KELLWOOD

PARSONS

REMEDIAL INVESTIGATION REPORT
RIVERFRONT SUPERFUND SITE
OPERABLE UNITS NO. 2/6
NEW HAVEN, MISSOURI

MAIN REPORT

Prepared on behalf of Kellwood Company for:

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7

30290849

JUNE 2010

30290849

PARSONS

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June 1, 2010

Mr. Jeffrey L. Field
Remedial Project Manager
Environmental Protection Agency - Region 7
SUPR
901 North 5th Street
Kansas City, Kansas 66101

Re: Remedial Investigation Report
Riverfront Superfund Site, Operable Unit No. 2/6
New Haven, Missouri
Administrative Order on Consent: CERCLA-07-2004-0078

Dear Mr. Field:

In accordance with the above-referenced Administrative Order on Consent (the 2004 AOC) and on behalf of Kellwood Company, Parsons is submitting this June 2010 Remedial Investigation (RI) Report. This report has been revised to address comments provided by USEPA, MDNR, USGS, and MDHSS comments in a letter dated January 13, 2010, and verbal comments provided by USEPA and MDNR during a March 31, 2010 meeting and subsequent conversations. In addition to the revised report, a table briefly summarizing the agency written comments and Kellwood's responses is included with this submittal for reference.

A complete electronic version of the RI report and the response to comments table is available on the project web portal located at:

https://projects.parsons.com/sites/riverfront/default.aspx (RI and FS reports library).

Please feel free to call me at (716) 541-0752 if you have any questions regarding this report.

Sincerely,

Mark S. Raybuck

Mark S. Raybuck
Project Manager

cc: J. Schumacher, USGS
E. Kifer, MDNR
R. Blake, Black and Veatch
K. Grypp, Kellwood
S. Poplawski, Bryan Cave

RESPONSE TO AGENCY COMMENTS
ON THE DECEMBER 2009 RI REPORT

Response to Remedial Investigation Report Comments
Riverfront Superfund Site OU2/OU6
June 2010

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
USEPA/ Major Comments					
1	5-6	5.3.4	Fate and Transport in Groundwater, Dispersion, Diffusion, and Groundwater Velocity Subsections	Additional discussion on effects of dispersion and diffusion is needed in Fate and Transport and Groundwater Velocity Sections	Additional discussion of dispersion and diffusion was added to Section 4.
2	5-6	5.3.4	Fate and Transport in Groundwater, Transport Time Subsection	Check velocities. Language is too vague ("present over large areas")	The discussion of groundwater velocities has been revised to include information on travel time to JS-14 and to eliminate the "present over large areas" statement.
3	5-7	5.3.4	Fate and Transport in Groundwater, Transport Time 1st Full Paragraph	The VOC plume may be larger than anticipated and VOC mass could be accumulating in unknown volumes. Dispersion and diffusion may have a long period over which to serve as significant processes.	These issues were addressed in a March 1, 2010 response letter to the USEPA. Additional discussion of these issues has been added to the text of the RI.
4	7-2	7.1.2	Sources of COPCs, 2nd Paragraph, 1st Sentence	Pathways may exist that could allow contaminants from OU2 to reach the area of JS-25, JS-27 and the MW-9 cluster.	Potential pathways that could allow contaminants to reach these areas have been identified and discussed in the report.
USEPA Technical Comments					
1	E-1	Executive Summary	2nd Paragraph, 4th Sentence and 5th Sentence	Relationship b/w "open lot and former Kellwood facility should be described in more detail (ie: "open lot" was the site of disposal of used tetrachloroethene from Kellwood facility")	The discussion has been clarified and expanded.
2	E-1	Executive Summary	4th Paragraph, 2nd Sentence	rewrite sentence	Sentence was rewritten and clarified.
3	2-1	2.1.2	Meteorology, 1st Paragraph, 2nd Sentence	use more recent data	The figures have been updated to include data from 1999 to the most recently available data. The data is for the Rosebud, MO weather station.
4	2-1	2.1.2	Meteorology, 2nd Paragraph, 1st Sentence and Figure 2-3 and 2-4	Where is the data from? New Haven or Chesterfield? If it's from Chesterfield, note the distance from Chesterfield to New Haven	Data from the Rosebud, MO weather station (approximately 23 miles from New Haven) has been substituted into the report.
5	2-12	2.2	Previous Investigations at Operable Units OU2 and OU6	all of the reports listed in Section 2 should be referenced in Section 8	References have been updated.
6	2-18	2.2.5.2	Monitoring Wells, 2nd Paragraph	include MW-2 results in text	Discussion of the results for MW-2 has been added.
7	3-1	3.1.1	Soil Investigation (Task 1), 4th Paragraph, 7th Sentence and Table 3.1	text and tables do not agree on # of samples	The number of samples has been corrected.
8	3-1	3.1.1	Soil Investigation (Task 1), 5th Paragraph, 2nd Sentence and Table 3.6	analysis should read: TOC, water content, bulk density and specific gravity	Analyses have been corrected.
9	3-1	3.1.1	Soil Investigation (Task 1), 6th Paragraph, 2nd Sentence	insert "most of" b/w "that" and "the"	Edit has been incorporated.
10	3-5	3.1.2.1	Task 2a - Interval Screening, 6th Paragraph 1st, 4th, and 5th Sentences	# of samples do not match-up b/w 1st sentence and the 4th and 5th sentences	Number of samples has been corrected.
11	3-6	3.1.2.1	Task 2a - Interval Screening, 1st Full Paragraph, 1st and 2nd Sentences	insert "PCE" after "ug/L" in both sentences	Text has been changed as requested.
12	3-7	3.1.2.2	Task 2b - Direct Push Sampling, 4th Full Paragraph, 2nd and 3rd Sentences and Figure 3.3	the depths do not match b/w the text and the figures	The depths have been confirmed and corrected.
13	3-8	3.1.2.3	Task 2c - Residential Well Sampling, Table in Text listing the wells sampled and Figures 3.4a-d	include City well W3 in the text table	W-3 has been added to the table.
14	3-9	3.1.2.3	Task 2c - Residential Well Sampling, 1st Partial Paragraph, 1st Partial Sentence and Table 3.11	not all wells are included in table 3.11 which then doesn't match detections discussed on pgs. 3-9	Table 3.11 has been updated to include these wells.
15	3-10	3.1.2.4	Task 2d - Monitoring Well Installation and Sampling, 1st Partial Paragraph, 1st Partial Sentence	There is no "Section 3.3.2.4"; this also applies to the 2nd sentence in the second full paragraph on pgs. 3-11	Reference to this section was deleted.
16	3-22	3.1.2.5	Task 2e - Site-wide Groundwater Sampling, 3rd Full Paragraph, 1st Sentence and Table 3.12	text and tables do not agree on # of samples	Number of samples has been corrected.

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
17	3-22	3.1.2.5	Task 2e - Site-wide Groundwater Sampling, 3rd Full Paragraph, 1st Sentence and Table 3.12	text and tables do not agree on # of samples, also # of samples in which PCE was detected	Number of samples has been corrected.
18	3-22	3.1.2.5	Task 2e - Site-wide Groundwater Sampling, 3rd Full Paragraph, 1st Sentence and Table 3.12	include natural attenuation parameters	Discussion of natural attenuation parameters was added in Section 3.1.2.5 with evaluation of natural attenuation considered in Section 5.3.4.
19	3-22	3.1.2.5	Task 2e - Site-wide Groundwater Sampling, 4th Full Paragraph, 1st, 2nd and 3rd Sentences	These three sentences should be moved to section 3.1.2.3 and/or additional text should be added to explain that wells cited in these sentences were not sampled as part of Task 2e.	Discussion was added to Section 3.1.2.5 to note that the residential whole-house treatment system wells were sampled as a part of the ongoing monitoring of these systems.
20	3-31	3.1.4	Sediment and Surface Water Investigation (Task 4), 3rd Full Paragraph, 3rd and 4th Sentences and Table 3.17	text and tables do not agree on # of samples	Number of samples were confirmed and corrected.
21	3-31	3.1.4	Sediment and Surface Water Investigation (Task 4), 3rd Full Paragraph	VC was detected above the screening criteria once in the samples; this info. should be included to text	Information regarding the elevated VC was added to the text.
22	3-35	3.1.6	Soil Vapor Sampling, 5th Full Paragraph, 3rd Sentence	no "Section 3.3.6"	Reference to this section was deleted.
23	3-36	3.1.7	Management of Investigative Derived Waste, 1st Paragraph, 7th Sentence	discuss how cuttings *above* the regulatory limits were disposed of (if any)	A statement was added that no cuttings exceeded the regulatory limits.
24	4-1	4.2	Distribution of Chemicals of Potential Concern in Soil, 3rd Paragraph, 5th Sentence	clearly identify the nine borings referenced	The boring numbers were added to the text.
25	4-2	4.2	Distribution of Chemicals of Potential Concern in Soil, 2nd Full Paragraph, 1st Sentence	clearly identify the boring in text	The boring numbers were added to the text.
26	4-2	4.2	Distribution of Chemicals of Potential Concern in Soil, 4th Full Paragraph	No "Section 3.3.4.2" or "Section 3.3.4.3"; also include references to figures and tables summarizing sewer investigations, figures and tables should be referenced for clarity (as was done in 1st paragraph of Section 4.2)	References to these sections were deleted. References to the appropriate tables and figures were added.
27	4-4	4.4.1	Groundwater Flow, 1st Full Paragraph, 3rd Sentence	residential wells JS-14 and JS-36 should be included in Figure 4.1b or reference other wells that are shown for clarity	The description was changed to reference surface water tributaries and Figure 2.6 instead of JS-14 and 36.
28	4-4	4.4.1	Groundwater Flow, Hydraulic Conductivity Subsection, 1st Paragraph, 1st Sentence	no "Section 3.3.2.6"	Reference to this section was deleted.
29	NA	NA	General Comment on the Text	TCE, c-DCE and VC should not be referenced as "breakdown products" (no evidence)	A global change was made to remove the use of "breakdown products".
30	4-5	4.4.2	Distribution and Trends of Chemicals of Potential Concern in Groundwater, 2nd Paragraph, 1st and 2nd Sentences and Figure 4.2	1st sentence indicates that MW-14US is contaminated but 2nd sentence and Figure 4.2 show that it is *not* contaminated	Text was corrected to indicate contamination at MW-7US instead of MW-14US.
31	4-6	4.4.2	Distribution and Trends of Chemicals of Potential Concern in Groundwater, Overburden Subsection, 1st Paragraph, 1st Sentence	also refer to Table 3.9 to include results from direct push in overburden	A reference to the direct push results table was added to the text.
32	4-6	4.4.2	Distribution and Trends of Chemicals of Potential Concern in Groundwater, Overburden/Bedrock Interface Subsection, 2nd Paragraph	also reference Figure and Table where DNAPL borehole information is provided	References to the figure and table were added to the text.
33	4-7	4.4.2	Distribution and Trends of Chemicals of Potential Concern in Groundwater, Overburden/Bedrock Interface Subsection, 1st Partial Paragraph and Figure 4-2	add well MW-1T1 for clarity	MW-1T1 is in the upper bedrock and would not be appropriate for this figure. MW-1S is the proper well for the figure and is included.

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
34	4-8	4.4.2	Distribution and Trends of Chemicals of Potential Concern in Groundwater, Upper Bedrock Subsection, 1st Partial Paragraph, 1st Partial Sentence and 3rd and 4th Sentences and Figure 4.2	add well MW-1T1 to the Upper Sand/Upper Bedrock portion of Figure 4.2	The figure includes MW-1UB rather than MW-1T1 due to the higher concentration. An explanation has been added to the text.
35	4-8	4.4.2	Distribution and Trends of Chemicals of Potential Concern in Groundwater, Upper Bedrock Subsection, 1st Full Paragraph, 2nd Sentence and Figure 4.2	add well MW12 to the Upper Sand/Upper Bedrock portion of Figure 4.2, also add a discussion of MW10UB in text	MW-12 is a Swan Creek well rather than an upper sandstone marker bed well, and thus, is not included on this figure. The text has been modified to utilize MW-10UB instead of MW-12 to define the western extent of contaminants.
36	4-8	4.4.2	Distribution and Trends of Chemicals of Potential Concern in Groundwater, Roubidoux/Lower Jefferson City Subsection, 1st Paragraph and Figure 4.2	add well JS-37 to Figure 4.2	JS-37 was added to the figure.
37	4-8	4.4.2	Distribution and Trends of Chemicals of Potential Concern in Groundwater, Roubidoux/Lower Jefferson City Subsection, 1st Paragraph, 2nd Sentence and Figure 4.2	# of wells with PCE detections differ in text and figure (double check)	Number of samples has been corrected.
38	4-8	4.4.2	Distribution and Trends of Chemicals of Potential Concern in Groundwater, Roubidoux/Lower Jefferson City Subsection, 4th Paragraph, 3rd Sentence	text should clarify if 2009 samples continued to trend toward lower concentrations	Figures showing plots of concentration vs. time have been added and the text expanded.
39	4-10	4.5	Distribution and Trends of Chemicals of Potential Concern in Sanitary Sewers and Adjacent Soils	provide summary of the sewer sampling that was conducted north of Highway 100	Text has been added to discuss these samples and to refer readers to the figure presenting the results.
40	7-1	7.1.1	Location, Nature and Extent of Impacts, 2nd Paragraph, 3rd Sentence	discuss the probable distribution of DNAPL and how it will affect gw contamination levels (esp. in the low permeability zones b/w the various formations)	Discussion of the extent of DNAPL in the bedrock was added to the text.
41	7-2	7.1.2	Sources of COPCs, and Section 7.1.2, Page 7-3, Fate and Transport Subsection	two subsections have the same section number, make appropriate changes	The section number was revised.
42	7-2	7.1.2	Fate and Transport, 2nd Paragraph, 4th Sentence	DNAPL will remain in place for an extended period of time, contributing PCE to groundwater, which will eventually drive contaminants to deeper intervals via dispersion and diffusion. The vertical distribution of the plume over time should be addressed.	Discussion of the vertical distribution of the plume over time was added to the text.
43	7-3	7.1.2	Fate and Transport, 5th Paragraph, 2nd Sentence and Page 4-4, 1st Full Sentence	The potential for PCE to migrate downward through natural vertical pathways increases over time and should be discussed.	A discussion of the potential for migration downward over time has been added to the text.
44	7-5	7.2	Conclusions, 7th Bullet, 2nd Sentence	discuss possibility of contamination mitigation via preferential path	Discussion of the potential for contaminants to migrate from OU2 to the north has been added to the text along with additional information on the dip of the bedrock.
45	7-6	7.2	Conclusions, 3rd Full Bullet	Need to address the risks from contaminated indoor air at former Kellwood facility.	Additional investigation will be conducted and included in a supplement to the RI report.

Response to Remedial Investigation Report Comments
Riverfront Superfund Site OU2/OU6
June 2010

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
USEPA Editorial Comments					
1			Table 2.1	in bottom cell under "General Hydrologic Properties" change "moist" to "most"	Text corrected.
2			Table 2.2	1) expand some entries with additional explanation (i.e. the January 2, 2007 entry should list who Parsons requested approval from) 2) some task entries should include number of borings (Task 1) or number of wells sampled (Task 2c) 3) administrative entries such as Oct. 25, '07 and Nov. 1, '07 and Nov. 29, '07 can be omitted 4) entries NOT done by Parsons should be italicized 5) provide cross-reference dates in some entries 6) Table or Section 1.2 should provide necessary detail of ownership of Kellwood facility 7) Table should include an entry for excavation and incineration of the heavily contaminated soils in '96	Table was modified as requested.
3			Table 3.1	change column to "Number of Samples Analyzed"	Table was modified as requested.
4			Tables 3.7 and 3.8	not all well depths are described; include notes why some intervals are missing	Optical televiewer tables were modified as requested.
5			Table 3.12, Page 2 of 5	sample MW14US has two lab IDs and two dates but one set of results, on table explain why it was sampled twice	Note was added to site-wide monitoring results table that natural attenuation parameters were collected in a 2nd sampling event.
6			Table 3.15	1) include boring results of T17 & U17 2) with omission of data for T17 & U17, results in Section 3.1.3, page 3-39 full paragraph could not be reviewed 3) sample N* with lab ID has "D" at the end of its sample ID, explain this in the notes	Results of T17 and U17 were on 4th page that did not print, and are now included on the table. The sample ID ending in "D" was incorrect and has been deleted.
7			Figure 3.1c and Table 3.16	sample shown on Figure 3.1c (SD910) was not listed in Table 3.16 (make appropriate changes)	Sample SD910 was on last page of table that did not print, now corrected.
8			Table 3.16	discuss SVOC detections from SD06 in text	The presence of SVOCs and pesticides in the primary sample along with the absence in the duplicate sample has been noted in the text.
9			General Comments on the "Data Results" Tables	provide detection limit for non-detect sample results rather then "ND"	Detection limits are provided in the appendix. These tables were generated from the database and the detection limits can not be automatically included.
10			Figure 2.3	mark normal amount of precipitation esp. for April '07 Jan. '08 and Sept/Dec '08	The figure has been modified to show departure from normal.
11			Figure 2.4	Clarify caption whether temps are monthly averages or monthly high/lows?	The figure has been modified to show departure from normal monthly average.
12			Table 3.4, Page 2 of 4, Task 2d - Well installation, Rationale Column, 7th Cell down, 13th and 14th Cell, 15th Cell	1) describe "deferred" activities and provide tentative schedule for these activities 2) statement in 13th and 14th cell was incomplete-rewrite 3) 15th cell-change "Swam" to "Swan"	Table was modified as requested.
13			Table 3.6	1) place duplicate samples adjacent to primary samples and designate the duplicates so they are easily identified 2) samples from same boring should be adjacent to each other 3) provide what each Screening Criteria were based on (i.e. MCL or Missouri Default target Level), this also applies to Table 3.9.4) explain "R" coding in notes on page 4 of 8	Duplicate samples moved adjacent to primary sample, ID shaded to indicate a duplicate ("notes" had entry added to explain this). Specifics of screening criteria is the first item in Notes for each table.
14			Figure 3.2	coloring of PCE portion of figure, make colors consistent	Appears to be a copy problem.
15			Table 3.7	1) "inconsequential" note should be explained 2) "weathered chart" should read "weathered chert"	Inconsequential was removed from the table. Spelling of chert corrected.
16			Table 3.11	Delete entries for bromoethane and 1,2-dibromo-3-chloropropane since all are either non detect or rejected. Subject to technical comment 14.	Table was modified as requested.
17			Table 3.13, Slug Test Results, "Well" Column, Last 2 Cells	1) wells labeled "MW-10" should be re-labeled "MW-10UB" 2) column labeled "Average Hydraulic Conductivity (feet per day)" should be labeled "Calculated Hydraulic Conductivity (feet per day)"	Table was modified as requested.

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
18			Table 3.13, Slug Test Results	1) slug in test for well S1, K=18 but test data sheet indicates K=4.6 ft/day which uses the Bower-Rice method 2) slug out test for Well 1S, K=18 but dated sheet indicates that K=32.14 ft/day. Was slug in/out averaged (MW2S and MW2SW were not)? 3) "T" needs to be divided by the saturated thickness (b) for K=T/b and describe this process for clarity 40 Well 6E is missing from slug out entry, explain absence or provide appropriate data	The values were averaged and have been edited to the actual values. The text was modified to include a description on how the K was derived from T for the Cooper et al method. A note was also added to the table. Data on the 3rd slug out for MW-6R was inadvertently not recorded.
19			Table 3.14	change "Lithololic Unit" to "Lithologic Unit" and discuss converting the Transmissivity solution on the pump test data sheet to hydraulic conductivity provided in this table	The heading was modified as requested. A note describing the translation from transmissivity to hydraulic conductivity was added.
20			Table 3.17	remove entries for chloromethane, chloroethane and acetone b/c they are either ND or R coded	Table was modified as requested.
21			Table 3.16	remove entries for methylene chloride, MEK, TCE and c-DEC b/c they are non-detect	TCE and DCE were retained as these are CPOCs
22			Figures 3.1c, 3.13 and 3.14	add Lift station 5 (LS5) to figures	Figure 2.14 showing USGS sewer sampling locations has been added to the report, and shows LS-5.
23			Table 3.18	remove entries for chloromethane, 1,1-DCA, chloroform and chlorobenzene b/c they are non-detect	Table was modified as requested.
24			Appendix D cover page	states that only excerpts of the July '08 report were included but the whole report was included (reconcile)	Appendix D cover page modified to include reference to whole report.
1			Figure 4.1c	1) color wells in red or have call out on a red background 2) use highlight method on Figures 4.1a and 4.1b to show which wells were measured	1) Modified figure to show wells and callouts in white. 2) same as 1)
26		4.6	1st Paragraph, 2nd and 3rd Sentences and 3rd Paragraph, 1st Sentence	list the drainage IDS on the surface water sampling figures	Listed on figures as suggested.
27			Figure 3.8a	callout for MW1-S is barely visible, while MW2S and MW2T3 indicate colored circle (reconcile and clarify)	Figure adjusted for clarity.
USGS					
G1				Include all relevant data, add more complete explanation of how these support the conclusions.	Modifications to text for specific comments throughout the RI report address this comment.
G2				previous surface and groundwater samples collected by the EPA should be included as well as data collected from domestic and monitoring wells from as far back as 1999 (included and summarized)	Historical data were incorporated in the analysis for the RI and added to the text.
G3				All historic data from the site should be used and a single figure showing maximum extent of contamination in groundwater should be presented regardless of depth.	Historical data have been incorporated throughout the RI report. A figure of maximum aerial extent of impacts in groundwater has been added (Figure 4.4).
G4				1) bedrock dip direction may be incorrect, need to present detailed account of data collected along with the DGLS data lead 2) need analysis including uncertainties, etc.	Detailed information on bedrock depth, including uncertainties, has been added to the text and figures.
G5	3-37	3.2	1st Bullet	All lab data should be included in report, do not exclude not "validated" data	Data, including intermediate analyses that were not validated have been incorporated into the report.
G6	3-30	3.1.3	1st Paragraph	"No unique lithology" statement is incorrect (reconcile)	Occurrence of interformational conglomerate was not consistently observed throughout the NAPL investigation area. Some boreholes had multiple instances of this conglomerate, others did not. In addition, depths at which conglomerate was observed varied (even when corrected for elevation).
G7	4-3	4.4.1	2nd Paragraph	Identify zones of saturated overburden, add a figure showing contour map of estimated top of bedrock using NAPL core hole data, EMA well data, Geotechnology well data, USGS well log data, Parsons Geoprobe lines	A top of bedrock map has been incorporated into the report.

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
G8				provide estimates of volume or mass of contaminants or waste present at the site; volumes of contaminated soils, groundwater, NAPL impacted bedrock, quantity of surface water, mass of PCE that migrated through domestic wells can be estimated.	Discussion of interviews and limits of estimates of disposal rate were added to the text. Information from interviews gave conflicting accounts of the potential disposal rate. Speculation as to the mass disposed of was not added to the document.
G9		All and FS		VOC concentrations in various zones not clear. Interval screening results are not included in the maps of extent.	The interval screening results do not represent concentrations from a specific interval and therefore are not on the maps of extent in an interval. The results are incorporated into the figure showing extent of PCE regardless of depth or date.
S-1	E-3	ES	1st Bullet	# of slug tests is inconsistent in text	Corrected text to indicate correct number of slug tests.
S-2	E-4	ES	1st Bullet	unnamed tributary west of JS-14 should be referred to by the 500 tributary designation used by USEPA	USEPA stream nomenclature was incorporated throughout the text.
S-3	E-4	ES	3rd Bullet	list maximum concentrations and location of PCE detections in Upper SS/Upper Bedrock	The maximum concentration detected in the upper sandstone marker bed/uppermost bedrock was listed.
S-4	E-4	ES	3rd Bullet	extent of groundwater contamination is inadequately characterized (reconcile)	Access issues prevent monitoring to south. Western extent is limited by MW-14US, MW-10UB, MW-11 and MW-12. Agree that extent west of MW-7US is not clear.
S-5	E-4	ES	4th Bullet	Extent of PCE in Swan Creek has been identified as outlined in operational logic. There are at least 2 locations where either a Swan Creek well was not drilled or it is uncertain if the interval contains PCE.	Correct. No modifications to text required.
S-6	E-5	ES	1st	1) JS-25 has PCE above the MCL but no filtration system on this well (unused well) 2) JS-37 was abandoned	Text was clarified to include these facts.
S-7	E-5	ES	2nd	Insufficient data was presented to determine if the dip is to the south.	Two tables, structure contour maps, and a gamma log cross section were added to Section 3 to demonstrate the local dip. No change to text.
S-8	E-5	ES	4th Bullet	reconcile the GW flow from OU2	The direction of groundwater flow by transmissive zone was added to the discussion.
S-9	E-5	ES	4th Bullet	If MOST groundwater discharges to creeks, then were does the remainder go?	The text was revised to include the potential for downward migration through either natural or man-made conduits.
S-10	E-6	ES	3rd Bullet	1) 3rd line: no SW samples shown 2) last sentence indicating that surface water is "NOW" is confusing 3) have PRGs increased but stayed below the PRGs or have levels decreased in SW with time?	(1) There are no surface water bodies within OU2. The tributaries in OU6 were sampled as the nearest downgradient surface water bodies for OU2. The surface water data collected in 2001 and 2002 are now included in the risk assessment evaluation. (2) The bullet has been revised. (3) The surface water data collected in 2001 and 2002 have been incorporated into the risk assessment. The PRG for PCE has increased based on current state of the science; thus, detections of PCE are below the current benchmark. In addition, the detected levels of PCE in 2009 are lower than that detected historically, and appear to be decreasing with time.

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
S-11	E-6	ES	3rd Bullet	1) maybe should use term ESL rather than PRG 2) PCE levels in the 500 tributary are above revised ESL of 45 ug/L contrary to statements here and in section 6.1	The term "PRG" (Preliminary Remediation Goal) was used to be consistent with how the term was used in the 2002 BERA (Section 8.0 of the BERA) and will not be revised. Note that, a revised PRG of 111 ug/L has been used based upon the 2006 USEPA Region 3 BTAG freshwater screening benchmark; thus, the statement that detected concentrations of PCE are below the PRG is correct.
S-12	E-6	ES	1st summary bullet	need to establish groundwater extent of PCE on west, south and possibly east	Access issues prevent monitoring to south. Western extent defined by MW-14US, MW-10UB, MW-11, MW-12. JS-25 on east to be re-configured to assist with eastern definition. Information to evaluate remedial options is sufficient.
S-13	E-6	ES	2nd summary bullet	do not omit previous EPA data from the 500 tributary that has PCE above the revised ESL levels	The data from the 500 tributary have been incorporated and while it is above the Region 5 2003 ESL, it is below the Region 3 BTAG screening benchmark. Thus the bullet is correct.
S-14	E-6	ES	4th summary bullet	wells JS-25 and JS-27 have not been addressed	Discussion of JS-25 and JS-27 has been added to the bullet.
S-15	E-6	ES	4th and 5th summary bullets	address presence of DNAPL at the OU2	The 5th bullet states: " DNAPL is present in a limited area north and northwest of the Former Kellwood facility".
S-16	1-1	1.2		include information from the EPA interviews to indicate specifically the PCE use in building, storage areas and activities on lot north of building and expand mention of DNAPL	Descriptions of the historical use of PCE from the USEPA interviews have been added.
S-17	2-1	2.12		use of data from Chesterfield Missouri is not adequate to characterize precip. trends in New Haven	Temperature and precipitation data from the Rosebud, MO weather station were substituted.
S-18	2-1	2.12		additional review and presentation of historical GW data from site is needed	Additional review and presentation of historical precipitation and temperature have been included in the report.
S-19	2-2	2.1.3		What does the presence of Missouri River have to do with OU2/OU6 other than influencing the water levels in Roubidoux and below?	The identification of the Missouri River was to describe the surface water body to the north that controls the location of the surface water divide noted in the next paragraph.
S-20	2-2	2.1.3		use EPA nomenclature for the unnamed streams in the area throughout report	Text was modified to use USEPA nomenclature. Figure showing naming convention added to report.
S-21	2-2	2.1.4		the 1968 report on the Missouri River alluvium is not relevant nor references /used in this document (reconcile)	The reference was deleted.
S-22	2-6	2.1.4.3		incorporate surface geophysical work by Parsons into text with specific details outlining findings, present information on direction of dip	Information on the dip of the bedrock was added in Section 3.1.2.4. This text includes discussion of structure contours on the top of upper sandstone marker bed and Swan Creek, the elevation of bedrock surface, the presence of folding, potential geologic structures, and the consistency with geophysical anomalies identified in the Powers report.
S-23	2-3	2.1.4.1	4th	1) other locations are closer than MW-2 and MW-1 to the site 2) include Swan Creek Upper Sandstone on geologic logs	Information from MW-6SW was inserted to replace MW-1 and MW-2. The logs are boring logs and relate the observations of the lithology. Correlations with geologic units are presented in the cross sections and structure-contour maps.

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
S-24	2-5	2.1.4.3		Exposures in road cuts and creeks in the immediate vicinity of OU2 and OU6 show varied direction and magnitude of dips.	Concur. Sentence modified to read: "Observations of outcrops along Highway 100 in western Franklin County and in the vicinity of OU2/OU6 indicate that the surficial bedrock contains a number of local variations in the dip of the rock units. "
S-25	2-7	2.1.6.1	1st	Starbuck is the correct source for the absence of Missouri River alluvial sediments	The attribution of the statement has been corrected.
S-26	2-8	2.1.6.3		Suggest including potentiometric contours from the USEPA well inventory, as it may put water levels from JS-37 and JS-25 into perspective.	Potentiometric map from USEPA well inventory added.
S-27	2-9	2.1.6.3		use generalized geologic sections to show various units discussing regional flow, shallow GW divide and upward vs. downward gradients (include wells JS-37 and JS-38)	Generalized geologic cross section from USEPA RI reports added.
S-28	2-9	2.1.6.3	end of the last paragraph	include that the upward gradients near the Missouri River are also supported by the upwards heads in USEPA monitoring well cluster BW-01 and BW-00	Existence of head differentials between BW-01 and BW-00 were added to text.
S-29	2-13	2.2.2.1	Last paragraph	three monitoring well installations out of place under "Soil Investigation" heading (reconcile)	The comment suggests this paragraph is out of place in that it mentions the installation of monitoring wells. However, the paragraph notes the results of soil sampling performed during the installation of the monitoring wells, and thus is not out of place.
S-30	2-14	2.2.2.1		units for VOCs in soil switch b/w ug/kg and mg/kg, need to be consistent throughout the report	All units were changed to µg/kg.
S-31	2-13	2.2.2.2	Last paragraph	out of place b/c it's under the 3rd order heading (2.2.2. Geotechnology 1991-1998)-please reconcile	The comment suggests that this paragraph is out of place in that it discusses USGS soil sampling. The results directly relate to the removal action that is the subject of this section. Furthermore, it points to the full discussion of the USGS sampling in Section 2.2.4, and is thus an appropriate place to introduce the material.
S-32	2-14	2.2.2.2		include historical data into tables and figures discussed in reports	Discussion of historical sampling results was added to the text and figures were added to the report.
S-33	2-14	2.2.3.1		include EMA sampling efforts and used in a summary of contamination in the upper sandstone/upper bedrock	Discussion of historical sampling results was added to the text and figures were added to the report.
S-34	2-15	2.2.4.1	1st	revise text, data tables and figures to account for wells BW-21, BW-21A, and BW-22, with discussion of differences in lithology and gamma logs between the wells.	Discussion of the difference in the lithology and logs of the wells was added in this section as well as in Section 3.1.2.4. A well construction table was added. These wells will be included in the extent of PCE in groundwater figure for all lithologic intervals.
S-35	2-15	2.2.4.1		include that location OU2-GPM01 was not monitoring well but a water sample was collected from direct push boring using peristaltic pump	Text was inserted to indicate that OU2-GPM01 was a water sample from a direct push boring.
S-36	2-15	2.2.4.1		include locations and analytical values from test pits in RI/FS and shown on figures of the extent of soil contamination	A table listing the analytical results of the USGS soil sampling has been added to the text. The results were added to the extent of impacts in soil figure in Section 4.
S-37	2-16	2.2.4.3		Include USGS surface water data. All historical data is relevant and should be incorporated to report.	A table and figure presenting the USGS surface water data has been added to the report. Historical data have been incorporated into the report.
S-38	2-17	2.2.4.4		include other sewer inflows to manholes and the absences of PCE in the sewers except for those downstream from the former Kellwood facility	A figure showing the USGS sampling of the sewers has been added. Text has been modified to note that the detections were downstream from the former Kellwood facility.

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
S-39	2-17	2.2.4.5		include summary figure showing location and distribution of PCE in vegetation samples	The figure has been added along with text noting that the extent of PCE identified from the vegetative samples is consistent with the results of sampling performed for the RI.
S-40	2-17	2.2.5.1		1) include references to previous work (as discussed in section 3.1.2.1) along with a summary figure with results 2) previous wells should be shown in cross section with nearby monitoring wells showing the PCE bearing zones and flow zones 3) IRS data discussed in section 3.1.1 should present an understanding of contamination in domestic wells	A reference to the previous reports has been added. The discussion of interval screening in Section 3 has been expanded to more fully indicate the nature of the movement of VOCs in the wells.
S-41	2-17+	2.2.5.1	last	An estimation of the mass of PCE that has migrated down the well prior to the liner installation and that has been removed since the liner installation should be provided.	Flow rates and mass estimate added (Section 4.4.2), additional discussion of interval screening added to Section 3.1.2.1.
S-42	2-18	2.2.5.1	2 & 3	include downward flow quantities (~xx gpm) in text	Flow rates have been added.
S-43	3-2	3.1.1	last	1) include reference to the table containing additional parameters 2) an additional figure should be included to show where the additional parameters were collected or at least mentioned in the text.	The IDs for samples in which extra parameters were collected have been added to the text, along with a reference to the table of results.
S-44	3-4	3.1.1	2nd	Natural gamma logs do not directly indicate the possible presence of iron oxides or clay.	The text did not state that the gamma logs directly indicate the possible presence of iron oxides or clay. The text, however, was modified to explain the source of the gamma radiation being detected.
S-45	3-5	3.1.1	3rd	resolve the type of pumps and tubing used on pgs 3-4 and 3-9	The tubing used was corrected. Although a USGS pump with HDPE tubing was used for site-wide sampling of USGS MWs, a USGS pump was not used in interval sampling.
S-46		3.1.1		There is a lengthy discussion of the JS-14 and JS-36 interval sampling with little discussion of JS-37 and JS-38.	The details of the interval screening presented in previous reports were condensed. Additional information from the JS-37 and JS-38 interval screening was included.
S-47	3-7	3.1.2.2	5th	Direct push refusal is not necessarily top of bedrock	Text and figures have been modified to specifically state direct push refusal rather than top of bedrock, or to state that top of bedrock is assumed as direct push refusal.
S-48	3-8	3.1.2.3	1st	prior USGS sampling data should be included in figures and tables and text	The prior sampling is not shown on Figure 3.4 because this figure presents a contemporaneous set of samples. The USGS sampling data have been added to tables and figures in other sections of the report.
S-49	3-9	3.1.2.3	last	text should summarize all analytical results from JS-25 (do not refer to other sections for part of the information)	A summary of additional sampling events was added to the text.
S-50	3-8	3.1.2.3		data in this section, table 3.10 and figure 3.4 need to include previous EPA data or field GC screening during initial well inventory	A notation of the earlier USGS sampling was added to the text. The full USGS data were presented in an earlier section and added to the extent of impacts discussion in Section 4.
S-51		3.1.2.3	Also Table 3.10	include additional well information such as depth, well casing and water level	The table was modified to include available well depth and casing information. Information on the OU association and location has been deleted.
S-52	3-11	3.1.2.4		redundant: text here and section 2.2.5.2 on pg 2-18 should be condensed	The two sentences were retained rather than refer readers back to Section 2.2.5.2

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
S-53	3-13	3.1.2.4	4th full	Discussion of chlorides is questionable or incomplete	Deleted chloride concentration deemed questionable. The comment suggests that a laboratory chloride sample was analyzed; howeve, the text does not state this, and this was not the case. Expanded rationale for concern of septic tank effluent.
S-54	3-17	3.1.2.4	6th	include USGS VOC analysis results, GC screening results from various boring and wells	A table containing the results of all analyses on completed boreholes was added to the report.
S-55	3-18	3.1.2.4	5th complete	use EPA terminology throughout report and remove reference to work plan figure and use figure currently in the document	The text has been modified to use the EPA terminology and Figure 2.6 was added to illustrate the stream segment nomenclature.
S-56	3-20	3.1.2.4	1st	include MW-14XX	Sample 14X will be included in maps showing extent of PCE in groundwater in the overburden and in all depth intervals.
S-57		3.1.2.4		include information and results about the field GC samples collected during drilling and on boring logs	Intermediate sample results are included on the USGS boring logs. Parsons did not include the results on their boring logs due to the large number of factors that could influence the results. A reference to the table that includes intermediate sample results was added.
S-58	3-21	3.1.2.5	bullet list	include BW-22 in maps for GW sampling and include intermediate samples in text	The figures referred to are for the upper sandstone marker bed/uppermost bedrock, the Swan Creek and the lower Jefferson City/Roubidoux. This well is considered an intermediate well, and does not fall into one of these intervals. The intermediate results are from the upper bedrock and are included on the comprehensive figure of extent of contamination in Section 4.
S-59		3.1.2.6		1) verify "D" values 2) geologic logs and well construction data is inconsistent (reconcile) 3) describe how "K" was derived 4) plot the "K" values on a bar chart	The comment questions the aquifer thickness at MW-8US. The geologic log indicates a 16-ft difference between top of sand pack and bottom of well, the distance noted in the USGS comment as incorrect. The comment suggests a thickness of 14.2 ft, based on top of upper sand marker bed and base of well at 57.2 ft. This is not consistent with the well log (95 ft for the well bottom). Use of the entire open borehole provides a better representation than the sand thickness since weathered dolostone above and below the sand units may contribute to the overall permeability of the interval.
S-60	3-23	3.1.2.6	2nd	1) clarify the last sentence and include data in the appendix with the other test data 2) explain why this test was not repeated	Information has been added to the text to specify how the response was non standard. Other wells were substituted to meet the requirements agreed to in the Work Plan.
S-61	3-24	3.1.2.6	4th	explain apparent rising head tests in Roubidoux wells with larger "K" values	Only one well was tested with three slug in tests and two slug out. This sample size is too small to make a reasonable explanation.
S-62	3-24	3.1.2.6		Suggest slug tests in remaining wells	More slug tests were performed than were agreed to in the Work Plan. In addition, there are K values for all major permeable intervals. No response was required in the text.

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
S-63	3-25	3.1.2.6	6th	explain the fluctuation in water levels not associated with the pumping of city wells	An explanation was added to indicate that water level fluctuations are likely due to barometric effects rather than changes in stage of the Missouri River.
S-64	3-26	3.1.2.6		1) revise text: tests consist of pumping one city well and making WL observations in the 2nd well 2) revise 1st column of table 3.14 to "Observation Well"	Text was revised to more clearly indicate that only one well was pumping at a time and that observations from W-4 were made when W-3 was being pumped. The table was revised to replace "Well" with "Observation Well" for the first column.
S-65	3-27	3.1.2.6	2nd	1) explain barometric impact and if there was assumed barometric efficiency 2) take into account the fact that the aquifer responds quickly to stage changes in Missouri River and how it might affect water level trends	An explanation of the barometric correction was added. The Missouri River effect on the water levels is not thought to be the principal cause of the short-term cyclical water level fluctuations as discussed in the text in response to comment S-63.
S-66	3-29	3.1.3		text listed NAPL core holes as F-11 but the labels are switched to F11 in section 4 and on figures (reconcile)	A note has been added to the text to indicate the hyphens could not be retained in the analytical data from which the figures and tables were generated. NAPL holes referred to in Section 4.4, L-12 and P-14 had hyphens inserted.
S-67	3-36	3.1.6	2nd	list actual value of screening value for "deep" soil gas	The text was modified to list the screening value of 210 µg/m3 for the industrial use scenario.
S-68	3-37	3.1.8	1st	only one well installed for EPA was gauged but written as "USGS monitoring wells" (reconcile)	Text modified to state that BW-20 was gauged for NAPL.
S-69	3-31	3.4.1	2nd	include ALL data, previous USGS samples are not included to show data or locations. Add discharge and temperature data to table 3.17.	The USGS sample noted in the text was a field GC grab sample from a location that was not definitively provided to Parsons. Based on the description of the sample location, Parsons collected a sample for laboratory analysis and made measurements to estimate the flow conditions. Given the lack of information on the USGS sample and the complete information on the Parsons sample, the USGS results were not included.
S-70	3-31	3.4.1	3rd	1) list values if screening criteria in text and apply consistently throughout text, tables and figures 2) Figure 3.12 lists (MCL), table 3.17 footnote indicates Missouri default levels (table B-1) or MCLs (as applicable)-reconcile this	Screening criteria have been identified in text and confirmed in tables and figures.
S-71	3-31	3.4.1		1) explain possible causes for wide swings in one tributary but not the other 2) sample ID in text (SW-08) is inconsistent vs. figure and tables (SW06)	There was only one location with multiple sampling events presented in this section. The previous USGS sampling may not have shown a large variation at SW-6. However, drawing conclusions based on this would be a case of serious over interpretation of the available data. The inconsistent use of a hyphen between text and figures has been corrected.
S-72	4-2	4.3		DNAPL may not be absent but rather not contact liner	Discussion of the possibility of a false negative was added in Section 3.1.3.
S-73	4-3	4.4.1	1st	remove the "(but not vinyl chloride")	The text was removed as requested

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
S-74	4-3	4.4.1	2nd	Figure 3.3 does not show bedrock dip direction, but apparent dip. Steep dip of beds in core hole A-7 and differing logs from BW-21 and BW-22 provide considerable data of a structural feature.	Figure 3.3 (now Figure 3.7) shows the slope in the top of bedrock (assumed to be direct-push probe refusal). The figure does not provide any information with regard to the dip of units within the bedrock. The difference in depth to bedrock of BW-21 and BW-22 is clearly stated in next sentence.
S-75	4-4	4.4.1	2nd	1) explain what is meant by "historical data" and include whatever data you are referring to 2) "Boeuf Creek" is inconsistent with WL maps (reconcile) 3) 500 tributary is NOT a tributary to Wildcat Creek (reconcile)	The text was revised to replace "historical data" with specific reference to detections in surface water. References to tributaries were given by the numbering convention and a comma was inserted to remove the implication that the 500 tributary flows into Wildcat Creek.
S-76	4-4	4.4.1	2nd	Disagree with conclusion that the direction of flow in Roubidoux cannot be determined. Suggests stepping out to BW-07 for additional data.	Clarified text to indicate factors suggesting higher than "normal Roubidoux" water levels for MW-9R and BW-7. Added conclusion that with these factors taken into account, that flow in Roubidoux is to the north. Note that revised Figure 4.2c clearly includes the water level of BW-7.
S-77	4-5	4.4.1	2nd	1)include data from slug BW-21 (K values) in RI text and table 3.13 2) slug test should be completed in MW9R (reconcile)	The results for BW-21 were included in text and discussed in Section 3.2.1.6. It was not included in Table 3.13 as it did not have corresponding data in Appendix G.
S-78	4-9	4.4.2	1st	make estimates about volume of water moving down JS-36 and JS-14 based on static flow meter measurements	Vertical flow rates were added to the text of the Interval Screening discussion in Section 3 and in Section 4.4.2.
S-79	4-5	4.4.2	1st	remove "extensive" in last sentence	Word "extensive" was deleted.
S-80	4-5	4.4.2	2nd	1) include upper bedrock data from BW-21A during BW-21 and BW-22 installation and PCE detected flowing down casing at JS-38 2) 500 tributary spring emerging from the upper bedrock should be included in text and figures 3) text seems out of place due to page break titled "Upper Bedrock" (reconcile)	Figure 4.2 (now Figure 4.3) has been revised to include historical data in addition to the RI data. This text is a lead in to the discussion of each interval and is intended to summarize the overall extent of impacts.
S-81	4-6	4.4.2	1st	PCE was also detected at MW14-XX, mentioned in Section 3 but not shown elsewhere (reconcile)	A parenthetical comment was added to the text after "the originally planned location of MW 14US " to indicate this is MW-14X.
S-82	4-6	4.4.2	2nd	not clear how overburden samples can be collected from wells not completed in overburden (reconcile)	The first sentence of the Overburden subsection states: "Sampling of groundwater in the overburden was performed as a part …..the initial direct push borings at proposed monitoring well locations". The text of Section 3.2 was revised to no longer state that these data were not used in the report.
S-83	4-6	4.4.2	3rd	figure 3.8 includes data from various sources that aren't all discussed (reconcile)	The reference to the figure was unnecessary and was deleted. Reference to a new Figure 4.4 showing maximum historical concentrations has been added.
S-84	4-6	4.4.2	last	PCE also detected at BW-21, BW-22 and the 500 tributary spring	The discussion in this paragraph is highlighting values related to the extent of impacts and significant results. Not every well with a detection is noted in the text. Discussion of the 500-tributary spring has been added. A figure has been added (Figure 4.4) to include the maximum historical concentration at any sampling point.

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
S-85	4-6	4.4.2	last	not all wells mentioned (MW-101, MW-102 and MW-103) are not shown in cross section (reconcile)	The cross sections were intended to show the relationships of all of the significant permeable intervals. As these three boreholes only reach the upper sandstone marker bed without reaching the Swan Creek or the Roubidoux, and the location was interior to other wells, they were not selected for inclusion.
S-86	4-6	4.4.2	Overburden section	Include figure showing extent of PCE in overburden using all historic data.	An addition to Figure 4.3 showing all historic detections of PCE in the overburden has been added. The construction of well BW-21A more closely resembles MW-2S (straddling the overburden/bedrock interface) than MW-1S, which is strictly overburden. MW-2S has been included in the upper bedrock figures and discussions, although this is a judgment call. Therefore, BW-21A was included in the upper bedrock figure and discussion.
S-87	4-6	4.4.2		terms are inconsistent (reconcile), i.e. Upper Sandstone vs Upper Sand	Global search and replace performed.
S-88	4-7	4.4.2	1st	include data from core holes at the land farm and vicinity	Discussion of the DNAPL holes and BW-20 was added.
S-89	4-7	4.4.2	2nd	last sentence is incomplete and should include/summarize evidence for such a structure (offset gamma logs in domestic and monitoring wells in this area, etc)	The reader is referred to Section 3.3.4 for a discussion of a preferential flow structure.
S-90	4-7	4.4.2		Similar PCE levels in MW-9US and MW-9SW does not call for another source. The lack of PCE above the upper sandstone is consistent with a source not immediately nearby the wells.	The text makes no suggestion that the similar concentrations indicate a separate source. The text merely notes that the similar concentrations are in contrast to other well clusters. Agree that a source nearby these wells is not likely based on similar concentrations and lack of PCE in screening sample above upper sandstone marker bed. Data are not sufficient to speculate regarding mechanism for the similar concentrations.
S-91	4-7	4.4.2		1) 34 samples mentioned on pg. 3-7, where is data? 2) why isn't 9US data not discussed? (reconcile)	Analytical results for intermediate samples were added in Section 3.1.2.4 related to the installation of the monitoring wells. A table listing all analytical results in wells under construction has been added. A discussion of the factors influencing the concentrations in these samples is included.
S-92	4-8	4.4.2	1st	Direction of dip of bedrock is not conclusive given data presented in the RI. Unusual water level differences noted between MW-9US, MW-101, MW-102 and MW-103.	Additional information on the dip of the bedrock has been added to Section 5.3.4. There is a relatively smaller difference in water level (and thus a somewhat lower gradient) between MW-9US and MW-102 compared to the water level difference seen from MW-102 with both MW-101 and MW-103. However, the southward hydraulic gradient is not in doubt.

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
S-93	4-8	4.4.2	3rd	1) add figures to display time trend of PCE in wells w/ relation to general precipitation trends and lining of these wells 2) include calculations of volume and mass of PCE that moved down JS-38 before and after it was lined	Figures 3.3 to 3.6 showing time trends of PCE concentration have been added in Section 3. Discussion of the flow rates has also been added to Section 3 along with a discussion of the impacts of the installation of the liners. An estimate of the mass of PCE that migrated down JS-38 has been added to Section 4.4.2. Discussion related to cleanup times and appropriate remedial alternatives for the site are evaluated in the FS. Estimation of a cleanup time would be highly speculative and would be a serious over interpretation of the data.
S-94	4-9	4.4.2	2nd	Suggest discussing JS-38 ahead of JS-14, JS-36, and JS-37. Distinguish between migration along long open borehole vs. leaking around ineffective casing seal.	Moved discussion of JS-38 ahead of others, added indication that JS-37 also had long open section.
S-95	4-9 and 4-10	4.4.2	last	1) see other notes regarding bedrock dips 2) summarize sample data from JS-25 (table) and comment on pump use	Discussion of multiple sample results for JS-25 has been added to Section 3.1.2.3.
S-96	4-10	4.6	4th	include ALL historical data	Historical data has been added.
S-97	5-2	5.1.1	1st	remove "if land farming enhanced…?" sentence	Sentence removed.
S-98	5-2	5.1.1	1st	Indicate what "task 1 samples" are. Lack of vinyl chloride is not diagnostic.	Sentence reworded to indicate soil sampling task. Discussion modified to discuss vinyl chloride.
S-99	5-2	5.1.1	2nd	Add discussion of depression on lot that tends to enhance infiltration.	Depression on lot and resulting increased infiltration added.
S-100	5-2	5.1.1	3rd	clarify meaning of last sentence "if VOCs are located beneath the water table…"	Text edited to indicate that although soils beneath pavement may not lose PCE to water infiltration, PCE may migrate to groundwater moving through the soil.
S-101	5-3	5.3.3	1st	this discussion of infiltration is out of place, put on page 5-2	Discussion of infiltration deleted, discussion in Section 5.3.1 enhanced.
S-102	5-3	5.3.3	2nd	USEPA data from 500 tributary should be used to make argument of volatilization stronger	Discussion of USEPA samples along 500 tributary presented to strengthen argument for rapid volatilization.
S-103	5-3	5.3.4	1st	text refers to flow to Wildcat Creek or "ultimately Boeuf Creek", language is inconsistent (reconcile)	The "ultimately to Boeuf Creek" refers to the fact that Boeuf Creek receives the flow of Wildcat Creek and the 500 tributary. The text has been revised to be more specific.
S-104	5-3	5.3.4	1st	"…less flow occurs in the Swan Creek sandstone member" is inconsistent with Darcy's Law. If the statement refers to mass flux, then estimates of the rate of flow and mass flux should be included.	The statement did refer to mass flux. The statement has been clarified by comparing typical contaminant concentrations in the intervals.
S-105	5-4	5.3.4	1st	explain how bedrock, dip and "drop-off" of bedrock surfaces are evidence of groundwater flow direction	An explanation that the potentiometric surface in the overburden is typically a subdued replica of the bedrock surface has been added to the text.
S-106	5-4	5.3.4	2nd	language is too vague, PCE detection locations are unclear, where else might PCE discharge?	Revised the wording from may to will. The next paragraph discusses the other potential migration routes.
S-107	5-5	5.3.4	1st	dispersion WILL result in the plume widening as it moves and will broaden the "peaks"	Text revised to replace "may" with "will".
S-108	5-5	5.3.4	2nd	Adsorption will occur on the numerous thin clay lenses in the bedrock. Calculation should be made assuming a "reasonable OC content" to indicate a K or anticipated retardation factor	Text revised to include discussion of the potential for clays in the aquifer matrix to adsorb COPCs and then desorb them if remediation results in clean water being in the aquifer, resulting in a rebound. Calculation of the effects would require numerous assumptions, including the percentage and mineralogical distribution of clays the bedrock. Thus, the results would be totally speculative.

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
S-109	5-5	5.3.4	2nd	Please revise the discussion of diffusion, as diffusion will be slight only in areas where advection is large. Discuss diffusion into dead-end pore and impact on time to remove contaminants.	Text has been modified to more fully address impacts of diffusion, including potential for contaminants to reach dead end fractures where it would be hard to remediate.
S-110	5-5	5.3.4	5th	revisit travel time estimates based on arrival time at JS-14 and revise this section accordingly. Suggest that much of travel rate in sand units is primarily along contact with weathered bedrock. Inspection of an early core indicated presence of pyrite which is inconsistent with large flow or oxygen rich water.	An analysis of travel time to JS-14 was added to the text. The suggestion that the high flow rates do not occur over wide areas was deleted.
S-111	5-5	5.3.4	bullet list	A more detailed evaluation of natural attenuation is required to support the conclusion in the last paragraph, as no "real" data is shown. Include DO ranges determined in the RI and what these indicate, relative abundance of PCE vs TCE+DCE.	A summary of the natural attenuation parameters was presented with a comparison against values that would be expected if anaerobic degradation was occurring at a significant rate.
S-112	5-6	5.3.4		1) revise text to indicate presence of potential vertical features 2) PCE HAS migrated deeper at OU4 so potential does exist	Text has been modified to address potential for geologic structure and even limited vertical connectivity to lead to downward migration of contaminants over long time periods. The vertical migration at OU4 was also noted.
S-113	6-1	6.1		USEPA data from the 500 tributary above Boeuf Lutheran Road had PCE concentrations above the 45 µg/L ESL. The ecological risk assessment is based on incomplete data.	See responses to comments S-10, S-11 and S-13. The text on pg 6-1 has been revised
S-114	7-2	7.1.1	3rd	Do not believe that JS-37 extends to Roubidoux	Concur. Text modified to state "lower Jefferson City interval" rather than "lower Jefferson City/Roubidoux interval".
S-115	7-2	7.1.2	1st	Information is available to make estimates of PCE released.	Text modified to give a range of PCE usage and disposal based on interviews by the USEPA.
S-116	7-2	7.1.2	2nd	replace word "presumed" with "possible"	"are presumed to the result" was replaced with "are likely the result" The preponderance of the evidence suggests a different source, so it is considered more than "possible".
S-117	7-2	7.1.2	2nd	The comment reading DNAPL is likely to be stable is speculation and there is no evidence to indicate if the DNAPL is stable or not.	The text has been modified to explain that the limited area where DNAPL is observed after 36 years suggests that it is likely that the DNAPL is stable or that migration rates are very low.
S-118	7-2	7.1.2	2nd	Site data on volatilization from surface water should be included.	The explanation of volatilization has been modified to present the USGS data for the 500 tributary in addition to the OU4 information.
S-119	7-2	7.1.2	5th	Expand discussion of biodegradation once comments in previous sections have been addressed.	Discussion was expanded to identify those factors that did not indicate that anaerobic degradation was occurring.
S-120	7-4	7.2	bullets	1) extent of groundwater contamination is inadequately characterized (reconcile) 2) RI needs to present more than one round of sampling	Access issues prevent monitoring to south. Western extent is limited by MW-14US, MW-10UB, MW-11 and MW-12. Agree that extent west of MW-7US is not clear. RI report with only one round of monitoring well data was explicitly requested by the EPA. Additional round conducted in March/April 2010 to be presented in an addendum.
S-121	7-5	7.2	3rd bullet	The description of a "minimal" connectivity between the Roubidoux and underlying units is not supported by the pump test data and earlier statements in the report.	Word "minimal" was deleted.
S-122	7-5	7.2	6th bullet	If "MOST" of the GW flowing through the overburden and upper bedrock discharges to the unnamed creeks where does the rest go?	Text was modified to indicate the potential for some contaminants to move to lower intervals through open boreholes or natural pathways.

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S-123	7-5	7.2	7th bullet	A separate source for PCE at JS-25, JS-27, MW-9US and MW-9SW is possible, but has not been demonstrated. Dip of beds to south have not been demonstrated.	Additional information indicating localized dips to the south has been added to the text. The wording has been changed to state a potential for the PCE to not have originated at OU-2.
S-124	7-5	7.2	bullets	consider possible ecological risks	See also responses to S-10, S-11 and S-13. The text of the bullet on page 7-5 will not be revised.
S-125	7-6	7.2	1st paragraph	no confirmed dip direction as been established (reconcile)	Additional information indicating localized dips to south have been provided.
S-126	7-6	7.2	last bullet	Statements in last bullet have been addressed in previous comments.	Changed to state that extent of contamination has been "generally" defined.
S-127			Fig 2 3.12	1) label all streams 2) figures should list dates of samples, estimated or measured discharge at time of measurement 3) include summary figure for ALL surface water data collected in OU2/OU6	1) Streams will be labeled as requested. 2) Data is provided in Tables, the flow data will be added. 3) A summary figure (Figure 4.6) has been added.
S-128			Fig 2.3	include ALL EPA data from 1999-2000 and the precipitation data	Precipitation data back to 1999 has been added
S-129			Fig 3.10.-b	define light and dark blue layers on N12, P17 and F11	A note in the Legend refers the reader to "See Boring Logs"
S-130			Fig. 3.15	1) missing base photo credit 2) indicate which hole (SV15) contained PCE 3) sample IDs on figure do not match text (reconcile)	1) Photo credit will be added. 2) A color change for the marking dots will indicated which hole contained PCE. 3) See response to comment S-158.
S-131			Fig. 3.2	1) figure should include results from EMS discussed in section 2.2.3.2 2) expand data to include several quartiles (i.e. screening extremely "hot" locations)	1) This figure represents data acquired only since Parsons has been performing the RI. Historic data is included in the figure. The indicator colors will be changed as requested.
S-132			Fig. 3.2	expand scale on figure to me more inclusive	See response to comment S-131.
S-133			Fig. 3.3	1) determine how top of bedrock is determined 2) discuss if surface shown is depth to refusal	The figure will be changed to state "DPT Refusal" rather than "Top of Bedrock".
S-134			Fig. 3.3	color the points in the insert figure according to the PCE concentrations	Figure 4.3 has been modified to detail the contamination in shallow groundwater.
S-135			Fig. 3.9	figure includes data from points not listed on table me (reconcile) and include base photo credit/date	Data from points T17 and U17 were on a fourth page of the table that did not print
S-136			Fig. 4.1x	1) "upper sand/upper bedrock formation" is not defined as a formation according to Missouri DGLS (reconcile) 2) callout "Upper Sand" is not consistent throughout text (reconcile)	Figures edited to say "Upper Sandstone Marking Bed/Upper Bedrock Permeable Zone"
S-137			Fig. 4.1x	1) explain inconsistencies of location with contours with the water level elevations 2) explain large WL difference between wells (MW102, MW101 and MW101) but small difference b/w MW9US vs MW102	1) The gradient determines the relative distance between a point and a contour line. For example, the difference in water level of MW14US and MW7US is approximately 7 feet. The 550' contour line is placed approximately 2/5 the distance away from MW14US. The head difference between BW21A and MW1UB is approximately 2.3 feet. The lateral distance between the two wells is such that the 550' contour line is "pulled" farther away from BW21A. 2) See response to comment S-92.
S-138			Fig. 4.1.bc	only label wells used in constructing these maps and color shade according to PCE levels	Figures edited so that the points not used in development of the contours are grayed out. The figure is intended to show the water level contours, PCE concentrations are shown in other figures within the document.
S-139			Fig 4.1c	1) why are the dots for MW4 and JS25 colored red but not the others? (reconcile) 2) why is there a 500 label in the upper left part of the figure (resolve)	The dots for MW5 and JS25 should not have been shaded, and will be edited. The 500 label was a relic from other figures and will be deleted.
S-140			Fig 4.2	well locations of MW-11, MW-12, MW-04 appear to be proposed locations and not final 'as built' (resolve)	GPS survey coordinates have now been incorporated.

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S-141			Fig 4.2	1) color shades for <5 and 5-100 range cannot be distinguished (resolve) 2) 500 tributary spring is not on figure or data in text (resolve)	1) The color shades have been adjusted. 2) The 500 tributary spring has been added to text and to the figure.
S-142			Fig 4.2	1) interval screening depths are inconsistent with data values being plotted as lower Jeff City/Roubidoux (reconcile) 2) well JS-37 data is not shown and 2004 ISR report indicates larger concentrations (resolve)	The interval screening samples can not be associated with a single specific permeable zone. The residential influent samples of these wells are considered to be primarily lower Jefferson City/Roubidoux, and are plotted as such. A sitewide lateral extent of contamination figure (regardless of depth) is provided in Section 4.
S-143			Fig 4.2	1) The upper sandstone was encountered in MW11 and MW12 but was dry. The figure seems to indicate that this interval was not targeted. 2) Why are samples from DNAPL holes not on figure as they are upper bedrock?	1) No water samples were able to be collected from the upper sandstone, therefore no data is available to be presented on the figure. 2) Data from the coreholes was added to Figure 4.3.
S-144			Fig. 4.2	figure does not show extent of PCE contamination (resolve)	A zero line would be speculative, therefore it is not presented.
S-145	MW-2S		Table 3.13	curve should also be fit to later data (resolve)	The early data represents the properties of the material directly around the well. Interpretation of data after the 35 second break would be speculative.
S-146			Table 3.13	no data listed for MW-14 (resolve)	Slug tests were performed prior to installation of MW-14. Also, the Work Plan states that slug test would be performed on 10-15 selected wells, not all wells at the site.
S-147			Table 3.13	include well construction data such as completion type (screen vs. open hole)	Well construction has been added to the table.
S-148			Table 3.13		Both solutions were run for each test. Solutions that did not fit the data are not presented as the results could not be relied upon.
S-149			Table 3.15	1) this table (along with others) does not include all the data for values listed(reconcile) 2) figure 3.9 shows data from T17 and U17 but samples are not listed on table (resolve)	1) Units are listed in the 3rd column of the table. 2) Data for T17 and U17 will be added to the table.
S-150			Table 3.15	explain why concentrations of PCE in samples from core holes having DNAPL staining are typically much smaller than the solubility	The coreholes were purged immediately before sampling, bringing water from the fractures near the borehole to the well. Much of this water was not in direct contact with the NAPL, and thus had concentrations well below saturation.
S-151			Table 3.15	include in text and incorporate into drill logs the nearly 200 return water samples from core holes taken to look at vertical distribution of PCE as compared to PID screenings and flute liner results	Results are included on the drill logs

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S-152			Table 3.4	Further explanation/information needed regarding reconfiguration of well JS-37. Clarification requested regarding PID readings. Question raised regarding re-sampling groundwater at corehole locations at a later date.	1) Text been modified to indicate that following reconfiguration, the well would not recover from pumping, thus a sample can not be collected. A table of interval screening results has been added to the report. 2) The DNAPL boring logs contained a note at the bottom indicating where no PID hits were observed. At one borehole, the PID exhibited lamp failure and was indicated on the log. At one hole, PID readings were considered unreliable because of calibration issues and was noted on the boring log. Text modified to identify the boring where the PID was not working, and the boring where the PID data was questionable. Zero values have been added to the body of the log where nondetects were observed, rather than the note at the bottom. In addition, the note of the lamp failure and questionable results have been moved to the body of the log. 3) Groundwater in the overburden was inadvertently not collected in one borehole (A-14), and no follow-up sampling was performed.
S-153		Appendix Flute/core logs		1) photo showing core and flute liners is incomplete for P14 (reconcile) 2) P15 description is inconsistent for depth of NAPL (resolve)	1) The photo log has been updated to include all of P14. 2) The discrepancy has been resolved, and the descriptions edited as such.
S-154		Appendix Flute/core logs		1) column titled PID/SCAN does not indicate units for the values (resolve) 2) "RETURN WATER CONCENC" column dos not indicate units or values (resolve)	1) The logs have been edited to include PID units. 2) The logs have been edited to include return water units.
S-155		Appendix Flute/core logs		bars on several cores have colored bars that extend across the entire column but have different values (reconcile the scale)	The scale has been edited.
S-156		Appendix Flute/core logs		show the depth of the confirmed NAPL identified in the Flute liners	Notes have been added to the logs to indicate the depth of NAPL identified on the FLUTe™ liners.
S-157		Appendix Flute/core logs		some logs have tic marks every foot and others do not (resolve)	The logs have been edited to show 1 foot indicator tic marks.
S-158		Appendix Flute/core logs		logs list core holes as "P-15" but figures list then as "P15" (resolve and check text for consistency)	A note has been added to the text to indicate the hyphens could not be retained in the analytical data from which the figures and tables were generated.
S-159		Appendix Geologic logs		add geologic units and cross check with figures	Interpretation of geologic units have not been added to the well logs because the logs represent observations rather than interpretation of the geologic units.
S-160		Appendix Geologic logs		1) if PID readings were "ND" it should be noted on logs 2) if there were issues with PID meter, indicate that in text and which holes were affected	See response to S-152. Footnote on logs indicating "No PID Hits" was removed and data was input in PID column instead. Footnote indicating problem with PID meter on A-14 was removed and text placed in PID column.
S-161		Appendix Geologic logs		indicated origin of values for "RETURN WATER CONCENC" column and resolve discrepancy of PCE concentrations	See response to S-151. The return water column contained data both from the USGS field GC and from PID readings from the return water. The logs have been updated to include only the Field GC data as contained in the USGS field GC results spreadsheet provided to Parsons.
MDNR/General Comments					
1				1) special area 3 rules only address new well construction and reconstruction of existing wells 2) steel casing in particular degrades with age	Text was revised to be specific as to the application of the rules to new or reconfigured wells and to note concern of degradation of steel casings.
2				according to HHRA remaining risks have not been addressed by coast activities (reconcile)	

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3				DNAPL can act as a source of dissolved phase PCE for a very long time at concentrations that are extremely high.	Discussion was added to the text to note that flow pathways with even minor connectivity may be significant over the long period of time that DNAPL will be contributing PCE to the dissolved phase.
4				Confirm that well certification reports were submitted for all monitoring wells and that an abandonment report was submitted for the direct push borings.	Parsons prepared well certification reports for the drill contractor's signature and submission. Parsons will confirm that the reports were properly filed.
MDNR/Specific Comments					
1	vii	List of Acronyms	Title	title the section "List of Acronyms"	Text corrected as requested.
2	1-1	1.3	Report Organization, bullet #7	last word (OU 6) should have space removed between "OU" and "6"	Text corrected as requested.
3	2-9	2.1.6.3	Groundwater Flow and Gradients, 3rd Paragraph	"overly" should be changed to "overlie"	Text corrected as requested.
4	2-9	2.1.6.3	Groundwater Flow and Gradients, 3rd Paragraph	clarify meaning of "decommissioned" (were wells plugged or just taken out of service?)	
5	2-10		Next to last paragraph	remove the word "potential"	Text corrected as requested.
6	3-15	3.1.2.4	Task 2 d - Monitoring Well Installation and Sampling, Monitoring Well Construction Details, MW-9 Cluster, 4th paragraph, 3rd sentence from end	insert word "with" after word "sealed" and remove extra period at end of sentence	Text corrected as requested.
7	3-18	3.1.2.4	Task 2 d - Monitoring Well Installation and Sampling, Monitoring Well Construction Details, MW-9 Cluster, last paragraph in section, 3rd sentence from end	remove word "with" after the word "cored"	Text corrected as requested.
8	3-18	3.1.2.4	Task 2 d - Monitoring Well Installation and Sampling, Monitoring Well Construction Details, MW-10UB, 2nd paragraph, last sentence	insert the word "in" before the words "Section 3.3…"	Text corrected as requested.
9	4-6	4.4.2	Distribution and Trends of Chemicals of Potential concern in Groundwater, Overburden subsection, 2nd paragraph, next to last sentence	change the word "initially" to "initial"	Text corrected as requested.
10	4-8	4.4.2	Distribution and Trends of Chemicals of Potential concern in Groundwater, Roubidoux/Lower Jefferson City subsection, 1st paragraph, 6th sentence	not a complete sentence (resolve)	Text was revised to be correct.
11	4-8	4.4.2	Distribution and Trends of Chemicals of Potential concern in Groundwater, Roubidoux/Lower Jefferson City subsection, 4th paragraph, 1st sentence	distance between wells JS-52 and JS-38 is believed to be less than 100 feet (resolve)	The distance was corrected.
12	5-4	5.3.4	Fate and Transport in Groundwater, Advection subsection, 1st paragraph	change "CPOCs" to "COPCs" midway through paragraph	Text corrected as requested.
13			Figure 3.6	correct cross section label from "A-A" to "B-B"	Text corrected as requested.
14			Figure 3.7	correct cross section label from "B-B" to "A-A"	Text corrected as requested.
15			Table 2.1	change word "moist" to "most"	Text corrected as requested.
16			Table 3.4, Task 2d	change word "deferred" to "deferred"	Text corrected as requested.
17			Table 3.4, Task 2e	change "sample" to "sampled"	Text corrected as requested.
MDHSS General Comments					
Bullet 1			Sample Nomenclature Explanation	explain "PA", "BW" and " US" in figure section and not only Appendix 1	Text was added in Sections 3.1.2.3 and 3.1.2.4 to explain the naming conventions.
Bullet 2			PCE contaminated drinking water	repairing well linings and installing whole house filtration systems are not permanent solutions to PCE contamination (reconcile)	The evaluation of remedial actions is presented in the Feasibility Study.

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MDHSS Specific Comments					
Bullet 1	3-8	3.1.2.3	Last sentence of last full paragraph	no "section 3.3.2.3" OR "section 3.3.2.5" on figure 3.8a (resolve)	References to these sections were deleted from the text.
Bullet 2	3-10 and 3-11	3.1.2.4		no "section 3.3.2.4" (resolve)	References to these sections were deleted from the text.
Bullet 1	7-2	7.1.2		Could PCE at MW-9 result from a cone of depression caused by pumping City Well 3?	PCE was detected in the relatively shallow Swan Creek and upper sandstone marker bed intervals. These intervals were not shown to have a discernable connection to the Gasconade and lower that the city well produces from. Furthermore, a distinct southward hydraulic gradient exists in these intervals, indicating that a cone of depression from the city well has not been established in the interval with PCE.
Bullet 2	7-3	7.1.2		this section is numbered the same as the previous section (resolve)	Section numbering was corrected.
Bullet 3	7-4	7.1.2	First full paragraph	should read "Shallow groundwater containing PCE is expected to discharge to unnamed tributaries…"	Text corrected as requested.
MDHSS HH Risk Assessment Comments					
Bullet 1		3.2		1) risk assessment should contain complete data usability evaluation for analytical results used to calculate potential health risks 2) document that the data satisfies criteria outlined in EPA's *Guidance for Data Usability in Risk Assessment*	Added Table 1 to Appendix A and moved description of previous data collection activities to Section 3.2
Bullet 2		3.2		all site data should be incorporated as applicable	Added Table 1 to Appendix A and moved description of previous data collection activities to Section 3.2; added quarterly residential data from 2008-2009 and USGS groundwater sampling from 2008-2009
Bullet 1		4		should include evaluation of OU6 residential wells	Table 7 presents the evaluation of the OU6 residential wells prior to treatment and added the quarterly residential well results from 2008-2009 to App A. This is explained further in Sections 3.4 and 4.1.6.
Bullet 2		4.1.6		should include incidental ingestion of soil-derived dust or inhalation of soil-derived particulates for an indoor worker	Included indoor dust exposure for indoor worker in App E and Table 17.2
Bullet 3		4.2		1) use current recommendation of EPA for determining UCL 2) text in Appendix D and section 7.2 does not agree on UCL determinations (resolve)	ProUCL recommendation was followed; text changed to reflect proper procedure followed
Bullet 4		4.2		1) should not use field duplicates averaged to compute UCLs 2) the max. values for duplicates be used to calculate UCLs (include quality issue in section 3.2 and uncertainties section)	Max utilized for duplicates; discrepancy in some of the duplicates with wide variability discussed in Section 3.3
Bullet 5		4.3		consult EPAs user guide to determine applicability of the NAPL Model for this site	Included text in Section 4.3.3 to indicate that the applicability of the J&E NAPL model will be evaluated after additional data is collected.
Bullet 1		5		no longer necessary to convert inhalation unit risk to inhalation slope factor NOR an inhalation reference concentration to inhalation reference dose	Concentration in air used to estimate risk instead of conversion
Bullet 1		6.1		text should state " A cancer risk of $1x10^{-6}$ or less…"	change made
Bullet 1			Table 12.6	vinyl chloride is listed as chemical of potential concern for surface water but not listed on Table 12.6 (check ALL tables for consistency)	vinyl chloride added to surface water pathway; tables revised and checked for accuracy

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Bullet 2			Table 14	1) consult EPAs inhalation guidance to estimate risks for inhalation pathway and update risk assessment accordingly 2) missing pages regarding input parameters for indoor workers and residents for vapor migration to indoor air from groundwater pathway 3) calculations noted could not be found in document (resolve) 4) exposure frequency should be 120 days/year 5) averaging time should be adjusted to assume duration of exposure (not the entire year) 6) soil to skin adherence factor for child residence should be set at 0.2cm3	inhalation risk re-evaluated; added input parameter tables for indoor workers and residents for the vapor migration pathway; added PEF and VF calculation tables into appendix E; changed to sub chronic exposure parameters for construction workers; changed exposure freq. for const. workers to 120 days/yr; changed averaging time for construction workers to 6 months; changed soil skin adherence factor for child to 0.2 cm^2
Bullet 3			Tables 15.1, 15.2, 16.1 and 16.2	all toxicity values should be checked to ensure most current toxicity values are listed on tables and used in calculations	checked all toxicity values and used most current and tables verified
USEPA (ENSV/EAMB) Risk Assessment General Comments					
1				utilize pore water samplers to collect pore water at locations where surface water and sediment have already been collected then compare to surface water ecological screening levels	relooked eco risk to look at additional sampling data; determined collection of pore water samples not necessary based on concentrations and distribution of COPECs
2		Several		RAIS and other sources of toxicity should not be used or cited as sources of toxicity values in BLRA, use original sources to ensure transparency and consistency (may contact Region 7 risk assessors for other toxicity values)	changed to cite original toxicity sources in tables instead of referencing RAIS database
3		Several		1) discuss whether residential wells (OU6) are currently being used for potable or non-potable purposes and mitigation measures (if any) 2) suggest removing "Table 7" 3) if Kellwood can groundwater in upper sand and bedrock unit and between transmissive zones is of insufficient yield or quality, they must be evaluated quantitatively in risk assessment under drinking water scenario 4) all wells screened in Swan Creek formation and all other formations containing groundwater of sufficient quality or yield must be evaluated under the drinking water pathway 5) references to residential drinking water scenarios being *hypothetical* **must be removed**	added information concerning the residential wells in Section 3.4; the table was revised to reflect it is for screening residential wells prior to treatment; all groundwater evaluated; all wells screened in Swan Creek formation and other aquifers of sufficient yield included in evaluation; all references to the residential wells being hypothetical were removed
4				cancer risks have been underestimated in BLRA for all exposure pathways involving children (<16) exposed to PAHs and vinyl chloride (consult EPAs *2005 Supplemental Guidance for Assessing Susceptibility from Early-Life Exposures to Carcinogens (Supplemental Guidance)*)	re-calculated risk for children with ADAFs and specific guidance for vinyl chloride
5				body weight is no longer accounted for in the intake equation (exposure concentration is estimated which now takes into account exposure time)	air concentration used to estimate exposure
6				*see comments* 1) BLRA should include characterization of the VI pathway including all areas of the site (off-site and on-site buildings) that may be impacted by site related contaminants and source media, also include background discussion on the pathway 2) BLRA should include specific areas where building-related measurements are needed or may be needed in the future 3) additional vapor intrusion sampling is needed at the on-site buildings near to and overlying soil, NAPL, and shallow groundwater contamination 4) provide discussion on type of work being conducted at site including use or production of chemicals 5) evaluate vapor intrusion pathways for off-site shallow groundwater given proximity of residences	information re: the VI pathway added to exposure assessment section; high school re-evaluated per initial response and information added to Appendix C; identified specific areas where additional sampling is recommended per initial response; description of current work and materials used by Metalcraft added to Section 2.2; additional samples being collected to evaluate VI pathway south of site

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7				revise risk assessment so that land use and complete and incomplete exposure pathways at OU2 and OU6 are included	Sections 3 & 4 expanded to include more detailed descriptions of OU2 and OU6 and current exposure pathways for each OU
USEPA (ENSV/EAMB) Specific Risk Assessment Comments					
1	21	3.2		data usability evaluation should be conducted and documented consistent with EPA guidance (i.e., *RAGS Part D data usability worksheets*)	Added Table 1 in Appendix A and moved description of previous data collection activities to Section 3.2
2	23	3.3.1		evaluate soil gas samples by screening them against conservative risk-based screening levels like all the other media and must be documented in *RAGS Part D* tables	soil gas samples were screened and added to Appendix C; see also response to General Comment 6 above
3	27	4.1.3		1) revise section to account for transport pathway 2) last bullet limits emission of volatile COPCs to the atmosphere to those present in surface soil 3) add "subsurface soil" to referenced statement	added VI pathway as a potential transport pathway; "surface" deleted from the second to last bullet in section 4.1.3
4	27	4.1.4		remove "(0-10)" and revise similar statements except when referring to depth interval for direct contact exposure pathways	removed 0-10' from statement and similar statements
5	27	4.1.5		1) revise risk assessment so that residential land-use pertaining to OU6 is NOT referred to as hypothetical 2) evaluate future residential exposure pathways with regard to OU2 3) rationale for evaluating residential scenario at OU2 should be provided	removed reference to residential land use as being a hypothetical situation for OU6;
6	28	4.1.5		1) revise this section and other relevant sections to discuss more conservative assumptions that were used for future industrial workers and trespasser 2) explain why subsurface soils were included in hypothetical resident's direct contact with soil pathways	added rationale for residential use being a future hypothetical use under the no action assumption; added discussion of the conservative assumptions used to evaluate future industrial workers and trespassers; provided rationale for inclusion of subsurface soils for residential direct contact exposure (surface re-grading)
7	29	4.1.6		list the industrial worker's incidental ingestion of indoor dust derived from outdoor soil as a complete exposure pathway	added incidental ingestion of dust as a complete exposure pathway for an indoor industrial worker
8	29	4.1.6	Last paragraph	1) specifically state that the drinking water wells have not been identified at OU2 and that current groundwater ingestion, inhalation and dermal contact pathways for OU2 are incomplete 2) section should provide more specific information on the water body impacted by site-related contamination (any concerns downstream?)	last paragraph revised as suggested; still need to add language re: downstream aquatic resources
9	29	4.2	Last sentence on page	insert "of the arithmetic mean" after "(UCL)"	change to text made as suggested
10	30	4.2		re-calculate the EPCs consistent with ProUCL 1.00.04 guidance (i.e. detection limits for non-detect samples should be entered into ProUCL along with non-detect coding)	text changed as correct ProUCL procedure used for non-detects
11	30	4.2		revise section according to EPAs definition of surface soil and evaluate soil according to EPA guidance and policy	definition of surface soil revised as suggested
12	30	4.2		section should include equation to estimate exposure concentration of inhalation exposures and revise text accordingly	inhalation exposure revised to use air concentration
13	31	4.2	Last paragraph	1) revise section to provide examples of exposure factors that are based on 95th percentile estimates 2) also state exposure frequencies for the trespasser and construction worker scenarios are based on best professional judgment and provide rationale for selected values	text deleted and exposures updated to reflect 95th percentile estimates
14		5		revise section and other sections to account for the use of sub chronic toxicity values when evaluating construction worker scenario	sub chronic toxicity values/exposure parameters used for construction worker
15	34	5.1		do not list/use Oak Ridge National Laboratory RAIS as original source of toxicity values	original toxicity values cited and used instead of RAIS values
16	35	5.2		"no threshold" option no longer serves as starting point of evaluating cancer risks (resolve)	discussion of no-threshold policy revised as suggested

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17	36	5.3		equation and discussion regarding this conversion (RfCs to RfDs) must be removed from BLRA	inhalation exposure revised to use air concentration
18	36	5.3		revise definition of sub chronic exposures and chronic exposures	definition of sub chronic and chronic exposures revised as suggested
19	38	6.1	First sentence of last paragraph	remove first sentence of last paragraph or more accurately characterize EPAs "target" cancer risk range and point of departure	changed to 1E-6 as point of departure
20	43	7.1	Last sentence in section	remove this sentence and replace with brief discussion on how background may impact the overall health risks estimated for the site	statement deleted and discussion on how background may impact overall health risk estimates added
21	42-43	7.1		include the elimination of COPCs detected below screening levels impact health risk/hazard estimates	added sentence that elimination of some COPCs may underestimate risk
22	43-44	7.2		1) remove discussion regarding DL/2 substitution method 2) see comments 3) insufficient groundwater data to support the conclusion that the use of max. detection overestimates health risks 4) provide specific examples to support discussion regarding VI model 5) provide information to support use of soil data over gas data and explain how/why combining risks/hazards for soil and groundwater volatilization to indoor air overestimates risks/hazards 6) revise this section to accurately reflect exposure duration of construction worker (6 months) 7) second last sentence should be removed or provide supporting rationale	discussion regarding the DL/2 substitution removed; referenced statements regarding overestimation of risks based on focused areas were removed; removed sentence regarding maximum concentrations used in risk assessment and replaced with uncertainty regarding limited data sets; uncertainty regarding overestimation of VI pathway removed; soil inhalation risks removed from risk assessment; therefore, this uncertainty discussion regarding these pathways removed; revised construction workers exposure to reflect 6 months duration; soil adherence factor uncertainty discussion removed
23	44	7.3		remove referenced statements regarding RfDs and RfCs	referenced statements removed
24	44-45	7.3		statement starting with "For compounds without toxicity values, either surrogate values or route to route extrapolations…" should be removed also, contact EPA risk assessors for approval or surrogate toxicity values	referenced statements removed
25	45	7.4		discussion regarding uncertainties of additive health risks should be removed unless site-specific information can be shown	referenced statements removed
26	49	9		should include complete references for "Geotechnology, 1993", "Jacobs Engineering Group, 1994", "MDNR, 1989" and "USEAP, 2003"	references checked and modified
27			Table 2a	should show the VOC detection frequency for 72 samples	revisions to table made as suggested
28			Table 3	revise so the scenario timeframe for the vapor intrusion pathway for indoor workers is listed as "current/future" which is consistent with Section 4.1.5	revisions to table made as suggested
29			Table 5	revise to include all on-site and off-site data from groundwater units providing drinking water of sufficient quality and yield	data checked
30			Table 6	revise so the scenario timeframe for the vapor intrusion pathway for indoor workers is listed as "current/future" which is consistent with Section 4.1.5	revisions to table made as suggested
31			Table 8	surface water data for SVOCs and metals is not useable unless additional surface water samples are collected and analyzed, one sample is not adequate	information added to text in Section 7.1 that SVOC and metal data collected to identify potential presence/absence of these compounds since they are not believed to be site-related
32			Table 9	sediment data for SVOCs and metals is not useable unless additional surface water samples are collected and analyzed, one sample is not adequate	information added to text in Section 7.1 that SVOC and metal data collected to identify potential presence/absence of these compounds since they are not believed to be site-related
33			Table 10	revise so the oral absorption factor of TCE is 1	revisions to table made as suggested

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
34			Table 11	1) state that no analysis was performed for pathways that are incomplete 2) revise table to account for VI pathway at the New Haven High School (current/future) 3) revise table to account for VI pathway for current/future residences overlying and/or near to shallow groundwater contamination south of the former Kellwood property	revisions to table made as suggested
35			Tables 12.1-12.6	1) too much uncertainty to suggest that the true exposure point concentration is lower or higher than maximum detection or result from a small number of samples (reconcile) 2) explain why the value was used when maximum detection was used in place of 95% UCL	revisions to table made as suggested
36			Table 14	1) daily intake calculations should be grouped by timeframe, exposure medium, and receptor 2) inhalation rate and body weight as exposure factors should be removed from table 3) averaging time should be adjusted to portion of year that exposure occurs (do not dilute over a year) 4) adult ingestion rate citation is "USEPA's Standard Default Exposure Factors" and child's water ingestion rate is "U.S.EPA.1980. Water Quality Criteria Documents: Availability. Federal Register, (November 28) 45(231):79318-79397." 5) cite original source as *RAGS Part B* (USEPA, 1991b) 6) event duration for child and adult resident dermal contact with gw during bathing are 1 and 0.58 hours respectively 7) use exposure frequency 120 days/year for construction workers exposure pathways 8) use soil adherence factor of 0.2 for child residents 9) exposure time should be no less than 2 hours for the trespasser	revisions to table made as suggested
37			Table 15.1	1) provide sub chronic toxicity values 2) chronic non-cancer health hazards resulting from ingestion and dermal contact with TCE should be addressed in uncertainties section 3) correct oral absorption factor of "1" 4) on table provide an RfD of 8.0E-04 mg/kg-day for hexachlorobenzene	revisions to table made as suggested
38			Table 15.2	1) no need to provide column for "extrapolated inhalation RfDs" 2) provide sub chronic toxicity values 3) risk assessment should use CalEPA's chronic REL of 3E-05 mg/m3 to evaluate non-cancer health hazards resulting from arsenic inhalation 4) use chronic RfC of 1.1 mg/me for methylene chloride 5) use chronic RfC of 2.7E-01 mg/m3 for PCE 6) use chronic RfC of 1E-02 mg/m3 for TCE 7) use trans-1,2-dichloroethylene's RfC of 6E-02 mg/m3 as a surrogate for 1,2-dichloroethylene (total)	revisions to table made as suggested
39			Tables 15.1 and 15.2	1) provide arsenic's sub chronic RfD pf 3E-04 mg/kg-day per HEAST 2) provide naphthalene's intermediate MRL of 6E-01 mg/kg-day (ATSDR, 2009) 3) provide methylene chloride's sub chronic RfD of 6E-02 mg/kg-day per HEAST 4) provide 1,2-dichloroethylene's (total) sub chronic RfD of 1E-01 mg/kg-day and target organ is blood 5) PCE's sub chronic RfD is 1E-01 mg/kg day from HEAST (USEPA, 1997b)	revisions to table made as suggested
40			Table 16.1	1) use CalEPA's oral slope factor of 1.3E-02 (mg/kg-day)-1 2) list IRIS as source of vinyl chloride and hexachlorobenzene's slope factors, not Regional Screening Table	revisions to table made as suggested
41			Table 16.2	1) no need to provide a column for extrapolated inhalation cancer slope factors 2) use CalEPA's IURs for benz(a)anthracene, benzo(b)fluoranthene, and chrysene, which are 1.1E-04, 1.1E-03, 1.1E-04 and 1.1E-05 (ug/mg3)-1 respectively 3) use CalEPA's IUR of 3.4E-05 (ug/m3)-1 for naphthalene 4) use CalEPA's IUR of 2E-06(ug/m3)-1 for TCE 5) source of hexachlorobenzene's IUR is IRIS	revisions to table made as suggested
42			Table 17.1	the EPC for the inhalation of volatile emissions pathway must be based on the entire soil column (surface to the groundwater table) not the 0-3ft bgs interval and residential soil exposure scenarios should be revised accordingly	revisions to table made as suggested

Comment No.	Page	Section	Paragraph/Location	Comment Summary	Response
43			Table 17.2	1) revise this table so it is consistent with Table 6 2) revise table so that it lists scenario timeframe as "current/future"	revisions to table made as suggested
44		Appendix B		1) revise/reorganize appendix so it indicates receptor and level of evaluation being performed 2) revise the model so that it uses 30 years for both exposures 3) need consistency between Lt provided in Table 14 and Appendix D and provide explanation regarding selection of that depth since contamination is present at shallower depths	Appendix B has been reorganized to clearly show the receptor and level of evaluation preformed; PCE model re-run using 30 years instead of 35 years;
45		Appendix C	Table 3.21	revise screening approach for soil vapor samples	screening of soil vapor data revised per initial response submittal
46		Appendix D		BLRA should include ProUCL input files also	ProUCL input files included in Appendix
47		Appendix E		revise appendix through the use of page numbers and organizing particular topics (PEF, VF, risk estimates) into section	Appendix E has been reorganized by topic and page numbers included

Note: Figure and table numbers have changed relative to the December 2009 RI Report. December RI Report list of tables and figures is attached for reference.

REMEDIAL INVESTIGATION REPORT

RIVERFRONT SUPERFUND SITE
OPERABLE UNIT NO. 2/6
NEW HAVEN, MISSOURI

Prepared for:

United States Environmental Protection Agency
Region VII

Prepared on behalf of Kellwood Company by:

PARSONS

JUNE 2010

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LIST OF ACRONYMS

AMSL	above mean sea level
AOC	Administrative Order on Consent
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
cis-1,2-DCE	cis-1,2-dichloroethene
COPCs	chemicals of potential concern
CR	cancer risk
CVOCs	chlorinated volatile organic compounds
DNAPL	dense non-aqueous phase liquid
DPT	direct-push technology
EMA	Environmental Management Alternatives
ERA	Ecological Risk Assessment
ESA	Environmental Site Assessment
ESLs	Ecological Screening Levels
FSP	Field Sampling Plan
ft/min	feet per minute
GC	gas chromatograph
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
IDW	investigation-derived waste
IRIS	Integrated Risk Information System
MCL	maximum contaminant level
MDNR	Missouri Department of Natural Resources
mg/L	milligrams per liter
ml	milliliters
MRLs	Minimal Risk Levels
MSI	Mount Sopris Instrument Company, Inc.
MTBE	Methyl-tert-butyl ether
NWI	National Wetlands Inventory
OU	Operable Unit
PCBs	polychlorinated biphenyls
PCE	Tetrachloroethylene (also known as perchloroethylene and tetrachloroethene)
PID	photoionization detector
POTW	Publicly-Owned Treatment Works
ppb	parts per billion
ppm	parts per million
PPRTVs	Provisional Peer Reviewed Toxicity Values
PRGs	Preliminary Remediation Goals
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RQD	rock quality designation

RWI	Residential Well Investigation
SOP	Standard Operating Procedure
SOW	statement of work
SP	self potential
SPR	single-point resistivity
STL	Severn-Trent Laboratories, Inc. (now TestAmerica Laboratories, Inc.)
SVOCs	semivolatile organic compounds
T&E	threatened and endangered
TCE	Trichloroethylene (also known as trichloroethene)
TCLP	Toxic Characteristic Leaching Procedure
TESS	Threatened and Endangered Species Database System
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VC	vinyl chloride
VOCs	volatile organic compounds

EXECUTIVE SUMMARY

INTRODUCTION

A Remedial Investigation (RI) of Operable Units (OU) OU2 and OU6 of the Riverfront Superfund Site, located in New Haven, Franklin County, Missouri was performed to fulfill the requirements of the Administrative Order on Consent, Docket No. CERCLA-07-2004-0078 (AOC) entered into by the United States Environmental Protection Agency (USEPA) with Kellwood Company (Kellwood), dated March 22, 2004.

The Kellwood Company operated a tube mill at 202 Industrial Drive between 1973 and 1985. Tetrachloroethylene (PCE) was used to remove oils from fabricated parts. Kellwood sold the facility in 1985 and ceased operation of the tube mill. Investigations of volatile organic compounds (VOCs) in the area of the former Kellwood facility and the open lot to the north, where disposal of spent PCE was reported, began in 1989. In approximately 1990, American Recreational Products (ARP) and Kellwood Company were informed by the State of Missouri that there were reports of disposal of cleaning solvent containing PCE or trichloroethylene (TCE) on the City-owned property just north of the former Kellwood facility.

In 1994, soil from the open lot exhibiting PCE concentrations exceeding 380,000 micrograms per kilogram (µg/kg) was excavated for off-site incineration. In the 1990s, soil remaining on the open lot was tilled to maximize volatilization. Dense non-aqueous phase liquid (DNAPL) is still present in the area of the open lot. Since March 2008, approximately six liters of DNAPL have been removed through periodic recovery operations, which are ongoing.

New Haven, Missouri, is located in the northwestern part of Franklin County, and lies immediately south of the Missouri River. OU2 consists of the area in the immediate vicinity of where releases of hazardous substances took place. OU6 is the area to the south and southwest of OU2 where groundwater containing PCE has been observed. Surface water in the area of OU2 and OU6 flows south via the 500, 510 and 600 tributaries to Wildcat Creek and to Boeuf Creek, which flows to the east before turning north to empty into the Missouri River.

New Haven is underlain by the geologic units of the Ozark Aquifer. The Ozark Aquifer is composed of eight lithological units, from top to bottom: the St. Peter Sandstone, Powell Dolomite, Cotter Dolomite, Jefferson City Dolomite, Roubidoux Formation, Gasconade Dolomite, Eminence Dolomite, and Potosi Dolomite. There are three geologic structures in the OU2 area: the Wildcat Creek Anticline, the Park Creek Structure, and the Berger Creek Bluff Fault, all trending northwest-southeast.

RI SCOPE

The RI included a number of field activities, followed by completion of a baseline human health risk assessment. The primary work tasks were:

Task 1 – Soil Investigation (see **Section 3.1.1**) - A total of 81 soil samples were collected from 42 soil borings in the vicinity of the open lot and the former Kellwood facility as a part of Task 1. The samples were collected in September 2007 and June 2008. Four samples were collected for geotechnical parameters. The analytical results are summarized in **Table 3.2** and are shown in **Figure 3.2**.

Task 2 Groundwater Investigation

- Task 2A (see **Section 3.1.2.1**) – Interval Screening - Interval screening was performed at domestic wells JS-14 and JS-36 in April 2006 and April 2007, with discrete samples being collected at a number of depths under both static and pumping conditions. In addition, geophysical logging was performed to evaluate the flow conditions in the borehole and to aid in correlation of geologic strata across OU2/OU6. Observations from the optical logs of these wells are presented in **Tables 3.4 and 3.5**. A liner was installed in both JS-14 and JS-36 to isolate the lower part of the well from impacts in the shallower groundwater. A liner had previously been installed in JS-38 in July 2005 following the interval screening of JS-38 with the same purpose of isolating the lower part of the well from impacts in the shallower groundwater.
- Task 2B – Direct Push Borings (see **Section 3.1.2.2**) – Direct push borings were advanced at 18 locations north of Boeuf Lutheran Road in May 2008 and April 2009 to evaluate the depth to bedrock profile and to collect groundwater samples from the overburden. Analytical results of the samples are summarized in **Table 3.7** and are presented in **Figure 3.7**.
- Task 2C - Residential Well Sampling (see **Section 3.1.2.3**) – Samples were collected from 31 residential wells located generally south of the former Kellwood facility in February through May 2008. The analytical results are summarized in **Table 3.9** and are presented in **Figures 3.8a through 3.8d**.
- Task 2D - Monitoring Well Installation (see **Section 3.1.2.4**) – Direct push borings were advanced at each of the monitoring well cluster locations to evaluate the need for surface casing to prevent downward movement of groundwater during monitoring well installation. Thirteen new monitoring wells were installed for the RI at eight sites. The United States Geological Survey (USGS) installed five wells at three sites. The data from these wells are included as a part of this RI. Monitoring well installation began in June 2008 and continued through August 2009.
- Task 2E - Sitewide Monitoring Well Sampling (see **Section 3.1.2.5**) – The first round of sitewide sampling of monitoring wells and residential wells

selected as "sentinel" wells included 38 wells. The first round of sitewide samples was collected between March and September 2009. Analytical results are summarized in **Table 3.10** and are shown on **Figures 3.12a through 3.12d.** Additional sampling rounds will be performed at later dates.

- Task 2F - Aquifer Testing (see **Section 3.1.2.6**) – Slug testing was performed in February 2009 on 16 monitoring wells that were open to the overburden (2 wells), the upper sandstone marker bed (4 wells), the uppermost bedrock (2 wells), the Swan Creek sandstone member (4 wells), the Roubidoux Formation (1 well), and undifferentiated rock (3 wells). Results of the slug tests are listed in **Table 3.16**. An aquifer test was performed in July and August 2009 that monitored responses in 9 monitoring wells to multiple cycles of pumping of city wells W-3 and W-4. Results of the aquifer test are listed in **Table 3.17**.

Task 3 DNAPL Investigation (see **Section 3.1.3**) – In August through November 2007, core holes were drilled at 22 locations and a FLUTe™ liner was installed in each borehole to identify the presence of DNAPL. Water samples from the core holes were collected for analysis. The results of the analyses are summarized in **Table 3.18** and are shown on **Figures 3.17, 3.18a, and 3.18b**.

Task 4 Sediment and Surface Water Investigation (see **Section 3.1.4**) – Surface water (14 locations) and sediment samples (8 locations) were collected in August 2008 and April 2009. The analytical results are summarized on **Tables 3.19 and 3.20** and are shown on **Figures 3.19 a through d and 3.20**.

Task 5 Sanitary Sewer Investigation (see **Section 3.1.5**) – The sanitary sewer investigation included sampling of sewer water and sediment, video inspection of the sewer line from the former Kellwood facility to Lift Station 5, and sampling of soil outside of the sewer lines along three segments north of Highway 100 and adjacent to five defects identified as a result of the video inspection. This portion of the RI was performed in September 2007 and May 2008. Analytical results are summarized in **Tables 3.21, 3.22, and 3.23** and are presented on **Figures 3.21 and 3.22**.

Soil Vapor Sampling (see **Section 3.1.6**) – Soil vapor samples were collected from five locations in the vicinity of New Haven High School in September 2009. Sample results are summarized in **Table 3.24** and are shown on **Figure 3.23.**

NATURE AND EXTENT OF IMPACTS

- During the performance of Task 3, PCE was detected as DNAPL in five core holes. Three of the core holes were located on the open lot immediately north of the former Kellwood facility. DNAPL was detected in two core holes outside the northwest portion of the former Kellwood facility (**Section 3.1.3**, **Table 3.18**, **Figures 3.17, 3.18a, and 3.18b**).

- PCE in soil is limited to the open lot north of the former Kellwood facility, beneath the floor of the former Kellwood facility, and beneath and immediately west of Industrial Drive (**Section 3.1.1**, **Table 3.2**, and **Figure 4.1**).
- During the performance of Task 4, PCE was detected in surface water in the 600 tributary that flows behind the homes in the Wildcat Creek Estates Subdivision and in the 500 tributary (**Section 3.1.4**, **Table 3.19**, and **Figures 4.7a through 4.7d**). The only sediment samples containing PCE are from the 500 tributary (**Section 3.1.4**, **Table 3.20**, and **Figure 4.8**).
- PCE was detected in groundwater at concentrations as high as 2,800 micrograms per liter (µg/L) in the overburden in the direct push borings on the west side of the industrial park (**Section 3.1.2.2**, **Tables 3.7**, and **Figure 4.3**). The extent of the groundwater impacts in the overburden is delineated to the west, east and south.
- PCE was detected in the groundwater in the upper sandstone marker bed/uppermost bedrock south and west of the former Kellwood facility at concentrations of up to 1,400,000 µg/L in BW-20 (**Section 3.1.2.5**, **Table 3.10**, and **Figure 4.3**). PCE was also detected below the 5 µg/L USEPA maximum contaminant level (MCL) in one monitoring well in the upper sandstone marker bed north of the former Kellwood facility. The extent of the groundwater impacts in the upper sandstone marker bed/uppermost bedrock has been adequately defined.
- PCE was detected below the 5 µg/L MCL in several wells tapping the Swan Creek sandstone member, located south of the Former Kellwood facility (**Section 3.1.2.5**, **Table 3.10**, and **Figure 4.3.**). PCE was also detected below the 5 µg/L MCL in one monitoring well in the Swan Creek north of the former Kellwood facility. The extent of the groundwater impacts in the Swan Creek sandstone member has been adequately defined.
- PCE was not detected in borings alongside sewer segments north of Highway 100 or at defects in the sewer between the former Kellwood facility and Lift Station 4 (**Section 3.1.5**, **Tables 3.21, 3.22, and 3.23**, and **Figures 3.22**).

FATE AND TRANSPORT

- There is limited hydraulic connectivity between the upper sandstone marker bed/uppermost bedrock interval and the underlying Swan Creek sandstone, and between the Swan Creek sandstone and the underlying lower Jefferson City/Roubidoux. A discernible, but minimal hydraulic connectivity exists between the Roubidoux and the units that are utilized by the two city wells (Gasconade and lower units). Migration of PCE in groundwater to the lower Jefferson City/Roubidoux may involve a vertical short-circuiting of the intervening strata, which otherwise naturally limit

downward vertical migration. The short-circuiting may occur through natural geologic features such as a fault or fracture or through man-made features such as an open well borehole.

- PCE has been detected in several domestic wells south and southwest of the former Kellwood facility. The domestic wells that have been affected by PCE appear to be related to short-circuiting by an open well borehole. Domestic wells with VOCs above MCLs have whole-house treatment units which treat the water to remove VOCs and achieve the MCLs. JS-37 was formerly used as a domestic well but was removed from service and was abandoned. JS-25 (located east of OU2) contains PCE, but is not used and does not have a treatment unit.
- Wells MW-9US, MW-9SW, JS-25 and JS-27 are north and northeast of OU2, and groundwater collected from these four wells contained PCE at concentrations of up to 7.9 µg/L. The PCE in these wells does not appear to have originated at OU2, as they are upgradient, up-dip, and up the slope of the top of bedrock. Also, monitoring wells and DNAPL core holes that did not contain PCE are located between these wells and OU2.
- Advection is the primary process controlling the fate and transport of PCE in groundwater associated with the site. The primary avenues for migration are in the overburden near the bedrock interface and in the upper sandstone marker bed/uppermost bedrock. Concentrations of PCE observed in monitoring wells that are open to the Swan Creek sandstone member are lower than in the overburden or upper bedrock/upper sandstone marker bed monitoring wells at the MW-1, MW-2, and MW-4 clusters. PCE was not detected in the Swan Creek sandstone member well at the MW-7 cluster despite the relatively high concentration in the upper sandstone. The limited connection between geologic units is also indicated by the sizeable potentiometric head (water level) difference between the upper sandstone marker bed/uppermost bedrock and the Swan Creek sandstone, and between the Swan Creek and the lower Jefferson City/Roubidoux.
- Groundwater flow from OU2 in the overburden, in the upper sandstone marker bed/uppermost bedrock and in the Swan Creek is to the south and west (Figures 4.2a and 4.2b). Limited connectivity between the upper bedrock/upper sandstone, the Swan Creek sandstone member, and the lower Jefferson City/Roubidoux, is preventing groundwater in the upper bedrock/upper sandstone marker bed from migrating downward except where wells with long open intervals short-circuit the intervening strata. Most groundwater containing PCE is expected to discharge from the upper sandstone marker bed/uppermost bedrock and the overburden to the 500 and 600 tributaries. The potential exists for some groundwater containing PCE to migrate downward through either natural or man-made vertical pathways. It is possible that groundwater containing PCE may either currently, or in the future, discharge directly to Wildcat Creek

(tributary 700) and Boeuf Creek between the 500 and 600 tributaries. Groundwater flow in the lower Jefferson City/Roubidoux appears to northerly.

RISK ASSESSMENT

- The human health risk assessment indicated that for ingestion of groundwater by hypothetical residents, total cancer risk was within the acceptable risk range, and the hazard index was below target levels.
- The total cancer risk and total hazard index exceed target ranges for hypothetical residents in the area near the former Kellwood facility where DNAPL is present through incidental ingestion, inhalation, dermal contact with impacted soil, and inhalation of indoor air (volatilizing from either soil or groundwater). Current zoning of this area is commercial/industrial.
- The total cancer risk and total hazard index exceed target ranges for industrial workers through inhalation of indoor air in the area near the former Kellwood facility where DNAPL is present.
- A review of the July 2002 ecological risk assessment (ERA) for OUs 1 through 4, which included an evaluation of the surface water tributaries in OU6, indicated that PCE was present in two surface water locations at concentrations above the USEPA Region 5 environmental data quality level, which was published in 1999. However, based on the volatility of PCE, the conditions of the water body in which it was detected, and the low calculated hazard quotients, PCE was determined to present a minimal risk to aquatic life, and no further ecological investigations were recommended in the 2002 ERA. No other media or compounds were identified as posing a potential risk to ecological receptors in the 2002 ERA report. A further review of the ecological risk, based on the previously collected data (2001 and 2002) and data collected in support of this RI in 2008 and 2009, indicated that there are currently no issues identified for ecological receptors within OU2 or OU6. The previously detected concentrations of PCE in surface water in OU6 that had been identified as being above the Region 5 screening level are below the updated screening benchmark for PCE of 111 µg/L (USEPA, 2006), and the 2008 and 2009 sample concentrations are below applicable ecological screening levels. Thus, no ecological risks have been identified within OU2 or OU6.

SUMMARY AND CONCLUSIONS

The RI addressed several media, including soils, sediment, surface water, sewer water, sewer sediment and groundwater at various depths. Monitoring wells were installed in each of the laterally extensive permeable zones. The primary conclusions of the RI are:

- Groundwater is the primary media of concern and the nature and extent of impacts has been adequately delineated both horizontally and vertically. The limit of impacts to the south could not be fully identified using monitoring wells, due to lack of access, but it appears that PCE in the shallow groundwater discharges to Wildcat Creek. The limits of impacts to the west are generally established; however the exact boundary to the west of MW-7US is not clear.
- The human health risk assessment indicated that for ingestion of groundwater by hypothetical residents, the total cancer risk was within the acceptable risk range, and the hazard index was below target levels.
- There are currently no ecological risk concerns related to surface water and sediment.
- The overburden and upper sandstone marker bed/uppermost bedrock units (not used for drinking water supply) have higher concentrations of VOCs in groundwater than lower bedrock units. Concentrations decline substantially in the Swan Creek sandstone and lower units (potential water supply) relative to the overburden and upper sandstone marker bed/uppermost bedrock.
- The primary risk for PCE to migrate to the lower Jefferson City/Roubidoux permeable zone is from wells with long open intervals. These wells may compromise the intervening strata, which would limit downward vertical migration of groundwater. Such risks have been addressed through the existing state well construction advisory, and repairs of selected residential wells through lining.
- The source of PCE at JS-25 and JS-27 is not clear, as evidence suggests the likelihood of a separate source.
- DNAPL is present in a limited area north and northwest of the former Kellwood facility.
- Soils with the highest PCE concentrations were previously removed for off-site incineration.
- The human health risk assessment concluded that in the area near the former Kellwood facility where DNAPL is present, the total cancer risk and total hazard index exceed target ranges for (1) hypothetical residents - for incidental ingestion of soil, inhalation, dermal contact with impacted soil and inhalation of indoor air; and (2) for industrial workers through inhalation of indoor air.

SECTION 1
INTRODUCTION

1.1 PURPOSE AND SCOPE OF RI REPORT

This Remedial Investigation (RI) Report has been prepared to summarize the RI activities and results concerning Operable Units (OU) OU2 and OU6 of the Riverfront Superfund Site, located in New Haven, Franklin County, Missouri. The work was performed to fulfill the requirements of the Administrative Order on Consent, Docket No. CERCLA-07-2004-0078 (AOC) (dated March 22, 2004) entered into by the United States Environmental Protection Agency (USEPA) with Kellwood Company (Kellwood).

The overall objectives of the investigation, as defined in the AOC, Attachment 2, Statement of Work (SOW), are as follows:

- Characterize the nature and extent of impacts from chemicals of potential concern (COPCs)
- Assess the risks posed by these impacts
- Provide information needed to evaluate potential remedial options

Detailed information on the proposed scope and methodology to achieve the above objectives is presented in the USEPA-approved February 2006 RI/FS Work Plan and July 2006 Sampling and Analysis Plan [SAP; comprised of the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP)].

1.2 HISTORICAL SUMMARY

The Kellwood Company operated a tube mill at 202 Industrial Drive between 1973 and 1985. PCE was used to remove oils from the parts fabricated using the tube mill and from swedging operations. The USEPA conducted a number of interviews with former Kellwood employees and others in the community. Notes of the interviews were provided to Parsons by the USEPA with the names of those interviewed who requested anonymity redacted. These interviews indicated that spent PCE was disposed on the open lot north of the facility (owned by the City of New Haven), by disposing to the sanitary sewer and through removal by a disposal contractor (unknown identity). Interviewees did not have detailed information related to the quantity of PCE used or disposed at the Kellwood facility. One interviewee suggested that the quantity used was approximately 220 gallons per year. A different interviewee indicated that several swedge operators would each dispose of several inches of spent PCE from a 5-gallon bucket, several times per shift. Several interviewees indicated that most of the spent PCE was poured into floor drains that led to the sanitary sewer system, or was collected the PCE in drums for off-site disposal by a disposal contractor.

Kellwood sold the facility (referred to as the former Kellwood facility) in 1985 and ceased operation of the tube mill. The former Kellwood facility is currently owned by Metalcraft Enterprises, a subsidiary of Tubular Steel Incorporated. Investigations of VOCs in the area of the open lot and the former Kellwood facility began in 1989. A summary of previous investigations is presented in Section 2.2 of this report. In 1994, soils from the open lot exhibiting PCE concentrations exceeding 380,000 micrograms per kilogram (µg/kg) were excavated for off-site incineration. From 1994 through 1996, soil remaining on the open lot was tilled to maximize volatilization. Dense non-aqueous phase liquid (DNAPL) was detected in monitoring well BW20 upon its installation. Since March 2008, approximately 6 liters of DNAPL has been removed from the site.

1.3 RI REPORT ORGANIZATION

This Report is organized into the following eight sections .

1. Section 1 – Introduction: Describes the purpose and organization of the document.
2. Section 2 – Site Background: Provides a background, a discussion on the physical characteristics of the site, and a summary of the related historical investigations.
3. Section 3 – Field Methods: Presents a detailed discussion of the activities conducted, the analytical testing methods used, and provides a summary of the investigation results.
4. Section 4 – Nature and Extent of Impacts at OU2 and OU6: Includes a detailed discussion of the nature and extent of impacts at OU2 and OU6.
5. Section 5 – Fate and Transport: Discusses the characteristics of COPCs at OU2 and OU6 and their potential migration.
6. Section 6 – Baseline Risk Assessment for OU2 and OU6: Discusses the human health and ecological risk assessments for OU2 and OU6.
7. Section 7 – Summary and Conclusions: Summarizes the findings of the RI at OU2 and OU6.
8. Section 8 – References: Lists the references used in the report.

SECTION 2
SITE BACKGROUND

2.1 PHYSICAL CHARACTERISTICS

2.1.1 Surface Features

The Former Kellwood facility is part of an industrial park that was developed in the mid-1970s. It is located at 202 Industrial Drive, south of State Highway 100 and west of Highway C (**Figures 2.1 and 2.2**). The principal feature of the Former Kellwood facility (currently a facility operated by Metalcraft Enterprises, a division of Tubular Steel) is a privately-owned manufacturing building (about 60,000 square feet), including a concrete ramp. As discussed in Section 2.2, the focus of the 1994 agreement between Kellwood and the Missouri Department of Natural Resources (MDNR) is a vacant lot north of the building, which is owned by the city of New Haven. There are several other manufacturing and warehousing facilities located in the industrial park.

New Haven is part of the Salem Plateau physiographic sub-province of the Ozark Plateau. The physiographic setting of New Haven is moderate to rugged terrain formed with steep valleys and thin soils, characteristic of the Ozark Plateau. In the upland areas, there are loess (wind-blown) deposits as thick as 15 feet overlying the typical Salem Plateau cherty, silty clay material. Topography in the New Haven area caused by the gradual uplift of the Ozark Dome, and erosion of uplifted rocks by precipitation, runoff, and stream flow, is accentuated because of its location along the Missouri River. The land surface elevation ranges from 470 feet above mean sea level (AMSL) to 920 feet AMSL. An east-west trending ridge, along which State Highway 100 runs, lies about 1 mile to the south of the Missouri River, and divides the Missouri River valley to the north and the Boeuf Creek valley to the south. Elevations on this ridge reach up to 740 feet AMSL.

2.1.2 Meteorology

The climate of New Haven, Missouri features four distinct seasons, including cold winters and long, hot summers. The average daily minimum temperature in January is 17 degrees Fahrenheit (^{o}F). The average daily maximum temperature in July is 88°F. The average annual precipitation is 43.5 inches, of which over 24 inches typically falls in the crop-growing period between April and September (http://www.usclimatedata.com, April 2010).

Monthly precipitation and temperatures during the execution of the RI field work at Rosebud, Missouri are presented in **Figures 2.3 and 2.4**. Precipitation from February 2005 through January 2008 was generally below normal. February through October of 2008 had generally above normal precipitation. Temperatures were generally above normal from October 2004 through December 2007, with several single-month exceptions. Temperatures from

February 2008 through August 2009 (the most recent data available), were generally below normal. The concentration of PCE in the four residential wells with whole-house treatment systems and a record of quarterly sampling did not show trends in PCE concentration that could be correlated with the periods of above and below normal precipitation or temperature.

2.1.3 Surface Water Hydrology

The major body of water in New Haven is the Missouri River, which borders the northern edge of the City. There are a number of small creeks and tributaries in the area, including Boeuf Creek, which lies to the south of OU2 (see **Figure 2.5)**.

A surface water divide between small tributaries that flow north to the Missouri River and tributaries that flow into Boeuf Creek lies along and north of Highway 100. Surface water in the area of OU2 and OU6 flows south via unnamed tributaries to Wildcat Creek and to Boeuf Creek, which flows to the east before turning north to empty into the Missouri River. The small tributaries that drain the area of OU2 and OU6 and feed Wildcat Creek and Boeuf Creek typically have low flows except following a precipitation event. The upper reaches of these drainages are ephemeral (only seasonal flow). These tributaries are generally not named on topographic maps. The USEPA established a nomenclature for the unnamed streams in the area that will be utilized in this report (e.g., tributary 500, and tributary 600). **Figure 2.6** shows the surface water designations in the area of OU2 and OU6.

2.1.4 Geology

The information presented in the following section on bedrock geology, as well as the sections describing hydrology and hydrogeology in the New Haven area and in the vicinity of OU2, is based on the results of this investigation as well as previous work performed by the United States Geological Survey (USGS), Black and Veatch, and MDNR, presented in the following documents:

- USGS and Black and Veatch. 2007. *Focused Remedial Investigation of Operable Unit OU4, Riverfront Superfund Site, Franklin County, 2000-2007, Missouri.* Prepared for USEPA Region VII.
- USGS and Black and Veatch. 2003. *Focused Remedial Investigation of Operable Units OU1 and OU3, Riverfront Superfund Site, Franklin County, Missouri.* Prepared for USEPA Region VII.
- Starbuck, Edith. 2003. *Geologic Report for the New Haven, Missouri Area: Rolla* Missouri Department of Natural Resources, Geological Survey and Resource Assessment.
- Imes, J.L., and Emmett, L.F. 1994. *Geohydrology of the Ozark Plateaus Aquifer System in Parts of Missouri, Arkansas, Oklahoma, and Kansas.* USGS Professional Paper 1414-D.

- Miller, D.E., and Vandike, J.E. 1997. *Groundwater Resources of Missouri:* Rolla, Missouri Department of Natural Resources, Geological Survey and Resource Assessment, Water Resources Report 46.

2.1.4.1 Bedrock Geology

New Haven is underlain by the geologic units of the Ozark Aquifer, a marine sedimentary, primarily carbonate, rock formation. The Ozark Aquifer is composed of eight lithological units, from top to bottom (see **Table 2.1**): the St. Peter Sandstone, Powell Dolomite, Cotter Dolomite, Jefferson City Dolomite, Roubidoux Formation, Gasconade Dolomite, Eminence Dolomite, and Potosi Dolomite. These formations, which, based on published literature and observations from this RI, are cherty dolostones and sandstones of Cambrian and Ordovician age, can be described as follows:

- **The St. Peter Sandstone**: The St. Peter Sandstone is less than 40 feet thick, where present. It is exposed approximately one-third mile to the west of OU2, and can be recognized as a fine-grained cemented quartz sandstone that is generally tan, reddish-tan, or white in color.

- **The Powell Dolomite**: The Powell Dolomite, where present, consists of a dolostone with medium to thick bedding, which is tan in color and finely crystalline, containing little to no chert. The Powell Dolomite contains greenish-grey mudstone/shale beds that are as much as 2 feet thick in the lower 50 to 70 feet of the formation. The Powell and Cotter Dolomites are the bedrock units most commonly exposed in the New Haven Area.

- **The Cotter Dolomite**: The Cotter Dolomite ranges from 85 to 300 feet thick and is a tan, finely crystalline, silty to sandy, cherty dolostone, with thin greenish-grey mudstone/shale beds, and dark-reddish brown, fine-grained well cemented sandstone beds, typically less than 2 feet thick. The Cotter Dolomite contains two notable sandstone units, the upper sandstone marker bed and the Swan Creek sandstone member. The upper sandstone marker bed consists of approximately 4 to 5 feet of massively bedded, fine-grained sandstone. It consistently outcrops at an altitude of about 550 feet mean sea level (MSL) in many of the New Haven Creeks. The top of the upper sandstone marker bed is at a depth of approximately 47 feet below ground surface (bgs) at MW-101 at the northwest corner of the former Kellwood facility. It is not present at all locations in the area of OU2 and OU6. The Swan Creek sandstone lies approximately 60 feet below the upper sandstone. It is generally an 8 to 10 foot layer of fine-grained, well-cemented sandstone within a layer of 15 to 20 foot thick sandy dolostone. The Swan Creek sandstone does not outcrop, except to the southeast along Boeuf Creek. The Swan Creek sandstone member is present at 131 feet bgs at MW-6SW, and at 113 feet bgs at MW-9SW. A distinguishing characteristic of the sandstone beds of

the Cotter Dolomite is that they are thicker than sandstone beds in the Powell and the Jefferson City and contain greater quantities of chert.

- **The Jefferson City Dolomite**: Beneath the Cotter Dolomite is the Jefferson City Dolomite, a layer that is fairly indistinguishable from the overlying Cotter Dolomite. Because of their similar lithologies, they are grouped together. The Jefferson City Dolomite is a tan to light grey, fine to medium crystalline dolostone or argillaceous dolostone, containing greenish-grey mudstone/shale beds and several chert-rich zones. It varies between 150 and 165 feet thick in the New Haven area and does not crop out as a surface feature.

- **The Roubidoux Formation**: Frequently used for domestic supply wells in New Haven, as discussed in Section 2.1.6, the Roubidoux Formation is variable in grain size and mineralogical composition. It is an approximately 115-foot layer consisting of sandstone, sandy dolomite, dolostone, mudstone, chert, and cherty dolostone. It can be most easily differentiated from the Jefferson City dolomite by an increase in chert, and a change to a more weathered orange-brown color at the top of the formation. The Roubidoux Formation contains a 20 to 30-foot interval of fine-grained, poorly cemented, well-sorted quartzose sandstone approximately 20 to 40 feet from the top of the unit.

- **The Gasconade Dolomite:** This formation underlies the Roubidoux Formation and has an average thickness in New Haven of about 305 feet. The Gasconade Dolomite is divided into the Upper and Lower Gasconade, and the Basal Gunter Sandstone member. The Upper Gasconade is characterized as massively bedded dolostone with little to no chert or sandstone, in contrast to the Lower Gasconade which contains abundant chert, including massive chert beds, 10 to 20 feet thick. The Upper Gasconade is approximately 35 to 50 feet thick in New Haven and is less permeable then the Roubidoux Formation above, and the Lower Gasconade below. The Gunter Sandstone in the New Haven area, despite its name, is a dolostone containing less than 10 percent sand.

- **Eminence Dolomite:** Underlying the Gasconade is the Eminence Dolomite, a medium to coarsely crystalline dolostone, with less than 5 percent chert and sand. This is the youngest formation of the Cambrian in New Haven. The Eminence Dolomite varies between 145 and 180 feet thick beneath New Haven.

- **Potosi Dolomite:** The Eminence Dolomite overlies the Potosi Dolomite, the lowermost formation in the Ozark aquifer. The Potosi Dolomite is a massively to thickly bedded, very porous, “vuggy” (small open cavities) dolostone, averaging 200 feet thick in the area. As discussed below in

Section 2.1.6, the Potosi Dolomite is often used for high capacity wells, such as the Pepsi Well.

The bedrock units that can be found exposed at the ground surface in the New Haven area are the Ordovician formations of the St. Peter Sandstone, Powell Dolomite, and Cotter Dolomite. **Figure 3.9** shows the location of generalized geologic cross-sections (**Figures 3.10 and 3.11**) in the OU2/OU6 area based on logs of monitoring wells installed for this RI and by the USGS. These cross-sections extend from the Cotter Dolomite into the Roubidoux Formation and indicate unit thicknesses that are consistent with the descriptions above.

2.1.4.2 Surficial Geology

New Haven, Missouri is covered by several unconsolidated surficial deposits including Quaternary-Age loess, residual deposits of the Buffalo Series, Quaternary-Age alluvium, and Quaternary-Age terrace deposits. The youngest of these is the loess, deposited in the Pleistocene epoch, consisting of uniform silt, tan to light brown, wind-blown particles, with locally small amounts of clay. The loess is located primarily at topographic highs in the area, and ranges from 0 to greater than 20 feet thick.

The Buffalo Series Deposits are residual deposits from the weathering of the underlying Powell and Cotter Dolomites. They are divided into two sub-units, the Buffalo A Sub-unit, and the Buffalo O Sub-unit. The Buffalo A Sub-unit is generally a stiff, orange-brown sandy or silty clay with small quantities of chert, less than 5 feet thick, and underlying the Quaternary-Age Loess. The Buffalo O Sub-unit is much thinner than the Buffalo A Sub-unit and is mixed with colluvial deposits (deposited near base of a slope), so that the combined deposit is less than 1 foot thick and is generally only found on slopes along the bluffs of the Missouri River Valley and, therefore, is not likely to be found in OU2.

The Quaternary-Age alluvium is found in the flood plains of the streams, and tends to consist of organic-rich deposits of silt and clay. The area around Boeuf Creek and its tributaries, including Wildcat Creek, contains large alluvial deposits (from running water) with chert gravel. The Quaternary-Age Terrace Deposits are also found near Boeuf Creek and are similar to the alluvial deposits, but are at a higher altitude, and were deposited in an earlier stream deposition event.

2.1.4.3 Structural Geology

New Haven is part of the Ozark Plateau, a broad structural and topographic dome characterized by karst (dissolved limestone) topography. Regionally, the Ozark Plateau is characterized by dissolution-induced sinkholes, caves, fractures, and underground drainage. The Ozark Plateau is underlain by a broad asymmetrical anticlinal arch, whose gently-dipping limb faces south toward the Ouachita Mountains.

Bedrock units in New Haven regionally dip to the northeast. The bedrock is fractured and jointed throughout, southeast-northwest and southwest-northeast.

Observations of outcrops along Highway 100 in western Franklin County and in the vicinity of OU2/OU6 indicate that the surficial bedrock contains a number of local variations in the dip of the rock units. There are three major structures in the OU2 area: the Wildcat Creek Anticline, the Park Creek Structure, and the Berger Creek Bluff Fault, all trending northwest-southeast (USEPA, 2003 and Starbuck, 2002). The locations of these structures are shown on **Figure 2.5**.

The Berger Creek Bluff Fault is northeast of OU2, and runs through the center of New Haven, just to the northeast of the Pepsi facility and southwest of OU4. This structure is exposed along a bluff to the northwest of New Haven, where it is a series of three faults about 50 feet apart with offsets of 3 to 10 feet. The Berger Creek Bluff Fault most likely extends to the southeast, following highs in the upper sandstone marker bed unit and a lineament to the southeast of New Haven.

The Wildcat Creek Anticline, lying to the southeast of OU2, was observed in an outcrop along a branch of Wildcat Creek located in the western half of Section 1, T44N, R3W (Starbuck, 2002). Flanks of this anticline dip to the southwest and northeast. More evidence of folded bedrock was also observed north of the outcrop along the same branch of Wildcat Creek.

The Park Creek Structure is delimited by faults trending to the northwest and northeast. The structure is expressed through uncharacteristic dips and altitudes of the upper sandstone marker bed of the Cotter Dolomite along a creek to the southwest of OU2, exposures of St. Peter Sandstone encountered at altitudes much lower than anticipated, and a northeast trending fault bounding an outcrop of the St. Peter Sandstone just south of Highway 100 in the western part of the city, west of OU2.

Geophysical surveying performed by Parsons in July 2004 identified a resistivity anomaly west of the northern well nest (MW-1) installed as part of the Residential Well Investigation (RWI) (Parsons, 2005). This trough in the bedrock was interpreted to be a geologic feature, and may indicate a vertical offset of strata. A possible fault was also identified east of the southern well nest (MW-2) and JS-38, in MDNR geophysical results from September 2004. The Interval Screening performed in July 2004 identified an offset in the transmissive zones between JS-37 and JS-38 that could indicate a fault, or that beds are dipping to the north.

Based on the logs of the monitoring wells (MW-101, MW-9SW, MW-9US, BW-21, MW-6SW, MW-6US, MW-7SW, MW-7US, MW-1SW, MW-11, MW-12, MW-2SW, and MW-4B) and domestic wells with geophysical logs (JS-25, JS-14, JS-36, JS-37, PA-55 and JS-38), the surface of both the upper sandstone marker bed and the Swan Creek dips very gently to the southwest in the immediate vicinity of OU2. The difference in dip in the vicinity of OU2 compared to the dip between JS-37 and JS-38 reflects the effects of local geologic structures. Exposures of rock in roadcuts and stream beds in the area indicate that local changes in the direction and magnitude of dip in bedrock are common in the area.

2.1.5 Soils

The predominant soils in the OU2/6 area are the Crider silt loam and the Hartville silt loam, with the Haymond silt loam present along creeks. The Crider silt loam is a deep, well drained soil that is mapped in a unit on 5 to 9 percent slopes and a unit on 9 to 14 percent slopes. The surface layer of the Crider is dark yellowish brown to brown. Permeability of the Crider soil is described as moderate (Soil Conservation Service, 1989). The soil is locally severely eroded. The soil is reported to contain a moderate amount of organic matter.

The Hartville silt loam is a very deep, poorly drained soil that is present on stream terraces and foot slopes. Map units (subdivisions of the soil type) of 2 to 5 percent slope and 5 to 9 percent slope are present in the OU2/6 area. The surface layer is typically dark grayish brown. These soils have a permeability described as slow. Organic content is moderately low.

Haymond silt loam is the predominant soil in the flood plains of creeks in the OU2/6 area. The Haymond is a very deep, well drained soil that occurs in areas with little slope. Flooding for brief periods is common for this soil. The surface layer is dark grayish-brown. The soil has a moderate permeability and organic matter content.

2.1.6 Hydrogeology

2.1.6.1 Aquifers

There are two primary aquifers in the New Haven area: the Missouri River alluvial aquifer and the bedrock Ozark Aquifer (USEPA, 2003). The Department of Natural Resources has determined that there are no Missouri River alluvial sediments in the vicinity of OU2. Although there are Quaternary alluvial deposits southwest of the site, the only aquifer in the vicinity of OU2 is the bedrock Ozark aquifer. The bedrock Ozark aquifer beneath OU2 consists of two distinct flow systems: a shallow flow system and a deep flow system. The shallow bedrock flow system includes the Cotter Dolomite and Jefferson City Dolomite. The deep bedrock flow system includes the Roubidoux Formation and older geological formations, including the Gasconade, Eminence and Potosi Dolomite.

The Ozark Aquifer is found throughout New Haven and OU2. It consists of a thick sequence of water-bearing dolostone, limestone, and sandstone formations, as described in Section 2.1.4.1, with varying water-yielding capacities. **Table 2.1** shows bedrock units of the Ozark Aquifer. The uppermost bedrock units found in New Haven are the St. Peter Sandstone, Powell Dolomite, Cotter Dolomite, and Jefferson City Dolomite. Beneath the Cotter and Jefferson City Dolomites, the geologic formations which comprise the Ozark aquifer are, in order of increasing age, the Roubidoux Formation, the Gasconade Dolomite, the Gunter Sandstone Member of the Gasconade Dolomite, the Eminence Dolomite, and the Potosi Dolomite.

The St. Peter Sandstone, as discussed in 2.1.4.1, is less than 40 feet thick when present, and is only found in places such as the Park Creek Structure. In New Haven, it is exposed approximately 1/3-mile to the west of OU2. The Powell and Cotter Dolomites are the bedrock units most often exposed in the New Haven area. The partial erosion of these units creates considerable variance in their thicknesses in the New Haven area. Where present, the Powell is as thick as 95 feet; the Cotter ranges from 85 to 300 feet thick.

The Cotter and Jefferson City Dolomites contain numerous thin shale and mudstone partings and are less permeable than the underlying formations of the Ozark aquifer, which helps to obstruct groundwater from discharging to the lower units (Imes and Emmett, 1994). The Powell, Cotter, and Jefferson City Dolomites produce small yields, locally producing only 5 to 15 gallons per minute (gpm).

2.1.6.2 Well Yields

According to a USGS/USEPA well survey, many of the domestic wells in the New Haven area (where there is information available) are open to portions of the Cotter Dolomite, Jefferson City Dolomite, and/or the underlying Roubidoux Formation. The Roubidoux Formation (which produces about 15 to 50 gpm) is used for newer domestic supply wells, and is probably the most widely used formation in the Salem Plateau for domestic supply (Miller and Vandike, 1997). Yields from the Roubidoux Formation in areas such as New Haven where the formation is buried several hundred feet, are often larger than the average elsewhere (Miller and Vandike,1997). It is believed that the significant recharge area for the Roubidoux Formation is located approximately 15 miles southwest of New Haven where the Roubidoux Formation is exposed at the surface.

High capacity wells are drilled into formations with higher production yields. The deeper units, in particular the Gunter Sandstone Member of the Gasconade Dolomite and the Potosi Dolomite, produce greater quantities of water and are therefore desirable for high-capacity municipal and industrial wells. Recharge to the Gasconade, Eminence and Potosi Dolomite flow system occurs primarily along a regional east-west trending topographic divide across southern Missouri, about 90 miles south of New Haven. Wells open to the Gunter Sandstone Member have an average yield of only 40 to 50 gpm; however, yields from production wells open to this unit locally are found to be as large as 200 to 500 gpm (Miller and Vandike, 1997).

Most of the high capacity wells in the area, including New Haven municipal wells W1, W2, and W4, and the Pepsi well are drilled into the Potosi Dolomite, which is the lowest unit of the Ozark Aquifer, and a unit that is known to be very porous and full of vugs (small dissolution voids). The Potosi Dolomite has predictably high yields ranging from 200 to 1,000 gpm. City well W3 was also originally drilled into the Potosi Dolomite to take advantage of the high production yields, but because of a problem with turbidity, the lower part of the well was plugged,

leaving the well open instead to the Gasconade and Eminence Dolomites, which have yields of approximately 75 to 250 gpm (Miller and Vandike, 1997).

2.1.6.3 Groundwater Flow and Gradients

As part of the site investigation by the USEPA, the USGS inventoried the domestic wells and high production wells in the New Haven area during the spring of 1999. During the inventory, water level measurements were taken in selected wells within 5 to 6 miles of New Haven on the south side of the Missouri River. Results of the inventory indicated that water levels are the highest along the topographic ridge between the Missouri River and Boeuf Creek, north of OU2, and in the uplands south of Boeuf Creek, and are lowest along Boeuf Creek and the Missouri River. The highest water levels (more than 580 feet AMSL) are west of New Haven and several miles south of New Haven. Shallow groundwater flows from topographic highs toward the topographic lows at the discharge areas along Boeuf Creek and the Missouri River (**Figure 2.7**).

New Haven is a recharge area for groundwater and has an average annual precipitation of approximately 40 inches (USEPA, 2003). Regionally, groundwater flows to the north/northeast (USEPA, 2003). There is a shallow groundwater divide that runs roughly east-west located north of Highway 100. South of this divide, shallow groundwater flows from OU2 south towards Boeuf Creek.

Most domestic wells in the New Haven area are less than 400 feet deep, and are open to Cotter Dolomite, Jefferson City Dolomite, and/or the upper part of the Roubidoux Formation. The current municipal wells (W-3 and W-4) are more than 800 feet deep with deeper casings, and therefore are open to the deeper groundwater flow system, including the Lower Gasconade Dolomite, the Gunter Sandstone Member of the Gasconade Dolomite, and the Eminence Dolomite (**Figure 2.8**). The Pepsi well is open from the Roubidoux Formation to the Potosi Dolomite. Decommissioned municipal wells W-1 and W-2 had relatively shallow casing depths (less than 220 feet). This is due to (1) their lower land surface elevation; and (2) they were open to strata that overlie the strata used in W-3 and W-4. Municipal well W-1 was open from the lower Cotter Dolomite to the Potosi Dolomite, and municipal well W-2 was open from the Jefferson City Dolomite to the Potosi Dolomite. Both of these wells have been plugged.

The static water elevations measured in municipal wells W3 and W4 and in the nearby Pepsi well ranged from 493 to 500 feet AMSL when these wells were drilled in 1988, 1994, and 1965, respectively. The potentiometric map of shallow groundwater (Cotter/Jefferson City Dolomites) in the area indicates water elevations of approximately 525 feet AMSL. As discussed in the OU1/OU3 RI Report (USEPA, 2003), these head differences suggest a potential downward gradient of approximately 0.15 feet per foot between the Cotter/Jefferson City Dolomite and the deeper formations (Roubidoux, lower Gasconade Dolomite, upper Potosi Dolomite). The downward gradient decreases with increasing distance away from the shallow groundwater divide, and the vertical gradient

reverses and points upward, near the Missouri River where the regional flow system dominates. This last assertion is supported by tests performed by USGS in municipal well W-2 from 1999 to 2000, and by potentiometric head differentials monitored in wells BW-01 and BW-00 (USEPA, 2003, and USEPA, 2001). These tests, which included geophysical logging (caliper, natural gamma, borehole fluid, electromagnetic induction, and borehole video logs), together with borehole flow meter tests), detected upward vertical flow in this well borehole. The results of this testing were included in the 2001 Expanded Site Investigation/Remedial Investigation Results report and the 2003 Focused Remedial Investigation Report for OU1 and OU3, (prepared by USGS for USEPA).

The interval screening portion of the RWI identified both JS-37 and JS-38 as vertical conduits for COPC migration from the shallow bedrock to the lower portions of the Cotter and Jefferson City formations. JS-38 is also open to the upper 15 to 20 feet of the Roubidoux Formation, but not to the sand unit of the Roubidoux Formation. Interval screening testing was also performed at JS-14 and JS-36 in 2007. This testing indicated that these wells also served as vertical conduits for downward migration. Both JS-14 and JS-36 are terminated in the lower portions of the Jefferson City. Liners have been installed in JS-14, JS-36 and JS-38 to reduce the downward migration from shallow portions of the well to the lower portions. Bentonite grout was placed in the lower portion of JS-37 to minimize vertical movement in the borehole, minimizing the potential for COPCs to move to lower horizons.

The MDNR Wellhead Protection Program instituted Special Area 3 that covers the area of OU2 and OU6 (**Figure 2.9**). The designation of Special Area 3 results in additional rules for constructing new water wells or modifying existing wells. These additional rules provide greater protection against exposure to residents by reducing the risk of new man-made conduits being created. The establishment of Special Area 3 does not address existing wells, but only new wells and wells being reconfigured. Additional discussion of the rules is included in Section 2.4.4.2.

2.1.7 Land Use

New Haven is located in Franklin County, Missouri approximately 55 miles west of downtown St. Louis, Missouri. The 2006 population estimate was approximately 2,000 residents (City of New Haven, 2009). The population is characterized as rural, and occupies approximately 707 households with an average household size of 2.5 people. Land use north of State Highway 100, the main road through New Haven, is primarily single-family residential, with some multi-family dwellings, small businesses, churches, and manufacturing facilities. This area includes downtown New Haven which lies along the Missouri River. Additional industrial areas, as well as new residential development, exist south of Highway 100. Manufacturing facilities in the area produce automotive door seals, custom aluminum tubing, and waterproof and dyed synthetic fabrics.

These industries employ several hundred workers, many from outside the city limits. The eastern part of the city is primarily deciduous forest. Land use outside the city limits is mostly pasture, with some soybean and corn crops.

2.1.8 Ecology

According to the USFWS TESS database, the State of Missouri supports 31 federally listed threatened and endangered (T&E) species, consisting of 21 animals and 10 plants. According to the Missouri Department of Conservation Natural Heritage Database, there are a total of seven federally listed T&E species in Franklin County. However, due to site development and ecology, only two of the seven species may potentially be found within or near OU2 or OU6. These two species are the threatened decurrent false aster (*Boltonia decurrens*) and the endangered winged mapleleaf (*Quadrula fragosa*). No additional information on the occurrence of rare or endangered species or natural communities is known at this time.

The OU2 and OU6 areas are not located within a national wildlife refuge, national park, national forest or grassland, state, county, or city park. New Haven is located in the New Haven topographic quadrangle map within the Central Irregular Plains ecological region. The Missouri River located to the northeast of OU2 and OU6 has six designated beneficial uses, including protection of warm-water aquatic-life and human-health-fish consumption, irrigation, livestock and wildlife watering, boating and canoeing, drinking water supply, and industrial water supply. The river is a riparian wetland and supports a wide variety of wildlife, including T&E species. The river is also a sanctuary for a wide variety of migratory waterfowl and birds.

Although T&E species may be within or pass through the OU2 or OU6 areas, according to the USFWS Critical Habitat Portal database, there are no designated critical habitat areas within Franklin County.

The USFWS Wetlands Online Mapper, through the National Wetlands Inventory (NWI), was used to identify wetland areas within the OU2 and OU6 areas. Wetlands are land areas that are transitional between terrestrial and deep-water habitats, in which the water table is usually at or near the surface or in which the land is covered by shallow water. Currently, according to the NWI database, there are two predominant wetland systems (Palustrine and Riverine) with varying classes, sub-classes, water regimes and modifiers. The four wetland types identified by the NWI within OU2 and OU6 are:

- PUBF/Gx-Palustrine, unconsolidated bottom, semi-permanently flooded/intermittently flooded, excavated
- PFO1A-Palustrine, forested, broad-leaved deciduous, temporarily flooded
- PEM1-Palustrine, emergent, persistent
- R2USA-Riverine, lower perennial, unconsolidated shore, temporarily flooded

According to the National Historic Landmarks, National Register of Historic Districts, National Register of Historic Places, and National Register Information System national databases, there are no nationally or state registered structures or districts within the OU2 and OU6 areas. The national register listings for New Haven are located in the downtown area and along the river. The New Haven Cemetery is located in the northeast corner of OU6.

2.2 PREVIOUS INVESTIGATIONS AT OPERABLE UNITS OU2 AND OU6

This section provides a description of historical sampling events that have taken place in OU2 since 1989. A summary of the previous investigations is also presented as **Table 2.2**.

2.2.1 MDNR (1989-1993)

2.2.1.1 Soil Investigation

On September 11, 1989, MDNR performed an investigation of the New Haven Public Water Supply Site. The Division of Environmental Quality, Laboratory Services Program, collected four soil samples and one water sample. One of these soil samples was collected in OU2, on the northern side of the Former Kellwood manufacturing building. The sample was analyzed for metals and volatile organic compounds (VOCs). Tetrachloroethylene (PCE) was detected in this sample at a concentration of 13,000 µg/kg, and trichloroethylene (TCE) was detected at 6,500 µg/kg (MDNR, 1989).

2.2.1.2 Groundwater Investigation

Between May 1988 and September 1993, MDNR collected numerous samples from W3, and one sample from the Pepsi well. Neither PCE nor TCE was detected in the samples above the laboratory detection limits (MDNR, 1988 and Jacobs Engineering Group, 1994).

2.2.2 Geotechnology (1991-1998)

In 1991, Geotechnology, Inc. submitted a Final Contamination Delineation Plan for the Former Kellwood facility to MDNR (Geotechnology, 1991). In 1992, this plan was revised (Geotechnology, 1992a and 1992b). In 1994, an agreement was reached between Kellwood and MDNR for the remediation of soils containing PCE and TCE at the former Kellwood facility. As described in Section 2.2.2.2, soils with concentrations of PCE exceeding 380,000 µg/kg (approximately 90 cubic yards) were excavated and sent to an off-site incinerator. To meet the remedial objective of reducing the highest observed levels of PCE and its degradation products in the soil to a concentration of 1,000 µg/kg or below, the remaining soil was land-farmed. The results of soil investigations performed prior to, and after the land-farming, are described below.

2.2.2.1 Soil Investigation

In 1991, prior to the land-farming activities, 16 borings (B-1 through B-16) were advanced at OU2. Continuous soil samples were collected and field screened with a photoionization detector (PID) for the presence of volatile organic vapors. Laboratory analysis of these soil samples indicated that the primary COPC was PCE.

One composite sample was collected over the entire depth of each boring; total boring depths ranged from 1 foot to 9 feet bgs. PCE was detected in 11 of the 16 samples. The highest level of PCE (810,000 µg/kg) was found at B-7, approximately 80 feet north of the existing former Kellwood manufacturing building, and 150 feet east of Industrial Drive. Several other VOCs were also encountered in various borings.

In addition, a composite sample prepared from aliquots of the most impacted boring according to PID readings was analyzed for Toxic Characteristic Leaching Procedure (TCLP) metals; no metals were detected above TCLP limits in this sample. A sample prepared from the aliquots with PID readings greater than 100,000 µg/kg was analyzed for TCLP VOCs; PCE was detected in this sample at 8,800 micrograms per liter (µg/L), above the regulatory limit of 700 µg/L.

In 1993, Geotechnology installed three monitoring wells north of the former Kellwood facility (MW-101, MW-102, and MW-103). During installation of these wells, soil samples were also collected from each of the well boreholes, between 0 and 3 feet bgs. VOCs were not detected in any of the three soil samples (Geotechnology, 1993).

2.2.2.2 Removal Action/Land-farming

In 1994, Geotechnology began off-site disposal of soil with concentrations greater than or equal to 380,000 µg/kg PCE or 260,000 µg/kg of TCE. Soil and weathered rock, totaling approximately 90 cubic yards, with VOC levels between 610,000 and 3,000,000 µg/kg, were removed using a track-hoe and transported to an off-site location for incineration. Additionally, as part of the subsequent land-farming effort, the area was periodically plowed/disked to expose and volatilize organic compounds adsorbed to the remaining soil, to meet a cleanup objective of 1,000 µg/kg.

To monitor the progress of the land-farming activities, the soil was periodically sampled, and in 1998, a Final Soil Sampling Report was issued to MDNR. The results of the last round of sampling, which occurred on June 25, 1998, indicated that the VOC concentrations in the soil at the land-farm sampling grid locations were below 1,000 µg/kg. Kellwood received a letter dated August 25, 1998, from MDNR stating that no further action regarding the soil was required.

Subsequent soil sampling performed by USGS in 2001 (discussed in Section 2.2.4) found elevated levels of PCE (3.3 mg/kg in a laboratory sample, 17.6 mg/kg from the field GC) in selected soil samples.

2.2.2.3 Groundwater Investigation

In 1993, three monitoring wells (MW-101, MW-102, and MW-103) were installed north of the former Kellwood facility (Geotechnology, 1993). MW-101 and MW-102 were screened between 35 and 55 feet bgs, and MW-103 was screened between 40 and 60 feet bgs, tapping the upper sandstone marker bed of the Cotter Dolomite. Between 1993 and 2003, these three wells were monitored quarterly by Geotechnology, as outlined in an agreement between Kellwood and MDNR. Parsons performed quarterly monitoring of these wells between November 2003 and March 2004. The results, which were submitted quarterly to MDNR and USEPA, showed low levels of VOCs (less than 10 µg/L) in MW-101. The results for MW-102 and MW-103 were non-detect. These sampling results are consistent with results from the RI. These historical sampling results are included on **Figures 2.10 and 2.11**.

2.2.3 Environmental Management Alternatives (EMA)

In 1999, EMA performed a Phase I and limited Phase II Environmental Site Assessment (ESA) of the former Kellwood plant property. At that time, and currently, this was the site of a metal fabrication facility operated by Metalcraft Enterprises. The Phase I and II were done for Excaliber Acquisition Corporation as part of a proposed property transfer.

2.2.3.1 Groundwater Investigation

As part of the Phase II ESA, EMA installed six monitoring wells. Three of the wells (MW-1, MW-2, and MW-5) were screened between approximately 51 and 61 feet bgs. MW-3 was screened from 45 to 55 feet bgs, MW-4 was screened from approximately 41 to 51 feet bgs, and MW-2A was screened between approximately 2 and 3 feet bgs. The report concluded that groundwater flow at the former Kellwood facility is to the south and southwest.

EMA collected groundwater samples from each well. PCE, TCE and cis-1,2-dichloroethene (cis-1,2-DCE) were detected in the loading dock area and south-southwest of the former Kellwood facility.

In their site assessment report, EMA indicated that the VOCs detected in the deeper groundwater at MW-2 and MW-4 may have migrated downward during drilling of these wells. They added that the presence of organic compounds during the second round of sampling two months later suggested probable long-term presence of these compounds. The analytical results of the EMA sampling are included in **Figure 2.11**. These results are consistent with sampling results performed as a part of this RI.

EMA also collected three samples of plant wastewater to evaluate discharges to the city municipal wastewater system (New Haven Publicly Owned Treatment Works [POTW]). Detectable concentrations of VOCs and semivolatile organic compounds (SVOCs) were not found, although the detection limit of one of the samples was elevated due to the presence of soap.

2.2.3.2 Soil Investigation

As part of the Phase II ESA, EMA drilled five test borings, field screened soil boring samples, and collected one soil sample (MW-2) for analytical testing. The sample contained PCE at a concentration of 339,000 µg/kg, TCE at 2,100 µg/kg, and cis-1,2-DCE at 5,620 µg/kg at the northeast corner of the former Kellwood facility, near DNAPL borehole N-12.

2.2.4 USGS and Black & Veatch (2000 to Present)

The USGS and Black & Veatch launched an investigation of the New Haven area as part of the OU1 and OU3 RI. Results of this investigation, as they relate to OU2, are described below.

2.2.4.1 Soil Investigation

In 2001, USGS collected samples from five test pits located north of the former Kellwood facility. The test pits ranged from 1 to 2 feet deep. In addition, soil samples were collected during the installation of monitoring well BW-21A and direct push boring OU2-GPM01. PCE was detected in several test pits, and in the borehole samples from BW-21A and OU2-GPM01. Soil samples from the test pits had concentrations of VOCs that were consistent with the samples collected as a part of this RI. The analytical results of the USGS soil sampling is presented in **Table 2.3**. Soil samples were also collected from four locations at which sediment samples were collected. The samples collected from 0-0.2 feet bgs at these locations were classified as sediment samples, and the samples collected from 0-0.5 feet bgs at these locations were classified as soil samples. PCE was not detected in these samples.

2.2.4.2 Groundwater and Residential Well Investigation

From 2000 to 2002, the USGS installed and sampled new monitoring wells in OU2, sampled existing wells in the area that had been installed as part of previous investigations, and sampled City Well W-3. PCE was detected in several of the monitoring wells but not in W-3. The construction of the USGS monitoring wells is listed in **Table 2.4**. The geologic and gamma logs from BW-21 and BW-22 differ markedly despite being located only 300 feet apart. The significance of these wells will be discussed in Section 3.2.1.4.

Since 1999, the USGS has inventoried and sampled residential wells in the New Haven area. Five residential wells to the south of the former Kellwood facility (JS-14, JS-36, JS-37, JS-38, and JS-52) were found to contain PCE. **Table 2.5** lists the results of historical groundwater sampling of completed wells by the USEPA and USGS. In response to these detections, Kellwood voluntarily installed whole-house carbon filtration systems at four of these residences (JS-14, JS-36, JS-38, and JS-52), and maintained and sampled those wells in accordance with AOC CERCLA-07-2002-0091 (2002 AOC), and voluntarily extended a city water line at one residence (JS-37). Additionally, the casing for well JS-50 was voluntarily extended to 200 feet bgs by Kellwood to protect

against possible VOC infiltration from shallower depths. As part of the 2002 AOC, the whole-house carbon filtration systems at JS-14, JS-36, JS-38, and JS-52 are sampled on a quarterly basis to measure treatment effectiveness. The results of the quarterly residential sampling are submitted to USEPA as part of quarterly monitoring reports required by the 2002 AOC.

Well Installation Advisory

In response to the residential well detections, MDNR issued an initial water well installation advisory for the New Haven area in September 2002. For the area south of New Haven (southeast of the former Kellwood facility) the advisory recommended 200 feet of casing, full-length grouting, and a 10-inch borehole diameter for any new residential wells.

A rule amendment became effective on April 30, 2006 that applied to wells in an area referred to as Special Area 3, defined as Sec 36, Township 45, Range 3W; Sec 2, N ½ Sec 11, SW ¼ Sec 1 and NW ¼ Sec 12, Township 44, Range 3W (see **Figure 2.9**). This rule amendment (and prior to its finalization, an emergency rule) set new drilling and construction standards for water wells and heat pump wells. The standards included in the rule amendment are:

- Consultation with MDNR prior to installing any water well or heat pump well.
- Analysis of a water sample prior to deepening of any existing well.
- Containerization of drilling derived solids and liquids and analysis for determination of proper disposal.
- Including a sampling point within 10 feet of the wellhead for any new or deepened wells in the area.
- Analysis of a water sample from any new or deepened wells within 60 days.
- At any event at which DNAPL is encountered, cease drilling, collect a DNAPL sample for analysis, and plug the borehole full-length with high-solids bentonite grout.

2.2.4.3 Surface Water and Sediment Investigation

A surface water and sediment investigation, performed from 2000 to 2002 by USGS, tested Boeuf Creek and several tributaries in the vicinity of OU2 for VOCs. PCE and TCE were found in several stream water samples collected in the 500 and 510 tributaries that run west of OU2. Concentrations of up to 100 µg/L were detected near the confluence of the 500 and 510 tributaries (**Figure 2.12** and **Table 2.6**). Only one sample (OUX-710TB-6) in the eastern tributaries contained PCE and TCE in 2000; when this location was re-sampled in 2002, PCE and TCE were not detected.

Stream sediment samples were collected from 0 to 0.2 feet bgs in the 510 tributary that runs just west of OU2. PCE was detected at an estimated concentration of 1.8 µg/kg in sample OUX-EC06 (**Figure 2.13**). No other

chemicals were detected in any sediment samples. As discussed in Section 2.2.3.1, soil samples were also collected from 0 to 0.5 feet bgs from the sediment sampling locations; no PCE was detected in the soil samples.

2.2.4.4 Sewer Investigation

An investigation of the sewer lines servicing New Haven was performed by USGS during 2001 and 2002. This investigation showed PCE and TCE at selected locations (lift stations and manholes) in the sanitary sewer system. **Figure 2.14** shows the results of the USGS water samples collected from the sanitary sewer system. All of the locations with detections of PCE and TCE were downstream of the former Kellwood facility.

Slightly elevated levels of organics, including PCE and TCE, were found in LS5, a lift station located west of the former Kellwood facility. Numerous field gas chromatograph (GC) samples and samples for laboratory analysis were collected from LS5. The field GC samples were collected from diffusion bag samplers placed in the lift station in order to obtain a four-day average PCE concentration. Since most of the laboratory samples were instantaneous grab samples, the analytical laboratory results are not necessarily comparable to the field GC results. Field GC results indicated that PCE was present at LS5 at concentrations ranging from 0.05 to 24.46 µg/L, whereas laboratory grab samples detected PCE ranging from 1.6 to 5.4 µg/L. TCE (up to 69.8 µg/L), 1,2-dichloroethylene (1,2-DCE) (up to 201 µg/L), vinyl chloride (up to 97.7 µg/L), and benzene (up to 7.3 µg/L) were also found in field GC samples collected from LS5.

Low levels of organics, including PCE and TCE, were also found in LS4, a lift station located east of the former Kellwood facility. Field GC results indicated that PCE was present at LS4 at a concentration of 0.03 µg/L, whereas laboratory grab samples detected PCE at a concentration of 1.2 µg/L. TCE (0.04 µg/L), 1,2-DCE (0.18 µg/L), and benzene (0.34 µg/L) were also found in field GC samples collected from LS4.

PCE was detected in samples collected from manholes northeast of the former Kellwood facility (up to 7 µg/L at MH407; and up to 3.2 µg/L at MH154) and north of the former Kellwood facility (up to 19.6 µg/L at MH156S; and up to 0.45 µg/L at MH156N).

2.2.4.5 Biota Sampling

In 2001 and 2002, a tree core survey was completed in the vicinity of OU2 by USGS. Several samples directly north of the former Kellwood manufacturing building contained PCE. PCE was also detected in samples collected southwest of the former Kellwood manufacturing building. The extent of PCE detections in the tree core samples is consistent with the extent of detections in shallow groundwater for samples collected as a part of this RI. The results of the USGS tree core samples are shown in **Figure 2.15.**

2.2.5 Parsons (Residential Well Investigation)

In June 2004, Kellwood agreed to perform an expedited bedrock well installation and residential well sampling effort. The purpose of this RWI was to gain additional understanding about detections of PCE in certain residential wells (OU6) south of OU2 along Boeuf-Lutheran Road and in the Wildcat Creek Development along Highway C. The RWI was conducted in phases, the first of which was the interval screening, followed by monitoring well installation and two rounds of groundwater sampling. Details of this investigation were presented in a report dated April 2005 (Parsons, 2005). A summary is provided below.

2.2.5.1 Interval Screening

Interval screening was performed at two residential wells, JS-37 and JS-38, in July 2004 (Parsons, 2005). Borehole geophysics, including an optical televiewer, a natural gamma probe, a fluid resistivity/temperature probe, and a heat pulse flow meter, were used to identify transmissive intervals and intervals with the potential to carry VOCs into each well. Flow, fluid resistivity, and temperature measurements were collected both during static conditions (to identify intervals providing the greatest yield to the well) and while pumping (to verify the highest yielding intervals under residential well pumping conditions).

Based on the interval screening results, there appeared to be multiple transmissive zones present in the vicinity of the residential wells. At well JS-37, four intervals were identified that contributed significant flow to the well. At well JS-38, two such zones were identified.

The uppermost transmissive zone in JS-37 may correlate with the Swan Creek sandstone. This interval is likely to be present in the cased portion of well JS-38. Analytical data collected during the interval screening indicated the presence of higher PCE, TCE and cis-1,2-DCE levels in well JS-37 compared to well JS-38. PCE concentrations under static conditions are higher in the shallow samples in well JS-37. This well had a downward flow of just under 0.2 gpm in the borehole under static conditions.

Concentrations of PCE varied little with depth in well JS-38, under both static and stressed conditions. This well was observed to have a downward flow of approximately 0.5 gpm in the borehole under static conditions. Based on reports of the conditions in which the well casing was grouted in place, it is possible that the seal between the casing of well JS-38 and the borehole is ineffective. The high flows that were observed immediately beneath the bottom of the casing reinforced this concern. Based on these findings, a liner was installed in JS-38 to seal off water from the portion of the borehole above the packer, including the water entering the well from around the casing. The downward flow of PCE in this well is the likely source of PCE in the well for the adjacent home, JS-52. JS-52 was lined shortly after it was installed and is believed to have an effective seal that prevents water from shallow depths from entering the well.

2.2.5.2 Monitoring Wells

Between September and November 2004, a total of eight monitoring wells were installed south of OU2 at the MW-1 (northern) and MW-2 (southern) locations. These wells were sampled during drilling to provide information on the extent and magnitude of impacted groundwater, and to screen and case wells at appropriate depths.

During the first round of monitoring well sampling, conducted in December 2004, VOCs were only detected in the shallowest wells in each well cluster. A second round of sampling was conducted in February 2005 to verify these results. The data were compiled and submitted to USEPA in the Draft Residential Well Investigation Report (Parsons April 2005). The results from the second round of sampling showed that impacts above USEPA MCLs in groundwater in the vicinity of well nest MW-1 were limited to the interface between the overburden and the bedrock (MW-1S). Impacts in groundwater below MCLs were encountered at depths of 49 to 75 feet in MW-1T1 (1 µg/L of PCE detected on February 2, 2005; the analytes were below detection limits on December 16, 2004). Monitoring well MW-1SW was not impacted. This well was cased through the zone encompassing the overburden/bedrock interface and the next transmissive zone (49 to 75 feet bgs), and was installed as open hole in a deeper transmissive zone (Swan Creek Sandstone).

Monitoring well MW-2S, which is screened across the overburden-bedrock interface, contained PCE at estimated concentrations less than the practical quantitation limit of 1 µg/L during both sampling events. The four deeper wells in the MW-2 cluster (MW-2SW, MW-2T2, MW-2T3, and MW-2R) were non detect in both sampling events.

SECTION 3
INVESTIGATION METHODS AND RESULTS

3.1 FIELD ACTIVITY SUMMARY AND RESULTS

3.1.1 Soil Investigation (Task 1)

The goal of the soil investigation was to characterize the extent and magnitude of VOCs in soil in the immediate vicinity of the former Kellwood facility. Select samples were also analyzed for SVOCs, pesticides, polychlorinated biphenyls (PCBs) and metals for risk assessment purposes.

To achieve this objective, a sampling grid was surveyed over the land-farm area, the loading dock of the former Kellwood facility, and the area to the southwest of the land-farm area. A 30-foot by 30-foot grid was laid out in the areas mentioned above starting with west-east rows designated by letters A through U (letters I and O were not used). Row A was the southernmost, and row U was the northernmost. Numbered south-north columns started in the west with column 1, and the eastern-most column was number 17.

Borings were advanced and multiple samples were collected at 37 different grid locations between September 10 and 13, 2007 (see **Figure 3.1a** for sampling locations). The borings were continuously logged at each location (see Appendix C for logs), and the material was screened with a PID capable of detecting vapors to the parts per billion (ppb) range (RAE Systems^{tm} ppbRAE).

Typically, two soil samples were collected for analysis from each boring. Sample collection and analysis summary is presented in **Table 3.1**. With the exception of borings advanced in the parking lot and road bed (B2, B4, B8, B10, C6, D4, D10, E2, E6, E8, F10, H10, K10, M10, N12, P12, R10, and T10), one surface soil sample (0 to 6 inches bgs) was collected from each boring. At the boring locations located in the parking lot and road bed, one sample was collected from the first interval of soil encountered below the fill. A second sample was collected from each of the borings at a depth interval at the highest PID reading. A second sample was not collected from T10 as the bedrock at this point was too shallow to allow further advancement beyond the initial sample depth. A total of 91 samples were collected for VOC analysis. In addition, five of these samples; B4-SS01-004.0-070912, MC04-SS01-001.3-080621, P14-SS01-000.0-070911, P14-SS01-003.0-070911, and P16-SS01-002.5-070911, were also analyzed for SVOCs, pesticides, PCBs and metals for use in the risk assessment. The results of these analyses are included in **Table 3.2**.

As part of the soil investigation, four Shelby tube geotechnical samples were collected; one each at grid locations B2, E2, P6, and R6. The samples were analyzed for total organic carbon, specific gravity, water content, and bulk density. The results of these samples are presented in **Table 3.3**.

Soils are thin on the open lot north of the former Kellwood facility where the PCE disposal was reported to have occurred. One reason for the thin soil is that most of the impacted soil was excavated for off-site treatment. The average depth to refusal observed during the advancement of the 15 soil borings on this open lot was approximately 28 inches.

A summary of analytical results is presented in **Table 3.2** and shown on **Figure 3.2**. PCE was detected in 41 of the samples. Seventeen of the samples contained PCE at concentrations at or above the 141 µg/kg screening criterion. PCE concentrations are generally above the screening criterion for the samples collected in the southern and central portions of the open lot north of the former Kellwood facility. TCE and 1,2-DCE (total), were detected in 11 samples, but at concentrations below their respective screening criteria.

Five samples were analyzed for SVOCs, pesticides/PCBs and selected metals in addition to VOCs. Several SVOCs were detected in three of the five samples. However, none of these detections exceeded the screening criteria. The concentrations of metals in the five samples were below the screening criteria with the exception of lead in three samples, and barium and arsenic, each in one sample.

3.1.2 Groundwater Investigation (Task 2)

The goal of the groundwater investigation at OU2, combined with data gathered from OU6, was to characterize the horizontal and vertical extent and magnitude of VOCs in groundwater and to identify the geologic, hydrologic, and geochemical factors that affect the distribution and migration of VOCs, especially PCE, in the subsurface. The groundwater investigation task was divided into seven components, or subtasks: interval screening, direct-push sampling, residential well sampling, monitoring well installation and sampling, site-wide groundwater sampling, aquifer testing, and surveying. Each subtask is described in the sections below.

3.1.2.1 Task 2a – Interval Screening

This section describes the procedures and methodology used during the April 2006 interval screening conducted in wells JS-14 and JS-36 and the April 2008 interval screening conducted in well JS-36. The results of the interval screening were presented to the USEPA in a report dated July 2008 (Parsons, 2008). The text and tables from that report along with the geophysical logs are presented in **Appendix D**.

Preparation for the interval screening investigation began with the delivery and filling of a 1,500-gallon tank at each of the two residences for use while the wells were out of service. The existing well pumps were then pulled.

During the April 2006 event, an old well pump was discovered at the bottom of JS-36 that blocked access to the lower portion of the borehole. As a result, follow up logging and interval screening of JS-36 was performed in April 2008.

The old well pump was removed from the well, allowing access to the entire length of the borehole.

Downhole borehole geophysics performed on the two residential wells (JS-14 and JS-36) included:

- Borehole visual imaging using an optical televiewer and borehole diameter measurement with a caliper to identify well construction and any significant bedding planes, fracture zones, and solution cavities that may provide a preferential groundwater migration pathway;
- Borehole natural gamma, single point resistivity(SPR), and self-potential (SP) surveys to assist in correlating the location-specific stratigraphy to other well locations within OU2 and OU6;
- Interval water characteristics and flow measurements using a fluid resistivity/ temperature probe and heat-pulse flowmeter during ambient conditions to identify those intervals providing the greatest yield to the well;
- Interval flow measurements while pumping from the top at a constant rate to verify the highest yielding intervals to the well under stressed conditions (similar to residential well pumping conditions); and
- Discrete sampling at selected depths under both static and pumping conditions.

Changes in the temperature, fluid resistance and fluid conductivity may indicate zones of flow into or out of the borehole. Temperature, fluid resistance, and fluid conductivity of the water in the borehole were measured over the entire saturated depth of both wells under both static and pumping conditions. Logging was performed under both static and pumping conditions. The static logging was performed first after a period of no activity in the borehole, allowing the well to reach ambient conditions prior to logging.

The wells were logged under pumping conditions following the heat pulse flowmeter measurements. A pump was temporarily placed in the well on flexible tubing. The log was run only in the portion of the borehole beneath the pump. At well JS-14, the pumping rate was approximately 2 gpm, and the pumping rate at JS-36 was approximately 5 gpm. During flowmeter testing, each of these wells was pumped for over two hours at a lower rate.

Natural gamma, self potential (SP), and single-point resistivity (SPR) surveys were performed in the JS-14 and JS-36 wells. The surveys were performed using an MSI Model 2PGA-1000 probe. These logs were performed under static conditions. The gamma log measures the natural gamma radiation produced by the rock formation through which the well passes. Peaks in gamma activity generally indicate areas with higher clay content or the presence of oxides of iron or manganese which commonly contain greater concentration of several elements that undergo radioactive decay. The SP probe measures very small

voltages that exist between the grounded probe and the surrounding rock. SPR measures the resistivity of the rock through which the borehole passes. Because rock is more resistive to electrical flow than water, higher SPR values are typically associated with rock that contains less water, whereas lower SPR values are associated with zones with greater water content.

Vertical flow within the borehole was measured under both static and pumping conditions. A minimum of three heat pulses were measured at each depth interval screened. In the event that there is no flow in the borehole, the heat pulse will slowly move upward due to the reduced density of the heated water. These results are observable on the display of the MSHeat program as a very gradual rise and subsequent fall of the differential temperature at a time beyond 30 seconds from the time of the pulse. This is in contrast to the sharp deflection that is observed when the heat pulse is carried by water flow in the borehole.

High resolution borehole images were recorded using an MSI Model OBI-40 optical televiewer. **Tables 3.4 and 3.5** present the observations from the optical televiewer logs at JS-14 and JS-36, respectively.

The borehole diameter was measured using a MSI Model CLP-2380 caliper. The caliper is equipped with three arms that expand to measure the diameter of the borehole.

Sampling of water from discrete levels was performed from both well JS-14 and well JS-36. Discrete samples were collected under both static and pumping conditions. The sampling was accomplished using a discrete sampling tool operated on the logging wireline. The tool used consisted of a chamber with a manual drain valve at the bottom and a remotely operated valve at the top. The sampler was lowered to the appropriate sample, and the top valve was opened using the MSLog software. This allowed water from the borehole to enter the chamber. The wireline was shaken to dislodge any air entrapped in the entryways of the tool. The top valve was then closed, and the tool returned to the surface. The depth was zeroed prior to going into the borehole and was checked again coming out of the borehole to identify whether slippage of the depth counter occurred. The discrete sampling during pumping was performed following the flowmeter testing and fluid property logging to allow for water stored in the borehole to be purged thoroughly prior to sampling. Once at the surface, the contents of the sampler were poured into laboratory-provided sample containers (40-milliliter [ml] glass vials with Teflon septa) for chemical analysis.

Vinyl flexible discharge tubing was used to carry the pump discharge to the surface. The discharge of the pump was routed to a tee that allowed for indicator parameter screening and the collection of samples from a small port and the conveyance of the purged water to the temporary tank used to supply the residence from a larger port.

At well JS-14, the pump was set at a depth of approximately 100 feet bgs. The discharge of the pump was restricted to maintain a sustainable flow of approximately 2 gpm.

During the April 2006 event at well JS-36, the pump was set at approximately 80 feet bgs for the flowmeter testing. The flow rate from the pump was approximately 0.75 gpm, which produced a high upward flow rate when the flowmeter was set immediately below the pump. During the discrete sampling portion of the testing at JS-36, the pump was set at approximately 100 feet bgs. The pump was allowed to run unrestricted and produced approximately 5 gpm.

During the April 2008 event at JS-36, the pump was set at approximately 100 feet bgs for the flowmeter testing and discrete sampling. The flow rate from the pump was approximately 6 gpm, which produced a high upward flow rate when the flowmeter was set below the pump.

A total of 32 samples were collected using the discrete sampler for onsite (one partially filled 40-ml glass vial with Teflon septum) analysis using a portable GC during the April 2006 event. A total of 15 samples were submitted for laboratory analysis (12 of which had also been analyzed using the portable GC). The on-site analysis was performed by USGS staff. At JS-14, 17 samples were analyzed on-site and 6 samples were submitted for laboratory analysis. At JS-36, 15 were analyzed on-site and 9 were submitted for laboratory analysis. During the April 2008 event, a total of 13 samples from JS-36 were submitted for laboratory analysis. Analytical results for the interval sampling (JS-14, JS-36, JS-37, and JS-38) are presented in **Table 3.6**.

PCE concentrations in discrete samples collected from JS-14 under static (non-pumping) conditions ranged from 1.57 to 6 µg/L (using both field GC and laboratory results). PCE in discrete samples collected from JS-14 under pumping conditions ranged from 12.7 to 29 µg/L. Discrete samples from the April 2008 event at JS-36 showed low variability in the PCE concentration with depth under static conditions, ranging from 230 to 280 µg/L. PCE concentrations in the pumping samples from that event were similar, ranging from 210 to 290 µg/L. The flowmeter testing indicated that under static conditions, water was entering the well from the shallow portion of the well, flowed downward, and exited the well in the lower portion of the borehole. The flowmeter measurements indicated that all of the wells exhibited downward flow under static conditions. The downward flow rates ranged from approximately 0.14 gpm in JS-14 to approximately 0.50 gpm at JS-36.

The results suggested that all of the wells in which interval screen was performed appeared to provide conduits for potential downward migration of VOCs. Due to this finding, liners were installed in JS-14, JS-36, and JS-38 to isolate the shallower, more highly impacted portions of the well from the deeper less impacted portions of the well. Three-inch PVC pipe was installed in each borehole. The bottom portion of the PVC pipe was perforated to allow water to enter the pipe. A packer (a section of 3-inch pipe with rubber boots at each end) was placed in each borehole. The area on the outside of the pipe between the boots was filled with a bentonite paste to create a seal. The packer was placed in the borehole at a depth of approximately 220 feet in JS-14, at approximately 330 feet in JS-36, and at approximately 175 feet. Immediately after placement of

the liner and packer, the water levels inside and outside of the 3-inch pipe were measured and compared to the initial water level. The water level inside the 3-inch pipe declined whereas the water level outside the 3-inch pipe rose, indicating that a seal was established. The annulus between the outside of the 3-inch pipe and the borehole was filled with bentonite slurry placed through a tremie pipe to further isolate the shallow interval.

The three wells in which liners were installed and a fourth well adjacent to JS-38 (JS-52) are equipped with whole-house treatment systems. Water from the wells before treatment, between the two treatment units, and the effluent from the treatment units, is sampled quarterly. **Figures 3.3** through **3.7** are plots of the concentration of PCE in the raw water from the wells. The liner installation date is indicated on the plots. For JS-52, the liner installation date in the neighboring well JS-38 is shown. This is because the downward flow in JS-38 is believed to be impacting JS-52, which has had a liner with an effective seal since shortly after being drilled. The trend of JS-14 shows a steady rise in PCE concentrations over time until the liner was installed in the well. The installation of the liner led to an immediate sharp decline in PCE concentration with a gradually slower rate of decline.

The concentration of PCE in JS-36 shows variability between samples, but exhibited a general rising trend through the end of 2006. A trend in PCE concentration is not apparent since 2007.

JS-37 is no longer used as a domestic well. It was plugged in an attempt to isolate the portion just beneath the casing for monitoring. A subsequent sampling event resulted in the well going dry before it could be purged.

The concentration of PCE in JS-38 exhibits a substantial variability between samples prior to and immediately after the installation of the liner. However, since June 2006 (almost one year after installation of the liner), there has been a steady decline in PCE concentrations. There is an indication that the rate of decline has slowed markedly in the last year of sampling.

PCE concentrations in JS-52, located less than 100 feet north of JS-38, have consistently shown moderate variability over time. Since October 2005, there has been a slow decline in PCE concentration.

3.1.2.2 Task 2b – Direct-Push Sampling

To further evaluate the depth to bedrock and VOC distribution in shallow groundwater at the site, 18 direct-push borings were advanced through the overburden at the locations shown in **Figure 3.7**. Because of site conditions (wet ground), site access agreements, and schedule restrictions, the borings were done as parts of two mobilizations in May 2008 and April 2009.

Twelve borings were advanced along an east-west line. Two bends in the line were required to obtain access from the City of New Haven (for the industrial park property) and the New Haven School District (for the west end of the transect) (see **Figure 3.7)**. The borings were spaced at 100-foot intervals, with a

200-foot distance between CSE 7 and CSE8. Continuous soil cores were collected in a nominal 2-inch inner diameter (ID) by 4-foot long core barrel lined with disposable acetate sleeves. After the barrel was pushed through the interval, the sleeve was removed and cut open length-wise to reveal the intact soil core. Samples of the core were then placed into Ziploc® (or equivalent) bags and sealed. The bags of soil were placed in an area that would allow the soils to off-gas into the sealed bags (either in direct sunlight or inside a warm vehicle), then a PID capable of measuring to the ppb range was inserted into the bag and the headspace measurement was recorded. A laboratory sample was collected from the soil core in the interval that showed the highest headspace PID reading. The soil sample was collected using a Terra Core™ sampler and associated bottleware. The sample was placed on ice inside of a cooler and shipped to TestAmerica Laboratories.

After the headspace samples were collected, the soil core was then logged by a field geologist. The soil was then containerized for later disposal as a special waste. If groundwater was present in the borehole, a sample was collected, via bailer, and shipped to TestAmerica Laboratory in University Park, Illinois for VOC analysis in accordance with SW-846 8260B. If the soil cores indicated the presence of water, but no free water was present within the borehole, a 5-foot long section of 1-inch diameter well screen, along with riser pipe was placed in the boring. If after a 24-hour period, no water (or insufficient water) had accumulated, the screen and riser pipe were removed. If a sufficient volume of water had collected in the screen, a sample was collected and shipped to the laboratory for VOC analysis, and the screen and riser pipe were removed.

Additional samples of groundwater were collected in borings that exhibited saturated conditions in multiple strata. These upper samples were also collected via bailer and shipped to the laboratory for VOC analysis. After sample collection was completed, the boreholes were then backfilled per MDNR regulations.

Two lines of borings were completed during this subtask: one generally trending north-south, and the other trending east-west. Geologic cross-sections were created to illustrate the varying depth to refusal (assumed to approximate the depth to bedrock) in the subject area. Depth to bedrock in the eastern two borings was shallow, and had a relatively higher land surface elevation.

The portion of the east-west transect between CSE3 and CSN3 had the lowest bedrock surface elevation, with the elevations in this interval ranging from approximately 536 feet to 544 feet. A drop of 16 feet in the bedrock surface is present between CSE2 and CSE3. A drop of 6 feet in the bedrock surface is present between CSE8 and CSN3. The depth to bedrock is less than 10 feet in borings CSE9 through CSE12. Due to a westward slope in land surface, this results in the bedrock surface sloping westward in this interval. Variation in the bedrock surface along the north-south transect is minimal. The bedrock surface varies by only approximately 8 feet, with the deepest portion of the transect near the drain pipe of the detention basin.

Water was not encountered in borings CSE1, CSE2, CSE3, or CSE9. Water was encountered at shallow depths at CSN2 and CSN3, allowing for collection of two groundwater samples from these borings. A total of 16 groundwater samples were collected. The results of these analyses are presented in **Table 3.7, and also plotted on Figure 3.7**. PCE was detected in 12 of these samples, with the screening criteria (5 µg/L USEPA MCL) exceeded in 11 samples. The highest concentration was 2,800 µg/L, in the sample from CSE5, which is within the bedrock low of the east-west transect. TCE and 1,2-DCE (total) were detected in 10 samples, with the TCE concentration consistently exceeding the screening criterion. TCE was detected at a concentration below the screening criterion in one sample. Concentrations were relatively consistent in the north-south transect, with slightly lower concentrations in the middle of the transect.

3.1.2.3 Task 2c – Residential Well Sampling

Prior to the start of the OU2 RI, the USEPA and USGS had begun sampling of selected residential drinking water wells located south of OU2 in the area now known as OU6. As part of the groundwater investigation portion of this RI, another round of sampling was conducted at these wells (between February 28, 2008 and May 28, 2008), as seen on **Figure 3.8a-d**. The results of this sampling round are consistent with the historical sampling performed by USEPA and the USGS. The wells included (based on homeowner consent) were:

JS-07	JS-27	JS-41	JS-51
JS-10	JS-29	JS-42	JS-52*
JS-11	JS-33	JS-43	DM-21
JS-12	JS-36*	JS-44	PA-53
JS-14*	JS-37	JS-45	PA-55*
JS-15	JS-38*	JS-47	MW-13
JS-20	JS-39	JS-50	MW-2R
JS-25	JS-40	W-3	

Wells denoted with an asterisk (*) are located at residences that are sampled on a quarterly basis as part of the 2002 AOC required quarterly sampling. The historical sampling by the USEPA and USGS included several wells for which Parsons was not granted access for the current sampling event, including JS-06, JS-45 and JS-46, all of which were previously non-detect. The domestic well IDs were generally established by the USGS during their well inventory efforts in the late 1990's and thereafter. The ID lists the person identifying the well and a sequential number of the well identified. Wells leading with JS were inventoried by John Schumacher. Wells leading with DM were inventoried by Doug Mugel.

Paul Brenden also inventoried wells; however, none of those wells were sampled for this RI. Wells identified by Parsons lead with PA.

To sample the residential wells, a hose was attached to an outside faucet or hydrant nearest to the well head. The water was allowed to run freely except for a small volume that was diverted through a tee to a flow-through cell for measurement of water quality parameters. Water quality readings were taken approximately every five minutes until stabilization was achieved. Samples were then collected directly from the water source into pre-preserved, laboratory supplied bottles; labeled; packed on ice; and shipped to the laboratory for VOC analysis per USEPA Method 524.2.

Available information on the construction of the residential wells is presented in **Table 3.8**. Locations of the wells and concentrations of PCE, TCE, DCE, and vinyl chloride (VC) are shown on **Figure 3.8a-d**. The analytical results for these samples are summarized in **Table 3.9.** PCE was detected in nine samples, exceeding the screening level in eight of the nine samples. TCE, 1,2-DCE, or both were positively detected in eight of the samples. However, the screening levels were exceeded in only one of these samples (for TCE). The highest PCE concentration detected was 280 µg/L at JS-36. This well is one of four residential wells which have been equipped with whole-house carbon treatment systems to remove PCE prior to use. The greatest impacts appear to be to the north in the vicinity of Boeuf Lutheran Road, and to the south just north of McKenzie Drive, with no detection of VOCs above screening criteria between these locations.

Methyl-tert-butyl ether (MTBE) was detected at estimated concentrations below the reporting limits in three wells, JS-10, JS-25, and JS-29. This compound is not a COPC for this site. MTBE was used as a fuel additive beginning in 1979. Its use has since been discontinued.

The Beaver Brand Hats well, JS-25, has not been used for an extended time, as the facility now utilizes the New Haven public water supply. On the initial sampling attempt, it was found that the well pump would not operate. The surface control box for the pump was later checked and found to be operational, indicating that the problem was in the motor of the submersible pump. In order to collect the sample, Parsons utilized a 3-inch submersible pump connected to vinyl tubing. Following the detection of PCE in JS-25 (at 21 µg/L, sample JS25-GW01-080425), the well was re-*sampled* to confirm the detection. There was concern that the sampling pump may have cross-contaminated the sample with VOCs from its previous use at JS-36. The sample from the follow-up event (see sample JS25-GW01-080527) did not contain PCE at a detectable concentration. An additional follow-up sample (sample ID JS25-GW01-081030) was also non-detect. However, as a part of Task 2e, **PCE was detected at 7.1 µg/L (see sample JS25-GW01-090429, Section 3.1.2.**5, **Table 3.10**, and **Figure 3.12a**).

3.1.2.4 Task 2d – Monitoring Well Installation and Sampling

The fourth sub-task of the groundwater investigation task of the RI involved the drilling, construction, development, and sampling of 18 new individual monitoring wells. The Work Plan proposed installation of eleven well nests during this phase of work (MW-3 through MW-13). The Work Plan and Field Sampling Plan (FSP) included a decision tree that would identify the final locations and total depths of each well. The monitoring well construction and rationale for installation are presented in **Table 3.11**. Wells installed by Parsons followed a naming convention in which MW indicated a monitoring well location, either a single well or a cluster, followed by a hyphen and the location number. The interval being monitored in the well is indicated by one or two characters after the location number. The following codes were utilized:

S – unconsolidated material

UB – uppermost bedrock

US – upper sandstone marker bed

T1 – transmissive zone located above the Swan Creek

SW – Swan Creek sandstone member

T2 and T3 – transmissive zones in the dolostone

R - Roubidoux

The USGS installed wells for this RI that did not utilize this convention. Where multiple wells were installed at a single location, the wells were identified with MW, followed by a hyphen, followed by a location number, followed by a letter (or lack of letter). This RI included sampling of existing USGS monitoring wells BW-20, BW-21, BW-21A and BW-22. The BW of these identification numbers refers to bedrock wells.

During the RWI, a total of eight wells were completed at the MW-1 and MW-2 well nests. After confirming, through multiple samples, that the water in MW-2R had not been impacted by the PCE, this well was voluntarily converted to a domestic well for the property owner.

Drilling Methods

Three general drilling methods were used to construct the monitoring wells: air rotary, water-circulation coring, and cable-tool drilling. At each well or cluster of wells, a direct-push technology (DPT) boring was advanced to refusal. The purpose of the DPT boring was to identify if VOCs were present in the unconsolidated material that should be cased off prior to drilling in the bedrock. A macrotube (4-foot long) sampler was hydraulically pushed, filling a plastic sleeve with soil. A small sample of soil from the tube at 2-foot intervals (or less) was placed in a zipper-topped bag. The headspace in the bag was screened for VOCs by piercing the bag with the probe of a ppbRae PID. The headspace reading was recorded on the boring log along with a description of the soil. A soil

sample was selected for laboratory analysis from the depth corresponding to the highest headspace reading. No soil samples were collected below the depth at which water was encountered. The soil sample was packed in pre-preserved vials included in a Terra Core^{tm} kit using a disposable soil syringe included with the kit, and shipped to the laboratory for VOC analysis via USEPA Method 8260B. The borehole was left open for at least 24 hours to allow water to accumulate. A sample of the accumulated water was collected using a microbailer (1/2-inch diameter) and was placed in 40-ml pre-preserved vials for laboratory analysis.

Air rotary drilling was performed in accordance with Standard Operating Procedures (SOPs) 2, 3, and 4 in Appendix B of the approved FSP. Cuttings and return water were diverted into a lined rolloff box for characterization for proper disposal. Cuttings for logging were collected from the discharge to the rolloff box using a wire strainer on a pole. The cuttings were washed and described on the log. Air rotary drilling was used only to advance the borehole for installation of casing. None of the sampling intervals of the monitoring wells were drilled using air rotary methods.

The open hole portions of boreholes that were advanced using air rotary drilling were drilled using water-circulation coring as described in SOPs 2, 3, and 4 in Appendix B of the approved FSP. With the exception of the open hole interval of the two Roubidoux wells (MW-6R and MW-9R), coring was performed using an HQ drill bit. The Roubidoux wells were cored using an NQ bit with wire-line retrieval of the core barrel. Core runs of up to 10 feet were used. Occasionally, shorter runs were utilized where a lithology change was expected or if water circulation pressures rose due to possible blocking of the discharge ports on the drill bit. The core was removed from the barrel and placed in polyvinyl chloride (PVC) troughs for measurement, PID screening, calculation of rock quality designation (RQD), and lithologic description. The core was then placed in waxed cardboard core boxes. Wooden spacer blocks were used to mark the top and bottom of each core run and the top and bottom depth of each box.

Cable tool drilling was utilized at a number of the monitoring wells instead of the combination of air rotary and water-circulation coring The cable-tool drill rig is lighter than the air rotary rig and is mounted on a shorter truck, providing easier access. Limited amounts of water are added to the borehole, and the addition of water is limited to the portion of the borehole before water is produced. With less water introduced into the borehole, COPCs are not diluted. The cable tool method does not remove as much water in a productive interval as air rotary drilling, creating less investigation-derived waste (IDW) to be contained. Most importantly, there is no large injection of air into the subsurface which could impact concentrations of VOCs. Finally, it is relatively easy to identify when the borehole begins producing water relative to other drilling methods.

The cable tool drilling method uses a drill bit on a large steel rod that is suspended on a wire rope. An eccentric wheel repeatedly raises and drops the bit and rod, pulverizing the material into a slurry (initially from water added to the

borehole, and subsequently from water produced from the formation). Periodically, bit and rod are removed from the borehole and a steel bailer is used to lift the slurry out of the hole. The slurry is dumped into a bucket with a discharge pipe to the dumpster. Cuttings are collected from the discharge pipe in a wire strainer, and are then washed and logged. Water from the slurry is collected in a vial for potential analysis. Analyses performed on samples from the boreholes prior to completion of the well are presented in **Table 3.12**. USGS data were received directly from the USGS, and not included in the analytical data validation process that is described in Section 3.2. The airspace in the discharge pipe above the slurry is monitored with a PID to detect volatile organic vapors.

Casings used in the construction of the monitoring wells included PVC, steel, and galvanized steel. The specific material used is identified in the discussion of each well. Casing seals included bentonite, Portland cement grout, and a mix of bentonite with some Portland cement. In several instances where VOCs were detected in shallow groundwater, the casing for deeper wells were pressure grouted. The grout for most wells was placed through a tremie pipe. Several wells were constructed with slotted PVC screen and riser. A sand pack was placed through a tremie pipe with grout placed above the sand pack.

The monitoring wells were completed with a flush-mount cover with a bolt-on lid. The covers were set in a concrete pad with a low slope to promote precipitation to run off rather than collect in the well vault.

Monitoring Well Construction Details

The following sections detail the processes and methods used to drill, construct, and develop each well. Additionally, these sections describe the decision-making process implemented for each well to determine its final position and total depth. Boring logs showing lithology and well construction are provided in Appendix C.

MW-1UB

Three monitoring wells were installed at the MW1 cluster during the RWI (MW-1S, MW-1SW, and MW-1T1). An additional well,MW-1UB, was installed to monitor the groundwater in the uppermost producing zone in bedrock.

MW-1UB was installed using a cable tool drill rig. A 10-inch bit was used that allowed the 10-inch diameter steel casing to follow the bit downward through the soils. The 10-inch hole was drilled to a depth of about 34 feet bgs (approximately 8 feet into bedrock). Six-inch diameter steel casing was then sealed into the rock using Portland cement grout placed using a tremie pipe. The 10-inch steel pipe was removed from the ground prior to well completion.

After allowing the cement to set up for approximately four days, a 6-inch nominal diameter hole was drilled to a depth of 43.7 feet bgs. The drilling was stopped when the bit was observed falling through a fractured zone. The hole was bailed

dry using the rig bailer and recovery was monitored to identify the zone's adequacy for producing enough water to be monitored.

The remaining annular space outside the 6-inch steel casing was grouted, using a tremie pipe as the 10-inch starter casing was removed from the hole. The well was then completed with a flush mount vault. The boring and construction details for each of the wells installed are provided in the well log in **Appendix C**.

The open borehole well was developed by purging with a pump until water quality parameters stabilized. A dedicated submersible pump was installed in the well.

MW-3

Property access for MW-3 was not granted by the land owner.

MW-4 Cluster

Property access for MW-4 was not granted by the land owner to Parsons. Access was obtained by the USGS, who installed wells MW-4A, MW-4B and MW-4. MW-4A was drilled using a cable tool drill rig. A ten-inch borehole was advanced to approximately 20 feet. The borehole was bailed dry and a sample for field GC analysis was collected. This sample contained PCE at a concentration less than 5 µg/L (**Table 3.12**). Six-inch steel casing was installed in the borehole and was grouted with Portland cement grout from 12 feet to 20 feet bgs. The annular space above the Portland grout was left open to allow for sampling of the shallow interval, which was performed on April 28, 2009, after which the remaining annulus was grouted to the surface. The field GC concentration of the annular sample was approximately 6 µg/L.

The open-hole interval of MW-4A was drilled with a 6-inch cable tool bit. The open hole interval is from 20 feet to 28 feet bgs. An intermediate sample was collected by bailing the hole when it was open from 20 to 26 feet bgs. The field GC indicated that PCE was present at approximately 430 µg/L.

Monitoring well MW-4B was installed as a result of the detection of PCE in the interval of 20 to 28 feet bgs in MW-4A. A 14-inch hole was drilled using the cable tool rig to a depth of 40 feet. Ten-inch steel casing was grouted in the borehole from 28 to 40 feet bgs. The water remaining in the borehole was flushed with potable water and bailed out six times. The concentration of water inside the casing dropped from over 200 µg/L to approximately 8 µg/L. A 10-inch borehole was cable tool drilled from 40 to 63 feet bgs. A sand unit believed to be the Swan Creek sandstone was encountered from 46 feet to 54 feet bgs. Field GC analyses indicated that the PCE concentration in the cuttings increased from 10 µg/L at 46 feet bgs to greater than 100 µg/L within this sand interval. The concentration in the cuttings increased to greater than 400 µg/L at 63 feet bgs where a possible thin sand layer was encountered.

Six-inch steel casing was installed to a depth of 63 feet bgs. Grout was used to seal the casing from 56 to 63 feet bgs, leaving an annulus between the six and 10-inch casings open from 40 to 56 feet bgs. This included the sand believed to be the Swan Creek sandstone. A 6-inch borehole was drilled, with the PCE

concentration decreasing in the cuttings from 9 µg/L at 65 feet bgs to 1 µg/L at 80 feet bgs. At 85 feet bgs, the concentration of PCE in the cuttings rose to 25 µg/L, and 140 µg/L at 90 feet bgs. The water level in the annulus between the six and 10-inch casings dropped, indicating a leak in the seal for the 6-inch casing. Drilling was halted at 91.5 feet bgs and a 3-inch galvanized steel casing was installed. Grout was placed through a tremie pipe from 50.3 feet to 91.5 feet bgs. After the well was completed, additional grout was added at 40 feet bgs, with sand placed from 40 feet to near the surface. An NX core hole was drilled from 91.5 feet to 130 feet bgs to provide the open hole for the monitoring well.

MW-5UB

The final location of MW-5UB was moved 500 feet northwest to the back yard of the residence of domestic well JS-07, to a location that was acceptable to the property owner. In addition, grab sample results from the installation of the Benson domestic well (PA-55) indicated shallow groundwater contained no detectable concentrations of PCE, which provided an indication that the eastern boundary of PCE in groundwater did not extend as far east as the originally proposed location of MW-5.

MW-5UB was drilled using a cable tool drill rig. A 10-inch hole was drilled to approximately 20 feet bgs. During drilling, water was running into the hole at approximately 12 feet bgs. An intermediate water sample (MW5-GW01-020.0-080616) was collected at this depth for VOC analysis. A 6-inch steel casing was set in bentonite to prevent downward migration of water in the borehole annulus.

Drilling continued with a 6-inch bit. Because an unexpected volume of water was accumulating in the boring, at approximately 50 feet bgs the boring was pumped dry and a downhole camera was deployed. Water was observed entering the hole at about 23 feet bgs, signaling possible leakage through the annulus. The volume of water entering the borehole at this shallow a depth and the consistent flow was considered unusual based on the experience of both the site geologist and the well driller. The well location is near the drain fields of the septic systems of two houses. Water entering the well at this shallow depth could be largely from these drain fields.

After pumping the boring dry, a downhole packer was installed at a depth of approximately 30 feet bgs. After several hours, the water levels were measured both inside the packer assembly (influenced by the borehole below the packer), and outside the packer assembly (influenced by the borehole above the packer). The head difference was approximately three feet (water level in upper section of borehole was higher). A pump was then installed through the packer and the borehole below the packer was pumped dry. During pumping, the water level in the borehole above the packer dropped.

The packer was left in the hole overnight, and the water levels returned to their pre-pumping stages (about three feet of head difference). The bottom was pumped out again, and a downhole camera was deployed. Water was observed entering the borehole at the bottom of the packer. The packer was then removed

from the borehole. Approximately 2.5 feet of bentonite seal was remaining above the packer, indicating an adequate seal.

Based on these observations, a 2-inch screened PVC well was installed rather than an open hole well. This method would allow the chloride-impacted water to be sealed off , but would allow water from the uppermost bedrock production zone (the intended target zone for this well) to be sampled. The screened interval for this monitoring well is in a zone of gray dolostone with some cherty fragments and shale.

The well was constructed of 15 feet of 2-inch diameter PVC screen. Two-inch diameter PVC riser pipe was installed above the screen with a centralizer on the deepest section of pipe. Sand was placed through a tremie pipe to one foot above the screened interval. Bentonite grout was tremmied into the annulus from the top of the sand to the surface.

MW-5UB was developed by bailing 2.5 well volumes from the borehole. Water quality parameters (pH, conductivity, turbidity, dissolved oxygen, temperature, and oxygen reduction potential) were measured during development, and stabilized.

MW-6 Cluster

A cluster of three monitoring wells was installed at the MW-6 location. The three wells were drilled using a combination of air rotary and water-circulation coring.

The initial DPT boring encountered refusal at 10.2 feet bgs. Based on the PID headspace screening, one soil sample (MW6-SS01-007.0-080514) was collected and shipped to the laboratory for VOC analysis. However, because of the shallow bedrock, there was no accumulation of groundwater in the borehole.

The shallowest of the monitoring wells at the MW6 cluster is MW-6US, with a target monitoring zone of the upper sandstone marker bed of the Cotter Dolomite. An air rotary rig was used to drill an 8-inch diameter hole to a depth of 24.8 feet bgs, with 8-inch diameter steel casing set to about 15 feet bgs. This steel casing was not grouted/cemented in; it was installed to keep the hole open in the overburden. Four-inch diameter PVC casing was installed from the surface to 24.8 feet bgs, and the bottom four feet were sealed using grout placed through a tremie pipe. The remainder of the annulus was filled with bentonite chips. Below 24.8 feet, the boring was cored with HQ conventional tooling to a total depth of 73 feet bgs. MW-6US was developed by pumping multiple well volumes of water from the well. A dedicated submersible pump was installed in the well.

The second well at the MW-6 cluster, MW-6SW, was installed immediately south of MW-6US. An 8-inch diameter steel casing was cemented into a 10-inch diameter hole to a depth of 27 feet bgs. Below this, an 8-inch hammer bit was used to drill to a depth of 125 feet bgs. Four-inch diameter PVC casing was lowered into the boring. The bottom five feet were sealed with grout placed through a tremie pipe. The remaining annular space was grouted with a

bentonite/cement slurry. From 125 to 141 feet bgs, the boring was drilled with HQ core tooling.

The Swan Creek sandstone member of the Cotter Dolomite was the target zone for MW-6SW. The core contains sand between about 131 and 136 feet bgs. The monitoring well was left as an open hole, and was completed with a flush mount vault at the surface. MW-6SW was developed by pumping and bailing until water quality parameters stabilized. A dedicated submersible pump was installed in the well.

The final monitoring well drilled at the MW6 cluster, MW-6R, was installed approximately 25 feet south of MW-6SW. An 8-inch diameter steel casing was installed to 27 feet bgs. An 8-inch diameter hammer bit was used to drill to 393 feet bgs. Return water samples were collected for analysis by the USGS during drilling. Four-inch diameter PVC casing was installed to 393 feet. NQ wireline core tooling was used to drill to a total depth of 450.8 feet bgs.

The target zone for this monitoring well was the Roubidoux Formation, a unit assumed to produce a large percentage of the water in the local domestic wells. A number of thin (12 to 18 inches thick) sandstone layers were present in the upper part of the formation, but the actual sandstone unit was reached at about 427 feet bgs. MW-6R penetrates approximately 24 feet into the sand of the Roubidoux Formation.

MW-6R was developed by pumping approximately 800 gallons of water from the well. A dedicated submersible pump was installed in the well.

MW-7 Cluster

Two monitoring wells were installed at the MW-7 location; MW-7US targeting the upper sandstone marker bed of the Cotter Dolomite, and MW-7SW targeting the Swan Creek sandstone member of the Cotter Dolomite.

A DPT boring was advanced prior to installation of monitoring wells. The DPT reached refusal at 6.9 feet bgs. The weathered bedrock in the shoe of the sampler was friable sandstone. Based on the PID headspace screening, one soil sample was collected and shipped to the laboratory for VOC analysis. There was not enough groundwater in the borehole to collect a sample.

MW-7US was installed using the cable tool method. At 9.5 feet, an intermediate sample was collected for laboratory analysis. PCE was not detected in this sample. MW-7US was drilled to 15 feet bgs with a 10-inch diameter bit, and 6-inch diameter steel casing was grouted into the boring. Below the casing, a 6-inch diameter bit was used to advance the boring to a total depth of 26 feet bgs. The monitoring well was left open to the formation – the upper sandstone marker bed from 15 to 20 feet bgs, and a mixed zone of dolostone and sandstone to depth.

MW-7US was developed by pumping until water quality parameters stabilized. While installing a dedicated submersible pump into MW-7US, it was discovered that the open portion of the borehole was blocked off at about 20 feet bgs. The

blockage was removed using a steel point that was welded to the end of a heavy gauge steel pipe. The pipe was allowed to fall into the hole to break up the restriction. A 5-foot section of 2-inch diameter PVC screen with a 20 foot section of riser pipe was lowered to the bottom of the well to keep the well open. The dedicated submersible pump was then installed for future sampling of the well.

Because PCE was detected in the upper sandstone marker bed at the MW-7 location, a second well was drilled to target the Swan Creek sandstone member. This well, MW-7SW, was drilled to 94 feet bgs using the cable tool method.

A 12-inch diameter hole was drilled to a depth of 41 feet bgs and 8-inch steel casing was installed. The boring was deepened using an 8-inch diameter bit to drill to a depth of 75 feet bgs. This interval was cased (to seal off water from above) with 5-inch diameter galvanized steel casing. PCE was detected in drill cuttings at up to 17.4 µg/L The lack of PCE in the initial sample from the completed MW-7SW (**Table 3.12**) indicates that the presence of PCE in the drill cuttings is likely due to (1) water from the upper sandstone marker bed interval left inside the casing following grouting; and (2) PCE in the drill water tank from rinsing cuttings in a shallow zone in the tank when water in buckets was iced over.

The total depth of MW-7SW was achieved by advancing a 5-inch diameter bit to 94 feet bgs. The bottom section of the monitoring well was left open to monitor the water in the Swan Creek sandstone member of the Cotter Dolomite, which was logged at approximately 86 to 92 feet bgs.

MW-7SW was pumped until water quality parameters stabilized, to develop the well. A dedicated submersible pump was installed in the well.

MW-8US

The MW-8 monitoring well location was moved from the proposed location in the Work Plan for two reasons: (1) at the proposed location, the City of New Haven has plans to build a road that would allow access to potential new facilities in the industrial park, requiring the well to be placed within two feet of the edge of an embankment (unsafe working conditions), and within a buried communication cable corridor; (2) the proposed location was directly adjacent to the open lot immediately north of the former Kellwood facility, very near previously installed monitoring wells; thus information gathered from the well would not be as useful as information gathered from a location further away. Therefore, with USEPA's approval, MW-8US was moved east-northeast to the eastern edge of the City of New Haven's industrial park property.

The new location for MW-8US was chosen to provide information from east of the source area. This information was warranted because of confirmed PCE concentrations in the residential well at JS-27, and conflicting analytical results at the unused industrial well at JS-25.

A DPT boring was advanced to refusal at 19.6 feet bgs. Based on the PID headspace screening, one soil sample was collected for VOC analysis. There was not enough groundwater in the borehole to collect a sample.

MW-8US was drilled using the cable tool method to allow for a more precise delineation of lithologic zones. MW-8US was installed to target groundwater in the upper sandstone marker bed of the Cotter Dolomite. The well was drilled to a total depth of 95 feet bgs. Because a groundwater sample was not collected from the overburden, the first encountered groundwater (at 40 feet) was collected for VOC analysis. PCE was not detected in this sample.

MW-8US was completed with 2-inch diameter PVC screen and riser (screened from 85 to 95 feet bgs). A sand pack was installed from 95 to 79 feet bgs using a tremie pipe, and the remainder of the annulus was grouted with bentonite.

The well was developed by pumping until water quality parameters were stable and the water ran clear. A dedicated submersible pump was installed in the well.

MW-9 Cluster

A cluster of three monitoring wells was installed at the MW-9 location. Although originally planned to be installed on the south side of the asphalt parking lot at 116 Industrial Drive, the property owners (Redbird, LLC) requested that the wells be installed in the gravel lot on the north side of the asphalt parking lot.

The cable tool method of drilling was utilized for the shallower two wells of the cluster. The DPT boring at this cluster location reached refusal at 6.8 feet bgs. Based on the PID headspace screening, one soil sample was collected and shipped to the laboratory for VOC analysis. There was not enough groundwater in the borehole to collect a sample (groundwater was measured at 6.6 feet bgs).

MW-9US was targeted for monitoring the first encountered water in bedrock. After discussions between the USGS and Parsons, the determination was made to target the upper sandstone marker bed of the Cotter Dolomite. As the cable tool bit was advanced, the boring was bailed dry of water and rock cuttings. Multiple samples were collected for VOC analysis by the USGS's mobile GC, and none had detections of PCE (**Table 3.12**). The upper sandstone marker bed unit was encountered between 43 and 51 feet bgs, and the boring exited the unit at 51 feet bgs. The boring was continued to a total depth of 57 feet bgs so that the entire upper sandstone marker bed unit was monitored. Samples of the drill cuttings from this well were non-detect for PCE to a depth of 43.5 to 46.2 feet, where PCE was detected at less than 1 µg/L. The maximum PCE concentration in cuttings during the drilling of MW-9US was just over 3 µg/L at a depth range of 48.5 to 51 feet. A laboratory analysis of a sample of groundwater from the open borehole at 31 feet was non-detect for PCE.

The well was constructed with 15 feet of 2-inch diameter PVC screen at the bottom of the boring, and completed with 2-inch diameter PVC riser. A sand pack was installed from 57 to 39 feet bgs, and the annular space above filled with bentonite chips.

MW-9US was developed by using a combination of surging with a bailer and purging with a 12-volt sample pump. More than three well volumes of water were purged from the well and water quality parameters stabilized. A dedicated submersible pump was installed in the well.

The second well drilled at the MW9 cluster (MW-9SW) was completed to monitor the Swan Creek sandstone. An 8-inch diameter steel pipe was pressure grouted to a depth of 66 feet bgs. Pressure grouting was used because of the proximity of this well to the City of New Haven's Well Number 3. Pressure grouting would fill voids around the casing to prevent downward migration of shallow groundwater. Analysis of multiple intermediate samples in the interval from the bottom of the outer casing to 100 feet did not indicate the presence of PCE. .

Four-inch diameter PVC casing was installed through the steel casing to a depth of 100 feet bgs, and sealed using grout placed through a tremie pipe. The well was then completed to a total depth of 125 feet bgs by HQ coring. Drill cutting samples from the open borehole section of the well did not indicate the presence of PCE. However, the initial sample from the completed borehole indicated PCE at 2.2 µg/L The Swan Creek sandstone member was encountered between approximately 114 feet and 121 feet bgs. The cored interval was left open. MW-9SW was developed by pumping multiple well volumes of water from the well. A dedicated submersible pump was installed in the well.

MW-9R was installed as a Roubidoux Formation targeted well. MW-9R was drilled approximately 30 feet south of the other two wells in this cluster because the air rotary method was used. This would minimize impacts from drilling on the existing wells.

8-inch steel casing was installed to a depth of 139 feet bgs. Water samples were taken during drilling from the discharge pipe of a diverter attached to the top of the surface casing. These samples were analyzed by the USGS, and were non-detect for PCE.

The boring was then drilled to a depth of 373 feet bgs. The borehole was advanced in 60-foot intervals, after which the hole was blown dry and a pump was placed in the borehole to purge as much water as possible. Intermediate samples were collected for laboratory analysis from depths of 195 feet and 255 feet bgs after purging several hundred gallons. PCE was not detected in these samples. Upon reaching a depth of 373 feet bgs, 3-inch diameter, galvanized steel pipe was pressure grouted with Portland cement. Below the casing, the boring was cored using NQ tools to a depth of 421 feet bgs. Because of the highly broken nature of the cored interval (Jefferson City Dolomite into the Roubidoux Formation), drilling was stopped short of the sand unit of the Roubidoux. In order to keep the lower portion of the borehole open, 50 feet of slotted 1.25-inch diameter PVC pipe was placed into the hole.

MW-10UB

Access to the proposed location of MW-10 was denied by the property owner; therefore, the final location was moved west-northwest to a Franklin County Highway Department right-of-way, in the area where Boeuf-Lutheran Road crosses the 500 tributary.

Installation of MW-10UB began by probing, via DPT, until refusal at 16.8 feet bgs. Based on the PID headspace screening, one soil sample (MW10-SS01-008.0-080512) was collected and shipped to the laboratory for VOC analysis. Additionally, a groundwater sample (MW10-GW01-016.0-080512) was collected from the open borehole and shipped to the laboratory for VOC analysis. Sample results are discussed in Section 3.3 of this report.

For the same reasons identified for MW-5UB, the cable tool method of drilling was chosen over the air rotary method. A 12-inch diameter steel pipe (driven in ahead of the drill bit) was used as a temporary surface casing to hold the hole open. 8-inch steel casing was cemented to a depth of 27 feet bgs.

Drilling was continued with an 8-inch bit to 48 feet. The accumulated cuttings and water were bailed from the boring every five feet. Samples of the cuttings were collected for lithologic logging, and the water was periodically sampled for VOC analysis by the USGS via their mobile GC unit. The well was completed as an 8-inch open hole from 27 feet to a total depth of 48 feet bgs, in a zone of gray to tan dolostone with a trace of chert and glauconitic shale.

A submersible pump was utilized to develop the well. The well was completely purged twice, and water quality parameters were recorded. A dedicated submersible pump was installed in the well.

During drilling events at MW-10UB none of the water samples analyzed by the USGS had detections of PCE.

MW-11

Property access for MW-11 was not granted by the land owner to Parsons. Access was obtained by the USGS, who installed MW-11. MW-11 was drilled using a cable tool drill rig. Six-inch steel casing was installed to approximately 25 feet bgs. The well was drilled to 92 feet bgs and completed by installing 20 feet of 2-inch PVC screen and riser. A sand pack was installed from 64 feet bgs to the total depth. Bentonite chips were placed in the borehole to a depth of 60 feet bgs. A one-foot layer of sand was placed over the chips. The remaining annulus between the bottom of the casing at 25 feet bgs and the top of the sand above the bentonite seal at 61 feet bgs was left open to allow for sampling of the shallow interval. Field GC samples collected during drilling did not indicate the presence of PCE.

MW-12

Property access for MW-12 was not granted by the land owner to Parsons, but access was obtained by the USGS. The USGS installed MW-12 using a cable

tool drill rig. Six-inch steel casing was installed to 25 feet bgs. A six-inch borehole was drilled to 91 feet bgs. The well has an open-hole completion. The well has a one foot stick up of the six-inch casing. Field GC samples collected during drilling did not contain PCE.

MW-14US

Because of the apparent northern and western migration of VOCs, as seen in MW-9US, MW-9SW and MW-7US, the USEPA requested that an additional shallow monitoring well be installed west of the source area. The primary function of this well (MW-14US) was to better define the northern and western extent of impacted groundwater.

A boring was started at the southeast corner of the New Haven High School building with a target zone of the upper sandstone marker bed of the Cotter Dolomite. However, high PID screening results in the soil during the DPT phase of installation indicated that VOCs may be present. Sample results from the groundwater sample collected at the overburden-bedrock interface confirmed the presence of PCE at this location with a concentration of 29 µg/L. Since the primary function of the monitoring well is establish the plume boundary, the boring was sealed and a new location was chosen. This original boring is designated as MW-14X.

Access was granted by the City of New Haven and the City of New Haven Park Board for drilling and construction of a monitoring well on their property located just west of the New Haven High School. A DPT boring was advanced at the revised location until refusal at 27.8 feet bgs. A representative from the USGS was onsite to analyze soil and water samples. USGS's mobile GC showed no detections of PCE in the soil. PCE was not detected in the groundwater at the overburden/bedrock interface. A sample was collected and shipped to the laboratory for VOC analysis, and PCE was not detected in this sample.

The cable tool method of drilling was used to allow for a more precise delineation of lithologic zones. MW-14US was installed to target groundwater in the upper sandstone marker bed of the Cotter Dolomite.

A 10-inch diameter bit was used to drill through the overburden and into bedrock to a depth of 33 feet bgs. Approximately three feet of 10-inch steel casing was used as starter pipe for the boring. An 8-inch diameter steel temporary casing was then installed in the hole to keep the overburden from collapsing as the borehole was cleaned and the well screen was installed. The monitoring well was completed with 4-inch diameter PVC screen and riser. The casing was pulled as the sand pack was installed. Once the sand pack was in place, the remaining casing was removed and bentonite chips were added as the well seal.

The well was developed by bailing dry multiple times and pumping until water-quality parameters were stable and the water ran clear. A dedicated submersible pump was installed in the well.

Information collected as a part of the monitoring well installations along with information available from previous investigations discussed in Section 2 and other tasks allow for a better understanding of the geology of the OU-2/OU-6 area. Logs of drill cuttings, core descriptions, and borehole gamma logs allow for the estimation of the elevation of the top of the bedrock, top of the upper sandstone marker bed, and the top of the Swan Creek member at a number of locations.

The elevation of the upper surface of bedrock is shown in **Figure 3.13**. The surface was defined based on logging boreholes during monitoring well installation and direct push borings. The point of refusal of the direct push borings is used as an approximation of the top of bedrock. Bedrock is seen to drop steeply to the southwest of the open lot north of the former Kellwood facility.

The top of the upper sandstone marker bed was calculated for 11 boreholes as shown in **Table 3.13**. The interpretation of the top of the upper sandstone marker bed was based on descriptions of core, cable tool drill cuttings (typically collected at 2.5 to 3-foot intervals in the depth range where the upper sandstone marker bed is anticipated), and in air rotary drill cuttings. The interpretations based on core descriptions have the greatest accuracy, as the lithology is continuously observed intact. Cable tool drill cuttings are collected from the vertical interval between the previous bailing of the cuttings and the current bailing of the cuttings. Incomplete flushing of the borehole during the bailing of the cuttings and the action of the bit stabilizer can result in cuttings from higher intervals being included in the sample as well. Therefore, the cuttings represent a range of depths.

Cuttings from air rotary drilling are blown out of the borehole through a diverter and then are carried through a discharge pipe to a roll off box. The cuttings are caught on a strainer placed into the discharge. There is a degree of uncertainty as to the depth from which cuttings collected from the discharge were from. There is a time lag from the generation of the cuttings at the bit face to when they arrive at the discharge point. Buildup of cuttings in the diverter and discharge pipe occurs that can contribute cuttings from shallower depths in with the “fresh” cuttings. **Table 3.13** lists an estimated error range for the depth associated with the interpretation. Structure contours of the top of the upper sandstone marker bed are presented in **Figure 3.14**. In the area of concentrated data points surrounding the former Kellwood facility, the dip of the upper sandstone marker bed is to the south. The upper sandstone marker bed was not observed at the MW-1 and MW-2 clusters and at MW-5UB, MW-10UB.

The top of the Swan Creek Member was calculated for 17 boreholes as shown in **Table 3.14**. The interpretation of the top of the Swan Creek was based on a combination of core description, cable tool cuttings, air rotary cuttings and gamma logs. In the immediate area of the former Kellwood facility, the dip of the top of the Swan Creek member is to the south-southeast (**Figure 3.15**). This dip is opposite the regional dip, which is to the north. This dip reversal appears to be the result of an anticline in the vicinity of MW-9SW and a syncline in the vicinity

of JS-37. Both plunge to the east-northeast. The top of the Swan Creek member in JS-36, JS-14, and MW-7SW is low compared to MW-11, JS-37, and BW-21. This suggests the potential for a structure trending roughly north-south between these sets of wells. A structure in this vicinity would be consistent with the results of surface geophysical studies performed as a part of the Residential Well Investigation in 2004 that identified electrical resistivity anomalies near the western margin of the industrial park (Powers, 2004); the depression in the bedrock surface identified in the direct push borings (Task 2b); and the difference in lithology between adjacent wells BW-21A and BW-22 identified by the USGS.

A cross-section utilizing the gamma logs of JS-38, MW-2R, PA-55, MW-6R, BW-21, MW-9R, and BW-7 is presented in **Figure 3.16**. This cross-section illustrates the southward dip of the Swan Creek member (apparent dip on the cross-section) shown on the structure contour map between MW-6R and MW-9R.

3.1.2.5 Task 2e – Site-wide Groundwater Sampling

Because of the extended period of time required to drill and construct the new monitoring wells, a round of groundwater sampling was started prior to completion of Task 2d. Locations of monitoring wells are shown on **Figure 3.1b**. A summary of groundwater elevation data collected contemporaneously is in **Table 3.15**.

The following wells were sampled in accordance with the Work Plan (newly installed wells are listed with an *):

- MW1 cluster (MW-1S, MW-1T1, MW-1SW, MW-1UB*)
- MW2 cluster (MW-2S, MW-2SW, -2T2, MW-2T3, MW-2R)
- MW4 cluster* (MW4A, MW-4B, MW-4BS, MW4) (installed by the USGS)
- MW-5UB*
- MW6 cluster* (MW-6US, MW-6SW, MW-6R)
- MW7 cluster* (MW-7US, MW-7SW)
- MW8*
- MW9 cluster* (MW-9US, MW-9SW, MW-9R)
- MW-10UB*
- MW11* (installed by the USGS)
- MW12* (installed by the USGS)
- MW13
- MW-14US*
- MW-101
- MW-102

- MW-103
- BW-20
- BW-21
- BW-21A
- BW-22

In addition to the monitoring wells listed above, five sentinel wells were chosen from local residences. The "sentinel" wells sampled included:

- JS-20 – Selected to identify a westward migration of VOCs known to exist in the vicinity of JS-14 and JS-36;
- JS-15 – Selected to identify an eastward migration of VOCs known to exist at JS-37, and the MW-1 cluster;
- JS-39 – Selected to identify a northeastward migration from VOCs known to exist at the MW-2 and MW-4 clusters as well as northward migration of VOCs known to exist from the JS-38 and JS-52 vicinity;
- JS-40 – Selected to identify a potential eastward migration of VOCs known to exist from the area of JS-38 and JS-52 as well as the MW-2 and MW-4 clusters; and,
- PA-53 – Selected to identify a potential southward migration of VOCs known to exist from the area of JS-38 and JS-52 as well as the MW-2 and MW-4 well clusters.

Also, as presented in Section 3.1.8 (Deviations from the RI/FS Work Plan), the former industrial well at Beaver Brand Hats (JS-25) was sampled. The USEPA requested that this RI report be prepared following the initial round of site-wide monitoring well sampling. Three additional rounds of site-wide groundwater sampling will be performed with the next event scheduled for early 2010.

The sampling protocol described in SOP 8 of the FSP was followed for the monitoring wells. The sampling protocol described in SOP 7 of the FSP was followed for residential wells. In summary, the wells were pumped until a minimum of 1.2 well volumes were purged. Indicator parameters were monitored at 5-minute intervals. When the indicator parameters were within the defined range of stability, the sample was collected into pre-preserved sample containers. The samples were handled under chain-of-custody procedures and packaged for shipment to the laboratory as described in SOPs 11 and 12. Analytical results are discussed in Section 3.3.

Analytical results are summarized on **Figures 3.12a through d**, and on **Table 3.10**. Complete results are contained in **Appendix J**.

PCE was detected in 15 of the 41 samples collected. The concentration of PCE in nine of the samples exceeded the screening criteria. TCE and/or 1,2-DCE were detected in six samples, with the screening criteria exceeded in five

samples. Five samples were analyzed for SVOCs, pesticides/PCBs and selected metals. SVOCs were positively identified in two samples, but at concentrations that were well below the screening criteria. One of the samples that contained SVOCs was from MW-101, located adjacent to the open lot north of the former Kellwood facility, and also contained PCE at a concentration of 16 µg/L. Sample MW6US-GW01-090309 contained naphthalene and 2-methlynaphthalene at estimated concentrations below reporting limits but above instrument detection limits, but did not contain PCE at detectable concentrations. Pesticides and PCBs were not detected in any of the samples. None of the wells contained metals at concentrations above the screening levels.

The maximum nitrate concentration detected was 7 mg/L in MW12-GW01-090514. Most nitrate concentrations were less than 2 mg/L, with nine samples that were below the method detection limit. Nitrate concentrations were largely non-detect, with a maximum concentration of 0.44 mg/L in BW20-GW01-090319. Sulfate concentrations ranged from 4.5 to 330 mg/L (in BW22-GW01-090324 and BW20-GW01-090319, respectively). Chloride concentrations ranged from 1.9 mg/L in BW21-GW01-090324 to 100 mg/L in MW9SW-GW01-090312. Most samples were non-detect for sulfide, ethane, and ethylene. Methane ranged from non-detect to 68 mg/L in MW12-GW01-090514. Ammonia concentrations were generally low, with a maximum concentration of 1.3 mg/L in BW20-GW01-090319. An evaluation of these parameters with regard to the potential for natural attenuation is presented in Section 5.3.4.

Five wells tapping the lower Jefferson City and/or Roubidoux Formations had positive detections of PCE. These included the four residences with whole-house treatment systems (JS-14, JS-36, JS-38, and JS-52) and JS-25. The four wells with whole-house treatment systems and the city well were sampled as a part of the on-going monitoring of the treatment systems rather than as a part of Task 2e. These samples are analyzed using the drinking water method (524.2) rather than Method 8260B. However, the sampling events were coordinated to provide contemporaneous data, and the results are included in this discussion of Task 2e. The highest PCE concentration detected among these five wells was at JS-36. Three of the monitoring wells tapping the Swan Creek Sandstone Member of the Cotter Dolomite had PCE detected, but at concentrations below the screening level of 5 µg/L. Six wells that tap the uppermost bedrock and/or the upper sandstone marker bed of the Cotter Dolomite contained detectable concentrations of PCE. The highest PCE concentration was detected in BW-20, which has had free-phase product present and is open to the uppermost bedrock.

During the drilling of MW-10UB, none of the water samples analyzed by the USGS had detections of PCE. These results indicate that the shallow groundwater in the area is not directly impacted by the water in the 500 tributary, which contained PCE at 4.5 µg/L.

3.1.2.6 Task 2f – Aquifer Testing

Two forms of aquifer testing were performed in the OU2/OU6 area: single-well tests (slug tests) and a pumping test. The primary intent of these tests was to characterize the hydraulic interconnectivity of the various bedrock flow systems; secondly, the tests were used to evaluate inter-aquifer characteristics.

Single-well Tests

Slug tests were performed on 18 wells:

- MW-1 cluster (MW-1S, MW-1T1, MW-1SW, MW-1UB)
- MW-2 cluster (MW-2S, MW-2SW, MW-2T2, MW-2T3)
- MW-5UB
- MW-6 cluster (MW-6US, MW-6SW, MW-6R)
- MW-7 cluster (MW-7US, MW-7SW)
- MW-8-US
- MW-9 cluster (MW-9US, MW-9SW)
- MW-10UB

Slug tests were not performed on MW-9R or on MW-14US as these monitoring wells had not been completed at the time of the tests. In addition, an equipment malfunction prevented data collected at MW-9SW from being read. The response of water levels to the introduction of the slug in MW-5UB did not follow a typical response by stabilizing prior to reaching the initial water level; therefore, the data were not analyzed. The test was not repeated since slug tests in other wells in the upper bedrock were performed.

Falling head slug tests were performed by lowering a slug (constructed of PVC pipe filled with neat cement) into the monitoring well a few feet below the static water level. This slug caused an immediate rise in water level because of the addition of the slug's volume. Water levels in the well were recorded, via a pressure transducer set in the well prior to the insertion of the slug, as it declined over time. Typically, the test was allowed to run until the water level had returned to within at least five percent of the static (pre-test) water level.

Rising head slug tests were also performed on each of these monitoring wells by removing the slug from the well causing an immediate lowering of the water level. As with the falling head tests, the water levels were recorded as they returned to within approximately five percent of static levels. Water levels were also checked manually to confirm the transducer's readings.

Because of the rapid recovery of some wells (particularly the deeper wells), multiple tests were conducted to confirm results. Also, some of the shallower wells that had static water levels within the screened/sand packed area had quick recoveries because the water displaced by inserting the slug simply went into the

sand pack and immediately drained back into the well. Results from tests on these wells are not considered reliable.

Results of the slug tests, including individual and average hydraulic conductivity (permeability) values, are shown on **Table 3.16**. Complete data from the tests are provided in **Appendix G**.

The software program AQTESOLV (version 3.50) was used to analyze the slug test data. The change in water level and time from the slug introduction or removal was input into the program, in conjunction with data on the well construction and aquifer geometry. Most of the wells had a response that matched with the Cooper-Bredehoeft-Popadopulos method. This method is a type curve fit method for confined aquifers that accounts for a fully penetrating well. The data from most of the wells matched the Cooper-Bredehoeft-Popadopulos type curve better than the straight line methods (Bouwer and Rice or Hvorselev) despite the ability of these methods to account for partial penetration. In instances where the water level response does not have a good fit with the Cooper-Bredehoeft-Popadopulos curves, the Bouwer and Rice straight line method was utilized. The AQTESOLV output for the Cooper-Bredehoeft-Popadopulos presents the aquifer property of transmissivity rather than hydraulic conductivity. The hydraulic conductivity is calculated by dividing the transmissivity by the aquifer thickness. Input parameters, curve fits, and calculated hydraulic conductivity (or transmissivity) values are presented in Appendix G.

Six wells completed in the upper sandstone marker bed and/or uppermost bedrock were tested. Five of these wells had a response that fit the Cooper-Bredehoeft-Popadopulos curve equal to or better than the Bouwer and Rice straight line method. Well MW-10UB had a better fit with the Bouwer and Rice unconfined straight line method. The average hydraulic conductivity for the upper bedrock and upper sandstone marker bed wells was 1.5 feet per day (ft/day) (see **Table 3.16** for results). MW-7US had the highest hydraulic conductivity, dominating the average value, with the other wells in this group typically ranging from 0.1 to 0.2 ft/day. These are considered relatively low values.

Four monitoring wells tapping the Swan Creek sandstone member were tested. These wells had a response that fit the Cooper-Bredehoeft-Popadopulos curve. The average hydraulic conductivity of these wells was 0.22 ft/day. Only one Roubidoux well had slug tests performed. The average hydraulic conductivity of the five tests conducted in MW-6R was 0.86 ft/day (relatively low). The USGS performed slug testing on BW-21 (USGS, 2003). The hydraulic conductivity for BW-21 is reported by the USGS to range from 1.7 to 3.8 ft/day. This range is slightly higher than the range of 0.34 to 1.4 ft/day established for MW-6R, however, differences of this magnitude are not uncommon, even within the same geologic interval over relatively short distances. The two overburden wells, MW-1S and MW-2S had high hydraulic conductivity values (18 ft/day and 14 ft/day,

respectively), which may reflect the impact of the filter pack on these screened wells.

Pumping Test

A pumping test was used to characterize the interconnectivity of the various bedrock flow systems within the site. The pumping test performed during this RI was conducted differently from the methods described in the Work Plan because of concerns from the City of New Haven. An alternative method (described below) was proposed to, and concurred with by, the City of New Haven, the USEPA, and the USGS. This alternative method provided adequate results for evaluation of the interconnectivity of the bedrock flow systems.

The test was conducted from July 17 through August 6, 2009. Pressure transducers (to monitor water levels) were placed in the following wells for the duration of the pumping test: MW-9R, MW-9SW, MW-9US, MW-6R, MW-6SW, MW-6US, BW-21, JS-25, BW-7, City Well W4, and City Well W3. Because of the construction of the pump head at W3, the transducer was attached to the air line that extended down the well to approximately 380 feet below top of casing (btoc). Accordingly, the pressure readings on the air line are approximate, and are discussed in more detail in Section 3.3.2.6. The transducers in each well were set to read depth to water from a set zero point (typically the top of casing) – this allowed a direct correlation between the transducer readings and the manual water level readings collected using an electronic water level meter.

Some transducers were installed prior to the start date on July 9, 2009, but the remaining transducers were installed on July 17, 2009. The test began on July 17, 2009 at approximately 1430 hours. The transducers were taken offline by the afternoon of August 6, 2009.

Rather than monitoring the water levels in these wells for 14 days while W3 pumped (as described in the Work Plan and Field Sampling Plan), the test was conducted over 21 days while the two city wells (W3 and W4) alternated their pumping schedules.

Standard procedure for the City of New Haven is to pump from one of their two wells each day, as needed, to maintain a required volume of water in their towers. The well from which water is pumped is automatically switched on a daily basis; therefore, each well only produces water every other day. The only way that both wells would be pumping at the same time would be for a high water-use emergency to occur, such as a major fire. No emergencies occurred during the test. For the purposes of this test, the wells were allowed to run on their normal schedule through July 20 (4 days). From July 21 to 27 (7 days), the wells were set to pump only from W4 (on demand only). From July 28 through August 4 (8 days), the pumps were switched to pump only from W3 (on demand only). On August 5, the pumps were returned to their normal schedule, and the test was terminated on August 6 (2 days).

The transducers were downloaded every two to three days during the test, and water level readings were manually confirmed.

A total of 17 cycles of pumping of the city wells occurred from the time that the transducers were placed in the wells monitored to the end of the test, excluding several short (less than 10 minutes) pumping periods. These short pumping periods were performed to confirm that the monitoring equipment on the city wells (both the transducers measuring water level and the pump motor state recorders) was functioning properly. The water levels in the wells being monitored showed fluctuations which were clearly not associated with the pumping of the city wells. These fluctuations resulted in difficulties with distinguishing the effects of pumping. The fluctuations appear to be related to barometric effects. Water levels in the Roubidoux wells could be impacted by fluctuations in Missouri River stage. The wells in the upper sandstone marker bed and the Swan Creek would not be impacted by changes in stage of the Missouri River, as they occur at elevations higher than the river level. In addition, the fluctuations in the upper sandstone marker bed and Swan Creek wells were similar in magnitude and periodicity to the changes in the Roubidoux.

A summary of the analyses (hydraulic conductivity and storativity values) are presented in **Table 3.17**. Plots of the observed data with the type curve fit and input parameters are presented in **Appendix G**.

The aquifer test indicates that a hydraulic connection is present between the Roubidoux Formation and the deeper strata from which the city wells produce their water. However, the hydraulic conductivity values estimated for the wells tapping the Roubidoux Formation are significantly lower than the values estimated at W-4, indicating that a lesser hydraulic connection exists between the Roubidoux and the Gasconade and lower formations than within the Gasconade and lower formations.

There is no discernible connection between either the Swan Creek sandstone member or the upper sandstone marker bed of the Cotter Dolomite and the strata from which the city wells produce their water.

Pumping Well W-4: The water level in well W-4 showed an immediate decline when the pump in W-3 turned on (and W-4 was not pumping). Likewise, the water level in W-4 showed an immediate rise when the pump in W-3 turned off. The drawdown data from W-4 were input into the AQTESOLV for analysis of the aquifer's hydraulic properties of hydraulic conductivity and storativity. The analyses for the aquifer test assumed that the aquifer extended from the bottom of W-4 to the top of the Roubidoux Formation. The Theis solution was utilized in the analysis, assuming a confined aquifer and allowing for analysis of wells with partial penetration of the aquifer. Observation data from W-4 for five different pumping cycles of W-3 (including one prior to the deployment of the transducers in BW-7 and JS-25) were analyzed. The hydraulic conductivity from the five pumping cycles ranged from 36 to 60 ft/day (considered in the high range). The

storage coefficient (dimensionless) ranged from 0.00011 to 0.00014 (typical for confined aquifers).

Pumping Well W-3: At City well W-3 there was no access to the interior of the well to install a pressure transducer. Therefore, a pressure transducer was installed in the air line at the output from an air compressor. The air line produced water level measurements with a significant variability between readings, and a general decline in the indicated water level between periods that the compressor would refill the 4-gallon air reservoir. Therefore, the data were not of sufficient quality to permit an analysis of drawdown in W-3 from pumping cycles of W-4.

Non-pumping Wells: The water level in each of the non-pumping wells being monitored was evaluated to identify responses to either the initiation or cessation of the pumping. In some instances the water level in an individual well was rising at the time that pumping started in one of the city wells. If a water level drawdown from the city well beginning its pumping cycle was present, the rate of rise of the water level would be expected to change to a lower rate at the time that the city well turned on, or shortly thereafter. If the water level was declining at the time that pumping started, an increase in the rate of decline would be expected at the time that the pump turned on or shortly afterward. A similar response to the end of the pumping cycle would be expected. A decrease in the rate of decline or an increase in the rate of rise would be expected to occur at the time the pump shut off or shortly afterward. If a time lag occurred between the start of the pumping cycle and the change in water level rise or fall, a similar time lag would be expected between the pump shut down and the decrease in the rate of water level decline or an increase in the rate of water level rise.

A positive indication of an impact from the pumping of the city well on an individual well for a specific pumping cycle required an inflection (change in rate of rise or decline) related to the start of pumping, an inflection related to the stopping of pumping, and a consistent lag time between the change in pump state and the water level inflections. None of the 17 pumping cycles produced a positive indication of response in the wells open to the upper sandstone marker bed or the Swan Creek sandstone member (MW-6US, MW-6SW, MW-9US, and MW-9SW). In addition, a positive indication of a response to the pumping cycles was not observed in MW-6R, a Roubidoux well.

MW-6 cluster: An analysis of the water levels in the three wells at the MW-6 cluster indicated a close correlation between the water levels and changes in barometric pressure. The transducers used for the aquifer test were vented so that the output of the transducers were reporting actual water level and pressure rather than differential pressures that require correction for changes in the barometric pressure. The influence of barometric impacts to water levels was subtracted from the water-level fluctuations. The method used to correct for barometric changes is similar to that established by Erskine (1991) for correcting effects of tidal fluctuations on well water-level data. Barometric efficiency is calculated as the standard deviation of the well values by the standard deviation

of the pressure values. Time lag (if any) is depicted using graphical means. The drawdown data are then corrected for the barometric changes based on efficiency and change in barometric pressure. In addition, long-term trends were subtracted. The water levels in MW-6US, MW-6SW, and MW-6R were compared to the time of pumping of the city wells. Although several instances were found where the adjusted water level did begin a decline near the time of the start of pumping and began to rise near the time of the end of the pumping cycle, close examination indicated that the start of the water level declines or the start of the water level rise would occur before the change in pumping status, and thus could not be a response to the pumping of the city well.

BW-7: Positive indications of drawdown were observed for 7 of the 17 pumping cycles in BW-7. Analyses were performed on data from two of the cycles. Water level fluctuations in the other cycles had influences that masked the impact of the pumping of the city wells. The open interval of BW-7 extends significantly above the top of the Roubidoux Formation. The well construction input was for a well that reached the top of the aquifer, assumed to be the top of the Roubidoux Formation. Thus, the input understated the open length of the well. In actuality, the water level in BW-7 is likely influenced by the lower portion of the Jefferson City Dolomite as well as the Roubidoux Formation.

JS-25: Positive indications of drawdown were observed for 8 of the 17 pumping cycles in JS-25. Analyses were performed for two of the cycles. Water level fluctuations in the other cycles had influences that masked the impact of the pumping of the city wells. The water level in JS-25 is influenced by the Swan Creek sandstone as well as the Roubidoux Formation, as evidenced by a static water level approximately 30 feet higher than other wells open to the Roubidoux Formation. There is over an order of magnitude difference in the hydraulic conductivity and storativity values indicated from the July 26 pumping cycle and the July 27 pumping cycle. This may be related to the ambiguity of selecting the initial water level and the drawdown where changes in water level independent of the effect of the pumping were present.

MW-9R: Positive indications of drawdown were observed for 9 of the 17 pumping cycles for MW-9R (closest of the wells monitored to W-3). However, only one of the pumping cycles yielded data for which a reasonable analysis could be performed. The drawdown data for the July 26 pumping cycle were analyzed. The hydraulic conductivity and storativity indicated are both significantly lower than those indicated for other wells monitored. One reason for this could be the fact that this well does not reach the sand interval of the Roubidoux Formation.

BW-21: Positive indications of drawdown were observed for 14 of the 17 pumping cycles in BW-21. Analyses were performed for four of the cycles. Hydraulic conductivity values from the four pumping cycles ranged from 5 to 8.4 ft/day (moderately high). Storativity values ranged from 0.001 to 0.0024.

3.1.2.7 Task 2g – Surveying

A final survey of the monitoring wells utilized in this RI (inclusive of USGS wells BW-20, BW-21, and BW-21A) was completed on September 1 and 2, 2009. A temporary control point was set near the source area and was related back to the USGS benchmark located near Trinity Lutheran Church in New Haven.

The USGS was also conducting a survey of the area during the same time frame. Results of their survey were used for points/monitoring wells where Parsons does not have access agreements, as well as for correlation.

3.1.3 DNAPL Investigation (Task 3)

The DNAPL investigation consisted of installing core holes into the upper portion of the bedrock in the area where the disposal of PCE occurred. Core holes were drilled at selected nodes of the survey grid (**see Figure 3.1a for locations**). FLUTe™ liners were then placed in the borehole in accordance with FSP SOP 9. The FLUTe™ liners have a treated surface that produces a stain when it contacts free-phase hydrocarbons. The FLUTe™ liners only indicate the presence of DNAPL at the point in time that the liner is in the borehole. Areas where DNAPL may have previously been present, but is no longer present, would not leave an indication on the liner, even though residual PCE has sorbed onto the rock matrix. Elevated PID readings were noted on the core at locations where DNAPL was not indicated to be present. The possibility exists that the water circulation during coring displaced the DNAPL from the immediate vicinity of the borehole. This is not likely to lead to a false negative indication because the water circulation would have to push the DNAPL upward into the fracture, because if the fracture had a downward avenue for movement, however slight, the DNAPL would have already followed it. The density of the displaced DNAPL would drive it back down in the fracture once the water circulation ceased. The boreholes were purged following drilling, and the FLUTe™ liners were placed into the borehole and left for a minimum of two hours, and in many cases, were left in place overnight. DNAPL displaced by the water circulation would have had sufficient time to flow back to the low point of the fracture adjacent to the borehole during this time.

Note that because both borings for soil samples (Task 1) and DNAPL holes were advanced on the same surveyed grid, both soil boring and DNAPL core holes are identified by a letter followed by a number. For the purposes of the boring logs and text, core holes have a hyphen separator, i.e., P-14, whereas soil borings do not have a hyphen, i.e., P14. For analytical samples (and the figures which were generated using the analytical samples), the hyphen could not be retained. Therefore, on the analytical results tables and figures, the presence of a hyphen cannot be used as a guide. However, the title of the figure or table is definitive in whether the information presented is from a soil boring (soil sample) or DNAPL core hole (aqueous sample).

The open lot north of the former Kellwood facility was overgrown and consisted of mounds and depressions prior to the DNAPL investigation. The lot was prepared for the DNAPL investigation by clearing brush and pushing material from the mounds into the depressions. Individual core sites were prepared by excavating to bedrock, drilling holes for rebar pins in the bedrock surface, and concreting a starter pipe consisting of 4-inch PVC pipe to the bedrock. Holes that were located in areas other than the open lot north of the former Kellwood facility had a greater depth to bedrock. In these instances, a pilot hole for the starter pipe was drilled to the bedrock surface using augers. The starter pipe was then cemented into the borehole.

The core rig was then set up over the starter pipe. A PVC tee with a discharge pipe was placed onto the starter pipe to allow the circulation water and cuttings to be diverted into a steel cuttings tub. The steel cuttings tub consisted of four chambers with baffles to allow cuttings to settle. Water was added to the cuttings tub as necessary. The amount of water lost during the coring process was recorded. Samples of the return water were collected every 2 feet for potential analysis by the USGS using their field GC. A conventional HQ core bit and barrel was used to drill the core hole. The core was recovered when the 10-foot barrel was full, when blockage of the ports on the drill bit occurred, or when a target depth was reached.

The core was removed from the core barrel and placed in PVC troughs for measurement of recovery and RQD, PID screening, and lithologic description. No PID screening was performed on the core from L-12 due to failure of the PID lamp. The PID had a questionable calibration on the morning that A-14 was cored. The core was placed in core boxes with wooden spacer blocks to indicate the depth of core runs and top and bottom depths of the core box.

A FLUTe™ liner was then placed in the core hole by turning the first few feet of the liner inside out to form a pocket, clamping the liner to the top of the starter pipe and inverting the liner into the core hole by filling the pocket with water. The steps for the FLUTe™ liner are described in Section 3.5.6 of the FSP. The FLUTe™ liner was left in the borehole a minimum of two hours to allow the reactive liner to interact with potential NAPL. The liner was then removed from the borehole and was turned right-side out and examined for stains indicating the presence of DNAPL. Where DNAPL was indicated, the liner was laid out adjacent to the core along with a measuring tape, and photographed for documentation.

The core hole was then sampled by purging with a 12-volt purge pump. Attempts were made to purge at least as much water as was lost in the drilling process. When it was not possible to purge this volume, the borehole was pumped out at least three times. Water was allowed to recover into the borehole prior to sampling with a disposable bailer.

Core holes that had indications of DNAPL were allowed to accumulate DNAPL. Those holes that accumulated recoverable quantities of DNAPL were left open

for periodic monitoring and recovery of DNAPL. Other boreholes were sealed by grouting with Portland cement through a tremie pipe.

A total of 22 core holes were drilled as a part of the DNAPL investigation. These core holes surround the former Kellwood facility to the north, west and south. The open area north of the former Kellwood facility contained 14 of the core holes. DNAPL was positively identified on the FLUTe™ liners of 5 of the core holes as indicated on **Figure 3.17**. The DNAPL detections were located primarily adjacent to the northern and northwestern portions of the former Kellwood facility. The core logs are presented in **Appendix C**. Photographs of the liners alongside the core are presented in **Appendix F.**

The depth to bedrock was shown to increase markedly to the southwest, with depth to bedrock being 42 feet at F-8 compared to 10 feet at J-8 (90 feet north) and 11 feet at F-11 (90 feet east). Cross sections through the core holes are presented in **Figures 3.18a and 3.18b**. The average depth to bedrock for the 14 core holes on the open lot north of the former Kellwood facility is just over 2 feet. The cores recovered exhibited numerous fractures, most of which were nearly horizontal. No intervals of fractures or unique lithology were observed that could be correlated between holes.

Three of the core holes with DNAPL were located at the southern portion of the open lot north of the north door of the former Kellwood facility (P-14, P-15, and Q-15.5). DNAPL was detected in these three holes at depths ranging from 4.4 to 18.1 feet. DNAPL was also indicated on the liners from 22.7 to 22.9 feet in P-14 and from 18.9 to 20.8 feet in P-15; however, these detections appeared to result from accumulation of DNAPL in the borehole prior to liner installation rather than presence of DNAPL in fractures in these intervals.

Two core holes near the northwest corner of the former Kellwood facility (L-12 and N-12) had DNAPL detected by the FLUTe™ liner. The DNAPL was indicated over a longer interval in these holes compared to the holes on the vacant lot north of the former Kellwood facility. One of the two intervals in L-12 was over 6 feet long (4.6 to 11.4 feet).

Following the drilling of the core hole and the installation of the FLUTe™ liner, the core holes were purged for groundwater sampling. Groundwater was sampled from each core hole, with the exception of P-15. A summary of detections is presented in **Table 3.18**. PCE was detected in each of the groundwater samples analyzed. Only one of the 21 samples did not contain PCE above the screening criterion. The highest concentration of PCE was estimated at 240,000 µg/L. TCE and/or 1,2-DCE were detected in 15 of the samples, including three of the four samples from holes where DNAPL was detected. Eleven (11) of the samples contained TCE and/or 1,2-DCE at concentrations greater than the screening criterion. The break-down product vinyl chloride was not detected in the samples; however due to the dilution necessary to analyze for PCE, the detection limit for vinyl chloride was elevated.

As expected, the highest concentrations of VOCs correlated with the presence of DNAPL, adjacent to the northern and northwestern portions of the former facility.

Core hole L-12 as well as USGS monitoring well BW-20 were gauged quarterly to identify whether DNAPL had accumulated in the borehole. When greater than 0.03 feet of DNAPL was detected in the borehole, a peristaltic pump was used to remove the DNAPL. Approximately 6,200 ml of DNAPL has been recovered. The gauging and recovery effort in core hole N-12 discontinued in April 2008, due to the lack of DNAPL.

3.1.4 Sediment and Surface Water Investigation (Task 4)

Surface Water

Sixteen surface water samples were collected as a part of the RI (see **Figure 3.1c**). Four of the samples were collected by USGS, three of which were on property to which Parsons was not granted access. Samples were not collected from two proposed locations. Several other sample locations were moved to alternate locations to gain access either from a cooperative property owner or to reach a public right-of-way. Two of the surface water samples were collected from the same location at different times.

Surface water samples were collected in accordance with Section 3.5.7.1 and SOP10 of the FSP. Attempts were made to use a flow meter to gauge the flow of the surface water, but the low-flow conditions did not provide the depth and velocity required to spin the flowmeter. Instead, the channel width and depth were measured with a tape and the velocity was estimated by timing the movement of a leaf on the water surface along a length measured with the tape.

The surface water was collected directly into the sample containers. Personnel accessed the sample locations from downstream. The samples were sent to the laboratory and analyzed for VOCs. One sample was also analyzed for SVOCs, pesticides, PCBs, and metals. Three samples were collected upstream of SW-08 to delineate the distribution of PCE upstream from (1) a positive detection in a sample collected during the RI (sample SW8-SW01-080804) and (2) a detection from a USGS grab sample (not shown). These three samples are identified as SW-08U1, SW-08U2, and SW-08U3. Sediment samples were not collected at these locations or as a part of the USGS sampling efforts.

PCE was detected in 5 of the 16 surface water samples (see **Table 3.19** and **Figure 3.19a** for results). None of the samples exceeded the updated ecological benchmark of 111 µg/L (USEPA 2006). TCE was detected at concentrations below the screening criterion in four samples. 1,2-DCE was detected at concentrations below the screening criterion in three samples. Vinyl chloride was detected in sample SW08-SW01-090825 (3.6 µg/L), below the ecological screening criterion (930 µg/L). PCE was not detected in the same sample.

Samples were collected from SW-08 on three different occasions. The concentration of PCE at SW-08 ranged from non-detect to 14 µg/L.

Sediment

Sediment samples were collected from eight locations in August of 2008 and April of 2009 (**Figure 3.1c**). These samples were collected in accordance with Section 3.5.7.2 and SOP10 of the FSP. The samples were analyzed for VOCs. One sample was also analyzed for SVOCs, pesticides, PCBs, and selected metals for risk assessment purposes. Sediment was collected using a stainless steel scoop. The sample location was approached from downstream so that the movement of the sampler would not disturb the sample location. The location for the sample was selected to maximize the amount of fine-grained material in the sample. Once the sample was in the scoop, larger gravel pieces were discarded. This was necessary to allow the use of the measuring syringe of the Terra Core^{tm} kit that was utilized for the VOC samples.

PCE was detected in one of the eight sediment samples (sample ID SD06-SD01-000.2-080801) at an estimated concentration (see **Table 3.20**). The sample that contained PCE was collected from the 500 tributary immediately west of MW-10UB (**Figure 3.20**). Sample SD06-SD01-000.2-080801 was also analyzed for additional parameters. A number of SVOCs and pesticides were detected at estimated values in the primary sample. Benzo(b)fluoranthene, benzo(k)fluoranthene, and benzo(a)pyrene were positively identified in the sample. The duplicate sample had no detections for SVOCs or pesticides.

3.1.5 Sewer Investigation (Task 5)

3.1.5.1 Sanitary Sewer Connected to the Former Kellwood Facility

Sampling within and alongside the sanitary sewer downstream of the former Kellwood facility included sampling of sewer water and sediment, video inspection of the interior of the sewer line, and direct-push sampling of soils immediately outside of the sewer at defects identified during the video inspection. Sewer water and sewer sediment samples were collected from manholes and lift stations at locations proposed in the FSP (see Figure 3.1c).

Sewer water and sediment sampling was the first task performed. The locations of the manholes to be sampled were reviewed with the Public Works Manager for the City of New Haven. Upon arrival at each sampling site, the lid of the manhole was removed and the conditions of the manhole were noted, including flow state, inlet and outlet directions and sizes, and amount of sediment present. A bailer was then lowered into the manhole to capture the sewer water sample. The sewer water was transferred into laboratory preserved sample vials; the vials were labeled and placed on ice.

Sewer sediment was collected using a disposable stainless-steel scoop attached to a pole. A disposable soil sampling syringe was used to transfer the proper volume of sample to the vials of a Terra Core^{tm} sampling kit. The vials were labeled and placed on ice.

Video inspection of the sewer from MH407 downstream to LS5 was performed by Ace Pipe Cleaning, Inc. The sewer line was cleaned by jetting and rooting prior to the video inspection. Following the cleaning, a crawler-mounted video camera was placed into the sewer and advanced downstream to the next manhole. The camera operator made audio notes of observations that were recorded along with the video. When the crawler reached the next downstream manhole, it was retracted to the original manhole. The process was repeated at subsequent manholes until LS5 was reached. The video inspection was recorded onto a DVD.

The DVD was reviewed to identify locations of potential defects in the sewer line that could allow leakage of water out of the sewer and into the adjacent soil. Five defects were identified for direct-push sampling of the soils adjacent to the sewer. The direct push borings were advanced to a depth of at least two feet below the bottom of the sewer pipe. Soil core from the direct push sampler was logged, and headspace samples were screened with a PID capable of measuring to the ppb level. Soil samples were collected from the depth of the highest headspace and the depth corresponding to the depth of the sewer pipe. Where headspace readings were very low to zero, soil samples were collected from the depth corresponding to the bottom of the sewer pipe and the bottom of the hole.

The disposable soil syringe from a Terra Core kit was used to transfer a measured volume of sample into the pre-preserved vials of the kit. The samples were then placed on ice in a cooler. If the borehole was less than 10 feet deep, the unused soil core was returned to the borehole. For boreholes greater than 10 feet deep, the borehole was sealed by filling with bentonite chips, hydrating the chips every two feet. Samples were then sent to the laboratory for VOC analysis.

Analytical results of the samples of sewer water and sewer sediment collected from several manholes and lift stations are summarized in **Tables 3.21 and 3.22** and are shown on **Figures 3.21 and 3.22**. Sediment was not present in MH-156 or in MH-405. Seven sewer water samples and five sewer sediment samples were analyzed.

PCE was detected in three of the seven sewer water samples at concentrations below the screening level of 5 µg/L for drinking water. TCE, 1,2-DCE, and vinyl chloride were not found in the sewer water samples.

PCE was detected at concentrations above the 141 µg/kg soil screening level in two of the sewer sediment samples (samples MH331-SD01-070918 and MH407-SD01-070913). The other three sewer sediment samples did not contain PCE. None of the samples contained TCE, 1,2-DCE, or vinyl chloride.

Evaluation of the video of the sewer line between MH-407 and Lift Station 5 did not indicate any significant defects in the line. Several sags and small accumulations of roots were identified near several manholes. Five soil borings, each adjacent to an identified sag or root accumulation, were advanced to evaluate whether VOCs in the wastewater may have leaked from the sewer. A

total of ten (10) soil samples were collected from these borings. PCE, TCE, 1,2-DCE, and vinyl chloride were not found in these samples.

3.1.5.2 Suspected Abandoned Sewer Line Adjacent to the Former Kellwood Facility

The work plan called for investigation of the sewer line that was suspected to have been abandoned adjacent to the former Kellwood facility. During preparation for this task, Mr. Julius Gatzemeyer (City of New Haven) was interviewed regarding the line. He indicated that during the initial development of the industrial park, a six-inch sewer line was constructed from MH-407 northward to MH-156S. Given the age of the construction, he stated that this line was probably constructed using PVC pipe. MH-407 receives the effluent from the Former Metalcraft Facility. When the manufacturing facility was constructed southeast of Former Metalcraft Facility, Lift Station 7 was constructed to pump the wastewater from the manufacturing facility to MH-407, where it would flow by gravity northward to MH-156S, then west to Lift Station 4. With the added flow, the six-inch pipe from MH-407 to MH-156S was undersized, and the existing line was replaced with an 8-inch PVC line. Because of the configuration of the line, the 6-inch line would have been removed to make room for the 8-inch line rather than abandoned in place. This information was presented to the USEPA with a request to forego the planned evaluation. The USEPA concurred with the request and the evaluation was not performed.

3.1.5.3 Older Sewer Line Sections Located North of Highway 100

Direct push borings were installed along three sewer segments north of Highway 100 to evaluate the potential for exfiltration of wastewater containing COPCs from the sewer lines. Sampling and analysis were conducted as described above. Five borings were planned along each of three sewer segments. Due to access issues and an inability to accurately identify the location of the sewer line, only 11 of the 15 proposed borings were advanced. The borings were advanced to refusal or to a depth four to six feet deeper than the depth of the sewer line. Soil cores from the direct push sampler were logged and headspace samples were screened with a PID. Soil samples were collected from the depth of the highest headspace and the depth corresponding to the depth of the sewer pipe. Where headspace readings were very low to zero, soil samples were collected from the depth corresponding to the bottom of the sewer pipe and the bottom of the hole.

Five soil borings were proposed for each of three sewer segments north of Highway 100 to evaluate whether VOCs in wastewater (if present) could have ex-filtrated the sewer segments in transit to the wastewater treatment facility. At the time that this task was developed, the source of VOCs in the Maiden Lane area was not known. Prior to execution of this task, a source for the VOCs in this area unrelated to the former Kellwood facility was identified. Four of the proposed soil

boring sites were not advanced due to either access issues or ambiguity of the location of the sewer line.

Three soil borings were advanced along the sewer segment at the south end of Maupin Avenue marked “A” on Figure 4.5 of the Work Plan. Four soil borings were advanced along the sewer segment along Miller Street from Maiden Lane northward marked “B”. Four soil borings were advanced along the sewer segment paralleling Maupin Avenue north of Mary Hammack Street, marked “C”. A total of 22 soil samples were analyzed from the 11 borings. None of the samples contained PCE, TCE, 1,2-DCE, or vinyl chloride. Analytical results are provided in **Table 3.23**.

3.1.6 Soil Vapor Sampling

Based on the detection of PCE in shallow groundwater near the southeast corner of the New Haven High School building (MW-14X), the USEPA requested that soil vapor sampling be conducted.

Five borings were installed around the high school building (3 on the southeast side, 1 on the east side, and 1 on the northeast side) via DPT to an approximate depth of 10 feet (see **Figure 3.23**). The soils were screened with a PID and logged. The soil vapor sampling point consisted of a 6-inch long stainless steel screen connected to ¼-inch Teflon® tubing. The tubing extended to the surface where it was fitted with a brass valve.

Coarse filter sand was placed in the annular space around the screen, using a tremie pipe, and bentonite was installed (hydrating every six inches) above to create a vapor seal from the surface. A 1-foot long section of 4-inch diameter PVC pipe was installed, with a locking expansion cap, at the surface.

The sampling points were allowed to equilibrate overnight (or longer) before sampling. To sample, a flow controller (supplied by the lab) and a three-way valve were connected at the top of each sampling point to allow connection to both the sampling device (SUMMA® type canister) and a purge line. Purging was accomplished by connecting a disposable, high-volume syringe to one port of the three-way valve. The syringe was then opened to create a vacuum on the sampling point, pulling vapor from the soil through the flow controller into the syringe. When the gauge on the flow controller showed that no vacuum existed, the three-way valve was closed and the contents of the syringe were evacuated into a Tedlar® bag. The vapors in the Tedlar® bag were then monitored for oxygen, carbon dioxide, methane, and VOCs to verify that representative samples were being collected.

The percent helium was also monitored in the purged vapors. Prior to purging, a bucket, fitted with sampling ports, was placed over the sampling point and filled with helium. Monitoring of the helium in the purged vapors demonstrated the effectiveness of the bentonite seal between the surface and the screened interval of the sampling point.

Prior to sampling, an attempt was made to purge each sampling point of three volumes of the sampling system. However, because of the low permeability of the soils present in the area, not all five points were completely evacuated of three volumes.

Once purging was complete, samples for laboratory analyses were collected directly into 1-liter SUMMA® type canisters (provided and pre-cleaned by the laboratory). This was accomplished by opening the three-way valve to the canister and then opening the inlet valve on the canister. The initial vacuum present in the canister (typically approximately 30 inches of mercury) was noted, and the canister was then left to fill.

After sample collection was complete, the inlet valve on the canister was closed, and the final vacuum was noted. The samples were sent to the laboratory for analysis of selected VOCs.

During sampling activities, time-weighted ambient air samples were collected, upwind, into pre-cleaned, 6-liter, flow-controlled SUMMA® type canisters. These samples served as an indication of background conditions during sampling.

The purpose of the sampling was to evaluate whether soil vapors from VOCs detected in the overburden groundwater sample (collected from the originally planned location of MW-14) might impact the school building. The locations of the soil vapor monitoring points are on **Figure 3.23**. The monitoring points varied from 9.8 to 10.8 feet deep. The length of the open interval of the monitoring points varied from 0.8 feet to 1.3 feet. Soils encountered were silts with varying quantities of clay. Some weathered sandstone was encountered in boring SVI-1.

Headspace measurements were performed with a ppbRae^{tm} PID. SVI-3, SVI-4, and SVI-5 had headspace readings of zero at all depths. Relatively low headspace readings were indicated from the two shallow samples from SVI-2. Headspace readings from SVI-1 from 6, 8, and 10 feet bgs ranged from 250 parts per million (ppm) to 1,850 ppm (the upper limit of the ppbRae^{tm}). Despite the high headspace readings, no odors of solvent or other organic odors were noted.

One soil vapor sample was collected from each monitoring point, with a replicate sample collected from SVI-3. The results from these samples are presented in **Table 3.24**. The samples from SVI-4 and SVI-5 had a large vacuum remaining in the samplers at the end of the eight-hour sample period. An ambient air sample was collected on each day that the soil vapor monitoring probes were being sampled. PCE, TCE, 1,2-DCE or vinyl chloride were not detected in the soil vapor samples, with the exception of PCE at 200 micrograms per cubic meter (µg/m^3) from SVI-5. This concentration is below the 210 µg/m^3 target soil gas concentration value for soil gas for industrial use, but is above the target soil gas concentration for residential use of 41 µg/ m^3. The sample is below the Missouri Tier 1 risk-based levels. Low levels of PCE, TCE, and 1,2_DCE were detected in the ambient air sample on 9-11-09.

3.1.7 Management of Investigation Derived Waste

Soil cuttings and water produced during drilling or in well development and sampling were collected and contained. The containment method was dependent upon the media involved and the volume produced. Cuttings from drilling operations were contained in a combination of drums, dumpsters, and rolloff boxes. Liquids in the dumpster or rolloff box were pumped to transfer tanks and taken to large tanks for storage. Each dumpster or rolloff box contained cuttings from one investigation site and was characterized by collecting a representative sample for laboratory analysis for VOCs using the TCLP. After receipt of the TCLP analyses, a determination was made regarding the proper disposal of the cuttings. Roll-off boxes and dumpsters that had TCLP VOCs below regulatory levels were transported to the Prairie Valley Landfill for disposal. Drums of cuttings from the boring of the starter pipes for the DNAPL investigation were transported to a permitted landfill by the Kiesel Company. None of the cuttings had TCLP VOCs above regulatory levels.

Accumulated water from drilling operations, decontamination operations, well development, and well purging was stored in several large tanks. Water that was likely to contain VOCs was segregated in different tanks from water that was not expected to contain VOCs. Samples from the tanks were analyzed for VOCs to determine the proper disposal method. Water that contained PCE at a concentration below the 5 µg/L screening level for drinking water was discharged either to the sanitary sewer or to the ground (based on guidance from MDNR) Water containing PCE at concentrations above 5 µg/L was transported by the Kiesel Company to the St. Louis Metropolitan Sewer District for treatment.

3.1.8 Quarterly DNAPL Recovery Efforts

Gauging of the core holes and USGS monitoring well BW-20 with recoverable DNAPL was performed quarterly during the RI. The well cover was removed and an interface probe was used to gauge the water level, the DNAPL level and the bottom of the hole. If more than 0.03 feet of DNAPL is detected, a polyethylene or copper tube was lowered to the bottom of the hole. Tubing from a peristaltic pump was slid over the down-hole tubing. The tubing was raised and the pump was turned on to discharge to a bucket or jug. Once water was flowing, the tube was lowered into the DNAPL. Because of the density of the DNAPL, the flow often stopped; in these instances the tube was raised and lowered to re-start the flow. The recovered DNAPL was placed in a 5-gallon bucket which is located inside of a 55-gallon drum for secondary containment and is stored in a drum at the rear of the ARP test facility across Industrial Drive from the Former Metalcraft facility.

3.1.9 Deviations from the RI/FS Work Plan and/or Sampling Analysis Plan

The RI was performed in accordance with the USEPA-approved RI/FS Work Plan and the SAP, but with modifications that were either due to field conditions, access restrictions or USEPA requests. All these modifications were made with

prior approval from USEPA. The deviations made from the RI/FS Work Plan and/or SAP are summarized in **Table 3.25**.

3.2 ANALYTICAL METHODS USED IN THE REMEDIAL INVESTIGATION

With the exception of soil vapor samples, the analytical methods used were in accordance with the USEPA-approved SAP. The soil vapor assessment in the vicinity of the school was added to the RI activities after the RI/FS Work Plan and SAP were approved. With approval from USEPA, the soil gas and ambient air samples were analyzed using USEPA Method TO-15 for selected VOCs (PCE, TCE,cis-1,2-DCE,trans-1,2-DCE, and vinyl chloride).

The data collected and presented in this report were validated in accordance with the QAPP with the exception of the following:

- The 34 groundwater samples collected during the monitoring well installation were used primarily for field screening purposes. As such, the associated data were not validated.
- The 4 groundwater sample results for JS-14, JS-36, JS-38, and JS-52 shown on **Figure 4.3** are from the third quarter 2009 residential well sampling performed under the 2002 AOC and are not validated.

The data validation reports are presented in **Appendix H** and the validated analytical results are presented in **Appendix I**.

SECTION 4
NATURE AND EXTENT OF IMPACTS

4.1 SUMMARY OF SOURCES INVESTIGATED

Chemicals of Potential Concern investigated as a part of this RI include PCE, TCE, 1,2-DCE and vinyl chloride. PCE was the chemical that was disposed of on the open lot north of the reported as being former Kellwood facility. Through reductive dechlorination, PCE can degrade to TCE, 1,2-DCE and vinyl chloride. As described in Section 3, DNAPL containing PCE was detected immediately north and northwest of the former Kellwood facility.

4.2 DISTRIBUTION OF CHEMICALS OF POTENTIAL CONCERN IN SOIL

The distribution of PCE, TCE, 1,2-DCE, and vinyl chloride north and west of the former Kellwood facility and beneath the facility was evaluated by the 41 soil borings associated with Task 1. Two samples were collected for analysis from each boring, with the exception of boring MC-1 located in the northeast corner of the former Kellwood facility and boring T-10, located on Industrial Drive north of the former Kellwood facility. **Figure 4.1** presents the detected concentrations of PCE, TCE, 1,2-DCE (total), and vinyl chloride in the samples collected from the soil borings. Analytical results for compounds detected in the samples are presented in **Tables 2.3, 3.2, 3.21, and 3.23**.

Analytical results of soil samples collected as a part of the RI, along with prior sampling by the USEPA, USGS, and others, indicate that the extent of PCE, TCE, and 1,2-DCE is limited to the open lot north of the former Kellwood facility, beneath the former Kellwood facility, and adjacent areas to the west of these two areas (specifically, beneath Industrial Drive and in the open lot northwest of the former Kellwood facility). Details of the distribution are provided below.

The central portion and southern margin of the open lot north of the former Kellwood facility exhibits concentrations of PCE that are above the 141 µg/kg screening level (see **Figure 4.1**). PCE was detected in these samples at concentrations of up to 23,000 µg/kg. TCE and 1,2-DCE were detected at concentrations below the screening level in the shallower sample from boring P16. Because of the shallow depth to refusal in this area (approximately 28 inches), variation of concentration with depth is not very significant. Of the eight boring locations in the open lot with PCE detections, four of the locations had higher concentrations detected in the shallower sample (P14, P16, Q13, and S13). Four locations had higher concentrations detected in the deeper sample (P15, Q16, R13, and S15). Samples collected from the northern and eastern portions of the open lot did not contain PCE, TCE, 1,2-DCE, or vinyl chloride.

Eight soil borings were advanced in the gravel parking lot on the west side of Industrial Drive. These borings were located to evaluate the potential for the

release of PCE in this area. None of the 16 samples analyzed from these borings were found to contain PCE, TCE, 1,2-DCE, or vinyl chloride.

Four soil borings were advanced in the open lot on the west side of Industrial Drive northwest of the former Kellwood facility. These borings were located to evaluate the potential for the release of PCE in this area, and to evaluate the potential for westward migration from the open lot north of the former Kellwood facility. None of the shallow samples from these four borings contained PCE, TCE, 1,2-DCE, or vinyl chloride. The deeper samples from the two eastern borings contained PCE at concentrations below the screening level, but no detectable concentrations of TCE, 1,2-DCE, or vinyl chloride.

Eleven (11) borings were advanced along Industrial Drive (one in the truck loading area on the northwest corner of the former Kellwood facility [N12] and one north of the ramp at the north end of the former Kellwood facility [P12]) to evaluate migration westward from the former Kellwood facility and the open lot to the north. PCE was detected in 12 of the 20 samples, with the screening criteria exceeded in 5 samples. The maximum concentration of PCE in these samples was 380 µg/kg in the 3.5-foot depth sample from R10. PCE was not found in either sample from the two southernmost borings and the northernmost boring. PCE concentrations were generally higher in the deeper sample of a given boring. TCE and/or 1,2-DCE were detected at concentrations below the screening level in eight samples.

Five borings were advanced through the concrete floor of the former Kellwood facility to evaluate the potential for leakage from piping or through cracks in the floor. Only one depth was sampled at boring MC1. PCE was detected in each of the nine samples from these borings. The highest concentration detected was 290,000 µg/kg from the deeper sample at boring MC4. This boring was placed near an abandoned floor drain near the historical point of use. This sample and the deeper sample from boring MC05 both exceeded the screening criteria. The remaining samples, although indicating detections, had concentrations below the screening level. TCE and/or 1,2-DCE were detected at concentrations below the screening levels in two samples.

Samples collected at five defects in the sewer lines between the manhole in front of the former Kellwood facility (MH-407) and LS-4 did not indicate the presence of detectable concentrations of PCE, TCE, 1,2-DCE, or vinyl chloride (samples in **Table 3.21** with sample IDs beginning with SDF). Samples collected from 11 direct push borings alongside the sewer in three segments north of Highway 100 did not indicate the presence of detectable concentrations of PCE, TCE, 1,2-DCE, or vinyl chloride (**Table 3.23**).

4.3 DISTRIBUTION OF DNAPL

FLUTe™ liners indicated the presence of DNAPL in three core holes at the southern end of the open lot north of the former Kellwood facility. DNAPL was also detected in core holes immediately west of the north end of the former

Kellwood facility (**Figure 3.17**). DNAPL was detected at depths ranging from 4 feet to 22 feet bgs (**Figures 3.18a and 3.18b**). The core holes with positive detections of DNAPL were flanked by core holes where the FLUTe™ liners did not indicate the presence of DNAPL. There is no indication that DNAPL is present outside of this limited area. Over a 12 month period, approximately 6.2 liters of DNAPL have been recovered from core holes P-14 (since sealed) and L-12, as well as USGS monitoring well BW-20.

The FLUTe™ liners only indicate the presence of DNAPL at the point in time that the liner is in the borehole. Areas where DNAPL may have previously been present, but is no longer present, would not leave an indication on the liner, even if residual PCE had sorbed onto the rock matrix.

4.4 DISTRIBUTION OF CHEMICALS OF POTENTIAL CONCERN IN GROUNDWATER

4.4.1 Groundwater Flow

Precipitation infiltrating soil and bedrock that may contain DNAPL, as well as groundwater migrating past areas with DNAPL, have released PCE, TCE and 1,2-DCE to groundwater. These VOCs have migrated in groundwater from the open lot north of the former Kellwood facility. PCE, TCE and 1,2-DCE, have been detected in groundwater in the unconsolidated material above bedrock to the west and south of the former Kellwood facility. Core holes installed as a part of Task 3 (DNAPL investigation) indicate that the bedrock surface drops sharply to the southwest of the former Kellwood facility. Depth to bedrock, which is only a few feet in the open lot north of the former Kellwood facility and at the northwest corner of the former Kellwood facility, drops to over 50 feet at core hole A-7.

An east-west line of direct push borings completed as a part of Task 2b identified a dip in the bedrock surface running roughly from the southern end of Industrial Drive westward to the boundary of the industrial park (see **Figure 3.7**). This is consistent with the results of electrical resistivity surveys performed in 2004 across the southern end of the industrial park. USGS monitoring well BW-22 is located just north of this line of direct push borings. The USGS reported that the depth to bedrock at this well was much greater than at BW-21, located approximately 200 feet to the north and that the lithology encountered in the boreholes was different. In addition, high concentrations of PCE were detected in samples of intermediate samples during the installation of the well. The depth to bedrock at the MW-1 cluster of wells is within the range of the depth to bedrock observed in the bedrock dip of the direct push cross-section line. There are not sufficient data to determine whether the bedrock dip is associated with a structural feature in the bedrock or is due to a normal weathering pattern. However, the potential exists that there is a structural feature in the vicinity of the bedrock low.

Upper Bedrock Flow: A number of monitoring wells tap the uppermost bedrock and/or the upper sandstone marker bed of the Cotter Dolomite. Monitoring wells that tap the upper sandstone marker bed include: MW-6US, MW-7US, MW-8US, MW-9US, MW-14US, MW-101, MW-102, and MW-103. Wells that are open to upper bedrock above the Swan Creek sandstone member of the Cotter Dolomite include MW-1UB, MW-4A, MW-5UB, MW-10UB, and BW-21A. A water-level contour map prepared from water level measurements in the upper sandstone marker bed/uppermost bedrock wells is presented as **Figure 4.2a**. These data, collected on September 1, 2009 indicate a distinct gradient to the southwest at a magnitude of approximately 0.009 feet per foot.

Swan Creek Flow: Monitoring wells in the Swan Creek sandstone member of the Cotter Dolomite include MW-1SW, MW-2SW, MW-4BS, MW-6SW, MW-7SW, MW-9SW, MW-11 and MW-12. A water-level contour map prepared from water level measurements on September 1, 2009 from these wells is presented in **Figure 4.2b**. These data indicate a distinct gradient in the Swan Creek to the southwest at 0.012 feet per foot.

The gradient to the southwest in the upper sandstone marker bed/uppermost bedrock and the Swan Creek indicates that groundwater flow is toward the 500 and 600 tributaries, to Wildcat Creek and ultimately to Boeuf Creek. This flow pattern is consistent with the detections of PCE in surface water in the 500 and 600 tributaries (see Section 4.6 and **Figure 2.6**). The upper sandstone marker bed is known to crop out in the bed of the 500 and 510 tributaries. A spring on this creek is known to exist at the approximate location of the outcrop of the upper sandstone marker bed near the joining of these two tributaries. This spring was not accessible for sampling during the RI, but PCE has been detected during historical sampling of this spring by the USGS.

Roubidoux Flow: Only a few monitoring wells extend into the Roubidoux Formation. These include MW-2R (now a domestic well), MW-6R, MW-9R, BW-21, and BW-07 (located substantially north of OU2). In addition, two domestic supply wells were measured: JS-25 (no longer in use) and MW-4 (a newly drilled domestic well). JS-25 has a very long open-hole section that extends from above the Swan Creek into the Roubidoux. Water level measurements from these wells are presented in **Figure 4.2c**. The water levels over this wide area show just over three feet of difference with the exception of JS-25. Because of the small amount of variation, the data are presented without contours. The long open-hole interval in JS-25 results in the water level being influenced by both the Roubidoux and the Swan Creek. As a result, the water level in this well is substantially higher than would be expected for a well open only to the Roubidoux. The completion depth of MW-9R was short of the sand interval of the Roubidoux Formation, which may lead to the water level being slightly higher than would have resulted with a completion that included the sand interval. The water level in BW-7 may be somewhat influenced by its open interval including a substantial portion of the lower Jefferson City. A clear gradient and flow direction cannot be established for the Roubidoux in this area using these data. However,

when the expected influences of the details of the well completions are evaluated, the conclusion can be drawn that flow in the Roubidoux is northward, which is consistent with regional information.

Monitoring well clusters that tap the Roubidoux and shallower intervals include the MW-2, MW-6 and MW-9 well clusters. The vertical hydraulic gradient was calculated at each of these well clusters by dividing the difference in head between the shallowest well and the Roubidoux well by the vertical distance between the bottom of the shallower well's open interval to the top of the Roubidoux well's open interval. The vertical gradient was greatest at the MW-2 cluster at 0.27 feet per foot in a downward direction. At the MW-6 and MW-9 clusters, the vertical gradient was downward at 0.17 and 0.23 feet per foot, respectively. These high vertical gradients indicate a weak connection between these units. By Darcy's law the hydraulic gradient is inversely proportional to the effective hydraulic conductivity and directly proportional to the flow rate. The aquifer test results and the high concentration of PCE in the upper sandstone marker bed/uppermost bedrock compared to the Swan Creek and lower permeable zones indicate that the vertical flow rate is low. Thus, the high hydraulic gradient indicates a weak connection between the units.

Hydraulic Conductivity: Slug testing indicates that hydraulic conductivity measurements for the upper sandstone marker bed and upper bedrock monitoring wells range from 0.11 ft/day to 10 ft/day. The hydraulic conductivity values obtained from the slug tests fell into a low range with the exception of MW-7US, which was over an order of magnitude greater. The average hydraulic conductivity of these wells, excluding MW-7US, is 0.20 ft/day (a relatively low value).

Slug test results for the wells in the Swan Creek (MW-1SW, MW-2SW, MW-6SW, and MW-7SW) indicate an average hydraulic conductivity of 0.23 ft/day with a range of 0.05 to 0.5 ft/day (relatively low). MW-6R was the only well in the Roubidoux where a slug test was performed (MW-9R was not complete at the time and MW-2R was converted to a domestic well). The average hydraulic conductivity estimated for MW-6R was 0.86 ft/day.

Hydraulic conductivity estimates based on the aquifer testing indicate that the Gasconade Dolomite and lower units that city wells W-3 and W-4 utilize are more transmissive than the Roubidoux Formation and significantly more transmissive than the undifferentiated Jefferson City intervals and the Swan Creek sandstone member and upper sandstone marker bed. The high vertical gradient measurements indicate that there is, at most, a limited hydraulic connection between the Roubidoux Formation permeable zone and the overlying Swan Creek sandstone member and upper sandstone marker bed of the Cotter Dolomite. The pumping test conducted using city wells W-3 and W-4 confirmed this. The measurements in the Swan Creek and upper sandstone marker bed during the pumping test did not show a discernible water level response to pumping of either city well.

4.4.2 Distribution and Trends of Chemicals of Potential Concern in Groundwater

PCE, TCE and 1,2-DCE have been detected in the four laterally transmissive intervals: overburden above bedrock, the upper sandstone marker bed of the Cotter Dolomite, the Swan Creek sandstone member of the Cotter Dolomite, and in the lower Jefferson City Dolomite/Roubidoux Formation. VOCs have also been detected in other undifferentiated intervals in the Cotter Dolomite.

The distribution of PCE is widest in the upper sandstone marker bed/uppermost bedrock permeable zone (see **Figure 4.3**) with PCE present above the 5 µg/L screening criterion to the west at MW-7US, and to the south at MW-04A. Samples collected from the overburden at MW-14US and at MW-04A did not contain PCE. PCE is present at concentrations in the hundreds to low thousands of µg/L in the overburden throughout the southern portion of the industrial park south and southwest of the former Kellwood facility as seen in the direct push borings (**Table 3.7**), BW-21A, and in MW-1S. The distribution of PCE in the Swan Creek sandstone member is limited, with concentrations generally lower. PCE in the lower Jefferson City/Roubidoux is limited to small isolated occurrences. The following sections provide details about the PCE distribution in each of these intervals.

Overburden

Sampling of groundwater in the overburden was performed as a part of the direct push cross-section holes north of Boeuf Lutheran Road, the initial direct push borings at proposed monitoring well locations, and in monitoring wells MW-1S and MW-2S (see **Tables 3.7 and 3.10**). PCE, TCE and 1,2-DCE were identified in a number of the direct push borings for the cross-section. The highest concentrations of PCE detected in these borings were along the eastern side of the bedrock low, just west of Industrial Drive near its intersection with Hellman Drive (1,500 and 2,800 µg/L in borings CSE4 and CSE5, respectively) (**Figure 4.3**). Water was not encountered in the direct push borings to the east of Industrial Drive despite being left open at least 24 hours to allow water to collect. The area of higher bedrock west of the industrial park detention basin had two samples that did not contain detectable concentrations of PCE.

Groundwater samples were collected from the overburden at MW-1UB, MW-5UB, the MW-6 cluster, the MW-7 cluster, MW-8US, the MW-9 cluster, MW-10UB, the originally planned location of MW-14US (termed MW-14X), and the final location of MW-14US. PCE was present in the samples from MW-1UB, and the initial location of MW-14US. The sample of water from the overburden at the relocated MW-14US did not contain PCE.

Overburden/Bedrock Interface

Monitoring wells MW-1S and MW-2S (which straddles the overburden/bedrock interface) were installed in 2004 and have been sampled on several occasions. Samples from these wells collected as a part of the Round 1 site-wide sampling

event in March 2009 contained PCE at 2,100 µg/L and 22 µg/L, respectively (**Table 3.10**). Sampling of MW-1S following the initial installation indicated PCE present at 1,800 µg/L in December 2004 and 1,400 µg/L in February 2005. MW-2S had PCE present at 9.8 µg/L in December 2004 and 11 µg/L in February 2005. Thus, the concentration of PCE has risen between 2005 and 2009 in these wells.

Figure 4.3 shows the distribution of PCE in water in the overburden irrespective of the date of the sampling event.

Upper Sandstone Marker Bed/Uppermost Bedrock

PCE, along with TCE and 1,2-DCE, was detected in a number of monitoring wells that are open to the upper sandstone marker bed and/or uppermost bedrock. PCE was detected in the shallow bedrock in each of the samples of groundwater collected from the 21 DNAPL boreholes sampled (**Figure 3.13** and **Table 3.18**).

The distribution of PCE in this unit is shown in **Figure 4.3**. Detections were primarily to the south and southwest in a downgradient direction. However, PCE was detected in MW-9US to the north of the former Kellwood facility (**Table 3.10**) at 3.4 µg/L. Three monitoring wells are completed in the upper sandstone marker bed in the vicinity of the open lot north of the former Kellwood facility at depths ranging from 35 to 61 feet. The well hydraulically down gradient (MW-101 to the southwest) had PCE detected at a concentration of 16 µg/L. The monitoring well to the north (MW-102) and to the southeast (MW-103) did not contain PCE. This contrasts with BW-20, which contains DNAPL and is located in the middle of these three upper sandstone marker bed wells, but is completed between 10 and 20 feet, and the DNAPL core holes on the open lot north of the former Kellwood facility, which generally had PCE concentrations in the thousands of µg/L.

Monitoring well MW-1UB was completed in the uppermost bedrock at the MW-1 cluster (open interval 34 to 43.6 feet bgs). PCE was detected in the well at a concentration of 1,700 µg/L. Well MW-1T1, located immediately adjacent to MW-1UB, and open from 49 to 75.3 feet bgs contained PCE at 1.6 µg/L in the March 2009 sampling event. Figure 4.3 shows the results for MW-1UB rather than MW-1T1 due to the higher concentration at MW-1UB and the fact that it is the more shallow of the wells in the bedrock.

PCE was detected at the 500 tributary spring at a concentration of 100 µg/L. Although this sample was not from a well, it represents a discharge from the upper sandstone marker bed. PCE was detected at a concentration of 460 µg/L in MW-04A at a depth between 20 and 28 feet, approximately 12 feet into rock, and the most southerly detection. To the west, MW-10UB did not contain PCE. MW-2S is located to the east of MW-04A and is open to approximately the same elevation of rock and overburden. MW-2S contained PCE at 22 µg/L in March 2009. PCE concentrations in the well in December 2004 and February 2005 were 9.8 and 11 µg/L, respectively. It is possible that there is some preferential

pathway controlling the distribution of PCE in the vicinity of MW-04A, since the distribution pattern is long compared to its limited width. The potential for a preferential pathway will be discussed in Section 5.3.4.

Swan Creek

Three of the seven monitoring wells open to the Swan Creek sandstone member contained PCE (**Figure 4.3**). Two of the wells with detections of PCE are located to the south, downgradient of the former Kellwood facility. The concentration of PCE in both of these wells, MW04BS and MW-1SW was below the screening level (**Table 3.10**). The concentration in the Swan Creek in MW-04BS (open from 40 to 56 feet bgs) was 4.1 µg/L, compared to the 460 µg/L concentration detected from 20 to 28 feet in well MW04A immediately adjacent. At the MW-1 cluster, PCE was detected in MW-1SW (open from 95 to 111 feet bgs) at 2.3 µg/L. The uppermost bedrock well at the cluster, MW-1UB, open from 34 to 44 feet bgs, had PCE present at 1,700 µg/L. Well MW-1T1 is open in the interval between these two wells (50 to 73 feet bgs) and contained PCE at 1.6 µg/L. Both MW-1T1 and MW-1SW were installed in 2004. Sampling at the time of installation (December 2004) indicated that PCE was not present, although PCE was present at 1 µg/L in MW1-T1 in the February 2005 sampling event.

PCE was detected in MW-9SW at a concentration of 2.4 µg/L. This well is hydraulically upgradient from the open lot north of the former Kellwood facility. This concentration is approximately the same magnitude as the PCE in MW-9US. The lack of PCE in MW-7SW (open from 75 to 94 feet bgs) is noteworthy, in that the upper sandstone marker bed well (MW-7US, open from 15 to 25 feet) contained PCE at a concentration of 750 µg/L. The similar concentrations in the Swan Creek and upper sandstone marker bed at the MW-9 cluster is in sharp contrast to the large difference in concentrations at the MW-1, MW-4 and MW-7 well clusters.

The detections of PCE in MW-9US and MW-9SW are contrary to the hydraulic gradient and bedrock dip. An intermediate sample collected from a depth of 31 feet in the borehole for MW-9SW did not contain detectable concentrations of PCE. Thus, it is known that at the MW-9 cluster, PCE was detected at concentrations below the screening criteria in the upper sandstone marker bed (41 to 53 feet bgs) and in the Swan Creek member (114 to 121 feet bgs), but not at a shallower depth. The mechanism for VOCs to migrate from the area of the former Kellwood facility to the location of the MW-9 cluster is unclear. There is a relatively steep hydraulic gradient in the opposite direction, indicating that groundwater flow is to the southwest rather than to the north. In addition, MW-102, which is located directly between the former Kellwood facility and the MW-9 cluster and is screened in the same interval as MW-9US, did not contain PCE. The lack of PCE in MW-102 indicates that dispersion or diffusion of PCE is not contributing PCE to MW-9US. Several core holes from the DNAPL investigation were placed between the identified DNAPL and the MW-9 cluster without detecting DNAPL. In addition, evaluation of the logs of MW-9US, MW101, MW-6US, and MW-7US indicates that the upper surface of the upper sandstone

marker bed dips to the southwest, away from the MW-9 cluster. Given the lack of an identifiable mechanism for transport of PCE from the area of OU2 to the MW-9 cluster, a source other than OU2 appears to be possible.

Roubidoux/Lower Jefferson City

The distribution of PCE in wells open to the Roubidoux Formation or the lower portion of the Jefferson City Dolomite is indicated on **Figure 4.3**. PCE has been detected in six wells as a part of Tasks 2c and 2e. Well JS-37 historically contained PCE at approximately 69 µg/L, with discrete samples from the interval sampling task containing up to 340 µg/L. This well was reconfigured in April 2008. An attempt to sample the reconfigured well in April 2009 was unsuccessful due to the water level in the well not recovering after the initial pumping. PCE concentrations in the six Roubidoux/Lower Jefferson City wells which had positive detections ranged from 0.8 µg/L at JS-27 to 290 µg/L at JS-36. Four of the six wells with positive detections are located to the south and southwest of the former Kellwood facility. This is the direction of apparent groundwater flow in the overburden, upper sandstone marker bed/uppermost bedrock and Swan Creek intervals.

Several lines of evidence suggest that the Roubidoux/lower Jefferson City permeable zone has a limited natural hydraulic connection to the overlying Swan Creek and upper sandstone marker bed/uppermost bedrock intervals. The aquifer test did not identify a discernible response in the Swan Creek or upper sandstone marker bed to the pumping of the city wells. In addition, the high vertical hydraulic gradient could not exist if a moderately direct hydraulic connection between these intervals existed. Borehole flowmeter measurements identified downward flows in JS-14, JS-36, JS-37, and JS-38 ranging from approximately 0.14 gpm in JS-14 to approximately 0.50 gpm at JS-36.

The wells south of the former Kellwood facility that have had confirmed detections of PCE had downward flow of water containing PCE either in the specific well or in a well immediately adjacent. The fact that PCE concentrations declined following installation of liners is strong evidence that the long open well intervals that extend upward to an interval with PCE present or ineffective sealing of the well casing are the main mechanisms for downward migration of PCE into the Roubidoux/lower Jefferson City overcoming the intervening layers natural resistance to vertical migration.

The casing of JS-38 did not have an effective seal. Therefore, water was reaching the backside of the well casing, flowing downward until the water reached the end of the casing and entered the borehole. The water then flowed down the borehole and into the Roubidoux/lower Jefferson City. The water flowing into the Roubidoux/lower Jefferson City would then be drawn into JS-52. The presence of elevated levels of PCE in the upper bedrock at MW-04A and lower concentrations of PCE in MW-2S indicates that there is a source of PCE in the shallow bedrock in the vicinity of JS-38.

Migration of PCE along the long open well interval appears to be influencing the presence of PCE in JS-36, JS-14, and JS-37.

Quarterly sampling of JS-36 and JS-38 has been performed since 2002. Quarterly sampling of JS-14 and JS-52 has been performed since 2004. A liner was installed in JS-38 in July 2005. Liners were installed in JS-14 and JS-36 in April 2008. JS-52 has had a liner in place since shortly after the well was drilled in 2003. Time trends of PCE concentrations in these wells are presented in **Figures 3.3 through 3.6**.

Over the period of quarterly sampling, the concentration of PCE in JS-38 ranged from a high of 19 µg/L in November 2003 to 4.6 µg/L in May 2009. The PCE concentration in the four quarters prior to the installation of the liner in July 2005 averaged approximately 11 µg/L. Following installation of the liner, the concentration has slowly declined to the point that it is at approximately equal to the 5 µg/L screening level, with some samples below the screening level and some above. An estimation of the mass of PCE that flowed down the well prior to installation of the liner in the well can be calculated assuming water containing an average of 30 µg/L (the maximum concentration detected during the interval screening) flowed downward at a rate of approximately 0.45 gpm for a period of at least three years (based on the earliest sampling date). Approximately 0.1 kg of PCE may have migrated down the well in this 3-year period using these assumptions.

The concentration of PCE in JS-52 averaged 3.2 µg/L in the four quarters leading up to the liner installation in JS-38 (located less than 100 feet away). In the four quarters after the liner installation, the PCE concentration rose to an average of 6.7 µg/L. However, the four samples in 2008 averaged 4.3 µg/L, indicating a trend of lower concentrations. The four samples in 2009 had an average concentration of 5.1 µg/L. Although the flow of PCE down the borehole of JS-38 and into the lower Jefferson City/Roubidoux impacted JS-52, well JS-40, located approximately 400 feet to the northeast, MW-2R (converted to a domestic well and subject to routine pumping) approximately 550 feet north-northwest, and MW-4, approximately 650 feet northwest, all are non-detect for PCE. this indicates that the impact of the downward flow of PCE downward in JS-38 is localized.

The concentration of PCE in JS-36 rose from 170 µg/L in January 2002 to 430 µg/L in December 2006 (**Figure 3.4**). In the four quarters prior to the installation of the liner, the PCE concentration in JS-36 averaged approximately 260 µg/L. Following the installation of the liner, the average PCE concentration has been approximately 230 µg/L.

JS-14 had an average concentration of approximately 34 µg/L in the four samples prior to the installation of the liner (**Figure 3.3**). Following installation of the liners, the PCE concentration has averaged 19 µg/L, with a steady decline over time.

Both JS-25 (7.1 µg/L) and JS-27 (0.8 µg/L) had detections of PCE in the spring of 2009. The mechanism for PCE to migrate from the area of the former Kellwood facility to these wells is not clear. The hydraulic gradient of the upper sandstone marker bed and Swan Creek intervals is from the northwest to the southeast, away from these wells rather than toward them. DNAPL, which was detected immediately north of the former Kellwood facility could migrate along bedding planes toward the wells JS-27 and JS-25. However, several core holes from the DNAPL investigation were placed between the identified DNAPL and these wells without detecting DNAPL. In addition, evaluation of the logs of MW-9US, MW-101, MW-6US, and MW-7US indicates that the upper surface of the upper sandstone marker bed dips to the southwest, away from JS-27 and JS-25. Furthermore, MW-8US, located south of JS-27 and west of JS-25 would be likely to have detectible concentrations of PCE if DNAPL or groundwater were moving from the open lot north of the former Kellwood facility toward JS-27 or JS-25. Given the lack of an identifiable mechanism for transport of PCE from the area of OU2 to the MW-9 cluster, a source other than OU2 appears to be possible.

Figure 4.4 presents the concentration of PCE in groundwater at all locations regardless of the depth or transmissive zone. At locations that have clusters of wells or had intermediate screening samples in addition to the finished well samples, the highest value is indicated in the figure. For example, at BW-22, the completed well has not had PCE detected in the samples. However, during drilling, a sample from the interval of 66 to 126 feet contained 1,170 µg/L.

4.5 DISTRIBUTION OF CHEMICALS OF POTENTIAL CONCERN IN SANITARY SEWERS AND ADJACENT SOILS

Five soil borings were advanced adjacent to the sewer line that serves the former Kellwood facility. The boring locations were selected to be near defects in the line to evaluate the potential for leakage of water containing COPCs from the line. Two soil samples were collected from each boring. None of the ten samples contained PCE, TCE, 1,2-DCE, or vinyl chloride. These data are included in the distribution of PCE in soil figure (**Figure 4.1**). Eleven soil borings were advanced along three sewer segment north of Highway 100. None of the samples from these borings contained PCE, TCE, 1,2-DCE, or vinyl chloride. The distribution of PCE in sediment from the sanitary sewers is presented in **Figure 3.22**. The distribution of COPCs in sewer water is shown **in Figure 4.5**. All of the locations with PCE detected in sewer water are downstream of the former Kellwood facility.

4.6 DISTRIBUTION OF CHEMICALS OF POTENTIAL CONCERN IN SEDIMENT AND SURFACE WATER

PCE was detected in surface water in several stream segments in OU6 south and west of the former Kellwood facility (**Figure 4.6**). PCE was detected at concentrations above the screening level at two locations along the 600 tributary west of the homes in Wildcat Creek Estates. PCE was also detected at low

levels (below the screening criterion) at the Boeuf Lutheran Road crossing of the 500 tributary. This creek receives runoff from the northwestern portion of the industrial park, including the former Kellwood facility and the industrial park's detention basin as well as the area of the New Haven High School and the city park. Samples from the upper portion of the drainage basin (SW-01, SW-02, SW-03, and SW-04) did not contain detectable concentrations of PCE.

Historical samples collected by the USGS indicated that PCE was present in a spring located on the stream between samples SW-04 and SW-08. Access to sample this spring as a part of this RI was not granted. The upper sandstone marker bed of the Cotter Dolomite is reported to crop out in the stream near this spring. Access to collect a sample downstream of SW-06 was also not granted.

PCE was found to be present only at low levels at the Boeuf Lutheran Road crossing of the stream that flows southward west of JS-14 and JS-36 (drainage 500 on Figure 2.3 of the Work Plan, sample SD06). Access was not granted to sample this drainage further downstream.

PCE was detected at a concentration below the screening criterion in the sediment sample SD06-SD01-080801. No other sediment samples contained PCE.

SECTION 5
FATE AND TRANSPORT

5.1 POTENTIAL ROUTES OF MIGRATION

Potential human exposure pathways for COPCs are presented in **Table 5.1**. Exposure may potentially occur through soil, groundwater, surface water, and sediments that contain PCE, TCE, 1,2-DCE, and vinyl chloride. A baseline risk assessment evaluating each of these pathways is presented in Section 6.

5.2 CHEMICALS OF POTENTIAL CONCERN CHARACTERISTICS

PCE is a chlorinated solvent that is widely used as a dry-cleaning solvent and as a metal degreaser. PCE is nonflammable and has limited solubility in water. As a result, PCE may occur as a non-aqueous, free-phase liquid. PCE has a low viscosity and a density approximately twice that of water and tends to sink through groundwater a to low-permeability layer, where it can then flow laterally downslope. Free-phase PCE will occupy fractures or pore spaces without mixing with the surrounding groundwater. PCE dissolved in water readily volatilizes when exposed to the atmosphere. PCE is relatively stable, but biological processes and reductive dechlorination can break the PCE down to TCE then to 1,2-DCE, and vinyl chloride.

5.3 CHEMICALS OF POTENTIAL CONCERN MIGRATION

The fate (persistence) and transport (migration) of the COPCs are discussed below by media type.

5.3.1 Fate and Transport in Soil

Potential routes of migration vary for the potentially impacted media. Soil can erode from the site through the movement of stormwater and can be transported from the site by the action of the wind. The open lot north of the former Kellwood facility, where the primary disposal of PCE is reported to have occurred, has a very uneven surface, with numerous small depressions and mounds. Despite the uneven surface, the lot does not have a significant slope. Run off may erode some material from the mounds to the depressions. There is no flow path through which runoff is concentrated. Therefore, there does not appear to be significant erosion from runoff. Vegetation on the site is relatively sparse due to the shallow depth to bedrock and earlier removal of the topsoil, but is adequate to reduce the potential for wind to be an effective method of transport. Some soil containing VOCs is found beneath Industrial Drive, paved parking areas, and beneath the floor of the former Kellwood facility. The soils in these areas are unlikely to be subject to erosion by either running water or wind.

Losses of PCE from soil may occur due to volatilization, reductive dechlorination, and dissolution/dispersion into groundwater (primarily from DNAPL). Volatilization of PCE, TCE, 1,2-DCE, and vinyl chloride is likely occurring within

the open lot north of the former Kellwood facility. Evaluation of the ratio of degradation products of PCE indicates that there is minimal attenuation occurring in the soils. Of the 39 soil samples collected as a part of the soil sampling during this RI (excluding duplicates) that contained PCE, only nine had positive detections of TCE and five had positive detections of 1,2-DCE. In the nine samples that contained TCE and/or 1,2-DCE along with PCE, the ratio of combined TCE and 1,2-DCE to PCE ranged from 1 percent to as high as 40 percent, with most being less than 10 percent. For reductive dechlorination to occur, anaerobic conditions are required as well as the appropriate moisture content, electron receptors and an adequate carbon source. These conditions do not typically exist at OU2 due to the relatively thin soils, low levels of reduced organic carbon, and generally low moisture content.

In the area of the open lot north of the former Kellwood facility, infiltration of precipitation could lead to losses of PCE to groundwater, especially as past site activities have left the area as a depression that enhances the potential for infiltration. This process would be expected to be significant for water passing through fractures that may contain localized occurrences of DNAPL. In addition to infiltration, lateral flow of groundwater may pass through areas with localized DNAPL occurrences. The total mass of the DNAPL would change very slowly from this process due to the limited solubility of PCE in water and the limited volume of water encountering the DNAPL.

Volatilization would not be expected to be a significant process in areas with an impervious surface, such as the detections beneath Industrial Drive and under the slab of the former Kellwood facility. The soils beneath the impervious surfaces would also not be expected to have losses due to infiltrating water but may have losses to groundwater flowing through the soil.

5.3.2 Fate and Transport in Sediments

Sediments, by definition, lie in the path of a body of flowing water. As a result, sediments can move downstream in response to the flow of the water. The sediment may flow for long distances or may settle in a pool. Vegetation can stabilize the sediments, reducing the potential for migration.

PCE was detected in only one sediment sample, SD06-SD01-0.02-080801 on the 500 tributary. The concentration of PCE in this sample was low. TCE, 1,2-DCE and vinyl chloride were not detected in any of the sediment samples. The PCE detected in the sediment could migrate down the tributary, to Boeuf Creek. The concentrations detected would be expected to decline as the sediment is mixed with sediments not containing PCE and as some minimal quantities of PCE are lost to volatilization and partitioning to the surface water.

5.3.3 Fate and Transport in Surface Water

Precipitation falling on the ground can infiltrate and enter the groundwater system. Precipitation falling on the paved areas or other impervious surfaces

(including the roof of the former Kellwood facility) is typically directed to flow channels that prevent contact with soil. Surface water flows into the 510, 512 and 600 tributaries. The flow path to these creeks may include detention in ponds or basins. A small portion of the water flowing in the creeks or stored in the ponds or basins may evaporate.

Groundwater containing COPCs discharges to streams either diffusely into the stream channel or in springs. The rate of groundwater flow into the streams varies over time. In addition, the relative contribution of different areas may vary. PCE, TCE, 1,2-DCE, and vinyl chloride will volatilize as the surface water flows downstream. Volatilization can cause substantial reduction of the concentration of PCE in surface water. The RI Report for OU4 indicates that the concentration of PCE in surface water in one stream declined from 30.3 µg/L to below 5 µg/L within 600 feet downstream. A series of samples collected by the USGS along the 500 tributary on April 19, 2001 indicates the maximum PCE concentration detected on that date was 40 µg/L at 500TB-1B. PCE generally decreased downstream, reaching a low of 14.5 µg/L at 500TB-6, at a distance of 750 feet downstream. A second series of samples collected on March 14, 2002 ranged from 9.5 µg/L from 500TB-2 (immediately downstream of a spring) to 2.7 µg/L at 500TB-7, and 0.5 µg/L at EC08 (all field GC analyses, see Table 2.6). This decline in concentration occurred in a stream distance of approximately 1,250 feet from 500 TB-2 to 500TB-7, and 3,400 feet from 500TB-2 to EC08.

5.3.4 Fate and Transport in Groundwater

PCE, TCE, and 1,2-DCE flow from OU2 to the 500 and 600 tributaries south and west of OU2 and to Wildcat Creek downstream of the 600 tributary. Both Wildcat Creek and the 500 tributary empty to Boeuf Creek. Transport of COPCs in ground water is primarily through the overburden and the upper sandstone marker bed/uppermost bedrock. Limited transport of COPCs occurs in the Swan Creek sandstone member due to the concentrations in the Swan Creek being generally less than 10 µg/L compared to the hundreds to low thousands of µg/L in the upper sandstone marker bed/uppermost bedrock and overburden zones. There is a very limited connectivity between the upper sandstone marker bed/uppermost bedrock and the lower Jefferson City/Roubidoux. Occurrences of PCE in the lower Jefferson City/Roubidoux is restricted to instances where wells with open intervals that connect the two intervals overcome what is otherwise a poor connection between the shallow permeable zones and the lower Jefferson City/Roubidoux. Details on these conclusions are provided below.

Precipitation infiltrating the ground and migrating downward through soil or migrating through bedrock containing isolated areas of DNAPL can dissolve PCE, TCE, 1,2-DCE, and vinyl chloride. The migration of PCE in groundwater is affected by several processes, including advection, dispersion, diffusion, sorption, and natural attenuation. Advection is the movement of a chemical with the flow of the groundwater. Dispersion is the spreading of the chemical as the water containing it follows slightly different paths through the rock, some slightly

faster than others, resulting in spreading both along the flow path and lateral to the flow path. The effect of dispersion is greater along the flow path than lateral to it. Diffusion is the spreading due to concentration gradients. Sorption is the interaction of the chemical with the aquifer structure, binding it to the aquifer matrix. Natural attenuation occurs when the concentrations of compounds in groundwater and other media are reduced over time by a combination of naturally occurring chemical, physical, and biological processes.

Advection

Advection is the dominant process relating to the transport of PCE, TCE, and 1,2-DCE at OU2/OU6. Groundwater flow from the open area north of the former Kellwood facility to the south, southwest, and west is indicated by detections of PCE in monitoring wells open to the upper sandstone marker bed/uppermost bedrock, the measured potentiometric gradient, the dip of bedrock horizons (the top of the upper sandstone marker bed and the Swan Creek sandstone member), and the drop off of the bedrock surface to the southwest. The potentiometric surface in the overburden is typically a subdued replica of the bedrock surface, thus flow in the overburden typically follows the bedrock surface. The primary transport of COPCs in groundwater is along the overburden-bedrock surface as well as within the upper sandstone marker bed. Groundwater discharges from this interval to the 500 and 600 tributaries. The upper bedrock likely also discharges to Wildcat Creek (the 700 tributary) south of the MW-4 cluster, although PCE was not detected in surface water samples in Wildcat Creek in samples SW-12, SW-13 or SW-14.

Low concentrations of PCE are observed in monitoring wells that are open to the Swan Creek sandstone and an overlying intermediate permeable zone (MW-1T1) below the upper sandstone marker bed/uppermost bedrock at the MW-1 cluster, the MW-2 cluster and the MW-4 cluster. The Swan Creek sandstone well at the MW-7 cluster did not contain PCE despite the presence of PCE in the upper sandstone marker bed well. These observations indicate that there is a limited hydraulic connection between the upper sandstone marker bed/uppermost bedrock and the Swan Creek sandstone. The limited connection is also indicated by the sizeable head difference between the upper sandstone marker bed/uppermost bedrock and the Swan Creek sandstone member. Because of the limited connection between the upper sandstone marker bed/uppermost bedrock and the Swan Creek sandstone member, most of the PCE will discharge via seepage or springs to surface water in the unnamed creeks noted above or into Wildcat Creek.

A mechanism for short circuiting the intervening strata's tendency to limit downward migration must be present for PCE to reach the lower Jefferson City and Roubidoux interval, based on (1) the limited connection between the Swan Creek sandstone and the overlying upper sandstone marker bed/uppermost bedrock interval noted above; and (2) the lack of a discernible connection between the Roubidoux and the Swan Creek sandstone determined by the aquifer pumping test. The mechanism for short cutting the tendency of these

strata to limit downward vertical migration could be a natural geologic feature such as a fault or a fracture, an open borehole, or a well with an improperly sealed or degraded casing.

The domestic wells that have positive detections for PCE south and southwest of the former Kellwood facility (JS-14, JS-36, JS-38, JS-52 and historically JS-37 before being reconfigured) had short or ineffective casing or were immediately adjacent to a well that had a short or ineffective casing. The declining concentrations in these wells following the installation of liners in JS-14, JS-36, and JS-38 reinforces that these wells provided an alternative flow path rather than the PCE transport being related to downward flow along a fault or fracture. It is likely that wells JS-25 and JS-27 also provide a short circuit of the natural barrier to downward migration of PCE. All known wells with short or ineffective casing south and southwest of the former Kellwood facility have been modified to reduce the potential for the borehole to provide a pathway for downward migration of VOCs. The additional requirements on construction of new wells or reconfiguration of existing wells within Special Area 3 further protects against new pathways for downward migration being created. Degradation of steel casings on existing wells could result in downward migration in the future. Although downward migration through the geologic units outside of artificial pathways have not been identified, the potential exists that over long periods of time, migration through even poor connections may lead to COPCs reaching lower units or formations.

Natural Attenuation

The groundwater data from the March 2009 sampling event were evaluated for indications of natural attenuation of chlorinated volatile organic compounds (CVOCs).

As part of the evaluation of natural attenuation, various parameters were analyzed for evidence of anaerobic biodegradation using methods detailed by Wiedemeier, et. al. (1998). A summary of the natural attenuation evaluation by anaerobic biodegradation is shown below:

- Evidence of parent compound degradation is not present at OU2/OU6, as there is a very low percentage of TCE and DCE to PCE.
- Dissolved oxygen concentrations varied widely, but averaged 2 mg/L, which is higher than would be expected for anaerobic degradation to be occurring.
- Ferrous iron averaged 0.08 mg/L, whereas it would be expected to be 1 mg/L or higher if anaerobic conditions are present.
- Sulfate would be expected to be less than 20 mg/L if anaerobic conditions are present: however, sulfate concentrations ranged from 4.5 to 330 mg/L, with most values less than 20 mg/L.

- Sulfide concentrations would be expected to be above 1 mg/L if anaerobic conditions were present: however, OU2/OU6 sulfide concentrations averaged 0.9 mg/L.
- Methane ranged from non-detect to 68 mg/L. However, most of the samples were less than 1 mg/L. Methane concentrations would be higher if anaerobic conditions were present.

Based on the above, analytical data from the first round of site-wide sampling do not show a strong indication of natural attenuation via anaerobic biodegradation of CVOCs. Other natural attenuation processes are discussed below.

Sorption

A dolostone and sandstone aquifer matrix does not typically adsorb significant quantities of PCE, TCE, 1,2-DCE or vinyl chloride. Clays and organic carbon are more likely to adsorb PCE, TCE, 1,2-DCE or vinyl chloride because the clays and organic carbon provide charged surface locations that the compounds can sorb to. The aquifer matrix through which the groundwater is flowing contains small quantities of clay or organic carbon. Given the fairly low quantities of clay in the bedrock matrix, the amount of sorption in the bedrock will be relatively limited. The impact of sorption in retarding contaminant migration will last only until the clays have adsorbed the maximum amount of COPCs that they can based on the charges surface locations available. If remedial activities result in water with none to low levels of COPCs moving past the clays, rebounding concentrations of VOCs may be observed as they desorb from the clays into the groundwater. This effect would tend to make remediation of the groundwater more difficult.

Dispersion

Because of the continuing contribution of PCE to groundwater from the DNAPL present in the open area north of the former Kellwood facility, dispersion is unlikely to result in significantly lower maximum concentrations of PCE, TCE, and 1,2-DCE. The lateral component of dispersion will result in the VOC plume being wider than would be present in the absence of dispersion. The extent of impacts based on the RI sampling reflects the effects of dispersion in the transport of the contaminants. As the PCE migrates, dispersion will continue to cause the impacts to be present over a broader area both laterally and longitudinally than would occur in the absence of dispersion. It should be noted, however, that dispersion will not cause the PCE to migrate in directions significantly different than the direction in which the groundwater is moving by hydraulic processes. The overall effect of dispersion will be difficult to discern from the effect of contaminant migration that follows the overall groundwater flow.

Diffusion

Similarly, diffusion is likely to contribute to a wider plume, but the effect would be expected to be slight. The magnitude of diffusion is typically small compared to advection, but is more pronounced where groundwater flows are low. Because of the fairly strong hydraulic gradient, the dip of the bedrock layers, and the drop off of the bedrock surface to the southwest, it is unlikely that diffusion would result in VOCs moving against the groundwater flow to the southwest. Diffusion may result in VOCs moving into dead-end fractures along the flow path, especially in areas where concentrations are high. This is because the effect of dispersion is proportional to the concentration gradient. PCE that has diffused into dead-end fractures and other areas of restricted flow will be difficult to remediate. If remediation results in cleaner water in the area of these dead-end fractures, the PCE may diffuse back into the remediated water, resulting in elevated PCE levels for some time following the beginning of remedial efforts.

Groundwater Velocity

The apparent velocity of groundwater in the overburden can be estimated using Darcy's law. Based on the hydraulic conductivity estimate for the overburden at MW-1S, the hydraulic gradient in the upper sandstone marker bed and an assumed porosity range of 20 to 30 percent, the velocity of groundwater flow in the overburden would be within the range of 200 to 300 feet per year. It is not known if the high hydraulic conductivity estimate at MW-1S is representative or is unusually high.

The apparent velocity in the upper sandstone marker bed/uppermost bedrock interval was estimated assuming that the hydraulic conductivity was in the range from 0.11 ft/day to as high as 10 ft/day, the measured hydraulic gradient of 0.009 feet per foot, and a porosity of 10 to 30 percent. The estimated apparent velocity ranges from 1.2 to 325 feet per year. The apparent velocity using the median hydraulic conductivity value of 0.21 ft/day and a porosity of 20 percent is approximately 3.5 feet per year.

Transport Time

The earliest sample indicating the presence of PCE in JS-38 was collected in July 2002. The disposal of PCE at OU2 is reported to have occurred between 1973 and 1985. It is likely that the PCE reached JS-38 well before July 2002, as the concentration detected in the July 2002 sample was 10 µg/L, which would suggest that lower concentrations were present prior to the July 2002 sampling event. If it is assumed that the initial arrival of PCE at JS-38 was 2 years earlier and that the disposal of PCE did not reach groundwater until 1974, a travel rate of approximately 165 feet per year would be required.

The first samples collected from JS-14 in March 1999 contained PCE at an estimated concentration of 0.11 µg/L in one sample and a concentration of 0.3 µg/L in the other. Therefore, it is known that the PCE arrived at JS-14 prior to that date. Given the low concentration detected, it is likely that the arrival time

was not significantly earlier. If it is assumed that the initial arrival of PCE at JS-14 was in 1998, and that PCE reached groundwater north of the former Kellwood facility in 1974, a travel rate of approximately 81 feet per year (ft/yr) would be required. The travel rate required to reach JS-38 is within the possible travel rate range of both the overburden and the upper sandstone marker bed/uppermost bedrock intervals. However, the high hydraulic conductivity required for the higher end flow rate within the upper sandstone marker bed/uppermost bedrock is based on what appears to be an outlier in the estimates of hydraulic conductivity. Flow in the bedrock, however, would tend to be concentrated in high permeability zones such as fractures and bedding planes. Thus, much of the travel path from OU2 to JS-38 must occur at the overburden/bedrock interface or along a preferential pathway in the bedrock. Although the flow rate required to reach JS-14 is approximately half of that required to reach JS-38, both of these observations suggest that flow rates can be high in these preferential pathways.

Even if the transport of VOCs is via a preferential pathway, the observations that 1) there is a limited pathway for downward migration, and 2) that the ultimate fate of most of the groundwater is to discharge to surface water, are still valid. Although most preferential pathways appear to be horizontal in nature, the potential exists for natural vertical pathways to exist that could allow downward migration of COPCs. The offset in the top of the Swan Creek between JS-36, JS-14, MW-7SW on the west and MW-11, JS-37, and BW-21 on the east suggests the potential for a fault in this area. The potential for a geologic structure in this area is supported by the results of the geophysical surveys performed north of Boeuf Lutheran Road (Powers, 2004). Even limited vertical connectivity could be significant over the long period of time where COPCs are present in the groundwater, especially where DNAPL is present. Significant downward migration of PCE has been observed across the same geologic units at OU4.

The extent of impacts from COPCs indicated by the RI reflects the wide range of fate and transport processes that may have resulted in the current conditions. The observed extent of impacts also reflects that probability that COPCs, both dissolved and NAPL, have accumulated in unknown volumes in dead-end fractures and areas with restricted flow that will be difficult to remediate.

SECTION 6
BASELINE RISK ASSESSMENT FOR OPERABLE UNITS OU2 AND OU6

Ecological and human health risk assessments were conducted to evaluate potential affects to human health and the environment posed by chemical constituents in site soil, groundwater, surface water and sediments. Results of these assessments are presented below.

6.1 ECOLOGICAL RISK ASSESSMENT

A screening level ecological risk assessment (ERA) was completed for the Riverfront Superfund site in July 2002 (Black and Veatch, 2002). The ERA was completed for four of the identified operable units: OUs 1 through 4, although the actual study area included the OU6 watershed. The ERA considered the direct exposure risks associated with floodplain soil, surface water, and sediment. Since information on plant tissue concentrations was also available based on information gathered during the RI, a conservative ingestion model for a representative herbivore was also included in the 2002 ERA. Based on the evaluation conducted in the 2002 ERA, surface waters in the 510 and 512 tributaries, downstream of OU-2, may contain PCE at levels that could present a risk to ecological receptors. Floodplain surface soils, sediments, and plant tissue samples collected throughout the Riverfront Site's study did not indicate a significant risk to the environment.

Preliminary Remedial Goals (PRGs) present a concentration of a COPC in surface water that is assumed to be protective of aquatic organisms in the habitats of the study area. A PRG for PCE of 8.9 µg/L was recommended in the 2002 ERA and was based on the 1999 USEPA Region 5 environmental data quality limit. A review of the current Region 5 ecological screening levels (ESLs) shows that the limit for PCE was updated (increased) to 45 µg/L (USEPA, 2003). However, in 2006, USEPA Region 3 issued updated freshwater screening levels, and a screening benchmark of 111 µg/L PCE was established. PCE was detected in 46 of 92 surface water samples collected from Boeuf Creek and its tributaries from 2001 through 2009, with the maximum detected concentration being 100 µg/L in 2002, which is below the benchmark value. In addition, no other site-related compounds were detected above their respective screening levels in the surface water samples collected from Boeuf Creek or its tributaries, or in other media sampled at the site. Therefore, no further ecological investigations or assessments are recommended at this time. The updated ecological risk assessment results are provided in Appendix J.

6.2 BASELINE HUMAN-HEALTH RISK ASSESSMENT

A Human Health Risk Assessment (HHRA) report for OUs 2/6 was prepared to evaluate potential impacts to human health posed by chemical constituents in site soil, groundwater, surface water, and sediments. The risk assessment

process combines information on potential exposure to site-related constituents with information on their toxic characteristics to generate a quantitative estimate of risk. The risk assessment was performed in accordance with the USEPA Superfund Risk Assessment Guidance (USEPA, 1989, 1991, 1996, 2001, 2003, & 2004) and MDNR Division of Hazardous Waste Management Commission Risk-Based Corrective Action Process (March 2, 2009) for selecting COPCs. Data used in the evaluation were collected from soils, groundwater, surface water, and sediments. When site-specific data were not available, standard defaults were used. Methods used in this risk assessment are consistent with USEPA guidance documents. The full risk assessment is presented in **Appendix K**.

6.2.1 Exposure Assessment

The exposure assessment is typically performed to estimate the type and magnitude of exposures to chemical constituents that are present at or migrating from the site. The purpose of the exposure assessment is to identify the exposure pathways through which a receptor may potentially be exposed to constituents originating at a site. This involves projecting concentrations along actual or hypothetical pathways between sources and receptors.

Exposure pathways describe the movement of chemicals from sources (e.g., in soil or surface water) to exposure points, where receptors (i.e., potentially exposed populations) may come in contact with the chemicals. An exposure pathway is typically defined by the following elements (USEPA, 1989):

- A source and mechanism of constituent release to the environment;
- An environmental transport medium (e.g., soil, water) for the released constituents;
- A point of potential contact with the impacted medium (i.e., point of exposure); and
- An exposure route (e.g., inhalation, ingestion, dermal contact) at the point of exposure.

An exposure pathway is considered complete only if all four components are present. In conducting this risk assessment, only complete exposure pathways were evaluated quantitatively.

The impacted media are soil (0-10 feet bgs), groundwater, surface water and sediments. An exposure route is the means by which the chemical constituent actually contacts the body. Exposure routes include incidental ingestion and dermal contact with soils, inhalation of volatiles from soil and groundwater, inhalation of dust generated from soil and dermal contact with sediments and surface water.

Exposure points are defined as the points at which a receptor is likely to contact a COPC. For incidental ingestion and dermal contact, the exposure point is the

impacted area. For inhalation, the exposure point is ambient air, or air in an enclosed space.

The potential for exposure is analyzed from two perspectives: examination of current land use and consideration of potential future land use. Commercial workers, construction workers, and site trespassers are the current on-site human receptors. The anticipated future land use for the property should remain the same as the current land use based on the historical use and the zoning of the site and surrounding properties. However, a hypothetical residential future use scenario was also evaluated for informational purpose at the request of USEPA. The potential complete exposure pathways evaluated in this risk assessment are listed in Table 5.1.

6.2.2 Toxicity Assessment

The toxicity assessment provides a framework for characterizing the relationship between the magnitude of exposure to a COPC and the nature and likelihood of adverse health effects that may result from such exposure. In the risk assessment, chemical toxicity is typically divided into two categories: carcinogenic and noncarcinogenic. Potential health effects are evaluated separately for these two categories, because their toxicity criteria are based on different mechanistic assumptions, and associated risks are expressed in different units.

Pertinent toxicological information on COPCs was selected from the following sources:

- Integrated Risk Information System (IRIS)
- EPA's Provisional Peer Reviewed Toxicity Values (PPRTVs)
- Other Toxicity Values
    - The California Environmental Protection Agency toxicity values (http://www.oehha.ca.gov/risk/chemicalDB//index.asp).
    - The Oak Ridge National Laboratory Risk Assessment Information System toxicity values (http://risk/lsd.ornl.gov/index.shtml).
    - The Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs) (http://www.atsdr.cdc.gov/mrls.html).

The toxicity profiles for the COPCs can be found in the Oak Ridge National Laboratory Risk Assessment Information System and the ATSDR websites.

6.2.3 Risk Characterization

In risk characterization, information obtained from the exposure and toxicity assessments was integrated to characterize the potential risks posed by COPCs selected for the risk assessment. Risk can be described using two general criteria: the excess lifetime cancer risk for chemicals that are thought to be potential human carcinogens and the hazard quotient (HQ) for chemicals that

cause non-carcinogenic effects. Current regulatory methodology assumes that cancer risks and HQs can be summed across exposure routes for all media at the site to derive a "total site risk" (USEPA, 1989).

Potential risks for carcinogenic effects are typically estimated by calculating excess lifetime cancer risks (CR) as a result of exposure to carcinogens. Calculation of a CR for an exposure pathway involves multiplying the chronic daily intake for each chemical by its upper-bound cancer slope factor. For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper-bound lifetime cancer risk to an individual of between one in 10,000 (10^{-4}) and one in a million (10^{-6}). Potential risks for noncarcinogenic effects are typically estimated by calculating the HQ for each COPC. Calculation of a HQ for an exposure pathway involves dividing the chronic daily intake for each chemical by its reference dose. When the HQ for a COPC exceeds unity (one), there may be concern for potential noncancer effects for that COPC.

Calculation of the total cancer risk and total HI for the future exposed populations are summarized in **Table 6.1**. The risk and hazard calculation sheets are included in **Appendix K**.

The total cancer risk and the total hazard index exceed the target cancer risk range of 1×10^{-4} and 1×10^{-6}, and the target hazard level of 1 for the following receptors: industrial indoor worker and a hypothetical resident. For the hypothetical resident, the pathways of concern are incidental ingestion, inhalation, and dermal contact with impacted soil; the inhalation of soil volatiles in indoor air; and the inhalation of groundwater volatiles in indoor air exposure pathways. The risk is primarily driven from the inhalation of PCE in indoor air. The total cancer risk and the total hazard index associated with only this exposure pathway are 9.9×10^{-3} and 6.1. The primary chemicals of concern are PCE (soil and groundwater) and arsenic (soil). Locations where concentrations of PCE exceed target concentrations are underneath and immediately adjacent to (north and west) the former Kellwood facility (soil) and south and southwest of the former Kellwood facility (groundwater). For the industrial indoor worker, the risk is from PCE in soil and groundwater volatilizing to indoor air. PCE is the only COPC identified for this pathway. Locations where concentrations of PCE exceed target concentrations are underneath and north of the former Kellwood facility (soil) and south and southwest of the former Kellwood facility (groundwater).

SECTION 7
SUMMARY AND CONCLUSIONS FOR OU2 AND OU6

7.1 SUMMARY

7.1.1 Location, Nature and Extent of Impacts

Operable Unit 2 of the Riverfront Superfund Site is located in the area of the former Kellwood facility at 202 Industrial Drive in New Haven, Franklin County, Missouri and the open lot north of the facility. The former Kellwood facility is presently owned by Metalcraft Enterprises division of Tubular Steel, Inc. OU6 is located south of OU2. The area of OU2/6 generally slopes to the south and drains via the 500 and 600 tributaries to Wildcat Creek and Boeuf Creek. OU2 is wholly within the corporate limits of New Haven. OU6 includes areas both inside and outside the city. The former Kellwood facility and its surrounding area is within a partially developed industrial park. Beyond the limits of the industrial park, land use consists primarily of homes on large lots as well as agricultural fields. The agricultural land includes pasture/hay production as well as row crop farming.

PCE is a low-viscosity, non-flammable chlorinated organic solvent used as a metal degreaser and for dry cleaning. Due to a high density and limited solubility, it forms a non-aqueous phase liquid when released. The free-phase PCE (DNAPL) will sink through groundwater to an impermeable layer (typically bedrock) and then migrate along the slope of the impermeable layer unless it encounters a discontinuity in the bedrock. DNAPL flowing through discontinuities and fractures in the bedrock can be trapped where the fractures are not interconnected. The amount of DNAPL in the fractures in the bedrock depends upon the number and size of the fractures, the volume of the release, and the degree of interconnection. These factors are difficult to quantify.

The scope of the RI is to characterize the nature and extent of impacts and potential risk to human health and the environment. Evaluation of the amount of PCE trapped in the fractures is based on the results of the DNAPL investigation. During the RI, PCE was detected as DNAPL in five core holes. Three of the core holes were located on the open lot immediately north of the former Kellwood facility. DNAPL was detected in two core holes outside the northwest portion of the former Kellwood facility. DNAPL was detected in the upper 15 feet of bedrock, and then only in a few of the fractures. DNAPL was recovered from two of the core holes and USGS monitoring well BW-20. Since March 2008, approximately six liters of DNAPL have been recovered during quarterly monitoring events. If anaerobic conditions are present in the aquifer, PCE may degraded to TCE, 1,2-DCE, and vinyl chloride through reductive dechlorination. However, there is little indication that anaerobic conditions are present or that reductive dechlorination is occurring.

PCE, TCE and 1,2-DCE were detected in groundwater at a number of locations. PCE was detected in groundwater in the overburden in several direct-push borings in a line north of Boeuf Lutheran Road at up to 2,800 µg/L. The uppermost significant permeable zone in bedrock is the upper sand marker bed of the Cotter Dolomite/uppermost bedrock interval. PCE was detected at 190,000 µg/L in BW-20, which is open to the uppermost bedrock, and is located in the open lot north of the former Kellwood facility. Outside of the open lot, the maximum concentration of PCE detected in the upper sandstone marker bed/uppermost bedrock was 1,700 µg/L in MW-1UB. In general, detections of PCE in the upper sandstone marker bed/uppermost bedrock are located south and west of the former Kellwood facility, including wells MW-1UB, MW-04A, and MW-7US. PCE was not detected in MW-10UB and MW-14US to the west and in MW-6US and MW-8US to the east. PCE was detected at 3.2 µg/L in MW-9US, located north of, and hydraulically upgradient of OU2. MW-102, located between the former Kellwood facility and MW-9US, and screened in the upper sandstone, did not contain PCE.

PCE was detected in three monitoring wells open to the Swan Creek sandstone member of the Cotter Dolomite. The maximum concentration in the Swan Creek was 4.1 µg/L. At each location where PCE was detected in the Swan Creek, it was also detected in a well open to the upper sandstone marker bed/uppermost bedrock above the Swan Creek. PCE was not detected in MW-11, or MW-12 west of the Swan Creek monitoring wells that had PCE detections, and in MW-6SW, east of the Swan Creek monitoring wells that had PCE detections. With the exception of well MW-9SW, each of these Swan Creek wells had significantly lower PCE concentrations (where present) than the corresponding upper sandstone marker bed/uppermost bedrock well. The large difference in observed concentrations between these two units, along with a significant head difference, suggests that there is a weak hydraulic connection between the Swan Creek sandstone and the upper sandstone marker bed/uppermost bedrock.

Seven domestic/private supply wells in the vicinity of OU2/6 have had detections of PCE. Five of these wells are located south and southwest of the former Kellwood facility. One of these wells, JS-37, has been removed from service, and an attempt to convert it to a monitoring well has prevented subsequent sampling of the lower Jefferson City interval. Two wells, JS-25 and JS-27, are located to the east and northeast of the former Kellwood facility. JS-25 is not currently in use. JS-27 has consistently contained PCE at a concentration below the MCL. The maximum PCE concentration detected in the residential well sampling event was 290 µg/L (JS-36). JS-14, JS-36, JS-38, and JS-52 have home treatment systems in place to remove VOCs. Furthermore, liners have been installed in each of the wells with treatment systems.

The RI indicates that the presence of PCE in soil is limited to the open lot north of the former Kellwood facility, beneath the floor of the former Kellwood facility, and beneath and immediately west of Industrial Drive. PCE concentrations of up to 290,000 µg/kg were detected beneath the floor of the former Kellwood facility,

and a concentration of 23,000 µg/kg was detected on the open lot north of the former Kellwood facility.

PCE was detected in surface water in the 500 and 600 tributaries. The 600 tributary that flows behind the homes in the Wildcat Creek Estates Subdivision contained PCE at up to 19 µg/L in April 2009. The JS-500 tributary contained PCE at 4.5 µg/L in August 2008 at the culvert beneath Boeuf Lutheran Road. A sediment sample from the same location contained PCE at 3.2 µg/kg.

7.1.2 Sources of COPCs

The source of the PCE impacts present at OU2/6 is reportedly from disposal of PCE on the vacant lot north of the former Kellwood facility that occurred between 1973 and 1985. Interviews conducted by the USEPA give conflicting information on the amount of PCE disposed on the open lot north of the former Kellwood facility. These estimates range from approximately 10 gallons per day to approximately 220 gallons per year. It is difficult to make reliable estimates of volumes released based on anecdotal evidence gathered more than a decade after the reported disposal occurred.

PCE detections to the north and northeast of OU2 at the MW-9 well nest and at JS-25 and JS-27 are likely the result of a PCE release not associated with the open lot, as these areas are located hydraulically upgradient of OU2. In addition to being hydraulically upgradient, these areas are structurally up-dip based on elevations of the top of the upper sandstone marker bed and the Swan Creek sandstone member as logged in monitoring wells. Monitoring well MW-102, which did not contain PCE and is completed in the upper sandstone, is located on the north end of the open lot, north of the area where the disposal occurred. It is directly in line with MW-9US and MW-9SW, which both contained low concentrations of PCE. Similarly, MW-8US did not contain PCE and is screened in the upper sandstone. MW-8US is located between the disposal area and JS-27, and generally towards JS-25. Core holes used to determine the extent of DNAPL in the open lot indicate that there are areas where DNAPL was not detected between MW-9US, MW-9SW, JS-25 and JS-27. Although this evidence suggest a different source for the PCE in these wells, there is some potential for a flow path from OU2 to these wells. Potential flow paths from OU2 to these wells include migration of DNAPL along fractures cutting across the bedding units, migration downward to the Roubidoux formation then northeastward to JS-25 and JS-27 (but not to MW-9R).

7.1.3 Fate and Transport

Soil on the open lot north of the former Kellwood facility is not prone to erosion due to the relatively low slope of the open lot preventing significant run off of precipitation. Although vegetation is not thick, it sufficient to prevent significant wind erosion. PCE in soil that is near the surface and not covered by an impermeable material may volatilize. PCE in the soil not covered by an impermeable surface may partition to water infiltrating from precipitation.

DNAPL is known to be present in bedrock fractures in a small area on the north and northwest sides of the former Kellwood facility. After more than 20 years from the last disposal and 36 years from the initial disposal, the limited area of the detected DNAPL suggests that it is migrating slowly. PCE may dissolve from the DNAPL phase to groundwater passing through fractures adjacent to the DNAPL. However, due to the limited solubility of PCE in water, the rate of loss is expected to be small. Because of the limited solubility, the DNAPL is expected to remain for a substantial time, and may serve as a continuing source of PCE to groundwater. Over the periods of time that the DNAPL will be present, there is some potential that the limited vertical connectivity may provide a pathway for downward migration of COPCs.

Advection is the primary process controlling the fate and transport of PCE in groundwater. The primary avenues for migration are in the overburden near the bedrock interface and in the upper sandstone marker bed/uppermost bedrock. There is a limited hydraulic connection between the upper sandstone marker bed/uppermost bedrock and the Swan Creek sandstone. Groundwater flow from OU2 is to the south and west. Most groundwater is expected to discharge from the upper sandstone marker bed/uppermost bedrock and the overburden to the 600 tributary behind the homes of the Wildcat Creek subdivision and the 500 tributary west of JS-14 and JS-36. It is possible that groundwater containing PCE may either currently or in the future discharge to Wildcat Creek. The discharge can be either diffuse or concentrated at small springs.

Anaerobic conditions are necessary for reductive dechlorination of PCE. Analytical data from the first round of sitewide sampling do not show a strong indication of natural attenuation via anaerobic biodegradation of PCE. This finding is based on: the high percentage of PCE relative to the sum of TCE and DCE; the relatively high dissolved oxygen concentrations; the relatively high nitrate concentrations; the low ferrous iron concentrations; the high sulfate concentrations; and the low sulfide and methane concentrations.

The limited connectivity between the upper sandstone marker bed/uppermost bedrock and the Swan Creek sandstone, and between the Swan Creek sandstone and the lower Jefferson City/Roubidoux minimizes downward movement of groundwater. Vertical short-circuiting of these natural restraints on downward migration of groundwater is possible both from natural geologic features such as faults or fractures or from open boreholes. The known distribution of PCE in the lower Jefferson City/Roubidoux suggests that the occurrences of PCE in that interval are related to flow through an open borehole. With the continuing source of PCE from the DNAPL in the source area, even slow downward migration rates could result in movement of COPCs to deeper zones.

Shallow groundwater containing PCE is expected to discharge to the 500 and 600 tributaries, and to Wildcat Creek. PCE in surface water will move downstream. Much of the PCE is expected to volatilize from the surface water relatively quickly, as was demonstrated by USGS sampling along the 500

tributary and at OU4. PCE in sediments will be carried downstream. The sediments containing PCE may be stabilized in the stream bed by the growth of vegetation. The PCE may also volatilize to the atmosphere or partition to surface water.

7.1.4 Risk Assessment

A review of the July 2002 ecological risk assessment for OUs 1 through 4 indicated that PCE was present in surface water at concentrations above the USEPA Region 5 PRG at that time. However, these concentrations of PCE in surface water are below the current Region 5 PRG.

The total cancer risk and the total HI exceed the target cancer risk range of 1×10^{-4} and 1×10^{-6}, and the target hazard level of 1 for the following two receptors: industrial indoor worker and a hypothetical resident at the locations discussed in the following paragraph. For the hypothetical resident, the pathways of concern are incidental ingestion, inhalation, and dermal contact with impacted soil; the inhalation of soil volatiles in indoor air; and the inhalation of groundwater volatiles in indoor air exposure pathways. The risk is primarily driven from the inhalation of PCE in indoor air. The total cancer risk and the total HI associated with only this exposure pathway are 9.9×10^{-3} and 6.1. The primary chemicals of concern are PCE (soil and groundwater) and arsenic (soil).

Locations where concentrations of PCE exceed target concentrations for hypothetical residents are underneath and adjacent to (north and west of) the former Kellwood facility (soil) and south and southwest of the former Kellwood facility (groundwater). For the industrial indoor worker, the risk is from PCE in soil and groundwater volatilizing to indoor air. This is the only COPC identified for this pathway. Locations where concentrations of PCE exceed target concentrations for industrial indoor workers are underneath and north of the former Kellwood facility (soil) and south and southwest of the former Kellwood facility (groundwater).

7.2 CONCLUSIONS

The following conclusions were developed from information obtained during the RI, and integration of this information with historical data.

- Groundwater is the primary media of concern and the extent of impacts has been adequately delineated both horizontally and vertically. The extent of impacts to the south of the site could not be determined using monitoring wells, due to lack of access; however, it appears that shallow groundwater discharges to Wildcat Creek. The limits of VOC impacts to the west are generally established by MW-10UB and MW-14US; however, the exact boundary to the west of MW-7US is not clear.
- The human health risk assessment indicated that for ingestion of groundwater by hypothetical residents, the total cancer risk was within the acceptable risk range, and the hazard index was below target levels.

- There are currently no ecological risk concerns related to surface water and sediment.
- There is limited hydraulic connectivity between the upper sandstone marker bed/uppermost bedrock interval and the underlying Swan Creek sandstone, and between the Swan Creek sandstone and the underlying lower Jefferson City/Roubidoux. There is a hydraulic connection between the Roubidoux and the units that are utilized by the two city wells (Gasconade and lower units).
- The limited observed migration of PCE in groundwater to the lower Jefferson City/Roubidoux may involve a vertical short-circuiting of the intervening strata which otherwise limit downward migration. The domestic wells containing PCE appear to have been affected as a result of short-circuiting by an open well borehole.
- Repairs made to these wells (lining) and the well advisory limit the future potential for man-made conduits to provide a migration pathway.
- PCE is present in groundwater in the overburden near the bedrock interface and in the upper sandstone marker bed/uppermost bedrock south and west of the former Kellwood facility. This PCE appears to be migrating to the south and west. Most of the groundwater flowing through the overburden and in the upper sandstone marker bed/uppermost bedrock interval is expected to discharge to the 500 and 600 tributaries, Wildcat Creek, and Boeuf Creek either as diffuse flow or in small springs. The potential exists for some of the PCE to move downward to lower intervals through open boreholes; wells with poor seals or degraded casings; or through natural discontinuities in the rock. PCE in surface water is expected to volatilize to the atmosphere within a short distance downstream, as documented at OU4.
- Wells MW-9US, MW-9SW, JS-25 and JS-27 are north and northeast of OU2, and groundwater collected from these four wells contained PCE. It is possible that the PCE in these wells did not originate at OU2, as they are upgradient, up-dip, up the slope of the top of bedrock, and have monitoring wells and DNAPL core holes that did not contain PCE between the wells and OU2.
- The results of the RI for OU2/6 indicate that PCE is present on the open lot north of the former Kellwood facility. The most highly impacted soils on the lot were removed for incineration in the early 1990s. Soils containing PCE, however, are present on the vacant lot, beneath Industrial Drive, and beneath the floor of the former Kellwood facility.
- PCE is present as a free-phase liquid (DNAPL) in the shallow bedrock immediately north and northwest of the former Kellwood facility. A small quantity of PCE was recovered from two of the core holes and the USGS monitoring well BW-20. Bedrock in the area of the vacant lot averages

less than two feet deep. The top of bedrock drops off southwest of the vacant lot and the former Kellwood facility. Boring logs indicate that the top of the upper sandstone marker bed of the Cotter Dolomite and the top of the Swan Creek sandstone member of the Cotter Dolomite have a slight dip to the south in the OU2 area.

- PCE was not detected in borings adjacent to sewer segments north of Highway 100 or at defects in the sewer between the former Kellwood facility and Lift Station 4.
- The risk assessment indicated that the total cancer risk and total HI exceed target ranges for hypothetical residents near the former Kellwood facility through incidental ingestion, inhalation, dermal contact with impacted soil, and inhalation of indoor air (volatilizing from either soil or groundwater).
- The total cancer risk and total hazard index exceeded target ranges for industrial workers near the former Kellwood facility through inhalation of indoor air. Locations where concentrations of PCE exceeded target concentrations are underneath and north and west of the former Kellwood facility (soil) and south and southwest of the former Kellwood facility (groundwater).
- In summary, the extent of impacts in groundwater has been adequately defined, and groundwater exposure risks have been addressed through the existing state well construction advisory, repairs to selected residential wells, and installation of whole house filtration systems.

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KELLWOOD

PARSONS

REMEDIAL INVESTIGATION REPORT
RIVERFRONT SUPERFUND SITE
OPERABLE UNITS NO. 2/6
NEW HAVEN, MISSOURI

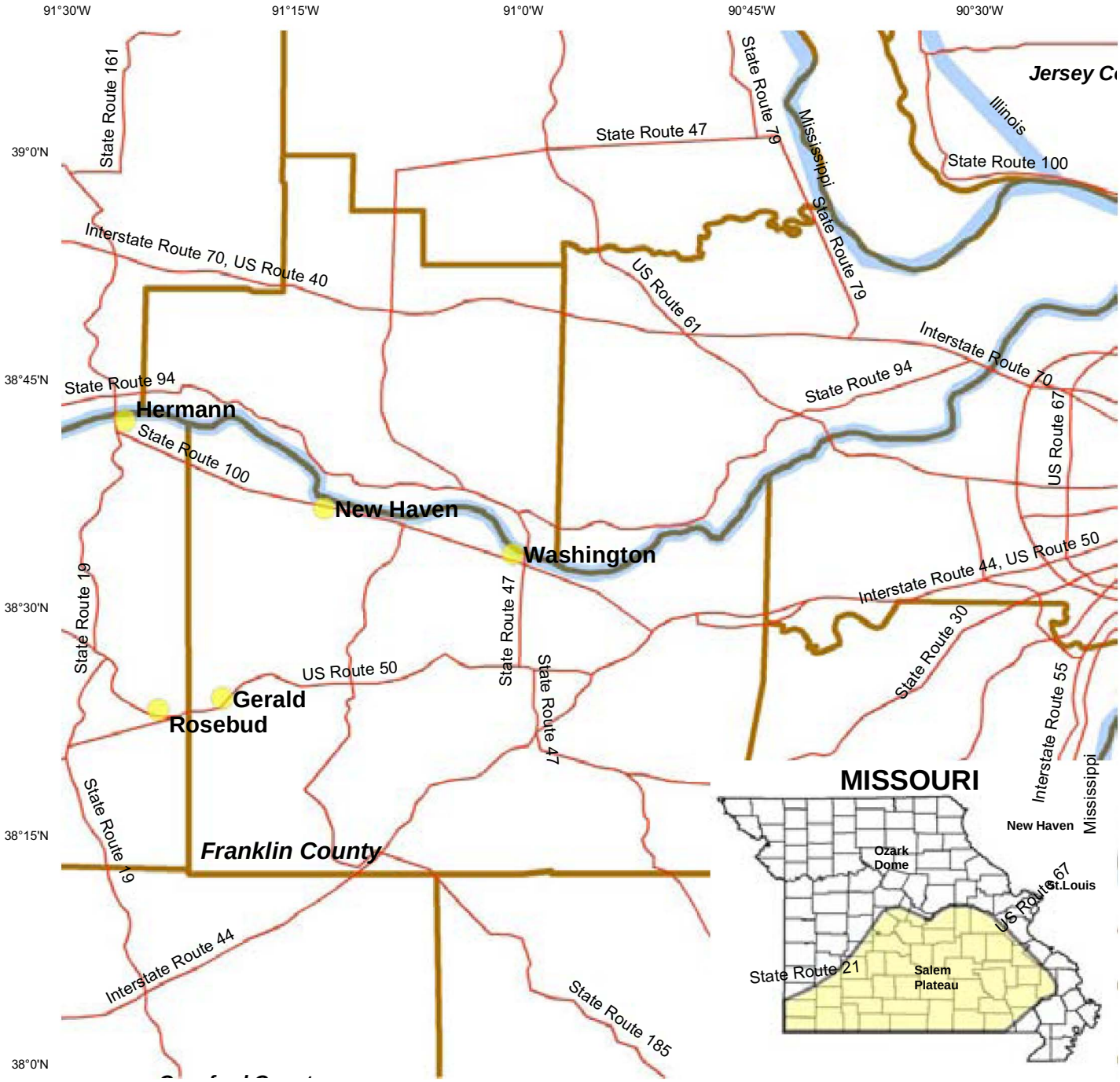
FIGURES AND TABLES

Prepared on behalf of Kellwood Company for:

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7

JUNE 2010



N
W E
S

0 2.5 5 10 15 20
Miles

Source: OU1/OU3 RI Report
(USEPA, 2003)

Figure 2.1

Map of New Haven
and Franklin County

Riverfront Superfund Site OU2/6
New Haven, Missouri

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9/25/09

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

N
W E
S

Meters

0 355 710 1,420

Legend

Operable Unit (OU)

new haven city boundary

Source: OU1/OU3 RI Report (USEPA, 2003)

Figure 2.2

Site Map

Riverfront Superfund Site OU2/6
New Haven, Missouri

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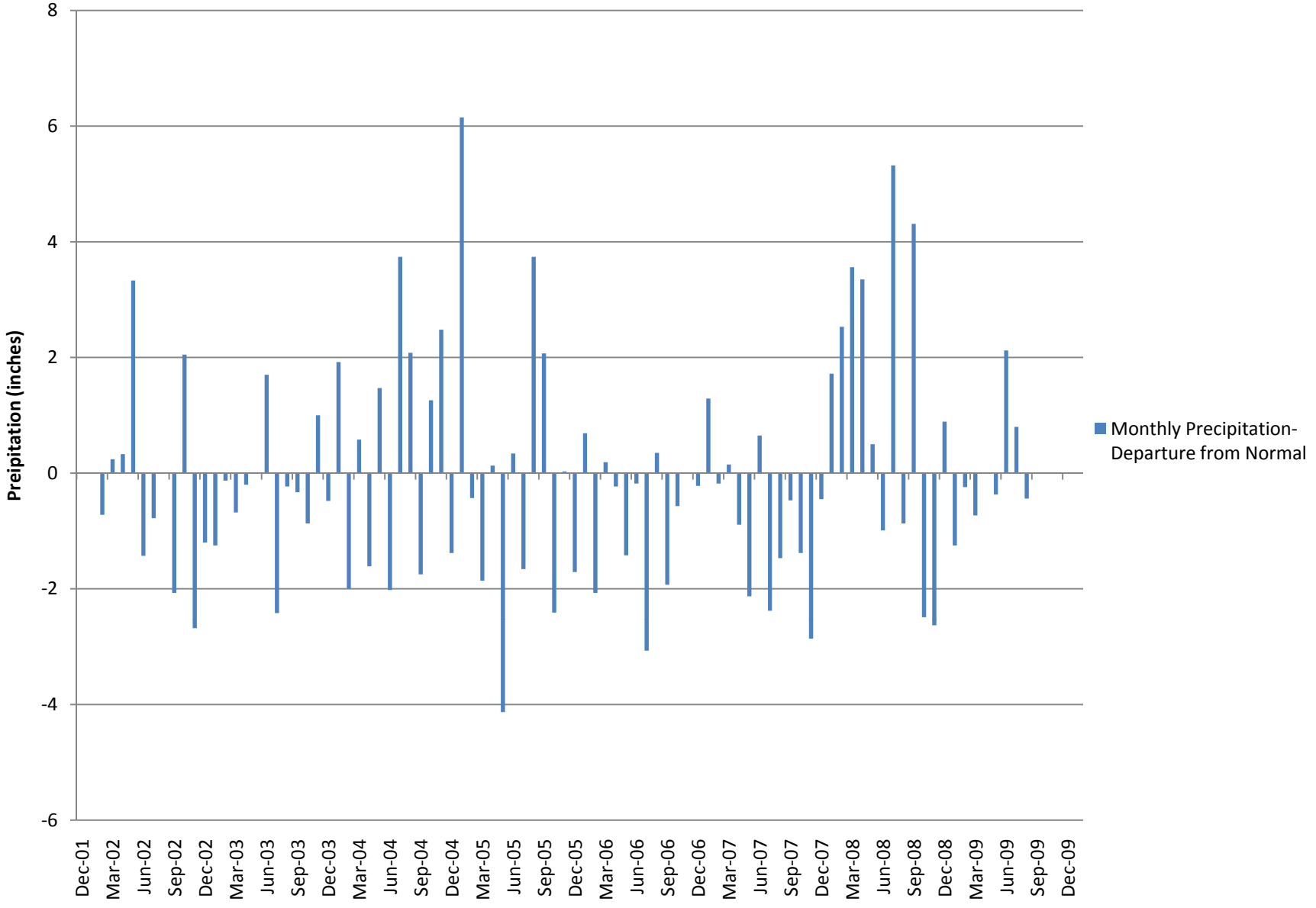
PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

Figure 2.3
Departure From Normal Precipitation, Rosebud, Missouri



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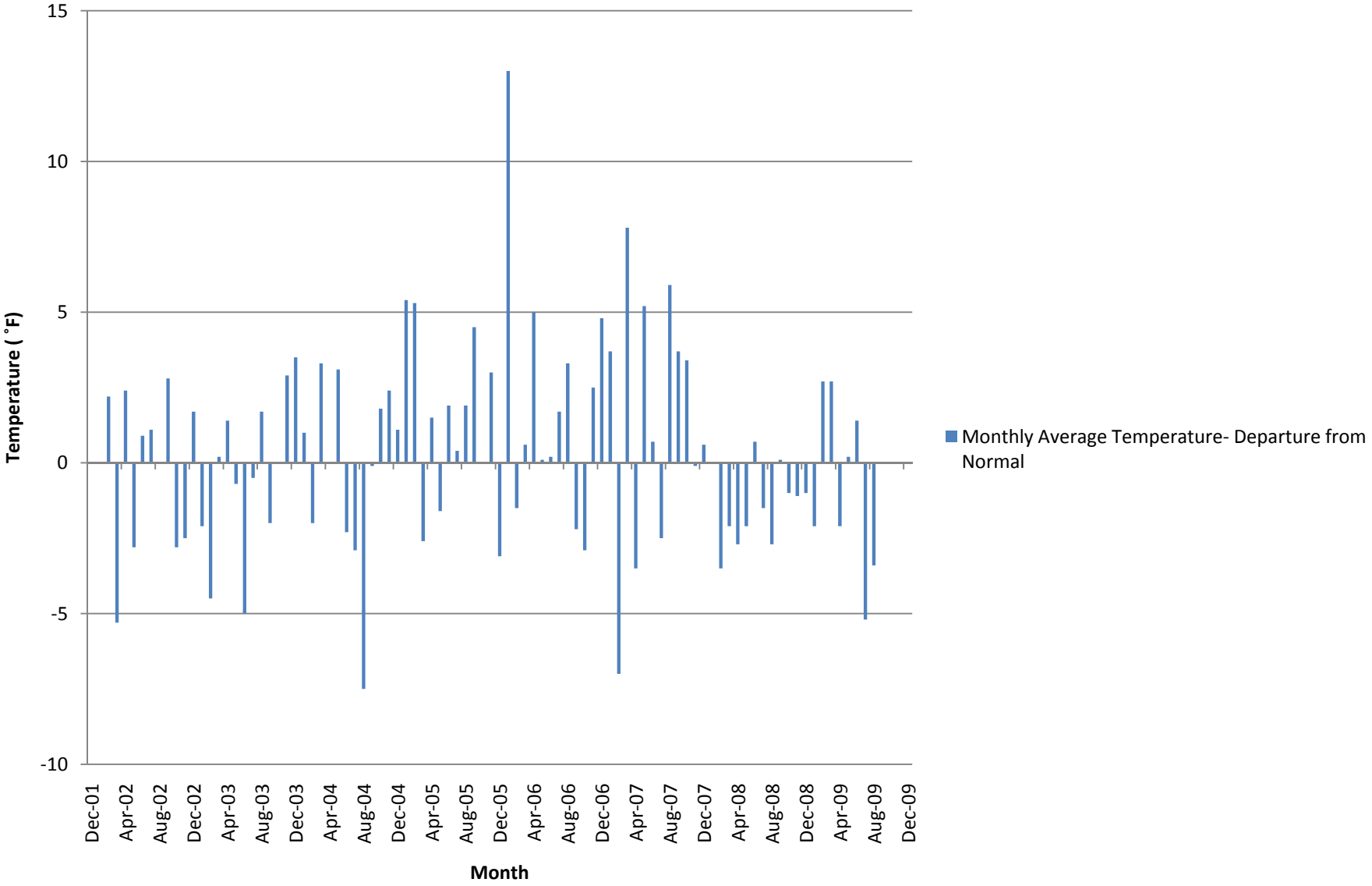
Departure From Normal Temperature, Rosebud, Missouri



N
W E
S

Legend

Bedrock Fault

Fold

580 Structural Contour on Top of the Upper Sand Unit in the Cotter Dolomite

Source: OU1/Ou3 RI Report (USEPA, 2003)

Figure 2.5

Geologic Map

Riverfront Superfund Site OU2/6
New Haven, Missouri

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9/25/09

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

Legend

OU2 Boundary

Creek

Source: OU1/OU3 RI Report
(USEPA, 2003)

0 380 760 1,520 2,280 3,040
Feet

FIGURE 2.6

Surface Water Bodies in
Vicinity of OU2 and OU6
Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS

40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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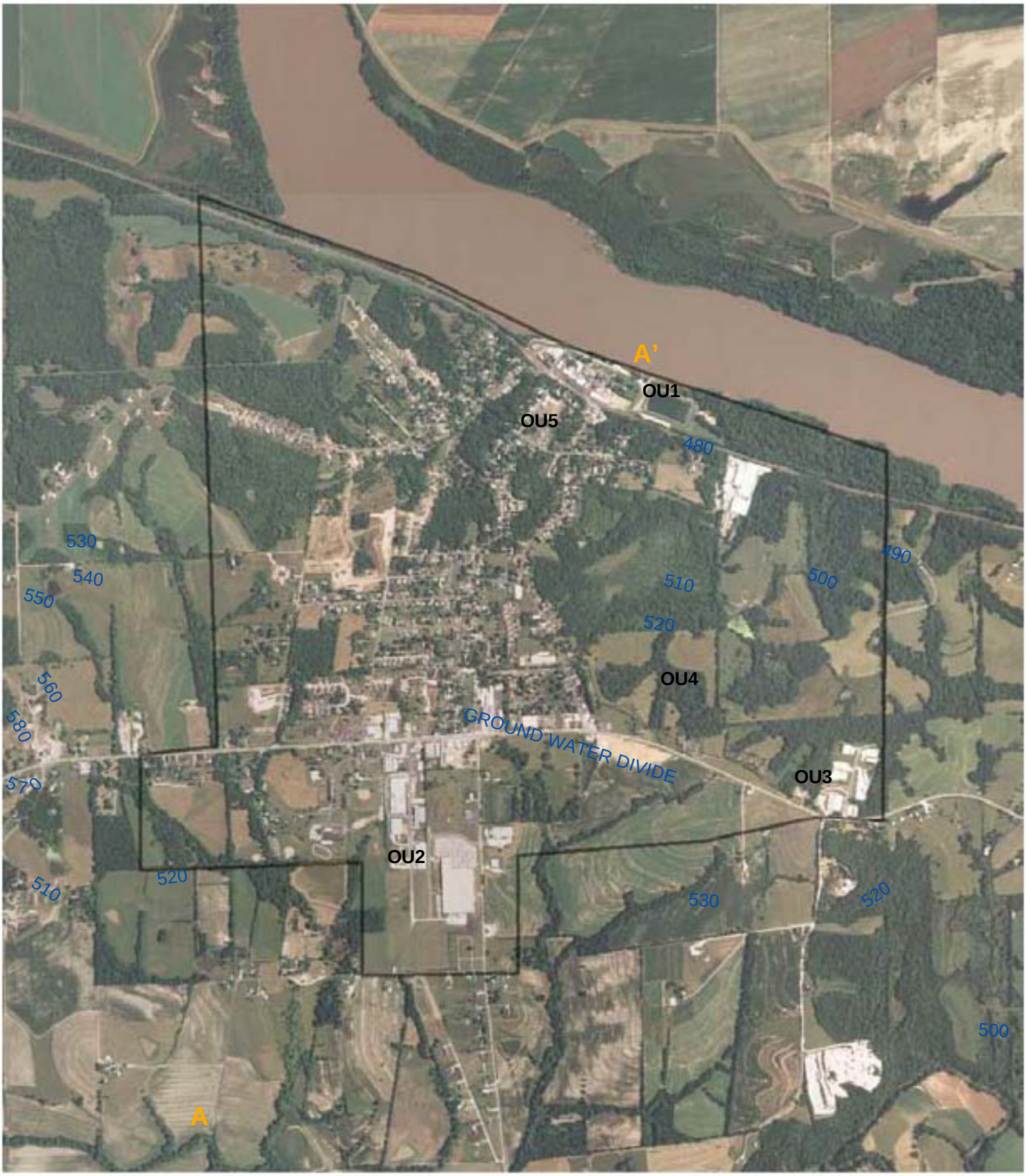

Legend

A A' Line of Cross-Section (See Figure 2.8)

Source: OU1/OU3 RI Report (USEPA, 2003)

0 625 1,250 2,500 3,750 5,000 Feet

FIGURE 2.7

Shallow Groundwater Contours in New Haven Area
Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS

40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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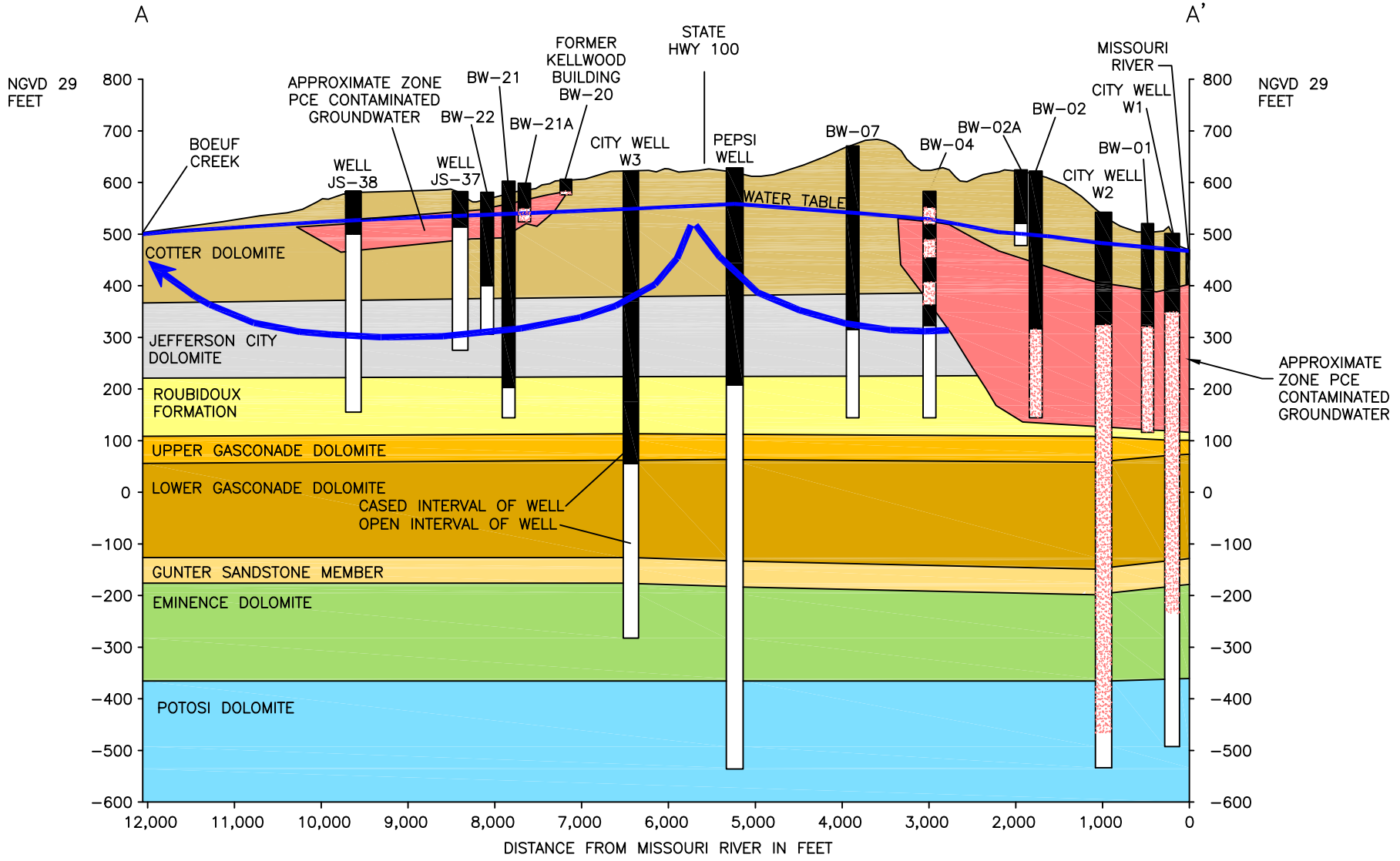


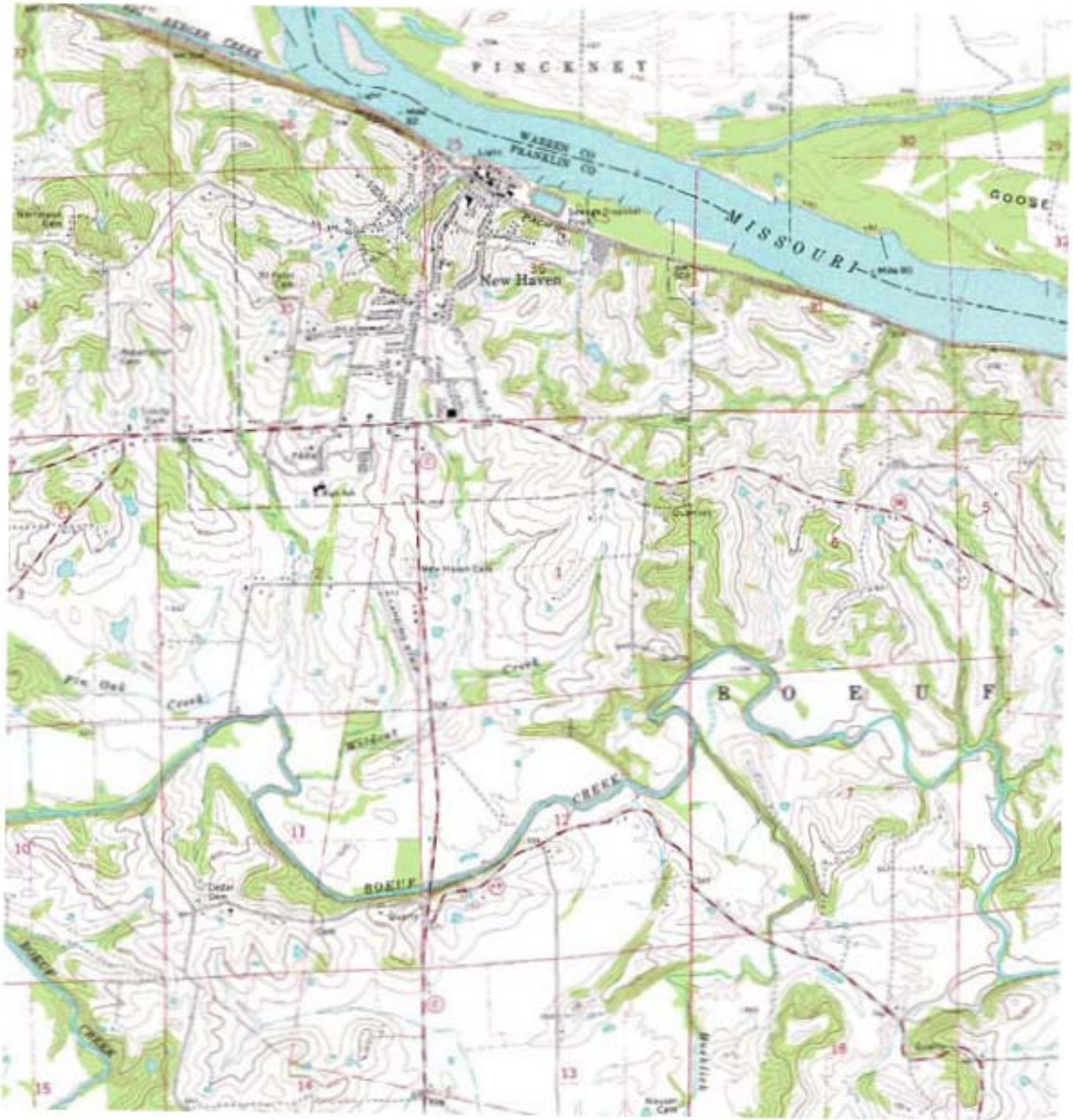
SOURCE: OU1/OU3 RI REPORT (USEPA, 2003)
Pink shading indicates PCE concentrations > MCL (5 ppb)
Blue arrows denote groundwater flow direction

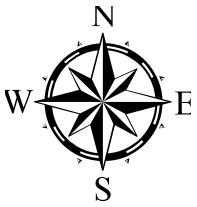
FIGURE 2.8

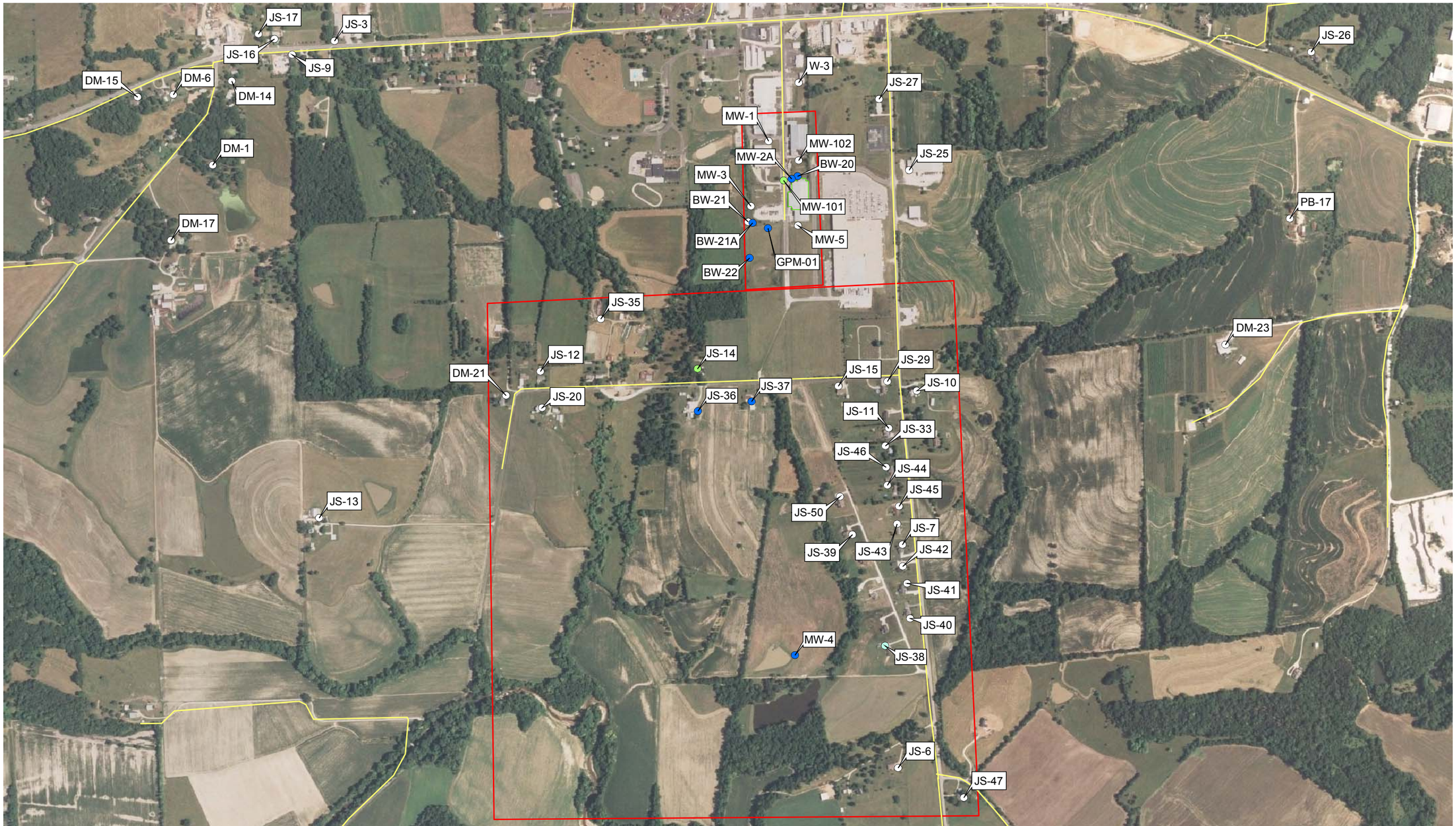
CONCEPTUAL GEOLOGIC CROSS-SECTION
NEW HAVEN, MO
RIVERFRONT SUPERFUND SITE, OU2

PARSONS
40 LA RIVIERE DRIVE, SUITE 350 – BUFFALO, NY 14202

R:\New Haven – Kellwood OU2\Cadd\Figures\Final RI\FIG 2.8 Conc Cross Section.dwg


PINCKNEY
MISSOURI
New Haven
BOEUF
CREEK


N
W
E
S



Well Inventory Notation

PB = Well Inventoried by P. Brenden, USGS
DM = Well Inventoried by D. Mugel, USGS
JS = Well Inventoried by J. Schumacher, USGS
CIS = Cistern
BW = Bedrock Well
MW = Monitoring Well
W = Municipal Well
The Pepsi well is shown as JS-22

N
W E
S

0 1,000 2,000 3,000 4,000 Feet

Sources:
1) OU1/OU2 RI Report
2) USGS Tables (GC summary7-geotechnology.xls and lab-sample-log.xls)

Legend

- Non Detect
- <= 5µg/L
- 5 - <= 45µg/L
- > 45µg/L
- OU Boundary

FIGURE 2.10

Pre-RI Groundwater Samples
Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS

40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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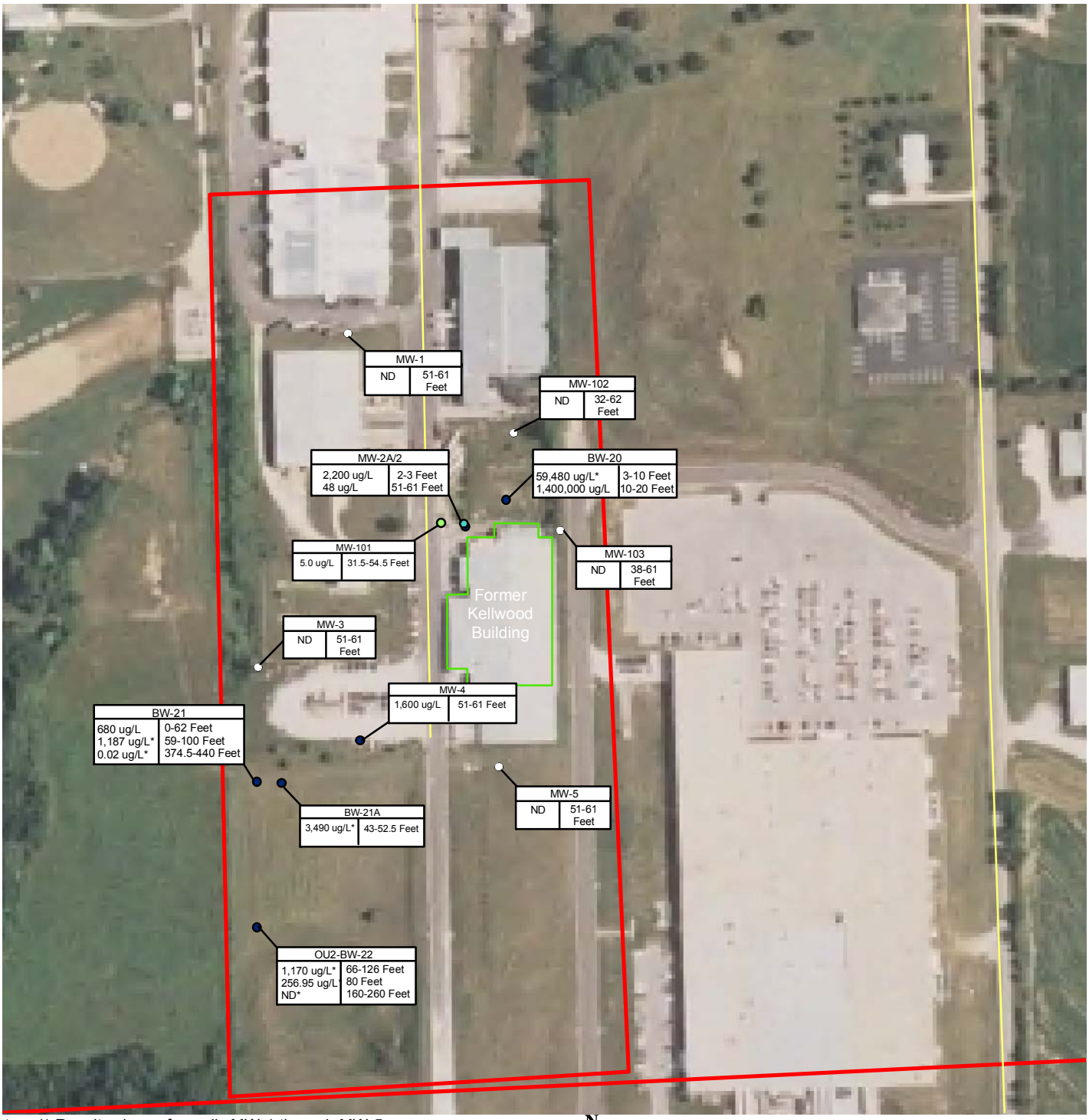

Notes: 1) Results shown for wells MW-1 through MW-5 were the maximum values seen in samples collected by EMA in 1999.
2) Results shown for wells MW-101 through MW-103 were collected by Parsons in December 2003.
3) Results Shown for wells BW-20 through BW-22 were the maximum values seen in samples collected by USGS in 2001.
4)Results marked with an asterisk were collected using a field GC.

N
W E
S

0 150 300 450 600 Feet

Legend

- Not Detected (ND)
- PCE <= 100 µg/L
- PCE <= 5.0µg/L
- PCE > 100 µg/L
- OU2 Boundary

Sources:
1. OU1/OU3 RI Report (USEPA, 2003)
2. EMA Phase II Report (1999)
3. USGS Tables (GC summary7-geotechnology.xls and lab-sample-log.xls)

FIGURE 2.11

Historical PCE Levels in Groundwater in Vicinity of Former Kellwood Facility
Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

N
W E
S

0 200 400 800 1,200 1,600
Feet

Legend

- Non Detect
- <= 5µg/L
- 5 - <= 111µg/L
- > 111µg/L
- OU Boundary

Sources:
1. OU1/OU3 RI Report (USEPA, 2003)
2. USGS Tables (GC summary7-geotechnology.xls and lab-sample-log.xls)

FIGURE 2.12

Pre-RI Surface Water Samples
Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS

40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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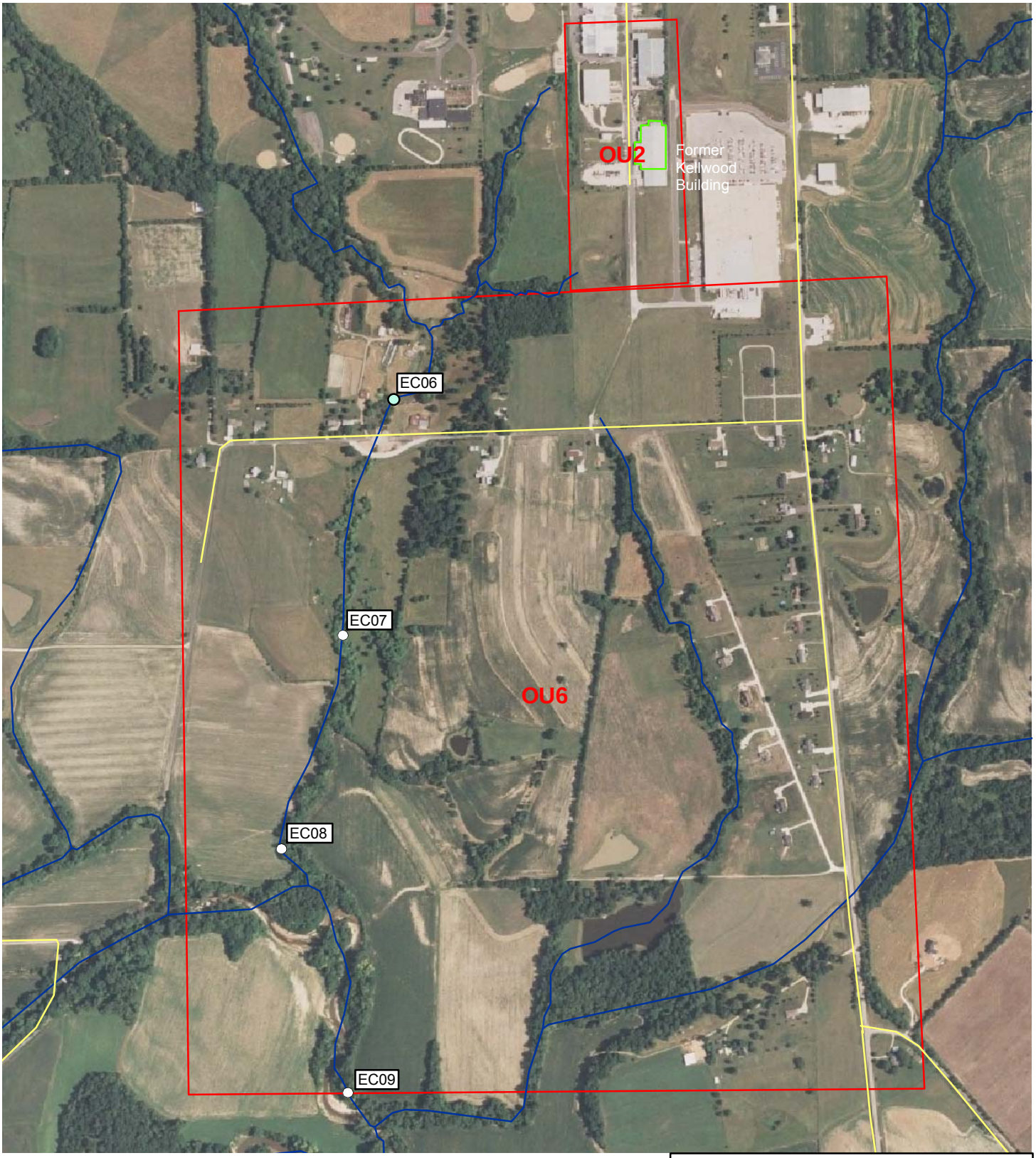


N
W E
S

0 250 500 1,000 1,500 2,000
Feet

Legend

- Not Detected (ND)
- <5 µg/kg
- OU Boundary

Sources:
1. OU1/OU3 RI Report (USEPA, 2003)
2. USGS Tables (GC summary7-geotechnology.xls and lab-sample-log.xls)

FIGURE 2.13

Historical Sediment Samples
Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

Legend

- Manhole Not Sampled
- Not Detected
- PCE < 5 PPB
- PCE > 5 PPB
- OU Boundary

N W E S

0 250 500 1,000 1,500 2,000 Feet

Sources:
1. OU1/OU3 RI Report (USEPA, 2003)
2. USGS Tables (GC summary7-geotechnology.xls and lab-sample-log.xls)

FIGURE 2.14

USGS Sanitary Sewer Sample Results
Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

Legend

No Data Available

PCE Detected

No PCE Detected

OU Boundary

0 100 200 400 600 800 Feet

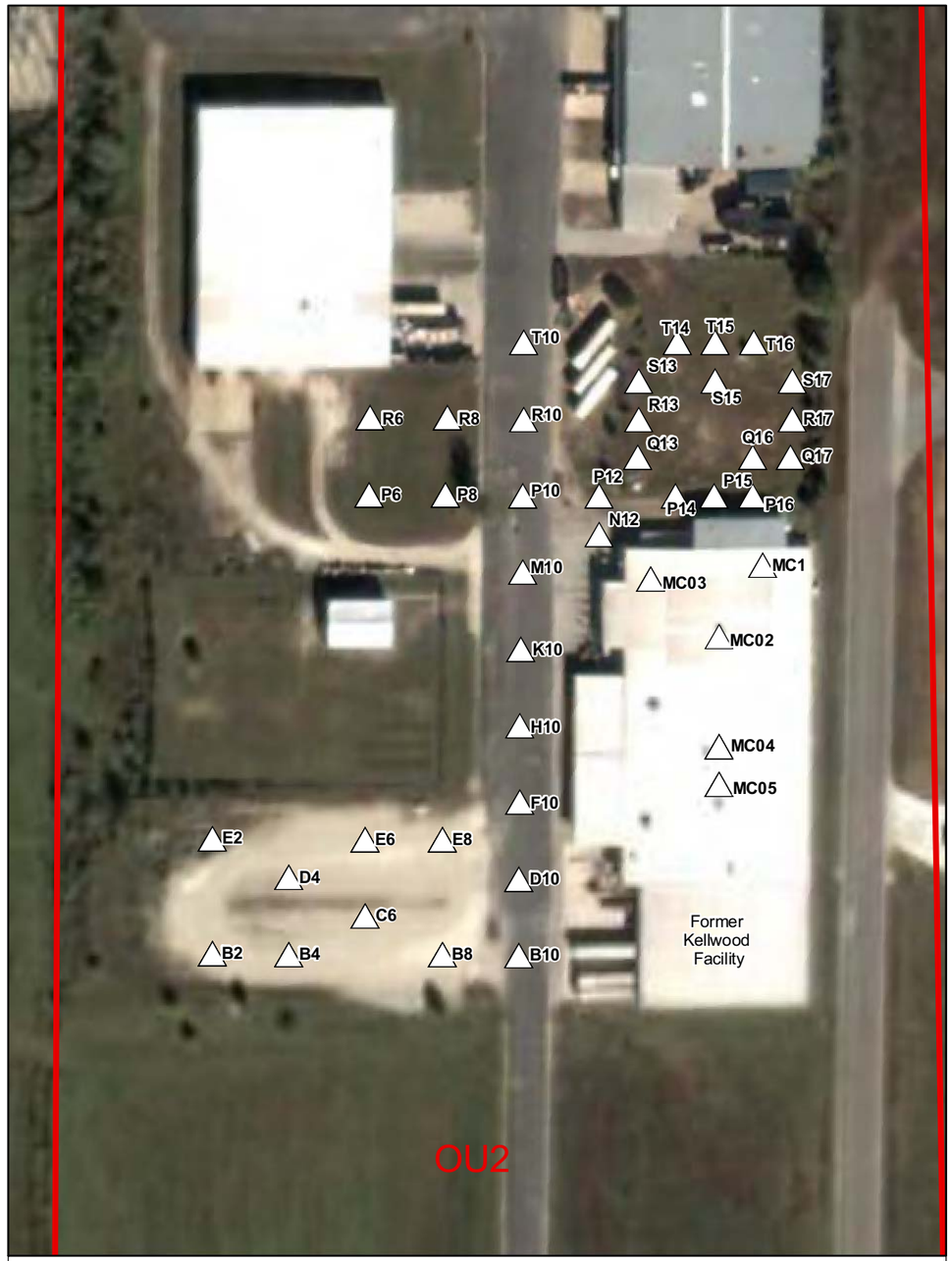
Note: Sampling and analysis performed by USGS, under contract to USEPA

FIGURE 2.15

USGS Tree Core Results
Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS

40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202



Soil Investigation

DNAPL Investigation

N
W E
S

0 45 90 180 270 360 Feet

DNAPL Testing Location

Soil Investigation

Figure 3.1a

Site Plan With Remedial Investigation Sampling Locations

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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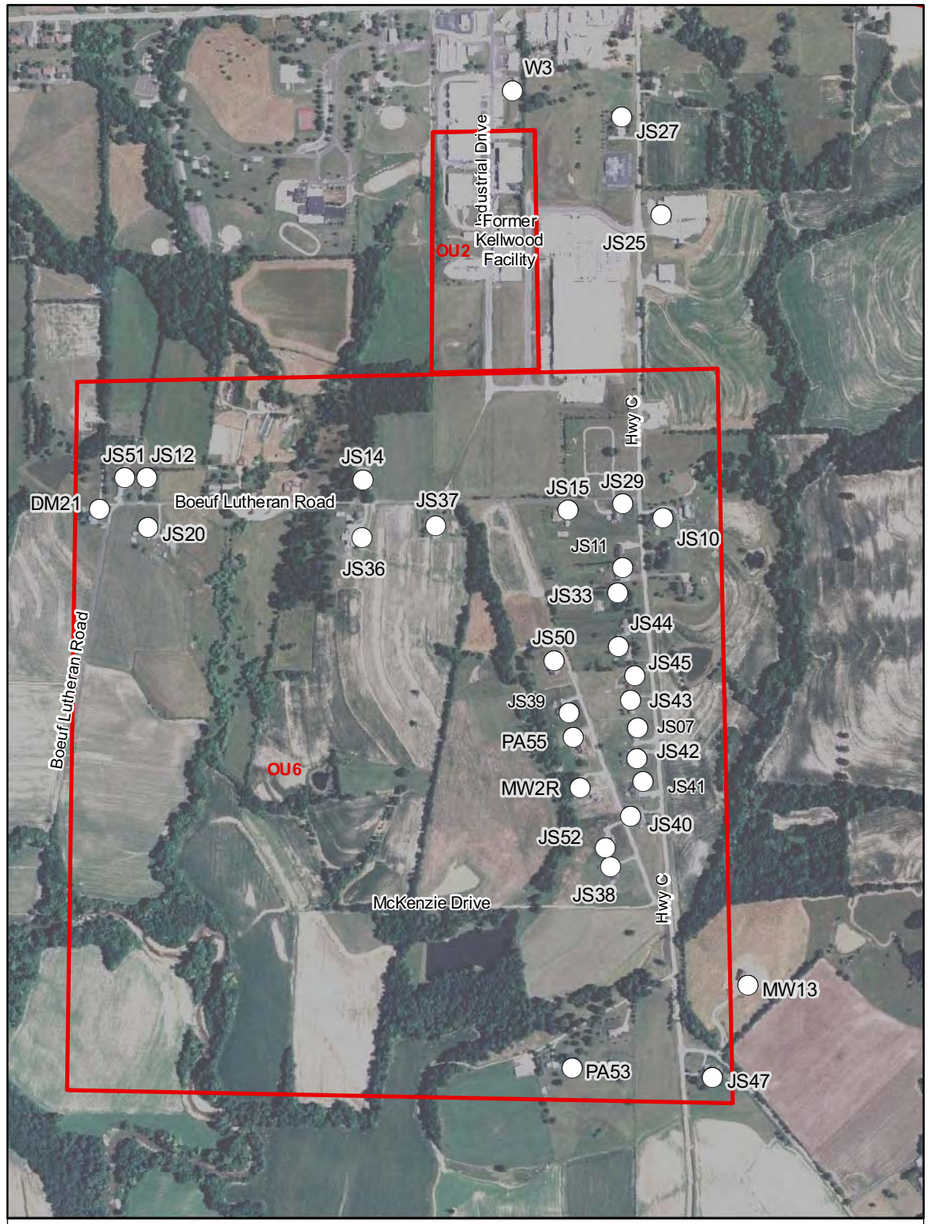
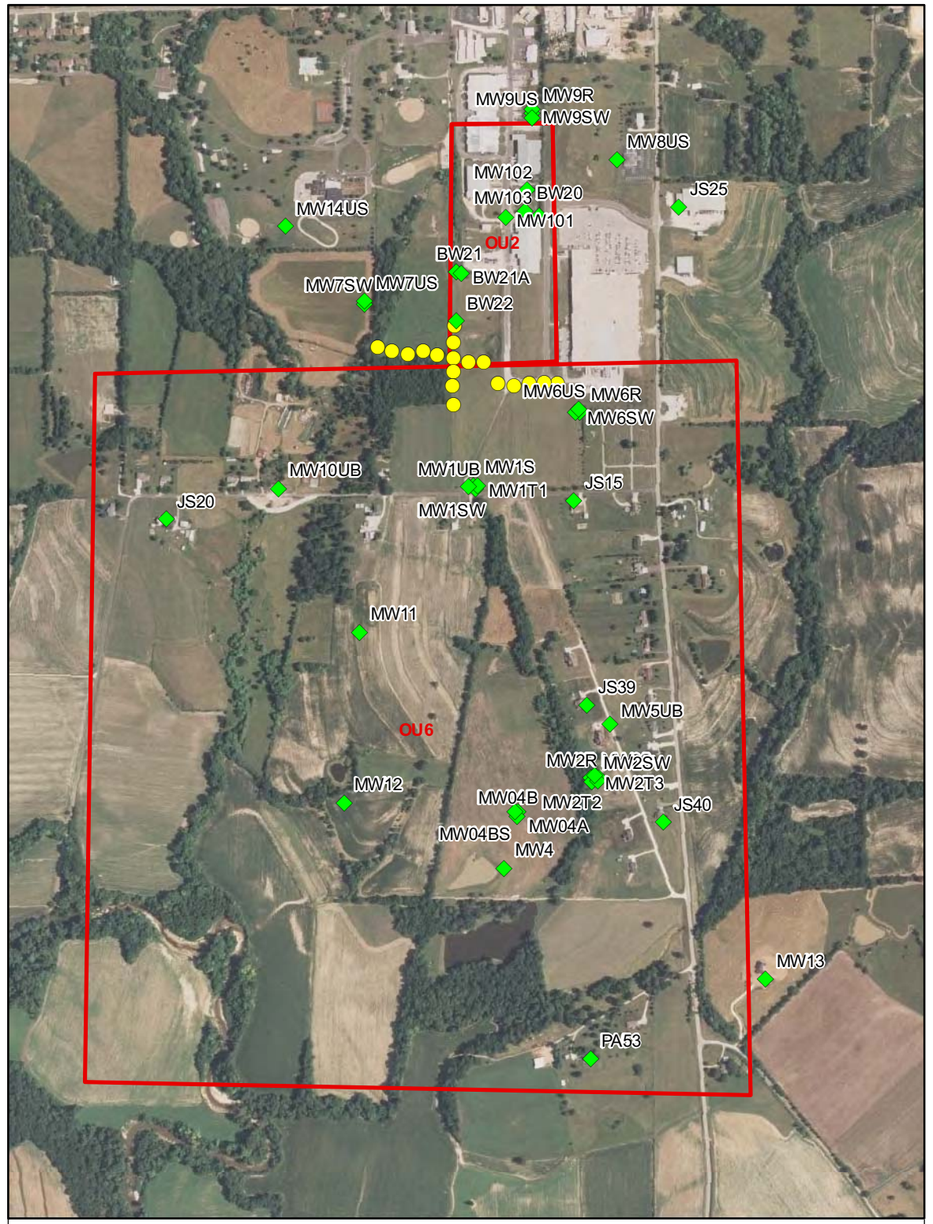


Residential Well Sampling



Groundwater Investigation (Task 2b, 2d, 2e)

0 465 930 1,860 2,790 3,720 Feet

N W E S

- Task 2b: Direct-push Sampling North of Boeuf Lutheran Road; See Figure 3.3 for details on sample IDs
- Task 2c: Residential Well Sampling
- Task 2d/2e: Monitoring Well Installation and Site-wide Groundwater Sampling

Figure 3.1b

Site Plan With Remedial Investigation Sampling Locations

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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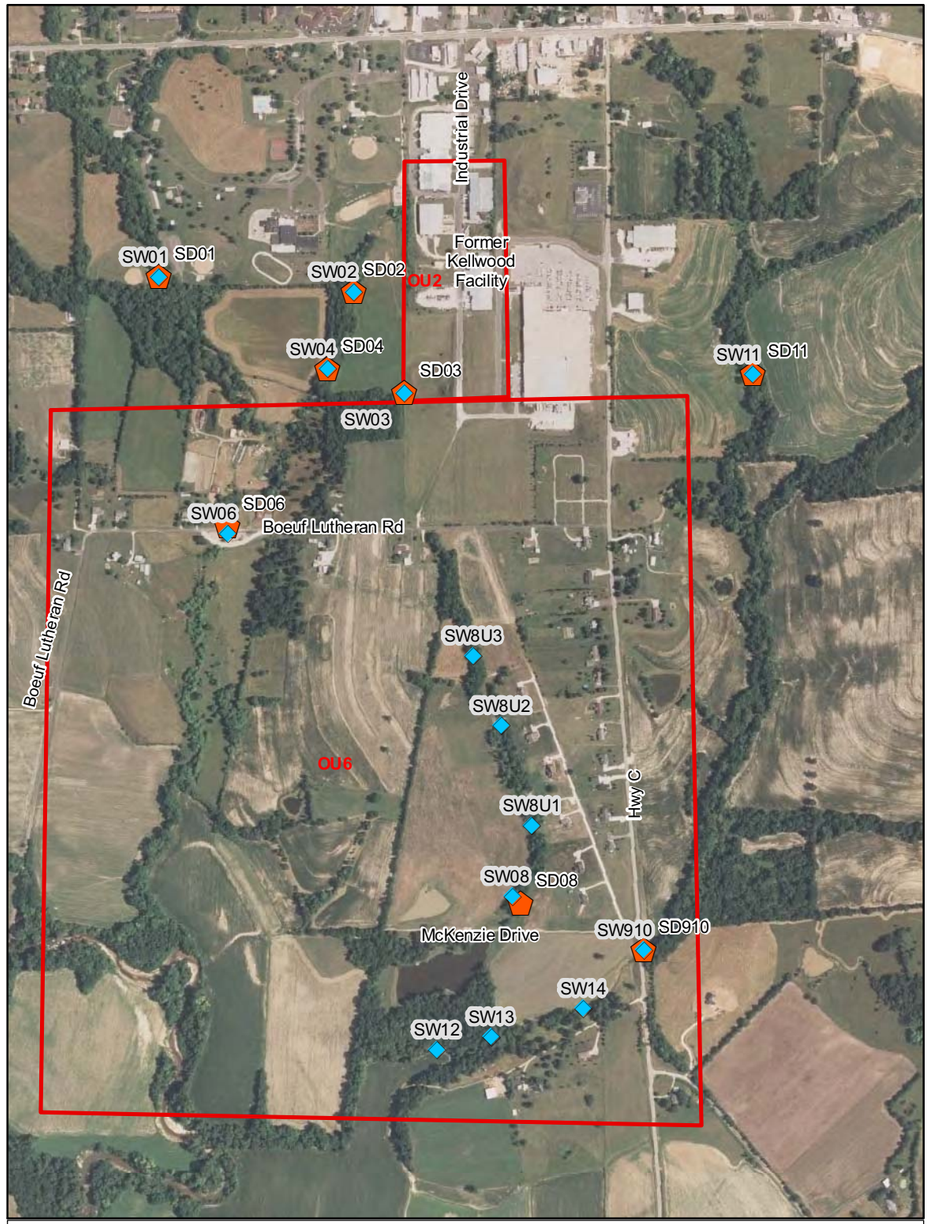

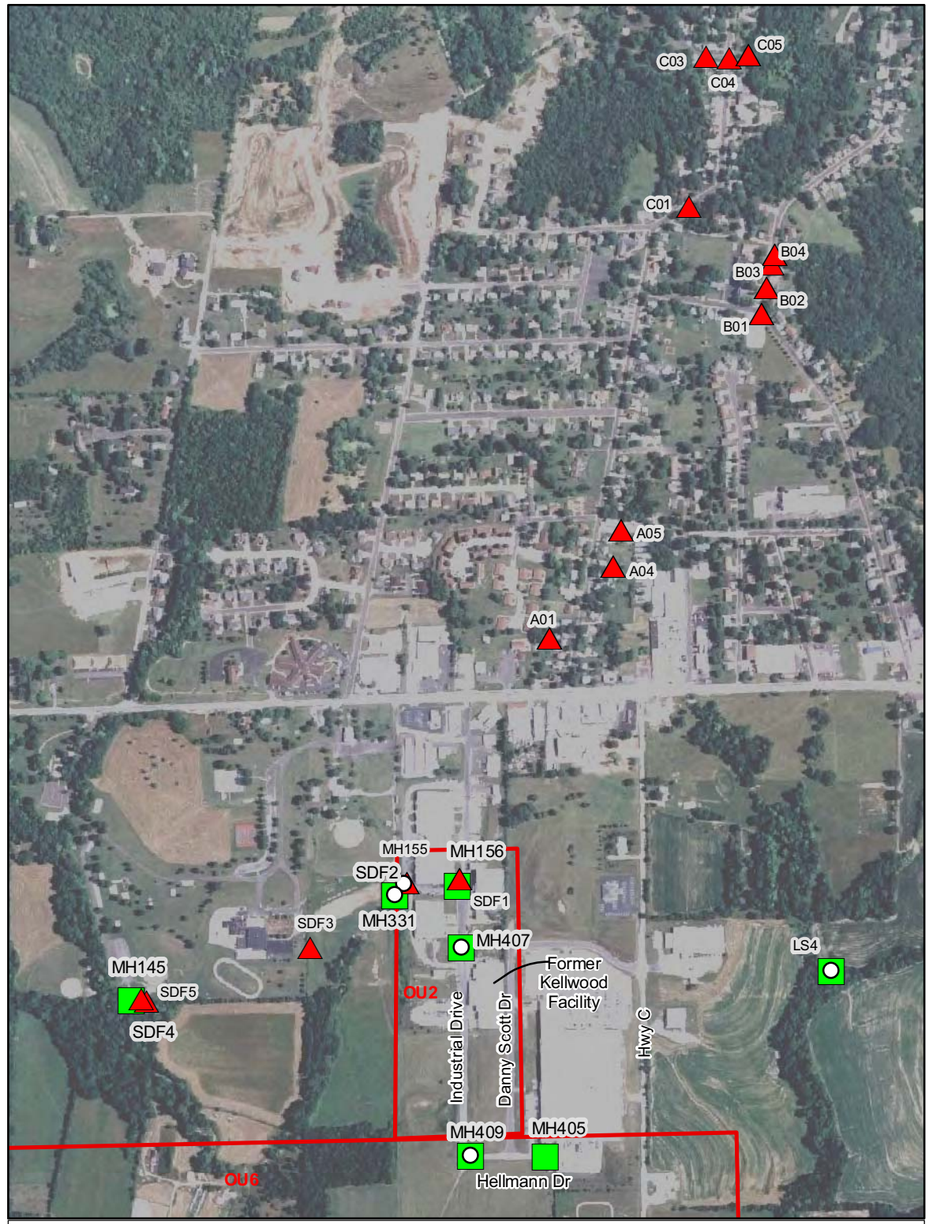

Feet
0 365 730 1,460 2,190 2,920

- Task 4: Surface Water
- Task 4: Sediment

N
W E
S

Feet
0 330 660 1,320 1,980 2,640

- Task 5: Sewer Sediment
- Task 5: Soil Adjacent to Sewer
- Task 5: Sewer Water

Figure 3.1c

Site Plan With
Remedial Investigation
Sampling Locations

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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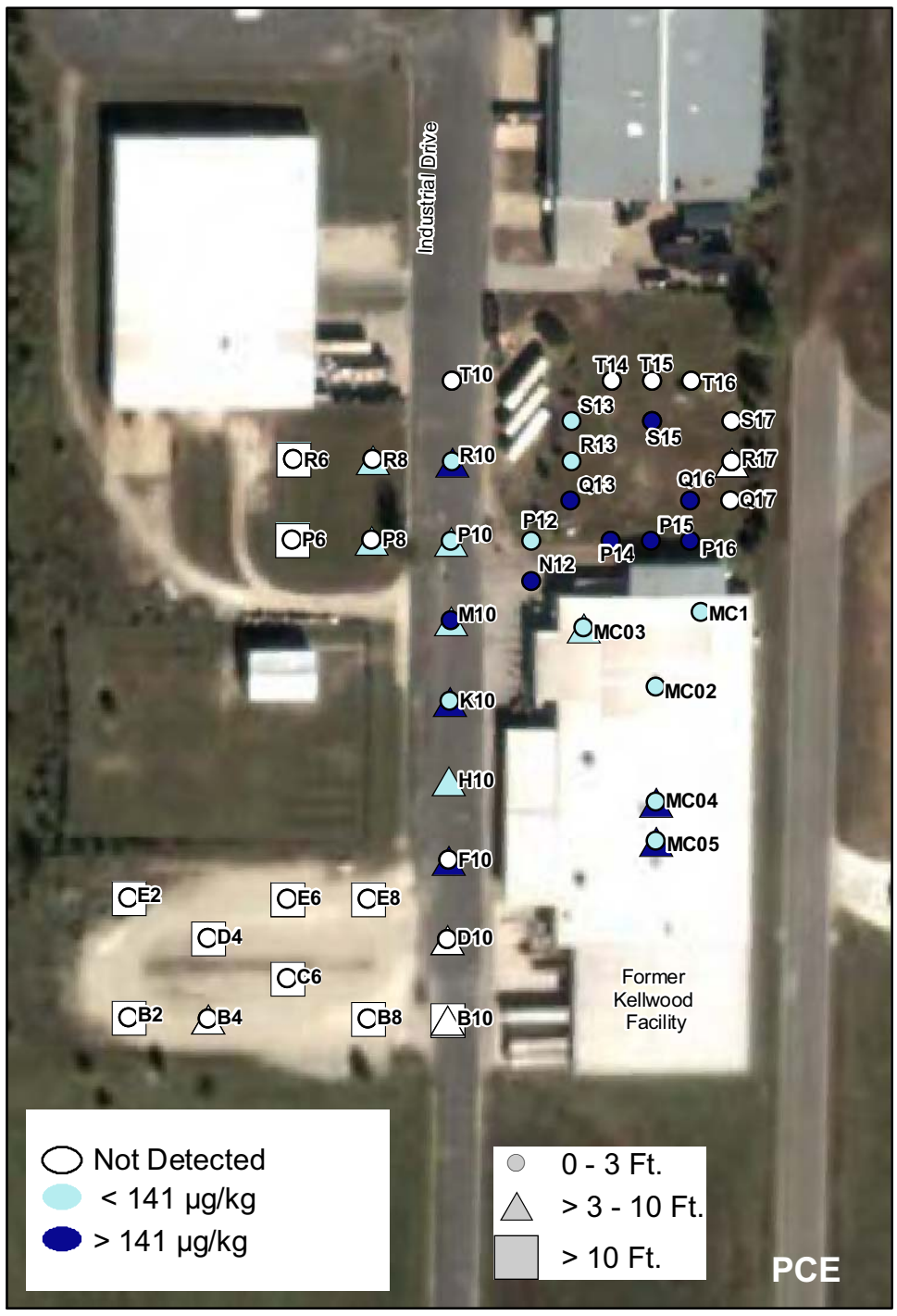

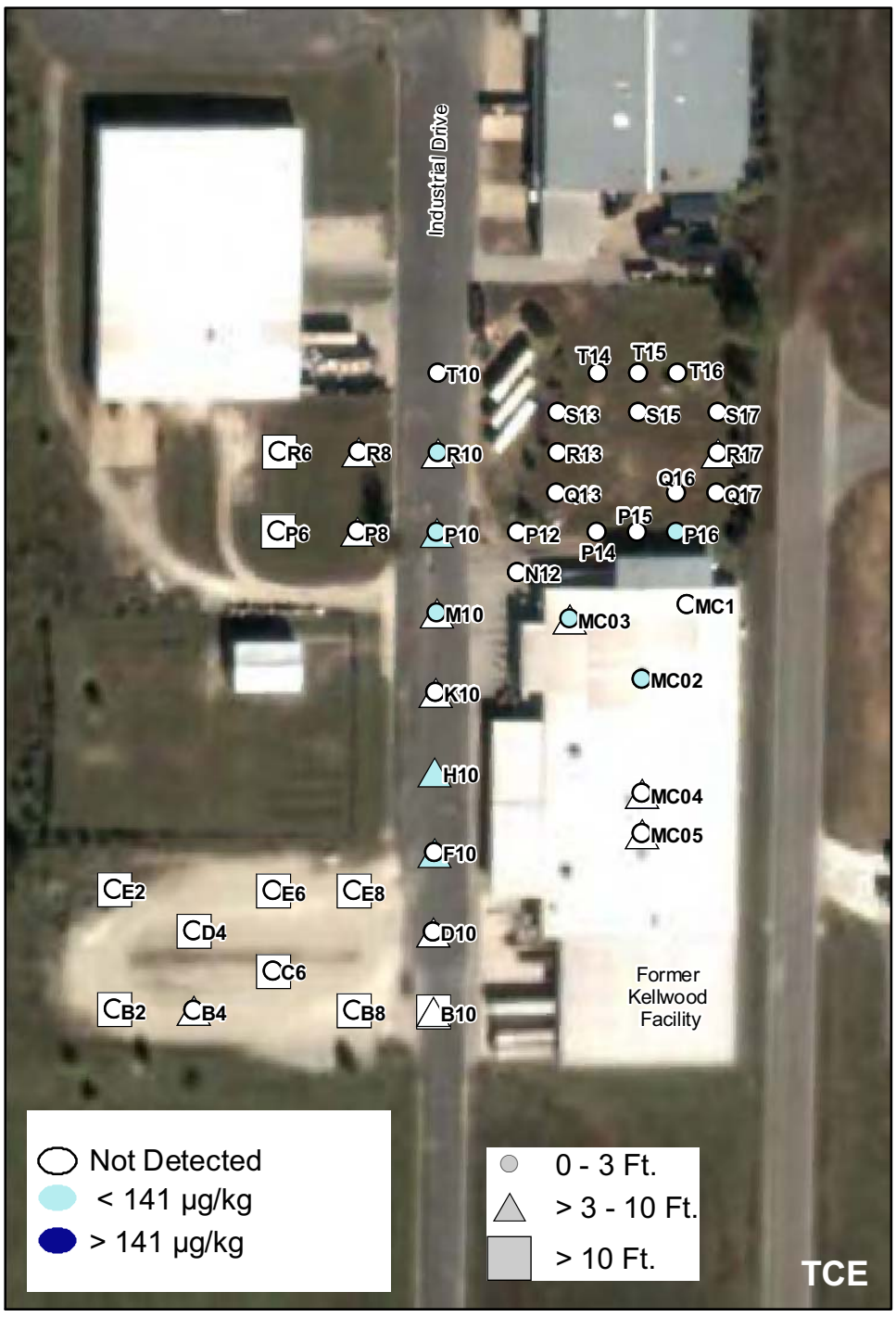

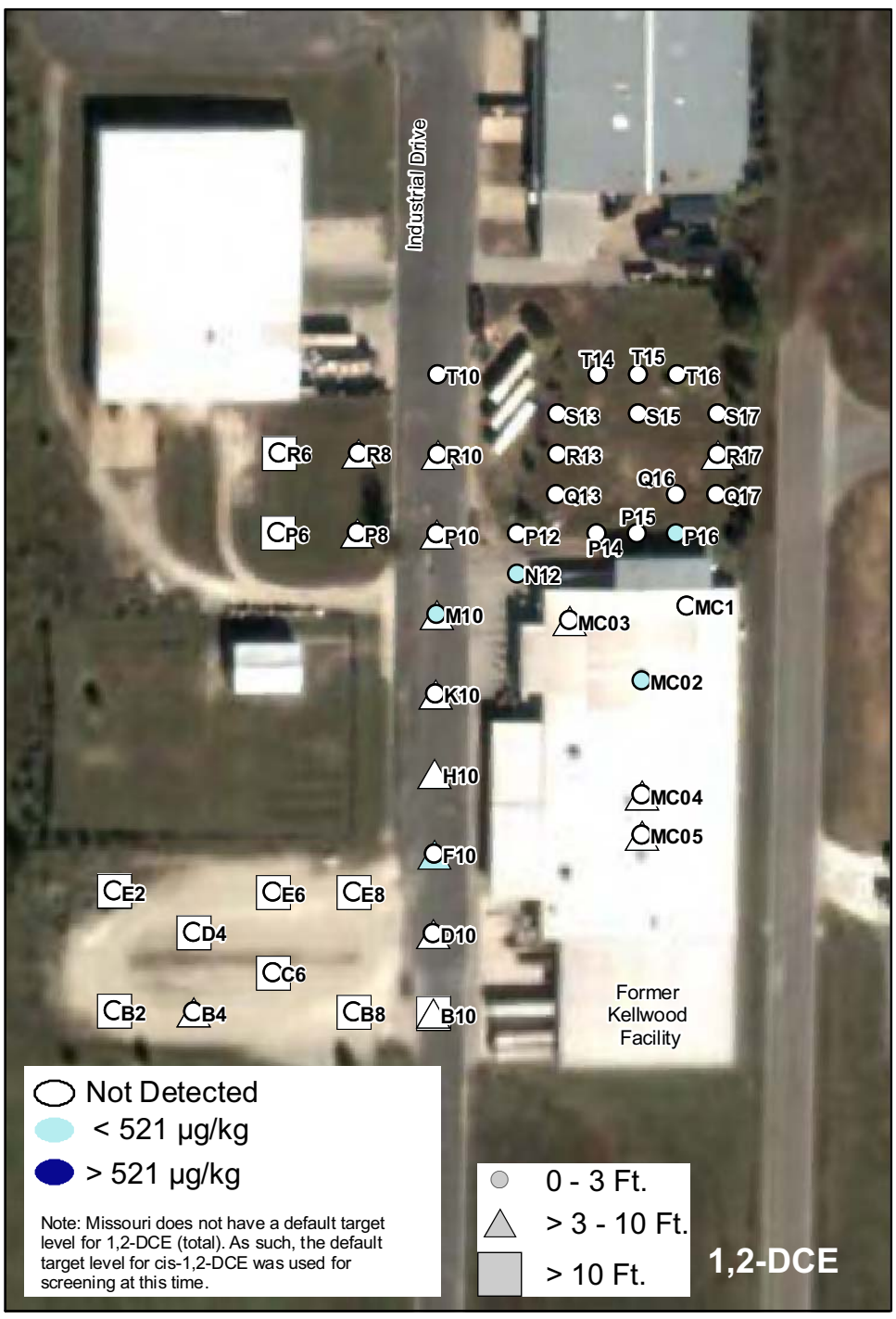

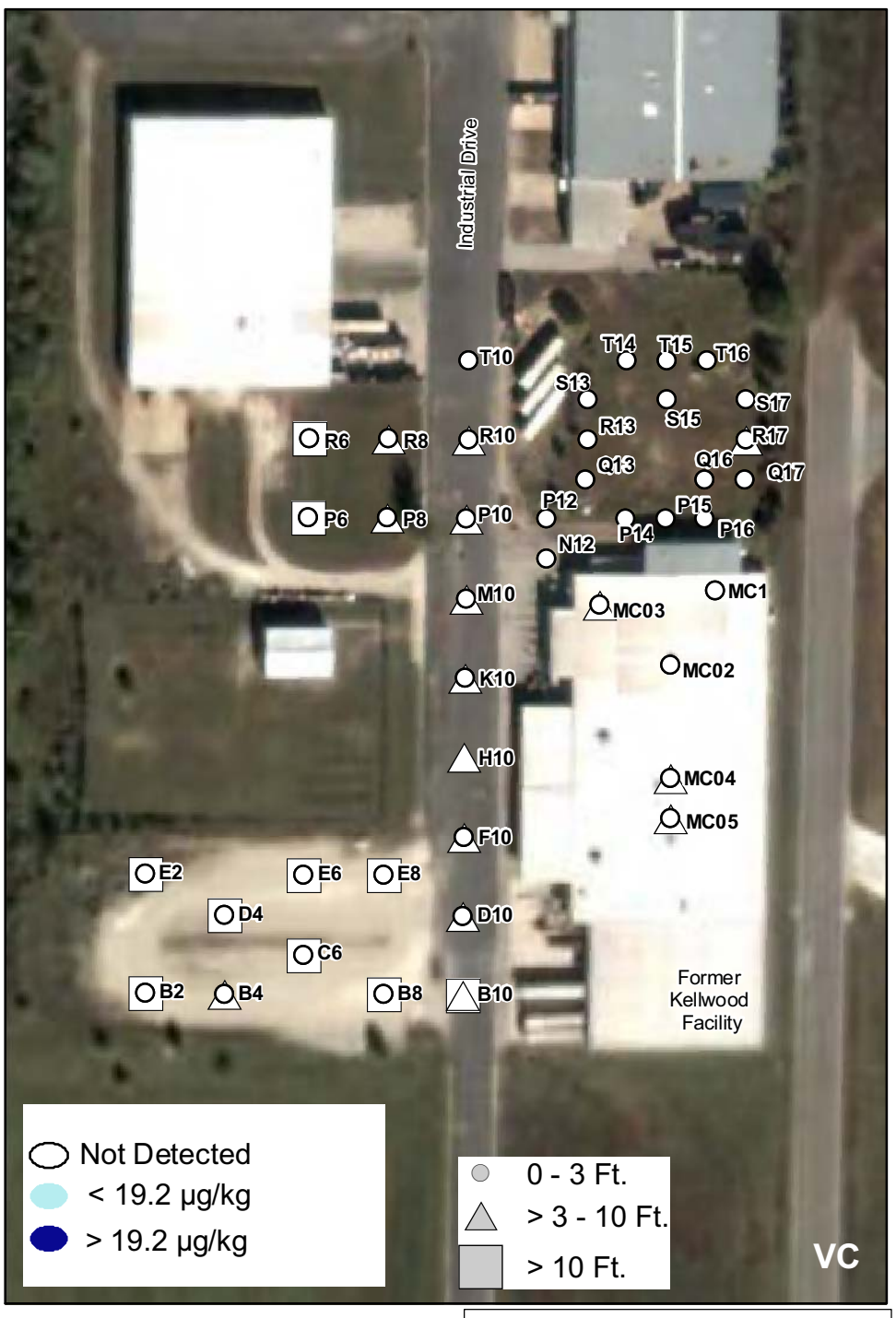

N
W E
S

0 25 50 100 150 200
Feet

Screening Criteria: Missouri Default Target Level for Soil

Figure 3.2

Distribution of Chemicals of Potential Concern in Soils at OU2 and OU6

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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Figure 3.3
Time Trend of PCE Concentrations in JS-14

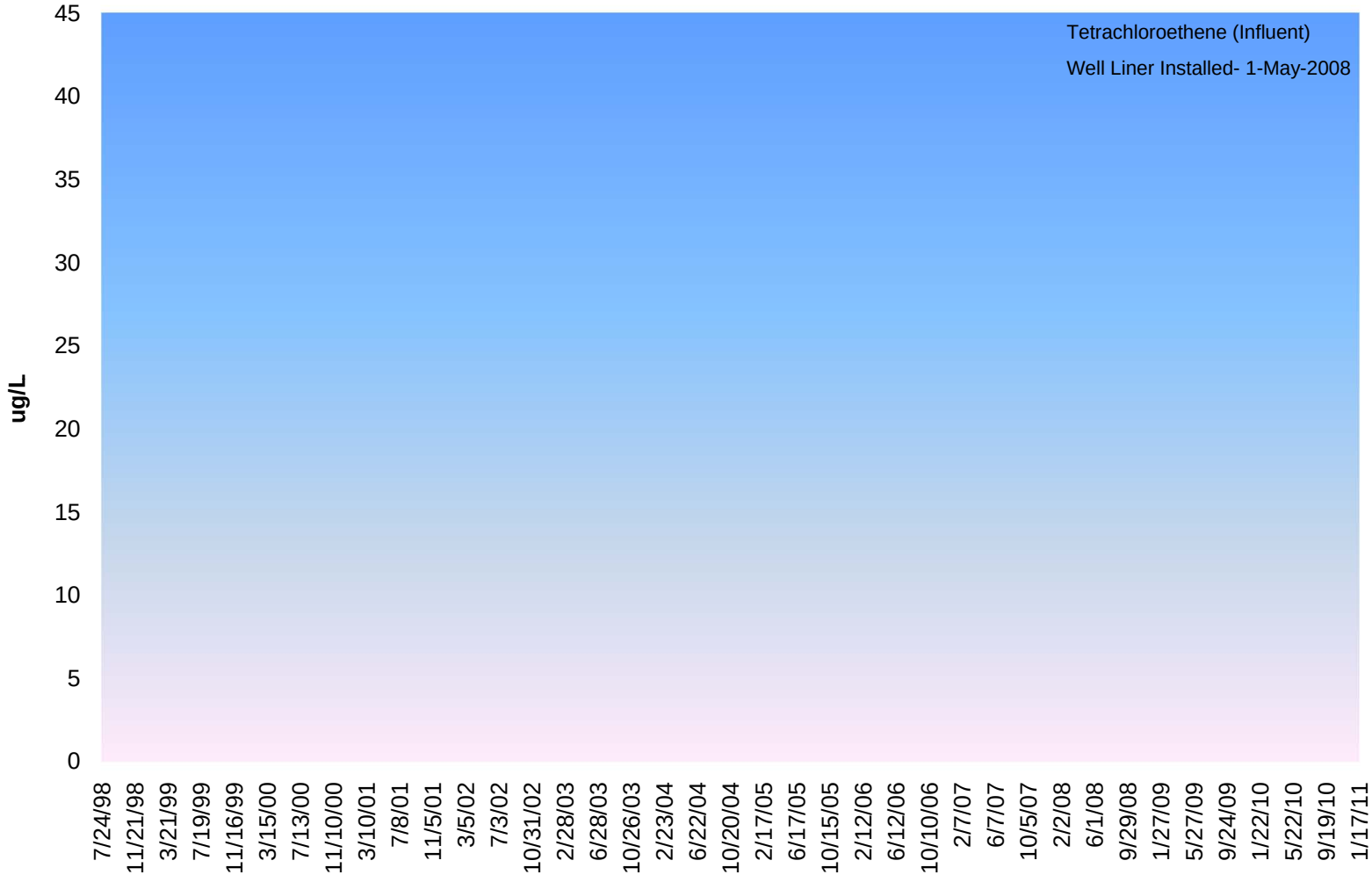


Figure 3.4
Time Trend of PCE Concentrations in JS-36

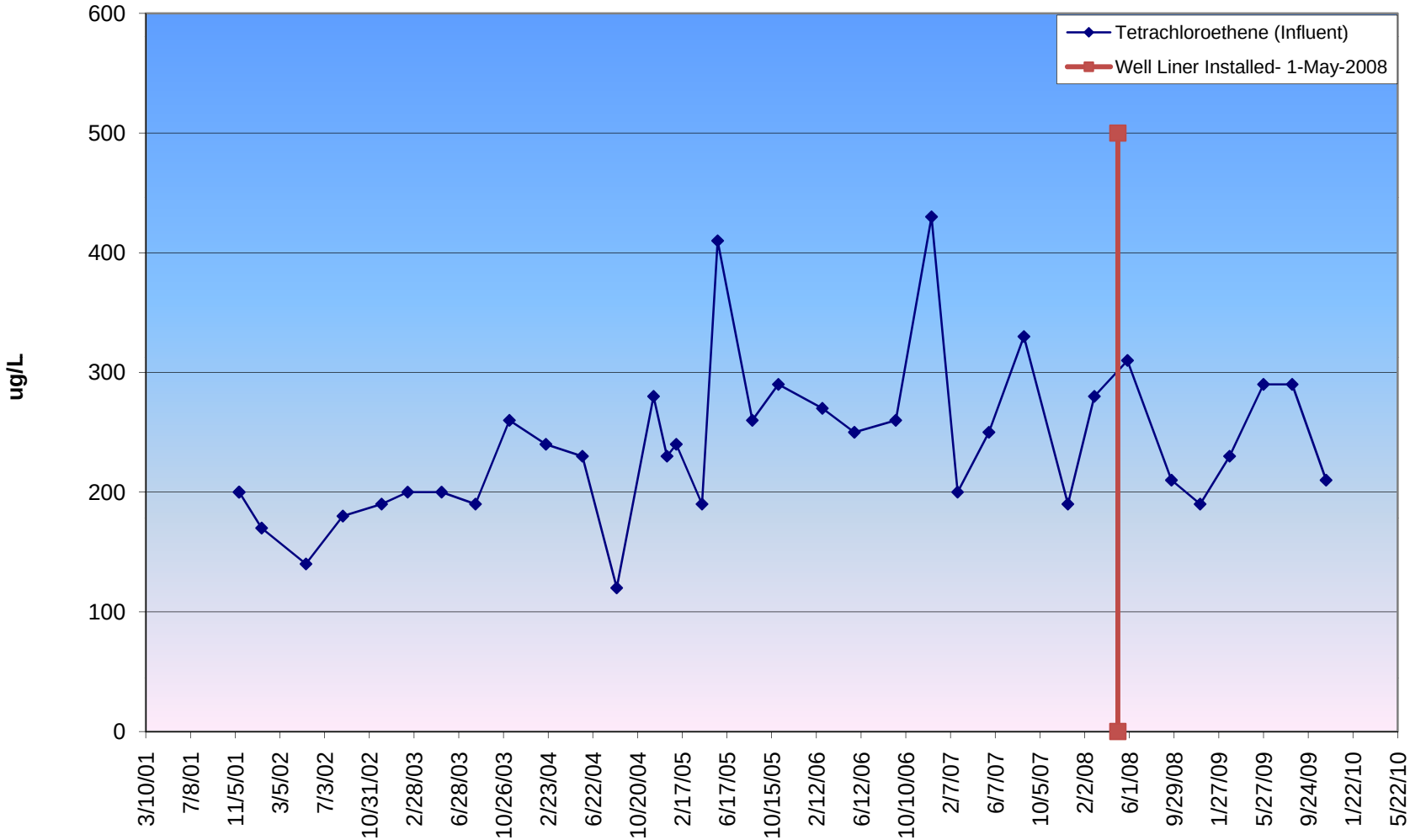


Figure 3.5
Time Trend of PCE Concentrations in JS-38

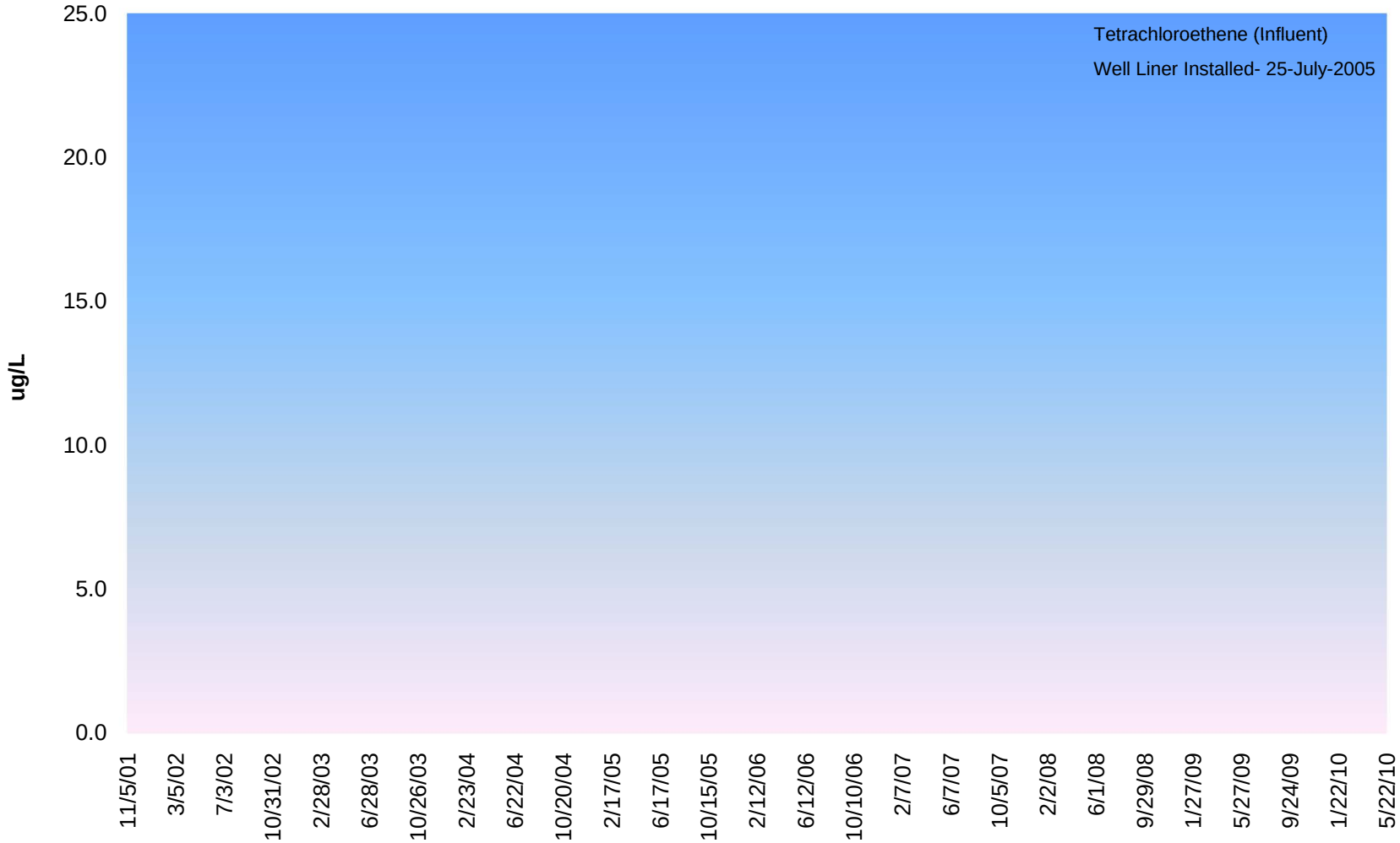
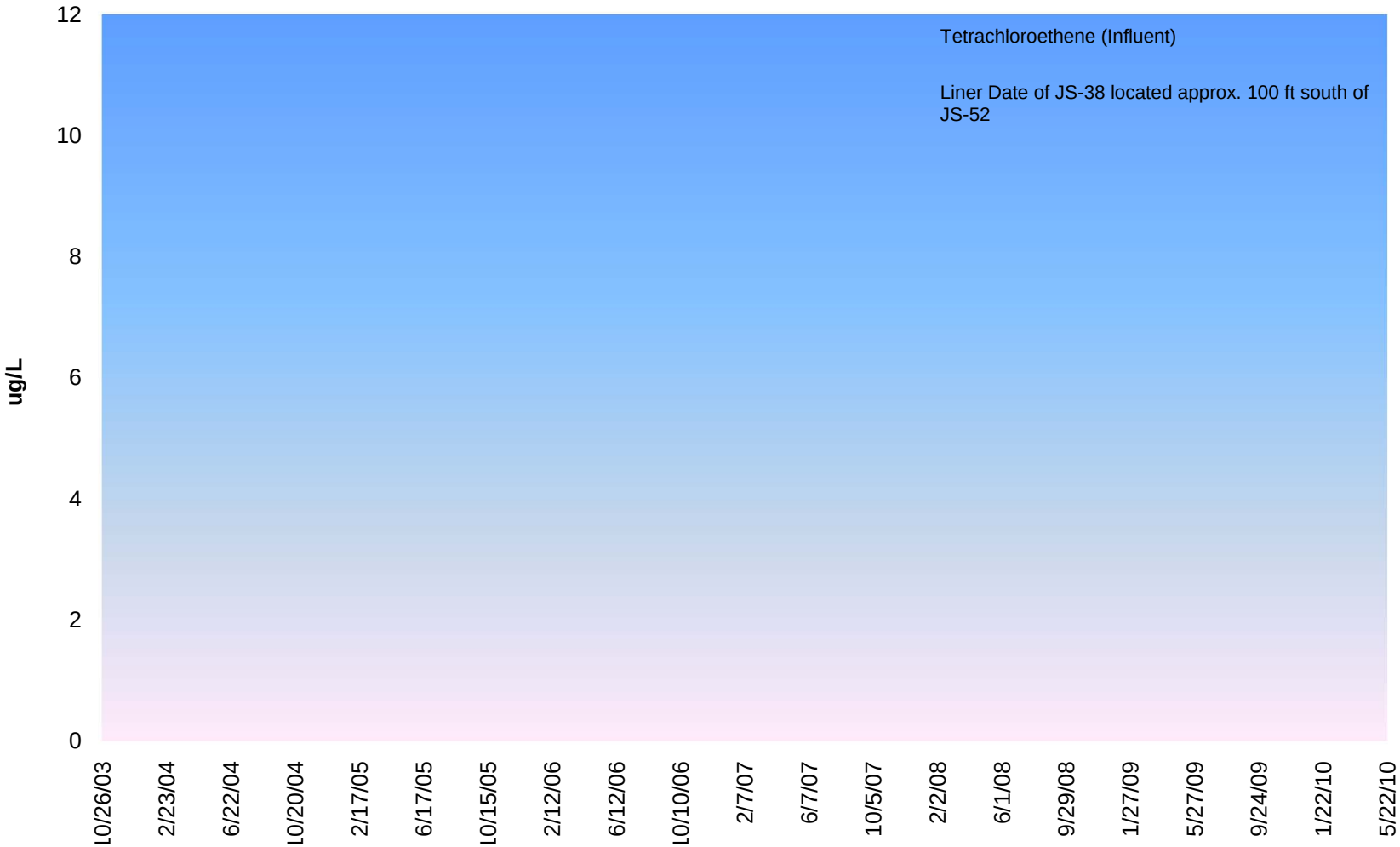
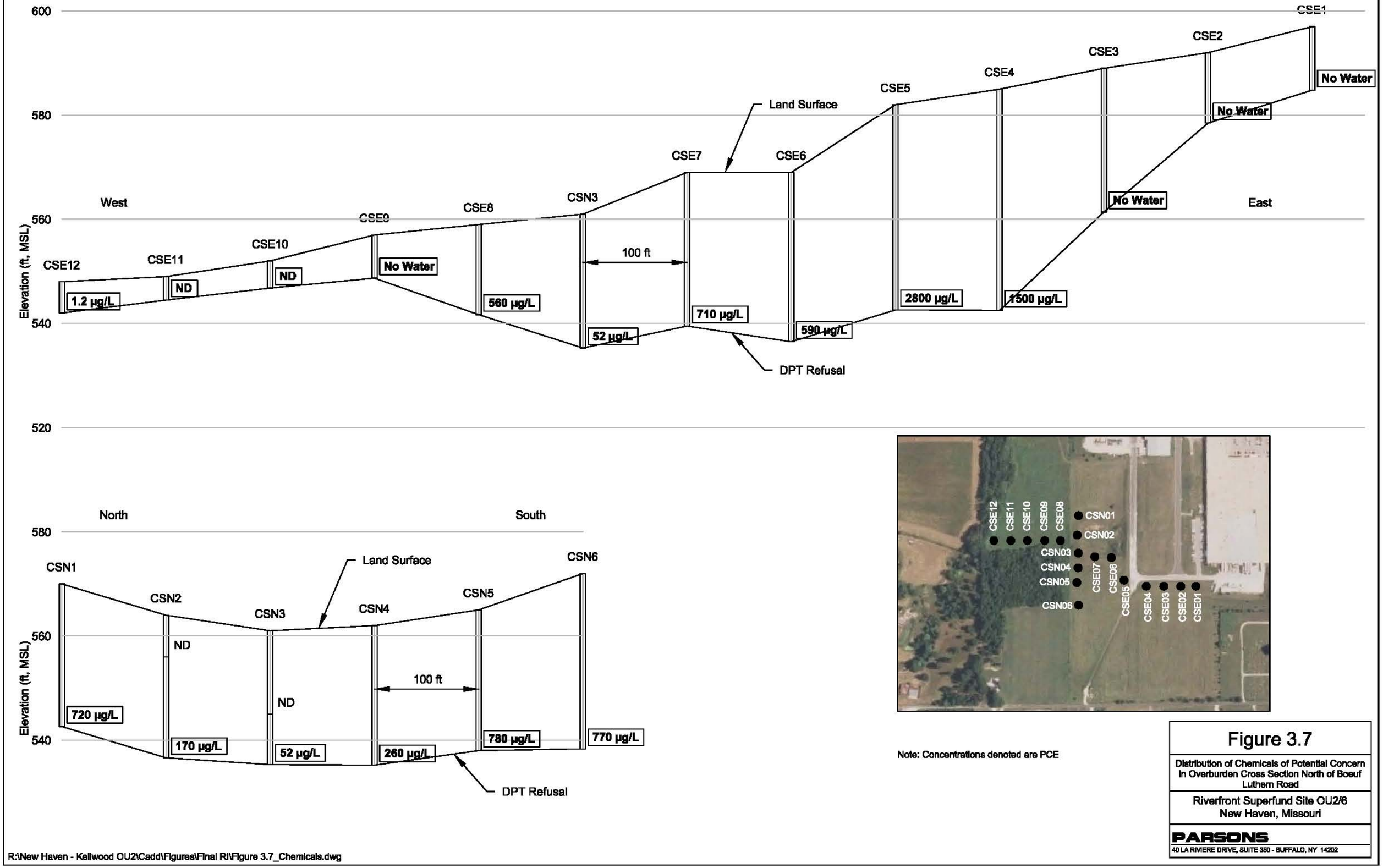


Figure 3.6
Time Trend of PCE Concentrations in JS-52





Note: Concentrations denoted are PCE

Figure 3.7

Distribution of Chemicals of Potential Concern In Overburden Cross Section North of Boeuf Luthem Road

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350 - BUFFALO, NY 14202

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Screening Criteria: USEPA MCLs or Missouri Default Target Level for Water
Residential Wells Sampled from February 28 to March 28, 2008

Not Detected
< 5 µg/L
5 - 100 µg/L
> 100 µg/L
Not Sampled

0 125 250 500 750 1,000
Feet

FIGURE 3.8a

Distribution of Chemicals of Potential Concern in Residential Wells (PCE)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

W3
JS27
Industrial Drive
JS25
OU2
Former
Kellwood
Facility
JS35
PCE
TCE
Hwy C
JS51
JS12
JS14
DM21
Boeuf Lutheran Road
JS15
JS29
JS10
JS20
JS37
JS36
JS11
JS33
JS46
JS44
JS50
JS45
JS43
JS39
JS07
PA55
OU6
JS42
Boeuf Lutheran Road
MW2R
JS41
JS40
VC
JS52
JS38
McKenzie Drive
Hwy C
MW13
JS06
PA53
JS47

Screening Criteria: USEPA MCLs or Missouri Default Target Level for Water
Residential Wells Sampled from February 28 to March 28, 2008

Not Detected
< 5 µg/L
5 - 100 µg/L
> 100 µg/L
Not Sampled

0 125 250 500 750 1,000
Feet

FIGURE 3.8b

Distribution of Chemicals of Potential Concern in Residential Wells (TCE)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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Screening Criteria: USEPA MCLs or Missouri Default Target Level for Water
Residential Wells Sampled from February 28 to March 28, 2008
trans-1,2-DCE was not detected in any of the Residential Wells sampled

Not Detected
< 70 µg/L
70 - 100 µg/L
> 100 µg/L
Not Sampled

0 125 250 500 750 1,000
Feet

FIGURE 3.8c

Distribution of Chemicals of Potential Concern in Residential Wells (cis-1,2_DCE)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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Screening Criteria: USEPA MCLs or Missouri Default Target Level for Water
Residential Wells Sampled from February 28 to March 28, 2008

Not Detected
< 2 µg/L
2 - 100 µg/L
> 100 µg/L
Not Sampled

0 125 250 500 750 1,000
Feet

FIGURE 3.8d

Distribution of Chemicals of Potential Concern in Residential Wells (Vinyl Chloride)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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0 250 500 1,000 1,500 2,000
Feet

FIGURE 3.9

Plan and Locations of Generalized Geologic Cross Sections

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

South

North

A

A'

MW-2R

MW-1SW

MW-6R

BW21

MW-9R

Land Surface

Top of bedrock

Upper Sand member

Swan Creek Sandstone

Top of Roubidoux Formation

Top of Sand portion of Roubidoux Formation

500 ft

Elevation (ft, MSL)

700

600

500

400

300

200

100

Legend

- Silt or Shale
- Silt and Clay
- Dolostone
- Dolomitic Limestone
- Sandstone

Figure 3.10

Geologic
Cross Section
A-A'

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350 - BUFFALO, NY 14202

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West

East

B

B'

MW-7SW

BW21

MW-9R

MW-8US

Land Surface

Top of bedrock

Upper Sand member

Swan Creek Sandstone

Top of Roubidoux Formation

Top of Sand portion of Roubidoux Formation

Elevation (ft, MSL)

600

500

400

300

200

100

Legend

- Silt or Shale
- Silt and Clay
- Dolostone
- Dolomitic Limestone
- Sandstone

500 ft

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Figure 3.11

Geologic
Cross Section
B-B'

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350 - BUFFALO, NY 14202

Screening Criteria: USEPA MCLs or Missouri Default Target Level for Water
Monitoring Wells Sampled from March 2 to September 30, 2009

Not Detected
< 5 µg/L (MCL)
5 - 100 µg/L
> 100 - 1,000 µg/L
> 1,000 µg/L

0 250 500 1,000 1,500 2,000
Feet

Note: Locations of wells in clusters are offset slightly to allow for legibility of concentration range.

FIGURE 3.12a

Distribution of Chemicals of Potential Concern in Monitoring Wells
(Site-wide GW Sampling Round-1: PCE)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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J:\442 PARCOMM\442906_Kellwood\GIS\Kellwood\MXDs\RI_FS_Revision_May2010\Fig3-12b_Task2e_Water_TCE.mxd - 5/24/2010 @ 11:23:24 PM

Screening Criteria: Lower of Missouri human health (non-drinking) level and USEPA Region 3 eclological benchmark

Not Detected
< 5 mg/L (MCL)
5 - 100 mg/L
> 100 - 1,000 mg/L
> 1,000 mg/L

0 125 250 500 750 1,000
Feet

Note: Locations of wells in clusters are offset slightly to allow for legibility of concentration range.

FIGURE 3.12b

Distribution of Chemicals of Potential Concern in Monitoring Wells
(Site-wide GW Sampling Round-1: TCE)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

J:\442 PAR COMM\442906_Kellwood\GIS\Kellwood\MXDs\RI_FS_Revision_May2010\Fig3-12c_Task2e_Water_1-2DCE.mxd - 5/24/2010 @ 11:14:47 PM

Screening Criteria: Federal MCLs or Missouri Default Target Levels for Water

Note:
1. Missouri does not have a default target level for 1,2-DCE (total). As such, the default target level for cis-1,2-DCE was used for screening at this time.

2. Locations of wells in clusters are offset slightly to allow for legibility of concentration range.

0 125 250 500 750 1,000
Feet

Not Detected
< 70 mg/L (MCL)
70 - 100 mg/L
> 100 - 1,000 mg/L
> 1,000 mg/L

FIGURE 3.12c

Distribution of Chemicals of Potential Concern in Monitoring Wells
(Site-wide GW Sampling Round-1: 1,2-DCE)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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FIGURE 3.12d

Distribution of Chemicals of Potential Concern in Monitoring Wells
(Site-wide GW Sampling Round-1: VC)

Riverfront Superfund Site OU2/6
New Haven, Missouri

Screening Criteria: Federal MCLs or Missouri Default Target Levels for Water

Not Detected
< 2 mg/L (MCL)
2 - 100 mg/L
> 100 - 1,000 mg/L
> 1,000 mg/L

0 125 250 500 750 1,000
Feet

Note: Locations of wells in clusters are offset slightly to allow for legibility of concentration range.

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

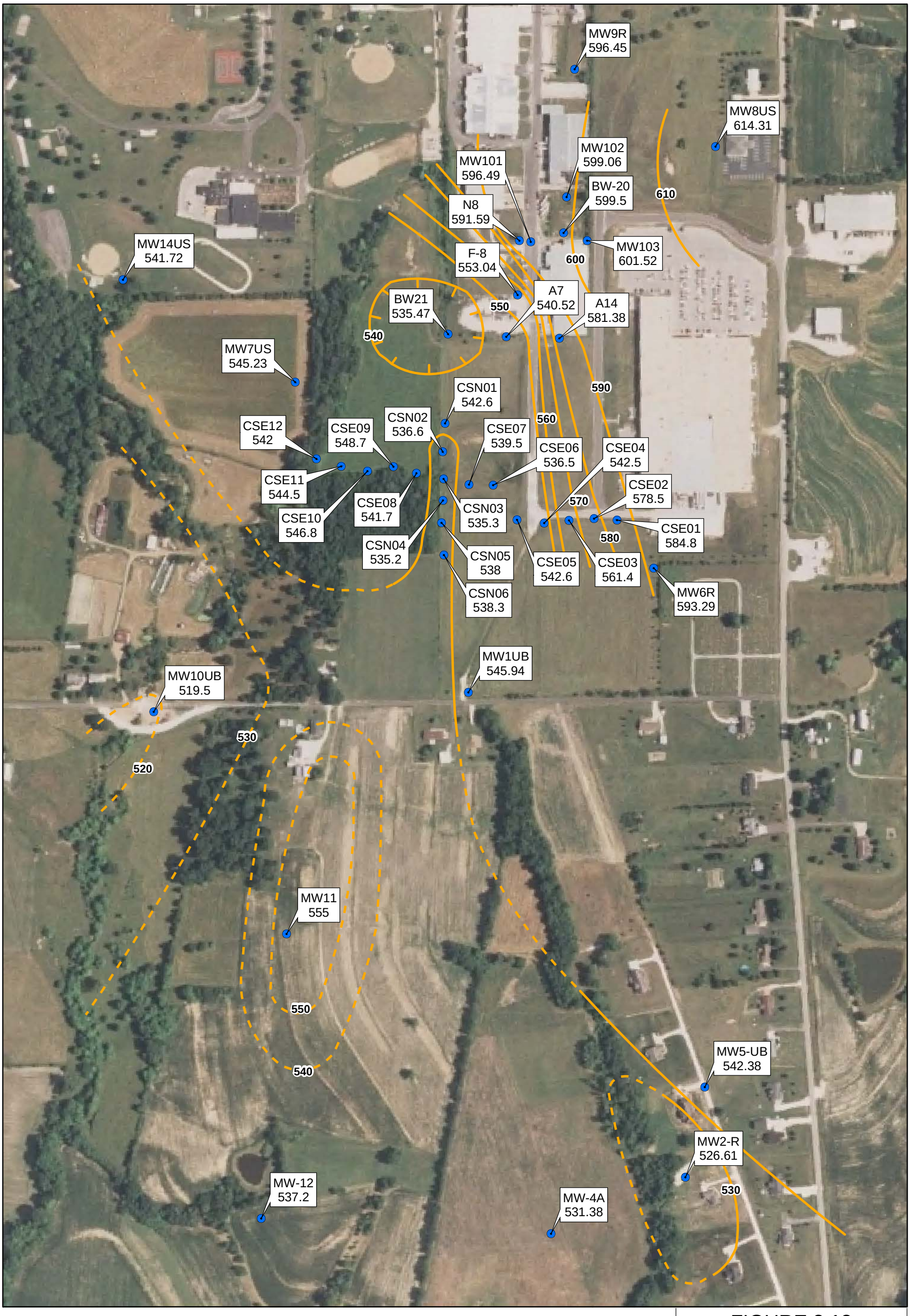

FIGURE 3.13

Elevation of Top of Bedrock

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS

40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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0 250 500 1,000 1,500 2,000

Feet

FIGURE 3.14

Well location with bedrock surface elevation for Upper Sandstone marker bed

Top of Upper Sandstone Marker Bed Contours (Ft. MSL)

Structure Contours on Top of Upper Sandstone Marker Bed

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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N
W E
S

0 250 500 1,000 1,500 2,000

Feet

- Well location with bedrock surface elevation for Swan Creek sandstone member
- Top of Swan Creek Sandstone Contours (Ft. MSL)
- Inferred Contour
- Potential Fault
- Anticline/Syncline

FIGURE 3.15

Structure Contours on Top of Swan Creek Sandstone Member

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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DNAPL Encountered

Screening Criteria: USEPA MCLs or Missouri Default Target Level for Water

0 25 50 100 150 200

Feet

FIGURE 3.17

Distribution of Chemicals of Potential Concern in Groundwater and DNAPL Detections at OU2

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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650

650

(West)

Land Surface

(East)

P 17

P 13

P 14

P 15

P 16

N 8

N 12

600

600

Top of bedrock

Elevation (ft, MSL)

200 ft

550

Legend

NAPL Indicated

Fracture in Core

Lithology (See boring Logs)

Figure 3.18a

Vertical Distribution of
DNAPL at OU2
East - West

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350 - BUFFALO, NY 14202

R:\New Haven - Kellwood OU2\Cadd\Figures\Final RI\Figure 3.18a_NAPL EW Cross Sections.dwg

(South)

(North)

Land Surface

Top of bedrock

F11

L 12

N 12

P 14

Q 15.5

R 17

T 17

U 17

A 07

600

500

Elevation (ft, MSL)

200 ft

Legend

NAPL Indicated

Fracture in Core

Lithology (See boring Logs)

Figure 3.18b

Vertical Distribution of
DNAPL at OU2 North - South

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS

40 LA RIVIERE DRIVE, SUITE 350 - BUFFALO, NY 14202

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Screening Criteria: Lower of Missouri human health (non-drinking) level and USEPA Region 3 eclological benchmark

Not Detected

< 5 µg/L (MCL)

5 - 111 µg/L

Access Denied

0 125 250 500 750 1,000

Feet

FIGURE 3.19a

Distribution of Chemicals of Potential Concern in Surface Water at OU2 and OU6 (PCE)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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Screening Criteria: Lower of Missouri human health (non-drinking) level and USEPA Region 3 eclological benchmark

Not Detected

< 5 µg/L (MCL)

5 - 111 µg/L

Access Denied

0 125 250 500 750 1,000

Feet

FIGURE 3.19b

Distribution of Chemicals of Potential Concern in Surface Water at OU2 and OU6 (TCE)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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Screening Criteria: Lower of Missouri human health (non-drinking) level and USEPA Region 3 eclological benchmark

Not Detected

< 70 µg/L (MCL)

70 - 111 µg/L

Access Denied

0 125 250 500 750 1,000

Feet

FIGURE 3.19c

Distribution of Chemicals of Potential Concern in Surface Water at OU2 and OU6 (Total - 1,2-DCE)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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Screening Criteria: Lower of Missouri human health (non-drinking) level and USEPA Region 3 eclological benchmark

Not Detected

< 2 µg/L (MCL)

2 - 111 µg/L

Access Denied

0 125 250 500 750 1,000

Feet

FIGURE 3.19d

Distribution of Chemicals of Potential Concern in Surface Water at OU2 and OU6 (Vinyl Chloride)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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FIGURE 3.20

Distribution of Chemicals of Potential Concern in Sediments at OU2 and OU6 (PCE)

Riverfront Superfund Site OU2/6
New Haven, Missouri

Screening Criteria: Missouri Default Target Level for Soil
TCE, 1,2-DCE, and Vinyl Chloride were not detected at any of the sediment sampling locations

Not Detected

< 141 µg/kg (Missouri Default Target Level for Soil)

Access Denied

0 125 250 500 750 1,000

Feet

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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Screening Criteria: USEPA MCLs or Missouri Default Target Level for Water
TCE, 1,2-DCE, and Vinyl Chloride were not detected at any of the sampling locations

Not Detected

< 5 µg/L (MCL)

> 5 - 100 µg/L

0 125 250 500 750 1,000

Feet

FIGURE 3.21

Distribution of Chemicals of Potential Concern in Sanitary Sewer Water at OU2 and OU6 (PCE)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

C03 C04 C05

C01

B04

B03

B02

B01

PCE

A05

A04

A01

TCE

Douglas St

Miller St

Hwy 100 / Allan

SDF2 SDF1

MH155

MH331

SDF3

Former Kellwood Facility

MH407

Hwy C

LS4

SDF5

SDF4

OU2

Industrial Drive

MH409

OU6

VC

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Screening Criteria: Missouri Default Target Level for Soil
TCE, 1,2-DCE, and Vinyl Chloride were not detected at any of the sampling locations

Sediment Sample

Soil Samples by Depth

0 - 3 Ft.

> 3 - 10 Ft.

> 10 Ft.

Not Detected

< 141 µg/kg (Missouri Default Target Level for Soil)

> 141 µg/kg

0 125 250 500 750 1,000

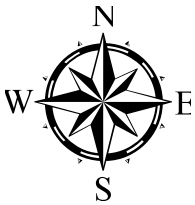
Feet

FIGURE 3.22

Distribution of Chemicals of Potential Concern in Sanitary Sewer Sediment and in Soils Adjacent to Sewer at OU2 and OU6 (PCE)

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202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E
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FIGURE 4.1

Screening Criteria: Missouri Default Target Level for Soil

Distribution of Chemicals of Potential Concern
in Soils at OU2 and OU6, All Data

Riverfront Superfund Site OU2/6
New Haven, Missouri

Feet

0 100 200 400 600 800

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

FIGURE 4.2a

Water Level Elevations
Upper Sandstone Marking Bed /
Upper Bedrock Permeable Zone
September 1, 2009

Riverfront Superfund Site OU2/6
New Haven, Missouri

Legend

530 Groundwater Elevation (ft AMSL)

0 125 250 500 750 1,000
Feet

\\moche01fs01\Restoration\New Haven - Kellwood OU2\Cadd\Figures\contour figures\Figure4.2a water level contour map.mxd

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

FIGURE 4.2b

Legend

530 Groundwater Elevation (ft AMSL)

Water Level Elevations
Swan Creek Formation
September 1, 2009

Riverfront Superfund Site OU2/6
New Haven, Missouri

0 125 250 500 750 1,000
Feet

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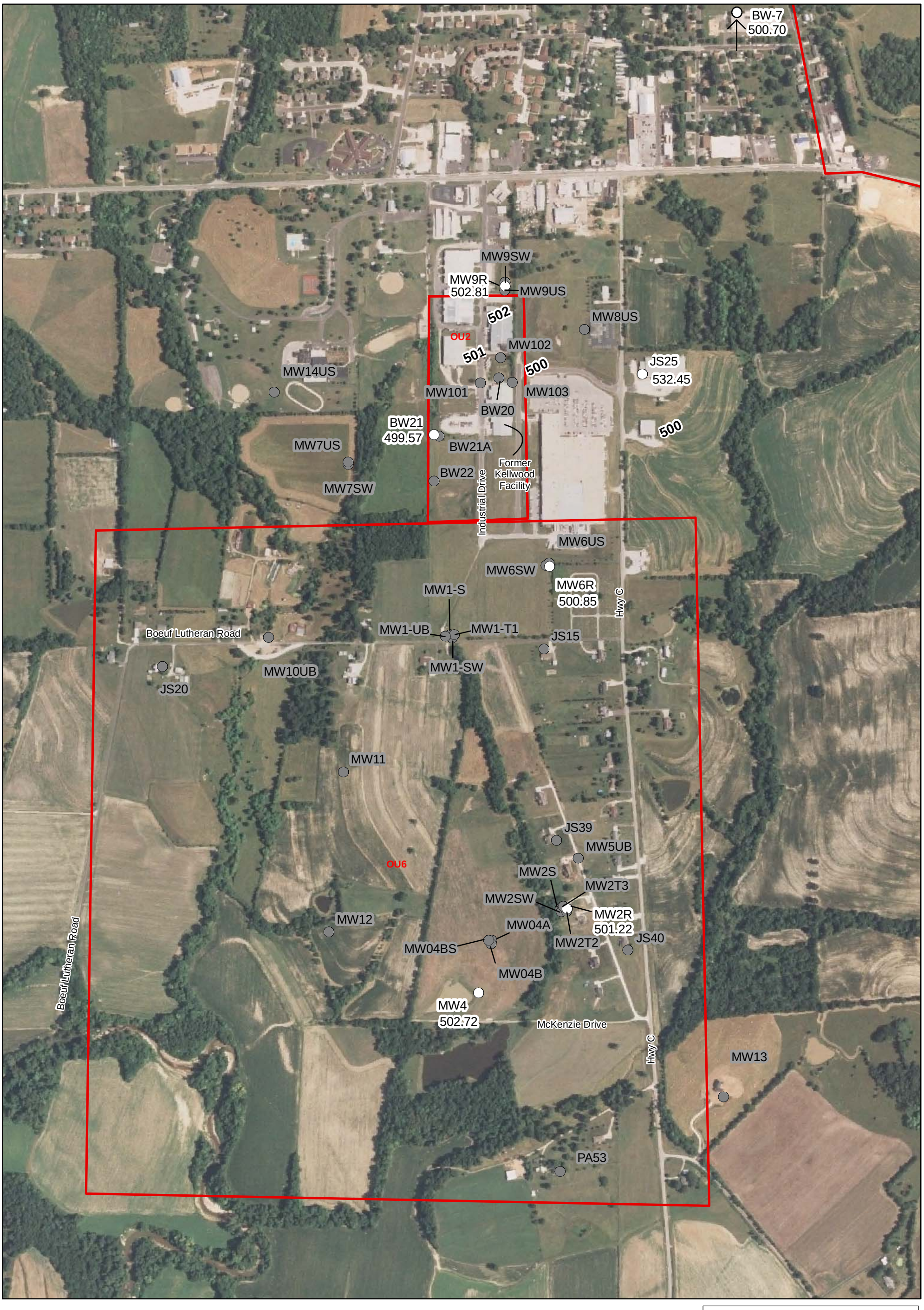
PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202



N
W E
S

0 125 250 500 750 1,000
Feet

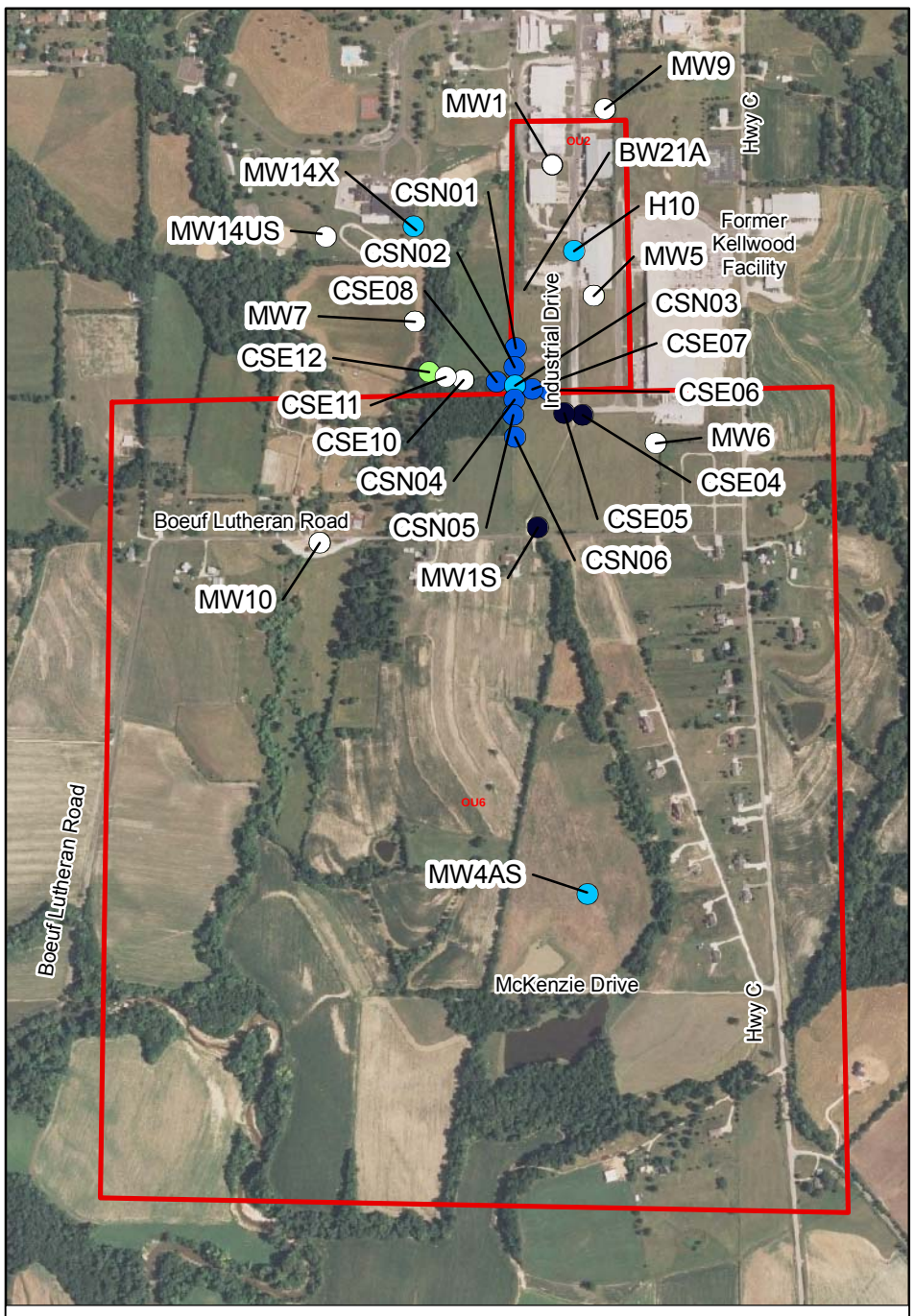
\\moche01fs01\Restoration\New Haven - Kellwood OU2\Cadd\Figures\contour figures\Figure4.2c water level contour map.mxd

FIGURE 4.2c

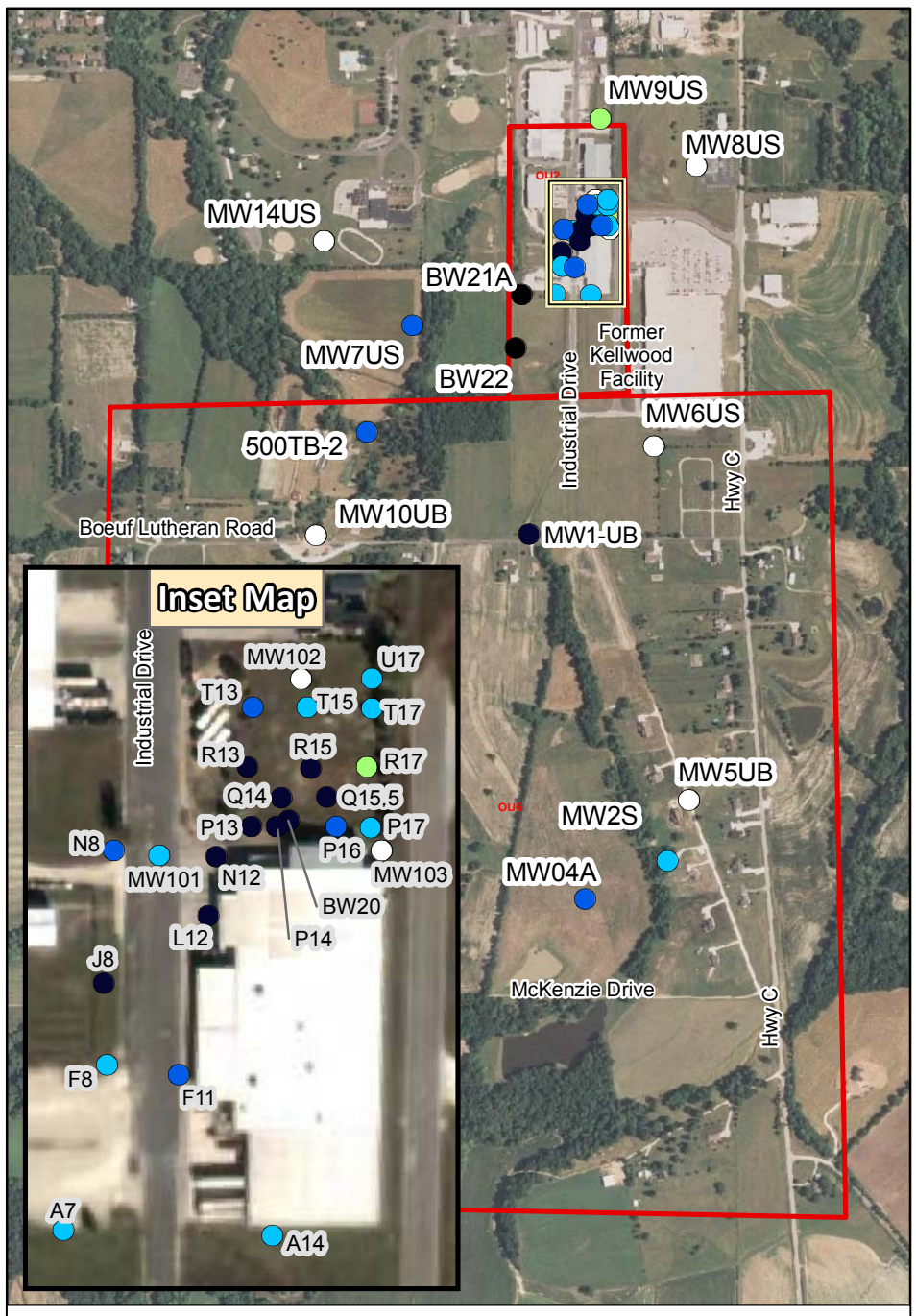
Water Level Elevations
Roubidoux Formation
September 1, 2009

Riverfront Superfund Site OU2/6
New Haven, Missouri

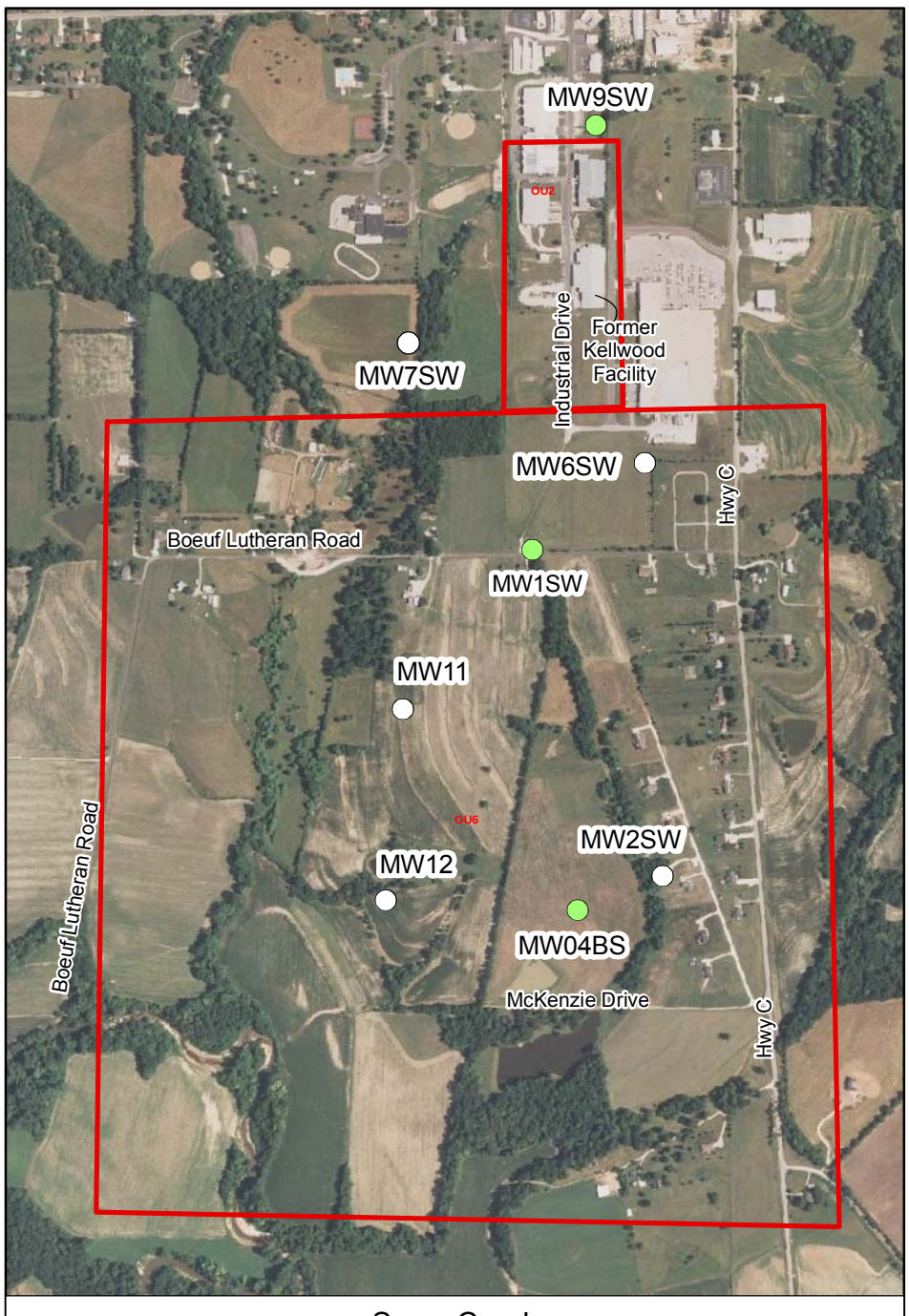
PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202



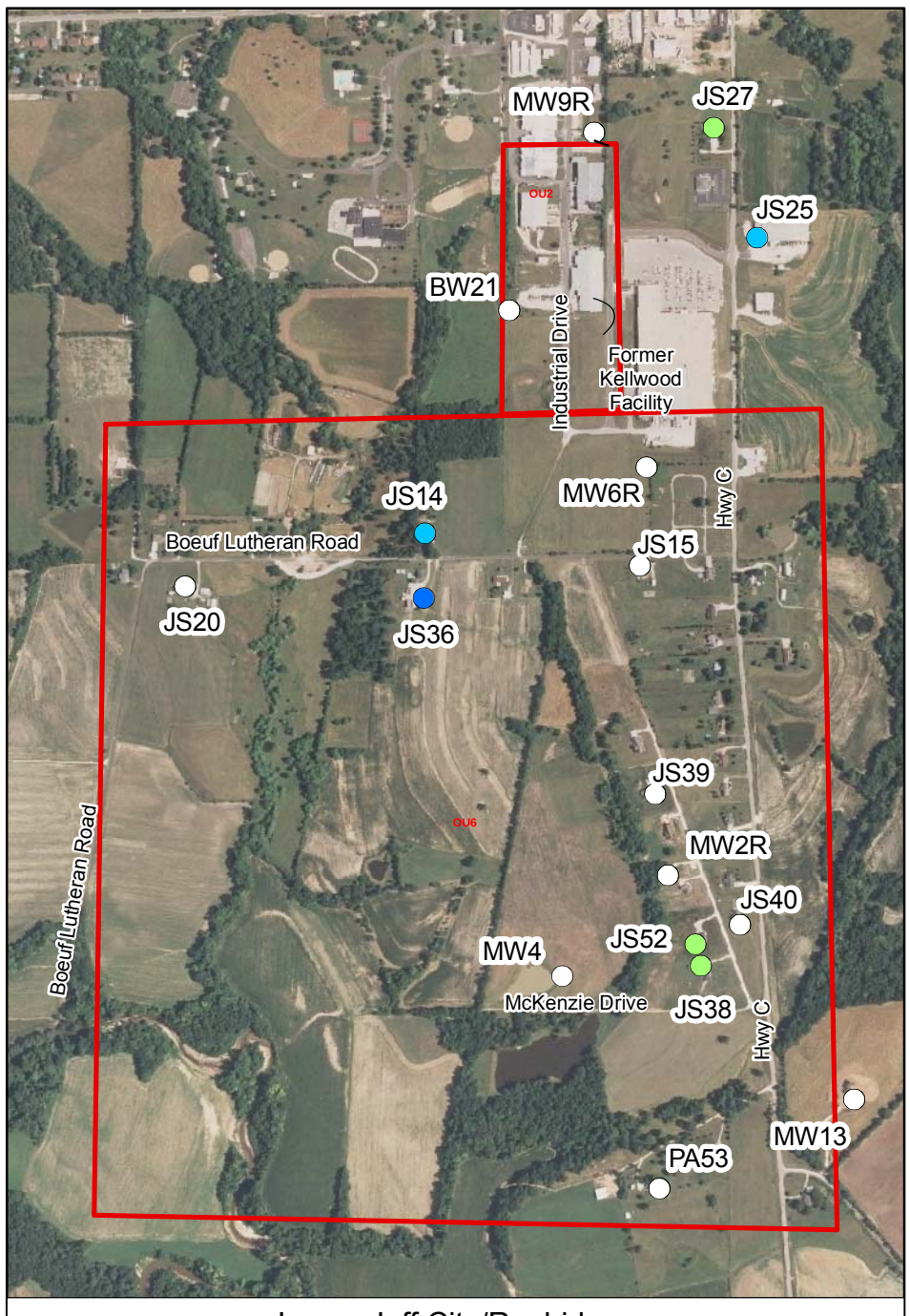
Unconsolidated



Upper Sandstone Marker Bed / Upper Bedrock Permeable Zone



Swan Creek



Lower Jeff City/Roubidoux

N
W E
S

0 750 1,500 2,250 3,000 Feet

- Not Detected
- < 5 µg/L (MCL)
- 5 - 100 µg/L
- > 100 - 1,000 µg/L
- > 1,000 µg/L

Screening Criteria: USEPA MCLs or Missouri Default Target Levels for Water

Figure 4.3

Distribution of PCE in Primary Transmissive Zones

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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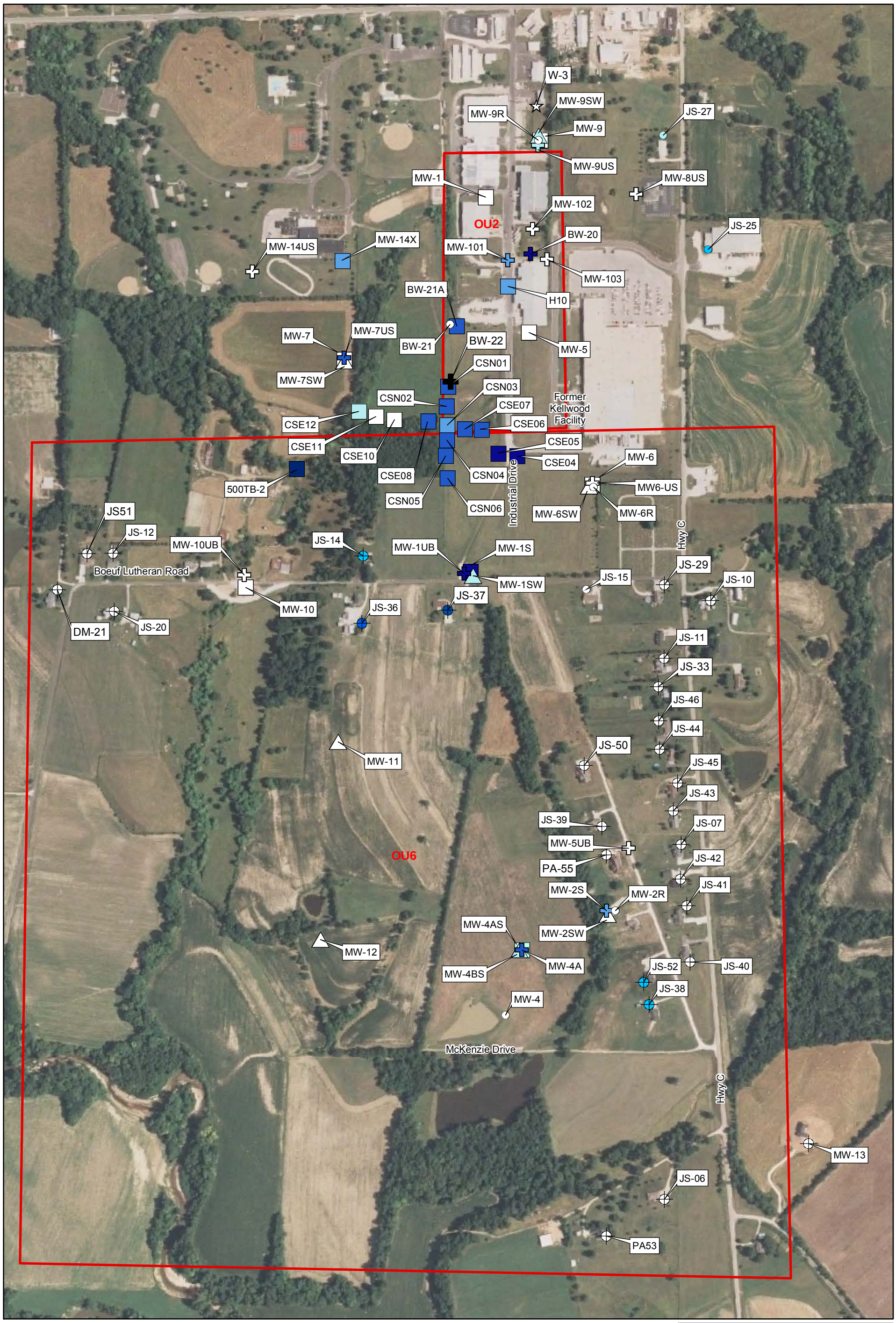

Residential Well

Zones

- Overburden
- Swan Creek
- Upper Sandstone Marker Bed / Upper Most Bedrock
- Lower Jefferson City/Roubidoux
- Gasconade and Lower

- Not Detected
- < 5 µg/L (MCL)
- 5 - 100 µg/L
- > 100 - 1,000 µg/L
- > 1,000 µg/L

Screening Criteria: USEPA MCLs or Missouri Default Target Levels for Water

FIGURE 4.4

Distribution of PCE in Groundwater, All Zones

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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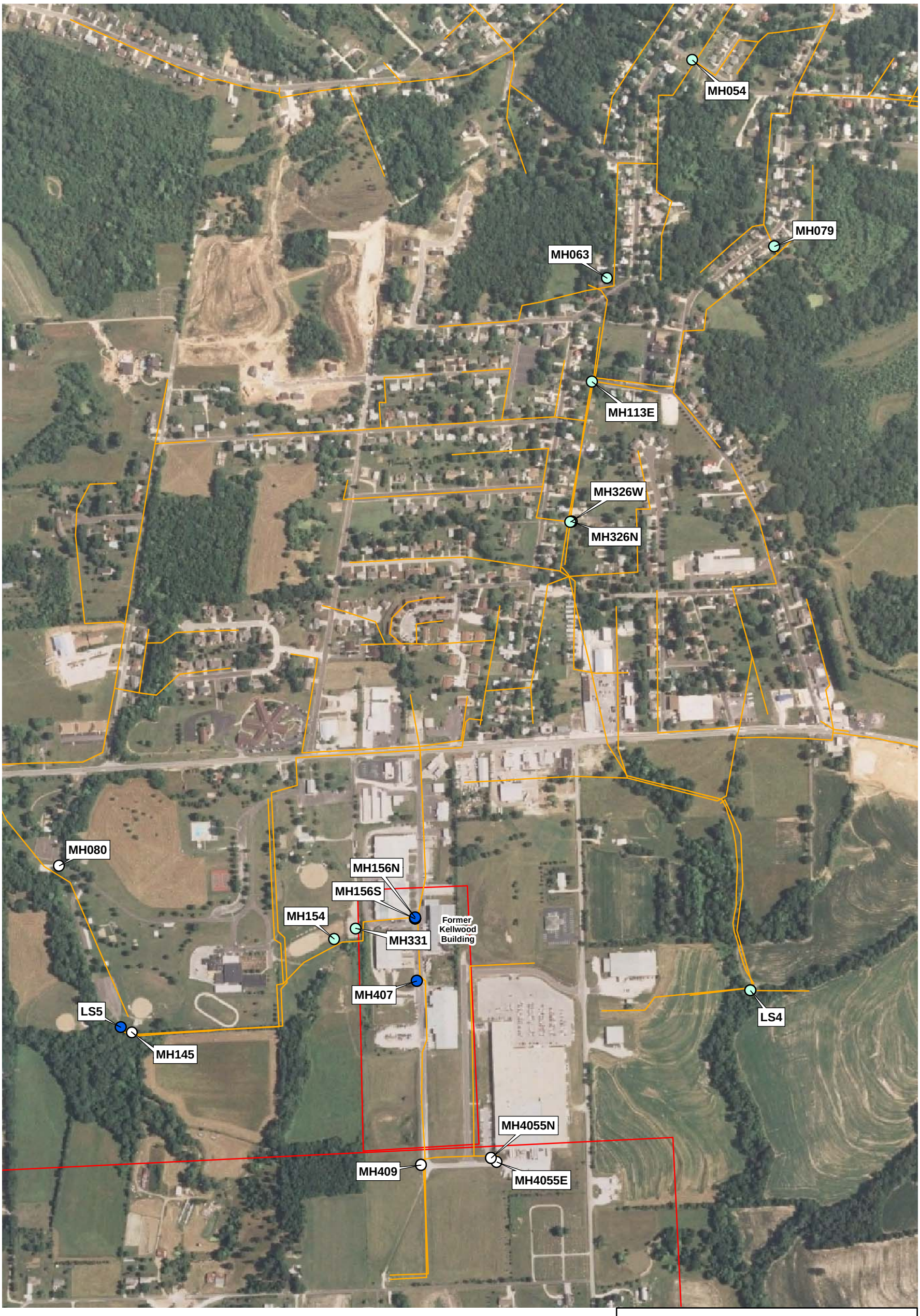


Legend

- Not Detected
- PCE <5 PPB
- PCE >5 PPB
- OU Boundary

N
W E
S

0 250 500 1,000 1,500 2,000 Feet

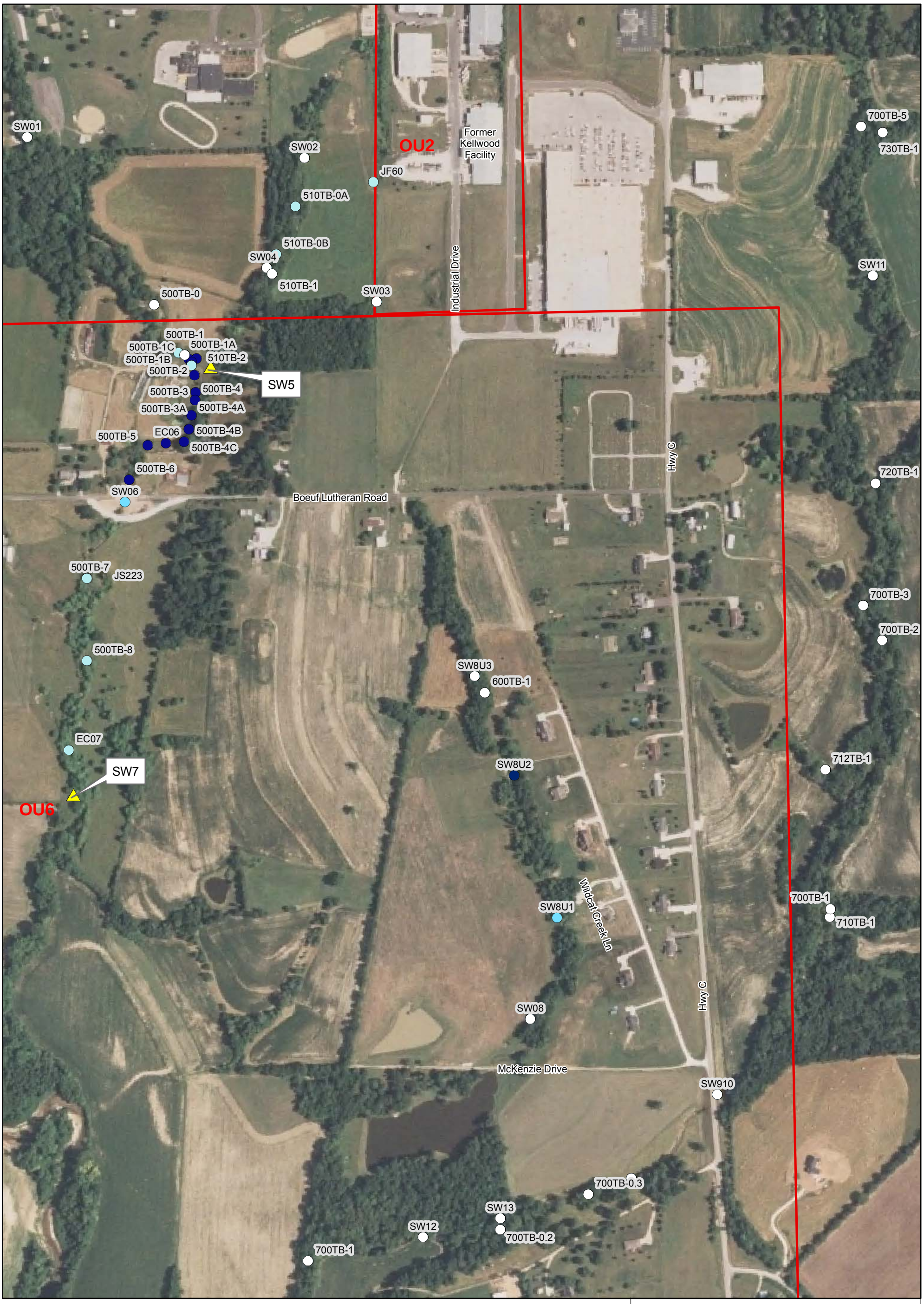
Sources:
1. OU1/OU3 RI Report (USEPA, 2003)
2. USGS Tables (GC summary7-geotechnology.xls and lab-sample-log.xls)

FIGURE 4.5

Distribution of Chemicals of Potential Concern in Sanitary Sewer Water, All Data
Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS

40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202



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N
W E
S

Screening Criteria: Lower of Missouri human health (non-drinking) level and USEPA Region 3 eclological benchmark

0 125 250 500 750 1,000
Feet

- Not Detected
- < 5 µg/L (MCL)
- 5 - 111 µg/L
- Access Denied

FIGURE 4.6

Distribution of Chemicals of Potential Concern in Surface Water, All Data

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

TABLES

TABLE 2.1
GEOLOGIC UNITS OF THE OZARK AQUIFER
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

System	Formation	Approximate Thickness (Feet)	General Lithology	General Hydrologic Properties
Ordovician	St. Peter Sandstone	Less than 40	Fine-grained cemented quartz sandstone.	Yields of 10 to 50 gpm where moderately thick.
	Powell Dolomite	0 to 95	Difficult to differentiate. Crystalline cherty dolostone with abundant thin shale partings and occasional thin sandstone beds. Thicker (2 to 10 feet thick) sandstone beds in Cotter. Within the Cotter, the upper sandstone marker bed and the Swan Creek sandstone member are important marker horizons and are laterally persistent.	Adequate for small domestic supply. Yields of 5 to 15 gpm locally. Less permeable than surrounding units and impedes downward water movement. Within the Cotter, the upper sandstone marker bed and the Swan Creek sandstone member are laterally persistent permeable zones.
	Cotter Dolomite	85 to 300		
	Jefferson City Dolomite	150 to 165		
	Roubidoux Formation	110 to 120	Cherty, sandy dolostone. Middle 20 to 30 feet is clean sandstone.	Normal yields of 15 to 50 gpm. Target unit for newer domestic wells.
	Upper Gasconade Dolomite	35 to 50	Massively bedded, crystalline dolostone.	Lower permeability than surrounding units.
	Lower Gasconade Dolomite	200 to 240	Cherty dolostone with massive chert beds.	Combined yields of upper and lower units range from 50 to 75 gpm.
	Gunter Sandstone Member of Gasconade Dolomite	35 to 50	Dolostone with less than 10 percent sand.	Normal yield of 40 to 50 gpm, but 200 to 500 gpm locally.
Cambrian	Eminence Dolomite	145 to 180	Crystalline dolostone with less than 5 percent chert and sand.	Yields of 75 to 250 gpm.
	Potosi Dolomite	Greater than 170	Crystalline dolostone with abundant small solution cavities and quartz druse.	Target zone of most high capacity wells. Yields 200 to 1,000 gpm.

Notes:
Table reproduced from Focused Remedial Investigation of OU1 and OU3, January 2003.
gpm - gallons per minute

TABLE 2.2
CHRONOLOGICAL HISTORY OF INVESTIGATIONS AT OU2 AND OU6
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Date	Activity
Mid -1970	*Former Kellwood Facility developed*
1973	*Kellwood company began operating tube mill*
September, 1985	*Kellwood operations ceased*
September, 1989	*MDNR performed an investigation of the New Haven Public Water Supply Site*
June 12, 1990	*State of Missouri informed American Recreation Products (ARP) and Kellwood Company of former employees statement of cleaning solvent dumping*
1988-1993	*MDNR performed groundwater investigation of Municipal Well 3 and Pepsi Well*
1991-1998	*Geotechnology submitted a Final Contamination Delineation Plan for Metalcraft Enterprises Facility to MDNR*
April 1, 1994	*Kellwood and MDNR entered into agreement to remediate soils*
1994-1996	*Geotechnology excavated highly contaminated soil, initiated and performed landfarming*
1999	*Environmental Management Associates performed Phase I and Phase II environmental site assessment*
1999-2002	*United State Geological Survey (USGS) installed groundwater monitoring wells, and collected soil, groundwater, residential well, sediment, surface water, and tree core samples in the vicinity of the Former Kellwood Facility*
October 19, 2000	*Riverfront Site listed as a Federal NPL or Superfund site*
2000 - 2007	*USGS and Black and Veatch performed Soil, Residential well and Groundwater Investigation throughout all Operable Units*
May 17, 2004	Draft RI/FS Work Plan submitted to USEPA
June 3, 2004	Draft Residential Well Investigation Work Plan submitted to USEPA
July 21, 2004	Final Expedited Residential Well Investigation Work Plan submitted to USEPA
Week of July 12, 2004	Surface geophysics portion of the Expedited Residential Well Investigation was completed
July 26 and August 16, 2004	Residential sampling portion of the Expedited Residential Well Investigation was performed
Week of July 16, 2004	Interval Screening portion of the Expedited Residential Well Investigation (consisting of borehole geophysics and groundwater sampling at several discrete intervals at the Vedder and Laune wells) was performed
August 30, 2004	Letter responding to EPA's comments on the draft RI/FS Work Plan was submitted
September - November 2004	Monitoring well installation portion of the Expedited Residential Well Investigation was completed
September 14, 2004	Submitted the Interval Screening Report for JS-37 and JS-38
September 30, 2004	Revisions to Standard Operating Procedure No. 9, the SOP describing Volatile Organics Analysis in Groundwater using a Portable Gas Chromatograph with Photoionization Detector, were submitted
October 14, 2004	Residential Well Sampling Memo submitted to USEPA
week of November 29th-December 13th, 2004	Monitoring well development (MW1 and 2 clusters) and sampling were conducted
January - July 2005	Amanda Farms pilot well installation and sampling were conducted
Week of January 31, 2005	Second round of monitoring well sampling at MW-1 and MW-2 clusters was conducted
February 10, 2005	Monitoring Well Sampling Memo submitted
February 23, 2005	Revised RI/FS Work Plan for OU2 was submitted
February 1, 2005	Video inspection of MW2-T3 was performed
February 1, 2005	Surface water in the vicinity of MW-1 was sampled at MDNR's request
February 4, 2005	During the second round of groundwater monitoring, well MW2-T3 was sampled for selected inorganic parameters on February 4, 2005, to evaluate the high turbidity noted in this well and to determine the viability of the well.

TABLE 2.2
CHRONOLOGICAL HISTORY OF INVESTIGATIONS AT OU2 AND OU6
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Date	Activity
April 27, 2005	Revised Final Residential Well Investigation (RWI) Work Plan was submitted
April 29, 2005	Draft RWI Report was submitted to USEPA
May 26, 2005	Final OU2 RI/FS Work Plan was submitted
July 7 - July 27, 2005	Amanda Farms Well Investigation Memorandum Report , response to comments, and revised report were submitted
July 25, 2005	A variance request was submitted to the MDNR to enable Mr. Tom Barkley to convert the Amanda Farms pilot monitoring well (AF01) into a permanent residential (domestic) water well (MW-13)
September 23, 2005	Submitted a workplan outlining the voluntary installation of the proposed domestic wells to be installed at 539 Wildcat Creek Lane and 559 Wildcat Creek Lane to the MDNR. The work plan, entitled Wildcat Creek Domestic Well Installation Work Plan, presents the activities that Kellwood is proposing to perform to facilitate the voluntary installation of the requested domestic water wells
October 28, 2005	Submitted Response to Comments and Redline text of the Final Remedial Investigation/Feasibility Study Work Plan to USEPA
November 29, 2005	Submitted a redline version of the revised Wildcat Creek Domestic Well Installation Work Plan detailing the proposed confirmation sampling of the MW2 monitoring well cluster, including interconnectivity evaluation
November 30, 2005	*USEPA/MDNR representatives informed Parsons, for the first time, that the Benson and Carlin wells would not be approved for installation.*
December 12, 2005	Received final comments on the RI work plan via e-mail
January 18, 2006	Submitted the Final RI/FS Work Plan and response to USEPA's comments
January 24, 2006	Submitted the PA-54 Residential Well Investigation Report (Burt Well Report)
February 2, 2006	*USEPA approved Revised Final RI/FS Work Plan and Revised Final Conceptual Exposure Pathway Analysis*
February 22, 2006	Task 2a - Submitted a technical memorandum summarizing the proposed approach to conduct interval screening of two existing residential wells, JS-14 and JS-36 as a part of the proposed RI/FS at OU2 of the Riverfront Superfund site.
February 28, 2006	Collected the final groundwater sample from AF-01, converted to a domestic well (MW-13), in accordance with the requirements stated in the Final Amanda Farms Well Investigation Memorandum Report, dated July 27, 2005.
March 6, 2006	Submitted draft Sampling Analysis Plan (SAP) consisting of the Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP) for the OU2/OU6 RI/FS
March 14, 2006	Submitted a response to comments letter to address questions/comments on the Draft QAPP raised by Ms. Diane Harris, Regional Quality Assurance Manager, USEPA Region 7, in a conference call on March 13, 2006
March 22, 2006	Task 2a - Submitted via email, a revised interval screening study (Study) memorandum, incorporating comments from USEPA, and summarizing the proposed approach to conduct this Study
April 3 through 7, 2006	Task 2a - Performed Interval Screening Activities at JS-14 and JS-36 as a part of expedited RI/FS activities
July 10, 2006	Submitted Final SAP
July 11, 2006	*USEPA provided additional comments on Final SAP*
July 14, 2006	Parsons provides responses on USEPA's comments on the Final SAP
July 18, 2006	*USEPA approved Final SAP*
August 14, 2006	Task 2a - Parsons submitted draft interval screening report summarizing the methodology and findings of the April 2006 interval screening study of JS-14 and JS-36
September 1, 2006	USEPA, Kellwood, and Parsons discussed the possible installation of domestic wells in Wildcat Creek Estates

TABLE 2.2
CHRONOLOGICAL HISTORY OF INVESTIGATIONS AT OU2 AND OU6
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Date	Activity
September 2006	Parsons discussed the modeling goals with MDNR and ran AQTESOLV modeling scenarios. The modeling effort was not meaningful and Parsons determined AQTESOLV is not a proper modeling technique. Parsons evaluated other modeling options and suggested the use of MODFLOW to the USGS.
	Began the pre-field (intrusive) investigation of the sewers on September 25, 2006, meeting with the City of New Haven Public Works Director, Mr. Julius Gatzemeyer, to review engineering drawings and discussing the sewer flow patterns.
October 12, 2006	Submitted a letter summarizing the discussion with Mr. Julius Gatzemeyer (City of New Haven Utilities Department) regarding the portions of the City sewer system covered by the Final RI/FS Work Plan, approved February 2, 2006 (RI/FS Work Plan)
Week of November 6, 2006	Conducted an aquifer test and re-sampling event for the MW2 cluster
December 12, 2006	Submitted a draft letter report summarizing (1) the results of an aquifer test and groundwater sampling performed at the Wildcat Creek subdivision on the MW-2 cluster on November 6 through 8, 2006, (2) Modeling results obtained from WATQ, an aquifer simulation and pumping test interpretation program described in the USGS Water Resources Investigation Report 99-4225, and (3) Methodology to conduct an aquifer test at MW2 to evaluate the potential for vertical connectivity between the Roubidoux Formation and overlying transmissive zones in the Jefferson City Dolomite
January 2, 2007	Requested approval of the installation of domestic wells in Wildcat Creek Estates from MDNR with concurrence from the City of New Haven and the USEPA
January 10, 2007	Provided USEPA with the Final Wildcat Creek Well Installation Work Plan, addressing comments from USEPA, MDNR, and USGS
January 16, 2007	*MDNR approves plan to convert monitoring well MW2R to a domestic supply well for the residence at 559 Wildcat Creek Lane*
January 18, 2007	Task 5 - Submitted a letter to the USEPA to document modifications to the sewer investigation discussed in the January 4, 2007 teleconference
January 18, 2007	*Task 2a - Received comments on the August 2006 Interval Sampling Report for JS-14/JS-36*
January 22, 2007	*Received approval from the USEPA on the January 10, 2007 Final Wildcat Creek Well Installation Work Plan*
January 25, 2007	*Received an approval letter from the USEPA on the January 18, 2007 Sewer Investigation letter*
January 29, 2007	MW2R was converted to a domestic supply well
January 29, 2007	Parsons, USEPA, MDNR, and USGS participated in a meeting with the property owners to discuss the proposed monitoring wells locations (for the remedial investigation) and associated access issues
February 6, 2007	Kellwood, Bryan Cave (legal counsel for Kellwood on the Riverfront Superfund Site, OU 2/6), Parsons, and USEPA participated in a meeting with the City of New Haven to discuss the specifics of the potential water main extension and access issues for the RI
February 26, 2007	Second (and final) round of sampling was performed at MW2R
March 5, 2007	To expedite resolving access issues associated with OU6, Kellwood submitted a written proposal to the City of New Haven regarding the extension of public water to the affected residences
April 3, 2007	*Received approval from Mrs. Benson's attorney to proceed with the proposed domestic well installation at 539 Wildcat Creek Lane*

TABLE 2.2
CHRONOLOGICAL HISTORY OF INVESTIGATIONS AT OU2 AND OU6
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Date	Activity
April 16, 2007	*Received comments from the USEPA on the March 2007 monthly progress report. The letter requested that an attempt be made to pursue selected tasks (Soil Investigation, Dense Non-Aqueous Phase Liquid [DNAPL] Investigation, Surface water and Sediment Sampling, and Sanitary Sewer Inspection and Sampling) of the remedial investigation at OU 2/6*
April 25, 2007	*Bryan Cave received an approval on the access request from the City of New Haven to proceed with the proposed Soil and DNAPL Investigation on the City of New Haven property (in the vicinity of the Former Kellwood Facility). According to the City of New Haven, the City's property was not implicated in the Surface Water and Sediment Sampling. Based on additional correspondence on April 25, 2007 between Bryan Cave and the City of New Haven, it was determined that further discussions between the City and Parsons are warranted for an approval on the proposed Sanitary Sewer Inspection and Sampling.*
April 25, 2007	Submitted an access request to Tubular Steel Inc. (TSI)/Metalcraft, current owner of the Former Kellwood Facility, to proceed with select aspects of the Soil Investigation and DNAPL Investigation at the Former Kellwood Facility
May 3, 2007	Parsons met with Steve Roth and Julius Gatzemeyer, City of New Haven, to further discuss the specifics of the proposed Sanitary Sewer Inspection and Sampling. Parsons was informed that additional review and discussions in the City Council meeting (scheduled for the second week of June 2007) were warranted before access is approved.
May 1, 2007	Contacted selected residents to seek access for the Surface water and Sediment Sampling at OU 2/6.
May 27 - July 9, 2007	Completed the domestic well installation (PA-55)
July 2007 to May 2008	Task 3 - Completed DNAPL Investigation including 22 core holes and core hole abandonment
August 23, 2007	Conducted second round of post-installation sampling at PA-55
September 2007 - June 2008	Task 1- Completed soil investigation including advancing 42 direct push borings
September 2007 - May 2008	Task 5 - Completed sewer investigation including: a video survey of the sewer segment immediately downstream of the former Kellwood facility, advancing 11 DPT borings along sewer segments north of Highway 100, advancing 5 DPT borings adjacent to potential sewer defects, collection of 7 sewer water samples, and collection of 5 sewer sediment samples
October 18, 2007	Submitted the Second Round of Domestic Well Sampling Report (conducted at PA-55)
December 5, 2007	In light of access issues related to the Groundwater and Sediment and Surface Water Investigations, submitted to USEPA to pursue these investigations at alternate locations (where possible)
December 19, 2007	Submitted a response to USEPA's October 29, 2007 comments letter on the October 18, 2007 Second Round Domestic Well Sampling Report for PA-55 in the Wildcat Creek Estates.
January 2, 2008	*Received an approval letter from the USEPA on the Second Round Domestic Well Sampling Report for PA-55. USEPA suggested that in addition to the groundwater samples (at PA-55) proposed (in order to better understand the form and thereby fate of iron in groundwater at PA-55) in the December 19, 2007 letter, a minimum of two additional background samples be collected from wells near PA-55, which are screened at the same interval as PA-55.*
February 2008 - May 2008	Task 2c - Residential Well Sampling was conducted from 38 wells
February 28, 2008	Collected the groundwater samples proposed in the December 19, 2007 response to comments on the Second Round Domestic Well Sampling Report for PA-55.

TABLE 2.2
CHRONOLOGICAL HISTORY OF INVESTIGATIONS AT OU2 AND OU6
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Date	Activity
March 2008 - Present	Conducted quarterly DNAPL recovery efforts at BW-20 and L-12.
April - May 2008	Task 2a - Interval screening efforts at JS-36 and liner installation at JS-14 and JS-36
May 2008 - September 2009	Task 2d - Monitoring Well Installation; Parsons installed 13 new monitoring wells, 5 wells installed and sampled by USGS
May 2008 and April 2009	Task 2b - Direct Push Borings North of Boeuf Lutheran Road, advanced 18 DPT borings to refusal
June 9, 2008	Submitted to USEPA a report summarizing the findings of the Benson well iron issue investigation in response to January 2, 2008 request from EPA
July 21, 2008	Task 2a - Submitted (via email) a draft of the revised Interval Screening Report (JS-14 and JS-36) for USEPA's review
August 2008 - August 2009	Task 4 - Collected sediment and surface water samples where access was available
February - March, 2009	Task 2f - Slug testing was conducted at 16 Parsons' installed monitoring wells
March 2009 - September 30, 2009	Task 2e - Sitewide Groundwater Sampling Round 1; Note that selected wells were sampled by USGS
June 18, 2009	Conducted a video survey of JS-25 (Beaver Brand Hats, located east of Highway C) on June 18, 2009 to evaluate the length and condition of the well casing
July - August 2009	Task 2f - Aquifer testing was conducted at selected monitoring wells and the City Wells 3 and 4
August 4, 2009	Task 11 - Submitted the soil vapor sampling work plan (near the New Haven High School) to USEPA
September 2, 2009	Task 2g - Completed surveying of the final monitoring well locations
September 8 and September 14, 2009	Task 11 - Completed soil vapor sampling activities (in the August 25, 2009 revised work plan) at the New Haven High School

Notes:
Text in italics represents work performed by others (other than Parsons)
To accommodate the proposed RI/FS schedule, selected reports/memoranda
(Task 6a – Preliminary Site Characterization Report, Task 6b – Fate and Transport Memorandum, Task 6d – Data Analysis Technical Memorandum, Task 6f – Candidate Technologies Technical Memorandum) were eliminated.
Instead, these components were included directly in the RI Report

TABLE 2.3
HISTORIC SOIL SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Name	Date Collected	Depth Interval (feet bgs)	PCE	TCE	cis-DCE	trans-DCE	VC	Toluene	Benzene
Laboratory Analysis									
MW-2[1]	7/15/99	0-3	**339,000**	**2,100**	**5,620**	---	---	---	---
OU2-SO-G01	2/20/01	0-1	<6.0	<6.0	<3.0	<3.0	<12	<6.0	<6.0
OU2-SO-G02	2/20/01	0-1	<6.0	<6.0	<3.0	<3.0	<12	<6.0	<6.0
OU2-SO-G03	2/20/01	0-1.5	**3,300 Q**	<310	<150	<150	<620	<310	<310
OU2-SO-G04	2/20/01	0-2	<5.9	<5.9	<3.0	<3.0	<12	<5.9	<5.9
OU2-SO-G05	2/20/01	0-2	<6.0	<6.0	<3.0	<3.0	<12	<6.0	<6.0
OUX-SO-EC06	3/14/02	0-0.5	<6.3	<6.3	<3.2	<3.2	<13	<6.3	<6.3
OUX-SO-EC07	3/14/02	0-0.5	<6.2	<6.2	<3.1	<3.1	<13	<6.2	<6.2
OUX-SO-EC08	3/14/02	0-0.5	<6.4	<6.4	<3.2	<3.2	<13	<6.4	<6.4
OUX-SO-EC09	3/14/02	0-0.5	<6.5	<6.5	<3.2	<3.2	<13	<6.5	<6.5
Field GC Analysis									
OU2-G01	2/20/01	0-1.5	**0.31**	0	0	**0.07**	0	---	**0.49**
OU2-G02	2/20/01	0-1	**0.07**	0	0	**0.03**	0	---	**0.05**
OU2-G03	2/20/01	0-1.5	**14,226**	**12.68**	**21.46**	**0.12**	0	---	**9.74**
OU2-G03 (DUP)	2/20/01	0-1.5	**17,610**	**2.4**	**2.3**	0	0	---	**4.5**
OU2-G04	2/20/01	0-2	**2,223.6**	**10.74**	**8.05**	0	0	---	**1.81**
OU2-G04 (DUP)	2/20/01	0-2	**5,280**	**30.8**	**2**	0	0	---	0
OU2-G05	2/20/01	0-2	**21.3**	0	0	0	0	---	**0.6**
OU2-BW-21A	3/8/01	5	**0.2**	0	0	0	0	---	**2.73**
OU2-BW-21A	3/8/01	10	0.0	0	**17**	0	0	---	0
OU2-BW-21A (DUP)	3/8/01	10	0.0	0	**0.73**	0	0	---	**0.22**
OU2-BW-21A	3/23/01	30	**6.2**	**3.31**	**8.32**	**0.05**	0	---	**4.95**
OU2-GPM01	10/22/01	3	0.0	0	0	0	0	---	0
OU2-GPM01	10/22/01	5.5	0.0	0	0	0	0	---	0
OU2-GPM01 (DUP)	10/22/01	18.5	0.0	0	0	0	0	---	0
OU2-GPM01	10/23/01	23.5	0.0	0	0	0	0	---	0
OU2-GPM01 (DUP)	10/23/01	31	0.0	0	0	0	0	---	**17.24**
OU2-GPM01 (DUP)	10/23/01	39	**24.8**	0	0	0	0	---	0

Notes:
Data for USGS samples are from USGS Lab Sample Log and Field GC Log unless noted
[1] - Data for MW-2 are from Pre-Acquistion ESA, Phase I and Limited Phase II Investigation Report, EMA, December 1999.
Results in ug/kg
Dup-Duplicate Sample
"---" Sample was not analyzed for this compound, or results are unknown
DCE - Dichloroethene
PCE - Tetrachloroethene
TCE - Trichloroethene
VC - Vinyl Chloride
Q - Sample was diluted

TABLE 2.4
U.S. GEOLOGICAL SUVEY MONITORING WELL CONSTRUCTION
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Well Name	Completion Type	Altitude of Measuring Point (feet msl)	Top of Monitoring Interval (feet bls)	Bottom of Monitoring Interval (feet bls)	Uppermost Producing Formation	Lowermost Producing Formation
BW-04	Open Hole	575.5	242.5	425	Cotter	Jeff City
BW-07	Open Hole	674.05	338.5	530	JC	Rbdx
BW-20	Open Hole	603.5	10	20	Cotter	Cotter
BW-21	Open Hole	584.63	374.5	440	Rbdx	Rbdx
BW-21A	Screen	585.34	43	52.4	Overburden	Cotter
BW-22	Open Hole	579.12	160	260	Cotter	Jeff City

TABLE 2.5
HISTORICAL GROUNDWATER SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Name	Collection Date	Screened Interval (feet bgs)	Laboratory or Field GC Analysis	PCE (µg/L)	TCE (µg/L)	cis-DCE (µg/L)	trans-DCE (µg/L)	Vinyl Chloride (µg/L)	Toluene (µg/L)	Benzene (µg/L)
Public Supply Well										
OUX-W3	3/22/1999	525-885	Field GC	ND	ND	ND	ND	ND	--	ND
City Well #3*	5/31/2000	525-885	Laboratory	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	--
OUX-W3	5/31/2000	525-885	Field GC	ND	ND	ND	ND	ND	--	ND
City Well #3*	11/13/2000	525-885	Laboratory	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--
City Well #3*	01/24/01	525-885	Laboratory	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--
OUX-W3	1/24/2001	525-885	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-GW-W3	06/06/01	525-885	Laboratory	<1	<1	<1	<1	<1	<1	<1
OUX-GW-W3	09/05/01	525-885	Laboratory	<1	<1	<1	<1	<1	<1	<1
OUX-GW-W3	08/01/02	525-885	Laboratory	<1	<1	<1	<.5	<2	<1	<1
OUX-GW-W3	08/16/02	525-885	Laboratory	<0.03	<0.04	<0.04	<0.03	<0.11	<0.05	<0.04
OUX-GW-W3	07/16/99	525-885	Laboratory	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1
OUX-GW-W3	05/31/00	525-885	Laboratory	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1
OUX-GW-W3	11/13/00	525-885	Laboratory	<1	<1	<1	<1	<1	<1	<1
OUX-W3	6/6/2001	525-885	Field GC	ND	ND	**0.12**	ND	ND	--	ND
OUX-GW-W3**	12/16/03	525-885	Laboratory	<5	<5	<5	<5	<5	<5	<5
Monitoring Wells										
OU2-BW-20	4/9/2001	3-10	Field GC	**1.4**	ND	**8.62**	ND	ND	--	**5.33**
OU2-BW-20	4/13/2001	3-10	Field GC	**59,480**	**48.8**	**0.65**	ND	ND	--	**0.85**
OU2-GW-BW-20	04/17/01	10-20	Laboratory	**200,000**	<5,000	<5,000	<2,500	<10,000	<5,000	<5,000
OU2-BW-20	4/18/2001	10-20	Field GC	**44.5**	**0.3**	**1.2**	**0.07**	ND	--	ND
OU2-GW-BW-20***	05/22/01	10-20	Laboratory	**1,400,000**	<40,000	<40,000	<20,000	<80,000	<40,000	<40,000
OU2-BW-21	1/10/2001	0-59	Field GC	**77.3**	**11.4**	**1.97**	ND	ND	--	ND
OU2-BW-21	1/10/2001	59-100	Field GC	**1,187**	**136.8**	**18.82**	**1.39**	ND	--	**8.03**
OU2-BW-21	1/31/2001	59-100	Field GC	ND	ND	ND	ND	ND	--	**0.7**
OU2-BW-21	5/31/2001	374.5-440	Field GC	**0.02**	ND	**0.04**	**3.03**	ND	--	ND
OU2-BW-21	5/31/2001	374.5-440	Field GC	**0.01**	ND	**0.16**	**1.85**	ND	--	ND
OU2-BW-21	5/31/2001	374.5-440	Field GC	**0.02**	ND	ND	ND	ND	--	ND
OU2-BW-21	8/21/2001	374.5-440	Field GC	ND	ND	ND	ND	ND	--	ND
OU2-BW-21	7/30/2002	374.5-440	Field GC	ND	ND	ND	ND	ND	--	ND
OU2-GW-BW-21***	05/31/01	374.5-440	Laboratory	<1	<1	<1	<1	<1	<1	<1
OU2-GW-BW-21	08/21/01	374.5-440	Laboratory	<1	<1	<1	<1	<1	<1	<1
OU2-GW-BW-21	07/30/02	374.5-440	Laboratory	<1	<1	<1	<.5	<2	<1	<1
OU2-BW-21A	3/20/2001	0-8	Field GC	ND	ND	ND	ND	ND	--	ND
OU2-GW-BW-21A***	06/11/01	43-52.4	Laboratory	**1,000**	**160**	**28 J**	<25	<100	<50	<50
OU2-GW-BW-21A	08/21/01	43-52.4	Laboratory	**1,000**	**160**	**32J**	<25	<100	<50	<50

TABLE 2.5
HISTORICAL GROUNDWATER SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Name	Collection Date	Screened Interval (feet bgs)	Laboratory or Field GC Analysis	PCE (µg/L)	TCE (µg/L)	cis-DCE (µg/L)	trans-DCE (µg/L)	Vinyl Chloride (µg/L)	Toluene (µg/L)	Benzene (µg/L)
OU2-GW-BW-21A	07/30/02	43-52.4	Laboratory	**970**	**170**	**34**	<33	<33	<33	<33
OU2-BW-21A	7/30/2002	43-52.5	Field GC	**3,490**	**330**	**40**	**0.33**	ND	--	ND
OU2-BW-22	2/6/2001	66-105	Field GC	**808**	**53.6**	**13**	**0.72**	ND	--	**0.24**
OU2-BW-22	2/6/2001	66-126	Field GC	**1,170**	**70**	**50**	ND	ND	--	ND
OU2-BW-22	2/13/2001	60-160	Field GC	**389**	**11.4**	**10.25**	ND	ND	--	ND
OU2-BW-22	2/13/2001	80	Field GC	**256.95**	**5.54**	**3.39**	**0.02**	ND	--	**0.12**
OU2-BW-22	2/26/2001	160-260	Field GC	ND	ND	ND	ND	ND	--	**0.19**
OU2-BW-22	2/27/2001	160-260	Field GC	ND	ND	ND	ND	ND	--	ND
OU2-GW-BW-22***	05/29/01	180-260	Laboratory	<1	<1	<1	<1	<1	<1	<1
OU2-GW-BW-22	08/21/01	180-260	Laboratory	<1	<1	<1	<1	<1	<1	<1
OU2-GW-BW-22	07/30/02	180-260	Laboratory	<1	<1	<1	<.5	<2	**0.26 J**	<1
OU2-BW-22	7/30/2002	180-260	Field GC	ND	ND	ND	ND	ND	--	ND
OU2-GPM01	10/23/2001	0-41.75	Field GC	**2,989.5**	**353.1**	**144.75**	**16.45**	ND	--	ND
OU2-MW-101	1/15/2002	33.5-53.5	Field GC	**1.24**	ND	ND	ND	ND	--	ND
OU2-MW-101	1/15/2002	33.5-53.5	Field GC	**1.5**	ND	ND	ND	ND	--	ND
OU2-MW-101	7/31/2002	33.5-53.5	Field GC	**3.34**	ND	ND	ND	ND	--	ND
OU2-MW-102	1/15/2002	33-55	Field GC	ND	ND	ND	ND	ND	--	ND
OU2-MW-102	1/15/2002	33-55	Field GC	ND	ND	ND	ND	ND	--	ND
OU2-MW-102	1/15/2002	33-55	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-UNKNOWN WELL	11/14/2001	0-34.5	Field GC	ND	ND	ND	**0.02**	ND	--	ND
OU2-G05	2/22/2001	0-2	Field GC	**8.73**	**0.97**	**0.53**	ND	ND	--	**0.59**
OU2-G05	2/22/2001	0-2	Field GC	**7.76**	**3.47**	**8.26**	ND	ND	--	**2.05**
Residential Wells										
DM-01*	3/23/1999	123-250	Field GC	<0.1	<0.1	--	--	--	--	--
JS-03*	3/22/1999	52-330	Field GC	<0.1	**0.2**	--	--	--	--	--
JS-06*	3/22/1999	120-400	Field GC	<0.1	<0.1	--	--	--	--	--
DM-06*	3/23/1999	NA	Field GC	<0.1	**1.3**	--	--	--	--	--
JS-07*	3/22/1999	103-415	Field GC	<0.1	<0.1	--	--	--	--	--
JS-09*	3/24/1999	106-360	Field GC	<0.1	<0.1	--	--	--	--	--
JS-10*	3/24/1999	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-10	10/04/02	0	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-11*	03/24/99	NA	Field GC	<0.1	<0.1	--	--	--	--	--
JS-12*	3/24/1999	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-12	01/29/02	400	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-13*	3/24/1999	NA	Field GC	<0.1	<0.1	--	--	--	--	--
DM-14*	3/25/1999	NA	Field GC	<0.1	0.8	--	--	--	--	--

TABLE 2.5
HISTORICAL GROUNDWATER SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Name	Collection Date	Screened Interval (feet bgs)	Laboratory or Field GC Analysis	PCE (µg/L)	TCE (µg/L)	cis-DCE (µg/L)	trans-DCE (µg/L)	Vinyl Chloride (µg/L)	Toluene (µg/L)	Benzene (µg/L)
JS-14*	3/24/1999	NA	Field GC	**0.3**	<0.1	--	--	--	--	--
OUX-GW-JS-14	03/24/99	NA	Laboratory	**0.11 E**	<0.125	<0.125	<0.125	<0.25	<0.125	<0.125
OUX-GW-JS-14	01/16/02	NA	Laboratory	**1.4**	<1	<1	<1	<1	<1	<1
DM-15*	3/25/1999	109-290	Field GC	<0.1	<0.1	--	--	--	--	--
JS-15*	3/24/1999	120-425	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-15	01/29/02	120-425	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-16*	3/25/1999	50-395	Field GC	<0.1	**4**	--	--	--	--	--
JS-17*	3/25/1999	NA	Field GC	<0.1	<0.1	--	--	--	--	--
DM-17*	3/30/1999	273-520	Field GC	<0.1	<0.1	--	--	--	--	--
JS-20*	03/31/99	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-20	01/29/02	400	Laboratory	<1	<1	<1	<1	<1	<1	<1
DM-21*	3/31/1999	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-22***	12/5/2000	406-1155	Laboratory	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DM-23*	04/01/99	100-490	Field GC	<0.1	<0.1	--	--	--	--	--
JS-25*	8/26/1999	--	Field GC	<0.1	<0.1	--	--	--	--	--
JS-26*	2/4/2000	NA	Field GC	<0.1	<0.1	--	--	--	--	--
JS-27*	7/11/2000	NA	Field GC	<0.1	<0.1				--	
JS-29*	01/24/01	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-29	01/24/01	NA	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-33*	03/22/01	NA	Field GC	<0.1	<0.1	--	--	--	--	--
JS-35*	8/28/2001	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-35	08/28/01	NA	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-36*	11/15/01	NA	Field GC	**200**	<15	--	--	--	--	--
OUX-GW-JS-36	11/16/01	468	Laboratory	**200**	<13	<13	<6.7	<27	<13	<13
JS-37*	01/16/02	61-297	Field GC	**69**	<4	--	--	--	--	--
OU2-GW-JS-37****	01/16/02	61-237	Laboratory	**62**	**1.0 J**	**1.0 J**	<4	<4	<4	<4
OU2-GW-JS-37	05/01/02	61-237	Laboratory	**69**	<4	<4	<4	<4	<4	<4
JS-38*	07/10/02	80-340	Field GC	**9.8**	0.36	--	--	--	--	--
OUX-GW-JS-38	07/10/02	105	Laboratory	**9.8**	**0.36 J**	<1	<0.5	<2	<1	<1
JS-39*	07/10/02	140-385	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-39	07/10/02	140-385	Laboratory	<1	<1	<1	<0.5	<2	<1	<1
JS-40*	07/25/02	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-40	07/25/02	NA	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-41*	07/25/02	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-41	07/25/02	NA	Laboratory	<1	<1	<1	<1	<1	<1	<1
JS-42*	08/01/02	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-42	08/01/02	NA	Laboratory	<1	<1	<1	<.5	<2	<1	<1

TABLE 2.5
HISTORICAL GROUNDWATER SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Name	Collection Date	Screened Interval (feet bgs)	Laboratory or Field GC Analysis	PCE (µg/L)	TCE (µg/L)	cis-DCE (µg/L)	trans-DCE (µg/L)	Vinyl Chloride (µg/L)	Toluene (µg/L)	Benzene (µg/L)
JS-43*	08/01/02	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-43	08/01/02	NA	Laboratory	<1	<1	<1	<.5	<2	<1	<1
JS-44*	8/1/2002	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-44	08/01/02	NA	Laboratory	<1	<1	<1	<.5	<2	<1	<1
JS-45*	08/01/02	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-45	08/01/02	NA	Laboratory	<1	<1	<1	<.5	<2	<1	<1
JS-46*	08/01/02	NA	Field GC	<0.1	<0.1	--	--	--	--	--
OUX-GW-JS-46	08/01/02	NA	Laboratory	<1	<1	<1	<.5	<2	<1	<1
JS-47*	08/16/02	90-390	Field GC	<0.1	<0.1	--	--	--	--	--
JS-50*	9/6/2002	200-400	Field GC	<0.1	<0.1	--	--	--	--	--
OU2-JS-37	1/16/2002	NA	Field GC	**43.67**	**2.36**	**3.67**	ND	ND	--	ND
OU2-JS-37	1/16/2002	NA	Field GC	**36.16**	**2.04**	**5.19**	ND	ND	--	ND
OU2-JS-37	4/30/2002	ND	Field GC	**95.4**	**4.06**	**1.03**	ND	ND	--	ND
OUX-JS-06	3/23/1999	ND	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-07	3/23/1999	ND	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-08	3/23/1999	ND	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-10	3/24/1999	ND	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-11	3/24/1999	ND	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-12	3/24/1999	ND	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-13	3/24/1999	ND	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-14	3/24/1999	ND	Field GC	**0.08**	ND	ND	ND	ND	--	ND
OUX-JS-14	3/24/1999	ND	Field GC	**0.33**	ND	ND	ND	ND	--	ND
OUX-JS-14	1/16/2002	ND	Field GC	**4.1**	ND	ND	ND	ND	--	ND
OUX-JS-15	3/24/1999	ND	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-15	1/29/2002	120-425	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-20	3/31/1999	ND	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-20	1/29/2002	400	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-22	12/5/2000	406-1155	Field GC	ND	ND	ND	ND	ND	--	**0.01**
OUX-JS-22	12/5/2000	406-1155	Field GC	ND	ND	ND	**0.53**	ND	--	**0.06**
OUX-JS-22	12/5/2000	406-1155	Field GC	**0.58**	ND	ND	**0.51**	**4.02**	--	**0.44**
OUX-JS-22	12/5/2000	406-1155	Field GC	ND	ND	ND	**0.52**	**3.92**	--	**2.78**
OUX-JS-22	12/5/2000	406-1155	Field GC	ND	ND	ND	**0.03**	**10.54**	--	**0.17**
OUX-JS-22	12/5/2000	406-1155	Field GC	ND	ND	ND	ND	**4.93**	--	**0.01**
OUX-JS-26	2/7/2000	ND	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-27	7/11/2000	ND	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-29	1/24/2001	ND	Field GC	ND	ND	ND	**0.02**	ND	--	ND
OUX-JS-33	3/22/2001	ND	Field GC	ND	ND	ND	ND	ND	--	ND

TABLE 2.5
HISTORICAL GROUNDWATER SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Name	Collection Date	Screened Interval (feet bgs)	Laboratory or Field GC Analysis	PCE (µg/L)	TCE (µg/L)	cis-DCE (µg/L)	trans-DCE (µg/L)	Vinyl Chloride (µg/L)	Toluene (µg/L)	Benzene (µg/L)
OUX-JS-35	8/28/2001	NA	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-36	11/15/2001	468	Field GC	**309.4**	**3.61**	**4.78**	ND	ND	--	ND
OUX-JS-36	11/15/2001	468	Field GC	**345.6**	**4.65**	**8.21**	ND	ND	--	ND
OUX-JS-36	11/15/2001	468	Field GC	**133**	**1.96**	**1.6**	**0.04**	ND	--	ND
OUX-JS-36	11/16/2001	468	Field GC	**432.8**	**6.07**	**11**	**0.09**	ND	--	**1.93**
OUX-JS-36	1/15/2002	NA	Field GC	**115.5**	**12.1**	ND	**5.39**	ND	--	ND
OUX-JS-40	7/25/2002	NA	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-41	7/25/2002	NA	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-42	8/1/2002	NA	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-43	8/1/2002	NA	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-44	8/1/2002	NA	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-45	8/1/2002	NA	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-46	8/1/2002	NA	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-47	8/16/2002	390	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-51	1/29/2002	400	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS-51	1/29/2002	147-425	Field GC	ND	ND	ND	ND	ND	--	ND
PB-17*	3/31/1999	NA	Field GC	<0.1	<0.1	--	--	--	--	--

Notes:
Data are from USGS Lab Sample Log and Field GC Log unless otherwise noted.
* Data are from USEPA website (http://mo.water.usgs.gov/epa/nh/Datadocs_files/table00-01.pdf), downloaded May 3, 2004).
** Data are from quarterly monitoring performed by Parsons.
*** Data are from letters to Mayor of New Haven (August 6, 2001 and February 15, 2001) and residents (February 15, 2001).
**** Data are from USGS Contract Laboratory Results Summary.
NA - Not available
ND - Analyte was not detected, however, the detection limit was not specified.
--- Sample was not analyzed for this compound.
Dup - Duplicate sample
E - Result exceeded calibration range, secondary dilution required.
J - Result is an estimated value below the reporting limit or a tentatively identified compound (TIC).
Q - Sample was diluted.

TABLE 2.6
HISTORICAL SURFACE WATER SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample name	Collection Date	Laboratory or Field GC Analysis	PCE (µg/L)	TCE (µg/L)	cis-DCE (µg/L)	trans-DCE (µg/L)	Vinyl Chloride (µg/L)	Toluene (µg/L)	Benzene (µg/L)
OU2-510TB-0A	4/18/2001	Field GC	**0.01**	ND	**0.21**	**0.08**	ND	--	ND
OU2-510TB-0B	4/18/2001	Field GC	**0.03**	ND	**0.01**	ND	ND	--	ND
OU2-JF60	4/18/2001	Field GC	**0.02**	ND	**0.02**	**0.01**	ND	--	ND
OUX-500TB-0	4/19/2001	Field GC	ND	ND	**0.03**	ND	ND	--	ND
OUX-500TB-1	1/24/2001	Field GC	ND	ND	0	ND	**0.14**	--	ND
OUX-500TB-1	4/19/2001	Field GC	**0.02**	ND	**0.35**	ND	ND	--	ND
OUX-500TB-1A	2/8/2001	Field GC	ND	ND	ND	ND	ND	--	**0.01**
OUX-500TB-1B	4/19/2001	Field GC	**40.14**	**4.67**	**2.04**	**0.02**	ND	--	ND
OUX-500TB-1C	4/19/2001	Field GC	**31.6**	**3.92**	**2.56**	**0.01**	ND	--	ND
OUX-500TB-2	2/8/2001	Field GC	**31.5**	**3.8**	**2.04**	ND	ND	--	**0.01**
OUX-500TB-2	4/19/2001	Field GC	**29.75**	**3.43**	**1.71**	**0.01**	ND	--	ND
OUX-SW-500TB-2	06/13/01	Laboratory	**32**	**4.2**	**0.82 J**	<1	<1	<1	<1
OUX-SW-500TB-2	08/28/01	Laboratory	**56**	**8.1**	**1.7 J**	<2	<2	<2	<2
OUX-SW-500TB-2	11/16/01	Laboratory	**58**	**8.6**	**1.9 J**	<2	<2	<2	<2
OUX-500TB-2	11/16/2001	Field GC	**70.08**	**9.88**	**3.98**	**0.36**	ND	--	ND
OUX-500TB-2	11/16/2001	Field GC	**68.06**	**12.63**	**4.77**	**0.04**	ND	--	ND
OUX-SW-500TB-2	03/14/02	Laboratory	**15.0**	**2.0**	**0.37 J**	<.5	<2	<1	<1
OUX-SW-500TB-2	07/29/02	Laboratory	**100.0**	**11.0**	**2.3 J**	<2.5	<2.5	<2.5	<2.5
OUX-SW-500TB-3*	01/24/01	Laboratory	**31**	**4.2**	**0.74 J**	<1	<1	<1	<1
OUX-SW-500TB-4	02/08/01	Laboratory	<1	<1	<1	<1	<1	<1	<1
OUX-600TB-1	3/14/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-500TB-2	3/14/2002	Field GC	**9.5**	**2.67**	**2.34**	ND	ND	--	ND
OUX-500TB-2	7/29/2002	Field GC	**85.9**	**10.9**	**1.5**	ND	ND	--	ND
OUX-500TB-3	1/24/2001	Field GC	**43.78**	**4.78**	**4.16**	**0.08**	**33.67**	--	ND
OUX-500TB-3	2/8/2001	Field GC	**25.1**	**3.77**	**3.21**	ND	ND	--	**0.07**
OUX-500TB-3A	4/19/2001	Field GC	**28.45**	**3.83**	**2.44**	**0.01**	ND	--	ND
OUX-500TB-4	4/19/2001	Field GC	**26.75**	**3.42**	**2.21**	**0.01**	ND	--	ND
OUX-500TB-4A	4/19/2001	Field GC	**23.33**	**2.72**	**1.65**	**0.01**	ND	--	ND
OUX-500TB-4B	4/19/2001	Field GC	**28.56**	**5.03**	**0.4**	ND	ND	--	ND
OUX-500TB-4C	4/19/2001	Field GC	**18.22**	**2.68**	**0.09**	ND	ND	--	ND
OUX-500TB-5	2/8/2001	Field GC	**14.76**	**2.14**	**1.86**	ND	ND	--	**0.01**
OUX-500TB-5	4/19/2001	Field GC	**16.96**	ND	**0.98**	ND	ND	--	ND
OUX-500TB-6	4/19/2001	Field GC	**14.49**	ND	**1.2**	ND	ND	--	ND
OUX-500TB-7	3/14/2002	Field GC	**2.65**	**0.66**	**0.12**	ND	ND	--	ND
OUX-500TB-8	3/14/2002	Field GC	**3.74**	**2.14**	**0.06**	ND	ND	--	ND
OUX-510TB-1	1/24/2001	Field GC	ND	ND	**0.94**	ND	**11.36**	--	ND
OUX-510TB-2	1/24/2001	Field GC	**2**	**0.46**	**0.32**	ND	**0.94**	--	ND
OUX-510TB-2A	4/19/2001	Field GC	**1.66**	**0.33**	**1.06**	ND	ND	--	ND
OUX-510TB-2A	4/19/2001	Field GC	**1.76**	**0.41**	**0.31**	ND	ND	--	ND
OUX-700TB-0.2	9/24/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-700TB-0.3	9/24/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-700TB-1	3/4/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-700TB-2	3/4/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-700TB-3	3/4/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-700TB-3	3/13/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-700TB-3	3/13/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-700TB-5	3/5/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-710TB-1	3/4/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-710TB-2	3/4/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-710TB-3	3/4/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-710TB-4	3/5/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-710TB-5	3/5/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-710TB-6	8/15/2000	Field GC	**44**	**0.22**	ND	ND	ND	--	ND
OUX-710TB-6	3/5/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-710TB-8	8/16/2000	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-710TB-9	3/5/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-712TB-1	3/4/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-720TB-1	3/4/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-720TB-2	3/4/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-720TB-3	3/4/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-730TB-1	3/13/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-SW-EC06	03/14/02	Laboratory	**8.9**	1.	<1	<.5	<2	<1	<1
OUX-EC06	3/14/2002	Field GC	**7.33**	**2.72**	**0.14**	ND	ND	--	0
OUX-SW-EC07	03/14/02	Laboratory	**1.3**	<1	<1	<.5	<2	<1	<1
OUX-EC07	3/14/2002	Field GC	**2.41**	**1.45**	ND	ND	ND	--	ND
OUX-SW-EC08	03/14/02	Laboratory	**0.33 J**	<1	<1	<.5	<2	<1	<1

TABLE 2.6
HISTORICAL SURFACE WATER SAMPLING RESULTS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample name	Collection Date	Laboratory or Field GC Analysis	PCE (µg/L)	TCE (µg/L)	cis-DCE (µg/L)	trans-DCE (µg/L)	Vinyl Chloride (µg/L)	Toluene (µg/L)	Benzene (µg/L)
OUX-EC08	3/14/2002	Field GC	**0.47**	**0.05**	ND	ND	ND	--	ND
OUX-SW-EC09	03/14/02	Laboratory	<1	<1	<1	<.5	<2	<1	<1
OUX-EC09	3/14/2002	Field GC	ND	ND	ND	ND	ND	--	ND
OUX-JS223	3/14/2002	Field GC	**2.85**	**3.03**	**4.86**	ND	ND	--	ND

Notes:
Data are from USGS Lab Sample Log and Field GC Log unless otherwise noted.
* Data are from a letter to resident of New Haven (February 15, 2001).
--- Sample was not analyzed for this compound.
ND - Analyte not detected above detection limit of instrument, which is not speicified.
J - Result is an estimated value below the reporting limit or a tentatively identified compound (TIC).

TABLE 3.1
SAMPLE COLLECTION AND ANALYSIS SUMMARY
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Parameter	Matrix	Analytical Method	Number of Samples Analyzed
SOIL INVESTIGATION (TASK 1)			
VOCs	Soil	8260B	44
SVOCs	Soil	8270C	4
Pesticides	Soil	8081A	4
PCBs	Soil	8082	4
RCRA metals	Soil	6010B and 7471A	4
Zinc	Soil	6010B	4
Geotechnical*	Soil	Various	4
GROUNDWATER INVESTIGATION (Tasks 2a through 2e)			
Task 2a – Interval Screening			
VOCs	Groundwater	8260B	13
Task 2b – Direct-Push Sampling			
VOCs	Groundwater	8260B	14
Task 2c – Residential Well Sampling			
VOCs	Groundwater	524.2	31
Task 2d – Well Installation			
VOCs	Soil	8260B	8
VOCs	Groundwater	8260B	7
Task 2e – Site-wide Groundwater Sampling			
VOCs	Groundwater	8260B	40
Methane, Ethane, and Ethene	Groundwater	RSK SOP 175	38
Sulfate/Sulfide	Groundwater	EPA Method 300/376.1	38
Nitrate/Ammonia	Groundwater	EPA 353.2/350.2	38
Chloride	Groundwater	EPA Series 300	38
Total and Ferrous Iron	Groundwater	Hach field analysis	38
SVOCs	Groundwater	8270C	6
Pesticides	Groundwater	8081A	6
PCBs	Groundwater	8082	6
RCRA metals	Groundwater	6010B and 7471A	6
Zinc	Groundwater	6010B	6
DNAPL INVESTIGATION (TASK 3)			
VOCs	Liquids	8260B	21
SEDIMENT AND SURFACE WATER SAMPLING (TASK 4)			
VOCs	Surface water	8260B	11
VOCs	Sediment	8260B	8
SVOCs	Sediment	8270C	2
Pesticides	Sediment	8081A	2
PCBs	Sediment	8082	2
RCRA metals	Sediment	6010B, 7470A and 7471A	2
Zinc	Sediment	6010B	2
SANITARY SEWER SYSTEM INSPECTION AND SAMPLING (TASK 5)			
Sewer Downgradient of Former Kellwood Facility			
VOCs	Soil	8260B	10
VOCs	Sewer Water	8260B	7
VOCs	Sediment	8260B	5
Segments A, B, and C North of Highway 100			
VOCs	Soil	8260B	22
SOIL VAPOR SAMPLING (TASK 11)			
Selected VOCs	Air	TO15	7

Notes:

*Geotechnical samples will be analyzed for Bulk Density (ASTM D2937 or approved equivalent), Volumetric Moisture Content (ASTM D2216 or approved equivalent), Specific Gravity (ASTM D854/C127 or approved equivalent) and total organic carbon (ASTM D2974 or approved equivalent).

Duplicates and re-analysis are not included in the Number of Analyses

TABLE 3.2
SUMMARY OF SOIL ANALYTICAL RESULTS (TASK 1)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth Sample ID	500-6519-10 12-Sep-07 1 B2-SS01-001.0-070912	500-6519-11 12-Sep-07 18 B2-SS01-018.0-070912	500-6519-7 12-Sep-07 1 B4-SS01-001.0-070912	500-6519-8 12-Sep-07 1 B4-SS02-001.0-070912	500-6519-9 12-Sep-07 4 B4-SS01-004.0-070912	500-6519-5 12-Sep-07 1.4 B8-SS01-001.4-070912	500-6519-6 12-Sep-07 11.2 B8-SS01-011.2-070912	500-6548-8 13-Sep-07 3.5 B10-SS01-003.5-070913	500-6548-11 13-Sep-07 14 B10-SS01-014.0-070913	500-6519-2 12-Sep-07 1.7 C6-SS01-001.7-070912	500-6519-3 12-Sep-07 14.7 C6-SS01-014.7-070912	500-6519-15 12-Sep-07 2 D4-SS01-002.0-070912
VOCs		UNITS:												
Acetone	4200	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	6260	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	7300	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	29800	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SVOCs														
Phenanthrene	158000	ug/Kg					ND							
Fluoranthene	2280000	ug/Kg					**23** J							
Pyrene	1500000	ug/Kg					**18** J							
Benzo[a]anthracene	6120	ug/Kg					ND							
Chrysene	599000	ug/Kg					**15** J							
Benzo[b]fluoranthene	6190	ug/Kg					**20** J							
Benzo[k]fluoranthene	62000	ug/Kg					ND							
Benzo[a]pyrene	620	ug/Kg					ND							
Benzo[g,h,i]perylene	1720000	ug/Kg					ND							
PESTICIDES														
Dieldrin	93.6	ug/Kg					ND							
4,4'-DDE	14300	ug/Kg					ND							
Endosulfan II	NA	ug/Kg					ND							
4,4'-DDD	20200	ug/Kg					ND							
Endosulfan sulfate	NA	ug/Kg					ND							
4,4'-DDT	14300	ug/Kg					ND							
Endrin aldehyde	18200	ug/Kg					ND							
PCBs														
PCB-1254	1100	ug/Kg					ND							
METALS														
Arsenic	3.89	mg/Kg					**15**							
Barium	2040	mg/Kg					**310**							
Cadmium	9.31	mg/Kg					**0.48**							
Chromium	74600	mg/Kg					**18**							
Lead	3.74	mg/Kg					**31**							
Mercury	2190	ug/Kg					**41**							
Selenium	6.27	mg/Kg					**0.64** J							
Silver	16.2	mg/Kg					ND							
Zinc	7220	mg/Kg					**41**							

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.2
SUMMARY OF SOIL ANALYTICAL RESULTS (TASK 1)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth Sample ID	500-6519-16 12-Sep-07 11.4 D4-SS01-011.4-070912	500-6548-6 13-Sep-07 2 D10-SS01-002.0-07913	500-6548-7 13-Sep-07 10 D10-SS01-010.0-07913	500-6519-12 12-Sep-07 2 E2-SS01-002.0-070912	500-6519-13 12-Sep-07 11 E2-SS01-011.0-070912	500-6548-1 13-Sep-07 1 E6-SS01-001.0-07913	500-6548-2 13-Sep-07 15.2 E6-SS01-015.2-07913	500-6548-4 13-Sep-07 1.5 E8-SS01-001.5-07913	500-6548-5 13-Sep-07 13 E8-SS01-013.0-07913	500-6547-14 13-Sep-07 3 F10-SS01-003.0-070913	500-6547-15 13-Sep-07 8.5 F10-SS01-008.5-070913
VOCs		UNITS:											
Acetone	4200	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	6260	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	7300	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**42**
Toluene	29800	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**220**
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**15**
SVOCs													
Phenanthrene	158000	ug/Kg											
Fluoranthene	2280000	ug/Kg											
Pyrene	1500000	ug/Kg											
Benzo[a]anthracene	6120	ug/Kg											
Chrysene	599000	ug/Kg											
Benzo[b]fluoranthene	6190	ug/Kg											
Benzo[k]fluoranthene	62000	ug/Kg											
Benzo[a]pyrene	620	ug/Kg											
Benzo[g,h,i]perylene	1720000	ug/Kg											
PESTICIDES													
Dieldrin	93.6	ug/Kg											
4,4'-DDE	14300	ug/Kg											
Endosulfan II	NA	ug/Kg											
4,4'-DDD	20200	ug/Kg											
Endosulfan sulfate	NA	ug/Kg											
4,4'-DDT	14300	ug/Kg											
Endrin aldehyde	18200	ug/Kg											
PCBs													
PCB-1254	1100	ug/Kg											
METALS													
Arsenic	3.89	mg/Kg											
Barium	2040	mg/Kg											
Cadmium	9.31	mg/Kg											
Chromium	74600	mg/Kg											
Lead	3.74	mg/Kg											
Mercury	2190	ug/Kg											
Selenium	6.27	mg/Kg											
Silver	16.2	mg/Kg											
Zinc	7220	mg/Kg											

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
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Shaded sample IDs indicate duplicate samples

TABLE 3.2
SUMMARY OF SOIL ANALYTICAL RESULTS (TASK 1)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth Sample ID	500-6547-16 13-Sep-07 8.5 F10-SS02-008.5-070913	500-6547-9 13-Sep-07 6.4 H10-SS01-006.4-070913	500-6547-8 13-Sep-07 3.5 H10-SS01-103.5-070913	500-6547-10 13-Sep-07 2.5 K10-SS01-002.5-070913	500-6547-11 13-Sep-07 6 K10-SS01-006.0-070913	500-6582-4 14-Sep-07 3 M10-SS01-003.0-070914	500-6582-5 14-Sep-07 4.9 M10-SS01-004.9-070914	500-6582-8 14-Sep-07 4.9 M10-SS02-004.9-070914	500-12177-4 21-Jun-08 0.8 MC1-SS01-000.8-080621	500-12177-7 21-Jun-08 0.6 MC02-SS01-000.6-080621	500-12177-8 21-Jun-08 2.7 MC02-SS01-002.7-080621	500-12177-1 21-Jun-08 0.7 MC03-SS01-000.7-080621
VOCs		UNITS:												
Acetone	4200	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	6260	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**3** J
Methyl Ethyl Ketone	7300	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	141	ug/Kg	**42**	**7.4**	ND	ND	ND	**22**	ND	ND	ND	**3.3** J	ND	**5.2** J
Toluene	29800	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**7.9**	ND
Tetrachloroethene	141	ug/Kg	**220**	**56**	ND	**27**	**180**	**150**	**61**	**100**	**9.3**	**25**	**9.4**	**53**
1,2-Dichloroethene, Total	521	ug/Kg	**16**	ND	ND	ND	ND	**6.9**	ND	ND	ND	**3.5** J	ND	ND
SVOCs														
Phenanthrene	158000	ug/Kg												
Fluoranthene	2280000	ug/Kg												
Pyrene	1500000	ug/Kg												
Benzo[a]anthracene	6120	ug/Kg												
Chrysene	599000	ug/Kg												
Benzo[b]fluoranthene	6190	ug/Kg												
Benzo[k]fluoranthene	62000	ug/Kg												
Benzo[a]pyrene	620	ug/Kg												
Benzo[g,h,i]perylene	1720000	ug/Kg												
PESTICIDES														
Dieldrin	93.6	ug/Kg												
4,4'-DDE	14300	ug/Kg												
Endosulfan II	NA	ug/Kg												
4,4'-DDD	20200	ug/Kg												
Endosulfan sulfate	NA	ug/Kg												
4,4'-DDT	14300	ug/Kg												
Endrin aldehyde	18200	ug/Kg												
PCBs														
PCB-1254	1100	ug/Kg												
METALS														
Arsenic	3.89	mg/Kg												
Barium	2040	mg/Kg												
Cadmium	9.31	mg/Kg												
Chromium	74600	mg/Kg												
Lead	3.74	mg/Kg												
Mercury	2190	ug/Kg												
Selenium	6.27	mg/Kg												
Silver	16.2	mg/Kg												
Zinc	7220	mg/Kg												

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
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TABLE 3.2
SUMMARY OF SOIL ANALYTICAL RESULTS (TASK 1)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth Sample ID	500-12177-2 21-Jun-08 5 MC03-SS01-005.0-080621	500-12177-6 21-Jun-08 1.3 MC04-SS01-001.3-080621	500-12177-3 21-Jun-08 6.6 MC4-SS01-006.6-080621	500-12177-9 21-Jun-08 1.3 MC05-SS01-001.3-080621	500-12177-5 21-Jun-08 9 MC5-SS01-009.0-080621	500-12177-10 21-Jun-08 9 MC05-SS02-009.0-080621	500-6487-13 11-Sep-07 1 N12-SS01-001.0-070911	500-6487-14 11-Sep-07 2 N12-SS01-002.0-070911	500-6489-8 11-Sep-07 0.5 P6-SS01-000.5-070911	500-6489-9 11-Sep-07 12 P6-SS01-012.0-070911	500-6489-7 11-Sep-07 0.5 P8-SS01-000.5-070911	500-6489-6 11-Sep-07 6 P8-SS01-006.0-070911
VOCs		UNITS:												
Acetone	4200	ug/Kg	ND	ND	R	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	6260	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	7300	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND	ND	**17**	ND	ND	ND	ND
Toluene	29800	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	**3.9** J	**6.7**	**290000**	**3.9** J	**140**	**230**	**5.1**	**260**	ND	ND	ND	**11**
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND	ND	ND	ND	**5.9**	ND	ND	ND	ND
SVOCs														
Phenanthrene	158000	ug/Kg		ND										
Fluoranthene	2280000	ug/Kg		ND										
Pyrene	1500000	ug/Kg		ND										
Benzo[a]anthracene	6120	ug/Kg		ND										
Chrysene	599000	ug/Kg		ND										
Benzo[b]fluoranthene	6190	ug/Kg		ND										
Benzo[k]fluoranthene	62000	ug/Kg		ND										
Benzo[a]pyrene	620	ug/Kg		ND										
Benzo[g,h,i]perylene	1720000	ug/Kg		ND										
PESTICIDES														
Dieldrin	93.6	ug/Kg		**3.7** J+										
4,4'-DDE	14300	ug/Kg		**54** J+										
Endosulfan II	NA	ug/Kg		**32** +										
4,4'-DDD	20200	ug/Kg		**7.5** J+										
Endosulfan sulfate	NA	ug/Kg		**13** +										
4,4'-DDT	14300	ug/Kg		**18** +										
Endrin aldehyde	18200	ug/Kg		**17** +										
PCBs														
PCB-1254	1100	ug/Kg		ND										
METALS														
Arsenic	3.89	mg/Kg		**5.1**										
Barium	2040	mg/Kg		**120**										
Cadmium	9.31	mg/Kg		ND										
Chromium	74600	mg/Kg		**15**										
Lead	3.74	mg/Kg		**7**										
Mercury	2190	ug/Kg		**27**										
Selenium	6.27	mg/Kg		ND										
Silver	16.2	mg/Kg		ND										
Zinc	7220	mg/Kg		**19**										

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.2
SUMMARY OF SOIL ANALYTICAL RESULTS (TASK 1)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID / Sample Date / Sample Depth / Sample ID	500-6582-6 / 14-Sep-07 / 2.5 / P10-SS01-002.5-070914	500-6582-7 / 14-Sep-07 / 5.3 / P10-SS01-005.3-070914	500-6487-12 / 11-Sep-07 / 0.5 / P12-SS01-000.5-070911	500-6487-11 / 11-Sep-07 / 2 / P12-SS01-002.0-070911	500-6487-10 / 11-Sep-07 / 0 / P14-SS01-000.0-070911	500-6487-7 / 11-Sep-07 / 3 / P14-SS01-003.0-070911	500-6487-5 / 11-Sep-07 / 0.5 / P15-SS01-000.5-070911	500-6487-3 / 11-Sep-07 / 0.5 / P15-SS02-000.5-070911	500-6487-4 / 11-Sep-07 / 2.5 / P15-SS01-002.5-070911	500-6487-6 / 11-Sep-07 / 0.5 / P16-SS01-000.5-070911	500-6487-9 / 11-Sep-07 / 2.5 / P16-SS01-002.5-070911	500-6487-8 / 11-Sep-07 / 2.5 / P16-SS02-002.5-070911
VOCs		UNITS:												
Acetone	4200	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND J	ND	ND	ND	ND
Carbon disulfide	6260	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND J	ND	ND	ND	ND
Methyl Ethyl Ketone	7300	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND J	ND	ND	ND	ND
Trichloroethene	141	ug/Kg	**21**	**5**	ND	ND	ND	ND	ND	ND J	ND	**100**	ND	**140**
Toluene	29800	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND J	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	**53**	**110**	**140**	**6.5**	**920**	ND	**48**	**63**	**2200**	**15000**	**1700**	**23000**
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND J	ND	**79** J	ND	**87** J
SVOCs														
Phenanthrene	158000	ug/Kg					ND	**19** J					**14** J	ND
Fluoranthene	2280000	ug/Kg					ND	**50**					**64**	**28** J
Pyrene	1500000	ug/Kg					ND	**41**					**50**	**24** J
Benzo[a]anthracene	6120	ug/Kg					ND	**17** J					**31** J	**8.5** J
Chrysene	599000	ug/Kg					ND	**31** J					**43**	**16** J
Benzo[b]fluoranthene	6190	ug/Kg					ND	**39**					**61**	**21** J
Benzo[k]fluoranthene	62000	ug/Kg					ND	**16** J					**18** J	ND
Benzo[a]pyrene	620	ug/Kg					ND	**22** J					**36**	ND
Benzo[g,h,i]perylene	1720000	ug/Kg					ND	**18** J					**21** J	ND
PESTICIDES														
Dieldrin	93.6	ug/Kg					ND	ND					ND	ND
4,4'-DDE	14300	ug/Kg					ND	ND					ND	ND
Endosulfan II	NA	ug/Kg					ND	ND					ND	ND
4,4'-DDD	20200	ug/Kg					ND	ND					ND	ND
Endosulfan sulfate	NA	ug/Kg					ND	ND					ND	ND
4,4'-DDT	14300	ug/Kg					ND	ND					ND	ND
Endrin aldehyde	18200	ug/Kg					ND	ND					ND	ND
PCBs														
PCB-1254	1100	ug/Kg					ND	ND					**32**	**47**
METALS														
Arsenic	3.89	mg/Kg					**0.5** J	**1.4**					**3.3**	**2.8**
Barium	2040	mg/Kg					**20**	**23**					**53**	**47**
Cadmium	9.31	mg/Kg					**0.084** J	**0.22**					**0.3**	**0.29**
Chromium	74600	mg/Kg					**3.2**	**5.6**					**7**	**6.1**
Lead	3.74	mg/Kg					**0.34** J	**2.1**					**4.8**	**5**
Mercury	2190	ug/Kg					ND	**6.6** J					**9.3** J	**13** J
Selenium	6.27	mg/Kg					ND	ND					ND	ND
Silver	16.2	mg/Kg					ND	ND					**0.1** J	ND
Zinc	7220	mg/Kg					**2** J	**5.8**					**29**	**24**

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.2
SUMMARY OF SOIL ANALYTICAL RESULTS (TASK 1)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID / Sample Date / Sample Depth / Sample ID	500-6458-3 10-Sep-07 0.5 Q13-SS01-000.5-070910	500-6458-1 10-Sep-07 2 Q13-SS01-002.0-070910	500-6457-10 10-Sep-07 0.5 Q16-SS01-000.5-070910	500-6457-4 10-Sep-07 1 Q16-SS01-001.0-070910	500-6457-5 10-Sep-07 0.5 Q17-SS01-000.5-070910	500-6457-6 10-Sep-07 0.5 Q17-SS02-000.5-070910	500-6457-11 10-Sep-07 2.9 Q17-SS01-002.9-070910	500-6489-4 11-Sep-07 0.5 R6-SS01-000.5-070911	500-6489-1 11-Sep-07 12 R6-SS01-012.0-070911	500-6489-5 11-Sep-07 0.5 R8-SS01-000.5-070911	500-6489-2 11-Sep-07 9.3 R8-SS01-009.3-070911	500-6489-3 11-Sep-07 9.3 R8-SS02-009.3-070911
VOCs		UNITS:												
Acetone	4200	ug/Kg	ND	ND	ND	ND	**160** J	**200** J	ND	ND	ND	ND	ND	ND
Carbon disulfide	6260	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	7300	ug/Kg	ND	ND	ND	ND	**7**	**9.9**	ND	ND	ND	ND	ND	ND
Trichloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	29800	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	**2100**	**87**	**49**	**490**	ND	ND	ND	ND	ND	ND	**22**	ND
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SVOCs														
Phenanthrene	158000	ug/Kg												
Fluoranthene	2280000	ug/Kg												
Pyrene	1500000	ug/Kg												
Benzo[a]anthracene	6120	ug/Kg												
Chrysene	599000	ug/Kg												
Benzo[b]fluoranthene	6190	ug/Kg												
Benzo[k]fluoranthene	62000	ug/Kg												
Benzo[a]pyrene	620	ug/Kg												
Benzo[g,h,i]perylene	1720000	ug/Kg												
PESTICIDES														
Dieldrin	93.6	ug/Kg												
4,4'-DDE	14300	ug/Kg												
Endosulfan II	NA	ug/Kg												
4,4'-DDD	20200	ug/Kg												
Endosulfan sulfate	NA	ug/Kg												
4,4'-DDT	14300	ug/Kg												
Endrin aldehyde	18200	ug/Kg												
PCBs														
PCB-1254	1100	ug/Kg												
METALS														
Arsenic	3.89	mg/Kg												
Barium	2040	mg/Kg												
Cadmium	9.31	mg/Kg												
Chromium	74600	mg/Kg												
Lead	3.74	mg/Kg												
Mercury	2190	ug/Kg												
Selenium	6.27	mg/Kg												
Silver	16.2	mg/Kg												
Zinc	7220	mg/Kg												

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.2
SUMMARY OF SOIL ANALYTICAL RESULTS (TASK 1)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth Sample ID	500-6582-9 14-Sep-07 2 R10-SS01-002.0-070914	500-6582-10 14-Sep-07 3.5 R10-SS01-003.5-070914	500-6458-2 10-Sep-07 0.5 R13-SS01-000.5-070910	500-6458-4 10-Sep-07 1.5 R13-SS01-001.5-070910	500-6458-12 10-Sep-07 0.5 R17-SS01-000.5-070910	500-6458-7 10-Sep-07 3.5 R17-SS01-003.5-070910	500-6458-6 10-Sep-07 0.5 S13-SS01-000.5-070910	500-6458-5 10-Sep-07 1 S13-SS01-001.0-070910	500-6458-9 10-Sep-07 0.5 S15-SS01-000.5-070910	500-6458-8 10-Sep-07 2.5 S15-SS01-002.5-070910	500-6458-11 10-Sep-07 0.5 S17-SS01-000.5-070910	500-6458-10 10-Sep-07 2.7 S17-SS01-002.7-070910
VOCs		UNITS:												
Acetone	4200	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND J	ND	ND	ND
Carbon disulfide	6260	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND J	ND	ND	ND
Methyl Ethyl Ketone	7300	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND J	ND	ND	ND
Trichloroethene	141	ug/Kg	**6.4**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	29800	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	**100**	**380**	**6.4**	**24**	ND	ND	**47**	**13**	**470** J	**21000**	ND	ND
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SVOCs														
Phenanthrene	158000	ug/Kg												
Fluoranthene	2280000	ug/Kg												
Pyrene	1500000	ug/Kg												
Benzo[a]anthracene	6120	ug/Kg												
Chrysene	599000	ug/Kg												
Benzo[b]fluoranthene	6190	ug/Kg												
Benzo[k]fluoranthene	62000	ug/Kg												
Benzo[a]pyrene	620	ug/Kg												
Benzo[g,h,i]perylene	1720000	ug/Kg												
PESTICIDES														
Dieldrin	93.6	ug/Kg												
4,4'-DDE	14300	ug/Kg												
Endosulfan II	NA	ug/Kg												
4,4'-DDD	20200	ug/Kg												
Endosulfan sulfate	NA	ug/Kg												
4,4'-DDT	14300	ug/Kg												
Endrin aldehyde	18200	ug/Kg												
PCBs														
PCB-1254	1100	ug/Kg												
METALS														
Arsenic	3.89	mg/Kg												
Barium	2040	mg/Kg												
Cadmium	9.31	mg/Kg												
Chromium	74600	mg/Kg												
Lead	3.74	mg/Kg												
Mercury	2190	ug/Kg												
Selenium	6.27	mg/Kg												
Silver	16.2	mg/Kg												
Zinc	7220	mg/Kg												

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.2
SUMMARY OF SOIL ANALYTICAL RESULTS (TASK 1)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth Sample ID	500-6582-11 14-Sep-07 2 T10-SS01-002.0-070914	500-6582-12 14-Sep-07 2 T10-SS02-002.0-070914	500-6457-7 10-Sep-07 0.5 T14-SS01-000.5-070910	500-6457-9 10-Sep-07 1.7 T14-SS01-001.7-070910	500-6457-8 10-Sep-07 0.5 T15-SS01-000.5-070910	500-6457-2 10-Sep-07 1.5 T15-SS01-001.5-070910	500-6457-1 10-Sep-07 0.5 T16-SS01-000.5-070910	500-6457-3 10-Sep-07 1.4 T16-SS01-001.4-070910
VOCs		UNITS:								
Acetone	4200	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	6260	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	7300	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	29800	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND	ND	ND	ND	ND
SVOCs										
Phenanthrene	158000	ug/Kg								
Fluoranthene	2280000	ug/Kg								
Pyrene	1500000	ug/Kg								
Benzo[a]anthracene	6120	ug/Kg								
Chrysene	599000	ug/Kg								
Benzo[b]fluoranthene	6190	ug/Kg								
Benzo[k]fluoranthene	62000	ug/Kg								
Benzo[a]pyrene	620	ug/Kg								
Benzo[g,h,i]perylene	1720000	ug/Kg								
PESTICIDES										
Dieldrin	93.6	ug/Kg								
4,4'-DDE	14300	ug/Kg								
Endosulfan II	NA	ug/Kg								
4,4'-DDD	20200	ug/Kg								
Endosulfan sulfate	NA	ug/Kg								
4,4'-DDT	14300	ug/Kg								
Endrin aldehyde	18200	ug/Kg								
PCBs										
PCB-1254	1100	ug/Kg								
METALS										
Arsenic	3.89	mg/Kg								
Barium	2040	mg/Kg								
Cadmium	9.31	mg/Kg								
Chromium	74600	mg/Kg								
Lead	3.74	mg/Kg								
Mercury	2190	ug/Kg								
Selenium	6.27	mg/Kg								
Silver	16.2	mg/Kg								
Zinc	7220	mg/Kg								

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.3
SUMMARY OF SOIL GEOTECHNICAL DATA
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Boring	Sample ID	Sampling Date	Lab ID	Sampling Depth (feet)	USCS Classification[a]	Visual Soil Description[a]	Volumetric Moisture Content (ASTM D 2216) (%)
B2	B2-SS01-008.0-070920	20-Sep-07	725728	8	CL	Dark brown clay with orange tint. Medium Soft; Pliable	23
E2	E2-SS01-007.7-070920	20-Sep-07	725727	7.7	CH	Dark brown clay; Dry; Medium Hard	25.7
P6	P6-SS01-004.2-070920	20-Sep-07	725730	4.2	CH	Brown Sandy Clay; Dry; Hard	16.8
R6	R6-SS01-010.6-070920	20-Sep-07	725729	10.6	CH	Tan to brown cherty sandy clay, dry, loose	34.9

Notes:
ST: Shelby Tube
[a]: Description based on field observations

TABLE 3.3
SUMMARY OF SOIL GEOTECHNICAL DATA
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Boring	Sample ID	Sampling Date	Lab ID	Sampling Depth (feet)	Bulk Density (ASTM D 2937) (g/cm^3)	Total Organic Content (ASTM D 2974) (%)	Specific Gravity (ASTM D 854)
B2	B2-SS01-008.0-070920	20-Sep-07	725728	8	1.67	1.5	2.721
E2	E2-SS01-007.7-070920	20-Sep-07	725727	7.7	1.57	1.5	2.73
P6	P6-SS01-004.2-070920	20-Sep-07	725730	4.2	1.6	0.9	2.698
R6	R6-SS01-010.6-070920	20-Sep-07	725729	10.6	1.38	1.9	2.721

Notes:
ST: Shelby Tube
[a]: Description based on field observations

TABLE 3.4
OPTICAL TELEVIEWER LOG OBSERVATIONS AT JS-14
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

TOP OF INTERVAL (ft btoc)	BOTTOM OF INTERVAL (ft btoc)	OBSERVATION*
101.5	101.5	Bottom of casing.
114.5	116.5	Coarse texture, slight diameter increase.
127.0	128.5	Coarse texture, slight caliper variation.
144.5	144.5	Color change - pink/orange above, light grey below.
149.0	149.0	Color change - pink/orange above, light grey below.
164.5	168.0	Shaley laminations.
174.5	176.5	Coarse texture, small vugs.
176.5	184.0	Fine texture, some lamination.
184.0	185.5	Coarse texture, large diameter.
198.0	202.0	Coarse texture, diameter variation.
203.5	203.5	Weathered zone, diameter change.
207	209	Significant weathering, significant diameter change.
220	220	Small vugs and coarse texture.
236.0	236.5	Weathered zone.
248.5	252.0	Laminated zone.
254	254	Weathering, small vugs.
256.0	259.0	Weathered, deep vugs, large diameter.
262.0	263.0	Weathered.
266.5	269.0	Weathered, diameter change.
275.5	284.5	Weathered chert, caliper spike.
289.0	289.0	Color change - buff above, reddish pick below.
294.5	294.5	Laminations, color change - reddish pink above, buff below.
324.0	328.0	Weathered, vugs.
330.0	330.5	Weathered, vugs.
334.0	343.0	Weathered, scattered vugs.
346.0	350.5	Color change - buff/pink above, strong reddish pink below.
355.5	362.0	Weathered, diameter change, some lamination.
364.5	365.5	Weathered, vugs.
372	377	Weathered, vugs.

*Made on April 4, 2006
Note: This is a summary of observations rather than a log of the well, thus, not all depths are described

TABLE 3.5
OPTICAL TELEVIEWER LOG OBSERVATIONS AT JS-36
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

TOP OF INTERVAL (ft btoc)	BOTTOM OF INTERVAL (ft btoc)	OBSERVATION*
29.7	29.7	Bottom of casing
37.6	37.6	Minor feature.
39.7	42.6	Weathered zone, slight diameter increase.
45	48	Weathered zone, small horizontal features.
54.5	57	Weathered zone, vugs larger diameter.
61.5	52	Weathered zone.
63.3	64.7	Weathered zone, vugs.
66.3	67.4	Weathered zone, nodules, hole diameter larger.
69.5	69.8	Significant horizontal gap, caliper spikes.
74	76	Coarse interval.
77	80.5	Scattered large vugs, caliper spikes.
89.4	91.5	Coarse, weathered interval, deep vugs.
95.5	98	Coarse texture, vugs interlayered with finer, laminar layers.
99.5	100.5	Coarse zone, vug.
102.8	103.5	Horizontal weathered zone, larger diameter.
104.5	107.3	Coarse, discolored zone.
117.8	124.7	Coarse, weathered intervals in finer rock, discoloration downward from bottom of interval.
131	132.8	Coarse interval.
143.5	147	Coarse interval.
165.5	165.7	Two vugs.
168.4	172	Weathered interval, deep vug, larger hole.
176.5	180	Weathered interval, very deep vug, very large borehole diameter.
181	188.5	Crenulated texture, weathered.
190.5	198.5	Coarse texture, angular chert.
203.5	204	Vug.
210	211	Weathered zone.
212.5	212.5	Weathered zone.
223	224	Weathered horizontal feature.
239	240.7	Coarse texture.
247	247.5	Small vug.
252.5	254	Weathered, coarse, larger diameter.
258.5	261.5	Coarse, weathered vugs.
261.5	263	Laminar bedding.
263	266	Coarse, small vugs, larger hole.
268.5	269.5	Coarse, vugs.
273.5	275.3	Weathered, vugs, larger hole.
282.5	287	Coarse texture.
292.4	292.8	Shaley interval.
297.7	300	Coarse texture.
301	301.6	Weathered coarse zone.
310	311.5	Vugs.

*Made on April 22, 2008
Note: This is a summary of observations rather than a log of the well, thus, not all depths are described

TABLE 3.6
SUMMARY OF INTERVAL SCREENING ANALYSES
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

SAMPLE ID	ANALYZED VIA	PUMPING CONDITIONS	SAMPLING DATE	SAMPLING DEPTH	PCE		TCE		1,2-DCE		Vinyl Chloride	
Maximum Contaminant Level					***5***		***5***		***70***		***2***	
JS14-GW01-090.4-060404	Field GC	Static	4-Apr-06	90.4	**2.30**		ND		ND		ND	
JS14-GW01-090.4-060404	Field GC	Static	4-Apr-06	90.4	**2.25**		ND		ND		ND	
JS14-GW01-130.4-060404	Field GC	Static	4-Apr-06	130.4	**1.57**		ND		ND		ND	
JS14-GW01-130.4-060404	Field GC	Static	4-Apr-06	130.4	**2.65**		ND		ND		ND	
JS14-GW01-155.2-060404	Field GC	Static	4-Apr-06	155.2	**2.95**		ND		ND		6.6	
JS14-GW01-155.2-060404	Field GC	Static	4-Apr-06	155.2	**3.13**		ND		ND		ND	
JS14-GW01-155.2-060404	Field GC	Static	4-Apr-06	155.2	**4.80**		ND		ND		ND	
JS14-GW01-155.2-060404	Laboratory	Static	4-Apr-06	155.2	3.7	UB	0.13	UH	0.34	UH	0.16	UH
JS14-GW01-175.2-060405	Field GC	Static	5-Apr-06	175.2	**3.05**		ND		ND		6.6	
JS14-GW01-175.2-060405	Field GC	Static	5-Apr-06	175.2	**2.50**		ND		ND		ND	
JS14-GW01-200.2-0604	Laboratory	Static	5-Apr-06	200.2	0.18	U	0.13	U	0.34	U	0.16	U
JS14-GW01-220.2-0604	Laboratory	Static	5-Apr-06	220.2	**3.9**	UB	0.13	UJH	0.34	UJH	0.16	UJH
JS14-GW01-250.3-060405	Field GC	Static	5-Apr-06	250.3	**3.30**		ND		ND		ND	
JS14-GW01-250.3-060405	Field GC	Static	5-Apr-06	250.3	**4.49**		ND		ND		ND	
JS14-GW01-280.3-060405	Field GC	Static	5-Apr-06	280.3	**3**		ND		ND		ND	
JS14-GW01-280.3-060405	Field GC	Static	5-Apr-06	280.3	**6**		ND		ND		ND	
JS14-GW01-375.3-060405	Field GC	Static	5-Apr-06	375.3	**3.25**		ND		ND		ND	
JS14-GW01-375.3-060405	Field GC	Static	5-Apr-06	375.3	**4.46**		ND		ND		ND	
JS14-EB01-000.0-060406	Laboratory	Equipment Blank	6-Apr-06	--	**4.4**		0.13	U	0.34	U	0.16	U
JS14 Discharge	Field GC	Discharge	6-Apr-06	--	**14.40**		ND		ND		ND	
JS14 Discharge	Field GC	Discharge	6-Apr-06	--	**6.29**		ND		ND		ND	
JS14-GW01-105.1-060406	Field GC	Pumping	6-Apr-06	105.1	**19.3**		ND		ND		ND	
JS14-GW01-105.1-0604	Laboratory	Pumping	6-Apr-06	105.1	29	UB	0.13	U	0.34	U	0.16	U
JS14-GW02-105.1-0604	Laboratory	Pumping	6-Apr-06	105.1	26	UB	0.13	U	0.34	U	0.16	U
JS14-GW01-110.1-060406	Field GC	Pumping	6-Apr-06	110.1	**20.4**		ND		ND		ND	
JS14-GW01-120.1-060406	Field GC	Pumping	6-Apr-06	120.1	**15.75**		ND		ND		ND	
JS14-GW01-134-060406	Field GC	Pumping	6-Apr-06	134	**13.34**		ND		ND		ND	
JS14-GW01-145-060406	Field GC	Pumping	6-Apr-06	145	**12.73**		ND		ND		ND	
JS14-GW01-145.2-0604	Laboratory	Pumping	6-Apr-06	145.2	17	UB	0.13	U	0.34	U	0.16	U
JS14-GW01-175-060406	Field GC	Pumping	6-Apr-06	175	**14.34**		ND		ND		ND	
JS14-GW01-185.3-060406	Field GC	Pumping	6-Apr-06	185.3	**13.67**		ND		ND		ND	
JS14-GW01-250.2-0604	Laboratory	Pumping	6-Apr-06	250.2	16	UB	0.13	U	0.34	U	0.16	U
JS36-GWS1-077.1-080423	Laboratory	Static	23-Apr-08	77.1	**280**	B+	**7.3**		**2.4**		0.23	U
JS36-GWS1-189.3-080424	Laboratory	Static	24-Apr-08	189.3	**250**	B+	**6.2**		**2.4**		0.23	U

TABLE 3.6
SUMMARY OF INTERVAL SCREENING ANALYSES
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

SAMPLE ID	ANALYZED VIA	PUMPING CONDITIONS	SAMPLING DATE	SAMPLING DEPTH	PCE		TCE		1,2-DCE		Vinyl Chloride	
Maximum Contaminant Level					***5***		***5***		***70***		***2***	
JS36-GWS1-200.0-080424	Laboratory	Static	24-Apr-08	200.0	**250**	B+	**5.4**		**1.9**	J	0.23	U
JS36-GWS1-250.1-080424	Laboratory	Static	24-Apr-08	250.1	**230**	B+	**6.0**		0.3	U	0.23	U
JS36-GWS1-267.2-080424	Laboratory	Static	24-Apr-08	267.2	**250**	B+	**6.8**		**2.5**		0.23	U
JS36-GWS1-410.2-080424	Laboratory	Static	24-Apr-08	410.2	**260**	B+	**6.0**		**2.4**		0.23	U
JS36-EB01-080424	Laboratory	Equipment Blank	24-Apr-08	--	**5.1**		0.2	U	0.3	U	0.23	U
JS36-GWP1-105.5-080424	Laboratory	Pumping	24-Apr-08	105.5	**250**	B+	**5.8**		**2.3**		0.23	U
JS36-GWP2-105.5-080424	Laboratory	Pumping (Duplicate)	24-Apr-08	105.5	**220**	B+	**5.6**		**2.2**		0.23	U
JS36-GWP1-189.3-080424	Laboratory	Pumping	24-Apr-08	189.3	**290**	B+	**6.1**		**2.2**		0.23	U
JS36-GWP1-200.0-080424	Laboratory	Pumping	24-Apr-08	200.0	**250**	B+	**5.9**		**2.2**		0.23	U
JS36-GWP1-250.1-080424	Laboratory	Pumping	24-Apr-08	250.1	**210**	B+	**5.1**		**1.8**	J	0.23	U
JS36-GWP1-267.1-080424	Laboratory	Pumping	24-Apr-08	267.1	**230**	B+	**5.3**		**2.1**		0.23	U
JS36-GWP1-410.0-080424	Laboratory	Pumping	24-Apr-08	410.0	**220**	B+	**5.4**		**2.1**		0.23	U
JS-37-S-64	Field GC	Static	07/22/04	64.0	**422.8**		**15.46**		**4.**			
JS-37-S-70A	Field GC	Static	07/22/04	70.0	**514.4**		**15.35**		**4.**			
JS-37-S-100A	Field GC	Static	07/22/04	100.0	**245.4**		**10.26**		**3.**			
JS-37-S-110A	Field GC	Static	07/22/04	110.0	**115.8**		**9.63**		**3.**			
JS-37-S-160A	Field GC	Static	07/22/04	160.0	**167.9**		**11.77**		**4.**			
JS-37-P-100	Field GC	(Duplicate)	07/27/04	100.0	**28.94**		**1.76**		**5.**			
JS-37-P-100	Field GC	(Duplicate)	07/27/04	100.0	**31.89**		**1.02**		**1.**			
JS-37-P-150	Field GC	Pumping	07/27/04	150.0	**64.5**		**2.1**		**4.05**			
JS-37-P-210	Field GC	Pumping	07/27/04	210.0	**62.2**		**2.18**		**4.2**			
JS-37-P-230	Field GC	(Duplicate)	07/27/04	230.0	**63.25**		**3.39**		**5.**			
JS-37-P-230	Field GC	(Duplicate)	07/27/04	230.0	**59.**		**1.85**		**5.**			
JS-37-P-250	Field GC	(Duplicate)	07/27/04	250.0	**54.35**		**1.24**		**2.**			
JS-37-P-250	Field GC	(Duplicate)	07/27/04	250.0	**54.65**		**2.45**		**1.2**			
JS-37-Outflow-1	Field GC	Outflow	07/27/04		**69.39**		**3.45**		**0.**			
JS-37-Ouflow-3	Field GC	Outflow (Duplicate)	07/27/04		**50.49**		**2.01**		**0.**			
JS-37-Outflow-3	Field GC	Outflow (Duplicate)	07/27/04		**50.9**		**1.97**		**1.3**			
JS-38-S-75	Field GC	Static	07/22/04	75.0	**30.1**		**5.57**		**0.**			
JS-38-S-75	Field GC	Static	07/22/04	75.0	**30.91**		**7.02**		**2.25**			
JS-38-S-102.5A	Field GC	Static	07/26/04	102.5	**11.09**		**2.**		**2.5**			

TABLE 3.6
SUMMARY OF INTERVAL SCREENING ANALYSES
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

SAMPLE ID	ANALYZED VIA	PUMPING CONDITIONS	SAMPLING DATE	SAMPLING DEPTH	PCE		TCE		1,2-DCE		Vinyl Chloride	
Maximum Contaminant Level					***5***		***5***		***70***		***2***	
JS-38-S-105	Field GC	Static	07/22/04	105.0	**27.7**		**5.31**		**0.**			
JS-38-S-105A	Field GC	Static	07/26/04	105.0	**11.75**		**2.55**		**2.**			
JS-38-S-110A	Field GC	Static	07/26/04	110.0	**10.97**		**2.**		**2.**			
JS-38-S-120	Field GC	Static	07/22/04	120.0	**19.32**		**5.31**		**0.**			
JS-38-S-140	Field GC	Static	07/22/04	140.0	**19.33**		**4.23**		**2.**			
JS-38-S-235	Field GC	Static	07/22/04	235.0	**16.99**		**5.41**		**1.9**			
JS-38-S-325	Field GC	Static	07/22/04	325.0	**15.65**		**4.64**		**1.85**			
JS-38-P-85	Field GC	Pumping (Duplicate)	07/23/04	85.0	**13.54**		**0.65**		**0.25**			
JS-38-P-85	Field GC	Pumping (Duplicate)	07/23/04	85.0	**13.58**		**1.**		**0.**			
JS-38-P-102.5	Field GC	Pumping	07/23/04	102.5	**12.89**		**0.**		**0.**			
JS-38-P-105	Field GC	Pumping	07/23/04	105.0	**15.03**		**1.35**		**0.**			
JS-38-P-110	Field GC	Pumping	07/23/04	110.0	**14.73**		**1.2**		**0.75**			
JS-38-P-120	Field GC	Pumping	07/23/04	120.0	**12.62**		**0.**		**0.**			
JS-38-P-175	Field GC	Pumping	07/23/04	175.0	**15.32**		**1.35**		**0.**			
JS-38-P-190	Field GC	Pumping	07/23/04	190.0	**12.87**		**1.**		**0.**			
JS-38-P-325	Field GC	Pumping (Duplicate)	07/23/04	325.0	**11.34**		**1.25**		**0.**			
JS-38-P-325	Field GC	Pumping (Duplicate)	07/23/04	325.0	**12.14**		**1.2**		**0.93**			
JS-38-Outlet-1	Field GC	Outlet	07/23/04		**8.46**		**1.2**		**0.63**			
JS-38-Outlet-A	Field GC	Outlet	07/23/04		**10.25**		**3.25**		**0.**			
JS-38-Outlet-B	Field GC	Outlet	07/23/04		**10.64**		**3.25**		**0.**			
JS-38-Outlet-C	Field GC	Outlet	07/23/04		**11.66**		**1.13**		**0.75**			
JS-38-Outlet-D	Field GC	Outlet	07/23/04		**10.51**		**1.75**		**0.75**			
JS-37-S-64	Laboratory	Static	7/22/2004		330	D	**5.5**		5.5			
JS-37-S-70A	Laboratory	Static	7/22/2004		340	D	**5.7**		5.7			
JS-37-S-160A	Laboratory	Static	7/22/2004		88	E	**1.4**		1.4			
JS-37-P-100	Laboratory	Pumping	7/27/2004		50	E	**0.94**		0.94			
JS-37-P-150	Laboratory	Pumping	7/27/2004		53	D	**0.98**		0.98			
JS-37-P-210	Laboratory	Pumping	7/27/2004		66	D	**0.85**		0.85			
JS-37-P-230	Laboratory	Pumping	7/27/2004		49	D	**0.67**		0.67			
JS-37-P-250	Laboratory	Pumping	7/27/2004		55	D	**1.1**		1.1			

TABLE 3.6
SUMMARY OF INTERVAL SCREENING ANALYSES
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

SAMPLE ID	ANALYZED VIA	PUMPING CONDITIONS	SAMPLING DATE	SAMPLING DEPTH	PCE		TCE		1,2-DCE		Vinyl Chloride	
Maximum Contaminant Level					***5***		***5***		***70***		***2***	
JS-37-OUTFLOW 4	Laboratory		7/27/2004		57	D	**0.86**		0.86			
JS-38-S-105A	Laboratory	Static	7/26/2004		**30**		**0.64**		**0.64**			
JS-38-S-120	Laboratory	Static	7/22/2004		**9.7**		**<0.5**		**<0.5**			
JS-38-S-325	Laboratory	Static	7/22/2004		**7.8**		**<0.5**		**<0.5**			
JS-38-P-85	Laboratory	Pumping	7/22/2004		**9.1**		**0.35 J**		**0.35 J**			
JS-38-P-120	Laboratory	Pumping	7/22/2004		**8.1**		**0.30 J**		**0.30 J**			
JS-38-P-190	Laboratory	Pumping	7/22/2004		**7.8**		**0.28 J**		**0.28 J**			
JS-38-P-325	Laboratory	Pumping	7/22/2004		**7.8**		**0.32 J**		**0.32 J**			
JS-38-OUTLET-1	Laboratory		7/22/2004		**7.8**		**<0.5**		**<0.5**			

Notes:
SW-846 8260B: Analyzed in an off-site laboratory via SW-846 8260B
Field GC: Analyzed on a Photovac or Syntex Portable Gas Chromatograph by USGS
The off-site laboratory analytical data has been validated in accordance with the USEPA approved Quality Assurance Project Plan, March 2006
(NO QUALIFIER) - Confirmed identification.
U: Analyte was analyzed for but not detected above the adjusted project reporting limit (PRL).
UJ: Analyte not detected, reported PRL may be inaccurate or imprecise. Additional qualifiers (defined below) give further detail of the reasons for the 'J' qualifier.
J: Analyte detected, estimated concentration.
H: Holding time or sample preservation violation.
L: Reported percent recovery value is outside the control limits for the LCS sample associated with the sample.
UB: Data considered to be undetected at the elevated reporting limit due to laboratory or field blank contamination. Data is usable as undetected value.
ND: Not Detected
For analytical results obtained via portable Gas Chromatographs (GC), in the event that analyte was not detected in a duplicate sample or has been not detected by a different instrument or by the off-site lab, the analyte was considered non-detect.
All units are in micrograms/ Liter (µg/L)
Shaded results exceed EPA National Primary Drinking Water Maximum Contaminant Levels (MCLs).
Bolded results indicate detected compounds.
D indicates that the sample was diluted for analysis
E indicates estimated values

TABLE 3.7
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN OVERBURDEN NORTH OF BOEUF LUTHERAN ROAD (TASK 2B)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID	500-18318-1	500-18318-3	500-18318-4	500-18318-5	500-18318-6	500-18367-3	500-18367-2
		Sample Date	15-Apr-09	15-Apr-09	16-Apr-09	16-Apr-09	16-Apr-09	17-Apr-09	17-Apr-09
		Sample Depth (feet)	42	39.4	32.5	29.5	29.5	12.3	5.2
		Sample ID	CSE04-GW01-042.0-090415	CSE05-GW01-039.4-090415	CSE06-GW01-032.5-090416	CSE07-GW01-029.5-090416	CSE07-GW02-029.5-090416	CSE08-GW01-012.3-090417	CSE10-GW01-005.2-090417
VOCs		UNITS:							
Acetone	2,970	ug/L	R	R	**5.4** J	R	R	R	R
Trichloroethene	5	ug/L	**63**	**220**	**46**	**47**	**65**	**95**	ND
Tetrachloroethene	5	ug/L	**1500** +	**2800** +	**590** +	**710** +	**870** +	**560** +	ND
1,2-Dichloroethene, Total	70	ug/L	**32**	**64**	**8.4**	**9**	**11**	**27**	ND

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
+: results reported from diluted samples
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

TABLE 3.7
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN OVERBURDEN NORTH OF BOEUF LUTHERAN ROAD (TASK 2B)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID	500-18318-7	500-18318-8	500-18367-5	500-11381-1	500-11379-6	500-11379-4	500-11381-2
		Sample Date	16-Apr-09	16-Apr-09	17-Apr-09	14-May-08	14-May-08	14-May-08	15-May-08
		Sample Depth (feet)	4.5	6	27.4	8	27.4	27.4	16
		Sample ID	CSE11-GW01-004.5-090416	CSE12-GW01-006.0-090416	CSN01-GW01-027.4-090417	CSN2-GW01-008.0-080514	CSN2-GW01-027.4-080515	CSN2-GW02-027.4-080514	CSN3-GW01-016.0-080515
VOCs		UNITS:							
Acetone	2,970	ug/L	R	**10** J	R	**11**	**35** J+	ND	ND
Trichloroethene	5	ug/L	ND	ND	**80**	ND	**17** +	**15** +	ND
Tetrachloroethene	5	ug/L	ND	**1.2**	**720** +	ND	**170** +	**300** +	ND
1,2-Dichloroethene, Total	70	ug/L	ND	ND	**31**	ND	**4.2** +	**3.1** +	ND

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
+: results reported from diluted samples
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

TABLE 3.7
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN OVERBURDEN NORTH OF BOEUF LUTHERAN ROAD (TASK 2B)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID	500-11379-7	500-11379-5	500-11402-2	500-18367-4
		Sample Date	15-May-08	15-May-08	16-May-08	17-Apr-09
		Sample Depth (feet)	25.7	26.8	27	33.7
		Sample ID	CSN3-GW01-025.7-080515	CSN4-GW01-026.8-080515	CSN5-GW01-027.0-080516	CSN06-GW01-033.7-090417
VOCs		UNITS:				
Acetone	2,970	ug/L	ND	**5.6** +	**12**	R
Trichloroethene	5	ug/L	**4.4**	**34** +	**70**	**56**
Tetrachloroethene	5	ug/L	**52**	**260** +	**780** +	**770** +
1,2-Dichloroethene, Total	70	ug/L	ND	**8.1** +	**11**	**9.6**

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
+: results reported from diluted samples
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

TABLE 3.8
RESIDENTIAL WELL INFORMATION SUMMARY
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Well ID	Type of Well	Well Depth (ft bgs)	Casing Length (ft bgs)	Casing Type	Installation Date	Land Surface Elevation (ft MSL)	Street Address
JS-07	Residential	415	103	NA	1995	563	1247 Highway C
JS-10	Residential	NA	NA	NA	--	600	1176 Highway C
JS-11	Residential	435	NA	NA	1965	590	1199 Highway C
JS-12	Residential	400	NA	PVC[2]	--	--	2921 Boeuf Lutheran Rd
JS-14	Residential	383	220	PVC[1]	1970s	588	2851 Boeuf-Lutheran Rd
JS-15	Residential	425	120	NA	1994	598	2784 Bouef-Lutheran Rd
JS-20	Residential	400	NA	NA	--	--	2926 Bouef Lutheran Rd
DM-21	Residential	400	NA	NA	--	--	2939 Boeuf Lutheran Rd
JS-25	Residential	NA	NA	NA	--	617	1074 Highway C
JS-27	Residential	NA	NA	NA	--	--	1043 Highway C
JS-29	Residential	400	NA	NA	1994	605	2750 Boeuf-Lutheran Rd
JS-33	Residential	NA	NA	NA	--	588	1191 Highway C
JS-36	Residential	368	331	PVC[1]	1951	588	2852 Boeuf Lutheran Road
JS-37	Residential	297	61	Steel	--	575	2826 Boeuf-Lutheran Rd
JS-38	Residential	340	175	PVC[1]	2000	556	585 Wildcat Creek Lane
JS-39	Residential	385	140	PVC	2001	--	529 Wildcat Creek Lane
JS-40	Residential	NA	NA	NA	--	550	1279 Highway C
JS-41	Residential	NA	NA	NA	--	555	1273 Highway C
JS-42	Residential	NA	NA	NA	--	561	1251 Highway C
JS-43	Residential	NA	NA	NA	--	570	1231 Highway C
JS-44	Residential	NA	NA	NA	--	583	1217 Highway C
JS-45	Residential	NA	NA	NA	--	572	1227 Highway C
JS-47	Residential	390	90	NA	1969	535	1356 Highway C
JS-50	Residential	400	200	NA	2002	561	513 Wildcat Creek Lane
JS-51	Residential	NA	NA	NA	--	--	2917 Boeuf Lutheran Rd
JS-52	Residential	NA	NA	PVC	2004	570	571 Wildcat Creek Lane
PA-53	Residential	NA	NA	NA	--	--	1321 Highway C
MW-2R	Residential	370	341	PVC	2004	538	559 Wildcat Creek Lane
PA-55	Residential	387	345	PVC[1]	2007	551	539 Wildcat Creek Lane
MW-13	Residential	420	155	PVC	2006	579	887 Burt Lane

Notes:
Adapted from USGS, 2004 with additions
ft bgs: feet below ground surface
ft MSL: feet above mean sea level
PVC: polyvinyl chloride
[1]: Original/outer casing is steel with PVC liner installed
[2]: Owner reports original steel casing either replaced with PVC or lined with PVC

TABLE 3.9
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN RESIDENTIAL WELLS (TASK 2C)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth Sample ID	500-9940-5 6-Mar-08 NA DM21-GW01-080306	500-9940-2 6-Mar-08 415 JS07-GW01-080306	500-9986-5 11-Mar-08 NA JS10-GW01-080311	500-9986-6 11-Mar-08 NA JS10-GW02-080311	500-9940-3 6-Mar-08 NA JS11-GW01-080306	500-9986-9 11-Mar-08 NA JS12-GW01-080311	500-9794-11 28-Feb-08 NA JS14-INF-GW01-080228	500-9940-6 6-Mar-08 NA JS15-GW01-080306	500-9940-4 6-Mar-08 NA JS20-GW01-080306	500-10929-1 25-Apr-08 NA JS25-GW01-080425
VOCs		UNITS:										
Methyl tert-butyl ether	128	ug/L	ND	ND	**0.16** J	**0.16** J	ND	ND	ND	ND	ND	**0.21** J
cis-1,2-Dichloroethene	70	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ug/L	ND	ND	ND	ND	ND	ND	**0.43**	ND	ND	**0.73**
Tetrachloroethene	5	ug/L	ND	ND	ND	ND	ND	ND	**37**	ND	ND	**21**

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
ND: compound was not detected
J: estimated concentration
+: results reported from diluted samples
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

TABLE 3.9
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN RESIDENTIAL WELLS (TASK 2C)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth Sample ID	500-11671-2 27-May-08 NA JS25-GW01-080527	500-10541-6 9-Apr-08 NA JS27-GW01-080409	500-9986-4 11-Mar-08 NA JS29-GW01-080311	500-9986-2 11-Mar-08 NA JS33-GW01-080311	500-9794-2 28-Feb-08 NA JS36-INF-GW01-080228	500-9794-3 28-Feb-08 NA JS36-INF-GW02-080228	500-10072-3 14-Mar-08 NA JS37-GW01-080314	500-10072-4 14-Mar-08 NA JS37-GW02-080314	500-9794-15 28-Feb-08 NA JS38-INF-GW01-080228	500-9794-16 28-Feb-08 NA JS38-INF-GW02-080228
VOCs		UNITS:										
Methyl tert-butyl ether	128	ug/L	ND	ND	**0.15** J	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	70	ug/L	ND	ND	ND	ND	**2.2**	**2.4**	**1.1**	**0.92**	ND	ND
Trichloroethene	5	ug/L	ND	ND	ND	ND	5	**5.9**	ND	**1.1** J	**0.3**	**0.28**
Tetrachloroethene	5	ug/L	ND	**0.7**	ND	ND	**280** +	**290** +	**51** +	**58** +	**6.8**	**6.5**

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
ND: compound was not detected
J: estimated concentration
+: results reported from diluted samples
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

TABLE 3.9
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN RESIDENTIAL WELLS (TASK 2C)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth Sample ID	500-10541-4 9-Apr-08 385 JS39-GW01-080409	500-10541-5 9-Apr-08 NA JS40-GW01-080409	500-11671-3 28-May-08 NA JS41-GW01-080528	500-9986-7 11-Mar-08 NA JS42-GW01-080311	500-11380-1 14-May-08 NA JS43-GW01-080514	500-10541-2 9-Apr-08 NA JS44-GW01-080409	500-10541-3 9-Apr-08 NA JS45-GW01-080409	500-9986-8 11-Mar-08 390 JS47-GW01-080311	500-10072-2 14-Mar-08 NA JS50-GW01-080314	500-9986-3 11-Mar-08 NA JS51-GW01-080311
VOCs		UNITS:										
Methyl tert-butyl ether	128	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	70	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
ND: compound was not detected
J: estimated concentration
+: results reported from diluted samples
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

TABLE 3.9
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN RESIDENTIAL WELLS (TASK 2C)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth Sample ID	500-9794-7 28-Feb-08 NA JS52-INF-GW01-080228	500-10541-7 9-Apr-08 NA MW13-GW01-080409	500-9794-20 28-Feb-08 369.8 MW2R-GW01-000.0-080228	500-11671-1 27-May-08 NA PA53-GW01-080527	500-9794-21 28-Feb-08 387 PA55-GW01-000.0-080228	500-9794-19 29-Feb-08 NA W3-GW01-000.0-080229
VOCs		UNITS:						
Methyl tert-butyl ether	128	ug/L	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	70	ug/L	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ug/L	**0.25**	ND	ND	ND	ND	ND
Tetrachloroethene	5	ug/L	**5.3**	ND	ND	ND	ND	ND

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
ND: compound was not detected
J: estimated concentration
+: results reported from diluted samples
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

TABLE 3.10
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN SITE-WIDE GROUNDWATER SAMPLING – ROUND 1 (TASK 2E)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID	500-17729-1	500-17702-3	500-17786-3	500-17786-2	500-18415-1	500-17843-3	500-18570-3	500-18570-4	500-17843-1	500-17843-4
		Sample Date	19-Mar-09	18-Mar-09	24-Mar-09	24-Mar-09	22-Apr-09	25-Mar-09	29-Apr-09	29-Apr-09	25-Mar-09	25-Mar-09
		Sample Depth (feet)	20	52.5	440	260	425	NA	473	473	385	NA
		Sample ID	BW20-GW01-090319	BW21A-GW01-090318	BW21-GW01-090324	BW22-GW01-090324	JS15-GW01-090422	JS20-GW01-090325	JS25-GW01-090429	JS25-GW02-090429	JS39-GW01-090325	JS40-GW01-090325
VOCs		UNITS:										
Acetone	2,970	ug/L	ND	ND	ND	ND	R	R	R	R	R	R
Methylene Chloride	5	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	3,640	ug/L	ND		ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ug/L	ND	**150**	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ug/L	**190000** +	**810** +	ND	ND	ND	ND	**7.1**	**7.9**	ND	ND
1,2-Dichloroethene, Total	70	ug/L	ND	**78**	ND	ND	ND	ND	ND	ND	ND	ND
SVOCs												
Phenol	4,570	ug/L										
2-Methylphenol	743	ug/L										
3 & 4 Methylphenol	NA	ug/L										
Naphthalene	1.09	ug/L										
2-Methylnaphthalene	11.70	ug/L										
METALS												
Barium	2	mg/L										
Chromium	0.1	mg/L										
Zinc	4.69	mg/L										
NATURAL ATTENUATION PARAMETERS												
Nitrogen, Nitrate	NA	#N/A	**3.3**	**1.1**	ND	**0.18**	**0.063** J	**0.32**	**2.5**	**2.4**	**0.021** J	ND
Nitrogen, Nitrite	NA	mg/L	**0.44**	ND	ND	ND	ND	ND	**0.011** J	**0.013** J	ND	**0.013** J
Sulfate	NA	mg/L	**330**	**16**	**11**	**4.5**	**11**	**8.2**	**14**	**14**	**14**	**9.4**
Chloride	NA	mg/L	**64**	**44**	**1.9**	**2.8**	**2.6**	**2.4**	**80**	**72**	**1.8**	**4.8**
Sulfide	NA	mg/L	**0.31** J	**1.5**	ND	ND	ND	ND	ND	ND	ND	ND
Methane	NA	ug/L	**0.26** J	**0.19** J	**0.71** J	**9.9** J	ND	**0.25** J	ND	ND	**0.35** J	**0.44** J
Ethane	NA	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylene	NA	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ammonia (as N)	NA	mg/L	**1.3**	**0.2**	ND	ND	ND	**0.38**	ND	ND	**0.52**	ND
Nitrogen, Nitrate Nitrite	NA	mg/L	**3.7**	**1.1**	ND	**0.18**	**0.063** J	**0.32**	**2.5**	**2.4**	**0.021** J	ND

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used

NA: Not Available

Blank Cells: Parameter Not Analyzed

ND: compound was not detected

J: estimated concentration

+: results reported from diluted samples

R: rejected data

Natural attenuation parameters were collected as a separte sampling event for MW-14US, thus there are two lab sample IDs and two sample dates

Bolded values: detected

Shaded values: exceeded screening criteria

Shaded sample ID indicates a duplicate sample

TABLE 3.10
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN SITE-WIDE GROUNDWATER SAMPLING – ROUND 1 (TASK 2E)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID	500-20828-7	500-18900-4	500-18900-3	500-18573-3	500-21444-1	500-20828-6 500-21108-1	500-17676-1	500-17676-2	500-17702-1	500-17587-1
		Sample Date	26-Aug-09	14-May-09	14-May-09	28-Apr-09	30-Sep-09	26-Aug-09 10-Sep-09	17-Mar-09	17-Mar-09	18-Mar-09	11-Mar-09
		Sample Depth (feet)	NA	28	130	56	382	33.5	53.5	56	61	48
		Sample ID	PA53-GW01-090826	MW04A-GW01-090514	MW04B-GW01-090514	MW04BS-GW01-090428	MW4-GW01-090930	MW14US-GW01-033.0-090826	MW101-GW01-090317	MW102-GW01-090317	MW103-GW01-090318	MW10UB-GW01-090311
VOCs		UNITS:										
Acetone	2,970	ug/L	R	R	R	ND	ND	R	ND	ND	ND	ND
Methylene Chloride	5	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	3,640	ug/L	ND	ND	ND	ND	**28**	ND				ND
Trichloroethene	5	ug/L	ND	**14**	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ug/L	ND	**460** +	ND	**4.1**	ND	ND	**16**	ND	ND	ND
1,2-Dichloroethene, Total	70	ug/L	ND	**2.6**	ND	ND	ND	ND	ND	ND	ND	ND
SVOCs												
Phenol	4,570	ug/L							**10**			
2-Methylphenol	743	ug/L							**1.3** J			
3 & 4 Methylphenol	NA	ug/L							**0.33** J			
Naphthalene	1.09	ug/L							**0.42** J			
2-Methylnaphthalene	11.70	ug/L							ND			
METALS												
Barium	2	mg/L							**0.098**			
Chromium	0.1	mg/L							**0.0053** J			
Zinc	4.69	mg/L							ND			
NATURAL ATTENUATION PARAMETERS												
Nitrogen, Nitrate	NA	#N/A	**1.6**	**3.4**	ND			**1.3**	**0.32**	**0.66**	**4.7**	ND
Nitrogen, Nitrite	NA	mg/L	ND	ND	ND			ND	ND	ND	ND	**0.24**
Sulfate	NA	mg/L	**9.7**	**16**	**22**			**44**	**13**	**19**	**28**	**10**
Chloride	NA	mg/L	**5.3**	**34**	**4.7**			**81**	**5.4**	**11**	**18**	**12**
Sulfide	NA	mg/L	ND	ND	ND			ND	ND	ND	ND	ND
Methane	NA	ug/L	ND	ND	**27**			**2.1**	**0.19** J	**0.19** J	**0.19** J	**0.3** J
Ethane	NA	ug/L	ND	ND	**8.6**			**0.43**	ND	ND	ND	ND
Ethylene	NA	ug/L	ND	ND	**4**			ND	ND	ND	ND	ND
Ammonia (as N)	NA	mg/L	ND	**0.23**	ND			ND	**0.17** J	**0.82**	**0.4**	**0.19** J
Nitrogen, Nitrate Nitrite	NA	mg/L	**1.6**	**3.4**	ND			**1.3** J	**0.32**	**0.66**	**4.7**	**0.24**

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used

NA: Not Available

Blank Cells: Parameter Not Analyzed

ND: compound was not detected

J: estimated concentration

+: results reported from diluted samples

R: rejected data

Natural attenuation parameters were collected as a separte sampling event for MW-14US, thus there are two lab sample IDs and two sample dates

Bolded values: detected

Shaded values: exceeded screening criteria

Shaded sample ID indicates a duplicate sample

TABLE 3.10
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN SITE-WIDE GROUNDWATER SAMPLING – ROUND 1 (TASK 2E)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID	500-17587-3	500-18900-1	500-18900-2	500-17651-4	500-17651-2	500-17651-3	500-17392-2	500-17448-1	500-17448-3	500-17392-1
		Sample Date	11-Mar-09	14-May-09	14-May-09	16-Mar-09	16-Mar-09	16-Mar-09	3-Mar-09	5-Mar-09	5-Mar-09	3-Mar-09
		Sample Depth (feet)	48	92.3	91	NA	29.1	29.1	111.2	75.3	43.6	369.8
		Sample ID	MW10UB-GW02-090311	MW11-GW01-090514	MW12-GW01-090514	MW13-GW01-090316	MW1S-GW01-090316	MW1S-GW02-090316	MW1SW-GW01-090303	MW1T1-GW01-090305	MW1UB-GW01-090305	MW2R-GW01-090303
VOCs		UNITS:										
Acetone	2,970	ug/L	ND	R	R	R	R	R	R	ND	ND	R
Methylene Chloride	5	ug/L	**3.5**	ND	ND	ND	**28**	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	3,640	ug/L	ND	ND	ND				ND	ND	ND	ND
Trichloroethene	5	ug/L	ND	ND	ND	ND	**87**	**94**	ND	ND	**100**	ND
Tetrachloroethene	5	ug/L	ND	ND	ND	ND	**2000** +	**2100** +	**2.3**	**1.6**	**1700** +	ND
1,2-Dichloroethene, Total	70	ug/L	ND	ND	ND	ND	**40**	**41**	ND	ND	**44**	ND
SVOCs												
Phenol	4,570	ug/L					ND	ND				
2-Methylphenol	743	ug/L					ND	ND				
3 & 4 Methylphenol	NA	ug/L					ND	ND				
Naphthalene	1.09	ug/L					ND	ND				
2-Methylnaphthalene	11.70	ug/L					ND	ND				
METALS												
Barium	2	mg/L					**0.25**	**0.24**				
Chromium	0.1	mg/L					**0.0029** J	**0.0033** J				
Zinc	4.69	mg/L					ND	ND				
NATURAL ATTENUATION PARAMETERS												
Nitrogen, Nitrate	NA	#N/A	**2.4**	**2**	**7**	**0.2**	**1.1**	**2.3**	**0.23**	**0.065** J	**0.87**	**0.095** J
Nitrogen, Nitrite	NA	mg/L	**0.24**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sulfate	NA	mg/L	**10**	**10**	**13**	**10**	**19**	**18**	**5.6**	**11**	**25**	**4.5**
Chloride	NA	mg/L	**12**	**5**	**18**	**2**	**24**	**23**	**9.1** J	**1.8**	**27**	**2.5** J
Sulfide	NA	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methane	NA	ug/L	**0.29** J	ND	**68**	**0.19** J	**0.21** J	**0.21** J	**0.44** J	**0.31** J	**0.56** J	**0.42** J
Ethane	NA	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	**1.1**	ND
Ethylene	NA	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	**1.2**	ND
Ammonia (as N)	NA	mg/L	**0.074** J	**0.097** J	ND	**0.39**	**0.31**	**0.22**	**0.77**	ND	ND	ND
Nitrogen, Nitrate Nitrite	NA	mg/L	**2.6**	**2**	**7**	**0.2**	**1.1**	**2.3**	**0.23**	**0.065** J	**0.87**	**0.095** J

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used

NA: Not Available

Blank Cells: Parameter Not Analyzed

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Bolded values: detected

Shaded values: exceeded screening criteria

Shaded sample ID indicates a duplicate sample

TABLE 3.10
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN SITE-WIDE GROUNDWATER SAMPLING – ROUND 1 (TASK 2E)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID	500-17392-3	500-17392-4	500-17362-1	500-17362-3	500-17362-2	500-17605-1	500-17508-2	500-17534-1	500-17508-1
		Sample Date	3-Mar-09	3-Mar-09	2-Mar-09	2-Mar-09	2-Mar-09	12-Mar-09	9-Mar-09	10-Mar-09	9-Mar-09
		Sample Depth (feet)	20.4	20.4	56.3	116	195	50.8	450.8	141	73
		Sample ID	MW2S-GW01-090303	MW2S-GW02-090303	MW2SW-GW01-090302	MW2T2-GW01-090302	MW2T3-GW01-090302	MW5UB-GW01-090312	MW6R-GW01-090309	MW6SW-GW01-090310	MW6US-GW01-090309
VOCs		UNITS:									
Acetone	2,970	ug/L	R	R	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	3,640	ug/L	ND	ND				ND	ND	ND	ND
Trichloroethene	5	ug/L	**1.5**	**1.4**	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ug/L	**22**	**20**	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene, Total	70	ug/L	**1.6** J	**1.6** J	ND	ND	ND	ND	ND	ND	ND
SVOCs											
Phenol	4,570	ug/L									ND
2-Methylphenol	743	ug/L									ND
3 & 4 Methylphenol	NA	ug/L									ND
Naphthalene	1.09	ug/L									**0.29** J
2-Methylnaphthalene	11.70	ug/L									**0.17** J
METALS											
Barium	2	mg/L									**0.096**
Chromium	0.1	mg/L									**0.005** J
Zinc	4.69	mg/L									ND
NATURAL ATTENUATION PARAMETERS											
Nitrogen, Nitrate	NA	#N/A	**2.1**	**2.1**	ND	ND	ND	**0.94**	ND	**0.11**	**0.098** J
Nitrogen, Nitrite	NA	mg/L	ND	ND	ND	ND	ND	**0.016** J	**0.0073** J	ND	ND
Sulfate	NA	mg/L	**20**	**23**	**9.4**	**8.5**	**12**	**11**	**13**	**6.7**	**10**
Chloride	NA	mg/L	**61** J	**66** J	**2.1**	**1.8**	**1.8**	**13**	**1.9**	**4.5**	**3.8**
Sulfide	NA	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methane	NA	ug/L	**0.45** J	**0.41** J	**0.88** J	**0.49** J	**0.44** J	**0.23** J	**0.36** J	**0.3** J	**0.31** J
Ethane	NA	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylene	NA	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ammonia (as N)	NA	mg/L	**0.83**	**0.37**	**0.27**	**0.11** J	**0.062** J	**0.17** J	**0.12** J	**0.19** J	**0.077** J
Nitrogen, Nitrate Nitrite	NA	mg/L	**2.1**	**2.1**	ND	ND	ND	**0.96**	ND	**0.11**	**0.098** J

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used

NA: Not Available

Blank Cells: Parameter Not Analyzed

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Bolded values: detected

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Shaded sample ID indicates a duplicate sample

TABLE 3.10
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS IN SITE-WIDE GROUNDWATER SAMPLING – ROUND 1 (TASK 2E)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID	500-17766-3	500-17651-1	500-17766-2	500-18570-2	500-17605-3	500-17605-4	500-17605-5
		Sample Date	23-Mar-09	16-Mar-09	23-Mar-09	28-Apr-09	12-Mar-09	12-Mar-09	12-Mar-09
		Sample Depth (feet)	94	26	95	NA	125	57.4	57.4
		Sample ID	MW7SW-GW01-090323	MW7US-GW01-090316	MW8US-GW01-090323	MW9R-GW01-090428	MW9SW-GW01-090312	MW9US-GW01-090312	MW9US-GW02-090312
VOCs		UNITS:							
Acetone	2,970	ug/L	ND	R	ND	**6.8** J	ND	ND	ND
Methylene Chloride	5	ug/L	ND	ND	ND	ND	**5.2**	ND	ND
Methyl Ethyl Ketone	3,640	ug/L				**46**	ND	ND	ND
Trichloroethene	5	ug/L	ND	**140** J	ND	ND	ND	ND	ND
Tetrachloroethene	5	ug/L	ND	**750** +	ND	ND	**2.4**	**3.4**	**3.4**
1,2-Dichloroethene, Total	70	ug/L	ND	**38**	ND	ND	ND	ND	ND
SVOCs									
Phenol	4,570	ug/L		ND	ND				
2-Methylphenol	743	ug/L		ND	ND				
3 & 4 Methylphenol	NA	ug/L		ND	ND				
Naphthalene	1.09	ug/L		ND	ND				
2-Methylnaphthalene	11.70	ug/L		ND	ND				
METALS									
Barium	2	mg/L		**0.14**	**0.1**				
Chromium	0.1	mg/L		**0.0016** J	ND				
Zinc	4.69	mg/L		ND	**0.083**				
NATURAL ATTENUATION PARAMETERS									
Nitrogen, Nitrate	NA	#N/A	**0.045** J	**1.2**	**6.1**	ND	**4**	**0.4**	**5**
Nitrogen, Nitrite	NA	mg/L	**0.013** J	ND	**0.0051** J	**0.0083** J	ND	ND	ND
Sulfate	NA	mg/L	**5.1**	**16**	**45**	**14**	**19**	**23**	**23**
Chloride	NA	mg/L	**2.2**	**45**	**19**	**4.4**	**100**	**75**	**71**
Sulfide	NA	mg/L	ND	ND	ND	ND	ND	ND	ND
Methane	NA	ug/L	**2.9** J	**0.26** J	**0.39** J	**0.7**	**0.37** J	**0.19** J	**0.19** J
Ethane	NA	ug/L	**0.37**	ND	ND	ND	ND	ND	ND
Ethylene	NA	ug/L	ND	ND	ND	ND	ND	ND	ND
Ammonia (as N)	NA	mg/L	**0.27**	**0.14** J	**0.17** J	ND	**0.078** J	**0.17** J	**0.093** J
Nitrogen, Nitrate Nitrite	NA	mg/L	**0.058** J	**1.2**	**6.1**	ND	**4**	**0.4**	**5**

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used

NA: Not Available

Blank Cells: Parameter Not Analyzed

ND: compound was not detected

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Natural attenuation parameters were collected as a separte sampling event for MW-14US, thus there are two lab sample IDs and two sample dates

Bolded values: detected

Shaded values: exceeded screening criteria

Shaded sample ID indicates a duplicate sample

TABLE 3.11
MONITORING WELL CONSTRUCTION SUMMARY AND RATIONALE FOR INSTALLATION
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Proposed Well Nest	Nomenclature	Number of Wells Proposed/Installed	Well Construction	Rationale for Well	Overall Rationale for Location	Status/Notes
MW-1	MW1S	1	Construction: Screened Outer Casing Length: NA Inner Casing Length: 13.8 Open interval depth: 13.8 - 29.1	To evaluate the potential for COPCs migration along the overburden/bedrock interface.	To help define the hydraulic properties of the underlying water-bearing zone in the area north of JS-37.	Completed
	MW1-UB	1	Construction: Screened Outer Casing Length: NA Inner Casing Length: 34 Open interval depth: 34-43.5	To evaluate water quality in the weathered limestone and sandstone encountered during previous drilling efforts.		Completed
	MW1-T1	1	Construction: Single Cased open hole Outer Casing Length: NA Inner Casing Length: 49 Open interval depth: 49 - 75.3	To intercept the transmissive interval identified in JS-37 at a depth of 64 feet bgs.		Completed
	MW1-SW	1	Construction: Double Cased open hole Outer Casing Length: 80 Inner Casing Length: 95 Open interval depth: 111.2	To evaluate whether water quality in the Swan Creek sand member.		Completed
MW-2	MW2S	1	Construction: Screened Outer Casing Length: NA Inner Casing Length: 10.2 Open interval depth: 10.2 - 20.4	To evaluate the potential for COPCs migration along the overburden/bedrock interface.	To help define the vertical gradient and to delineate (vertically) the impacts observed at JS-38.	Completed
	MW2-SW	1	Construction: Single Cased Open Hole Outer Casing Length: NA Inner Casing Length: 35.4 Open interval depth: 35.4 - 56.3	To evaluate water quality in the Swan Creek sand member.		Completed
	MW2-T2	1	Construction: Single Cased Open Hole Outer Casing Length: NA Inner Casing Length: 95.4 Open interval depth: 95.4 - 116	To monitor the transmissive zone identified from 103 to 111 feet bgs in well JS-38.		Completed
	MW2-T3	1	Construction: Double Cased Open Hole Outer Casing Length: 125 Inner Casing Length: 155 Open interval depth: 155 - 195	To monitor the transmissive interval identified from 180 to 190 feet bgs (366 to 356 feet MSL) in well JS-38.		Completed
	MW2-R	1	Construction: Double Cased Open Hole Outer Casing Length: 125 Inner Casing Length: 341 Open interval depth: 341 - 369.8	To help evaluate the water quality in the Roubidoux near the Wildcat Creek residential users.		Completed. This MW was converted for domestic use at the Carlin residence.
MW-3	--	1	Uppermost transmissive zone in bedrock	To delineate the COPCs in the uppermost transmissive zone in bedrock.	To delineate the southern extent of the impacts. Based on initial RWI results and sampling of domestic wells along the west side of Highway C, the impacts in the vicinity of the Wildcat Creek subdivision appear to be limited to depths of less than 55 ft bgs.	Access Denied

TABLE 3.11
MONITORING WELL CONSTRUCTION SUMMARY AND RATIONALE FOR INSTALLATION
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Proposed Well Nest	Nomenclature	Number of Wells Proposed/Installed	Well Construction	Rationale for Well	Overall Rationale for Location	Status/Notes
MW-4	MW04A	1	Construction: Single Cased Open Hole Outer Casing Length: 20.0 Inner Casing Length: NA Open interval depth: 20.0 - 28.0	To evaluate whether COPCs are present in the Upper Bedrock unit.	To investigate COPCs levels west of the creek (a surface expression of a potential fault or fracture zone).	Completed by USGS
	MW04B	1	Construction: Double Cased Open Hole Outer Casing Length: 40 Inner Casing Length: 91.5 Open interval depth: 91.5 - 130.0 Annular Opening: 40.0 - 56.0	To evaluate whether COPCs are present in the Swan Creek sand member and undifferentiated dolostone below the Swan Creek.		
	MW4	1	Construction: Triple Cased Open Hole Outer Casing Length: 19 Intermediate Casing Length: 110 Inner Casing Length: 218 Open interval depth: 218 - 382	--	Domestic Well.	
MW-5	MW5-UB	1	Construction: Screened Outer Casing Length: NA Inner Casing Length: 34.9 Open interval depth: 34.9 - 50.8	To evaluate water quality in the uppermost transmissive zone in bedrock.	To delineate the eastern extent of the groundwater impacts.	Completed
MW-6	MW6-US	1	Construction: Single Cased Open Hole Outer Casing Length: NA Inner Casing Length: 24.8 Open interval depth: 24.8 - 73	To evaluate water quality in the Upper Sand unit.	To delineate the eastern extent of the groundwater impacts north of Boeuf-Lutheran Road.	Completed
	MW6-SW	1	Construction: Double Cased Open Hole Outer Casing Length: 27 Inner Casing Length: 125 Open interval depth: 125 - 141	To evaluate water quality in the Swan Creek sand member.		Completed
	MW6-R	1	Construction: Double Cased Open Hole Outer Casing Length: 27 Inner Casing Length: 385 Open interval depth: 385 - 450.83	To evaluate the water quality in the Roubidoux.		Completed
MW-7	MW7-US	1	Construction: Single Cased Open Hole Outer Casing Length: NA Inner Casing Length: 15 Open interval depth: 15 - 25.99	To evaluate whether COPCs are present in the Upper Sand unit.	To delineate the western extent of the groundwater impacts, to ensure COPCs have not migrated toward the school, and to investigate the area near the lift station.	Completed
	MW7-SW	1	Construction: Double Cased Open Hole Outer Casing Length: 41.3 Inner Casing Length: 75.4 Open interval depth: 75.4 - 94	To evaluate whether COPCs are present in the Swan Creek sand member.		Completed
MW-8	MW8-US	1	Construction: Screened Outer Casing Length: NA Inner Casing Length: 85 Open interval depth: 79.3 - 95	To evaluate whether COPCs are present in the Upper Sand unit.	To investigate CPOCs concentrations directly east of the landfarm area, and to confirm that downward migration has not occurred at the source area.	Completed

TABLE 3.11
MONITORING WELL CONSTRUCTION SUMMARY AND RATIONALE FOR INSTALLATION
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Proposed Well Nest	Nomenclature	Number of Wells Proposed/Installed	Well Construction	Rationale for Well	Overall Rationale for Location	Status/Notes
MW-9	MW9-US	1	Construction: Double Cased Screened Completion Outer Casing Length: 8 Inner Casing Length: 42.2 Open interval depth: 39 - 57.4	To evaluate whether COPCs are present in the Upper Sand unit.	To delineate the northern extent of the groundwater impacts, and to ensure that COPCs are not migrating through the Roubidoux north towards City Well 3.	Completed
	MW9-SW	1	Construction: Double Cased Open Hole Outer Casing Length: 66.3 Inner Casing Length: 100.5 Open interval depth: 110.5 - 125	To evaluate whether COPCs are present in the Swan Creek sand member.		Completed
	MW9-R	1	Construction: Triple Cased Open Hole Outer Casing Length: 8 Intermediate Casing: 139.2 Inner Casing Length: 369 Open interval depth: 371-421.2	To help evaluate the water quality in the Roubidoux.		Completed
MW-10	MW10-UB	1	Construction: Single Cased Open Hole Outer Casing Length: NA Inner Casing Length: 27 Open interval depth: 27 - 48	To evaluate water quality in the uppermost transmissive zone in bedrock.	To delineate the western extent of the groundwater impacts.	Completed
MW-11	MW11	1	Construction: Screened with outer casing Outer Casing Length: 25 Inner Casing Length: 72 Sand Pack depth: 67 - 92.3 Annular Opening: 25 - 62	To evaluate whether COPCs are present in the uppermost bedrock and Swan Creek.	To delineate the southwestern extent of the impacts. Residential well JS-36, which contained greater than 200 ppb PCE, is located approximately 700 feet to the north. If COPCs are found at the uppermost bedrock, an intermediate bedrock well will also be installed to obtain vertical delineation.	Completed
MW-12	MW12	1	Construction: Single Cased Open Hole Outer Casing Length: NA Inner Casing Length: 21 Open interval depth: 21 - 91	To evaluate whether COPCs are present in the uppermost bedrock and Swan Creek.	To delineate the western extent of the impacts. Based on RWI results, the COPCs in the vicinity of the Wildcat Creek subdivision appear to be limited to depths of less than 55 ft bgs. If CPOCs are detected in MW-12, then the MW-11 well cluster will be moved approximately 600 feet to the west.	Completed
MW-13	MW-13	1	Construction: Double Cased Open Hole Outer Casing Length: 39 Inner Casing Length: 155 Open interval depth: 155 - 420	The Amanda Farms pilot well, intended to confirm the absence of CPOCs in the area southeast of the Wildcat Creek subdivision. This pilot well was installed and sampled in March 2005. The pilot well was then used to complete a domestic well.	To confirm the absence of COPCs in the area southeast of the Wildcat Creek subdivision.	Completed
MW-14	MW14-US	1	Construction: Single Cased Screened Outer Casing Length: NA Inner Casing Length: 23.5 Sand Pack depth: 22.6 - 33.5	To evaluate water quality in the Upper Sand unit.	To confirm absence of COPCs near the New Haven school building.	Completed

TABLE 3.12
SUMMARY OF INTERMEDIATE GROUNDWATER sAMPLES COLLECTED DURING MONITORING WELL INSTALLATION
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Well	Date	Analysis Type	Media	Top of Interval	Bottom of Interval	PCE (µg/L)	TCE (µg/L)	cisDCE (µg/L)	transDCE (µg/L)	1,2-DCE (µg/L)	VC (µg/L)
BW-20											
BW-20	04/09/01	Field GC	GW	3	10	1.4	ND	8.62	ND	---	ND
BW-20	04/12/01	Field GC	Cuttings	5	5	13785	12.66	1.25	ND	---	74.08
BW-20	04/12/01	Field GC	Cuttings	10	10	26895	15.25	5.45	ND	---	ND
BW-20	04/13/01	Field GC	GW	3	10	59480	48.8	0.65	ND	---	ND
BW-20	04/16/01	Field GC	Cuttings	15	15	63140	40.1	8.7	ND	---	67.15
BW-20	04/16/01	Field GC	Cuttings	20	20	49460	90	23	148	---	ND
BW-20	04/18/01	Field GC	Cuttings	10	20	2.48	0.07	0.01	ND	---	ND
BW-20	04/18/01	Field GC	GW	10	20	44.5	0.3	1.2	0.07	---	ND
BW-20	04/13/01	Laboratory	GW	5	10	**23,000**	<800	<800	<400	---	<1600
BW-21											
BW-21	01/10/01	Field GC	GW	0	59	**77**	11.4	1.97	ND	---	ND
BW-21	01/10/01	Field GC	GW	62	110	**1,187**	136.8	18.82	1.39	---	ND
BW-21	01/11/01	Laboratory	GW	0	62	**680 Q**	**92**	**16 J**	<40	---	<40
BW-21	01/31/01	Field GC	GW	62	160	**ND**	ND	ND	ND	---	ND
BW-21	05/31/01	Field GC	GW	374.5	440	**0**	ND	0.04	3.03	---	ND
BW-21	07/30/02	Field GC	GW	374.5	440	**ND**	ND	ND	ND	---	ND
BW-21A											
BW-21A	03/20/01	Field GC	GW	0	8	ND	ND	ND	ND	---	ND
BW-21A	06/11/01	Laboratory	GW	43	52.4	**1,000**	**160**	**28 J**	<25	---	<100
BW-21A	08/21/01	Laboratory	GW	43	52.4	**1,000**	**160**	**32J**	<25	---	<100
BW-21A	07/30/02	Laboratory	GW	43	52.4	**970**	**170**	**34**	<33	---	<33
BW-21A	07/30/02	Field GC	GW	43	52.4	**3490**	**330**	**40**	.33	---	ND
BW-22											
BW-22	02/06/01	Field GC	GW	60	105	808	53.6	13	0.72	---	ND
BW-22	02/06/01	Field GC	GW	60	126	1170	70	50	ND	---	ND
BW-22	02/13/01	Field GC	GW	80	80	256.95	5.54	3.39	0.02	---	ND
BW-22	02/13/01	Field GC	GW	60	160	389	11.4	10.25	ND	---	ND
BW-22	02/26/01	Field GC	GW	160	260	ND	ND	ND	ND	---	ND
BW-22	02/27/01	Field GC	GW	160	260	ND	ND	ND	ND	---	ND
JS-37											
JS-37	01/16/02	Field GC	GW			36.16	2.04	5.19	ND	---	ND
JS-37	04/30/02	Field GC	GW			95.4	4.06	1.03	ND	---	ND
MW-101											
MW-101	07/31/02	Field GC	GW	31.5	54.5	3.34	ND	ND	ND	---	ND
MW-101	03/17/09	Field GC	GW			22.7	0.08	ND	ND	---	ND
MW-102											
MW-102	03/17/09	Field GC	GW			ND	ND	ND	ND	---	ND
MW-103											
MW-103	03/17/09	Field GC	GW			ND	ND	ND	ND	---	ND
MW-1S											
MW-1S	10/08/04	Lab	GW	0	28.5	270	13	---	---	13	<1.0
MW-1SW											
MW-1SW	10/21/04	Lab	GW	0	95	<1.0	<1.0	---	---	<1.0	<1.0
MW-1UB											
MW-1UB	05/12/08	Lab	GW	0	26.3	1300	51	---	---	17	<1.2
MW-1UB	07/17/08	Lab	GW	0	43	1700	76	---	---	30	<1.0

TABLE 3.12
SUMMARY OF INTERMEDIATE GROUNDWATER sAMPLES COLLECTED DURING MONITORING WELL INSTALLATION
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Well	Date	Analysis Type	Media	Top of Interval	Bottom of Interval	PCE (µg/L)	TCE (µg/L)	cisDCE (µg/L)	transDCE (µg/L)	1,2-DCE (µg/L)	VC (µg/L)
MW-2R											
MW-2R	09/15/04	Lab	GW	0	25	35	1.6	---	---	1.8	<1.0
MW-2R	09/15/04	Field GC[1]	GW	0	25	37.97	6.61	4.85	ND	---	ND
MW-2R	09/15/04	Field GC[1]	GW	0	45	30.5	1	---	---	2	<1.0
MW-2R	09/15/04	Field GC[1]	GW	0	45	36.66	5.27	3.5	ND	---	ND
MW-2R	09/16/04	Field GC[1]	GW	0	105	19	<1.0	---	---	<1.0	<1.0
MW-2R	09/21/04	Lab	GW	0	160	<1.0	<1.0	---	---	<1.0	<1.0
MW-2R	09/21/04	Field GC[1]	GW	0	160	<1.0	<1.0	---	---	<1.0	<1.0
MW-2R	09/22/09	Field GC[1]	GW	0	200	<1.0	<1.0	---	---	<1.0	<1.0
MW-2R	09/22/09	Field GC1	GW	0	344	<1.0	<1.0	---	---	<1.0	<1.0
MW04AS											
MW04AS	04/28/09	Field GC	GW	3	12	5.95	ND	ND	0.95	---	4.86
MW04AS	04/28/09	Lab	GW	3	12	9.3	<0.2	---	---	<0.3	<0.23
MW04BS											
MW04BS	04/28/09	Field GC	GW	10	14	4.1	<0.2	---	---	<0.3	<0.23
MW04 (Residential Well											
MW-04	08/03/09	Field GC	Cuttings	19	33	ND	ND	0.68	ND	---	98.9
MW-04	07/29/09	Field GC	GW	19	42	0.5	ND	ND	ND	---	1.19
MW-04	07/29/09	Field GC	Cuttings	19	45	ND	ND	0.13	ND	---	2.94
MW-04	07/29/09	Field GC	Cuttings	19	58.5	ND	ND	ND	ND	---	1.25
MW-04	07/29/09	Field GC	GW	19	69	1.37	ND	ND	ND	---	0.83
MW-04	08/11/09	Field GC	Cuttings	19	73	ND	ND	ND	ND	---	1.6
MW-04	08/11/09	Field GC	Cuttings	19	78	ND	0.44	1.66	ND	---	5.1
MW-04	08/11/09	Field GC	Cuttings	19	83	ND	ND	0.15	ND	---	2.48
MW-04	08/11/09	Field GC	Cuttings	19	88	ND	ND	0.24	0.26	---	2.96
MW-04	08/11/09	Field GC	Cuttings	19	93	ND	ND	ND	0.43	---	3.84
MW-04	08/11/09	Field GC	Cuttings	19	98	ND	ND	ND	0.92	---	3.4
MW-04	08/11/09	Field GC	Cuttings	19	103	ND	ND	ND	0.76	---	2.73
MW-04	08/11/09	Field GC	Cuttings	19	108	ND	ND	ND	0.59	---	3.36
MW-04	08/11/09	Field GC	GW	19	110	ND	ND	ND	ND	---	1.05
MW-04	08/12/09	Field GC	GW	19	110	ND	ND	ND	ND	---	0.38
MW-04	08/25/09	Field GC	GW	115	282	ND	ND	ND	ND	---	ND
MW04A											
MW04A	03/06/09	Field GC	Cuttings	?	10	ND	1.06	1.01	0.21	---	34.8
MW04A	03/06/09	Field GC	Cuttings	?	18	ND	5.8	8.4	0.45	---	78.6
MW04A	03/06/09	Field GC	GW	?	18	ND	0.61	1.28	0.13	---	9.22
MW04A	03/06/09	Field GC	Cuttings	?	20	23.1	7.53	7.29	0.62	---	51.5
MW04A	03/09/09	Field GC	Cuttings	6	17	6.1	ND	ND	ND	---	ND
MW04A	03/09/09	Field GC	Cuttings	21	26	73.1	5.7	3.3	ND	---	ND
MW04A	03/09/09	Field GC	GW	21	26	446	9.2	2	ND	---	ND
MW04A	03/09/09	Field GC	GW	21	26	695	12.2	ND	ND	---	ND
MW04A	03/09/09	Field GC	GW	21	28	555	10	ND	ND	---	ND
MW04A	03/09/09	Field GC	GW	21	26	446	9.2	2	ND	---	ND
MW04A	04/28/09	Field GC	GW			394	9.55	1.78	ND	---	1.62
MW04A	04/28/09	Lab	GW	20	28	420	13	---	---	2.1	<0.44

TABLE 3.12
SUMMARY OF INTERMEDIATE GROUNDWATER sAMPLES COLLECTED DURING MONITORING WELL INSTALLATION
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Well	Date	Analysis Type	Media	Top of Interval	Bottom of Interval	PCE (µg/L)	TCE (µg/L)	cisDCE (µg/L)	transDCE (µg/L)	1,2-DCE (µg/L)	VC (µg/L)
MW04B											
MW04B	03/16/09	Field GC	Cuttings	0	18.3	ND	ND	ND	ND	---	ND
MW04B	03/16/09	Field GC	Cuttings	0	20	32.8	6.4	ND	ND	---	ND
MW04B	03/16/09	Field GC	GW	0	21	19.4	3.2	ND	ND	---	ND
MW04B	03/16/09	Field GC	Cuttings	0	23	53	ND	ND	ND	---	ND
MW04B	03/16/09	Field GC	Cuttings	0	27	83	ND	ND	ND	---	ND
MW04B	03/17/09	Field GC	GW	0	27	426	7	ND	ND	---	ND
MW04B	03/17/09	Field GC	GW	0	31	271	5.5	ND	ND	---	ND
MW04B	03/17/09	Field GC	GW	0	36	285	4.4	ND	ND	---	ND
MW04B	03/17/09	Field GC	GW	0	40	491	8.8	ND	ND	---	ND
MW04B	03/23/09	Field GC	Cuttings	40	43	41	2.8	2.98	ND	---	33.78
MW04B	03/23/09	Field GC	Cuttings	40	46.5	10.3	1.9	0.45	0.27	---	21.5
MW04B	03/24/09	Field GC	Cuttings	40	49	146	ND	ND	ND	---	ND
MW04B	03/24/09	Field GC	GW	40	49	77	ND	ND	ND	---	ND
MW04B	03/24/09	Field GC	Cuttings	40	52.7	118.5	0.44	ND	ND	---	4.33
MW04B	03/24/09	Field GC	Cuttings	40	55	149	1.13	ND	ND	---	15.95
MW04B	03/24/09	Field GC	Cuttings	40	57.5	238	3.94	6.35	2.91	---	27.25
MW04B	03/24/09	Field GC	Cuttings	40	61	348.5	4.49	2.92	ND	---	60.5
MW04B	03/25/09	Field GC	GW	40	61	362	1.06	ND	ND	---	3.61
MW04B	03/25/09	Field GC	Cuttings	40	63	437.5	1.89	ND	ND	---	25.74
MW04B	04/20/09	Field GC	Cuttings	63	65	8.96	4.84	3.66	0.33	---	24.6
MW04B	04/20/09	Field GC	Cuttings	63	67.5	7.99	ND	4.43	1.08	---	10.8
MW04B	04/20/09	Field GC	Cuttings	63	70	7.77	ND	1.43	0.82	---	8.31
MW04B	04/20/09	Field GC	Cuttings	63	72.5	4.77	3.18	2.62	1.37	---	10.2
MW04B	04/20/09	Field GC	Cuttings	63	75	2.45	ND	0.15	0.08	---	10.2
MW04B	04/20/09	Field GC	GW	63	75	0.77	ND	ND	ND	---	1.9
MW04B	04/21/09	Field GC	GW	63	75	1.18	ND	ND	ND	---	1.33
MW04B	04/21/09	Field GC	Cuttings	63	80	1.07	ND	ND	ND	---	2.79
MW04B	04/21/09	Field GC	Cuttings	63	85	24.8	ND	9.29	6.4	---	12.1
MW04B	04/21/09	Field GC	Cuttings	63	90	55	ND	ND	ND	---	16.25
MW04B	04/21/09	Field GC	Cuttings	63	90	141.5	ND	ND	ND	---	9.45
MW04B	05/04/09	Field GC	Cuttings	92	100	ND	ND	ND	ND	---	7.6
MW04B	05/04/09	Field GC	Cuttings	92	105	ND	ND	9.29	6.4	---	6.59
MW04B	05/04/09	Field GC	Cuttings	92	110	ND	0.49	0.6	ND	---	15.1
MW04B	05/04/09	Field GC	Cuttings	92	115	ND	ND	ND	ND	---	6.6
MW04B	05/04/09	Field GC	Cuttings	92	120	ND	ND	ND	ND	---	3.95
MW04B	05/04/09	Field GC	Cuttings	92	125	ND	ND	ND	ND	---	7.6
MW04B	05/04/09	Field GC	Cuttings	92	129	ND	ND	ND	ND	---	7.75
MW-5UB											
MW-5UB	05/16/08	Lab	GW	0	8.4	<0.14	<0.20			<0.22	<0.23
MW-5UB	07/17/08	Lab	GW	0	50.8	ND	ND	ND	ND		ND
MW-6US											
MW-6US	05/16/08	Lab	GW	0	8.4	<0.14	<0.20	---	---	<0.22	<0.23
MW-6US	08/19/08	Lab	GW	24.8	63.3	ND	ND	ND	ND	---	ND
MW-6US	08/19/08	Lab	GW	24.8	73	ND	ND	ND	ND	---	ND
MW-6SW											
MW-6SW	09/09/08	Field GC	Cuttings	27	60	ND	ND	ND	ND	---	ND
MW-6SW	09/09/08	Field GC	Cuttings	27	80	ND	ND	ND	ND	---	ND
MW-6SW	09/09/08	Field GC	Cuttings	27	100	ND	ND	ND	ND	---	ND
MW-6SW	09/09/08	Field GC	Cuttings	27	110	ND	ND	ND	ND	---	ND
MW-6SW	09/09/08	Field GC	GW	27	125	ND	ND	ND	ND	---	ND
MW-6SW	08/19/08	Lab	GW	125	141	ND	ND	ND	ND	---	ND

TABLE 3.12
SUMMARY OF INTERMEDIATE GROUNDWATER sAMPLES COLLECTED DURING MONITORING WELL INSTALLATION
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Well	Date	Analysis Type	Media	Top of Interval	Bottom of Interval	PCE (µg/L)	TCE (µg/L)	cisDCE (µg/L)	transDCE (µg/L)	1,2-DCE (µg/L)	VC (µg/L)
MW-6R											
MW-6R	09/25/08	Field GC	Cuttings	27	145	ND	0.13	ND	ND	---	ND
MW-6R	09/25/08	Field GC	Cuttings	27	375	ND	0.23	ND	ND	---	ND
MW-6R	09/30/08	Field GC	Cuttings	27	380	ND	ND	ND	ND	---	ND
MW-6R	09/30/08	Field GC	Cuttings	27	395	ND	ND	ND	ND	---	ND
MW-6R	09/25/08	Field GC	GW	27	395	ND	0.23	ND	ND	---	ND
MW-6R	11/17/08	Field GC	Cuttings	393	409	ND	ND	ND	ND	---	ND
MW-6R	12/05/08	Lab	GW	393	450.8	ND	ND	ND	ND	---	ND
MW-7US											
MW-7US	11/07/08	Lab	GW	0	9.5	<0.14	<0.20	---	---	<0.22	<0.23
MW-7US	11/07/08	Field GC	Cuttings	0	9.5	ND	ND	ND	ND	---	ND
MW-7US	11/07/08	Field GC	Cuttings	0	15	11.5	3.75	ND	ND	---	ND
MW-7US	11/10/08	Field GC	Cuttings	15	20	27.25	ND	ND	ND	---	ND
MW-7US	11/10/08	Field GC	Cuttings	15	25	31.5	ND	ND	ND	---	ND
MW-7US	11/12/08	Field GC	Cuttings	15	25	916.67	175	ND	ND	---	ND
MW-7US	11/12/08	Lab	GW	15	24.5	810	120	---	---	35	<1.0
MW-7SW											
MW-7SW	12/09/08	Field GC	Cuttings	46	46	16	ND	ND	ND	---	ND
MW-7SW	12/09/08	Field GC	Cuttings	51	51	17.4	ND	ND	ND	---	ND
MW-7SW	12/09/08	Field GC	Cuttings	56	56	14.5	5.25	11.5	ND	---	ND
MW-7SW	12/10/08	Field GC	GW	56	56	9.35	1.32	ND	ND	---	ND
MW-7SW	12/10/08	Field GC	Cuttings	62	62	7.05	4.26	ND	ND	---	ND
MW-7SW	12/10/08	Field GC	Cuttings	67	67	1.53	ND	ND	ND	---	ND
MW-7SW	12/10/08	Field GC	Cuttings	72	72	0.39	ND	ND	ND	---	ND
MW-7SW	12/10/08	Field GC	Cuttings	75	75	ND	ND	ND	ND	---	ND
MW-7SW	21/11/08	Field GC	GW	75	75	1.16	0.07	ND	ND	---	ND
MW-7SW	12/22/08	Field GC	Cuttings		85	ND	ND	ND	ND	---	ND
MW-7SW	12/23/08	Field GC	Cuttings		94	ND	ND	ND	ND	---	ND
MW-7SW	12/11/08	Lab	GW	41.3	75	1.6	<0.20	---	---	<0.30	<0.23
MW-7SW	01/14/09	Lab	GW	75	94	<0.14	<0.20	---	---	<0.30	<0.23
MW-8US											
MW-8US	01/07/09	Field GC	Cuttings	21	35	ND	ND	ND	ND	---	ND
MW-8US	01/07/09	Field GC	Cuttings	21	40	ND	ND	ND	ND	---	ND
MW-8US	01/07/09	Field GC	Cuttings	21	46	ND	ND	ND	ND	---	ND
MW-8US	01/08/09	Field GC	Cuttings	21	55	ND	ND	ND	ND	---	ND
MW-8US	01/12/09	Field GC	Cuttings	21	75	ND	ND	ND	ND	---	ND
MW-8US	01/12/09	Field GC	Cuttings	21	80	ND	ND	ND	ND	---	ND
MW-8US	01/12/09	Field GC	Cuttings	21	95	ND	ND	ND	ND	---	ND
MW-8US	01/21/09	Field GC	GW	21	65	ND	ND	ND	ND	---	ND
MW-8US	01/12/09	Lab	GW	0	75	<0.14	<0.20	---	---	<0.22	<0.23
MW-8US	01/21/09	Lab	GW	0	65	<0.14	<0.20	---	---	<0.22	<0.23
MW-8US	01/30/09	Lab	GW	0	95	<0.14	<0.20	---	---	<0.22	<0.23

TABLE 3.12
SUMMARY OF INTERMEDIATE GROUNDWATER sAMPLES COLLECTED DURING MONITORING WELL INSTALLATION
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Well	Date	Analysis Type	Media	Top of Interval	Bottom of Interval	PCE (µg/L)	TCE (µg/L)	cisDCE (µg/L)	transDCE (µg/L)	1,2-DCE (µg/L)	VC (µg/L)
MW-9US											
MW-9US	05/12/08	Lab	GW	0	6.8	<0.14	<0.20	---	---	<0.22	<0.23
MW-9US	07/15/08	Lab	GW	0	31	<0.14	<0.20	---	---	<0.22	<0.23
MW-9US	08/13/08	Lab	GW	0	57.3	2	<0.20	---	---	<0.30	<0.23
MW-9US	07/09/08	Field GC	Cuttings	0	8	ND	ND	0.69	ND	---	ND
MW-9US	07/14/08	Field GC	Cuttings	8	16	ND	ND	4.41	ND	---	ND
MW-9US	07/14/08	Field GC	Cuttings	16	19	ND	ND	2.78	ND	---	ND
MW-9US	07/14/08	Field GC	Cuttings	19	22	ND	ND	4.25	ND	---	ND
MW-9US	07/14/08	Field GC	Cuttings	22	25	ND	ND	2.04	ND	---	ND
MW-9US	07/14/08	Field GC	Cuttings	25	30	ND	ND	ND	ND	---	ND
MW-9US	07/15/08	Field GC	Cuttings	30	36	ND	ND	ND	ND	---	ND
MW-9US	07/15/08	Field GC	Cuttings	36	38.5	ND	ND	ND	ND	---	ND
MW-9US	07/15/08	Field GC	Cuttings	38.5	41	ND	ND	0.6	ND	---	ND
MW-9US	07/15/08	Field GC	Cuttings	41	43.5	ND	ND	0.6	ND	---	ND
MW-9US	07/15/08	Field GC	Cuttings	43.5	46.2	0.71	ND	0.6	ND	---	ND
MW-9US	07/15/08	Field GC	Cuttings	46.2	48.5	0.81	ND	0.6	ND	---	ND
MW-9US	07/15/08	Field GC	Cuttings	48.5	51	3.11	ND	14.7	ND	---	ND
MW-9US	07/15/08	Field GC	Cuttings	51	53.5	1.43	ND	1.89	ND	---	ND
MW-9US	07/15/08	Field GC	Cuttings	53.5	56	1.08	ND	0.6	ND	---	ND
MW-9SW											
MW-9SW	09/02/08	Field GC	Cuttings	66	71	ND	ND	ND	ND	---	ND
MW-9SW	09/02/08	Field GC	Cuttings	66	76	ND	ND	ND	ND	---	ND
MW-9SW	09/02/08	Field GC	Cuttings	66	81	ND	ND	ND	ND	---	ND
MW-9SW	09/02/08	Field GC	Cuttings	66	86	ND	ND	ND	ND	---	ND
MW-9SW	09/02/08	Field GC	Cuttings	66	91	ND	ND	ND	ND	---	ND
MW-9SW	09/03/08	Field GC	GW	66	91	ND	ND	ND	ND	---	ND
MW-9SW	09/03/08	Field GC	Cuttings	66	96	ND	ND	ND	ND	---	ND
MW-9SW	09/03/08	Field GC	Cuttings	66	100	ND	ND	ND	ND	---	ND
MW-9SW	09/05/08	Field GC	GW	66	100	ND	ND	ND	ND	---	ND
MW-9SW	09/08/08	Field GC	GW	40	40	ND	ND	ND	ND	---	ND
MW-9SW	09/08/08	Field GC	GW	60	60	ND	ND	ND	ND	---	ND
MW-9SW	09/15/08	Field GC	Cuttings	100.5	105	ND	ND	ND	ND	---	ND
MW-9SW	09/15/08	Field GC	Cuttings	100.5	115	ND	ND	ND	ND	---	ND
MW-9SW	09/16/08	Field GC	Cuttings	100.5	125	ND	ND	ND	ND	---	ND
MW-9SW	09/23/08	Lab	GW	100.5	125	2.2	<0.20	---	---	<0.30	<0.23
MW-9SW	09/29/08	Lab	GW	100.5	125	1.2	<0.20	---	---	<0.30	<0.23
MW-9R											
MW-9R	04/08/09	Field GC	Cuttings		387.3	ND	ND	ND	ND	---	3.29
MW-9R	04/08/09	Field GC	Cuttings		399	ND	ND	ND	0.02	---	0.64
MW-9R	04/08/09	Field GC	Cuttings		407.6	ND	ND	ND	ND	---	8.6
MW-9R	04/13/09	Field GC	Cuttings		419.7	ND	ND	ND	ND	---	15.18
MW-9R	10/16/08	Lab	GW	8	139.2	<0.14	<0.20	---	---	<0.30	<0.23
MW-9R	10/22/08	Lab	GW	139.2	195	<0.14	<0.20	---	---	<0.30	<0.23
MW-9R	10/23/08	Lab	GW	139.2	255	<0.14	<0.20	---	---	<0.30	<0.23
MW-9R	10/27/08	Lab	GW	139.2	315	<0.14	<0.20	---	---	<0.30	<0.23
MW-10UB											
MW-10UB	05/12/08	Lab	GW	0	16	<0.14	<0.20	---	---	<0.22	<0.23
MW-10UB	07/01/08	Field GC	Cuttings	25	27	ND	ND	ND	ND	---	ND
MW-10UB	07/01/08	Field GC	Cuttings	25	48	ND	ND	ND	ND	---	ND
MW-10UB	07/17/08	Lab	GW	27	47.7	<0.14	<0.20	---	---	<0.22	<0.23

TABLE 3.12
SUMMARY OF INTERMEDIATE GROUNDWATER sAMPLES COLLECTED DURING MONITORING WELL INSTALLATION
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Well	Date	Analysis Type	Media	Top of Interval	Bottom of Interval	PCE (µg/L)	TCE (µg/L)	cisDCE (µg/L)	transDCE (µg/L)	1,2-DCE (µg/L)	VC (µg/L)
MW-11											
MW-11	02/05/09	Field GC	Cuttings	3	23.9	ND	ND	ND	ND	---	ND
MW-11	02/06/09	Field GC	Cuttings	3	25	ND	ND	ND	ND	---	ND
MW-11	02/09/09	Field GC	Cuttings	25	30	ND	ND	ND	ND	---	ND
MW-11	02/09/09	Field GC	Cuttings	25	35	ND	ND	ND	ND	---	ND
MW-11	02/09/09	Field GC	Cuttings	25	40	ND	ND	ND	ND	---	ND
MW-11	02/09/09	Field GC	Cuttings	25	45	ND	ND	ND	ND	---	ND
MW-11	02/10/09	Field GC	GW	25	40	ND	ND	ND	ND	---	ND
MW-11	02/10/09	Field GC	Cuttings	25	50	ND	ND	ND	ND	---	ND
MW-11	02/10/09	Field GC	Cuttings	25	55	ND	ND	ND	ND	---	ND
MW-11	02/10/09	Field GC	Cuttings	25	60	ND	ND	ND	ND	---	ND
MW-11	02/10/09	Field GC	Cuttings	25	65	ND	ND	ND	ND	---	ND
MW-11	02/10/09	Field GC	Cuttings	25	68	ND	ND	ND	ND	---	ND
MW-11	02/10/09	Field GC	Cuttings	25	70	ND	ND	ND	ND	---	ND
MW-11	02/10/09	Field GC	Cuttings	25	75	ND	ND	ND	ND	---	ND
MW-11	02/10/09	Field GC	Cuttings	25	80	ND	ND	ND	ND	---	ND
MW-11	02/10/09	Field GC	GW	25	80	ND	ND	ND	ND	---	ND
MW-11	02/11/09	Lab	GW	?	80	<0.14	<0.20	---	---	<0.22	<0.23
MW-12											
MW-12	02/26/09	Field GC	Cuttings	?	23	ND	1	4.8	3.6	---	2.36
MW-12	02/26/09	Field GC	Cuttings	?	30	ND	0.51	0.49	0.48	---	3.45
MW-12	02/26/09	Field GC	Cuttings	?	40	ND	2.77	2.22	0.98	---	9.36
MW-12	02/26/09	Field GC	Cuttings	?	45	ND	3.1	5.05	0.42	---	29.2
MW-12	02/26/09	Field GC	Cuttings	?	50	ND	ND	ND	ND	---	ND
MW-12	02/27/09	Field GC	Cuttings	?	50	ND	ND	ND	0.22	---	1
MW-12	02/27/09	Field GC	Cuttings	?	55	ND	1.1	0.32	0.15	---	31.1
MW-12	02/27/09	Field GC	Cuttings	?	60	ND	0.75	0.38	0.13	---	29.8
MW-12	02/27/09	Field GC	Cuttings	?	65	ND	1.7	1.2	0.36	---	50.9
MW-12	02/27/09	Field GC	Cuttings	?	70	ND	0.43	0.71	0.13	---	27
MW-12	03/02/09	Field GC	GW	?	70	ND	ND	ND	ND	---	0.76
MW-12	03/02/09	Field GC	Cuttings	?	75	ND	ND	ND	ND	---	1.8
MW-12	03/02/09	Field GC	Cuttings	?	86	ND	2.12	1.25	0.19	---	108
MW-12	03/06/09	Field GC	GW			ND	ND	ND	ND	---	0.43
MW-12	03/09/09	Lab	GW	?	91	<0.14	<0.20	---	---	<0.22	<0.23
MW-14US											
MW-14US	07/22/09	Field GC	Cuttings	0	27.8	ND	ND	ND	ND	---	10.05
CSE04											
CSE04	04/15/09	Field GC	GW	0	42	1630	48.3	28.3	---	---	8.91

Notes:
Field GC analyses are from USGS Lab Sample Log and Field GC Log unless noted
"---" Sample was not analyzed for this compound, or results are unknown
[1] - Parsons Field GC analysis

TABLE 3.13
STRUCTURE CONTOUR DATA ON THE TOP OF THE UPPER SANDSTONE MARKER BED
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Location	Sampling Method	Reference Elevation	Top Upper Sandstone Marker Bed (depth)	Bottom Upper Sandstone Marker Bed (depth)	Estimated Error Range	Top Upper Sand (MSL)	Upper Probable Limit, Top Upper Sandstone Marker Bed (MSL)	Lower Probable Limit, Top of Upper Sandstone Marker Bed (MSL)	Bottom Upper Sandstone Marker Bed (MSL)
MW-6US	Core	604	64.5	69	1	539.5	540.5	538.5	535
MW-7US	Cable Tool	552	15	20	2.5	537	539.5	534.5	532
MW-8US	Cable Tool	633.8	85	92	2.5	548.8	551.3	546.3	541.8
MW-9US	Cable Tool	599.4	43	51	2.5	556.4	558.9	553.9	548.4
MW-11	Cable Tool	558	3	8.5	2.5	555	557.5	552.5	549.5
MW-12	Cable Tool	558.2	21	25	2.5	537.2	539.7	534.7	533.2
MW-14US	Cable Tool	572.7	23		5	549.7	554.7	544.7	
MW-101	Core	596.9	47.5	53.5	2	549.4	551.4	547.4	543.4
F-8	Core	595	47.8	50.9	1	547.2	548.2	546.2	544.1
BW-3	Air Rotary	646	120	130	5	526	531	521	516
BW-7	Air Rotary	672.5	110	120	5	562.5	567.5	557.5	552.5

TABLE 3.14
STRUCTURE CONTOUR DATA ON THE TOP OF THE SWAN CREEK
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Location	Sampling Method	Reference Elevation	Top Swan Creek (depth)	Bottom Swan Creek (depth)	Error Range	Top Swan Creek (MSL)	Upper Probable Limit, Top Swan Creek (MSL)	Lower Probable Limit, Top of Swan Creek (MSL)	Bottom Swan Creek (MSL)
MW-1SW	Core	570.8	99	105	1	471.8	472.8	470.8	465.8
MW-2SW	Core	535	42	46.5	1	493	494	492	488.5
MW-4B	Cable Tool	539.5	46.5	54	2.5	493	495.5	490.5	485.5
MW-6SW	Core	603.6	130.75	134.3	1	472.85	473.85	471.85	469.3
MW-7SW	Cable Tool	552.1	86.5	91.5	2.5	465.6	468.1	463.1	460.6
MW-9SW	Core	599.6	113.8	121.25	1	485.8	486.8	484.8	478.35
MW-11	Gamma/CT	558	75	80	5	483	488	478	478
MW-12	Gamma/CT	558	69	76	5	489	494	484	482
BW-21	Gamma/CT	582.5	102	109	5	480.5	485.5	475.5	473.5
BW-3	Air Rotary?	646	190	195	5	456	461	451	451
BW-7	Gamma/CT	672.5	192	197	5	480.5	485.5	475.5	475.5
JS-14	Gamma	597	145	151	5	452	457	447	446
JS-25	Gamma	617.3	138	142	5	479.3	484.3	474.3	475.3
JS-36	Gamma	599	152	159	5	447	452	442	440
JS-37	Gamma	575	103	110	5	472	477	467	465
JS-38	Gamma	546	49	56	5	497	502	492	490
PA-55	Gamma/AR	550	58	64	10	492	502	482	486

TABLE 3.15
GROUNDWATER ELEVATION DATA
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Location/ID	Measurement Date	Top of Casing Elevation	Ground Surface Elevation	Depth to Water	Groundwater Elevation
BW20*	1-Sep-09	602.72	601.50	--	--
BW21*	30-Sep-09	584.10	582.47	84.53	499.57
BW21A*	**1-Sep-09**	**585.00**	**582.97**	**33.75**	**551.25**
BW-22	1-Sep-09	579.06	--	51.71	527.35
BW-22A	1-Sep-09	579.06	--	29.38	549.68
BW-7	30-Sep-09	674.10	--	173.4	500.70
MW-101	**1-Sep-09**	**596.93**	**598.99**	**43.00**	**553.93**
MW-102*	**1-Sep-09**	**604.20**	**601.56**	**43.75**	**560.45**
MW-103*	**1-Sep-09**	**605.42**	**603.02**	**47.59**	**557.83**
MW-10UB	**1-Sep-09**	**534.09**	**534.50**	**8.39**	**525.70**
MW-1S	1-Sep-09	570.57	570.90	21.58	548.99
MW-1SW	1-Sep-09	570.53	570.78	44.38	526.15
MW-1T1	1-Sep-09	570.49	570.84	22.29	548.20
MW-1UB	**1-Sep-09**	**570.42**	**570.94**	**21.48**	**548.94**
MW-2R**	30-Sep-09	537.75	535.61	36.53	501.22
MW-2S	1-Sep-09	535.18	535.71	8.73	526.45
MW-2SW	1-Sep-09	534.44	534.99	16.14	518.30
MW-2T2	1-Sep-09	534.63	535.11	27.85	506.78
MW-2T3	1-Sep-09	535.51	536.08	30.66	504.85
MW4	30-Sep-09	545.55	--	42.83	502.72
MW4A	**1-Sep-09**	**539.27**	**539.38**	**12.34**	**526.93**
MW4B	1-Sep-09	539.07	539.5	30.99	508.08
MW-4BS	1-Sep-09	539.07	539.5	23.11	515.96
MW5UB	**1-Sep-09**	**551.81**	**552.38**	**25.60**	**526.21**
MW-6R	30-Sep-09	603.42	603.49	102.57	500.85
MW-6SW	1-Sep-09	603.45	603.62	72.29	531.16
MW-6US	**1-Sep-09**	**603.54**	**603.97**	**47.04**	**556.50**
MW-7SW	1-Sep-09	551.66	552.10	23.10	528.56
MW-7US	**1-Sep-09**	**551.62**	**551.98**	**8.1**	**543.52**
MW-8US	**1-Sep-09**	**633.47**	**633.81**	**59.29**	**574.18**
MW-9R	30-Sep-09	598.55	598.95	95.74	502.81
MW-9SW	1-Sep-09	599.22	599.61	35.81	563.41
MW-9US	**1-Sep-09**	**599.18**	**599.42**	**23.25**	**575.93**
MW11	1-Sep-09	557.93	558	39.36	518.57
MW12	1-Sep-09	558.77	558.2	--	--
MW-13**	1-Sep-09	581.30	579.32	--	--
MW-14US	**1-Sep-09**	**572.38**	**572.72**	**20.63**	**551.75**
JS-25***	30-Sep-09	618.08	617.26	84.63	533.45

Notes:
All data reported in feet
*: Well has a stick-up
**: Residential Well
***: Industrial/Commerical Well
--: Not Available/Not Measured
Not highlighted: Between prominent transmissive zones; Example: BW22-Between Cotter and Jeff City
Upper Sand/Upper Bedrock
Swan Creek
Lower Jeff City/Roubidoux

TABLE 3.16
SLUG TEST RESULTS
(TASK 2f)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Well	Construction Type	Date	Slug In/Out	Lithologic Unit	Calculated Hydraulic Conductivity (feet per day)	Solution Used	Fit Assessment
MW-1S	Screen	3-Mar-09	In	Overburden	4.6	Bouwer and Rice Unconfined	Good
MW-1S	Screen	3-Mar-09	Out	Overburden	32	Bouwer and Rice Unconfined	Good
MW-1UB	Open Hole	24-Feb-09	In	Upper Bedrock	0.23	Cooper-Bredeheoft-Popadopulos Confined	Excellent
MW-1UB	Open Hole	24-Feb-09	Out	Upper Bedrock	0.19	Cooper-Bredeheoft-Popadopulos Confined	Excellent
MW-1T1	Open Hole	19-Feb-09	In	Undifferentiated	0.12	Cooper-Bredeheoft-Popadopulos Confined	Good
MW-1T1	Open Hole	19-Feb-09	Out	Undifferentiated	0.11	Cooper-Bredeheoft-Popadopulos Confined	Good
MW-1SW	Open Hole	18-Feb-09	In	Swan Creek	0.031	Cooper-Bredeheoft-Popadopulos Confined	Fair
MW-1SW	Open Hole	18-Feb-09	Out	Swan Creek	0.068	Cooper-Bredeheoft-Popadopulos Confined	Good
MW-2S	Screen	24-Feb-09	In	Overburden/ Upper Bedrock	18	Bouwer and Rice Unconfined	Good
MW-2S	Screen	24-Feb-09	Out	Overburden/ Upper Bedrock	9.9	Bouwer and Rice Unconfined	Fair
MW-2SW	Open Hole	12-Feb-09	In	Swan Creek	0.11	Bouwer and Rice Confined	Good
MW-2SW	Open Hole	12-Feb-09	Out	Swan Creek	0.11	Bouwer and Rice Confined	Fair
MW-2T2	Open Hole	12-Feb-09	In	Undifferentiated	0.27	Cooper-Bredeheoft-Popadopulos Confined	Fair
MW-2T2	Open Hole	12-Feb-09	Out	Undifferentiated	0.11	Cooper-Bredeheoft-Popadopulos Confined	Good
MW-2T3	Open Hole	16-Feb-09	In	Undifferentiated	0.42	Cooper-Bredeheoft-Popadopulos Confined	Fair
MW-2T3	Open Hole	16-Feb-09	Out	Undifferentiated	0.63	Cooper-Bredeheoft-Popadopulos Confined	Excellent
MW-2T3	Open Hole	16-Feb-09	In	Undifferentiated	0.43	Cooper-Bredeheoft-Popadopulos Confined	Excellent
MW-2T3	Open Hole	16-Feb-09	Out	Undifferentiated	0.40	Cooper-Bredeheoft-Popadopulos Confined	Good
MW-6US	Open Hole	13-Feb-09	In	Upper Sand	0.14	Cooper-Bredeheoft-Popadopulos Confined	Excellent
MW-6US	Open Hole	13-Feb-09	Out	Upper Sand	0.15	Cooper-Bredeheoft-Popadopulos Confined	Excellent
MW-6SW	Open Hole	13-Feb-09	In	Swan Creek	0.71	Cooper-Bredeheoft-Popadopulos Confined	Excellent
MW-6SW	Open Hole	13-Feb-09	Out	Swan Creek	0.28	Cooper-Bredeheoft-Popadopulos Confined	Excellent
MW-6R	Open Hole	16-Feb-09	In	Roubidoux	0.64	Cooper-Bredeheoft-Popadopulos Confined	Good
MW-6R	Open Hole	16-Feb-09	Out	Roubidoux	1.1	Cooper-Bredeheoft-Popadopulos Confined	Good
MW-6R	Open Hole	16-Feb-09	In	Roubidoux	0.84	Cooper-Bredeheoft-Popadopulos Confined	Good
MW-6R	Open Hole	16-Feb-09	Out	Roubidoux	1.4	Cooper-Bredeheoft-Popadopulos Confined	Excellent
MW-6R	Open Hole	16-Feb-09	In	Roubidoux	0.34	Cooper-Bredeheoft-Popadopulos Confined	Fair
MW-7US	Open Hole	23-Feb-09	In	Upper Sand	6.3	Cooper-Bredeheoft-Popadopulos Confined	Fair
MW-7US	Open Hole	23-Feb-09	Out	Upper Sand	10	Cooper-Bredeheoft-Popadopulos Confined	Fair
MW-7SW	Open Hole	23-Feb-09	In	Swan Creek	0.25	Cooper-Bredeheoft-Popadopulos Confined	Excellent
MW-7SW	Open Hole	23-Feb-09	Out	Swan Creek	0.25	Cooper-Bredeheoft-Popadopulos Confined	Good
MW-8US	Screen	23-Feb-09	In	Upper Sand	0.11	Cooper-Bredeheoft-Popadopulos Confined	Good
MW-8US	Screen	23-Feb-09	Out	Upper Sand	0.16	Cooper-Bredeheoft-Popadopulos Confined	Excellent
MW-9US	Screen	27-Feb-09	In	Upper Sand	0.30	Cooper-Bredeheoft-Popadopulos Confined	Good
MW-9US	Screen	27-Feb-09	Out	Upper Sand	0.29	Cooper-Bredeheoft-Popadopulos Confined	Good
MW-10UB	Open Hole	17-Feb-09	In	Upper Bedrock	0.2	Cooper-Bredeheoft-Popadopulos Confined	Excellent
MW-10UB	Open Hole	17-Feb-09	Out	Upper Bedrock	0.22	Cooper-Bredeheoft-Popadopulos Confined	Good

Aqtesolv output for the Cooper-Bredeheoft-Popadopulos confined solution is presented as a transmissivity in ft2/d. The hydraulic conductivity (ft/d) is the transmissivity divided by the length of open borehole.

TABLE 3.17
PUMPING TEST RESULTS
(TASK 2f)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Observation Well	Date	Pumping Well	Lithologic Unit	Hydraulic Conductivity (feet per day)	Storage Coefficient (dimensionless)	Fit Assessment
W-4	13-Jul-09	W-3	Gasconade and lower	50	0.00011	Good
W-4	17-Jul-09	W-3	Gasconade and lower	36	0.00013	Fair
W-4	22-Jul-09	W-3	Gasconade and lower	54	0.00013	Good
W-4	28-Jul-09	W-3	Gasconade and lower	47	0.00014	Excellent
W-4	3-Aug-09	W-3	Gasconade and lower	60	0.00011	Good
BW-7	22-Jul-09	W-3	Roubidoux and Jefferson City	0.23	0.00014	Fair
BW-7	27-Jul-09	W-4	Roubidoux and Jefferson City	8.8	0.0019	Fair
BW-21	22-Jul-09	W-3	Roubidoux Formation	5.3	0.0024	Fair
BW-21	26-Jul-09	W-4	Roubidoux Formation	8.4	0.001	Good
BW-21	27-Jul-09	W-4	Roubidoux Formation	7.1	0.0011	Fair
BW-21	3-Aug-09	W-3	Roubidoux Formation	5.0	0.0024	Fair
JS-25	26-Jul-09	W-4	Roubidoux, Jefferson City and Cotter	7.4	0.0014	Good
JS-25	27-Jul-09	W-4	Roubidoux, Jefferson City and Cotter	0.61	0.00026	Poor
MW-9R	26-Jul-09	W-4	Roubidoux Formation	0.094	0.000078	Poor

Aqtesolv output for the Cooper-Bredeheoft-Popadopulos confined solution is presented as a transmissivity in ft2/d. The hydraulic conductivity (ft/d) is the transmissivity divided by the length of open borehole.

TABLE 3.18
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS DURING DNAPL INVESTIGATION (TASK 3)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-7330-1 16-Oct-07 35.8 A14-GW01-035.8-071016	500-7566-2 30-Oct-07 72.7 A7-GW01-072.7-071030	500-7772-1 8-Nov-07 31.3 F11-GW01-031.3-071108	500-7476-1 26-Oct-07 62.5 F8-GW01-062.5-071026	500-7566-1 1-Nov-07 30.5 J8-GW01-030.5-071101	500-7330-2 17-Oct-07 25.5 L12-GW01-025.5-071017	500-7133-3 11-Oct-07 25.5 N12-GW01-025.5-071011
VOCs		UNITS:							
Chloromethane	18.3	ug/L	ND	ND	ND J	ND	ND	ND	ND
Acetone	2,970	ug/L	ND	ND	ND J	ND	ND	ND	ND
Methyl Ethyl Ketone	3,640	ug/L	ND	ND	**3.3** J+	ND	ND	ND	ND
Trichloroethene	5	ug/L	ND	ND	**430** J+	ND	**130**	ND	**470**
Toluene	1,000	ug/L	ND	ND	**3.2** J+	ND	ND	ND	ND
Tetrachloroethene	5	ug/L	**10**	**62**	**820** J+	**100**	**2100** +	**240000** +	**45000** +
Chlorobenzene	100	ug/L	ND	ND	ND J	ND	ND	ND	ND
Ethylbenzene	700	ug/L	ND	ND	ND J	ND	ND	ND	ND
Xylenes, Total	10,000	ug/L	ND	ND	ND J	ND	ND	ND	ND
1,2-Dichloroethene, Total	70	ug/L	ND	ND	**84** J+	ND	**81**	ND	**300**

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used

NA: Not Applicable

ND: compound was not detected

J: estimated concentration

+: results reported from diluted samples

Bolded values: detected

Shaded values: exceeded screening criteria

Shaded sample IDs are duplicate samples

TABLE 3.18
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS DURING DNAPL INVESTIGATION (TASK 3)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-7133-1 10-Oct-07 24.7 N8-GW01-024.7-071010	500-7133-2 10-Oct-07 24.7 N8-GW02-024.7-071010	500-6329-4 28-Aug-07 22.6 P13-GW01-022.6-070828	500-6329-3 28-Aug-07 22.3 P14-GW01-022.3-070828	500-6409-4 4-Sep-07 23.5 P16-GW01-023.5-070904	500-5774-3 3-Aug-07 20.9 P17-GW01-020.9-070803	500-6409-3 4-Sep-07 23.2 Q14-GW01-023.2-070904
VOCs		UNITS:							
Chloromethane	18.3	ug/L	ND	ND	ND	ND	**4.3**	ND	ND
Acetone	2,970	ug/L	**7**	**5.5**	ND	ND	ND	**27**	ND
Methyl Ethyl Ketone	3,640	ug/L	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ug/L	ND	ND	**420** +	**320**	**2.9**	**1**	**74**
Toluene	1,000	ug/L	ND	ND	ND	ND	ND	**15**	**6**
Tetrachloroethene	5	ug/L	**130** +	**110** +	**84000** +	**150000** +	**880** +	**21**	**38000** +
Chlorobenzene	100	ug/L	ND	ND	ND	ND	ND	ND	**7**
Ethylbenzene	700	ug/L	ND	ND	ND	**97** J+	ND	ND	**37**
Xylenes, Total	10,000	ug/L	ND	ND	ND	**500**	**3.4**	ND	**190**
1,2-Dichloroethene, Total	70	ug/L	ND	ND	**140** J+	**110** J+	**10**	**4.8**	**60**

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used

NA: Not Applicable

ND: compound was not detected

J: estimated concentration

+: results reported from diluted samples

Bolded values: detected

Shaded values: exceeded screening criteria

Shaded sample IDs are duplicate samples

TABLE 3.18
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS DURING DNAPL INVESTIGATION (TASK 3)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-6329-5 31-Aug-07 25 Q15.5-GW01-025.0-070831	500-6329-2 28-Aug-07 22 R13-GW01-022.0-070828	500-6329-6 31-Aug-07 25.5 R15-GW01-025.5-070831	500-5774-4 3-Aug-07 20.2 R17-GW01-020.2-070803	500-6101-2 20-Aug-07 21 T13-GW01-021.0-070828	500-6101-3 20-Aug-07 21 T13-GW02-021.0-070820	500-6101-4 20-Aug-07 20.3 T15-GW01-020.3-070820
VOCs		UNITS:							
Chloromethane	18.3	ug/L	ND	ND	ND	ND	ND	ND	ND
Acetone	2,970	ug/L	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	3,640	ug/L	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ug/L	**60** J+	**10**	**9.3** J+	ND	**23**	**23**	**4.9**
Toluene	1,000	ug/L	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ug/L	**70000** +	**1600** +	**6600** +	**2.1**	**210** +	**230** +	**99**
Chlorobenzene	100	ug/L	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	700	ug/L	**300** +	ND	ND	ND	ND	ND	ND
Xylenes, Total	10,000	ug/L	**1700** +	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene, Total	70	ug/L	ND	**7.8** J+	**6.8** J+	ND	**8.4**	**7.8**	**3.6**

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used

NA: Not Applicable

ND: compound was not detected

J: estimated concentration

+: results reported from diluted samples

Bolded values: detected

Shaded values: exceeded screening criteria

Shaded sample IDs are duplicate samples

TABLE 3.18
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS DURING DNAPL INVESTIGATION (TASK 3)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-5774-2 2-Aug-07 20.3 T17-GW01-020.3-070802	500-5774-1 30-Jul-07 23.5 U17-GW01-023.5-070730
VOCs		UNITS:		
Chloromethane	18.3	ug/L	ND	ND
Acetone	2,970	ug/L	ND	ND
Methyl Ethyl Ketone	3,640	ug/L	ND	ND
Trichloroethene	5	ug/L	**2.5**	**7.5**
Toluene	1,000	ug/L	ND	ND
Tetrachloroethene	5	ug/L	**42**	**29**
Chlorobenzene	100	ug/L	ND	ND
Ethylbenzene	700	ug/L	ND	ND
Xylenes, Total	10,000	ug/L	ND	ND
1,2-Dichloroethene, Total	70	ug/L	**1.7** J	**13**

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used

NA: Not Applicable

ND: compound was not detected

J: estimated concentration

+: results reported from diluted samples

Bolded values: detected

Shaded values: exceeded screening criteria

Shaded sample IDs are duplicate samples

TABLE 3.19
SUMMARY OF SURFACE WATER ANALYTICAL RESULTS (TASK 4)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Missouri Default Target Levels (Table B-2) or MCL Screening Criteria	Region 3 BTAG (freshwater aquatic life)	Missouri Human Health (organism only) Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-18152-9 9-Apr-09 NA SW01-SW01-090409	500-18152-7 9-Apr-09 NA SW02-SW01-090409	500-12974-2 1-Aug-08 NA SW03-SW01-080801
VOCs				UNITS:			
Vinyl Chloride	2	930	525	ug/L	ND	ND	ND
Methylene Chloride	5	98.1	470	ug/L	**7.5**	ND	ND
Methyl Ethyl Ketone	3,640	14000	-	ug/L	**0.83** J	ND	ND
Trichloroethene	5	21	80	ug/L	ND	ND	ND
Tetrachloroethene	5	111	8.85	ug/L	ND	ND	ND
1,2-Dichloroethene, Total	70	590	140000	ug/L	ND	ND	ND
SVOCs							
4-Bromophenyl phenyl ether	0.01	1.5	-	ug/L			
Hexachlorobenzene	0.22	0.0003	0.00074	ug/L			
Fluoranthene	164	0.04	370	ug/L			
Pyrene	96.1	0.025	11000	ug/L			
3,3'-Dichlorobenzidine	1.19	4.5	0.08	ug/L			
Benzo[a]anthracene	0.1	0.018	0.049	ug/L			
Chrysene	10.3	-	0.049	ug/L			
Benzo[b]fluoranthene	0.06	-	0.049	ug/L			
Benzo[k]fluoranthene	0.65	-	0.049	ug/L			
Benzo[a]pyrene	0.01	0.015	0.049	ug/L			
Indeno[1,2,3-cd]pyrene	0.04	-	0.049	ug/L			
Dibenz(a,h)anthracene	NA	-	0.049	ug/L			
Benzo[g,h,i]perylene	26.4		0.049	ug/L			
PESTICIDES							
Endosulfan I	NA	0.051	-	ug/L			
4,4'-DDD	0.52	0.011	0.00084	ug/L			
Endosulfan sulfate	NA	-	-	ug/L			
4,4'-DDT	0.24	0.0005	0.00059	ug/L			
Methoxychlor	40	0.019	-	ug/L			
Endrin ketone	2.07	0.036	0.0023	ug/L			
Endrin aldehyde	0.71	-	0.0023	ug/L			
METALS							
Arsenic	0.01	5	-	mg/L			
Barium	2	4	-	mg/L			
Cadmium	0.005	0.25	-	mg/L			
Chromium	0.1	85	-	mg/L			
Lead	0.015	2.5	-	mg/L			
Selenium	0.05	1	-	mg/L			
Silver	0.078	3.2	-	mg/L			
Zinc	4.69	120	-	mg/L			
Field Parameters				UNITS:			
Flow				gal/min	630	12.3	5.9
pH				std. units	7.85	7.14	7.87
Temperature				degrees C	9.6	9.5	23.1
Dissolved Oxygen				mg/L	4.67	4.38	10.67
Conductivity				us/cm	571	668	615
ORP				mv	-66.8	-42.1	235

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.19
SUMMARY OF SURFACE WATER ANALYTICAL RESULTS (TASK 4)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Missouri Default Target Levels (Table B-2) or MCL Screening Criteria	Region 3 BTAG (freshwater aquatic life)	Missouri Human Health (organism only) Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-18152-5 9-Apr-09 NA SW04-SW01-090409
VOCs				UNITS:	
Vinyl Chloride	2	930	525	ug/L	ND
Methylene Chloride	5	98.1	470	ug/L	**3.3**
Methyl Ethyl Ketone	3,640	14000	-	ug/L	ND
Trichloroethene	5	21	80	ug/L	ND
Tetrachloroethene	5	111	8.85	ug/L	ND
1,2-Dichloroethene, Total	70	590	140000	ug/L	ND
SVOCs					
4-Bromophenyl phenyl ether	0.01	1.5	-	ug/L	
Hexachlorobenzene	0.22	0.0003	0.00074	ug/L	
Fluoranthene	164	0.04	370	ug/L	
Pyrene	96.1	0.025	11000	ug/L	
3,3'-Dichlorobenzidine	1.19	4.5	0.08	ug/L	
Benzo[a]anthracene	0.1	0.018	0.049	ug/L	
Chrysene	10.3	-	0.049	ug/L	
Benzo[b]fluoranthene	0.06	-	0.049	ug/L	
Benzo[k]fluoranthene	0.65	-	0.049	ug/L	
Benzo[a]pyrene	0.01	0.015	0.049	ug/L	
Indeno[1,2,3-cd]pyrene	0.04	-	0.049	ug/L	
Dibenz(a,h)anthracene	NA	-	0.049	ug/L	
Benzo[g,h,i]perylene	26.4		0.049	ug/L	
PESTICIDES					
Endosulfan I	NA	0.051	-	ug/L	
4,4'-DDD	0.52	0.011	0.00084	ug/L	
Endosulfan sulfate	NA	-	-	ug/L	
4,4'-DDT	0.24	0.0005	0.00059	ug/L	
Methoxychlor	40	0.019	-	ug/L	
Endrin ketone	2.07	0.036	0.0023	ug/L	
Endrin aldehyde	0.71	-	0.0023	ug/L	
METALS					
Arsenic	0.01	5	-	mg/L	
Barium	2	4	-	mg/L	
Cadmium	0.005	0.25	-	mg/L	
Chromium	0.1	85	-	mg/L	
Lead	0.015	2.5	-	mg/L	
Selenium	0.05	1	-	mg/L	
Silver	0.078	3.2	-	mg/L	
Zinc	4.69	120	-	mg/L	
Field Parameters				UNITS:	
Flow				gal/min	9.8
pH				std. units	7.63
Temperature				degrees C	9.1
Dissolved Oxygen				mg/L	4.92
Conductivity				us/cm	479
ORP				mv	-45.5

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.19
SUMMARY OF SURFACE WATER ANALYTICAL RESULTS (TASK 4)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Missouri Default Target Levels (Table B-2) or MCL Screening Criteria	Region 3 BTAG (freshwater aquatic life)	Missouri Human Health (organism only) Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-12974-4 1-Aug-08 NA SW06-SW01-080801	500-12974-5 1-Aug-08 NA SW06-SW02-080801	500-13011-3 4-Aug-08 NA SW08-SW01-080804
VOCs				UNITS:			
Vinyl Chloride	2	930	525	ug/L	ND	ND	ND
Methylene Chloride	5	98.1	470	ug/L	ND	ND	ND
Methyl Ethyl Ketone	3,640	14000	-	ug/L			
Trichloroethene	5	21	80	ug/L	ND	ND	**2.3**
Tetrachloroethene	5	111	8.85	ug/L	**4.5**	**4.3**	**3.5**
1,2-Dichloroethene, Total	70	590	140000	ug/L	ND	ND	**4.1**
SVOCs							
4-Bromophenyl phenyl ether	0.01	1.5	-	ug/L	**0.16** J	ND	
Hexachlorobenzene	0.22	0.0003	0.00074	ug/L	**0.065** J	ND	
Fluoranthene	164	0.04	370	ug/L	ND	ND	
Pyrene	96.1	0.025	11000	ug/L	**0.07** J	ND	
3,3'-Dichlorobenzidine	1.19	4.5	0.08	ug/L	ND	ND	
Benzo[a]anthracene	0.1	0.018	0.049	ug/L	**0.065** J	ND	
Chrysene	10.3	-	0.049	ug/L	**0.067** J	ND	
Benzo[b]fluoranthene	0.06	-	0.049	ug/L	**0.042** J	ND	
Benzo[k]fluoranthene	0.65	-	0.049	ug/L	ND	ND	
Benzo[a]pyrene	0.01	0.015	0.049	ug/L	ND	ND	
Indeno[1,2,3-cd]pyrene	0.04	-	0.049	ug/L	ND	ND	
Dibenz(a,h)anthracene	NA	-	0.049	ug/L	ND	ND	
Benzo[g,h,i]perylene	26.4		0.049	ug/L	ND	ND	
PESTICIDES							
Endosulfan I	NA	0.051	-	ug/L	**0.051**	**0.05**	
4,4'-DDD	0.52	0.011	0.00084	ug/L	ND	ND	
Endosulfan sulfate	NA	-	-	ug/L	ND	ND	
4,4'-DDT	0.24	0.0005	0.00059	ug/L	ND	ND	
Methoxychlor	40	0.019	-	ug/L	ND	ND	
Endrin ketone	2.07	0.036	0.0023	ug/L	ND	ND	
Endrin aldehyde	0.71	-	0.0023	ug/L	ND	ND	
METALS							
Arsenic	0.01	5	-	mg/L	ND	ND	
Barium	2	4	-	mg/L	**0.16**	**0.16**	
Cadmium	0.005	0.25	-	mg/L	ND	ND	
Chromium	0.1	85	-	mg/L	ND	ND	
Lead	0.015	2.5	-	mg/L	ND	ND	
Selenium	0.05	1	-	mg/L	ND	ND	
Silver	0.078	3.2	-	mg/L	ND	ND	
Zinc	4.69	120	-	mg/L	ND	ND	
Field Parameters				UNITS:			
Flow				gal/min	315	315	2
pH				std. units	7.87	7.87	
Temperature				degrees C	26.5	26.5	
Dissolved Oxygen				mg/L	10.67	10.67	
Conductivity				us/cm	607	607	
ORP				mv	237	237	

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.19
SUMMARY OF SURFACE WATER ANALYTICAL RESULTS (TASK 4)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Missouri Default Target Levels (Table B-2) or MCL Screening Criteria	Region 3 BTAG (freshwater aquatic life)	Missouri Human Health (organism only) Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-18152-1 8-Apr-09 NA SW8-SW01-090408	500-20828-2 25-Aug-09 NA SW08-SW01-090825
VOCs				UNITS:		
Vinyl Chloride	2	930	525	ug/L	ND	**3.6**
Methylene Chloride	5	98.1	470	ug/L	ND	ND
Methyl Ethyl Ketone	3,640	14000	-	ug/L	ND	ND
Trichloroethene	5	21	80	ug/L	**2.2**	**1.4**
Tetrachloroethene	5	111	8.85	ug/L	**14**	ND
1,2-Dichloroethene, Total	70	590	140000	ug/L	ND	**6.6**
SVOCs						
4-Bromophenyl phenyl ether	0.01	1.5	-	ug/L		
Hexachlorobenzene	0.22	0.0003	0.00074	ug/L		
Fluoranthene	164	0.04	370	ug/L		
Pyrene	96.1	0.025	11000	ug/L		
3,3'-Dichlorobenzidine	1.19	4.5	0.08	ug/L		
Benzo[a]anthracene	0.1	0.018	0.049	ug/L		
Chrysene	10.3	-	0.049	ug/L		
Benzo[b]fluoranthene	0.06	-	0.049	ug/L		
Benzo[k]fluoranthene	0.65	-	0.049	ug/L		
Benzo[a]pyrene	0.01	0.015	0.049	ug/L		
Indeno[1,2,3-cd]pyrene	0.04	-	0.049	ug/L		
Dibenz(a,h)anthracene	NA	-	0.049	ug/L		
Benzo[g,h,i]perylene	26.4		0.049	ug/L		
PESTICIDES						
Endosulfan I	NA	0.051	-	ug/L		
4,4'-DDD	0.52	0.011	0.00084	ug/L		
Endosulfan sulfate	NA	-	-	ug/L		
4,4'-DDT	0.24	0.0005	0.00059	ug/L		
Methoxychlor	40	0.019	-	ug/L		
Endrin ketone	2.07	0.036	0.0023	ug/L		
Endrin aldehyde	0.71	-	0.0023	ug/L		
METALS						
Arsenic	0.01	5	-	mg/L		
Barium	2	4	-	mg/L		
Cadmium	0.005	0.25	-	mg/L		
Chromium	0.1	85	-	mg/L		
Lead	0.015	2.5	-	mg/L		
Selenium	0.05	1	-	mg/L		
Silver	0.078	3.2	-	mg/L		
Zinc	4.69	120	-	mg/L		
Field Parameters				UNITS:		
Flow				gal/min		
pH				std. units		
Temperature				degrees C		
Dissolved Oxygen				mg/L		
Conductivity				us/cm		
ORP				mv		

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.19
SUMMARY OF SURFACE WATER ANALYTICAL RESULTS (TASK 4)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Missouri Default Target Levels (Table B-2) or MCL Screening Criteria	Region 3 BTAG (freshwater aquatic life)	Missouri Human Health (organism only) Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-18152-3 9-Apr-09 NA SW8U1-SW01-090409	500-18152-4 9-Apr-09 NA SW8U2-SW01-090409	500-18572-1 29-Apr-09 NA SW8U3-SW01-090429
VOCs				UNITS:			
Vinyl Chloride	2	930	525	ug/L	ND	ND	ND
Methylene Chloride	5	98.1	470	ug/L	ND	ND	ND
Methyl Ethyl Ketone	3,640	14000	-	ug/L	ND	ND	ND
Trichloroethene	5	21	80	ug/L	ND	**2.8**	ND
Tetrachloroethene	5	111	8.85	ug/L	**2.2**	**19**	ND
1,2-Dichloroethene, Total	70	590	140000	ug/L	ND	**6**	ND
SVOCs							
4-Bromophenyl phenyl ether	0.01	1.5	-	ug/L			
Hexachlorobenzene	0.22	0.0003	0.00074	ug/L			
Fluoranthene	164	0.04	370	ug/L			
Pyrene	96.1	0.025	11000	ug/L			
3,3'-Dichlorobenzidine	1.19	4.5	0.08	ug/L			
Benzo[a]anthracene	0.1	0.018	0.049	ug/L			
Chrysene	10.3	-	0.049	ug/L			
Benzo[b]fluoranthene	0.06	-	0.049	ug/L			
Benzo[k]fluoranthene	0.65	-	0.049	ug/L			
Benzo[a]pyrene	0.01	0.015	0.049	ug/L			
Indeno[1,2,3-cd]pyrene	0.04	-	0.049	ug/L			
Dibenz(a,h)anthracene	NA	-	0.049	ug/L			
Benzo[g,h,i]perylene	26.4		0.049	ug/L			
PESTICIDES							
Endosulfan I	NA	0.051	-	ug/L			
4,4'-DDD	0.52	0.011	0.00084	ug/L			
Endosulfan sulfate	NA	-	-	ug/L			
4,4'-DDT	0.24	0.0005	0.00059	ug/L			
Methoxychlor	40	0.019	-	ug/L			
Endrin ketone	2.07	0.036	0.0023	ug/L			
Endrin aldehyde	0.71	-	0.0023	ug/L			
METALS							
Arsenic	0.01	5	-	mg/L			
Barium	2	4	-	mg/L			
Cadmium	0.005	0.25	-	mg/L			
Chromium	0.1	85	-	mg/L			
Lead	0.015	2.5	-	mg/L			
Selenium	0.05	1	-	mg/L			
Silver	0.078	3.2	-	mg/L			
Zinc	4.69	120	-	mg/L			
Field Parameters				UNITS:			
Flow				gal/min	6.5	2.1	
pH				std. units	7.65	7.46	
Temperature				degrees C	9.3	9.2	
Dissolved Oxygen				mg/L	5.64	5.72	
Conductivity				us/cm	830	832	
ORP				mv	-46.0	-42.5	

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.19
SUMMARY OF SURFACE WATER ANALYTICAL RESULTS (TASK 4)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Missouri Default Target Levels (Table B-2) or MCL Screening Criteria	Region 3 BTAG (freshwater aquatic life)	Missouri Human Health (organism only) Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-13011-4 4-Aug-08 NA SW910-SW01-080808	500-13011-2 4-Aug-08 NA SW11-SW01-080804	500-20828-3 25-Aug-09 NA SW12-SW01-090825
VOCs				UNITS:			
Vinyl Chloride	2	930	525	ug/L	ND	ND	ND
Methylene Chloride	5	98.1	470	ug/L	ND	ND	ND
Methyl Ethyl Ketone	3,640	14000	-	ug/L			ND
Trichloroethene	5	21	80	ug/L	ND	ND	ND
Tetrachloroethene	5	111	8.85	ug/L	ND	ND	ND
1,2-Dichloroethene, Total	70	590	140000	ug/L	ND	ND	ND
SVOCs							
4-Bromophenyl phenyl ether	0.01	1.5	-	ug/L			
Hexachlorobenzene	0.22	0.0003	0.00074	ug/L			
Fluoranthene	164	0.04	370	ug/L			
Pyrene	96.1	0.025	11000	ug/L			
3,3'-Dichlorobenzidine	1.19	4.5	0.08	ug/L			
Benzo[a]anthracene	0.1	0.018	0.049	ug/L			
Chrysene	10.3	-	0.049	ug/L			
Benzo[b]fluoranthene	0.06	-	0.049	ug/L			
Benzo[k]fluoranthene	0.65	-	0.049	ug/L			
Benzo[a]pyrene	0.01	0.015	0.049	ug/L			
Indeno[1,2,3-cd]pyrene	0.04	-	0.049	ug/L			
Dibenz(a,h)anthracene	NA	-	0.049	ug/L			
Benzo[g,h,i]perylene	26.4		0.049	ug/L			
PESTICIDES							
Endosulfan I	NA	0.051	-	ug/L			
4,4'-DDD	0.52	0.011	0.00084	ug/L			
Endosulfan sulfate	NA	-	-	ug/L			
4,4'-DDT	0.24	0.0005	0.00059	ug/L			
Methoxychlor	40	0.019	-	ug/L			
Endrin ketone	2.07	0.036	0.0023	ug/L			
Endrin aldehyde	0.71	-	0.0023	ug/L			
METALS							
Arsenic	0.01	5	-	mg/L			
Barium	2	4	-	mg/L			
Cadmium	0.005	0.25	-	mg/L			
Chromium	0.1	85	-	mg/L			
Lead	0.015	2.5	-	mg/L			
Selenium	0.05	1	-	mg/L			
Silver	0.078	3.2	-	mg/L			
Zinc	4.69	120	-	mg/L			
Field Parameters				UNITS:			
Flow				gal/min	253	5.8	
pH				std. units	7.96	7.4	
Temperature				degrees C	26.1	24.0	
Dissolved Oxygen				mg/L	12.58	7.29	
Conductivity				us/cm	489	781	
ORP				mv	230	254	

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.19
SUMMARY OF SURFACE WATER ANALYTICAL RESULTS (TASK 4)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Missouri Default Target Levels (Table B-2) or MCL Screening Criteria	Region 3 BTAG (freshwater aquatic life)	Missouri Human Health (organism only) Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-20828-4 25-Aug-09 NA SW13-SW01-090825	500-20828-5 25-Aug-09 NA SW14-SW01-090825
VOCs				UNITS:		
Vinyl Chloride	2	930	525	ug/L	ND	ND
Methylene Chloride	5	98.1	470	ug/L	ND	ND
Methyl Ethyl Ketone	3,640	14000	-	ug/L	ND	ND
Trichloroethene	5	21	80	ug/L	ND	ND
Tetrachloroethene	5	111	8.85	ug/L	ND	ND
1,2-Dichloroethene, Total	70	590	140000	ug/L	ND	ND
SVOCs						
4-Bromophenyl phenyl ether	0.01	1.5	-	ug/L		
Hexachlorobenzene	0.22	0.0003	0.00074	ug/L		
Fluoranthene	164	0.04	370	ug/L		
Pyrene	96.1	0.025	11000	ug/L		
3,3'-Dichlorobenzidine	1.19	4.5	0.08	ug/L		
Benzo[a]anthracene	0.1	0.018	0.049	ug/L		
Chrysene	10.3	-	0.049	ug/L		
Benzo[b]fluoranthene	0.06	-	0.049	ug/L		
Benzo[k]fluoranthene	0.65	-	0.049	ug/L		
Benzo[a]pyrene	0.01	0.015	0.049	ug/L		
Indeno[1,2,3-cd]pyrene	0.04	-	0.049	ug/L		
Dibenz(a,h)anthracene	NA	-	0.049	ug/L		
Benzo[g,h,i]perylene	26.4		0.049	ug/L		
PESTICIDES						
Endosulfan I	NA	0.051	-	ug/L		
4,4'-DDD	0.52	0.011	0.00084	ug/L		
Endosulfan sulfate	NA	-	-	ug/L		
4,4'-DDT	0.24	0.0005	0.00059	ug/L		
Methoxychlor	40	0.019	-	ug/L		
Endrin ketone	2.07	0.036	0.0023	ug/L		
Endrin aldehyde	0.71	-	0.0023	ug/L		
METALS						
Arsenic	0.01	5	-	mg/L		
Barium	2	4	-	mg/L		
Cadmium	0.005	0.25	-	mg/L		
Chromium	0.1	85	-	mg/L		
Lead	0.015	2.5	-	mg/L		
Selenium	0.05	1	-	mg/L		
Silver	0.078	3.2	-	mg/L		
Zinc	4.69	120	-	mg/L		
Field Parameters				UNITS:		
Flow				gal/min		
pH				std. units		
Temperature				degrees C		
Dissolved Oxygen				mg/L		
Conductivity				us/cm		
ORP				mv		

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)

There is no screening criterion for 1,2,-DCE(total). The MCL for cis-1,2-DCE was used
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
R: rejected data
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.20
SUMMARY OF SEDIMENT ANALYTICAL RESULTS (TASK 4)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-18152-10 9-Apr-09 NA SD01-SD01-090409	500-18152-8 9-Apr-09 NA SD02-SD01-090409	500-12974-3 1-Aug-08 0.2 SD03-SD01-000.2-080801	500-18152-6 9-Apr-09 NA SD04-SD01-090409
VOCs		UNITS:				
Chloromethane	204	ug/Kg	ND	ND	ND	ND
Chloroethane	281	ug/Kg	ND	ND	**1.3** J	ND
Acetone	4,200	ug/Kg	**96** J	ND	ND	ND
Trichloroethene	141	ug/Kg	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	ND	ND	ND	ND
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND
SVOCs						
Hexachlorocyclopentadiene	24,300	ug/Kg				
4-Bromophenyl phenyl ether	27.20	ug/Kg				
Hexachlorobenzene	2,910	ug/Kg				
Fluoranthene	2,280,000	ug/Kg				
Pyrene	1,500,000	ug/Kg				
3,3'-Dichlorobenzidine	130	ug/Kg				
Benzo[a]anthracene	6,120	ug/Kg				
Chrysene	599,000	ug/Kg				
Benzo[b]fluoranthene	6,190	ug/Kg				
Benzo[k]fluoranthene	62,000	ug/Kg				
Benzo[a]pyrene	620	ug/Kg				
Indeno[1,2,3-cd]pyrene	3,770	ug/Kg				
Dibenz(a,h)anthracene	620	ug/Kg				
Benzo[g,h,i]perylene	1,720,000	ug/Kg				
PESTICIDES						
4,4'-DDD	20,200	ug/Kg				
Endosulfan sulfate	NA	ug/Kg				
4,4'-DDT	14,300	ug/Kg				
Methoxychlor	304,000	ug/Kg				
Endrin ketone	18,300	ug/Kg				
Endrin aldehyde	18,200	ug/Kg				

TABLE 3.20
SUMMARY OF SEDIMENT ANALYTICAL RESULTS (TASK 4)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-18152-10 9-Apr-09 NA SD01-SD01-090409	500-18152-8 9-Apr-09 NA SD02-SD01-090409	500-12974-3 1-Aug-08 0.2 SD03-SD01-000.2-080801	500-18152-6 9-Apr-09 NA SD04-SD01-090409
METALS						
Arsenic	3.89	mg/Kg				
Barium	2,040	mg/Kg				
Cadmium	9.31	mg/Kg				
Chromium	74,600	mg/Kg				
Lead	3.74	mg/Kg				
Selenium	6.27	mg/Kg				
Silver	16.20	mg/Kg				
Zinc	7,220	mg/Kg				

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

TABLE 3.20
SUMMARY OF SEDIMENT ANALYTICAL RESULTS (TASK 4)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-12974-6 1-Aug-08 0.2 SD06-SD01-000.2-080801	500-12974-7 1-Aug-08 0.2 SD06-SD02-000.2-080801	500-13011-6 4-Aug-08 0.2 SD08-SD01-000.2-080804	500-13011-5 4-Aug-08 0.2 SD11-SD01-000.2-080804	500-13011-7 4-Aug-08 0.2 SD910-SD01-000.2-080804
VOCs		UNITS:					
Chloromethane	204	ug/Kg	**1.8** J	ND	ND	ND	ND
Chloroethane	281	ug/Kg	**1.3** J	**1** J	ND	ND	ND
Acetone	4,200	ug/Kg	ND	ND	**15** J	ND	ND
Trichloroethene	141	ug/Kg	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	**3.2** J	**2.1** J	ND	ND	ND
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND	ND
SVOCs							
Hexachlorocyclopentadiene	24,300	ug/Kg	**130** R	ND			
4-Bromophenyl phenyl ether	27.20	ug/Kg	ND	ND			
Hexachlorobenzene	2,910	ug/Kg	ND	ND			
Fluoranthene	2,280,000	ug/Kg	**27** J	ND			
Pyrene	1,500,000	ug/Kg	**47**	ND			
3,3'-Dichlorobenzidine	130	ug/Kg	**54** J	ND			
Benzo[a]anthracene	6,120	ug/Kg	**18** J	ND			
Chrysene	599,000	ug/Kg	**36** J	ND			
Benzo[b]fluoranthene	6,190	ug/Kg	**64**	ND			
Benzo[k]fluoranthene	62,000	ug/Kg	**43**	ND			
Benzo[a]pyrene	620	ug/Kg	**67**	ND			
Indeno[1,2,3-cd]pyrene	3,770	ug/Kg	**27** J	ND			
Dibenz(a,h)anthracene	620	ug/Kg	**9.7** J	ND			
Benzo[g,h,i]perylene	1,720,000	ug/Kg	**27** J	ND			
PESTICIDES							
4,4'-DDD	20,200	ug/Kg	**0.59** J	ND			
Endosulfan sulfate	NA	ug/Kg	**0.18** J	ND			
4,4'-DDT	14,300	ug/Kg	**1.5** J	ND			
Methoxychlor	304,000	ug/Kg	**0.55** J	ND			
Endrin ketone	18,300	ug/Kg	**0.33** J	ND			
Endrin aldehyde	18,200	ug/Kg	**0.7** J	ND			

TABLE 3.20
SUMMARY OF SEDIMENT ANALYTICAL RESULTS (TASK 4)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-12974-6 1-Aug-08 0.2 SD06-SD01-000.2-080801	500-12974-7 1-Aug-08 0.2 SD06-SD02-000.2-080801	500-13011-6 4-Aug-08 0.2 SD08-SD01-000.2-080804	500-13011-5 4-Aug-08 0.2 SD11-SD01-000.2-080804	500-13011-7 4-Aug-08 0.2 SD910-SD01-000.2-080804
METALS							
Arsenic	3.89	mg/Kg	**15** J	**33** J			
Barium	2,040	mg/Kg	**520** J	**640**			
Cadmium	9.31	mg/Kg	**0.56** J	**0.44** J			
Chromium	74,600	mg/Kg	**58** J	**21** J			
Lead	3.74	mg/Kg	**28** J	**52** J			
Selenium	6.27	mg/Kg	ND	**0.53** J			
Silver	16.20	mg/Kg	**0.44** J	**0.29** J			
Zinc	7,220	mg/Kg	**320** J	**78** J			

Notes:
Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

TABLE 3.21
SUMMARY OF SEWER SEDIMENT AND SOILS (ADJACENT TO SEWER DEFECTS) ANALYTICAL RESULTS
SEWER DOWNGRADIENT OF FORMER KELLWOOD FACILITY (TASK 5)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Sample Type Lab ID Sample Date Sample Depth (feet) Sample ID	Sediment 500-6721-4 20-Sep-07 NA LS4-SD01-070920	Sediment 500-6675-3 19-Sep-07 NA MH155-SD01-070919	Sediment 500-6674-4 18-Sep-07 NA MH331-SD01-070918	Sediment 500-6548-9 13-Sep-07 NA MH407-SD01-070913	Sediment 500-6547-12 13-Sep-07 NA MH409-SD01-070913	Sediment 500-6547-13 13-Sep-07 NA MH409-SD02-070913
VOCs		UNITS:						
Acetone	4,200	ug/Kg	ND	**4800**	ND	ND J	ND	ND
Carbon disulfide	6,260	ug/Kg	ND	ND	ND	ND J	ND	ND
Methylene Chloride	17.6	ug/Kg	ND	ND	ND	**100** J	ND	ND
Methyl Ethyl Ketone	7,300	ug/Kg	ND	**2500**	ND	ND J	ND	ND
Toluene	29,800	ug/Kg	ND	ND	ND	ND J	**1300**	ND
Tetrachloroethene	141	ug/Kg	ND	ND	**170**	**290** J	ND	ND

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.21
SUMMARY OF SEWER SEDIMENT AND SOILS (ADJACENT TO SEWER DEFECTS) ANALYTICAL RESULTS
SEWER DOWNGRADIENT OF FORMER KELLWOOD FACILITY (TASK 5)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Sample Type Lab ID Sample Date Sample Depth (feet) Sample ID	Soil 500-11312-6 12-May-08 6 SDF1-SS01-006.0-080512	Soil 500-11312-1 12-May-08 11 SDF1-SS01-011.0-080512	Soil 500-11312-2 13-May-08 6 SDF2-SS01-006.0-080513	Soil 500-11312-4 13-May-08 14 SDF2-SS01-014.0-080513	Soil 500-11312-9 13-May-08 5 SDF3-SS01-005.0-080513	Soil 500-11312-7 13-May-08 7 SDF3-SS01-007.0-080513
VOCs		UNITS:						
Acetone	4,200	ug/Kg	ND	ND	**99**	ND	ND	ND
Carbon disulfide	6,260	ug/Kg	ND	ND	ND	ND	ND	ND
Methylene Chloride	17.6	ug/Kg	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	7,300	ug/Kg	ND	ND	**19**	**6.3**	ND	ND
Toluene	29,800	ug/Kg	ND	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.21
SUMMARY OF SEWER SEDIMENT AND SOILS (ADJACENT TO SEWER DEFECTS) ANALYTICAL RESULTS
SEWER DOWNGRADIENT OF FORMER KELLWOOD FACILITY (TASK 5)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Sample Type Lab ID Sample Date Sample Depth (feet) Sample ID	Soil 500-11312-8 13-May-08 6 SDF4-SS01-006.0-080513	Soil 500-11312-3 13-May-08 8 SDF4-SS01-008.0-080513	Soil 500-11312-5 13-May-08 6 SDF5-SS01-006.0-080513	Soil 500-11312-10 13-May-08 8 SDF5-SS01-008.0-080513	Soil 500-11312-11 13-May-08 8 SDF5-SS02-008.0-080513
VOCs		UNITS:					
Acetone	4,200	ug/Kg	ND	ND	ND	ND	ND
Carbon disulfide	6,260	ug/Kg	ND	ND	**3.1** J	ND	ND
Methylene Chloride	17.6	ug/Kg	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	7,300	ug/Kg	ND	ND	ND	ND	ND
Toluene	29,800	ug/Kg	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	ND	ND	ND	ND	ND

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate samples

TABLE 3.22
SUMMARY OF SEWER WATER ANALYTICAL RESULTS
SEWER DOWNGRADIENT OF FORMER KELLWOOD FACILITY (TASK 5)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-6721-5 20-Sep-07 NA LS4-SR01-070920	500-6675-10 19-Sep-07 NA MH155-SR01-070919	500-6547-7 13-Sep-07 NA MH156-SR01-070913
VOCs		UNITS:			
Chloromethane	18.3	ug/L	ND	ND	ND
Acetone	2,970	ug/L	**130**	**32**	**19** J
Carbon disulfide	527	ug/L	ND	ND	ND
Methylene Chloride	5	ug/L	ND	ND	**0.24** J
1,1-Dichloroethane	24.9	ug/L	ND	ND	**0.15** J
Methyl Ethyl Ketone	3,640	ug/L	ND	ND	**17**
Chloroform	80	ug/L	**1.3**	ND	ND
Toluene	1,000	ug/L	ND	ND	ND
Tetrachloroethene	5	ug/L	**1.2**	ND	**4.3**
Chlorobenzene	100	ug/L	ND	ND	ND

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

TABLE 3.22
SUMMARY OF SEWER WATER ANALYTICAL RESULTS
SEWER DOWNGRADIENT OF FORMER KELLWOOD FACILITY (TASK 5)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-6674-13 19-Sep-07 NA MH331-SR01-070918	500-6721-7 20-Sep-07 NA MH405-SR01-070920	500-6548-10 13-Sep-07 NA MH407-SR01-070913	500-6547-1 13-Sep-07 NA MH409-SR01-070913	500-6547-2 13-Sep-07 NA MH409-SR02-070913
VOCs		UNITS:					
Chloromethane	18.3	ug/L	**1.8**	ND	ND	**1.2**	**1.8**
Acetone	2,970	ug/L	**18**	**60**	**18**	**25** J	**18** J
Carbon disulfide	527	ug/L	ND	ND	**1.4** J	**2.8** J	**3** J
Methylene Chloride	5	ug/L	ND	ND	ND	ND	**0.24** J
1,1-Dichloroethane	24.9	ug/L	ND	ND	ND	ND J	**0.15** J
Methyl Ethyl Ketone	3,640	ug/L	**5.6**	**14**	**56**	**16**	**25**
Chloroform	80	ug/L	ND	ND	ND	ND	ND
Toluene	1,000	ug/L	ND	ND	ND	**1.2**	**1.1**
Tetrachloroethene	5	ug/L	**2.3**	ND	ND	ND	ND
Chlorobenzene	100	ug/L	ND	ND	ND	**1**	**1.1**

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
J: estimated concentration
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample ID indicates duplicate sample

TABLE 3.23
SUMMARY OF SOIL (ADJACENT TO SEWER DEFECTS) ANALYTICAL RESULTS
SEWER NORTH OF HIGHWAY 100 (TASK 5)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-6674-16 19-Sep-07 1.5 A01-SS01-001.5-070919	500-6674-18 19-Sep-07 4 A01-SS02-004.0-070919	500-6674-14 19-Sep-07 1.5 A04-SS01-001.5-070919	500-6674-15 19-Sep-07 5 A04-SS01-005.0-070919	500-6674-7 18-Sep-07 7 A05-SS01-007.0-070918	500-6674-5 18-Sep-07 13 A05-SS01-013.0-070918
VOCs		UNITS:						
Vinyl chloride	19.2	ug/Kg	ND	ND	ND	ND	ND	ND
Trichloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND	ND	ND

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate sample

TABLE 3.23
SUMMARY OF SOIL (ADJACENT TO SEWER DEFECTS) ANALYTICAL RESULTS
SEWER NORTH OF HIGHWAY 100 (TASK 5)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-6674-2 18-Sep-07 13 A05-SS02-013.0-070918	500-6674-9 18-Sep-07 9 B01-SS01-009.0-070918	500-6674-8 18-Sep-07 15 B01-SS01-015.0-070918	500-6675-5 19-Sep-07 9 B02-SS01-009.0-070919	500-6675-4 19-Sep-07 12.8 B02-SS01-012.8-070919	500-6674-1 18-Sep-07 14.8 B02-SS01-014.8-070918
VOCs		UNITS:						
Vinyl chloride	19.2	ug/Kg	ND	ND	ND	ND	ND	ND
Trichloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND	ND	ND

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate sample

TABLE 3.23
SUMMARY OF SOIL (ADJACENT TO SEWER DEFECTS) ANALYTICAL RESULTS
SEWER NORTH OF HIGHWAY 100 (TASK 5)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-6674-17 19-Sep-07 9 B02-SS02-009.0-070919	500-6674-10 18-Sep-07 9 B03-SS01-009.0-070918	500-6675-6 19-Sep-07 6 B04-SS01-006.0-070919	500-6674-6 18-Sep-07 9 B04-SS01-009.0-070918	500-6674-3 18-Sep-07 11.6 B04-SS01-011.6-070918	500-6675-7 19-Sep-07 4 C01-SS01-004.0-070919
VOCs		UNITS:						
Vinyl chloride	19.2	ug/Kg	ND	ND	ND	ND	ND	ND
Trichloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND	ND	ND

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate sample

TABLE 3.23
SUMMARY OF SOIL (ADJACENT TO SEWER DEFECTS) ANALYTICAL RESULTS
SEWER NORTH OF HIGHWAY 100 (TASK 5)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-6675-2 19-Sep-07 5.5 C01-SS01-005.5-070919	500-6675-8 19-Sep-07 4 C03-SS01-004.0-070919	500-6675-1 19-Sep-07 8.4 C03-SS01-008.4-070919	500-6675-9 19-Sep-07 14.7 C04-SS01-014.7-070919	500-6721-3 20-Sep-07 10 C05-SS01-010.0-070920	500-6721-1 20-Sep-07 15 C05-SS01-015.0-070920
VOCs		UNITS:						
Vinyl chloride	19.2	ug/Kg	ND	ND	ND	ND	ND	ND
Trichloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND
Tetrachloroethene	141	ug/Kg	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene, Total	521	ug/Kg	ND	ND	ND	ND	ND	ND

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate sample

TABLE 3.23
SUMMARY OF SOIL (ADJACENT TO SEWER DEFECTS) ANALYTICAL RESULTS
SEWER NORTH OF HIGHWAY 100 (TASK 5)
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

	Screening Criteria	Lab ID Sample Date Sample Depth (feet) Sample ID	500-6721-2 20-Sep-07 15 C05-SS02-015.0-070920
VOCs		UNITS:	
Vinyl chloride	19.2	ug/Kg	ND
Trichloroethene	141	ug/Kg	ND
Tetrachloroethene	141	ug/Kg	ND
1,2-Dichloroethene, Total	521	ug/Kg	ND

Notes:

Screening Criteria: The analytical data were compared to the Missouri Default Target Levels (Table B-1) or the USEPA MCLs (as applicable)
NA: Not Applicable
Blank Cells: Parameter Not Analyzed
ND: compound was not detected
Bolded values: detected
Shaded values: exceeded screening criteria
Shaded sample IDs indicate duplicate sample

TABLE 3.24
SUMMARY OF SOIL VAPOR MONITORING DATA
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Location	USEPA Target Soil Gas Concentration for Residential Use[1]	USEPA Target Soil Gas Concentration for Industrial Use[2]	Missouri Tier 1 Risk-Based Target Level for for Indoor Air for Residential Use[3]	Missouri Tier 1 Risk-Based Target Level for Indoor Air for Non-Residential Use[4]	Missouri Tier 1 Risk-Based Target Level for Soil Vapor for Indoor Inhalation for Residential Use[5]	Missouri Tier 1 Risk-Based Target Level for Soil Vapor for Indoor Inhalation for Non-Residential Use[6]	Units	SVI1	SVI2	SVI3	SVI3*	SVI4	SVI5	Ambient Air**	
Sample Depth (feet)								9.8	10	10.2	10.2	9.9	10.8	--	--
Sample Collection Date								11-Sep-09	11-Sep-09	11-Sep-09	11-Sep-09	14-Sep-09	14-Sep-09	11-Sep-09	14-Sep-09
Compound															
Tetracholoethene (PCE)	41	210	427	909	380	1,990	ug/m^3	ND	ND	ND	ND	ND	**200**	**2.8**	ND
Trichloroethene (TCE)	120	610	1,280	2,730	1,040	5,440	ug/m^3	ND	ND	ND	ND	ND	ND	**1.9**	ND
cis-1,2-dichloroethene (cDCE)	NA	NA	2,090	6,820	1,820	14,600	ug/m^3	ND	ND	ND	ND	ND	ND	**0.94**	ND

Notes
(1) USEPA target soil gas concentration is based on the December 2009 RSL for residential air (USEPA, 2009) where the soil gas to indoor air attenuation factor = 0.01 (USEPA, 2008).
(2) USEPA target soil gas concentration is based on the December 2009 RSL for industrial air (USEPA, 2009) where the soil gas to indoor air attenuation factor = 0.01 (USEPA, 2008).
(3) Target level is based on Missouri Risk-Based Corrective Action (Missouri, 2006) Tier 1 for silty soil in indoor air for residential use (Table B-3) with a soil attenuation factor of 0.01 (USEPA, 2008).
(4) Target level is based on Missouri Risk-Based Corrective Action (Missouri, 2006) Tier 1 for silty soil in indoor air for non-residential use (Table B-6) with a soil attenuation factor of 0.01 (USEPA, 2008).
(5) Target level is based on Missouri Risk-Based Corrective Action (Missouri, 2006) Tier 1 for silty soil in soil vapor for residential use (Table B-3).
(6) Target level is based on Missouri Risk-Based Corrective Action (Missouri, 2006) Tier 1 for silty soil in soil vapor for non-residential use (Table B-6).
*: Duplicate Sample
<14: Compound not detected
Bolded cells indicate detected compounds
**:Ambient air samples were collected as background samples from outdoor air
NA = Not available

TABLE 3.25
SUMMARY OF MODIFICATIONS TO RI/FS WORK PLAN AND SAP
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Task	Modification/Deviation	Rationale
Task 1 - Soil Investigation	2 samples per soil boring were proposed. At selected borings, only 1 sample per boring was collected	Encountered refusal at location
Task 2a - Interval Screening at JS-14 and JS-36	Interval Screening was conducted ahead of the RI	At USEPA's request to provide information regarding interconnectivity between geologic strata and thus implications regarding potential vertical migration of impacted groundwater
	Additional work was performed at JS36 in April 2008	To remove the obstruction (abandoned pump) encountered during the April 2006 investigation and, then, to redo the work associated with the interval screening activities at JS-36 absent the abandoned pump
	Liners were installed at JS-14 and JS-36	To modify the wells in a manner that would preclude COPCs related to OU2/6, from migrating downwards, thereby reducing the concentrations of OU2/6 COPCs in the wells (and thereby in the influent that enters the home water system)
	JS-37 was reconfigured (but it was not successful)	The work was completed based on USEPA's December 5, 2007 approval letter with comments. However, the reconfiguration was not successful; bentonite rose too high
Task 2b – Direct-Push Sampling	Relocated the proposed direct push borings further north	To accommodate landowners' concerns and obtain access
Task 2c – Residential Well Sampling	JS-06, JS-35,JS-46 were not sampled	Access to sample these wells could not be obtained
	Sampled additional wells MW-2R,PA-55,MW-13	These wells were installed during/immediately after the Work Plan was approved

TABLE 3.25
SUMMARY OF MODIFICATIONS TO RI/FS WORK PLAN AND SAP
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Task	Modification/Deviation	Rationale
Task 2d – Well Installation	Overburden soil and groundwater samples were not collected from the monitoring wells installed by USGS	--
	Overburden soil sample from final MW14US location was not collected	MW14US was moved from the east side of the New Haven School to the west side. The soil sample from the final location was inadvertently missed.
	Overburden groundwater sample could not be collected from MW8 location	The location was dry.
	Monitoring wells were proposed to be installed via air rotary techniques. Cable tool technique was used at MW1UB, MW5UB, MW7UB, MW7US, MW8US, MW9US, MW9SW, MW10UBm MW11, MW12, MW14US	At USEPA's request and with USEPA's concurrence
	MW9SW was cored for the open hole interval	Based on field conditions
	MW15 could not be installed	Bennett Packaging Inc., land owners denied access
	In lieu of installing MW15, JS-25 was proposed to be reconfigured	Well owner had not given access approval at the time of the Draft RI Report preparation. To accommodate the proposed RI/FS schedule, reconfiguration and sampling of JS-25 was defered, geophysical logging performed by USGS. Reconfiguration and sampling will be performed when an access agreement can be obtained.
	MW5UB installed with screen	To eliminate potential influence of septic tank
	MW7US installed with screen	Due to unstable borehole
	MW8US installed with screen	To restrict the sampling interval to upper sand
	MW9US installed with screen	To restrict the sampling interval to upper sand
	MW9R installed with screen	Due to unstable borehole
	MW14US installed with screen	Allow sampling of overburden/bedrock interface
	MW04B installed with dual completion (cable tool was used to install casing and the open hole was cored). Casing left with annular space	Allows sampling of two intervals
	MW11 installed with cable tool; Annular space left open to formation	To isolate Swan Creek; To allow for sampling of the second interval
	MW12 left as open hole and is being considered for abandonment	Well sampled with no detection. Abandonment considered to minimize number of wells on landowner's property.
	Only overburden groundwater samples during well installation were proposed in the Work Plan. Approximately 28 groundwater samples were collected during well installation.	At USGS's request

TABLE 3.25
SUMMARY OF MODIFICATIONS TO RI/FS WORK PLAN AND SAP
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Task	Modification/Deviation	Rationale
Task 2e- Site-Wide Groundwater Sampling	In lieu of 4 site-wide groundwater sampling rounds prior to the RI report, only 1 round was conducted	To accommodate expedited turnaround of the RI report
	BW07 was not sampled	No technical basis for sampling
	JS37 sampling was proposed to be included but was not sample	Since the reconfiguration was not successful
Task 2f - Aquifer Testing	The proposed test was performed with the City Well No. 3 on normal demand rather than continuous pumping	To accommodate the City's requests and to alleviate their concerns
Task 3 - DNAPL Investigation	A total of 22 core holes were installed in lieu to originally proposed maximum of 20	Based on field conditions
	Liquids encountered in corehole P15 were not sampled	USEPA and USGS were overseeing the installation of this particular corehole. USEPA indicated that there was no need to collect samples for analytical testing from locations where DNAPL was encountered. At subsequent locations where DNAPL was encountered, USGS requested collection of samples for analytical testing
	The photoionization detector had a lamp failure duirng drilling of core hole L-12 and produced questionable readings at core hole A-7	PID screening of core was not performed on L-12 and screening results for A-7 are questionable
	Water encountered above the bedrock at A14 was not collected	A14 was the only location where water was encountered above the bedrock. A groundwater sample was inadvertently not collected
Task 4 - Sediment and Surface Water Sampling	10 Sediment and Surface Water Sampling locations were proposed. However, 2 were not sampled and 2 other locations were combined to 1.	Due to access issues
	Relocated SW2 and SW4 locations	Due to access issues
	Collected 3 additional upstream surface water samples and re-sampled SW08	At USEPA's request
	3 additional samples were collected from the tributary south of Wildcat Creek	USGS collected these samples
	Surface water samples were proposed during summer and spring base flow conditions. Surface water samples were only collected once	Due to access issues and based on flow conditions
	Field parameters not collected from several sample locations	Field parameters inadvertently not collected at several sample locations, field parameters not known for samples collected by the USGS
	Stream flows were calculated rather than direct measurements	Since low flows conditions were observed
Task 5 - Sanitary Sewer Inspection and Sampling		

TABLE 3.25
SUMMARY OF MODIFICATIONS TO RI/FS WORK PLAN AND SAP
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Task	Modification/Deviation	Rationale
Sanitary Sewer Directly Downgradient of the Former Kellwood Facility	Sewer sediment samples from 2 man holes could not be collected	Lack of sampling volume
Suspected Abandoned Sewer Line Adjacent to the Former Kellwood Facility	The proposed work was not performed	As communicated to the USEPA research indicated that the suspected sewer was removed during installation of the new sewer. Therefore, this task could not be performed.
Older Sewer Line Sections Located North of Highway 100	11 soil borings were installed instead of the proposed15	Due to access issues and due to lack of definition of sewer location
Task 6a – Preliminary Site Characterization Report	Reports/Memoranda were not developed	To accommodate the proposed RI/FS schedule, these reports/memoranda were eliminated (with USEPA's approval). Instead, these components were included directly in the RI Report
Task 6b – Fate and Transport Memorandum		
Task 6d – Data Analysis Technical Memorandum		
Task 6f – Candidate Technologies Technical Memorandum		

TABLE 5.1
MATRIX OF EXPOSURE PATHWAYS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route
Current	Soil	Soil	Surface soil (0-3')	Site Workers	Adult	Ingestion
						Dermal contact
				Trespassers	Juvenile	Ingestion
						Dermal contact
			Mixed soil (0-10')	Construction Workers	Adult	Ingestion
						Dermal
			Ambient Air (0-3')	Site Workers	Adult	Inhalation
				Trespassers	Juvenile	Inhalation
				Construction Workers	Adult	Inhalation
			Indoor Air (0-10')	Site Workers	Adult	Inhalation
	Groundwater	Groundwater	Ambient Air	Site Workers	Adult	Inhalation
				Trespassers	Juvenile	Inhalation
				Construction Workers	Adult	Inhalation
			Indoor Air	Site Workers	Adult	Inhalation
				High School Occupants	Adult & Juvenile	Inhalation
				Residents	Adult & Child	Inhalation
			Shallow Groundwater	Construction Workers	Adult	Dermal Contact
			Tap Water	Commercial Workers	Adult	Ingestion Inhalation during showering Dermal contact during showering
				Residents	Adult & Child	Ingestion Inhalation during showering Dermal contact during showering
	Surface Water	Surface Water	Boeuf Creek Tributaries	Trespassers	Juvenile	Dermal contact
	Sediment	Sediment	Bouef Creek Tributaries	Trespassers	Juvenile	Incidental Ingestion
						Dermal contact
						Inhalation

TABLE 5.1
MATRIX OF EXPOSURE PATHWAYS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Soil	Soil	Surface soil (0-3')	Quant	The facility is currently occupied by Metalcraft Industries.
				Quant	The facility is currently occupied by Metalcraft Industries.
				Quant	Although the access to the facility is limited, trespassers may be able to gain access to some areas of OU2/OU6.
				Quant	Although the access to the facility is limited, trespassers may be able to gain access to some areas of OU2/OU6.
			Mixed soil (0-10')	None	No construction activities occur at the facility.
				None	No construction activities occur at the facility.
			Ambient Air (0-3')	Quant	The facility is currently occupied by Metalcraft Industries.
				Quant	Although the access to the facility is limited, trespassers may be able to gain access to some areas of OU2/OU6.
				None	No construction activities occur at the facility.
			Indoor Air (0-10')	Quant	The facility is currently occupied by Metalcraft Industries.
	Groundwater	Groundwater	Ambient Air	Quant	Although the facility is occupied by Metalcraft Industries, the groundwater volatilization to ambient air pathway is insigificant comparing to the soil direct contact exposure pathways.
				Quant	Although the access to the facility is limited, trespassers may be able to gain access to some areas of OU2/OU6.
				None	No construction activities occur at the facility.
			Indoor Air	Quant	The facility is currently occupied by Metalcraft Industries.
				Quant	The school is currently occupied by high school teachers, students and maintenance employees.
				Quant	Evaluated for the shallow groundwater at the north end of OU6; however, additional sampling is being conducted to further evaluate this pathway.
			Shallow Groundwater	None	No construction activities occur at the facility.
			Tap Water	None	Groundwater at the facility is not used for potable consumption.
				Quant	Although residents currently have in-house treatment systems to remove contaminants prior to consumption, the concentrations in tap water were evaluated prior to treatment.
	Surface Water	Surface Water	Boeuf Creek Tributaries	Quant	Human exposures through swimming in the tributaries are unlikely because the tributaries are shallow. Wading is a potentially complete exposure pathway since the depths of the tributaries is shallow.
	Sediment	Sediment	Bouef Creek Tributaries	Quant	Human exposures through swimming in the tributaries are unlikely because the tributaries are shallow. However, there is potential for a trespasser to be exposed to sediment while wading.
				Quant	Human exposures through swimming in the tributaries are unlikely because the tributaries are shallow. However, there is potential for a trespasser to be exposed to sediment while wading.
				Quant	Human exposures through swimming in the tributaries are unlikely because the tributaries are shallow. However, there is potential for a trespasser to be exposed to sediment while wading.

TABLE 5.1
MATRIX OF EXPOSURE PATHWAYS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route
Future	Soil	Soil	Surface soil (0-3')	Commercial Workers (Outdoor)	Adult	Ingestion
				Trespassers	Juvenile	Dermal contact
						Ingestion
						Dermal contact
			Mixed soil (0-10')	Construction Workers	Adult	Ingestion
						Dermal contact
				Future Residents - OU2	Adult and child	Ingestion
						Dermal contact
			Ambient Air (0-3')	Commercial Workers (Outdoor)	Adult	Inhalation
				Trespassers	Juvenile	Inhalation
			Mixed (0-10')	Construction Workers	Adult	Inhalation
				Future Residents - OU2	Adult and child	Inhalation
			Indoor Air (0-10')	Commercial Workers (Indoor)	Adult	Inhalation
				Future Residents - OU2	Adult and child	Inhalation
	Groundwater	Groundwater	Ambient Air	Commercial Workers (Outdoor)	Adult	Inhalation
				Trespassers	Juvenile	Inhalation
				Construction Workers	Adult	Inhalation
				Future Residents - OU2	Adult and child	Inhalation
			Indoor Air	Commercial Workers (Indoor)	Adult	Inhalation
				Future Residents - OU2	Adult and child	Inhalation
			Shallow Groundwater	Construction Workers	Adult	Dermal Contact
			Deep Groundwater	Future Groundwater Users - OU2	Adult and child	Ingestion Inhalation during showering Dermal contact during showering
	Surface Water	Surface Water	Boeuf Creek Tributaries	Trespassers	Juvenile	Dermal contact
	Sediment	Sediment	Boeuf Creek Tributaries	Trespassers	Juvenile	Direct contact including Incidental Ingestion, inhalation and dermal contact.

TABLE 5.1
MATRIX OF EXPOSURE PATHWAYS
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Soil	Soil	Surface soil (0-3')	Quant	Under the anticipated future commercial scenario, commercial workers may be exposed to impacted soil.
				Quant	Under the anticipated future commercial scenario, commercial workers may be exposed to impacted soil.
				Quant	Under the anticipated future commercial scenario, a juvenile trespasser may be exposed to impacted soil.
				Quant	Under the anticipated future commercial scenario, a juvenile trespasser may be exposed to impacted soil.
			Mixed soil (0-10')	Quant	Under the anticipated future commercial scenario, construction workers may be exposed to impacted soil.
				Quant	Under the anticipated future commercial scenario, construction workers may be exposed to impacted soil.
				Quant	Although the anticipated future use for the facility is industrial, a future residential scenario was also evaluated. A future resident may be exposed to impacted soil.
				Quant	Although the anticipated future use for the facility is industrial, a future residential scenario as also evaluated. A future resident may be exposed to impacted soil.
			Ambient Air (0-3')	Quant	Under the anticipated future commercial scenario, commercial workers may be exposed to impacted soil via soil volatilization to ambient air.
				Quant	Under the anticipated future commercial scenario, a juvenile trespasser may be exposed to impacted soil via soil volatilization to ambient air.
			Mixed (0-10')	Quant	Under the anticipated future commercial scenario, construction workers may be exposed to impacted soil via soil volatilization to ambient air.
				Quant	Although the anticipated future use for the facility is industrial, a future residential scenario was also evaluated. A future resident may be exposed to impacted soil.
			Indoor Air (0-10')	Quant	Under the anticipated future commercial scenario, commercial workers may be exposed to impacted soil via soil volatilization to indoor air.
				Quant	Under the future residential scenario for the site, residents may be exposed to impacted soil via soil volatilization to indoor air.
	Groundwater	Groundwater	Ambient Air	Quant	Under the anticipated future commercial scenario, commercial workers may be exposed to impacted groundwater via groundwater volatilzation to ambient air.
				None	Under the anticipated future commercial scenario, a juvenile trespasser may be exposed to impacted groundwater via groundwater volatilization to ambient air.
				Quant	Under the anticipated future commercial scenario, construction workers may be exposed to impacted groundwater via groundwater volatilization to ambient air.
				Quant	Although the anticipated future use for the facility is industrial, a future residential scenario was also evaluated. A future resident may be exposed to impacted groundwater.
			Indoor Air	Quant	Under the anticipated future commercial scenario, commercial workers may be exposed to impacted groundwater via groundwater volatilization to indoor air.
				Quant	Under the future residential scenario, residents may be exposed to impacted groundwater via groundwater volatilization to indoor air.
			Shallow Groundwater	None	The groundwater dermal contact is considered an incomplete exposure pathway because the typical depth to groundwater is deeper than 10 feet, which is deeper than normal construction activity.
			Deep Groundwater	Quant	Although groundwater at the facility is not used for potable consumption and no drinking water wells are identified at the facility, a future groundwater user was considered because there is no groundwater use restriction to prevent any drinking water wells to be installed at the facility and there are potable wells in the vicinity of the facility.
	Surface Water	Surface Water	Boeuf Creek Tributaries	Quant	Human exposure through swimming in tributaries is unlikely because they are shallow. Wading is a potentially complete exposure pathway.
	Sediment	Sediment	Boeuf Creek Tributaries	Quant	Although human exposure through swimming in tributaries is unlikely; wading is a potential activity. There is potential for a trespasser to be exposed to sediment.

TABLE 6.1

SUMMARY OF RISKS

Riverfront Superfund Site - OU2/OU6

RECEPTOR	TOTAL RISK	HAZARD INDEX
Industrial Outdoor Worker	7.6E-06	0.018
Industrial Indoor Worker	**1.9E-03**	0.96
Construction Worker	6.6E-07	0.015
Juvenile Trespasser	2.6E-05	0.038
Future Potential Resident - OU2	**9.4E-03**	**6.9**
Future Groundwater User - OU2	**5.5E-03**	**2.9**
Current/Future Groundwater User - OU6 (prior to groundwater treatment)	**3.3E-03**	**1.9**
Current/Future Resident - OU6 (inhalation of PCE from shallow groundwater)	2.5E-05	0.017

Bold and shaded values are outside of the acceptable risk range or hazard index.

KELLWOOD

PARSONS

REMEDIAL INVESTIGATION REPORT
RIVERFRONT SUPERFUND SITE
OPERABLE UNITS NO. 2/6
NEW HAVEN, MISSOURI

APPENDICES

Prepared on behalf of Kellwood Company for:

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7

JUNE 2010

APPENDIX A
FIELD DATA SHEETS

TASK 2C

RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 06 MAR 08

WELL ID: OUX-DM-21 SAMPLE ID: DM21-GW01-080306 COLLECTED BY: LLG/LLW

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. **SAMPLING INFORMATION**

House owner contact prior to sampling: [✓] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [✓] Outside Spigot [ ] Other Explain: _____

Softner? [ ] Before [ ] After [ ] Other Explain: _____

Pressure Tank? [✓] Before [ ] After [ ] Other Explain: before sample pt

Treatment System? [ ] Yes [✓] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft		
1633										5	
1638			7.22	694	0	2.26	13.45	103			
1643			7.22	693	11.5	2.20	13.54	97			
1648			7.22	693	26.1	1.98	13.50	93			
1653			7.22	693	34.8	1.85	13.45	88			
1658			7.21	695	42.2	1.79	13.38	84			

3. **SAMPLE COLLECTION:**

Samples Collected? [✓] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

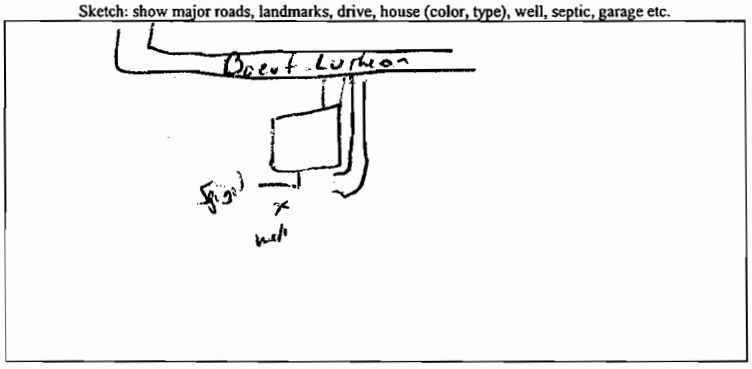
Stored on ice? [✓] Yes [ ] No Remarks: _____

In containers provided by lab? [✓] Yes [ ] No Remarks: _____

Stored on ice? [✓] Yes [ ] No Remarks: _____

REMARKS:

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 06 MAR 08

WELL ID: OUX-JS-07 SAMPLE ID: JS07-GW01-080306 COLLECTED BY: LLG/LLW

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. SAMPLING INFORMATION

House owner contact prior to sampling: [✓] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [✓] Other Explain: YARD Hydrant

Softner? [ ] Before [ ] After [ ] Other Explain: _____

Pressure Tank? [ ] Before [ ] After [ ] Other Explain: _____

Treatment System? [ ] Yes [✓] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. ON-SITE MEASUREMENTS:

HORIBA CALIBRATED? [✓] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1003			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	1058m	
1007			7.27	.499	0	4.16	13.23	115			
1013			7.34	.498	0	1.31	13.25	103			
1018			7.34	500	0	1.27	13.31	99			
1023			7.34	507	0	1.15	13.33	98			

3. SAMPLE COLLECTION:

Samples Collected? [✓] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

Stored on ice? [✓] Yes [ ] No Remarks: _____

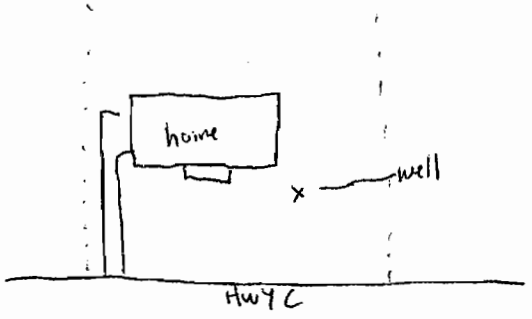
In containers provided by lab? [✓] Yes [ ] No Remarks: _____

Stored on ice? [✓] Yes [ ] No Remarks: _____

REMARKS:

Sampled 1025

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted]

DATE: 11 MAR 08

WELL ID: OUX-JS-10

SAMPLE ID: JS10-GW01-080311 GW02

COLLECTED BY: Lew/Lee

HOUSE/WELL OWNER: [redacted]

PHONE: [redacted]

ADDRESS: [redacted]

1. SAMPLING INFORMATION

House owner contact prior to sampling: [✓] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [✓] Other Explain: Yard Hydrant

Softner? [ ] Before [ ] After [ ] Other Explain: _____

Pressure Tank? [ ] Before [✓] After [ ] Other Explain: after sample pt

Treatment System? [ ] Yes [ ] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. ON-SITE MEASUREMENTS:

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1255			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	8	
1300			6.95	810	0	4.66	12.79	162			
1305			6.91	811	1.4	3.53	13.25	160			
1310			6.94	803	4.3	3.07	13.37	154			
1315			6.99	798	8.1	2.87	13.45	150			
1320			7.01	798	5.7	2.80	13.47	148			
1325			7.02	796	5.2	2.67	13.58	145			

3. SAMPLE COLLECTION:

Samples Collected? [✓] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

Stored on ice? [✓] Yes [ ] No Remarks: _____

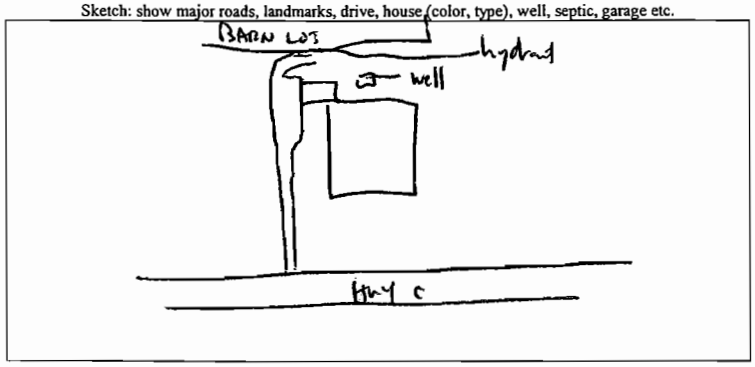
In containers provided by lab? [✓] Yes [ ] No Remarks: _____

Stored on ice? [✓] Yes [ ] No Remarks: _____

REMARKS:

Duplicate

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 06 MAR 08

WELL ID: OUX-JS-11 SAMPLE ID: JS11-GW01-080306 COLLECTED BY: LLG LLW

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. SAMPLING INFORMATION

House owner contact prior to sampling: [✓] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [✓] Outside Spigot [ ] Other Explain: _____

Softner? [ ] Before [ ] After [ ] Other Explain: -?

Pressure Tank? [✓] Before [ ] After [ ] Other Explain: _____

Treatment System? [ ] Yes [✓] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. ON-SITE MEASUREMENTS:

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1403			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	5	
1407			7.26	599	0	4.50	13.48	117			
1412			7.25	599	0	3.91	13.54	115			
1417			7.25	602	0	3.81	13.24	114			
1422			7.25	600	0	3.68	13.34	114			
1427			7.25	599	0	3.70	13.22	115			

3. SAMPLE COLLECTION:

Samples Collected? [✓] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

Stored on ice? [✓] Yes [ ] No Remarks: _____

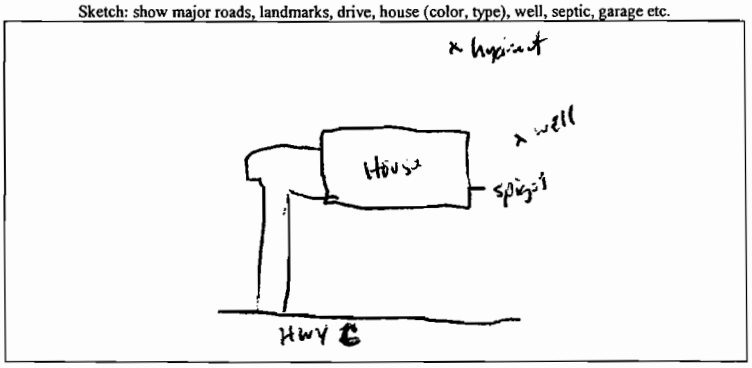
In containers provided by lab? [✓] Yes [ ] No Remarks: _____

Stored on ice? [✓] Yes [ ] No Remarks: _____

REMARKS:

Sampled 1429

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 7/11/2018

WELL ID: OUX-JS-12 SAMPLE ID: JS12-GW01-080318 COLLECTED BY: MW/LG

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. SAMPLING INFORMATION

House owner contact prior to sampling: [✓] Yes [ ] No Remarks: _____

Sample Collected From: [✓] Inside faucet [ ] Outside Spigot [ ] Other Explain: _____

Softner? [ ] Before [ ] After [ ] Other Explain: N/A

Pressure Tank? [✓] Before [ ] After [ ] Other Explain: Before sample pt

Treatment System? [ ] Yes [✓] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. ON-SITE MEASUREMENTS:

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
~~1507~~ 1514			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	6.67	
1519			7.24	695	0	8.42	13.32	95			
1524			7.17	690	0	8.30	13.55	98			
1529			7.11	688	0	4.85	13.59	96			
1534			7.14	683	0	4.08	13.64	95			
1539			7.16	678	0	3.73	13.65	96			
1544			7.17	676	0	3.46	13.66	95			
1549			7.17	673	0	3.24	13.67	96			

3. SAMPLE COLLECTION:

Samples Collected? [✓] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

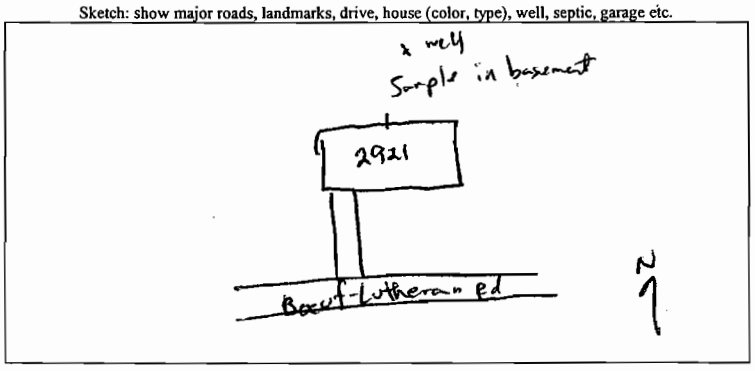
Stored on ice? [✓] Yes [ ] No Remarks: _____

In containers provided by lab? [✓] Yes [ ] No Remarks: _____

Stored on ice? [✓] Yes [ ] No Remarks: _____

REMARKS:

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted]
DATE: 2-28-08
WELL ID: JS-14
SAMPLE ID: ~~T4P-GW01-080228~~ JS14-~~GW01-T4P~~-080228 JS14-INF-GW01-080228 JS14-INT-GW01-080228 JS14-EFF-GW01-080228
SAMPLE COLLECTED BY: of Parsons
HOUSE/WELL OWNER: [redacted] PHONE: [redacted]
ADDRESS: [redacted]

1. [ ] **SAMPLING INFORMATION**

House owner contact prior to sampling: [XX] Yes [ ] No Remarks:
Sample Collected From: [XX] Inside faucet [ ] Outside Spigot [ ] Other Explain: Typical From kitchen sink.
Softner? [ ] Before [ ] After [ ] Other Explain: None
Pressure Tank? [XX] Before [ ] After [ ] Other Explain:
Treatment System? [XX] Yes [ ] No Remarks:
[ ] Deficiencies/Problems Observed By Sample Collector Explain:
[ ] Deficiencies/Problems Corrected By Sample Collector Explain:

2. [ ] **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED: [X] Yes [ ] No COMMENTS: Multi point pH

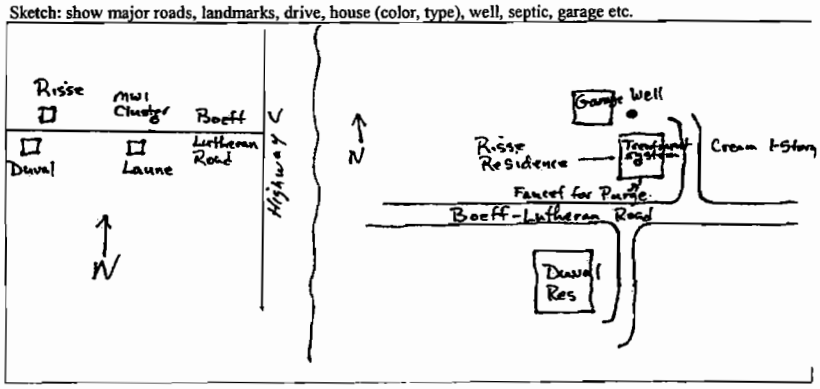
Time	Color	Smell	pH	Conductivity (uS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft		
1720										8.6	
1725			7.29	641	0	1.91	14.97	137			
1730			7.25	638	0	1.02	14.99	134			
1735			7.26	637	0	0.0	12.64	132			
1740			7.26	633	0	0.0	12.48	131			
1745			7.24	635	0	0.0	12.57	129			215

3. [ ] **SAMPLE COLLECTION:**

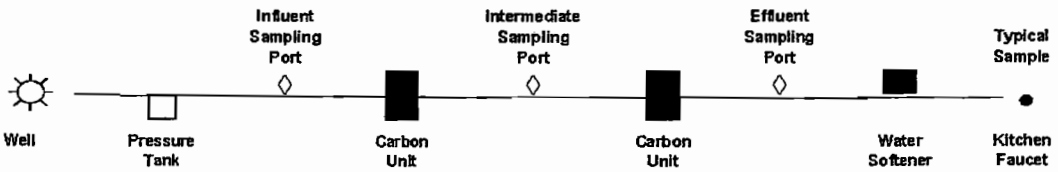
Samples Collected? [XX] VOC [XX] Coliform [ ] Metals [ ] Others Explain:
Stored on ice? [X] Yes [ ] No Remarks:
In containers provided by lab? [XX] Yes [ ] No Remarks:
Stored on ice? [X] Yes [ ] No Remarks:

REMARKS:

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



Plumbing Schematic



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 06 MAR 08

WELL ID: OUX-JS-15 SAMPLE ID: JS15-GW-080306 COLLECTED BY: LLG / LLW

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. SAMPLING INFORMATION

House owner contact prior to sampling: [X] Yes [ ] No Remarks:

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [X] Other Explain: HYDRANT next to well

Softner? [ ] Before [ ] After [ ] Other Explain:

Pressure Tank? [ ] Before [ ] After [X] Other Explain:

Treatment System? [ ] Yes [X] No Remarks:

[ ] Deficiencies/Problems Observed By Sample Collector Explain:

[ ] Deficiencies/Problems Corrected By Sample Collector Explain:

2. ON-SITE MEASUREMENTS:

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1250			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	10	
1255			7.31	550	6	5.47	13.31	130			
1300			7.28	543	0	3.35	13.58	126			
1305			7.28	539	0	2.91	13.46	120			
1310			7.28	537	0	2.38	13.33	115			
1315			7.28	534	0	1.92	13.35	109			
1320			7.27	531	0	1.62	13.24	105			
1327			7.28	530	0	1.26	13.37	101			
1332			7.28	533	0	1.20	13.43	99			
1337			7.28	531	0	1.11	13.45	96			

3. SAMPLE COLLECTION:

Samples Collected? [X] VOC [ ] Coliforms [ ] Metals [ ] Others Explain:

Stored on ice? [X] Yes [ ] No Remarks:

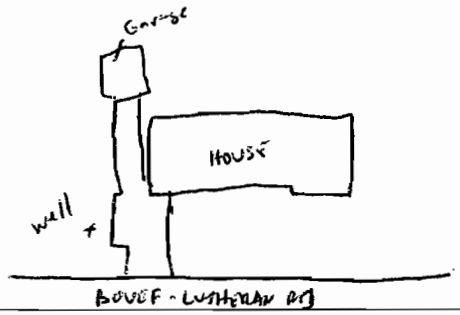
In containers provided by lab? [X] Yes [ ] No Remarks:

Stored on ice? [X] Yes [ ] No Remarks:

REMARKS:

SAMPLE 1338

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 06 MAR 08

WELL ID: OUX-JS-20 SAMPLE ID: J520-GW01-080306 COLLECTED BY: LLG/LLW

HOUSE/WELL OWNER: [redacted] PHONE [redacted]

ADDRESS: [redacted]

1. **SAMPLING INFORMATION**

House owner contact prior to sampling: [/] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [/] Outside Spigot [ ] Other Explain: _____

Softner? [ ] Before [ ] After [ ] Other Explain: _____

Pressure Tank? [/] Before [ ] After [ ] Other Explain: before Sample pt

Treatment System? [ ] Yes [/] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1542			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	9	
1547			7.41	542	0	4.01	13.03	116			
1552			7.35	544	0	1.15	13.04	110			
1557			7.34	544	0	0.52	13.07	106			
1602			7.33	541	0	0.26	13.11	103			
1607			7.33	537	0	0.00	13.07	101			
1612			7.33	534	0	0.00	13.07	99			
1617			7.33	534	0	0.00	13.03	97			

3. **SAMPLE COLLECTION:**

Samples Collected? [/] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

Stored on ice? [/] Yes [ ] No Remarks: _____

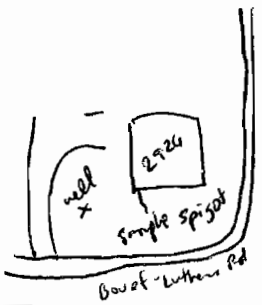
In containers provided by lab? [/] Yes [ ] No Remarks: _____

Stored on ice? [/] Yes [ ] No Remarks: _____

REMARKS:

1620 -Sample

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: BEAVER BRAND HATS DATE: MAY 27, 2008
WELL ID: JS25 SAMPLE ID: JS25-GW01-080527 COLLECTED BY: LLW / LLG
HOUSE/WELL OWNER: PHONE:
ADDRESS:

1. **SAMPLING INFORMATION**

House owner contact prior to sampling: [X] Yes [ ] No Remarks:
Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [X] Other Explain: REDIFLOW PUMP IN WELL
Softner? [ ] Before [ ] After [ ] Other Explain: N/A
Pressure Tank? [ ] Before [ ] After [ ] Other Explain: N/A
Treatment System? [ ] Yes [X] No Remarks:
[X] Deficiencies/Problems Observed By Sample Collector Explain: WELL UNABLE TO PRODUCE 6 gpm AT SAMPLE PUMP DEPTH
[X] Deficiencies/Problems Corrected By Sample Collector Explain: LOWERED PUMP FLOW RATE TO ~1.5 gpm

2. **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1012			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	1.5	48
1027			7.58	669	0	4.09	16.21	111		2	70.5
1035			7.17	659	0.1	3.51	16.17	114			
1130			7.95	651	0	3.30	16.60	113		1.5	184
1135			7.36	650	0	3.09	16.65	109			
1140			7.33	650	0.1	2.85	16.63	103			199

3. **SAMPLE COLLECTION:**

Samples Collected? [X] VOC [ ] Coliforms [ ] Metals [ ] Others Explain:
Stored on ice? [X] Yes [ ] No Remarks:
In containers provided by lab? [X] Yes [ ] No Remarks:
Stored on ice? [X] Yes [ ] No Remarks:

REMARKS:
↑ TO 2 GPM @ 1024
BEGIN PURGE 0955 @ 6 GPM
UNTIL 1003

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.

15
1.5
7.5
15.0
22.5

RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 11 MAR 2008

WELL ID: OUX-JS-29 SAMPLE ID: JS 29-GW01-080311 COLLECTED BY: CW/LLC

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. SAMPLING INFORMATION

House owner contact prior to sampling: [✓] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [✓] Other Explain: YARD HYDRANT

Softner? [ ] Before [ ] After [ ] Other Explain: _____

Pressure Tank? [ ] Before [ ] After [ ] Other Explain: _____

Treatment System? [ ] Yes [✓] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. ON-SITE MEASUREMENTS:

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1138			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	10	
1143			7.08	724	0	5.35	13.87	147			
1148			7.05	720	0	4.01	13.95	144			
1153			7.05	715	0	3.59	13.91	144			
1158			7.05	714	0	2.95	13.91	143			
1203			7.04	714	0	2.64	13.87	143			
1208			7.04	711	6.3	2.39	13.96	143			
1213			7.04	709	6.9	2.26	13.93	143			

3. SAMPLE COLLECTION:

Samples Collected? [✓] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

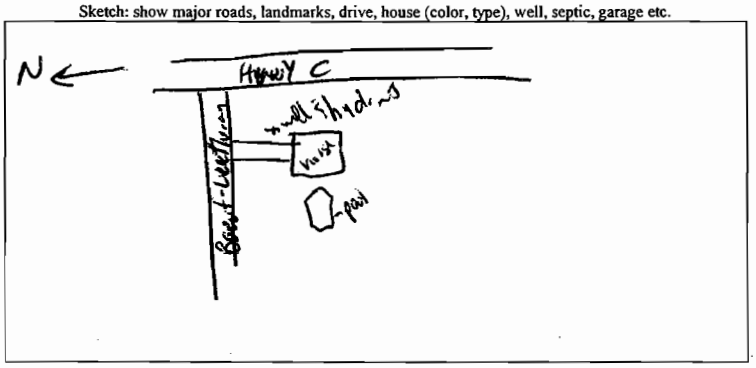
Stored on ice? [✓] Yes [ ] No Remarks: _____

In containers provided by lab? [✓] Yes [ ] No Remarks: _____

Stored on ice? [✓] Yes [ ] No Remarks: _____

REMARKS:

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 11 MAR 07

WELL ID: OUX-JS-33 SAMPLE ID: JS33-GW01-050311 COLLECTED BY: LLW/LLG

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. SAMPLING INFORMATION

House owner contact prior to sampling: [✓] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [✓] Other Explain: YARD HYDRANT

Softner? [ ] Before [ ] After [ ] Other Explain: _____

Pressure Tank? [ ] Before [✓] After [ ] Other Explain: After Sample pt

Treatment System? [ ] Yes [✓] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. ON-SITE MEASUREMENTS:

HORIBA CALIBRATED? [✓] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
0836			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	10	
0848			7.27	664	0	6.67	12.99	159			
0853			7.20	644	0	3.46	13.54	156			
0858			7.16	637	0	2.23	13.56	155			
0903			7.15	635	0	1.81	13.56	154			
0908			7.14	636	0	1.61	13.60	151			
0913			7.14	636	0	1.56	13.53	149			

3. SAMPLE COLLECTION:

Samples Collected? [✓] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

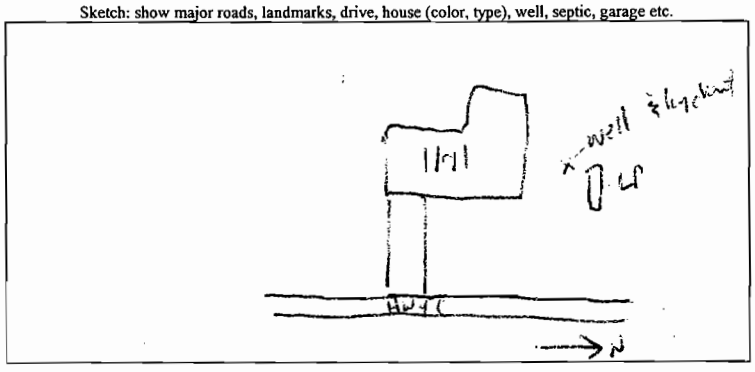
Stored on ice? [✓] Yes [ ] No Remarks: _____

In containers provided by lab? [✓] Yes [ ] No Remarks: _____

Stored on ice? [✓] Yes [ ] No Remarks: _____

REMARKS:

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 02-28-08

WELL ID: JS-36 SAMPLE ID: JS36-T4P-GW01-080228
JS36-INF-GW01-080228
~~JS36 INF-GW01-080228~~
JS36 INT-GW01-080228
JS36 EFF-GW01-080228

SAMPLE COLLECTED BY: _____ of Parsons

HOUSE/WELL OWNER: [redacted] PHONE: 573 237-3075

ADDRESS: [redacted]

1. [ ] **SAMPLING INFORMATION**

House owner contact prior to sampling: [XX] Yes [ ] No Remarks: _____

Sample Collected From: [XX] Inside faucet [ ] Outside Spigot [ ] Other Explain: Typical From kitchen sink.

Softner? [ ] Before [XX] After [ ] Other Explain: _____

Pressure Tank? [XX] Before [ ] After [ ] Other Explain: _____

Treatment System? [XX] Yes [ ] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. [ ] **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [X] Yes [ ] No COMMENTS: Multi Point ~~Conductivity~~ pH auto Cal other parameters

Time	Color	Smell	pH	Conductivity (uS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft		
1217										6	
1225			7.10	876	9.1	0.8	12.01	114			
1230			7.09	891	21.5	0.69	11.46	113			
1235			7.07	881	39.4	3.54	12.27	115			
1240			7.08	881	51.4	4.88	12.63	117			
1245			7.07	886	65	5.14	12.04	121		12	
1250			7.10	882	72.3	5.43	11.75	123			
1255			7.10	884	77.4	5.52	11.54	125			
1300			7.10	883	81.6	5.87	11.44	126			~~258~~ 318

3. [ ] **SAMPLE COLLECTION:**

Samples Collected? [XX] VOC [XX] Coliform [ ] Metals [ ] Others Explain: _____

Stored on ice? [X] Yes [ ] No Remarks: _____

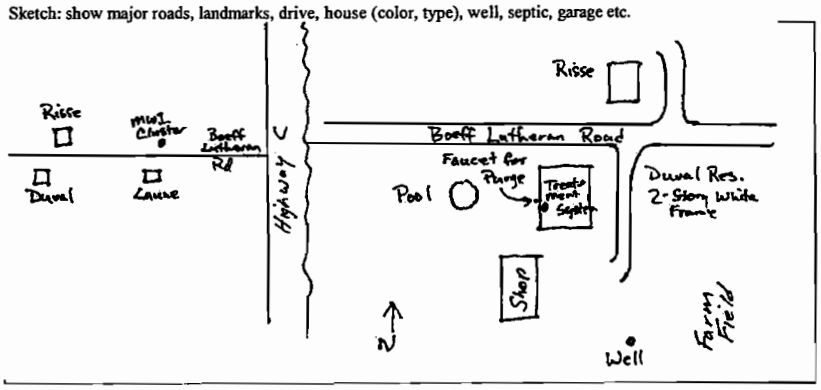
In containers provided by lab? [XX] Yes [ ] No Remarks: _____

Stored on ice? [X] Yes [ ] No Remarks: _____

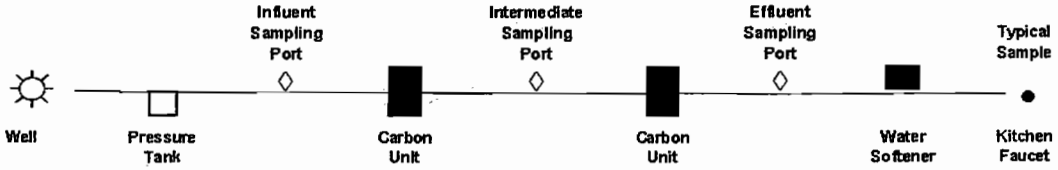
REMARKS:

Opened faucet at rear of shop to add to purge.

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



Plumbing Schematic



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 14 MAR 08

WELL ID: OU2-JS-37 SAMPLE ID: JS37-GW01-080314 COLLECTED BY: LLW / LLG

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. **SAMPLING INFORMATION**

House owner contact prior to sampling: [X] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [ ] Other Explain: w/submersible pump in well

Softner? [ ] Before [ ] After [ ] Other Explain: N/A

Pressure Tank? [ ] Before [ ] After [ ] Other Explain: N/A

Treatment System? [ ] Yes [ ] No Remarks: N/A

[X] Deficiencies/Problems Observed By Sample Collector Explain: Water drawdown faster than recharge, have to stop pumping to let well recharge.

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)	
1345			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft			
1354			7.14	712	0	5.16	15.73	156				
1402			7.14	738	0	4.99	16.84	153	85.43			Break to empty tank
1436			7.15	625	0.2	3.38	14.62	125				
1450			7.15	624	1.7	3.08	15.40	120				
1455			7.19	617	1.4	3.11	14.95	117				
1502			7.19	615	3.5	3.82	14.59	109				
1508			7.20	605	4.4	4.42	14.68	110				
1513			7.20	604	4.3	4.14	14.95	110				
1518			7.18	605	17.5*	3.66*	14.53	102				

3. **SAMPLE COLLECTION:**

Samples Collected? [X] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

Stored on ice? [X] Yes [ ] No Remarks: _____

In containers provided by lab? [X] Yes [ ] No Remarks: _____

Stored on ice? [X] Yes [ ] No Remarks: _____

REMARKS:

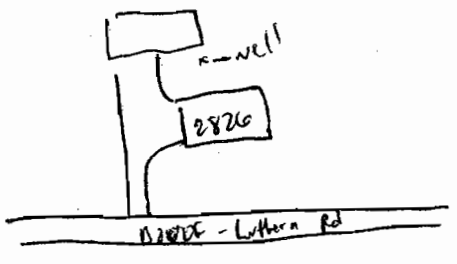
WL = 59.19' bgs - start

MS/MSD & Duplicate

Stopped - few times to let well recharge and turbidity

* DO reading is not real because of air in the line

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 2-29-08

JS38-TYP-GW01-080228
JS38-INF-GW01-080228
JS38-INF-GW02-080228
JS38-INT-GW01-080228
JS38-EFF-GW01-080228

WELL ID: JS-38 SAMPLE ID:

SAMPLE COLLECTED BY: of Parsons

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. [ ] **SAMPLING INFORMATION**

House owner contact prior to sampling: [XX] Yes [ ] No Remarks:

Sample Collected From: [XX] Inside faucet [ ] Outside Spigot [ ] Other Explain: Typical From kitchen sink.

Softner? [ ] Before [XX] After [ ] Other Explain:

Pressure Tank? [XX] Before [ ] After [ ] Other Explain:

Treatment System? [XX] Yes [ ] No Remarks:

[ ] Deficiencies/Problems Observed By Sample Collector Explain:

[ ] Deficiencies/Problems Corrected By Sample Collector Explain:

2. [ ] **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [X] Yes [ ] No COMMENTS: Multi Point pH calibration, autocal for other parameters

Time	Color	Smell	pH	Conductivity (uS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft		
1833										6	
1840			7.29	713	0	1.72	11.86	150			42
1845			7.27	727	0	0.95	11.77	146			
1850			7.27	734	0	0.55	11.93	142			
1855			7.27	735	0.0	0.24	11.92	138			
1900			7.27	733	0.0	0.12	11.93	135			162

3. [ ] **SAMPLE COLLECTION:**

Samples Collected? [XX] VOC [XX] Coliform [ ] Metals [ ] Others Explain:

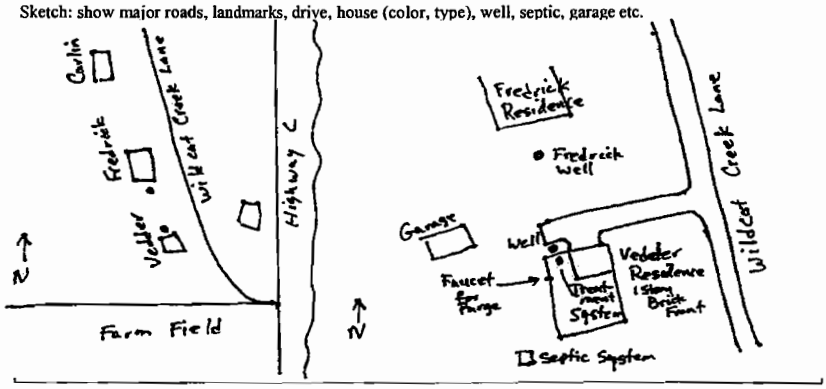
Stored on ice? [X] Yes [ ] No Remarks:

In containers provided by lab? [XX] Yes [ ] No Remarks:

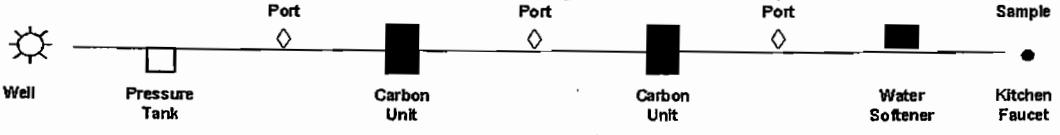
Stored on ice? [X] Yes [ ] No Remarks:

REMARKS:

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



Plumbing Schematic



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted]
DATE: 09APR08 14MAR08
WELL ID: OUX-JS-39
SAMPLE ID: JS39-GW01-080314
COLLECTED BY: LLW/LLC
HOUSE/WELL OWNER: [redacted]
PHONE [redacted]
ADDRESS: [redacted]

1. **SAMPLING INFORMATION**

House owner contact prior to sampling: [✓] Yes [ ] No Remarks:
Sample Collected From: [ ] Inside faucet [✓] Outside Spigot [ ] Other Explain:
Softner? [ ] Before [ ] After [ ] Other Explain: ?
Pressure Tank? [ ] Before [ ] After [ ] Other Explain: ?
Treatment System? [ ] Yes [✓] No Remarks:
[ ] Deficiencies/Problems Observed By Sample Collector Explain:
[ ] Deficiencies/Problems Corrected By Sample Collector Explain:

2. **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1015			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	7.8	
1023			7.52	401	0	0	14.79	110			
1028			7.47	402	0	0	14.92	97			
1033			7.45	402	0	0	14.16	95			
1038			7.44	400	0	0	14.42	90			
1043			7.45	399	0	0	14.54	86			
1048			7.44	401	0	0	14.60	79			

3. **SAMPLE COLLECTION:**

Samples Collected? [✓] VOC [ ] Coliforms [ ] Metals [ ] Others Explain:
Stored on ice? [✓] Yes [ ] No Remarks:
In containers provided by lab? [✓] Yes [ ] No Remarks:
Stored on ice? [✓] Yes [ ] No Remarks:

REMARKS:
1052 - Sampled

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.

RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 09 APRIL 08

WELL ID: OUX-JS-40 SAMPLE ID: JS40-GW01-080407 COLLECTED BY: LLG/LLM

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. SAMPLING INFORMATION

House owner contact prior to sampling: [✓] Yes [ ] No Remarks:

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [✓] Other Explain: YARD HYDRANT

Softner? [NA] Before [ ] After [ ] Other Explain:

Pressure Tank? [NA] Before [✓] After [ ] Other Explain: After sample pt

Treatment System? [ ] Yes [NA] No Remarks:

[ ] Deficiencies/Problems Observed By Sample Collector Explain:

[ ] Deficiencies/Problems Corrected By Sample Collector Explain:

2. ON-SITE MEASUREMENTS:

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft		
1105										12	
1110			7.43	461	0	0	14.24	101			
1115			7.37	449	0	0	14.14	96			
1120			7.36	445	0	0	14.13	92			

3. SAMPLE COLLECTION:

Samples Collected? [✓] VOC [ ] Coliforms [ ] Metals [ ] Others Explain:

Stored on ice? [✓] Yes [ ] No Remarks:

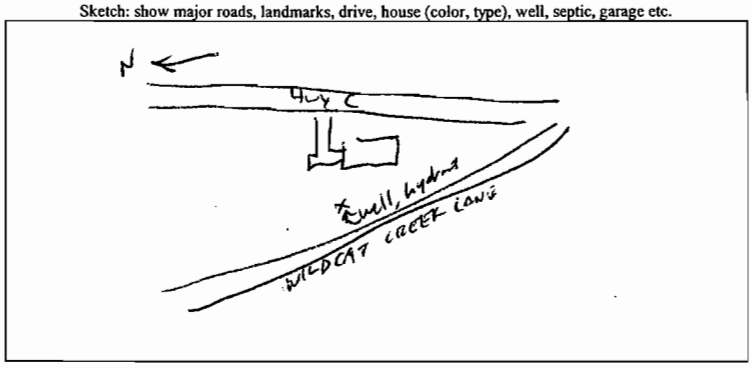
In containers provided by lab? [✓] Yes [ ] No Remarks:

Stored on ice? [✓] Yes [ ] No Remarks:

REMARKS:

Samples 1122

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 5-28-08

WELL ID: OUX-JS-41 SAMPLE ID: JS41-GW01-080528 COLLECTED BY: LC

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. SAMPLING INFORMATION

House owner contact prior to sampling: [X] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [X] Outside Spigot [ ] Other Explain: _____

Softner? [X] Before [ ] After [ ] Other Explain: _____

Pressure Tank? [X] Before [ ] After [ ] Other Explain: _____

Treatment System? [ ] Yes [X] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. ON-SITE MEASUREMENTS:

HORIBA CALIBRATED? [X] Yes [ ] No COMMENTS: Multi point pH + Cond.

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft		
1528										ii	
1540			7.34	552	2.4	0.0	15.46	130			
1545			7.41	546	3.7	0.0	15.45	124			
1550			7.41	541	4.6	0.0	15.41	128			

3. SAMPLE COLLECTION:

Samples Collected? [ ] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

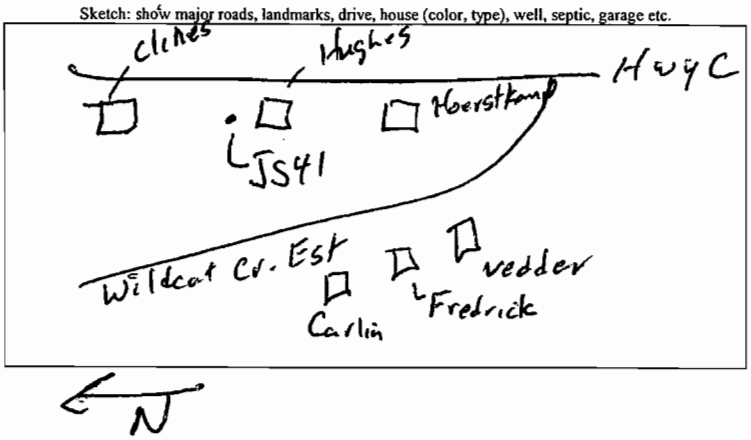
Stored on ice? [ ] Yes [ ] No Remarks: _____

In containers provided by lab? [ ] Yes [ ] No Remarks: _____

Stored on ice? [ ] Yes [ ] No Remarks: _____

REMARKS:

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 11 MAR 08

WELL ID: OUX-JS-42 SAMPLE ID: JS 42-GW01-080311 COLLECTED BY: LLW/LLG

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. **SAMPLING INFORMATION**

House owner contact prior to sampling: [X] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [X] Other Explain: YARD HYDRANT

Softner? [ ] Before [ ] After [ ] Other Explain: _____

Pressure Tank? [ ] Before [X] After [ ] Other Explain: after sample pt

Treatment System? [ ] Yes [X] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1340			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	1.6	
1345			7.24	559	0	1.21	13.71	125			
1350			7.21	548	0	0.0	13.72	118			
1355			7.24	542	0	0	13.77	111			
1400			7.25	540	0	0	13.78	105			

3. **SAMPLE COLLECTION:**

Samples Collected? [X] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

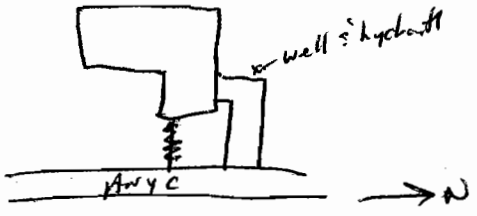
Stored on ice? [X] Yes [ ] No Remarks: _____

In containers provided by lab? [X] Yes [ ] No Remarks: _____

Stored on ice? [X] Yes [ ] No Remarks: _____

REMARKS:

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 5-14-08

WELL ID: OUX-JS-43 SAMPLE ID: JS43-GW01-080514 COLLECTED BY: Lee Gordy

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. **SAMPLING INFORMATION**

House owner contact prior to sampling: [X] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [X] Outside Spigot [ ] Other Explain: _____

Softner? [ ] Before [ ] After [ ] Other Explain: Unknown

Pressure Tank? [X] Before [ ] After [ ] Other Explain: _____

Treatment System? [ ] Yes [X] No Remarks: _____

[X] Deficiencies/Problems Observed By Sample Collector Explain: leak at pitless or hydrant base.

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1555			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	2gpm	
1605	None	None	6.91	554	15	0.45	13.93	59			
1610			7.05	481	0	0.17	13.82	56			
1615			7.06	457	0	0.20	13.76	53			
1620			7.12	451	0	0.15	13.77	48			
1625			7.37	453	0	0.06	13.98	44			
1630			7.47	473	0	0.07	13.95	43			
1635			7.40	480	0	0.04	13.88	45			

3. **SAMPLE COLLECTION:**

Samples Collected? [X] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

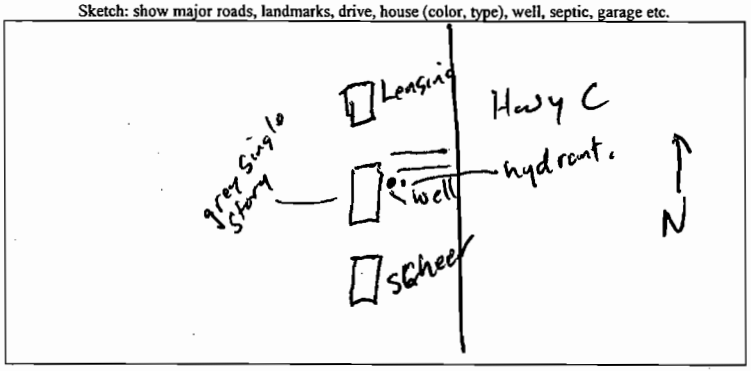
Stored on ice? [X] Yes [ ] No Remarks: _____

In containers provided by lab? [X] Yes [ ] No Remarks: _____

Stored on ice? [X] Yes [ ] No Remarks: _____

REMARKS:

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 09 APRIL 2008

WELL ID: OUX-JS-44 SAMPLE ID: JS44-GW01-080409 COLLECTED BY: LLG/LLW

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. **SAMPLING INFORMATION**

House owner contact prior to sampling: [X] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [X] Other Explain: YARD HYDRANT

Softner? [ ] Before [ ] After [ ] Other Explain: ?

Pressure Tank? [ ] Before [ ] After [ ] Other Explain: ?

Treatment System? [ ] Yes [X] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft		
0838										10.7	
0855			7.74	457	6.9	1.97	13.25	144			
0900			7.32	465	0	1.36	13.80	138			
0905			7.31	469	0	1.15	13.49	138			
0910			7.31	462	0	1.06	13.55	138			
0918			7.33	457	6	0.98	13.73	136			

3. **SAMPLE COLLECTION:**

Samples Collected? [X] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

Stored on ice? [X] Yes [ ] No Remarks: _____

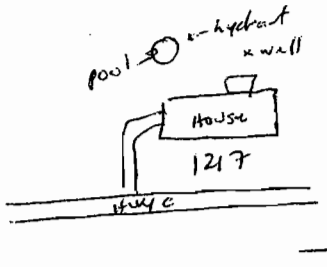
In containers provided by lab? [X] Yes [ ] No Remarks: _____

Stored on ice? [X] Yes [ ] No Remarks: _____

REMARKS:

SAMPLE 0918

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 09 APRIL 08

WELL ID: OUX-JS-45 SAMPLE ID: JS45-080409 GWU1- COLLECTED BY: LLC/LLW

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. SAMPLING INFORMATION

House owner contact prior to sampling: [X] Yes [ ] No Remarks:

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [X] Other Explain: Yard hydrant

Softner? [X] Before [ ] After [ ] Other Explain:

Pressure Tank? [X] Before [ ] After [ ] Other Explain:

Treatment System? [ ] Yes [X] No Remarks:

[ ] Deficiencies/Problems Observed By Sample Collector Explain:

[ ] Deficiencies/Problems Corrected By Sample Collector Explain:

2. ON-SITE MEASUREMENTS:

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
0926			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	8.8	
0931			7.41	402	0	0.49	13.83	128			
0936			7.40	407	0	0.18	13.95	124			
0941			7.40	411	0	0.12	13.98	121			
0946			7.40	416	0	0.41	14.10	118			

3. SAMPLE COLLECTION:

Samples Collected? [ ] VOC [ ] Coliforms [ ] Metals [ ] Others Explain:

Stored on ice? [ ] Yes [ ] No Remarks:

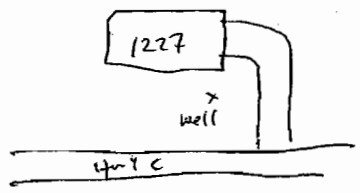
In containers provided by lab? [ ] Yes [ ] No Remarks:

Stored on ice? [ ] Yes [ ] No Remarks:

REMARKS:

SAMPLE 0950

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 11 MAR 08

WELL ID: OUX-JS-47 SAMPLE ID: JS47-GW02-080311 COLLECTED BY: LLW/LLG

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. **SAMPLING INFORMATION**

House owner contact prior to sampling: [✓] Yes [ ] No Remarks:

Sample Collected From: [ ] Inside faucet [✓] Outside Spigot [ ] Other Explain:

Softner? [ ] Before [ ] After [ ] Other Explain:

Pressure Tank? [✓] Before [ ] After [ ] Other Explain:

Treatment System? [ ] Yes [✓] No Remarks:

[ ] Deficiencies/Problems Observed By Sample Collector Explain:

[ ] Deficiencies/Problems Corrected By Sample Collector Explain:

2. **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft		
1410										0.33	
1415			6.56	673	5.3	0.55	13.85	-54			
1420			6.87	668	10.1	0	13.93	-62			
1425			6.88	664	14.4	0	13.97	-67			
1430			6.90	656	9	0	13.97	-70			

3. **SAMPLE COLLECTION:**

Samples Collected? [✓] VOC [ ] Coliforms [ ] Metals [ ] Others Explain:

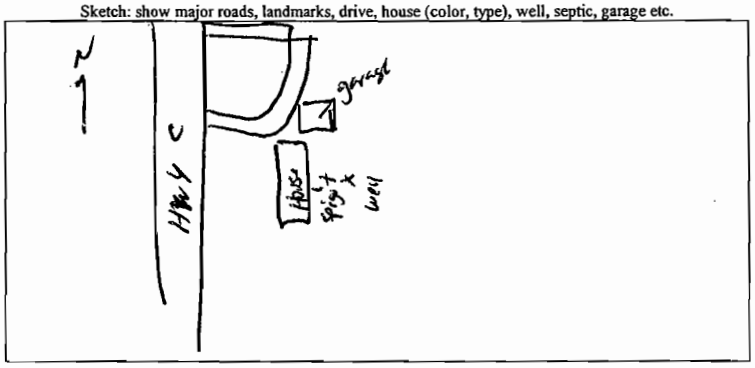
Stored on ice? [✓] Yes [ ] No Remarks:

In containers provided by lab? [✓] Yes [ ] No Remarks:

Stored on ice? [ ] Yes [ ] No Remarks:

REMARKS:

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 14 MAR 08

WELL ID: OUX-JS-50 SAMPLE ID: JS 50 - GW01-080314 COLLECTED BY: LLW/LLS

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. SAMPLING INFORMATION

House owner contact prior to sampling: [X] Yes [ ] No Remarks:

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [X] Other Explain: Yard Hydrant

Softner? [ ] Before [ ] After [ ] Other Explain:

Pressure Tank? [ ] Before [X] After [ ] Other Explain: after sample pt

Treatment System? [ ] Yes [X] No Remarks:

[ ] Deficiencies/Problems Observed By Sample Collector Explain:

[ ] Deficiencies/Problems Corrected By Sample Collector Explain:

2. ON-SITE MEASUREMENTS:

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
750			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	10	
0805			6.99	588	0	3.51	12.98	148			
0810			7.20	593	25.1	1.50	12.98	137			
0815			7.22	594	29.6	1.61	12.84	137			
0820			7.22	595	17.9	1.58	12.39	138			
0825			7.23	597	14.2	1.55	11.86	140			
0830			7.23	595	8.6	1.45	11.35	141			
0835			7.22	587	4.8	1.57	13.05	134			
0840			7.23	587	3.6	1.59	13.32	132			
0845			7.22	587	5.9	1.55	13.15	120			

3. SAMPLE COLLECTION:

Samples Collected? [X] VOC [ ] Coliforms [ ] Metals [ ] Others Explain:

Stored on ice? [X] Yes [ ] No Remarks:

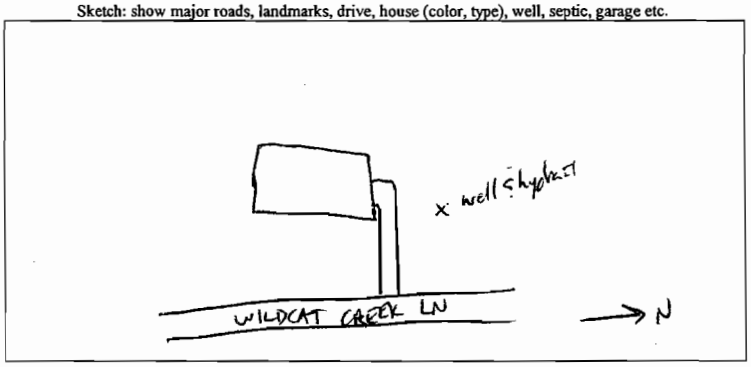
In containers provided by lab? [X] Yes [ ] No Remarks:

Stored on ice? [X] Yes [ ] No Remarks:

REMARKS:

MS/MSD

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 11 MAR 08

WELL ID: OUX-JS-51 SAMPLE ID: JS51-GW01-080311 COLLECTED BY: LW/LG

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. **SAMPLING INFORMATION**

House owner contact prior to sampling: [X] Yes [ ] No Remarks: _____

Sample Collected From: [X] Inside faucet [ ] Outside Spigot [ ] Other Explain: _____

Softner? [ ] Before [X] After [ ] Other Explain: _____

Pressure Tank? [ ] Before [X] After [ ] Other Explain: after sample pt

Treatment System? [ ] Yes [X] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1007			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	10	
1012			7.20	655	0	5.41	13.26	148			
1017			7.19	661	0	3.99	13.64	145			
1022			7.18	663	0	3.64	13.65	143			
1027			7.18	664	0	3.31	13.67	141			
1032			7.18	664	0	3.51	13.64	139			

3. **SAMPLE COLLECTION:**

Samples Collected? [X] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

Stored on ice? [X] Yes [ ] No Remarks: _____

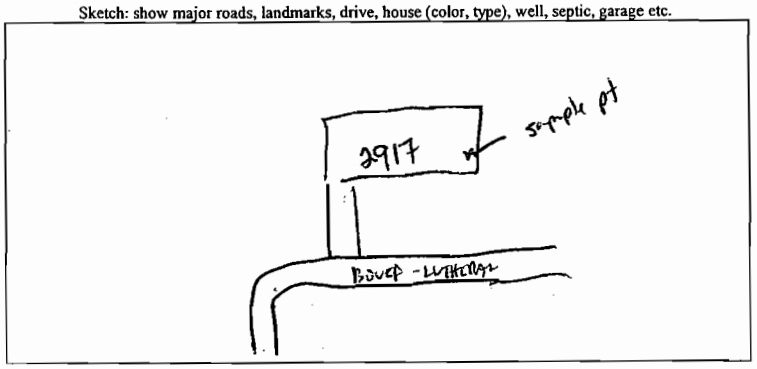
In containers provided by lab? [X] Yes [ ] No Remarks: _____

Stored on ice? [X] Yes [ ] No Remarks: _____

REMARKS:

collected sample from spigot inside basement, before pressure tank

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 2-28-08 JS52 TYP-GW01-080228
WELL ID: JS-52 SAMPLE ID: JS52-INF-GW01-080228
JS52-INT-GW01-080228
SAMPLE COLLECTED BY: of Parsons JS52 EFF-GW01-080228
HOUSE/WELL OWNER: [redacted] PHONE: [redacted]
ADDRESS: [redacted]

1. [ ] **SAMPLING INFORMATION**

House owner contact prior to sampling: [XX] Yes [ ] No Remarks:
Sample Collected From: [XX] Inside faucet [ ] Outside Spigot [ ] Other Explain: Typical From kitchen sink.
Softner? [ ] Before [XX] After [ ] Other Explain:
Pressure Tank? [XX] Before [ ] After [ ] Other Explain:
Treatment System? [XX] Yes [ ] No Remarks:
[ ] Deficiencies/Problems Observed By Sample Collector Explain:
[ ] Deficiencies/Problems Corrected By Sample Collector Explain:

2. [ ] **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED: [X] Yes [ ] No COMMENTS: Multi point pH, autocal for other parameters

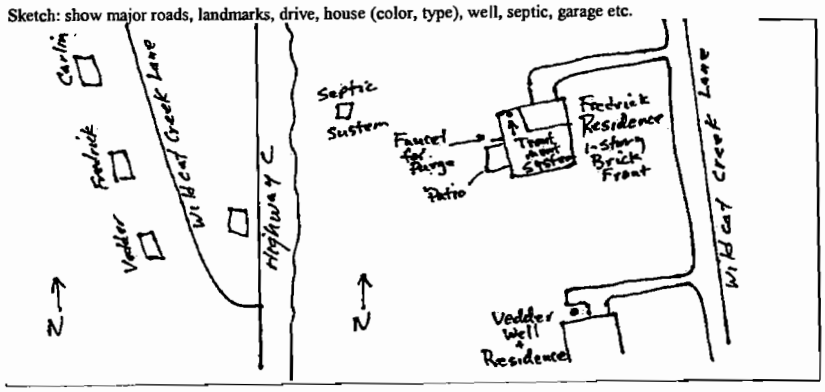
Time	Color	Smell	pH	Conductivity (uS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft		
1540										6.7	
1545			7.48	597	0	0.83	10.10	136			
1550			7.42	603	0	0.0	9.73	134			
1555			7.36	601	0	0.0	11.28	130			
1600			7.35	602	0	0.0	11.48	129			
1605			7.35	611	0	0.0	11.68	127			
1610			7.35	622	0	0.0	11.74	126			201

3. [ ] **SAMPLE COLLECTION:**

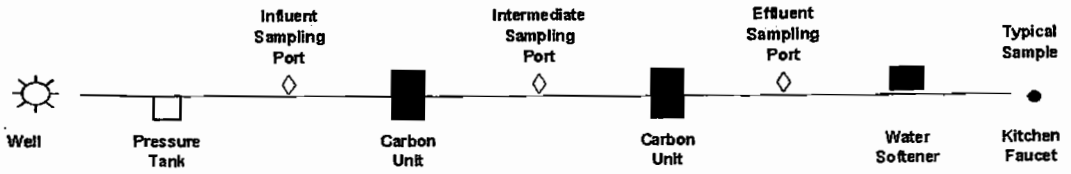
Samples Collected? [XX] VOC [XX] Coliform [ ] Metals [ ] Others Explain:
Stored on ice? [X] Yes [ ] No Remarks:
In containers provided by lab? [XX] Yes [ ] No Remarks:
Stored on ice? [X] Yes [ ] No Remarks:

REMARKS:

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



Plumbing Schematic



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 09 APRIL 08

WELL ID: MW13 SAMPLE ID: MW13-GW01-080409 COLLECTED BY: LLC/LLW

HOUSE/WELL OWNER: [redacted] PHONE:

ADDRESS:

1. **SAMPLING INFORMATION**

House owner contact prior to sampling: [✓] Yes [ ] No Remarks:

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [✓] Other Explain: YARD HYDRANT

Softner? [ ] Before [ ] After [ ] Other Explain:

Pressure Tank? [ ] Before [ ] After [ ] Other Explain: after sample pt

Treatment System? [ ] Yes [✓] No Remarks:

[ ] Deficiencies/Problems Observed By Sample Collector Explain:

[ ] Deficiencies/Problems Corrected By Sample Collector Explain:

2. **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED? [ ] Yes [ ] No COMMENTS:

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1425			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft	1/4	
1430			7.43	448	1.2	0.83	14.10	119			
1435			7.40	428	0	0.58	14.13	111			
1440			7.39	423	0	0.56	14.12	107			

3. **SAMPLE COLLECTION:**

Samples Collected? [✓] VOC [ ] Coliforms [✓] Metals [✓] Others Explain:

Stored on ice? [✓] Yes [ ] No Remarks:

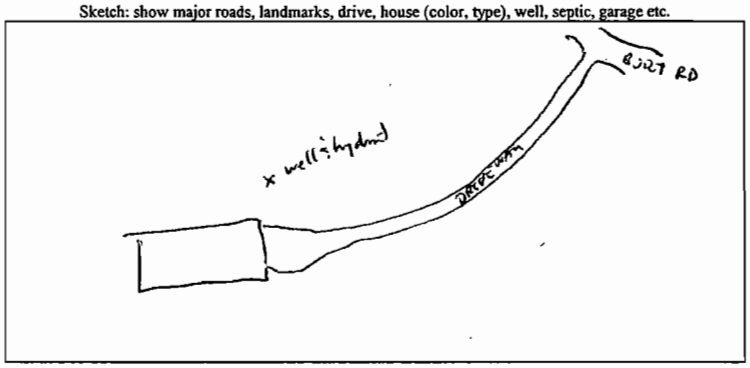
In containers provided by lab? [✓] Yes [ ] No Remarks:

Stored on ice? [✓] Yes [ ] No Remarks:

REMARKS:

SAMPLE FOR VOC & INORGANICS
1442 - SAMPLE

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



RESIDENTIAL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 9-28-08

WELL ID: MW2R SAMPLE ID: MW2R-GW01-000.0-080228

SAMPLE COLLECTED BY: of Parsons

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. [ ] **SAMPLING INFORMATION**

House owner contact prior to sampling: [XX] Yes [ ] No Remarks:

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [XX] Other Explain: Yard Hydrant

Softner? [ ] Before [ ] After [ ] Other Explain: None

Pressure Tank? [XX] Before [ ] After [ ] Other Explain:

Treatment System? [ ] Yes [XX] No Remarks:

[ ] Deficiencies/Problems Observed By Sample Collector Explain:

[ ] Deficiencies/Problems Corrected By Sample Collector Explain:

2. [ ] **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED: [X] Yes [ ] No COMMENTS: Multipoint pH. autocal Other parameters

Time	Color	Smell	pH	Conductivity (uS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft		
0907										13	
0925			6.84	611	0	6.03	10.06	152			
0930			7.21	602	0	4.64	10.51	141			
0935			7.30	599	0	4.13	10.28	138			
0940			7.32	594	0	3.90	10.07	137			
0945			7.33	593	0	4.02	10.24	137			

3. [ ] **SAMPLE COLLECTION:**

Samples Collected? [XX] VOC [XX] Coliform [ ] Metals [ ] Others Explain:

Stored on ice? [ ] Yes [ ] No Remarks:

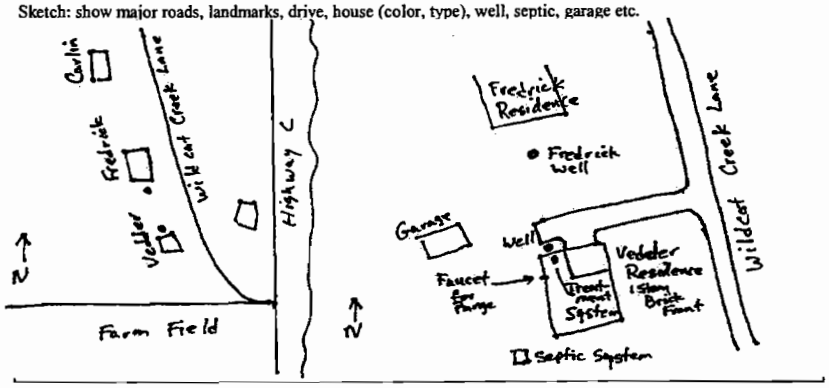
In containers provided by lab? [XX] Yes [ ] No Remarks:

Stored on ice? [ ] Yes [ ] No Remarks:

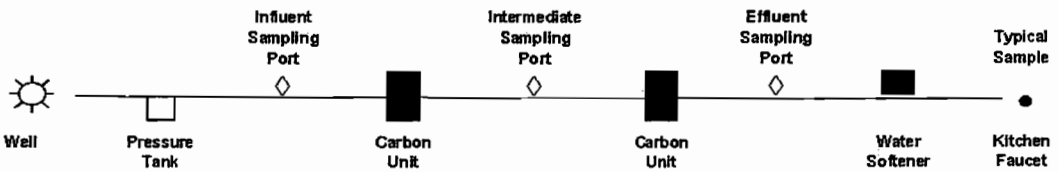
REMARKS:

Conductivity Std has ice.
Cannot use.

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.



Plumbing Schematic



RESIDENTIAL/DOMESTIC WELL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 5-27-08

WELL ID: OUX-PA-53 SAMPLE ID: PA53-GW01-080527 COLLECTED BY: LG

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. SAMPLING INFORMATION

House owner contact prior to sampling: [X] Yes [ ] No Remarks: _____

Sample Collected From: [ ] Inside faucet [X] Outside Spigot [ ] Other Explain: _____

Softner? [X] Before [ ] After [ ] Other Explain: _____

Pressure Tank? [X] Before [ ] After [ ] Other Explain: _____

Treatment System? [ ] Yes [X] No Remarks: _____

[ ] Deficiencies/Problems Observed By Sample Collector Explain: _____

[ ] Deficiencies/Problems Corrected By Sample Collector Explain: _____

2. ON-SITE MEASUREMENTS:

HORIBA CALIBRATED? [X] Yes [ ] No COMMENTS: Multi point pH + Cond.

Time	Color	Smell	pH	Conductivity (us/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft		
1047	Clear	None								8	
1055			7.43	602	0	1.33	15.34	126			
1100			7.34	601	0	1.25	15.40	128			
1105			7.28	601	0	1.17	15.28	129			
1110			7.29	603	0	1.12	15.14	129			

3. SAMPLE COLLECTION:

Samples Collected? [X] VOC [ ] Coliforms [ ] Metals [ ] Others Explain: _____

Stored on ice? [X] Yes [ ] No Remarks: _____

In containers provided by lab? [X] Yes [ ] No Remarks: _____

Stored on ice? [X] Yes [ ] No Remarks: _____

REMARKS:

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.

RESIDENTIAL SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: [redacted] DATE: 2-28-08

WELL ID: PA55 SAMPLE ID: PA55-GW01-000.0-080228
PA55-GW02-000.0-080228

SAMPLE COLLECTED BY: of Parsons

HOUSE/WELL OWNER: [redacted] PHONE: [redacted]

ADDRESS: [redacted]

1. [ ] **SAMPLING INFORMATION**

House owner contact prior to sampling: [XX] Yes [ ] No Remarks:

Sample Collected From: [ ] Inside faucet [ ] Outside Spigot [XX] Other Explain: Yard hydrant

Softner? [XX] Before [ ] After [ ] Other Explain:

Pressure Tank? [XX] Before [ ] After [ ] Other Explain:

Treatment System? [ ] Yes [XX] No Remarks:

[ ] Deficiencies/Problems Observed By Sample Collector Explain:

[ ] Deficiencies/Problems Corrected By Sample Collector Explain:

2. [ ] **ON-SITE MEASUREMENTS:**

HORIBA CALIBRATED: [X] Yes [ ] No COMMENTS: Multipoint pH autocal other parameters

Time	Color	Smell	pH	Conductivity (uS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	< 10 NTU (or ± 10 NTU)	± 10%	± 0.2 °C	± 10 mV	< 0.3 ft		
1025										125pm	
1030			7.52	572	0	5.42	12.30	136			
1035			7.40	581	2.5	2.33	12.41	22			
1040			7.40	584	0	1.84	11.85	1			
1045			7.38	570	0	2.75	12.00	-6			
1050			7.38	549	0	2.90	11.79	7			300

3. [ ] **SAMPLE COLLECTION:**

Samples Collected? [XX] VOC [ ] Coliforms [ ] Metals [ ] Others Explain:

Stored on ice? [X] Yes [ ] No Remarks:

In containers provided by lab? [XX] Yes [ ] No Remarks:

Stored on ice? [X] Yes [ ] No Remarks:

REMARKS:

collect other parameters
GW01 unfiltered
GW02 filtered

Sketch: show major roads, landmarks, drive, house (color, type), well, septic, garage etc.

TASK 2E

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: Land Farm DATE: 3-16-09

MONITORING WELL ID: BW20

SAMPLE ID: BW20-GW01-090316

SAMPLE COLLECTED BY: LC/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [X] Is apparent [ ] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[X] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[ ] Water Level Measured At 6.71 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1349			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
1400	light rust	None	7.23	1206	0.27	10.6	-25.9	10.83		11
1410	pale rust	None	7.24	1215	0.24	10.8	-26.9	13.87		19
1420	"	"	7.27	1221	0.42	11.0	-28.4	16.90		28
1430	turbid, pale rust	"	7.29	1217	0.37	11.2	-28.9	18.01		33.5
1434	muddy	Sweet								
1440			7.33	1237	1.28	11.3	-31.9	20.92		39 *
3-19 0743		Resume purge								
0752	pale rust	Sweet	7.07	1314	2.03	10.6	-17.4	12.82		47
0755	"	very Sweet	7.09	1323	2.00	10.7	-18.2	14.54		53
0800	"	"	7.10	1322	2.09	10.7	-18.9	16.69		59
0805	"	"	7.10	1323	2.24	10.8	-19.3	18.00		65

~~4~~ ~~8~~ ~~12~~ ~~16~~ ~~20~~ ~~24~~ ~~28~~ ~~32~~ ~~36~~ 40 44 48

COMMENTS: Well has had Napl in past. *1440 Pump off, allow to recover
Product observed in bailer when sampling

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: Ind. Park DATE: 3-18-09

MONITORING WELL ID: BW21A

SAMPLE ID: BW21A-GW01-090318

SAMPLE COLLECTED BY: LC/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [X] Is apparent [ ] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[X] Water Level Measured At 34.27 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1132			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
1140	Clear	None	6.79	810	1.54	14.5	-2.7	34.28		1
1150	Clear	None	6.81	807	1.30	14.8	-4.2	34.28		2
1200	"	"	6.82	807	1.14	14.8	-4.6	34.29		3.5
1210	"	"	6.82	806	1.03	14.9	-4.5	34.29		4.5
1220	"	"	6.83	805	0.94	14.9	-4.5	34.31		5.5
1230	"	"	6.83	804	0.92	14.8	-4.9	34.30		6.5
1240	"	"	6.83	803	0.91	14.8	-4.9	34.30		7.5
1250	"	"	6.83	802	0.82	14.7	-5.0	34.30		9.0
1300	"	"	6.83	801	0.81	14.7	-5.0	34.30		10.5

COMMENTS: _____

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: _____ DATE: 3-24-09

MONITORING WELL ID: BW 21

SAMPLE ID: BW21-GW01-090324

SAMPLE COLLECTED BY: LO/LW of Parsons

1. [ ] WELL CONDITION

[X] Locked [ ] Unlocked

Well ID: [X] Is apparent [ ] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] PRODUCT INFORMATION

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] WATER LEVEL

[X] Water Level Measured At ~~83.40~~ 82.93 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] ON-SITE MEASUREMENTS:

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity	DO	Temp	ORP	DTW	Purge Rate	Volume Purged
				(uS/cm)	(mg/L)	(oC)	(mV)	(ft)	(gpm)	(gallons)
1143			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft	2.4	
1155	Clear	none	7.22	498	0.12	15.7	-26.9	86.83		28.8
1205			7.23	492	0.13	15.7	-28.0	86.98		53
1215			7.25	497	0.10	15.8	-28.7	87.08		77
1225			7.25	499	0.09	15.8	-28.9	87.14		101
1235			7.23	511	0.14	15.8	-28.1	87.18		125
1245			7.22	516	0.17	15.8	-27.7	87.22		149
1255			7.22	518	0.18	15.7	-27.2	87.25		173
1305			7.22	519	0.19	15.7	-27.4	87.28		197
1315			7.22	520	0.19	15.7	-27.4	87.30		221

2.4
2
4.8

29
24
53
24
77
24
101

173
24
197
24
~~221~~

COMMENTS: 171 = 1 Volume
205 = 1.2 Volume

171
34
205

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: USGS BW22 DATE: 3/24/07

MONITORING WELL ID: BW22

SAMPLE ID: BW22-GW01-090324

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [X] Is apparent [ ] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[ ] Product Not Observed

3. [ ] **WATER LEVEL**

[ ] Water Level Measured At 51.27 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 BECKMAN 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
0823			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft	1.9	
0830	clear	None	8.12	406	0.15	15.1	-73.2	88.30	1.9	14
0840	"	"	7.71	487		15.2	-55.2			34
0850	"	"	7.59	509	1.31	15.3	-47.9	107.16	1.75	50
0900	"	"	7.53	522	0.46	15.4	-45.2	109.84		67
0910	"	"	7.52	513	0.34	15.5	-44.0	114.98		83
0920	"	"	7.42	517	0.39	15.6	-39.3	124.52	1.6	99
0930	"	"	7.40	515	0.43	15.7	-37.4	134.95	1.0	105
0940	"	"	7.28	524	0.43	16.8	-31.7	135.61		115
0950	"	"	7.25	529	0.62	16.8	-28.7	138.11		125
1000	"	"	7.23	534	0.74	16.9	-27.8	141.04	0.65	135
1010	"	"	7.20	545	0.80	17.6	-26.3	142.31		147.5
1020	"	"	7.19	558	0.93	17.4	-26.1	143.40		147
1030	"	"	7.19	560	1.00	17.6	-25.5	144.42		153.5
1040	"	"	7.19	564	1.07	17.8	-25.9	145.29		160
1050	"	"	7.18	565	1.32	17.9	-25.3	146.09	0.6	166.5
1100	"	"	7.17	575	1.19	18.1	-25.1	145.23		172
1110	"	"	7.15	583	1.52	17.2	-23.6	144.92		178
1115	"	"	7.15	584	1.56	17.3	-23.6	144.91		184
1120	"	"	7.15	584	1.56	17.2	-23.4	144.92		190

COMMENTS: 151 gallons = 1 well vol

180 gallons = 1.2 " "

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: Hole Residence DATE: 4-22-09

MONITORING WELL ID: ~~JS15-GW01-090422~~ JS15

SAMPLE ID: JS15-GW01-090422

SAMPLE COLLECTED BY: LG/CW of Parsons

1. [ ] WELL CONDITION

[ ] Locked [ ] Unlocked Sealed

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: Good.

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] PRODUCT INFORMATION

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] WATER LEVEL

[ ] Water Level Measured At _____ Feet Below Top of Casing _____

[X] Other. Explain well sealed.

4. [ ] ON-SITE MEASUREMENTS:

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1335			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft	10	
1345			7.04	550	1.55	14.7	-12.9	—		100
1355			7.14	541	1.13	14.7	-18.2	—		200
1405			7.19	538	0.93	14.9	-20.8	—		300
1415			7.21	537	0.85	14.9	-22.0	—		400
1420			7.22	538	0.83	14.9	-22.5	—		450
1425			7.22	537	0.81	15.0	-22.5	—		500

COMMENTS: ~~TD~~ 290 ft. old water level 72 assume 220 ft of water in hole - 330 gallons

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: JS20 DATE: 3-25-04

MONITORING WELL ID: JS20

SAMPLE ID: JS20-GW01-09 0325

SAMPLE COLLECTED BY: LC/LW of Parsons

1. [ ] **WELL CONDITION**

[ ] Locked [ ] Unlocked Residential well

Well ID: [ ] Is apparent [ ] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[ ] Water Level Measured At _____ Feet Below Top of Casing _____

[X] Other. Explain Domestic well. Sealed

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 - Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1008			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft	7.5	
1120	Clear	None	7.22	555	2.36	13.6	-24.6	—		90
1130	"	"	7.23	554	0.82	13.5	-24.8			165
1140	"	"	7.23	551	0.87	13.5	-24.8			240
1150	"	"	7.23	544	0.74	13.6	-25.3			315
1200	"	"	7.23	548	0.82	13.7	-24.9		10	390
1210	"	"	7.24	544	0.66	13.6	-25.0			~~465~~ 490
1220	"	"	7.23	548	0.74	13.5	-24.7			590
1225	"	"	7.23	545	0.64	13.6	-25.0			640

COMMENTS: TD 452 Mr Lamne Concerned about volume of purge.

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: Beaver Brand Hats DATE: 4-29-09

MONITORING WELL ID: TS 25

SAMPLE ID: TS25-G-W01-090429

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] **WELL CONDITION**

[ ] Locked [N] Unlocked

Well ID: [ ] Is apparent [Y] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[Y] Product Not Observed

3. [ ] **WATER LEVEL**

[ ] Water Level Measured At 83.56 Feet Below Top of Casing _____

[ ] Other, Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [Y] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
0845			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft	1.5	
0855	Clear	None						91.55	1.8	15
0915								92.35	1.9	51
0935								93.79	1.9	89
1255	Clear	None	7.01	837	2.74	17.0	-12.6	96.90	1.9	475
1330	"	"	7.03	840	2.61	17.0	-13.7	96.94	1.9	
1405	"	"	7.03	832	2.80	16.8	-13.2	97.42	1.9	608
1410	"	"	7.02	848	2.76	16.8	-13.2	97.42	1.9	618
1415	"	"	7.02	850	2.79	16.8	-13.0	97.02	1.8	627

COMMENTS: TD is at least 400ft. (length of cable) one well volume a minimum of 480 gallons.

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: Wildcat Cr. Estates DATE: 3-25-09

MONITORING WELL ID: JS39

SAMPLE ID: JS39-GW01-090325

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] **WELL CONDITION**

[ ] Locked [ ] Unlocked Domestic well

Well ID: [ ] Is apparent [ ] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[ ] Water Level Measured At _____ Feet Below Top of Casing _____

[X] Other. Explain Well sealed

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
0750			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft	6	
0800	CLEAR	NONE	7.31	487	0.24	13.8	-29.3			60
0810	"	"	7.31	486	0.17	13.9	-29.3			120
0820	"	"	7.30	488	0.12	14.0	-29.0			180
0830	"	"	7.30	489	0.15	13.9	-28.7			240
0840	"	"	7.30	487	0.12	14.1	-28.6			300
0850	"	"	7.29	488	0.09	14.0	-28.6			360
0900	"	"	7.29	487	0.08	14.0	-28.2			420
0910	"	"	7.29	488	0.06	14.0	-28.2			480
0920	"	"	7.29	488	0.06	14.0	-28.1			540

COMMENTS: _____

540 = 1.2 vol

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: JS40 DATE: 3-25-09

MONITORING WELL ID: JS40

SAMPLE ID: JS40-GW01-090325

SAMPLE COLLECTED BY: _____ of Parsons

1. [ ] **WELL CONDITION**

[ ] Locked [ ] Unlocked Domestic well

Well ID: [ ] Is apparent [ ] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[ ] Water Level Measured At _____ Feet Below Top of Casing _____

[X] Other. Explain Sealed domestic well

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1305			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft	9	
1315	Clear	none	7.19	538	0.19	14.2	-22.4			90
1325	"	"	7.22	534	0.08	14.3	-24.5			180
1335	"	"	7.22	533	0.08	14.3	-24.5			270
1345	"	"	7.22	532	0.07	14.3	-24.4			360
1355	"	"	7.22	531	0.10	14.3	-24.4			450
1405	"	"	7.22	530	0.09	14.3	-24.3			540

COMMENTS: 540 Gallons - Assumed

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: Land Farm DATE: 3-17-09

MONITORING WELL ID: MW101

SAMPLE ID: MW101-GW01-090317

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[X] Water Level Measured At 43.71 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)	
0930			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft			
0940	clear	none	7.14	718	3.53	16.3	-17.8	47.98		2.5	← SLOWED PURGE RATE
0950	"	"	7.15	726	3.62	16.4	-18.1	48.00		5.0	
1000	"	"	7.15	727	3.74	16.4	-18.4	48.60		6.5	
1010	"	"	7.15	729	3.75	16.4	-18.1	49.13		9.0	
1020	"	"	7.15	730	3.71	16.5	-18.4	49.28		10.5	
1030	"	"	7.16	731	3.65	16.5	-18.4	49.35		12	
1035	"	"	7.16	732	3.66	16.7	-18.4	49.35		13	

COMMENTS: _____

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: Land Farm DATE: 3-17-09

MONITORING WELL ID: MW 102

SAMPLE ID: MW102-GW01-090317

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] WELL CONDITION

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] PRODUCT INFORMATION

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] WATER LEVEL

[X] Water Level Measured At 44.42 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] ON-SITE MEASUREMENTS:

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity	DO	Temp	ORP	DTW	Purge Rate	Volume Purged
				(uS/cm)	(mg/L)	(oC)	(mV)	(ft)	(gpm)	(gallons)
1143			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
1150	clear	none	7.09	737	3.56	15.4	-14.4	48.01		2.5
1200	"	"	7.14	738	4.05	15.5	-18.2	49.76		5.0
1210	"	"	7.25	739	4.04	15.6	-23.5	50.62		6.5
1220	"	"	7.28	736	4.33	15.7	-24.7	50.53		9.0
1230	"	"	7.30	738	3.89	15.7	-25.8	50.63		10.5
1240	"	"	7.28	739	4.49	15.7	-24.6	50.68		12.0
1250	"	"	7.33	740	4.55	15.8	-27.9	50.65		14.0
1300	"	"	7.21	746	4.81	15.8	-19.1	50.67		15.0
1310	"	"	7.15	752	4.68	15.8	-18.2	50.65		16.0
1315	"	"	7.16	753	4.85	15.9	-18.6	50.64		17.0

COMMENTS: _____

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: Land Farm DATE: 3-18-09

MONITORING WELL ID: MW103

SAMPLE ID: MW103-GW01-090318

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[ ] Water Level Measured At 48.25 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
0755			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
0810	Clear	None	6.96	862	3.08	15.7	-11.8	50.75		2.5
0820	Clear	None	6.98	869	3.21	16.3	-13.0	50.85		3.5
0830	Clear	None	6.98	863	3.41	16.5	-13.5	51.66		4.5
0840	Clear	None	6.99	865	3.52	16.3	-13.4	52.54		6
0850	Clear	None	6.99	868	3.60	16.2	-13.3	53.28		8
0900	Clear	None	6.99	870	3.64	16.2	-13.3	53.75		10
0910	Clear	None	6.99	871	3.53	16.2	-13.4	54.00		12
0920	Clear	None	6.98	870	3.54	16.1	-13.4	54.57		14
0930	Clear	None	6.98	870	3.45	16.2	-13.3	53.45		15
0940	Clear	None	6.99	873	3.57	16.2	-13.3	53.16		16
0945	Clear	None	6.99	872	3.55	16.2	-13.4	53.44		17

COMMENTS: _____

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW10 DATE: 3-11-09

MONITORING WELL ID: MW10UB

SAMPLE ID: MW10UB-GW01-090311

SAMPLE COLLECTED BY: LG/CW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[X] Water Level Measured At 7.85 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: 45185 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)	
0807			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft			
0820			7.24	732	1.05	10.4	-19.7			15	Pump not emp. restart
0830	Rusty	None	7.28	729	0.77	12.6	-22.2	15.18		30	
0840	"	"	7.27	731	0.57	13.6	-21.5	19.44		45	
0850	"	"	7.27	729	0.55	13.2	-21.5	22.89		60	
0900	"	"	7.27	728	0.50	13.0	-21.9	25.79		75	
0910	"	"	7.29	728	0.36	12.5	-22.3	28.30		90	
0920	"	"	7.28	726	0.62	12.6	-21.9	31.40		110	
0930	"	"	7.30	728	0.47	13.1	-22.9	33.88		120	
0940	"	"	7.31	722	1.30	13.2	-23.4	36.46		135	
0945	"	"	7.34	726	1.60	14.2	-25.0	35.65		145	
0950	"	"	7.36	724	1.78	14.2	-26.9	37.62		150	
0955	"	"	7.40	722	2.31	14.2	-28.9	38.14		155	
1000	"	"	7.40	722	2.37	14.2	-28.9	39.95		160	
1005	"	"	7.41	722	2.51	14.3	-29.2	41.63		165	
1010			7.46	721	3.45	14.2	-32.0	42.90		170	
1040	Resume	Purge, lower rate						35.55		170	
1045	Rusty	None	7.48	721	4.30	14.0	-33.0	35.95		175	
1050	"	"	7.45	721	3.85	14.2	-31.6	36.25		180	
1055	"	"	7.45	721	3.45	14.3	-30.8	36.48		185	
1100	"	"	7.39	720	2.65	14.3	-28.1	36.40		188	

COMMENTS: WL meter somewhat erratic 1005 Stop pump to empty tank

1105	Clear	none	7.38	721	2.55	14.3	-27.7	36.45		190
1110	"	"	7.37	720	2.36	14.3	-27.2	36.38		192
1115	"	"	7.37	721	2.34	14.3	-27.1	36.46		194
1120	"	"	7.37	721	2.33	14.3	-26.7	36.20		196

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW2 DATE: 3-2-09

MONITORING WELL ID: MW2T2

SAMPLE ID: MW2T2-GW01-090302

SAMPLE COLLECTED BY: LC/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[X] Water Level Measured At 27.73 Feet Below Top of Casing _____

[ ] Other, Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1410			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
1420	Clear/Yellow	none	9.73	161	0.05	13.8	-153	32.77		4
1430	clear	none	8.41	273	0.03	14.1	-58.8	34.60		7
1440	clear	none	7.91	342	0.04	14.2	-54.4	37.40		11
1450	clear	none	7.96	347	0.04	14.1	~~-54.4~~ -46.2	45.63		~~16~~ 18
1500	clear	none	7.52	452	0.02	14.2	-31.5	*		25
1510	clear	none	7.48	473	0.03	14.2	-29.0	47.88		31
1520	clear	none	7.53	437	0.03	14.1	-31.8	47.72		42
1530	clear	none	7.52	425	0.02	14.1	-35.0	54.55		53
1540	Clear	None	7.47	469	0.06	14.2	-28.9	55.49		62
1545	Clear	None	7.45	484	0.07	14.1	-27.4	55.23		66
1550	Clear	None	7.43	498	0.02	14.2	-26.7	55.43		68
1555	Clear	None	7.42	495	0.01	14.2	-26.1	55.57		

~~4~~ ~~15~~ 10 ~~49~~ ~~48~~ ~~57~~ 56

COMMENTS: 1 well volume 52.9

* UNABLE TO GET DTW

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW 2 DATE: 3-2-09

MONITORING WELL ID: MW2T3

SAMPLE ID: MW2T3-GW01-090302

SAMPLE COLLECTED BY: LC/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[X] Water Level Measured At 30.49 Feet Below Top of Casing _____

[ ] Other, Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: 45185 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1143			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft	1.2	
1155	Yellowish	None	7.56	305	0.33	13.8	-31.8	39.05		13
1205	"	"	8.36	321	0.06	14.0	-79.9	41.25	1.2	25
1215	"	"	7.52	387	0.02	14.0	-32.7	~~41.07~~		40
1225	"	"	7.48	499	0.02	14.0	-29.0	41.07		50
1235	Clear	None	7.46	502	0.06	13.9	-28.2	42.23		63
1245	Clear	None	7.45	498	0.02	14.0	-28.0	42.29		76
1255	Clear	None	7.47	499	0.02	14.0	-28.7	42.45		87
1305	"	"	7.45	501	0.04	14.0	-28.0	42.65		97
1315	"	"	7.45	500	0.04	14.0	-27.4	42.74		108
1325	"	"	7.44	501	0.01	14.0	-28.1	42.78		120

COMMENTS: One well volume 97.7 gallons
Sampled at 1330

~~4~~ ~~8~~ ~~12~~ ~~16~~ ~~20~~ ~~24~~ ~~28~~ ~~32~~ ~~36~~ ~~40~~ ~~44~~ ~~48~~ ~~52~~ ~~56~~ ~~60~~ ~~64~~ ~~68~~ ~~72~~ ~~76~~ ~~80~~ ~~84~~ ~~88~~ ~~92~~ ~~96~~ ~~100~~ ~~104~~ ~~108~~ ~~112~~ ~~116~~ 120 124 128

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW5 DATE: 3-11-09 + 3-12-09

MONITORING WELL ID: MW5UB

SAMPLE ID: MW5UB-GW01-090312

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] WELL CONDITION

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] PRODUCT INFORMATION

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] WATER LEVEL

[X] Water Level Measured At 24.07 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] ON-SITE MEASUREMENTS:

METERS USED: YS185 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)	
1249			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft			
1300	milky	none	7.37	706	3.88	14.5	-27.4	36.12		3.0	Turned off
1330	"	"	7.44	695	5.19	13.0	-29.7	27.10		3.0	
1340	"	"	7.36	723	3.24	13.2	-26.6	34.95		4.0	Turned off
1410	"	"	7.36	731	4.08	14.7	-27.3	35.88		5.0	turned off
1440	"	"	7.34	729	3.33	14.6	-25.4	36.54		7.0	Turned off
1505	milky	"	7.33	744	3.62	14.9	-26.0	37.24		8.5	
1600	"	"	7.31	736	3.81	14.7	-23.6	40.08		12	
3-12-09 0753	Resume		Purge					24.70			
0800	milky	"	7.24	665	3.98	14.6	-22.0	36.56		14	
0805	"	"	7.25	663	3.90	14.1	-22.8	37.72		15	
0810	"	"	7.23	660	3.56	12.7	-3.2	37.87		15.5	
0815	"	"	7.23	670	3.78		-21.9	39.05		16	
0820			7.22	670	3.50	13.1	-21.1	39.18		16.25	
0825			7.22	662	3.46	12.4	-5.5	39.24		16.5	
0910			7.35	678	3.90	14.5	-22.8	35.62		18.0	

COMMENTS: 0825 Pump off will let recover + sample.

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: mw6 DATE: 3-9-09

MONITORING WELL ID: MW6R

SAMPLE ID: MW6R-GW01-090309

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] WELL CONDITION

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] PRODUCT INFORMATION

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] WATER LEVEL

[X] Water Level Measured At 102.03 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] ON-SITE MEASUREMENTS:

METERS USED: _____

METERS CALIBRATED? [ ] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1248			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft	3	
1320								113.43	3	120
1340								113.75	3.5	180
1355			7.37	515	1.00	14.6	-28.2	113.70	3.5	232
1405			7.37	515	0.16	14.6	-28.2	114.00	3.5	267
1415			7.39	515	0.06	14.6	-29.0	114.14	3.5	302
1420			7.38	515	0.03	14.6	-28.5	112.39	2.5	314
1425			7.40	513	0.09	14.6	-29.5	112.63	3.0	329
1430			7.38	513	0.04	14.5	-29.0	112.61	3.0	344
1435			7.37	514	0.02	14.5	-28.5	112.63	3.0	359
1440			7.38	515	0.02	14.5	-28.9	112.60	3.0	374

35
17
52
180
232
35
267
35
302
12
314

COMMENTS: _____

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW6 DATE: 3-10-09

MONITORING WELL ID: MW6-SW

SAMPLE ID: MW6SW-GW01-090310

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[X] Water Level Measured At 72.5 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity	DO	Temp	ORP	DTW	Purge Rate	Volume Purged
				(uS/cm)	(mg/L)	(oC)	(mV)	(ft)	(gpm)	(gallons)
0805		/	± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
0815	clear	none	8.33	315	0.22	13.8	-83.4	77.45		3.5
0825	"	"	8.62	341	0.75	13.9	-97.5	78.50		5.5
0835	"	"	8.77	396	1.25	14.2	-105.6	78.96		7.0
0845	"	"	8.65	351	0.77	14.0	-97.1	83.52		12
0855	"	"	8.00	436	2.05	13.9	-60.1	86.71		16
0905	"	"	7.18	601	3.04	14.0	-20.6	88.31		20
0915	"	"	7.13	680	3.98	14.0	-17.2	89.29		25
0925	"	"	7.11	705	4.55	14.1	-16.4	89.40		28
0935	"	"	7.12	670	4.50	14.1	-17.1	89.94		32
0945	"	"	7.12	674	4.60	14.1	-16.8	90.55		36
0955	"	"	7.12	662	4.62	14.1	-17.1	91.11		40
1005	"	"	7.12	671	4.72	14.1	-16.7	91.91		44
1015	"	"	7.11	687	4.89	14.1	-16.2	92.43		48
1025	"	"	7.11	684	4.89	14.1	-16.6	92.89		52
1035	"	"	7.12	685	4.87	14.1	-16.6	93.45		56
1045	"	"	7.10	709	4.94	14.1	-16.1	93.11		60
1050	"	"	7.10	709	5.18	14.1	-15.8	93.04		63
1055	"	"	7.10	710	5.19	14.1	-15.8	93.03		64

~~4~~ ~~8~~ ~~12~~ ~~16~~ ~~20~~ ~~24~~ ~~28~~ ~~32~~ ~~36~~ ~~40~~ ~~44~~ ~~48~~ ~~52~~ ~~56~~ ~~60~~ ~~64~~

COMMENTS: SAMPLE: 1100

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW6 DATE: 3-4-09

MONITORING WELL ID: MW6-BLS

SAMPLE ID: MW6US-GW01-090309

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[X] Water Level Measured At 47.45 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 BECKMAN 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
9500			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
1000			7.28	582	7.81	13.1	-22.9	48.84		1
1010			7.29	586	7.66	13.6	-23.7	50.89		2
1020			7.30	590	8.37	13.6	-24.2	51.92		4 *
1040			7.30	591	7.17	13.5	-24.2	50.78		4.5
1050			7.31	592	7.22	13.6	-24.8	51.35		5.5 *
1120			7.31	592	7.13	13.7	-24.8	50.60		6.5
1130			7.30	594	7.14	13.8	-24.5	51.10		8
1140			7.30	595	7.05	13.7	-24.5	51.41		9
1150			7.32	595	6.99	13.7	-25.3	51.59		10.5
1200			7.32	594	6.86	13.7	-25.3	Probe Stuck on casing		11
1210			7.32	595	6.32	13.8	-25.6			11.5
1230			7.35	595	6.86	13.9	-27.2			13
1240			7.38	595	6.93	13.9	-28.7			13.5
1250			7.36	594	6.99	13.8	-27.1			14.5
1300			7.36	593	6.95	13.8	-27.2			16
1310			7.35	594	7.35	13.9	-27.9			17
1320			7.36	594	6.82	13.9	-27.4			18
1330			7.34	595	7.39	14.0	-26.7			19
1340			7.34	594	7.31	14.0	-26.7			20.
1350			7.34	594	7.36	13.9	-26.7			21

COMMENTS: * PUMPING AIR → ↑ D.O.

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW7 DATE: 3-23-09

MONITORING WELL ID: MW7SW

SAMPLE ID: MW7SW-GW01-090323

SAMPLE COLLECTED BY: LG/CW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[ ] Water Level Measured At 22.73 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: 45185 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1137			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
1150			7.94	472	0.75	14.4	-63.8	36.62		15
1200			7.71	492	0.25	13.9	-51.7	37.85	?	25
1210	CLEAR	NONE	7.56	508	0.16	13.9	-43.2	47.00		35
1220	"	"	7.45	523	0.14	13.9	-37.7	50.25		45
1230	"	"	7.37	535	0.11	14.1	-33.9	52.64		55
1240	"	"	7.36	538	0.10	14.1	-33.2	55.22		65
1250	"	"	7.35	542	0.10	14.0	-32.1	57.36		75
1300	"	"	7.33	550	0.12	14.0	-31.2	59.16		90
1310	"	"	7.31	555	0.13	14.1	-30.2	60.57		105
1320	"	"	7.30	559	0.13	14.1	-29.3	61.51		115
1330	"	"	7.29	561	0.15	14.1	-29.0	62.51		125
1335	"	"	7.28	560	0.19	14.2	-29.1	62.68		135
1340	"	"	7.24	570	0.14	14.0	-26.7	62.41		145

COMMENTS: 89 gallons = 1 volume

90
18
118

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW 7 DATE: 3-16-09

MONITORING WELL ID: MW 7 US

SAMPLE ID: MW 7 US - G-001-090316

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[X] Water Level Measured At 7.18 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1235			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
1245	Very Pale Rust	None	6.98	858	0.96	12.1	-7.9	8.95		8
1255	"	"	7.11	859	0.94	12.2	-15.2	9.21		16
1305	Clear	None	7.21	857	0.93	12.2	-20.5	9.35		24
1315	"	"	7.27	855	0.91	12.2	-24.0	9.47		32
1325	"	"	7.40	855	0.93	12.2	-30.7	9.49		39
1330	"	"	7.36	858	0.91	12.3	-29.0	9.50		43
1335	"	"	7.37	858	0.91	12.3	-28.8	9.52		46.5

~~4~~ ~~8~~ ~~12~~ ~~16~~ ~~20~~ ~~24~~ ~~28~~ ~~32~~ ~~36~~ ~~40~~ ~~44~~

COMMENTS: Collected MS/MSD

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW8 DATE: 3-23-09

MONITORING WELL ID: MW8US

SAMPLE ID: MW8US-GW01-090323

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[X] Water Level Measured At 61.25 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: 45185 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
0850								61.25		
0900	clear	none	7.20	782	2.28	14.5	-24.4	66.13		2.0
0910	"	"	7.19	791	2.32	14.7	-24.0	66.83		3.5
0920	"	"	7.18	810	2.19	14.6	-23.2	68.63		6.0
0930	"	"	7.16	825	2.42	14.6	-22.4	67.34		8.0
0940	"	"	7.16	830	2.35	14.6	-22.1	69.75		10.0
0950	"	"	7.15	830	2.37	14.7	-22.1	69.95		12.0
1000	"	"	7.15	835	2.27	14.7	-21.7	70.26		14.5
1005	"	"	7.15	834	2.25	14.7	-21.7	70.60		15.0
1010	"	"	7.15	830	2.16	14.7	-21.7	69.82		16.5
1015	"	"	7.15	838	2.18	14.8	-21.7	69.99		17.0
1020	"	"	7.15	839	2.17	14.7	-21.6	70.37		18.0
1025	"	"	7.15	838	2.15	14.7	-21.6	69.68		19.5
1030	"	"	7.15	838	2.16	14.8	-21.5	69.51		20.0
1035	"	"	7.14	842	2.08	14.8	-21.5	69.46		21.0

COMMENTS: 12 gallons = 1 well vol.

14.5 gallons ≈ 1.2 well vol.

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW9 DATE: 4-28-09

MONITORING WELL ID: MW9R

SAMPLE ID: MW9R-GW01-090428

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL** 112

[X] Water Level Measured At ~~92~~ 20 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: 45185 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
925			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft	1.9	
~~925~~ 935	clear	None	9.65	224	1.70	15.3	-156.7	116.64	~~1.9~~	19
945			9.61	232	0.13	15.3	-154.3	117.84		38
955			9.51	252	0.40	15.3	-148.1	118.73		57
1005			9.42	262	0.04	15.4	-144.0	117.67	1.3	~~76~~ 70
1015			9.35	269	0.04	15.5	-140.0	115.03	1.3	83
1025			9.35	265	0.03	15.6	-140.1	119.35	1.6	99
1035			7.94	459	0.15	15.6	-63.4	123.27	1.6	115
1045			7.83	455	0.16	15.7	-58.5	125.23	1.6	131
1055			7.70	476	0.17	15.9	-51.5	127.97	1.6	147
1105			7.65	484	0.17	15.8	-48.8	129.25	1.6	163
1115			7.61	486	0.17	15.8	-46.6	130.26	1.6	179
1125			7.58	488	0.17	15.7	-45.0	130.75	1.6	195
1135			7.57	490	0.17	15.7	-44.2	131.53	1.6	199
1145			7.57	486	0.16	15.7	-44.3	133.12	1.9	218
1155			7.52	491	0.17	15.8	-41.5	136.52	1.9	237
1205			7.48	501	0.14	15.8	-39.9	137.16	1.9	256
1210			7.48	505	0.16	15.8	-39.6	137.05	1.8	274

COMMENTS: 3" Casing 0.38 gal/ft. one well volume approx 125 gallons

FERROUS IRON: 0.~~20~~ 19 mg/L

TOTAL IRON: 0.17 mg/L

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW9 DATE: 3-12-09

MONITORING WELL ID: MW9SW

SAMPLE ID: MW9SW-GW01-090312

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[X] Water Level Measured At 37.71 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity	DO	Temp	ORP	DTW	Purge Rate	Volume Purged
				(uS/cm)	(mg/L)	(oC)	(mV)	(ft)	(gpm)	(gallons)
0937			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
0950	Clear	none	7.36	590	0.28	14.4	-28.4	52.97		18
1000	"	"	7.22	667	0.31	14.4	-21.5	60.14		30
1010	"	"	7.15	727	0.59	14.4	-17.0	65.51		40
1020	"	"	7.13	754	0.75	14.4	-16.5	69.21		52
1030	"	"	7.11	769	0.82	14.5	-15.3	71.95		65
1040	"	"	7.10	779	0.86	14.4	-15.1	73.74		75
1050			7.04	787	0.83	14.4	-11.0	75.55		85
1055			6.99	793	0.85	14.4	-9.0	76.20		90
1100			6.76	794	0.64	14.4	-5.5	76.81		94
1105			6.57	795	0.84	14.4	14.3	77.45		98
1110			6.49	795	0.86	14.4	18.8	78.01		104
1115			6.06	795	0.55	14.3	40.8	78.71		110
1120			5.85	821	0.94	14.3	57.5	78.35		115
1125			5.77	821	0.93	14.3	57.7	76.11		120
1130			5.67	821	0.92	14.4	63.5	78.00		126
1135			5.54	823	1.00	14.3	69.6	78.00		131
1140			5.49	816	0.97	14.4	72.4	78.05		135
1145			5.52	813	0.96	14.3	71.2	78.16		

COMMENTS: One well volume approx 69 gallons

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW 9 DATE: 3-12-09

MONITORING WELL ID: MW9US

SAMPLE ID: MW9US-GW01-090312

SAMPLE COLLECTED BY: LG/LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[X] Water Level Measured At 24.23 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI85 Beckman 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
1303			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
1310	Tea color	None	7.04	860	1.75	14.6	-11.4	30.05		2
1320	Cloudy	None	7.02	823	1.77	14.7	-10.3	31.71		5
1330	"	"	6.81	892	1.68	14.8	0.8	32.90		8
1340	"	"	6.01	930	1.63	14.7	43.3	32.91		12
1345	"	"	5.71	963	1.63	14.8	44.0	32.31		13.5
1350	"	"	5.85	964	1.61	14.7	53.1	32.12		14.5
1355	"	"	5.77	965	1.61	14.8	56.7	32.30		16
1400	"	"	5.74	966	1.59	14.7	58.7	32.71		17.5
1405	"	"	6.06	956	1.59	14.8	41.5	32.99		18.5
1410	"	"	6.31	968	1.56	14.7	27.8	32.41		20
1415	"	"	6.15	969	1.53	14.7	37.1	32.45		21.5
1420	"	"	6.80	961	1.50	14.7	2.1	32.60		22.5
1425	Clear	"	6.85	969	1.38	14.7	-1.1	31.70		24
1430	"	"	6.87	967	1.49	14.7	-2.5	31.55		25

COMMENTS: One well volume approx 8.3 gallons

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: MW14-US DATE: 8/26/09

MONITORING WELL ID: MW14-US

SAMPLE ID: _____

SAMPLE COLLECTED BY: LW of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: Good

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[ ] Water Level Measured At 20.39 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 Lecompte 410

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)	
			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft			
0813								20.39		0	~~4~~ ~~8~~ ~~12~~
0820	CLEAR	NONE	7.35	1010	5.44	14.7	-21.0	22.31		1.25	
0835	"	"	7.37	1015	6.04	15.1	-21.4	23.96		4.0	
0850	"	"	7.39	1009	5.65	15.2	-22.9	25.56		6.5	
0900	"	"	7.42	998	5.25	15.3	-24.1	26.57		8.0	STOPPED TO RECHECK
1038 Restart											
1035	"	"	7.31	1058	4.82	15.4	-18.7	24.25		10.0	
1045	"	"	7.34	1047	5.37	15.4	-20.3	25.54		16.5	
1058	"	"	7.38	1041	5.16	15.4	-22.7	26.46		13.5	STOP
1223 Restart											
1235	"	"	7.27	1039	3.91	16.3	-16.3			14.5	
1245	"	"	7.29	1045	3.92	16.7	-18.3			15.5	
1255	"	"	7.31	1056	4.38	17.1	-18.7			16.0	
1305	"	"	7.33	1054	4.28	16.5	-20.6	24.95		17.0	TURN PUMP ↑
1315	"	"	7.33	1057	4.31	16.5	-21.3			18	
1325	"	"	7.31	1054	4.35	16.7	-22.1			19.25	
1335	"	"	7.32	1049	4.30	16.8	-21.5			20.0	
1345	"	"	7.31	1052	4.32	16.8	-21.2			21.5	
1355	"	"	7.30	1056	4.36	16.8	-21.6			22.5	

COMMENTS: BAILED 27 GALLONS LAST WEEK

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: _____ DATE: 9-10-09

MONITORING WELL ID: MW14US

SAMPLE ID: MW-14US-GW01-090910

SAMPLE COLLECTED BY: _____ of Parsons

1. [ ] **WELL CONDITION**

[X] Locked [ ] Unlocked

Well ID: [ ] Is apparent [X] Is Not Apparent Explain: _____

Casing Condition Is: _____

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[X] Product Not Observed

3. [ ] **WATER LEVEL**

[X] Water Level Measured At 20.83 Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: 45185 Beckmon 4W

METERS CALIBRATED? [X] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)	
1048			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft			
1053	Clear	None						25.58		4	
1056	Cloudy	None	Pump	off				27.65		7	
1155		Pump on						2511		7	
1209			7.44	989	3.30	16.3	-38.5	27.26		9	pump off
1222	pump on							26.75			
1225	Cloudy	None.	7.26	982	2.81	15.6	-22.1	27.30		10	pump off
1240		Resume	purge					23.17			
1248	cloudy	none	7.06	981	2.17	16.1	-11.3	23.57		10.5	
1248	"	"	7.13	991	2.56	15.7	-15.2	23.89		11	
1252	"	"	7.16	1009	2.77	15.6	-17.0	24.17		11.5	
1456	"	"	7.19	1024	3.02	15.6	-17.8	24.42		11.8	
1500	"	"	7.21	1029	3.19	15.7	-19.1	24.66		12.3	
1504	"	"	7.22	1031	3.32	15.7	-19.7	24.95		12.8	
1508	"	"	7.22	1031	3.49	15.7	-20.7	25.21		13.3	
1512	"	"	7.22	1027	3.72	15.7	-21.9	25.55		14	

COMMENTS: Sampling for Attenuation parameters only.

GROUNDWATER SAMPLING FORM
Kellwood OU2/OU6

SAMPLING LOCATION: PA53 DATE: 8/26/01

MONITORING WELL ID: _____

SAMPLE ID: PA53-600/-290526

SAMPLE COLLECTED BY: LW of Parsons

1. [ ] **WELL CONDITION**

[ ] Locked [✓] Unlocked

Well ID: [ ] Is apparent [✓] Is Not Apparent Explain: _____

Casing Condition Is: RESIDENTIAL

[ ] Deficiencies Corrected By Sample Collector

[ ] Well Required Repair (Describe) _____

2. [ ] **PRODUCT INFORMATION**

[ ] Product Observed (Describe) _____

[✓] Product Not Observed

3. [ ] **WATER LEVEL**

[ ] Water Level Measured At _____ Feet Below Top of Casing _____

[ ] Other. Explain _____

4. [ ] **ON-SITE MEASUREMENTS:**

METERS USED: YSI 85 HERMAN 400

METERS CALIBRATED? [✓] Yes [ ] No COMMENTS: _____

Time	Color	Smell	pH	Conductivity (uS/cm)	DO (mg/L)	Temp (oC)	ORP (mV)	DTW (ft)	Purge Rate (gpm)	Volume Purged (gallons)
			± 0.1	± 3%	± 10%	± 0.2 oC	± 10 mV	< 0.3 ft		
1440	clear	no							5	0
1445	"	"	7.24	604	2.78	14.9	-18.4			25
1450			7.14	635	1.52	14.7	-21.3			50
1455			7.15	630	1.03	14.7	-20.9			75
1430			7.18	636	0.25	14.8	-21.4			100
1485			7.18	641	0.20	14.7	-21.8			125
1440			7.17	640	0.12	14.7	-20.9			150
1445			7.19	642	0.08	14.9	-18.8			175
1450			7.19	648	0.16	14.8	-18.9			200
1455			7.16	650	0.11	14.8	-20.5			225
1500			7.17	650	0.09	14.8	-22.0			250
										275

COMMENTS:

SAMPLE @ 1510

APPENDIX B
PHOTOGRAPHIC LOG

Building at left is Former Kellwood Facility and open lot where alleged disposal occurred.

View to southwest from southern end of Industrial drive. Southern portion of industrial park is in foreground.

Task 1 soil sampling.

Task 1 ATV mounted direct push probe inside the Former Kellwood Facility (at soil boring MC02).

Task 2A Interval Screening. Geophysical logging at JS-14. Tank in foreground is temporary supply to residence.

Task 2B Direct Push Cross Section. Soil boring being advanced at CSN-04.

Task 2C Residential Well Sampling. Flow through cell setup for residential well sampling.

Task 2C Residential Well Sampling. Flow through cell setup for city well 3 sampling.

Task 2D Monitoring Wells. Installing temporary screen and rise in direct push boring at site of the MW-6 cluster.

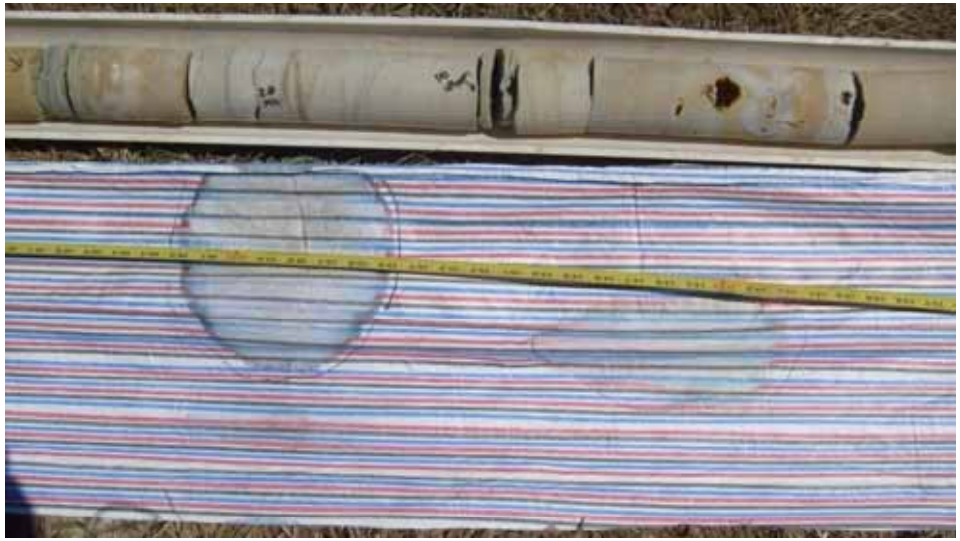
Task 2D Monitoring Wells. Installation of surface casing for MW-6US using air rotary drill rig.

Task 2D Monitoring Wells. Cable tool drilling of MW-10UB in right of way of Boeuf Lutheran Road.

Task 3 DNAPL Investigation. Core rig set up to drill an HQ core hole on the open lot north of the Former Kellwood Facility.

Task 3 DNAPL Investigation. Drilling of HQ core hole for U-17.

Task 3 DNAPL Investigation. Installation of FLUTe liner in U-17. Red hose is supplying water to invert liner, plastic hose is vent line.



Task 3 DNAPL Investigation. Liner from Q15.5 showing positive indication of DNAPL.

Task 4 Surface Water and Sediment. Sample location of SW-06 and SD-06 on north side of Boeuf Lutheran Road.

Task 4 Surface Water and Sediment. Sample site for SW-11 and SD-11. Inadequate flow at site to spin the flowmeter shown.

Task 5 Sanitary Sewer. Advancing direct push boring at sewer defect site SDF2.

Soil Vapor Sampling. Purging of SVI-04 on south side of New Haven High School.

APPENDIX C
SOIL BORING AND MONITORING WELL LOGS (TASKS 1, 2B, 2D, 3, 5)

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

FIELD BOREHOLE LOG

BOREHOLE NO.: **B-2**
TOTAL DEPTH: **18 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 12, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		Fill	well graded GRAVEL		
			brown and reddish brown CLAY w/gravel interspersed, moist, hard	B2-SS01-001.0-070912	
-2		Fill			
			black organics/wood chips		
		Fill			
-4		CL	brown gravelly CLAY, moist, soft, pliable		
		GP	1" dolomite GRAVEL		
		CL	dk brown CLAY, m. soft, pliable		
-6			as above except brown w/ orangish tint, getting progressively harder with depth, v. hard at 84"		
-8					
		CL			0
-10					
-12					
			gray CLAY, w/ orangish brown stain, damp, v. hard, v. tight		
-14					
		CH			
-16					
				B2-SS01-018.0-070912	
-18					

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **B-10**

TOTAL DEPTH: **14.08 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Asphalt and Gravel		
		Fill			
-2					
		Fill	tan silty SAND w/gravel, dry		
		Fill	limestone GRAVEL		
		Fill			
		Fill	silty SAND w/ gravel dry		
-4		CL	gravelly CLAY, damp, soft	B10-SS01-003.5-070913	
			dk brown and gray CLAY, hard, dry, low plastic, w/ chert at bottom		
-6			brown CLAY, m soft, damp, plastic getting dryer and harder w/ depth, gray mottling starts at 94" and gets v stiff w some chert at 125"		
					0
-8		CH			
-10					
			CHERT		
-12		GW	brown CLAY, dry vv hard, vv stiff, w/ chert throughout		
		CH			
-14				B10-SS01-014.0-079013	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **D-4**

TOTAL DEPTH: **11.4 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 12, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		FILL	gray well graded GRAVEL		
		FILL	sandy gravelly CLAY, brown ,dry, m hard, plastic		
-2			brown CLAY, dry, plastic, hard, getting harder w/ depth	D4-SS01-002.0 - 070912	
-4					
-6		CH			0
-8					
-10		Sandstone	quartz SANDSTONE grading into chert		
		CH	brown cherty CLAY, vv hard, dry	D4-SS01-011.4 - 070912	
		CH	brown sandy gravelly CLAY, dry, vv hard		

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **D-10**
TOTAL DEPTH: **10 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 13, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		FILL	Asphalt and Gravel		
-2		FILL	orange to brown clayey SILT w/ gravel, w/ green clay interspersed, dry , semi-loose	D10-SS01-002.0 - 070913	
-4		CL	brown silty CLAY w/ black mottling, damp at top, m hard, firm brown and gray CLAY, dry, v hard, v stiff		0
-6		CH			
-8		CH	sandy gravelly CLAY, dry brown and gray CLAY, dry, v hard, v stiff, chert throughout but heavy at bottom		
-10		CH		D10-SS01-010.0 - 070913	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **E-2**
TOTAL DEPTH: **11 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 12, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			gray GRAVEL, well graded, dry, loose		
		Fill			
		Fill	brown and tan silty CLAY, dry, hard		
-2		Fill	GRAVEL	E2-SS01-002.0 - 070912	
		Fill	gravely CLAY, tan to brown, dry, hard		
		CH	brown CLAY, dry, m. hard, some gravel		
-4			as above w/o gravel		
					0
-6					
		CH			
-8					
-10			gravelly CLAY, brown to red, hard	E2-SS01-011.0 - 070912	
		GC			

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **E-6**
TOTAL DEPTH: **15.17 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 13, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		FILL	gray well graded GRAVEL		
			brown silty CLAY, dry, hard, plastic	E6-SS01-001.0 - 070913	
-2					
-4		FILL			
-6					
-8			as above w/ gray CLAY interspersed, some gravel, more stiff		
		FILL			0
-10		FILL	clayey GRAVEL, dry		
		CH	reddish brown cherty CLAY, v hard, dry		
-12			gray to lt brown silty CLAY, dry, vv hard, plastic, vvstiff at bottom (unable to extract from DPT sample bbl.)		
		CH			
-14				E6-SS01-015.2 - 070913	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **E-8**
TOTAL DEPTH: **13 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 13, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		FILL	gray well graded GRAVEL		
			brown silty CLAY, dry, hard, plastic		
-2				E8-SS01-001.5 - 070913	
		FILL			
-4					
			as above w/ some gray CLAY, some gravel, gets harder and firm w/depth		
		FILL			
-6					
		FILL	gray clayey GRAVEL, dry		0
			brown CLAY, dry, vv hard, vv stiff, w/ some chert		
-8					
-10		CH			
-12				E8-SS01-013.0 - 070913	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **F-10**
TOTAL DEPTH: **8.5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 13, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Asphalt and Gravel		
		FILL			
-2					
		FILL	tan gravelly silty SAND, dry, loose, w/ some clay and gray mottling	F10-SS01-003.0 - 0700913	
-4			brown silty CLAY, damp, m soft, plastic		
		CH			0
			chert and limestone GRAVEL		
-6		GW			
			red and brown CLAY w/ chert, vv hard, v stiff, shale at refusal		
		CH			
-8				F10-SS01-008.5 - 070913	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **H-10**
TOTAL DEPTH: **6.42 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 13, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Asphalt and Gravel		
		FILL			
			NO RECOVERY		
-2		No Recovery			
		FILL	tan gravelly SILT, soft, dry		0
		FILL	as above except saturated	H10-SS01-003.5 - 070913	
-4			brown CLAY, soft at top getting harder w/depth, hard at bottom, wet		
		CH			
-6		SC	orange clayey SAND, wet, soft		
		CH	silty CLAY w/ chert, moist hard	H10-SS01-006.4 - 070913	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **K-10**
TOTAL DEPTH: **6.17 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 13, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Asphalt and Gravel		
		FILL			
-2			brown sandy CLAY, soft, damp		
		FILL		K10-SS01-002.5 - 070913	
		FILL	tan clayey SILT w/ gravel, dry, loose		0
		CH	brown CLAY, dry, m soft, plastic		
-4		SC	gray clayey SAND, dry, loose		
			brown CLAY w/ gray mottling, v hard, stiff, damp, shale at refusal		
		CH			
-6				K10-SS01-006.0 - 070913	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **M-10**
TOTAL DEPTH: **4.83 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 14, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Asphalt and Gravel		
		FILL			0
-2					
		FILL	brown gravelly CLAY, moist , soft		64
		FILL	limestone GRAVEL	M10-SS01-003.0 - 070914	
			orangish brown gravelly CLAY, damp, soft, w/ band of green limestone? debris at 44"		0
		CH			16
-4					
			clayey, gravelly SILT, tan, dry, loose		650
		MH		M10-SS01-004.9 - 070914	1836

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **N-12**
TOTAL DEPTH: **2.17 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept 11, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		FILL	Asphalt and Gravel		0
		FILL	gray GRAVEL and SAND, loose, dry		864 ppb
		FILL	gray gravelly SAND, loose, dry	N12-SS01-001.0 - 070911	0
		FILL	tan to lt brown sandy CLAY, moist, pliable		530 ppb
-2		CH	brown CLAY, moist, m soft, pliable	N12-SS01-002.0 - 070911	0

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **P-10**
TOTAL DEPTH: **5.33 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 14, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Asphalt and Gravel		
		FILL			
-2			reddish brown silty CLAY w/ gravel, w/ gray bands throughout, damp, soft at top, hardens w/ depth		
				P10-SS01-002.5 - 070914	0
		CH			
-4					
		CL	gray silty CLAY, moist, friable	P10-SS01-005.3 - 070914	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **P-12**
TOTAL DEPTH: **2 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 11, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			dk brown silty CLAY, damp, loose		
		FILL			484 ppb
				P12-SS01-000.5 - 070911	
			gray sandy clayey GRAVEL, well graded, dry, loose		
		FILL			
			tan to gray gravelly sandy CLAY, damp, grading to more sand at bottom		
		FILL			0
				P12-SS01-002.0 - 070911	
-2					

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **P-14**
TOTAL DEPTH: **3 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 11, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0					
		FILL	gray to brown clayey gravelly SAND, loose, damp	P14-SS01-000.0 - 070911	
		CH	brown sandy CLAY, hard, damp		0
		SW	tan to orangish brown silty SAND w/ qtz vein at 18.5"		147
-2					398
		SC	lt brown clayey SAND, damp, hard		
		GP	Quartz	P14-SS01-003.0 - 070911	3198

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **P-15**
TOTAL DEPTH: **3.5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 11, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		FILL	dk brown gravelly silty CLAY w/ organics, damp, pliable		251
		FILL	tan silty SAND, dry, loose	P15-SS01-000.5 - 070911	0
			tan to orangish brown SAND w/ gray staining from 27 - 37.5, loose, dry		3179
					5583
-2		FILL			
					86700
				P15-SS01-002.5 - 070911	
					5132
		FILL	quartzose GRAVEL		
		FILL	tan to orangish brown SAND w/ gray staining from 27 - 37.5, loose, dry		83400

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **P-16**
TOTAL DEPTH: **2.5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 11, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		FILL	brown sandy silty CLAY w/ gravel and organics, moist, pliable		8347
			brown to gray silty clayey GRAVEL, loose	P16-SS01-000.5 - 070911	5659
		FILL			23400
			gray to lt brown gravelly sandy CLAY, damp, pliable		37600
-2		CH			
				P16-SS01-002.5 - 070911	22100

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **P-6**
TOTAL DEPTH: **12.08 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 11, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		OL	lt brown CLAY w/organics, v hard, damp		
		GP	gray limestone GRAVEL		
-2			lt brown sandy CLAY, dry, hard, grading to brown silty clay, dry v hard at 36"		
		CH			
-4					
				P6-SS01-000.5 - 070911	
-6		CH	orangish brown gravelly CLAY grading to tan at 76", dry m hard		0
		GW	quartz and limestone GRAVEL		
			reddish brown gravelly CLAY, dry, hard		
-8		CH			
-10		CH	brown CLAY w/fine gravel, dry, hard		
			brown and gray CLAY, moist, v hard, somewhat pliable		
		CL			
-12				P6-SS01-012.0 -	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **P-8**
TOTAL DEPTH: **6 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 11, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0					
		TOPSOIL	brown CLAY w/ organics, moist, m hard, w/ gravel		
		FILL	gravel w/ brown CLAY, hard, damp	P8-SS01-000.5 - 070911	
			brown clayey SILT, w/some gravel, dry		
		FILL			
-2					
			gray well graded limestone GRAVEL		
		FILL			
			brown CLAY, hard, damp, w/ some sand and gravel thoughout, gray and orange mottling at 60" w/ some gravel		0
-4					
		CH			
				P8-SS01-006.0 - 070911	
-6					

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **Q-13**
TOTAL DEPTH: **2 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 10, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		FILL	brown silty CLAY w/ gravel, damp, loose		6842
		FILL	gray limestone GRAVEL	Q13-SS01-000.5 - 070910	
		FILL	brown gravelly silty CLAY, damp, pliable		2179
		CH	dk brown CLAY, damp, plastic w/ some sand		684
		SC	lt brown clayey SAND, dry, loose	Q13-SS01-002.0 - 070910	2709
-2					

NOTES:

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(314) 576-7330

FIELD BOREHOLE LOG

BOREHOLE NO.: **Q-16**
TOTAL DEPTH: **1.16 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 10, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			lt brown gravelly sandy CLAY, damp, loose		
		FILL		Q16-SS01-000.5 - 070910	118
		FILL	tan SAND w/ clay, dry, loose	Q16-SS01-001.0 - 070910	618

NOTES:

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(314) 576-7330

FIELD BOREHOLE LOG

BOREHOLE NO.: **Q-17**
TOTAL DEPTH: **2.92 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 10, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			brown silty CLAY w/ organics, damp		148
		FILL		Q17-SS01-000.5 - 070910	
		FILL	tan sandstone GRAVEL		0
			tan SANDSTONE		
-2					
		Sandstone			
				Q17-SS01-002.9 - 070910	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **R-10**
TOTAL DEPTH: **3.5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept 14, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Asphalt and Gravel		
		FILL			
			brown silty CLAY, moist, soft, plastic		0
-2				R10-SS01-002.0 - 070914	
		CH			
		MH	tan SILT, moist	R10-SS01-003.5 - 070914	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **R-13**
TOTAL DEPTH: **1.5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 10, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		FILL	brown silty sandy CLAY w/ organics and gravel, damp, loose		880
		FILL	gray and brown clayey GRAVEL	R13-SS01-000.5 - 070910	
		FILL	reddish brown gravelly CLAY w/ sand	R13-SS01-001.5 - 070910	0

NOTES:

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(314) 576-7330

FIELD BOREHOLE LOG

BOREHOLE NO.: **R-17**
TOTAL DEPTH: **3.5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 10, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			brown silty CLAY, moist, pliable		
		FILL		R17-SS01-000.5 - 070910	
			as above w/ gravel and gray staining		
		FILL			
			lt tan to orangish brown SAND w/ broken rock, seams of gray shale, dry		0
-2					
		FILL			
				R17-SS01-003.5 - 070910	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **R-6**
TOTAL DEPTH: **12.16 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**September 11, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Brown CLAY, with organics and gravel, hard, moist.		
			Same as above without organics and gravel.	R6-SS01-000.5 - 070911	
			with some 1-inch limestone GRAVEL.		
-2			Brown CLAY, dry, hard.		
-4					
-6		CH	Dark brown CLAY with limestone and chert gravel, grading larger and more prevelent with depth, dry.		0
-8			Brown CLAY with some gravel, moist, very hard.		
-10			with gray mottling.		
			Brown CLAY with tan gravel, moist, hard.		
			Orange brown CLAY with gravel, some gray mottling, moist, very very hard.		
-12			Gray SHALE, hard.	R6-SS01-012.0 - 070911	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **R-8**
TOTAL DEPTH: **9.33 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 11, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		FILL	brown sandy CLAY w/ gravel and organics, hard, damp, pliable		
		FILL	GRAVEL w/ brown clay, hard, damp	R8-SS01-000.5 - 070911	
		FILL	gray clayey SILT grading to silty gravel, dry		
-2			gray and red LIMESTONE and CHERT gravel well graded		
		FILL			
			brown CLAY, hard, damp, w/ some sand thoughout		
-4					
		CH			0
-6			tan SAND, dry, loose		
		SW			
			dk brown CLAY w/ gray mottling, moist, hard		
-8		CH			
		CH	tan to brown cherty sandy CLAY, dry, loose	R8-SS01-009.3 - 070911	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **S-13**
TOTAL DEPTH: **2.58 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 10, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			brown sandy clayey SILT w/ gravel and organics, loose, damp		824
		FILL		S13-SS010-000.5 - 070910	2570
			lt gray clayey SAND w/ gray shale	S13-SS01-001.0 - 070910	131
		FILL			59
-2			dk brown silty CLAY w/gravel, damp, pliable		
		FILL			0

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **S-15**
TOTAL DEPTH: **3.42 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 10, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		FILL	brown sandy silty CLAY, damp, loose		2028
			tan SAND, dry	S15-SS01-000.5 - 070910	104
		FILL			102
-2		FILL	lt brown sandy CLAY, damp		1166
		FILL	gray dolomite GRAVEL		9157
			reddish brown sandy silty CLAY, w/ qtz crystals from 36 - 41", dry, loose	S15-SS01-002.5 - 070910	
		FILL			1734

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **S-17**
TOTAL DEPTH: **2.67 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 10, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			brown sandy gravelly CLAY, damp		
		FILL		S17-SS01-000.5 - 070910	
			tan to lt brown gravelly CLAY, dry		
		FILL			0
-2			tan silty SAND w/ broken rock		
		FILL		S17-SS01-002.7 - 070910	

NOTES:

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(314) 576-7330

FIELD BOREHOLE LOG

BOREHOLE NO.: **T-10**
TOTAL DEPTH: **2.67 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 14, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Asphalt and Gravel		
		FILL	gravelly silty CLAY, tan to brown, hard, dry		0
-2		CH		T10-SS01-002.0 - 070914	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **T-14**
TOTAL DEPTH: **1.67 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 10, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		FILL	gray to brown clayey GRAVEL, dry		
		FILL	tan gravelly CLAY, dry	T14-SS01-000.5 - 070910	0
		FILL	gray limestone/dolomite GRAVEL		
		FILL	brown to tan sandy dolomite GRAVEL	T14-SS01-001.7 - 070910	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **T-15**
TOTAL DEPTH: **1.5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 10, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			brown sandy gravelly CLAY, damp		
		FILL			
			broken tan sandy DOLOSTONE w/ layers of gray shale	T15-SS01-000.5 - 070910	0
		Dolostone			
				T15-SS01-001.5 - 070910	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **T-16**
TOTAL DEPTH: **1.42 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 10, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			dk brown sandy CLAY w/ organics, damp		
		FILL			
			crushed tan DOLOSTONE w/sand, dry	T16-SS01-000.5 - 070910	0
		FILL			
				T16-SS01-001.4 - 070910	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MC-1**
TOTAL DEPTH: **10 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**6/21/08**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Chris Volner**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0		Fill	Concrete Floor			
			SILT w/ some clay, orangish brown to brown, dry, loose, not plastic			
-5		ML			100	0
				MC1-SS01-000.8-080621 MS/MSD		
-10						

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MC-2**
TOTAL DEPTH: **2.7 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**6/21/08**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Chris Volner**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0		Fill	Concrete Floor			
		GW	GRAVEL Fill	MC2-SS01-000.6-080621		
			Clayey SILT, brown, dry, little plastic, mod. firm, grading into more clay.			
		ML	As above w/ grayish green clay, mod. soft.		4-32" 100	0
			SILT grading to fine sand w/ 5% chert, reddish brown, soft.	MC2-SS01-002.7-080621		

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MC-3**
TOTAL DEPTH: **5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**6/21/08**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Chris Volner**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0		Fill	Concrete Floor			
		GW	GRAVEL Fill	MC3-SS01-000.7-080621		
		MH	Clayey SILT, brown to reddish brown, mod. soft, dry, no odor, plastic, <5% chert.			
		SW	Fine SAND w/ silt, red, soft, dry.		0-48" 100	0
		MH	As 6-26" interval w/ more chert, mod. hard.			
		GW	GRAVEL w/ silt, angular chert, damp, loose, no odor.			
		CH	Silty CLAY, reddish brown, plastic, damp, mod. soft, no odor.			
		MH	Sandy SILT w/ clay, loose, no odor.	MC3-SS01-005.0-080621	48-60" 100	0
-5						

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MC-4**
TOTAL DEPTH: **6.6 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas Whtie**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**6/21/08**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Chris Volner**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0		Fill	Concrete Floor			
		Gravel Fill	GRAVEL Fill			
			Silty CLAY w/ 40% chert, reddish brown, plastic, soft, no odor.	MC4-SS01-001.3-080621		0
		CH			0-48" 100	5
						4
			Clayey SILT w/ <5% chert, reddish brown, mod. firm, dry, no odor. Grading to fine sand and 10% chert.			3
		MH				2
-5			Silty CLAY, reddish brown to brown, dry, hard, plastic, no odor.			2
		CH			48-79" 100	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **MC5**

TOTAL DEPTH: **9 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**6/21/08**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Chris Volner**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0		Fill	Concrete Floor			
		Gravel Fill	GRAVEL Fill			
		CH	Silty SILT w/ some fine sand, brown to reddish brown, m. firm. plastic, no odor.	MC5-SS01-001.3-080621	0-48" 100	
		GC	GRAVEL, well graded, angular w/ 50% red clay, no odor.			
		CH	CLAY w/ silt some (<5%) angular gravel, red, hard, dry, plastic, no odor.			0
-5		SW	SAND and GRAVEL, dry, w/ silt.		48-84" 100	
		MH	Clayey SILT, reddish w/ black nodules, dry, hard, plasitc , no odor. Grades to mod. hard at 96".			
				MC5-SS01-009.0-080621	84-108" 100	

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSE01**
TOTAL DEPTH: **12.2 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, mod firm, pale brown, damp			
			SILT, trace clay, crumbly, damp, light brownish gray			
			SILT, little clay, mod soft, moist, slightly plastic, light yellowish brown		0-4 100%	20 ppb
-5			SILT, very little clay, mod soft to crumbly, damp, light brownish gray			30
		MH			4-8 100%	4
			SILT, little clay, mod soft, slightly mottled, pale brown to light gray, speckles of dark brown			51
-10			SILT and CLAY, trace gravel, angular, moist, slightly plastic, moderately firm, mottled gray and yellowish brown		8-11 100%	37
		MH-CH				16
		GW	GRAVEL and SAND, some clay, angular, brownish yellow.		11-12.2 100%	47

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSE02**
TOTAL DEPTH: **13.5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, trace clay, damp, mod soft, pale brown			
					0-4 70%	116
			SILT, trace clay, damp, mod firm to firm, slightly mottled, pale brown and brownish yellow			
-5			SILT, little clay, moist, mod soft, mottled light gray, pale brown			83
					4-8 100%	119
		MH	SILT, little clay, moist, mottled light gray and pale brown, soft			123
-10			SILT, little clay, moist, mod firm, mottled light gray, yellowish brown and dark brown		8-11 70%	173
			SILT some clay, firm, moist, plastic, mottled light gray, some yellowish brown			116
		GP	GRAVEL and CLAY, firm, moist, angular, light gray clay		11-13.5 100%	188

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSE03**
TOTAL DEPTH: **27.6 feet**

PROJECT INFORMATION

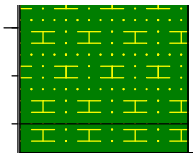
PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, some clay, mod firm, damp, light yellowish brown			
					0-4 100%	93
			SILT, little clay, firm damp, slightly mottled, light gray, pale brown			81
-5						
		MH			4-8 100%	96
			SILT, little to some clay, damp, mod firm, mottled light gray, pale brown with traces dark brown			
			SILT, little clay, moist, mod soft, mottled, light gray, pale brown and dark brown			139
-10						
					8-12 100%	117
		MH-CH	CLAY and SILT, trace gravel, mottled light gray and light yellowish brown, moist, mod soft, mod plastic			
			SILT some Clay, trace sand, mod firm, moist, mod plastic, mottled light gray, light yellowish brown			126
		MH				
					12-16 100%	195
-15						
		MH-CH	SILT and CLAY, trace sand and gravel, light gray and light yellowish brown, moist, very firm, slightly plastic.			
			SILT some Clay, trace gravel, moist, firm, slightly plastic, light gray and yellowish brown, traces brown			123
		MH			16-20 100%	301
-20						
			SILT and CLAY, trace gravel, damp, very firm, light yellowish brown with limonite stains			240
					20-22.8 100%	294
		MH-CH	SILT and CLAY, damp, very firm, grayish brown with few dark brown specks		22.8-24.3 100%	266

NOTES:

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
-25			SILT and CLAY, very firm, damp, light yellowish brown. Till? SILT and CLAY, very firm, damp, light brown. Till		24.3-27 100% 27-27.6 100%	480

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSE04**
TOTAL DEPTH: **42.5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, soft, moist, grayish brown, and light olive brown			
					0-3.5 100%	72
			SILT, some clay, mod soft, moist, mottled yellowish brown and light brownish gray			140
-5						
					3.5-7 100%	40
		MH				
			SILT, some clay, soft, moist, slightly plastic, light olive gray and brownish yellow			82
					7-11.5 80%	
-10						253
			SILT, some clay, mod firm, damp, slightly plastic, light olive gray and brownish yellow			225
					11.5-13 100%	
		GW	GRAVEL and CLAY. Clay is brownish yellow. Gravel is chert, sub-angular			164
					13-15 0%	
-15			NO SAMPLES			
			SILT and CLAY, damp, firm, slightly plastic, light yellowish brown to pale yellow			
					15-19 100%	420
		MH-CH				410
-20			SILT and CLAY, very firm, damp, grayish brown and dark brown			
					19-23 100%	350
			Till? CLAY and SILT with little sand and gravel, brown to light brownish gray, damp			450

NOTES:

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
-25					23-27 100%	380
		TILL				415
-30					27-31 100%	670
			Till? CLAY and SILT, little sand, trace gravel, moist, moderately firm, brown to yellowish brown			620
			SAND, little silt, damp, soft, light yellowish brown		31-34 100%	530
			SAND, little silt, mod firm, damp to moist, light yellowish brown to yellowish brown			232
-35					34-38 100%	258
			SAND, little silt and gravel, damp to moist, firm, yellowish brown			
		SP	SAND, little silt and gravel. Sand is course grained. Rock in shoe is wet, yellowish brown.			580
-40					38-42.5 100%	480
			Weathered rock, white, sandy to gravely, brittle			420

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSE05**
TOTAL DEPTH: **39.4 feet**

PROJECT INFORMATION

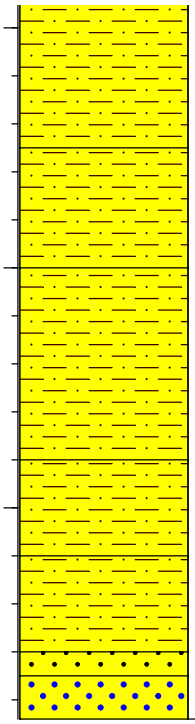
PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay and sand, damp, very firm, light brownish gray and grayish brown			
					0-4 100%	161
			SILT, some clay, firm, damp, mottled light brownish gray and brownish yellow with traces of limonite staining			507
-5		MH				
			SILT, some clay, mod firm, damp to moist, slightly plastic, grayish brown and yellowish brown		4-8 100%	621
			SILT and CLAY, moist, mod soft, slightly plastic, light brownish gray			622
-10		MH-CH			8-11 100%	493
			as above with chert and gravel			
		SS	SANDSTONE, broken and chert (refusal so offset 12 feet north)		11-12.8 100%	637
			SILT, some clay, firm, damp, yellowish brown with some limonite staining			
-15					13-16 60%	535
		MH	SILT, some clay, very firm, damp, mottled light brownish gray and pale brown, traces of limonite staining		16-18 100%	233
					18-20 100%	164
-20						
			SILT, little clay, trace sand, very firm, damp, light brownish gray and dark brown			657
					20-22.5 100%	
		MH-CH, GW	SILT, Clay, and Gravel, gravel is angular, damp to moist, moderately firm, brown with some light brownish gray			1077
					22.5-24 100%	
			SILT, some clay, very firm, damp, yellowish brown and			993

NOTES:

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
-25			reddish brown with dark brown sploches		24-26.4 100%	714
			SILT, some clay, trace sand, firm, damp, limonite nodules, pinkish gray and yellowish red			275
-30		MH	SILT, little sand and clay, damp to moist, mod firm, pinkish gray, strong brown		27.5-31 100%	523 790
-35			SILT, some sand, little clay, trace gravel, moist, mod soft, light brownish gray		31-35 100%	696 775
		SM	SILT and SAND, little clay, mod soft, damp, reddish yellow		35-39 100%	1748
		SW	SAND, some silt and gravel, soft, wet, yellowish brown			
		SS	SANDSTONE, weathered, white, wet, fine grained (upper sand?)			1630

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSE06**
TOTAL DEPTH: **32.5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 2009**

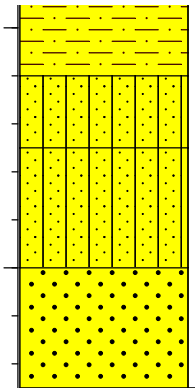
DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, trace clay, brown, very soft, moist at top to wet at bottom			
					0-4 60%	364
		MH	SILT, some clay, very moist, soft, slightly plastic, yellowish brown and light brownish gray			196
-5			SILT, some clay, moist, mod soft, slightly plastic, light brownish gray and brownish yellow			524
			SILT and CLAY, firm, wet, light gray to pinkish gray with few limonite stains			376
-10						443
		MH-CH	SILT and CLAY, moist, very firm, reddish brown with dark brown splotches			527
						392
-15					Rest of samples - 100%	
			SILT, some clay, trace sand, mod firm, moist, strong brown			523
						465
						382
-20		MH	SILT, some sand and clay, mod soft, moist, reddish yellow			
						459
						384

NOTES:

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
-25						671
			SAND and SILT, little clay, mod soft, moist, light gray and pinkish gray			
		SM	SAND, Silt, and Clay, soft, wet to moist, light brown			387
-30						678
		SW	SAND and GRAVEL some silt, little clay, wet, soft, brown. White ss fragments (upper sand?)			740



NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSE07**
TOTAL DEPTH: **29.5 feet**

PROJECT INFORMATION

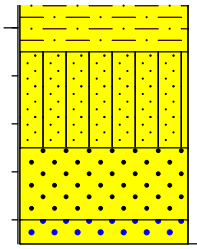
PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, damp, moist, brown, soft			
					0-3.5 100%	605
						777
-5						
			SILT, some clay, moist, soft, light gray and brownish yellow		3.5-7.5 80%	667
			SILT, little clay, soft, damp, light gray and brownish yellow			800
-10					7.5-11.5 100%	502
						827
		MH				
			SILT, some clay, mod firm, moist, strong brown with dark brown limonite stains, few pieces of chert		11.5-15.5 100%	680
-15						
			SILT, some clay, soft, moist, strong brown			749
					15.5-17.5 100%	
			SILT, some clay, firm damp to moist, mottled, strong brown, light brown with limonite nodules			944
					17.5-19.5 100%	
-20			SILT, some clay, mod firm, moist, reddish yellow, strong brown, limonite nodules, dark brown			624
					19.5-23.5 100%	673
						620

NOTES:

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
-25		SM SW SS	SAND and SILT, some clay, mod soft, moist, light gray with limonite nodules SAND, some silt, little clay, wet, soft, very pale brown. SANDSTONE, weathered, white, fine grained, poorly graded.		23.5-26.7 100% 26.7-29.5 100%	1111 608 691

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSE08**
TOTAL DEPTH: **17.3 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Aprol 17, 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, wet, soft, brown			
		MH	SILT, some clay, moist, mod soft, light gray and yellowish brown		0-4 100%	147
						314
-5		GP	Weathered rock, some silt, sand, and clay, rock is chert, angular, moist, light gray, reddish brown		4-6.5 100%	110
			SILT and CLAY, some sand, firm, damp, brown to reddish yellow		6.5-10 100%	286
-10		MH-CH	CLAY and SILT, trace rounded gravel, firm, damp, light blueish gray		10-12 100%	520
			CLAY and SILT, some sand, trace rounded gravel, damp, very firm, light blueish gray, light reddish brown, few limonite nodules		12-14.2 100%	391
-15			CLAY and SILT, some sand, little rounded gravel, firm, damp, pale yellow (piece of weathered SS in shoe)		14.2-15.8 100%	382
		GP	Weathered rock, chert, angular, silt and clay mod soft, moist, yellowish brown. Rock is chert residual		15.8-17.3 80%	555
		SS	Weathered Sandstone, fine grained, little silt, soft, wet, brownish yellow			905

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSE09**
TOTAL DEPTH: **8.3 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 16, 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, moist, soft, dark yellowish brown			
		MH	SILT, some clay, mod soft, damp, yellowish brown		0-4 100%	453
		GM	SILT and GRAVEL, little clay, gravel is angular and light gray, fines are yellowish brown			1055
-5		GP	GRAVEL, SILT, and CLAY, very firm, damp, gravel is angular, light gray and yellowish brown		4-6.5 100%	
		Dolo stone	Weathered rock. GRAVEL, some sand, silt, and clay. Dolostone and chert fragments, pale yellow, yellowish brown, and dark brown		6.5-8.3 100%	1146

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSE10**
TOTAL DEPTH: **5.2 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 16, 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, soft, wet, dark brown			
		MH	SILT, some clay, trace gravel, mod soft, moist, brown to yellowish red		0-4 100%	737
		Chert	Weathered rock, chert and sandstone, some silt and clay			1008
-5		MH-CH	SILT and CLAY, some sand and weathered rock. Firm, moist, light brownish gray, yellowish brown. Rock is dolostone, very fine grained		4-5.2 100%	990

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSE11**
TOTAL DEPTH: **4.5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 16, 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, some clay, wet, soft, dark brown			
		MH	SILT, some clay, trace rock, mod soft, moist, brown to light brownish gray	0-4 100%		490
			Weathered DOLOSTONE, white, very fine grained, moist			858

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSE12**
TOTAL DEPTH: **6 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 16, 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, soft, wet, brown			
		MH	SILT, some clay, broken rock, firm, moist, limonite nodules, yellowish brown to pale brown		0-4 100%	796
-5		MH-CH	SILT and CLAY with weathered dolostone and sandstone, some sand. Weathered rock is white, soil is brownish yellow		4-5.5 100%	656
			SANDSTONE, weathered, fine grained, white, damp to moist			1014 820

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSN01**
TOTAL DEPTH: **27.4 feet**

PROJECT INFORMATION

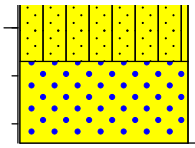
PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 17, 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, moist, soft, dark brown		0-3.5 100%	529
			SILT, little clay, damp, crumbly, yellowish brown			568
		MH				
-5					3.5-7.5 100%	580
			SILT, some clay, firm, damp, scattered pebbles, subrounded, grayish brown and yellowish brown			475
		GP	GRAVEL, angular, and Silt, very firm, damp, light gray and brownish yellow			
-10		CH-MH	CLAY and SILT, trace sand, very firm, damp, light reddish brown and brownish yellow, limonite partings		7.5-11.2 100%	435
		SP	SAND, little clay, firm, slightly cohesive, moist, brownish yellow			1049
			SILT, some clay, firm, moist, reddish yellow and yellowish brown, scattered limonite nodules		11.2-13.7 100%	800
-15					13.7-18.9 100%	820
		MH				815
-20			SILT, some clay, mod soft, moist, traces gravel, angular to rounded, reddish yellow to light brownish gray		18.9-22.7 100%	958
						984
		SM	SAND, SILT, and CLAY, trace gravel, rounded, moist, mod soft, pinkish gray and brownish yellow		22.7-25.7	978

NOTES:

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
-25			Weathered rock (upper sand?), sand, gravel, little silt, wet, white to very pale brown	25.7-27.4	100% 100%	768

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSN02**
TOTAL DEPTH: **27.4 feet**

PROJECT INFORMATION

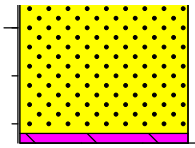
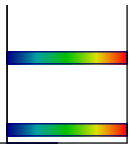
PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**5/14/08**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Cecil Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, wet, soft, brown		75	
						1045
			SILT, little clay, moist, mod firm, light brownish gray and yellowish brown		100	1437
-5					100	864
						1140
			SILT, CLAY and GRAVEL, wet, stiff, gravel is chert, Mn staining	CSW2-GW01-008.0-080514	100	1025
			SILT, some clay, stiff, moist, some partings with Mn staining, strong brown			
-10		ML	SILT and CLAY, very stiff, moist, Mn staining, mottled strong brown and reddish yellow		100	125
						186
			SILT, little to some clay, stiff, moist, spots with Mn staining, mottled light reddish brown, pinkish gray and dark reddish brown		100	515
-15						440
			SILT, little clay, mod firm, very moist, mottled light reddish brown and pinkish gray		40	522
					100	381
-20			TILL?, little sand, gravel and clay, stiff, moist, mottled pinkish gray, light brownish gray			577
		TILL	TILL?, Sand and Silt with some gravel and little clay, wet, mottled pinkish gray and light brownish gray. Gravel is largely chert, angular to subrounded up to 1 inch		100	496
						551
			SAND, fine grained with trace medium grained, very	CSW2-GW01-	100	485

NOTES:

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
-25		SP DOLO	uniform, wet, very pale brown, clayey silt in shoe Weathered DOLOSTONE, medium grained, brownish yellow	027.4-080514 MS/MSD CSW2-GW02-027.4-080514		 1182 1368

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSN03**
TOTAL DEPTH: **25.7 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**5/14/08**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Cecil Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, wet, soft, strong brown		70	
						20
			SILT, little clay, very moist, soft, light brownish gray, yellowish brown		90	262
-5						
			SILT, some clay, moist, firm, sticky, mottled yellowish red and light rownish gray			253
			SILT and CLAY, very stiff, damp, mix of yellowish brown, very pale brown and very dark grayish brown		100	289
		ML				177
-10						
			SILT and CLAY, moist to damp, very stiff, scattered Mn stains, mottled light brown and pinkish gray. Gets very moist in last 3 feet.		100	340
						325
					90	416
-15						
			SILT and CLAY, some sand, very moist, firm, reddish yellow to pinkish gray, scattered Mn stains (especially to 18')	CSN3-GW01-016.0-080515	100	340
			SAND, little clay, wet, soft/loose, fine grained to medium grained, light yellowish brown		100	
-20						
		SW				
			SAND and SILT, some clay, mod soft, wet, slightly mottled, yellowish brown, light brownish gray, rock in shoe.		100	
			SAND, little silt, wet, very soft,/loose, pale brown, scattered gravel.			

NOTES:

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
-25		SM ML	SAND and GRAVEL, some silt, wet, loose, pale brown SILT and SAND, wet, soft, yellow SILT, little sand, few rock fragments, firm, moist, light yellowish brown	CSN3-GW01-025.7-080515		

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSN04**
TOTAL DEPTH: **26.8 feet**

PROJECT INFORMATION

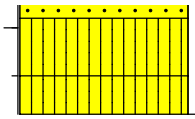
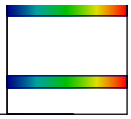
PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**5/14/08**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Cecil Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, wet, soft, dark grayish brown			
		ML				29
			SILT, some clay, mod firm, very moist, plastic, brown to yellowish brown			46
-5						
						165
			SILT and CLAY, very firm, plastic, sticky, moist, scattered Mn stains, strong brown, pinkish gray, very dark grayish brown			144
-10						143
		MH				
						263
-15						490
			SILT and CLAY, very firm, moist, sticky, slightly plastic, few subrounded pebbles of chert. Tillish appearance, light reddish brown and pinkish gray			319
						420
-20		ML	SILT, some clay, mod firm, very moist, pinkish gray			
			SAND, little silt, wet, soft, very pale brown			608
		SW				644
		GW	GRAVEL, SILT, SAND, and CLAY, firm, moist, gravel angular to subrounded			1141
		SW	SAND, little silt, fine grained to medium grained, brown, wet, loose			

NOTES:

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
-25		ML	SILT and GRAVEL, some clay, firm, gravel is blocky chert and limestone, wet, pale yellow SILT, little sand and clay, firm but crumbles, moist, yellow and light gray			 1390 1209

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSN05**
TOTAL DEPTH: **27 feet**

PROJECT INFORMATION

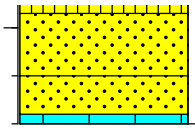
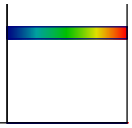
PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**5/14/08**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Cecil Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, some clay, moist, mod firm, crumbly, mix of light gray yellow and dark brown		100	
		ML				598
					100	389
-5			SILT and CLAY, mod firm, slightly plastic, damp to moist, light grayish brown and brownish yellow			461
		MH			100	484
			SILT and CLAY, very firm, damp, pale brown and brownish yellow			537
			SILT and CLAY, trace gravel subrounded chert fragments, damp, very firm, mix of light yellowwish brown, light brownish gray, and very dark grayish brown			
-10					100	659
			Large 1" CHERT piece, subangular			856
			SILT and CLAY, damp, very firm, yellowish red			
			SILT and CLAY, moist, firm, strong brown		100	752
-15						550
		ML				
			SILT and CLAY, moist, mod firm, light reddish brown and strong brown		100	619
			softer			739
			SILT and CLAY, moist, mod firm, brown		100	680
-20						
			grading to pinkish gray			725
			SILT and CLAY, trace sand, damp, firm, pinkish gray with traces reddish yellow		100	1018
			SILT and CLAY, trace gravel and sand, damp, very firm, gravel subrounded, pinkish gray, light gray and reddish yellow			498

NOTES:

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
-25		SW Lime stone	SILT and CLAY, little gravel, rounded chert, damp, very firm, light gray, with some reddish yellow SAND, little silt, compact, wet, dark gray SAND and GRAVEL, trace silt, wet, compact, gravel chert subrounded to subangular Weathered LIMESTONE, medium grained, moist, crumbly			 1026

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **CSN06**
TOTAL DEPTH: **33.7 feet**

PROJECT INFORMATION

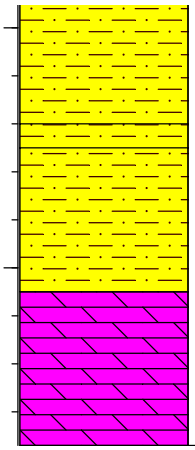
PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**April 17, 2009**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Mark**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, some clay, mod soft, moist, pale brown and brownish yellow		0-3.5 100%	680
-5		MH	SILT, little clay, soft, damp, pale brown, light yellowish brown		3.5-7 100%	830 793
			SILT, little clay, soft, moist, pale brown to yellowish brown			987
-10			SILT, some clay, mod soft, moist, pale brown to yellowish brown, some limonite staining		7-11 100%	803
			CLAY and SILT, soft, moist, plastic, pale brown and yellowish brown			624
					11-15 100%	635
-15		MH-CH				625
			SILT and CLAY, firm, damp, mottled, light brown and yellowish brown, scattered limonite stains		15-16.3 100%	
					16.3-18.3 100%	1056
-20			SILT, some clay and sand, mod firm, damp to moist, pinkish gray, light brown and reddish yellow		18.3-19.5 100%	1670
					19.5-22.5 100%	1750
		MH			22.5-23.5 100%	830

NOTES:

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
-25			SILT, some clay and sand, mod soft, moist, light brown, brownish yellow, scattered limonited nodules		23.5-27.5 80%	725
			SILT, some clay, trace gravel, moist, soft, light brownish gray and brownish yellow			458
-30					27.5-30.5 100%	679
			Weathered rock, chert, dolostone, some sand and clay, wet			325
						469

NOTES:

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Monitor Well Log

BOREHOLE NO.: **MW1-S**
TOTAL DEPTH: **29.1**

PROJECT INFORMATION

PROJECT:	**Kellwood OU6**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**440838**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Susan Fullerton**

DRILLING INFORMATION

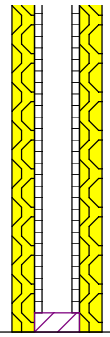
DRILLING CO.:	**Roberts Envi. Drilling, Inc.**
DRILLER:	**Chris Heber**
RIG TYPE:	**CME-750**
METHOD OF DRILLING:	**Hollow Stem Auger**
DATES DRILLED:	**October 29 2004**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		No Samples			Finished with flush mount completion
		SILT, some SAND, little CLAY, damp, moderately firm, mottled light gray, light brownish gray and light olive gray.	0 ppm		
-5		No Samples			
		SILT, some CLAY, little SAND, trace GRAVEL, moderately soft, damp, mottled yellowish brown and light gray.	0 ppm		
		No Samples			
		SILT, some CLAY, moist, moderately soft, slightly plastic, mottled light yellowish brown and light gray.	0 ppm		
-10		No Samples			
		SILT, some CLAY, moist, moderately firm, slightly plastic, mottled light yellowish brown and light gray.	0 ppm		Top of filter pack at 11.8 feet
		No Samples			
		SILT and CLAY, trace SAND, firm, moist, mottled light gray, light olive gray and dark gray.	0.7 ppm		
-15		No Samples			
		SILT, some CLAY, trace SAND, firm, moist, mottled light greenish gray and light reddish gray.	0.8 ppm		
		No Samples			Total depth of hole 29.1 feet, top of 2-inch PVC screen at 13.8, bottom of screen at 28.8, 0.35
		SILT, some CLAY, trace SAND, firm, moist, mottled reddish gray and light greenish gray.	0.6 ppm		
-20		No Samples			
		SILT, some CLAY, numerous rock fragments, firm, rock is	1.0 ppm		

NOTES: Originally drilled as MW1D

Well Name MW1-S

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
		mix of light brownish gray DOLOSTONE and brown CHERT, moist.			foot bottom plug.
		No Samples	1.8 ppm		
25		SILT and CLAY, trace rock fragments (GRAVEL), firm, moist, mottled pale olive and yellowish brown.			
		No Samples	4.1 ppm		
		SILT and rock fragments (GRAVEL), wet, soft, light yellowish brown.			
		No Samples. Auger Refusal at 29.1 feet.			

NOTES: Originally drilled as MW1D

Well Name MW1-S

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Monitor Well Log

BOREHOLE NO.: **MW-1-UB**
TOTAL DEPTH: **43.6'**

PROJECT INFORMATION

PROJECT:	**Remedial Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**

DRILLING INFORMATION

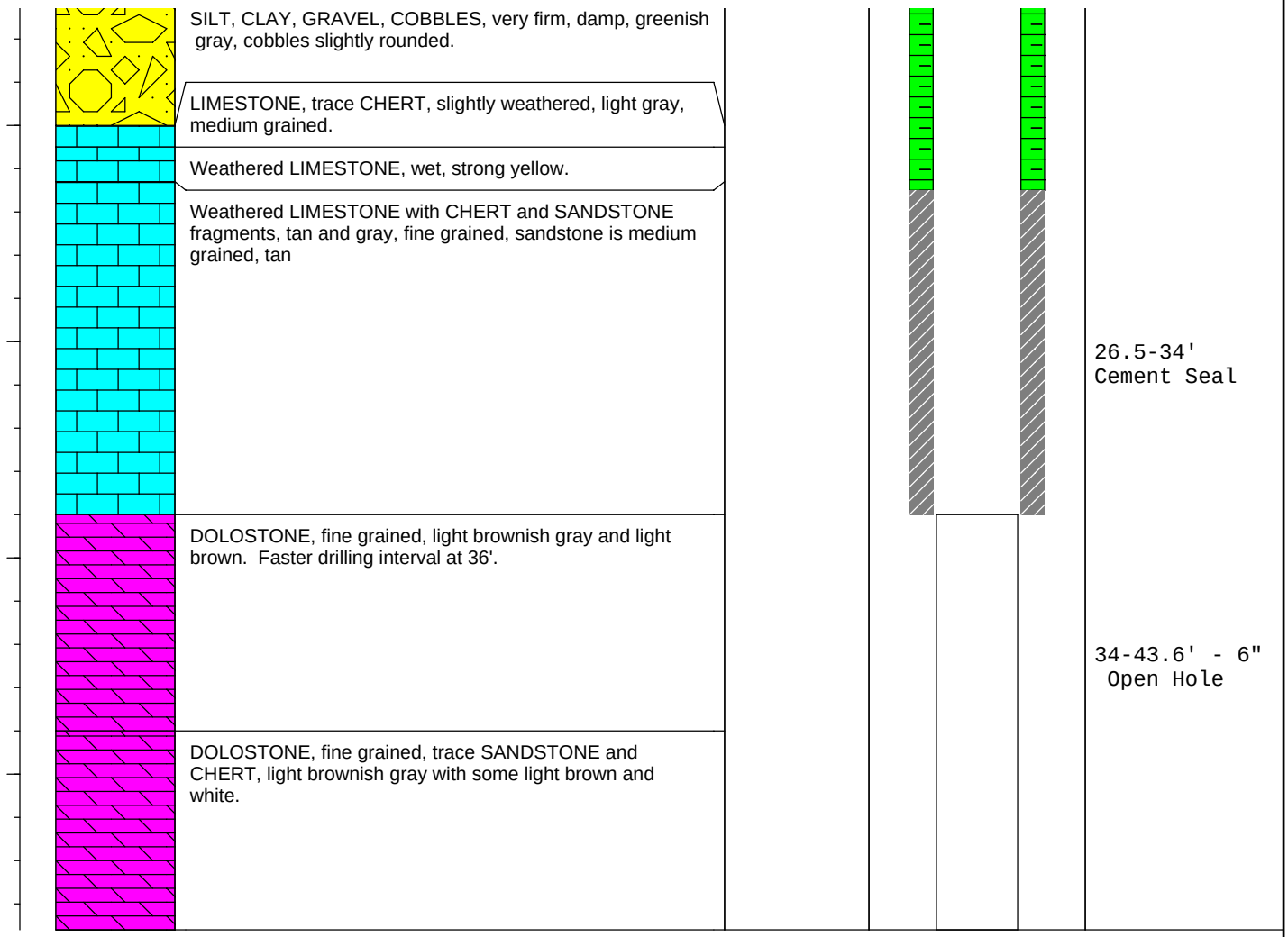
DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Speed Star**
METHOD OF DRILLING:	**Cable Tool**
DATES DRILLED:	**July 2008**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		SILT, little CLAY and SAND, loose, damp, mottled light gray and brownish gray.			Flush Mount Completion
		SILT, little CLAY, moderately soft, slightly plastic, damp, medium gray and reddish brown.			
-5		SILT, some CLAY, trace pebbles, firm, damp, medium gray with some yellowish brown.			0-34' - 10" Hole
		SILT, little CLAY, soft, moist, mottled light gray and grayish brown.			
		SILT, some CLAY, firm, damp, mottled gray and yellowish brown.			
-10		SILT, some CLAY, trace CHERT, firm, slgihtly plastic, damp, mottled gray and yellowish brown.			0.5-34' 6" Steel Casing
		SILT, some CLAY, moderately soft, slightly plastic, damp, mottled light greenish gray and yellowish brown.			
-15		SILT, some CLAY, firm, slightly plastic, damp, mottled light greenish gray, reddish brown and dark gray.			
		SILT, little CLAY, moderately firm, moist, mottled greenish gray and yellowish brown.			
		SILT, some CLAY, trace pebbles, firm, damp, slightly plastic, mottled yellowish brown, light greenish gray and black.			
-20		SILT, some CLAY, few pebbles. firm, slightly plastic, damp, pebbles slightly rounded, mottled greenish gray, brownish gray and brown.			0.5-26.5' Bentonite Seal

NOTES:

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25		SILT, CLAY, GRAVEL, COBBLES, very firm, damp, greenish gray, cobbles slightly rounded.			
		LIMESTONE, trace CHERT, slightly weathered, light gray, medium grained.			
		Weathered LIMESTONE, wet, strong yellow.			
		Weathered LIMESTONE with CHERT and SANDSTONE fragments, tan and gray, fine grained, sandstone is medium grained, tan			
30					26.5-34' Cement Seal
35		DOLOSTONE, fine grained, light brownish gray and light brown. Faster drilling interval at 36'.			34-43.6' - 6" Open Hole
40		DOLOSTONE, fine grained, trace SANDSTONE and CHERT, light brownish gray with some light brown and white.			



NOTES:

Well Name MW-1-UB

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Monitor Well Log

BOREHOLE NO.: **MW1-SW**
TOTAL DEPTH: **111.2**

PROJECT INFORMATION

PROJECT:	**Kellwood OU6**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**440838**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Susan Fullerton**

DRILLING INFORMATION

DRILLING CO.:	**Roberts Envi. Drilling, Inc.**
DRILLER:	**Chris Heber**
RIG TYPE:	**Air Rotary**
METHOD OF DRILLING:	**Air Rotary**
DATES DRILLED:	**October 26, 2004**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		FILL, GRAVEL SILT, little SAND and CLAY, yellowish brown, moist.			Finished with flush mount completion
-5					6-Inch PVC outer casing to 80, sealed with bentonite-cement grout. 4-Inch PVC inner casing to 95, sealed with high solids bentonite grout.
-10		DOLOSTONE and CHERT, weathered, brown.			
-15		DOLOSTONE, light gray, CHERT, brown and blue translucent, trace SANDSTONE.			
-20		DOLOSTONE, very fine grained, light gray, 20% CHERT, brown.			

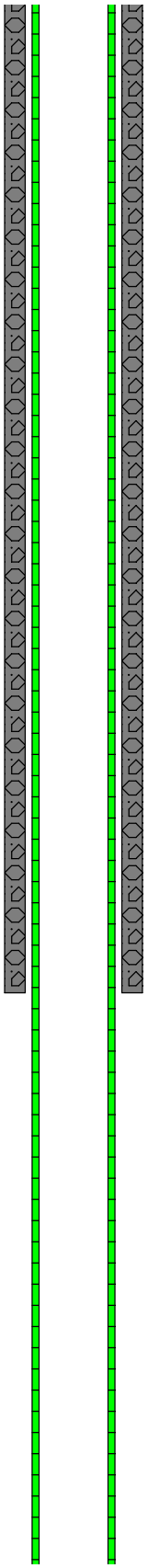
NOTES: Originally drilled as MW1C

Well Name MW1-SW

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25		DOLOSTONE, very fine grained, light gray, 10% CHERT.			
		DOLOSTONE, shaley, very fine grained to microcrystalline, light gray.			
		DOLOSTONE, shaley, light gray, very fine grained, trace silicified oolite.			
30		DOLOSTONE, light gray, 5% GLAUCONITE.			
		DOLOSTONE, very fine grained to microcrystalline, light gray with 10 to 15% brownish gray.			
35		DOLOSTONE, fine grained to very fine grained, very light brownish gray, interlayered with scattered large CHERT nodules, few voids.			
		SANDSTONE, QUARTZ with some CHERT, fine grained, well cemented, numerous vugs, mix of brown and medium gray.			
		CHERT embedded in QUARTZ SANDSTONE, SILTSTONE and DOLOSTONE matrix, greenish gray and brown, large drusy QUARTZ-lined vugs.			
40		DOLOSTONE, very fine grained, light brownish gray with irregular GLAUCONITE beds.			
		SANDSTONE, fully cemented, brown, fine grained with 30% DOLOSTONE, very fine grained to microcrystalline, 20% CHERT.			
45		DOLOSTONE, microcrystalline to very fine grained, light gray, 25% CHERT, brown, trace silicified oolite, producing approximately 1.5 gpm.			
50					
55		DOLOSTONE, very fine grained, light gray, 30% SANDSTONE, fine grained, very well cemented, light gray, trace white silicified oolite. Sandstone decreasing from top to bottom of interval.			

NOTES: Originally drilled as MW1C

Well Name MW1-SW

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
60		DOLOSTONE, very fine grained, light and medium gray, 10% SANDSTONE, trace silicified oolite.			
65		DOLOSTONE, very fine grained, light gray, 20% SANDSTONE, trace CHERT and GLAUCONITE.			
		DOLOSTONE, very fine grained, light gray and light brownish gray, 10% GLAUCONITE.			
70		DOLOSTONE, very fine grained, light gray, trace GLAUCONITE.			
75		DOLOSTONE, very fine grained, light gray, trace GLAUCONITE and CHERT.			
80		DOLOSTONE, very fine grained, light gray, trace silicified oolite.			
		DOLOSTONE, very fine grained, light gray, 10% GLAUCONITE, trace silicified oolite.			
85		DOLOSTONE, very fine grained, light gray and light brownish gray, trace silicified oolite.			
		DOLOSTONE, very fine grained, light gray and light brownish gray, trace CHERT.			
90		DOLOSTONE, mix of light gray and light grownish gray, trace CHERT. Slight color change in discharge.			
		DOLOSTONE, very fine grained, mix of light gray and light			

NOTES: Originally drilled as MW1C

Well Name MW1-SW

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
		brownish gray, 20 to 30% CHERT.			
-95		DOLOSTONE, microcrystalline to very fine grained, light brownish gray, scattered laminated GLAUCONITE zones up to 3mm, one embedded CHERT nodule, few vugs.			
		DOLOSTONE, fine grained, chalky, white with irregular GLAUCONITE above and below.			Open hole portion of well was drilled with NX core (approximately 3.5-inch diameter).
		DOLOSTONE, microcrystalline to very fine grained, light brownish gray, scattered laminated GLAUCONITE zones up to 3mm, few vugs.			
-100		DOLOSTONE, as above, intebedded with SANDSTONE, medium to fine grained, planar bedded.			
		SANDSTONE, very fine grained, well sorted, well cemented, yellowish brown and light gray, scattered beds of SILTY CLAY, well cemented, yellowish brown, up to 1 cm thick, few weathered horizontal fractures.			
-105		SANDSTONE, fine grained, well sorted, well cemented, light gray, scattered irregular GLAUCONITE beds.			
		DOLOSTONE, microcrystalline to very fine grained, light brownish gray, irregular thin shaley beds, few horizontal fractures, SANDSTONE interval 105.3 to 105.6, well cemented, medium to fine grained.			
		SANDSTONE, well cemented, medium to fine grained, light gray, scattered chalky DOLOSTONE beds, white, medium grained.			
-110		DOLOSTONE, very fine grained, light gray, scattered SAND, numerous small vugs poorly connected, slightly weathered.			

NOTES: Originally drilled as MW1C

Well Name MW1-SW

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW1-T1**
TOTAL DEPTH: **75.3**

PROJECT INFORMATION

PROJECT:	**Kellwood OU6**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**440838**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Susan Fullerton**

DRILLING INFORMATION

DRILLING CO.:	**Roberts Envi. Drilling, Inc.**
DRILLER:	**Chris Heber**
RIG TYPE:	**Air Rotary**
METHOD OF DRILLING:	**Air Rotary**
DATES DRILLED:	**October 22, 2004**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		FILL, GRAVEL SILT, some CLAY, brown, moist.			Finished with flush mount completion
-5		SILT, some CLAY, yellowish brown.			4-Inch PVC casing to 49 feet, sealed with bentonite - cement grout. Open hole portion of well was drilled with NX core (approximately 3.5-inch diameter).
-10		SILT, little CLAY, light brown.			
-15		SILT, some CLAY, yellowish brown with thin grayish brown layers.			
-20		SILT, some CLAY, abundant CHERT.			

NOTES: Originally drilled as MW1B

Well Name MW1-T1

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25					
		SANDSTONE, fine grained, well graded, well cemented, mix of yellowish brown and light yellowish gray.			
30					
35		DOLOSTONE, weathered, yellowish browN, 5 to 10% SANDSTONE.			
		DOLOSTONE, very weathered, yellowish brown, 10 to 15% SANDSTONE.			
40		DOLOSTONE, weathered, yellowish brown, 25% SANDSTONE, trace of silicified oolites.			
		DOLOSTONE and SANDSTONE, weathered yellowish brown, trace CHERT, trace light gray, very fine grained DOLOSTONE, traces of silicified oolites.			
45		DOLOSTONE, mix of yellowish brown, weathered with lesser light gray, very fine grained, 10 to 15% SANDSTONE.			
		DOLOSTONE, light gray with yellowish brown, 20% SANDSTONE.			
		DOLOSTONE, very fine grained, mostly light gray with trace of yellowish brown, 10% SANDSTONE.			
50		DOLOSTONE, sandy, medium to fine grained, light gray, irregular bedding, few interspersed CHERT nodules, large QUARTZ-lined vugs, few vertical fractures.	MW1B-GW01-050.0-041013		
		DOLOSTONE, very fine grained to microcrystalline, medium brownish gray, GLAUCONITE, high-angle, irregular bedding features.			
55		DOLOSTONE, medium to very fine grained, light brownish gray to white, chalky, fractured.			
		DOLOSTONE, microcrystalline to very fine grained, irregular bedding, medium brownish gray to light gray, vertical fractures and vugs, some QUARTZ-lined, weathering of			

NOTES: Originally drilled as MW1B

Well Name MW1-T1

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
		fracture surfaces.			
		DOLOSTONE, microcrystalline to very fine grained with scattered chalky intervals, light gray, laminar bedding.			
60		DOLOSTONE, medium grained, reworked, light gray, scattered CHERT, scattered, poorly connected vugs.			
		DOLOSTONE, medium grained, light gray, GLAUCONITE beds.			
		DOLOSTONE, microcrystalline to very fine grained, medium gray, scattered vugs.			
65		DOLOSTONE, sandy, medium grained, light gray, locally chalky.			
		DOLOSTONE, microcrystalline, light gray with medium gray planar beds.			
70					
		DOLOSTONE, reworked, mix of medium gray, chalky white limestone with very fine grained, light gray limestone, scattered GLAUCONITE.			
75					

NOTES: Originally drilled as MW1B

Well Name MW1-T1

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW2-R**
TOTAL DEPTH: **369.8**

PROJECT INFORMATION

PROJECT:	**Kellwood OU6**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**440838**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Susan Fullerton**

DRILLING INFORMATION

DRILLING CO.:	**Roberts Envi. Drilling, Inc.**
DRILLER:	**Chris Heber**
RIG TYPE:	**Air Rotary**
METHOD OF DRILLING:	**Air Rotary**
DATES DRILLED:	**November 1, 2004**

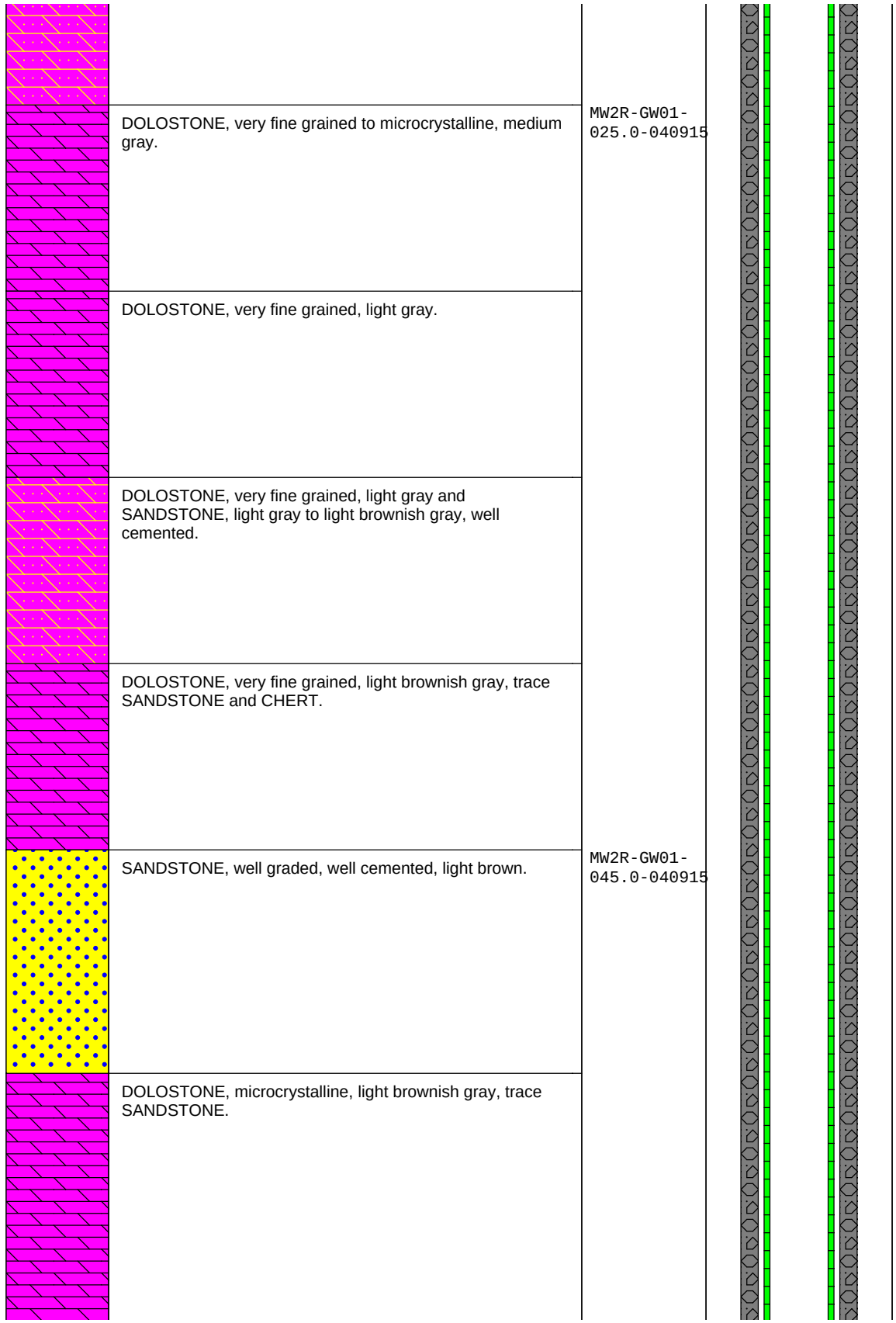
Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		FILL, Gravel SILT, some SAND, little CLAY and GRAVEL, reddish brown.			Finished with flush mount completion
-5					8-Inch PVC outer casing to 125, sealed with bentonite-cement grout.
-10		DOLOSTONE, light brownish gray, very fine grained, some SANDSTONE, trace CHERT.			4-Inch PVC inner casing to 341, sealed with high solids bentonite grout.
-15					
-20					

NOTES: Roubidoux Formation Well

Well Name MW2-R

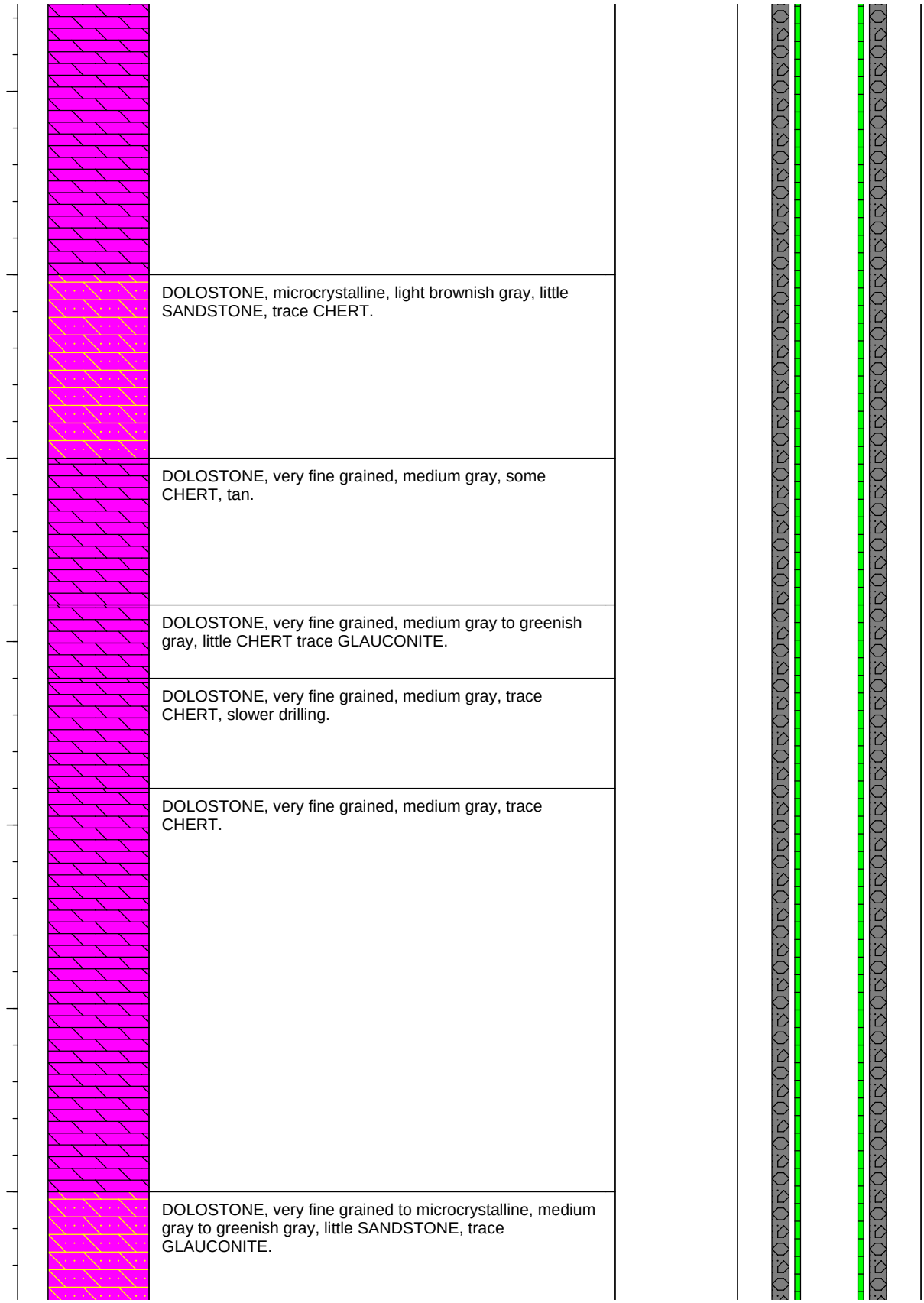
DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25		DOLOSTONE, very fine grained to microcrystalline, medium gray.	MW2R-GW01-025.0-040915		
30		DOLOSTONE, very fine grained, light gray.			
35		DOLOSTONE, very fine grained, light gray and SANDSTONE, light gray to light brownish gray, well cemented.			
40		DOLOSTONE, very fine grained, light brownish gray, trace SANDSTONE and CHERT.			
45		SANDSTONE, well graded, well cemented, light brown.	MW2R-GW01-045.0-040915		
50		DOLOSTONE, microcrystalline, light brownish gray, trace SANDSTONE.			
55					



NOTES: Roubidoux Formation Well

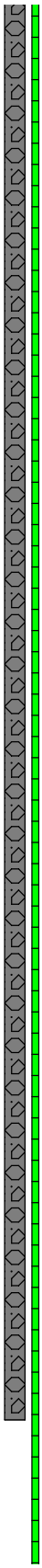
Well Name MW2-R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
60					
65		DOLOSTONE, microcrystalline, light brownish gray, little SANDSTONE, trace CHERT.			
70		DOLOSTONE, very fine grained, medium gray, some CHERT, tan.			
75		DOLOSTONE, very fine grained, medium gray to greenish gray, little CHERT trace GLAUCONITE.			
		DOLOSTONE, very fine grained, medium gray, trace CHERT, slower drilling.			
80		DOLOSTONE, very fine grained, medium gray, trace CHERT.			
85					
90		DOLOSTONE, very fine grained to microcrystalline, medium gray to greenish gray, little SANDSTONE, trace GLAUCONITE.			



NOTES: Roubidoux Formation Well

Well Name MW2-R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-95		DOLOSTONE, microcrystalline, mix of medium light gray and olive gray, silty.			
-100		DOLOSTONE, microcrystalline, medium gray to greenish gray, trace GLAUCONITE.			
-105		DOLOSTONE, fine grained, little SANDSTONE, light gray.	MW2R-GW01-105-040916		
		DOLOSTONE, fine grained, light and dark gray with thin banding, increasing water production.			
-110		DOLOSTONE, fine grained, light and dark gray with thin banding, and SANDSTONE, medium to fine grained, well graded, light gray.			
		DOLOSTONE, very fine grained, light gray, trace CHERT.			
-115		DOLOSTONE, very fine grained, medium gray, trace CHERT.			
-120		DOLOSTONE, very fine grained, uniform, light gray.			
		DOLOSTONE, very fine grained, uniform, light gray, little SANDSTONE.			
		DOLOSTONE, very fine grained, SANDSTONE and GRAVEL pebbles, brown, moderately cemented.			
-125		DOLOSTONE, microcrystalline, light gray, very unform.			

NOTES: Roubidoux Formation Well

Well Name MW2-R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-130					
-135		DOLOSTONE, microcrystalline, light gray, some CHERT.			
-140		DOLOSTONE, very fine grained to microcrystalline, little CHERT, trace GLAUCONITE.			
		DOLOSTONE, microcrystalline, light gray, little CHERT, few laminar bands of black in dolostone.			
-145		DOLSTONE, microcrystalline, light gray, trace CHERT.			
-150		DOLOSTONE, microcrystalline to very fine grained, light gray, little CHERT, light brownish gray.			
		DOLOSTONE, microcrystalline to very fine grained, light gray, little CHERT, light brownish gray, trace GLAUCONITE, increasing with depth.			
-155					
-160		DOLOSTONE, microcrystalline, light gray and light brownish gray, little CHERT and GLAUCONITE, slight increase in water production.	MW2R-GW01-160.0-010921		

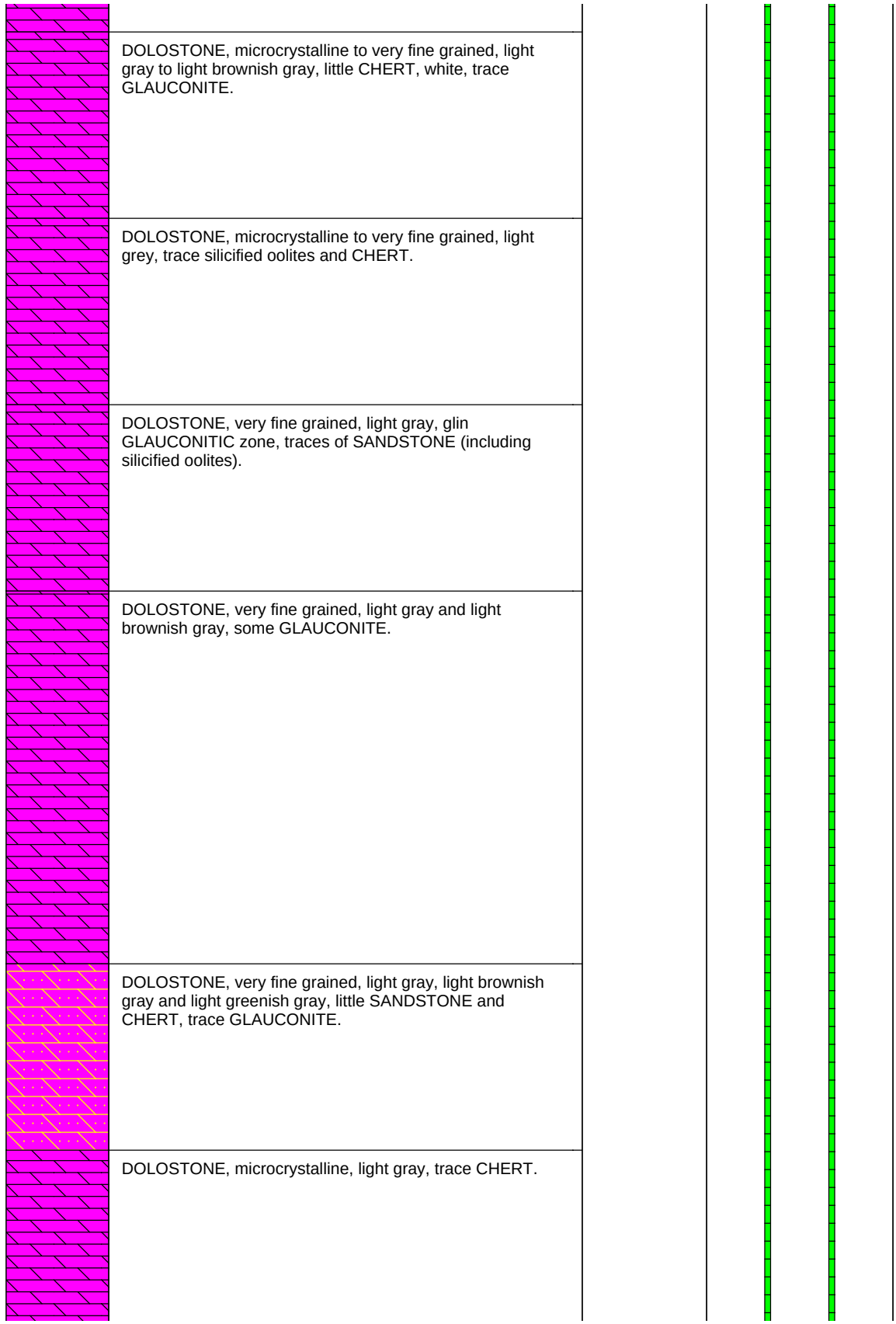
DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-165		DOLOSTONE, microcrystalline, light gray, trace GLAUCONITE.			
-170		DOLOSTONE, microcrystalline, light gray, little GLAUCONITE, trace CHERT.			
-175		DOLOSTONE, microcrystalline, light gray, trace CHERT.			
		DOLOSTONE, microcrystalline, light gray, some CHERT, light brownish gray.			
-180		DOLOSTONE, microcrystalline, light gray, greater CHERT, light brownish gray, little GLAUCONITE.			
		DOLOSTONE, microcrystalline, some SANDSTONE and CHERT.			
-185		DOLOSTONE, microcrystalline, little SANDSTONE, CHERT and GLAUCONITE, additional water production.			
-190		DOLOSTONE, microcrystalline, light gray, little GLAUCONITE, trace CHERT.			
-195		DOLOSTONE, microcrystalline, light gray, some CHERT, trace GLAUCONITE, possibly some additional water production.			

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-200		DOLOSTONE, microcrystalline, light gray, little GLAUCONITE, trace CHERT, one PYRITE grain.	MW2R-GW01-200.0-010922		
		DOLOSTONE, microcrystalline, light gray, very uniform.			
-205		DOLOSTONE, microcrystalline, light gray, trace CHERT.			
-210		DOLOSTONE, microcrystalline, light gray and light greenish gray.			
-215		DOLOSTONE, microcrystalline to very fine grained, light gray and light greenish gray, very faint lamination.			
		DOLOSTONE, microcrystalline to very fine grained, light gray, trace CHERT.			
-220		DOLOSTONE, microcrystalline to very fine grained, light gray, very uniform.			
-225		DOLOSTONE, microcrystalline to very fine grained, light gray with trace of white, microcrystalline LIMESTONE.			
-230		DOLOSTONE, microcrystalline to very fine grained, light gray, little white LIMESTONE and CHERT.			

NOTES: Roubidoux Formation Well

Well Name MW2-R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-235		DOLOSTONE, microcrystalline to very fine grained, light gray to light brownish gray, little CHERT, white, trace GLAUCONITE.			
-240		DOLOSTONE, microcrystalline to very fine grained, light grey, trace silicified oolites and CHERT.			
-245		DOLOSTONE, very fine grained, light gray, glin GLAUCONITIC zone, traces of SANDSTONE (including silicified oolites).			
-250		DOLOSTONE, very fine grained, light gray and light brownish gray, some GLAUCONITE.			
-255					
-260		DOLOSTONE, very fine grained, light gray, light brownish gray and light greenish gray, little SANDSTONE and CHERT, trace GLAUCONITE.			
-265		DOLOSTONE, microcrystalline, light gray, trace CHERT.			



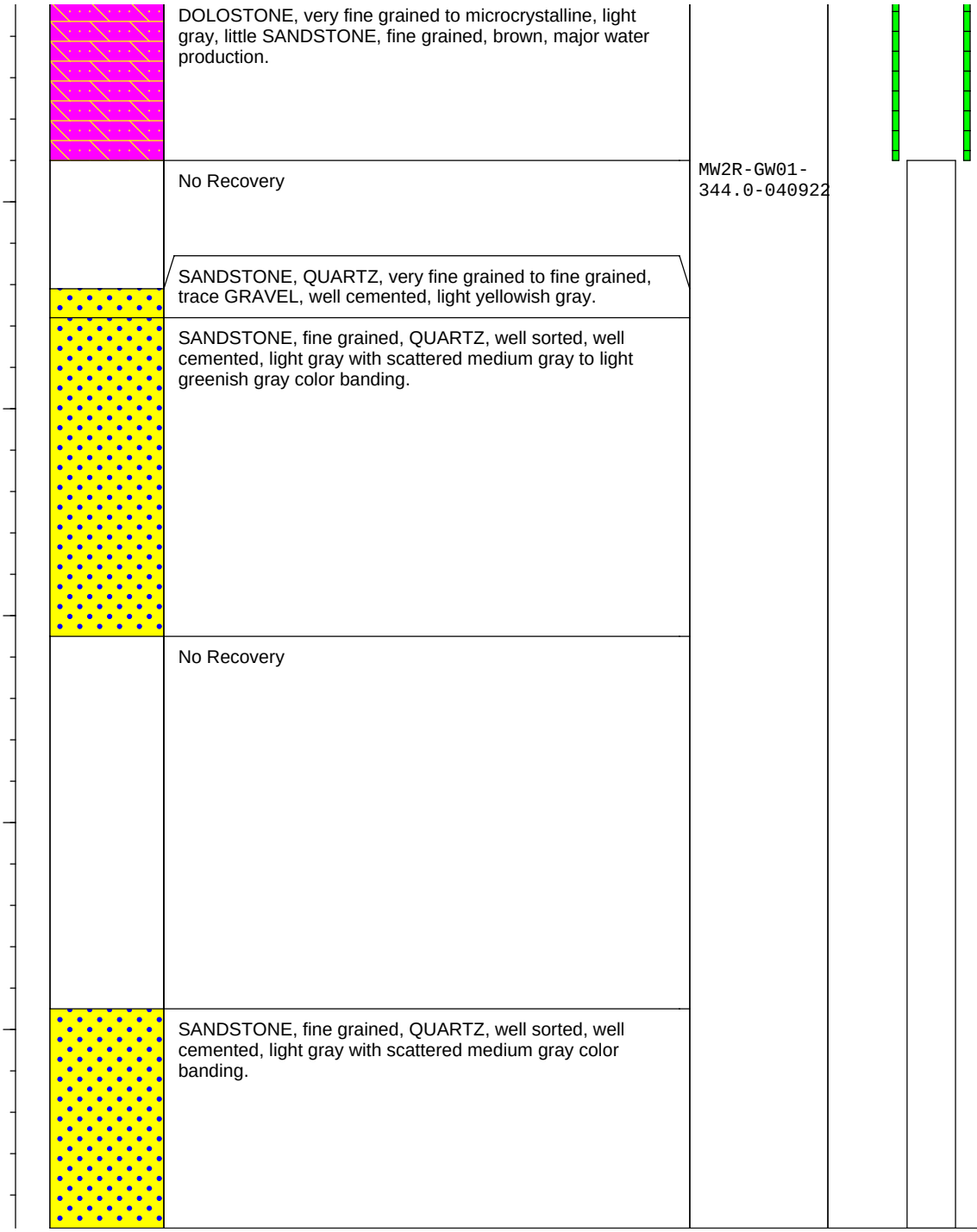
DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-270					
		DOLOSTONE, very fine grained, light gray, trace CHERT and GLAUCONITE.			
-275		DOLOSTONE, very fine grained to microcrystalline, mix of light gray and light brownish gray, trace SANDSTONE, mix of silcified oolites and QUARTZ.			
-280		DOLOSTONE, very fine grained to microcrystalline, light gray and light brownish gray.			
		DOLOSTONE, very fine grained to microcrystalline, trace SANDSTONE.			
-285		DOLOSTONE, very fine grained to microcrystalline, some GLAUCONITE, drill chattering.			
		DOLOSTONE, very fine grained to microcrystalline, little GLAUCONITE, smoother drilling.			
-290		DOLOSTONE, very fine grained to micorcrystalline, more GLAUCONITE.			
		DOLOSTONE, very fine grained to microcrystalline, medium gray, little GLAUCONITE, SANDSTONE and CHERT, light toned.			
-295					
-300		DOLOSTONE, very fine grained to microcrystalline, medium gray, some oolitic DOLOSTONE, light brownish gray, and little GLAUCONITE.			
		DOLOSTONE, very fine grained to microcrystalline, medium gray, some CHERT, brown.			

NOTES: Roubidoux Formation Well

Well Name MW2-R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-305					
		DOLOSTONE, very fine grained to microcrystalline, medium gray, little SANDSTONE, brown, increase in water production.			
-310					
		DOLOSTONE, light gray, light brownish gray and white, less SANDSTONE.			
-315					
		DOLOSTONE, very fine grained to microcrystalline, light gray, some CHERT, brown.			
-320					
		DOLOSTONE, very fine grained to microcrystalline, light gray, littlle CHERT, brown, and GLAUCONITE, trace SANDSTONE, silicified oolites, increasing with depth.			
-325					
		DOLOSTONE, very fine grained to microcrystalline, light gray, some SANDSTONE, brown.			
-330					
		SANDSTONE and DOLOSTONE			
-335					
		SANDSTONE with some DOLOSTONE.			
		SANDSTONE and DOLOSTONE.			
-340					

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
		DOLOSTONE, very fine grained to microcrystalline, light gray, little SANDSTONE, fine grained, brown, major water production.			
-345		No Recovery	MW2R-GW01-344.0-040922		
		SANDSTONE, QUARTZ, very fine grained to fine grained, trace GRAVEL, well cemented, light yellowish gray.			Open hole portion of well was drilled with NX core (approximately 3.5-inch diameter).
-350		SANDSTONE, fine grained, QUARTZ, well sorted, well cemented, light gray with scattered medium gray to light greenish gray color banding.			
-355		No Recovery			
-360					
-365		SANDSTONE, fine grained, QUARTZ, well sorted, well cemented, light gray with scattered medium gray color banding.			



PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW2-S**
TOTAL DEPTH: **20.4**

PROJECT INFORMATION

PROJECT:	**Kellwood OU6**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**440838**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Susan Fullerton**

DRILLING INFORMATION

DRILLING CO.:	**Roberts Envi. Drilling, Inc.**
DRILLER:	**Chris Heber**
RIG TYPE:	**Air Rotary**
METHOD OF DRILLING:	**Air Rotary**
DATES DRILLED:	**October 26, 2004**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		FILL, GRAVEL SILT, little SAND and CLAY, yellowish brown, moist.			Finished with flush mount completion
-5					
-10		DOLOSTONE and CHERT in SILTY CLAY.			Bentonite chips from 2 to 8.6 feet. Filter pack 8.6 feet to 20.4.
-15		DOLOSTONE, very fine grained, light yellowish brown and clear QUARTZ SANDSTONE, little CHERT.			Total depth of hole 20.4 feet, top of 2-inch PVC screen at 10.2, bottom of screen at 20.2, 0.2 foot bottom plug.
-20		DOLOSTONE, very fine grained, light gray and brownish gray, 20% CHERT.			

NOTES: Originally drilled as MW2A

Well Name MW2-S

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW2-SW**
TOTAL DEPTH: **56.3**

PROJECT INFORMATION

PROJECT:	**Kellwood OU6**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**440838**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Susan Fullerton**

DRILLING INFORMATION

DRILLING CO.:	**Roberts Envi. Drilling, Inc.**
DRILLER:	**Chris Heber**
RIG TYPE:	**Air Rotary**
METHOD OF DRILLING:	**Air Rotary**
DATES DRILLED:	**November 2, 2004**

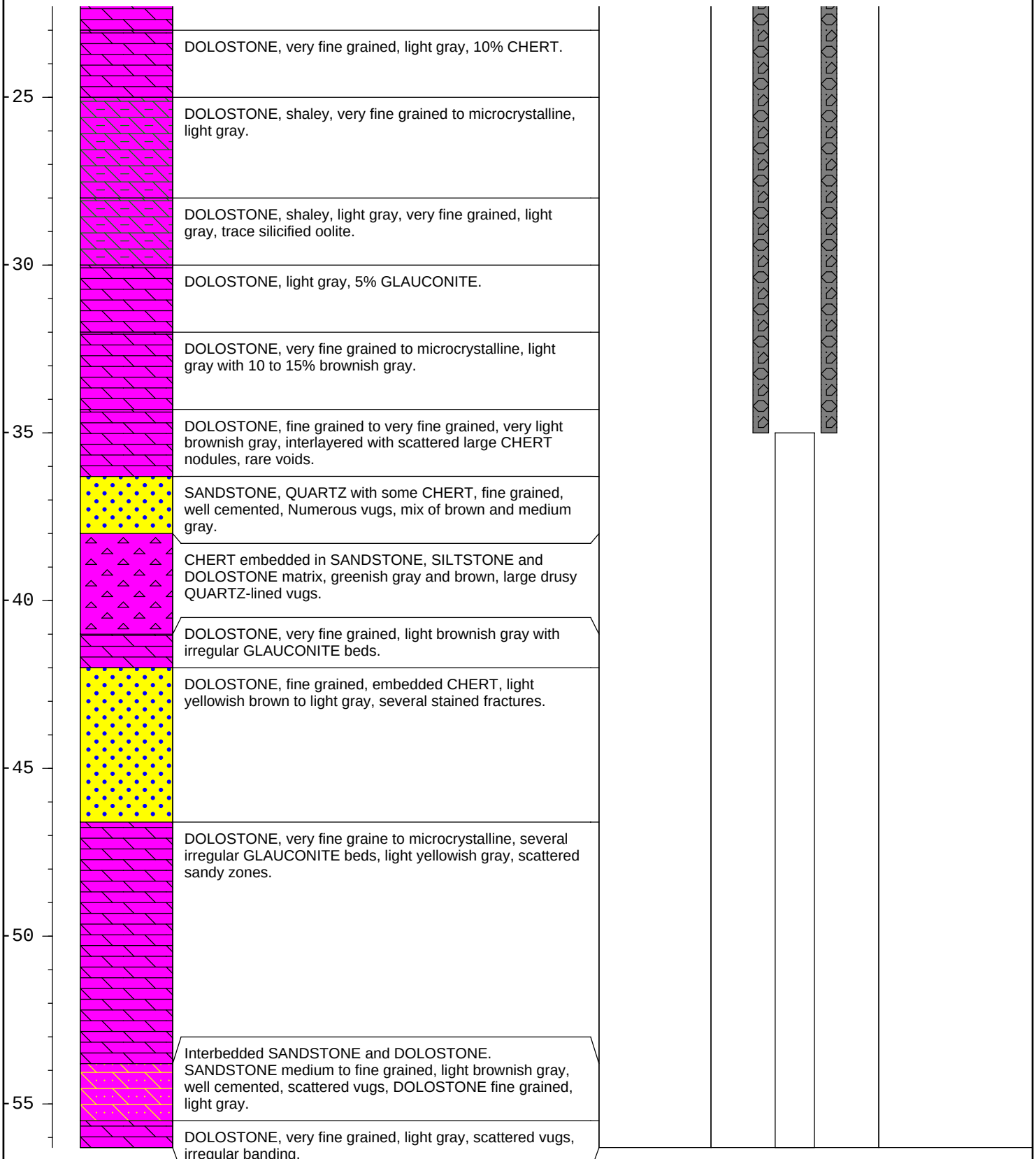
Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		FILL, GRAVEL SILT, little SAND and CLAY, yellowish brown, moist.			Finished with flush mount completion
-5					4-Inch PVC casing to 35, sealed with bentonite - cement grout. Open hole portion of well was drilled with NX core (approximately 3.5-inch diameter).
-10		DOLOSTONE and CHERT, weathered, brown.			
-15		DOLOSTONE, light gray, CHERT, brown and blue translucent, trace SANDSTONE.			
-20		DOLOSTONE, very fine grained, light gray, 20% CHERT, brown.			

NOTES: Originally drilled as MW2B

Well Name MW2-SW

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25		DOLOSTONE, very fine grained, light gray, 10% CHERT.			
		DOLOSTONE, shaley, very fine grained to microcrystalline, light gray.			
		DOLOSTONE, shaley, light gray, very fine grained, light gray, trace silicified oolite.			
30		DOLOSTONE, light gray, 5% GLAUCONITE.			
		DOLOSTONE, very fine grained to microcrystalline, light gray with 10 to 15% brownish gray.			
35		DOLOSTONE, fine grained to very fine grained, very light brownish gray, interlayered with scattered large CHERT nodules, rare voids.			
		SANDSTONE, QUARTZ with some CHERT, fine grained, well cemented, Numerous vugs, mix of brown and medium gray.			
40		CHERT embedded in SANDSTONE, SILTSTONE and DOLOSTONE matrix, greenish gray and brown, large drusy QUARTZ-lined vugs.			
		DOLOSTONE, very fine grained, light brownish gray with irregular GLAUCONITE beds.			
45		DOLOSTONE, fine grained, embedded CHERT, light yellowish brown to light gray, several stained fractures.			
50		DOLOSTONE, very fine graine to microcrystalline, several irregular GLAUCONITE beds, light yellowish gray, scattered sandy zones.			
55		Interbedded SANDSTONE and DOLOSTONE. SANDSTONE medium to fine grained, light brownish gray, well cemented, scattered vugs, DOLOSTONE fine grained, light gray.			
		DOLOSTONE, very fine grained, light gray, scattered vugs, irregular banding.			



NOTES: Originally drilled as MW2B

Well Name MW2-SW

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW2-T2**
TOTAL DEPTH: **116**

PROJECT INFORMATION

PROJECT:	**Kellwood OU6**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**440838**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Susan Fullerton**

DRILLING INFORMATION

DRILLING CO.:	**Roberts Envi. Drilling, Inc.**
DRILLER:	**Chris Heber**
RIG TYPE:	**Air Rotary**
METHOD OF DRILLING:	**Air Rotary**
DATES DRILLED:	**October 27, 2004**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		FILL, GRAVEL			Finished with flush mount completion
		SILT, some SAND and CLAY, trace GRAVEL, reddish brown.			
-5					4-Inch PVC casing to 95, sealed with bentonite-cement grout. Open hole portion of well was drilled with NX core (approximately 3.5-inch diameter).
-10		DOLOSTONE, brown, very fine grained.			
-15		SANDSTONE, very fine grained, well sorted, little DOLOSTONE.			
		SANDSTONE, very fine grained, well sorted, little CHERT and DOLOSTONE.			
-20		SANDSTONE and DOLOSTONE in equal portions, very fine grained, buff.			

NOTES: Originally drilled as MW2C

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25		DOLOSTONE, microcrystalline to very fine grained, medium gray, 5% CHERT.			
		DOLOSTONE, microcrystalline to very fine grained CHERT 5 to 10, GLAUCONITE 10%.			
30		DOLOSTONE, very fine grained to microcrystalline, light gray.			
35		DOLOSTONE, very fine grained to microcrystalline, light gray, 5% CHERT.			
		DOLOSTONE, very fine grained to microcrystalline, light gray, 5% SANDSTONE.			
40		DOLOSTONE, very fine grained to microcrystalline, light gray, 20% SANDSTONE, fine grained, well sorted, light brown.			
		DOLOSTONE, very fine grained to microcrystalline, light gray and light brownish gray, trace clear to blue CHERT.			
45		DOLOSTONE, very fine grained to microcrystalline, light gray, 30 to 40% SANDSTONE, clear, fine grained, well sorted.			
		SANDSTONE, fine grained, well sorted, clear, DOLOSTONE increasing from 10% at top of interval to 50% at bottom.			
50		DOLOSTONE, very fine grained to microcrystalline, light brownish gray, 20 to 25% SANDSTONE.			
55					

NOTES: Originally drilled as MW2C

Well Name MW2-T2

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
60		DOLOSTONE, very fine grained to microcrystalline, light brownish gray, 5% SANDSTONE, 5% GLAUCONITE.			
		DOLOSTONE, very fine grained to microcrystalline, light brownish gray to light gray.			
65		DOLOSTONE, light gray and brownish gray, and CHERT.			
		DOLOSTONE, light gray and medium gray, shaley, 10% CHERT, trace GLAUCONITE.			
70		DOLOSTONE, medium to light gray, 20% GLAUCONITE.			
75		DOLOSTONE, very fine grained to microcrystalline, medium gray and light gray.			
80		DOLOSTONE, very fine grained to microcrystalline, mix of medium and light gray.			
85		DOLOSTONE, very fine grained to microcrystalline, light gray and light brown.			
90		DOLOSTONE, shaley, light gray and light greenish gray, 20% GLAUCONITE.			

NOTES: Originally drilled as MW2C

Well Name MW2-T2

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-95		DOLOSTONE, light gray and light greenish gray, 20% GLAUCONITE.			
		No Samples			
		DOLOSTONE, very fine grained to microcrystalline, reworked with little CHERT and DOLOSTONE embedded in GLAUCONITE.			
		DOLOSTONE, very fine grained to microcrystalline, very light brownish gray, irregular laminar shaley beds, scattered CHERT, embedded in softer DOLOSTONE.			
-100					
		SHALE, calcareous, irregular lamination.			
-105		QUARTZ SANDSTONE, fine to medium grained, well sorted, moderately cemented, scattered MARCASITE, medium gray.			
		DOLOSTONE, microcrystalline to very fine grained with scattered, embedded CHERT, numerous poorly connected vugs with drusy QUARTZ, medium gray.			
-110		DOLOSTONE, very fine grained to microcrystalline, very light brownish gray, uniform.			
		DOLOSTONE, very fine grained to microcrystalline, light brownish gray, scattered irregular shaley seams (<1 mm thick), medium gray.			
-115					

NOTES: Originally drilled as MW2C

Well Name MW2-T2

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW2-T3**
TOTAL DEPTH: **196.5**

PROJECT INFORMATION

PROJECT:	**Kellwood OU6**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**440838**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Susan Fullerton**

DRILLING INFORMATION

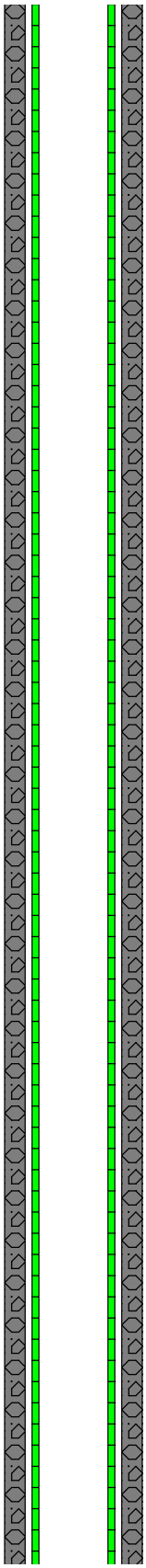
DRILLING CO.:	**Roberts Envi. Drilling, Inc.**
DRILLER:	**Chris Heber**
RIG TYPE:	**Air Rotary**
METHOD OF DRILLING:	**Air Rotary**
DATES DRILLED:	**October 21 2004**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		FILL, GRAVEL			Finished with flush mount completion
		SILT, some SAND and CLAY, trace GRAVEL, reddish brown.			
-5					8-Inch PVC outer casing to 125, sealed with bentonite-cement grout. 4-Inch PVC inner casing to 155, sealed with high solids bentonite grout. Open hole portion of well was drilled with NX core (approximately 3.5-inch diameter).
		DOLOSTONE, brown, very fine grained.			
-10					
-15		SANDSTONE, very fine grained, well sorted, little DOLOSTONE.			
		SANDSTONE, very fine grained, well sorted, little CHERT and DOLOSTONE.			
		SANDSTONE and DOLOSTONE in equal portions, very fine grained, buff.			
-20					

NOTES: Originally drilled as MW2D

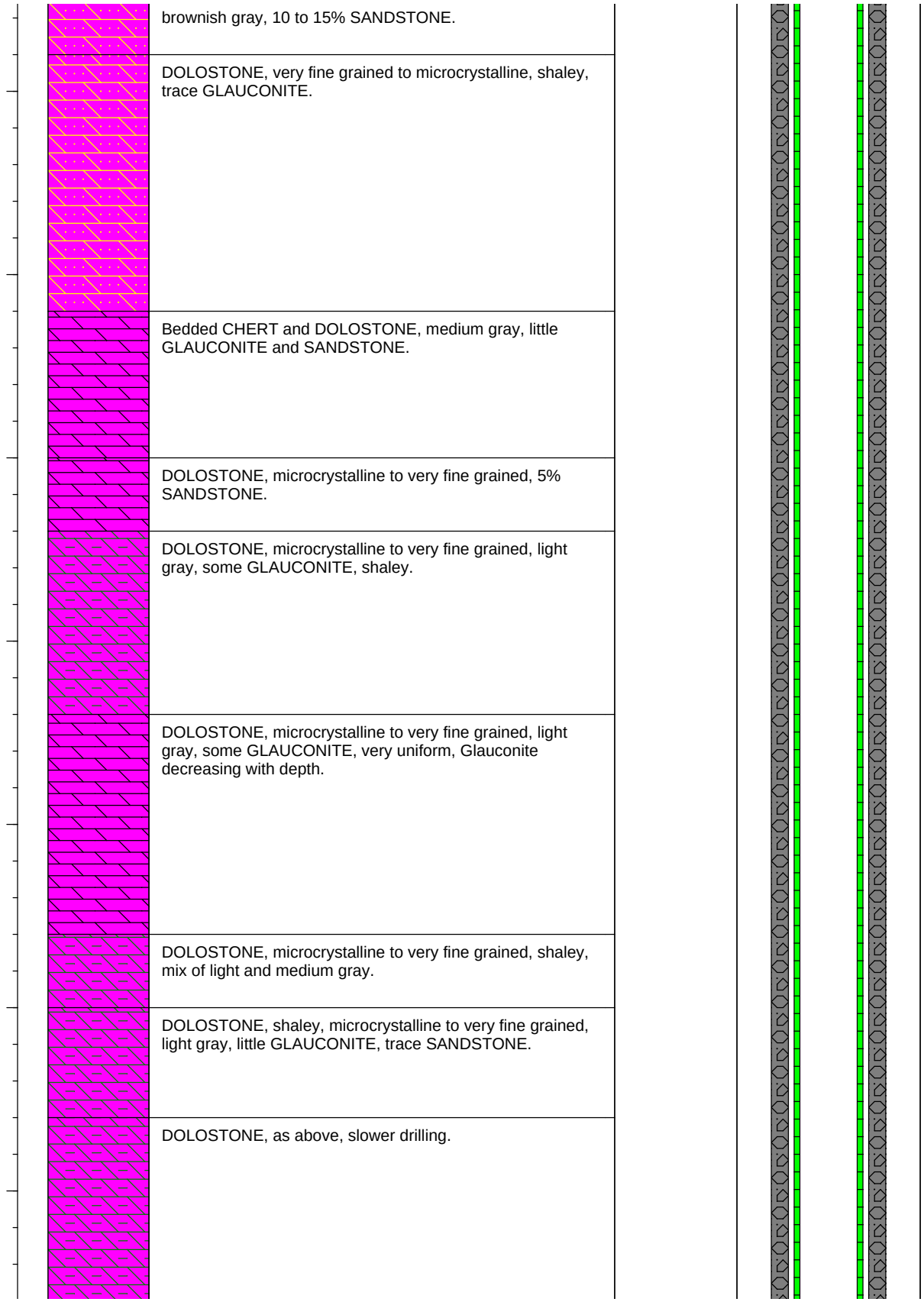
Well Name MW2-T3

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25		SANDSTONE, very fine grained, white to brown, some DOLOSTONE, microcrystalline, grayish brown, trace CHERT.			
		DOLOSTONE, microcrystalline to very fine grained, medium gray, little CHERT, brown, trace SANDSTONE, white to brown.			
		DOLOSTONE, medium gray, 10 to 15% SANDSTONE, brown, very fine grained, containing silicified oolites.			
		DOLOSTONE as above, trace SANDSTONE.			
30		DOLOSTONE as above, 20% SANDSTONE.			
		DOLOSTONE, microcrystalline to very fine grained, light gray, shaley partings, trace GLAUCONITE.			
35		DOLOSTONE as above, 10% SANDSTONE. Very slight production.			
		DOLOSTONE as above, 15 to 20% SANDSTONE, little CHERT.			
40		SANDSTONE, very fine grained, silicified oolite, some CHERT and DOLOSTONE.			
		DOLOSTONE, shaley, light brownish gray, 15 to 20% SANDSTONE, little CHERT, trace GLAUCONITE.			
45		DOLOSTONE, blocky texture, light grownish gray, 15 to 20% SANDSTONE, trace CHERT. Producing approximately 2 gpm.			
		SANDSTONE, very fine grained, trace CHERT.			
50		SANDSTONE, very fine grained, 30% DOLOSTONE, some CHERT.			
		DOLOSTONE, very fine grained to microcrystalline, 20% SANDSTONE.			
		DOLOSTONE, very fine grained to microcrystalline, light brownish gray, 10 to 15% SANDSTONE.			
55		DOLOSTONE, as above, trace SANDSTONE and CHERT.			
		DOLOSTONE, very fine grained to microcrystalline, light			

NOTES: Originally drilled as MW2D

Well Name MW2-T3

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
		brownish gray, 10 to 15% SANDSTONE.			
60		DOLOSTONE, very fine grained to microcrystalline, shaley, trace GLAUCONITE.			
65		Bedded CHERT and DOLOSTONE, medium gray, little GLAUCONITE and SANDSTONE.			
70		DOLOSTONE, microcrystalline to very fine grained, 5% SANDSTONE.			
		DOLOSTONE, microcrystalline to very fine grained, light gray, some GLAUCONITE, shaley.			
75		DOLOSTONE, microcrystalline to very fine grained, light gray, some GLAUCONITE, very uniform, Glauconite decreasing with depth.			
80		DOLOSTONE, microcrystalline to very fine grained, shaley, mix of light and medium gray.			
85		DOLOSTONE, shaley, microcrystalline to very fine grained, light gray, little GLAUCONITE, trace SANDSTONE.			
		DOLOSTONE, as above, slower drilling.			
90					



NOTES: Originally drilled as MW2D

Well Name MW2-T3

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-95		DOLOSTONE, shaley, microcrystalline to very fine grained, some GLAUCONITE, no SANDSTONE.			
		DOLOSTONE, shaley, microcrystalline to very fine grained, 10% GLAUCONITE.			
-100		DOLOSTONE, microcrystalline to very fine grained, light gray, some CHERT, little GLAUCONITE.			
		DOLOSTONE as above, 5% CHERT and GLAUCONITE.			
-105		DOLOSTONE, microcrystalline to very fine grained, shaley, light gray to light greenish gray. Flow approximately 3 gpm.			
		DOLOSTONE, very fine grained to microcrystalline, shaley, mix of light gray and olive gray.			
		SANDSTONE, very fine grained, 10% DOLOSTIONE.			
-110		DOLOSTONE, 40% SANDSTONE.			
		DOLOSTONE, microcrystalline to very fine grained, light gray, 30% CHERT, 5% SANDSTONE, one grain of iridescent MARCASITE.			
-115		DOLOSTONE, microcrystalline to very fine grained, 5% GLAUCONITE.			
		DOLOSTONE, microcrystalline to very fine grained, medium greenish gray, 5% CHERT, very uniform.			
-120		DOLOSTONE, microcrystalline to very fine grained, medium greenish gray, 5% CHERT and SANDSTONE.			
		DOLOSTONE as above, 5% CHERT.			
-125		No cuttings.			

NOTES: Originally drilled as MW2D

Well Name MW2-T3

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-130		DOLOSTONE, very fine grained to microcrystalline, light gray, 5% GLAUCONITE.			
-135					
		DOLOSTONE, very fine grained to microcrystalline, light gray, 5% CHERT, white and light brown, trace GLAUCONITE.			
-140		DOLOSTONE, very fine grained to microcrystalline, light gray, 5% GLAUCONITE.			
-145		DOLOSTONE, very fine grained to microcrystalline, light gray, 10% microcrystalline white DOLOSTONE, 5% GLAUCONITE.			
-150		DOLOSTONE, very fine grained to microcrystalline, light gray, 5% GLAUCONITE.			
		DOLOSTONE, very fine grained to microcrystalline, light gray and light brownish gray.			
		DOLOSTONE, very fine grained to microcrystalline, light gray.			
-155		DOLOSTONE, very fine grained to microcrystalline, light brownish gray with thin medium gray shaley beds (< 1mm) laminated with embedded clasts and darker bands from 156.5 to 157.0.			
		DOLOSTONE, very fine grained, fractures and thin shaley seams at 158.6, 161.0 and 162.5, reworked at 160.9			
-160					
		DOLOSTONE, very fine grained, light brownish gray,			

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-165		scattered medium gray irregular bands, shaley, scattered fractures.			
		DOLOSTONE, very fine grained, light brownish gray with medium greenish gray shaley zone, some fracturing, interspersed fragments.			
		SANDSTONE, medium-fine grained, well cemented, medium brownish gray.			
-170		DOLOSTONE, very fine grained, light brownish gray with light gray shaley banding, interspersed white LIMESTONE fragments, few CHERT nodules, fracturing and vugs from 173.5 to 174.7.			
-175		DOLOSTONE, very fine grained, scattered vugs with drusy QUARTZ.			
		DOLOSTONE, very fine grained, medium brownish gray, medium grained at 177.9			
-180		DOLOSTONE, reworked mix of very fine grained light brownish gray with coarser white fragments, scattered vugs with drusy QUARTZ.			
		SANDSTONE, medium grained, silicified oolites.			
-185		DOLOSTONE, fine to very fine grained, reworked, medium gray with white inclusions, scattered CHERT, few small vugs, scattered fractures.			
		DOLOSTONE, extensively reworked, shaley, banded and convoluted.			
-190		DOLOSTONE, very fine grained, light brownish gray, scattered shaley layers < 1mm thick.			
		DOLOSTONE, medium grained, light gray.			
		DOLOSTONE, very fine grained, light gray, thin shaley medium gray beds, interspersed CHERT and vugs at 193.0 to 194.2.			
-195		DOLOSTONE, very fine to fine grained, sandy, light to medium gray, some vertical fracturing.			
		DOLOSTONE, very fine grained with CHERT interspersed, thin shaley lamina.			

NOTES: Originally drilled as MW2D

Well Name MW2-T3

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW5-UB**
TOTAL DEPTH: **50.8'**

PROJECT INFORMATION

PROJECT:	**Remedial Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**

DRILLING INFORMATION

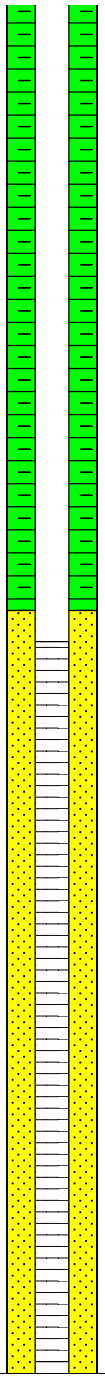
DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Speed Star**
METHOD OF DRILLING:	**Cable Tool**
DATES DRILLED:	**June 2008**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		SILT, little CLAY, soft, moist, yellowish bown and light brownish gray.			Flush mount vault completion.
		SILT, trace CLAY, soft, moist, mottled brownish yellow and grayish brown.			
-5		GRAVEL, some SILT, firm, damp, reddish yellow, gravel angular, limestone and chert.			6" Steel Casing in 10" Hole from surface to 20' bgs with bentonite grouted annulus
		SILT, some CLAY, firm, slightly plastic, damp, yellowish brown and light gray.			
		SILT, some CLAY, firm to very firm, damp, one large limestone fragment, mottled yellowish brown and light olive gray.			
-10		Weathered LIMESTONE, silt, loose, damp, mottled pale yellow and yellowish brown.			
		Cherty GRAVEL			
		DOLOSTONE, fine grained, gray, with weathered CHERT. Water coming in hole at about 12'			
-15					
-20		DOLOSTONE with LIMESTONE, fine grained to medium grained, yellowish tan to gray.			2" PVC Riser

NOTES:

Well Name MW5-UB

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25		All gray, loosing some water.			from surface. 15' screened interval at bottom. Sand pack from 34.9' bgs to TD. Bentonite grout above sand to surface.
30					
35		w/ 40% CHERT fragments.			
40		No chert, some glauconitic SHALE.			
45					
50		More glauconitic SHALE.			

NOTES:

Well Name MW5-UB

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW6-US**
TOTAL DEPTH: **73.0'**

PROJECT INFORMATION

PROJECT:	**Kellwood RI**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Speed Star, Mobile**
METHOD OF DRILLING:	**Air Rotary, Core**
DATES DRILLED:	**September 2008**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		Silt some clay, moist, mod soft, slightly plastic, light olive brown and light brownish gray. Scattered concretions at 3', less moist.			8-inch steel starter pipe set to 15 feet
-5		Silt little clay and sand, damp to moist, mod soft, yellowish brown and light brownish gray			
		Silt, some clay, mod soft, larger concretions (to 1/4"), damp to moist, brownish yellow and light brownish gray			4-inch PVC casing set to 24.8 feet, Portland cement seal at bottom with remaining annulus grouted with bentonite /Portland cement slurry
		Silt, some clay, moist, mod firm, highly mottled, large areas of Mn staining, light browinsh gray, brownish yellow, and dark grayish brown			
-10		Silt with fractured angular limestone, yellowish brown, dry			
		DOLOSTONE, very fine grained, weathered, few dendrites, brownish yellow.			
-15					Open hole 24.8 to 73.0 feet cut with HX core bit
		DOLOSTONE, fine to very fine grained, weathered, few dendrites, yellowish brown.			
-20					
		DOLOSTONE, very fine to fine grained, slightly weathered, light brownish gray.			

NOTES:

Well Name MW6-US

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
		DOLOSTONE, very fine grained, clayey, light greenish gray.			
		SANDSTONE, cemented quartz, light yellowish brown, little DOLOSTONE, very fine grained, light greenish gray.			
25		DOLOSTONE, very fine grained, soft sediment deformation, vug with drusy quartz at 25.4, mix of light yellowish brown and very light brown.			97% core recovery RQD 86%
		DOLOSTONE, very fine grained, very light brown and light yellowish brown, thin wavy SHALE beds to 1/8-inch thick, light green.			
30		DOLOSTONE, medium to fine grained, interformational CONGLOMERATE, yellowish brown and light grayish brown, slight weathering, vugs.			
		DOLOSTONE, very fine to fine grained, light brownish gray to light yellowish brown, laminar shaley interval, 30.6 to 30.8 feet, scattered wavy glauconitic shaley beds to 1/8-inch, abundant fractures.			
35		DOLOSTONE, fine grained, light gray to very pale brown, scattered thin wavy shaley seams, abundant horizontal fractures.			96% core recovery RQD 64%
		DOLOSTONE, fine grained, weathered at fractures, light gray and light brownish gray.			
40		DOLOSTONE, fine to very fine grained, local soft sediment deformation, very pale brown to light gray, scattered thin glauconitic shaley seams, abundant fractures.			
45		DOLOSTONE, fine grained, light gray, inclined and horizontal fractures, CHERT nodule at 45.1, abundant fractures.			core recovery 99% RQD 39%
		DOLOSTONE, medium grained, some CHERT, some glauconitic SHALE, vugs, vertical fractures with slight weathering, light gray, very pale brown.			
		DOLOSTONE, fine to medium grained, light gray.			
50		DOLOSTONE, fine grained, localized weathering, some soft sediment deformation, small vugs, some vertical fractures, abundant fractures.			
		DOLOSTONE and CHERT, mediuim grained, vugs, light gray.			
		DOLOSTONE, fine grained, light yellowish brown.			
		SANDSTONE, CHERT, and DOLOSTONE, medium grained, white to light yellowish brown.			
55		DOLOSTONE, fine grained, vugs, vertical and horizontal fractures, very pale brown.			99% core recovery RQD 47%
		DOLOSTONE, fine to medium grained, very pale brown, long, tight vertical fractures, minor vugs, abundant fractures.			

NOTES:

Well Name MW6-US

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
60		DOLOSTONE, very fine to fine grained, clayey, CHERT bed at top of interval, pale yellow, abundant fractures.			
		Interbedded DOLOSTONE and SANDSTONE, trace GLAUCONITE in sandstone, wavy bedding, white to yellow, abundant fractures.			
		DOLOSTONE, very fine grained, small vugs and both tight and open fractures.			
		DOLOSTONE, interformational CONGLOMERATE, very fine grained, white, light yellowish brown and gray.			100% core recovery RQD 33%
65		Interbedded DOLOSTONE, very fine to fine grained, light yellowish brown, and SANDSTONE, fine grained, gray, flat bedding, both open and tight fractures, trace GLAUCONITE lining fractures.			
		SANDSTONE, very fine to fine grained, gray, horizontal bedding, some vugs, numerous fractures.			
70		Interbedded DOLOSTONE, fine grained, light yellowish brown, and SANDSTONE, very fine grained, horizontal, thight bedding, yellowish brown, numerous fractures.			
		DOLOSTONE, very fine grained, light yellowish brown.			
		DOLOSTONE, medium grained, light yellowish brown to yellowish brown, vuggy, calcite filled vertical fracture from 71.83 to 72.5.			

NOTES:

Well Name MW6-US

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW6-SW**
TOTAL DEPTH: **141'**

PROJECT INFORMATION

PROJECT:	**Kellwood RI**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday / Lucas White**
PROJECT MANAGER:	**Peter Gelman**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Speed Star, Mobile**
METHOD OF DRILLING:	**Air Rotary, Core**
DATES DRILLED:	**September, 2008**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		Silt some clay, moist, mod soft, slightly plastic, light olive brown and light brownish gray. Scattered concretions at 3', less moist.			8-inch steel starter pipe set to 27 feet
-5		Silt little clay and sand, damp to moist, mod soft, yellowish brown and light brownish gray			
		Silt, some clay, mod soft, larger concretions (to 1/4"), damp to moist, brownish yellow and light brownish gray			4-inch PVC casing set to 125.0 feet, Portland cement seal at bottom with remaining annulus grouted with bentonite / Portland cement slurry
		Silt, some clay, moist, mod firm, highly mottled, large areas of Mn staining, light browinsh gray, brownish yellow, and dark grayish brown			
-10		Silt with fractured angular limestone, yellowish brown, dry			
		DOLOSTONE, very fine grained, weathered, few dendrites, brownish yellow.			
-15					
		DOLOSTONE, fine to very fine grained, weathered, few dendrites, yellowish brown.			Open hole 125.0 to 141.0 feet cut with HX core bit
-20					
		DOLOSTONE, very fine to fine grained, slightly weathered, light brownish gray.			

NOTES:

Well Name MW6-SW

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25		DOLOSTONE, very fine grained, clayey, light greenish gray.			
		SANDSTONE, cemented quartz, lighty yellowish brown, little DOLOSTONE, very fine grained, light greenish gray.			
		DOLOSTONE, fine to very fine grained, light brownish gray, little glauconitic SHALE.			
30					
35		DOLOSTONE, fine grained, slightly weathered, light yellowish brown to light brownish gray, trace CHERT and glauconitic DOLOSTONE.			
40					
45		DOLOSTONE, fine grained, very pale brown.			
		DOLOSTONE, fine grained, very pale brown, silicified oolites and glauconitic DOLOSTONE, very fine to coarse grained, light bluish gray.			
50		DOLOSTONE, fine grained, very pale brown.			
		DOLOSTONE, fine grained, very pale brown, SANDSTONE, medium grained, well cemented, dark yellowish brown, and CHERT, very pale bluish gray.			
55		DOLOSTONE, medium to fine grained, very pale brown, trace SANDSTONE and CHERT.			

NOTES:

Well Name MW6-SW

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
60		DOLOSTONE, fine grained, light gray, trace glauconitic SHALE.			
		DOLOSTONE, fine to medium grained, light gray and yellowish brown, little SANDSTONE, medium to fine grained, well sorted, light gray, trace CHERT.			
65		DOLOSTONE, fine grained, light gray and yellowish brown.			
		SANDSTONE, fine grained, well sorted, well cemented, light gray.			
70		DOLOSTONE, fine grained, very pale brown to brownish yellow.			
75		DOLOSTONE, fine grained, light gray to yellowish brown, trace glauconitic SHALE.			
80		DOLOSTONE, fine grained, brownish yellow to very pale brown, trace silicified oolites.			
		DOLOSTONE, medium to fine grained, pale olive to brownish yellow, slightly glauconitic.			
85		DOLOSTONE, medium grained, very pale brown, trace SANDSTONE, light gray, fine grained, well sorted.			
		DOLOSTONE and SANDSTONE, medium grained, light gray to very pale brown, sandstone well cemented, well sorted.			
		DOLOSTONE, fine to medium grained, light brownish gray to very light gray.			
90					

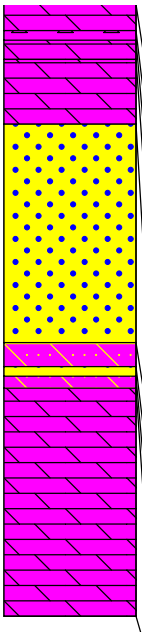
NOTES:

Well Name MW6-SW

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-95		DOLOSTONE, fine grained, white to very pale brown, trace glauconitic SHALE.			
-100		DOLOSTONE, fine grained, very pale brown, and SANDSTONE, fine grained, well cemented, white to light gray.			
		SANDSTONE, fine grained, well sorted, well cemented, light gray.			
		DOLOSTONE, fine grained, light gray, slightly shaley.			
-105		DOLOSTONE, fine to medium grained, locally glauconitic, light gray to light olive gray, trace CHERT and glauconitic SHALE.			
-110		DOLOSTONE, fine to medium grained, light gray to light olive gray.			
		DOLOSTONE, medium to fine grained, glauconitic, light olive to light gray.			
		DOLOSTIONE, medium to fine grained, gray, slightly shaley.			
-115		DOLOSTONE, medium grained, light gray, some SANDSTONE, medium grained, well cemented, light gray.			
-120		DOLOSTONE, fine grained, glauconitic, light grayish green and light gray.			
-125		DOLOSTONE, medium to fine grained, few vugs, some interformational CONGLOMERATE, slightly weathered, light gray to light yellowish brown.			100% core recovery
		DOLOSTONE, fine to medium grained, light gray and light yellowish brown along incipient fractures, locally glauconitic, vertical microfractures.			RQD 50%

NOTES:

Well Name MW6-SW

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-130		DOLOSTONE and glauconitic SHALE, fine to coarse grained, dendrites, soft sediment deformation. DOLOSTONE, fine grained, light gray and very pale brown. CHERT, coarse grained, white, trace pyrite. DOLOSTONE, fine grained, light gray. DOLOSTONE, fine grained, light yellowish brown, scattered chert nodules, very thin glauconitic SHALE seams, abundant fractures.			94% core recovery RQD 66%
-135		SANDSTONE, fine grained, well cemented, slight cross bedding, light gray, numerous fractures, shaley seam at 134.6. DOLOSTONE, medium grained, sandy, dendrites, yellow. SANDSTONE, fine grained, well cemented, light gray. DOLOSTONE, sandy, glauconite lens.			
-140		DOLOSTONE, fine grained, mottled, soft sediment deformation, scattered very thin convolute clay seams, dendrites, light gray to very pale brown, abundant fractures.			

NOTES:

Well Name MW6-SW

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW6-R**
TOTAL DEPTH: **450.83'**

PROJECT INFORMATION

PROJECT:	**Kellwood RI**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**

DRILLING INFORMATION

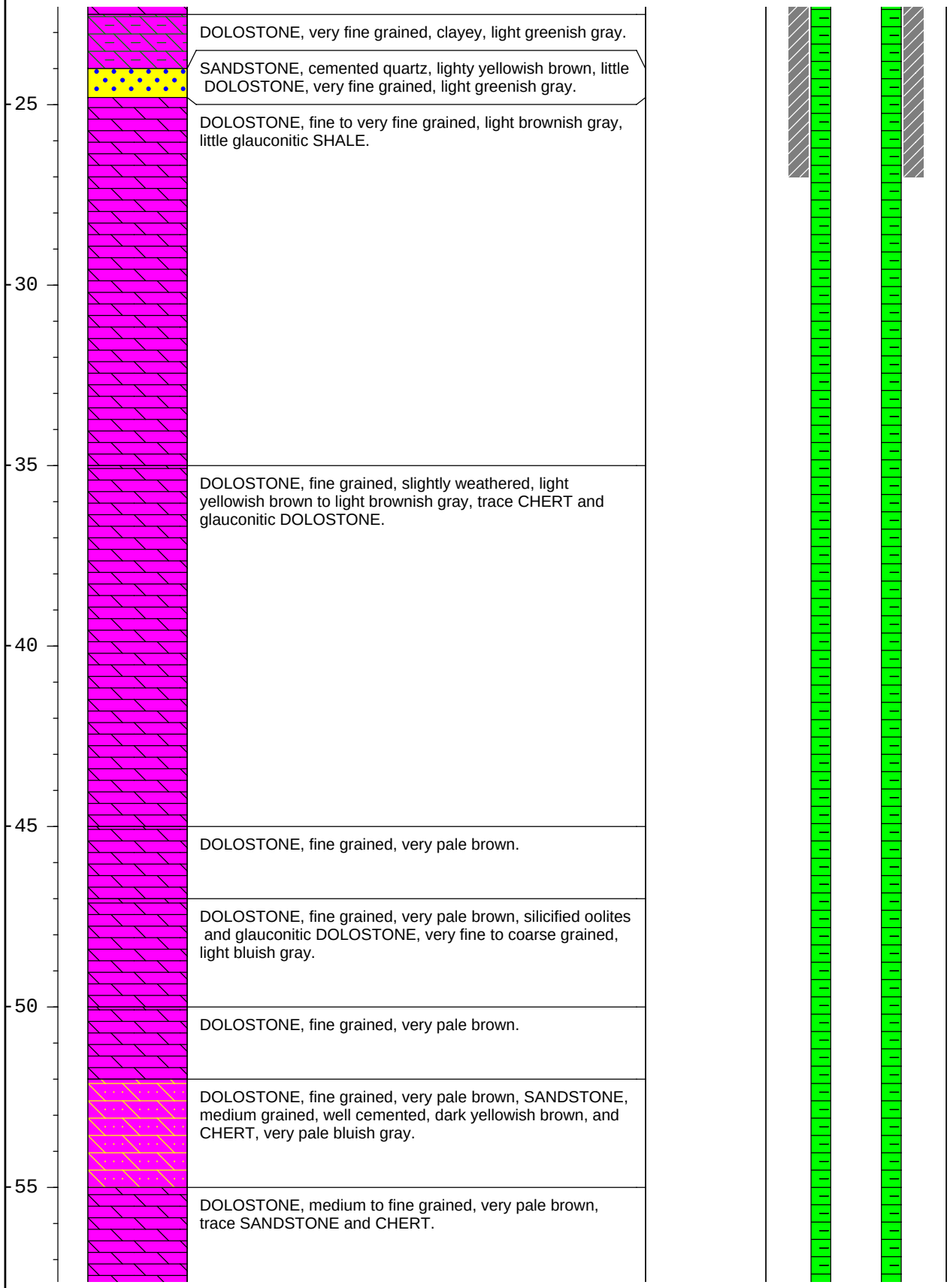
DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Speed Start, Mobile**
METHOD OF DRILLING:	**Air Rotary, NX Core**
DATES DRILLED:	**October 2008**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		Silt some clay, moist, mod soft, slightly plastic, light olive brown and light brownish gray. Scattered concretions at 3', less moist.			8-inch steel starter pipe set to 27 feet in cement
-5		Silt little clay and sand, damp to moist, mod soft, yellowish brown and light brownish gray			
		Silt, some clay, mod soft, larger concretions (to 1/4"), damp to moist, brownish yellow and light brownish gray			4-inch PVC casing set to 393 feet, Portland cement seat at bottom with remaining annulus grouted with bentonite / Portland cement slurry
		Silt, some clay, moist, mod firm, highly mottled, large areas of Mn staining, light browinsh gray, brownish yellow, and dark grayish brown			
-10		Silt with fractured angular limestone, yellowish brown, dry			
		DOLOSTONE, very fine grained, weathered, few dendrites, brownish yellow			
-15					
		DOLOSTONE, fine to very fine grained, weathered, few dendrites, yellowish brown.			Open hole 393 feet to bottom of hole
-20					
		DOLOSTONE, very fine to fine grained, slightly weathered, light brownish gray.			

NOTES:

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS



DOLOSTONE, very fine grained, clayey, light greenish gray.

SANDSTONE, cemented quartz, lighty yellowish brown, little DOLOSTONE, very fine grained, light greenish gray.

DOLOSTONE, fine to very fine grained, light brownish gray, little glauconitic SHALE.

DOLOSTONE, fine grained, slightly weathered, light yellowish brown to light brownish gray, trace CHERT and glauconitic DOLOSTONE.

DOLOSTONE, fine grained, very pale brown.

DOLOSTONE, fine grained, very pale brown, silicified oolites and glauconitic DOLOSTONE, very fine to coarse grained, light bluish gray.

DOLOSTONE, fine grained, very pale brown.

DOLOSTONE, fine grained, very pale brown, SANDSTONE, medium grained, well cemented, dark yellowish brown, and CHERT, very pale bluish gray.

DOLOSTONE, medium to fine grained, very pale brown, trace SANDSTONE and CHERT.

NOTES:

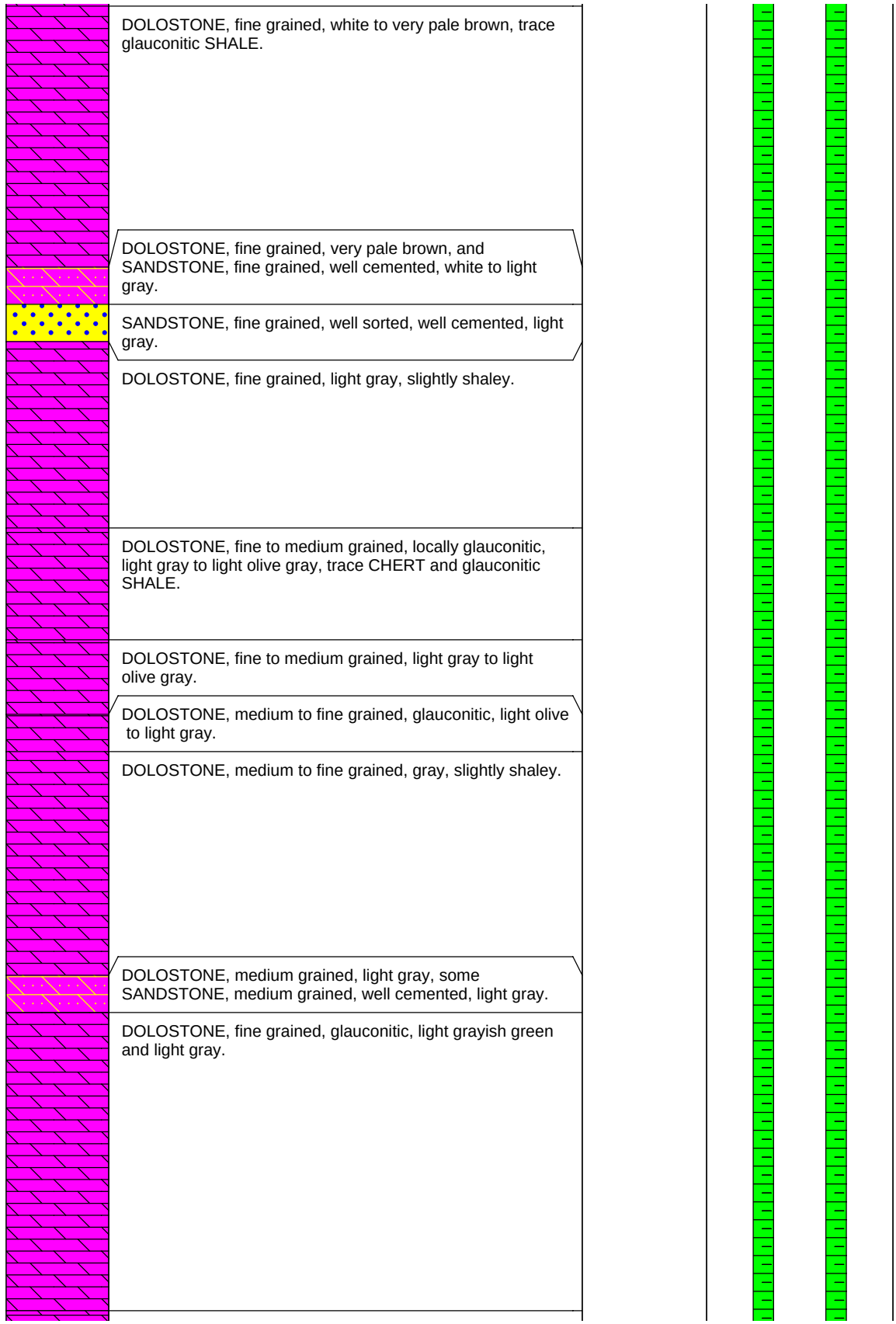
Well Name MW6-R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
60		DOLOSTONE, fine grained, light gray, trace glauconitic SHALE.			
		DOLOSTONE, fine to medium grained, light gray and yellowish brown, little SANDSTONE, medium to fine grained, well sorted, light gray, trace CHERT			
65		DOLOSTONE, fine grained, light gray and yellowish brown.			
		SANDSTONE, fine grained, well sorted, well cemented, light gray.			
70		DOLOSTONE, fine grained, very pale brown to brownish yellow.			
75		DOLOSTONE, fine grained, light gray to yellowish brown, trace glauconitic SHALE.			
80		DOLOSTONE, fine grained, brownish yellow to very pale brown, trace silicified oolites.			
		DOLOSTONE, medium to fine grained, pale olive to brownish yellow, slightly glauconitic.			
85		DOLOSTONE, medium grained, very pale brown, trace SANDSTONE, fine grained, light gray, well sorted.			
		DOLOSTONE and SANDSTONE, medium grained, light gray to very pale brown, sandstone well cemented, well sorted.			
		DOLOSTONE, fine to medium grained, light brownish gray to very light gray.			
90					

NOTES:

Well Name MW6-R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS



DOLOSTONE, fine grained, white to very pale brown, trace glauconitic SHALE.

DOLOSTONE, fine grained, very pale brown, and SANDSTONE, fine grained, well cemented, white to light gray.

SANDSTONE, fine grained, well sorted, well cemented, light gray.

DOLOSTONE, fine grained, light gray, slightly shaley.

DOLOSTONE, fine to medium grained, locally glauconitic, light gray to light olive gray, trace CHERT and glauconitic SHALE.

DOLOSTONE, fine to medium grained, light gray to light olive gray.

DOLOSTONE, medium to fine grained, glauconitic, light olive to light gray.

DOLOSTONE, medium to fine grained, gray, slightly shaley.

DOLOSTONE, medium grained, light gray, some SANDSTONE, medium grained, well cemented, light gray.

DOLOSTONE, fine grained, glauconitic, light grayish green and light gray.

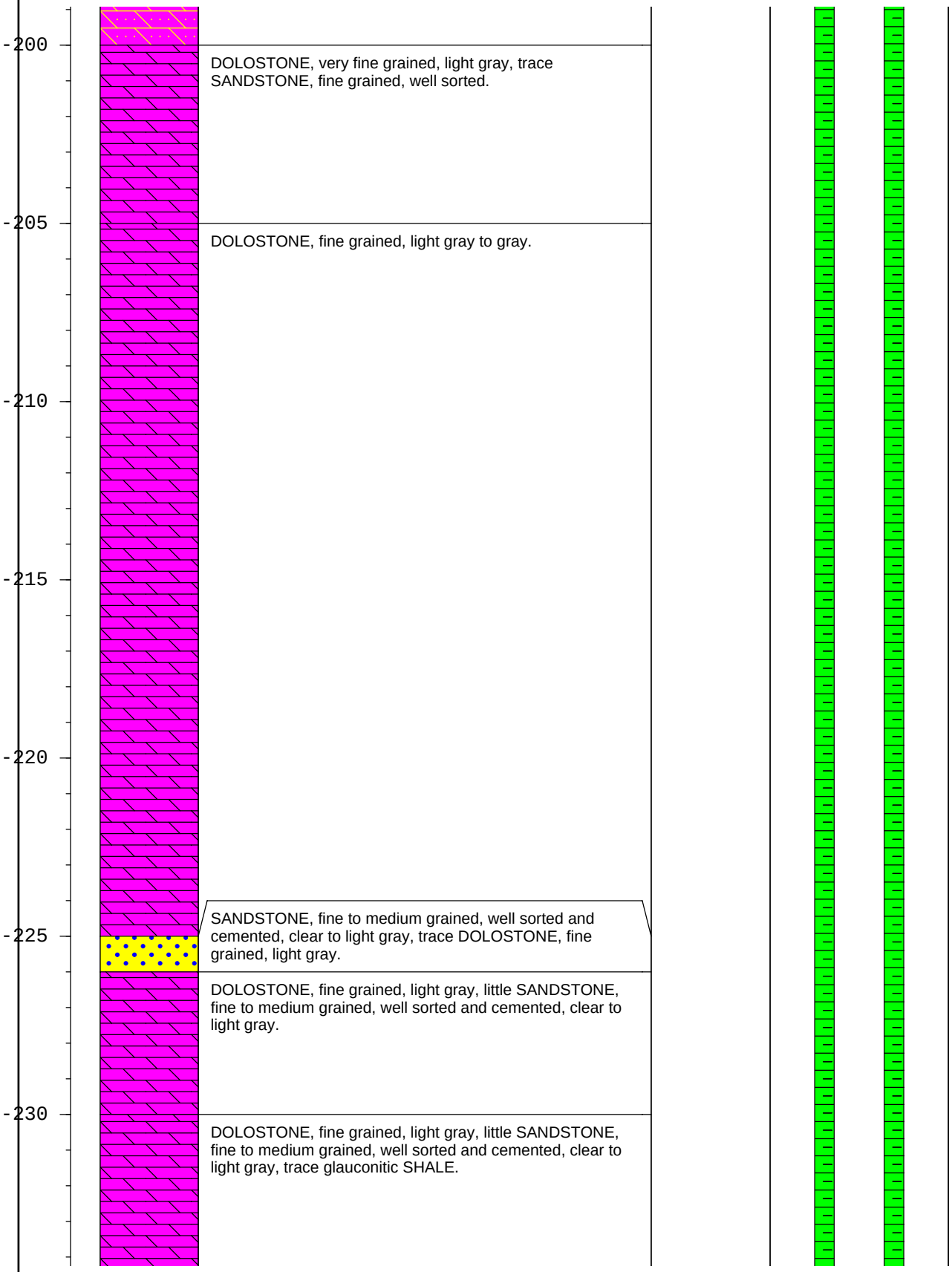
NOTES:

Well Name MW6-R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-130		DOLOSTONE, fine grained, light gray.			
		SANDSTONE, fine grained, well cemented, light gray.			
-135		DOLOSTONE, fine grained, light gray to very pale brown.			
-140		DOLOSTONE, very fine grained, light brownish gray.			
-145		DOLOSTONE, very fine grained, light brownish gray, some SANDSTONE, well graded, well cemented, light brownish gray and very pale brown.			
-150		DOLOSTONE, fine grained, light brownish gray, little CHERT, white and brownish yellow.			
-155		DOLOSTONE, very fine grained, brownish yellow, little SANDSTONE, fine grained, well sorted and cemented, very pale grown, trace glauconitic SHALE.			
		DOLOSTONE, fine grained, light gray.			
-160		DOLOSTONE, fine grained, light gray, little SANDSTONE, fine grained, well sorted and cemented, light gray to clear.			Driller reports water gain
		DOLOSTONE, fine grained, light gray to light brownish gray, trace glauconite.			

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-165		DOLOSTONE, very fine to fine grained, light gray to gray.			
-170		DOLOSTONE, fine grained, light gray to gray, trace CHERT.			
-175		DOLOSTONE, fine grained, light gray, trace GLAUCONITE.			
-180		DOLOSTONE, fine grained, suggarry, light gray.			
		DOLOSTONE, fine grained, gray, slightly shaley.			
-185		DOLOSTONE, fine grained, light gray, little CHERT, clear.			
		DOLOSTONE, fine grained, light gray, some SANDSTONE, fine grained, well sorted and cemented, and CHERT, clear, trace silicified oolite.			
-190		DOLOSTONE, medium grained, suggary, light gray.			
-195		DOLOSTONE, fine grained, light gray, some SANDSTONE, fine grained, well sorted and cemented.			

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS



DOLOSTONE, very fine grained, light gray, trace SANDSTONE, fine grained, well sorted.

DOLOSTONE, fine grained, light gray to gray.

SANDSTONE, fine to medium grained, well sorted and cemented, clear to light gray, trace DOLOSTONE, fine grained, light gray.

DOLOSTONE, fine grained, light gray, little SANDSTONE, fine to medium grained, well sorted and cemented, clear to light gray.

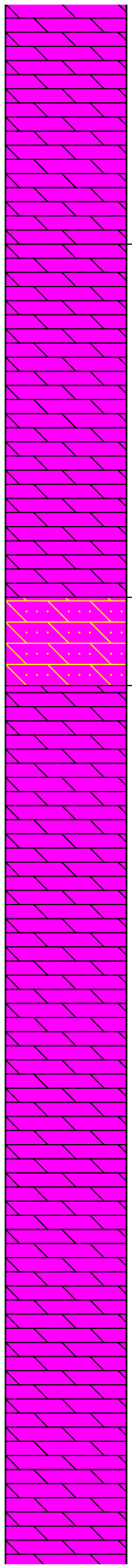
DOLOSTONE, fine grained, light gray, little SANDSTONE, fine to medium grained, well sorted and cemented, clear to light gray, trace glauconitic SHALE.

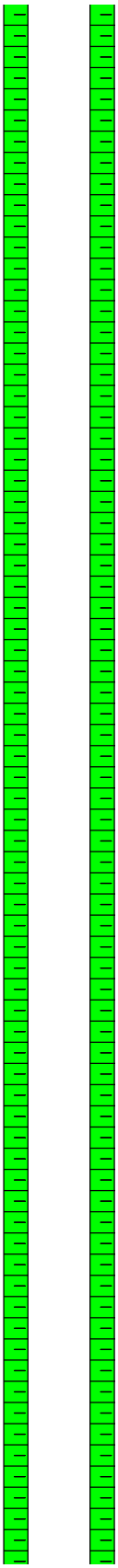
NOTES:

Well Name MW6-R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-235		DOLOSTONE, fine to very fine grained, gray to light gray.			
		DOLOSTONE, fine gained, gray to light gray, trace CHERT and silicified oolites.			
-240					
-245		DOLOSTONE, fine to very fine grained, light gray, little CHERT.			
-250		DOLOSTONE, fine to very fine grained, light gray.			
-255		DOLOSTONE, fine grained, gray, slightly shaley.			
-260		DOLOSTONE, fine grained, gray to light gray.			
-265		DOLOSTONE, fine to medium grained, light gray to light brownish gray, trace silicified oolites.			

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-270					
-275		DOLOSTONE, medium to fine grained, light brownish gray to light gray.			Making approximately 5 to 10 gpm
-280					
		DOLOSTONE, medium to fine grained, light gray, some SANDSTONE, fine grained, well sorted and cemented, trace silicified oolites.			
-285		DOLOSTONE, fine to very fine grained, light gray, trace silicified oolites.			
-290					
-295					
-300					Making approximately 10 to 15 gpm

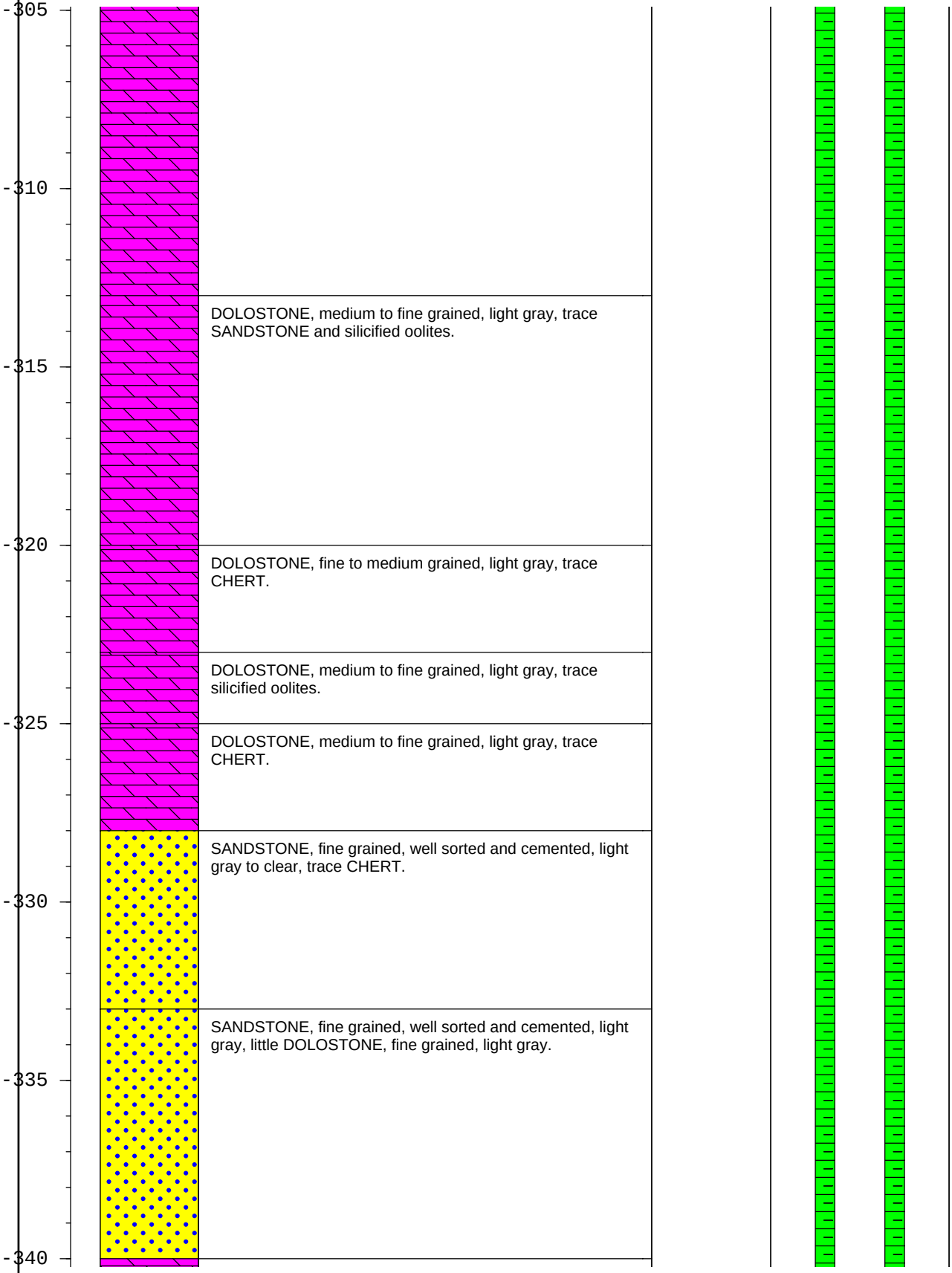




NOTES:

Well Name MW6-R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS



DOLOSTONE, medium to fine grained, light gray, trace SANDSTONE and silicified oolites.

DOLOSTONE, fine to medium grained, light gray, trace CHERT.

DOLOSTONE, medium to fine grained, light gray, trace silicified oolites.

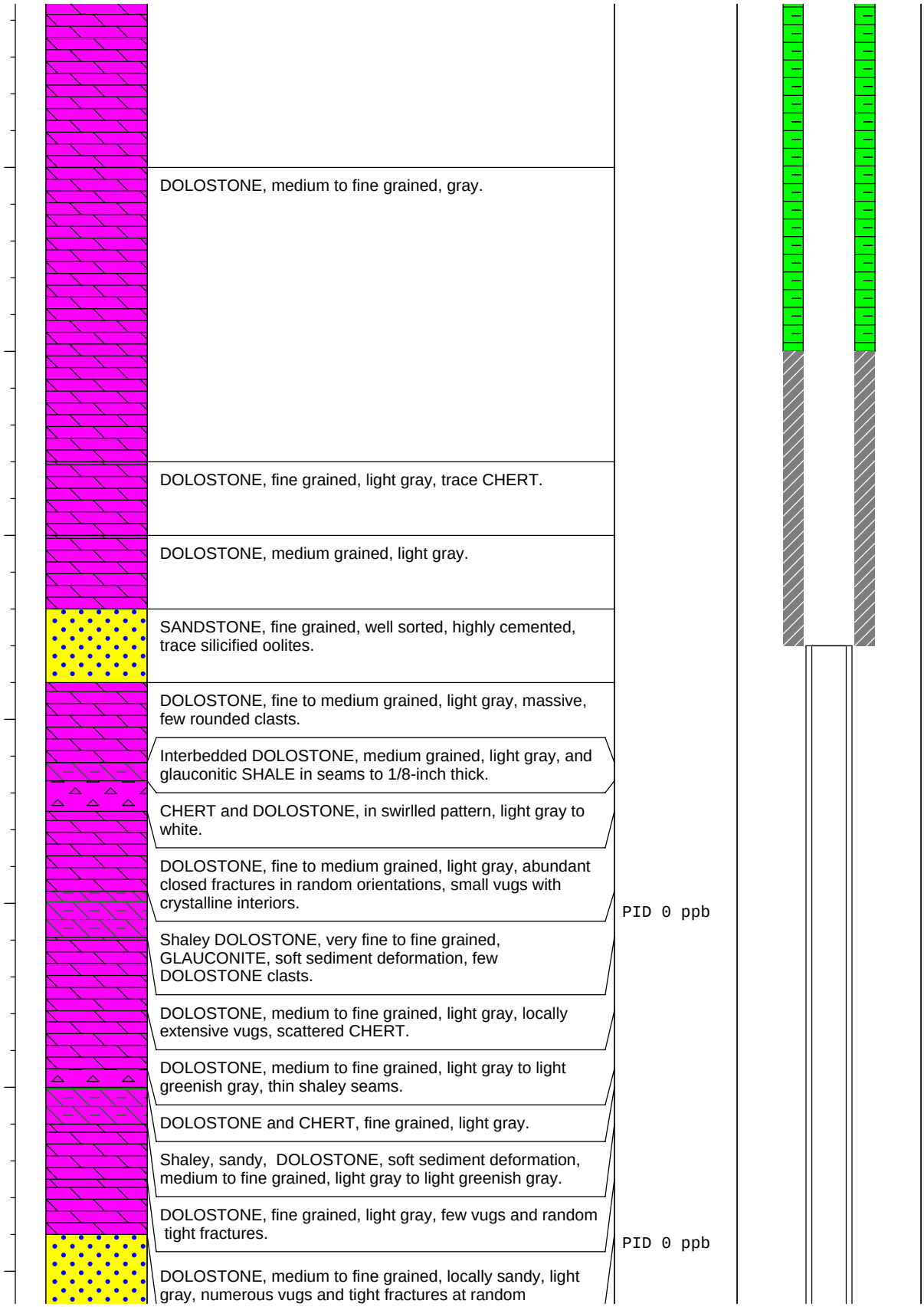
DOLOSTONE, medium to fine grained, light gray, trace CHERT.

SANDSTONE, fine grained, well sorted and cemented, light gray to clear, trace CHERT.

SANDSTONE, fine grained, well sorted and cemented, light gray, little DOLOSTONE, fine grained, light gray.

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-345		DOLOSTONE and glauconitic DOLOSTONE, fine grained, light gray.			Making approximately 15 to 20 gpm
		DOLOSTONE, medium to fine grained, light gray, trace CHERT.			
-350		DOLOSTONE, medium to fine grained, light gray, little SANDSTONE, fine grained, well sorted and cemented.			
-355		DOLOSTONE, medium grained, light gray, trace silicified oolites.			
-360		DOLOSTONE, medium grained, light gray, little SANDSTONE, fine grained, well sorted and cemented.			
-365					
-370					
-375					

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-380		DOLOSTONE, medium to fine grained, gray.			
-385		DOLOSTONE, fine grained, light gray, trace CHERT.			
-390		DOLOSTONE, medium grained, light gray.			
		SANDSTONE, fine grained, well sorted, highly cemented, trace silicified oolites.			
-395		DOLOSTONE, fine to medium grained, light gray, massive, few rounded clasts.			100% recovery
		Interbedded DOLOSTONE, medium grained, light gray, and glauconitic SHALE in seams to 1/8-inch thick.			
		CHERT and DOLOSTONE, in swirlled pattern, light gray to white.			RQD 92%
-400		DOLOSTONE, fine to medium grained, light gray, abundant closed fractures in random orientations, small vugs with crystalline interiors.	PID 0 ppb		94% Recovery
		Shaley DOLOSTONE, very fine to fine grained, GLAUCONITE, soft sediment deformation, few DOLOSTONE clasts.			RQD 69%
		DOLOSTONE, medium to fine grained, light gray, locally extensive vugs, scattered CHERT.			
-405		DOLOSTONE, medium to fine grained, light gray to light greenish gray, thin shaley seams.			
		DOLOSTONE and CHERT, fine grained, light gray.			
		Shaley, sandy, DOLOSTONE, soft sediment deformation, medium to fine grained, light gray to light greenish gray.			
		DOLOSTONE, fine grained, light gray, few vugs and random tight fractures.	PID 0 ppb		
-410		DOLOSTONE, medium to fine grained, locally sandy, light gray, numerous vugs and tight fractures at random			



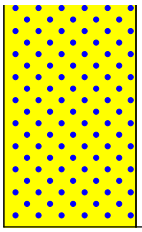
NOTES:

Well Name MW6-R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
		orientations.			98% Recovery
		SANDSTONE, scattered glaconitic SHALE seams, light greenish gray, moderately to poorly cemented, fine to medium grained.			RQD 62%
		DOLOSTONE, fine to medium grained, light gray, scattered vugs.			
-415		DOLOSTONE, sandy, medium grained, light gray to light greenish gray.			
		SANDSTONE, shaley, medium to fine grained, loosly to moderately cemented, sandy SHALE seams to 1/2-inch thick, inclined, light greenish gray to light gray.			
		DOLOSTONE and CHERT, dolostone coarse grained, gray, chert in large nodule with vertical contact.	PID 0ppb		
-420		DOLOSTONE, fine to very fine grained, very light gray, numerous vertical fractures, mostly tight, but some with gaps.			98% Recovery
		CHERT and DOLOSTONE, weathered, dolostone medium grained, crumbly, very light gray.			RQD 64%
		DOLOSTONE, fine grained, scattered CHERT, thin shaley seams, convolute contacts, light gray.			
-425		DOLOSTONE, medium to fine grained, light gray, scattered shaley seams, vugs.			
		SANDSTONE, scattered glauconitic SHALE seams, light greenish gray, moderately to poorly cemented, fine to medium grained.			
		DOLOSTONE and CHERT, medium to coarse grained, light gray, crumbly.	PID 0 ppb		
-430		DOLOSTONE, medium grained, sandy, thin SHALE seam, light gray, vugs.			100% Recovery
		Sandy DOLOSTONE, medium grained, with CHERT nodules, light brown, scattered fractures.			RQD 68%
		DOLOSTONE, fine to medium grained, light yellowish brown.			
-435		SANDSTONE, fine to medium grained, moderately well cemented, well sorted, very light gray.			
		SANDSTONE, fine grained, well sorted, moderately well cemented, slightly inclined bedding, light gray, scattered thin beds of glauconitic sand.			
			PID 0 ppb		
-440					98% Recovery
		SANDSTONE, fine to medium grained, moderately well cemented, well sorted, very light gray.			RQD 85%
-445					

NOTES:

Well Name MW6-R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-450			PID 0 ppb		

NOTES:

Well Name MW6-R

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW7-US**
TOTAL DEPTH: **25.99'**

PROJECT INFORMATION

PROJECT:	**Kellwood RI**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**

DRILLING INFORMATION

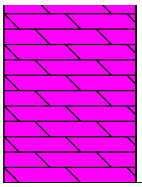
DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Speed Star & GeoProbe**
METHOD OF DRILLING:	**Cable Tool & Direct Push Probe**
DATES DRILLED:	**November 2008**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		SILT, little CLAY, crumbly, damp, grading downward to moist, grayish brown.	240 ppb		Flush Mount surface completion
-5		SAND and GRAVEL, with some SILT, little CLAY, sandstone fragements, well graded, cemented, clean, fine to medium grained, moist.	425 ppb 580 ppb		6" Steel Casing in 10" hole surface to 15'
		SILT and CLAY, yellowish brown, wet.	390 ppb		
		DOLOSTONE, weathered, very fine grained to fine grained, very pale brown to white.			
-10					Bentonite Seal surface to 15'
-15		SANDSTONE, fine to medium grained, weathered, poorly sorted, moderately cemented, clear to brownish yellow.			
					6" Open Hole 15' to TD
-20		DOLOSTONE and SANDSTONE, slightly weathered. Dolostone-fine grained, light brownish gray to very pale brown. Sandstone- fine grained, well graded, light brown.	2200 ppb		

NOTES: Contamination detected

Well Name MW7-US

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25			MW7US-GW01-024.5-081112 135 ppb		

NOTES: Contamination detected

Well Name MW7-US

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW7-SW**
TOTAL DEPTH: **94'**

PROJECT INFORMATION

PROJECT:	**Kellwood RI**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Speed Start & GeoProbe**
METHOD OF DRILLING:	**Cable Tool & Direct Push Probe**
DATES DRILLED:	**November - December 2008**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		SILT, little CLAY, crumbly, damp, grading downward to moist, grayish brown.	240 ppb		Flush Mount surface completion
-5		SAND and GRAVEL, with some SILT, little CLAY, sandstone fragements, well graded, cemented, clean, fine to medium grained, moist.	425 ppb 580 ppb		0-41.33' 8" Steel Casing in 12" Hole
		SILT and CLAY, yellowish brown, wet.	390 ppb		
		DOLOSTONE, weathered, very fine grained to fine grained, very pale brown to white.			
-10					Bentonite Seal from surface to 24' for 8" casing
-15		SANDSTONE, fine to medium grained, weathered, poorly sorted, moderately cemented, clear to brownish yellow.			
-20		DOLOSTONE and SANDSTONE, slightly weathered. Dolostone-fine grained, light brownish gray to very pale brown. Sandstone- fine grained, well graded, light brown.	2200 ppb		

NOTES: Contamination detected

Well Name MW7-SW

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25		DOLOSTONE, fine grained, weathered, trace CHERT, yellowish brown.	MW7US-GW01-024.5-081112 135 ppb		
30		DOLOSTONE, fine grained, slightly weathered, light yellowish brown to light brownish gray.			Cement Seal from 24' to 41.33' for 8" casing
35		DOLOSTONE, medium to very fine grained, trace silicified oolites, trace CHERT, light gray to light yellowish brown.			
40		DOLOSTONE, medium to fine grained, slightly weathered, trace CHERT, few dendrites, light brownish gray to light yellowish brown.			
45		DOLOSTONE, fine grained, light gray to light brownish gray.			41.33-75.42' 8" Hole
50		DOLOSTONE, fine to very fine grained, light gray.			0-75.42' 5" Galvanized Steel Casing, w/ Cement Seal to surface
55		DOLOSTONE, fine to very fine grained, light gray with little light yellowish brown, little CHERT, white.			

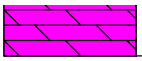
NOTES: Contamination detected

Well Name MW7-SW

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
60					
		DOLOSTONE, very fine grained, gray to very slightly greenish gray, very uniform.			
65					
		DOLOSTONE, very fine grained, trace GLAUCONITE, very light gray.			
70					
75		DOLOSTONE, very fine grained, light gray to light brownish gray			
80		DOLOSTONE, very fine grained, light brownish gray, little SANDSTONE fine grained, clear, trace CHERT, white			
85		SANDSTONE, quartz, fine grained, well sorted, light yellowish brown, very fine grained in the bottom 2.5 feet			
90		DOLOSTONE, very fine grained, light grayish brown, some fine grained sand, well sorted			

NOTES: Contamination detected

Well Name MW7-SW

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
					

NOTES: Contamination detected

Well Name MW7-SW

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW8-US**
TOTAL DEPTH: **95'**

PROJECT INFORMATION

PROJECT:	**Kellwood RI**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Speed Start**
METHOD OF DRILLING:	**Cable Tool**
DATES DRILLED:	**January 2009**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		SILT, little SAND and CLAY, firm, damp, mottled yellowish brown to light gray.			Flush Mount surface completion
			2'-34 ppb		0-4' 100% recovery
			4'-4 ppb		10" Hole from surface to 24'
-5					
		GRAVEL and SILT, little CLAY. Silt is firm, damp, reddish brown. Gravel is broken dolostone, angular to 1".	6'-17 ppb		4-8' 100% recovery
			8'-13 ppb		
-10		CLAY, some SILT, moist, firm, slightly plastic, blocky texture, mottled reddish to yellowish brown with scattered black partings.	10'-40 ppb		8-12' 100% recovery
			12'-0 ppb		
		SILT, little GRAVEL. Silt is yellow, damp, moderately soft,. Gravel is weathered dolostone, approximately 1/2".			
		CLAY and SILT, stiff, damp, yellowish brown with scattered manganese stains.	14'-17 ppb		12-16' 100% recovery
-15					
			16'-18 ppb		
		CLAY and GRAVEL, some SILT. Very stiff clay and silt, yellowish brown, damp, gravel is weathered dolostone, angular, buff.	17.5'-24 ppb		16-19.5' 100% recovery
			19'-16 ppb		
-20		Weathered DOLOSTONE, SILT and CLAY, yellow, moist, no free water.	19.6'-31 ppb		
		DOLOSTONE, little CHERT, fine grained, weathered, light yellowish brown.			

NOTES:

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25		DOLOSTONE, some CHERT and SHALE, weathered, dolostone is fine grained, light brownish gray. Chert is yellowish brown. Shale is glauconitic, grayish green.			6" Hole from 24' to 95'
		Shaley DOLOSTONE, glauconitic, grayish green and yellowish brown, little CHERT.			
30		DOLOSTONE, some shaley glauconitic, little CHERT and SANDSTONE. Dolostone is fine grained, grayish green and light gray. Chert is yellowish brown, SS is fine grained, fully cemented, clear.			
35		DOLOSTONE, fine grained, some shaley, glauconitic, light gray and grayish green, some CHERT and silicified oolites, trace SANDSTONE fine grained, fully cemented, clear.			
40		DOLOSTONE, fined grained, some shaley and glauconitic, little CHERT, silicified oolites, trace SANDSTONE, very pale brown and grayish green.			
45		DOLOSTONE, very fine grained, very pale brown, trace CHERT, reddish brown and shaley, glauconitic dolostone.			
50		DOLOSTONE, fine grained to very fine grained, very pale brown to light gray.			
55		DOLOSTONE, very fine grained, very pale brown, little silicified oolite, light yellowish brown.			

NOTES:

Well Name MW8-US

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
60		as above, with trace CHERT.			
65		DOLOSTONE, very fine grained, light gray to very pale brown, little CHERT, brownish yellow to reddish brown.			
70		DOLOSTONE, fine grained to medium grained, very pale brown, some suggary, some to little CHERT, brownish yellow.			Bentonite Seal from surface to 79.3'
75		DOLOSTONE, medium grained to fine grained, very pale brown, some slightly glauconitic, greenish gray, trace CHERT, reddish brown.			2" PVC Riser from surface to 85'
80		DOLOSTONE, fine grained, slightly weathered, some CHERT and SANDSTONE, silicified dolostone light yellowish brown, chert and SS are white to clear.			
85		SANDSTONE, fine grained, well sorted, very pale brown, traces CHERT, white.			2" PVC Screen 85' to 95'
90		SANDSTONE, fine grained, well sorted, very pale brown and DOLOSTONE, fine grained, light gray to very pale brown,			Sand Pack from 79.3' to 95'

NOTES:

Well Name MW8-US

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
95		slightly shaley.			

NOTES:

Well Name MW8-US

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW9-US**
TOTAL DEPTH: **57.4'**

PROJECT INFORMATION

PROJECT:	**Kellwood RI**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Speed Start**
METHOD OF DRILLING:	**Cable Tool**
DATES DRILLED:	**July 2008**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		SILT and CLAY, some GRAVEL overburden.			
		DOLOSTONE, very fine grained, weathered, light gray to light brownish gray, scattered dendrites.			
-5		DOLOSTONE, fine to very fine grained, light gray with scattered light brownish gray.			8-inch steel starter pipe set in bentonite to 8 feet
		DOLOSTONE, very fine to fine grained, trace SANDSTONE and SHALE, light gray and light brownish gray.	MW9US-DW-008 ND		
-10		DOLOSTONE, very fine grained, light gray to light yellowish brown, some weathering rind, trace CHERT.			2-inch PVC screen and riser, screen interval 42.2 to 57.2 feet
-15		DOLOSTONE, very fine grained, light gray to light yellowish brown, trace glauconitic SHALE.	MW9US-DW-016 ND		
-20		DOLOSTONE, fine to very fine grained, light gray, trace glauconitic SHALE	MW9US-DW-019 ND		
			MW9US-DW-022		

NOTES: Contamination detected

Well Name MW9-US

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25		DOLOSTONE, very fine grained, light gray, trace light brownish gray.	ND		
		DOLOSTONE, very fine grained, light gray.	MW9US-DW-025 ND		
			MW9US-DW-028 ND		
30		DOLOSTONE, very fine grained, light gray, some SANDSTONE, little CHERT and glauconitic SHALE. Driller reports drilling change at 35 feet.	MW9US-DW-031 ND		
35		DOLOSTONE and SANDSTONE, very fine grianed, light gray and light brownish gray. Producing some water.	MW9US-DW-036 ND		
		DOLOSTONE, little SANDSTONE, very fine grained, light brownish gray, trace glauconitic SHALE.	MW9US-DW-038.5 ND		
40		DOLOSTONE and SANDSTONE, very fine grained, light brownish gray.	MW9US-DW-041 ND		Sand Pack 39 feet to bottom of hole with bentonite seal above to surface
		SANDSTONE, very fine grained, quartz-rich, well sorted, light yellowish brown.	MW9US-DW-046 0.7ppb		
45		SANDSTONE, very fine grained, quartz rich, well sorted, light yellowish brown, some DOLOSTONE, very fine grained.	MW9US-DW-048.5 0.8 ppb		
50		DOLOSTONE, very fine grained, light yellowish brown, little SANDSTONE, trace CHERT.	MW9US-DW-051 1.4 ppb		
		DOLOSTONE, very fine grained, light yellowish brown, little silicified oolites, trace SANDSTONE.	MW9US-DW-053.5 1.4 ppb		
55			MW9US-DW-056 1.1 ppb		

NOTES: Contamination detected

Well Name MW9-US

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW9-SW**
TOTAL DEPTH: **125.0'**

PROJECT INFORMATION

PROJECT:	**Kellwood RI**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday / Lucas White**
PROJECT MANAGER:	**Mark Raybuck**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Speed Star, Mobile**
METHOD OF DRILLING:	**Cable Tool, Core**
DATES DRILLED:	**September 2008**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		SILT and Clay, some GRAVEL overburden.			
		DOLOSTONE, very fine grained, weathered, light gray to light brownish gray, scattered dendrites.			
-5		DOLOSTONE, fine to very fine grained, light gray with scattered light brownish gray.			LS to 66.3 feet has 8-inch steel casing pressure grouted with Portland cement
		DOLOSTONE, very fine to fine grained, trace SANDSTONE and SHALE, light gray and light brownish gray.			
-10		DOLOSTONE, very fine grained, light gray to light yellowish brown, some weathering rind, trace CHERT.			LS to 100.5 feet has 4-inch PVC casing tremie grouted with Portland cement
-15		DOLOSTONE, very fine grained, light gray to light yellowish brown, trace glauconitic SHALE.			Open hole from 100.5 to 125.0 cored using an HX bit
-20		DOLOSTONE, fine to very fine grained, light gray, trace glauconitic SHALE			

NOTES: Contamination detected

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
		DOLOSTONE, very fine grained, light gray, trace light brownish gray.			
25		DOLOSTONE, very fine grained, light gray.			
30		DOLOSTONE, very fine grained, light gray, some SANDSTONE, little CHERT and glauconitic SHALE. Driller reports drilling change at 35 feet.			
35		DOLOSTONE and SANDSTONE, very fine grianed, light gray and light brownish gray. Producing some water.			
		DOLOSTONE, little SANDSTONE, very fine grained, light brownish gray, trace glauconitic SHALE.			
40		DOLOSTONE and SANDSTONE, very fine grained, light brownish gray.			
		SANDSTONE, very fine grained, quartz-rich, well graded, light yellowish brown.			
45		SANDSTONE, very fine grained, quartz rich, well graded, light yellowish brown, some DOLOSTONE, very fine grained.			
50		DOLOSTONE, very fine grained, light yellowish brown, little SANDSTONE, trace CHERT.			Driller reports making lots of water
		DOLOSTONE, very fine grained, light yellowish brown, little silicified oolites, trace SANDSTONE.			
55		DOLOSTONE, very fine grained, little SANDSTONE and CHERT, tan to yellowish brown.			

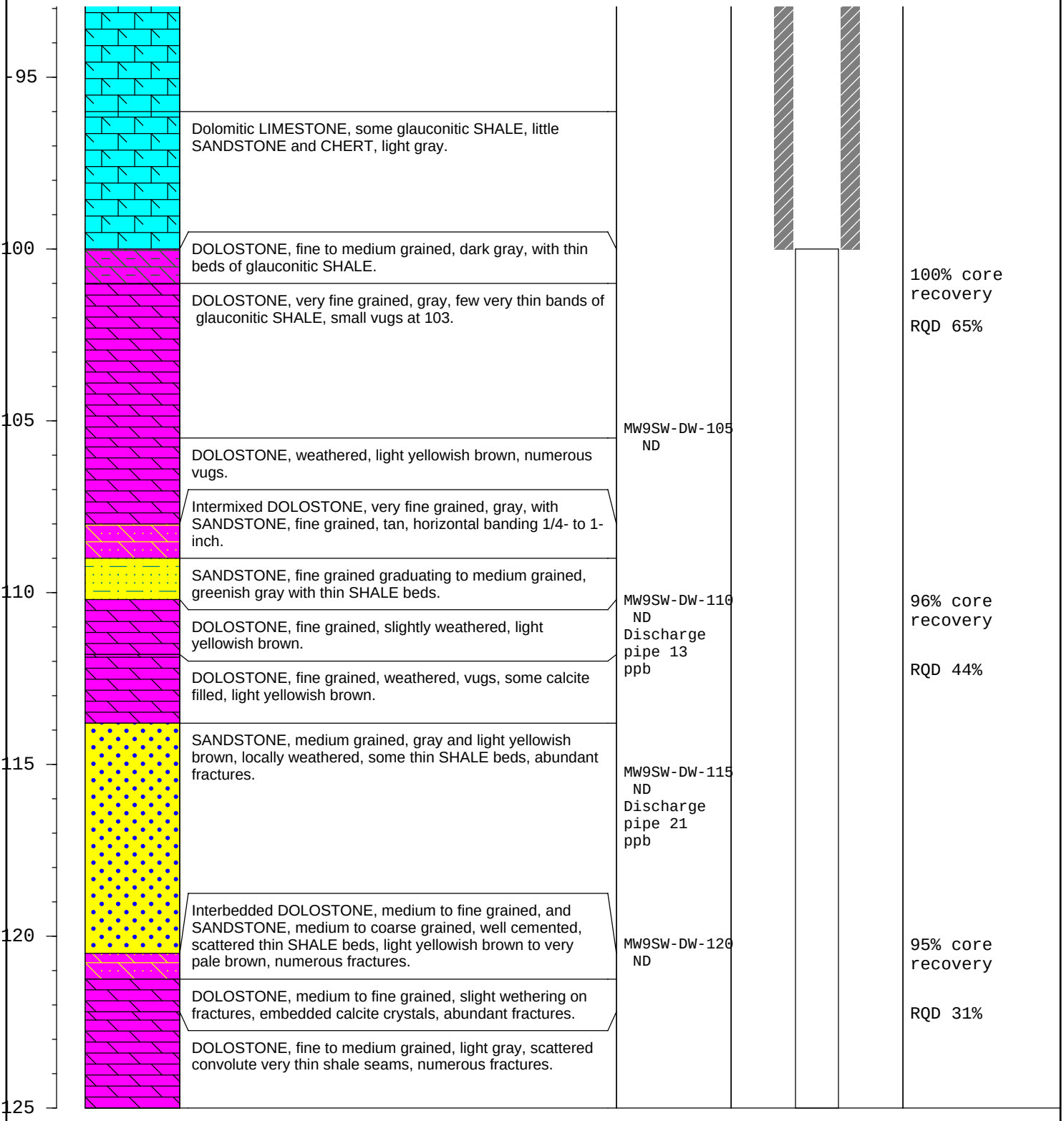
NOTES: Contamination detected

Well Name MW9-SW

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
60					
		DOLOSTONE, very fine grained, little CHERT, light gray to tan.			
65					
		DOLOSTONE and SANDSTONE, silicified oolites, medium grained, trace CHERT, light brownish gray.			
70					
		DOLOSTONE, little LIMESTONE, trace SANDSTONE, medium to fine grained, light brownish gray.			
75					
		DOLOSTONE, little SANDSTONE, trace glauconitic SHALE. Sandstone is moderately cemented, well graded quartz. Dolostone is fine to medium grained, light gray.			
80					
		DOLOSTONE, fine to medium grained, trace silicified oolite, light gray.			
85					
		DOLOSTONE, very fine to medium grained, light gray, trace silicified oolite.			
90					
		Dolomitic LIMESTONE, very fine to fine grained, light gray.			

NOTES: Contamination detected

Well Name MW9-SW



NOTES: Contamination detected

Well Name MW9-SW

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW9R**
TOTAL DEPTH: **421.2'**

PROJECT INFORMATION

PROJECT:	**Kellwood RI**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday/Lucas White**
PROJECT MANAGER:	**Mark Raybuck**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Speed Star, Mobile**
METHOD OF DRILLING:	**Air Rotary, Core**
DATES DRILLED:	**10/10/08-4/13/09**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		SILT and Clay, some GRAVEL overburden.			
		DOLOSTONE, weathered, very fine grained, light gray to light brownish gray, scattered dendrites.			
-5		DOLOSTONE, fine to very fine grained, light gray with scattered light brownish gray.			12-inch steel starter pipe cemented to 8 feet
		DOLOSTONE, very fine to fine grained, trace SANDSTONE and SHALE, light gray and light brownish gray.			
-10		DOLOSTONE, very fine grained, light gray to light yellowish brown, some weathering rind, trace CHERT.			8-inch steel outer casing cemented to 139.2 feet
-15		DOLOSTONE, very fine grained, light gray to light yellowish brown, trace glauconitic SHALE.			3-inch galvanized steel casing cemented to 372.7 feet
-20		DOLOSTONE, fine to very fine grained, light gray, trace glauconitic SHALE			

NOTES:

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
		DOLOSTONE, very fine grained, light gray, trace light brownish gray.			
25		DOLOSTONE, very fine grained, light gray.			
30		DOLOSTONE, very fine grained, light gray, some SANDSTONE, little CHERT and glauconitic SHALE. Driller reports drilling change at 35 feet.			
35		DOLOSTONE and SANDSTONE, very fine grianed, light gray and light brownish gray. Producing some water.			
		DOLOSTONE, little SANDSTONE, very fine grained, light brownish gray, trace glauconitic SHALE.			
40		DOLOSTONE and SANDSTONE, very fine grained, light brownish gray.			
		SANDSTONE, very fine grained, quartz-rich, well graded, light yellowish brown.			
45		SANDSTONE, very fine grained, quartz rich, well graded, light yellowish brown, some DOLOSTONE, very fine grained.			
50		DOLOSTONE, very fine grained, light yellowish brown, little SANDSTONE, trace CHERT.			
		DOLOSTONE, very fine grained, light yellowish brown, little silicified oolites, trace SANDSTONE.			
55		DOLOSTONE, very fine grained, little SANDSTONE and CHERT, tan to yellowish brown.			

NOTES:

Well Name MW9R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
60					
		DOLOSTONE, very fine grained, little CHERT, light gray to tan.			
65					
		DOLOSTONE and SANDSTONE, silicified oolites, medium grained, trace CHERT, light brownish gray.			
70					
		DOLOSTONE, little LIMESTONE, trace SANDSTONE, medium to fine grained, light brownish gray.			
75					
		DOLOSTONE, little SANDSTONE, trace glauconitic SHALE. Sandstone is moderately cemented, well graded quartz. Dolostone is fine to medium grained, light gray.			
80					
		DOLOSTONE, fine to medium grained, trace silicified oolite, light gray.			
85					
		DOLOSTONE, very fine to medium grained, light gray, trace silicified oolite.			
90					
		Dolomitic LIMESTONE, very fine to fine grained, light gray.			

NOTES:

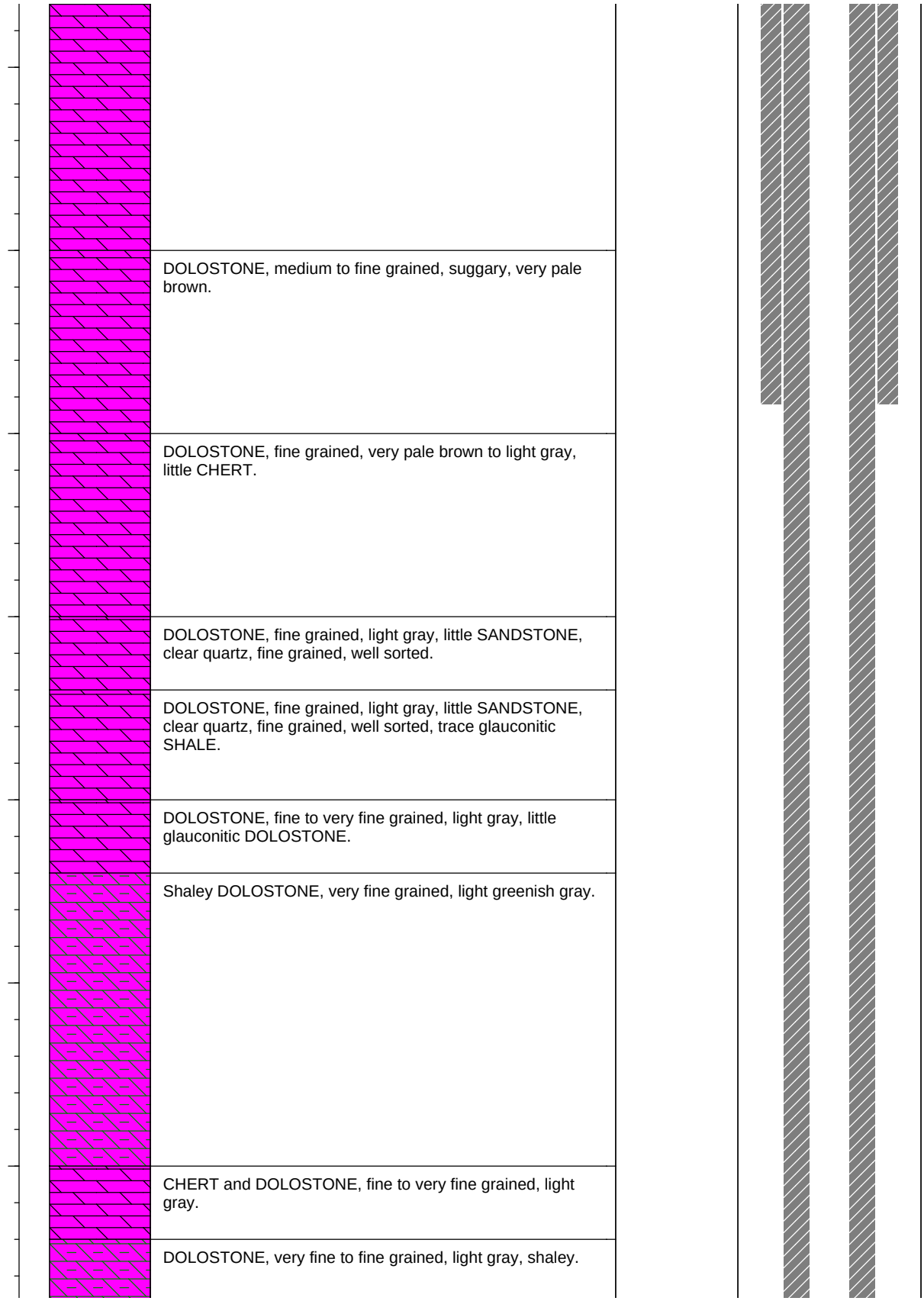
Well Name MW9R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-95					
		Dolomitic LIMESTONE, some glauconitic SHALE, little SANDSTONE and CHERT, light gray.			
-100		DOLOSTONE, very fine grained, gray, trace glauconitic SHALE.			
-105		DOLOSTONE, weathered, light yellowish brown.			
		Intermixed DOLOSTONE, very fine grained, gray, with SANDSTONE, fine grained, tan.			
-110		DOLOSTONE, fine grained, slightly weathered, light yellowish brown.			
-115		SANDSTONE, medium grained, gray and light yellowish brown, trace SHALE.			
-120		DOLOSTONE, medium to fine grained, slightly wethered.			
		DOLOSTONE, fine to medium grained, light gray, trace SHALE.			
-125		DOLOSTONE, medium to fine grained, light gray to very pale brown, little SANDSTONE, fine grained, well sorted and cemented, clear to yellow.			

NOTES:

Well Name MW9R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-130					
-135		DOLOSTONE, medium to fine grained, suggary, very pale brown.			
-140		DOLOSTONE, fine grained, very pale brown to light gray, little CHERT.			
-145		DOLOSTONE, fine grained, light gray, little SANDSTONE, clear quartz, fine grained, well sorted.			
		DOLOSTONE, fine grained, light gray, little SANDSTONE, clear quartz, fine grained, well sorted, trace glauconitic SHALE.			
-150		DOLOSTONE, fine to very fine grained, light gray, little glauconitic DOLOSTONE.			
		Shaley DOLOSTONE, very fine grained, light greenish gray.			
-155					
-160		CHERT and DOLOSTONE, fine to very fine grained, light gray.			
		DOLOSTONE, very fine to fine grained, light gray, shaley.			



NOTES:

Well Name MW9R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-165		DOLOSTONE, fine grained, light gray.			
-170		DOLOSTONE, fine to very fine grained, shaley, pale yellow to light greenish gray.			
		DOLOSTONE, fine grained, light gray, some SANDSTONE, coarse grained, well graded and cemented, yellow to clear.			
-175		DOLOSTONE, fine to medium grained, very pale brown, little SANDSTONE, fine grained, well cemented and graded, trace CHERT.			
-180					
		DOLOSTONE, fine grained, light gray and SANDSTONE, fine grained, well cemented and graded, yellow to clear.			
-185		DOLOSTONE, medium grained, yellowish brown, little CHERT.			
		DOLOSTONE, fine to very fine grained, light gray.			
-190					
-195		DOLOSTONE, fine to very fine grained, light gray, trace SANDSTONE, fine grained, very well cemented, well graded.			
		DOLOSTONE, very fine to fine grained, gray to light gray.			

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-200					
-205		DOLOSTONE, very fine to fine grained, gray to pale greenish gray, slightly shaley, lighter color at 208 feet.			
-210		Shaley DOLOSTONE, fine grained, gray to light gray, little SANDSTONE and CHERT, fine grained, well cemented and graded.			
-215		DOLOSTONE, medium grained, suggary, light gray, some SANDSTONE, medium grained, very well cemented.			
-220		DOLOSTONE, fine to very fine grained, light gray, and SHALE, some glauconitic, light greenish gray to grayish green.			
		DOLOSTONE, slightly shaley, fine grained, light gray, trace CHERT.			
-225		DOLOSTONE, fine grained, light gray.			
-230		SANDSTONE, fine grained, well sorted and graded, light gray, some glauconitic DOLOSTONE, fine grained, light grayish green.			
		DOLOSTONE, fine to medium grained, light gray.			
		SHALE, glauconitic, little DOLOSTONE, fine grained, greenish gray.			

NOTES:

Well Name MW9R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-235		DOLOSTONE, medium grained, light gray, little SANDSTONE, medium to fine grained, well cemented and graded.			
		DOLOSTONE, fine to medium grained, light gray, trace glauconitic SHALE.			
-240					
-245		DOLOSTONE, fine to very fine grained, light gray, trace glauconitic shale and CHERT.			
		Glauconitic SHALE and CHERT, light grayish green and white, some DOLOSTONE, light gray, grading downward to just DOLOSTONE.			
-250		DOLOSTONE, fine grained, light gray.			
		DOLOSTONE, fine grained, light gray, little silicified oolite.			
		DOLOSTONE, fine to medium grained, weathered, light gray to light yellowish brown, little silicified oolite, trace CHERT, driller reports softer, more water.			
-255		DOLOSTONE, some CHERT, medium to fine grained, yellow to light gray, weathered.			
-260		CHERT, some DOLOSTONE, medium grained, light gray.			
		DOLOSTONE, fine to medium grained, light gray.			
-265		DOLOSTONE, fine grained, light gray, little glauconitic SHALE, trace CHERT.			
		Shaley DOLOSTONE, fine grained, light gray.			
		DOLOSTONE, medium to fine grained, light gray.			

NOTES:

Well Name MW9R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-270		DOLOSTONE, medium to fine grained, little CHERT, light gray.			
		DOLOSTONE, fine to medium grained, light pale brownish gray.			
-275					
		DOLOSTONE, fine to very fine grained, slightly shaley, light gray to gray.			
-280					
		Shaley DOLOSTONE, fine to very fine grained, light gray to gray.			
-285		DOLOSTONE, medium to fine grained, slightly shaley, trace CHERT, light pale brownish gray.			
		DOLOSTONE, medium to fine grained, trace glauconitic SHALE, light pale brownish gray.			
-290		DOLOSTONE, medium to fine grained, shaley, light gray to gray.			
-295					
-300		DOLOSTONE, medium grained, suggary, very pale brown.			
		DOLOSTONE, fine to medium grained, light gray.			

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
-305		DOLOSTONE, fine to medium grained, slightly shaley, very pale brown.			
		DOLOSTONE, medium grained, very pale brown.			
-310		DOLOSTONE, medium grained, very pale brown, trace silicified oolites, glauconitic SHALE and CHERT.			
		DOLOSTONE, meidum to fine grained, very pale brown, trace CHERT.			
-315		DOLOSTONE, medium grained, suggary, light gray, little to some CHERT, white.			
-320		DOLOSTONE, medium grained, suggary, light gray, trace CHERT, grading downward to fine grained.			
-325		DOLOSTONE, fine to very fine grained, slightly shaley, light gray, softer drilling.			
		DOLOSTONE, fine to very fine grained, light gray to very pale brown, some CHERT.			
		DOLOSTONE, very fine to fine grained, light brownish gray, trace CHERT and glauconitic dolostone.			
-330		DOLOSTONE, fine grained, light greenish gray, grading downward to gray.			
		DOLOSTONE, fine grained, light gray to gray, some CHERT, trace SANDSTONE, fine grained, well graded and cemented, clear.			
-335					
-340					

NOTES:

Well Name MW9R

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
		DOLOSTONE, fine grained to very fine grained, gray to light gray			
		DOLOSTONE, medium to fine grained, gray.			
-345		DOLOSTONE, medium to fine grained, gray to very light gray.			
-350		DOLOSTONE, fine to medium grained, light gray to light brownish gray.			
		DOLOSTONE, medium grained, light brownish gray and white.			
-355		DOLOSTONE, medium grained, suggary, light brownish gray, trace silicified oolites.			
-360		DOLOSTONE, fine to medium grained, light gray, trace glauconitic SHALE.			
		Shaley DOLOSTONE, glauconitic, fine grained, light greenish gray.			
-365		Shaley DOLOSTONE, fine grained, greenish gray.			
		Shaley DOLOSTONE, fine grained, grayish green.			
-370		DOLOSTONE, fine grained to very fine grained, gray to light gray.			Coring started at 369.8 1.25-inch slotted PVC casing from 371-421.2 to prevent hole collapse
		DOLOSTONE, fine grained, light gray, locally vuggy, scattered fractures both horizontal and vertical (closed) CHERT nodule at 372.5-372.6.			
-375		DOLOSTONE, fine grained, light gray and CHERT, medium gray, solution-enlarged vugs with crystalline surface,			369.8-378.8

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
		abundant fractures, random orientations			100% Recovery RQD 35%
		DOLOSTONE, very fine grained, very light gray, few very thin shaley partings.			
		DOLOSTONE, fine grained to medium grained, light gray, few thin shaley partings.			
-380		DOLOSTONE, medium grained medium gray, CHERT, medium gray, soft sediment deformation.			
		Glauconitic DOLOSTONE, fine grained, light gray and CHERT, highly fractured			378.8-384 100% Recovery RQD 45%
		DOLOSTONE, medium grained to fine grained, light gray, scattered shaley partings, few inclined fractures with slight weathering rinds, trace CHERT.			
-385		Clayey DOLOSTONE and CHERT, light gray to light greenish gray, fractured, crumbly.			384-389.4 97% Recovery RQD 25%
		Glauconitic DOLOSTONE and CHERT, medium grained, light gray.			
		DOLOSTONE, medium grained to fine grained, with glauconitic SHALE beds to 0.5", shale is slightly inclined.			
		DOLOSTONE, medium grained, light gray and CHERT as nodules, small vugs in dolostone.			
-390		DOLOSTONE, fine grained to medium grained, highly broken, some glauconitic SHALE to 0.5".			389.4-399.4 100% Recovery RQD 77%
		CHERT, white with gray laminations.			
		DOLOSTONE, fine grained to medium grained, light gray, 0.75" CHERT bed with micro shear, relatively massive.			
-395		DOLOSTONE, medium grained, medium gray, soft sediment deformation, some glauconite.			
		DOLOSTONE, medium grained to fine grained, medium gray, local clauconitic zones, extensively vuggy to 30% pore space, slightly weathered.			
		DOLOSTONE, medium grained to fine grained, glauconitic, light greenish gray, no vugs, few CHERT beds.			
-400		DOLOSTONE, very fine grained to fine grained, light gray, no vugs.			399.4-407.6 77% Recovery RQD 52%
		DOLOSTONE, medium grained to fine grained, light gray, extensively vuggy, broken.			
		DOLOSTONE, fine grained to medium grained, light gray, thin glauconitic SHALE seam, convolute, few vugs, interformational conglomerate.			
-405		DOLOSTONE, medium grained to fine grained, light gray, very vuggy, broken.			
		DOLOSTONE, fine grained, light gray, some glauconitic SHALE, extensively fractured and broken, few vugs.			407.6-409.6 100% Recovery RQD 0%
-410		DOLOSTONE, medium grained, light gray with glauconitic intervals, slightly disturbed bedding, few fractures.			

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
					409.6-419.6 97% Recovery RQD 58%
		DOLOSTONE, fine grained, locally sandy, locally fratured random orientations, not vuggy, light gray.			
-415		DOLOSTONE, fine grained to medium grained, light gray, numerous large vugs, few fractures, convolute, trace bedded CHERT.			
		DOLOSTONE, medium grained to fine grained, sandy, light gray to yellowish brown, soft sediment deformation in lower portion.			
		DOLOSTONE, medium grained, light gray, chalky with interbedded glauconitic SHALE, locally crumbly.			419.6-420.8 100% Recovery RQD 0%
-420		DOLOSTONE, fine grained, light yellowish brown with CHERT nodules, thin sandy glauconitic SHALE seams.			
		DOLOSTONE, fine grained, light brown, hard.			

NOTES:

Well Name MW9R

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW10-UB**
TOTAL DEPTH: **48'**

PROJECT INFORMATION

PROJECT:	**Remedial Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lucas White/Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Speed Star**
METHOD OF DRILLING:	**Cable Tool**
DATES DRILLED:	**June 2008**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		SILT, little clay, soft, wet, uniform dark brown			Flush surface completion w/4" opening
-5		SILT, little clay, moist, firm to mod firm, dark brown			12" Hole to 27' bgs
-10		SILT, little clay, moist, mod soft, dark grayish brown			Bentonite Grout from surface to 19' bgs
-15		DOLOSTONE, fine to medium grained, tan to gray, with some gravel			
-20		DOLOSTONE, fine to medium grained, tan to gray, with little weathering			Neat Cement from 19' to 27' bgs

NOTES:

Well Name MW10-UB

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25					8" Steel Casing from surface to 27' bgs
		DOLOSTONE, tan to gray, with little green glauconitic SHALE.			
30					
		DOLOSTONE, gray to tan, with little green glauconitic SHALE.			
35					8" Open Hole from 27' to 48' bgs
		DOLOSTONE, gray to tan, trace CHERT and glauconitic SHALE.			
40					
		DOLOSTONE, very fine grained, gray to tan, trace CHERT and glauconitic SHALE. Picked up some water.			
45			MW10-GW01-048.0-080701		

NOTES:

Well Name MW10-UB

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

Monitor Well Log

BOREHOLE NO.: **MW14-US**
TOTAL DEPTH: **33.5'**

PROJECT INFORMATION

PROJECT:	**Kellwood RI**
SITE LOCATION:	**New Haven, Missouri**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**

DRILLING INFORMATION

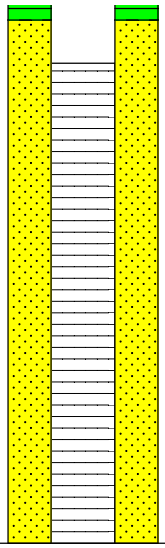
DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Direct Push & Cable Tool**
METHOD OF DRILLING:	**Hydraulic Push and Cable**
DATES DRILLED:	**July and August 2009**

Water level in completed well

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
0		SILT w/ v. little clay (Topsoil fill), dry crumbly, no odor 10YR5/3			
			7761 ppb		100% recovery from all DPT intervals
			14.47 ppm		
-5		Clayey SILT, dry, mod firm, not plastic, no odor 10YR6/6	15.23 ppm		
		CLAY, moist, firm, plastic, no odor 7.5YR7/1	4491 ppb		
		CLAY w/ silt, dry, v. firm, plastic, no odor 7.5YR5/6 w/ 10YR7/1	1200		
-10					Bentonite seal above sand
		CLAY w/ silt and <5% small cherty gravel, dry, v. firm, plastic, no odor 10YR6/1 w/ 10YR5/3 mottled			
		CLAY w/ 40% chert anglular, dry 5YR4/4 w/ gray and black mottling. Grades slowly to description below.	823		
			298		
		CHERT, gray w/clay	402		
-15		CLAY, firm, plastic, no odor 10YR6/1			
			765		Unsure of reasoning behind high PID readings in soil. USGS on-site GC showed no detections of PCE in soil.
		As above grading into SILTY CLAY w/ approx. 5% sand at 18 to 18.5'	1154		
			577		
		Sandy Silty CLAY, damp, mod firm, no odor, plastic 10YR6/3	818		
-20					
			610		
		Silty Sand w/ some cherty gravel, moist, crumbly 10YR6/6			
			521		Sand pack

NOTES:

Well Name MW14-US

DEPTH	SOIL SYMBOLS	LITHOLOGIC DESCRIPTION	PID / SAMP. #	WELL CONSTRUCTION	REMARKS
25		Coarse SAND, saturated, no odor, loose (Upper Sandstone?) 10YR5/8			from 22.6 to TD
		Fine SAND, saturated, no odor 10YR5/8	795		
		As above, 7.5YR8/1			
		GRAVEL, some sandstone, trace dolostone. Gravel is subangular brown, chert. Sandstone is fine grained, sell sorted, clear, weathered.	726		Begin Cable Tool drilling at 27.8
30		SANDSTONE fine grained, white, well cemented, with weathered subangular to subrounded gravel, brown - predominately chert. Trace dolostone.			

NOTES:

Well Name MW14-US

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **A-7**
TOTAL DEPTH: **72.67'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**October 30, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
-50						
				85% / 55%		
			DOLOSTONE, fine grained, mixx of light gray and buff, soft sediment deformation, numerous subplanar very thin clay seams, healed microfractures with offsets, inclined (~30 degrees) fractures and bedding features.		0	
-55						0
					0	
			Interformational conglomerate, DOLOSTONE, medium grained, inclined planar bedding, sandy glauconiteic shale, very fractured.			
			DOLOSTONE, fine grained, slightly weathered, mottled light gray and light yellowish brown, numerous small to moderate vugs, soft sediment deformation, scattered very thin convolute clay seams, numerous healed fractures, high angle open fracture from 57.83 to 58.33 feet.		0	2.19
-60			DOLOSTONE, fine grained, light gray, subplanar to convolute thin glauconitic shale seams, many truncated, angled fractures.	98% / 73%	0	2.81

NOTES: No NAPL detected

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, medium grained, slightly weathered, light gray and light yellowish brown, numerous vugs with calcite crystals.		0	3.23
			CHERT, massive.			
			DOLOSTONE, weathered, medium grained, soft sediment deformation, mix of yellowish brown and light green, angular fractures.	100% / 80%		
			Interformational conglomerate, DOLOSTONE, medium grained, buff, quartz SANDSTONE, medium grained, well cemented, glauconitic SHALE.		0	4
-65			DOLOSTONE, medium grained, soft sediment deformation, mix light yellowish brown and light gray, very thin convolute shale seams.			
			Interformational conglomerate, DOLOSTONE with glauconitic shale folded complexly within, many microfractures, few vugs.		0	4.53
			DOLOSTONE, medium to fine grained, yellowish brown, CHERT, both nodules and beds, light gray, some calcite fill of voids, 1/4-inch planar inclined glauconitic shale bed at 69.17 feet.		0	5.23
-70			DOLOSTONE, shaley, thin subplanar shale partings at 45-degree incline, scattered rounded dolomite nodules.		0	7.11
			DOLOSTONE, weathered, sandy, cherty, soft sediment deformation, mix of light greenish gray and yellowish brown, highly fractured.		0	4.95

NOTES: No NAPL detected

Corehole Name: A-7

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **A-14**
TOTAL DEPTH: **35.75'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**October 16, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
-15						Question-able PID calibra-tion
			DOLOSTONE, fine to very fine grained, interformational conglomerate, yellowish brown, numerous convolute glauconitic shale seams to 1/8-inch thick, extensive intact vertical fractures, some with calcite cement and obvious offsets.	100% / 61%	405 386 37	No Return Water Data
-20					111	
			DOLOSTONE, fine grained, mottled yellowish brown and light gray, few dendrites.		1822 337 337 500	
			DOLOSTONE, very fine grained, soft sediment deformation, thin to medium thickness convolute glauconite shale beds, some truncated.		967 1344 621 1340	
-25			DOLOSTONE, sandy, weathered, fine grained, extensively fractured to crumbles, few scattered planar glauconitic shale beds to 1/4-inch thick, vertical fracture faces.		318	
			DOLOSTONE, clayey, fine to very fine grained, light butt to light greenish gray, vertical fractures.	97% / 58%		

NOTES: No NAPL detected.

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, fine grained, light gray to buff, few dendrites, scattered very thin subplanar shaley seams.			
			Interbedded DOLOSTONE and SHALEY DOLOSTONE, slightly weathered, fine to medium grained, mix of light gray and light yellowish brown, few intact vertical fractures.			
-30			DOLOSTONE, fine to very fine grained, light gray, seald fractures both vertical and horizontal.			
			DOLOSTONE, weathered, very fine grained, yellowish brown, highly fractured, scattered very thin convolute shale seams.			
			DOLOSTONE, fine grained, mottled buff and light greenish gray, soft sediment deformation.	100% / 68%		
			DOLOSTONE, soft sediment deformation, fine to medium grained, scattered very thin convolute glauconitic shale seams, some truncated.			
-35						

NOTES: No NAPL detected.

Corehole Name: A-14

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **F-8**
TOTAL DEPTH: **62.5'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**October 25, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
-40						
			DOLOSTONE, fine to very fine grained, light yellowish brown, dendrites, vertical fractures.	78% / 21%		
			SANDSTONE, fine grained, quartz, light gray, well sorted, moderately well cemented, weathered vertical fracutres, scattered shaley seams.			
			Weathered DOLOSTONE, fine grained, light yellowish brown, very broken, little CHERT.		0	3.7
-45						
			Interformational conglomerate, DOLOSTONE, coarse to fine grained, mottled light gray and yellowish brown, CHERT, reworked dolostone, weathered clay seams.		0	7.2
			DOLOSTONE, fine grained, light yellowish brown with dendrites.			
			Interbedded SANDSTONE and DOLOSTONE, soft sediment deformation, planar bedding to 1-inch thick.			
			SANDSTONE, fine grained, quartz, light yellowish gray, locally medium gray, well sorted, scattered clay seams, some soft sediment deformation.		0	7.2
-50						
			SANDSTONE, quartz, light gray, well sorted, moderately well cemented, slighly inclined bedding.	99% / 59%	0	0
			Interbedded SANDSTONE and argillaceous DOLOSTONE, sandstone light gray to light brownish gray, DOLOSTONE, yellowish brown, beds vary up to 3/4-inch.			

NOTES: No NAPL detected.

Corehole Name: F-8

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, fine to very fine grained, lighty yellowish brown, fractured with 1/2-inch glauconitic shale bed.		0	0
			DOLOSTONE, medium grained, light gray.			
			DOLOSTONE, medium to coarse grained, light yellowish brown, numerous tiny vugs.		0	14.8
-55			DOLOSTONE, medium grained, light gray with yellowish brown, few moderate vugs, few thin convolute glauconitic shale seams.			
			DOLOSTONE, coarse grained, locally oolitic, chert nodule at 56.92 feet, light yellowish brown, few vugs, calcite fill of colosed vertical fracture at 58.58 to 59.17 feet.		0	7.1
			DOLOSTONE, sandy, medium to coarse grained, light yellowish brown.		0	6.5
-60			DOLOSTONE, coarse grained top and botom, fine grained in middle of interval, lighy yellowish brown.	97% / 97%	0	7.5
			DOLOSTONE, fine grained, light gray.			
			Interformational conglomerate, DOLOSTONE< coarse to medium grained, yellowish brown to light gray, scattered rounded chert.			
			DOLOSTONE, medium to coarse grained, light gray, vugs, numerous closed fracutres with slight weathering bands.			

NOTES: No NAPL detected.

Corehole Name: F-8

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **F-11**
TOTAL DEPTH: **31.33'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**November 6, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
-10						
			DOLOSTONE, fine grained, light yellowish brown, thin subplanar to convolute caly seams to 1/8-inch thick, weathered, fractured.	100% / 56%		
			DOLOSTONE, fine grained, soft sediment deformation, light yellowish brown to light gray, few scattered thin subplanar shale seams.			0
					13	
			DOLOSTONE, medium grained, slightly weathered, mottled light yellowish brown and light gray.			4.5
-15			DOLOSTONE, medium grained, light gray to yellowish brown, laminar SHALEY DOLOSTONE beds.			
					2	
						16.7
			DOLOSTONE with CHERT, medium grained, buff, vertical microfractures.			
			DOLOSTONE, fine grained, buff to chalk to light yellowish brown, laminar beds.		36	
			DOLOSTONE, medium grained, buff to light gray, scattered very thin convolute to subplanar shaley seams, CHERT bed at 18.75 feet.			54.3
			DOLOSTONE, medium grained, weathered, numerous vugs and fractures.			
-20						70.8
			DOLOSTONE, medium grained, buff.			
			Interbedded DOLOSTONE and SHALE, yellowish brown and green, beds to 1/4-inch thick.	100% / 90%		

NOTES: No NAPL detected.

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, medium grained, light gray to buff, soft sediment deformation, scattered subplanar to convolute shale seams.			44.6
						46.9
-25						
						35.9
						28.2
			DOLOSTONE, interformational conglomerate, medium grained, light gray and light yellowish brown, slightly weathered, vugs between 29.08 and 29.75 feet.			
			CHERT			
-30			DOLOSTONE, fine grained, light gray and light yellowish brown, thickly bedded.			23.5
			Glauconitic SHALE, laminar bedding.			
			DOLOSTONE, medium grained, light gray, 1/4-inch glauconitic shale at 31.0 feet, vugs at bottom.			

NOTES: No NAPL detected.

Corehole Name: F-11

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **J-8**
TOTAL DEPTH: **30.5'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**10-31-07**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
-10						
			CHERT in Dolostone.	100% / 69%		
			Interformational conglomerate, DOLOSTONE, medium grained, mix of light gray and light yellowish brown, slightly weathered.		2	
			DOLOSTONE, medium grained, light yellowish brown to buff, CALCITE fill at 11.83 feet.		3 13	0
			DOLOSTONE interlayered with SHALE, fine grained, light yellowish brown to buff, shale planar bedded, very slight incline, random strike, mostly yellowish brown.		4	
			DOLOSTONE, medium to fine grained, light buff, with white CHERT.		1	
			DOLOSTONE, sandy, medium grained, light yellowish brown, scattered thin planar beds.		2 6	0
-15					2	
					2	
					5	
			DOLOSTONE, medium to fine grained, buff, massive with side of large CHERT nodule.		5 4	26.9
			Interformational conglomerate, DOLOSTONE, coarse grained, weathered, mix of light gray, white and yellowish brown, major vugs between 17.42 and 17.67 feet.			
			DOLOSTONE, fine to medium grained, buff, massive.			29.2
			DOLOSTONE with planar shaley beds, fine gained, buff.			
			DOLOSTONE, fine to medium grained, soft sediment deformation, buff, numerous thin convolute shaley seams, some truncated.			
-20						28.0
			DOLOSTONE, medium grained, light buff, scattered thin wavy shale seams.	100% / 52%		
					1	
					5 4	

NOTES: No NAPL detected

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, medium grained, soft sediment deformation, buff, scattered thin subplanar convolute shaley seams.		3 12 3 1 1	37.2
-25			Interformational conglomerate, DOLOSTONE, medium grained, light gray and light yellowish brown, scattered very thin subplanar shale seams, large vug 26.08 feet.			13.3 14.9
			Glauconitic SHALE.			15.7
-30			DOLOSTONE, medium grained, mottled light gray and light yellowish brown, scattered small vugs.			31

NOTES: No NAPL detected

Corehole Name: J-8

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **L-12**
TOTAL DEPTH: **25.5'**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**DNAPL Investigation**	DRILLING CO.:	**S&S Drilling**
SITE LOCATION:	**Industrial Drive**	DRILLER:	**Neal Stephens**
JOB NO.:	**442906**	RIG TYPE:	**Mobile**
LOGGED BY:	**Lee Gorday**	METHOD OF DRILLING:	**HX Core**
PROJECT MANAGER:	**Peter Gelman**	SAMPLING METHODS:	
DATES DRILLED:	**October 17, 2007**	HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						No PID readings due to lamp failure.
			Weathered DOLOSTONE, fine grained, mottled yellowish brown and buff, vugs, few subplanar thin shale seams.	100% / 78%		
-5			DOLOSTONE, very fine grained, light greenish gray, several wavy glauconitic shale seams up to 1/8-inch thick.			
			DOLOSTONE, locally sandy, fine to medium grained, mottled yellowish brown and light gray, scattered vugs, sandy weathered interval 5.75 to 5.83 feet.			
			DOLOSTONE, soft sediment deformation, mottled greenish brown and greenish gray, subplanar to convolute glauconitic shale seams to 1/8-inch thick.			
-10						

NOTES: NAPL stains on FLUTe liner at 4'6" - 11'5", and 24'3" - 25'7"

Corehole Name: L-12

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, medium grained, mottled yellowish brown and light gray, soft sediment deformation.			
			DOLOSTONE, very fine to fine grained, light greenish gray, subplanar glauconitic shale seams to 1/4-inch thick.	100% / 75%		
-15			DOLOSTONE and CHERT, vugs, vertical fracture from 14.75 to 15.0 feet.			
			DOLOSTONE, medium grained, light yellowish brown, several glauconitic shale seams to 1/8-inch thick.			
			Glauconitic SHALE, subplanar bedding.			
			DOLOSTONE, medium grained, scattered thin convolute to subplanar shale seams.			
			DOLOSTONE, coarse to medium grained, slightly weathered, mottled light gray and yellowish brown, small vugs.			593
			DOLOSTONE, fine grained, light gray, sandy fracture at 18.92 feet.			
			Interbedded glauconitic SHALE and DOLOSTONE, sandy, medium grained, light gray.			
-20			DOLOSTONE, fine to medium grained, soft sediment deformation, very thin subplanar to convolute shale seams, inclined fracture at 22.83 feet.			587
						418
				92% / 75%		1450
-25						

NOTES: NAPL stains on FLUTe liner at 4'6" - 11'5", and 24'3" - 25'7"

Corehole Name: L-12

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **N-8**
TOTAL DEPTH: **24.67'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**October 9, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0			SILT, clayey, brown, dry, loose.		38	
			SILT, some GRAVEL and CLAY, brown, dry.			
			CLAY, silty, brown, damp, plastic.		40	
			CLAY, tan, soft, plastic.		51	
-5			CLAY, dark brown, plastic, damp, with SAND, tan.		22	
			DOLOSTONE, fine grained, buff, abundant subplanar to convolute thin shaley seams.	94% / 68%		
					20	
					9	34.4
			DOLOSTONE, fine grained, weathered, small vugs, interlayered light gray and very light yellowish brown.		16 4	
-10			DOLOSTONE, fine to very fine grained, interlayered with SHALEY DOLOSTONE, subplanar bedding to 1/2-inch thick.		23	36.7
			DOLOSTONE, very fine grained, light yellowish brown with dendrites.		16	
			DOLOSTONE, fine grained, light buff.			

NOTES: No NAPL Detected.

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, fine grained, buff and yellowish brown, with planar shaley seams to 1/8-inch thick, LIMESTONE pebbles embedded.			69.5
			DOLOSTONE, medium grained, light gray, scattered thin subplanar shaley seams.		7 23 28	41.6
-15			DOLOSTONE, interformational conglomerate, medium grained, small vugs, some weathereing.			
			DOLOSTONE, fine grained, light gray, vugs at top, slight weathering around vugs.	100% /		46.5
			DOLOSTONE, medium grained, interbedded with glauconitic sandy SHALE, interformational conglomerate.	75%		
			DOLOSTONE, fine grained, buff, soft sediment deformation, abundant convolution of beds.		18 4	34.3
-20						43.0
			DOLOSTONE, buff, medium to fine grained, convolute bedding with very thin shaley seams, locally sandy, few vugs.			62.6
			DOLOSTONE, fine grained, mottled slightly light gray and light yellowish brown, interformational conglomerate, locally sandy, convolute fractures, moderate vugs.			44.8

NOTES: No NAPL Detected.

Corehole Name: N-8

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **N-12**
TOTAL DEPTH: **25.5'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**October 11, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						
			DOLOSTONE, very fine grained, slightly mottoled light yellowish brown and light gray, few dendrites.	100% / 67%		
					11	21.5
					10	
					9	
					17	
					10	
-5					12	
					11	
			DOLOSTONE, fine grained, vugs with rhombs, yellowish brown.		48	
					20	
			DOLOSTONE, fine grained, mottled yellowish brown and greenish gray, very thin to thin glauconitic shale beds, subplanar, some vertical component to fractures.		155	690
			DOLOSTONE, very fine grained, greenish gray, subplanar glauconitic shale to 3/8 inch.		1125	
			DOLOSTONE, weathered, fine to medium grained, locally sandy, mottled yellowish brown and light gray, subplanar thin sandy gluaconitic shale beds.		15	4953
					16	
			DOLOSTONE, fine grained, slightly weathered, some soft sediment deformation, slightly mottled light gray and light yellowish brown, few very thin, convolute glauconitic shale beds, vertical fracture between 10.08 and 10.42.		15	
					13	
-10						8925
					11	
					10	
			DOLOSTONE, fine grained, light gray, abundant gauconitic shale in very thin to 3/8-inch convolute beds, some soft sediment deformation.		45	
					17	

NOTES: NAPL stain on FLUTe liner at: 6'8" - 9'0"

Corehole Name: N-12

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			Interformational conglomerate, DOLOSTONE, medium grained, vugs, light gray and light yellowish brown.	100% / 81%	6 12 13	16963
-15			DOLOSTONE, weathered, fine to medium grained, locally sandy, mottled yellowish brown and light gray, subplanar thin sandy gluaconitic shale beds.		10	
			DOLOSTONE, interformational conglomerate, medium grained, weathered, light yellowish brown and light gray intebedded with sandy glauconitic shale.		11 6 8 6 8	12825
			DOLOSTONE, medium grained, interbedded light greenish gray and light yellowish brown, locally sandy.			
			DOLOSTONE, medium to fine grained, light gray, scattered thin convolute to subplanar glauconitic shale beds.		10 16 28	15838
-20			Interformational conglomerate, DOLOSTONE, CHERT and LIMESTONE, numerous vugs, slight weathering.			
			DOLOSTONE, medium grained, light gray.	100% / 100%		
			Interbedded gluaconitic shale and DOLOSTONE, medium to fine grained, light gray.			
			DOLOSTONE, medium grained, scattered vugs, locally sandy, light gray, abundant very thin glauconitic convolute shales, minor soft sediment deformation.			13575
					33 55	
-25						

NOTES: NAPL stain on FLUTe liner at: 6'8" - 9'0"

Corehole Name: N-12

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **P-13**
TOTAL DEPTH: **22.58'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**August 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						
			DOLOSTONE, fine grained, banded lighty gray and yellowish brown, major vug with secondary mineralization at 4.33 feet, scattered dendrite, thin chert along horizontal fractures, some mud-filled fractures, glauconitic parting at 7.83 feet.	100% / 72%		
-5					0	15
					0	0
			DOLOSTONE, medium grained, light gray and yellowish brown, very thin convolute glauconitic shale seams.			
-10			DOLOSTONE, coarse grained, light gray and yellowish brown.		0	4175
			DOLOSTONE, medium grained, light gray and yellowish brown.			
			DOLOSTONE, very fine grained, light greenish gray to green, subplanar glauconitic shale seams.			

NOTES: No NAPL detected.

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, fine to medium grained, some sandy layers, alternating light gray and yellowish brown.		0	12208
			SHALE, glauconitic, laminated, grayish green.			
			DOLOSTONE, coarse grained, thin shale seam top and bottom.			
			DOLOSTONE, fine grained, light gray to yellwoish brown, scattered subplanar glauconitic shale seams at various angles, vertical fracture, partially clay filled 14.0 to 14.75 feet.	100% / 85%	0	30563
-15			SHALE, glauconitic, laminated, grayish green.			
			DOLOSTONE, fine grained, light gray, scattered thin convolute shale seams.		0	40125
					0	26250
			DOLOSTONE, medium to fine grained, light greenish gray to yellowish brown, few small unconnected vugs between 18.33 and 18.75 feet, thin subplanar glauconitic shale intervals, flay lying to slightly inclined, one offset.			
-20					0	40375
			CHERT bed cutting across DOLOSTONE, medium to fine gray, fwe small vugs.			
			DOLOSTONE, medium to fine grained, thin subplanar glauconitic shale seams.			
			CHERT, bedded at slight incline.			
			DOLOSTONE, fine grained, yellowish brown, inclined bedding.		0	37000
			SHALE, glauconitic, green, laminated, slight incline on beds.			
			DOLOSTONE, fine grained, light gray, very thin subplanar shaley seams at shallow angles.			

NOTES: No NAPL detected.

Corehole Name: P-13

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **P-14**

TOTAL DEPTH: **22.33'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**August 27, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						
			DOLOSTONE, fine grained, buff, slightly sandy.	87% / 63%		
					0	
			DOLOSTONE, medium to coarse grained, sandy, buff to light yellowish brown, random thin glauconitic shale beds.			
			Cobbles, little recovery.			
						97.5
			Interformational conglomerate, DOLOSTONE, fine to medium grained, light gray, few vugs, slight weathering.		0	
-5						
			Interformational conglomerate, little recovery, DOLOSTONE, very fine grained, light buff, few clay beds.			4333
					0	
			DOLOSTONE, interformational conglomerate, fine to very fine grained, light buff to light yellowish brown, thin shale seams at 7.08 and 7.17 feet, closed thin shale seams throughout interval.			
						1513
					0	
			Thin convolute closed glauconite bed.			
			DOLOSTONE, fine to medium grained, interformational conglomerate.			
			DOLOSTONE, soft sediment deformation, medium grained, light gray, scattered vugs.			
-10			DOLOSTONE, slightly weathered, medium grained, mottled light gray and yellowish brown.	96% / 77%	0	8125
			DOLOSTONE, very fine grained, mostly light gray, scattered medium thickness subplanar shale beds.			

NOTES: NAPL stains on FLUTe liner at: 13'2" - 22'4" (possible dripping of NAPL down borehole)

Corehole Name: P-14

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
					0	7875
			Weathered DOLOSTONE, medium to fine grained, yellowish brown, vugs, clay bed cutting at a moderate angle.		0	16438
-15			DOLOSTONE, fine grained, light gray with yellowish brown bands around large vugs with calcite crystals.			
			DOLOSTONE, fine to very fine grained, slightly mottled, convolute shale seams grading downward to thicker subplanar seams at bottom of interval.		0	1910
			DOLOSTONE, very fine grained, very light gray, convolute thin shaley beds.	100% / 100%	0	1190
-20						
			DOLOSTONE, interformational conglomerate, medium grained.	100% / 96%	0	
			DOLOSTONE, fine grained, light gray, one large vug with calcite crystals at 21.33 feet.			
			DOLOSTONE, light greenish gray, with subplanar shaley beds to 1/2-inch thick, gray green.			15750

NOTES: NAPL stains on FLUTe liner at: 13'2" - 22'4" (possible dripping of NAPL down borehole)

Corehole Name: P-14

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **P-15**
TOTAL DEPTH: **22.0'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**August 28, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						
			DOLOSTONE cobbles, medium grained, yellowish brown.	98% / 72%		
			DOLOSTONE, weathered, medium to fine grained, light gray to yellowish brown, planar fractures at random orientations.			372.5
-5			Interformational conglomerate, DOLOSTONE, sandy.			
			DOLOSTONE, fine to very fine grained, scattered convolute fractures.			
						550
			DOLOSTONE, fine to very fine grained, massive, clay filled fracture with high PID and smear on core at bottom.			
			DOLOSTONE, massive, yellowish brown.		120	1092
			DOLOSTONE, weathered, mottled light gray and yellowish brown, small vugs, DNAPL smear in clay-filled fracture at bottom.			
-10						2813
			DOLOSTONE, fine to very fine grained, light greenish gray, massive, several shally partings.		25	
			DOLOSTONE, medium to fine grained, interformational conglomerate, slightly weathered, few vugs.			

NOTES: NAPL stains on FLUTe liner at: 10'6" - 10'7", 12'4" - 13'1", and 18'10" - 19'5".

Corehole Name: P-15

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, very fine grained with moderately thin wavy-bedded shaley intervals.			1875
			DOLOSTONE, medium grained, locally sandy, slightly weathered, few vugs.			
			DOLOSTONE, sandy, with shaley intervals.	100% / 88%		
			DOLOSTONE, soft sediment deformation, light gray, vugs, CHERT nodule.			1213
-15			DOLOSTONE, weathered, medium grained, light yellowish brown, thin shaley bed.			
			DOLOSTONE, fine grained, mottled yellowish brown and ligh gray, vugs, convolute fracture along very thin shale seam at bottom.			
			DOLOSTONE, fine to very fine grained, light yellowish brown to light gray, scattered thin convolute shale seams.			
			DOLOSTONE, very fine to fine grained, scattered planar thin shale sheams.			2250
-20			DOLOSTONE, soft sediment deformation, yellowish brown and light gray.			
			DOLOSTONE, fine grained, light gray with scattered yellowish bronw, thinly bedded subplanar sandy shale seams.			

NOTES: NAPL stains on FLUTe liner at: 10'6" - 10'7", 12'4" - 13'1", and 18'10" - 19'5".

Corehole Name: P-15

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **P-16**
TOTAL DEPTH: **23.5'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**September 4, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						
			DOLOSTONE, some CHERT, medium to fine grained, weathered sand interval.	97% / 92%		
						247.5
			DOLOSTONE, slightly weathered, fine grained, light gray and yellowish brown.		7	
-5			Interformational conglomerate, DOLOSTONE, medium grained.			
					95	
			DOLOSTONE, very fine to fine grained, mottled yellowish brown and greenish gray, scattered convolute shaley seams.			
						885
					100	
					9	
						115
			DOLOSTONE, soft sediment deformation, mottled yellowish brown and greenish gray, silicious oolite at 10.33 feet.			
-10						
			SHALE, sandy, glauconitic.			1550
					20	
			DOLOSTONE, very fine grained, few thin subhorizontal glauconitic shale seams, otherwise massive.			
			Interformational conglomerate, DOLOSTONE, glauconitic shale interval, fine to medium grained, few small vugs.			

NOTES: No NAPL detected

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, very fine grained, slightly mottled light greenish gray with some yellowish brown, few subhorizontal glauconitic shale beds to 1/4-inch.		29	2100
			Weathered DOLOSTONE, sandy, medium grained, few vugs to 1/4-inch diameter.			
			DOLOSTONE, weathered, medium to fine grained, sandy intervals, few glauconitic shale seams, some vugs, one major vug with drusy quartz at 14.6 feet.	100% / 95%		2385
-15			DOLOSTONE, slightly weathered, fine grained, mottled light gray and yellowish brown, few vugs and tin convolute shaley seams.			
			DOLOSTONE, soft sediment deformation, light gray with scattered yellowish brown, thin convolute shale beds.			1000
			DOLOSTONE, fine to very fine grained, light gray, convolute shaley seams, incipient vertical fractures between 20.08 and 20.33 feet.			60
-20			Interformational conglomerate, DOLOSTONE, medium grained, some glauconitic shale..			0
			DOLOSTONE, light gray, few sandy intervals, few subplanar shaley seams.			
			CHERT, coarse grained.			0
			DOLOSTONE, medium grained, chert fill along fracture at 22.67 feet.			
			DOLOSTONE, light yellowish brown, planar bedding.			

NOTES: No NAPL detected

Corehole Name: P-16

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **P-17**
TOTAL DEPTH: **20.83'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**July 31, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						
						No Data
			DOLOSTONE, medium grained, weathered, light gray and yellowish brown, vugs.			
			DOLOSTONE, interformational conglomerate, medium to fine grained, light gray, some clay interspersed.		0	
-5			DOLOSTONE, fine grained to very fine grained, slightly weathered, clayey, light buff, soft sediment deformation.			
			DOLOSTONE, very fine grained, dendrites scattered, thin convolute clay seams, mottled buff and light yellowish brown.			
					0	
					0	
			DOLOSTONE, weathered, vugs, light gray to buff with yellowish brown around vugs, sandy clay seam (~1/4") at bottom of interval.			
-10			DOLOSTONE, very fine grained, scattered convolute, thin, galuconite seams, light gray with scattered light yellowish brown.		0	

NOTES: No NAPL detected.

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, very fine grained, scattered convolute, thin gluaconite seams, light gray.		0	
			LIMESTONE, medium grained, vugs, buff, calcite fill of vugs, some tight vertical fractures at 14.67 to 14.83 ft, some soft sediment deformation.		0	
-15			DOLOSTONE, very fine grained, light gray with subplanar to convolute, thin glauconitic clay beds.		0	
					0	
-20					0	

NOTES: No NAPL detected.

Corehole Name: P-17

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **Q-14**
TOTAL DEPTH: **23.17'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**August 31, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						
						No Data
			Interformational conglomerate.	100% / 80%	16	
			DOLOSTONE, weathered, fine grained, mottled light yellowish brown and light greenish gray, several very thin clay seams.			
-5			DOLOSTONE, fine grained, slightly mottled light greenish gray.			
					11	
					11	
					158	
			DOLOSTONE, slightly weathered, medium to fine grained, mottled light gray and yellowish brown, some small vugs.			
			Interfomational conglomerate, DOLOSTONE, fine to medium grained, sandy glauconitic intervals.			
			DOLOSTONE, fine to very fine grained, light gray with yellowish brown areas, convolute thin to medium shaley beds, thicker at 10.5 feet, horizontal weathered interval from 9.58 to 9.67 feet.			
-10						
			DOLOSTONE, sandy, weathered, vugs, sandy intervals 11.5 to 11.58 and 12.0		7	

NOTES: No NAPL detected.

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			to 12.17 feet, shaley beds 11.92 to 12.0 feet and at 12.33 feet.			
			DOLOSTONE, soft sediment deformation, very fine grained, mottled light gray and yellowish brown.	100% / 91%		
-15			DOLOSTONE, very fine grained, scattered convolute gluaconitic shaley beds.			
			DOLOSTONE, sandy, mottled light gray and yellowish brown.			
			DOLOSTONE, very fine grained, planar subhorizontal to inclined glauconitic shaley beds.			
-20			CHERT nodule with fractured in adjacent DOLOSTONE.			
			DOLOSTONE, fine grained, moderately thick glauconitic beds at 21.17 and 21.83 feet, sandy glauconite fill of fracture at 21.0 feet.			
-25						

NOTES: No NAPL detected.

Corehole Name: Q-14

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **Q-15.5**
TOTAL DEPTH: **25'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**August 30, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						No Data
			DOLOSTONE, medium grained, interformational conglomerate, highly weathered, light gray to yellowish brown, few vugs, scattered CHERT, especially at 4.25 feet.	93% / 48%	0	
-5			DOLOSTONE, fine grained, weathered, mottled light gray and yellowish brown, numerous fractures along very thin convolute clay seams.			
-10			DOLOSTONE, weathered, mottled light greenish gray and yellowish brown.	100% / 87%		
			DOLOSTONE, fine grained, massive, minor green shale at 11.08 feet.		9	

NOTES: NAPL stains on FLUTe liner at: 10'3" - 10'5", 11'10" - 12'7", and 12'11" - 13'8"

Corehole Name: Q-15.5

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, interformational conglomerate, vugs.		49	
			DOLOSTONE, fine grained, greenish gray, subplanar shale seams.		2	
			Weathered DOLOSTONE and SHALE, major glauconitic shale between 14.04 and 14.17 feet.		110	
-15			Weathered DOLOSTONE, vugs, single glauconitic shale seam at 15.0.			
			DOLOSTONE, fine grained, scattered vugs, light greenish gray, few shale seams, soft sediment deformation.			
			DOLOSTONE, medium to fine grained, vugs, interformational conglomerate.	91% / 88%		
-20			DOLOSTONE, fine grained, buff, limonite layer.			
			DOLOSTONE, medium to fine grained, locally sandy texture, planar shaley beds.			
-25						

NOTES: NAPL stains on FLUTe liner at: 10'3" - 10'5", 11'10" - 12'7", and 12'11" - 13'8"

Corehole Name: Q-15.5

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **R-13**
TOTAL DEPTH: **22.58'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**August 20, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						
			Interformational conglomerate, DOLOSTONE, fine grained, mottled light gray and light yellowish brown, minor vugs.	99% / 86%	0	
			Weathered DOLOSTONE, fine grained, scattered very thin convolute clay beds, vertical dendrites.			
						518
					0	
-5						
			DOLOSTIONE, soft sediment deformation, medium grained, mottled light gray and yellowish brown, tiny vugs.		0	
			DOLOSTONE, very fine grained, planar slightly inclilned glauconite beds up to 1/8-inch thick, light gray, slight mottling, calcite-filled vugs at 8.17 to 8.33 feet.			948.5
					0	
						985.8
-10			DOLOSTONE, medium grained, calcite-filled vugs.	100% / 82%	0	
			GLAUCONITE, laminar bedding.			
			DOLOSTONE, medium to fine grained, yellowish brown, dendrites, bottom is laminar bedded glauconitic shale with calcite fill.			
			DOLOSTONE, medium to fine grained, mottled buff and light yellowish brown,			

NOTES: No NAPL detected.

Corehole Name: R-13

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			vugs with calcite fill.		0	431.7
			DOLOSTONE, fine grained, light yelllowish brown, scattered tiny vugs, convolute thin clay beds.			505.8
					0	
-15						470
			DOLOSTONE, medium grained, light buff, vugs, some soft sediment deformation.	80% / 63%	0	
			DOLOSTONE with laminar shaley bedding, buff to medium gray.			536.7
					0	
			DOLOSTONE, medium to fine grained, light gray, relatively massive.			414.2
-20			DOLOSTONE, light buff, slightly convolute thin shaley beds.		0	
			DOLOSTONE, medium grained, light gray.		0	

NOTES: No NAPL detected.

Corehole Name: R-13

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **R-15**
TOTAL DEPTH: **25.5'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**August 30, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						
			Weathered DOLOSTONE, with interformational conglomerate, coarse grained, yellowish brown, thin, inclined glauconitic shale seam.	100% / 76%	11	No Data
			Weathered DOLOSTONE and CHERT, interformational conglomerate, coarse grained.			
			Weathered DOLOSTONE, with interformational conglomerate, coarse grained, yellowish brown with light gray cobbles, sandy glauconitic shale at top of interval, scattered chert, black vein between 4.0 and 4.17 feet.			
					1475	
-5			Weathered DOLOSTONE, very fine to fine grained, mottled light gray to yellowish brown, very thin clay filled fractures, slightly convolute.		11	
					12	
			DOLOSTONE, slightly weathered, with interformational conglomerate, mottled light gray and yellowish brown, vugs.			
			DOLOSTONE, slightly weathered, with interformational conglomerate, mottled light gray and yellowish brown, vugs, some glauconitic sand seams.			
-10			DOLOSTONE, fine grained, light gray with scattered yellowish brown.			
			DOLOSTONE, fine grained, light gray with subplanar green shale.	100% / 84%		

NOTES: DNAPL confirmed on FLUTe liner.

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, fine grained with coarse grained beds, thin glauconitic shale bed at 12.17 feet and at 13.2 feet, sharp top boundary.			
			DOLOSTONE, fine grained, light yellowish brown, some vugs, calcite filled vug at 14.08.			
			DOLOSTONE, fine grained, soft sediment deformation, very light yellowish brown, limonite at 16.17 and 16.33 feet.			
-15						
			DOLOSTONE, fine grained, light brownish gray, thin beds of limonitic shale.			
			DOLOSTONE, medium to coarse grained.			
			DOLOSTONE, interformational conglomerate, medium grained, light brownish gray.			
-20			DOLOSTONE, medium grained, light yellowish brown, horizontal limonitic layers.			
			DOLOSTONE, sandy, thin subhorizontal bedding.			
				87% / 55%		
			SHALE, sandy, greenish gray, horizontal laminar bedding.			
			DOLOSTONE, medium grained, light brownish gray, traces limonite.			
-25						
			DOLOSTONE, sandy, few small vugs.			

NOTES: DNAPL confirmed on FLUTe liner.

Corehole Name: R-15

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **R-17**
TOTAL DEPTH: **20.08'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**July 31 to Aug 1, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						
						No Data
			DOLOSTONE, interformational conglomerate, weathered, medium grained with intervals fine to very fine grained, light buff, chert nodule at 3.75 to 3.82 ft.	97% / 46%	0	
					0	
-5			DOLOSTONE, medium to fine grained, slightly weathered, gray with scattered yellowish brown, small vugs, weathered chert nodule with calcite and clay fill at 4.83.	100% / 100%		
			Interformational conglomerate, DOLOSTONE, medium to fine grained, light gray, some white calcite fill.		0	
			DOLOSTONE, very fine grained, very thin convolute clay seams, few vertical fractures at 6.67 feet, some calcite fill.	100% / 25%		
			DOLOSTONE, fine grained, light buff gray, scattered, very thin, confolute clay seams.	100% / 57%	0	
-10			DOLOSTONE, fine to medium grained, weathered, mottled light gray and light yellowish brown, few vugs.	100% / 86%	0	
			DOLOSTONE, very fine grained, inclined glauconitic clay beds to 1/8 inch, light gray.			

NOTES: No NAPL detected.

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, very fine grained, with vugs, light gray.		0	
			DOLOSTONE, very fine grained with subplanar glauconitic clay intervals to one inch, light gray.			
			DOLOSTONE, interformational conglomerate, medium to fine grained, some calcite cement and scattered glauconitic clay.		0	
-15			DOLOSTONE, fine to very fine grained, light gray, scattered thin, convolute glauconitic clay.		0	
			DOLOSTONE, very fine grained, light buff, scattered thin to 1/4-inch clay seams, some glauconitic, some brown.	94% / 74%	0	
-20						

NOTES: No NAPL detected.

Corehole Name: R-17

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(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **T-13**
TOTAL DEPTH: **21'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**August 3, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						No Data
			DOLOSTONE, poor recovery.	57% / 51%	0	
-5					0	
					0	
-10			DOLOSTONE, very fine grained, soft sediment deformation, light yellowish brown to buff, numerous convolute to subplanar glauconitic shale seams.		0	
			DOLOSTONE, fine grained, light greenish gray to buff, several subplanar glauconitic shale beds to 1/8-inch thick, healed vertical fracture with offset shale	89% / 79%		

NOTES: No NAPL detected.

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			beds.		0	
			DOLOSTONE, slightly weathered, light gray to buff, soft sediment deformation.			
			DOLOSTONE, fine grained, buff.		0	
-15			SHALEY DOLOSTONE, fine to very fine grained, light greenish gray to buff, laminar bedding with shaley partings.			
			DOLOSTONE, fine to very fine grained, light buff, white fill along slightly inclined fracture at 15.75 feet.		0	
			DOLOSTONE, fien grained, light yellowish brown, dendrites.			
			SHALE, glauconitic, laminated, greenish gray.			
			DOLOSTONE, fine grained, light greenish gray, soft sediment deformation, convolute and offset shaley beds.		0	
-20			DOLOSTONE, fine to medium grained, light gray, one 3/4-inch bed of white dolostone.			

NOTES: No NAPL detected.

Corehole Name: T-13

PARSONS
400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **T-15**
TOTAL DEPTH: **20.33'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**August 2, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0			DOLOSTONE, very fine grained, yellowish brown with dendrites, slight mottling with light gray, well fractured, scattered thin gluconitic clay seams.	100% / 71%	0	
					0	
-5			DOLOSTONE, medium to fine grained, mottled yellowish brown and light gray, some sandy intervals, small vugs, few dendrites.			
			DOLOSTONE, fine to very fine grained, light gray, few thin subplanar gluaconitic shale seams.		0	
			DOLOSTONE, medium to fine grained, soft sediment deformation, especially at top of interval, light gray to buff, little yellowish brown.			
			DOLOSTONE, fine grained, light gray, subplanar shaley beds up to 1/2-inch thick.	98% / 71%	0	
			DOLOSTONE, medium grained, buff to light gray, soft sediment deformation, very thin convolute glauconitic shale beds.			
-10			DOLOSTONE, fine grained, mottled light gray and light yellowish brown, small vugs, discontinuous.	100% / 78%	0	
			DOLOSTONE, fine to medium grained, interbedded light gray and light yellowish brown, numerous thin to very thin subplanar to convolute glauconitic shale beds, some shale beds cut across healed fractures.			

NOTES: No NAPL detected.

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
-15			DOLOSTONE, medium to fine grained, interformational conglomerate, few vugs, light gray and light yellowish brown.	100% / 93%	0	0
			DOLOSTONE, fine to medium grained, locally sandy, abundant shaley beds, some displaced by healed discontinuities.		0	
			DOLOSTONE and CHERT, interformational conglomerate, medium grained.		0	
			DOLOSTONE, medium grained, light yellowish brown, calcite inclusion, cross cutting bedding.	100% / 92%		
-20			DOLOSTONE, fine grained, light greenish gray, 1-inch glauconitic shale at top, thin subplancar shaley beds, random orientation.			

NOTES: No NAPL detected.

Corehole Name: T-15

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400 Woods Mill Road South, Suite 330
Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **T-17**
TOTAL DEPTH: **20.25'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**July 30, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						No Data
			DOLOSTONE, very fine grained, yellowish brown with black dendrites, few very thin greenish gray subplanar shale beds.	97% / 58%	0	
			DOLOSTONE, fine grained, mottled buff and yellowish brown, scattered dark dendrites, scattered thin subplanar sandy glauconitic shale beds.		0	
-5						
			DOLOSTONE, very fine grained, mottled light gray and yellowish brown, few very small vugs.		0	
			DOLOSTONE, very fine grained, yellowish brown, little dendrite, very thin subplanar glauconitic shale beds, black mineralization on fracture partings at 7.33 and 7.5.			
			DOLOSTONE, fine to very fine grained, light greenish gray, subplanar shaley beds.	96% / 38%	0	
			DOLOSTONE, very fine grained, light greenish gray with subplanar shaley beds to 1/8-inch thick.			
			DOLOSTONE, fine to very fine grained, soft sediment deformation, mottled light buff and light gray, sandy at fractures at 8.83 and 9.08.			
-10					0	
			DOLOSTONE, very fine grained, interformational conglomerate, light yellowish brown, minor calcite inclusions.	99% / 89%		
			DOLOSTONE, fine grained, light buff.			
			DOLOSTONE, very fine grained, some soft sediment deformation, scattered thin			

NOTES: No NAPL detected.

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
-15			to very thin subplanar gluaconitic shale beds, mottled very light yellowish brown to buff gray.		0	
			DOLOSTIONE, fine to medium grained, soft sediment deformation, mottled light yellowish brown and buff gray.		0	
			DOLOSTONE, fine grained with scattered medium grained, buff gray.			
			DOLOSTONE, very fine grained, light greenish gray with abundant thick subplanar glauconitic shale beds.		0	
			DOLOSTIONE, meidum to fine grained, buff, soft sediment deformation, sandy fractures top and bottom.			
-20			DOLOSTIONE, fine grained, light greenish gray to buff, thick(1/2-inch) subplanar glauconitic shale at 19 and 19.75 feet.	100% / 57%		

NOTES: No NAPL detected.

Corehole Name: T-17

PARSONS
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Chesterfield, MO 63017
(314) 576-7330

MONITORING WELL LOG

BOREHOLE NO.: **U-17**
TOTAL DEPTH: **23.04'**

PROJECT INFORMATION

PROJECT:	**DNAPL Investigation**
SITE LOCATION:	**Industrial Drive**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**July 26, 2007**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Neal Stephens**
RIG TYPE:	**Mobile**
METHOD OF DRILLING:	**HX Core**
SAMPLING METHODS:	
HAMMER WT./DROP	

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
0						
						No Data
			DOLOSTONE, very fine grained, buff, some dendrite, scattered very thin shaley beds, highly fractured.	100% / 0%	0	
				100% / 44%		
			DOLOSTONE, fine to very fine grained, mottled buff to buff-gray, scattered very thin convolute shaley beds.		0	
-5						
			DOLOSTONE, interformational conglomerate, medium grained, mottled light gray and light yellowish brown.	95% / 68%	0	
			DOLOSTONE, very fine grained, slightly mottled, mostly light gray with scattered very light yellowish brown, banding apparent at bottom of interval.		0	
			DOLOSTONE, very fine grained, greenish gray, scattered subplanar glauconitic shaley beds.	100% / 89%		
-10			DOLOSTONE, fine to very fine grained, buff, scattered thin sandy intervals, fracture in sandy interval at 9.58 feet.		0	
			DOLOSTONE, fine to very fine grained, abundant soft sediment deformation, mottled light yellowish brown and greenish gray.	100% / 88%		

NOTES: No NAPL detected

DEPTH	FRAC.	LITH SYMBOLS	CORE/CUTTINGS DESCRIPTION	REC./ RQD	PID / SCAN ppm 0-2000	RETURN WATER CONC. ug/L
			DOLOSTONE, very fine grained, very light greenish gray, abundant very thin to thin subplanar glauconitic shales.		0	
			DOLOSTONE, very fine grained, light greenish gray, scattered thin to very thin subplanar glauconitic shale beds.		0	
-15			DOLOSTONE, medium to fine grained, interformational conglomerate, mottled light yellowish brown and light buff-gray.		0	
			DOLOSTONE, very fine grained, some soft sediment deformation, abundant subplanar intervals of glauconitic shale.		0	
			DOLOSTONE, very fine grained, light yellowish brown, CHERT nodules, sandy intervals.			
			DOLOSTONE, light greenish gray to light yellowish brown, thin calcite seams.			
-20			DOLOSTONE, medium grained, light gray, scattered very thin subplanar shaley beds.			
			DOLOSTONE, medium grained, light gray, few vugs, some calcite beds, soft sediment deformation.			

NOTES: No NAPL detected

Corehole Name: U-17

PARSONS
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Chesterfield, MO 63017
(314) 576-7330

FIELD BOREHOLE LOG

BOREHOLE NO.: **Defect 1**
TOTAL DEPTH: **12 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**May 12, 2008**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Cecil Harriss**
RIG TYPE:	**AMS Power Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little Clay, some Gravel, silt light brown, mod soft, damp, gravel angular limestone fill.		100%	703
			SILT, little Clay, trace pebbles, soft, damp, brown.		100%	507
-5		ML	SILT, little Clay and Sand, soft, moist, brown.	SDF1-SS01-006.0-080512		740
			SILT, little Clay, mod. firm, damp, brown.		100%	705
-10			SILT, little Clay and Sand mod. soft, moist, brown.			190
			SILT, some Clay, trace Gravel, small nodules, very firm, slightly plastic, mottled yellowish brown and brown.	SDF1-SS01-011.0-080512		

NOTES:

PARSONS
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Chesterfield, MO 63017
(314) 576-7330

FIELD BOREHOLE LOG

BOREHOLE NO.: **Defect 2**
TOTAL DEPTH: **14 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**May 13, 2008**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Cecil Harriss**
RIG TYPE:	**AMS Power Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			Fill, SILT and Gravel, some Sand, gravel is angular limestone.		70%	
		GM				16
			SILT, little Clay, soft, moist, some small concretions, light brownish gray.			
-5			SILT, little Clay and Sand, small concretions, moist, yellowish brown.		80%	406
				SDF2-SS01-006.0-080513		442
		ML	SILT, little Sand, trace Clay, mod. firm, crumbly, damp, olive gray.		80%	175
-10						258
			SILT, little Sand, mod. firm, crumbly, damp, dark brownish gray.		100%	276
				SDF2-SS01-014.0-080513		129

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FIELD BOREHOLE LOG

BOREHOLE NO.: **Defect 3**
TOTAL DEPTH: **7 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**May 13, 2008**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Cecil Harriss**
RIG TYPE:	**Mule Mount Geoprobe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little Clay, mod. firm, moist, brown.		70%	
		ML	SILT, little Clay, mod. firm, slightly plastic, yellowish brown.			6
-5		ML-CL	SILT, some Clay, scattered small nodules, firm to stiff, sticky, moist, light yellowish brown to yellowish brown.	SDE3-SS01-005.0-080513	80%	147
				SDE3-SS01-007.0-080513		281

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FIELD BOREHOLE LOG

BOREHOLE NO.: **Defect 4**
TOTAL DEPTH: **8 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**May 13, 2008**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Cecil Harriss**
RIG TYPE:	**AMS Power Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little Sand and Clay, soft, wet to very moist, brown to dark brown.		75%	
		ML				314
-5			SILT, some Clay, little Sand, stiff, damp to moist, mottled brown and yellowish brown.		100%	425
		ML-CL		SDE4-SS01-006.0-080513		484
				SDE4-SS01-008.0-080513		532

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FIELD BOREHOLE LOG

BOREHOLE NO.: **Defect 5**
TOTAL DEPTH: **8 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Peter Gelman**
DATES DRILLED:	**May 13, 2008**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Cecil Harriss**
RIG TYPE:	**Mule Mounted Geoprobe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little Clay, soft, wet, grayish brown.		80%	
		ML				314
					100%	425
-5			SILT, some Clay, trace Gravel, stiff, moist, mottled grayish brown and light olive brown, gravel subrounded.			
		ML-CL		SDE5-SS01-006.0-080513		484
				SDE5-SS01-008.0-080513		841

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FIELD BOREHOLE LOG

BOREHOLE NO.: **A-01**

TOTAL DEPTH: **9.5 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 19, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		MH	tan clayey SILT w/organics, dry, loose		
			tan silty CLAY, dry, hard, friable		
		CL			
			tan and gray CLAY, moist, hard, plastic w/black nodules		0
-5					
		CH			
			gray silty CLAY, moist, hard, plastic, w/chert		

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FIELD BOREHOLE LOG

BOREHOLE NO.: **A-04**

TOTAL DEPTH: **7.75 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 19, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			tan SILT, w/ organics at surface, dry, loose		370
					15700
					7786
					5081
			tan to lt brown silty CLAY, dry, vv hard, vv stiff		5054
					742
					3378
					2422
			brown, damp, soft, plastic CLAY. (chert at refusal)		5772
-5					1101
					338
					77
					0

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FIELD BOREHOLE LOG

BOREHOLE NO.: **A-05**
TOTAL DEPTH: **13 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 18, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			gravel and silty SAND		
		FILL			
		FILL	gravelly SILT, dry, loose		
		CL	gray silty CLAY, moist, firm, low plastic		
		CH	as above, less silt, more plastic		
-5		SW	CHERT and SAND, damp, loose		
			red CLAY w/silt, vv hard, vv firm, damp, plastic		0
		CH			
		CH	as above w/chert		
-10			as above w/o chert w/ 30% sand, moist		
		CH			

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FIELD BOREHOLE LOG

BOREHOLE NO.: **B-01**
TOTAL DEPTH: **13 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 18, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Asphalt and Gravel		
		ASPHALT			
			brown clayey SILT, dry		
		MH	limestone GRAVEL		
		GRAVEL			
		CL	brown silty CLAY, dry m soft		24 ppm
			brown CLAY w/ some silt, damp, m soft, low plastic hardness increases w/ depth		
-5					
		CL			
					22 ppm
-10					
			cherty, gravelly CLAY, lt brown w/ red stains, v hard, v stiff		
		CH			
					0

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FIELD BOREHOLE LOG

BOREHOLE NO.: **B-02**
TOTAL DEPTH: **12.25 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 19, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Asphalt and Gravel		
		ASPHALT			
			brown and black SILT, dry, loose		
		SILT			
		CLAY AND SILT	tan and brown silty CLAY, dry, m soft, low plastic		498
			brown CLAY, dry, hard, low plastic		
-5					
		CL			
					0
-10					
		GW	GRAVEL		
		CH	tan sandy, silty, CLAY, dry, vv hard, v stiff		

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FIELD BOREHOLE LOG

BOREHOLE NO.: **B-03**
TOTAL DEPTH: **14.83 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 18, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Asphalt and Gravel		
		ASPHALT			444
		CLAY AND SILT	brown clayey SILT, dry loose		
		GRAVEL	limestone GRAVEL		
			brown CLAY w/silt, v hard, low plastic w/red mottling, less silt with depth		
-5		CL			
			as above except m soft		
					0
-10		CL			
			CHERT		
		GP			
			brown CLAY, damp, vv hard, vv stiff, sand at refusal		
		CH			

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **B-04**
TOTAL DEPTH: **11.58 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 18, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			Asphalt and Gravel		
		ASPHALT			4015
			lt brown to gray clayey SILT, damp, loose		
		MH			
		CLAY AND GRAVEL	gray silty CLAY, m soft, damp, plastic		
			limestone GRAVEL		
			brown and gray silty CLAY, damp, m soft		
-5		CH			
					0
			dk brown SILT, dry loose		
		ML	brown and gray silty CLAY, damp, m hard		
		CH			
			gray SHALE, moist, flaking, sandstone at refusal		
-10		Shale			

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FIELD BOREHOLE LOG

BOREHOLE NO.: **C-01**
TOTAL DEPTH: **6 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept 19, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		ASPHALT	Asphalt and Gravel		988
			brown silty CLAY, dapmp, m soft, plastic		
		CLAY AND SILT			0
-5		Siltaceous	tan silty SHALE w/gray bands, dry		

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **C-03**
TOTAL DEPTH: **8.42 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 19, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		ASPHALT	Asphalt, Gravel and Clay		
			brown silty CLAY, dry, low plastic		
		CL			0
-5					
			tan clayey SILT, moist, loose		
		MH			

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **C-04**
TOTAL DEPTH: **14.67 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 19, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**DPT**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0		ASPHALT	Asphalt and well graded Gravel		
			brown silty CLAY, moist, m soft, some black staining		
		CLAY AND SILT			
-5			brown CLAY, m hard, plastic		
					0
		CH			
-10					
			brown silty CLAY, hard, damp		
		CH			

NOTES:

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **C-05**
TOTAL DEPTH: **15 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lucas White**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**Sept. 20, 2007**

DRILLING INFORMATION

DRILLING CO.:	**Harriss Drilling Services**
DRILLER:	**Jim Harriss**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	PID
0			tan clayey SILT, dry, w/ organics at the surface		
		Clay and Silt			
			brown silty CLAY, dry, m hard, friable, roots throughout		
-5					
					0
		Clay and Silt			
-10					
		CH	brown CLAY, damp, v hard		
		CH	reddish brown CLAY w/ coarse sand and chert nodules (<10%), moist, v hard, stiff, plastic		
-15					

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVI1**
TOTAL DEPTH: **9.83 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**9/10/2009**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Mark Stephens**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, damp, cohesive, brownish gray and yellowish brown			
			SILT, trace clay, damp, soft, brownish gray			
-5		MH				
			SILT, some clay, trace gravel and sand, damp, firm, some weathered sandstone, brownish gray			
			SILT, some clay and gravel, firm, damp, olive gray and yellowish brown			18500

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVI2**
TOTAL DEPTH: **10 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**9/9/2009**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Mark Stephens**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, trace clay, sand and gravel, dry, firm, mottled olive gray and light brownish gray, scattered limonite stains			228
						4500
-5		MH				
			SILT, some clay, slightly moist, olive and light yellowish brown			0
-10						

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVI3**
TOTAL DEPTH: **10.17 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**9/8/2009**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Mark Stephens**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, trace sand and gravel, damp, slightly cohesive, light brownish gray and yellowish brown			
-5		MH	SILT, little clay and sand, trace gravel, damp, cohesive, mottled brownish yellow and brownish gray			0
			SILT, little clay, trace sand, firm, damp, grayish brown and light brownish gray, scattered limonite stains			
-10						

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVI4**
TOTAL DEPTH: **10 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**9/8/2009**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Mark Stephens**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, trace clay, loose, damp, light brownish gray			
			SILT, trace clay, light pinkish gray, scattered limonite stains, damp			
-5		MH				0
-10						

NOTES:

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FIELD BOREHOLE LOG

BOREHOLE NO.: **SVI5**
TOTAL DEPTH: **10 feet**

PROJECT INFORMATION

PROJECT:	**Kellwood OU2**
SITE LOCATION:	**New Haven, MO**
JOB NO.:	**442906-01000**
LOGGED BY:	**Lee Gorday**
PROJECT MANAGER:	**Mark Raybuck**
DATES DRILLED:	**9/8/2009**

DRILLING INFORMATION

DRILLING CO.:	**S&S Drilling**
DRILLER:	**Mark Stephens**
RIG TYPE:	**Direct Push Probe**
METHOD OF DRILLING:	**Direct Push**
SAMPLING METHODS:	**Macro Tube**
HAMMER WT./DROP	**Hydraulic Push**

Depth	Soil Symbols	USCS	Soil Description	Sample	Recov. %	PID
0			SILT, little clay, trace sand, damp, loose, light yellowish brown			
			SILT, some clay, trace sand, damp, cohesive to slightly firm			
-5		MH	SILT, little clay, damp, cohesive, light brownish gray with scattered limonite staining			0
			as above, slightly pinkish brownish gray			
-10						

NOTES:

APPENDIX D
INTERVAL SCREENING REPORT AND GEOPHYSICAL LOGS

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SECTION 1
INTRODUCTION

1.1 INTRODUCTION

The purpose of the Remedial Investigation and Feasibility Study (RI/FS) at the Operable Units 2/6 (OU2/OU6) (**Figure 1**) of the Riverfront Superfund Site, located in New Haven, Franklin County, Missouri is to investigate the nature and extent of impacted media, to determine if the impacted media pose a threat to public health or the environment, and to develop and evaluate potential remedial alternatives. All work is being performed to fulfill the requirements of the Administrative Order on Consent, Docket No. CERCLA-07-2004-0078 (AOC) entered into by the United States Environmental Protection Agency (USEPA) with Kellwood Company (Kellwood), dated March 22, 2004.

As outlined in the AOC and associated scope of work (SOW), the Remedial Investigation (RI) includes a hydrogeologic assessment of OU2/OU6. The goal of this assessment is to determine the horizontal and vertical extent and magnitude of tetrachloroethene (PCE) (a contaminant of concern at OU2/OU6) contamination in groundwater and to determine the geologic, hydrologic, and geochemical factors that affect the distribution and migration of PCE in the subsurface. In order to achieve this goal, one of the tasks was to conduct an interval screening study of two existing residential wells, JS-14 and JS-36 (the "Study"). The USEPA requested Kellwood conduct this Study in advance of the remaining RI/FS work to provide information regarding whether there is interconnectivity between geologic strata and thus whether operation of these wells could be a pathway for vertical migration of impacted groundwater.

From April 3, 2006, through April 7, 2006, Parsons, on behalf of Kellwood, conducted the Study in accordance with the Revised Interval Screening Technical Memorandum (Memo), approved April 3, 2006, and the Draft Quality Assurance Project Plan (QAPP), conditionally approved on March 23, 2006, for this Study. In August 2006, an Interval Screening Report (for JS14/36) [ISR] was submitted to the USEPA describing the activities conducted during the Study and the results obtained from those activities.

In accordance with Parsons' response to USEPA's January 16, 2007 and September 28, 2007 comments on the August 2006 Interval Sampling Report ("2007 Correspondence"), Parsons conducted the interval screening activities at JS-36 again in April 2008. The purpose of the April 2008 work at JS-36 was, first, to remove the obstruction (abandoned pump) encountered during the April 2006 investigation and, then, to redo the work associated with the interval screening activities at JS-36 absent the abandoned pump. During the course of the April 2008 activities at JS-36, Parsons installed liners at JS-14 and JS-36 to modify the wells in a manner that would preclude PCE or other contaminants-of-concern related to OU2/6, from migrating downwards, thereby reducing the concentration of OU2/6 contaminants in the wells (and thereby in the influent that enters the home water system). Additionally, based on USEPA's December 5, 2007 approval letter with comments, JS-37 was reconfigured in accordance with the specific guidance discussed in the December 17, 2007 teleconference with the USEPA.

This revised interval screening report has been modified to include the following:

- Methodologies associated with the April 2006 interval screening activities at JS-14 and JS-36;
- Methodologies associated with the April 2008 interval screening activities at JS-36;
- Findings of the interval screening activities for JS-14 (from the April 2006 effort) and for JS-36 (from the April 2008 effort);
- A discussion of the liner installations at JS-14 and JS-36; and
- A discussion of the reconfiguration work at JS-37.

1.2 OBJECTIVES OF THE STUDY

PCE has been detected at concentrations slightly higher than the Maximum Contaminant Level (MCL) (5 µg/L) in JS-14, while PCE was detected at concentrations higher than 200 µg/L in JS-36. These residential wells are located approximately 300 feet apart, on either side of the Boeuf Lutheran Road. The casing depths of both wells are unknown. The overall goal of the

Study was to gain additional understanding on PCE detections at the two residential wells. Following are the specific objectives of the interval screening:

- Use borehole geophysical techniques to identify transmissive intervals and intervals with the potential to carry contaminants into the well;
- Use this information to gain a better understanding of residential well construction and potential contaminant migration through the wells to lower units and subsequently to other wells;
- Use natural gamma logs to correlate units to United States Geological Survey (USGS) logs and between locations; and
- Use this information to develop recommendations to minimize the potential for the residential wells to act as a conduit for contaminant migration.

1.3 REPORT ORGANIZATION

This revised interval screening report (Revised ISR) is organized as follows:

Section 1: Describes the purpose and organization of the document.

Section 2: Describes the interval screening activities conducted at the site.

Section 3: Summarizes the results of the interval screening activities and presents the conclusions of the Study.

Section 4: Presents recommendations for future work at the two residential wells.

SECTION 2
INTERVAL SCREENING ACTIVITIES

This section describes in details the procedures and methodology used during the April 2006 interval screening at wells JS-14 and JS-36 and the April 2008 interval screening activities at JS-36. The field notes from the interval screening activities are provided in **Appendix A**.

2.1 WELL PREPARATION

April 2006

Preparation for the interval screening investigation began with the delivery and filling of a temporary 1,500-gallon water tank at each residence for use while the wells were out of service for the testing. The existing well pumps were then pulled from the well and set aside on elevated racks. At both residences the pump was connected to the home using a pitless adapter. The pump for JS-14 was connected to a section of plastic pipe which connects to a yard hydrant upstream of the whole-house treatment system. The pump was placed in the temporary tank to supply water to the residence. The pitless adapter was fitted with a closed cap and set in place to seal the water system. The pump for JS-36 was connected to black plastic pipe and to a short section of a galvanized pipe connected to a pitless adapter coupling. The pump was placed in the temporary tank and connected through temporary piping to the pitless adapter to supply water to the home. Water from the tanks at both residences passed through the whole-house treatment system prior to use in the home. Following the interval screening activities, the pumps were reinstalled in the well to restore the system for the homeowners. The check valve and several sections of drop pipe were found to be defective at JS-14 and these items were replaced.

April 2008

Preparation for the interval screening investigation at JS-36 began with the delivery and filling of two temporary 1,500-gallon water tanks at the residence for use while the well was out of service for the testing. The existing well pump was then pulled from the well and connected to black plastic pipe and to a short section of a galvanized pipe connected to a pitless adapter coupling. The pump was placed in the temporary tank and connected through temporary piping

to the pitless adapter to supply water to the home. Water from the tanks passed through the whole-house treatment system prior to use in the home.

Table 2.1 summarizes the chronology of interval screening activities conducted at each well and includes the approximate time elapsed between the various activities since pump removal at each well.

2.2 GEOPHYSICAL LOGGING

April 2006

Downhole borehole geophysics performed on the two residential wells (JS-14 and JS-36) included:

1. Borehole visual imaging using an optical televiewer and borehole diameter measurement with a caliper to determine well construction and identify any significant bedding planes, fracture zones, and solution cavities that may provide a preferential groundwater migration pathway;

2. Borehole natural gamma, single point resistivity, and self-potential surveys to assist in correlating the location-specific stratigraphy to other well locations within OU2 and OU6;

3. Interval water characteristics and flow measurements using a fluid resistivity/ temperature probe and heat-pulse flowmeter during ambient conditions to determine those intervals providing the greatest yield to the well borehole; and

4. Interval flow measurements while pumping from the top at a constant rate to verify the highest yielding intervals to the well borehole under stressed conditions (similar to residential well pumping conditions).

April 2008

Downhole borehole geophysics performed on the residential well JS-36 included:

1. Borehole visual imaging using an optical televiewer and borehole diameter measurement with a caliper to determine well construction and identify any significant bedding planes, fracture zones, and solution cavities that may provide a preferential groundwater migration pathway;

2. Borehole natural gamma, single point resistivity, and self-potential surveys to assist in correlating the location-specific stratigraphy to other well locations within OU2 and OU6;

3. Interval water characteristics and flow measurements using a fluid resistivity/ temperature probe and heat-pulse flowmeter during ambient conditions to determine those intervals providing the greatest yield to the well borehole; and

4. Interval flow measurements while pumping from the top at a constant rate to verify the highest yielding intervals to the well borehole under stressed conditions (similar to residential well pumping conditions).

2.2.1 Temperature – Fluid Resistance – Fluid Conductivity

April 2006

Temperature, fluid resistance, and fluid conductivity of the water in the borehole were measured over the entire saturated depth of both wells using a Mount Sopris Instrument Company, Inc. (MSI) Model 2PFA-1000 probe. The temperature, fluid resistance, and fluid conductivity sensors on the 2PFA-1000 probe were calibrated at the factory prior to shipping to the site. Changes in the temperature, fluid resistance and fluid conductivity may indicate zones of flow into or out of the borehole. All logging probes were lowered into the wells using an MSI 4MXA-1000 winch. The signals from all of the probes were processed through an MSI MGX-II console to convert the analog signal to a digital input. The digital input was fed to a laptop computer. The log acquisition, including recording of the measurements and the control of the probe, was performed using MSLog software.

As each tool was placed into the borehole, the top of the tool was brought to the ground surface for well JS-14 or the top of casing for well JS-36. The zero depth was indicated in MSLog, which then automatically corrected for the depth of each of the sensors from the top of the tool. At the completion of the logging run, the top of the tool was again brought to the ground surface to compare whether there had been any slippage causing erroneous depth readings.

Logging of temperature, fluid resistance, and fluid conductivity was performed under both static and pumping conditions. The static logging was performed first after a period of no activity in the borehole, allowing the well to reach ambient conditions prior to logging. The fluid static logging was conducted after at least 21 hours of no activity.

The wells were logged under pumping conditions following the heat pulse flowmeter measurements. The log was run only in the portion of the borehole beneath the pump. At well JS-14, the pumping rate was approximately 2 gallons per minute (gpm) while the pumping rate at JS-36 was approximately 5 gpm. Each of these wells was pumped for over two hours at a lower rate during flowmeter testing. The variation of pumping rate over time along with the calculated drawdown (based on the measured water levels) is presented in **Table 2.4**.

April 2008

Temperature, fluid resistance, and fluid conductivity of the water in the borehole (JS-36) were measured over the entire saturated depth of the well using a Mount Sopris Instrument Company, Inc. (MSI) Model 2PFA-1000 probe. The temperature, fluid resistance, and fluid conductivity sensors on the 2PFA-1000 probe were calibrated at the factory prior to shipping to the site. Changes in the temperature, fluid resistance and fluid conductivity may indicate zones of flow into or out of the borehole. All logging probes were lowered into the wells using an MSI 4MXA-1000 winch. The signals from all of the probes were processed through an MSI Matrix console to convert the analog signal to a digital input. The digital input was fed to a laptop computer. The log acquisition, including recording of the measurements and the control of the probe, was performed using MSLog software.

As each tool was placed into the borehole, the top of the tool was brought to top of casing. The zero depth was indicated in MSLog, which then automatically corrected for the depth of each of the sensors from the top of the tool. At the completion of the logging run, the top of the tool was again brought to the ground surface to compare whether there had been any slippage causing erroneous depth readings.

Logging of temperature, fluid resistance, and fluid conductivity was performed under both static and pumping conditions. The static logging was performed first after an overnight period of no activity in the borehole, allowing the well to reach ambient conditions prior to logging. The fluid static logging was conducted after at least 96 hours of no activity.

The well was logged under pumping conditions following the heat pulse flowmeter measurements. The log was run only in the portion of the borehole beneath the pump. At well

JS-36, the pumping rate was approximately 6 gpm. The variation of pumping rate over time along with the calculated drawdown (based on the measured water levels) is presented in **Table 2.4**.

2.2.2 Natural Gamma – Self Potential – Single Point Resistance

April 2006

Natural gamma, self potential (SP), and single point resistance (SPR) surveys were performed in both JS-14 and JS-36 wells. The surveys were performed using an MSI Model 2PGA-1000 probe. The probe was factory calibrated; there were no field adjustments necessary for the probe. The ground probe was clamped to a steel water hydrant at JS-14. During the April 2006 event, a ground probe was clamped to the casing of the well on JS-36. Although it was not evident until after data analysis, this procedure of connecting the ground clamp to the well casing could have caused short circuiting resulting in wandering SP readings.

These logs were performed under static conditions. The gamma log measures the natural gamma radiation produced by the rock formation through which the well passes. Peaks in gamma activity generally indicate areas with higher clay content or the presence of oxides of iron or manganese. The SP probe measures very small voltages that exist between the grounded probe and the surrounding rock. SPR measures the resistivity of the rock through which the borehole passes. Because rock is more resistive to electrical flow than water, higher SPR values are typically associated with rock that contains less water, whereas lower SPR values are associated with zones with greater water content. Logging was performed at a rate of approximately 20 feet per minute (ft/min). As with the other logging probes, the depth of the tool was set to zero before beginning the log and checked again at the completion of the logging.

April 2008

Natural gamma, SP, and SPR surveys were performed in JS-36. The surveys were performed using an MSI Model 2PGA-1000 probe. The probe was factory calibrated; there were no field adjustments necessary for the probe.

In accordance the 2007 Correspondence, to avoid any interference from connections to the well, the ground rod was driven approximately 5.5 feet into the ground.

These logs were performed under static conditions. The gamma log measures the natural gamma radiation produced by the rock formation through which the well passes. Peaks in gamma activity generally indicate areas with higher clay content or the presence of oxides of iron or manganese. The SP probe measures very small voltages that exist between the grounded probe and the surrounding rock. SPR measures the resistivity of the rock through which the borehole passes. Because rock is more resistive to electrical flow than water, higher SPR values are typically associated with rock that contains less water, whereas lower SPR values are associated with zones with greater water content. Logging was performed at a rate of approximately 20 ft/min. As with the other logging probes, the depth of the tool was set to zero before beginning the log and checked again at the completion of the logging.

2.2.3 Borehole Flow Measurements

April 2006

Vertical flow within the borehole was measured under both static and pumping conditions. The flow was measured using an MSI model HFP-2293 flowmeter. This flowmeter has a diverter that forces all vertical flow in the borehole to pass through a cell that has thermisters above and below a heating element. In operation, the heating element creates a momentary pulse of heat. This heat pulse passes either the upper or lower thermister in response to the flow of water in the borehole. In the event that there is no flow in the borehole, the heat pulse will slowly move upward due to the reduced density of the heated water. These results are observable on the display of the MSHeat program as a very gradual rise and subsequent fall of the differential temperature at a time beyond 30 seconds from the time of the pulse. This is in contrast to the sharp deflection that is observed when the heat pulse is carried by water flow in the borehole.

In the April 2006, a rental flowmeter probe and a flowmeter probe owned by the United States Geological Survey (USGS) were used during the Study. The wave forms produced using the rental probe were observed to be different than expected; therefore, the USGS probe was

used for all the measurements presented in the ISR. Calibration settings were provided by the USGS representatives. The stated minimum resolution of the probe was 0.03 gpm. A minimum of three heat pulses were measured at each depth interval screened.

April 2008

Vertical flow within the borehole (JS-36) was measured under both static and pumping conditions. The flow was measured using an MSI model HFP-2293 flowmeter rented from Mount Sopris. This flowmeter has a diverter that forces all vertical flow in the borehole to pass through a cell that has thermisters above and below a heating element. In operation, the heating element creates a momentary pulse of heat. This heat pulse passes either the upper or lower thermister in response to the flow of water in the borehole. In the event that there is no flow in the borehole, the heat pulse will slowly move upward due to the reduced density of the heated water. These results are observable on the display of the MSHeat program as a very gradual rise and subsequent fall of the differential temperature at a time beyond 30 seconds from the time of the pulse. This is in contrast to the sharp deflection that is observed when the heat pulse is carried by water flow in the borehole.

2.2.4 Optical Televiewer

April 2006

High resolution borehole images were recorded using an MSI Model OBI-40 optical televiewer. This probe recorded 360 picture elements (pixels) of the borehole wall at vertical intervals of 0.005 feet (1.52 millimeters), resulting in a high definition image of the borehole. The probe was calibrated at the factory before being shipped to the site. No calibrations were required in the field.

Centralizers were placed on the probe to keep the tool centered in the borehole. Logging was performed at a rate of approximately 2 to 3 ft/min.

April 2008

High resolution borehole images were recorded using a Colog Model ALT OBI 40 optical televiewer. This probe recorded 720 picture elements (pixels) of the borehole wall at vertical

intervals of 0.0016 feet (0.5 millimeters), resulting in a high definition image of the borehole. The probe was calibrated at the factory before being shipped to the site. No calibrations were required in the field.

Centralizers were placed on the probe to keep the tool centered in the borehole. Logging was performed at a rate of approximately 6 ft/min.

2.2.5 Caliper

April 2006

The borehole diameter was measured using a MSI Model CLP-2380 caliper. The caliper is equipped with three arms that expand to measure the diameter of the borehole. The probe was calibrated at the factory before being shipped to the site with no field adjustments necessary. The tool was lowered to the bottom of the borehole and the arms extended. Measurements were made logging upward from the bottom of the well at approximately 20 ft/min.

April 2008

The borehole diameter was measured using a MSI Model CLP-2380 caliper. The caliper is equipped with three arms that expand to measure the diameter of the borehole. The probe was calibrated at the factory before being shipped to the site with no field adjustments necessary. The tool was lowered to the bottom of the borehole and the arms extended. Measurements were made logging upward from the bottom of the well at approximately 20 ft/min.

2.3 DISCRETE SAMPLING

Sampling of water from discrete levels was performed from both well JS-14 and well JS-36. Discrete samples were collected under both static and pumping conditions. The sampling was accomplished using a discrete sampling tool operated on the logging wireline. The tool used consisted of a chamber with a manual drain valve at the bottom and a remotely operated valve at the top. The sampler was lowered to the appropriate sample depth using the MSI 4MXA-1000 winch. The top valve was opened using the MSLog software. This allowed water from the borehole to enter the chamber. The wireline was shaken to dislodge any air entrapped in the entryways into the tool. The top valve was then closed, and the tool returned to the surface. The

depth was zeroed prior to going into the borehole and was checked again coming out of the borehole to ensure that slippage of the depth counter did not occur.

The discrete sampling during pumping was performed following the flowmeter testing and fluid property logging (includes temperature, conductivity, and fluid resistivity logging). This allowed for water stored in the borehole to be purged thoroughly prior to sampling.

Once at the surface, the contents of the sampler were poured into laboratory-provided sample containers (40-ml glass vials with Teflon septums) for chemical analysis.

April 2006

Using the discrete sampler, a total of 30 samples were collected for onsite (one partially filled 40-ml glass vial with Teflon septum) analysis using a portable gas chromatograph (GC). (Note that the discrete sampling tool used during the April 2006 activities belonged to USGS.) A total of 15 samples were submitted for laboratory analysis (12 of which had also been analyzed using the portable GC). The onsite analysis was performed by USGS staff. At JS-14, 17 samples were analyzed onsite and 6 samples were submitted to Severn Trent Laboratories, Inc. (STL) in University Park, Illinois, for analysis via USEPA Method 8260B (8260B). At JS-36, 15 were analyzed onsite and 9 were submitted to STL for analysis via 8260B.

The sampler was disassembled and rinsed twice with ASTM Type 2 water prior to each use. In accordance with the approved Memo, for Quality Assurance and Quality Control (QA/QC), two field duplicates, two equipment blanks, and one matrix spike (MS) and matrix spike duplicate (MSD) samples were collected and analyzed. The analytical results are presented in **Tables 2.2 and 2.3**.

April 2008

A total of 13 samples from JS-36 were submitted to Test America (formerly STL) in University Park, Illinois, for analysis via 8260B.[1/]

[1/] Although additional separate samples (split samples) were collected for on-site analysis (intended to be performed by USGS staff), these samples were not analyzed due to the unavailability (disrepair) of the USGS portable GC.

Prior to each use, the sampler was disassembled, and in accordance with the 2007 Correspondence, washed with a Liquinox® tap water bath, rinsed with tap water (which was run through the whole-house treatment system prior to use), and then rinsed twice with ASTM Type 2 water. For QA/QC purposes, one field duplicate, one equipment blanks, and one matrix spike (MS) and matrix spike duplicate (MSD) samples were collected and analyzed. The analytical results are presented in **Table 2.3**.

2.4 STRESS TESTING

Discrete sampling and flow measurements were performed under both stressed and static conditions. The testing was performed by temporarily installing a Grundfos submersible pump into the borehole.

April 2006

Teflon-lined flexible discharge tubing was used to carry the pump discharge to the surface. The discharge tubing, electrical conductors, and safety cable were installed on a reel to keep the downhole items clean. The pump and all attached tubing and wiring were decontaminated prior to their first use and between each borehole. The discharge of the pump was routed to a T that allowed for indicator parameter screening and the collection of samples from a small port and the conveyance of the purged water to the temporary tank used to supply the residence from a larger port. The discharged water was pumped through the whole-house filtration system for use. Excess water was discharged to the ground following treatment.

At well JS-14, the pump was set at a depth of approximately 100 feet below ground surface (bgs). The discharge of the pump was restricted to maintain a sustainable flow of approximately 2 gpm. The variation of pumping rate over time along with the calculated drawdown (based on the measured water levels) is presented in **Table 2.4**.

At well JS-36, the pump was set at approximately 80 feet bgs for the flowmeter testing. The flow rate from the pump was approximately 0.75 gpm, which produced a high upward flow rate when the flowmeter was set immediately below the pump. During the discrete sampling portion of the testing at JS-36, the pump was set at approximately 100 feet bgs. The pump was allowed to run unrestricted and produced approximately 5 gpm. Measurements of flow rate,

water level, and indicator parameters were performed periodically to monitor the performance of the wells. At well JS-14, the water level was pulled down from a static level of 78.07 feet below top of casing (btoc) to a level of 99.13 feet btoc after 5 hours and 23 minutes. At well JS-36, the water level dropped from a static level of 74.05 feet btoc to 96.34 feet btoc after approximately 8 hours.

During the April 2006 activities, periodic measurements of the indicator parameters (pH, conductivity, oxidation/reduction potential [ORP], turbidity, dissolved oxygen, and temperature) were performed during the pumping of the wells. These measurements are supplemental indications of the purge effectiveness and do not impact the analytical results. These indicator parameters are presented in **Table 2.4**.

April 2008

Considering that the April 2008 additional work at JS-36 was based on the observations made after the April 2006 Study and since the findings of the April 2006 Study enabled Parsons to determine the effective purge rate, it was not necessary, during the April 2008 JS-36 discrete sampling, to collect the indicator parameters used to determine an effective purge rate.

Vinyl discharge tubing was used to carry the pump discharge to the surface. The discharge tubing, electrical conductors, and safety cable were installed on a reel to keep the downhole items clean. The pump and all attached tubing and wiring were decontaminated prior to their first use and after use.

At well JS-36, the pump was set at approximately 100 feet bgs for the flowmeter testing and discrete sampling. The flow rate from the pump was approximately 6 gpm, which produced a high upward flow rate when the flowmeter was set below the pump. Measurements of flow rate and water level were performed periodically to monitor the performance of the well. The water level dropped from a static level of 76.78 ft btoc to approximately 99 ft btoc after approximately 2 hours.

SECTION 3
RESULTS AND CONCLUSIONS

This section discusses the findings and analytical data that were generated from the geophysical logging and interval screening conducted at well JS-14 in April 2006 and at well JS-36 in April 2008.

3.1 GEOPHYSICAL LOGS

Geophysical well logs produced from wells JS-14 and JS-36 are presented in **Appendix B**. The total well depth was measured in the boreholes following removal of the pumps. The measured depth of well JS-14 was 383.5 feet btoc. In April 2006, the measured depth of well JS-36 was approximately 330 feet btoc. Obstructions were noticed at approximately 98 feet btoc and 315 feet btoc at JS-36. The JS-36 well owner reported that the well was supposedly deeper (approximately 450 feet bgs) and a well pump inadvertently dropped in the well in the 1970's could be blocking the well at 330 feet btoc. Therefore, in April 2008, this pump was removed and the geophysical logging was conducted again. The measured depth of well JS-36 with the abandoned pump removed was 468 feet btoc.

The land surface elevation at JS-14 was surveyed to be 596.73 feet above Mean Sea Level (MSL) and the land surface elevation at JS-36 was surveyed to be 599.02 feet MSL. The reference point for the logs at JS-36 was top of casing, which is approximately 2 feet above land surface. The reference point for JS-14 was land surface.

3.1.1 Gamma, Single Point Resistance, and Self Potential

Geophysical well logs produced as a part of the interval sampling investigation are presented in **Appendix B**. Due to poor coupling of the reference probe to ground, the self potential data is random and is not an indication of actual conditions in the wells.

A comparison of the gamma logs from the two wells indicates very similar patterns of gamma response with depth over long portions of the boreholes. The gamma response pattern in the interval from 195 to 197 ft bgs (402 to 404 ft MSL) in well JS-14 correlates with the gamma response pattern in the interval from 199 to 201 ft bgs (400 to 402 ft MSL) in JS-36. Other

intervals of distinctive pattern in the log from JS-14 include: 167 to 170 ft bgs (430 to 427 ft MSL), 180 to 185 ft bgs (417 to 412 ft MSL), 227 to 241 ft bgs (370 to 356 ft MSL), 285 ft bgs (312 ft MSL), 358 to 363 ft bgs (239 to 234 ft MSL). These intervals correlate with the following intervals in well JS-36: 171 to 173 ft btoc (428 to 426 ft MSL), 183 to 189 ft btoc (416 to 410 ft MSL), 230 to 240 ft btoc (369 to 359 ft MSL), 293 ft btoc (306 ft MSL), and 365 to 370 ft btoc (234 to 229 ft MSL).

The single point resistance (SPR) log is smoother in well JS-36 than the SPR log of well JS-14. Despite this difference, specific intervals of low resistivity can be correlated between the two wells. The similar intervals are consistently found at a shallower depth (relative to bgs) by 2 to 7 feet in well JS-14 than in well JS-36. This difference in depth is related to a combination of different land surface elevation and the low dip of rocks in the area.

The logs were also compared to the gamma, self potential, and single point resistance log for well JS-37, which is located approximately 475 feet to the east. A distinctive gamma signature that was observed in JS-14 from 194 to 207 ft bgs (403 to 390 ft MSL) and in JS-36 from 197 to 211 ft btoc (402 to 388 ft MSL); appears similar to the gamma signature observed in well JS-37 from 154 to 173 ft bgs (421 to 402 ft MSL). A second distinctive gamma signature in JS-14 is indicated from 284 to 293 ft bgs (313 to 304 ft MSL). This pattern correlates with a signature in JS-36 from 291 to 300 ft btoc (308 to 299 ft MSL), and a signature in JS-37 from 246 to 255 ft bgs (329 to 320 ft MSL). The same distinctive gamma signature was observed at a depth of 190 to 196 feet (349 to 355 feet MSL) in well JS-38, which is located approximately 2,800 feet south-southeast of JS-36.

3.1.2 Temperature, Fluid Resistance, and Fluid Conductivity

3.1.2.1 Well JS-14

Fluid resistance, fluid conductivity, and temperature logs were recorded in both wells under both static and pumping conditions. The log for well JS-14 under static conditions shows a very slight (several tenths of a degree) decrease in temperature over the length of the saturated portion of the borehole. There appears to be a gradual increase in the fluid resistance from the bottom of the casing (at approximately 101 feet bgs, 487 ft MSL) to approximately 150 feet bgs

(438 ft MSL). Considering that fluid resistance can be expressed as an inverse of fluid conductivity, there is a corresponding decrease in fluid conductivity over this interval. A slight variation in the slope of the fluid conductivity and fluid resistivity curves is observed at approximately 114 to 116 feet bgs (472 to 474 ft MSL) (**Appendix B)**. This corresponds to an interval where the rock was observed to have a coarser texture on the optical televiewer log as well as a slight increase in borehole diameter. It is interpreted that there is a slight increase in production of water in this interval. The steady increase in fluid resistance and the decrease in fluid conductivity ends at approximately 145 ft bgs (443 ft MSL), below which these parameters become stable with depth. This depth corresponds to an observed color change in the rock as well as an increase in the measured downward flow rate.

The fluid resistance, fluid conductivity, and temperature log recorded for well JS-14 under pumping conditions indicates an interval of decreasing temperature and fluid conductivity and an increasing fluid resistance with depth in the 10 feet immediately below the pumping water level of 100 ft bgs (488 ft MSL). Below this depth, these parameters vary only slightly with the exception of a slight increase in temperature (one to two tenths of a degree), a slight increase in fluid conductivity (565 to 570 micro Siemens/cm), and a slight decrease in fluid resistance (17.7 to 17.5 Ohm meters) between 216 and 217 feet bgs (371 to 372 ft MSL). This interval does not correspond to an observed variation in rock character in the optical televiewer log or borehole diameter.

3.1.2.2 Well JS-36

The static fluid log for well JS-36 (**Appendix B**) indicates a slight decrease in temperature (less than 0.2 degrees Celsius) from a depth of approximately 85 ft btoc (514 ft MSL) to the bottom of the well. An interval with fluid resistivity that increases with depth was observed from top of water to a depth of approximately 125 ft btoc (474 ft MSL). The fluid parameters below this level change very gradually with depth and have a small overall difference between 125 ft btoc and the bottom of the well at 468 ft btoc (474 to 131 ft MSL). A sharp increase in fluid resistance and a decrease in fluid conductivity was observed at the bottom indicating the presence of sediment. Within the interval of increasing fluid resistivity, five areas with inflections in the trends are present. These are in the intervals of 86 to 91 ft btoc (513 to 508 ft

MSL), 97 to 99 ft btoc (502 to 500 ft MSL), 100 to 106 ft btoc (499 to 493 ft MSL), 108 to 112 ft btoc (491 to 487 ft MSL), and 117 to 122 ft btoc (482 to 477 ft MSL). These intervals are associated with intervals of potentially enhanced permeability identified on the optical televiewer log and increased hole diameter. Considering that fluid conductivity is the inverse of fluid resistance; all instances where a change in fluid resistance is noted, the inverse change on fluid conductivity was observed on the log.

The fluid log obtained under pumping conditions shows a decrease in fluid resistivity from the bottom of the pump, approximately 103 ft btoc (496 ft MSL), to approximately 149 ft btoc (450 ft MSL). While an overall decreasing trend is realized, many spikes of higher resistivity are observed. The optical televiewer log shows a vertical fracture and a number of vugs (small unfilled cavities) in this interval. Below this interval the fluid resistivity declines slightly through the borehole until bottom. Four inflections are noted at approximate depths of 282, 296, 307, and 331 ft btoc (317, 303, 292, and 268 ft MSL). Each of the inflections correlated to potentially enhanced permeability intervals as observed on the optical televiewer log. Again, it is implied that any change in the fluid resistivity noted on the log has a corresponding inverse change in fluid conductivity.

3.1.3 Borehole Flow Measurements and Caliper Log

Borehole flow measurements were made using the heat-pulse flowmeter under both static (non-pumping) and pumping conditions. Caliper measurements of the borehole were performed following the optical televiewer runs. The results of these log runs are presented in **Appendix B**. The pumping rate used during borehole flow measurements was selected to be a sustainable rate with moderate drawdown while producing an accurate heat pulse signature.

3.1.3.1 Well JS-14

The caliper log of well JS-14 showed only a small variation in borehole diameter. Intervals with a slightly larger borehole diameter included the following intervals: 102 to 104 ft bgs (484 to 486 ft MSL, just below the bottom of casing); 114 to 117 ft bgs (471 to 474 ft MSL); 119 to 121 ft bgs (467 to 469 ft MSL); 167 to 169 ft bgs (419 to 421 ft MSL); 206 to 209 ft bgs (379 to 382 ft MSL); 257 to 259 ft bgs (329 to 331 ft MSL); 330 ft bgs (258 ft MSL); 341 to 342

ft bgs (246 to 247 ft MSL); and 346 to 347 ft bgs (241 to 242 ft MSL). Well JS-14 exhibited a downward flow of water throughout most of the borehole under static conditions. There were no depths at which an upward flow was detected. The maximum downward flow rate was 0.16 gpm. Flow under static conditions was measured inside the well casing to confirm that the flowmeter was operational. Readings at this level indicated no measurable flow. At 120 ft bgs (468 ft MSL), the uppermost static reading, a downward flow rate of 0.08 gpm was measured. Approximately the same flow rate was observed at 130 (458 ft MSL) and 140 ft bgs (448 ft MSL). An increase in the downward flow rate was observed at 145 (443 ft MSL) and 150 ft bgs (438 ft MSL). Thus, over an interval of ten feet, a significant increase in flow was observed. However, there was no corresponding variation in borehole diameter on the caliper log for this interval.

High downward flow rates (ranging from 0.14 to 0.16 gpm) were observed at multiple measurements made in the interval from 150 (348 ft MSL) to 240 ft bgs (438 ft MSL). Six flow measurements below the interval of highest flow had consistent downward flow rates ranging from 0.09 to 0.11 gpm between the 250 (268 ft MSL) to 320 ft bgs (338 ft MSL). The significant drop in static flow rate between 240 (348 ft MSL) and 250 ft bgs (338 ft MSL) does not have a corresponding variation in the borehole diameter.

The measured downward flow in the static borehole dropped to very low levels (0.02 gpm to no measurable flow) for four measurements in the interval from 335 (228 ft MSL) to 360 ft bgs (253 ft MSL). A thin interval of slightly greater borehole diameter is observed at 330 ft bgs (258 ft MSL) corresponding to a relatively moderate downward flow at that depth.

The results of the static flowmeter measurements in well JS-14 indicate that the borehole gains water in the intervals from 101 to 120 ft bgs and 140 to 150 ft bgs (468 to 487 ft and 438 to 448 ft MSL, respectively). The static flow rates measured at 130 feet and 140 feet, were both downward at 0.07 gallons per minute, whereas the measured flow at 150 feet was downward at 0.16 gallons per minute downward, and was 0.15 gallons per minute at 160 feet. The borehole loses water in the intervals from 240 to 250 ft bgs and 330 to 335 ft bgs (338 to 348 ft and 253 to 258 ft MSL, respectively).

In well JS-14, significant variations were observed in borehole flow rates under pumping conditions (with a change in depth and between multiple readings recorded at the same depth). A minimum of four borehole flow readings were recorded at each depth. As shown in **Appendix B**, no clear pattern of increase or decrease in flow rate was observed over the length of the borehole under the pumping conditions.

3.1.3.2 Well JS-36

The well diameter in JS-36 showed a much higher variability than was observed in well JS-14 during the April 2006 effort. The maximum borehole diameter exceeded 12 inches in the interval from 177 to 180 ft btoc (422 to 4419 ft MSL). There were 22 intervals where the borehole diameter exceeded seven inches.

Under static (non-pumping) condition, downward flow of water was measured at all depths (**Appendix B**). The flow rate was recorded using baffles that reduced the borehole size to three inches. Therefore, actual flow rates could presumably be on the order of four times the recorded rates (i.e. a six-inch borehole has four times the cross-sectional area as a three-inch borehole). The recorded flow rate showed minimal variability. The maximum downward flow rate indicated was less than 0.15 gpm at 166 ft btoc (433 ft MSL). The flow rate down the borehole increased between the static water level at 79 ft btoc (520 ft MSL) and the uppermost flow measurement at 80 ft btoc (519 ft MSL). A series of flow measurements from 85 to 189 feet btoc (514 to 410 ft MSL) indicate a relatively consistent downward flow. This consistent downward flow indicates that there was no significant gain of water in this interval. The flow rate measurements show a drop-off of the downward flow below the 189 ft btoc (41 ft MSL) reading and those taken at 235 ft btoc (364 ft MSL) and deeper. Measurements at 235 ft btoc (364 ft MSL) and 251 ft btoc (348 ft MSL) indicate a slightly greater downward flow.

3.1.4 Optical Televiewer Log

The optical televiewer logs of the two wells were plotted at a scale of one-half foot of well per inch of log in addition to the scale of 10 feet of well per inch of log that is included in **Appendix B** and the optical log observations are presented in **Tables 3.1 and 3.2**. These detailed logs were reviewed for preferential flow paths.

3.1.4.1 Well JS-14

In well JS-14, intervals that seem to have the greatest potential to act as a preferential flow paths are: 174.5 to 176.5 ft bgs (411.5 to 413.5 ft MSL), 198 to 202 ft bgs (386 to 390 ft MSL), 207 to 209 ft bgs (379 to 381 ft MSL), 256 to 259 ft bgs (329 to 332 ft MSL), 266.5 to 269 ft bgs (319 to 321. ft MSL), 275.5 to 284.5 ft bgs (303.5 to 310.5 ft MSL) and several zones in the interval from 324 to 343 ft bgs (245 to 264 ft MSL). The zones in the interval from 324 to 343 ft bgs (245 to 264 ft MSL) correspond to a loss of flow as indicated by the static flowmeter measurements. An interval with laminated strata was noted from 248.5 to 252 ft bgs (336 to 339.5 ft MSL) and corresponds to a loss of flow as indicated by the static flowmeter measurements. However, this interval does not appear to correlate with a visual indication of a preferential flow path on the optical televiewer log. The increase in flow between 140 and 150 ft bgs (438 to 448 ft MSL) occurred in an interval with a light gray rock (between 144.5 and 149.0 ft bgs (439 to 443.5 ft MSL)) which is in contrast with the pinkish-orange color above and below 144.5 and 149 ft bgs. However, the optical televiewer logs do not indicate a preferential flow path in this interval. An interval with a coarser texture was noted from 114.5 and 116.5 ft bgs (471.5 to 473.5 ft MSL) that corresponds to the interval between the bottom of casing at 101 ft bgs (487 ft MSL) and the uppermost flow measurement at 120 ft bgs (468 ft MSL), where there was a gain of approximately 0.08 gpm.

3.1.4.2 Well JS-36

Intervals that were judged to have the greatest potential to act as a preferential flow pathway include (all depths given as ft btoc): 41.5, 69 to 69.25, 76 to 79.25, 89 to 91, 102.5, 104.75 to 105.25, 117.25 to 124, 130.5 to 132, 168.75 to 171.75, 177 to 179.25, 180.5 to 181.25, 251.75 to 253.25, 258 to 261, 273 to 274.5, 281.5 to 283.75, 296.5 to 301, 308 to 310, 316 to 318, 325.5, 329.75 to 335, 348 to 349, 356.25, 369.5 to 370.75, 380.5 to 382, 383, 384, 404.5 to 405, 411.5, 414 to 421.5 (transition zone between geologic formations), 420 to 421.5, 432.5 to 435, and 437.5 to 444. The vug indicated on the log at 41.5 ft btoc (557.5 ft MSL) was observed via the drill crew's down-hole camera (used during the abandoned pump removal activities) as producing water – visual estimations were at about 1 gpm. The caliper spike to 12 inches at 177.5 to 179 ft btoc (421.5 to 420 ft MSL) is confirmed in the optical log as a vast horizontal

opening at that level. The zone from 414 to 421.5 ft btoc (185 to 177.5 ft MSL) appears to be a transition zone from the upper, fine-grained limestone/dolomite into a shale. Likewise, the zone from 437.5 to 444 ft btoc (161.5 to 155 ft MSL) appears to be a transition zone into the sandstone of the Roubidoux Formation

3.2 ANALYTICAL RESULTS

3.2.1 Well JS-14

Discrete samples from well JS-14 were collected at nine depth intervals under static conditions on April 4 and 5, 2006, and eight discrete samples were collected during the stress testing on April 6, 2006. The static samples were collected from depths 90.4, 130.4, 155.2, 175.2, 200.2, 220.2, 250.3, 280.3, and 375.3 ft bgs. The stress samples were collected from depths 105.1, 110.1, 120.1, 134.0, 145.2, 175.0, 185.3, and 250.2 ft bgs. Two samples from the pump discharge were also collected for QA/QC purposes. The stress discrete samples were collected during the stress test following the flowmeter testing. This allowed for water stored in the borehole to be purged thoroughly prior to sampling. In addition, pH, conductivity, ORP, turbidity, dissolved oxygen, and temperature were collected at regular intervals during stress testing to indicate purge effectiveness (**Table 2.4**).

The analytical data for well JS-14 have been presented in **Table 2.2** and complete analytical data packages from the laboratory are provided as **Appendix C**. As indicated in the data validation report presented in **Appendix D**, the laboratory reported that seven of the April 2006 samples were analyzed outside the required holding time (14 days). The affected samples pertinent to this report are JS14-TB01, JS14-GW01-155.2-060404, and JS14-GW01-220.2-060405. Considering that PCE was detected in the trip blank and the equipment blank, it is possible that the water samples were contaminated either during sampling or at the laboratory. To avoid this situation, an additional rinse step was proposed in the April 2008 JS-36 additional work.

The uppermost static sample from 90 ft bgs (498 ft MSL) was collected from within the well casing and represents the lowest concentration of PCE detected as a part of the static sampling, 2.3 micrograms per liter (µg/L) at 90 feet bgs. The sample collected from a depth of

130 ft bgs (458 ft MSL) had the next lowest PCE concentration, 2.65 µg/L. The relatively small difference in the overall concentration of PCE in the samples below 130 ft bgs makes evaluation of spatial variation speculative. The sample from a depth of 200 ft bgs (388 ft MSL) did not contain PCE at concentrations above the detection limit (elevated due to presence of PCE in the equipment blank or rinsate sample).

Analysis of the eight discrete samples collected under pumping conditions indicated a general trend of PCE concentrations decreasing with depth. The samples from depths of 105 and 110 ft bgs (483 and 478 ft MSL, respectively), contained the highest levels of PCE detected from the discrete pumping samples. Samples from 135, 145, 175, 185, and 250 ft bgs (453, 443, 413, 393 and 338 ft MSL, respectively) had significantly lower concentrations than the uppermost samples. The sample from 120 ft bgs (468 ft MSL) had a concentration transitional to the higher concentrations in the samples collected above and the lower concentrations in the samples collected below.

3.2.2 Well JS-36

Discrete samples from well JS-36 were collected from six depths under static conditions on April 24, 2008. The samples were collected from depths: 77.1, 189.3, 200.0, 250.1, 267.2, and 410.2 feet btoc. Discrete samples were collected from six depths during the stress testing on April 24, 2008. The samples were collected from depths of 105.5, 189.3, 200.0, 250.1, 267.1, and 410.0 ft btoc. The discrete samples were collected during the stress test following the flowmeter testing. This allowed for water stored in the borehole to be purged thoroughly prior to sampling.

The analytical data for well JS-36 are presented in **Table 2.2** and complete analytical data packages from the laboratory are provided as **Appendix C**. Although an additional rinse step was incorporated, PCE was detected in the equipment blank associated with the samples. PCE was also detected in all of the samples. As discussed in the attached data validation report, when adjusted for dilution, the PCE concentration in the samples is comparable to the concentration in the equipment blank. Considering the high concentration of PCE at JS-36 and since the laboratory blank associated with the samples was free of volatile contamination, it is likely that the concentration in the equipment blank is due to cross-contamination. As discussed in the data

validation report (**Appendix D**) since no major QA/QC problems were found during validation of the data and no reported results have been qualified as unusable (rejected), all the reported results are considered usable as reported and qualified.

The analytical data for the static samples indicated that the PCE concentration varied little over the depth of the borehole. The sample collected from the top of the water column at 77.1 ft btoc (522 ft MSL) resulted in the highest concentration, indicating that the contamination is entering the well near the top. An effort was made to seal off the upper level of the well, below the 41.5 ft btoc inflow with a Limco packer to obtain a sample. Unfortunately, the packer was unable to completely seal off the borehole; therefore, not enough water was retained above the packer to obtain a sample.

The analytical data from the discrete samples collected under pumping conditions also varied little over the depth of the borehole. The concentrations under pumping conditions are very similar to the concentration under static conditions throughout.

An equipment blank sample taken from the discrete sampler indicated a presence of PCE. A possible explanation is that contaminated formation water was carried from one stage of decontamination to the next, resulting in decontamination water that was influenced by the contamination. However, the PCE results in the discrete sampling (under both static and pumping conditions) ranged from 210 to 290 µg/L; while the concentration in the equipment blank was only 5 µg/L. Therefore, the overall impact of any carry-over contamination is very minimal, and would not change conclusions derived from the sampling effort.

3.3 CONCLUSIONS

Based on the results of the interval screening investigation, well JS-14 was found to be approximately 383 feet deep with 101 feet of casing. The total depth of well JS-36 is 468 ft with approximately 30 feet of casing. Correlation of natural gamma and single point resistance patterns with depth is possible between the wells. Comparison of distinctive gamma signatures between JS-14 and JS-36 indicate a slight dip opposite the regional pattern. Comparison of gamma signatures with JS-37 and JS-38 show a dip to the north-northwest, which is more in keeping with the regional pattern.

A rise in the fluid conductivity is observed on the pumping log of JS-14 at 214 ft bgs (374 ft MSL). Inflections in fluid conductivity were observed at 282, 296, 307 and 331 ft btoc [317, 303, 292, and 331 ft MSL] in JS-36.

Flow meter data indicate that a downward flow is present in both wells under static conditions. The flow rate is significantly greater in the well than what can be measured with the tools without use of baffles. Because of the strong static flow, little variation is identified in PCE concentration with depth in either well. Flow meter data under pumping conditions are inconclusive with regard to discrete zones of water production.

The optical televiewer and caliper logs, when compared to the logs from JS-14, indicate zones of potentially enhanced permeability in both wells in the approximate intervals from 170 to 180 ft and 250 to 285 ft). Additional zones of potentially enhanced permeability are observed as presented in **Tables 3.1 and 3.2**. The analytical data do not indicate an apparent pattern; however, based on the similar trends (as compared to the results of the JS-14 geophysical logging) in the static flowmeter, natural gamma, fluid conductivity, temperature and SPR logs, it is likely that water containing high concentrations of PCE enters the well at shallow depths, travels down the borehole and exits the well at a lower elevation of the well (JS-36).

Both wells appear to act as a conduit for downward migration of contaminants. Due to the greater flow rate and higher overall PCE concentrations observed in well JS-36, this well is considered to be the greater contributor to the downward migration of PCE.

SECTION 4
CORRECTIVE ACTIONS

Based on the results of the geophysical logging and discrete sampling efforts on wells JS-14 and JS-36, liners were installed in both wells. The overall objective of the liner installation process was to modify the wells in a manner that would preclude PCE or other contaminants-of-concern related to OU2/6, from migrating downwards and thereby reducing the concentration of OU2/6 contaminants in the wells (and therefore in the influent that enters the home water system). The liners are constructed of nominal 3-inch PVC that extends to the total depth of the well. The bottom portions of the liners are perforated (bottom 40 ft at JS-36 and bottom 60 ft at JS-14) to allow water to enter the well from the lower portion of the well. A seal using two rubber boots attached to the casing were fitted on the outside of the liner at a depth of 330.8 ft btoc in JS-36, and at 220.0 in JS-14. The area between the boots was packed with bentonite clay to form an initial seal. In addition, a half bag of neat portland cement grout was placed via tremmie pipe above the upper rubber boot. The bentonite seal packing and portland cement grout were allowed to set overnight at each location and the water levels within the liner and annulus space were compared to verify a good seal. The annular space between the well and liner above the initial seal was then grouted via tremmie pipe.

Both wells were equipped with new, three-inch, submersible pumps to replace the four-inch pumps that would not fit inside the three-inch liners. At JS-36 the pump was set at a depth of 200 ft btoc and all of the riser pipes were replaced with new Schedule 80 PVC. The pump at JS-14 was set at a depth of 240 ft bgs. New wiring was used and a few remaining sections of galvanized riser pipe were replaced with Schedule 80 PVC.

Although the results contained within this report do not pertain to the following corrective action, based on the results of the September 2004 interval screening activities and based on USEPA's December 5, 2007 approval letter with comments, JS-37 was reconfigured in accordance with the specifics discussed in the December 17, 2007 teleconference with the USEPA. Per USEPA's recommendation, Parsons reconfigured JS-37 by plugging the well to approximately 100 feet below ground surface (bgs). Since the USEPA and MDNR did not have

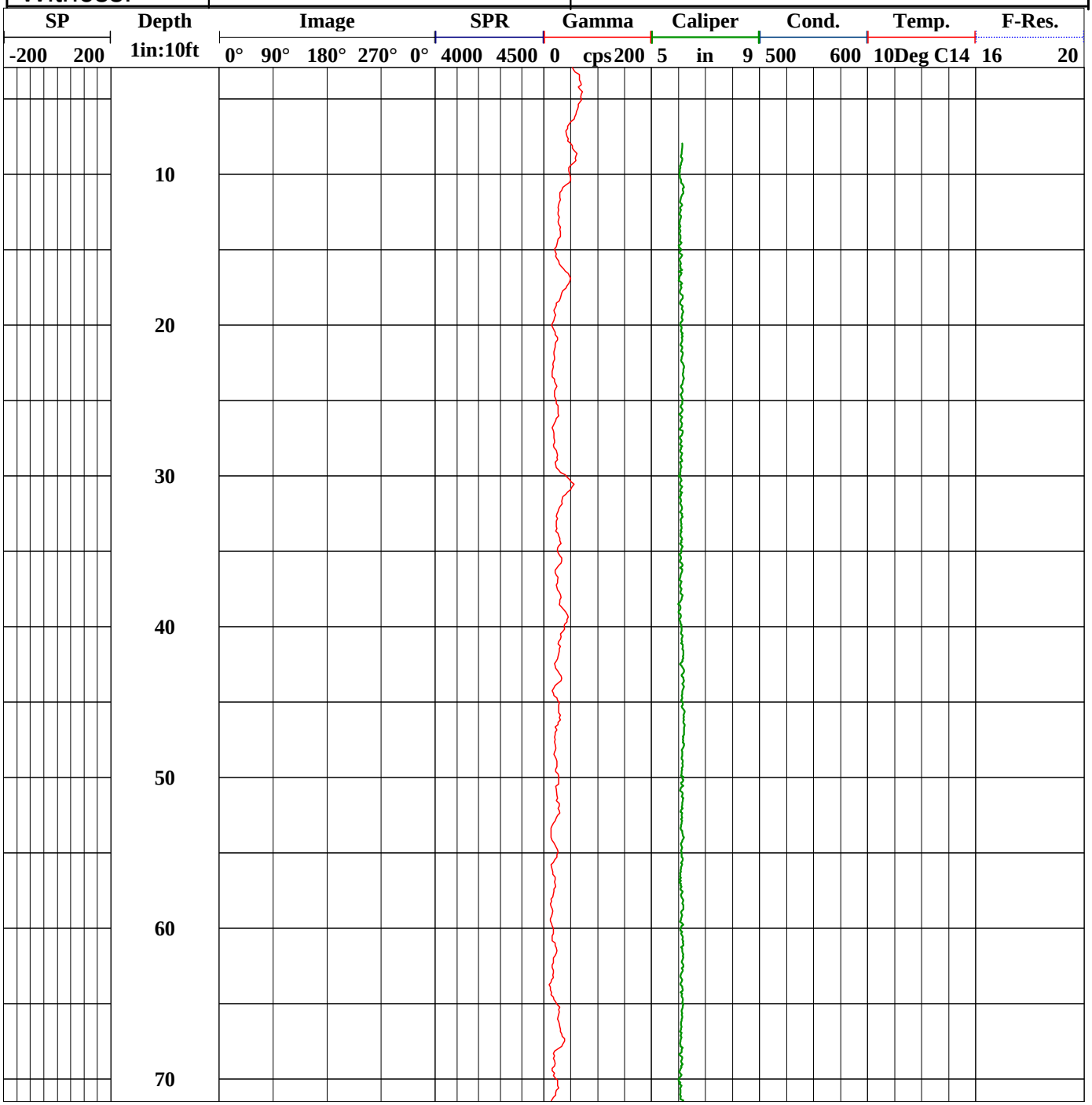
a preferred method for plugging the well, as agreed by USEPA, MDNR, and Parsons, a calculated quantity of high-solids bentonite was injected sufficient to bring the level to approximately 110 feet bgs followed by bentonite chips to 100 feet bgs.

The well construction diagrams for JS-14, JS-36, and JS-37 are presented in **Appendix E**.

JS-14 GEOPHYSICAL LOGS

COMPANY:	Parsons
Location:	New Haven, MO
Well	JS-14
Date	4-4-06
BH Fluid	Water
Casing	Steel
File Name	JS-14 Static Combination
Depth Driller	
Depth Logger	
Logged by:	Lee Gorday
Witness:	

OTHER SERVICES



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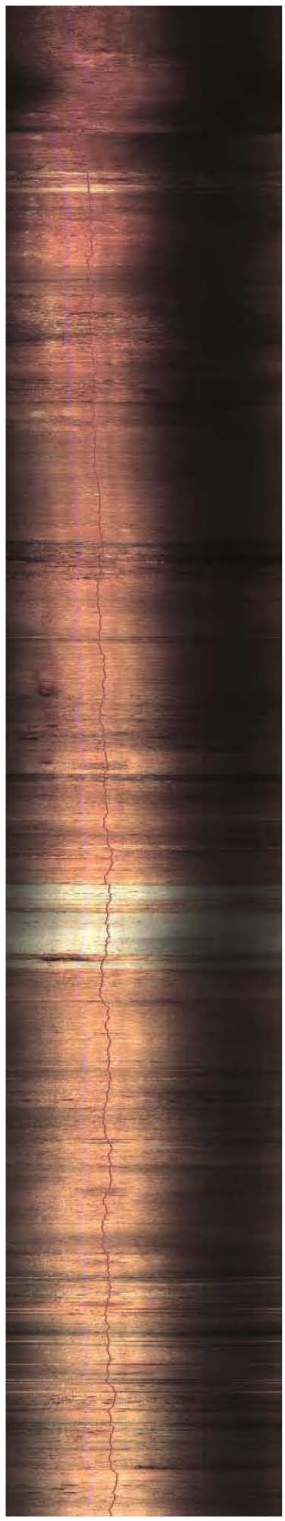

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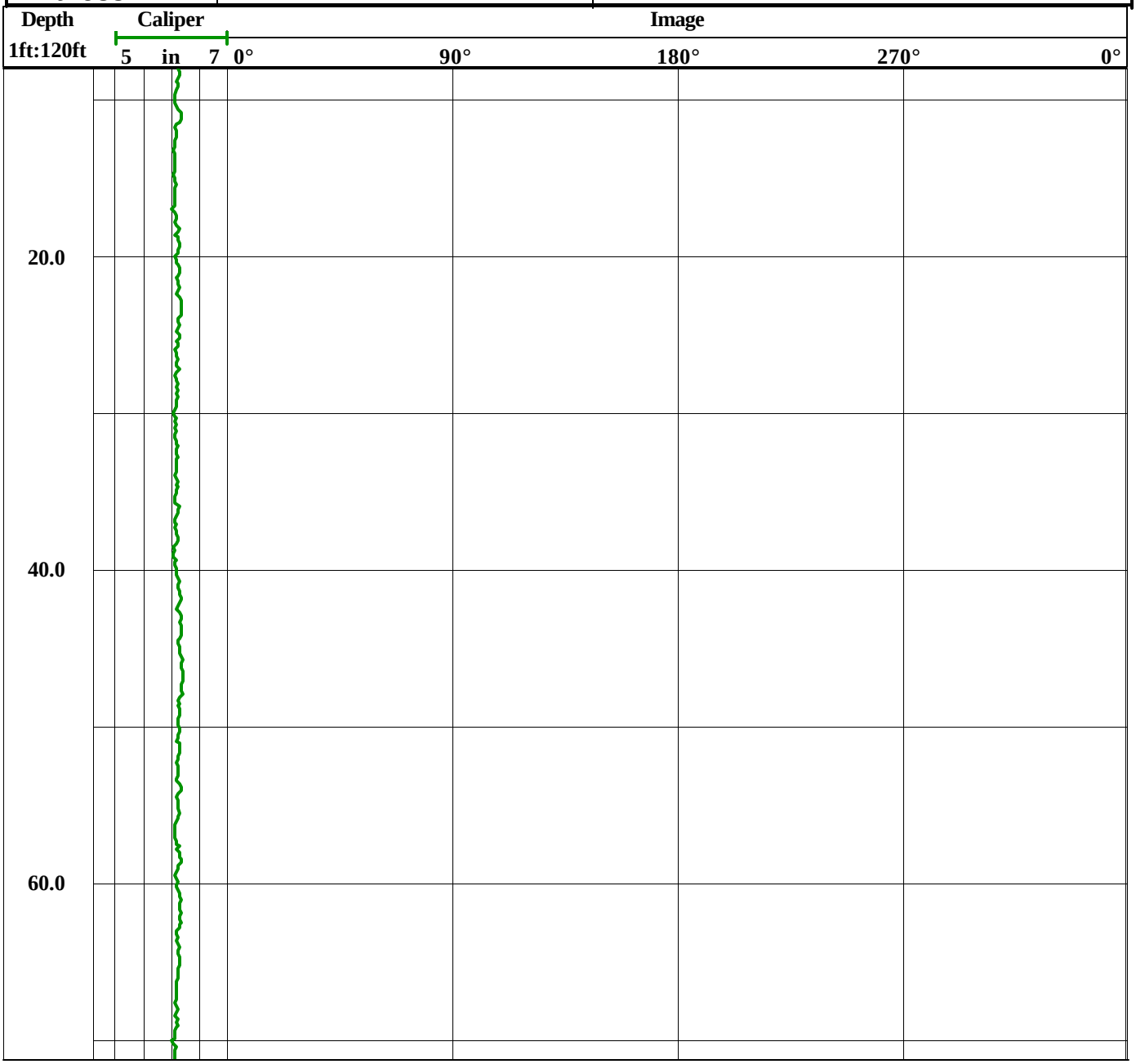
	COMPANY: Parsons			
	Location: New Haven, MO			
Well	JS-14			OTHER SERVICES
Date	4-4-06	BH Fluid	Water	
Casing	Steel			
File Name	JS-14 Optical2			
Depth Driller				
Depth Logger				
Logged by:	Lee Gorday			
Witness:				



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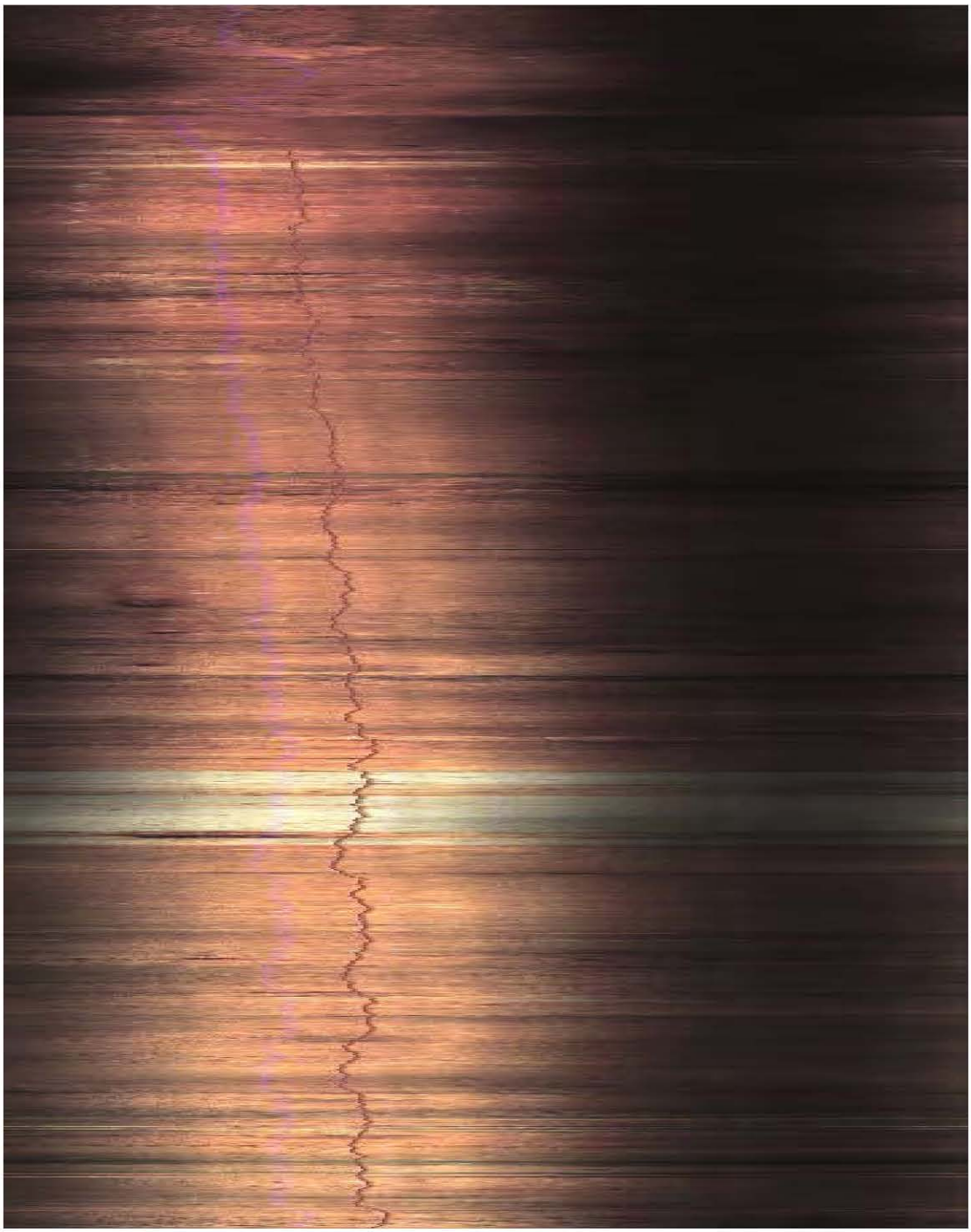

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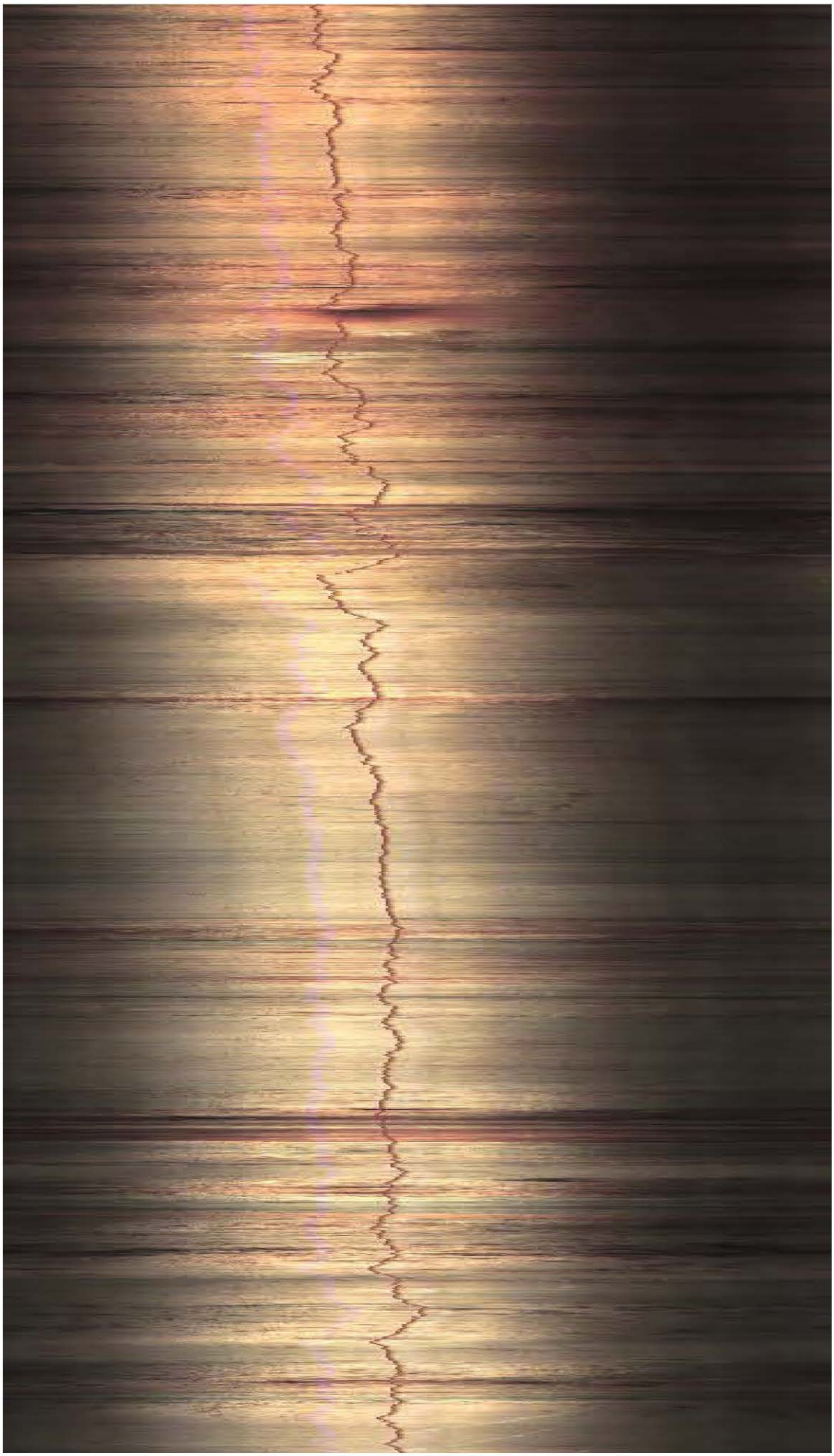

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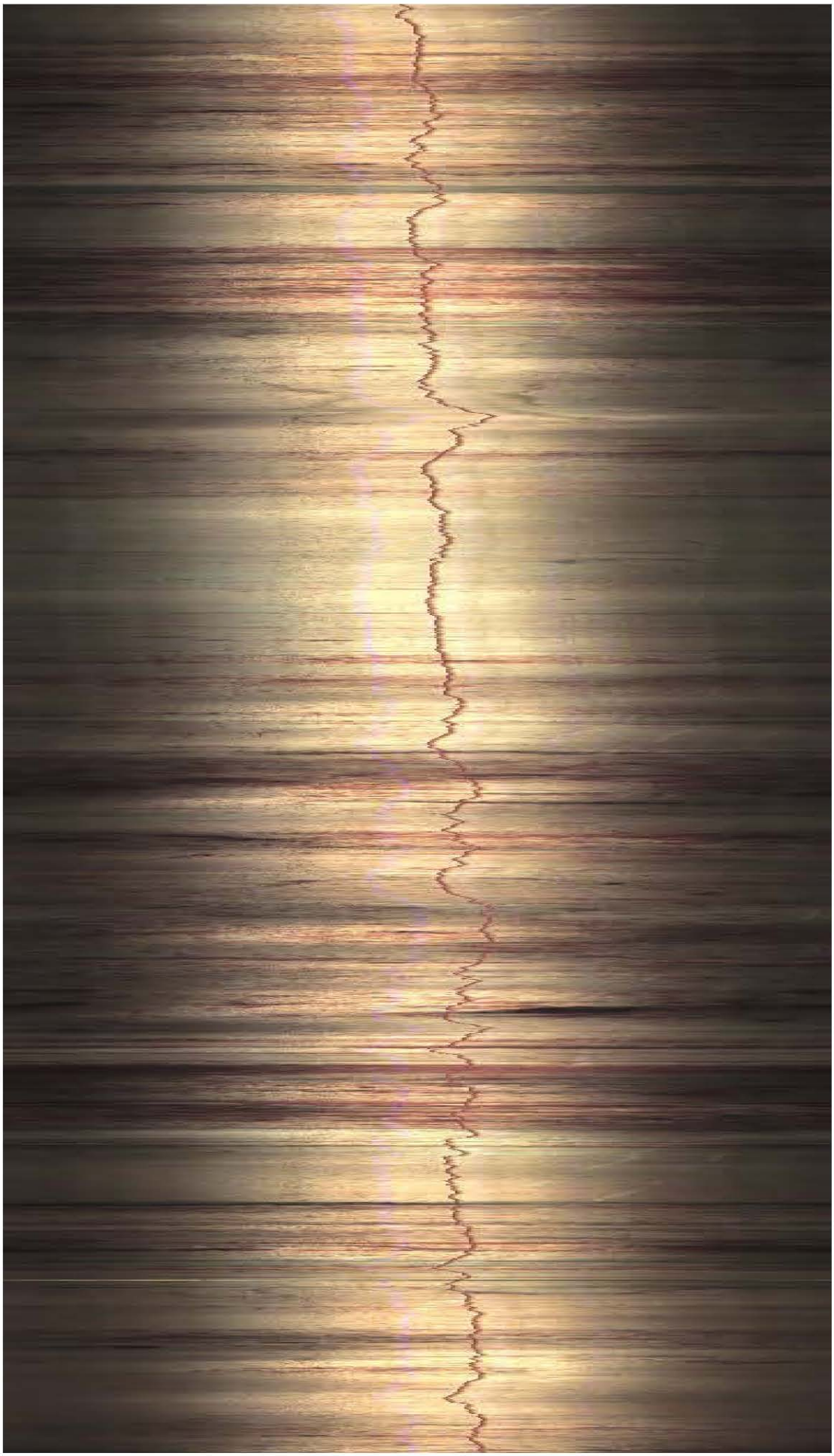

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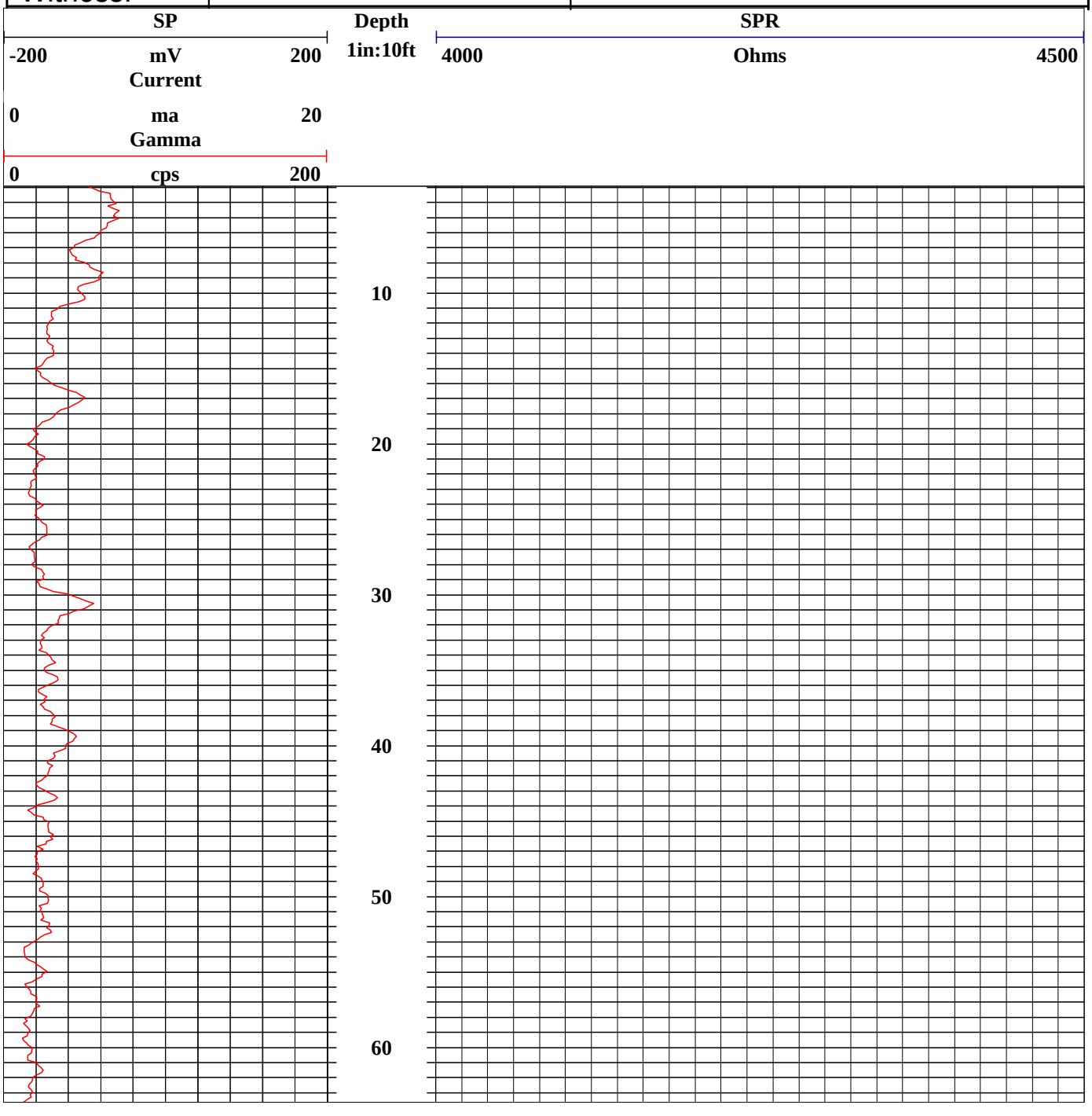
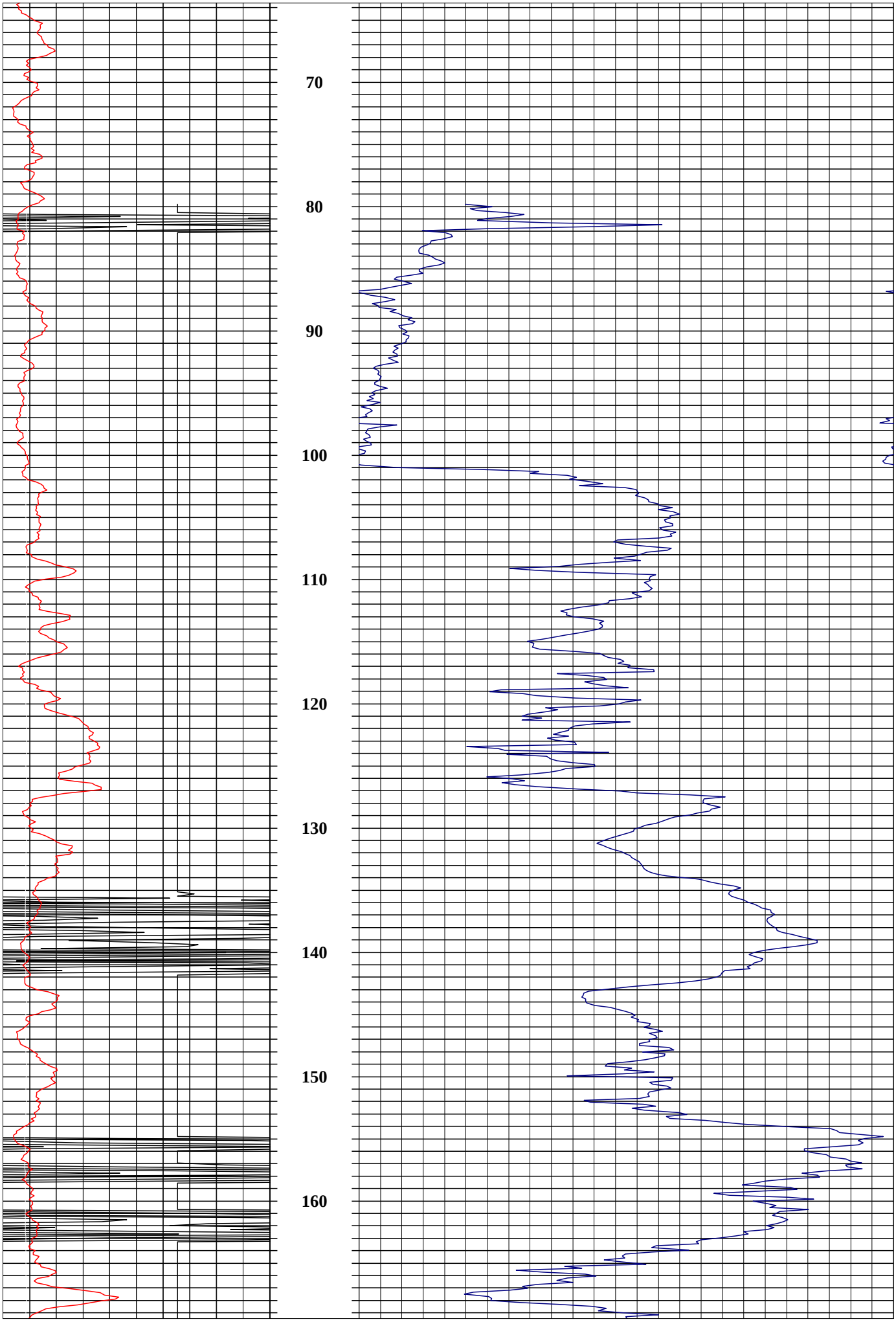
	COMPANY: Parsons
	Location: New Haven, MO

Well	JS-14		
Date	4-4--06	BH Fluid	Water
Casing	Steel		
File Name	JS-14 SP SPR Gamma		
Depth Driller	383.5		
Depth Logger			
Logged by:	Lee Gorday		
Witness:			

OTHER SERVICES

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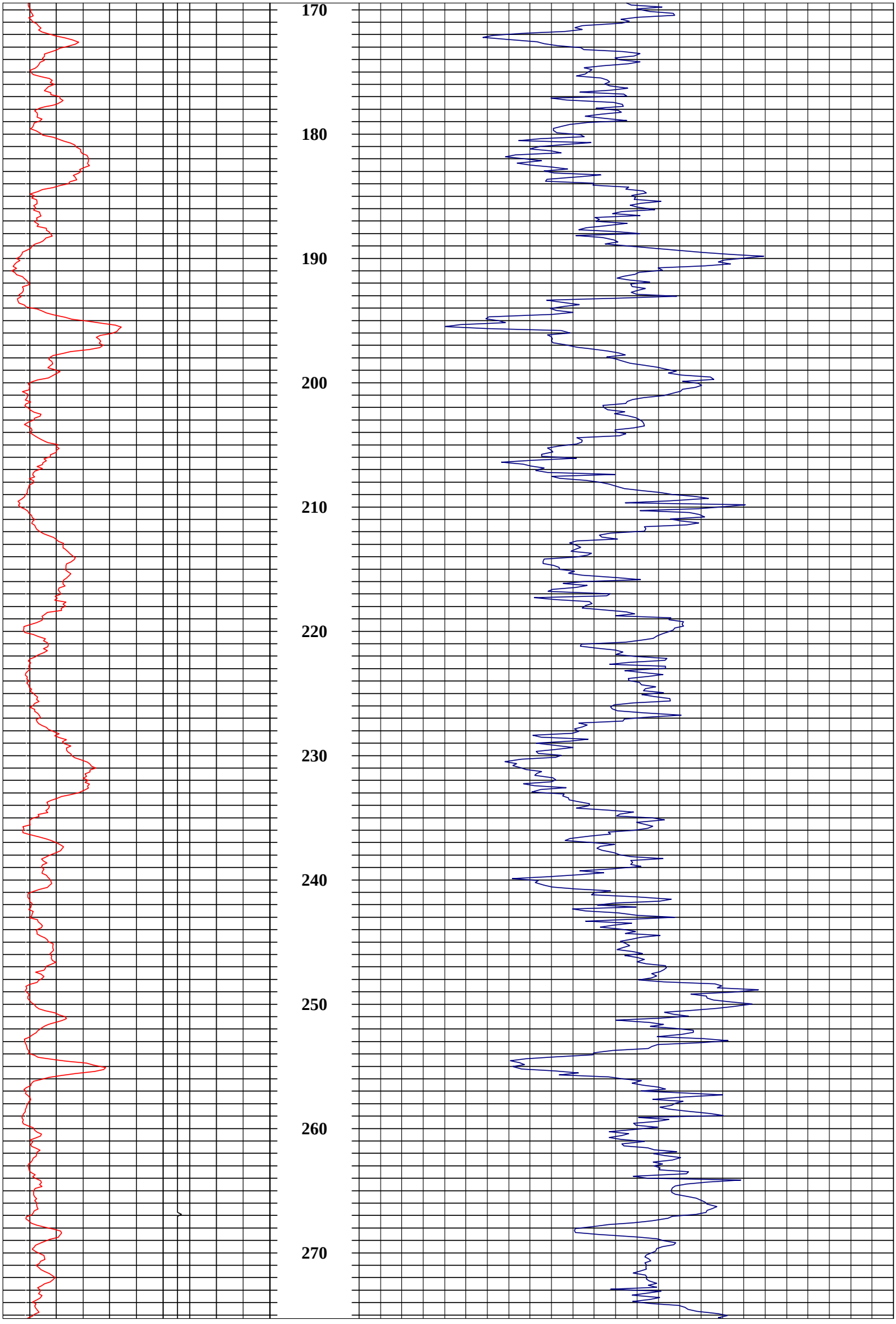
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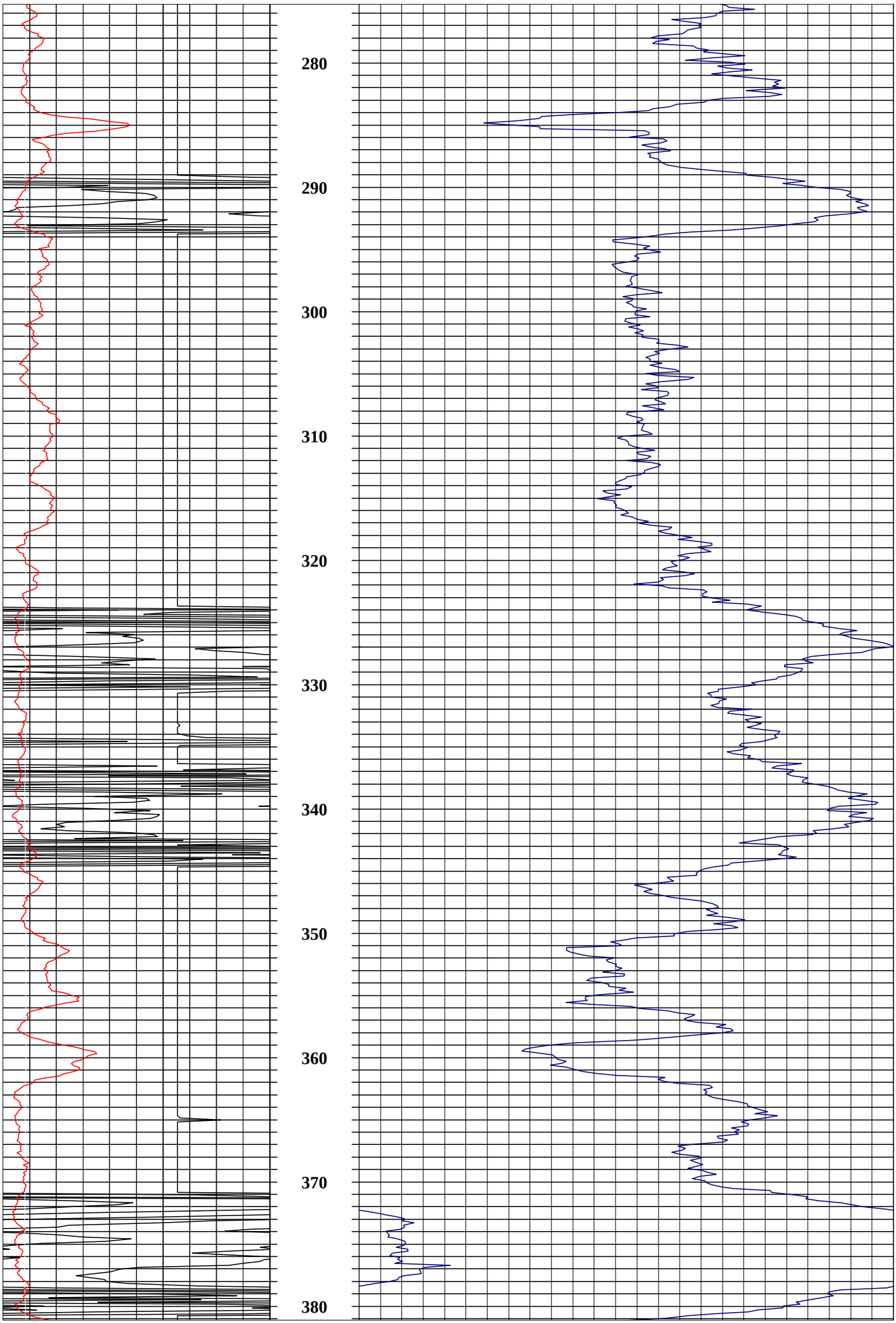
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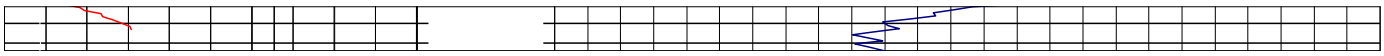
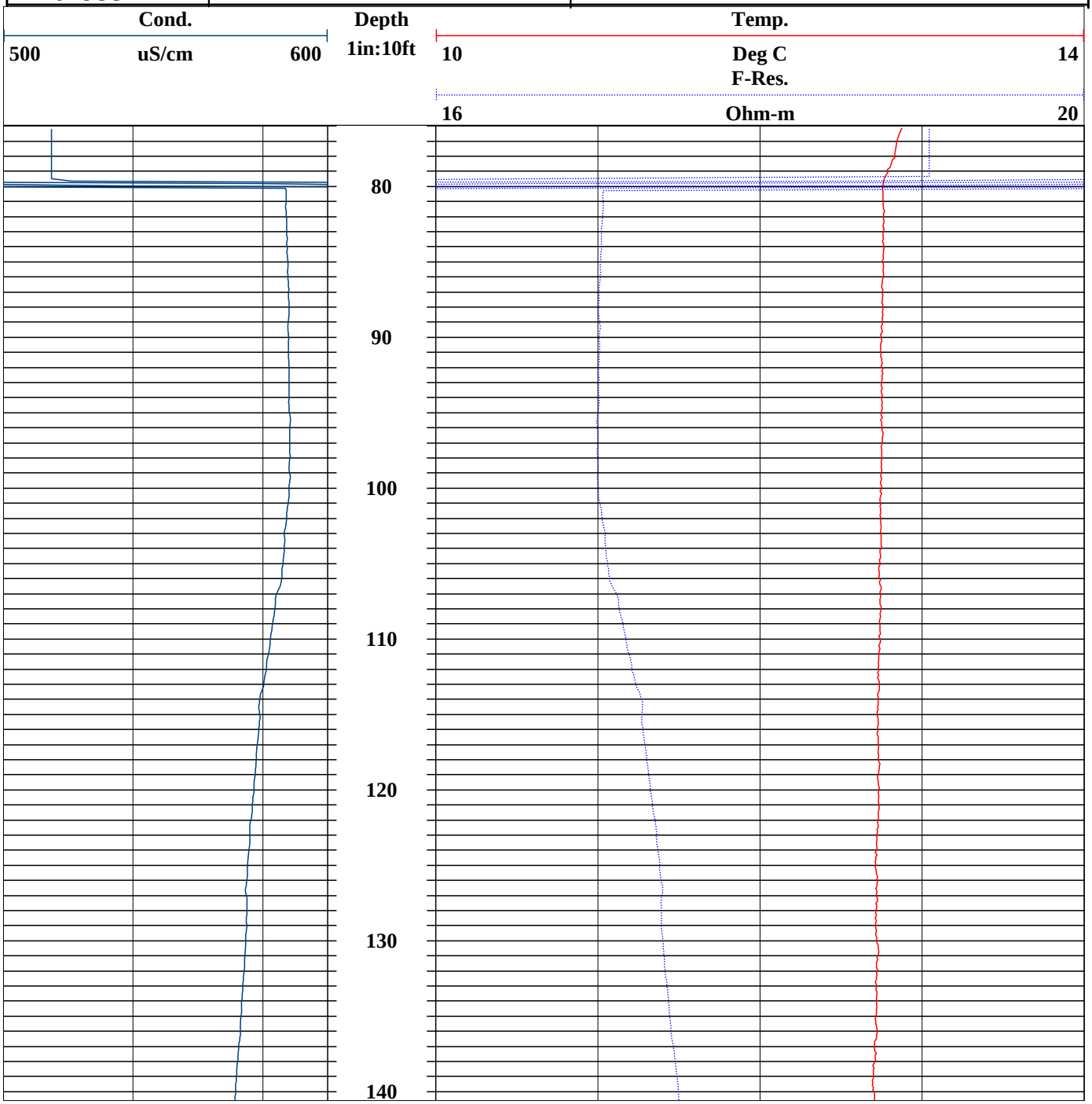
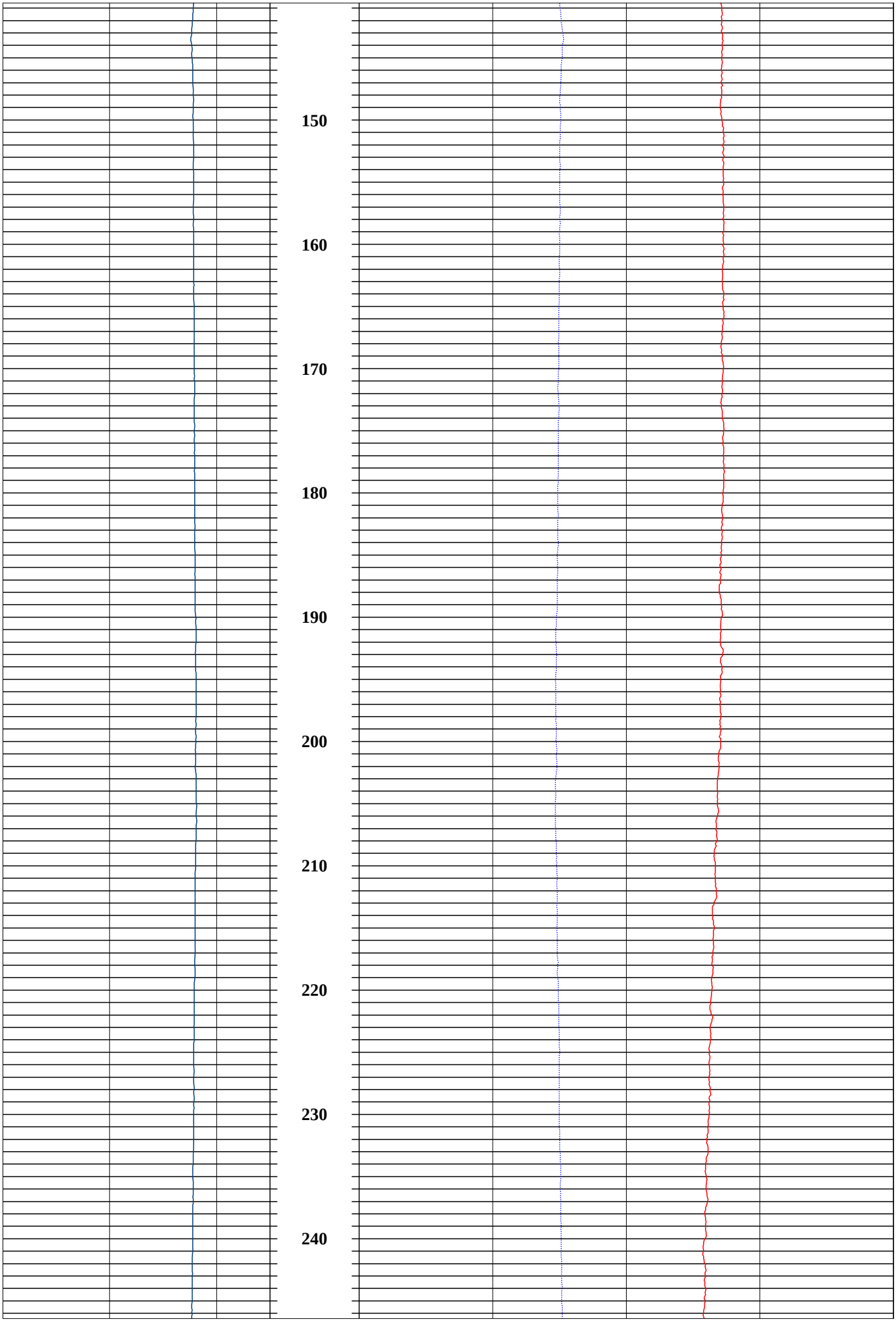


COMPANY:	Parsons
Location:	New Haven, MO

Well	JS-14		
Date	4-4-06	BH Fluid	Water
Casing	Steel		
File Name	JS-14 Static Fluid		
Depth Driller	383.5		
Depth Logger			
Logged by:	Lee Gorday		
Witness:			

OTHER SERVICES

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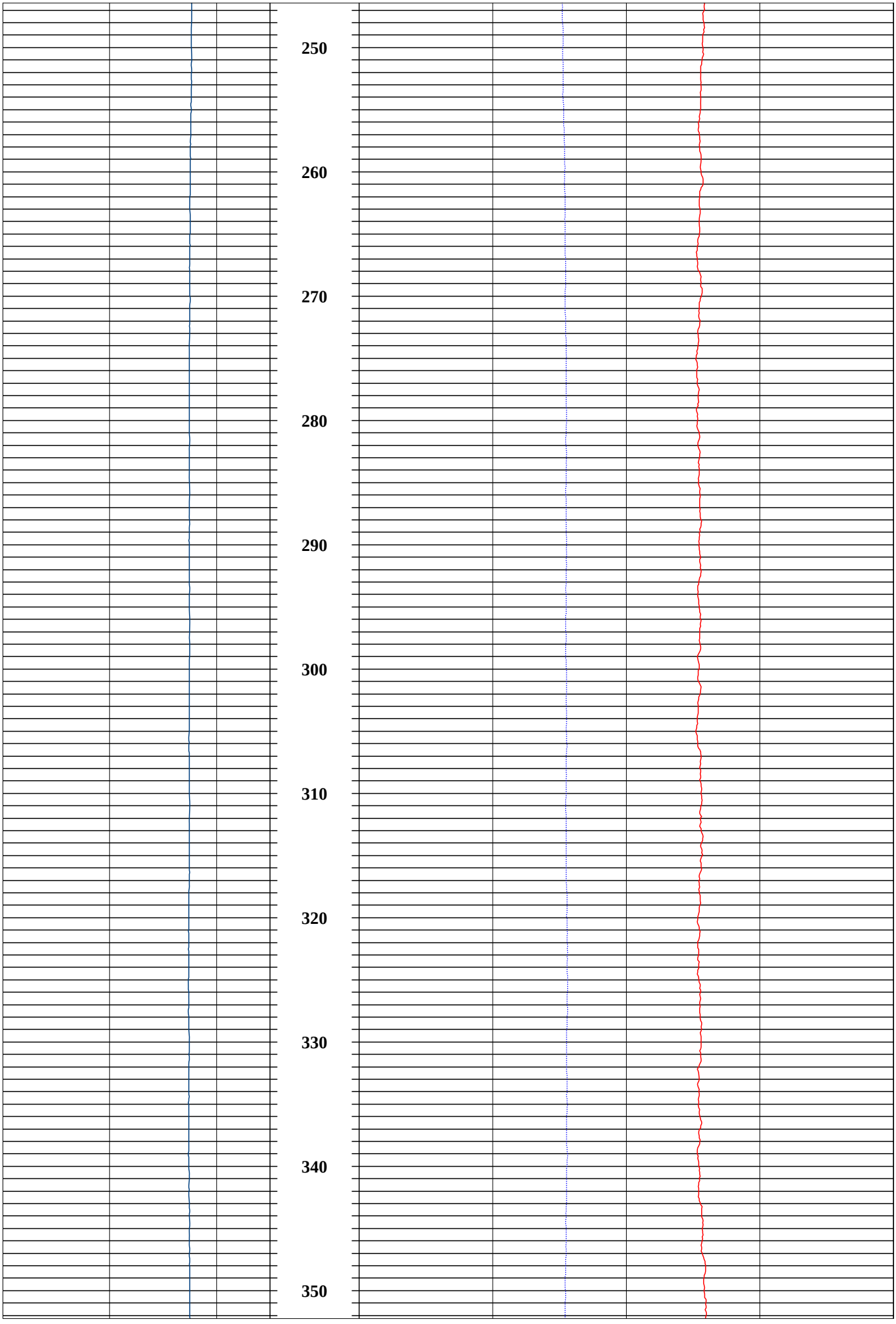
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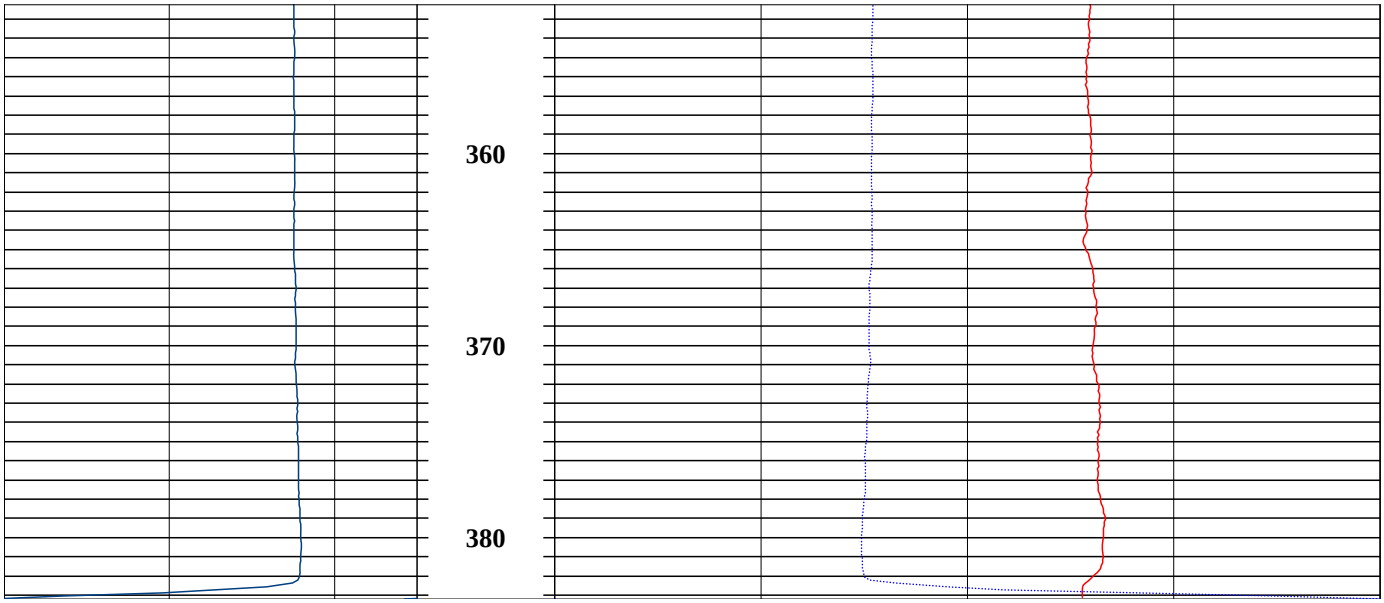
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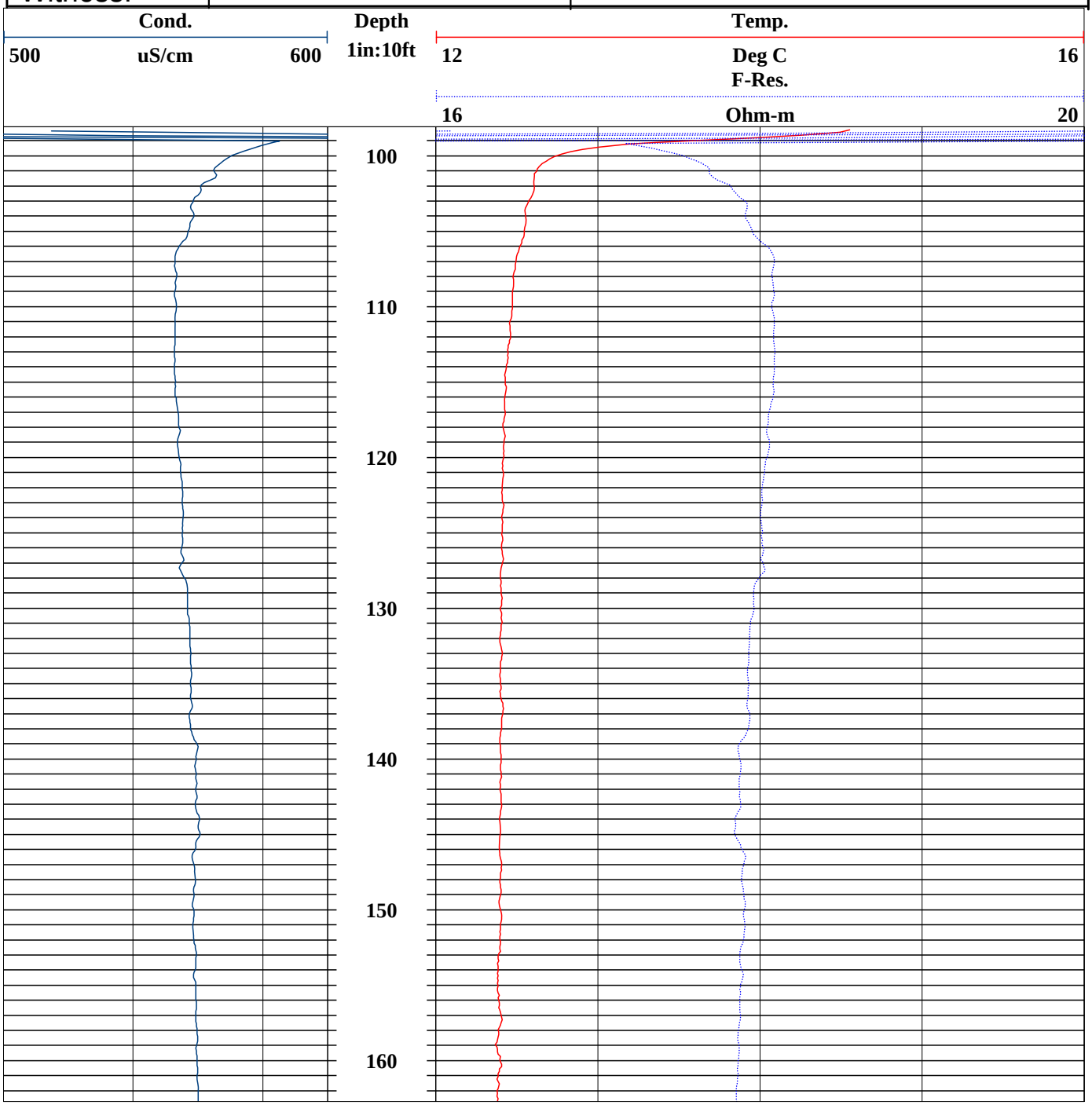
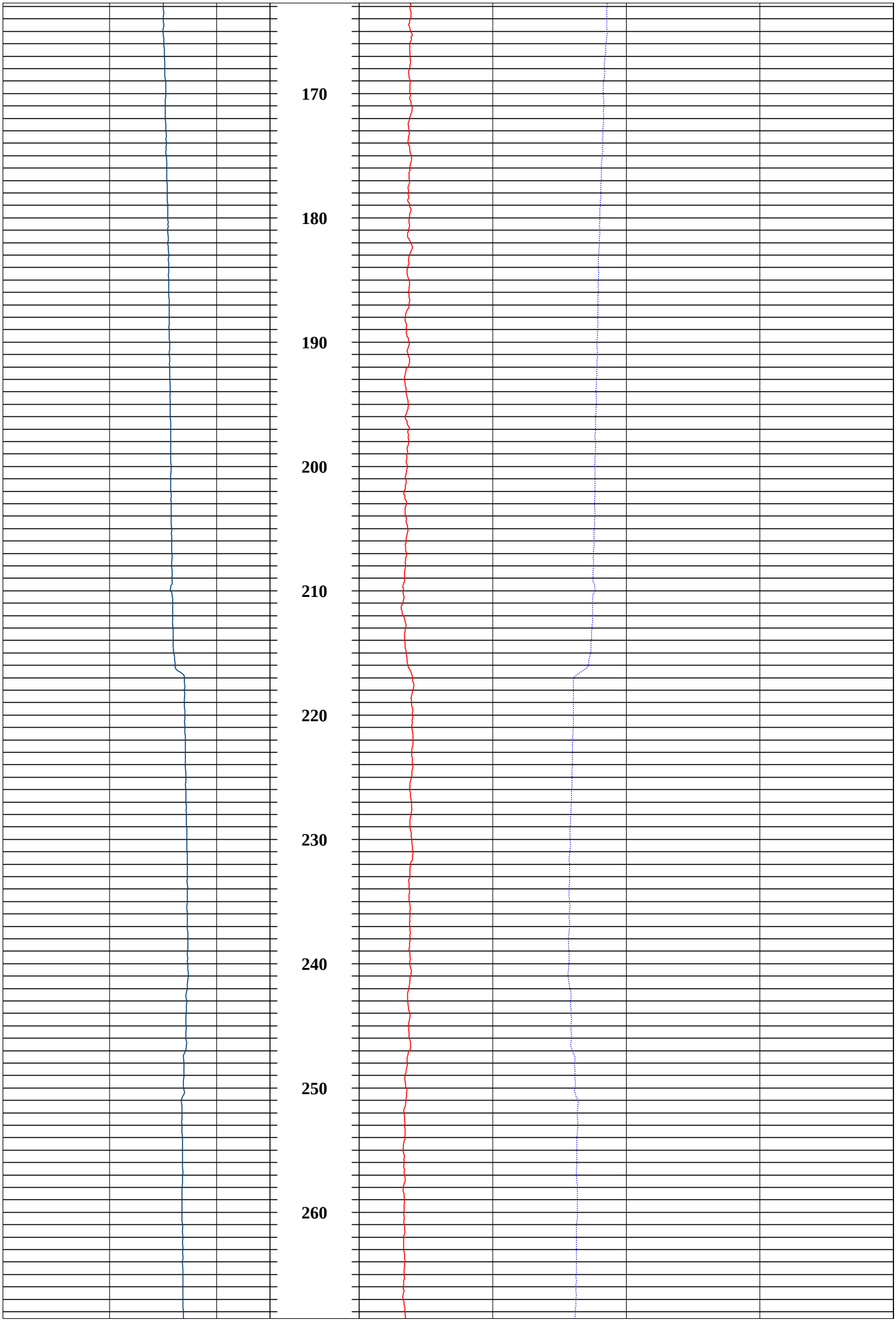
	COMPANY: Parsons
	Location:

Well	JS-14		
Date	4-6-06	BH Fluid	Water
Casing	Steel		
File Name	JS14 Fluid Pumping (approx 2 gpm)		
Depth Driller			
Depth Logger			
Logged by:	Lee Gorday		
Witness:			

OTHER SERVICES

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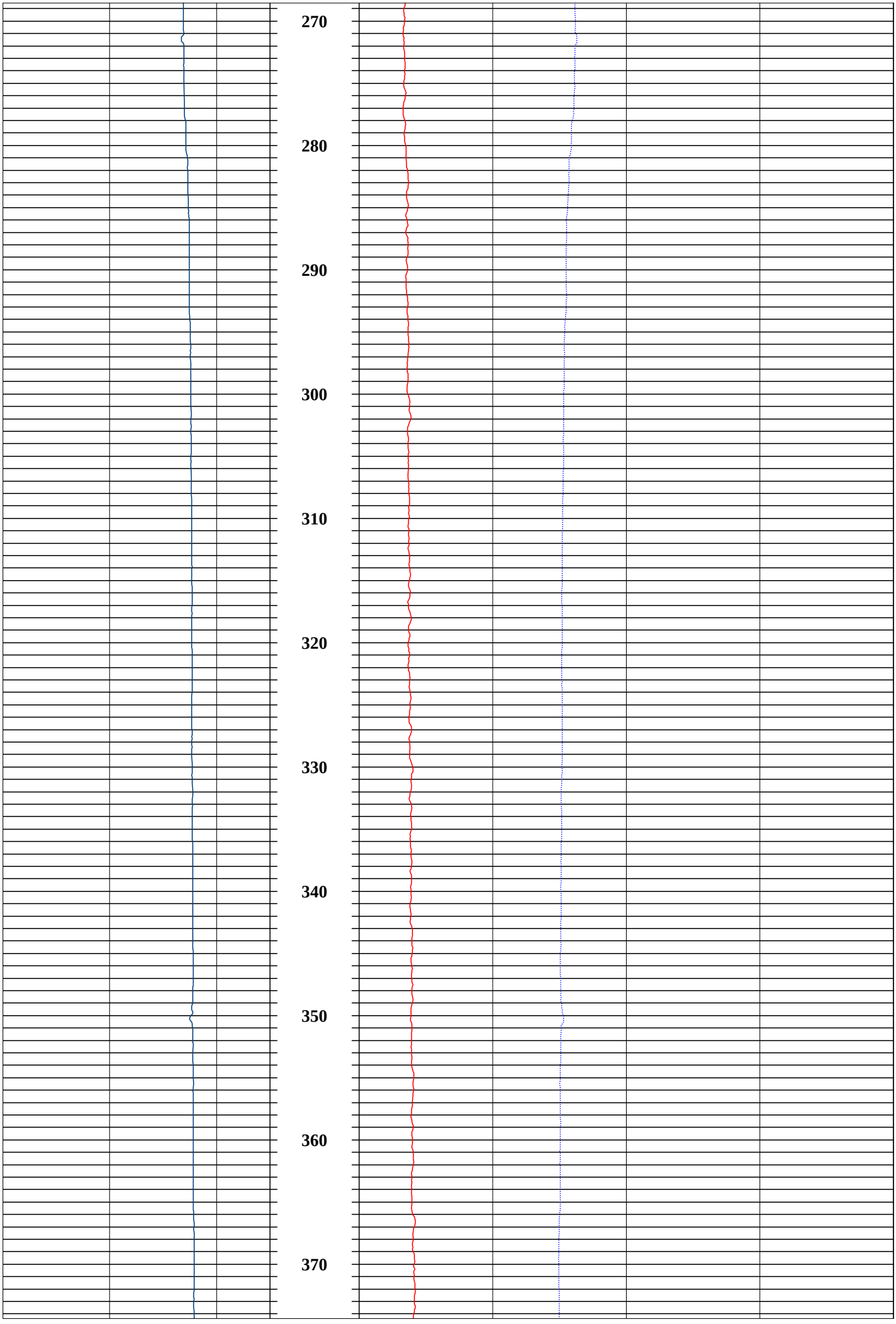
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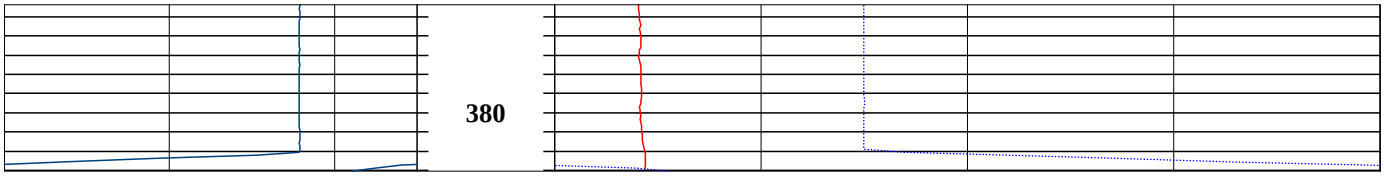
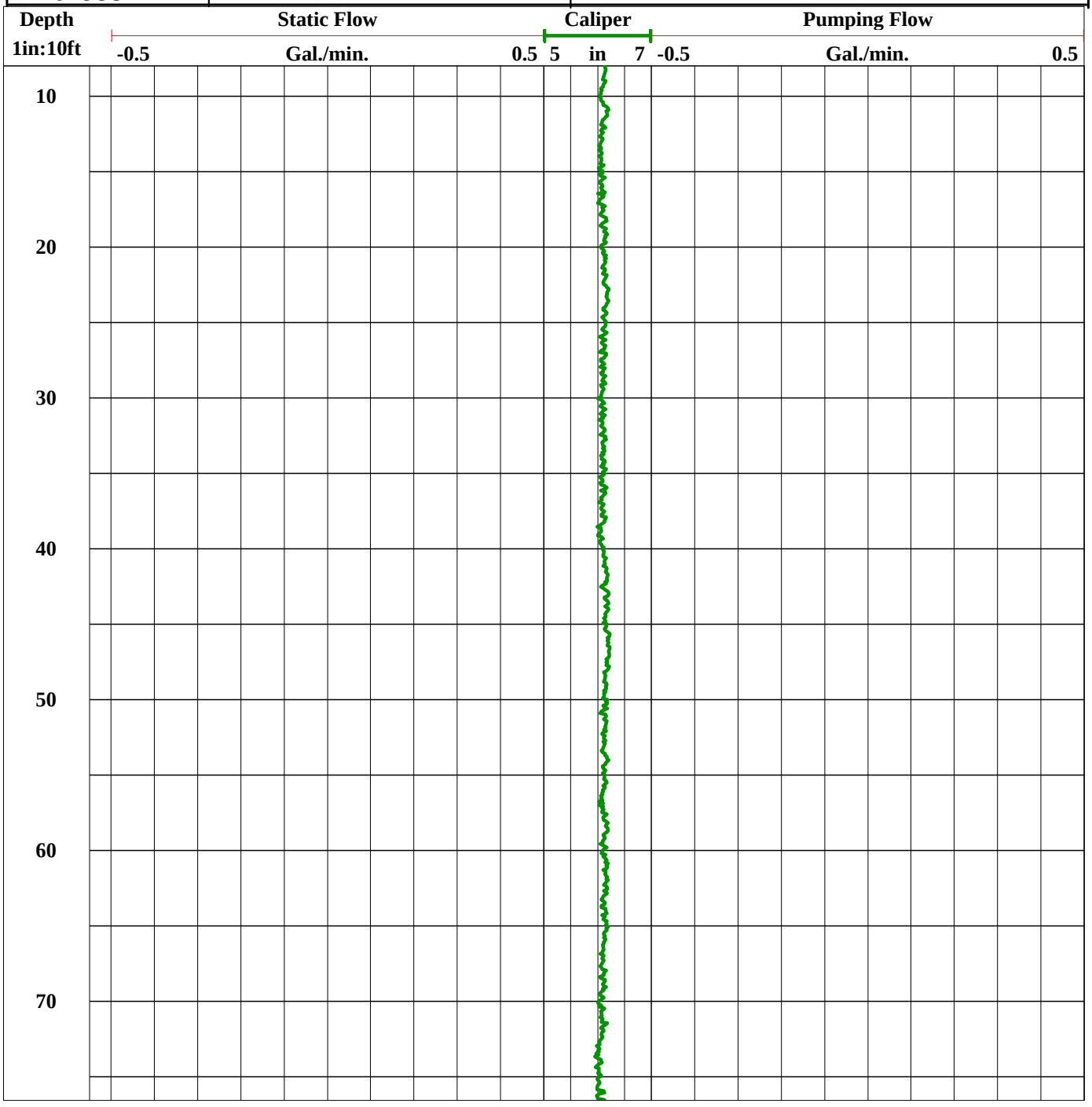
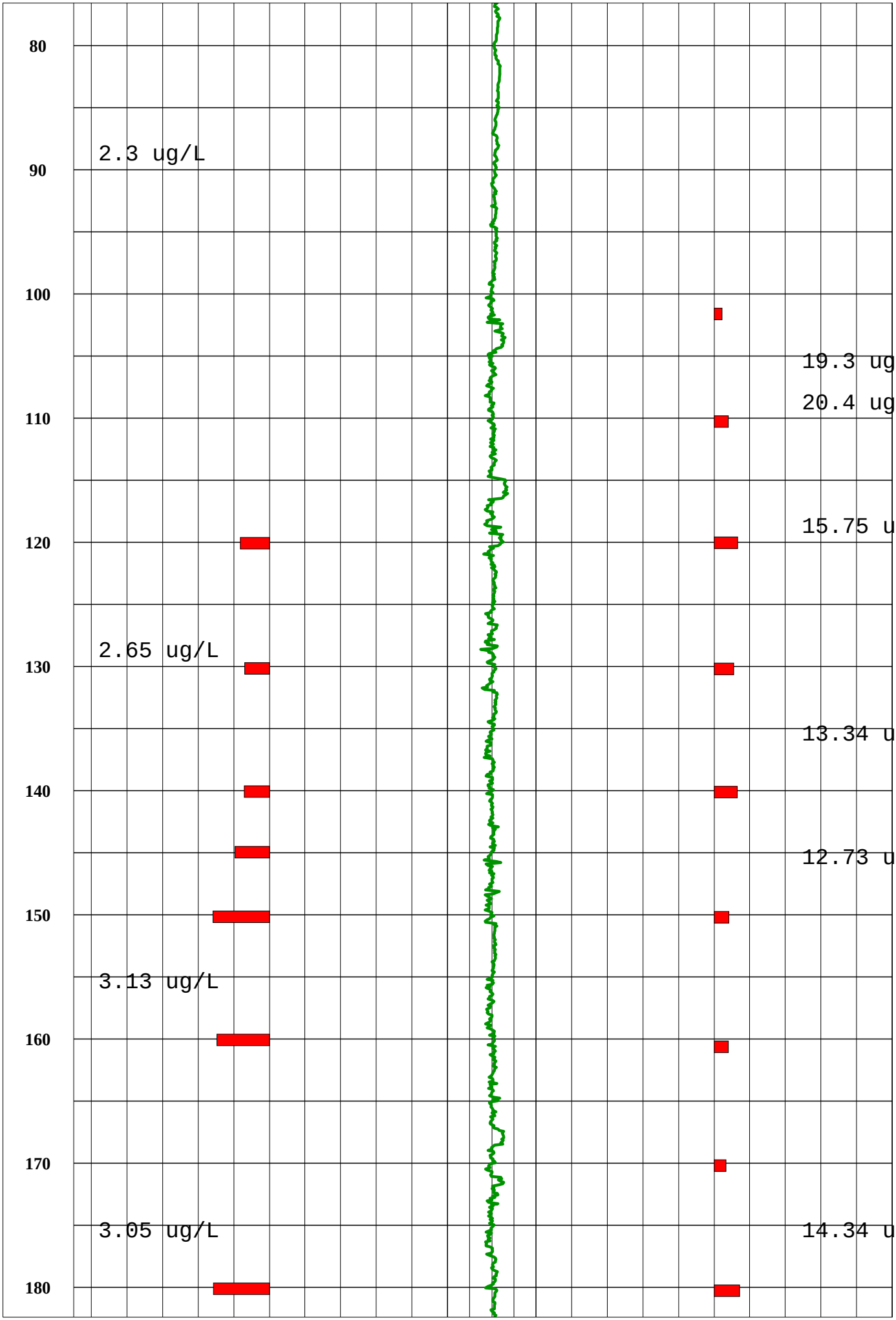
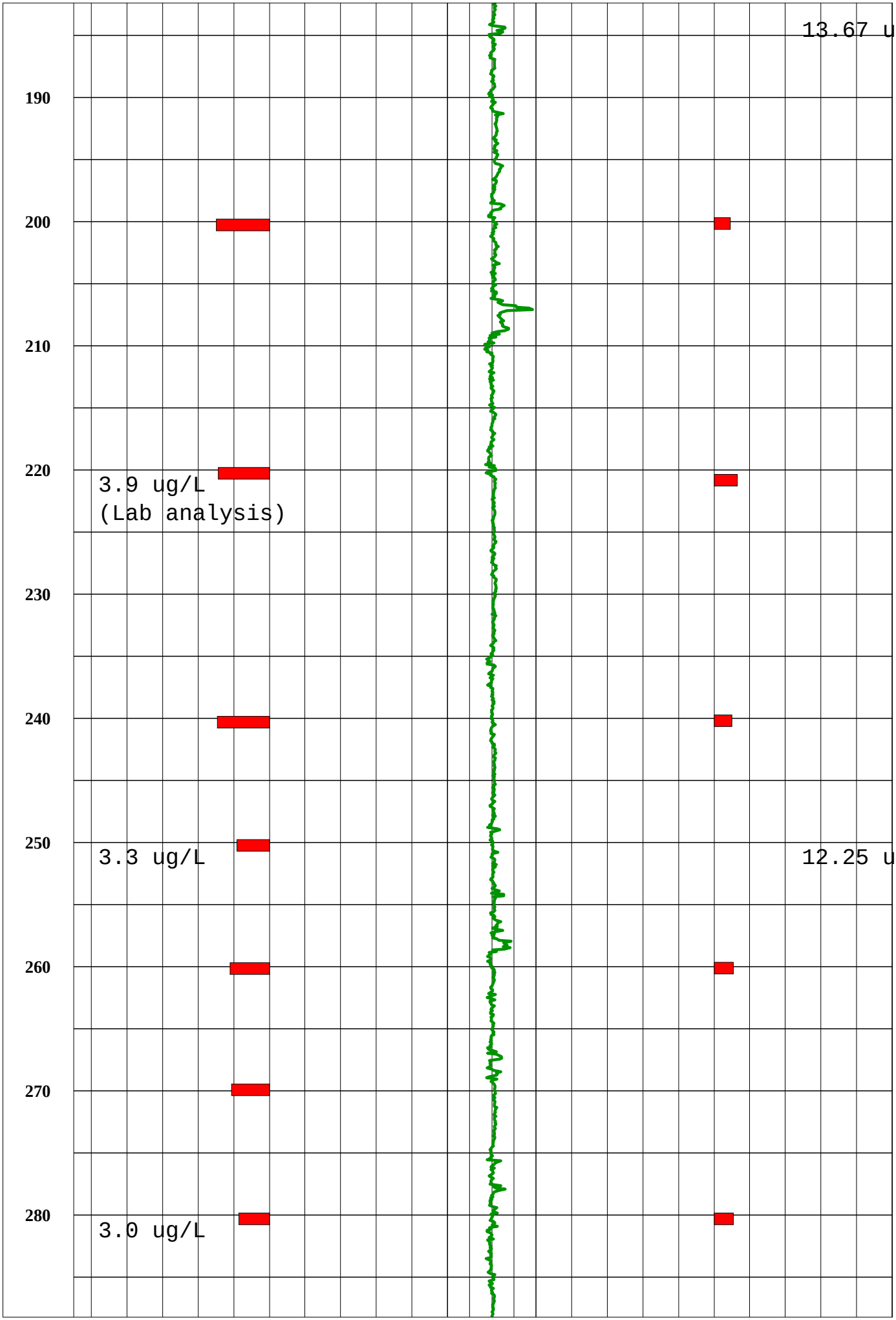

380

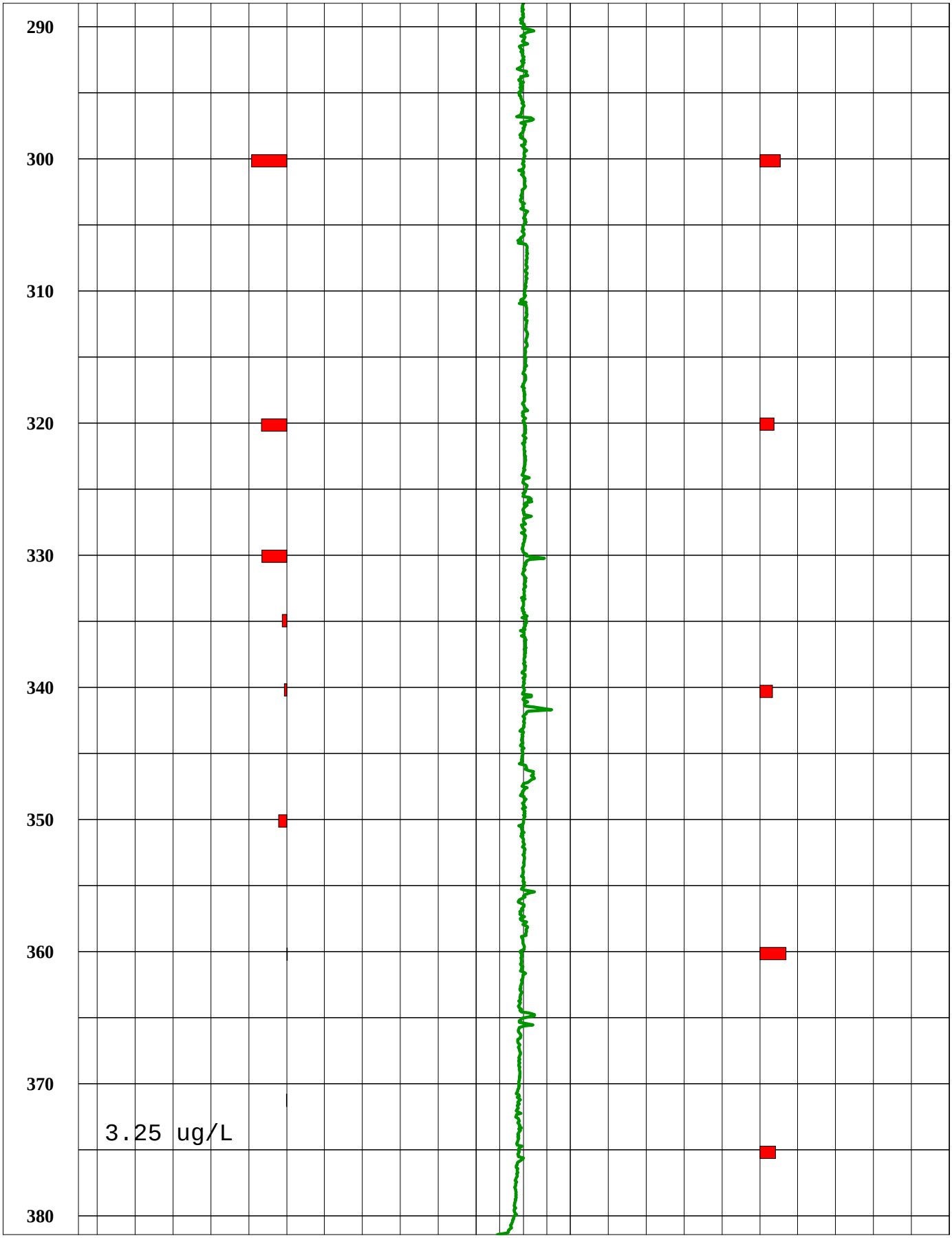
COMPANY:	Parsons
Location:	New Haven, MO
Well	JS-14
Date	4-5-06
BH Fluid	Water
Casing	Steel
File Name	JS-14 Static and Pumping (2 gpm) Flow
Depth Driller	330.4
Depth Logger	
Logged by:	Lee Gorday
Witness:	

OTHER SERVICES




80
90
100
110
120
130
140
150
160
170
180
2.3 ug/L
19.3 ug/L
20.4 ug/L
15.75 ug/L
2.65 ug/L
13.34 ug/L
12.73 ug/L
3.13 ug/L
3.05 ug/L
14.34 ug/L


13.67 ug/L
190
200
210
220
3.9 ug/L
(Lab analysis)
230
240
250
3.3 ug/L
12.25 ug/L
260
270
280
3.0 ug/L


290
300
310
320
330
340
350
360
370
380
3.25 ug/L

JS-36 GEOPHYSICAL LOGS

COMPANY: Parsons

Location: New Haven, MO

OTHER SERVICES

Well JS-36

Date 4-24-08 BH Fluid Water

Casing Steel

File Name JS36-Static Combination

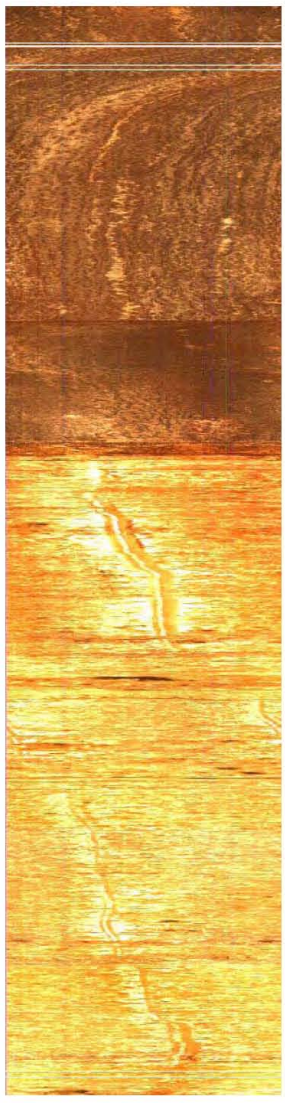
Depth Driller

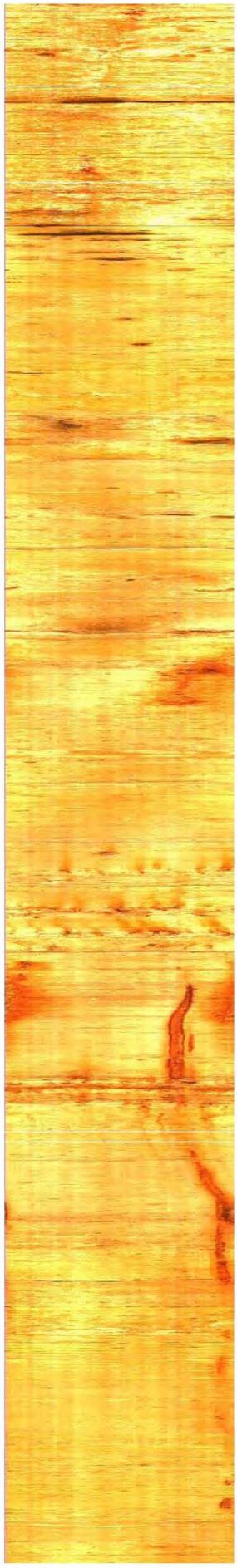
Depth Logger 468

Logged by: Lee Gorday

Witness:

SP	Depth	Tool.Image					SPR	Gamma	Caliper	FCON	TEMP	FRES
0 MV 200	1in:10ft	0°	90°	180°	270°	0°	0 200	0 cps 100	4 in 12	770 820	13 DEG_C 14	11 OHM-M 13

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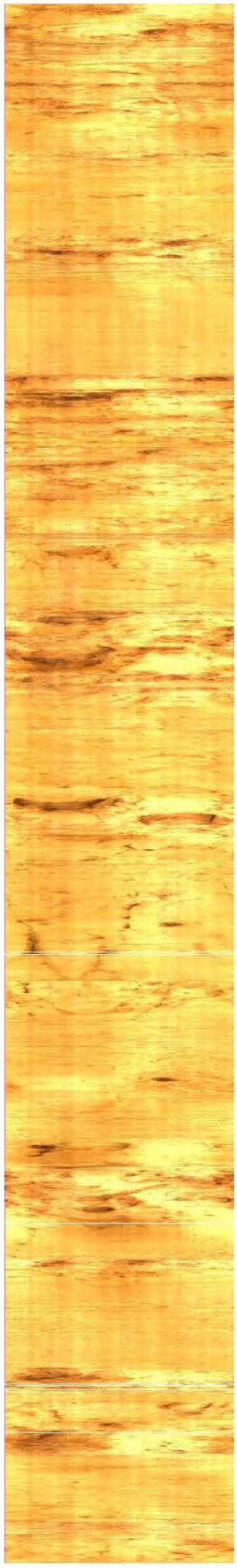
240
245
250
255


260
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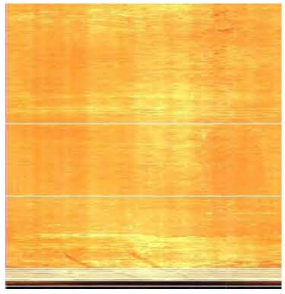
440
445
450


455
460
465

COMPANY: Parsons

Location: New Haven, MO

OTHER SERVICES

Well JS-36

Date 4-22-08 BH Fluid Water

Casing Steel

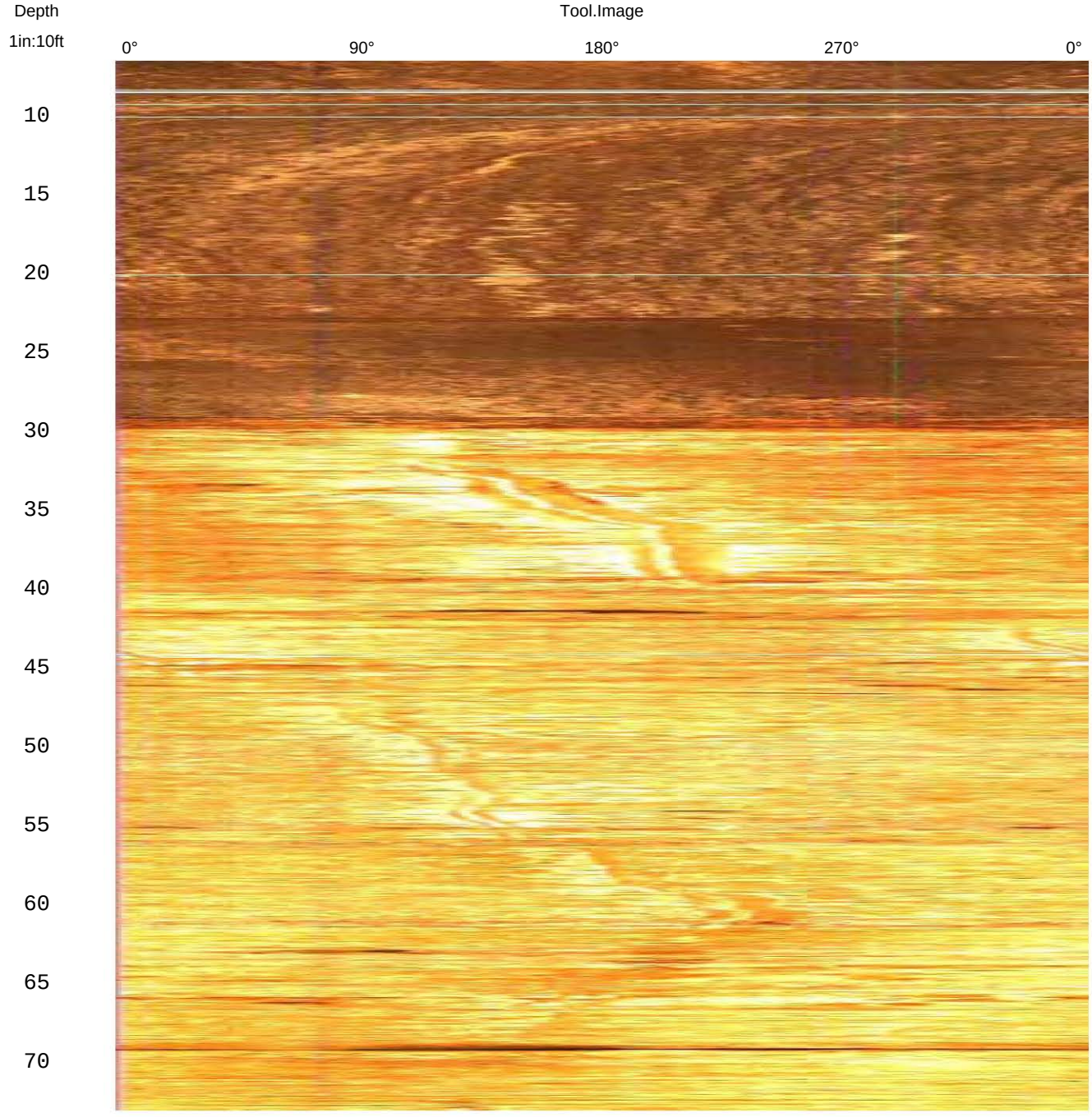
File Name JS-36 Optical

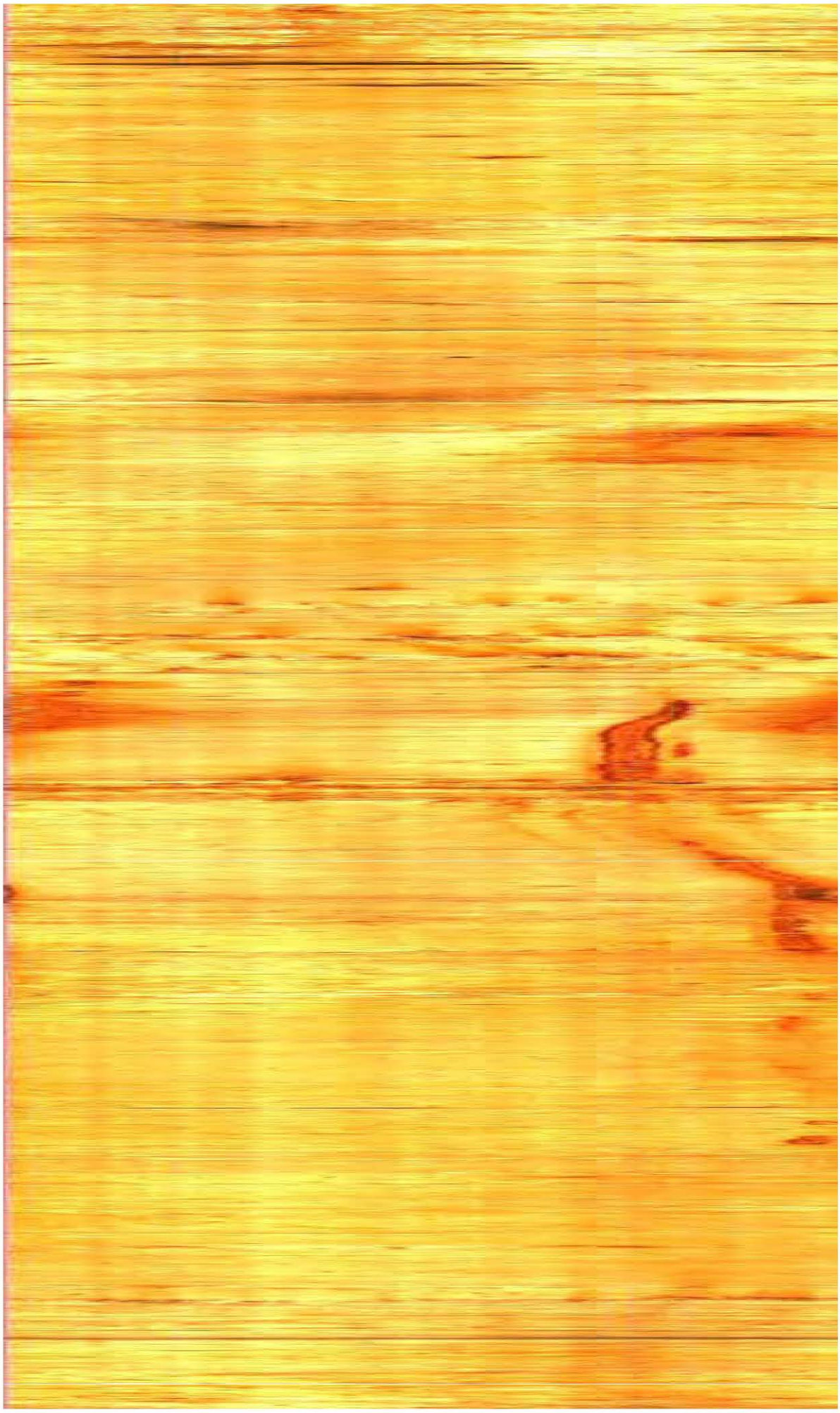
Depth Driller

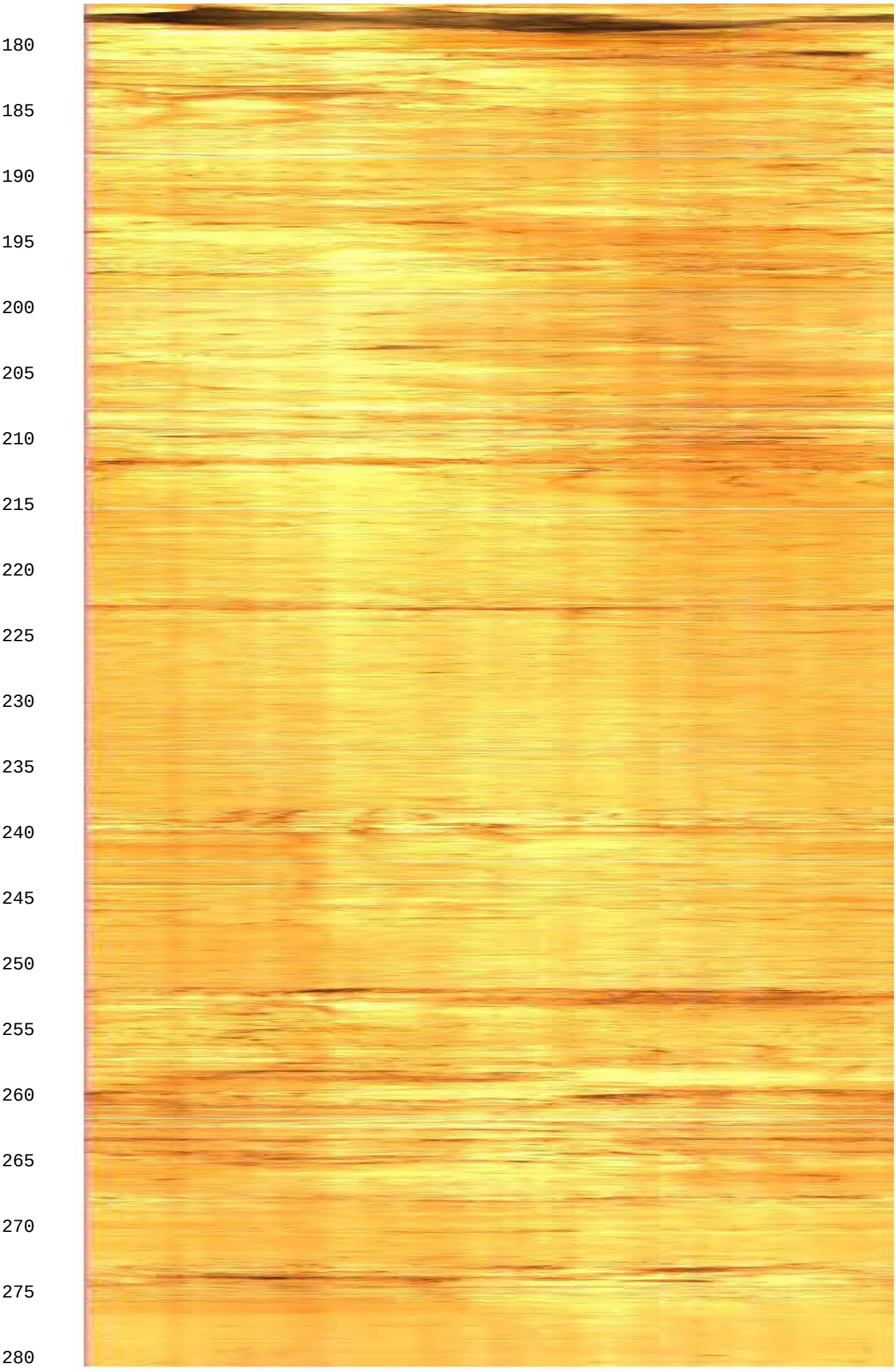
Depth Logger 468

Logged by: L. Gorday

Witness:



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210
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240
245
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255
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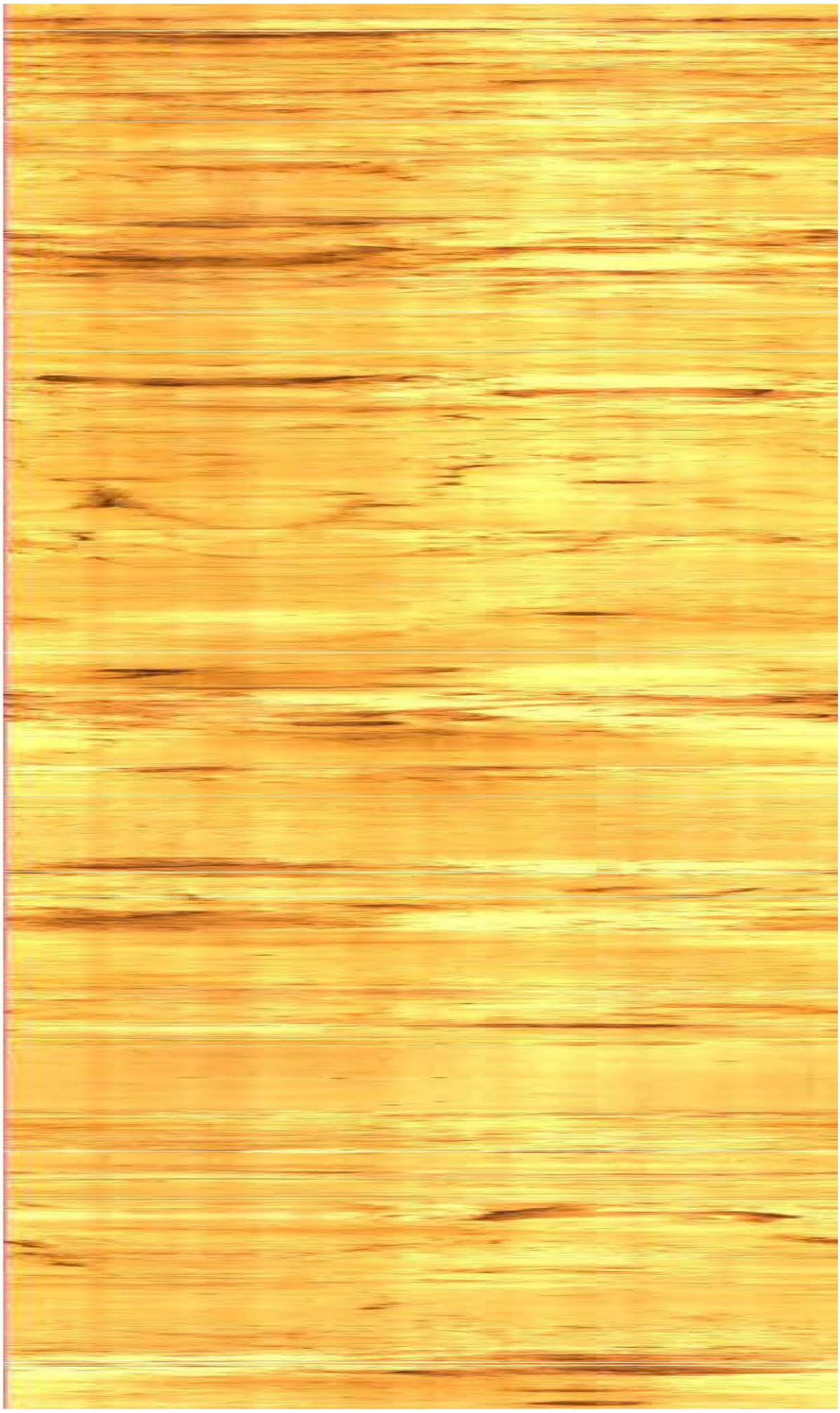
265
270
275
280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375
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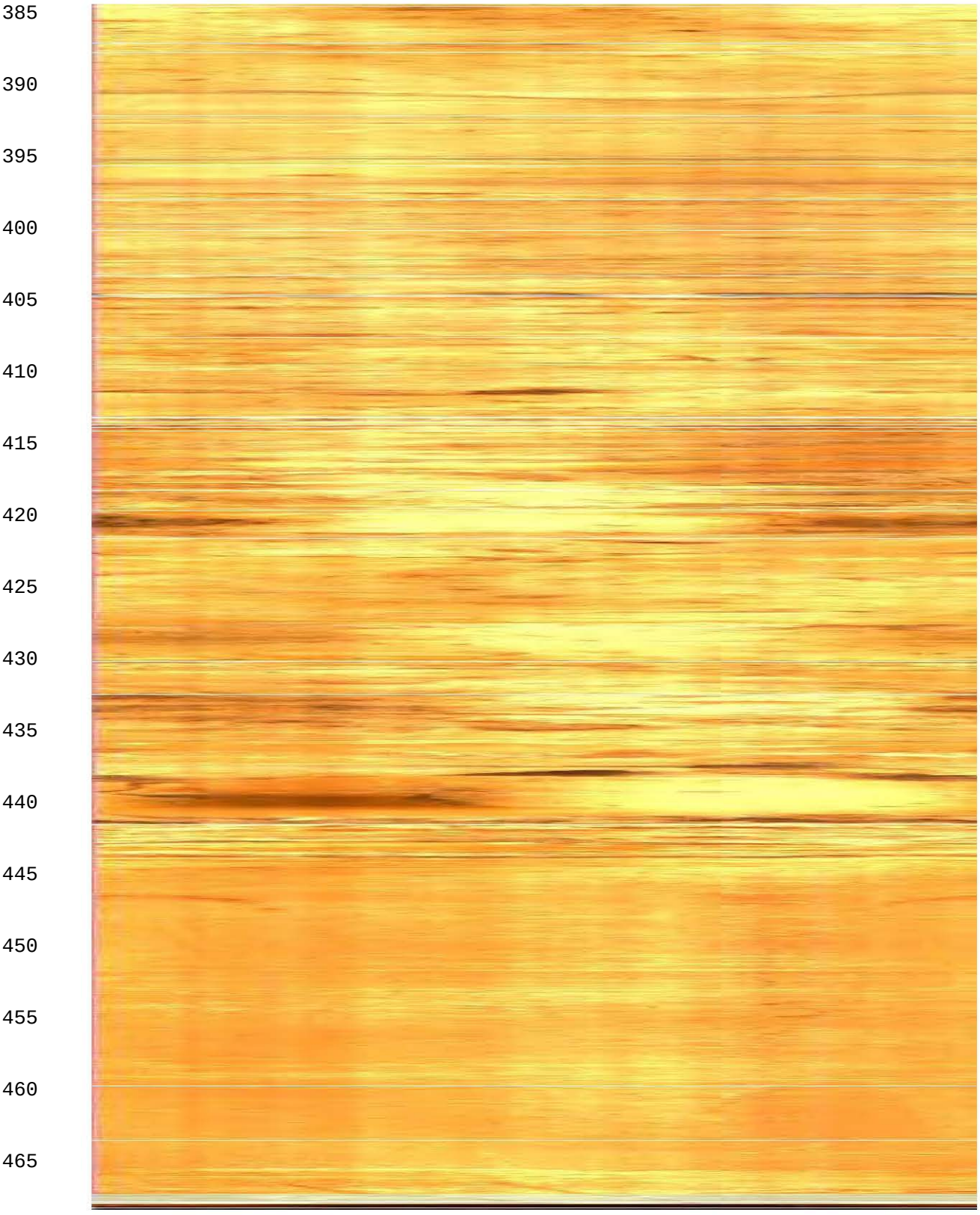
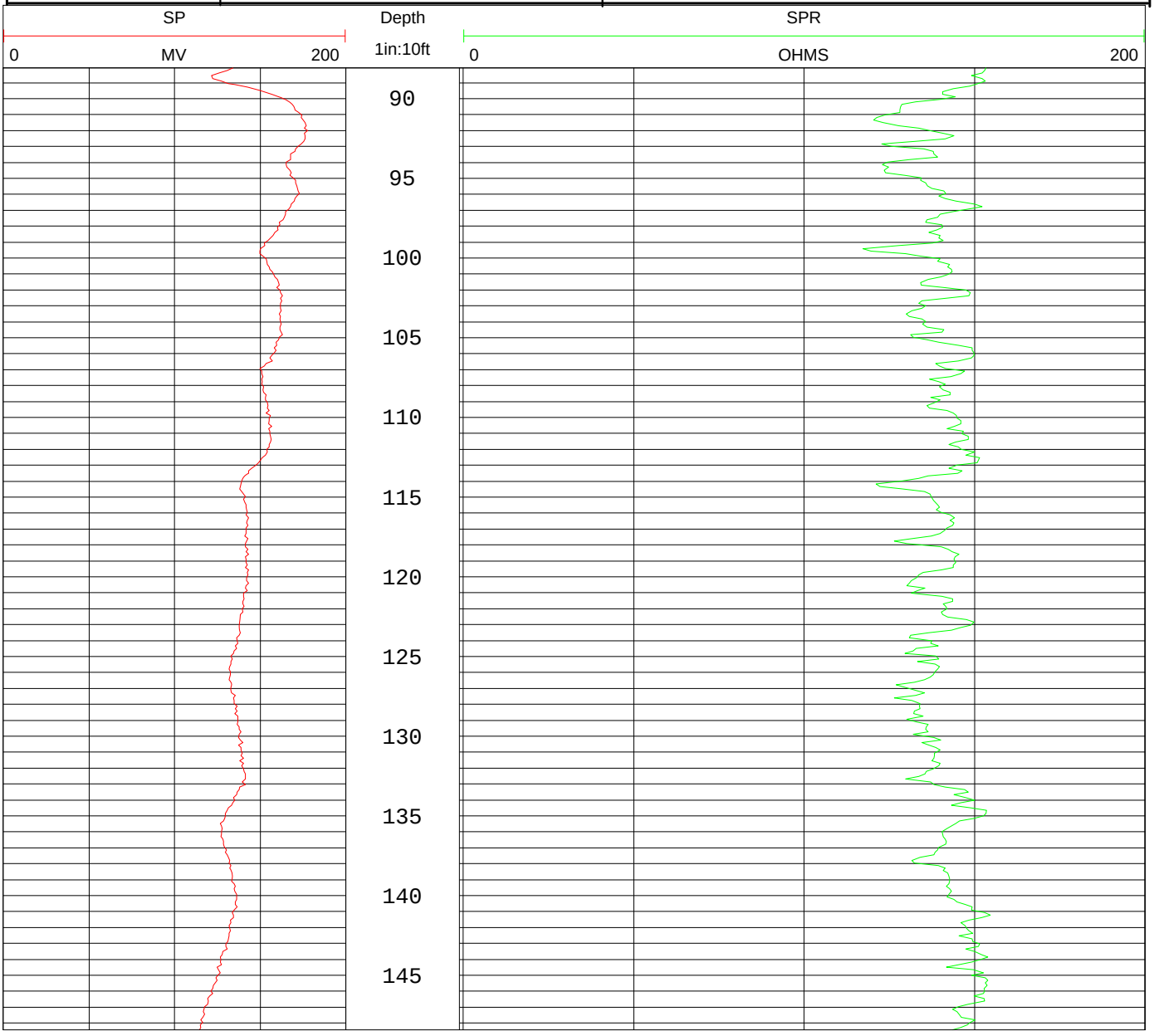
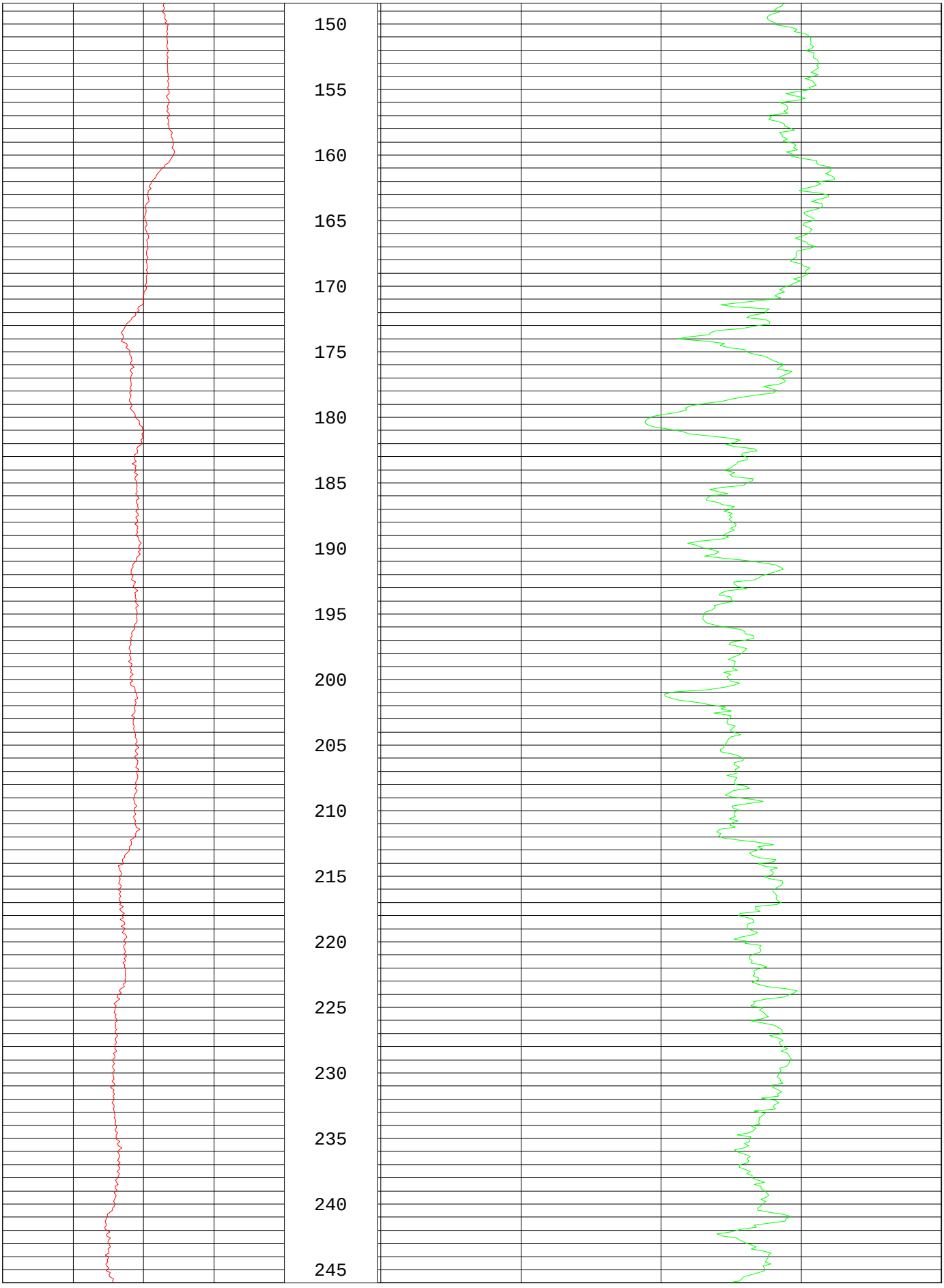

385
390
395
400
405
410
415
420
425
430
435
440
445
450
455
460
465

COMPANY:	Parsons
Location:	New Haven, MO

Well	JS-36		
Date	4-24-08	BH Fluid	Water
Casing	Steel		
File Name	JS-36 SP-SPR		
Depth Driller			
Depth Logger	468		
Logged by:	Lee Gorday		
Witness:			

OTHER SERVICES

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200
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240
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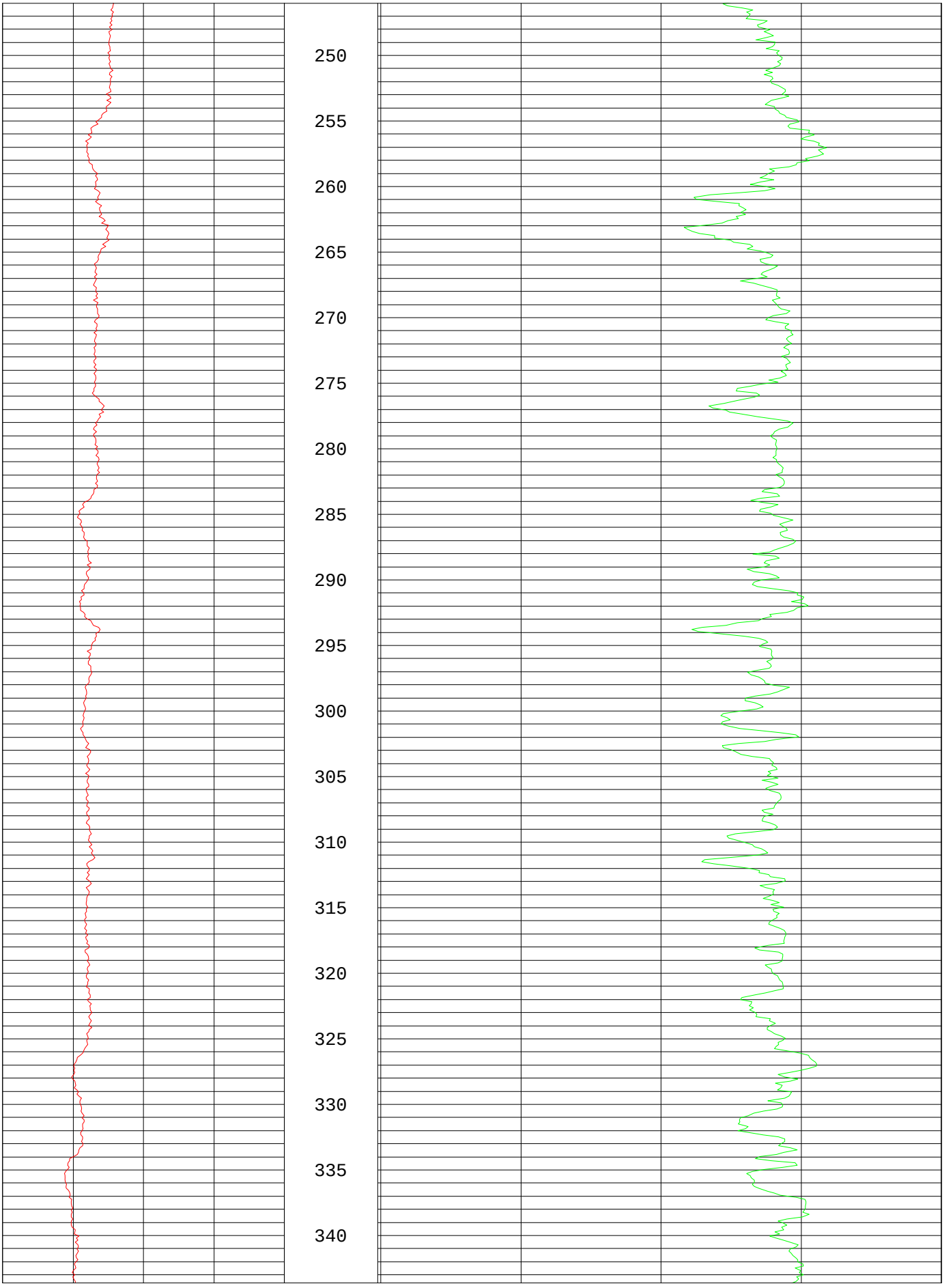
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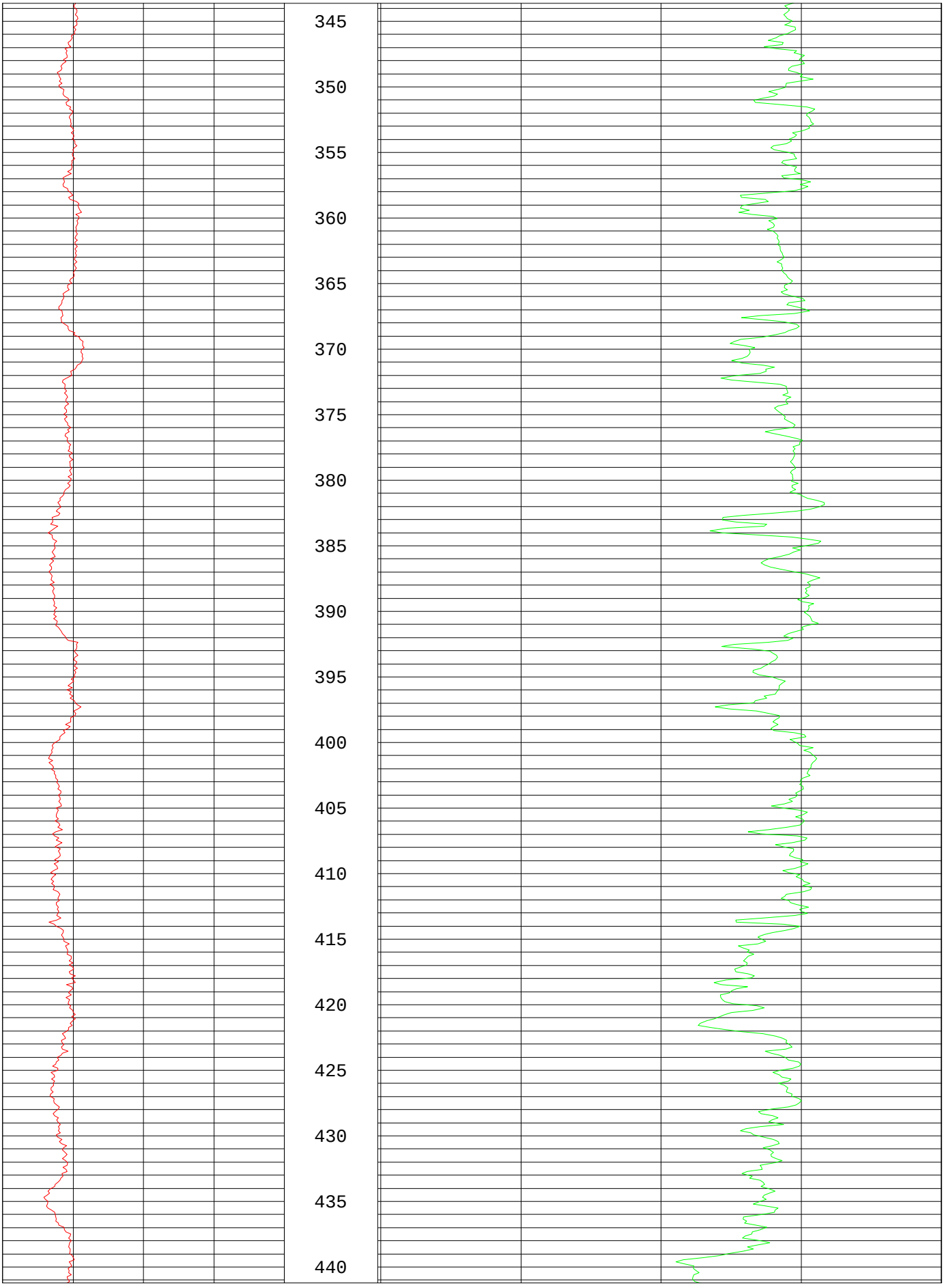
335
340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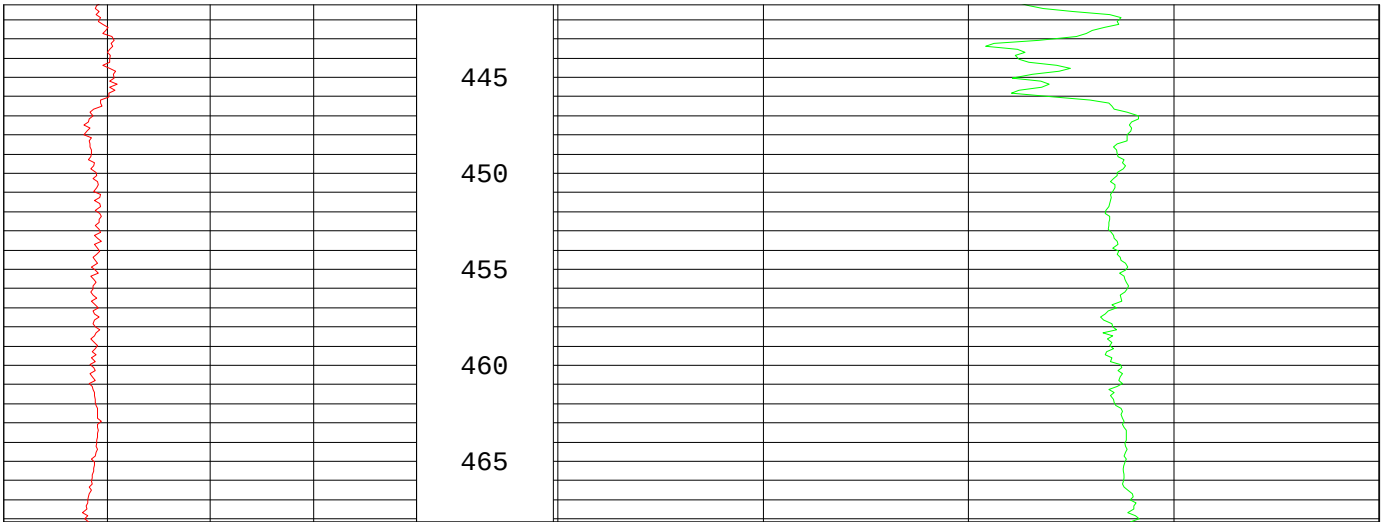
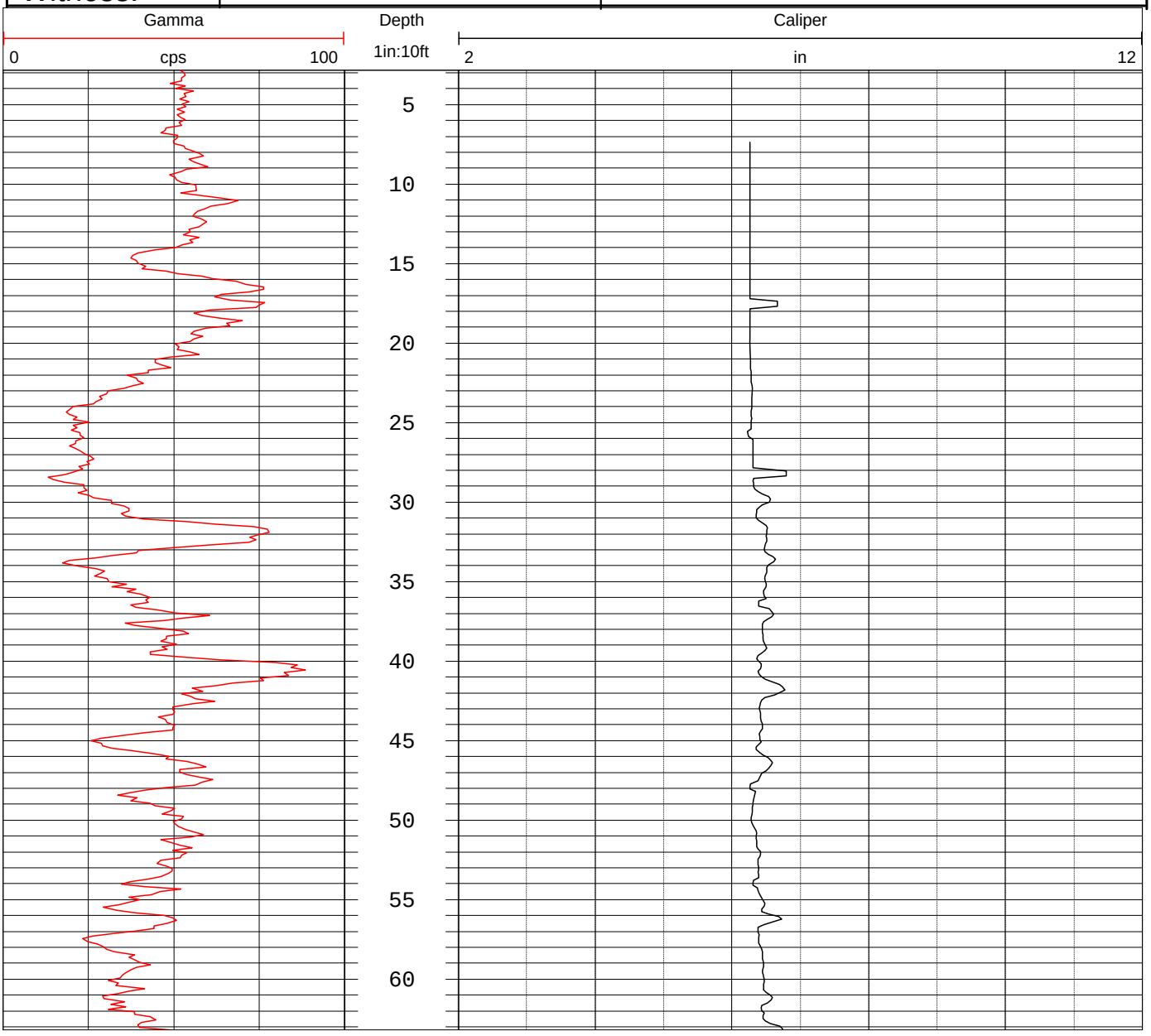
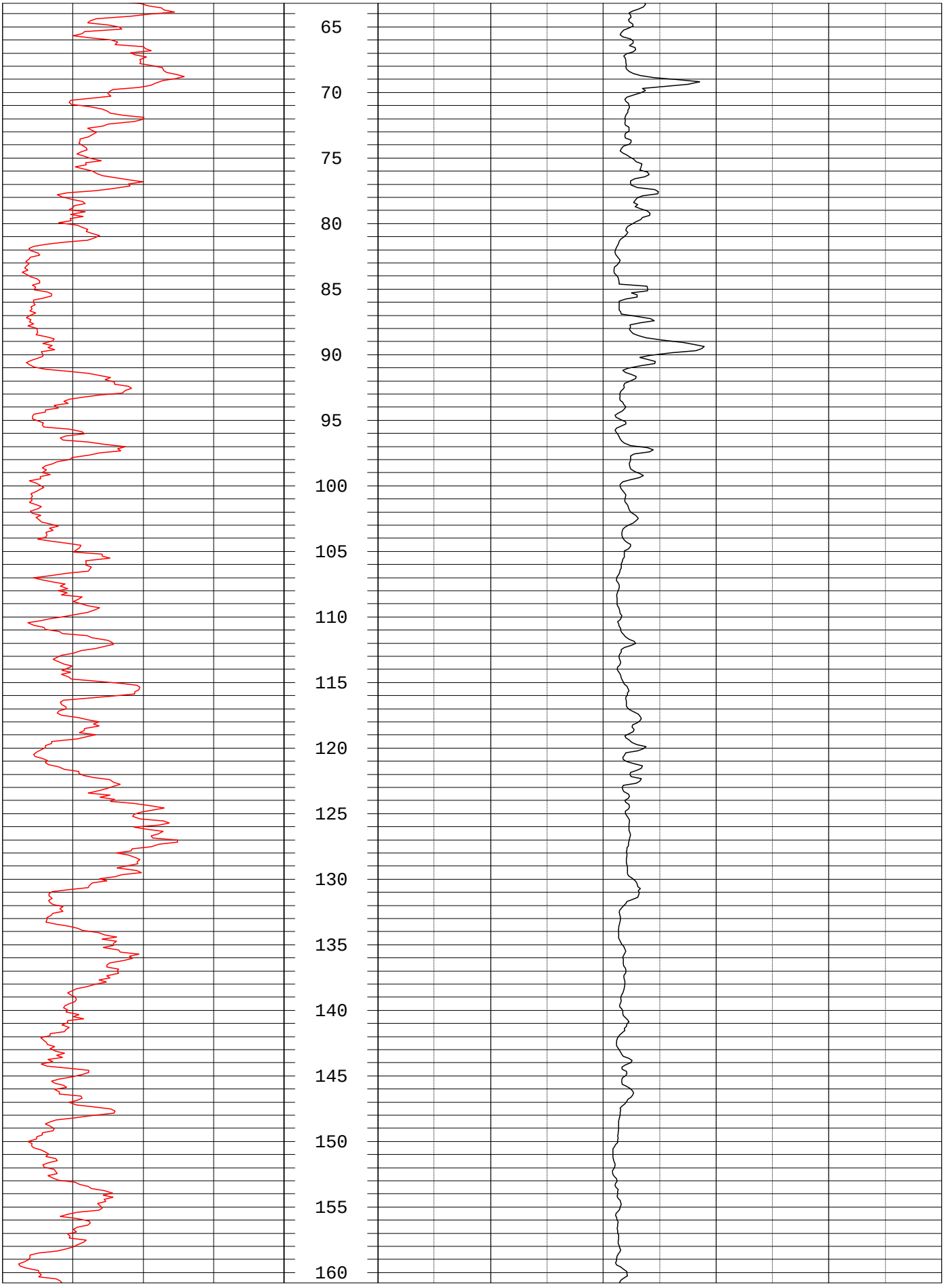

445
450
455
460
465

COMPANY:	Parsons
Location:	New Haven, MO

Well	JS-36		
Date	4-22-08	BH Fluid	Water
Casing	Steel		
File Name	JS-36 Caliper-Gamma		
Depth Driller			
Depth Logger	468		
Logged by:	Lee Gorday		
Witness:			

OTHER SERVICES

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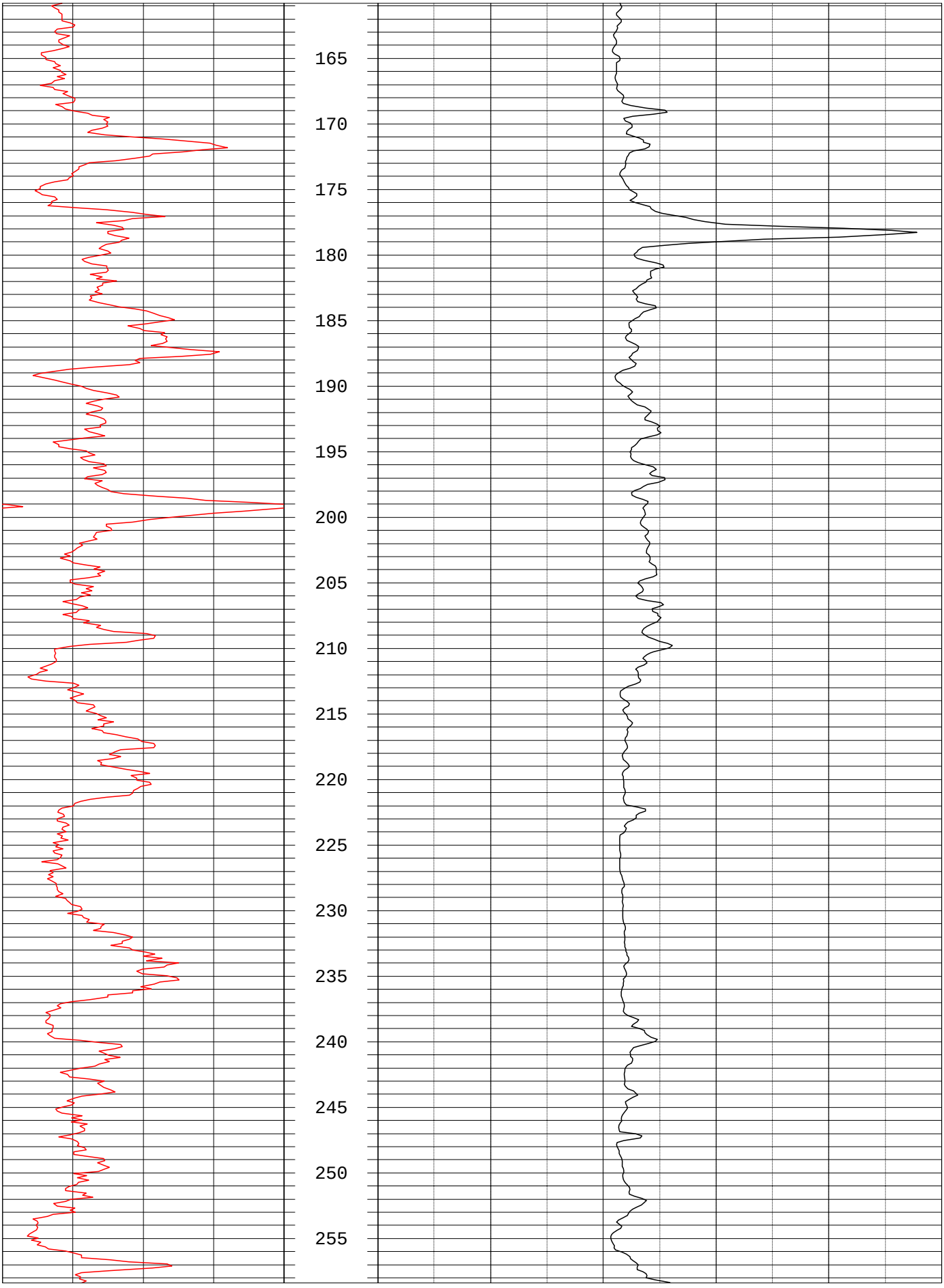
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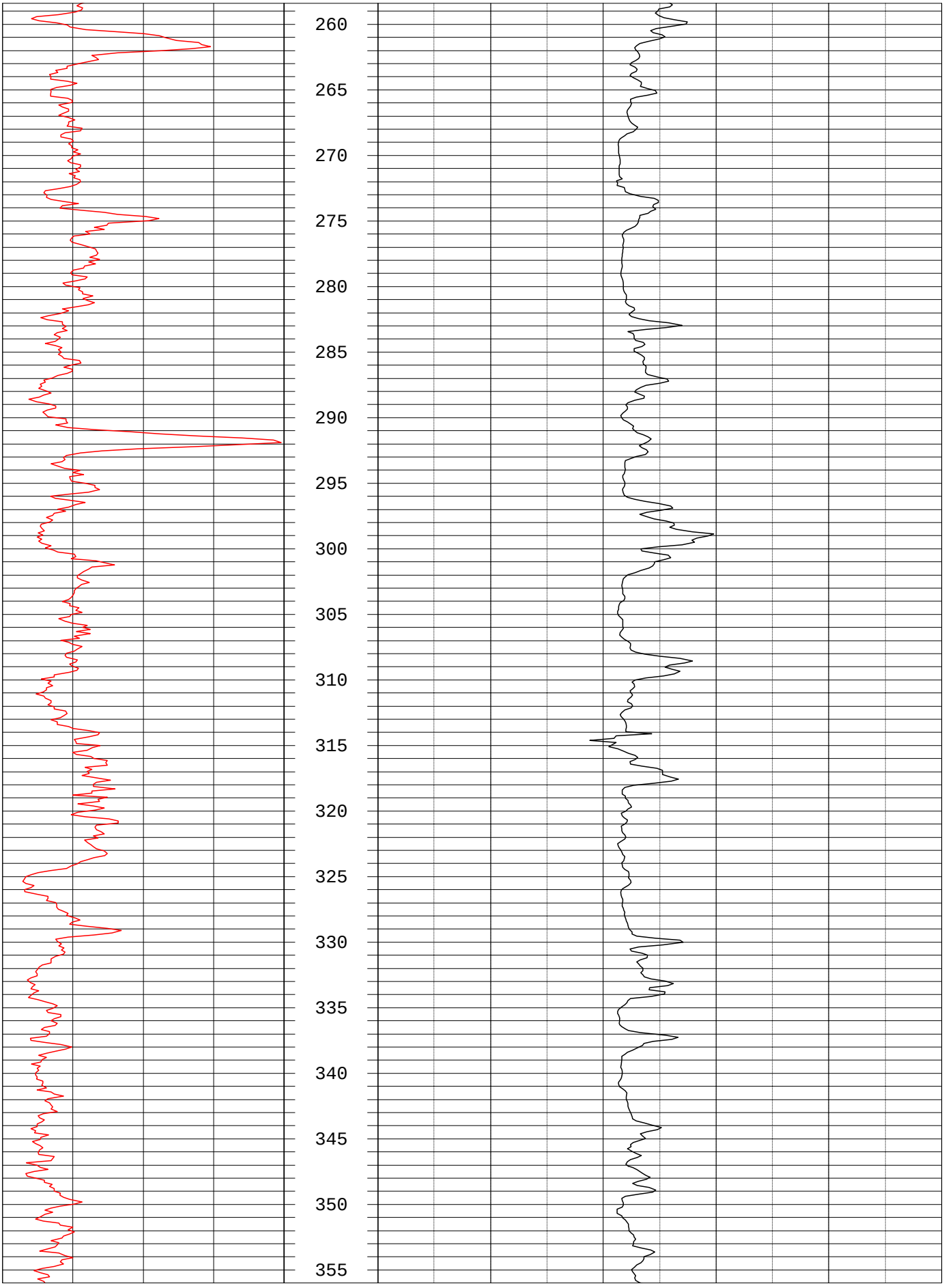
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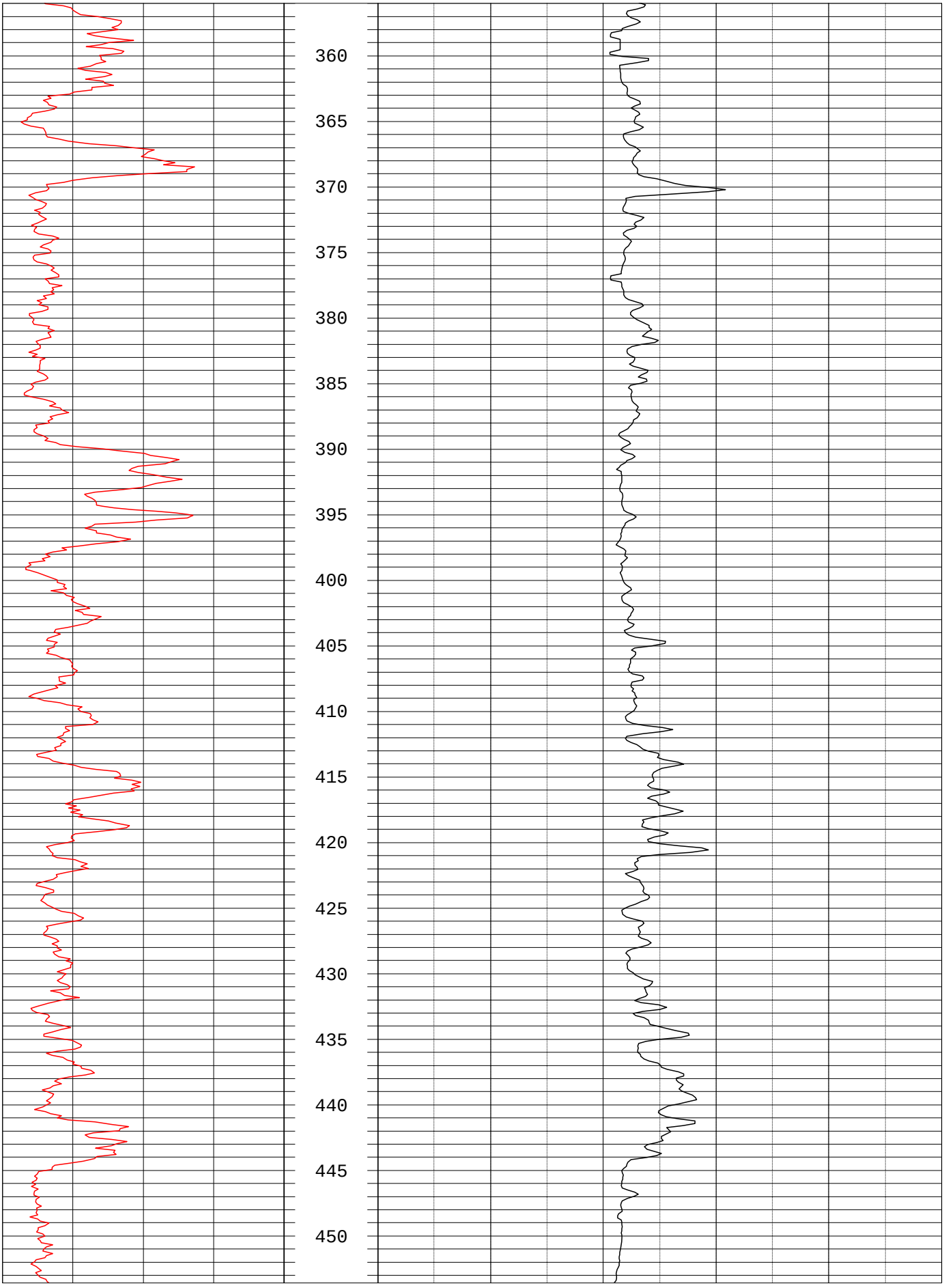
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365
370
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385
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400
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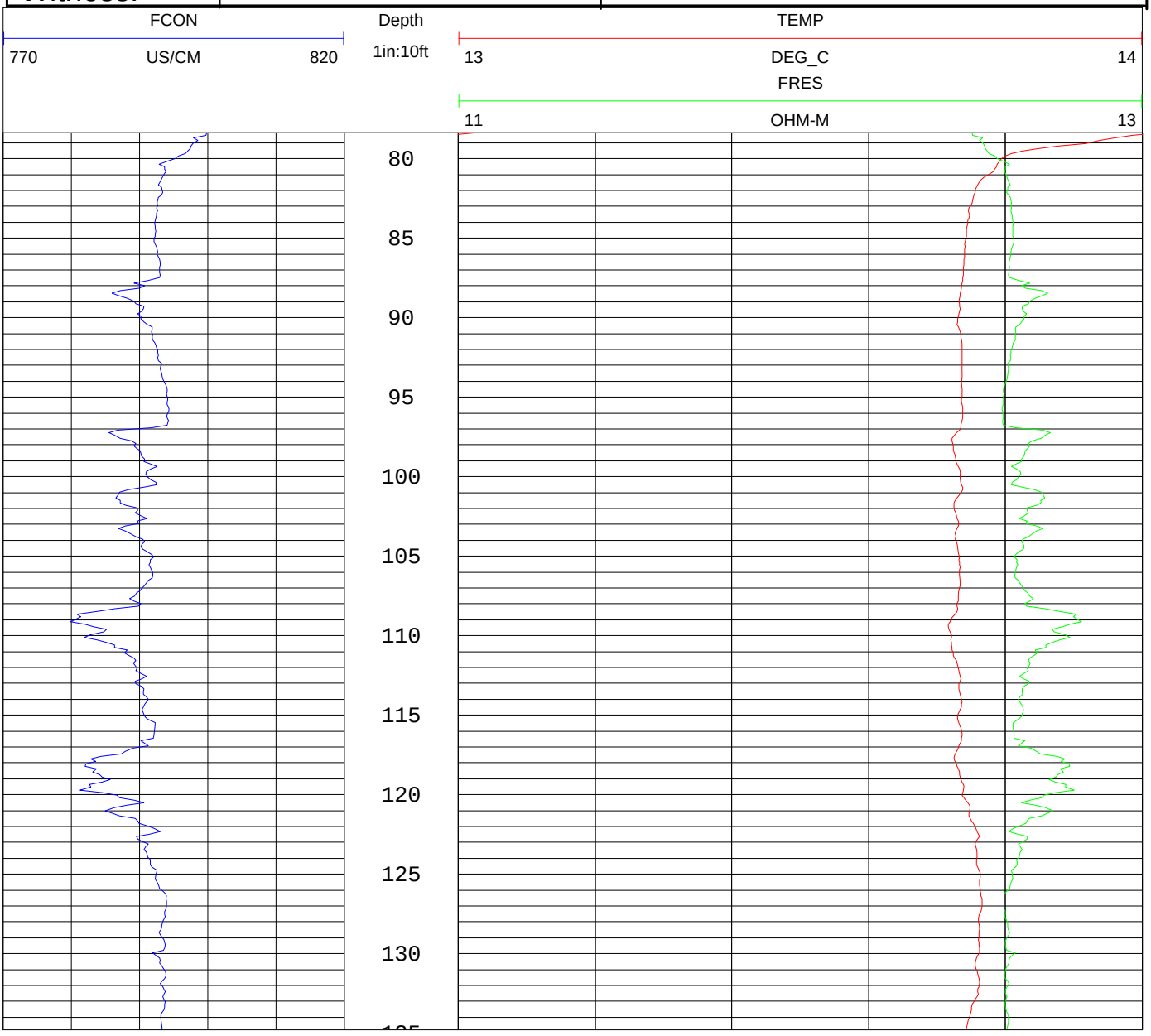
410
415
420
425
430
435
440
445
450

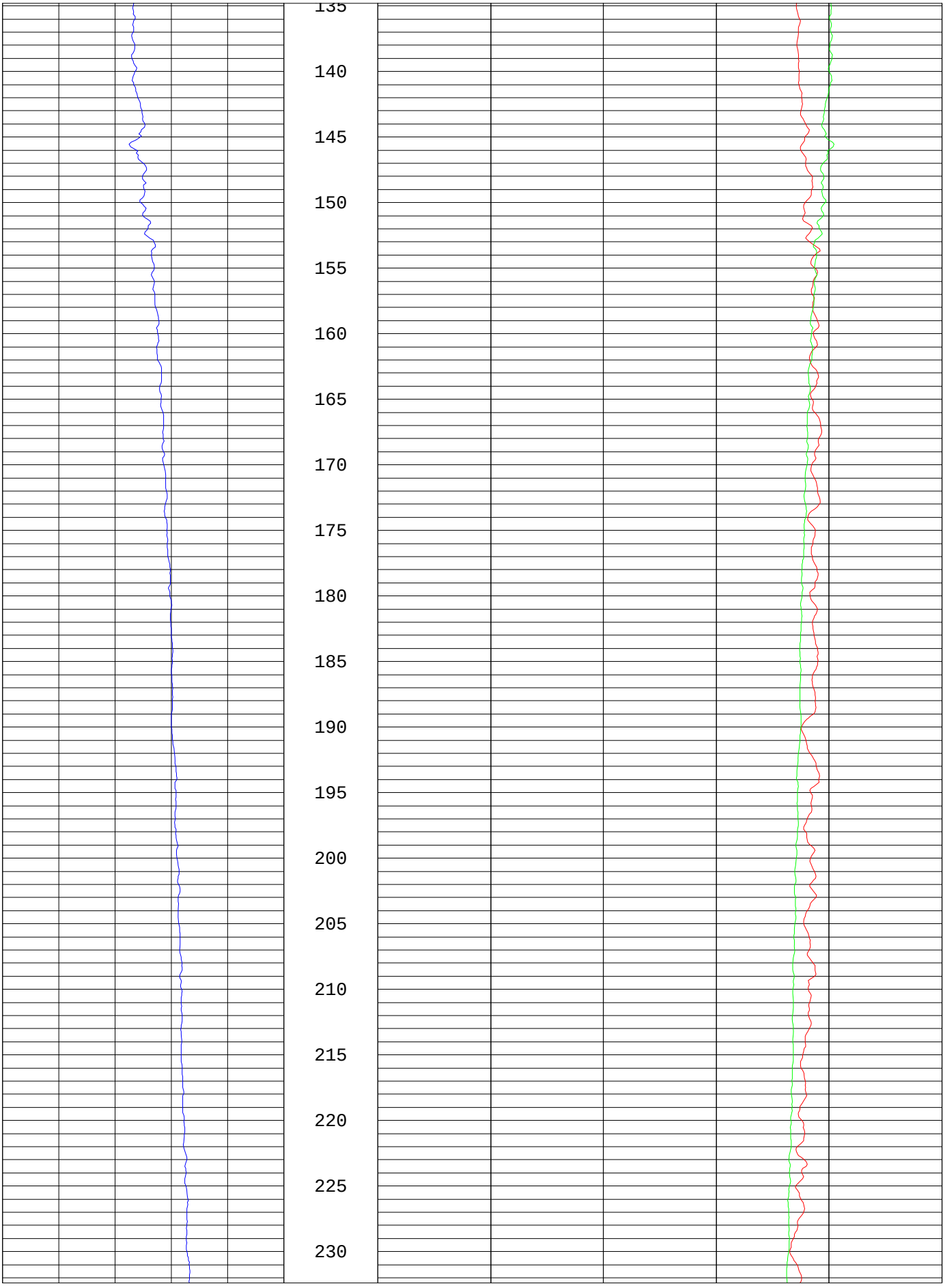
455
460
465

	COMPANY: Parsons
	Location: New Haven, MO

Well	JS-36		
Date	4-23-08	BH Fluid	Water
Casing	Steel		
File Name	JS36-Static Fluid		
Depth Driller			
Depth Logger	468		
Logged by:	Lee Gorday		
Witness:			

OTHER SERVICES

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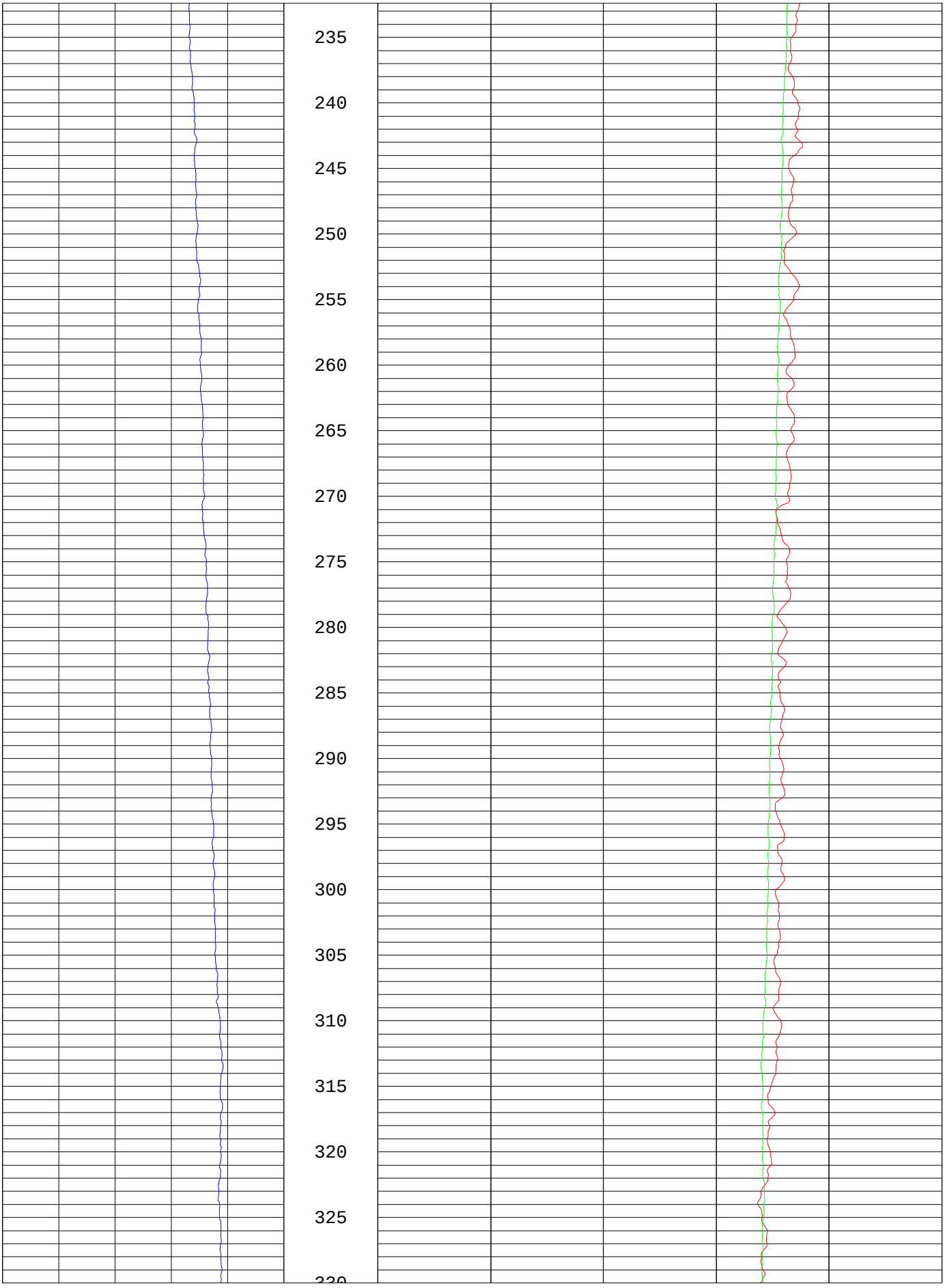
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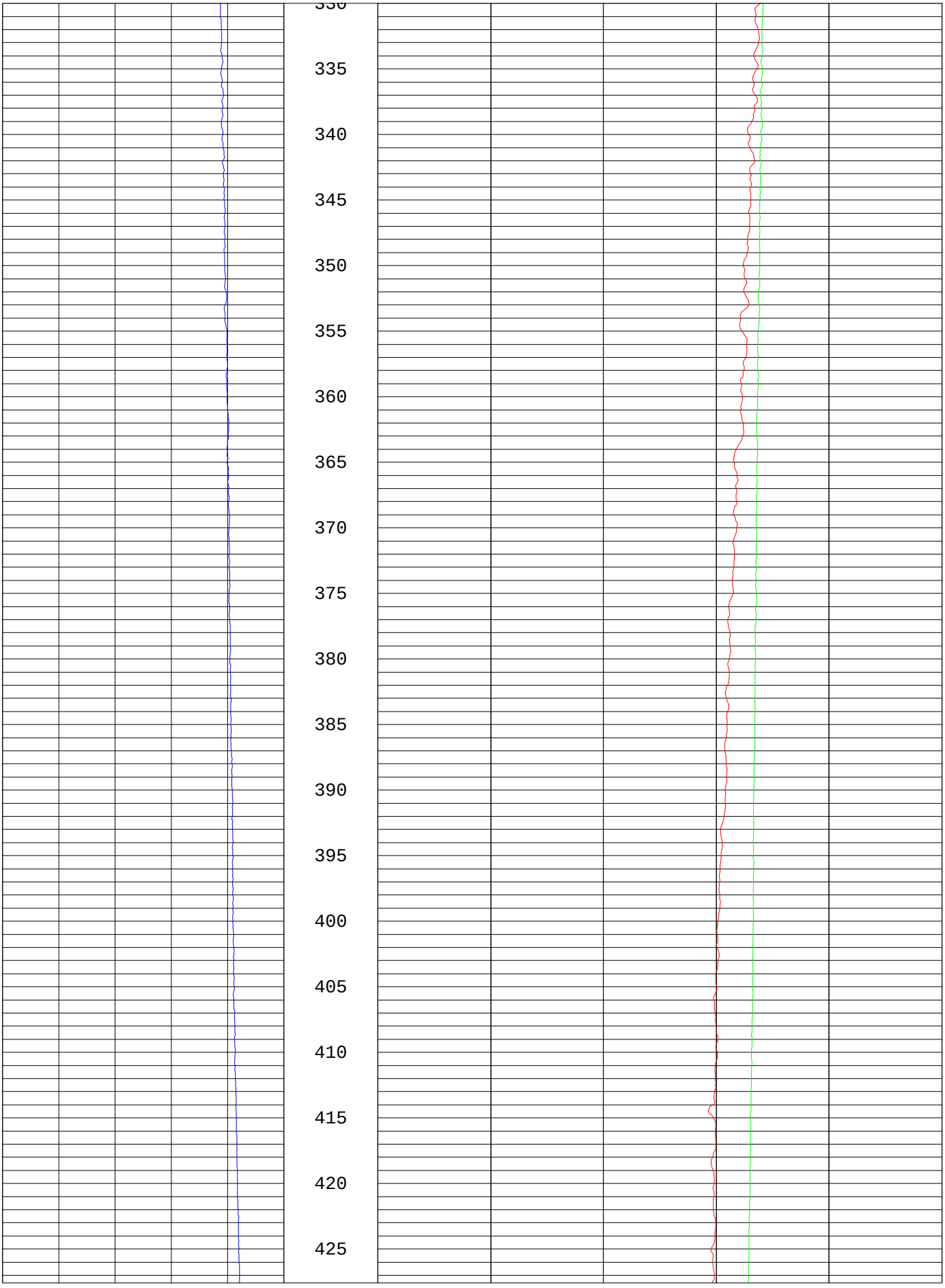
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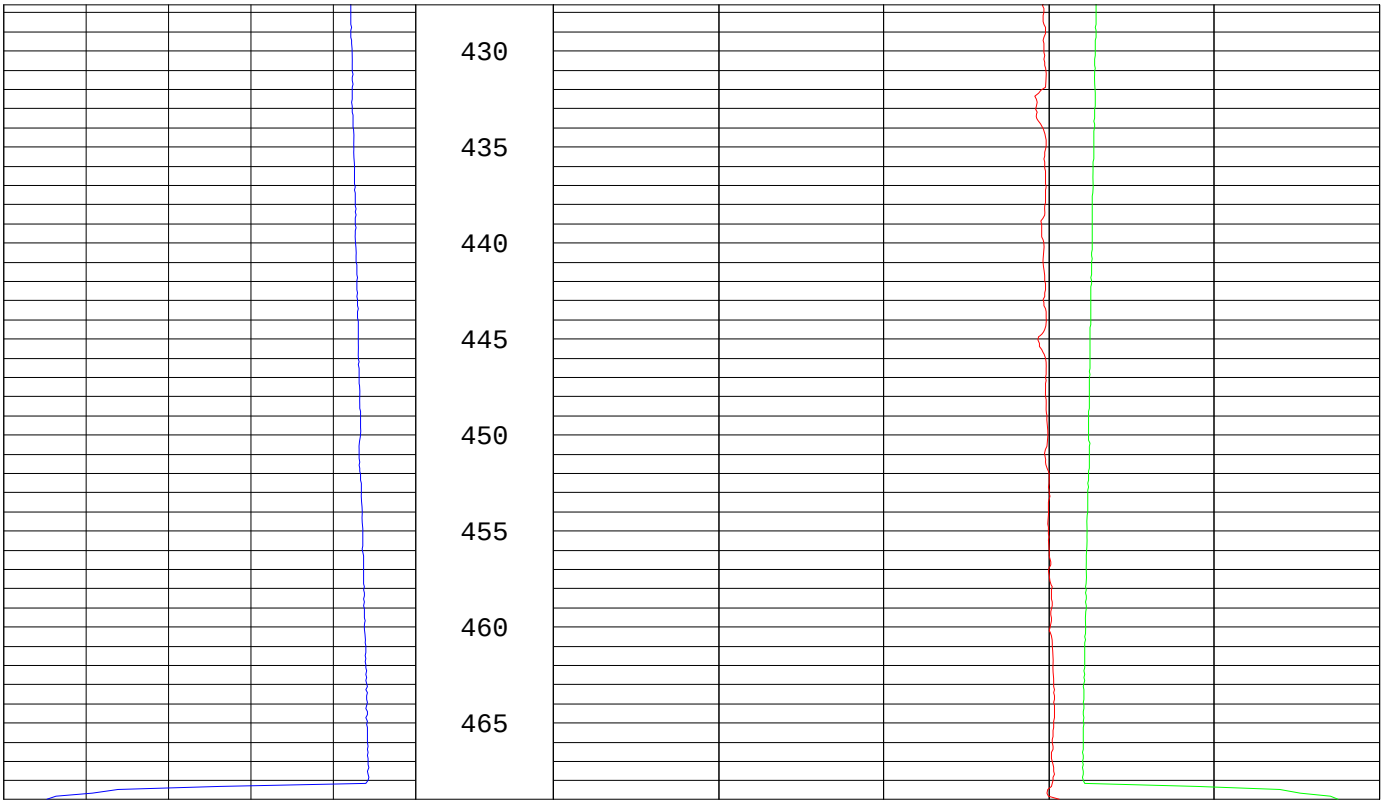
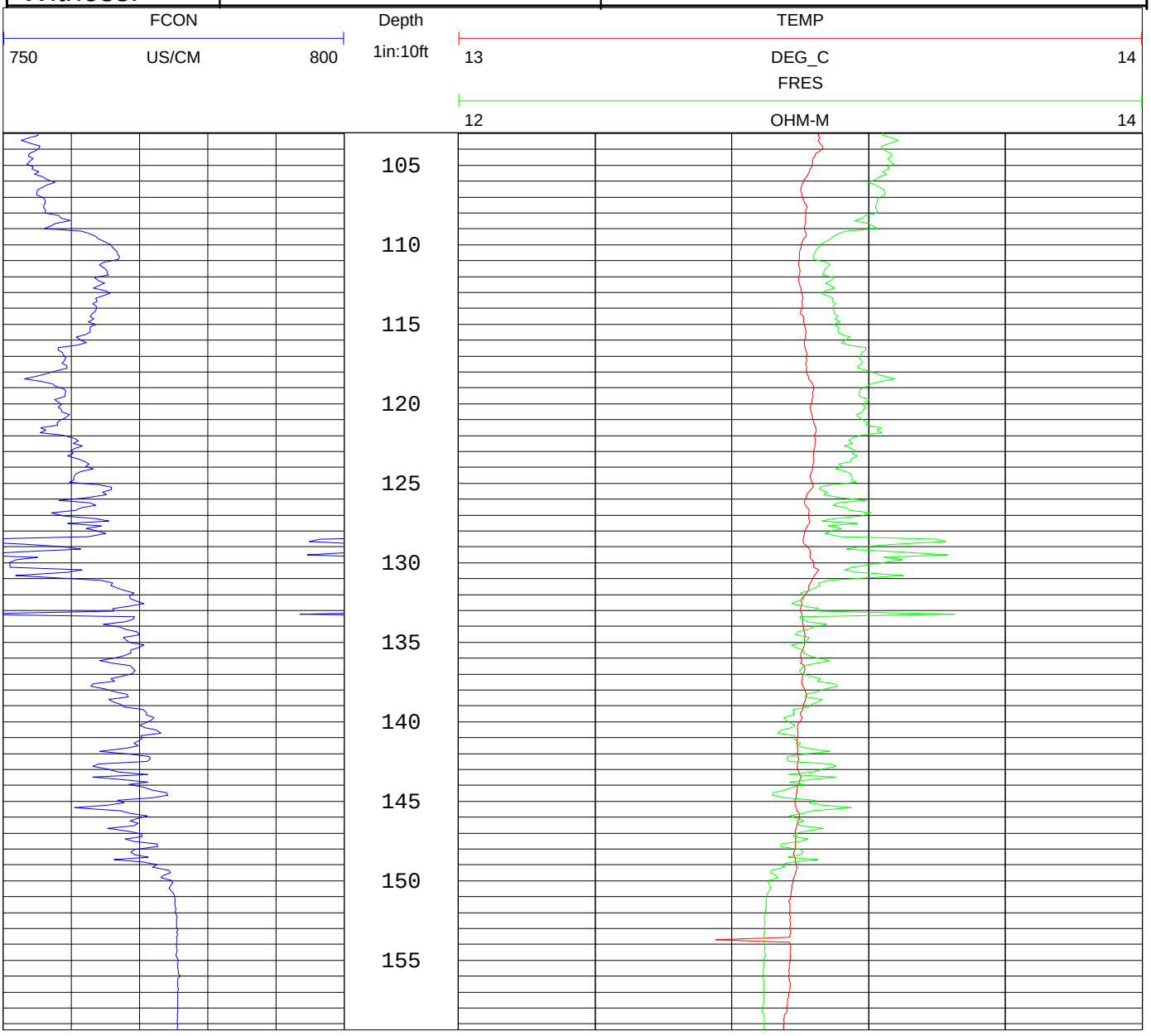
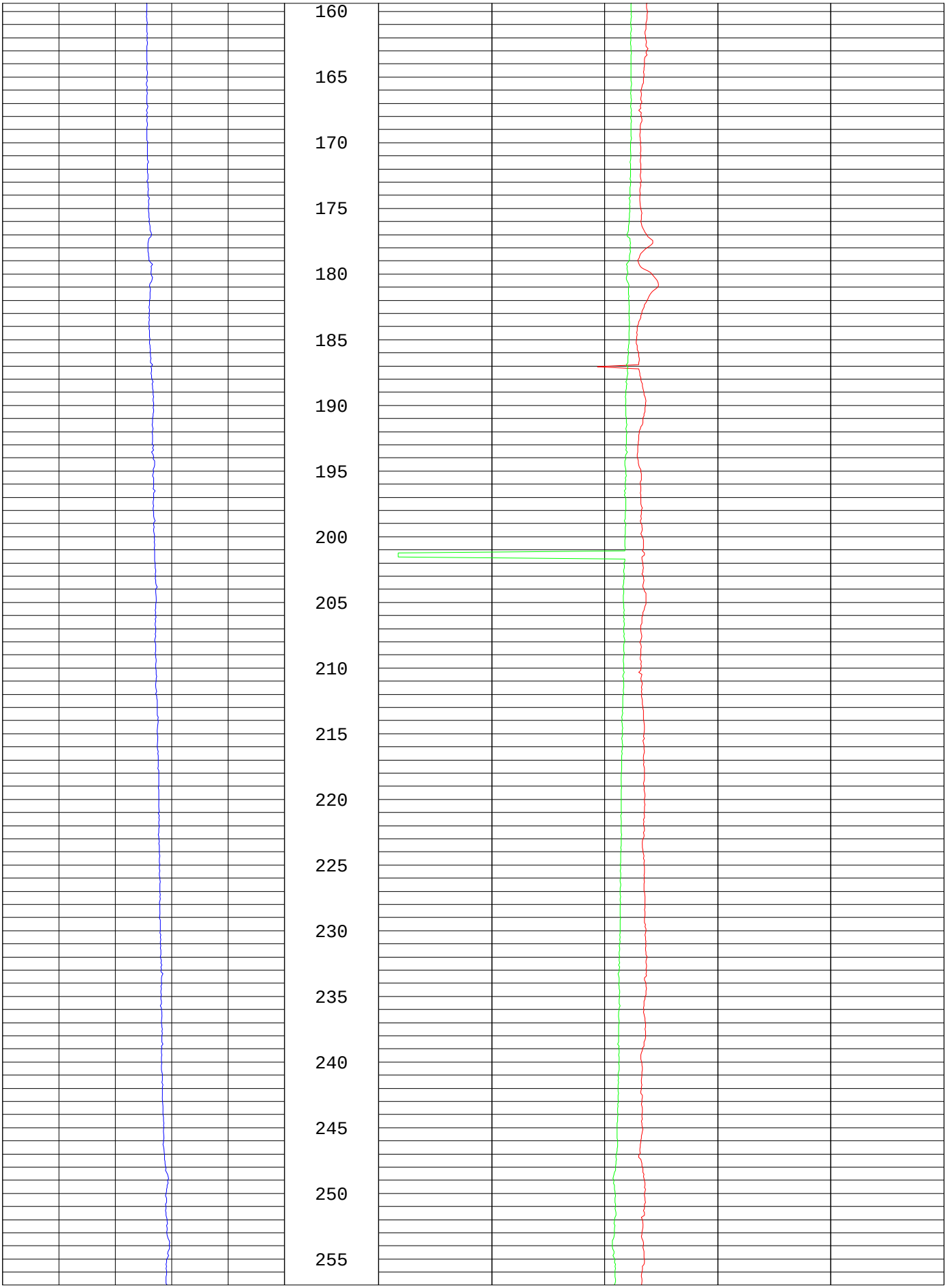

430
435
440
445
450
455
460
465

	COMPANY: Parsons
	Location: New Haven, MO

Well	JS-36		
Date	4-24-08	BH Fluid	Water
Casing	Steel		
File Name	JS36-Pumping Fluid (approx 6 gpm)		
Depth Driller			
Depth Logger	468		
Logged by:	Lee Gorday		
Witness:			

OTHER SERVICES

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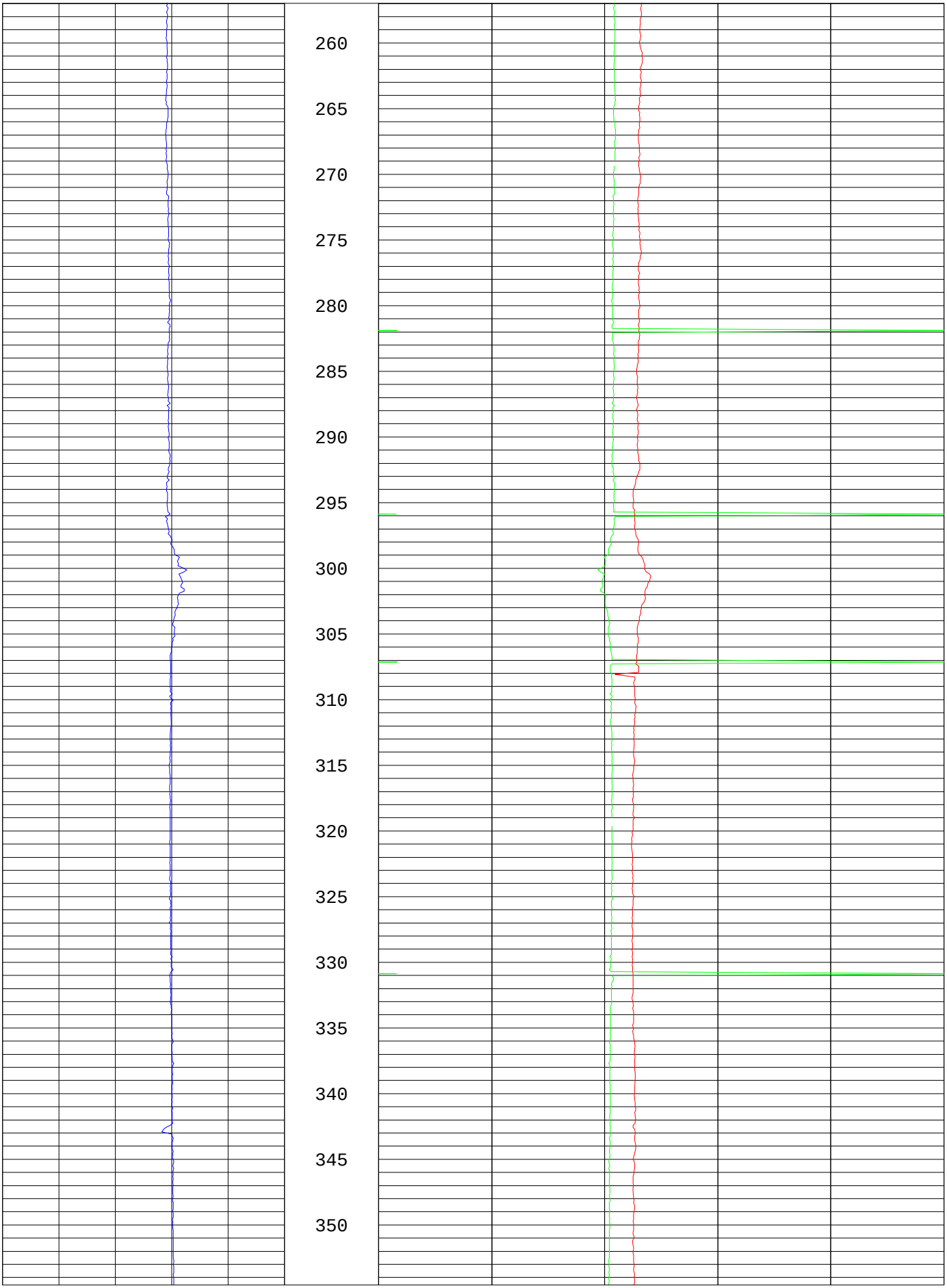
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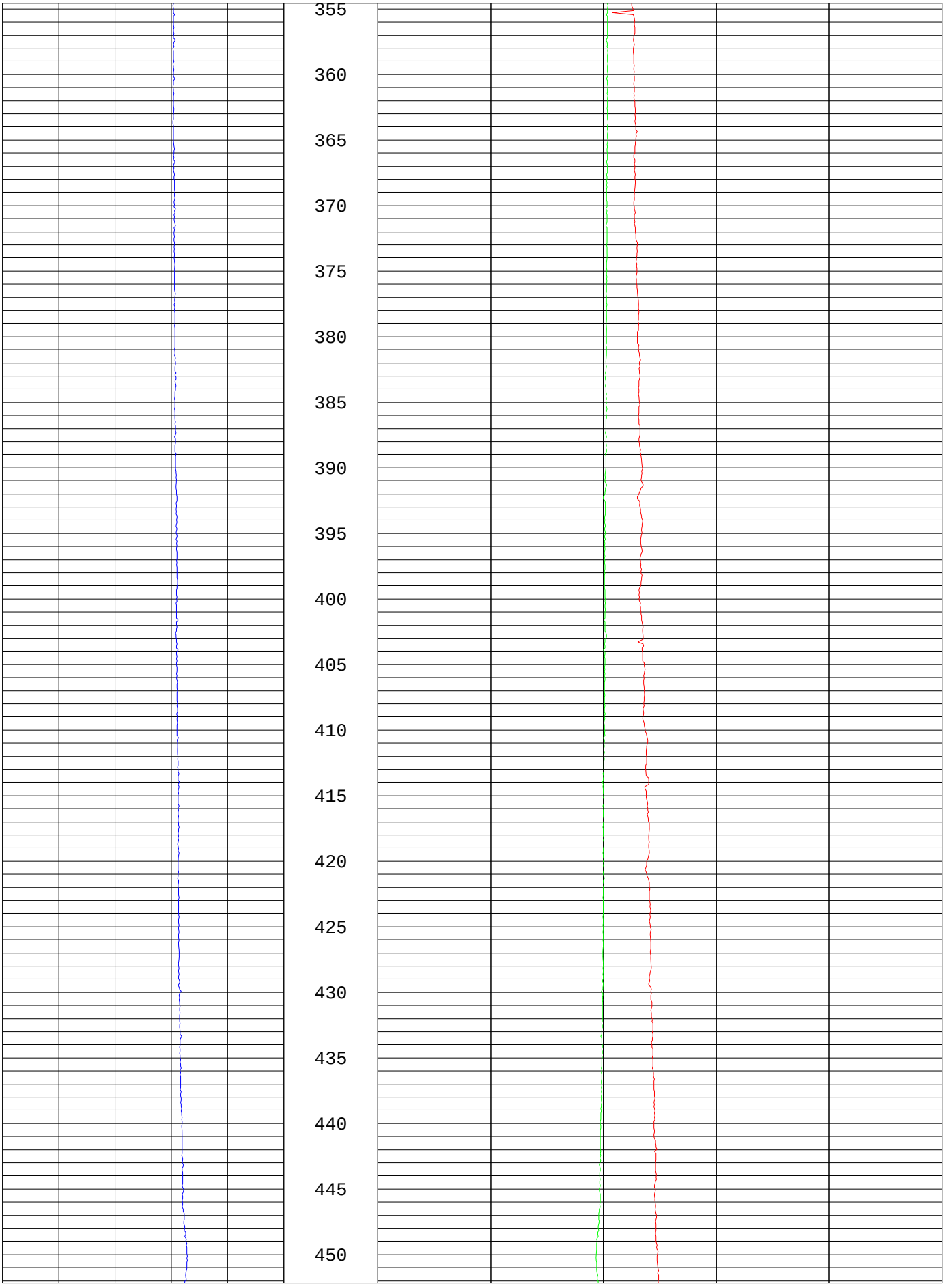
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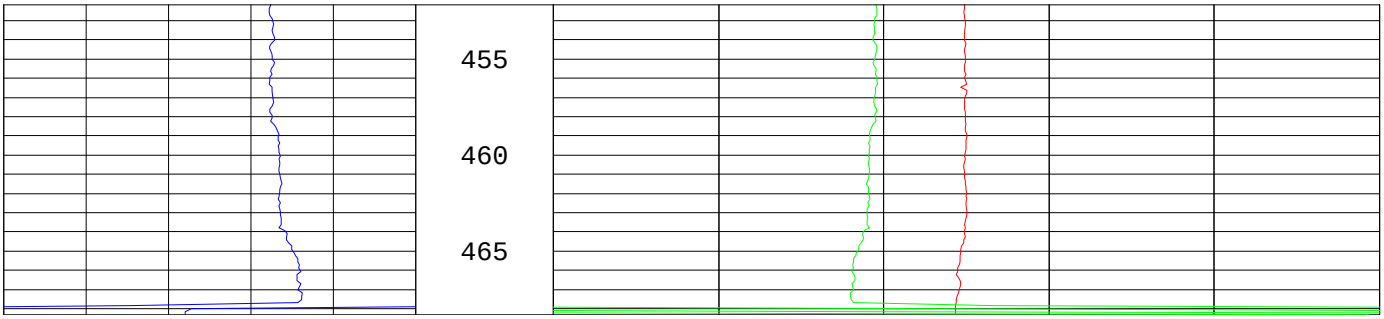
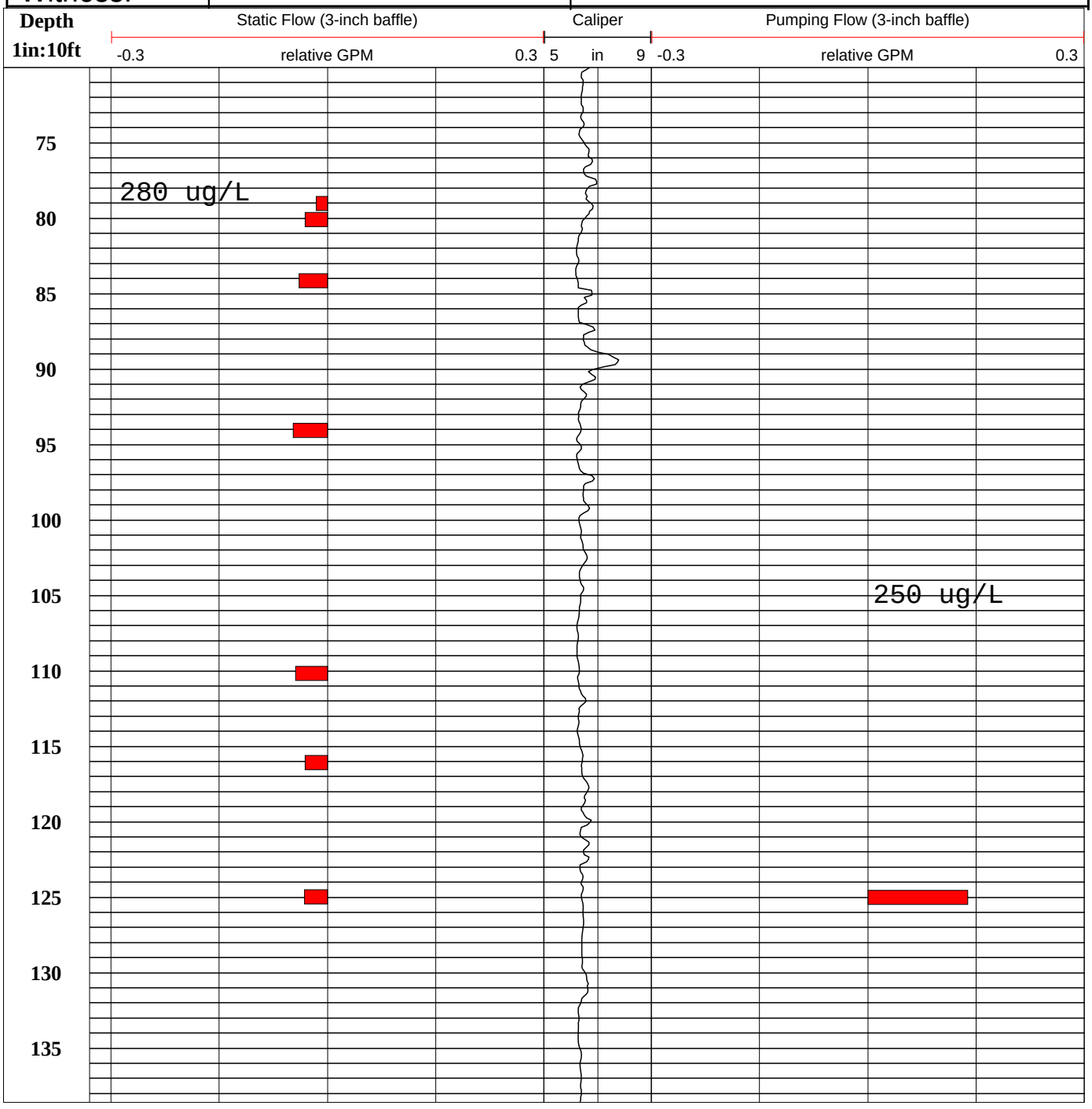
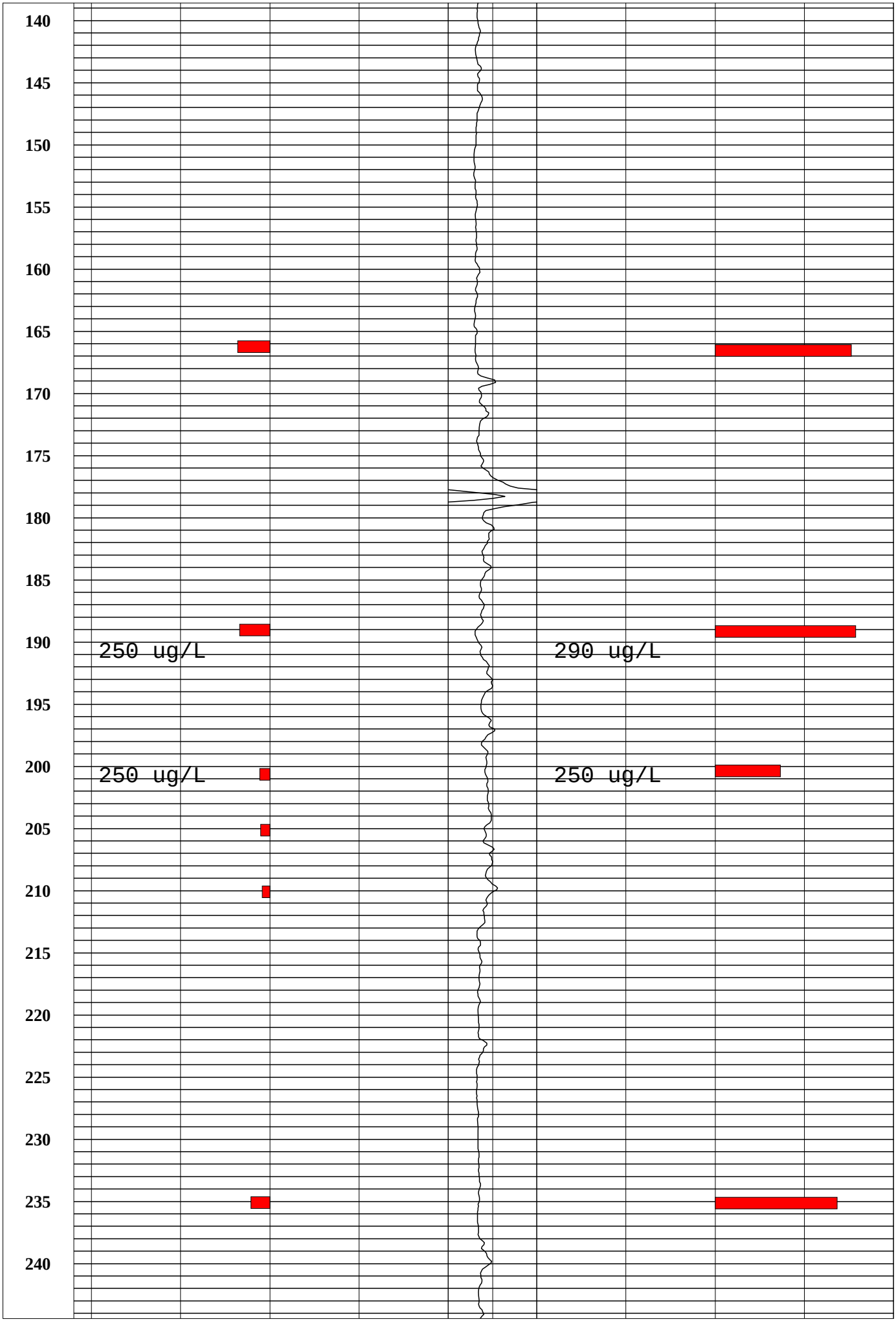

455
460
465

	COMPANY: Parsons
	Location: New Haven, MO

Well	JS-36		OTHER SERVICES
Date	4-24-08	BH Fluid	Water
Casing	Steel		
File Name	JS36-Static and Pumping (6 gpm)		Flow
Depth Driller			
Depth Logger	468		
Logged by:	Lee Gorday		
Witness:			

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215
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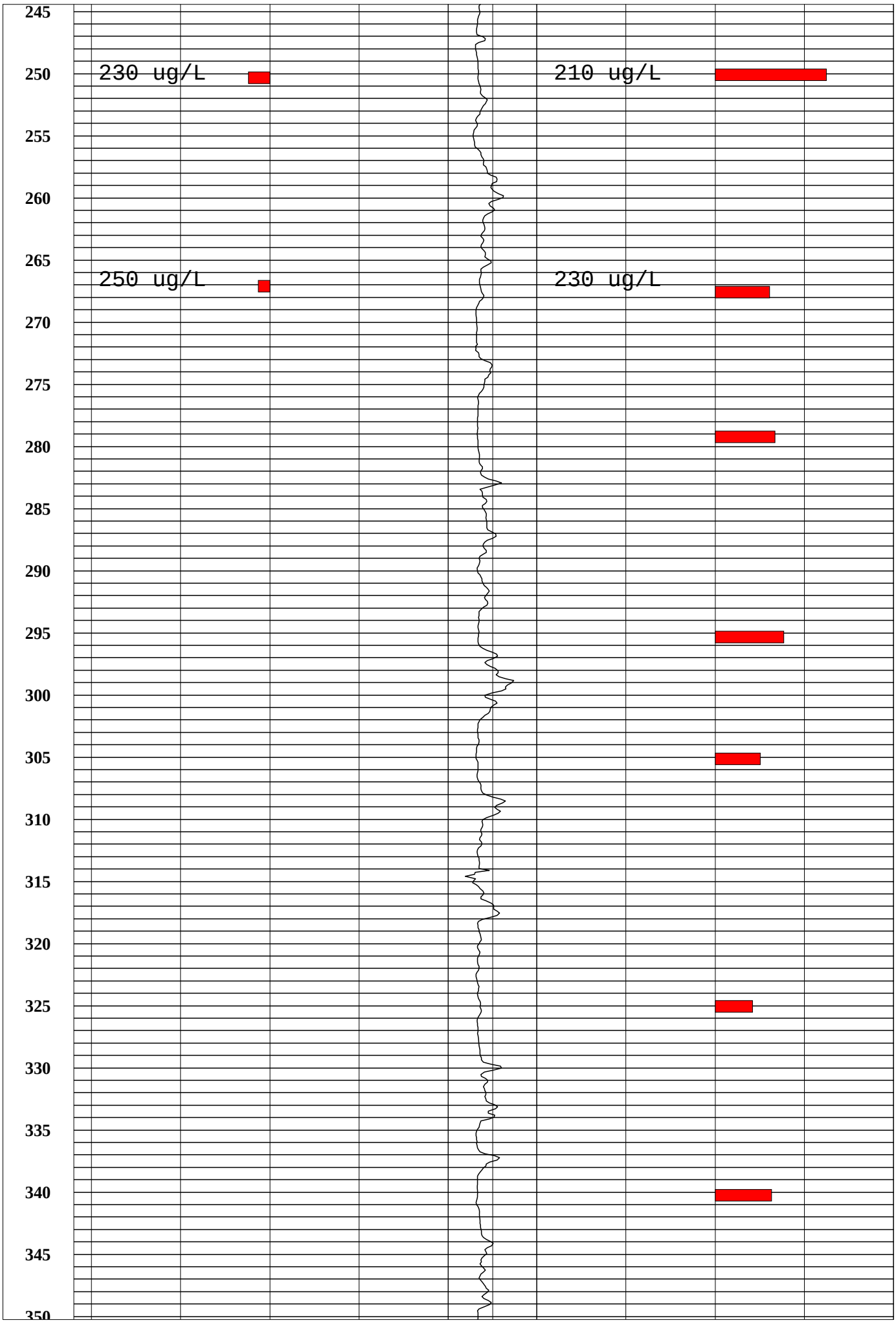
225
230
235
240
250 ug/L
290 ug/L
250 ug/L
250 ug/L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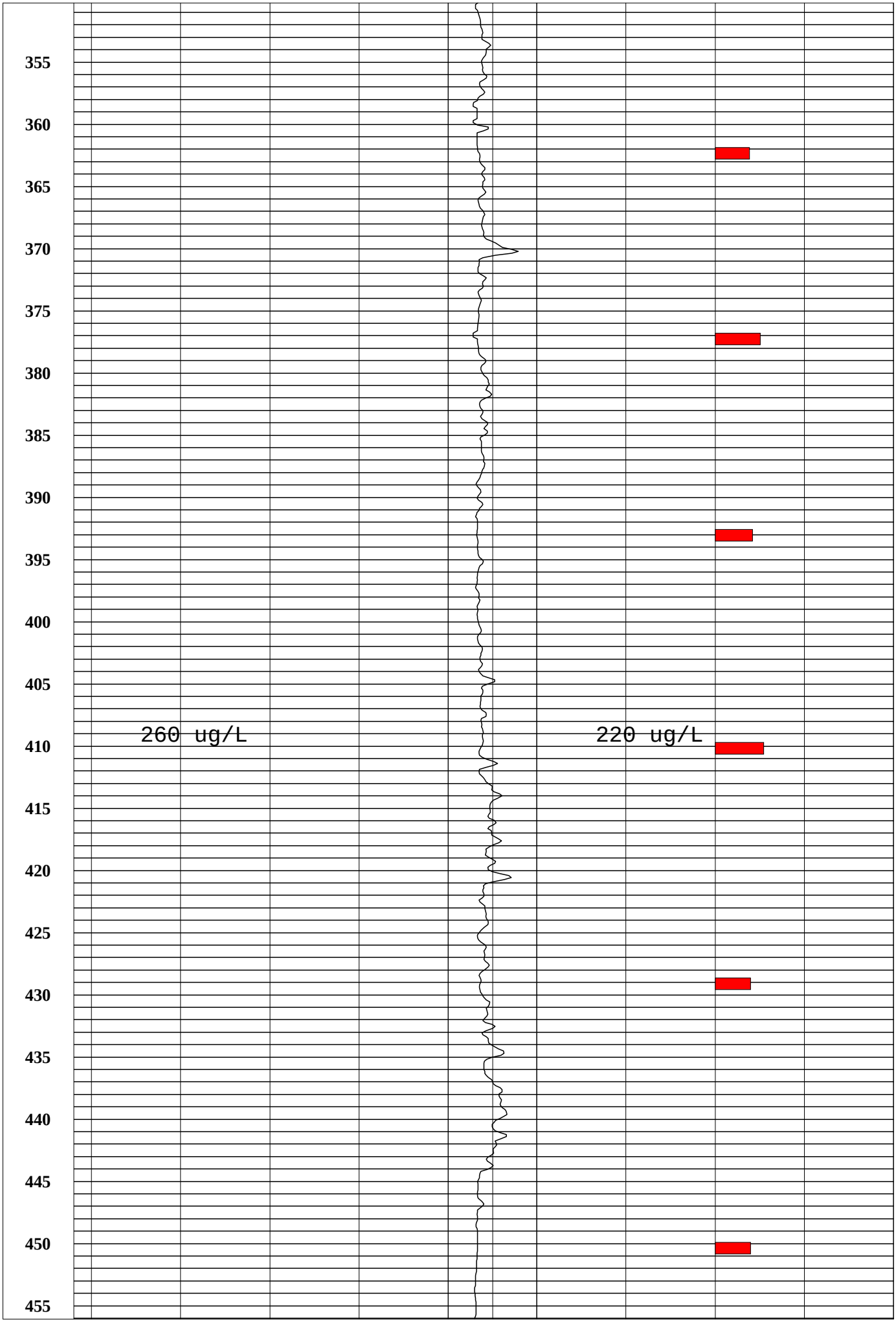
340
345
350
230 ug/L
210 ug/L
250 ug/L
230 ug/L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260 ug/L
220 ug/L
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425
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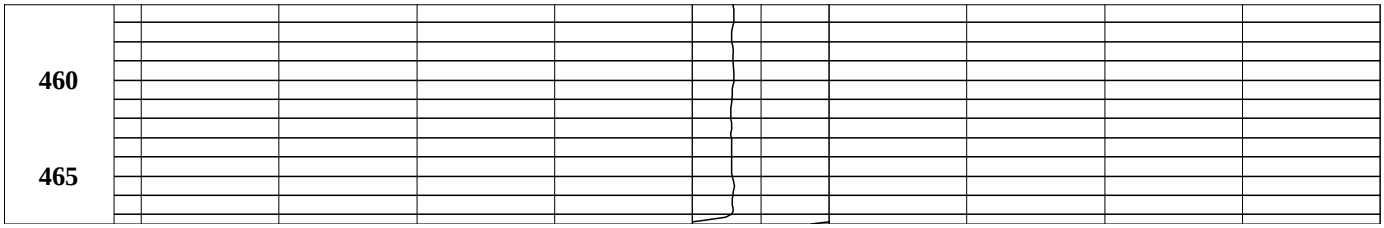
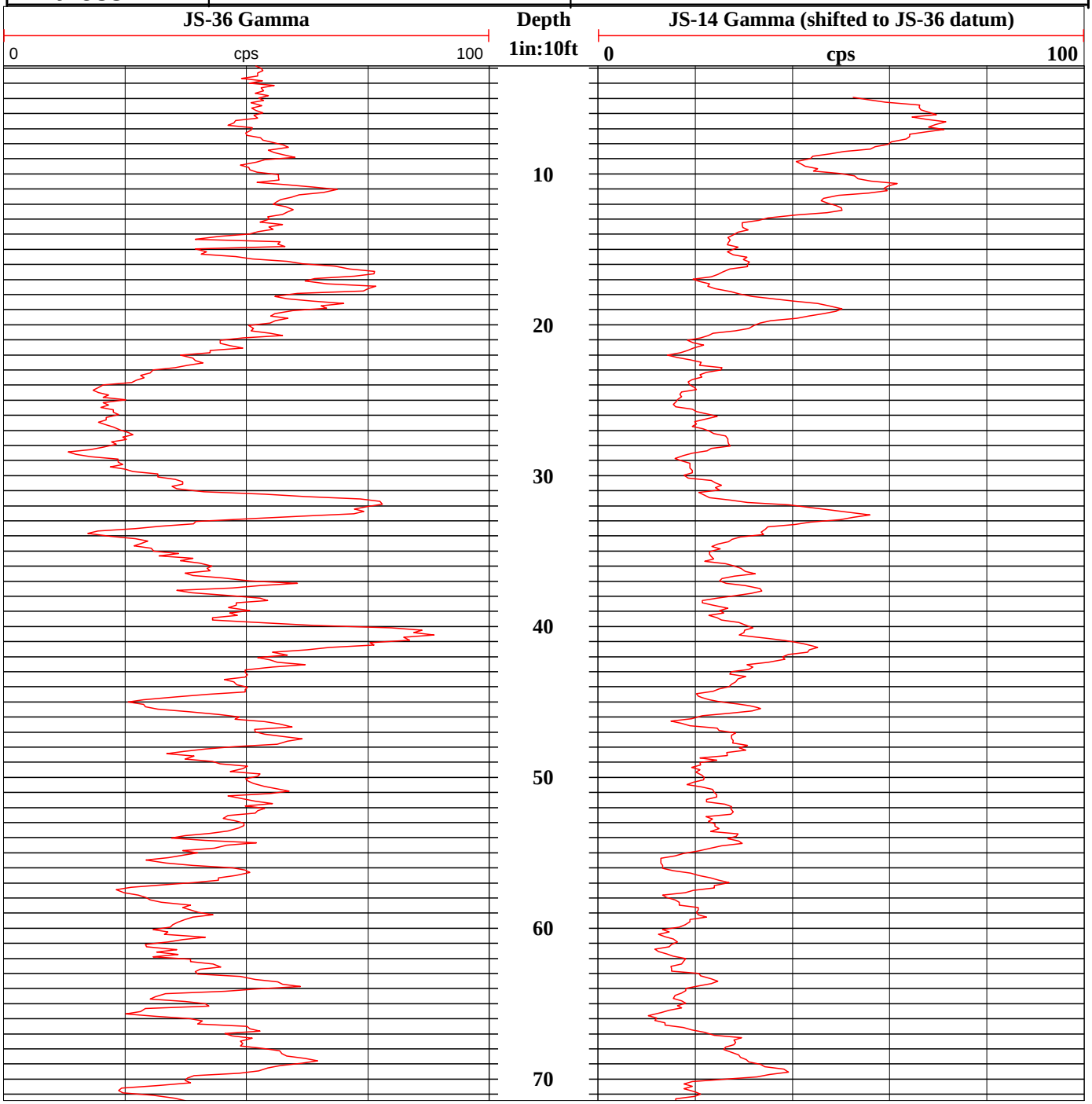

460
465

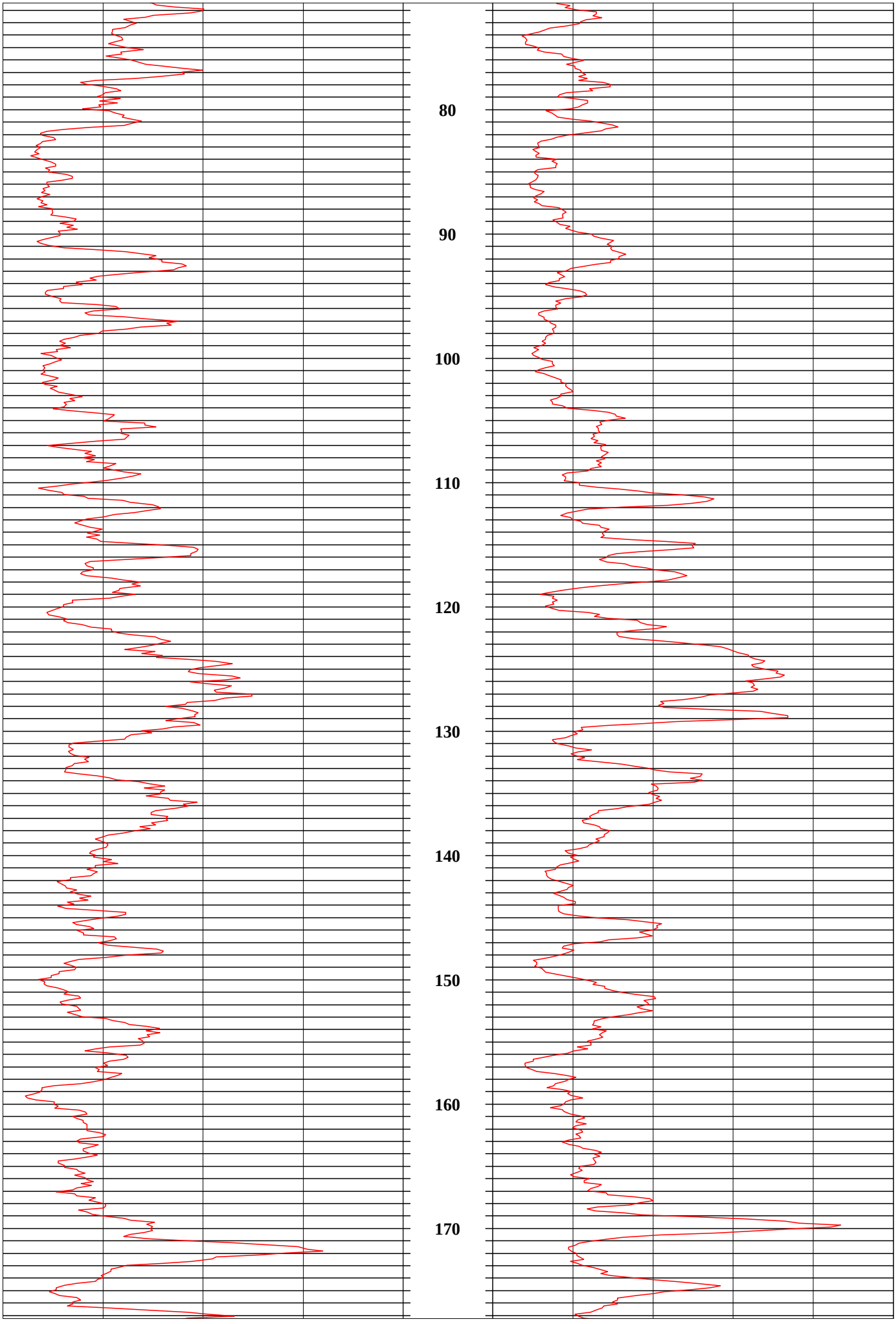
JS-14 AND JS-36 GAMMA COMPARISION

COMPANY:	Parsons
Location:	New Haven, MO

Well	JS-36 / JS-14		
Date	4-22-08/4-4-06	BH Fluid	Water
Casing	Steel		
File Name	JS-36 / JS-14 Gamma		
Depth Driller	383.5		
Depth Logger			
Logged by:	Lee Gorday		
Witness:			

OTHER SERVICES

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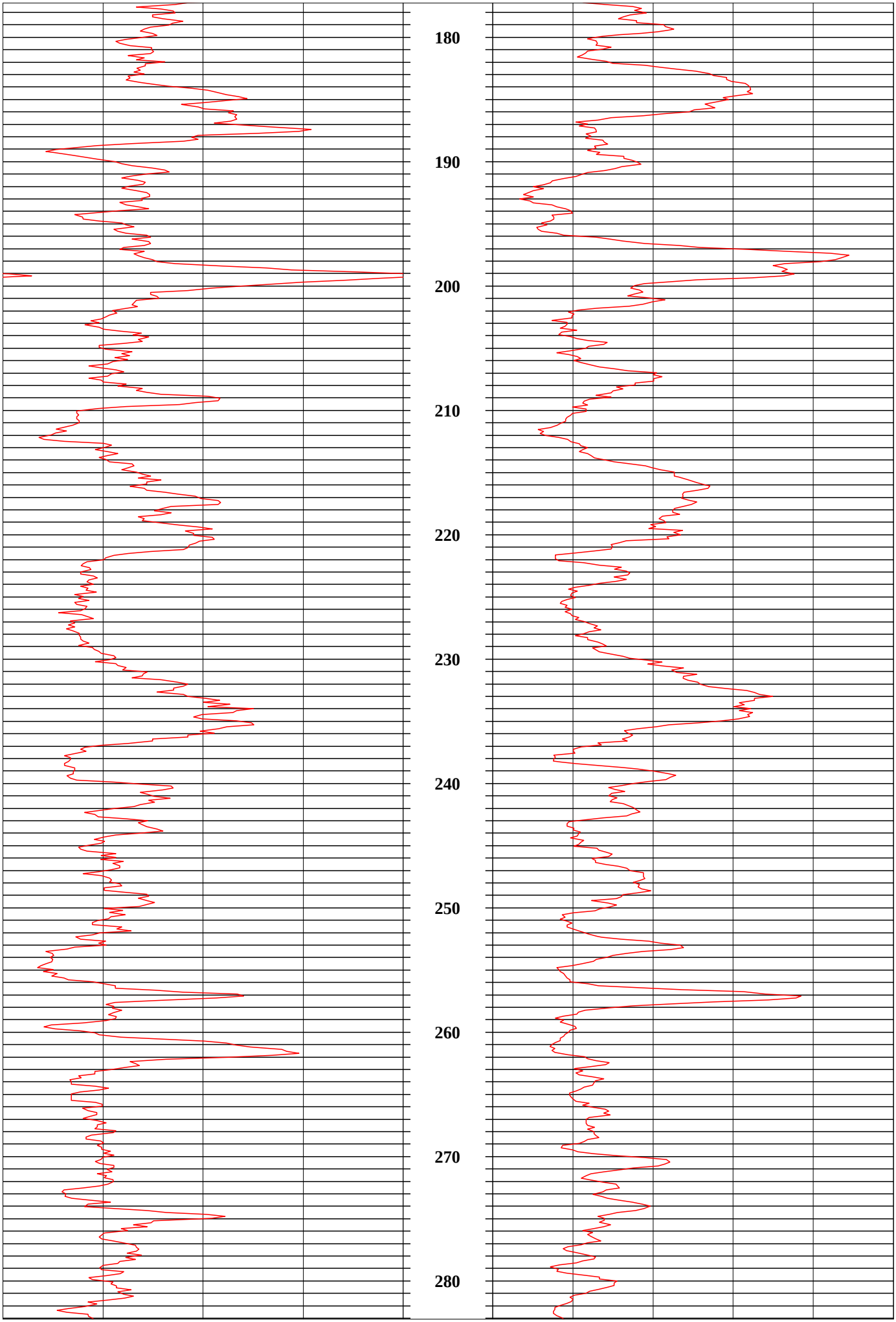
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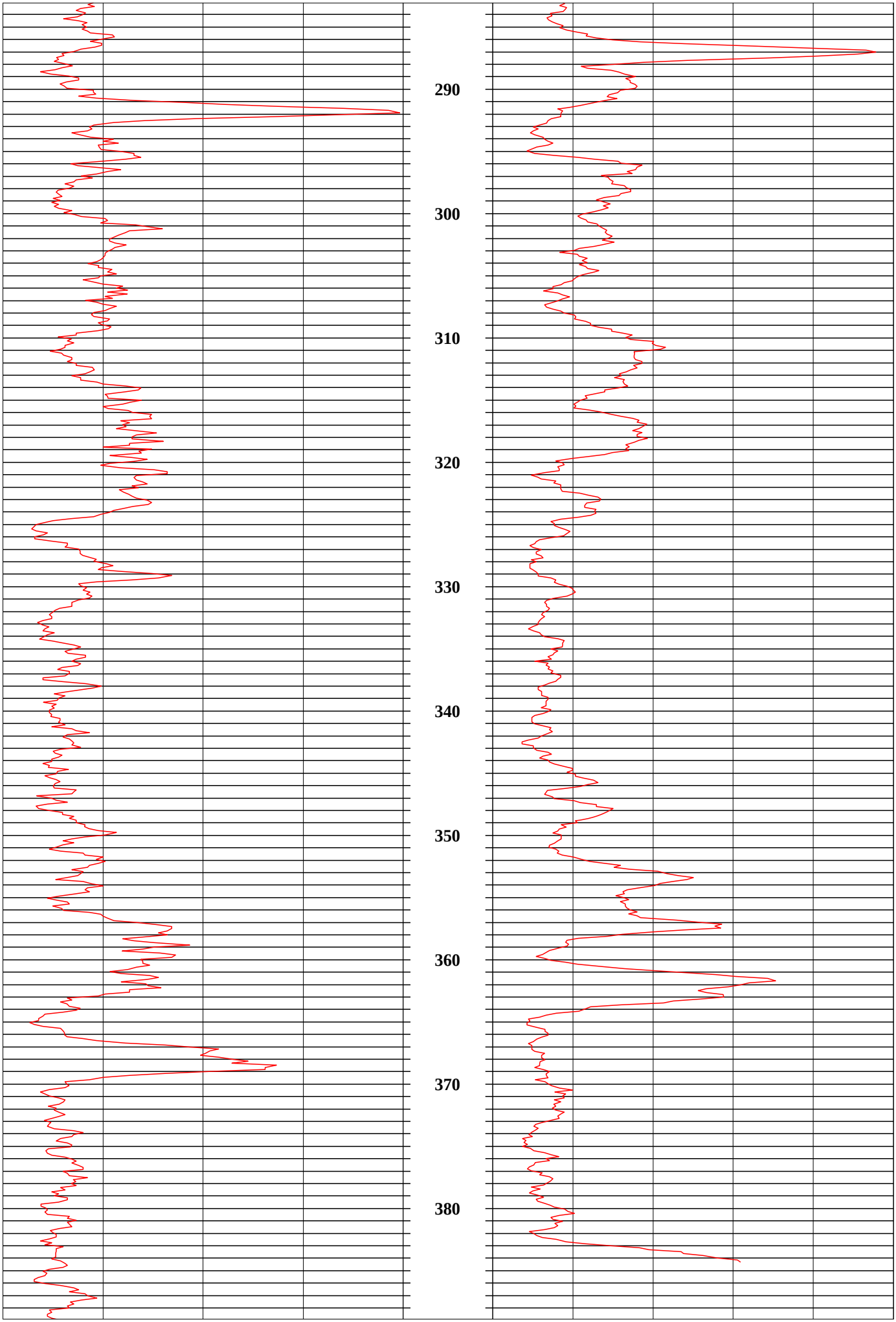
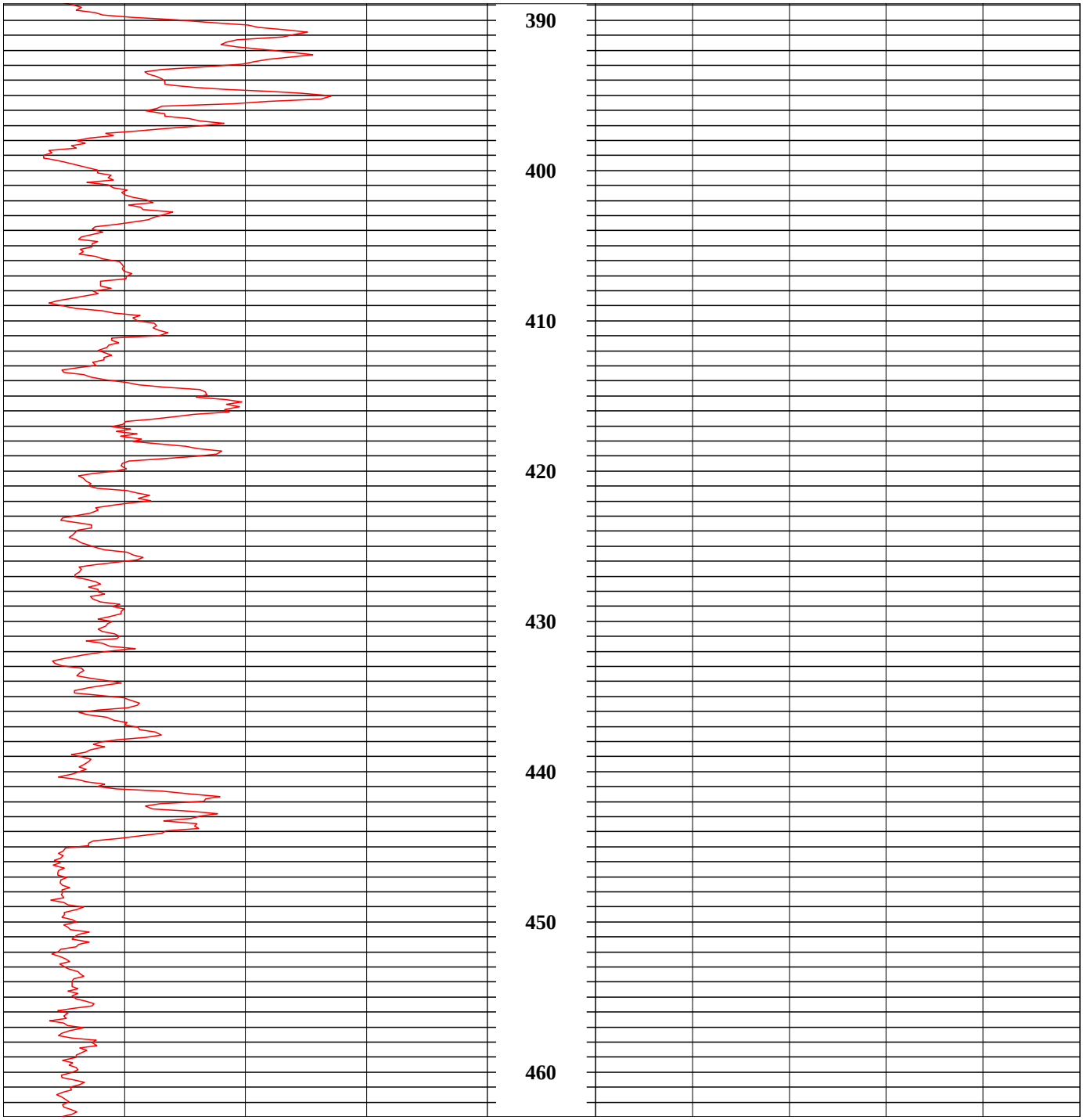
270
280


290
300
310
320
330
340
350
360
370
380


390
400
410
420
430
440
450
460

APPENDIX E
DNAPL MAPPING INFORMATION FROM FLUTE™ LINERS

L-12 from 3’5” to 4’9” NAPL stain present from 4’6” to bottom of interval.

L-12 from 4’4” to 5’10” NAPL stain present from 4’6” to bottom of interval.

L-12 from 5’11” to 7’4” NAPL stain present throughout interval.

L-12 from 7’3” to 8’7” NAPL stain present throughout interval.

L-12 from 8’5” to 9’11” NAPL stain present throughout interval.

L-12 from 9’7” to 10’11” NAPL stain present throughout interval.

L-12 from 10’4” to 11’8” NAPL stain present from top of interval to 11’5”.

L-12 from 11’8” to 13’1” NAPL stain is not present in this interval.

L-12 from 12’10” to 14’3” NAPL stain is not present in this interval.

L-12 from 14’0” to 15’4” NAPL stain is not present in this interval.

L-12 from 15’2” to 16’8” NAPL stain is not present in this interval.

L-12 from 16’4” to 17’7” NAPL stain is not present in this interval.

L-12 from 17’8” to 19’1” NAPL stain is not present in this interval.

L-12 from 18’8” to 20’4” NAPL stain is not present in this interval.

L-12 from 19’3” to 20’8” NAPL stain is not present in this interval.

L-12 from 20’9” to 22’1” NAPL stain is not present in this interval.

L-12 from 22’1” to 23’6” NAPL stain is not present in this interval.

L-12 from 23’0” to 24’5” NAPL stain is not present in this interval.

L-12 from 23’11” to 25’4” NAPL stain is present from 24’3” to the bottom of the interval.

L-12 from 24’8” to 25’7” NAPL stain is present throughout this interval.

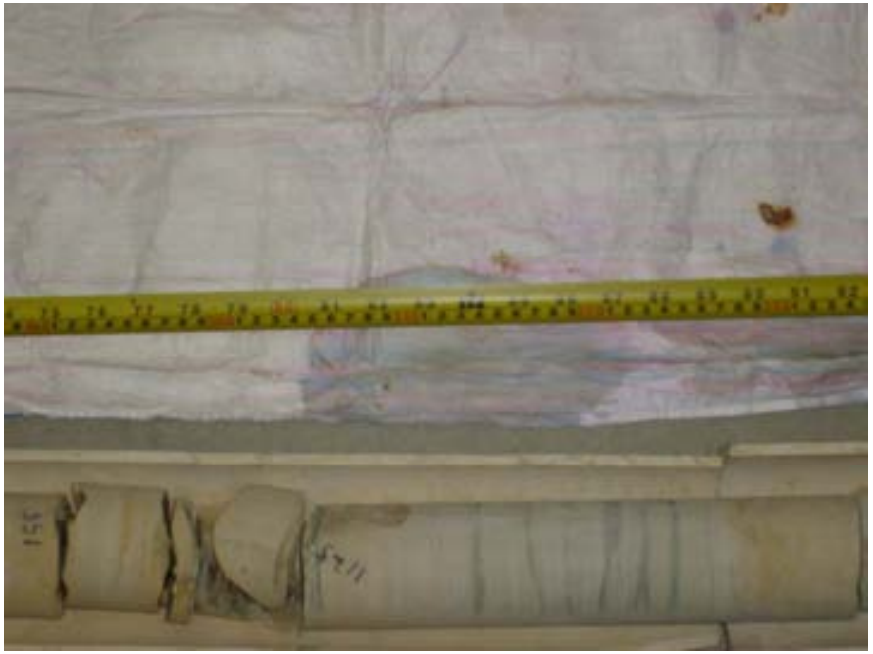
N-12 from 2’3” to 3’9” NAPL stain is not present in this interval.

N-12 from 3’1” to 4’7” NAPL stain is not present in this interval.

N-12 from 4’2” to 4’8” NAPL stain is not present in this interval.

N-12 from 4’10” to 6’4” NAPL stain is not present in this interval.

N-12 from 5’7” to 7’1” NAPL stain is present from 6’8” to the bottom of this interval.



N-12 from 6’2” to 7’8” NAPL stain is present from 6’8” to the bottom of this interval.

N-12 from 7’4” to 8’9” NAPL stain is present throughout this interval.

N-12 from 8’0” to 9’5” NAPL stain is present from the top of the interval through 9’0”.

N-12 from 8’11” to 10’4” NAPL stain is present from the top of the interval through 9’0”.

N-12 from 9’8” to 10’5” NAPL stain is not present in this interval.

N-12 from 10’6” to 12’5” NAPL stain is not present in this interval.

N-12 from 12’1” to 13’11” NAPL stain is not present in this interval.

N-12 from 13’6” to 15’4” NAPL stain is not present in this interval.

N-12 from 14’6” to 16’3” NAPL stain is not present in this interval.

N-12 from 15’10” to 17’4” NAPL stain is not present in this interval.

N-12 from 16’9” to 18’3” NAPL stain is not present in this interval.

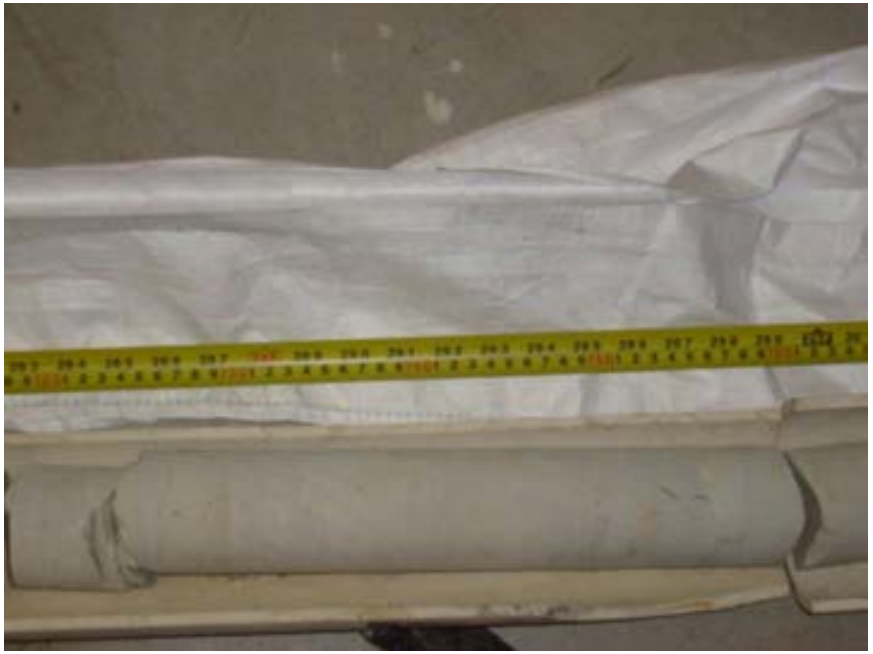
N-12 from 17’7” to 19’1” NAPL stain is not present in this interval.

N-12 from 18’9” to 20’3” NAPL stain is not present in this interval.

N-12 from 19’9” to 21’3” NAPL stain is not present in this interval.

N-12 from 21’1” to 22’7” NAPL stain is not present in this interval.

N-12 from 22’6” to 24’0” NAPL stain is not present in this interval.



N-12 from 23’7” to 25’1” NAPL stain is not present in this interval.

N-12 from 24’5” to 25’8” NAPL stain is not present in this interval.

P-14 from 1’4” to 4’ NAPL stain is not present in this interval.

P-14 from 2’2” to 5’6” NAPL stain is not present in this interval.

P-14 from 3’10” to 6’5” NAPL stain is not present in this interval.

P-14 from 6’2” to 9’10” NAPL stain is not present in this interval.

P-14 from 7’7” to 11’4” NAPL stain is not present in this interval.

P-14 from 12’0” to 15’0” NAPL stains present between 13’2” and the bottom of the interval.

P-14 from 13’3” to 16’1” NAPL stains present throughout the interval.

P-14 from 14’8” to 18’0” NAPL stains present throughout the interval possibly an indication of dripping down the borehole.

P-14 from 16’5” to 19’9” NAPL stains present throughout the interval possibly an indication of dripping down the borehole.

P-14 from 17’4” to 20’1” NAPL stains present throughout the interval possibly an indication of dripping down the borehole.

P-14 from 18’11” to 21’11” NAPL stains present throughout the interval possibly an indication of dripping down and collecting in the bottom of the borehole.

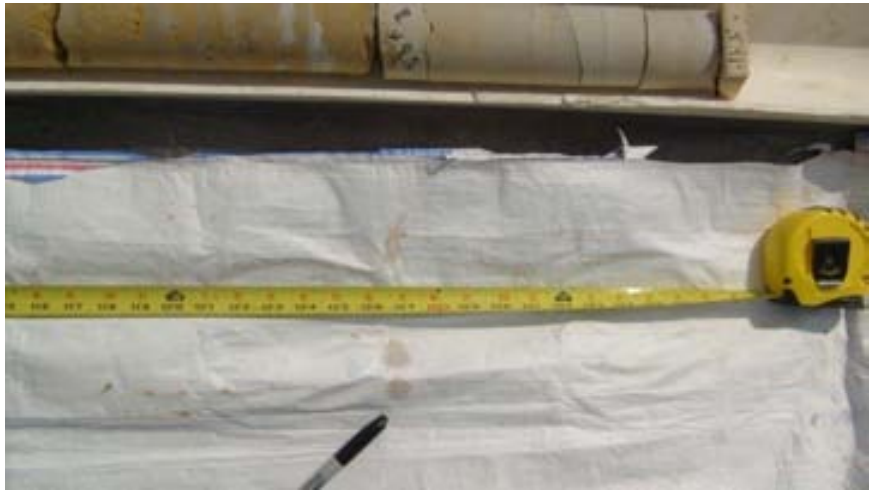
P-14 from 20’4” to 22’4” NAPL stains present throughout the interval possibly an indication of dripping down and collecting in the bottom of the borehole.

P-15 from 3’6” to 5’4” NAPL stain is not present in this interval.

P-15 from 3’10” to 6’5” NAPL stain is not present in this interval.

P-15 from 5’8” to 8’3” NAPL stain is not present in this interval.

P-15 from 7’5” to 10’5” NAPL stain is not present in this interval.



P-15 from 9’8” to 11’3” NAPL stain is present in between 10’6” and 10’7”.

P-15 from 11’3” to 13’5” NAPL stain present between 12’4” and 13’1”.

P-15 from 12’1” to 15’1” NAPL stain is present between 12’4” to 13’1”.

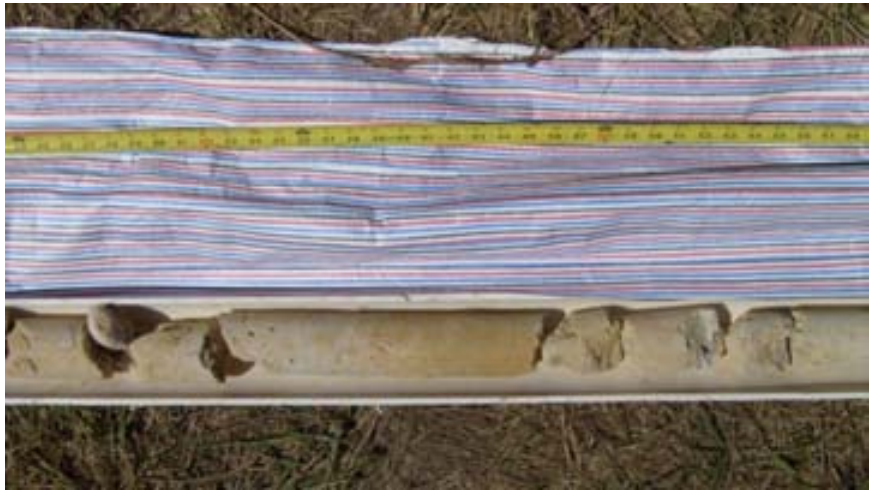
P-15 from 14’3” to 17’3” NAPL stain is not present in this interval.

P-15 from 16’3” to 19’5” NAPL stain is present between 18’10” and 19’5”.

P-15 from 17’0” to 19’5” NAPL stain is present from 18’10” to the bottom of the interval.

P-15 from 19’3” to 22’0” NAPL stain is present throughout the interval.

Q-15.5 from 1’5” to 3’3” NAPL stain is not present in this interval.



Q-15.5 from 2’0” to 4’10” NAPL stain is not present in this interval.

Q-15.5 from 3’8” to 6’3” NAPL stain is not present in this interval.

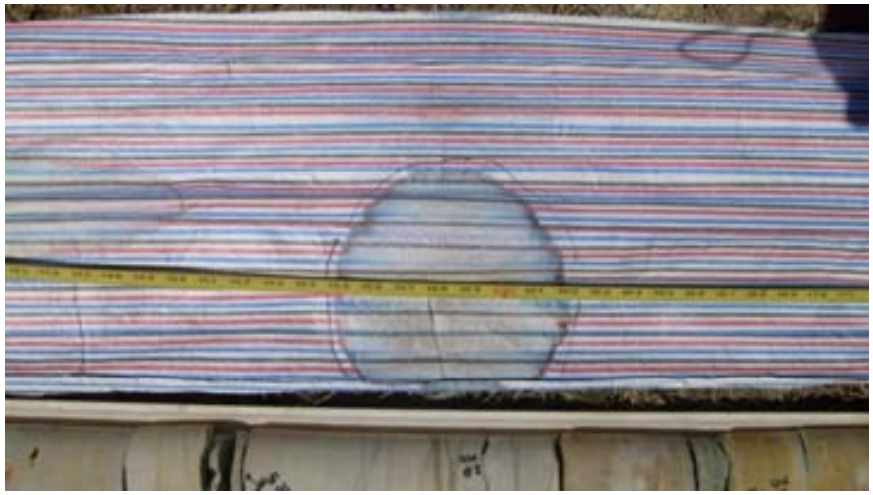
Q-15.5 from 5’3” to 8’0” NAPL stain is not present in this interval.

Q-15.5 from 7’1” to 9’9” NAPL stain is not present in this interval.

Q-15.5 from 9’6” to 11’5” NAPL stain is present between 10’3” and 10’5”.

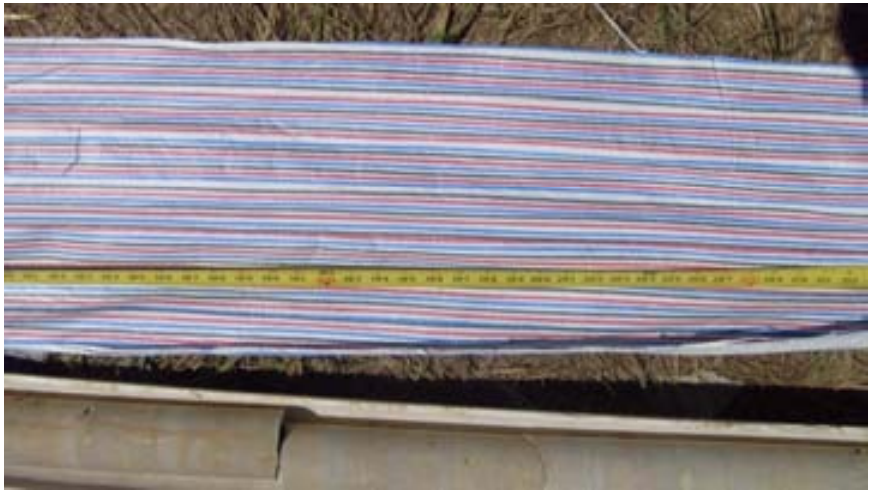
Q-15.5 from 10’6” to 12’11” NAPL stain is present between 11’10” and 12’7”.

Q-15.5 from 11’5” to 13’8” NAPL stain is present from 11’10” and 13’2”.



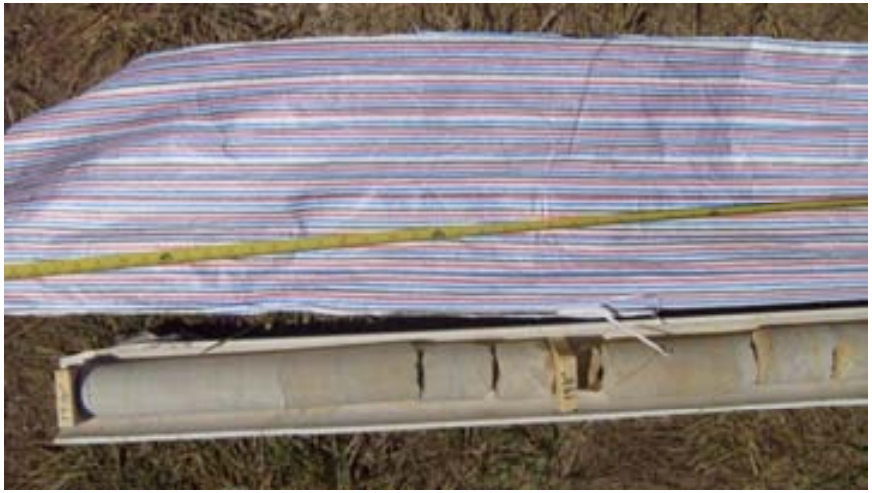
Q-15.5 from 12’1” to 13’8” NAPL stain is present from top of interval to 12’7” and from 12’11” to 13’8”.

Q-15.5 from 13’5” to 16’0” NAPL stain is present between the top of the interval and 13’8”.



Q-15.5 from 15’0” to 17’8” NAPL stain is not present in this interval.

Q-15.5 from 16’0” to 17’10” NAPL stain is not present in this interval.



Q-15.5 from 17’10” to 20’7” NAPL stain is not present in this interval.

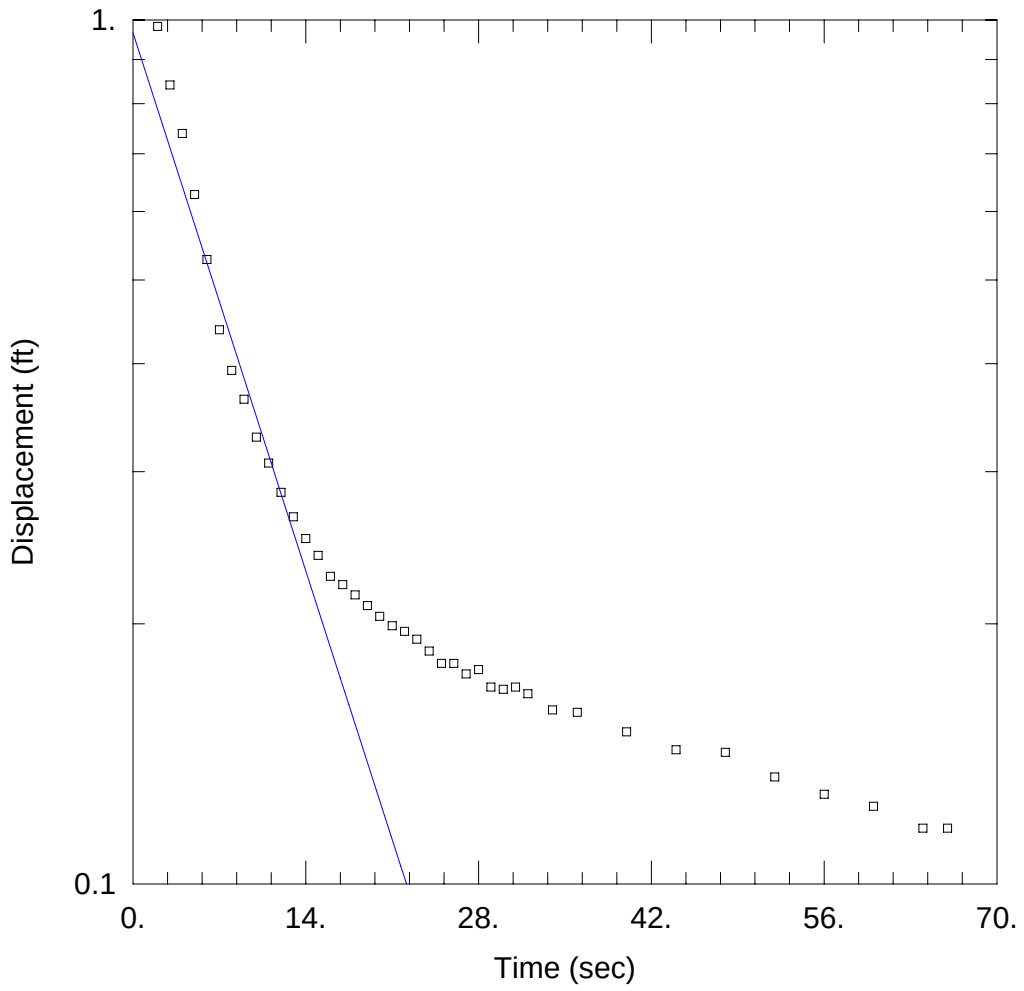
Q-15.5 from 18’7” to 21’10” NAPL stain is not present in this interval.

Q-15.5 from 21’4” to 24’1” NAPL stain is present in the interval from 22’10” and 23’1”.

Q-15.5 from 23’6” to 25’0” NAPL stain is not present in this interval.

APPENDIX F

AQUIFER TEST DATA AND PLOTS (SLUG TESTS AND PUMPING TEST)



MW-1S SLUG IN

Data Set: C:\...\MW-1S Slug In Bower and Rice.aqt
Date: 09/27/09 Time: 21:24:55

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-1S
Test Date: 2/24/09

AQUIFER DATA

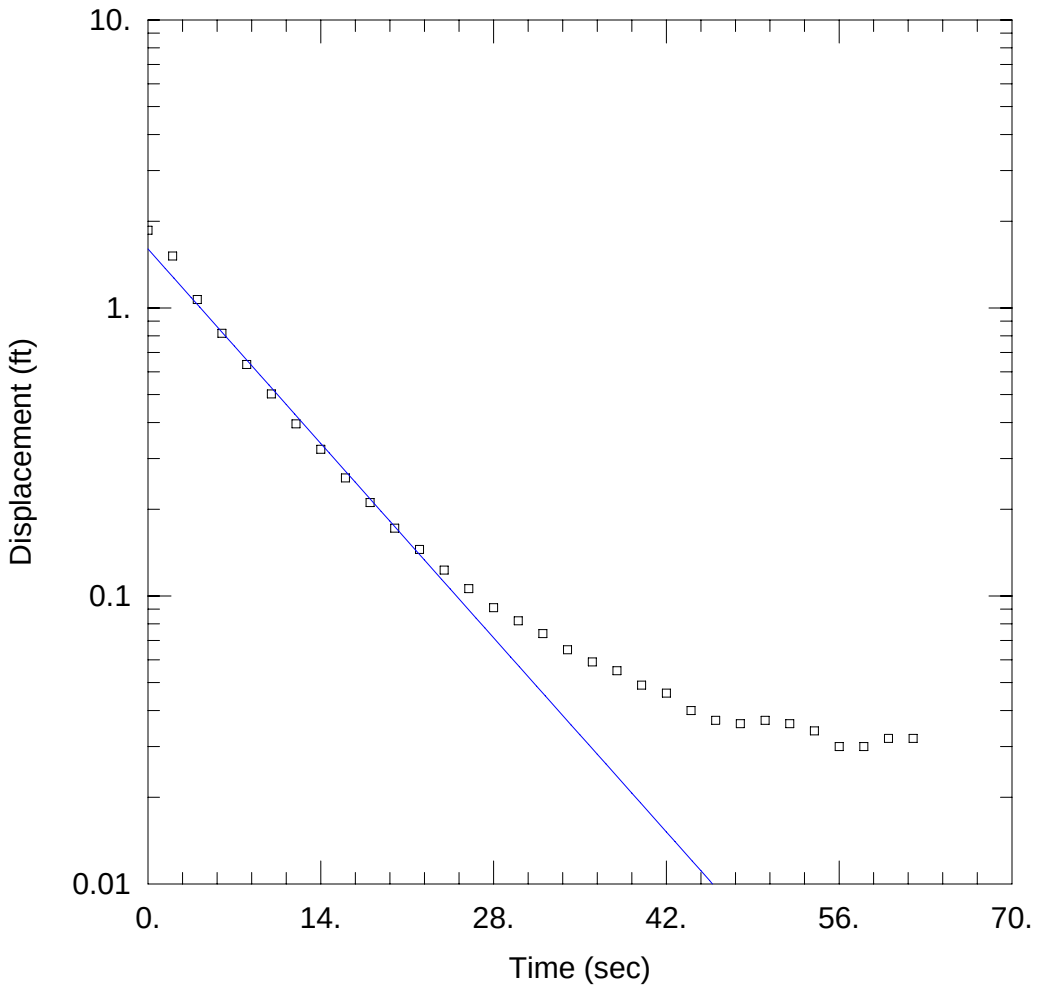
Saturated Thickness: 7.82 ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-1S)

Initial Displacement: 1.19 ft
Total Well Penetration Depth: 7.82 ft
Casing Radius: 0.08 ft
Static Water Column Height: 7.82 ft
Screen Length: 15. ft
Wellbore Radius: 0.35 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.6 ft/day
y0 = 0.9661 ft



MW-1S SLUG OUT

Data Set: C:\...\MW-1S 1-inch Slug Out BR.aqt
Date: 09/27/09 Time: 20:54:30

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-1S
Test Date: 3/3/09

AQUIFER DATA

Saturated Thickness: 7.82 ft Anisotropy Ratio (Kz/Kr): 0.1

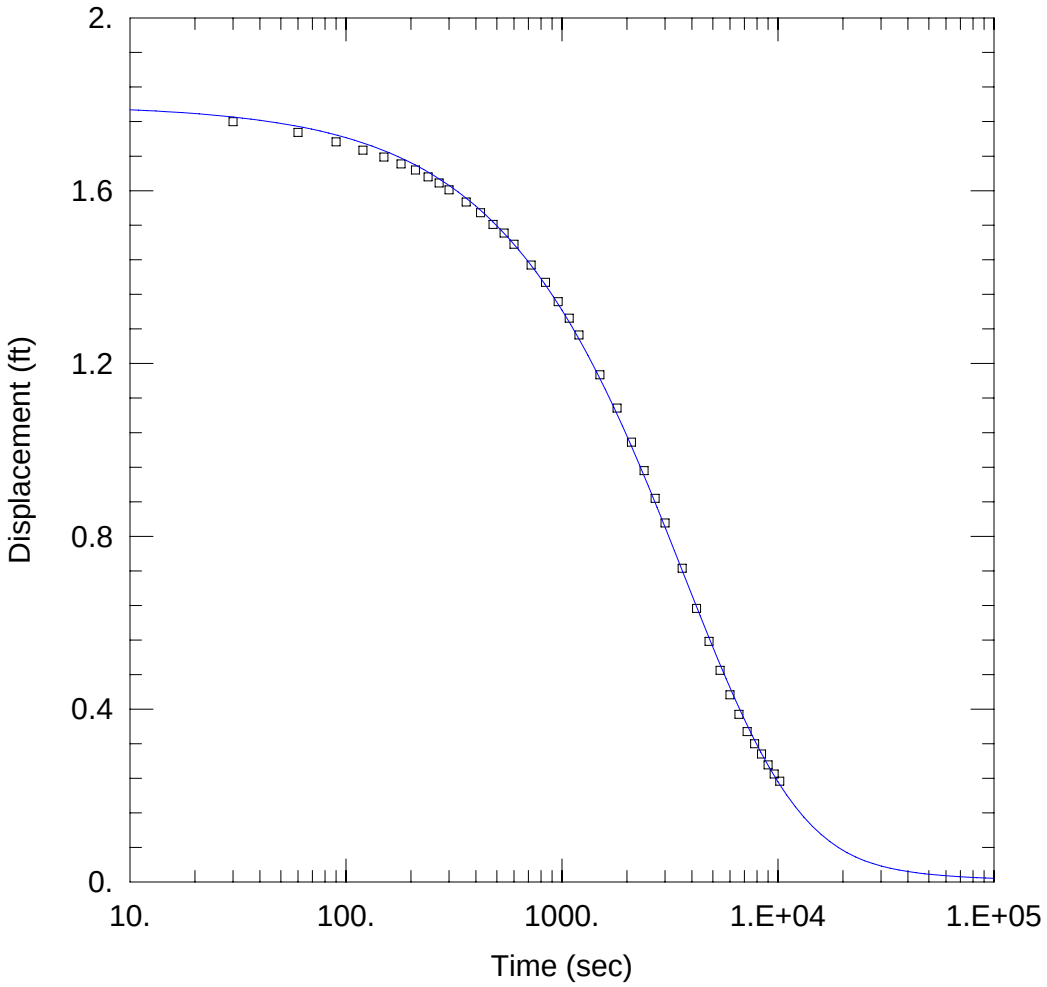
WELL DATA (MW-1S)

Initial Displacement: 1.86 ft
Total Well Penetration Depth: 7.82 ft
Casing Radius: 0.08 ft
Static Water Column Height: 7.82 ft
Screen Length: 15. ft
Wellbore Radius: 0.35 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 32.14 ft/day y0 = 1.602 ft



2 SLUGS IN

Data Set: C:\...\MW-1UB 2 Slugs In Cooper Conf.aqt
Date: 09/27/09 Time: 21:00:37

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-1UB
Test Date: 2/24/09

AQUIFER DATA

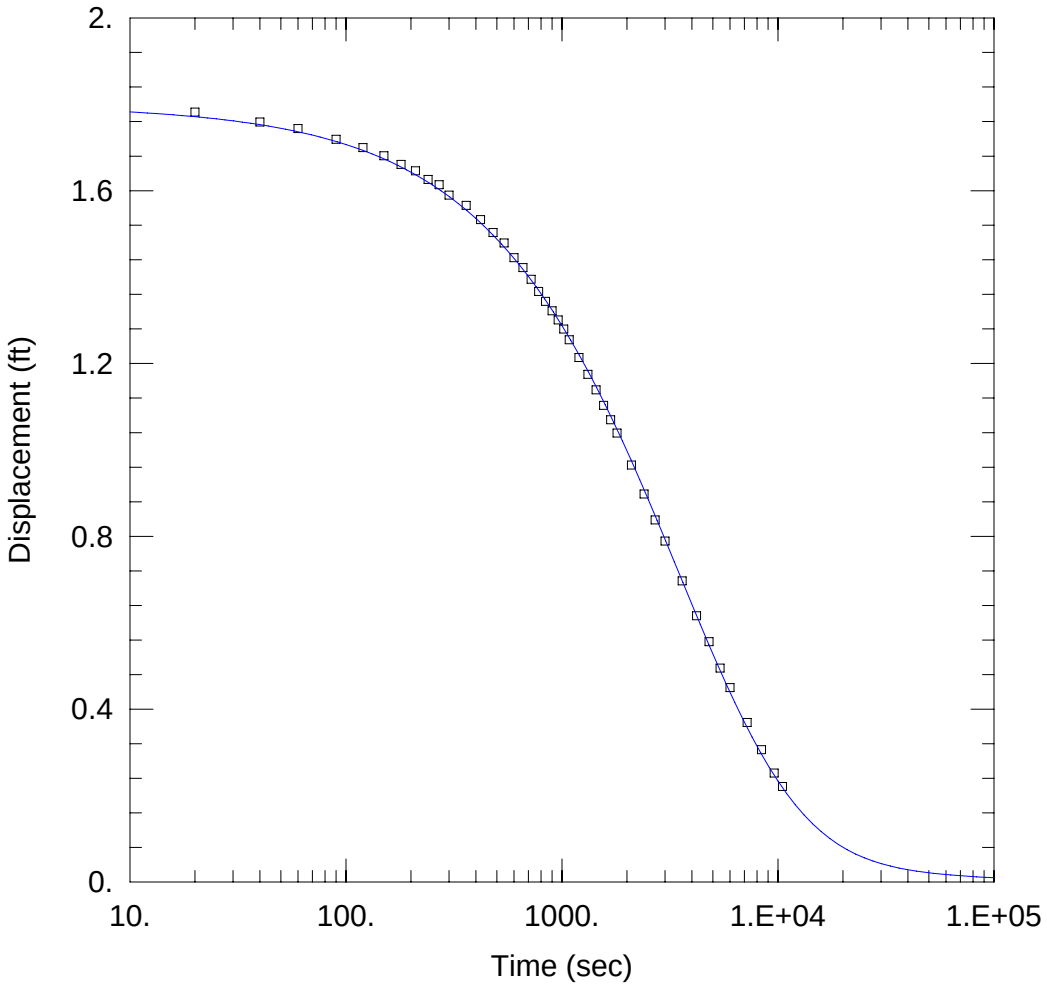
Saturated Thickness: 14.6 ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-1UB)

Initial Displacement: 1.8 ft
Total Well Penetration Depth: 14.6 ft
Casing Radius: 0.25 ft
Static Water Column Height: 21.4 ft
Screen Length: 14.6 ft
Wellbore Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 3.315 ft^2/day
S = 0.0002279



2 SLUGS OUT

Data Set: C:\...\MW-1UB 2 Lusgs Out Cooper Confined.aqt
Date: 09/27/09 Time: 20:58:47

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-1UB
Test Date: 2/24/09

AQUIFER DATA

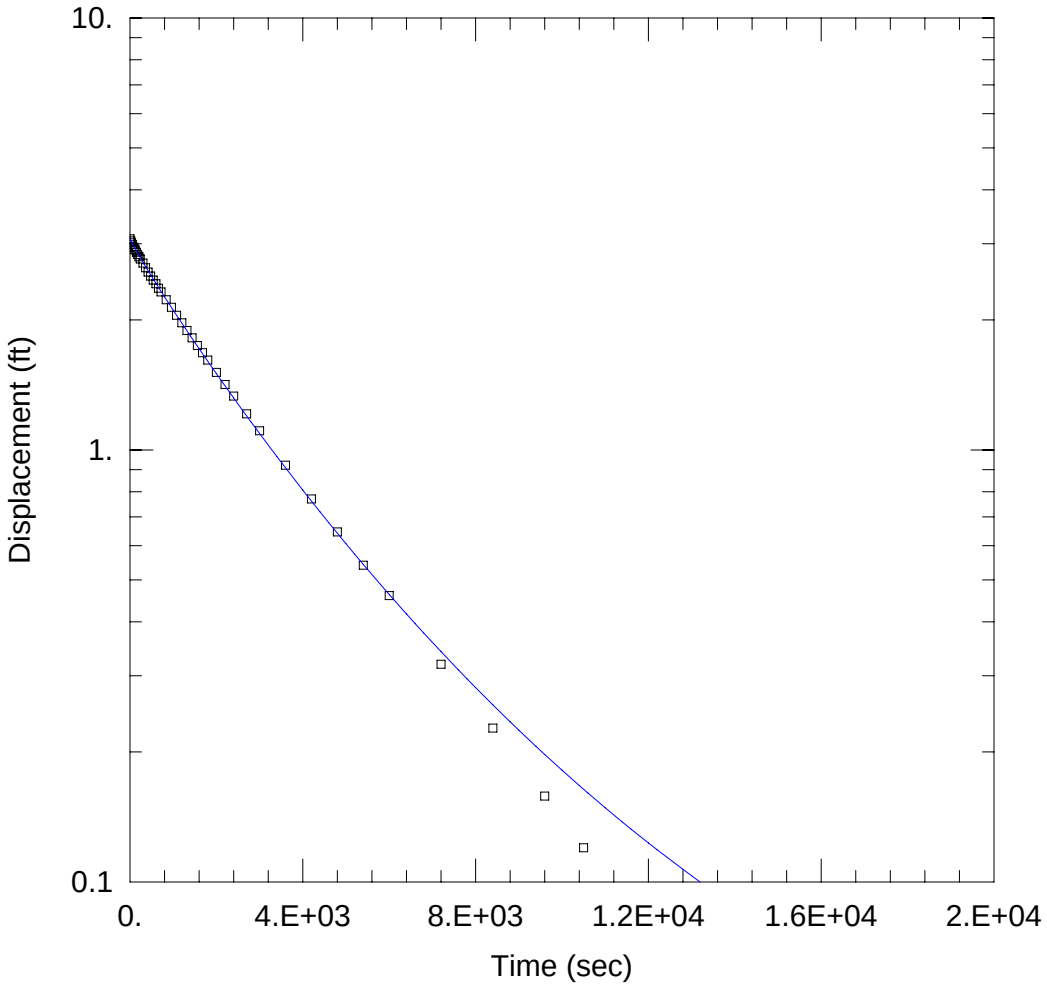
Saturated Thickness: 14.6 ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-1UB)

Initial Displacement: 1.8 ft
Total Well Penetration Depth: 14.6 ft
Casing Radius: 0.25 ft
Static Water Column Height: 21.4 ft
Screen Length: 14.6 ft
Wellbore Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 2.809 ft^2/day
S = 0.001215



LARGE SLUG IN

Data Set: C:\...\MW-1T1 Large Slug In Cooper Conf.aqt
Date: 09/28/09 Time: 17:05:35

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-1T1
Test Date: 2/19/09

AQUIFER DATA

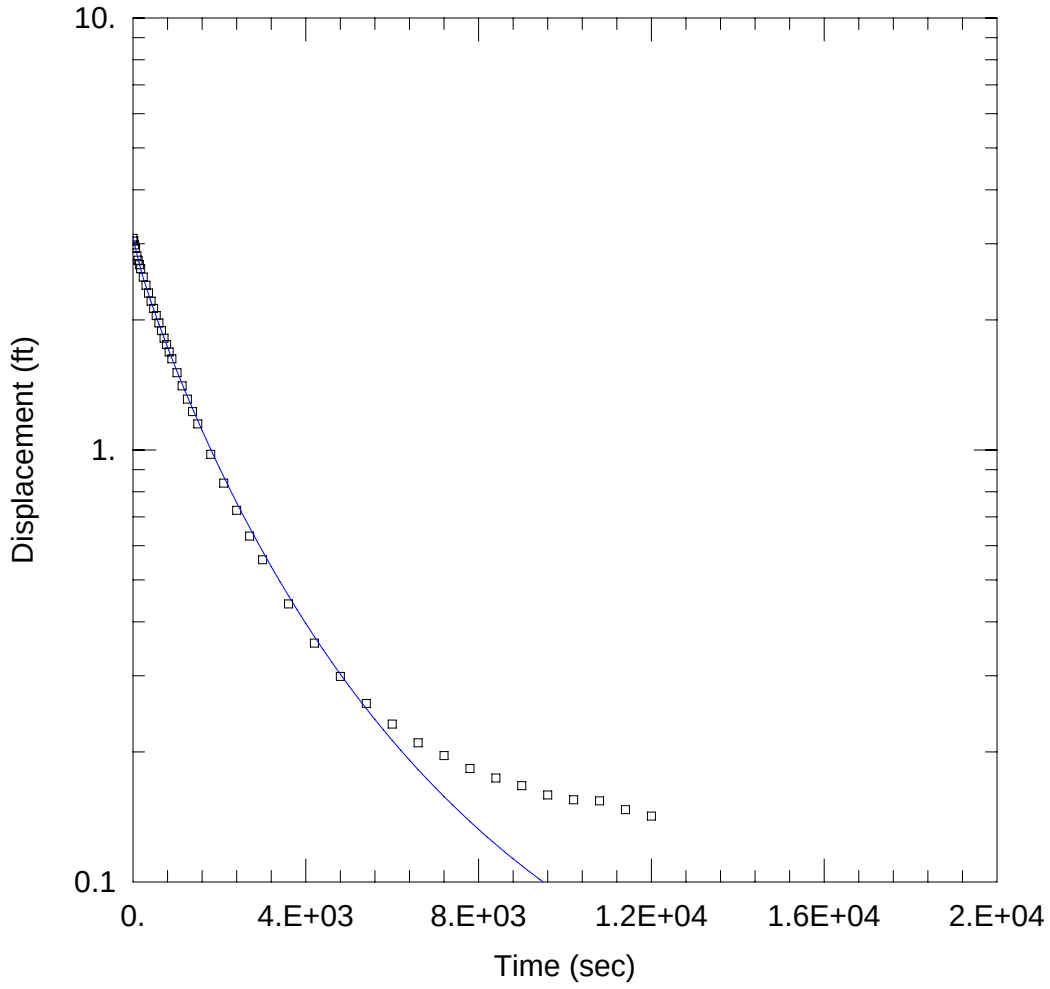
Saturated Thickness: 31. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-1T1)

Initial Displacement: 3.08 ft
Total Well Penetration Depth: 31. ft
Casing Radius: 0.17 ft
Static Water Column Height: 52. ft
Screen Length: 26. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
$T = 3.711\ ft^2/day$
S = 4.307E-07



WELL TEST ANALYSIS

Data Set: C:\...\MW-1T1 Large Slug Out Cooper Conf.aqt
Date: 09/28/09 Time: 17:06:19

PROJECT INFORMATION

Company: Parsons

AQUIFER DATA

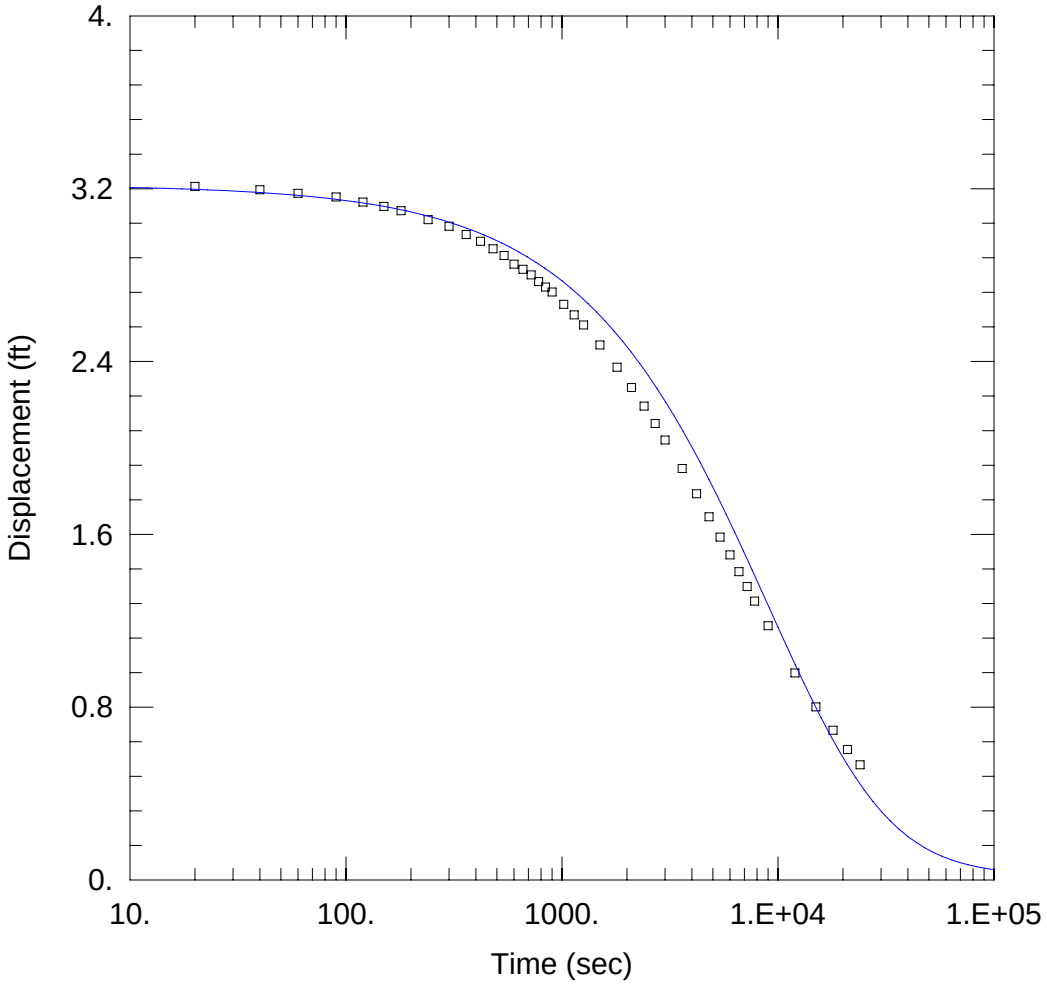
Saturated Thickness: 31. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-1T1)

Initial Displacement: 3.09 ft
Static Water Column Height: 52. ft
Total Well Penetration Depth: 31. ft
Screen Length: 26. ft
Casing Radius: 0.17 ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 3.437 ft^2/day
S = 0.001273



LARGE SLUG IN

Data Set: C:\...\MW-1SW Large SLug In Cooper Conf.aqt
Date: 09/27/09 Time: 21:27:34

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-1SW
Test Date: 2/18/09

AQUIFER DATA

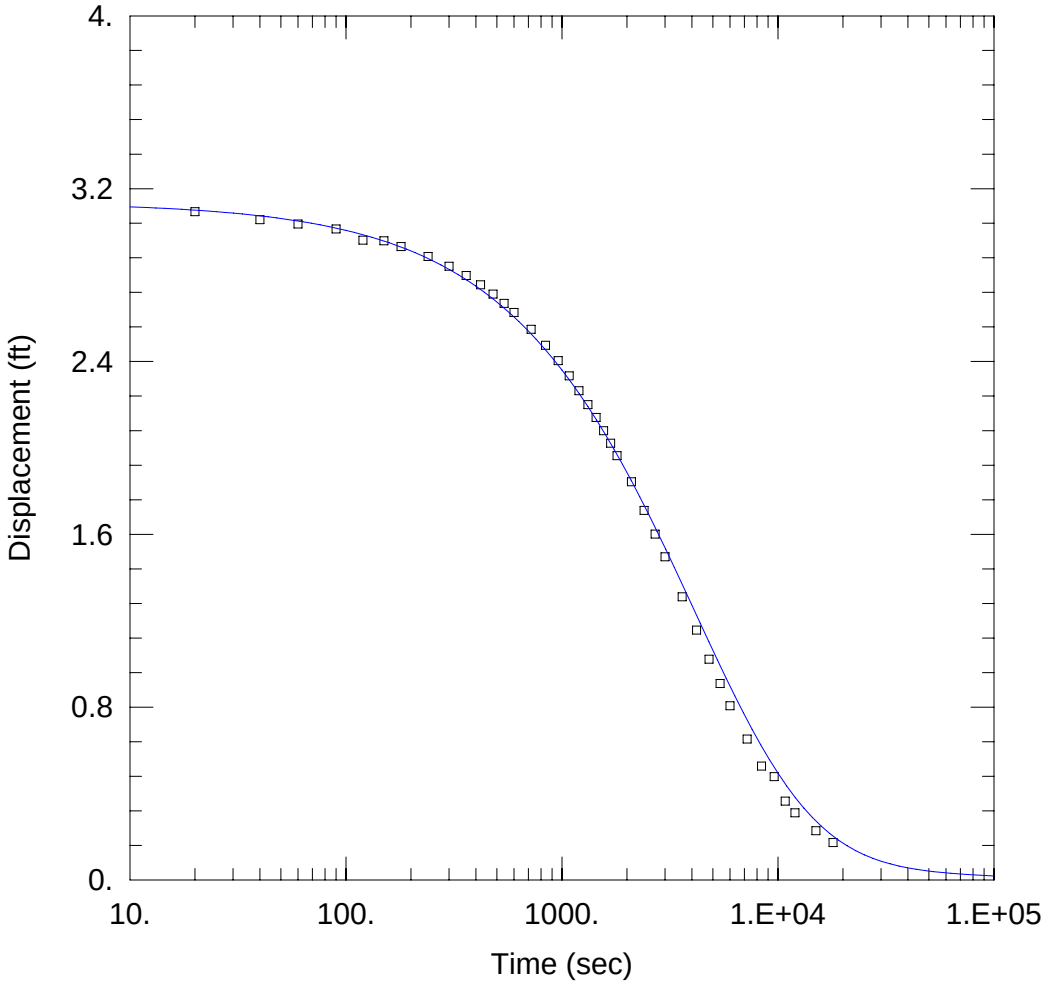
Saturated Thickness: 16. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-1SW)

Initial Displacement: 3.22 ft
Total Well Penetration Depth: 16. ft
Casing Radius: 0.17 ft
Static Water Column Height: 67. ft
Screen Length: 16. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 0.5585 ft^2/day
S = 0.001



LARGE SLUG OUT

Data Set: C:\...\MW-1SW Large Slug Out Cooper Conf.aqt
Date: 09/27/09 Time: 21:28:37

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-1SW
Test Date: 2/19/09

AQUIFER DATA

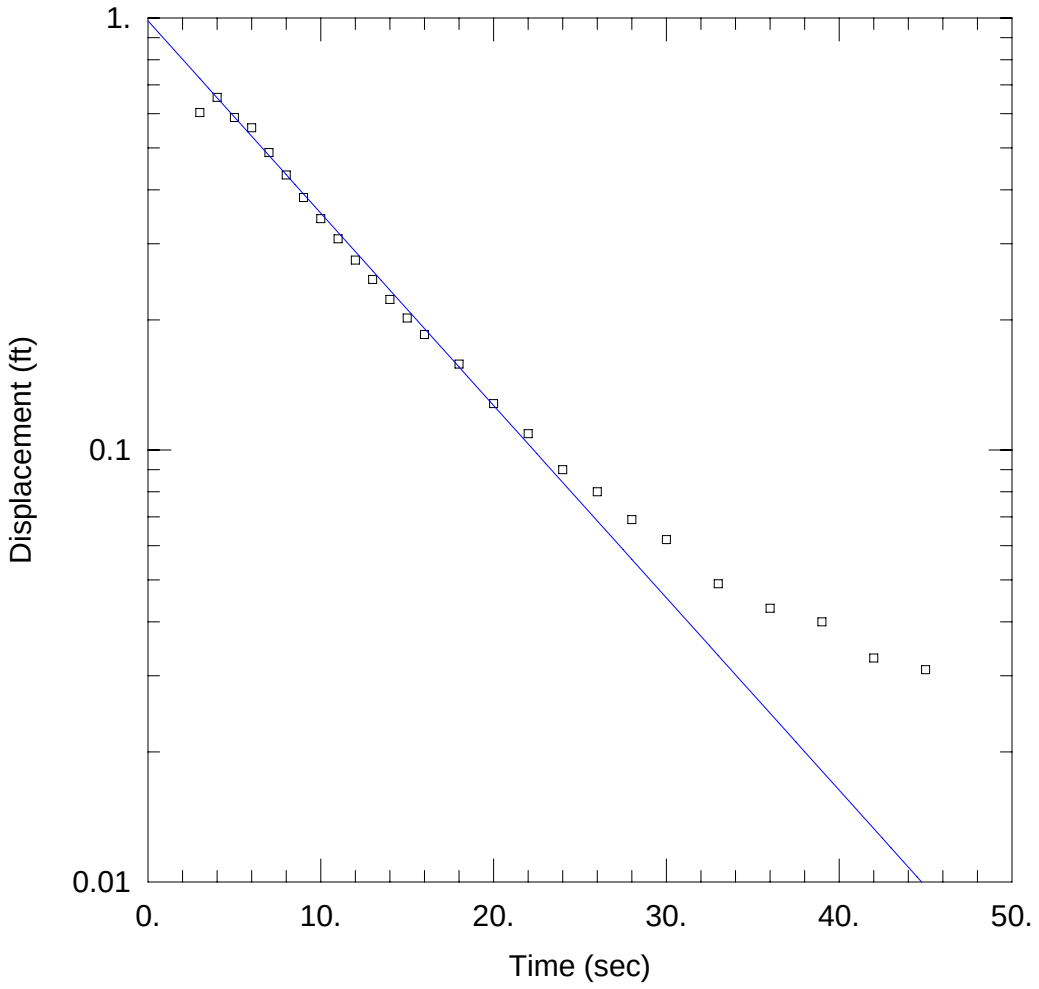
Saturated Thickness: 16. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-1SW)

Initial Displacement: 3.14 ft
Total Well Penetration Depth: 16. ft
Casing Radius: 0.17 ft
Static Water Column Height: 67. ft
Screen Length: 16. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 1.216 ft^2/day
S = 0.001



SLUG IN

Data Set: C:\...\MW-2S Slug In Bowuer and Rice Uncon.aqt
Date: 09/27/09 Time: 21:58:31

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-2S
Test Date: 2/24/09

AQUIFER DATA

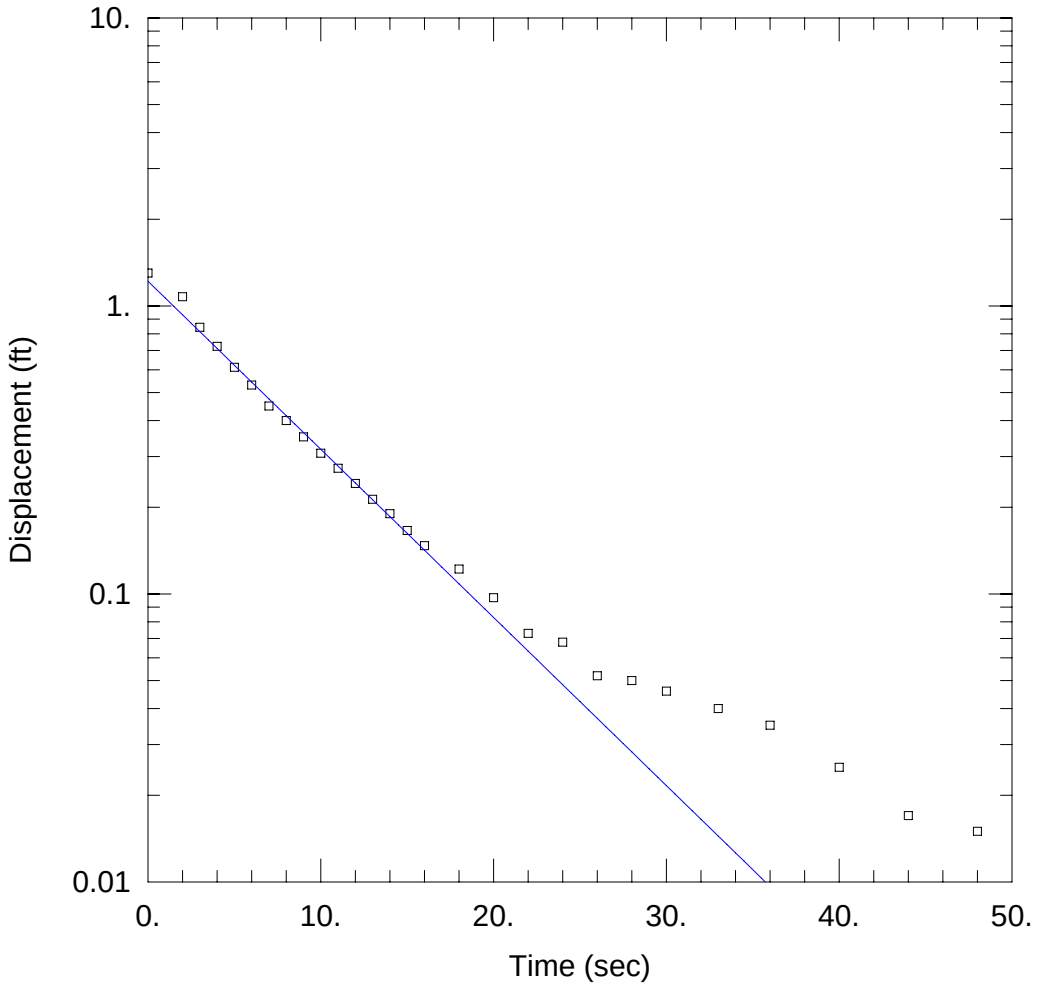
Saturated Thickness: 12. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-2S)

Initial Displacement: 1.17 ft
Total Well Penetration Depth: 12. ft
Casing Radius: 0.08 ft
Static Water Column Height: 14. ft
Screen Length: 10. ft
Wellbore Radius: 0.08 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 17.65 ft/day
y0 = 0.9845 ft



SLUG OUT

Data Set: C:\...\MW-2S Slug Out Bowuer and Rice.aqt
Date: 09/27/09 Time: 21:59:24

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-2S
Test Date: 2-24-09

AQUIFER DATA

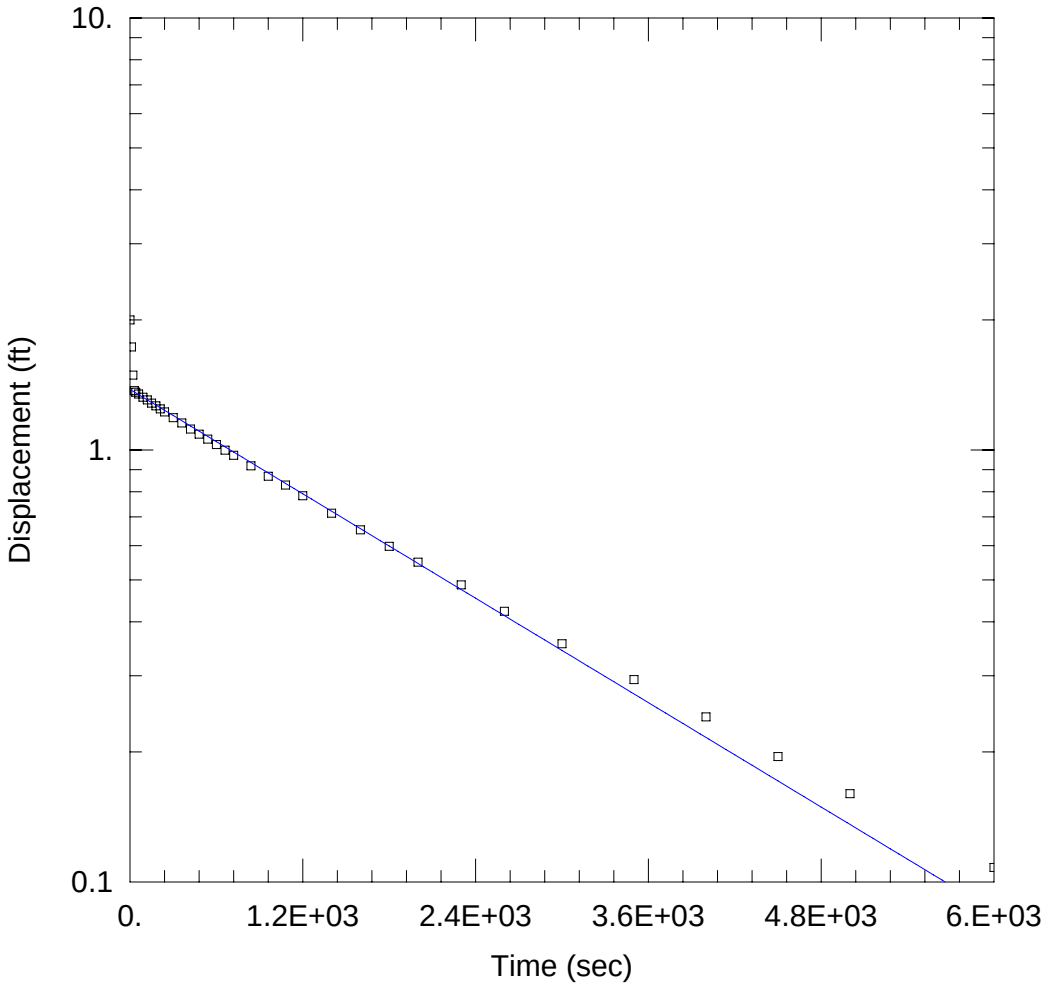
Saturated Thickness: 12. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-2S)

Initial Displacement: 1.3 ft
Total Well Penetration Depth: 1. ft
Casing Radius: 0.08 ft
Static Water Column Height: 14. ft
Screen Length: 10. ft
Wellbore Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 9.898 ft/day
y0 = 1.218 ft



SLUG IN

Data Set: C:\...\MW-2SW Slug In Bouwer and Rice Conf.aqt
Date: 09/27/09 Time: 22:05:29

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-2SW
Test Date: 2/12/09

AQUIFER DATA

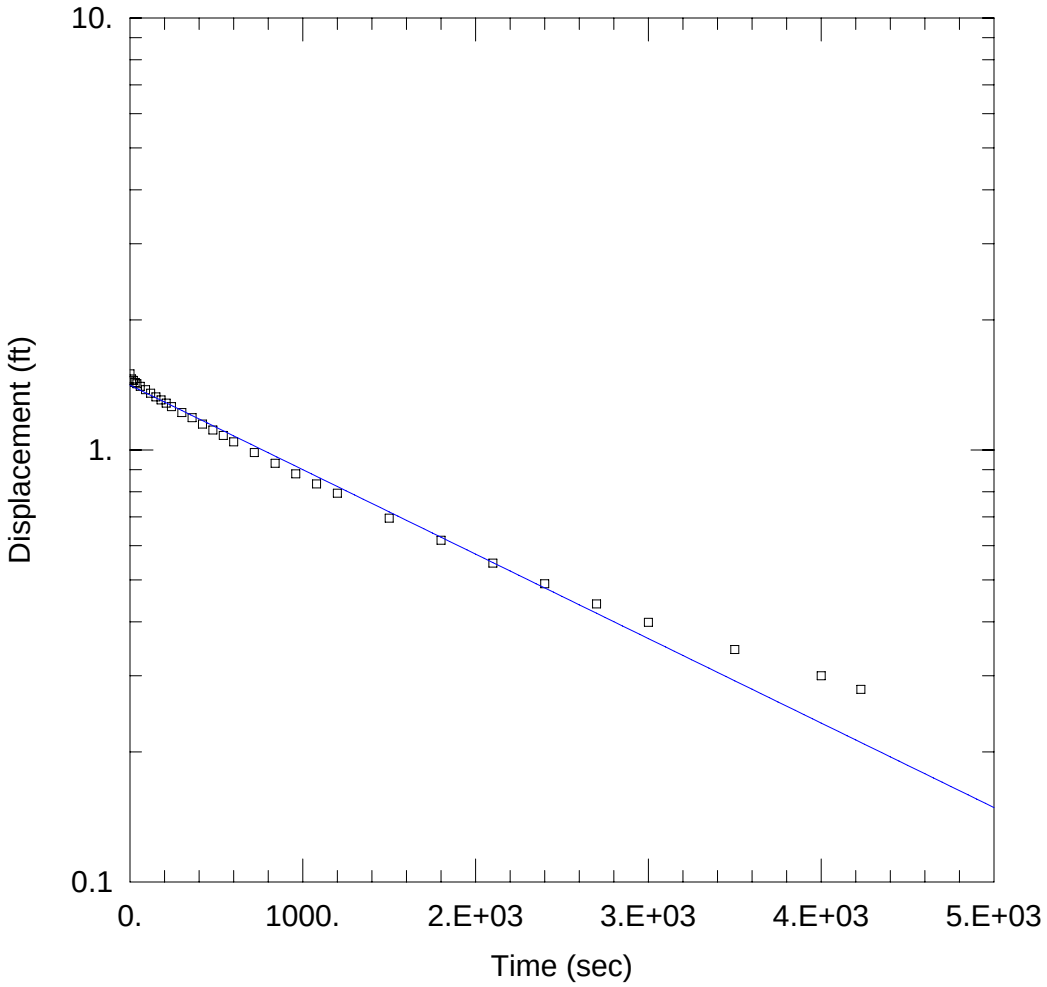
Saturated Thickness: 21. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-2SW)

Initial Displacement: 2. ft
Total Well Penetration Depth: 21. ft
Casing Radius: 0.17 ft
Static Water Column Height: 41. ft
Screen Length: 21. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.1087 ft/day
y0 = 1.381 ft



MW-2SW SLUG OUT

Data Set: C:\...\MW-2SW Slug Out Bouwer and Rice Conf.aqt
Date: 09/28/09 Time: 20:55:55

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-2SW
Test Date: 2-12-09

AQUIFER DATA

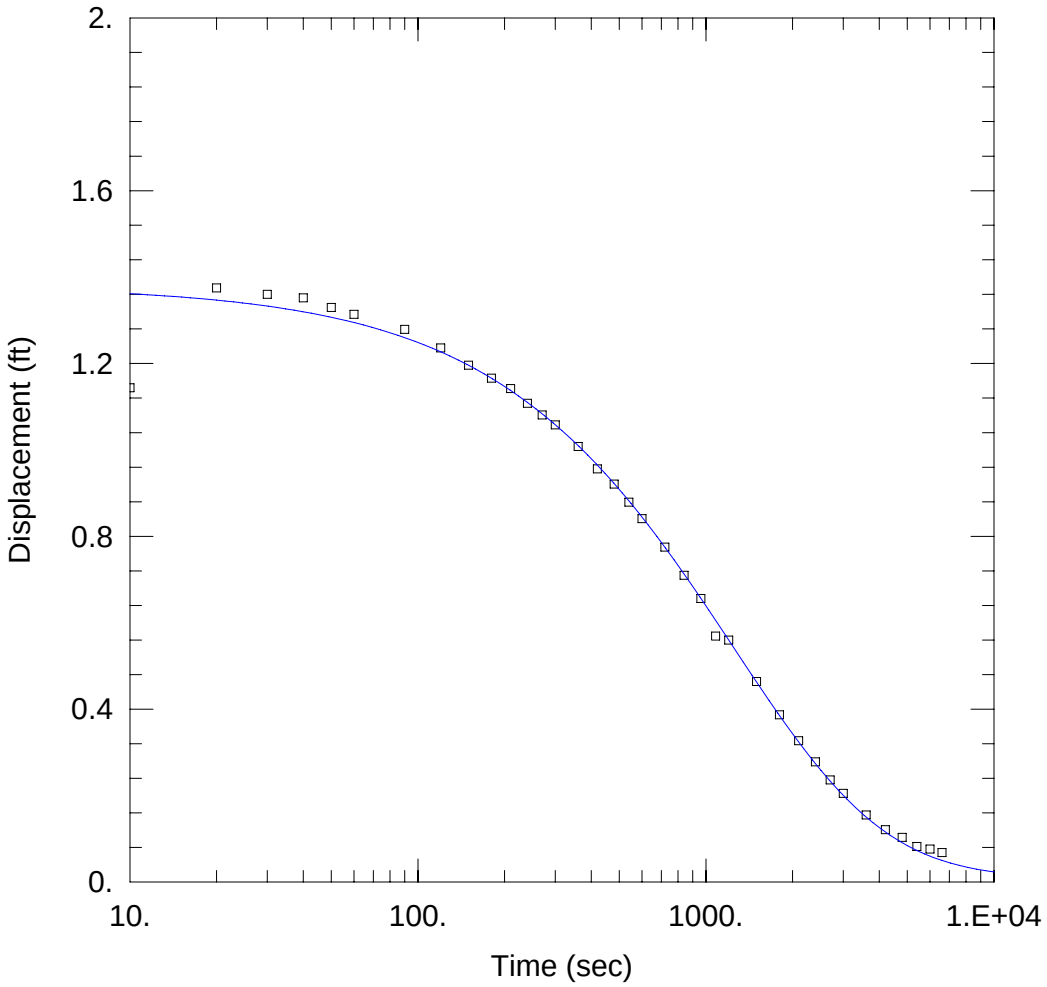
Saturated Thickness: 21. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-2SW)

Initial Displacement: 1.5 ft
Total Well Penetration Depth: 21. ft
Casing Radius: 0.17 ft
Static Water Column Height: 41. ft
Screen Length: 21. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.1055 ft/day
y0 = 1.412 ft



SLUG IN

Data Set: C:\...\MW-2T2 Slug In Cooper Conf.aqt
Date: 09/27/09 Time: 22:06:33

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-2T2
Test Date: 2/12/09

AQUIFER DATA

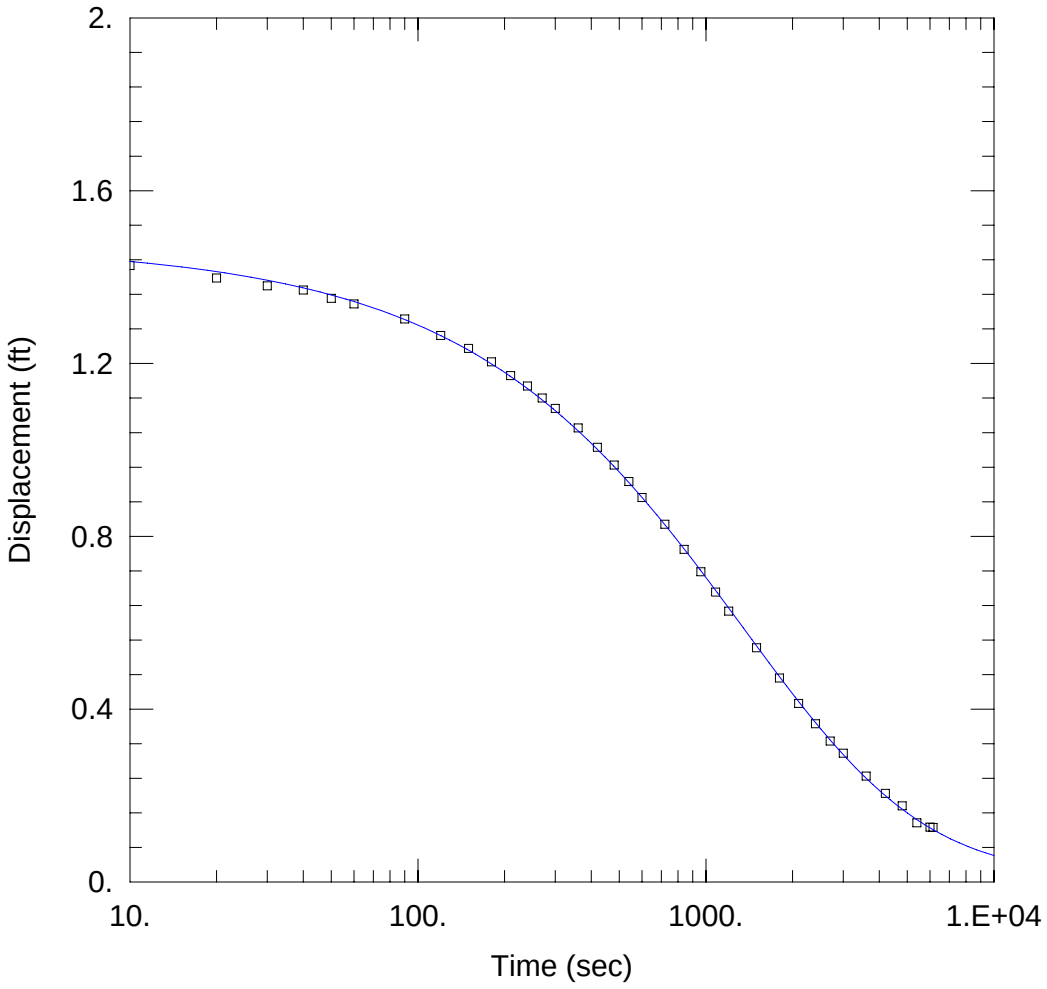
Saturated Thickness: 21. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-2T2)

Initial Displacement: 1.38 ft
Total Well Penetration Depth: 21. ft
Casing Radius: 0.17 ft
Static Water Column Height: 89. ft
Screen Length: 21. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
$T = 5.619\ ft^2/day$
S = 4.51E-05



SLUG OUT

Data Set: C:\...\MW-2T2 Slug Out Cooper Conf.aqt
Date: 09/27/09 Time: 22:07:40

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-2T2
Test Date: 2-13-09

AQUIFER DATA

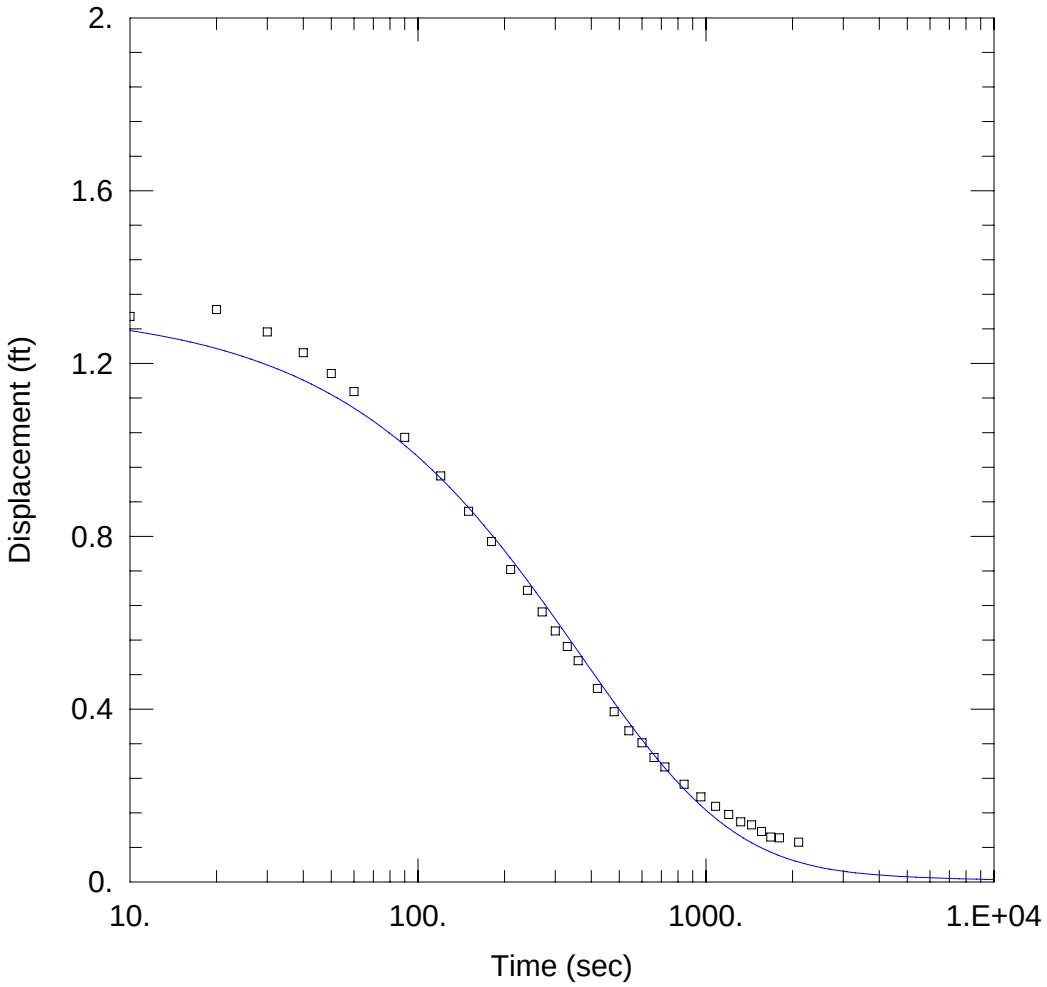
Saturated Thickness: 21. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-2T2)

Initial Displacement: 1.48 ft
Total Well Penetration Depth: 21. ft
Casing Radius: 0.17 ft
Static Water Column Height: 89. ft
Screen Length: 21. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 2.335 ft^2/day
S = 0.01731



SLUG IN

Data Set: C:\...\MW-2T3 Slug In Cooper Conf.aqt
Date: 09/27/09 Time: 22:10:43

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-2T3
Test Date: 2-16-09

AQUIFER DATA

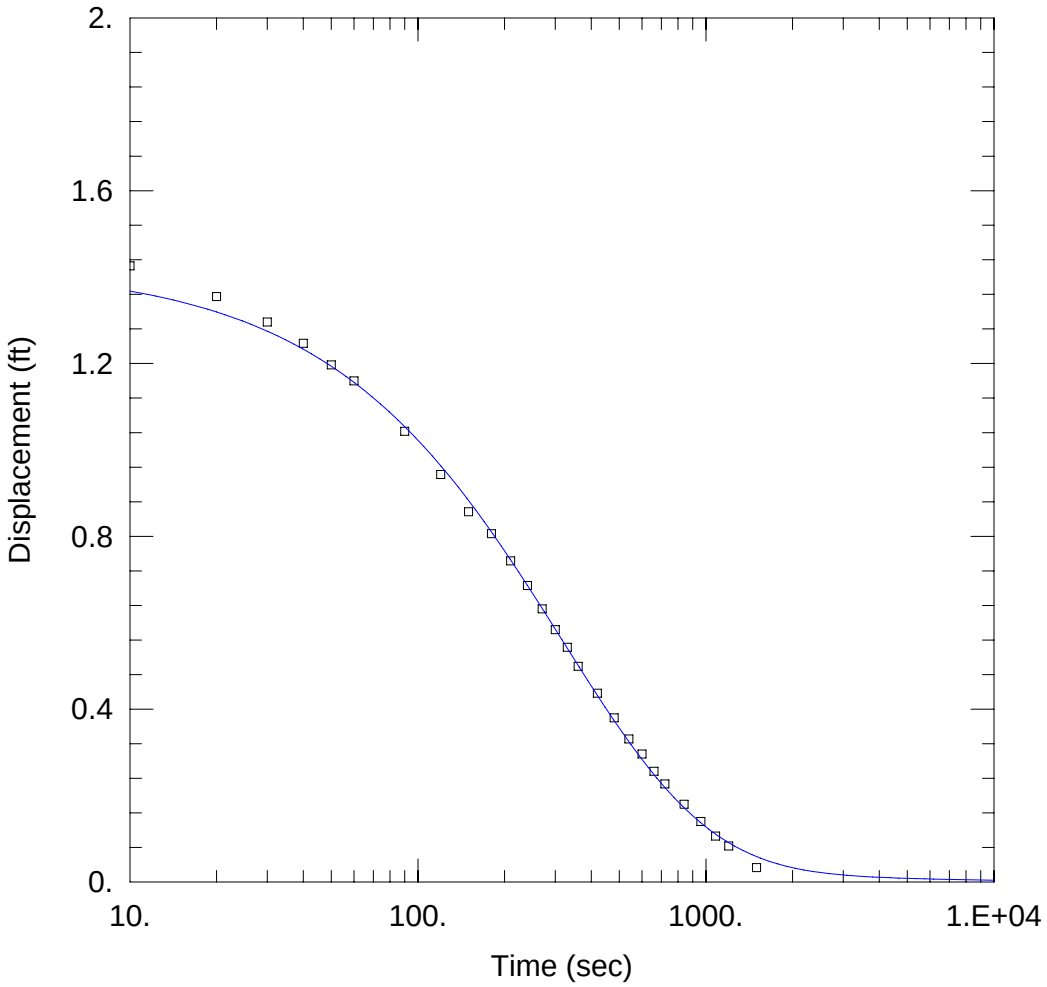
Saturated Thickness: 40. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-2T3)

Initial Displacement: 1.33 ft
Total Well Penetration Depth: 40. ft
Casing Radius: 0.17 ft
Static Water Column Height: 168. ft
Screen Length: 40. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 16.88 ft^2/day
S = 0.0001558



SLUG OUT

Data Set: C:\...\MW-2T3 Slug Out Cooper Conf.aqt
Date: 09/27/09 Time: 22:10:08

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-2T3
Test Date: 2-16-09

AQUIFER DATA

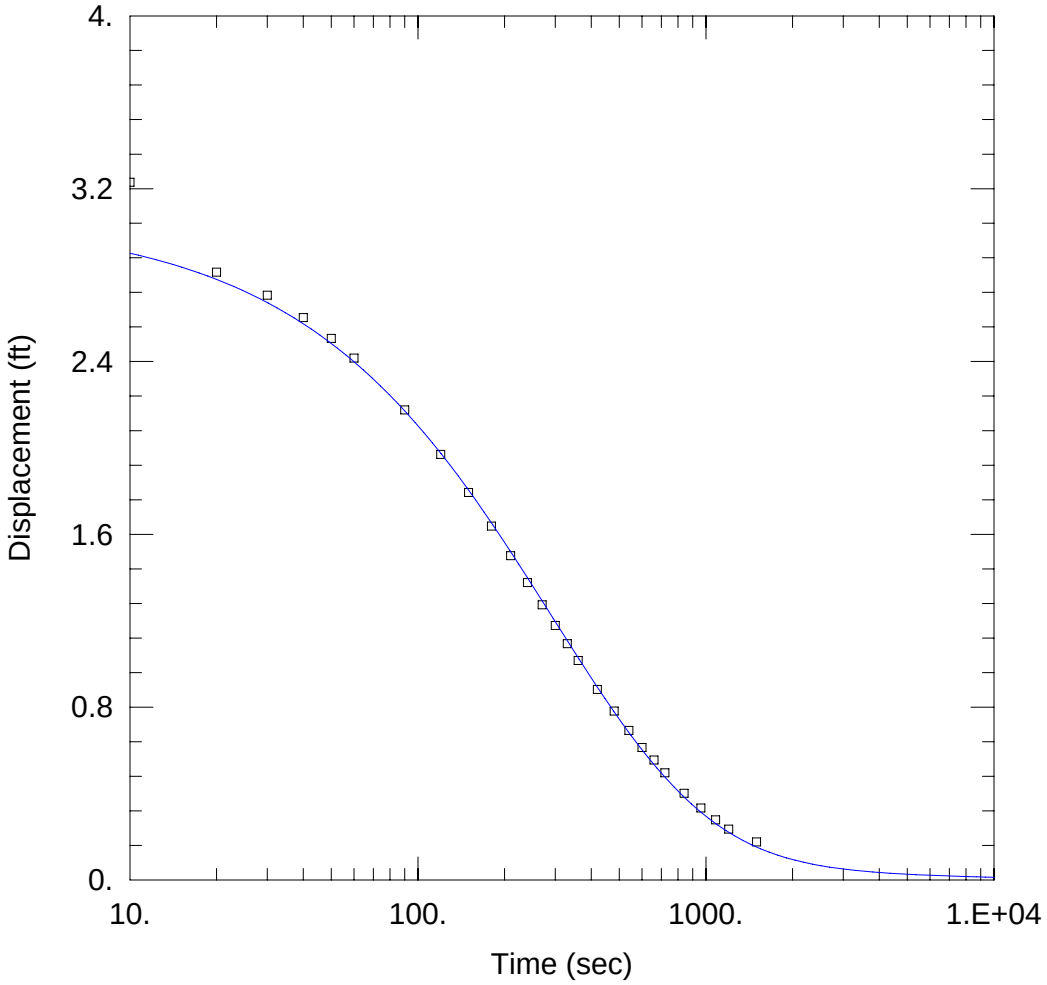
Saturated Thickness: 40. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-2T3)

Initial Displacement: 1.426 ft
Total Well Penetration Depth: 40. ft
Casing Radius: 0.17 ft
Static Water Column Height: 168. ft
Screen Length: 40. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 25.01 ft^2/day
S = 1.07E-05



LARGE SLUG IN

Data Set: C:\...\MW-2T3 Large Slug In Cooper Conf.aqt
Date: 09/27/09 Time: 22:12:54

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-2T3
Test Date: 2-17-09

AQUIFER DATA

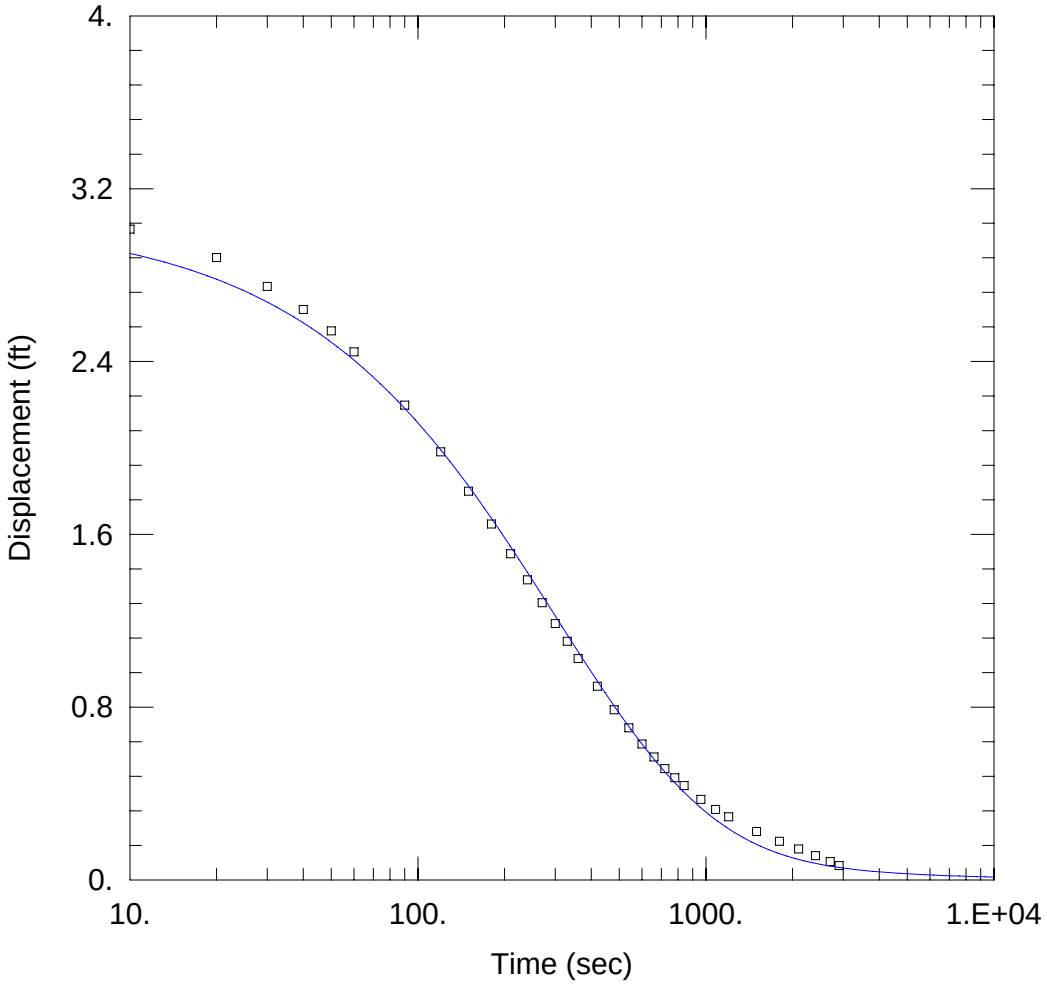
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-2T3)

Initial Displacement: 3.07 ft
Total Well Penetration Depth: 40. ft
Casing Radius: 0.17 ft
Static Water Column Height: 168. ft
Screen Length: 40. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 17.1 ft^2/day
S = 0.000977



LARGE SLUG OUT

Data Set: C:\...\MW-2T3 Large Slug Out Cooper Conf.aqt
Date: 09/27/09 Time: 22:11:33

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-2T3
Test Date: 2-17-09

AQUIFER DATA

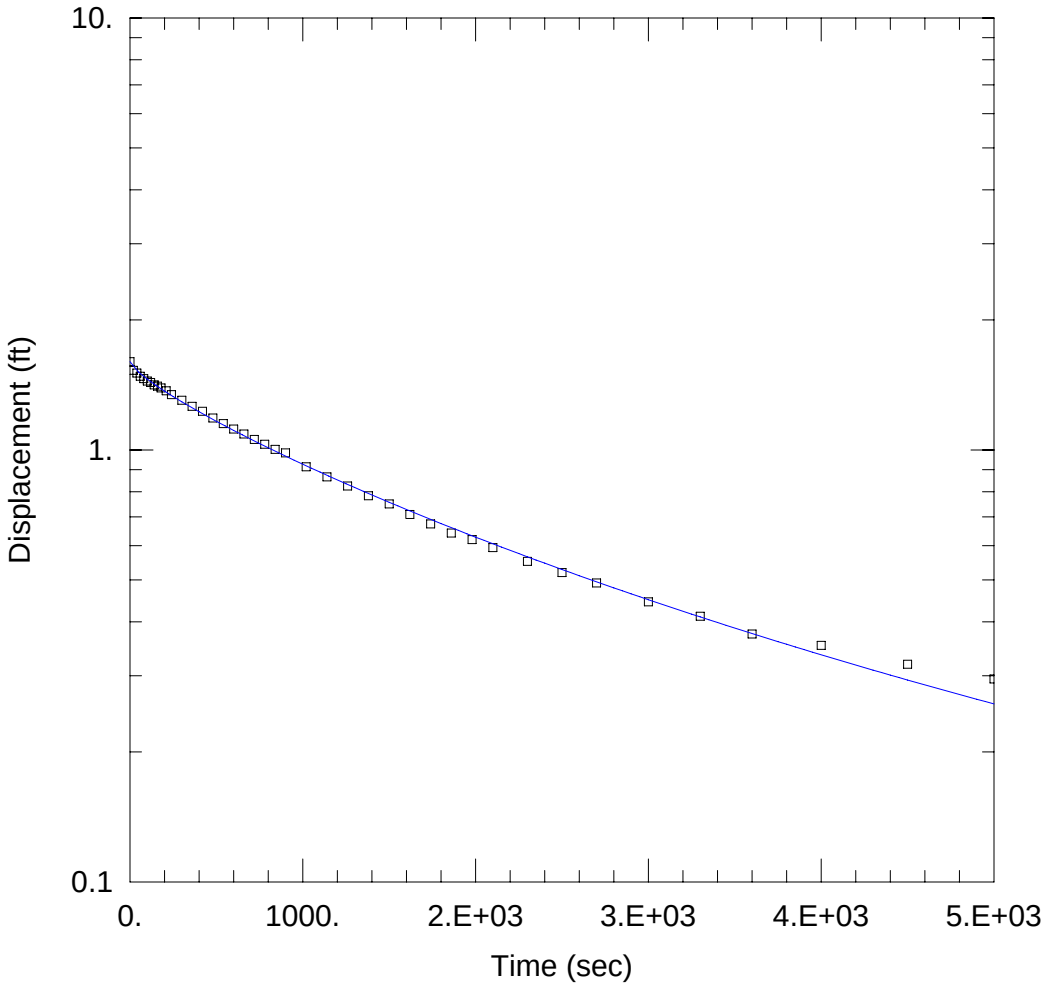
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-2T3)

Initial Displacement: 3.07 ft
Total Well Penetration Depth: 40. ft
Casing Radius: 0.17 ft
Static Water Column Height: 168. ft
Screen Length: 40. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 15.97 ft^2/day
S = 0.001325



SLUG IN

Data Set: C:\...\MW-6US Slug In Cooper Conf.aqt
Date: 09/27/09 Time: 22:16:06

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-6US
Test Date: 2/13/09

AQUIFER DATA

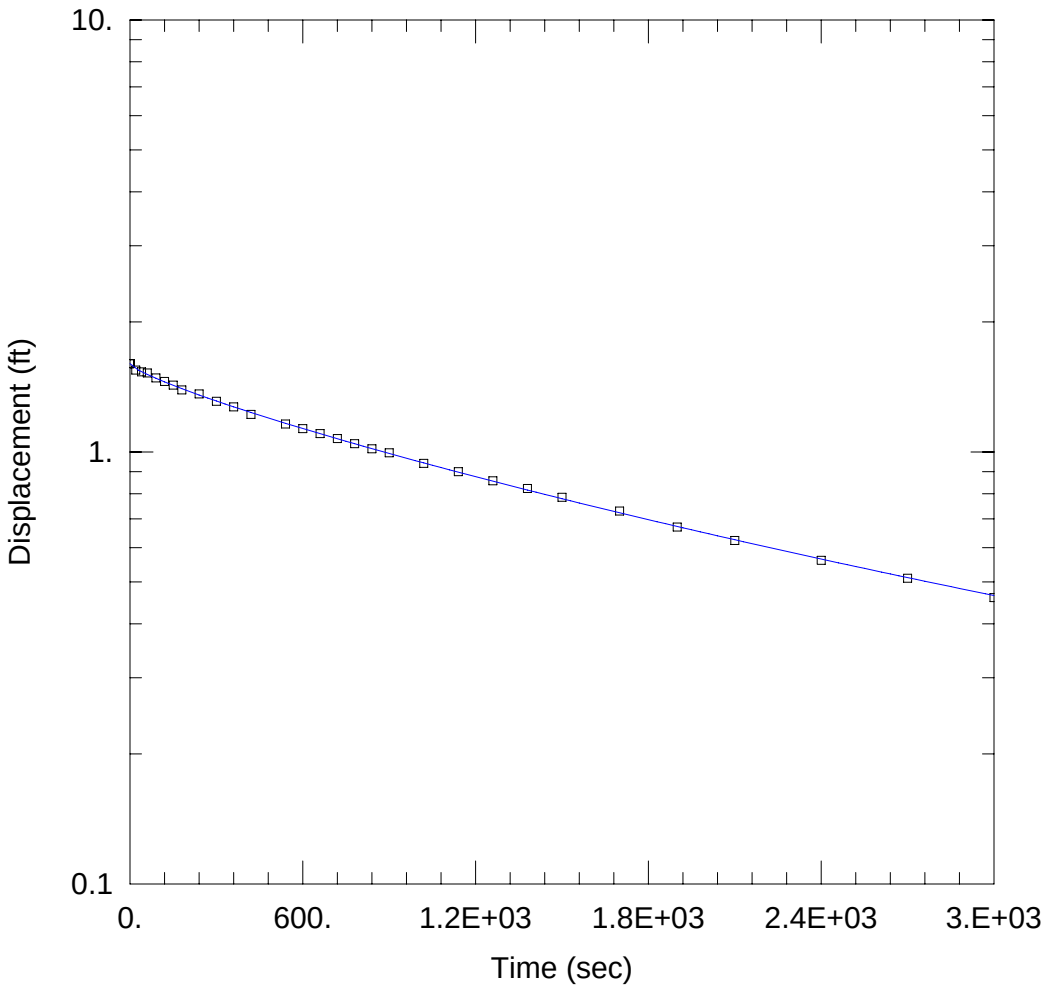
Saturated Thickness: 12. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-6US)

Initial Displacement: 1.6 ft
Total Well Penetration Depth: 25. ft
Casing Radius: 0.16 ft
Static Water Column Height: 25. ft
Screen Length: 25. ft
Wellbore Radius: 0.16 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
$T = 1.721\ ft^2/day$
S = 0.003603



SLUG OUT

Data Set: C:\...\MW-6US Slug Out Cooper Conf.aqt
Date: 09/27/09 Time: 22:19:19

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New haven, MO
Test Well: MW-6US
Test Date: 2/16/09

AQUIFER DATA

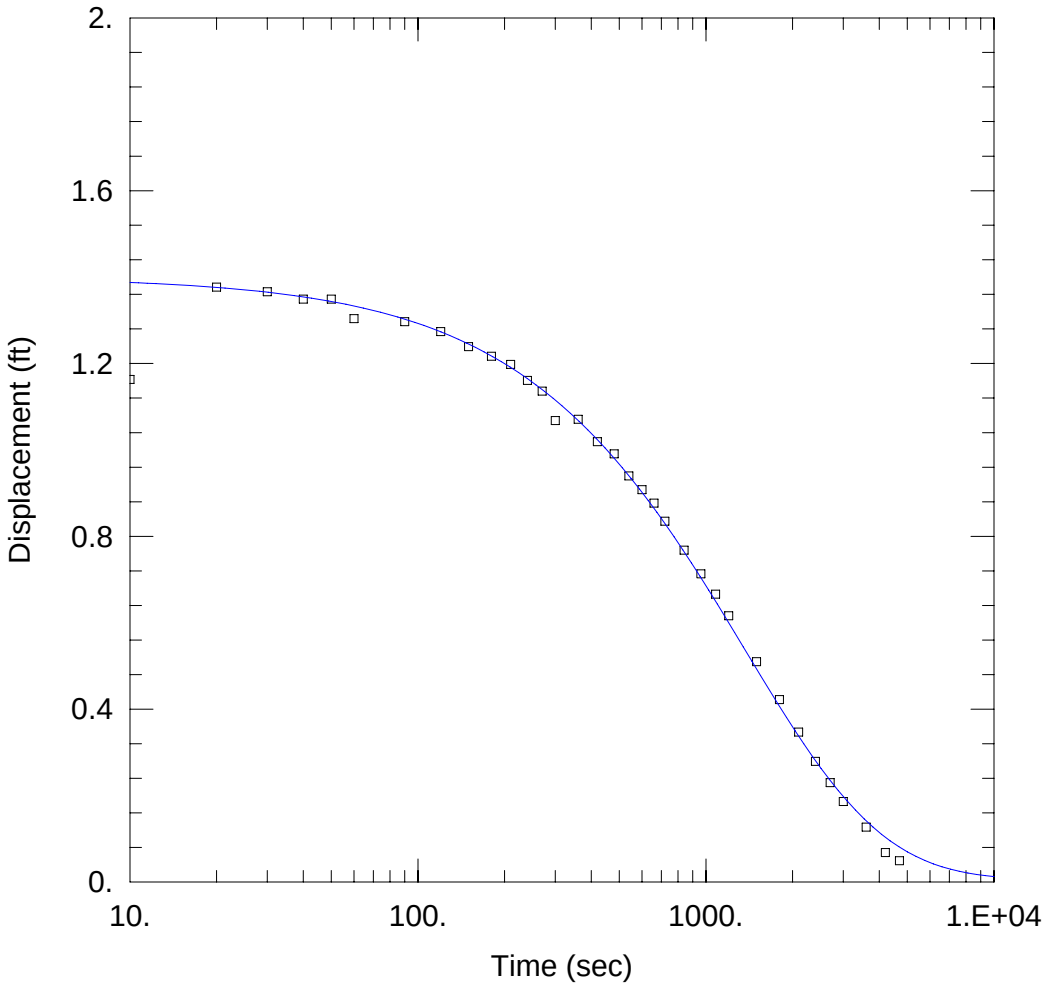
Saturated Thickness: 12. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-6US)

Initial Displacement: 1.6 ft
Total Well Penetration Depth: 25. ft
Casing Radius: 0.16 ft
Static Water Column Height: 25. ft
Screen Length: 25. ft
Wellbore Radius: 0.16 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 1.804 ft^2/day
S = 0.002036



SLUG IN

Data Set: C:\...\MW-6SW Slug In Cooper Conf.aqt
Date: 09/27/09 Time: 22:22:18

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-6-SW
Test Date: 2-13-09

AQUIFER DATA

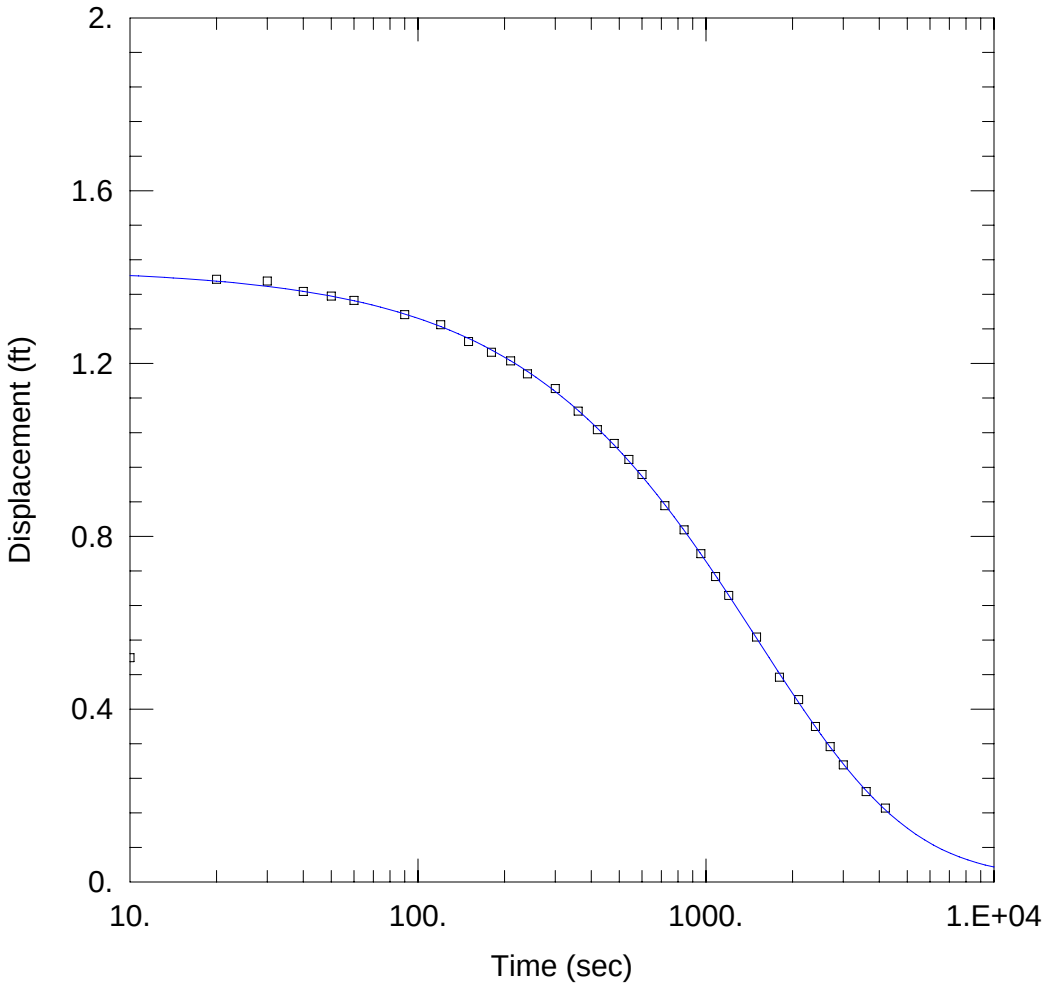
Saturated Thickness: 16. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-6SW)

Initial Displacement: 1.4 ft
Total Well Penetration Depth: 16. ft
Casing Radius: 0.17 ft
Static Water Column Height: 68. ft
Screen Length: 16. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 11.26 ft^2/day
S = 1.E-10



SLUG OUT

Data Set: C:\...\MW-6SW Slug Out Cooper Conf.aqt
Date: 09/27/09 Time: 22:20:02

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-6SW
Test Date: 2-13-09

AQUIFER DATA

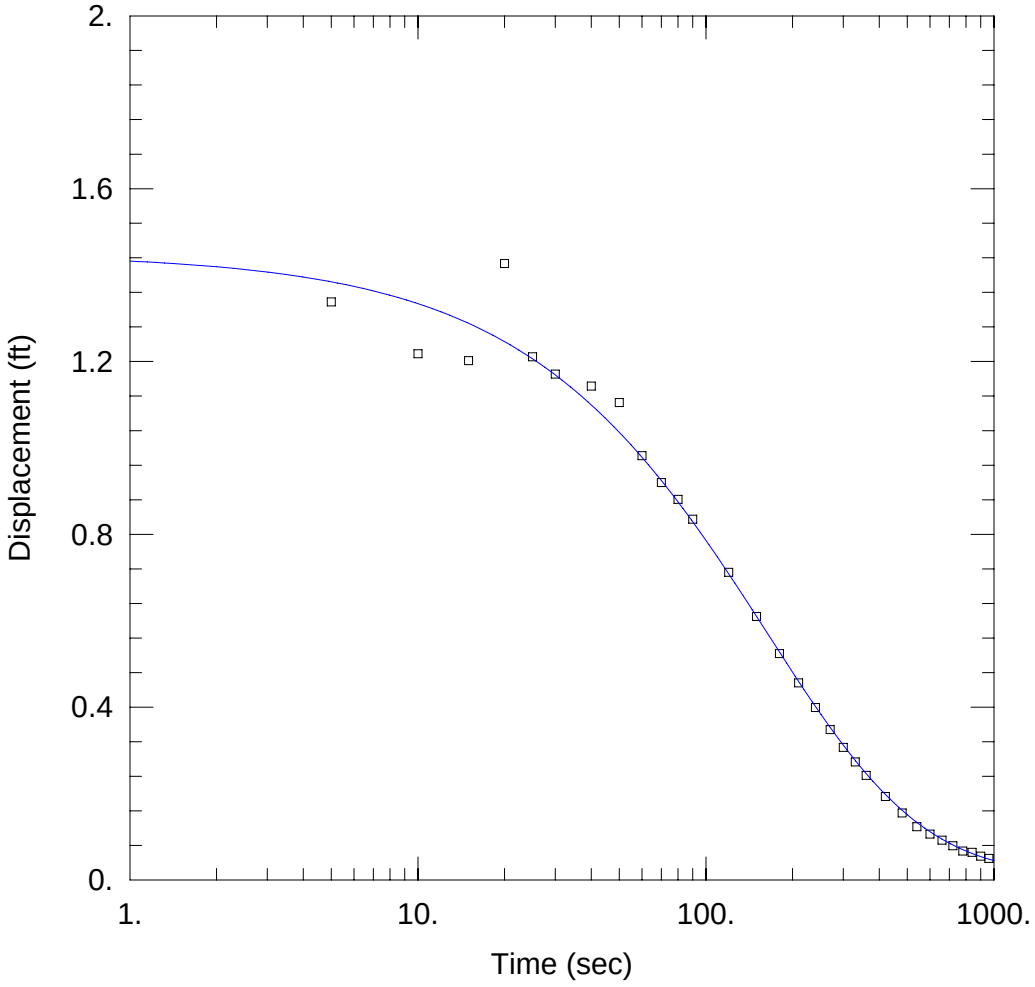
Saturated Thickness: 16. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-6SW)

Initial Displacement: 1.42 ft
Total Well Penetration Depth: 16. ft
Casing Radius: 0.17 ft
Static Water Column Height: 68. ft
Screen Length: 16. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 4.528 ft^2/day
S = 5.594E-05



SLUG IN FIRST RUN

Data Set: C:\...\MW-6R Slug In 1St Run Cooper Conf.aqt
Date: 09/27/09 Time: 22:27:42

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-6R
Test Date: 2-16-09

AQUIFER DATA

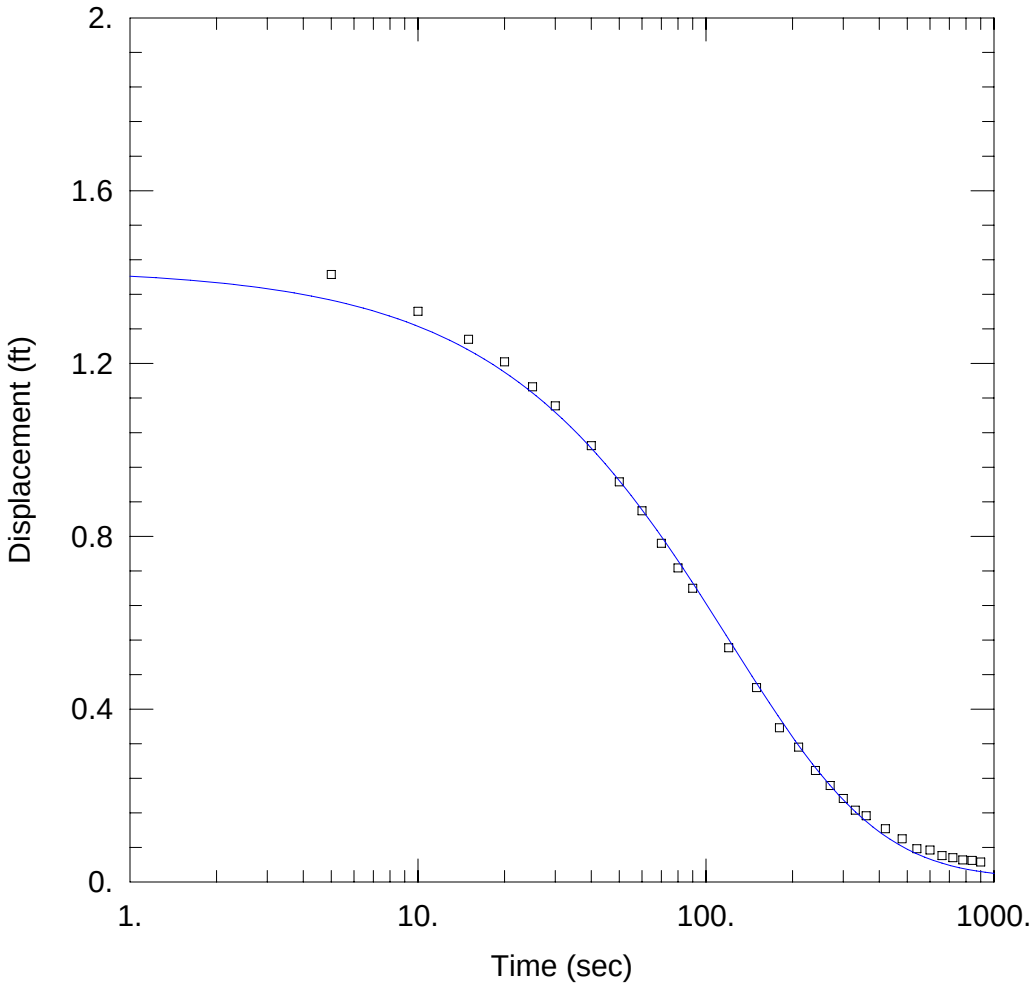
Saturated Thickness: 58. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-6R)

Initial Displacement: 1.45 ft
Total Well Penetration Depth: 58. ft
Casing Radius: 0.17 ft
Static Water Column Height: 348. ft
Screen Length: 58. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 37.24 ft^2/day
S = 0.0001947



SLUG OUT FIRST RUN

Data Set: C:\...\MW-6R Slug Out 1St Run Cooper Conf.aqt
Date: 09/27/09 Time: 22:25:05

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-6R
Test Date: 2-16-09

AQUIFER DATA

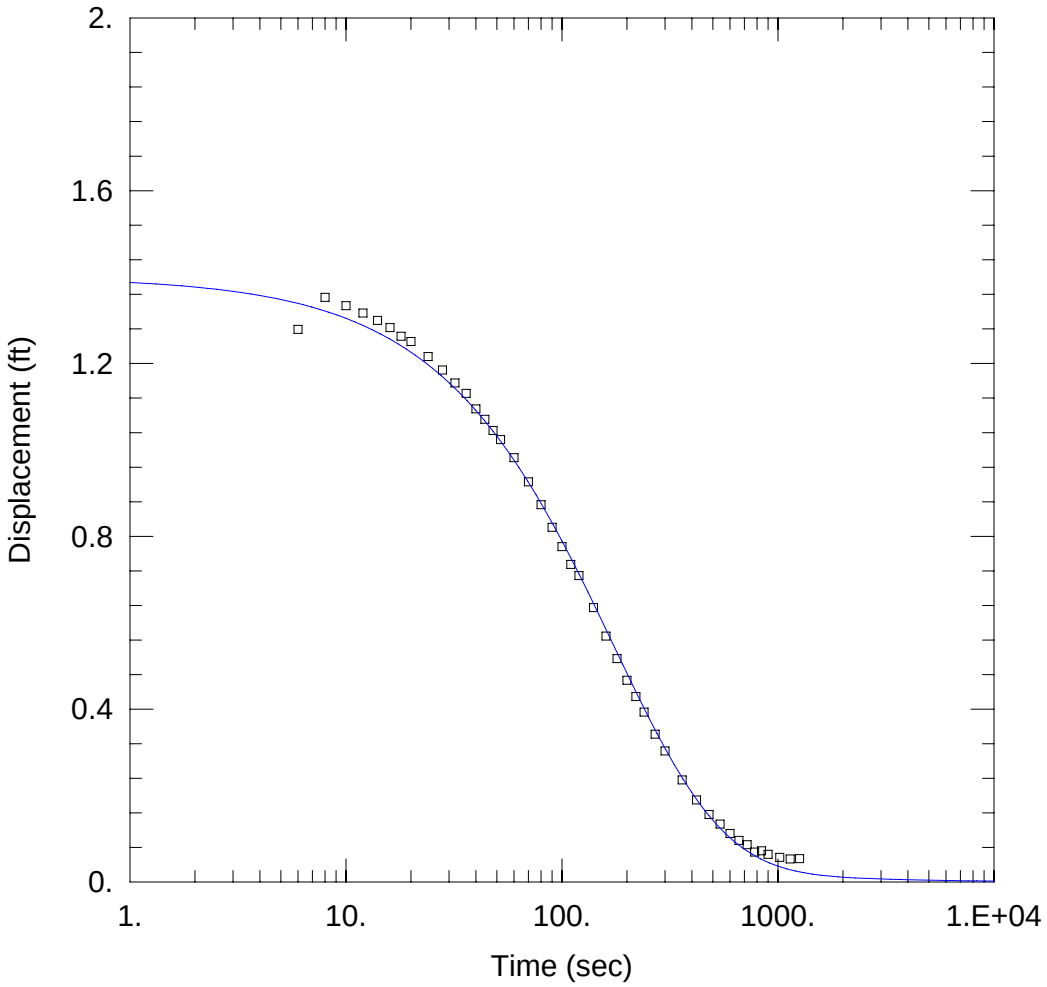
Saturated Thickness: 58. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-6R)

Initial Displacement: 1.42 ft
Total Well Penetration Depth: 58. ft
Casing Radius: 0.17 ft
Static Water Column Height: 348. ft
Screen Length: 58. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 66.17 ft^2/day
S = 9.482E-06



SLUG IN 2ND RUN

Data Set: C:\...\MW-6R Slug In 2nd Run Cooper Conf.aqt
Date: 09/27/09 Time: 22:27:16

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-6R
Test Date: 2-16-09

AQUIFER DATA

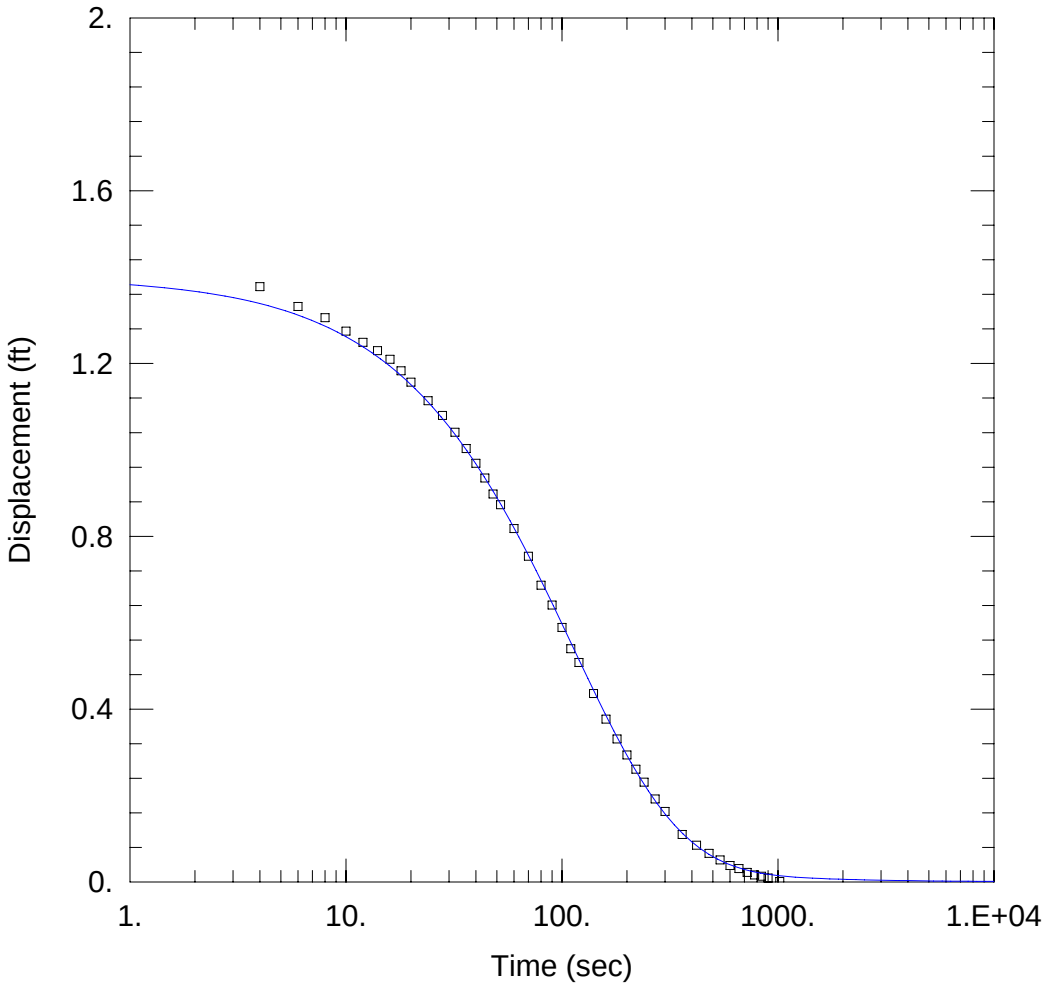
Saturated Thickness: 58. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-6R)

Initial Displacement: 1.4 ft
Total Well Penetration Depth: 58. ft
Casing Radius: 0.17 ft
Static Water Column Height: 348. ft
Screen Length: 58. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 48.96 ft^2/day
S = 4.624E-06



SLUG OUT 2ND RUN

Data Set: C:\...\MW-6R Slug Out 2nd Run Cooper Conf.aqt
Date: 09/27/09 Time: 22:24:38

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-6R
Test Date: 2-16-09

AQUIFER DATA

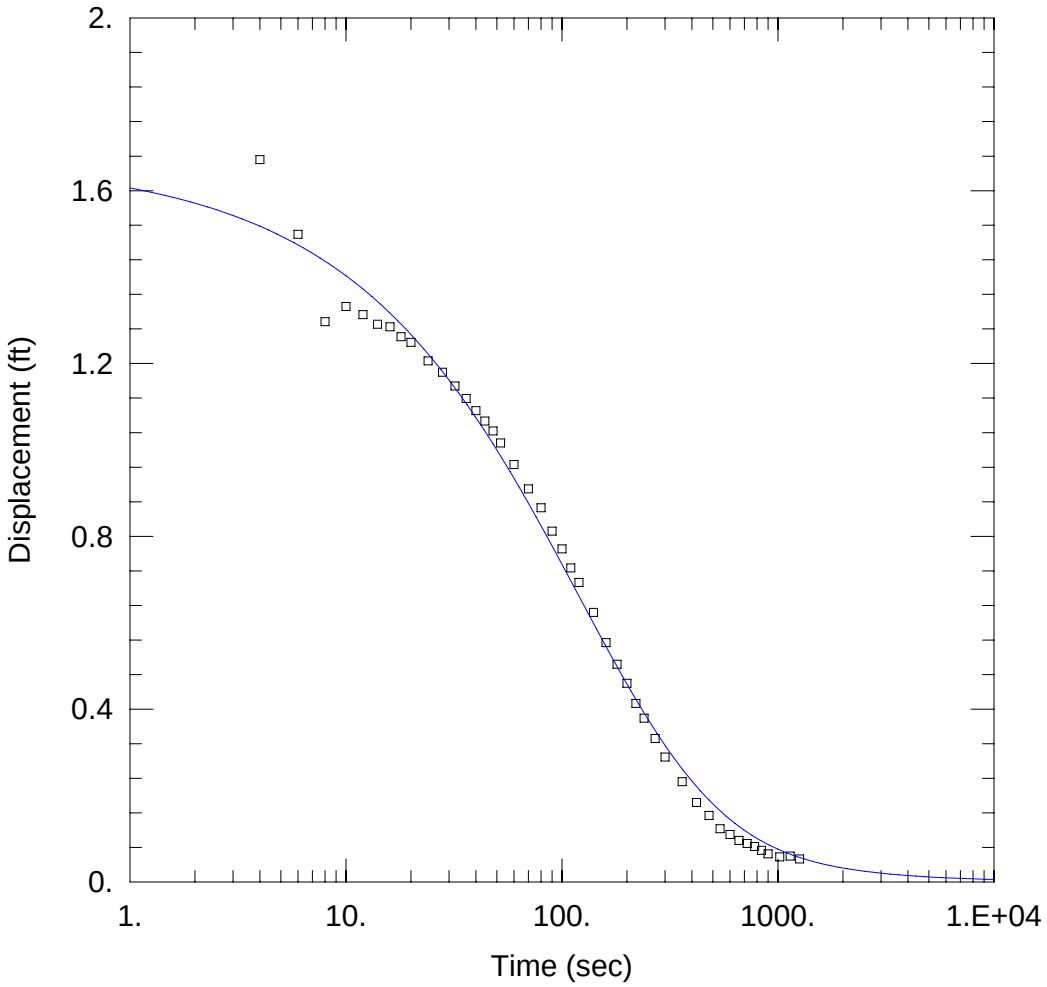
Saturated Thickness: 58. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-6R)

Initial Displacement: 1.4 ft
Total Well Penetration Depth: 58. ft
Casing Radius: 0.17 ft
Static Water Column Height: 348. ft
Screen Length: 58. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 82.14 ft^2/day
S = 1.587E-06



SLUG IN 3RD RUN

Data Set: C:\...\MW-6R Slug In 3rd Run Cooper Conf.aqt
Date: 09/27/09 Time: 22:26:03

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-6R
Test Date: 2-16-09

AQUIFER DATA

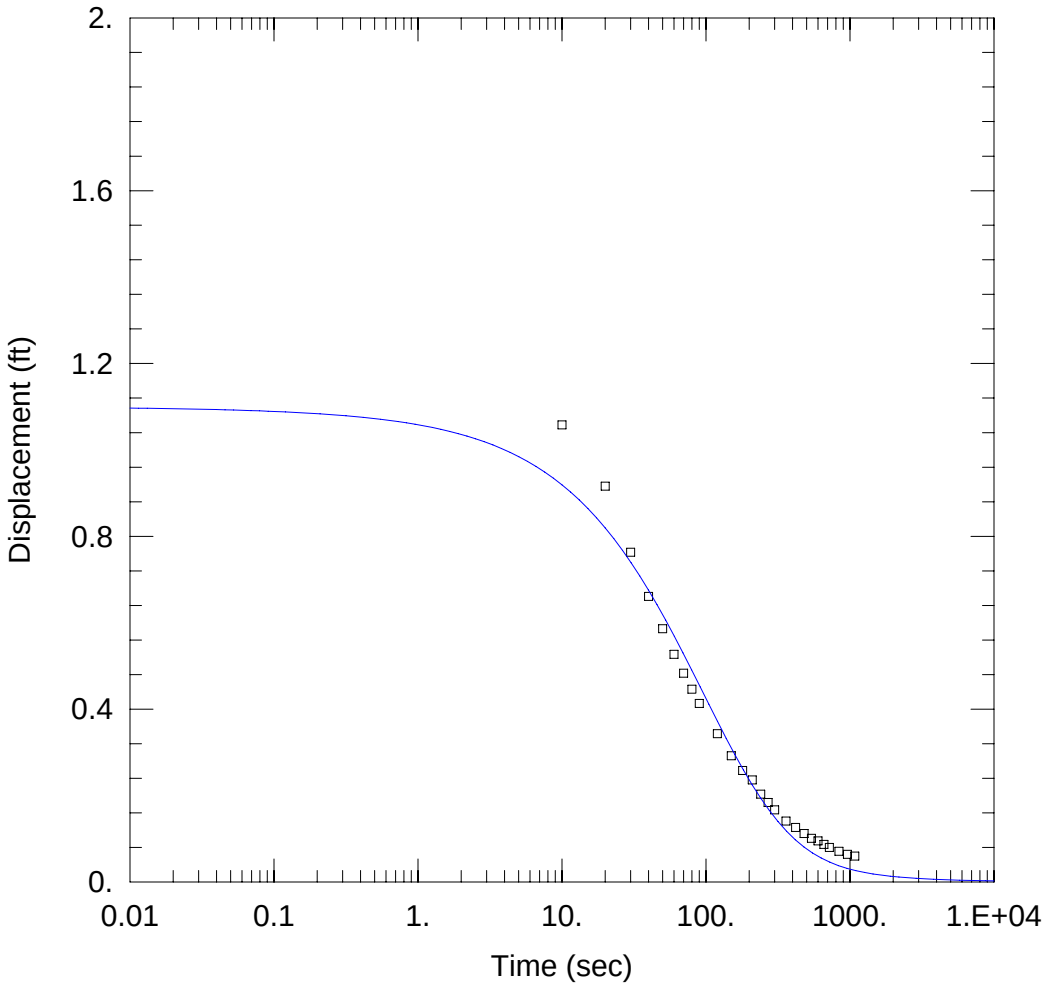
Saturated Thickness: 58. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-6R)

Initial Displacement: 1.68 ft
Total Well Penetration Depth: 58. ft
Casing Radius: 0.17 ft
Static Water Column Height: 348. ft
Screen Length: 58. ft
Wellbore Radius: 0.13 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 19.75 ft^2/day
S = 0.06117



TWO SLUGS IN

Data Set: C:\...\MW-7US Two Slugs In Cooper Conf.aqt
Date: 09/27/09 Time: 22:31:07

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-7US
Test Date: 2-23-09

AQUIFER DATA

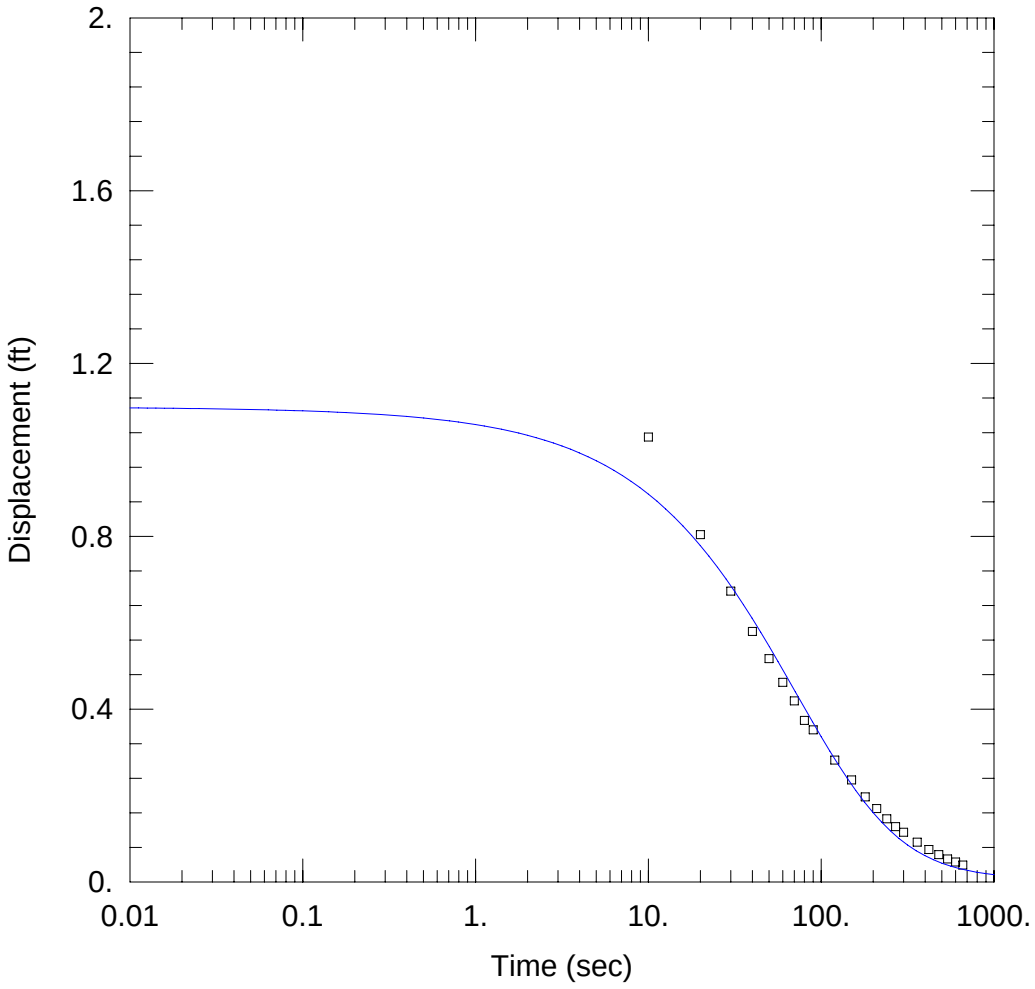
Saturated Thickness: 11. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-7US)

Initial Displacement: 1.1 ft
Total Well Penetration Depth: 11. ft
Casing Radius: 0.25 ft
Static Water Column Height: 16. ft
Screen Length: 11. ft
Wellbore Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 68.78 ft^2/day
S = 0.01191



TWO SLUGS OUT

Data Set: C:\...\MW-7US Two Slugs Out Cooper Conf.aqt
Date: 09/27/09 Time: 22:30:14

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-7US
Test Date: 2-23-09

AQUIFER DATA

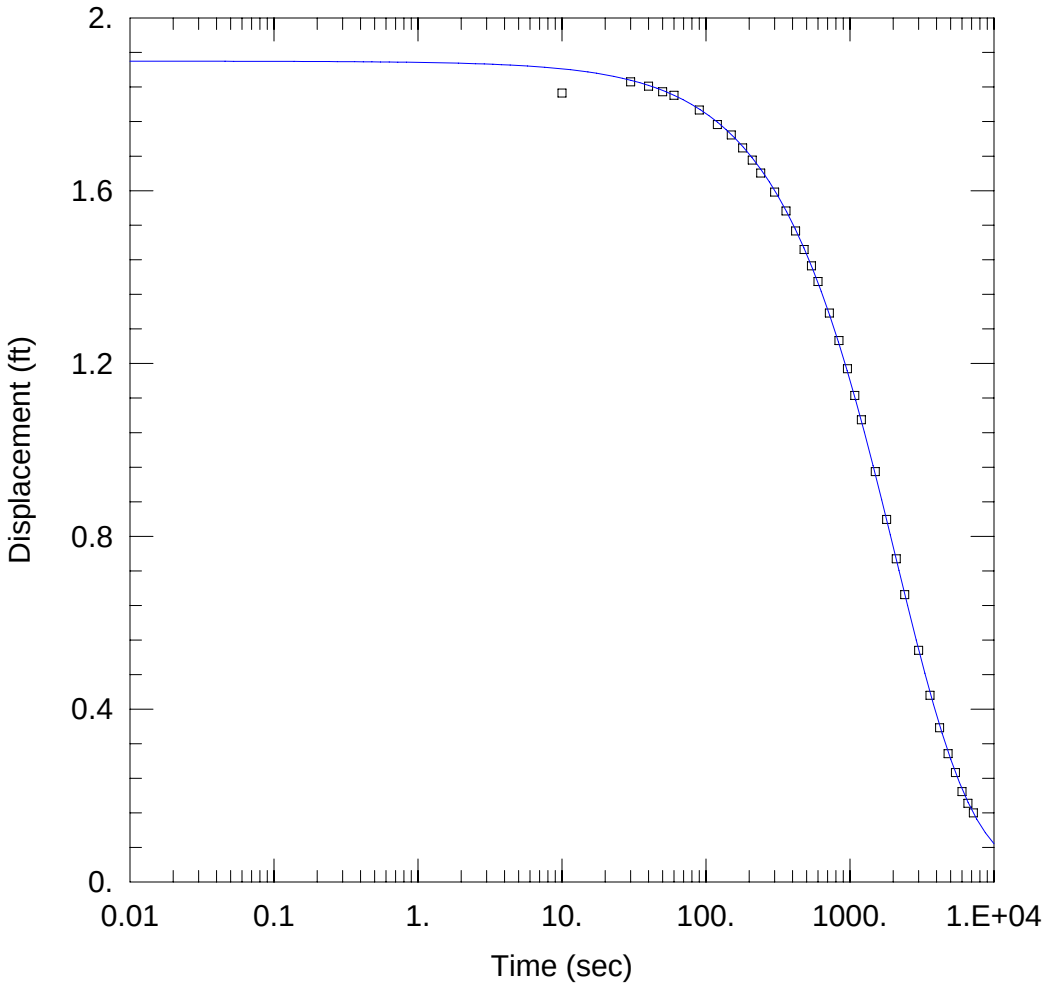
Saturated Thickness: 11. ft
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-7US)

Initial Displacement: 1.1 ft
Total Well Penetration Depth: 11. ft
Casing Radius: 0.25 ft
Static Water Column Height: 8. ft
Screen Length: 11. ft
Wellbore Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 110.7 ft^2/day
S = 0.0046



SLUG IN

Data Set: C:\...\MW-7SW Slug In Cooper Conf.aqt
Date: 09/27/09 Time: 22:34:27

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-7SW
Test Date: 2-23-09

AQUIFER DATA

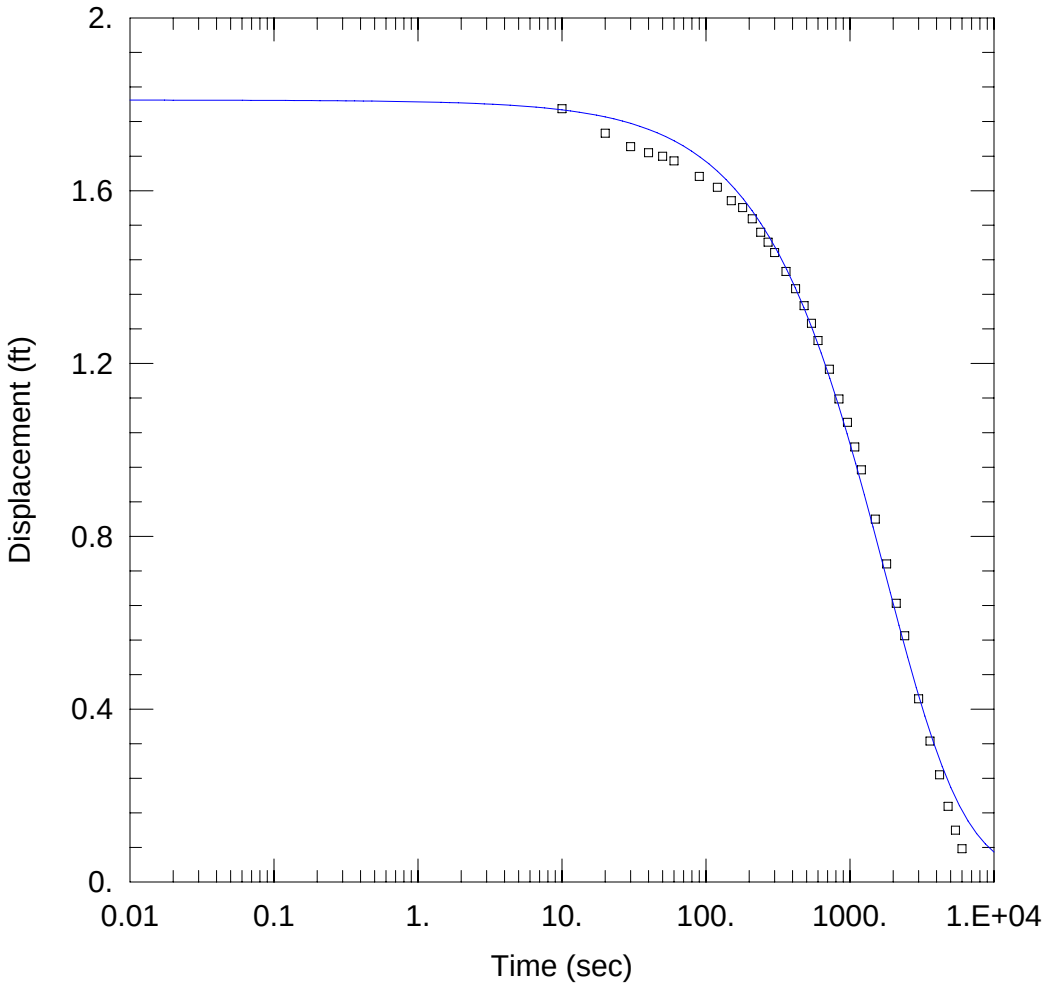
Saturated Thickness: 19. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-7SW)

Initial Displacement: 1.9 ft
Total Well Penetration Depth: 19. ft
Casing Radius: 0.21 ft
Static Water Column Height: 69. ft
Screen Length: 19. ft
Wellbore Radius: 0.21 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 4.676 ft^2/day
S = 6.827E-05



SLUG OUT

Data Set: C:\...\MW-7SW Slug Out Cooper Conf.aqt
Date: 09/27/09 Time: 22:33:05

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-7SW
Test Date: 2-23-09

AQUIFER DATA

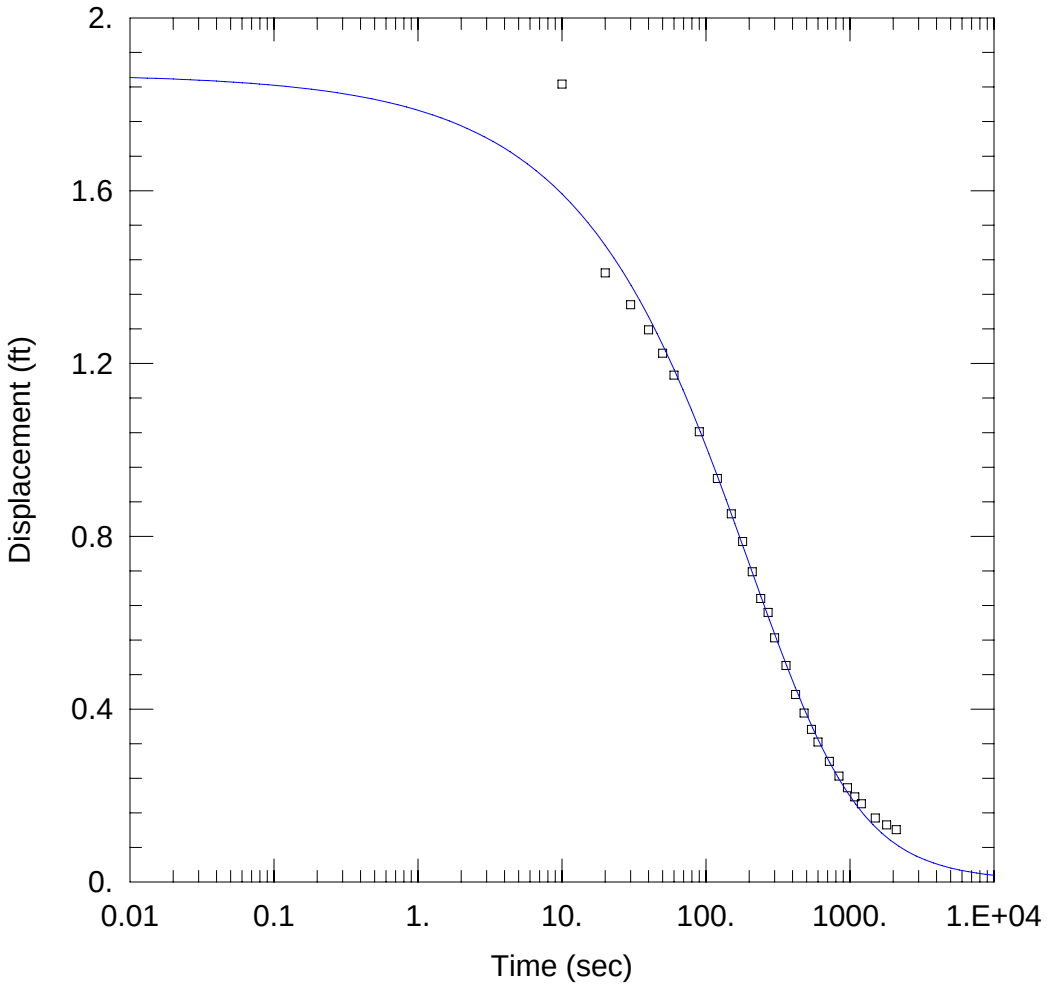
Saturated Thickness: 19. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-7SW)

Initial Displacement: 1.81 ft
Total Well Penetration Depth: 19. ft
Casing Radius: 0.21 ft
Static Water Column Height: 69. ft
Screen Length: 19. ft
Wellbore Radius: 0.21 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 4.795 ft^2/day
S = 0.0002697



SLUG IN

Data Set: C:\...\MW-8US Slug In Cooper Conf.aqt
Date: 09/27/09 Time: 22:37:06

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-8US
Test Date: 2-23-09

AQUIFER DATA

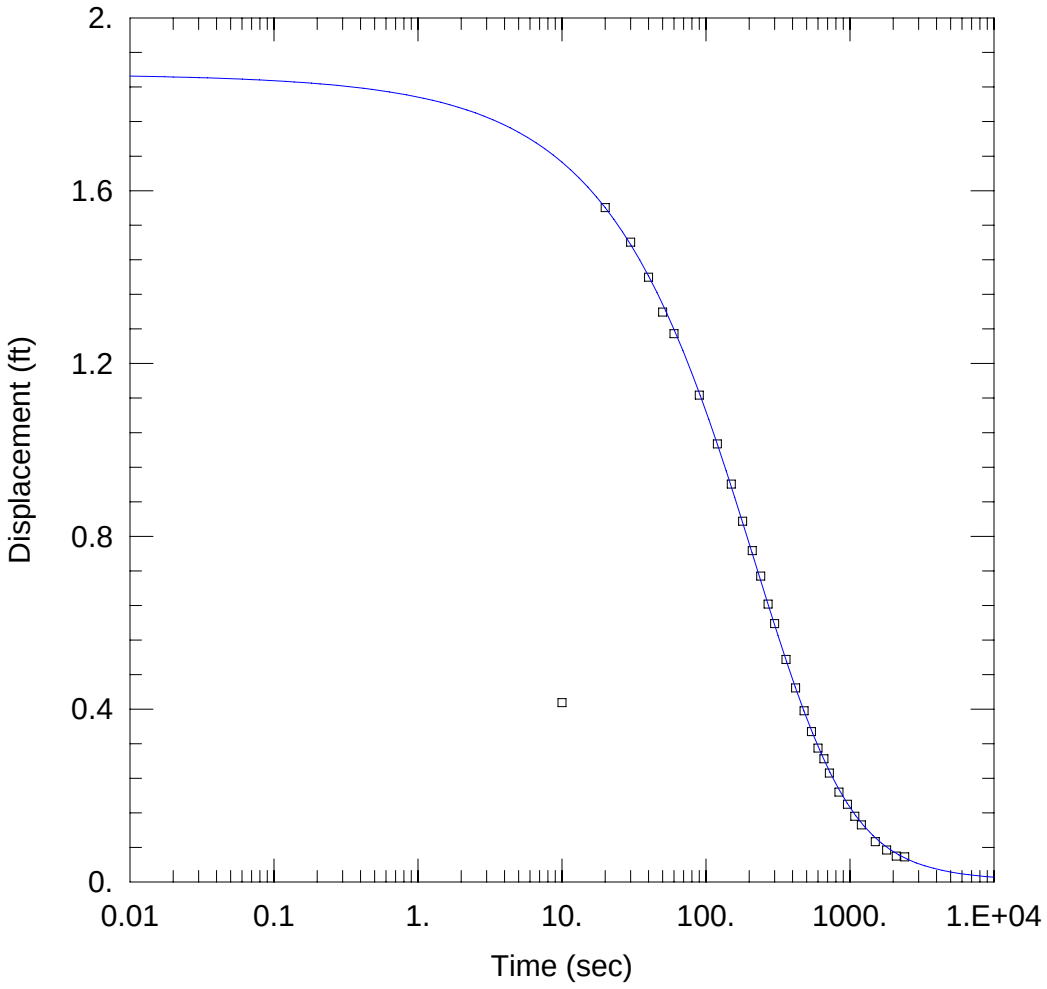
Saturated Thickness: 16. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-8US)

Initial Displacement: 1.87 ft Static Water Column Height: 35. ft
Total Well Penetration Depth: 16. ft Screen Length: 10. ft
Casing Radius: 0.08 ft Wellbore Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Cooper et al.
T = 1.826 ft^2/day S = 0.01136



SLUG OUT

Data Set: C:\...\MW-8US Slug Out Cooper Conf.aqt
Date: 09/27/09 Time: 22:36:33

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-8US
Test Date: 2-23-09

AQUIFER DATA

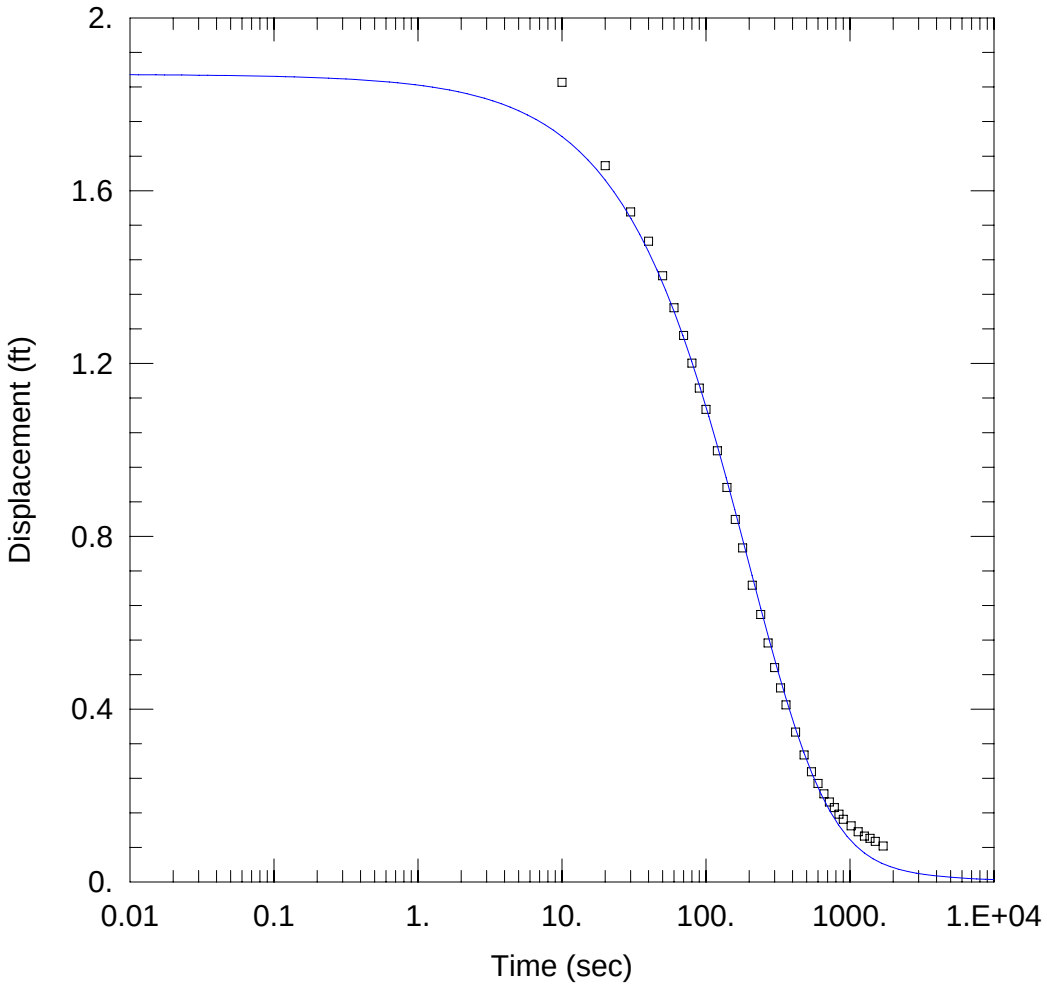
Saturated Thickness: 16. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-8US)

Initial Displacement: 1.87 ft
Total Well Penetration Depth: 16. ft
Casing Radius: 0.08 ft
Static Water Column Height: 35. ft
Screen Length: 10. ft
Wellbore Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
T = 2.598 ft^2/day
S = 0.002612



SLUG IN

Data Set: C:\...\MW-9US Slug In Cooper Conf.aqt
Date: 09/27/09 Time: 22:40:32

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-9US
Test Date: 2-27-09

AQUIFER DATA

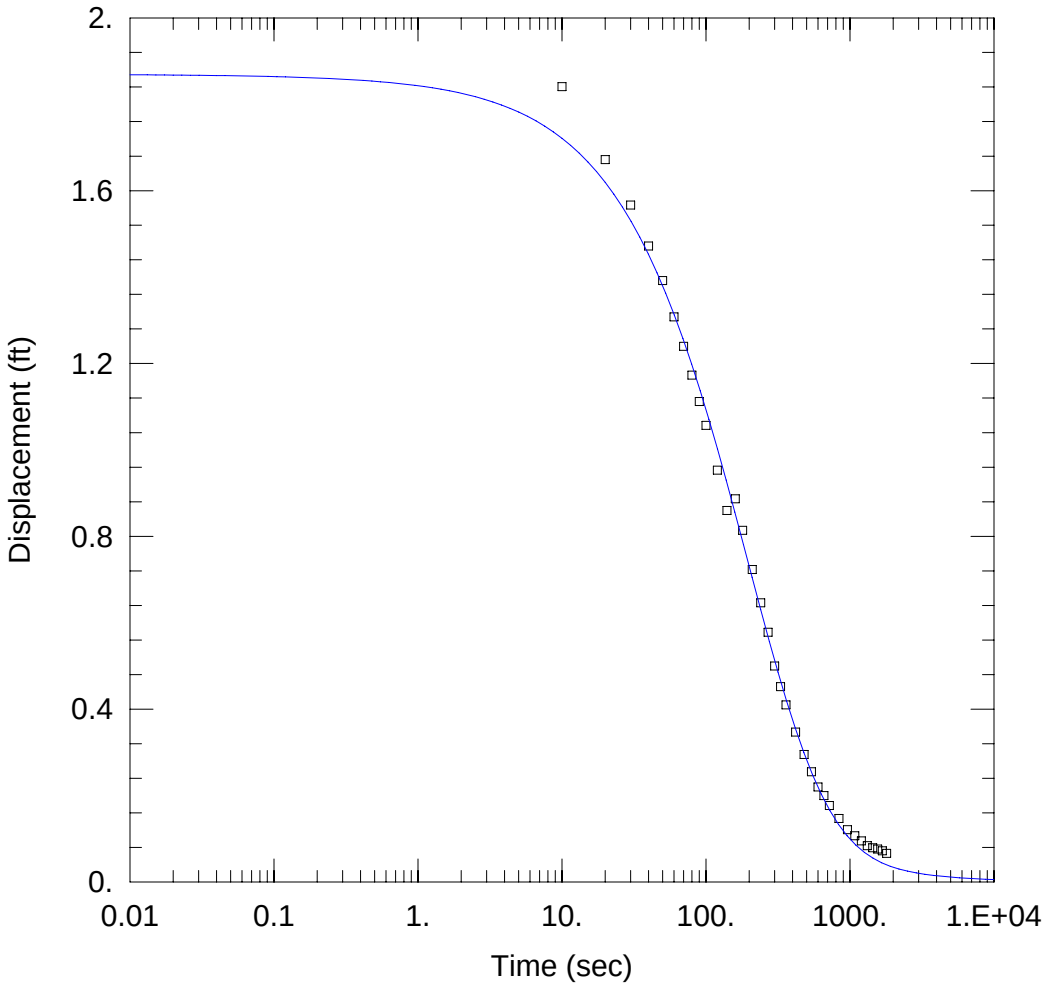
Saturated Thickness: 18. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-9US)

Initial Displacement: 1.87 ft
Total Well Penetration Depth: 18. ft
Casing Radius: 0.08 ft
Static Water Column Height: 36. ft
Screen Length: 15. ft
Wellbore Radius: 0.33 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
$T = 5.347\ ft^2/day$
S = 4.993E-05



SLUG OUT

Data Set: C:\...\MW-9US Slug Out Cooper Conf.aqt
Date: 09/27/09 Time: 22:39:09

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-9US
Test Date: 2-27-09

AQUIFER DATA

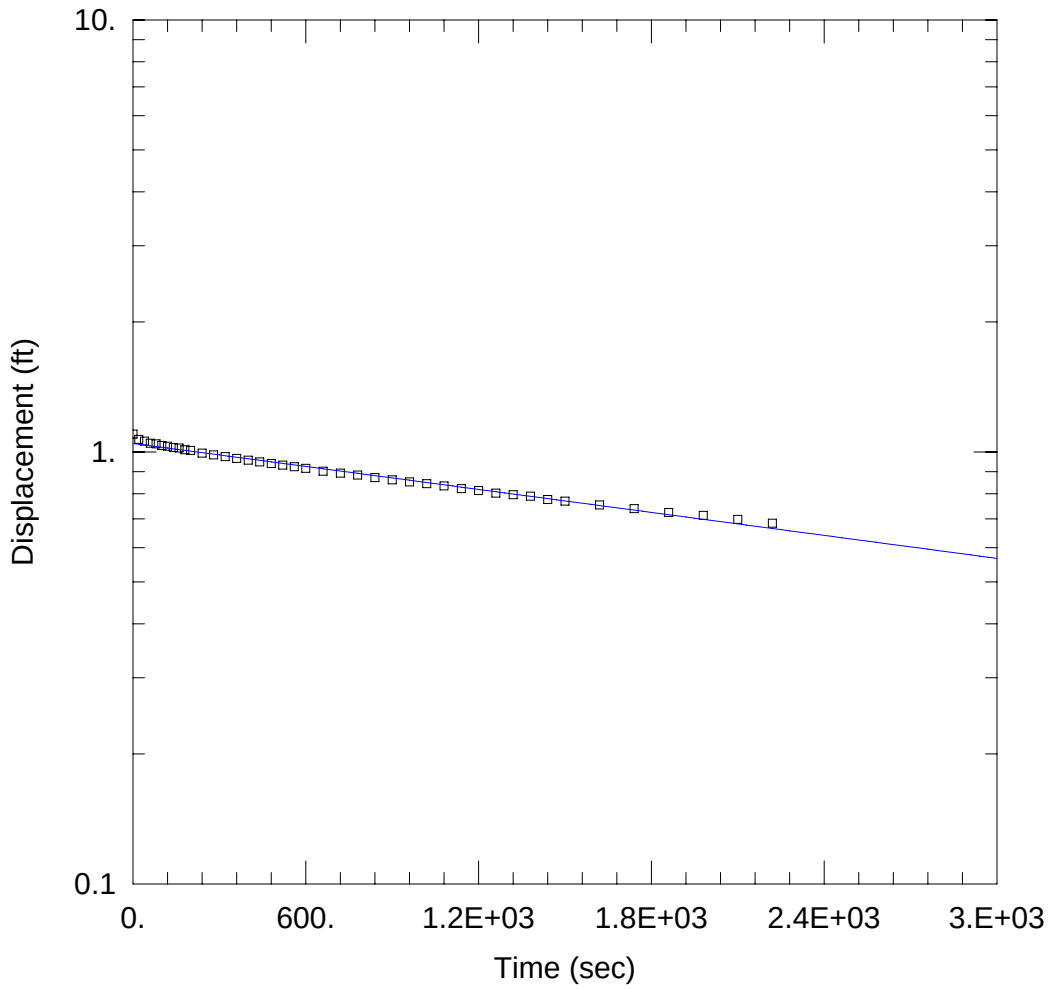
Saturated Thickness: 18. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-9US)

Initial Displacement: 1.87 ft
Total Well Penetration Depth: 18. ft
Casing Radius: 0.08 ft
Static Water Column Height: 36. ft
Screen Length: 15. ft
Wellbore Radius: 0.33 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper et al.
$T = 5.198\ ft^2/day$
S = 6.508E-05



2 SLUGS OUT

Data Set: C:\...\MW-10UB 2 Slugs Out Bouwer and Rice.aqt
Date: 09/27/09 Time: 22:45:58

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-10UB
Test Date: 2/17/09

AQUIFER DATA

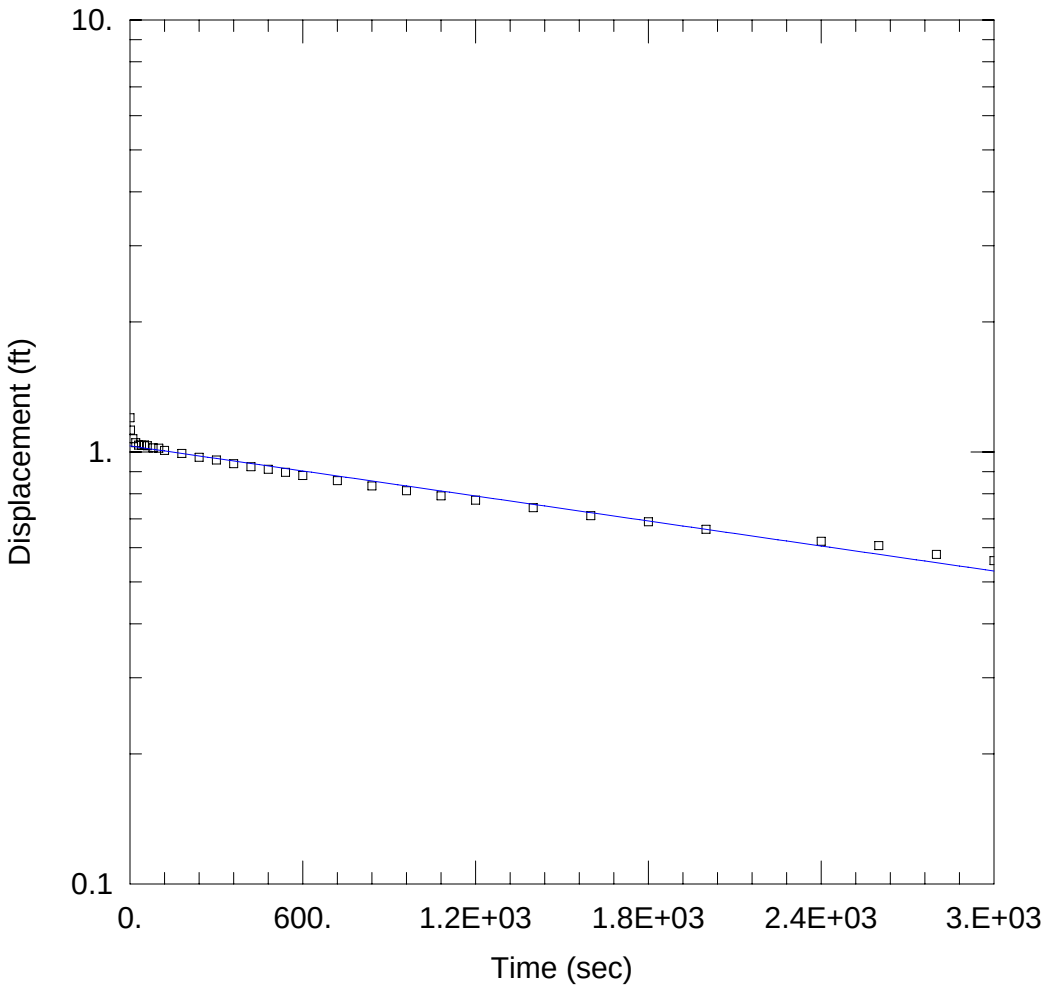
Saturated Thickness: 34. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-10UB)

Initial Displacement: 1.1 ft
Total Well Penetration Depth: 34. ft
Casing Radius: 0.33 ft
Static Water Column Height: 40.9 ft
Screen Length: 21. ft
Wellbore Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.2037 ft/day
y0 = 1.046 ft



LARGE SLUG IN

Data Set: C:\...\MW-10UB Large Slug Out Bouwer and Rice.aqt
Date: 09/28/09 Time: 21:14:42

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: MW-10UB
Test Date: 2/17/09

AQUIFER DATA

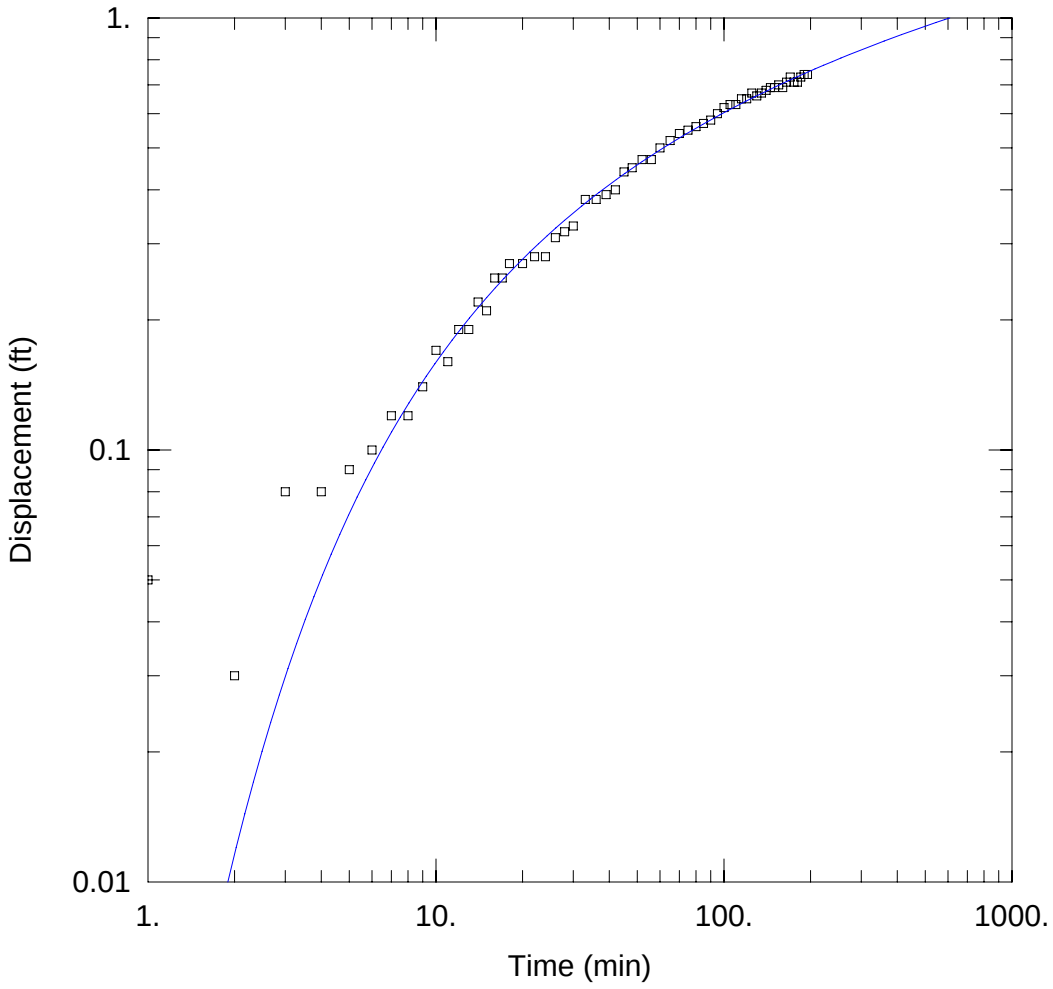
Saturated Thickness: 34. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-10UB)

Initial Displacement: 1.2 ft
Total Well Penetration Depth: 34. ft
Casing Radius: 0.33 ft
Static Water Column Height: 40.9 ft
Screen Length: 21. ft
Wellbore Radius: 0.33 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.2217 ft/day
y0 = 1.032 ft



GASCONADE AND LOWER AQUIFER TEST

Data Set: C:\...\W-4 Drawdown 7-13-09.aqt
Date: 10/07/09 Time: 13:09:24

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: City Well 3
Test Date: July 13, 2009

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-3	0	0

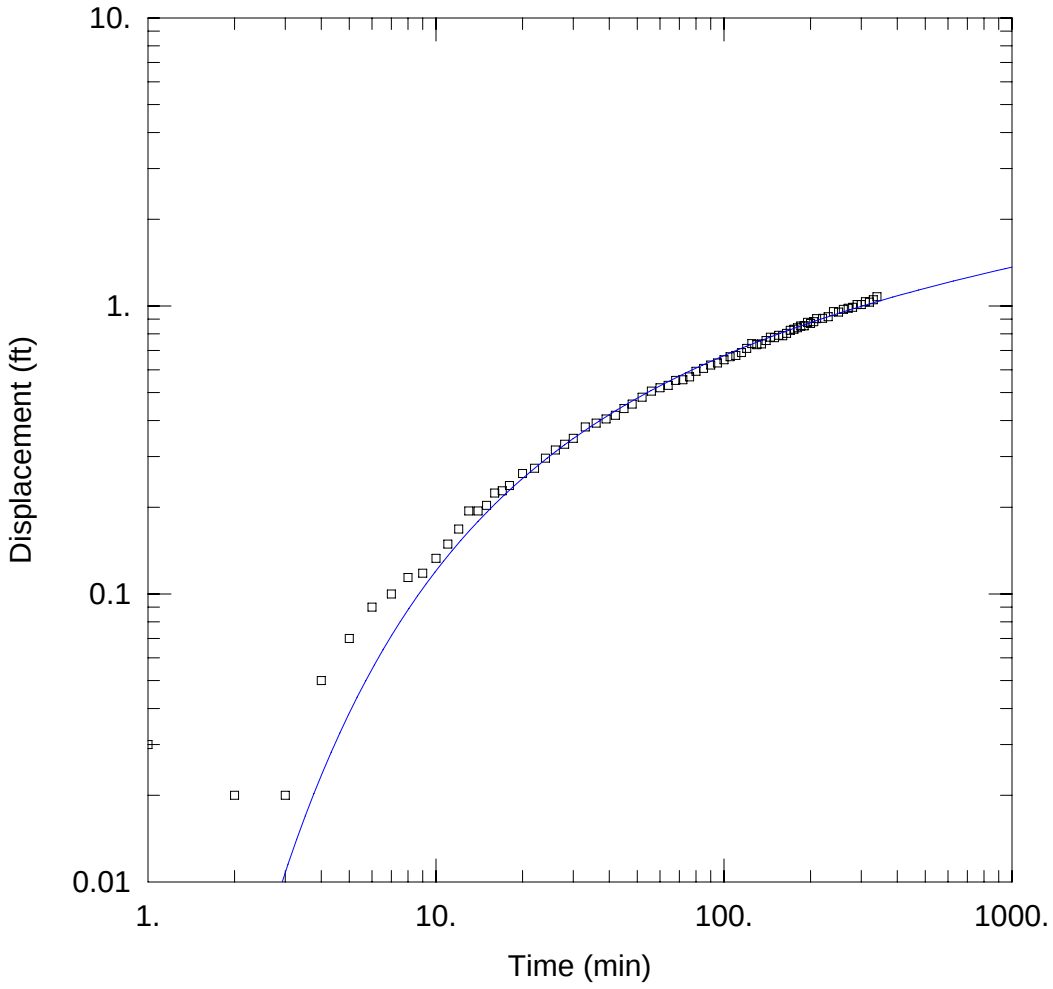
Observation Wells

Well Name	X (ft)	Y (ft)
▫ W-4	1770	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 3.08E+04 ft^2/day
S = 0.0001079
Kz/Kr = 0.1
b = 617. ft



GASCONADE AND LOWER AQUIFER TEST

Data Set: C:\...\W-4 Drawdown 7-17-09.aqt
Date: 10/07/09 Time: 13:12:44

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: City Well 3
Test Date: July 13, 2009

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-3	0	0

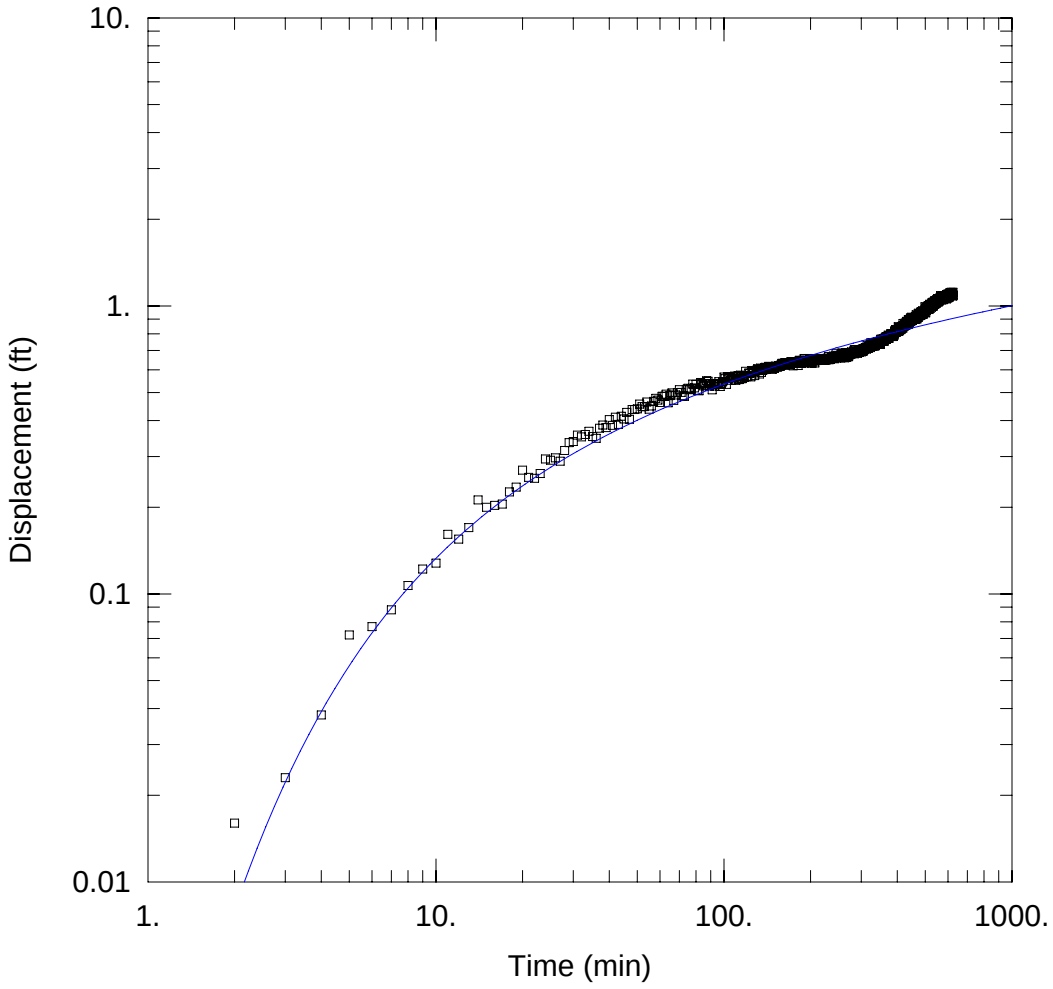
Observation Wells

Well Name	X (ft)	Y (ft)
▫ W-4	1770	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 2.236E+04 ft^2/day
S = 0.0001348
Kz/Kr = 0.1
b = 617. ft



GASCONADE AND LOWER AQUIFER TEST

Data Set: C:\...\W-4 Drawdown 7-22-09.aqt
Date: 10/07/09 Time: 23:02:27

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: City Well 3
Test Date: July 22, 2009

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-3	0	0

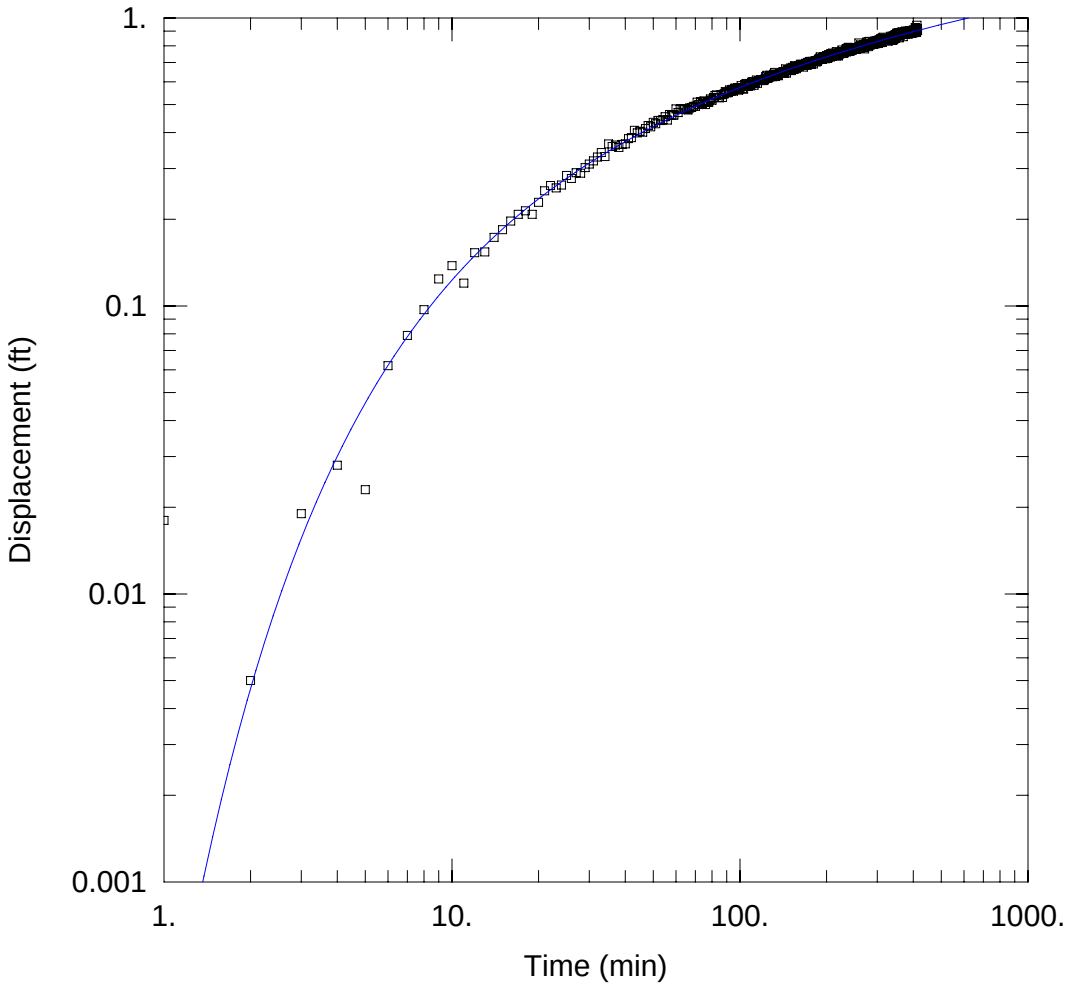
Observation Wells

Well Name	X (ft)	Y (ft)
W-4	1770	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 3.346E+04 ft^2/day
S = 0.0001297
Kz/Kr = 0.1
b = 617. ft



GASCONADE AND LOWER AQUIFER TEST

Data Set: C:\...\W-4 Drawdown 7-28-09.aqt
Date: 10/07/09 Time: 23:31:32

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: City Well 3
Test Date: July 28, 2009

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-3	0	0

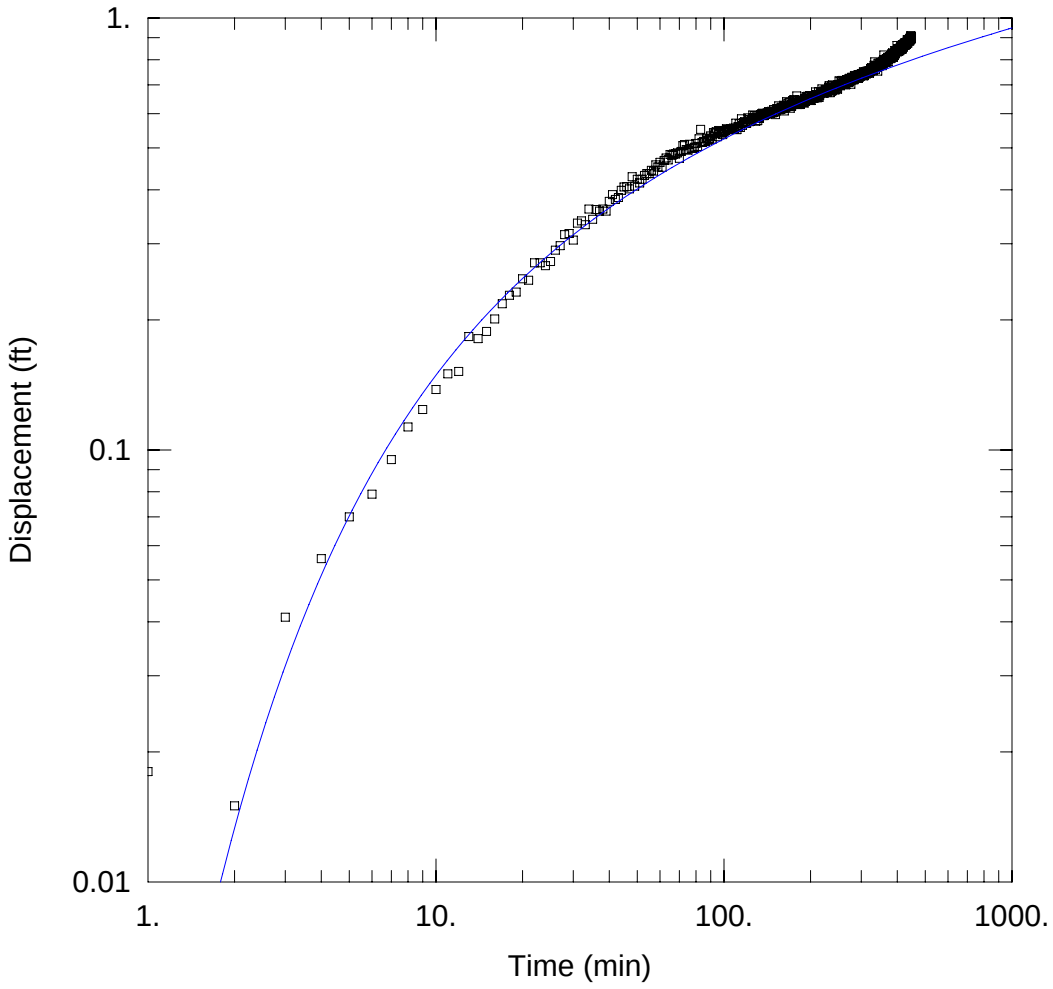
Observation Wells

Well Name	X (ft)	Y (ft)
▫ W-4	1770	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 2.877E+04 ft^2/day
S = 0.0001384
Kz/Kr = 0.1
b = 617. ft



GASCONADE AND LOWER AQUIFER TEST

Data Set: C:\...\W-4 Drawdown 8-3-09.aqt
Date: 10/07/09 Time: 23:16:43

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: City Well 3
Test Date: August 3, 2009

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-3	0	0

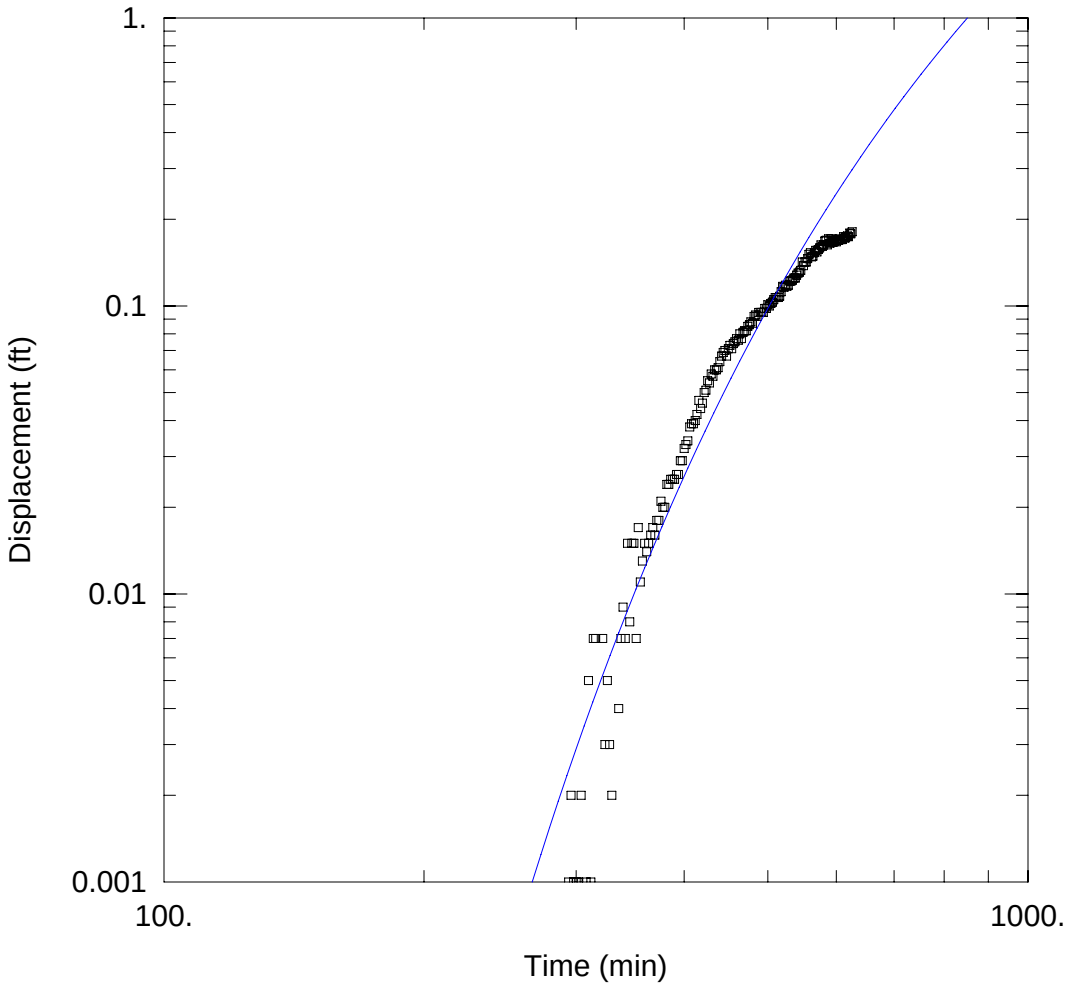
Observation Wells

Well Name	X (ft)	Y (ft)
▫ W-4	1770	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 3.701E+04 ft^2/day
S = 0.0001142
Kz/Kr = 0.1
b = 617. ft



BW-7 7-22-09

Data Set: C:\...\BW-7 7-22-09 Theis.aqt
Date: 10/07/09 Time: 23:44:00

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: W-3
Test Date: 7-22-09

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-3	0	0

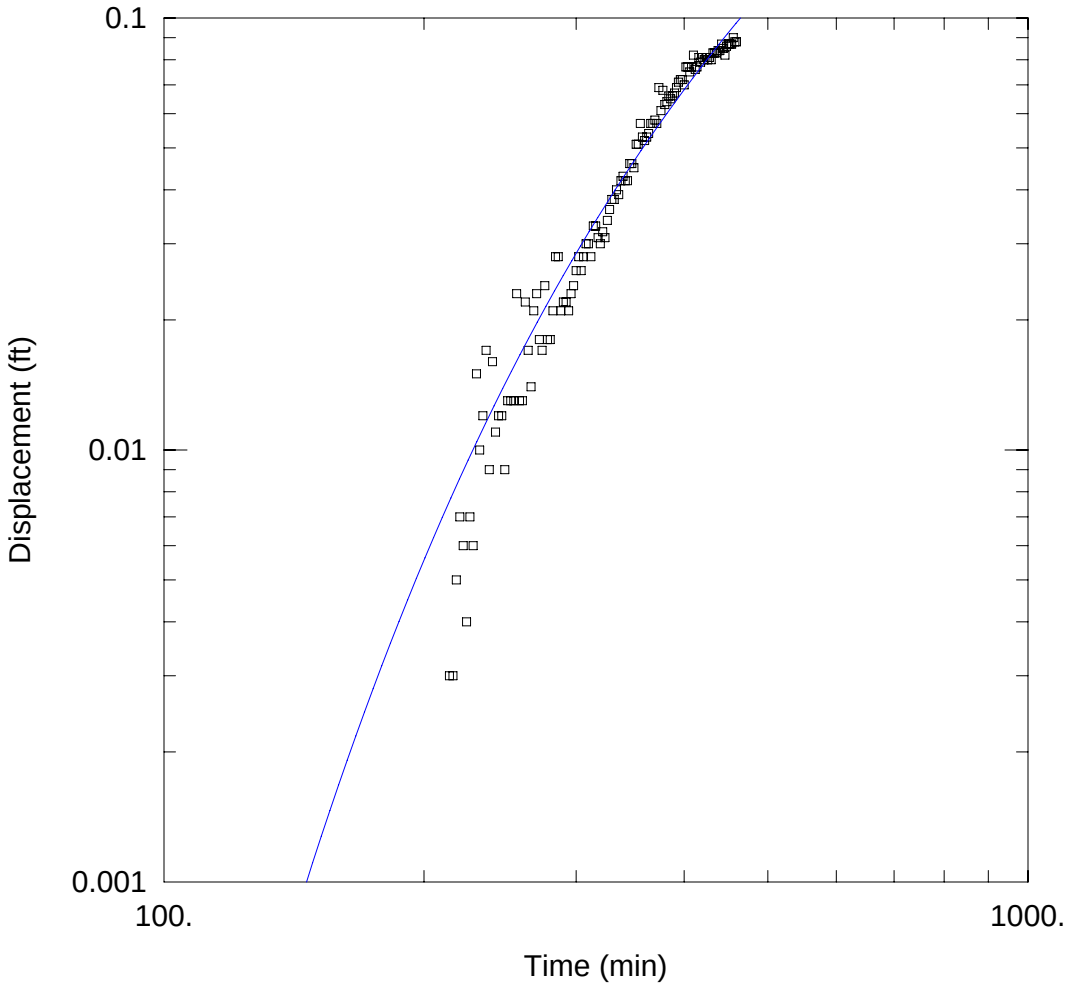
Observation Wells

Well Name	X (ft)	Y (ft)
□ BW-7	2500	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 143.7 ft^2/day
S = 0.0001414
Kz/Kr = 0.1
b = 617. ft



BW-7 7-27-09

Data Set: C:\...\BW-7 7-27-09 Theis.aqt
Date: 10/07/09 Time: 15:31:32

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: W-4
Test Date: 7-27-09

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-4	0	0

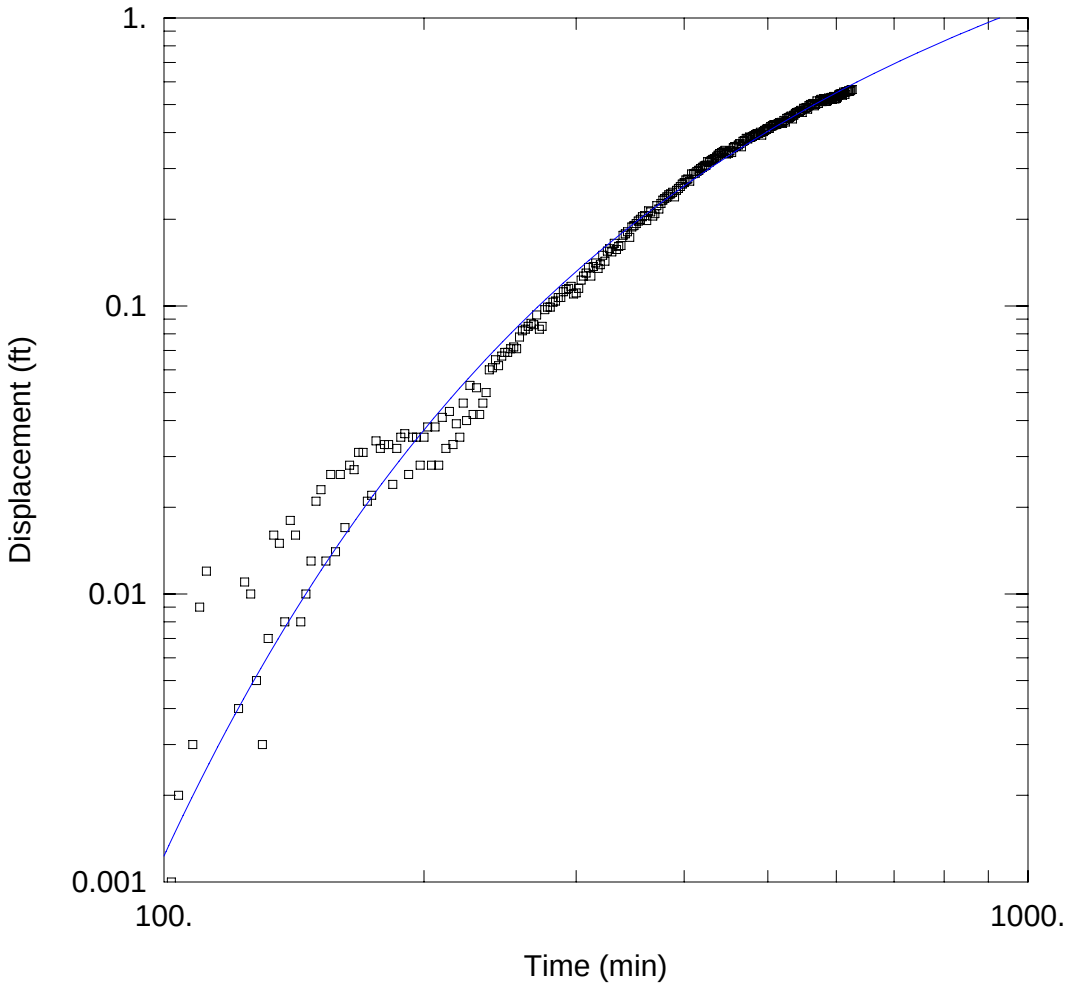
Observation Wells

Well Name	X (ft)	Y (ft)
▫ BW-7	2500	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 5437.3 ft^2/day
S = 0.001863
Kz/Kr = 0.1
b = 617. ft



BW-21 7-22-09

Data Set: C:\...\BW-21 7-22-09 Theis.aqt
Date: 10/07/09 Time: 13:31:24

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: W-3
Test Date: 7-22-09

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-3	0	0

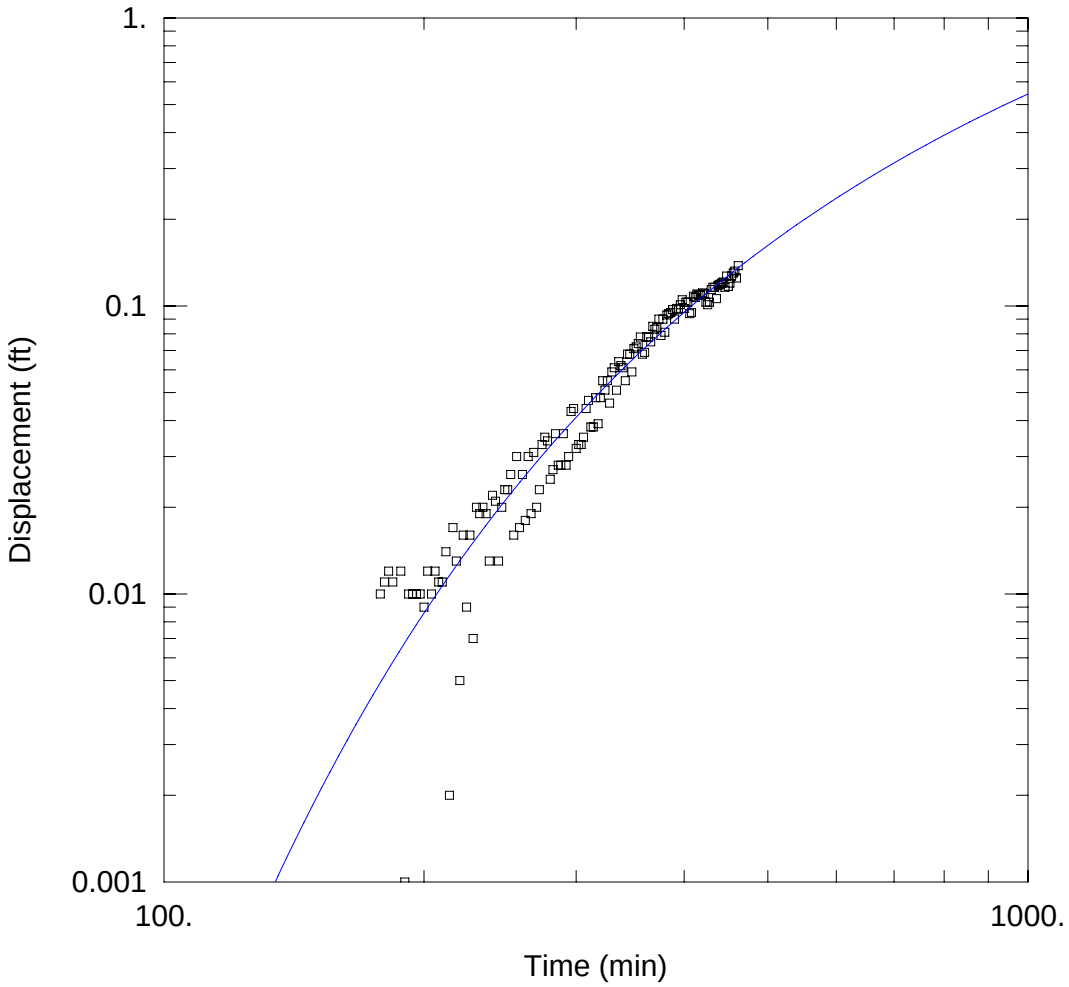
Observation Wells

Well Name	X (ft)	Y (ft)
▫ BW-21	1400	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 3313. ft^2/day
S = 0.002375
Kz/Kr = 0.1
b = 617. ft



BW-21 7-27-09

Data Set: C:\...\BW-21 7-27-09 Theis.aqt
Date: 10/07/09 Time: 15:13:20

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: W-4
Test Date: 7-27-09

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-4	0	0

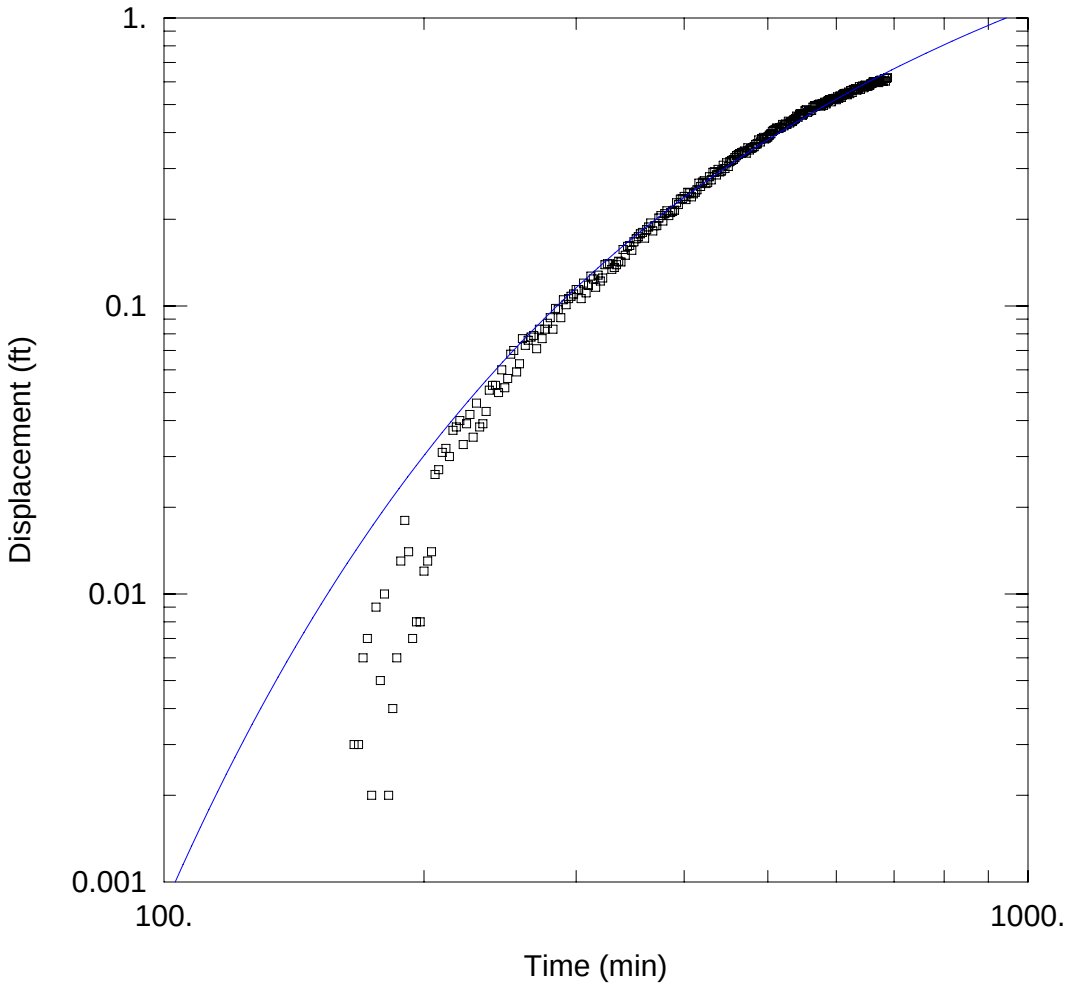
Observation Wells

Well Name	X (ft)	Y (ft)
▫ BW-21	2900	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 4414.8 ft^2/day
S = 0.001075
Kz/Kr = 0.1
b = 617. ft



BW-21 8-3-09

Data Set: C:\...\BW-21 8-3-09 Theis.aqt
Date: 10/07/09 Time: 14:47:19

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: W-3
Test Date: 8-3-09

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-3	0	0

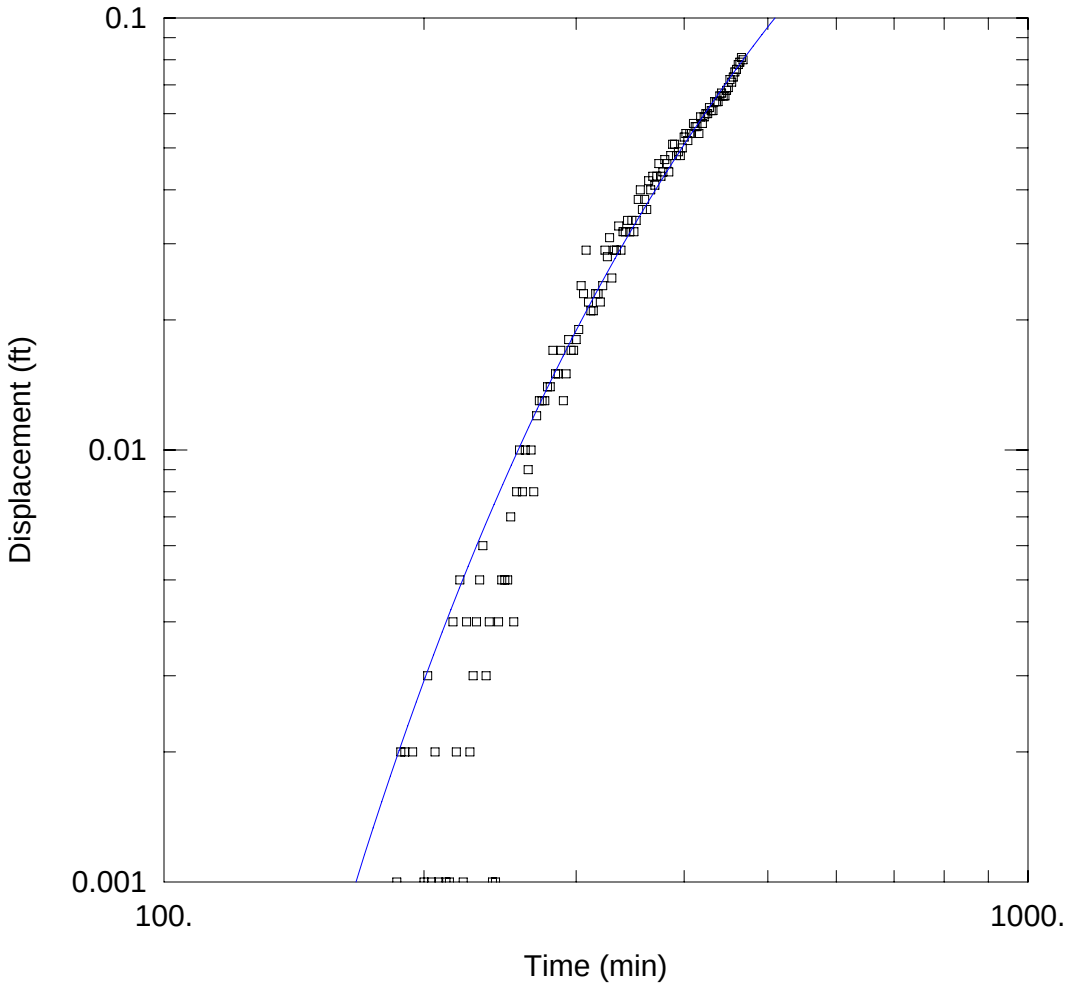
Observation Wells

Well Name	X (ft)	Y (ft)
▫ BW-21	1400	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 3103.9 ft^2/day
S = 0.002391
Kz/Kr = 0.1
b = 617. ft



JS-25 7-26-09

Data Set: C:\...\JS-25 7-26-09 Theis.aqt
Date: 10/07/09 Time: 15:48:04

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: W-4
Test Date: 7-26-09

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-4	0	0

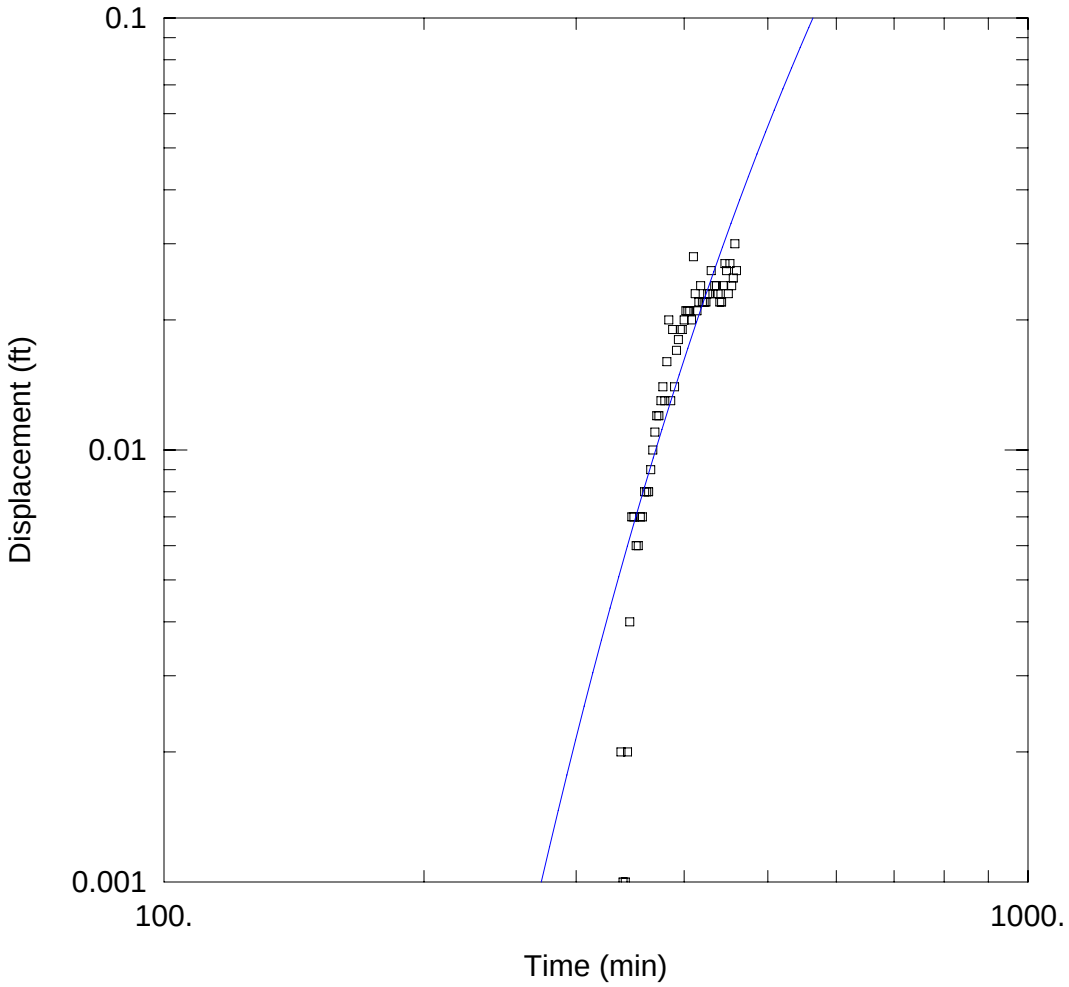
Observation Wells

Well Name	X (ft)	Y (ft)
▫ JS-25	2900	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 4554.4 ft^2/day
S = 0.001367
Kz/Kr = 0.1
b = 617. ft



JS-25 7-27-09

Data Set: C:\...\JS-25 7-27-09 Theis.aqt
Date: 10/07/09 Time: 23:46:21

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: W-4
Test Date: 7-27-09

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-4	0	0

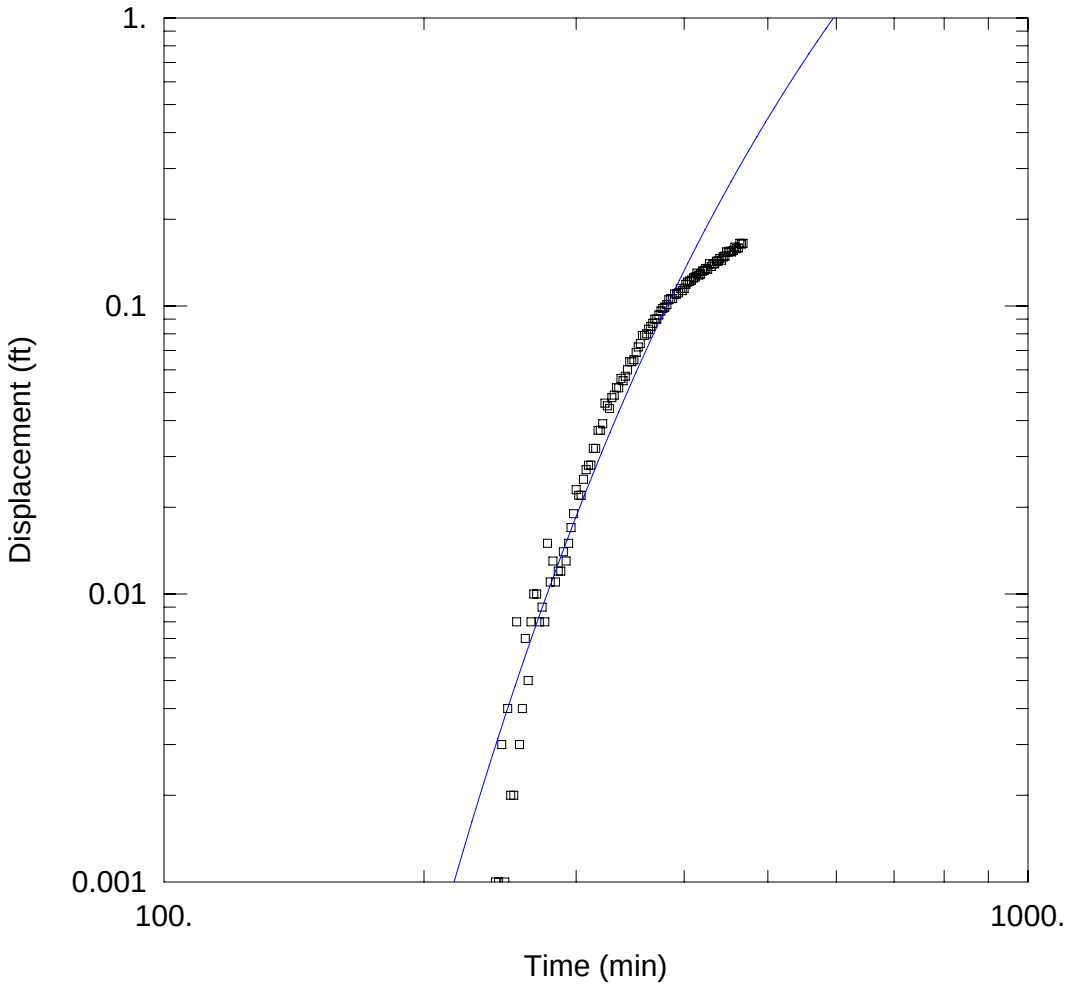
Observation Wells

Well Name	X (ft)	Y (ft)
□ JS-25	2900	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 375.7 ft^2/day
S = 0.0002582
Kz/Kr = 0.1
b = 617. ft



MW-9R 7-26-09

Data Set: C:\...\MW-9R 7-26-09 Theis.aqt
Date: 10/07/09 Time: 23:39:17

PROJECT INFORMATION

Company: Parsons
Client: Kellwood
Project: 442906
Location: New Haven, MO
Test Well: W-4
Test Date: 7-26-09

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
W-4	0	0

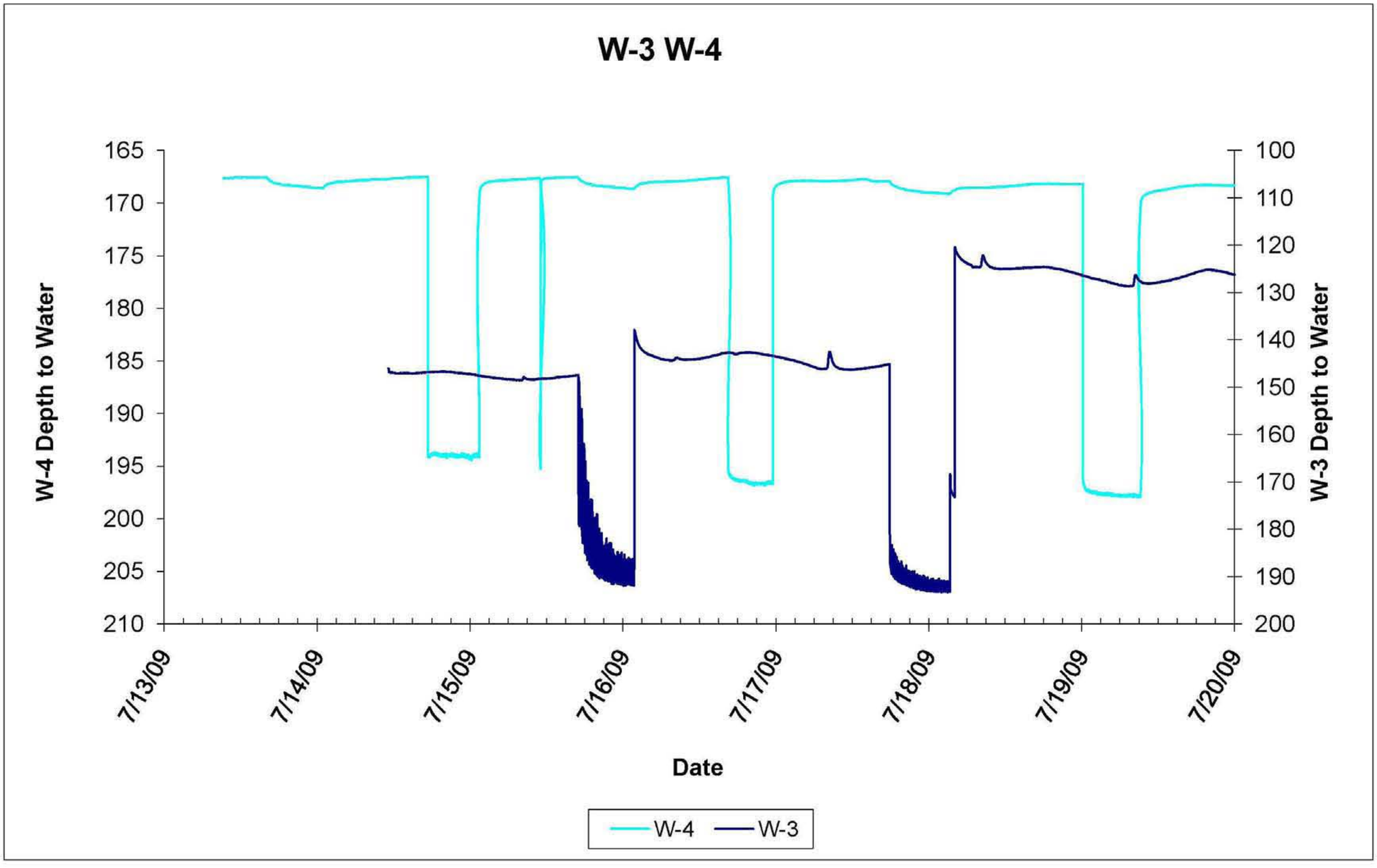
Observation Wells

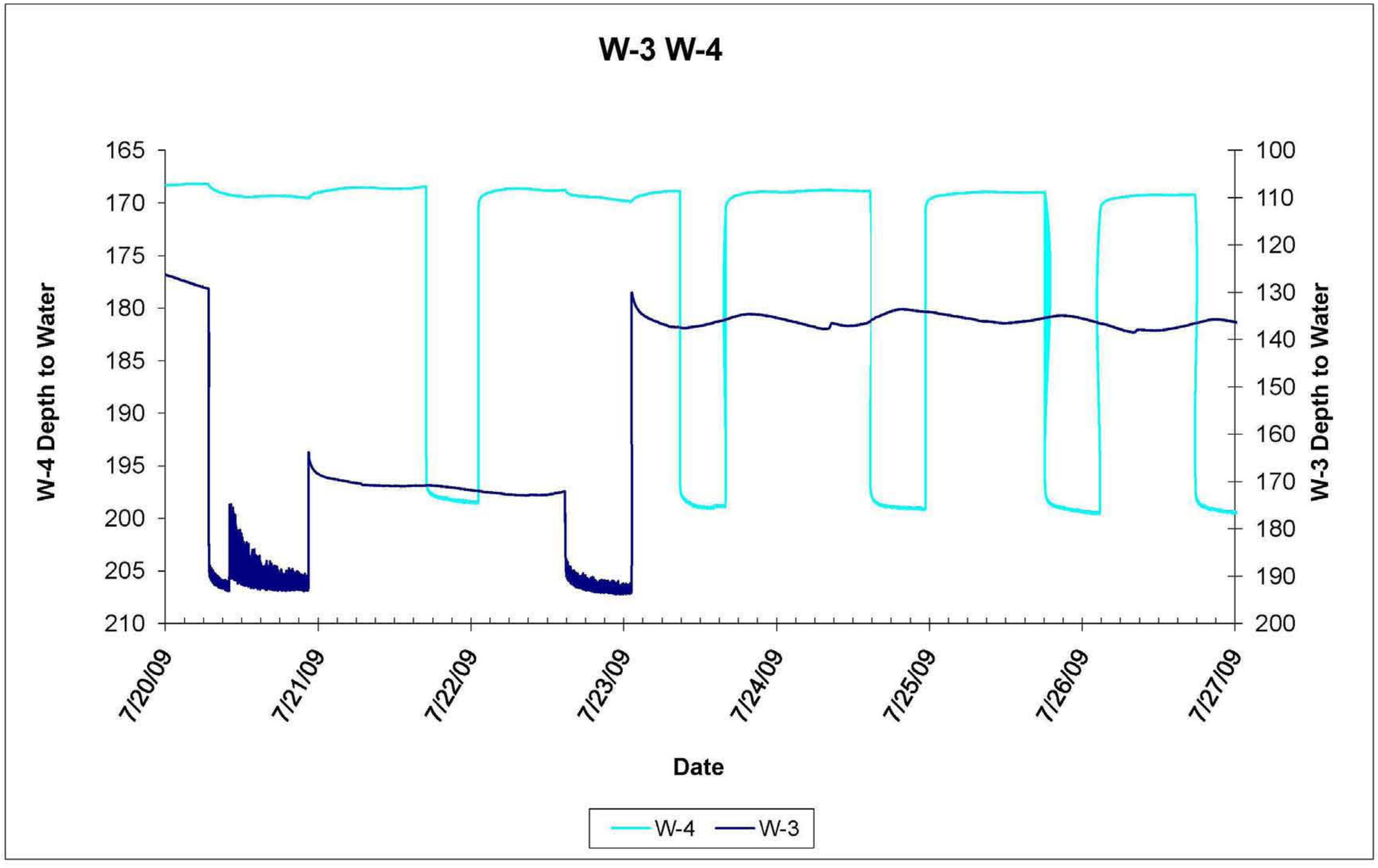
Well Name	X (ft)	Y (ft)
MW-9R	2000	0

SOLUTION

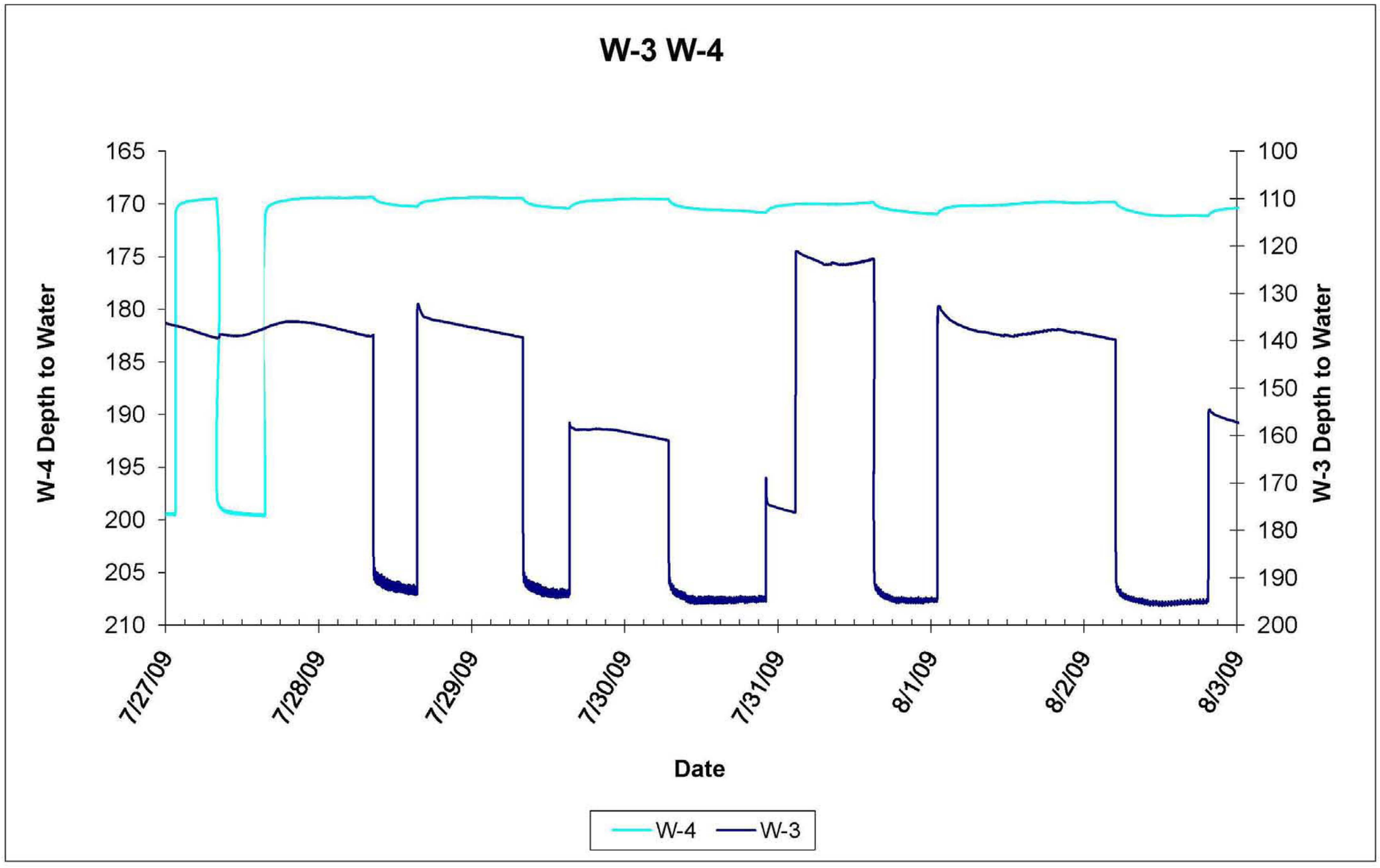
Aquifer Model: Confined
Solution Method: Theis

T = 57.53 ft^2/day
S = 7.846E-05
Kz/Kr = 0.1
b = 617. ft

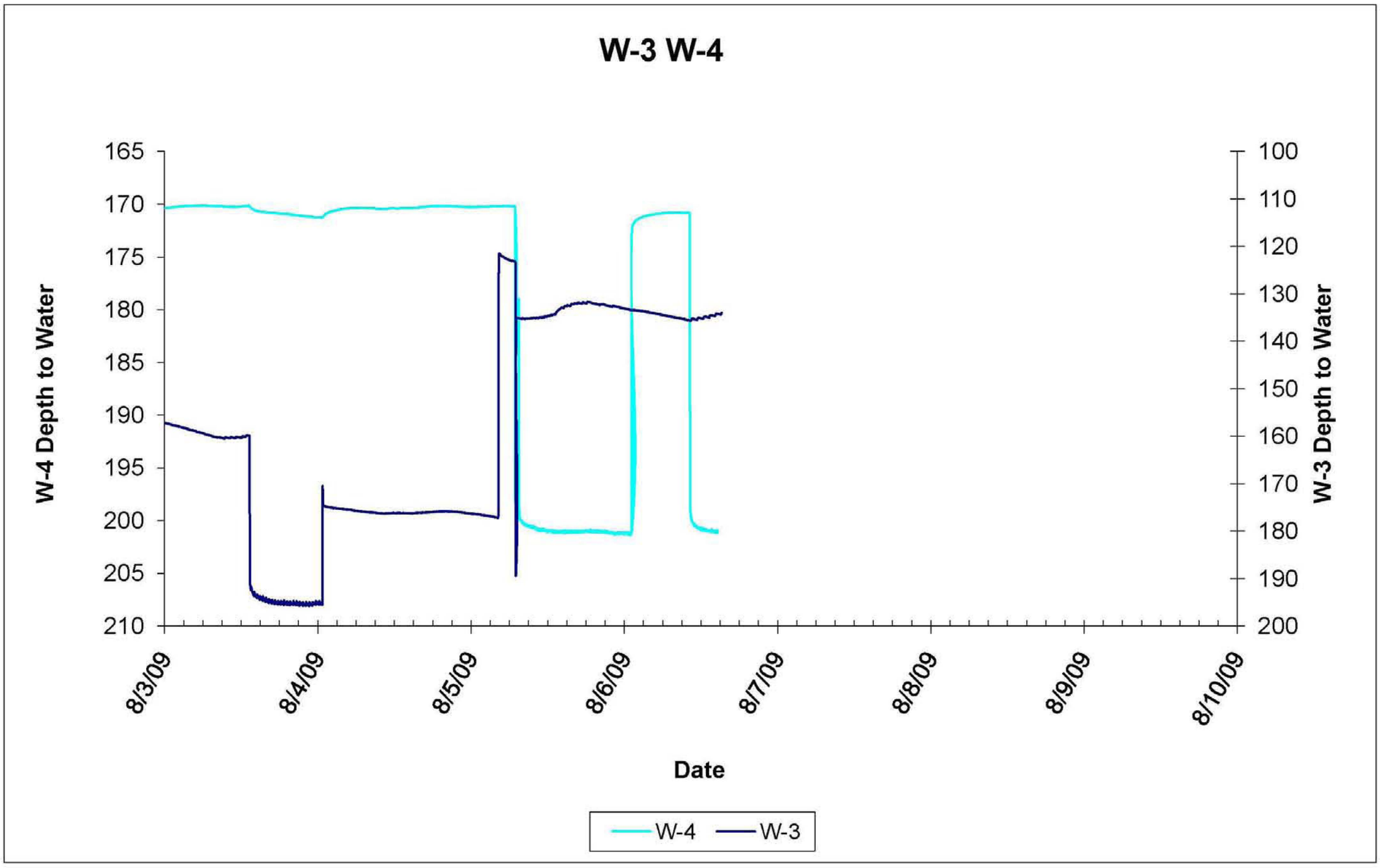

W-3 W-4
W-4 Depth to Water
W-3 Depth to Water
165
170
175
180
185
190
195
200
205
210
100
110
120
130
140
150
160
170
180
190
200
7/13/09
7/14/09
7/15/09
7/16/09
7/17/09
7/18/09
7/19/09
7/20/09
Date
W-4
W-3

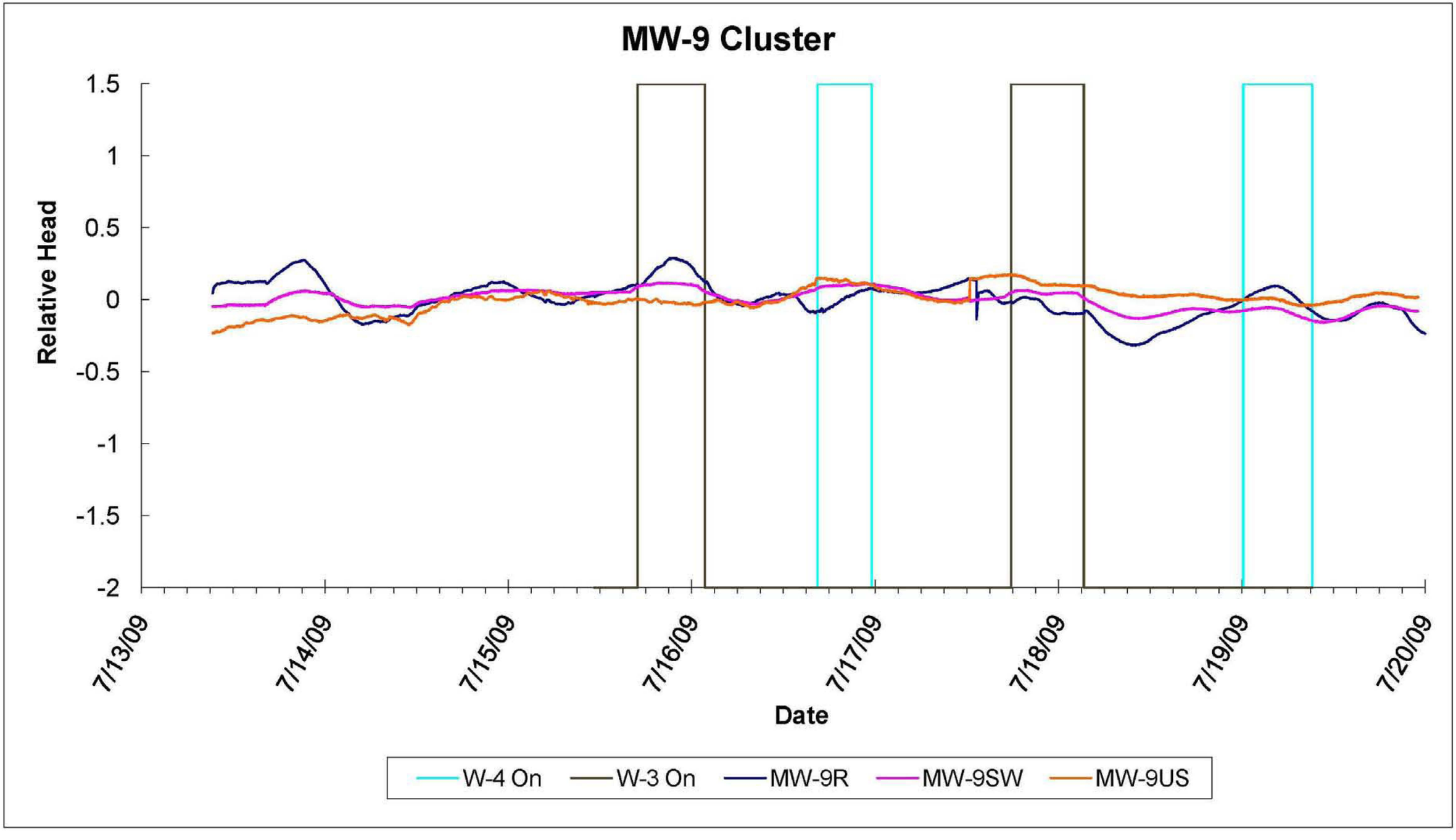

W-3 W-4
165
170
175
180
185
190
195
200
205
210
W-4 Depth to Water
100
110
120
130
140
150
160
170
180
190
200
W-3 Depth to Water
7/20/09
7/21/09
7/22/09
7/23/09
7/24/09
7/25/09
7/26/09
7/27/09
Date
W-4
W-3

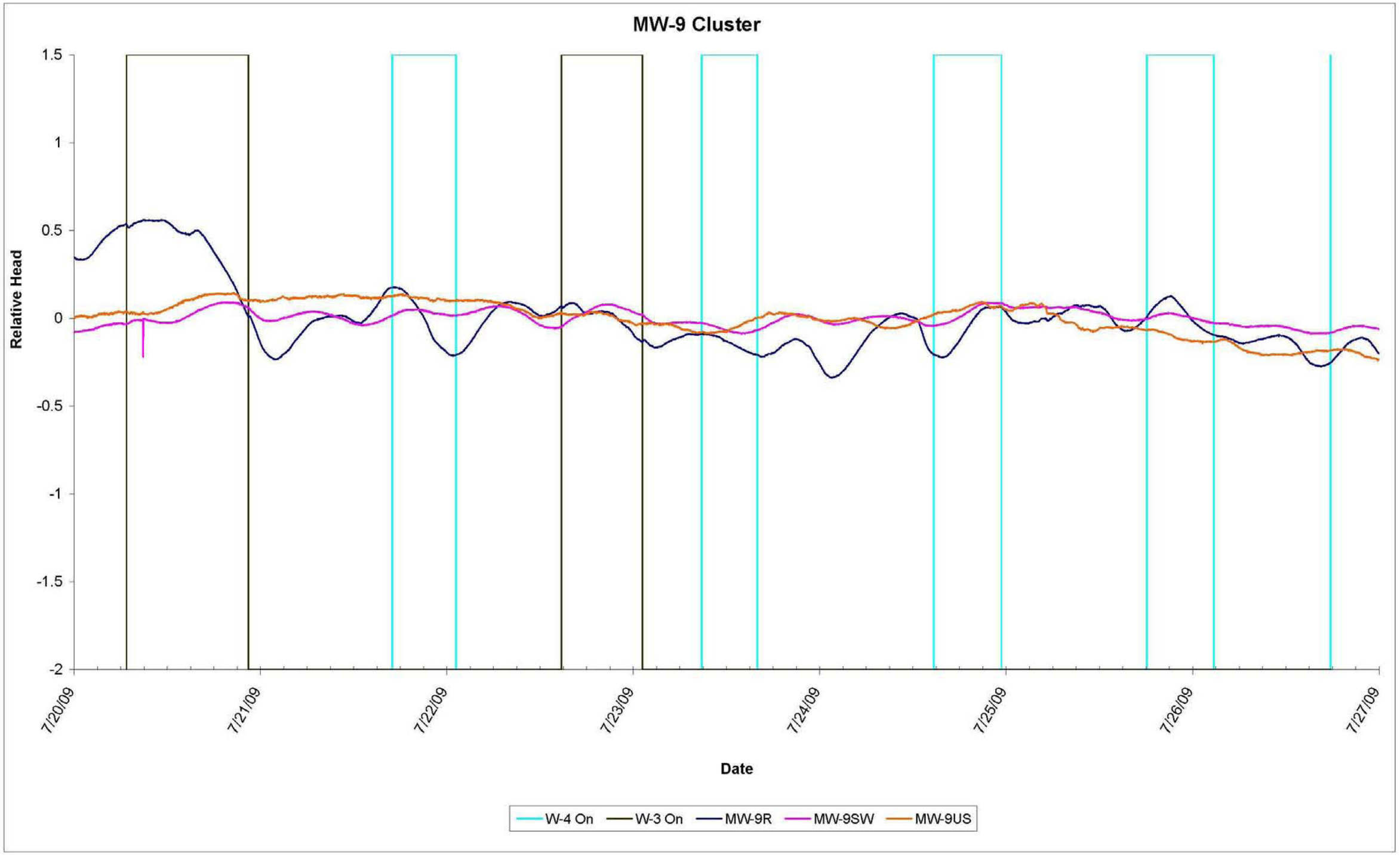
W-3 W-4


W-4 Depth to Water
165
170
175
180
185
190
195
200
205
210
W-3 Depth to Water
100
110
120
130
140
150
160
170
180
190
200
7/27/09
7/28/09
7/29/09
7/30/09
7/31/09
8/1/09
8/2/09
8/3/09
Date
W-4
W-3

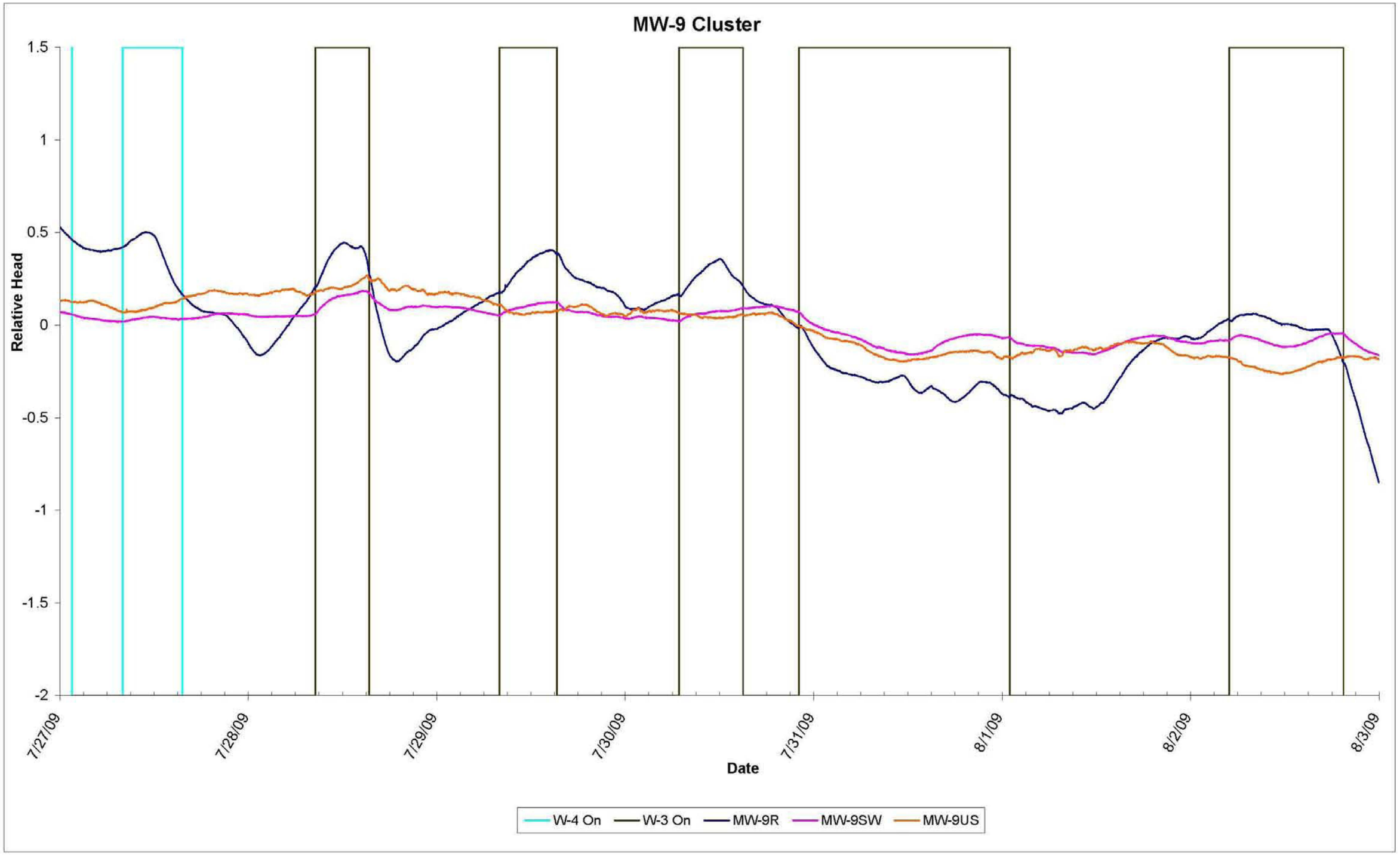
W-3 W-4


W-4 Depth to Water
W-3 Depth to Water
165
170
175
180
185
190
195
200
205
210
100
110
120
130
140
150
160
170
180
190
200
8/3/09
8/4/09
8/5/09
8/6/09
8/7/09
8/8/09
8/9/09
8/10/09
Date
W-4
W-3

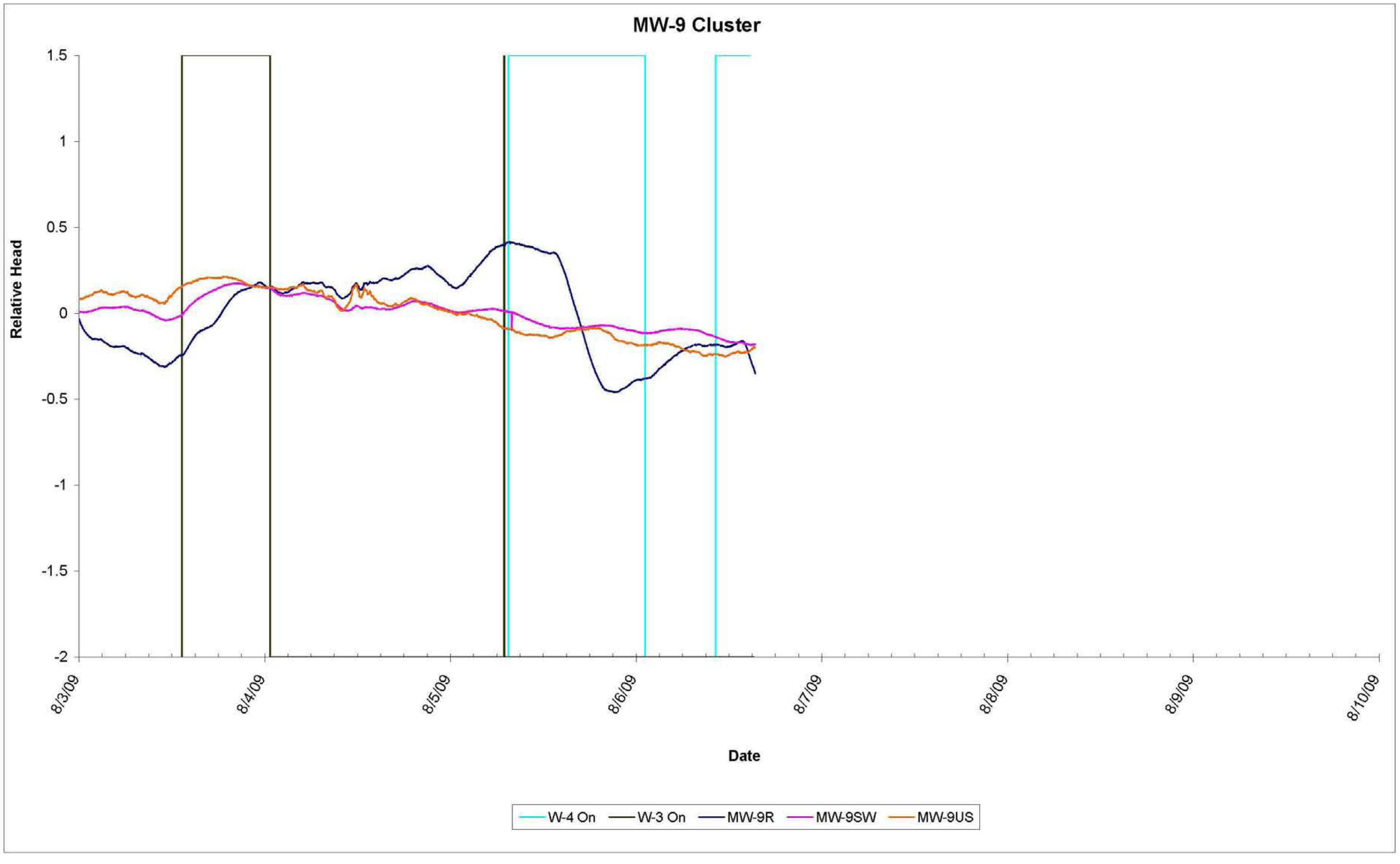

MW-9 Cluster
Relative Head
1.5
1
0.5
0
-0.5
-1
-1.5
-2
7/13/09
7/14/09
7/15/09
7/16/09
7/17/09
7/18/09
7/19/09
7/20/09
Date
W-4 On
W-3 On
MW-9R
MW-9SW
MW-9US

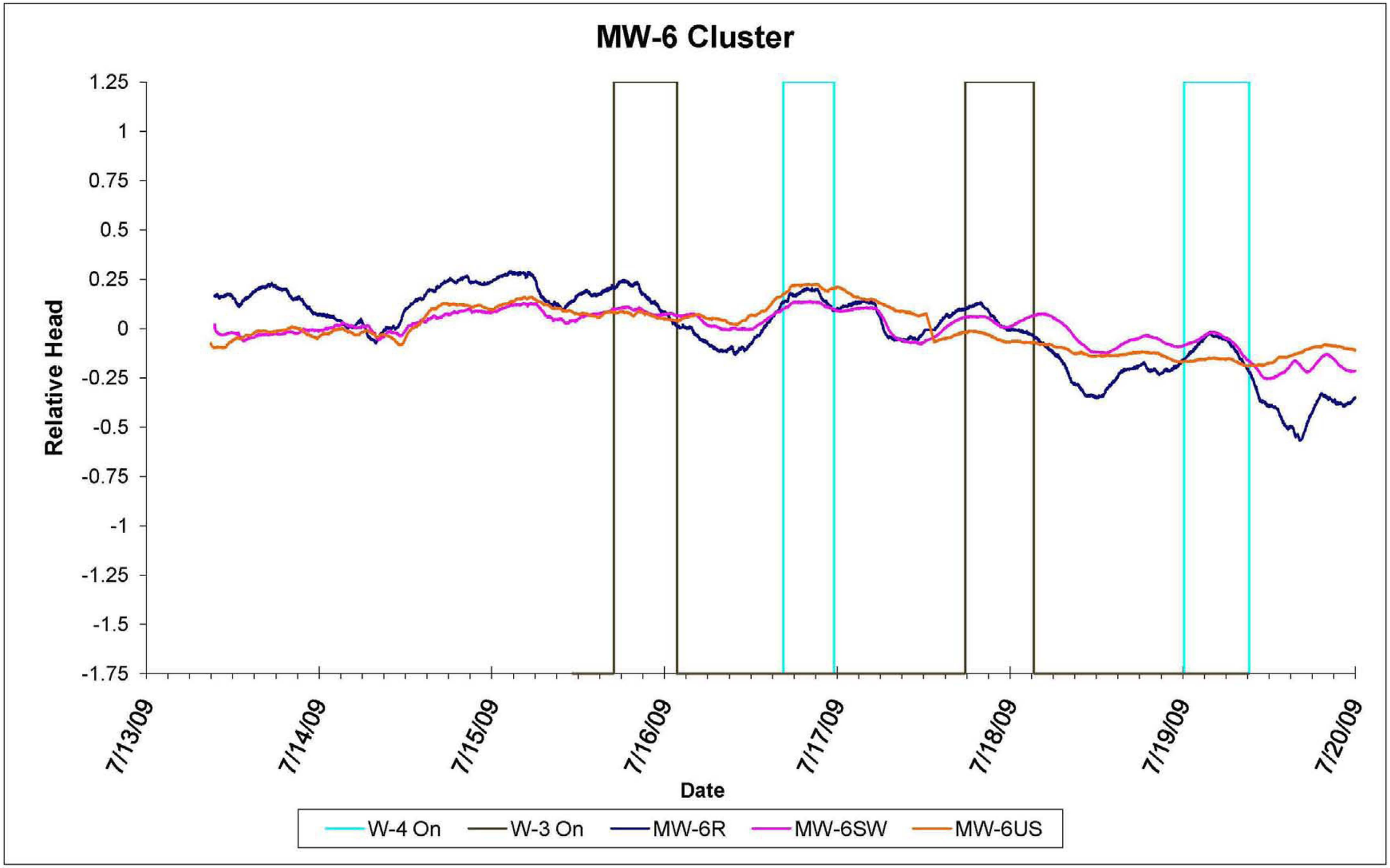

MW-9 Cluster
Relative Head
1.5
1
0.5
0
-0.5
-1
-1.5
-2
7/20/09
7/21/09
7/22/09
7/23/09
7/24/09
7/25/09
7/26/09
7/27/09
Date
W-4 On
W-3 On
MW-9R
MW-9SW
MW-9US

MW-9 Cluster

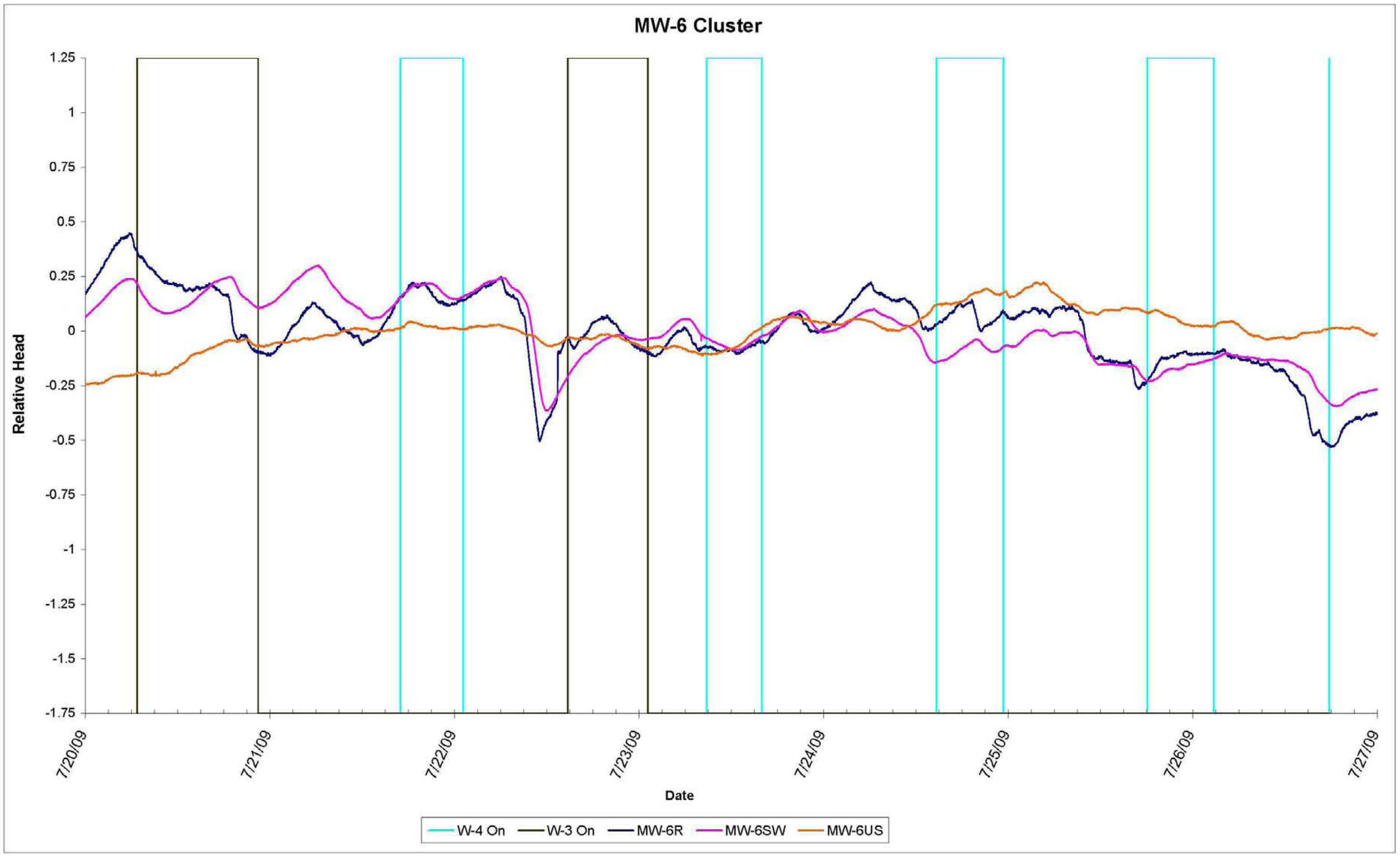

1.5
1
0.5
0
-0.5
-1
-1.5
-2
Relative Head
7/27/09
7/28/09
7/29/09
7/30/09
7/31/09
8/1/09
8/2/09
8/3/09
Date
W-4 On
W-3 On
MW-9R
MW-9SW
MW-9US

MW-9 Cluster


Relative Head
1.5
1
0.5
0
-0.5
-1
-1.5
-2
8/3/09
8/4/09
8/5/09
8/6/09
8/7/09
8/8/09
8/9/09
8/10/09
Date
W-4 On
W-3 On
MW-9R
MW-9SW
MW-9US


MW-6 Cluster
Relative Head
1.25
1
0.75
0.5
0.25
0
-0.25
-0.5
-0.75
-1
-1.25
-1.5
-1.75
7/13/09
7/14/09
7/15/09
7/16/09
7/17/09
7/18/09
7/19/09
7/20/09
Date
W-4 On
W-3 On
MW-6R
MW-6SW
MW-6US

MW-6 Cluster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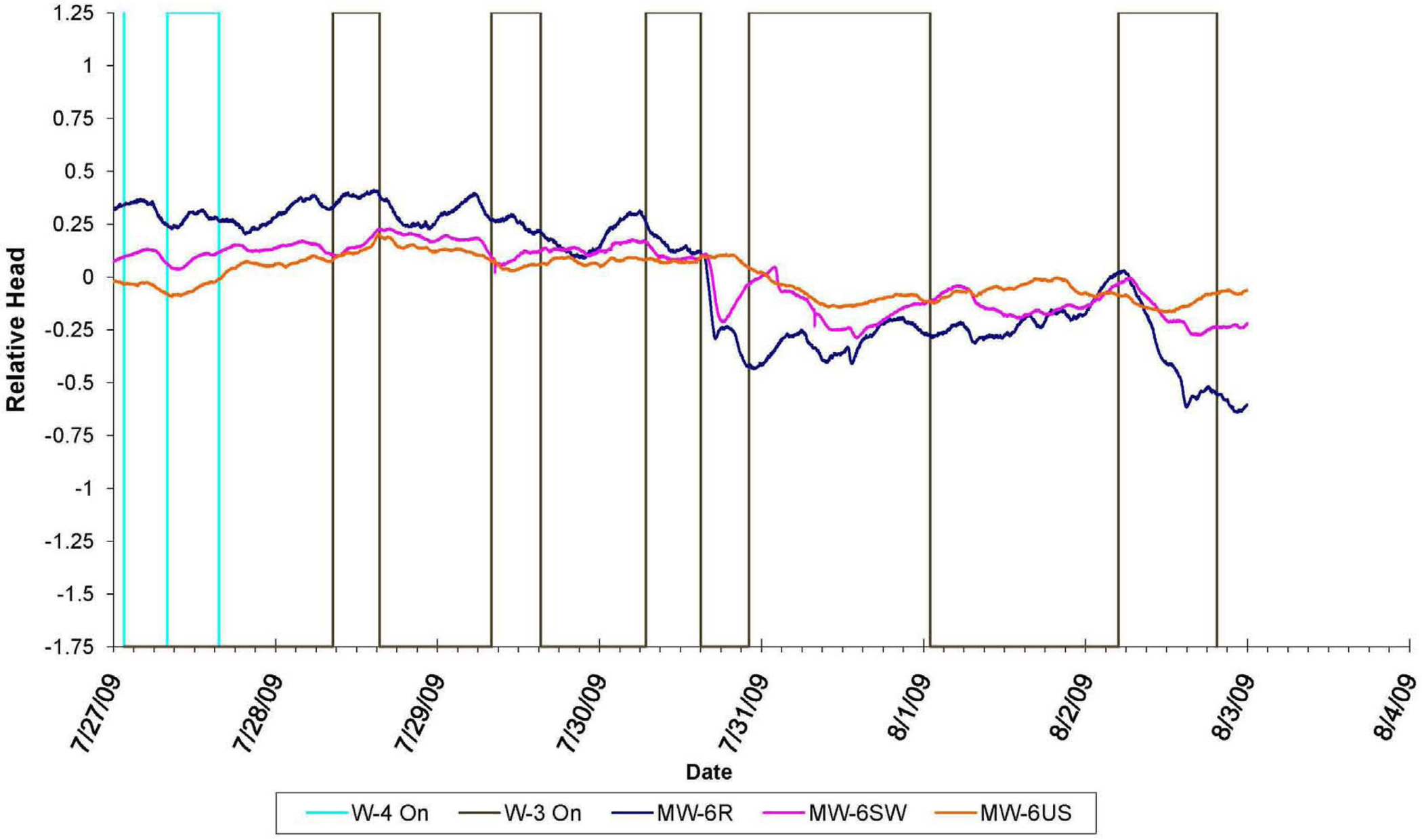
1
0.75
0.5
0.25
0
-0.25
-0.5
-0.75
-1
-1.25
-1.5
-1.75
7/20/09
7/21/09
7/22/09
7/23/09
7/24/09
7/25/09
7/26/09
7/27/09
Date
W-4 On
W-3 On
MW-6R
MW-6SW
MW-6US

MW-6 Cluster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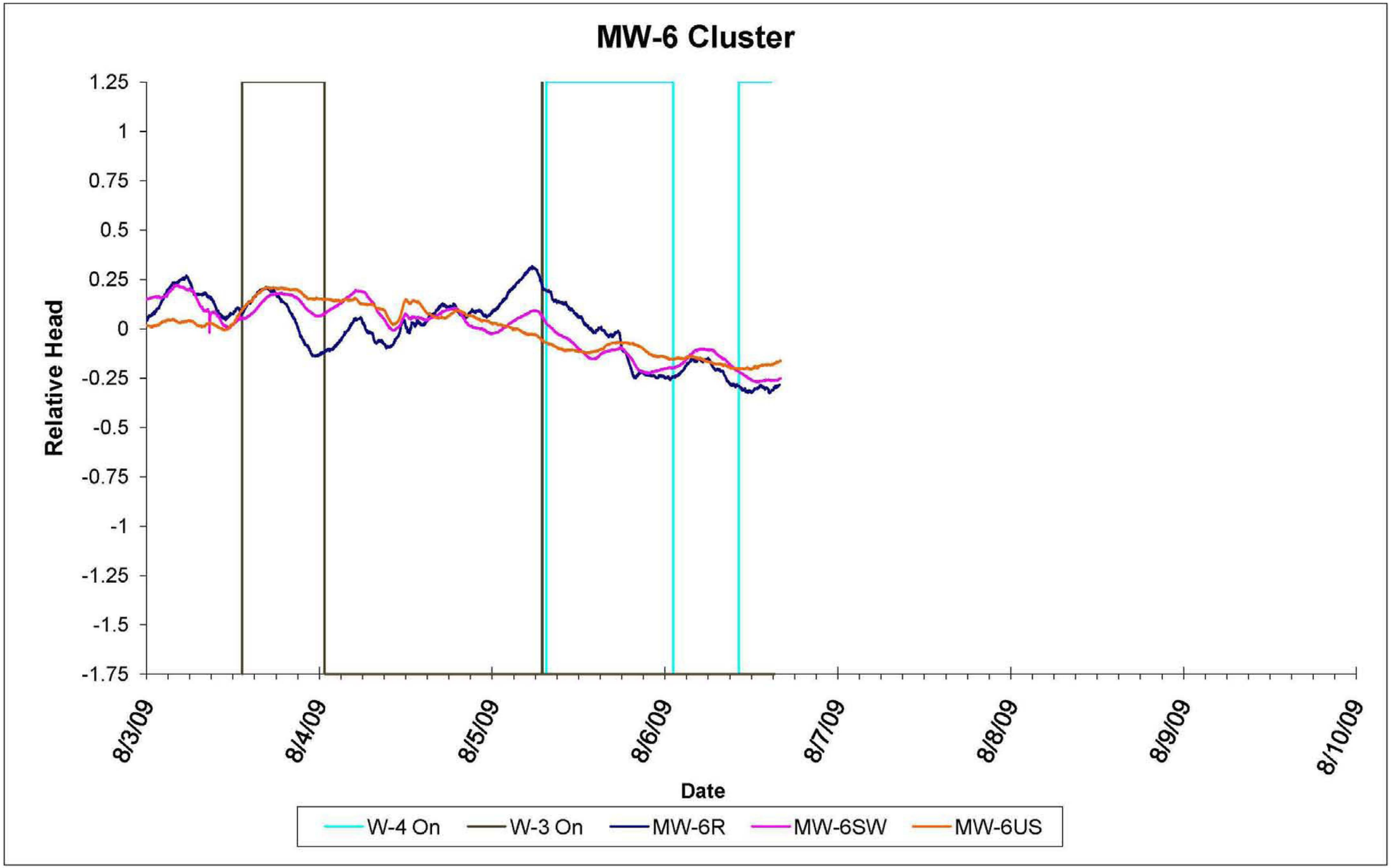
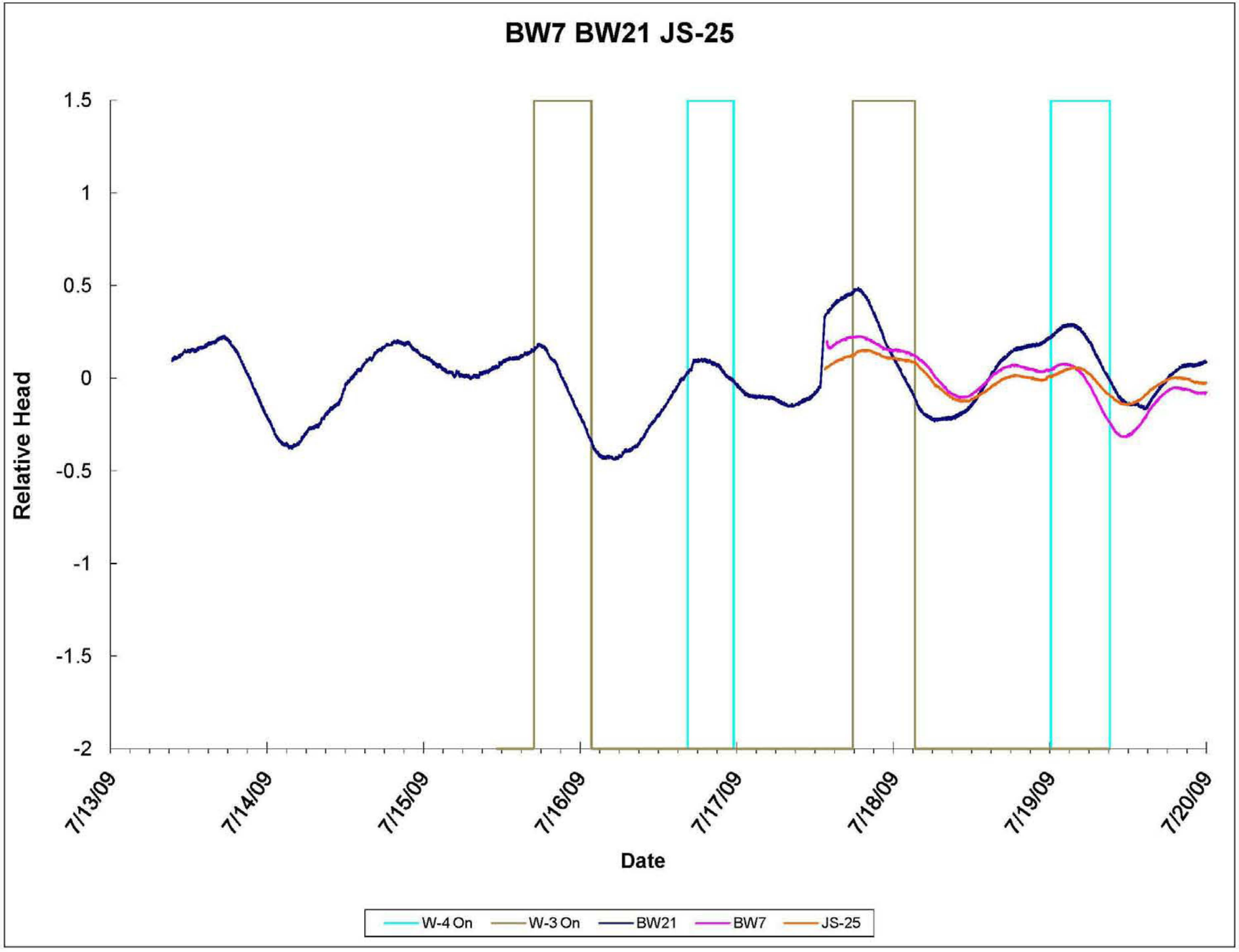
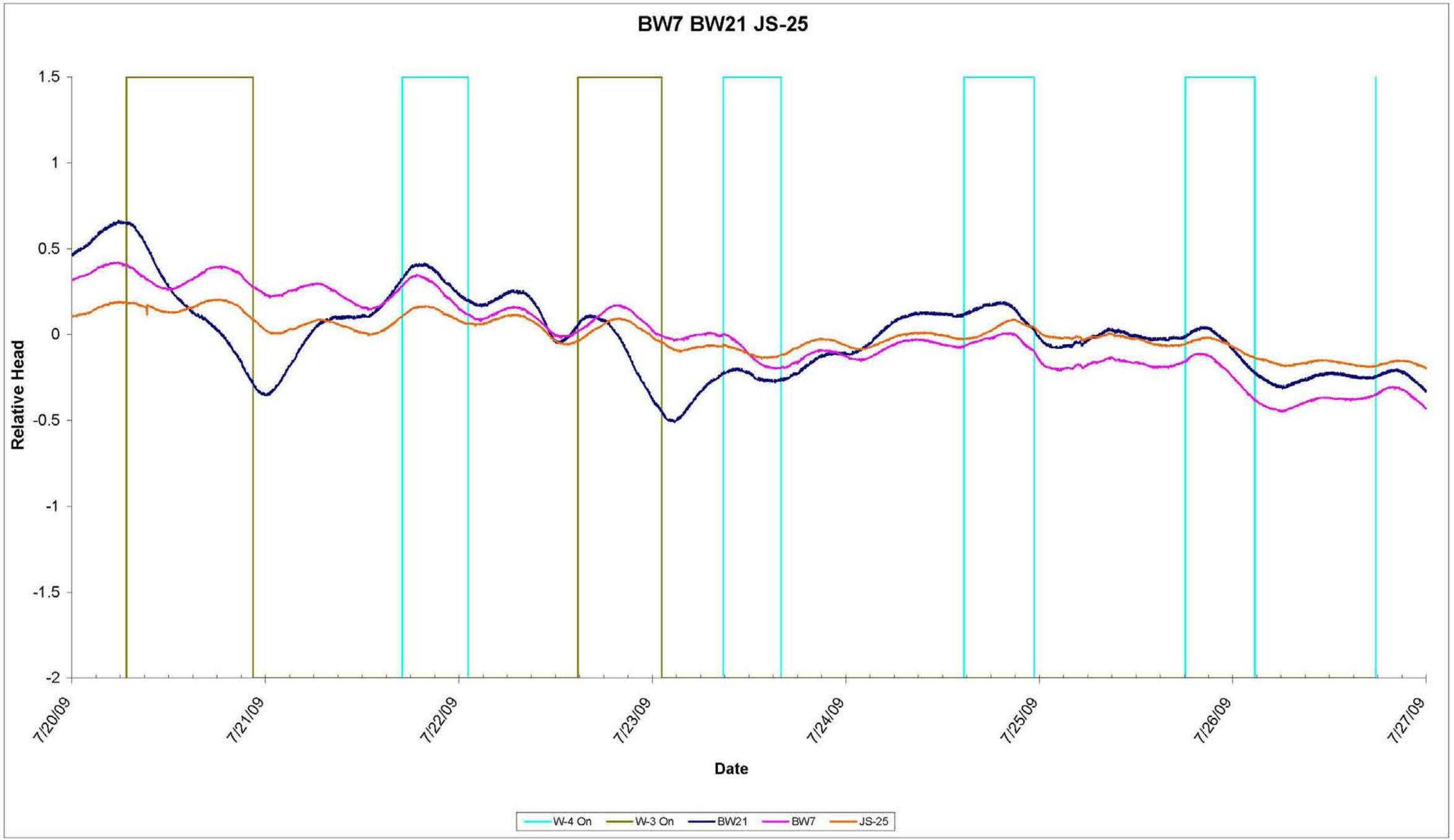
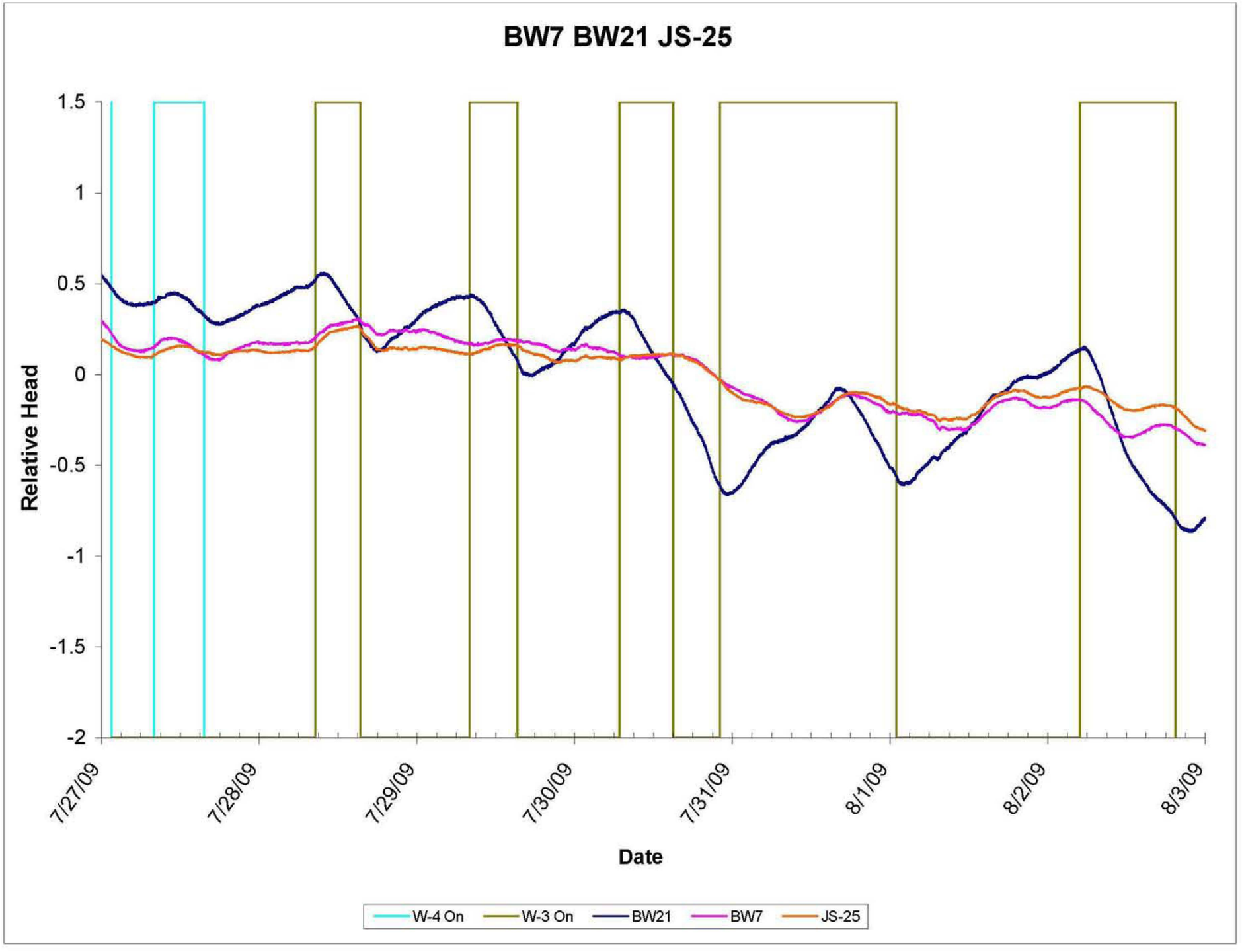
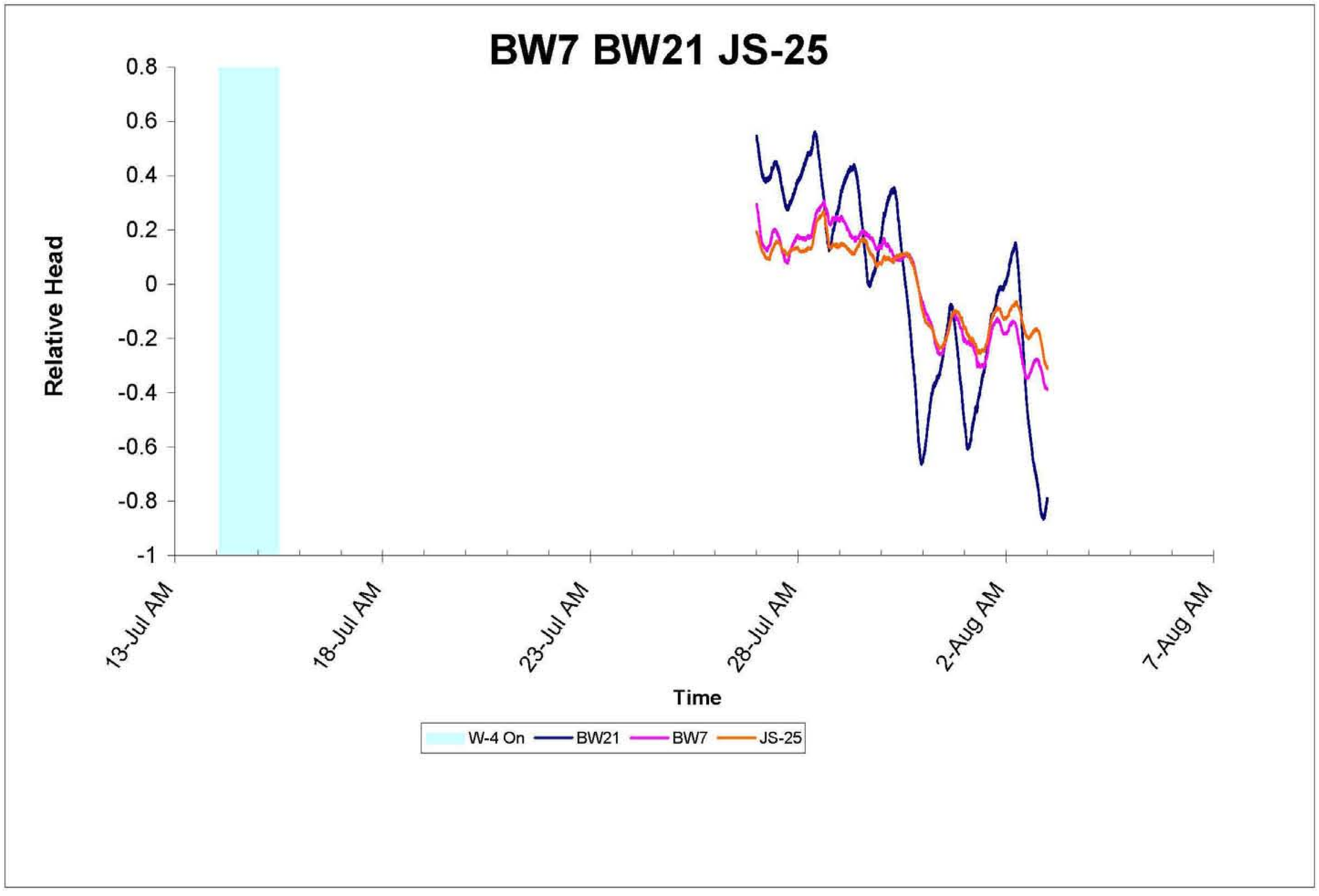
1
0.75
0.5
0.25
0
-0.25
-0.5
-0.75
-1
-1.25
-1.5
-1.75
7/27/09
7/28/09
7/29/09
7/30/09
7/31/09
8/1/09
8/2/09
8/3/09
8/4/09
Date
W-4 On
W-3 On
MW-6R
MW-6SW
MW-6US


MW-6 Cluster
1.25
1
0.75
0.5
0.25
0
-0.25
-0.5
-0.75
-1
-1.25
-1.5
-1.75
Relative Head
8/3/09
8/4/09
8/5/09
8/6/09
8/7/09
8/8/09
8/9/09
8/10/09
Date
W-4 On
W-3 On
MW-6R
MW-6SW
MW-6US

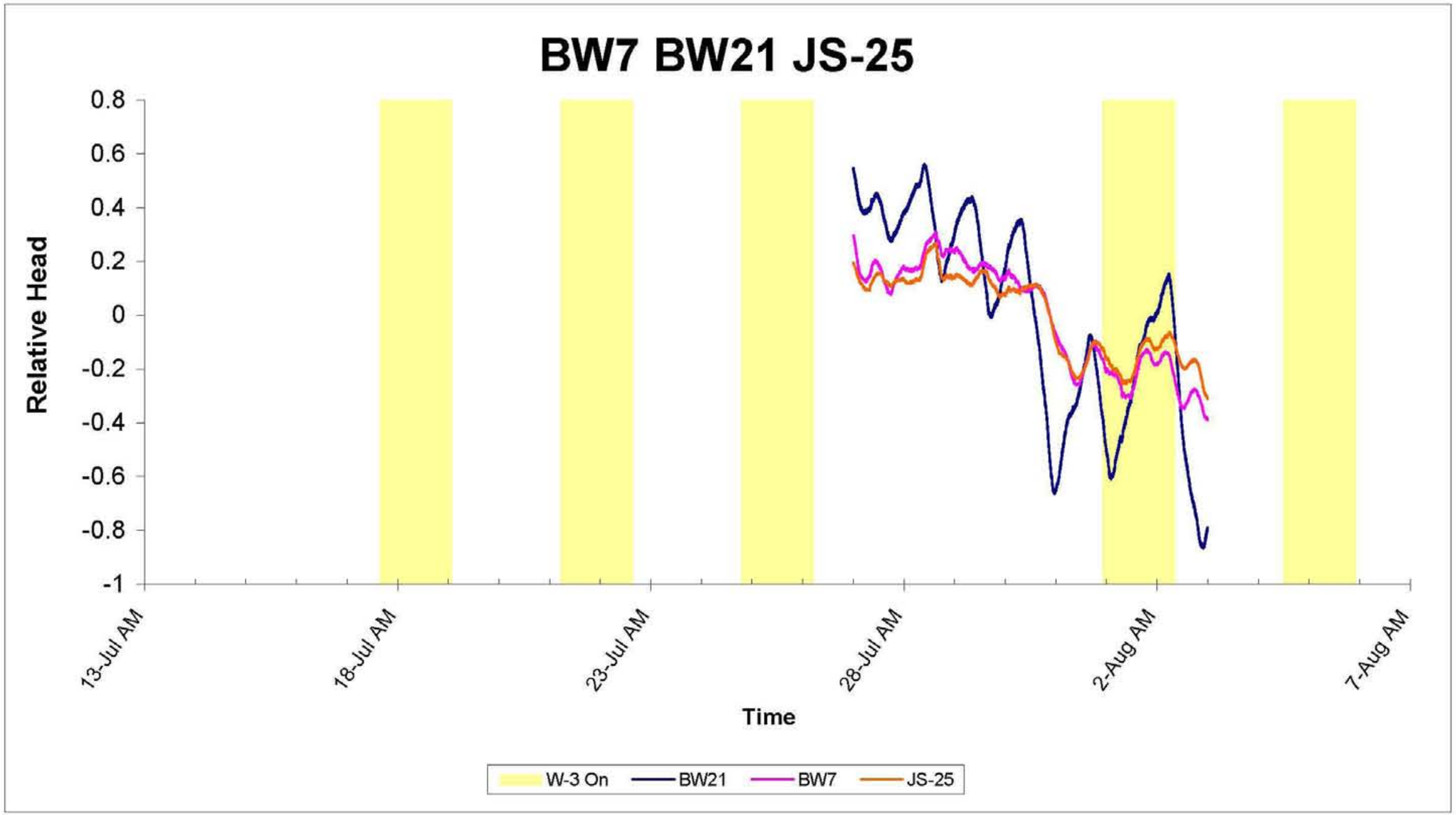

BW7 BW21 JS-25
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Relative Head
7/13/09
7/14/09
7/15/09
7/16/09
7/17/09
7/18/09
7/19/09
7/20/09
Date
W-4 On
W-3 On
BW21
BW7
JS-25

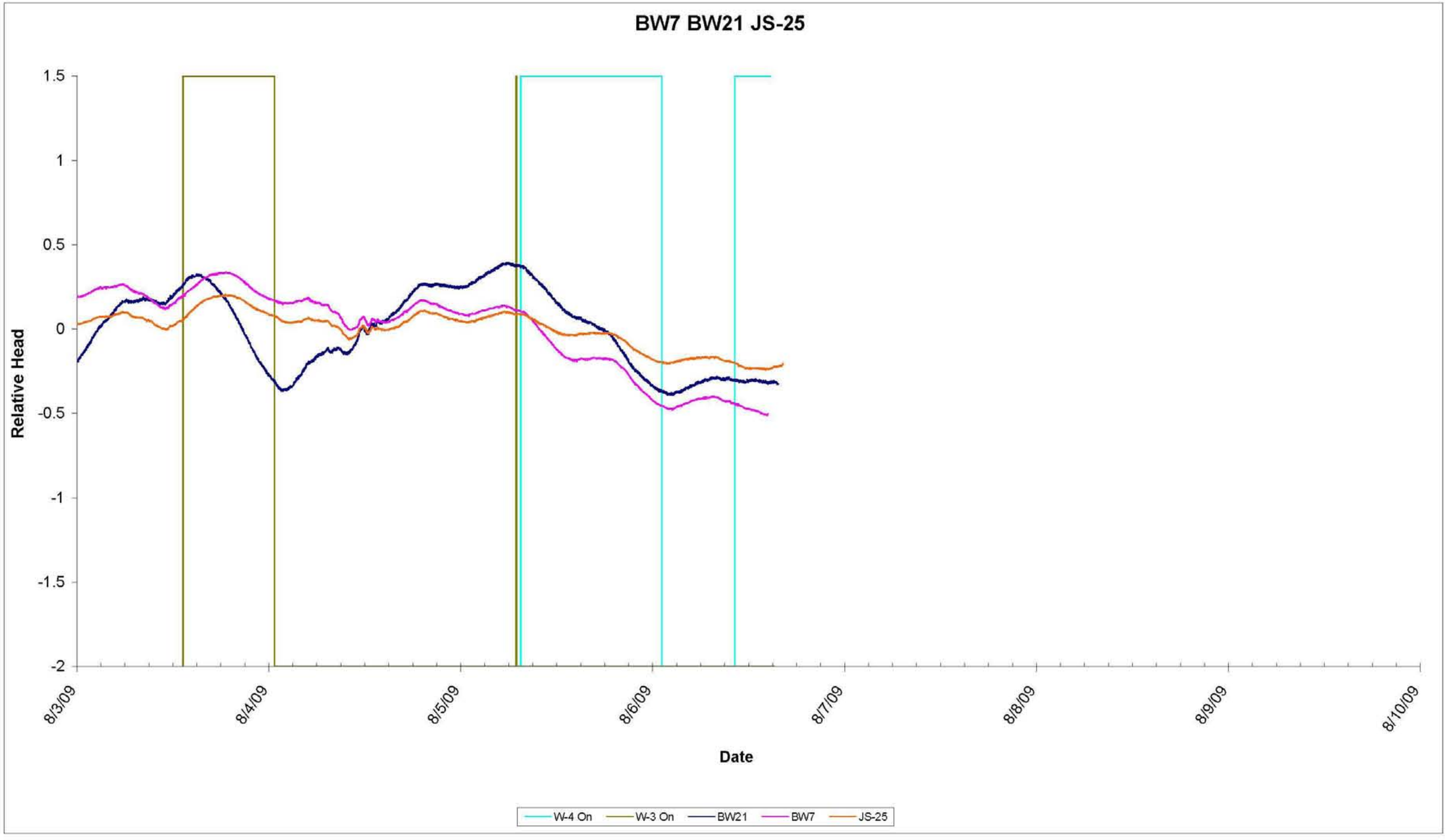

BW7 BW21 JS-25
Relative Head
1.5
1
0.5
0
-0.5
-1
-1.5
-2
7/20/09
7/21/09
7/22/09
7/23/09
7/24/09
7/25/09
7/26/09
7/27/09
Date
W-4 On
W-3 On
BW21
BW7
JS-25


BW7 BW21 JS-25
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Relative Head
7/27/09
7/28/09
7/29/09
7/30/09
7/31/09
8/1/09
8/2/09
8/3/09
Date
W-4 On
W-3 On
BW21
BW7
JS-25

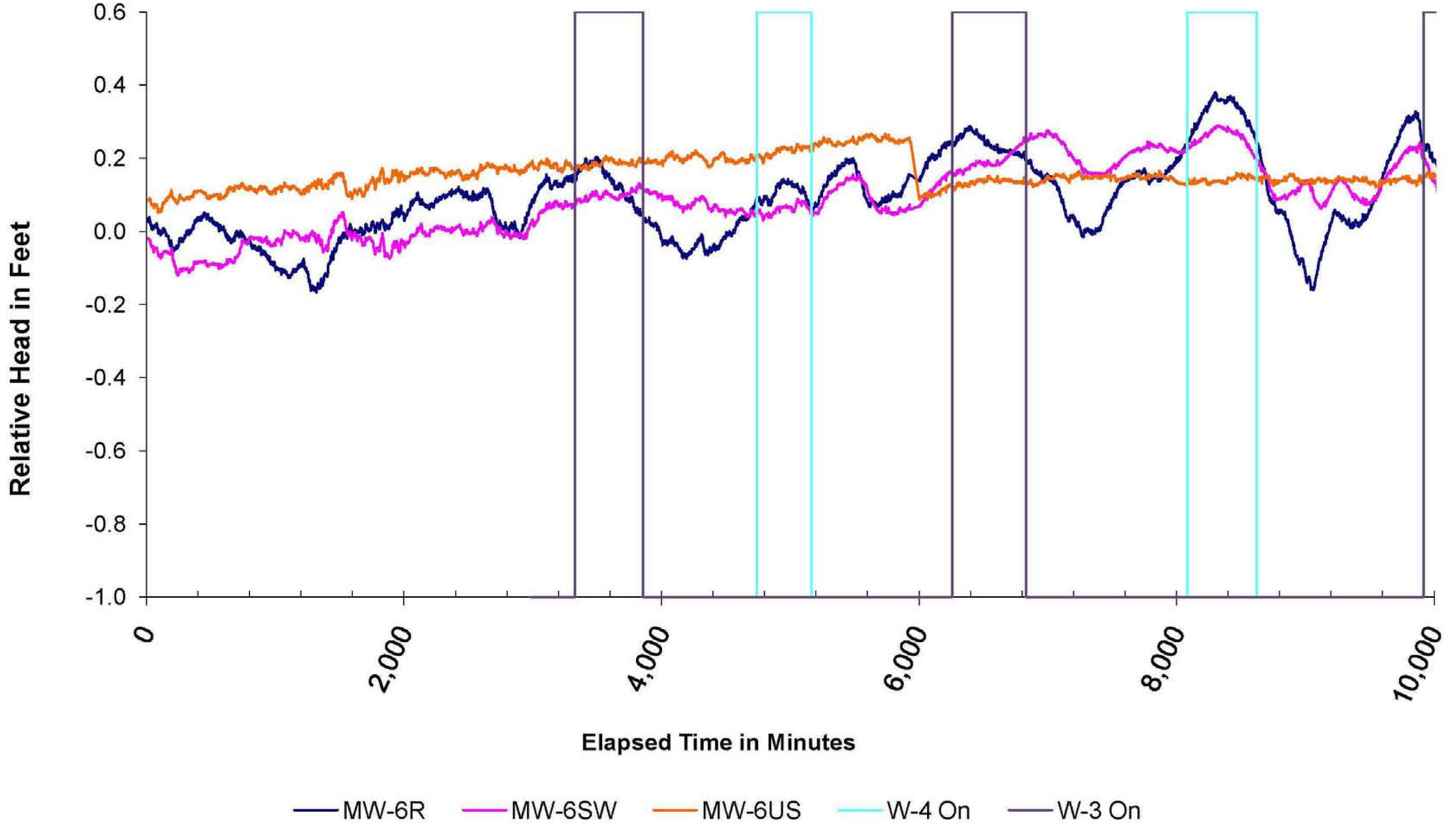


BW7 BW21 JS-25

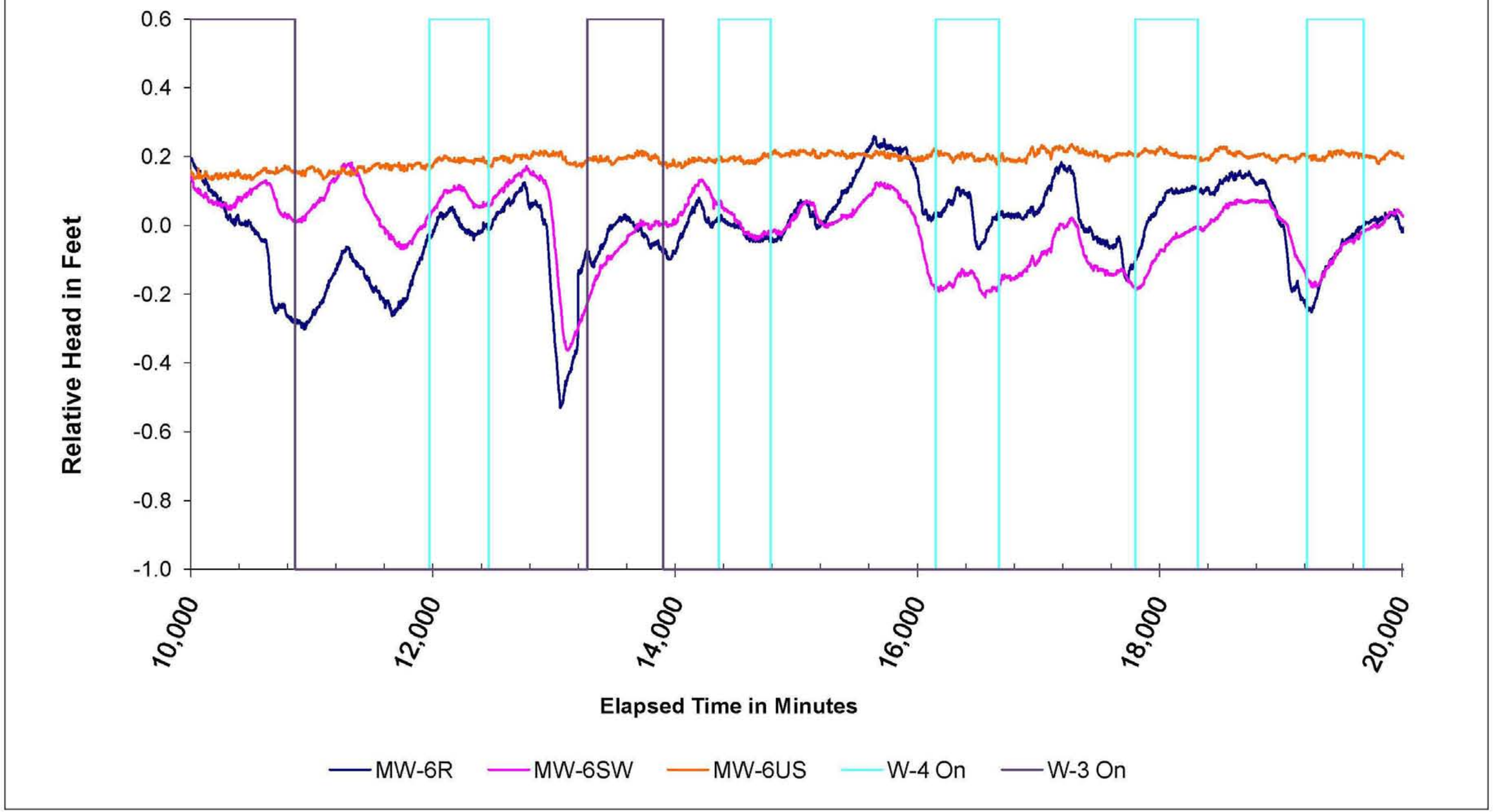

BW7 BW21 JS-25
Relative Head
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
13-Jul AM
18-Jul AM
23-Jul AM
28-Jul AM
2-Aug AM
7-Aug AM
Time
W-3 On
BW21
BW7
JS-25


BW7 BW21 JS-25
Relative Head
1.5
1
0.5
0
-0.5
-1
-1.5
-2
8/3/09
8/4/09
8/5/09
8/6/09
8/7/09
8/8/09
8/9/09
8/10/09
Date
W-4 On
W-3 On
BW21
BW7
JS-25

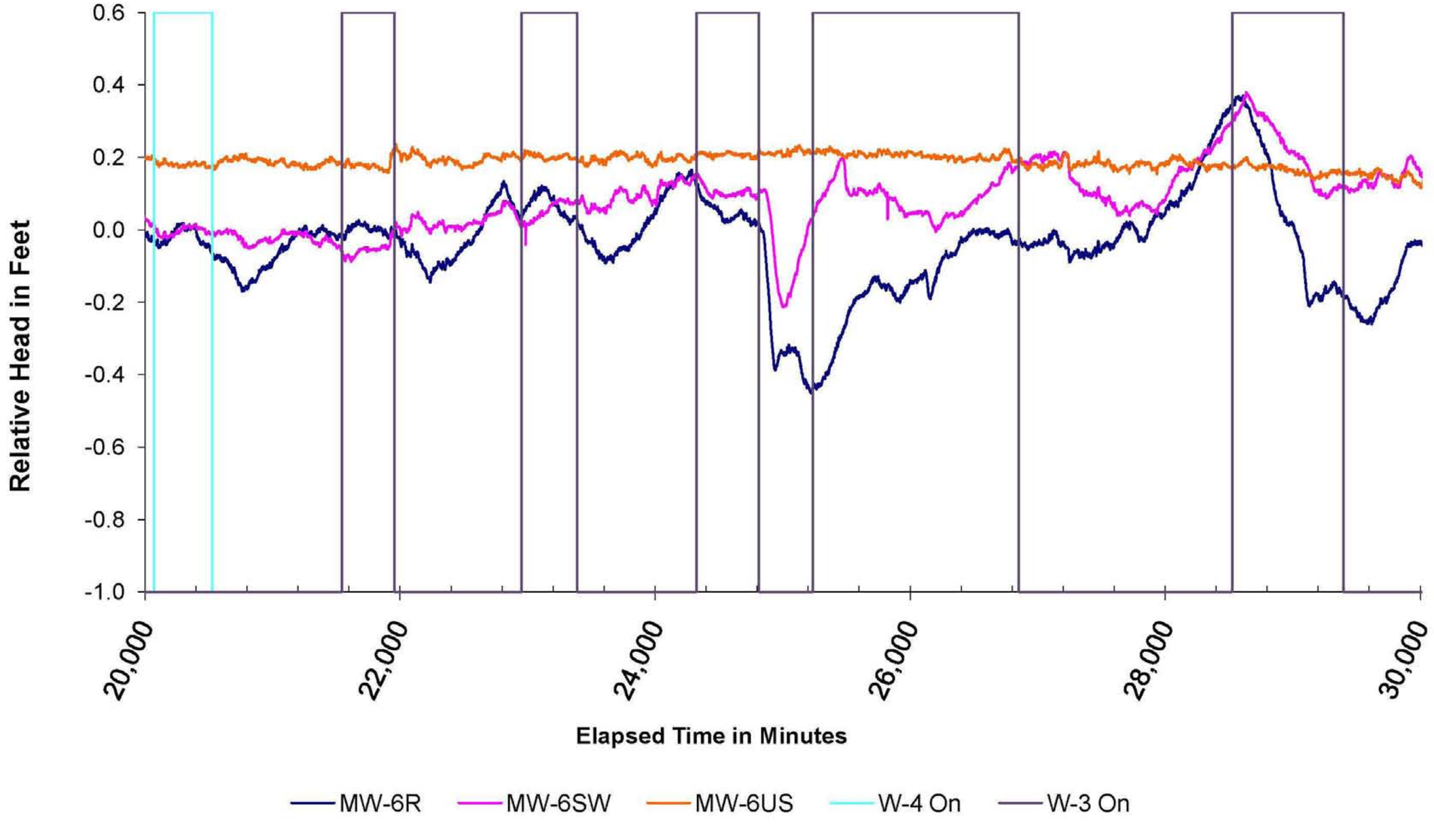
MW-6 Cluster
Barometric Pressure Filter Applied



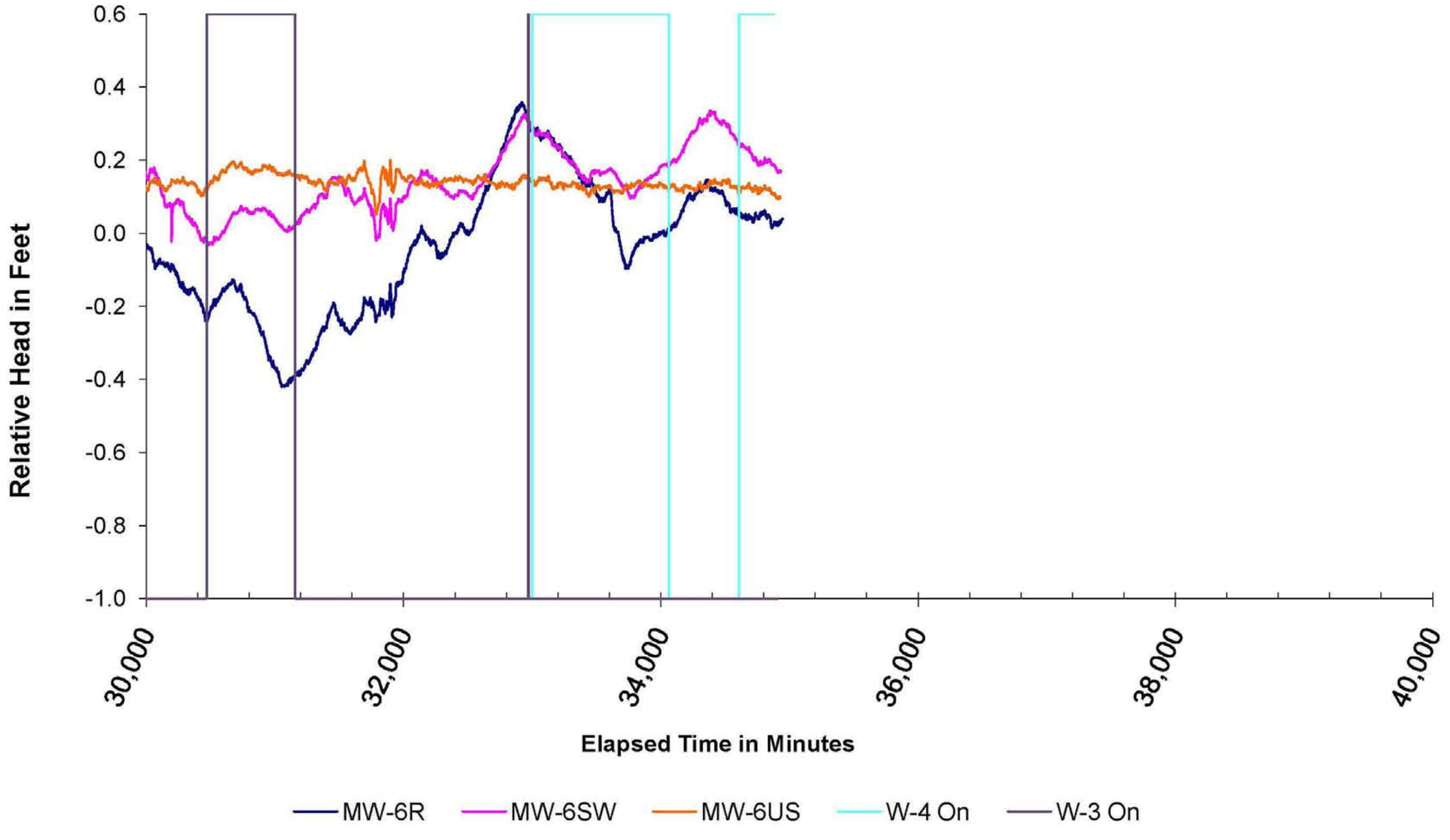
MW-6 Cluster
Barometric Pressure Filter Applied



MW-6 Cluster
Barometric Pressure Filter Applied



MW-6 Cluster
Barometric Pressure Filter Applied



APPENDIX G
SANITARY SEWER INSPECTION – ACE PIPELINE REPORT

Ace Pipe Cleaning, Inc.
727 North 1st Street, Suite 220
St Louis, MO 63102
Tel: (314) 621-8393, Fax: (314) 588-9781

PROJECT INFORMATION

WATERSHED	PROJECT NAME.	PROJECT MANAGER.	HANSEN NAME
	New Haven	Aruna Yellayi	09/19/2007

CLIENT	**PARSONS**
PROJECT MANAGER:	**Aruna Yellayi**
DEPARTMENT:	**Engineering**
PO BOX:	
STREET:	**999 Oakmont Plaza Drive, Suite 420**
CITY, ST ZIP:	**Westmont, IL 60559**
TELEPHONE:	**(630) 371-1813**
FAX:	**(630) 371-1818**
MOBILE:	
E-MAIL:	**Aruna.Yellayi@parsons.com**

PROJ MGR	
PROJECT MANAGER:	
DEPARTMENT:	
PO BOX:	
STREET:	
CITY, ST ZIP:	
TELEPHONE:	
FAX:	
MOBILE:	
E-MAIL:	

CONTRACTOR	**Ace Pipe Cleaning, Inc.**
PROJECT MANAGER:	**Ethan Waters**
DEPARTMENT:	**CCTV**
PO BOX:	
STREET:	**727 North 1st Street, Suite 220**
CITY, ST ZIP:	**St Louis, MO 63102**
TELEPHONE:	**(314) 621-8393**
FAX:	**(314) 588-9781**
MOBILE:	**(314) 600-5659**
E-MAIL:	**ewatersace@sbcglobal.net**

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INSPECTION REPORT

DATE:	WORK ORDER #:	WEATHER	OPERATOR:	SECTION NR	SECTION NAME:
09/19/2007		sunny, dry	ERIC CHAVEZ	1	
PRESENT	VEHICLE	CAMERA	PRESET	CLEANED	RATE:
	TV 127	PANTHER	6	Light	0

STREET	INDUSTRIAL DR	START DEPTH		START MH:	407
CITY	NEW HAVEN, MO	END DEPTH:		END MH:	156
STATUS	Complete	TAPE #:	091907EC	TVD LGTH:	392 ft

INSPECT REASON	gen. condition control	PIPE SIZE	8"
SECTION TYPE	Sanitary	MATERIAL	PVC JT LGTH:
AREA:		LINING:	
		TV INSPECTION #:	

REMARK:

1:875	POSITION		CODE	OBSERVATION	VCR #	PH	RATE
407	2.90		BUMH	Inspection Begins at Upstream Manhole	00:02:03	1a, b	0
	12.70		TF1	Tap - Factory - Fair to Good Condition, at 09 o'clock	00:03:15	2a	1
	47.60	S1	SG1	Pipe sag (slight) -- Less than 10% dia., START	00:04:33	3a	1
	58.50	E1	SG1	Pipe sag (slight) -- Less than 10% dia., END	00:05:08		1
	59.90		GCP	General Condition Photo	00:05:32	5a	0
	68.40	S2	SG1	Pipe sag (slight) -- Less than 10% dia., START	00:06:19	6a	1
	77.30	E2	SG1	Pipe sag (slight) -- Less than 10% dia., END	00:06:48		1
	101.70		GCP	General Condition Photo	00:07:30	8a	0
	154.00		GCP	General Condition Photo	00:09.24	9a	0
	204.60		GCP	General Condition Photo	00:11.06	10a	0
	253.90		GCP	General Condition Photo	00:12:30		0
	270.60	S3	SG1	Pipe sag (slight) -- Less than 10% dia., START	00:13:11	12a	1
	282.00		TF0	Tap - Factory - Good to Excellent Condition, at 12 o'clock	00:13:51	13a	0
	287.70		GCS1	Slight Grade Change (steeper grade starts)	00:15:29	14a	0
	287.70	E3	SG1	Pipe sag (slight) -- Less than 10% dia., END	00:15:45		1
	311.10		GCP	General Condition Photo	00:17:19	16a	0
	355.90		GCP	General Condition Photo	00:19:13	17a	0
	[illegible]	S4	GCP	Pipe sag (moderate) -- 26-50% dia., START	00:21:21	18a	1
	[illegible]	E4	GCP	Pipe sag (moderate) -- 26-50% dia., END	00:20:37		1
156	392.00		EDMH	Inspection Ends at Downstream Manhole	00.23 58	20a	0

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INSPECTION IMAGES

CITY:	STREET:	DATE	SECTION NR.	SECTION NAME:
NEW HAVEN, MO	INDUSTRIAL DR	09/19/2007	1	

IMAGE: 1a, TAPE #: 091907EC, 00:02:03
2.9FT, Inspection Begins at Upstream Manhole

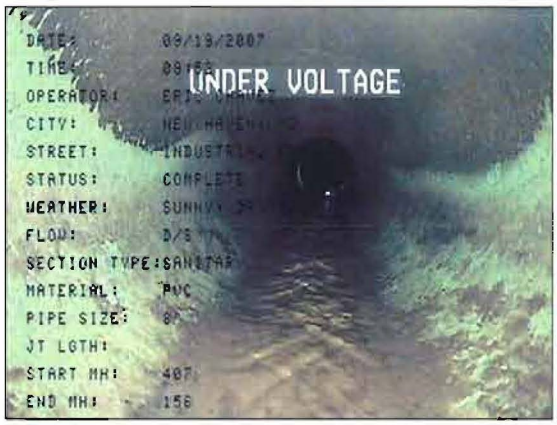

IMAGE: 1b, TAPE #: 091907EC, 00:02:03
2.9FT, Inspection Begins at Upstream Manhole

IMAGE: 2a, TAPE #: 091907EC, 00:03:15
12.7FT, Tap - Factory - Fair to Good Condition, at 09 o'clock

IMAGE 3a, TAPE #: 091907EC, 00:04:33
47.6FT, Pipe sag (slight) – Less than 10% dia., START

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR.	SECTION NAME
NEW HAVEN, MO	INDUSTRIAL DR	09/19/2007	1	

IMAGE: 5a, TAPE #: 091907EC, 00:05:32
59.9FT, General Condition Photo

IMAGE: 6a, TAPE #: 091907EC, 00:06:19
68.4FT, Pipe sag (slight) -- Less than 10% dia., START

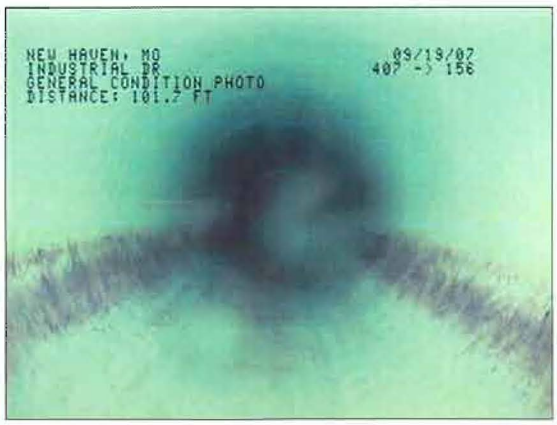

IMAGE: 8a, TAPE #: 091907EC, 00:07:30
101.7FT, General Condition Photo

IMAGE: 9a, TAPE #: 091907EC, 00:09:24
154FT, General Condition Photo

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR:	SECTION NAME
NEW HAVEN, MO	INDUSTRIAL DR	09/19/2007	1	

IMAGE: 10a, TAPE #: 091907EC, 00:11:06
204.6FT, General Condition Photo

IMAGE: 12a, TAPE #: 091907EC, 00:13:11
270.6FT, Pipe sag (slight) -- Less than 10% dia., START

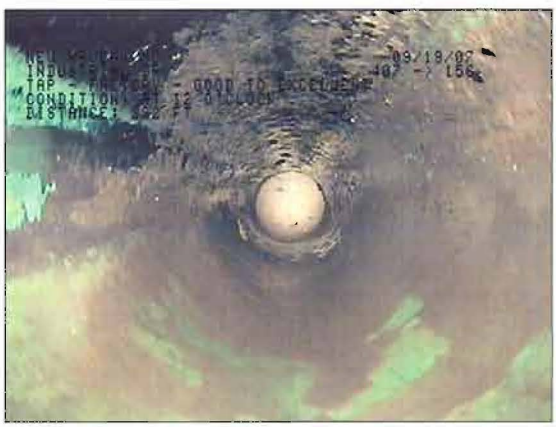

IMAGE: 13a, TAPE #: 091907EC, 00:13:51
282FT, Tap - Factory - Good to Excellent Condition, at 12 o'clock

IMAGE: 14a, TAPE #: 091907EC, 00:15:29
287.7FT, Slight Grade Change (steeper grade starts)

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INSPECTION IMAGES

CITY:	STREET:	DATE	SECTION NR.	SECTION NAME:
NEW HAVEN, MO	INDUSTRIAL DR	09/19/2007	1	

IMAGE: 16a, TAPE #: 091907EC, 00:17:19
311.1FT, General Condition Photo

IMAGE: 17a, TAPE #: 091907EC, 00:19:13
355.9FT, General Condition Photo

IMAGE: 18a, TAPE #: 091907EC, 00:21:24
369.5FT, Pipe sag (moderate) -- 25-50% dia., START

IMAGE: 20a, TAPE #: 091907EC, 00:23:58
392FT, Inspection Ends at Downstream Manhole

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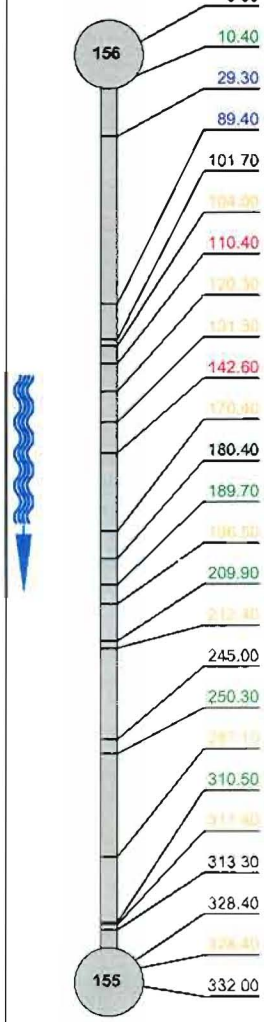
INSPECTION REPORT

DATE:	WORK ORDER #	WEATHER:	OPERATOR	SECTION NR	SECTION NAME
09/19/2007		sunny, dry	ERIC CHAVEZ	2	
PRESENT:	VEHICLE	CAMERA:	PRESET	CLEANED:	RATE:
	TV 127	PANTHER	6	Light	0

STREET	INDUSTRIAL DR	START DEPTH		START MH:	156
CITY:	NEW HAVEN, MO	END DEPTH		END MH:	155
STATUS	Complete	TAPE #:	091907EC	TV'D LGTH:	332 ft

INSPECT REASON:	gen. condition control	PIPE SIZE	8"
SECTION TYPE	Sanitary	MATERIAL	CIP JT LGTH:
AREA:		LINING	
		TV INSPECTION #	

REMARK:



1:750	POSITION		CODE	OBSERVATION	VCR #	PH	RATE
	0.00		BUMH	Inspection Begins at Upstream Manhole	00:24:17	21a	0
	10.40		VG2	Visible Gasket at Joint (Slight-Moderate)	00:27:22		2
	29.30		DAJ1	Deposits/Encrustation at Joint (<10% dia.), from 08 to 04 o'clock	00:28:30	23a	1
	89.40		DAJ1	Deposits/Encrustation at Joint (<10% dia.), from 08 to 05 o'clock	00:31:01	24a	1
	101.70		GCP	General Condition Photo	00:31:49	25a	0
	104.00	S1	SG3	Pipe sag (moderate) – 25-50% dia., START	00:32:18	26a	3
	110.40		W4	2 to 3/4-Pipe Water Depth (Camera Underwater)	00:32:53	27a	4
	120.30	E1	SG3	Pipe sag (moderate) – 25-50% dia., END	00:33:30		3
	131.30	S2	SG3	Pipe sag (moderate) – 25-50% dia., START	00:34:09	29a	3
	142.60		W4	2 to 3/4-Pipe Water Depth (Camera Underwater)	00:35:04	30a	4
	170.40	E2	SG3	Pipe sag (moderate) – 25-50% dia., END	00:35:29	31a	3
	180.40		GCP	General Condition Photo	00:36:56	32a	0
	189.70		DAJ2	Deposits/Encrustation at Joint (10-25% dia.), from 09 to 03 o'clock	00:37:53	33a	2
	196.50	S3	SG3	Pipe sag (moderate) – 25-50% dia., START	00:38:39	34a	3
	209.90		DAJ2	Deposits/Encrustation at Joint (10-25% dia.), from 09 to 04 o'clock	00:39:15	35a	2
	212.40	E3	SG3	Pipe sag (moderate) – 25-50% dia., END	00:39:32		3
	245.00		GCP	General Condition Photo	00:40:32	37a	0
	250.30		DAJ2	Deposits/Encrustation at Joint (10-25% dia.), from 08 to 04 o'clock	00:40:53	38a	2
	287.10	S4	SG3	Pipe sag (moderate) – 25-50% dia., START	00:41:50	39a	3
	310.50		DAJ2	Deposits/Encrustation at Joint (10-25% dia.), from 09 to 03 o'clock	00:42:48	40a	2
	311.40	E4	SG3	Pipe sag (moderate) – 25-50% dia., END	00:43:05		3
	313.30		GCP	General Condition Photo	00:43:14	42a	0
	328.40		PSHP	Pipe Material or Liner Change	00:43:53	43a	0
	328.40		RJ3	Moderate root infiltration at joint	00:44:15	44a	3
	332.00		EDMH	Inspection Ends at Downstream Manhole	00:46:07	45a, b	0

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR	SECTION NAME
NEW HAVEN, MO	INDUSTRIAL DR	09/19/2007	2	

IMAGE: 21a, TAPE #: 091907EC, 00:24:17
0FT, Inspection Begins at Upstream Manhole

IMAGE: 23a, TAPE #: 091907EC, 00:28:30
29.3FT, Deposits/Encrustation at Joint (<10% dia.), from 08 to 04 o´clock

IMAGE: 24a, TAPE #: 091907EC, 00:31:01
89.4FT, Deposits/Encrustation at Joint (<10% dia.), from 08 to 05 o´clock

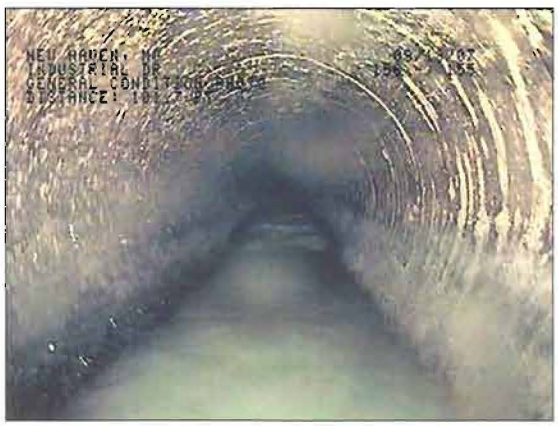

IMAGE: 25a, TAPE #: 091907EC, 00:31:49
101.7FT, General Condition Photo

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INSPECTION IMAGES

CITY:	STREET:	DATE:	SECTION NR:	SECTION NAME:
NEW HAVEN, MO	INDUSTRIAL DR	09/19/2007	2	

IMAGE: 26a, TAPE #: 091907EC, 00:32:19
104FT, Pipe sag (moderate) -- 25-50% dia., START

IMAGE: 27a, TAPE #: 091907EC, 00:32:53
110.4FT, 2 to 3/4-Pipe Water Depth (Camera Underwater)

IMAGE: 29a, TAPE #: 091907EC, 00:34:09
131.3FT, Pipe sag (moderate) -- 25-50% dia., START

IMAGE: 30a, TAPE #: 091907EC, 00:35:04
142.6FT, 2 to 3/4-Pipe Water Depth (Camera Underwater)

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR.	SECTION NAME
NEW HAVEN, MO	INDUSTRIAL DR	09/19/2007	2	

IMAGE: 31a, TAPE #: 091907EC, 00:36:29
170.4FT, Pipe sag (moderate) – 25-50% dia., END

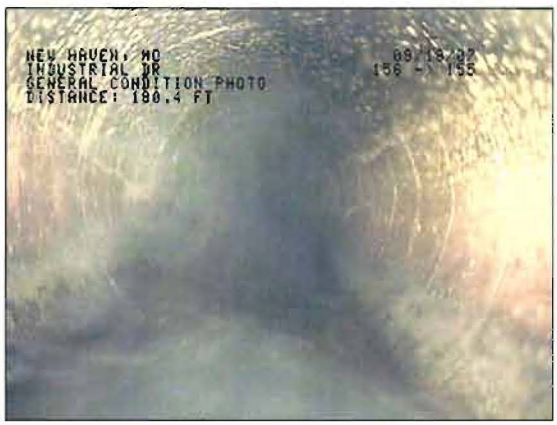

IMAGE: 32a, TAPE #: 091907EC, 00:36:56
180.4FT, General Condition Photo

IMAGE: 33a, TAPE #: 091907EC, 00:37:53
189.7FT, Deposits/Encrustation at Joint (10-25% dia.), from 09 to 03 o'clock

IMAGE: 34a, TAPE #: 091907EC, 00:38:39
196.5FT, Pipe sag (moderate) – 25-50% dia., START

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR	SECTION NAME
NEW HAVEN, MO	INDUSTRIAL DR	09/19/2007	2	

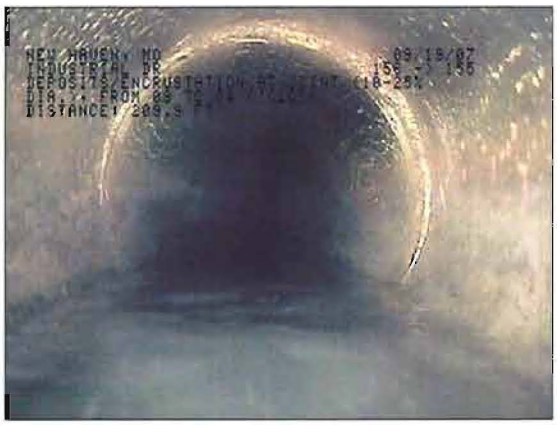

IMAGE: 35a, TAPE #: 091907EC, 00:39:15
209.9FT, Deposits/Encrustation at Joint (10-25% dia.), from 09 to 04 o´clock

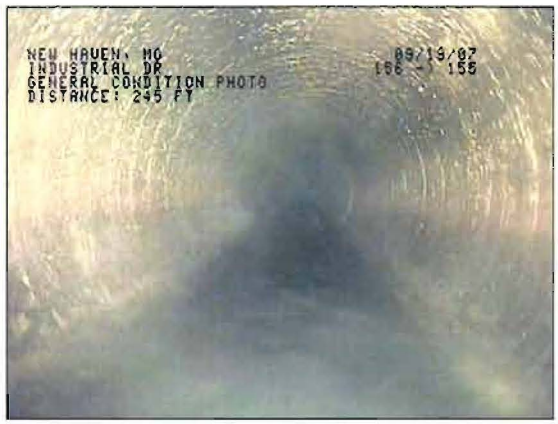

IMAGE: 37a, TAPE #: 091907EC, 00:40:32
245FT, General Condition Photo

IMAGE 38a, TAPE #: 091907EC, 00:40:53
250.3FT, Deposits/Encrustation at Joint (10-25% dia.), from 08 to 04 o´clock

IMAGE: 39a, TAPE #: 091907EC, 00:41:58
287 1FT, Pipe sag (moderate) – 25-50% dia., START

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INSPECTION IMAGES

CITY:	STREET:	DATE	SECTION NR:	SECTION NAME
NEW HAVEN, MO	INDUSTRIAL DR	09/19/2007	2	

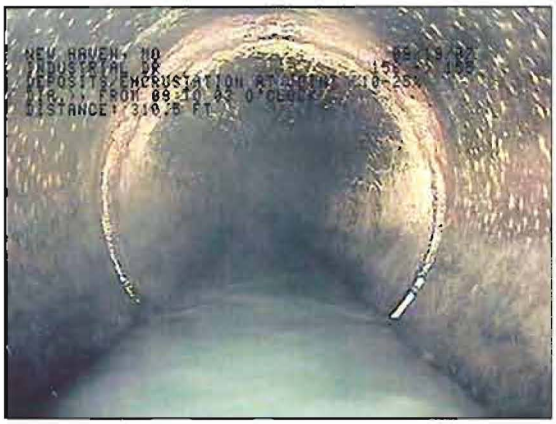

IMAGE: 40a, TAPE #: 091907EC, 00:42:48
310.5FT, Deposits/Encrustation at Joint (10-25% dia.), from 09 to 03 o'clock

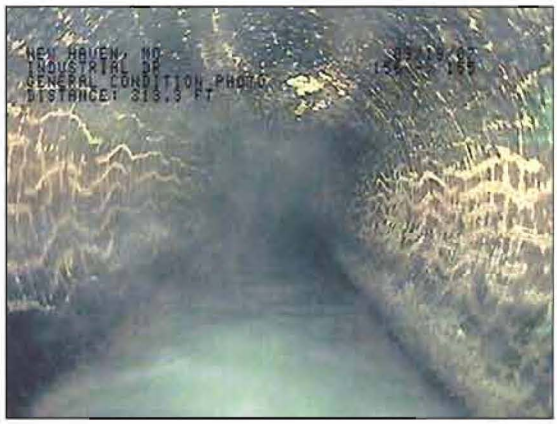

IMAGE: 42a, TAPE #: 091907EC, 00:43:14
313.3FT, General Condition Photo

IMAGE: 43a, TAPE # 091907EC, 00 43 53
328.4FT, Pipe Material or Liner Change

IMAGE: 44a, TAPE #: 091907EC, 00:44.10
328.4FT, Moderate root intrusion at joint

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INSPECTION IMAGES

CITY:	STREET	DATE	SECTION NR:	SECTION NAME
NEW HAVEN, MO	INDUSTRIAL DR	09/19/2007	2	

IMAGE: 45a, TAPE #: 091907EC, 00:46:07
332FT, Inspection Ends at Downstream Manhole

IMAGE: 45b, TAPE #: 091907EC, 00:46:07
332FT, Inspection Ends at Downstream Manhole

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INSPECTION REPORT

DATE	WORK ORDER #.	WEATHER:	OPERATOR:	SECTION NR:	SECTION NAME
09/19/2007		sunny, dry	ERIC CHAVEZ	3	
PRESENT:	VEHICLE	CAMERA:	PRESET	CLEANED.	RATE.
	TV 127	PANTHER	6	Light	0

STREET:	UNION ELECTRIC	START DEPTH:		START MH	155
CITY	NEW HAVEN, MO	END DEPTH		END MH	330
STATUS.	Complete	TAPE #.	091907EC	TV'D LGTH:	110 ft

INSPECT REASON.	gen. condition control	PIPE SIZE.	8"
SECTION TYPE	Sanitary	MATERIAL:	PVC JT LGTH:
AREA:		LINING.	
		TV INSPECTION #:	

REMARK.

1:250	POSITION		CODE	OBSERVATION	VCR #	PH	RATE
155	0.00		BUMH	Inspection Begins at Upstream Manhole	00:46:45	46a	0
	15.40	S1	SGS	Pipe sag (moderate) – 25-50% dia. START	00:50:50	47a	3
	16.70		W4	2 to 3/4-Pipe Water Depth (Camera Underwater)	00:51:21	48a	4
	26.10	E1	SGS	Pipe sag (moderate) – 25-50% dia. END	00:53:19		3
	95.30		GRS1	Light Grease (<10% dia.), at 12 o'clock	00:57:48		1
330	110.00		EDMH	Inspection Ends at Downstream Manhole	00:59:12	50a	0

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INSPECTION IMAGES

CITY:	STREET:	DATE:	SECTION NR:	SECTION NAME:
NEW HAVEN, MO	UNION ELECTRIC	09/19/2007	3	

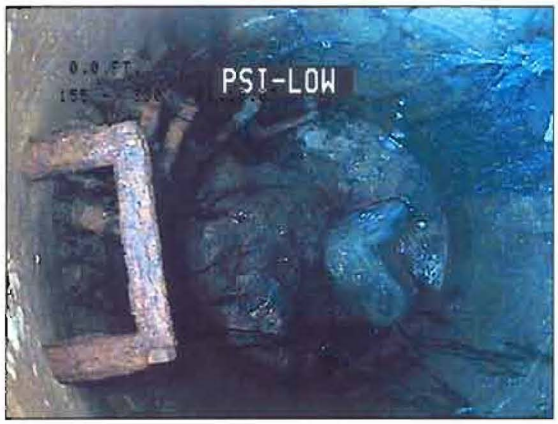

IMAGE: 46a, TAPE #: 091907EC, 00:46:45
0FT, Inspection Begins at Upstream Manhole

IMAGE: 47a, TAPE #. 091907EC, 00:50:50
15.4FT, Pipe sag (moderate) – 25-50% dia., START

IMAGE: 48a, TAPE #: 091907EC, 00:51:21
16 7FT, 2 to 3/4-Pipe Water Depth (Camera Underwater)

IMAGE: 50a, TAPE # 091907EC, 00.59:12
110FT, Inspection Ends at Downstream Manhole

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INSPECTION REPORT

DATE:	WORK ORDER #:	WEATHER	OPERATOR	SECTION NR	SECTION NAME
09/19/2007		sunny, dry	ERIC CHAVEZ	4	
PRESENT:	VEHICLE	CAMERA:	PRESET:	CLEANED:	RATE
	TV 127	PANTHER	6	Light	0

STREET:	UNION ELECTRIC	START DEPTH:		START MH:	330
CITY	NEW HAVEN, MO	END DEPTH.		END MH	331
STATUS:	Complete	TAPE #.	091907EC	TV'D LGTH.	136 ft

INSPECT REASON:	gen. condition control	PIPE SIZE	8"
SECTION TYPE:	Sanitary	MATERIAL.	PVC JT LGTH
AREA		LINING	
		TV INSPECTION #	

REMARK:

1:325	POSITION	CODE	OBSERVATION	VCR #	PH	RATE
330	0 00	BUMH	Inspection Begins at Upstream Manhole	00:59:28	52a, b	0
	53 20	GCP	General Condition Photo	01 04 27	53a	0
	105.70	GCP	General Condition Photo	01:05:41	54a	0
331	136.00	EDMH	Inspection Ends at Downstream Manhole	01:06.54	55a	0

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INSPECTION IMAGES

CITY:	STREET:	DATE:	SECTION NR:	SECTION NAME
NEW HAVEN, MO	UNION ELECTRIC	09/19/2007	4	

IMAGE: 52a, TAPE #: 091907EC, 00:59:28
0FT, Inspection Begins at Upstream Manhole

IMAGE: 52b, TAPE #: 091907EC, 00:59:28
0FT, Inspection Begins at Upstream Manhole

IMAGE: 53a, TAPE #: 091907EC, 01:04:27
53.2FT, General Condition Photo

IMAGE: 54a, TAPE #: 091907EC, 01:05:41
105.7FT, General Condition Photo

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INSPECTION IMAGES

CITY:	STREET:	DATE	SECTION NR.	SECTION NAME:
NEW HAVEN, MO	UNION ELECTRIC	09/19/2007	4	

IMAGE: 55a, TAPE #: 091907EC, 01:06:54
136FT, Inspection Ends at Downstream Manhole

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INSPECTION REPORT

DATE:	WORK ORDER #:	WEATHER:	OPERATOR:	SECTION NR:	SECTION NAME:
09/19/2007		sunny, dry	ERIC CHAVEZ	5	
PRESENT	**VEHICLE:**	**CAMERA:**	**PRESET:**	**CLEANED:**	**RATE**
	TV 127	PANTHER	6	Light	0

STREET	UNION ELECTRIC	START DEPTH		START MH:	331
CITY:	NEW HAVEN, MO	END DEPTH		END MH:	332
STATUS	Complete	TAPE #	091907EC	TV'D LGTH:	264 ft

INSPECT REASON:	gen. condition control	PIPE SIZE:	8"
SECTION TYPE	Sanitary	MATERIAL	PVC JT LGTH
AREA		LINING	
		TV INSPECTION #	

REMARK:

1:600	POSITION		CODE	OBSERVATION	VCR #	PH	RATE
331	0.00		BUMH	Inspection Begins at Upstream Manhole	01 07 04	56a, b	0
	9.10	S1	SG3	Pipe sag (moderate) -- 25-50% dia., START	01:08:15	57a	3
	9.50		W4	2 to 3/4-Pipe Water Depth (Camera Underwater)	01:08:36	58a	4
	14.70	E1	SG3	Pipe sag (moderate) -- 25-50% dia., END	01:08:58		3
	44.00	S2	SG2	Pipe sag (slight-moderate) -- 10-25% dia., START	01:09:49	60a	2
	54.30		W4	2 to 3/4-Pipe Water Depth (Camera Underwater)	01:10:19	61a	4
	69.30	E2	SG2	Pipe sag (slight-moderate) -- 10-25% dia., END	01:11:03		2
	103.20		GCP	General Condition Photo	01 12 05	63a	0
	134.60	S3	SG2	Pipe sag (slight-moderate) -- 10-25% dia., START	01:13:03	64a	2
	143.30	E3	SG2	Pipe sag (slight-moderate) -- 10-25% dia., END	01:13:27		2
	157.00	S4	SG3	Pipe sag (moderate) -- 25-50% dia., START	01:14:02	66a	3
	166.00	E4	SG3	Pipe sag (moderate) -- 25-50% dia., END	01:14:14		3
	203.60		GCP	General Condition Photo	01.19:22	69a	0
	239.80		SG2	Pipe sag (slight-moderate) -- 10-25% dia.	01:20:27	70a	2
	243.30		GRS1	Light Grease (<10% dia.), at 02 o'clock	01:20:44		1
	262.50		SG2	Pipe sag (slight-moderate) -- 10-25% dia., END	01:21:37		2
332	264.00		EDMH	Inspection Ends at Downstream Manhole	01.22 08	73a	0

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INSPECTION IMAGES

CITY:	STREET:	DATE:	SECTION NR.:	SECTION NAME:
NEW HAVEN, MO	UNION ELECTRIC	09/19/2007	5	

IMAGE: 56a, TAPE #: 091907EC, 01:07:04
0FT, Inspection Begins at Upstream Manhole

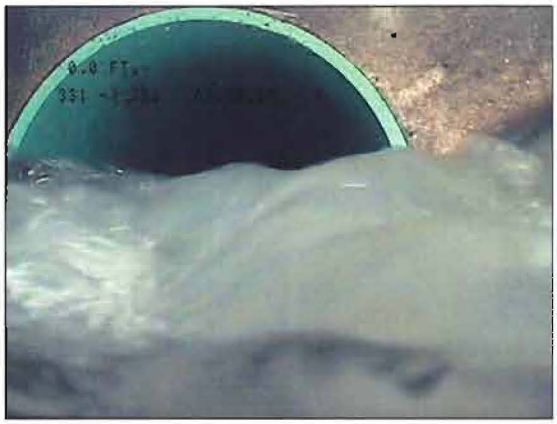

IMAGE: 56b, TAPE #: 091907EC, 01:07:04
0FT, Inspection Begins at Upstream Manhole

IMAGE: 57a, TAPE #: 091907EC, 01:08:15
5.1FT, Pipe sag (moderate) -- 25-50% dia., START

IMAGE: 58a, TAPE #: 091907EC, 01:08.36
9.5FT, 2 to 3/4-Pipe Water Depth (Camera Underwater)

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INSPECTION IMAGES

CITY:	STREET	DATE:	SECTION NR:	SECTION NAME:
NEW HAVEN, MO	UNION ELECTRIC	09/19/2007	5	

IMAGE: 60a, TAPE #: 091907EC, 01:09:49
44FT, Pipe sag (slight-moderate) -- 10-25% dia., START

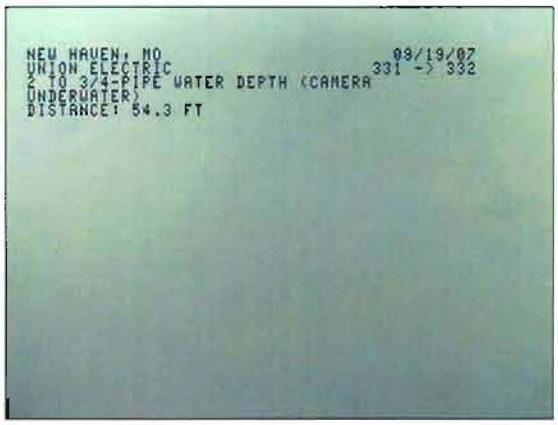

IMAGE: 61a, TAPE #: 091907EC, 01:10:19
54.3FT, 2 to 3/4-Pipe Water Depth (Camera Underwater)

IMAGE: 63a, TAPE #: 091907EC, 01:12:05
103.2FT, General Condition Photo

IMAGE: 64a, TAPE #: 091907EC, 01:13:03
134.6FT, Pipe sag (slight-moderate) -- 10-25% dia., START

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR	SECTION NAME
NEW HAVEN, MO	UNION ELECTRIC	09/19/2007	5	

IMAGE: 66a, TAPE #: 091907EC, 01:14.03
157 2FT, Pipe sag (moderate) -- 25-50% dia., START

IMAGE: 69a, TAPE #: 091907EC, 01:19:22
203.6FT, General Condition Photo

IMAGE: 70a, TAPE #: 091907EC, 01:20:27
239.8FT, Pipe sag (slight-moderate) -- 10-25% dia

IMAGE: 73a, TAPE #: 091907EC, 01:22:08
264FT, Inspection Ends at Downstream Manhole

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INSPECTION REPORT

DATE:	WORK ORDER #:	WEATHER	OPERATOR:	SECTION NR	SECTION NAME
09/19/2007		sunny, dry	ERIC CHAVEZ	6	
PRESENT:	VEHICLE:	CAMERA	PRESET	CLEANED	RATE:
	TV 127	PANTHER	6	Light	0

STREET:	UNION ELECTRIC	START DEPTH		START MH:	332
CITY:	NEW HAVEN, MO	END DEPTH:		END MH:	327
STATUS	Complete	TAPE #	091907EC	TV'D LGTH:	189 ft

INSPECT REASON	gen. condition control	PIPE SIZE:	8"
SECTION TYPE:	Sanitary	MATERIAL	VCP JT LGTH:
AREA		LINING	
		TV INSPECTION #:	

REMARK

1:425	POSITION		CODE	OBSERVATION	VCR #	PH	RATE
332	0.00		BUMH	Inspection Begins at Upstream Manhole	01.22.22	74a, b	0
	21.30	S1	SG2	Pipe sag (slight-moderate) -- 10-25% dia., START	01:25:54	75a	2
	43.80	E1	SG2	Pipe sag (slight-moderate) -- 10-25% dia., END	01:26:44		2
	49.80	S2	SG2	Pipe sag (moderate) -- 25-50% dia., START	01:27:04	77a	3
	64.80		GCP	General Condition Photo	01:27:38	78a	0
	117.90		W4	2 to 3/4-Pipe Water Depth (Camera Underwater)	01:29:23	79a	4
	152.20	E2	SG2	Pipe sag (moderate) -- 25-50% dia., END	01:31:08		3
	155.40		OSJ1	Slight Offset Joint (>90% clear)	01:31:23	81a	1
	166.80	S3	SG2	Pipe sag (moderate) -- 25-50% dia., START	01:31:58	82a	3
	181.30		RJ2	Light to moderate root intrusion at joint	01:33:06	83a	2
	188.90	E3	SG2	Pipe sag (moderate) -- 25-50% dia., END	01:34:44		3
327	189.00		EDMH	Inspection Ends at Downstream Manhole	01:35:17	85a	0

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INSPECTION IMAGES

CITY:	STREET:	DATE:	SECTION NR:	SECTION NAME:
NEW HAVEN, MO	UNION ELECTRIC	09/19/2007	6	

IMAGE: 74a, TAPE #: 091907EC, 01:22:22
0FT, Inspection Begins at Upstream Manhole

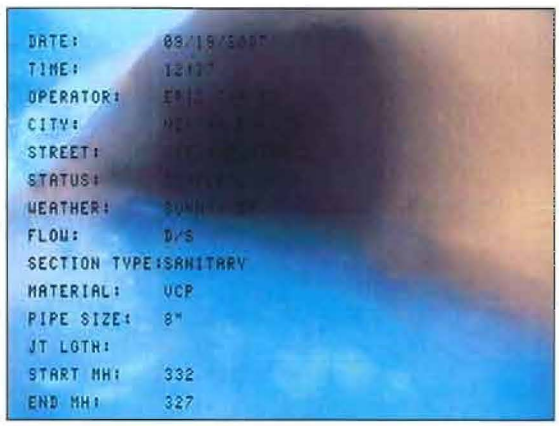

IMAGE: 74b, TAPE #: 091907EC, 01:22:22
0FT, Inspection Begins at Upstream Manhole

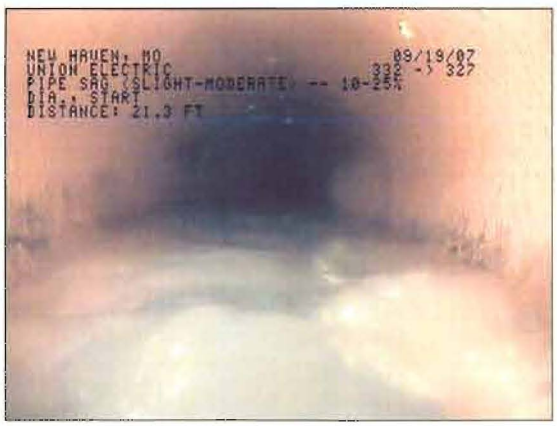

IMAGE: 75a, TAPE #: 091907EC, 01.25.54
21.3FT, Pipe sag (slight-moderate) -- 10-25% dia., START

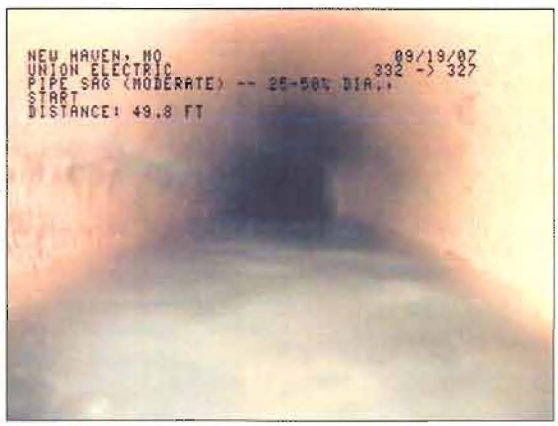

IMAGE: 77a, TAPE #: 091907EC, 01:27:04
49.8FT, Pipe sag (moderate) -- 25-50% dia., START

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR.	SECTION NAME
NEW HAVEN, MO	UNION ELECTRIC	09/19/2007	6	

IMAGE: 78a, TAPE #: 091907EC, 01:27:38
64.8FT, General Condition Photo

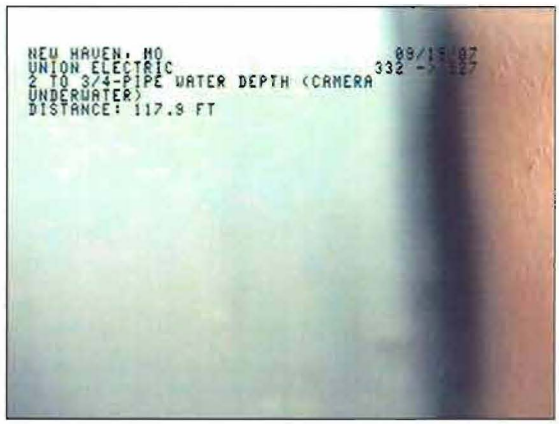

IMAGE: 79a, TAPE #: 091907EC, 01:29:23
117.9FT, 2 to 3/4-Pipe Water Depth (Camera Underwater)

IMAGE: 81a, TAPE #: 091907EC, 01:31:23
155.4FT, Slight Offset Joint (>90% clear)

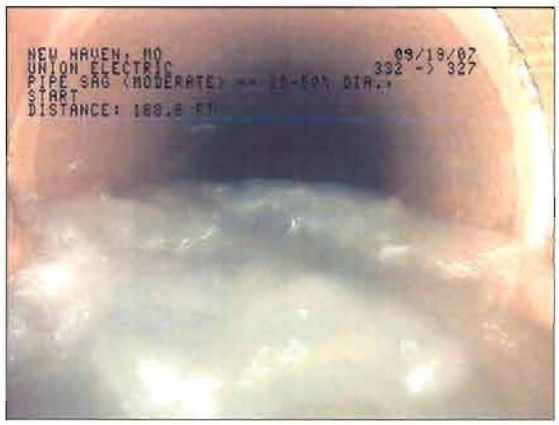

IMAGE: 82a, TAPE #: 091907EC, 01:31:56
168.6FT, Pipe sag (moderate) -- 25-50% dia , START

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INSPECTION IMAGES

CITY:	STREET:	DATE:	SECTION NR.	SECTION NAME:
NEW HAVEN, MO	UNION ELECTRIC	09/19/2007	6	

IMAGE: 83a, TAPE #: 091907EC, 01:33:06
181.3FT, Light to moderate root intrusion at joint

IMAGE: 85a, TAPE #: 091907EC, 01:35:17
189FT, Inspection Ends at Downstream Manhole

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INSPECTION REPORT

DATE	WORK ORDER #:	WEATHER	OPERATOR:	SECTION NR:	SECTION NAME:
09/19/2007		sunny, dry	ERIC CHAVEZ	7	
PRESENT:	VEHICLE	CAMERA:	PRESET	CLEANED	RATE:
	TV 127	PANTHER	6	Light	0

STREET	UNION ELECTRIC	START DEPTH:		START MH	327
CITY	NEW HAVEN, MO	END DEPTH		END MH:	149
STATUS	Complete	TAPE #	091907EC	TV'D LGTH:	22 ft

INSPECT REASON:	gen. condition control	PIPE SIZE	8"
SECTION TYPE:	Sanitary	MATERIAL:	VCP JT LGTH
AREA:		LINING	
		TV INSPECTION #	

REMARK:

1:50	POSITION	CODE	OBSERVATION	VCR #	PH	RATE
327	0.00	BUMH	Inspection Begins at Upstream Manhole	01:35:58	86a, b	0
	1.00	CFR2	Radial Crack (slight-moderate), from 12 to 12 o'clock	01:38:07	87a	2
	4.00	RJ2	Light to moderate root intrusion at joint	01:38:35	88a	2
	6.00	S1	SIG3 Pipe sag (moderate) - 25-50% dia., START	01:39:12	89a	3
	22.00	E1	SIG3 Pipe sag (moderate) - 25-50% dia., END	01:40:19		3
149	22.00	EDMH	Inspection Ends at Downstream Manhole	01:40:19	91a	0

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR	SECTION NAME
NEW HAVEN, MO	UNION ELECTRIC	09/19/2007	7	

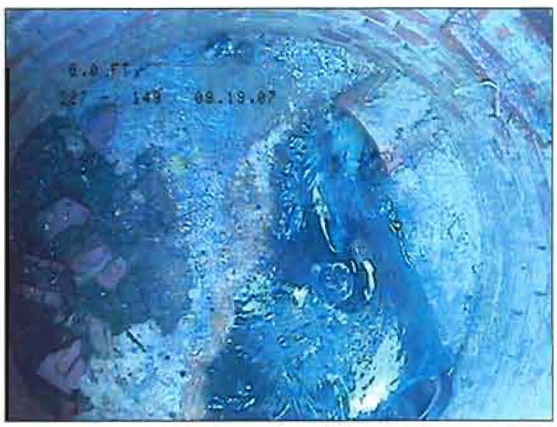

IMAGE: 86a, TAPE #: 091907EC, 01:35:58
0FT, Inspection Begins at Upstream Manhole

IMAGE: 86b, TAPE #: 091907EC, 01:35:58
0FT, Inspection Begins at Upstream Manhole

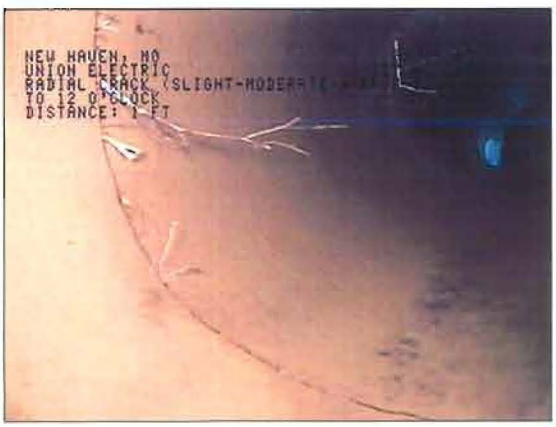

IMAGE: 87a, TAPE #: 091907EC, 01:38:07
1FT, Radial Crack (slight-moderate), from 12 to 12 o'clock

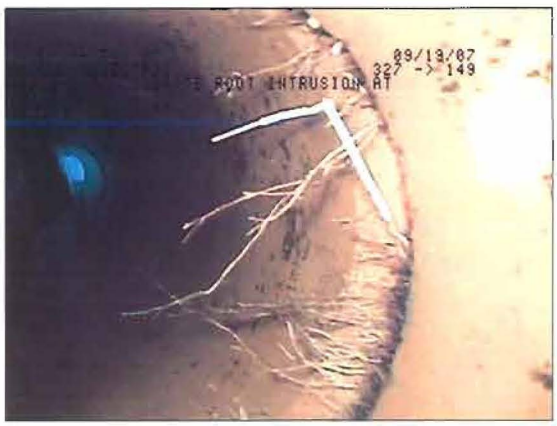

IMAGE: 88a, TAPE #: 091907EC, 01:38:35
4FT, Light to moderate root intrusion at joint

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St Louis, MO 63102
Tel: (314) 621-8393, Fax: (314) 588-9781

INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR.	SECTION NAME:
NEW HAVEN, MO	UNION ELECTRIC	09/19/2007	7	

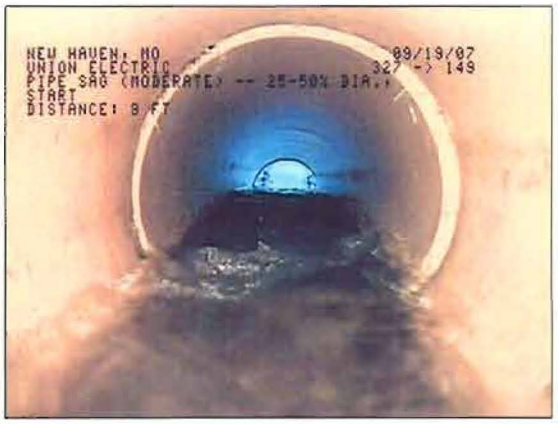

IMAGE: 89a, TAPE #: 091907EC, 01:39:12
9FT, Pipe sag (moderate) – 25-50% dia., START

IMAGE: 91a, TAPE #: 091907EC, 01:40:19
22FT, Inspection Ends at Downstream Manhole

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INSPECTION REPORT

DATE:	WORK ORDER #	WEATHER:	OPERATOR:	SECTION NR:	SECTION NAME:
09/19/2007		sunny, dry	ERIC CHAVEZ	8	
PRESENT:	VEHICLE:	CAMERA:	PRESET	CLEANED	RATE
	TV 127	PANTHER	6	Light	0

STREET:	NEW HAVEN SCHOOL	START DEPTH:		START MH:	149
CITY	NEW HAVEN, MO	END DEPTH:		END MH:	328
STATUS:	Complete	TAPE #:	091907EC	TV'D LGTH:	271 ft

INSPECT REASON:	gen. condition control	PIPE SIZE:	8"
SECTION TYPE	Sanitary	MATERIAL	PVC JT LGTH.
AREA:		LINING	
		TV INSPECTION #	

REMARK:

1:625	POSITION	CODE	OBSERVATION	VCR #	PH	RATE
149	0.00	BUMH	Inspection Begins at Upstream Manhole	01:40.27	92e, b	0
	44.59	S1	SG3 Pipe sag (moderate) – 25-50% dia. START	01:43:04	93a	2
	60.10	E1	SG3 Pipe sag (moderate) – 25-50% dia. END	01:43:41		2
	121.80	GCP	General Condition Photo	01:45:17	95a	0
	216.60	GCP	General Condition Photo	01:48:57		0
328	271.00	EDMH	Inspection Ends at Downstream Manhole	01:50:51	97a	0

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INSPECTION IMAGES

CITY:	STREET	DATE.	SECTION NR	SECTION NAME:
NEW HAVEN, MO	NEW HAVEN SCHOOL	09/19/2007	8	

IMAGE: 92a, TAPE #: 091907EC, 01:40:27
0FT, Inspection Begins at Upstream Manhole

IMAGE: 92b, TAPE #: 091907EC, 01:40:27
0FT, Inspection Begins at Upstream Manhole

IMAGE: 93a, TAPE #: 091907EC, 01:43:04
44.5FT, Pipe sag (moderate) -- 25-50% dia., START

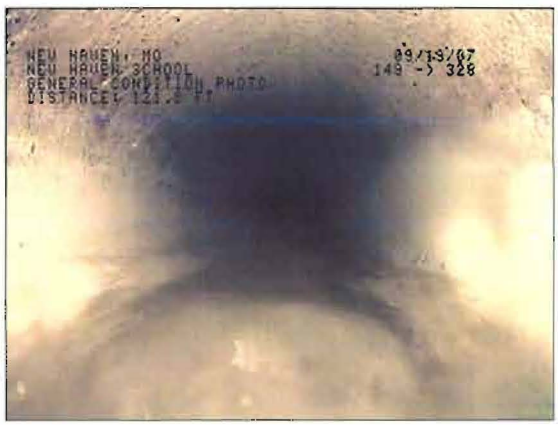

IMAGE: 95a, TAPE #: 091907EC, 01:45:17
121.8FT, General Condition Photo

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR.	SECTION NAME
NEW HAVEN, MO	NEW HAVEN SCHOOL	09/19/2007	8	

IMAGE: 97a, TAPE #: 091907EC, 01:50:51
271FT, Inspection Ends at Downstream Manhole

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INSPECTION REPORT

DATE	WORK ORDER #.	WEATHER	OPERATOR	SECTION NR	SECTION NAME
09/19/2007		sunny, dry	ERIC CHAVEZ	9	
PRESENT	VEHICLE	CAMERA	PRESET.	CLEANED:	RATE
	TV 127	PANTHER	6	Light	0

STREET	NEW HAVEN SCHOOL	START DEPTH		START MH	328
CITY	NEW HAVEN, MO	END DEPTH		END MH:	329
STATUS.	Complete	TAPE #.	091907EC	TV'D LGTH:	403 ft

INSPECT REASON	gen. condition control	PIPE SIZE	8"
SECTION TYPE	Sanitary	MATERIAL	PVC JT LGTH
AREA.		LINING	
		TV INSPECTION #	

REMARK:

1:900	POSITION		CODE	OBSERVATION	VCR #	PH	RATE
328	0.00		BUMH	Inspection Begins at Upstream Manhole	01:51:05	98a	0
	79.70		GCP	General Condition Photo	01:55:08	100a	0
	241.50		GCP	General Condition Photo	02:00:18	108a	0
	342.70		GCP	General Condition Photo	02:04:49	113a	0
329	403.00		EDMH	Inspection Ends at Downstream Manhole	02:10:02	116a	0

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR.	SECTION NAME
NEW HAVEN, MO	NEW HAVEN SCHOOL	09/19/2007	9	

IMAGE: 98a, TAPE #: 091907EC, 01:51:05
0FT, Inspection Begins at Upstream Manhole

IMAGE: 99a, TAPE #: 091907EC, 01:53:24
21.9FT, Pipe sag (moderate) -- 25-50% dia., START

IMAGE: 100a, TAPE #: 091907EC, 01:55:08
79 7FT, General Condition Photo

IMAGE: 102a, TAPE #: 091907EC, 01:56:14
111.7FT, Pipe sag (moderate) -- 25-50% dia , START

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INSPECTION IMAGES

CITY:	STREET:	DATE:	SECTION NR.	SECTION NAME:
NEW HAVEN, MO	NEW HAVEN SCHOOL	09/19/2007	9	

IMAGE: 104a, TAPE #: 091907EC, 01:58:48
195.7FT, Pipe sag (moderate) -- 25-50% dia., START

IMAGE: 106a, TAPE #: 091907EC, 02:00:18
241.5FT, General Condition Photo

IMAGE: 107a, TAPE #: 091907EC, 02:01:15
270.9FT, Pipe sag (moderate) -- 25-50% dia., START

IMAGE: 109a, TAPE #: 091907EC, 02:02:34
306.5FT, Pipe sag (moderate) -- 25-50% dia , START

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INSPECTION IMAGES

CITY:	STREET:	DATE:	SECTION NR:	SECTION NAME:
NEW HAVEN, MO	NEW HAVEN SCHOOL	09/19/2007	9	

IMAGE: 113a, TAPE #: 091907EC, 02:04:49
342.7FT, General Condition Photo

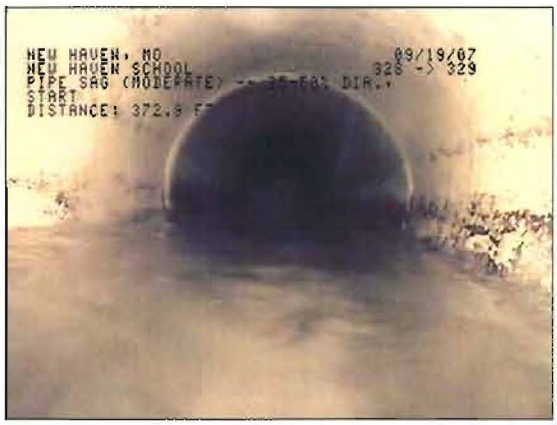

IMAGE: 114a, TAPE #: 091907EC, 02:05:56
372.9FT, Pipe sag (moderate) -- 25-50% dia., START

IMAGE: 116a, TAPE #: 091907EC, 02:10:02
403FT, Inspection Ends at Downstream Manhole

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INSPECTION REPORT

DATE	WORK ORDER #	WEATHER	OPERATOR	SECTION NR.	SECTION NAME
09/19/2007		sunny, dry	ERIC CHAVEZ	10	
PRESENT	VEHICLE: TV 127	CAMERA: PANTHER	PRESET: 6	CLEANED: Light	RATE: 0

STREET:	NEW HAVEN SCHOOL	START DEPTH:		START MH	329
CITY	NEW HAVEN, MO	END DEPTH		END MH	147A
STATUS:	Complete	TAPE #:	091907EC	TV'D LGTH:	32 ft

INSPECT REASON:	gen. condition control	PIPE SIZE	8"
SECTION TYPE:	Sanitary	MATERIAL	PVC JT LGTH:
AREA:		LINING:	
		TV INSPECTION #	

REMARK

1:75	POSITION	CODE	OBSERVATION	VCR #	PH	RATE
329	0 00	BUMH	Inspection Begins at Upstream Manhole	02 10 13	117a, b	0
	6 15	S1	SG3 Pipe sag (moderate) – 25-50% dia. START	02:11:19	119d	3
	21 05	E1	SG3 Pipe sag (moderate) – 25-50% dia. END	02:14:04		3
147A	32 00	EDMH	Inspection Ends at Downstream Manhole	02:15:18	120a	0

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INSPECTION IMAGES

CITY:	STREET	DATE	SECTION NR:	SECTION NAME:
NEW HAVEN, MO	NEW HAVEN SCHOOL	09/19/2007	10	

IMAGE: 117a, TAPE #: 091907EC, 02:10:13
0FT, Inspection Begins at Upstream Manhole

IMAGE: 117b, TAPE #: 091907EC, 02:10:13
0FT, Inspection Begins at Upstream Manhole

IMAGE: 118a, TAPE # 091907EC, 02:11:19
6.1FT, Pipe sag (moderate) -- 25-50% dia., START

IMAGE: 120a, TAPE #: 091907EC, 02:15:18
32FT, Inspection Ends at Downstream Manhole

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INSPECTION REPORT

DATE	WORK ORDER #.	WEATHER	OPERATOR	SECTION NR:	SECTION NAME.
09/19/2007		sunny, dry	ERIC CHAVEZ	11	
PRESENT:	VEHICLE	CAMERA:	PRESET:	CLEANED	RATE
	TV 127	PANTHER	6	Light	0

STREET	NEW HAVEN SCHOOL	START DEPTH		START MH:	147A
CITY:	NEW HAVEN, MO	END DEPTH:		END MH	146
STATUS	Complete	TAPE #.	091907EC	TV'D LGTH:	163 ft

INSPECT REASON:	gen. condition control	PIPE SIZE.	8"
SECTION TYPE:	Sanitary	MATERIAL	VCP JT LGTH
AREA		LINING:	
		TV INSPECTION #:	

REMARK

1:375 POSITION		CODE	OBSERVATION	VCR #	PH	RATE
0.00		SUMH	Inspection Begins at Upstream Manhole	02:15:28	121a, b	0
6.40		RJ2	Light to moderate root intrusion at joint	02:22:17	122a	2
9.80		RJ2	Light to moderate root intrusion at joint	02:22:35	123a	2
15.00	S1	RJ2	Light to moderate root intrusion at joint, START	02:22:52	124a	2
58.00		GCP	General Condition Photo	02:23:56	125a	0
111.10		GCP	General Condition Photo	02:25:16	126a	0
163.00		GCP	General Condition Photo	02:27:04	127a	0

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR	SECTION NAME:
NEW HAVEN, MO	NEW HAVEN SCHOOL	09/19/2007	11	

IMAGE: 121a, TAPE #: 091907EC, 02:15:28
0FT, Inspection Begins at Upstream Manhole

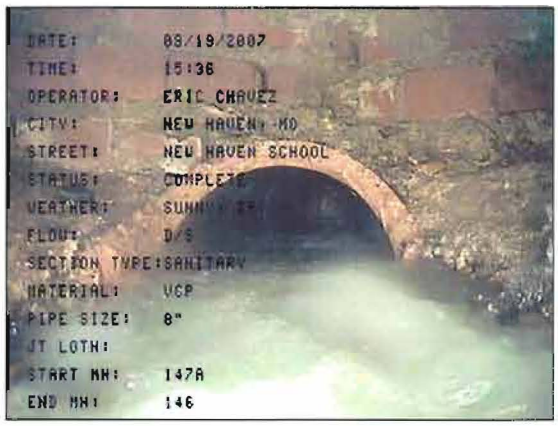

IMAGE: 121b, TAPE #: 091907EC, 02:15:28
0FT, Inspection Begins at Upstream Manhole

IMAGE: 122a, TAPE #: 091907EC, 02:22:17
6.4FT, Light to moderate root intrusion at joint

IMAGE 123a, TAPE #: 091907EC, 02:22:35
9.8FT, Light to moderate root intrusion at joint

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR	SECTION NAME
NEW HAVEN, MO	NEW HAVEN SCHOOL	09/19/2007	11	

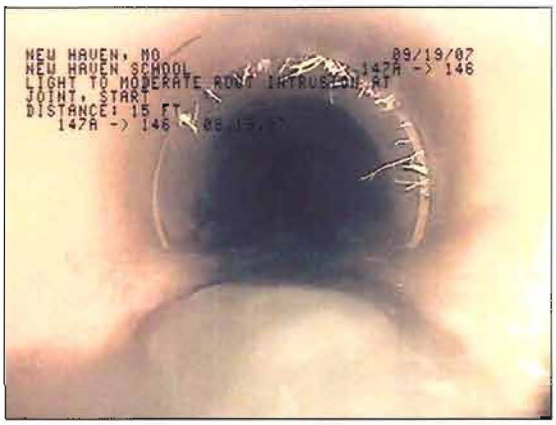

IMAGE: 124a, TAPE #: 091907EC, 02:22:52
15FT, Light to moderate root intrusion at joint, START

IMAGE: 125a, TAPE #: 091907EC, 02:23:56
58FT, General Condition Photo

IMAGE: 126a, TAPE #: 091907EC, 02:25:16
111.1FT, General Condition Photo

IMAGE: 127a, TAPE #: 091907EC, 02:27:04
163FT, General Condition Photo

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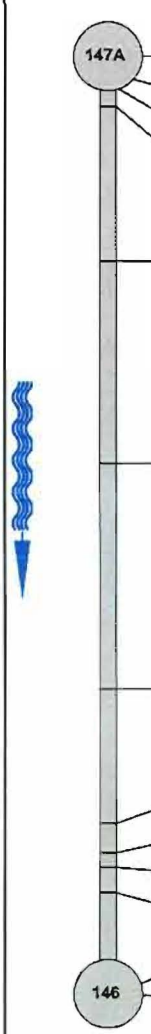
INSPECTION REPORT

DATE:	WORK ORDER #.	WEATHER	OPERATOR	SECTION NR	SECTION NAME:
09/20/2007		sunny, dry	ERIC	12	
PRESENT	VEHICLE	CAMERA:	PRESET:	CLEANED	RATE.
	TV 118	OZ11 PAN	6	Light	0

STREET	NEW HAVEN SCHOOL	START DEPTH:		START MH	147A
CITY	ST.LOUIS	END DEPTH		END MH:	146
STATUS	Complete	TAPE #:	092007EC	TV'D LGTH:	246 ft

INSPECT REASON:	gen. condition control	PIPE SIZE	8"
SECTION TYPE	Sanitary	MATERIAL	VCP JT LGTH:
AREA.		LINING	
		TV INSPECTION #:	

REMARK.



1:550 POSITION		CODE	OBSERVATION	VCR #	PH	RATE
0.00		BUMH	Inspection Begins at Upstream Manhole	00:00:00	1a	0
4.80		RJ2	Light to moderate root intrusion at joint	00:01:05	2a	2
8.10		RJ2	Light to moderate root intrusion at joint	00:01:18	3a	2
13.10	S1	RJ2	Light to moderate root intrusion at joint, START	00:01:18	4a	2
53.80		GCP	General Condition Photo	00:02:31	5a	0
106.90		GCP	General Condition Photo	00:03:36	6a	0
166.00		GCP	General Condition Photo	00:05:44	7a	0
201.20	E1	RJ2	Light to moderate root intrusion at joint, END	00:06:35		2
208.90		RJ2	Light to moderate root intrusion at joint	00:06:47	9a	2
212.70	S2	RJ2	Light to moderate root intrusion at joint, START	00:06:57	10a	2
219.40		GCP	General Condition Photo	00:07:04	11a	0
246.00	E2	RJ2	Light to moderate root intrusion at joint, END	00:07:55		2
246.00		EDMH	Inspection Ends at Downstream Manhole	00:08:03	13a	0

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR	SECTION NAME
ST.LOUIS	NEW HAVEN SCHOOL	09/20/2007	12	

IMAGE: 1a, TAPE #: 092007EC, 00:00:00
0FT, Inspection Begins at Upstream Manhole

IMAGE: 2a, TAPE #: 092007EC, 00:01:05
4.8FT, Light to moderate root intrusion at joint

IMAGE: 3a, TAPE #: 092007EC, 00:01:18
8.1FT, Light to moderate root intrusion at joint

IMAGE: 4a, TAPE #: 092007EC, 00:01:18
13.1FT, Light to moderate root intrusion at joint, START

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR.	SECTION NAME.
ST.LOUIS	NEW HAVEN SCHOOL	09/20/2007	12	

IMAGE: 5a, TAPE #: 092007EC, 00:02:31
53.8FT, General Condition Photo

IMAGE: 6a, TAPE #: 092007EC, 00:03:36
106.9FT, General Condition Photo

IMAGE: 7a, TAPE #: 092007EC, 00:05:44
166FT, General Condition Photo

IMAGE: 9a, TAPE #: 092007EC, 00:06:47
208.9FT, Light to moderate root intrusion at joint

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INSPECTION IMAGES

CITY	STREET	DATE:	SECTION NR.	SECTION NAME
ST.LOUIS	NEW HAVEN SCHOOL	09/20/2007	12	

IMAGE. 10a, TAPE #: 092007EC, 00:06:57
212.7FT, Light to moderate root intrusion at joint, START

IMAGE: 11a, TAPE #: 092007EC, 00:07:04
219.4FT, General Condition Photo

IMAGE. 13a, TAPE #: 092007EC, 00:08:03
246FT, Inspection Ends at Downstream Manhole

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INSPECTION REPORT

DATE.	WORK ORDER #	WEATHER.	OPERATOR:	SECTION NR:	SECTION NAME
09/20/2007		sunny, dry	ERIC	13	
PRESENT	VEHICLE.	CAMERA:	PRESET	CLEANED.	RATE:
	TV 118	OZ11 PAN	6	Light	0

STREET	NEW HAVEN SCHOOL	START DEPTH.		START MH	146
CITY	ST.LOUIS	END DEPTH:		END MH.	145
STATUS.	Complete	TAPE #	092007EC	TV'D LGTH:	233 ft

INSPECT REASON.	gen. condition control	PIPE SIZE.	8"
SECTION TYPE:	Sanitary	MATERIAL	VCP JT LGTH:
AREA		LINING	
		TV INSPECTION #.	

REMARK.

1:525 POSITION		CODE	OBSERVATION	VCR #	PH	RATE
0.00		BUMH	Inspection Begins at Upstream Manhole	00:08:22	14a, b	0
7.40		RJ1	Minor to light root intrusion at joint, at 01 o'clock	00:11:42	15a	1
22.70		RJ1	Minor to light root intrusion at joint, at 12 o'clock	00:13:25	16a	1
27.30	S1	RJ1	Minor to light root intrusion at joint, START	00:13:38	17a	1
50.30		GCP	General Condition Photo	00:14:37	18a	0
100.90		GCP	General Condition Photo	00:16:16	19a	0
116.90		RJ2	Light to moderate root intrusion at joint, at 12 o'clock	00:17:55	20a	2
146.30		SG2	Pipe sag (slight-moderate) -- 10-25% dia.	00:19:08	21a	2
150.90		GCP	General Condition Photo	00:19:36	22a	0
179.40	S2	SG2	Pipe sag (slight-moderate) -- 10-25% dia., START	00:20:36	23a	2
196.40		TF1	Tap - Factory - Fair to Good Condition, at 03 o'clock	00:21:55	24a	1
207.90		GCP	General Condition Photo	00:22:46	25a	0
216.10		RJ2	Light to moderate root intrusion at joint, at 11 o'clock	00:23:16	26a	2
231.70		CFR2	Radial Crack (slight-moderate), from 12 to 12 o'clock	00:25:47	27a	2
233.00	E2	SG2	Pipe sag (slight-moderate) -- 10-25% dia., END	00:26:12		2
233.00	E1	RJ1	Minor to light root intrusion at joint, END	00:26:22		1
233.00		EOMH	Inspection Ends at Downstream Manhole	00:26:37	30a	0

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR:	SECTION NAME:
ST.LOUIS	NEW HAVEN SCHOOL	09/20/2007	13	

IMAGE: 14a, TAPE #: 092007EC, 00:08:22
0FT, Inspection Begins at Upstream Manhole

IMAGE: 14b, TAPE #: 092007EC, 00:08:22
0FT, Inspection Begins at Upstream Manhole

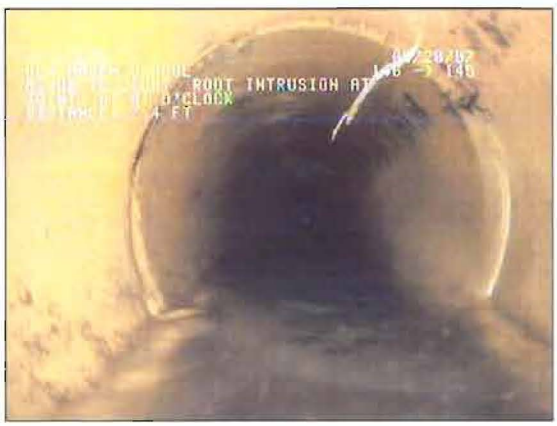

IMAGE: 15a, TAPE #: 092007EC, 00:11:42
7.4FT, Minor to light root intrusion at joint, at 01 o'clock

IMAGE: 16a, TAPE #: 092007EC, 00:13:25
22.7FT, Minor to light root intrusion at joint, at 12 o'clock

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INSPECTION IMAGES

CITY.	STREET	DATE	SECTION NR.	SECTION NAME.
ST.LOUIS	NEW HAVEN SCHOOL	09/20/2007	13	

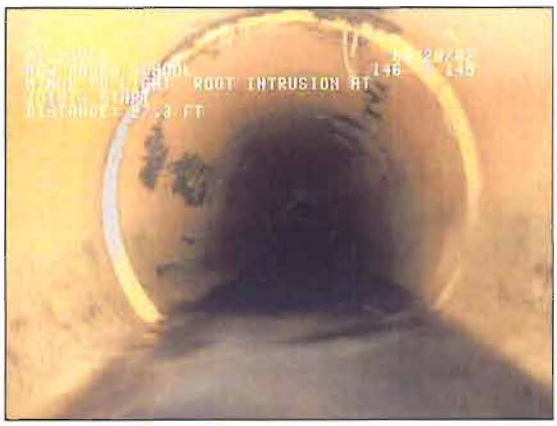

IMAGE: 17a, TAPE #: 092007EC, 00:13:38
27.3FT, Minor to light root intrusion at joint, START

IMAGE: 18a, TAPE #: 092007EC, 00:14:37
50.3FT, General Condition Photo

IMAGE: 19a, TAPE #: 092007EC, 00:16:16
100.9FT, General Condition Photo

IMAGE: 20a, TAPE # 092007EC, 00:17:55
116.9FT, Light to moderate root intrusion at joint, at 12 o'clock

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INSPECTION IMAGES

CITY	STREET	DATE	SECTION NR:	SECTION NAME
ST.LOUIS	NEW HAVEN SCHOOL	09/20/2007	13	

IMAGE: 21a, TAPE #: 092007EC, 00:19:08
146.3FT, Pipe sag (slight-moderate) -- 10-25% dia.

IMAGE: 22a, TAPE #: 092007EC, 00:19:36
150.9FT, General Condition Photo

IMAGE: 23a, TAPE #: 092007EC, 00:20:36
179.4FT, Pipe sag (slight-moderate) – 10-25% dia., START

IMAGE: 24a, TAPE #: 092007EC, 00:21:55
196.4FT, Tap - Factory - Fair to Good Condition, at 03 o'clock

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INSPECTION IMAGES

CITY.	STREET:	DATE.	SECTION NR.	SECTION NAME.
ST.LOUIS	NEW HAVEN SCHOOL	09/20/2007	13	

IMAGE: 25a, TAPE #: 092007EC, 00:22:46
207.9FT, General Condition Photo

IMAGE: 26a, TAPE #: 092007EC, 00:23:16
216.1FT, Light to moderate root intrusion at joint, at 11 o´clock

IMAGE: 27a, TAPE #: 092007EC, 00:25:47
231.7FT, Radial Crack (slight-moderate), from 12 to 12 o´clock

IMAGE: 30a, TAPE #: 092007EC, 00:26.37
233FT, Inspection Ends at Downstream Manhole

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727 North 1st Street, Suite 220
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Tel (314) 621-8393, Fax (314) 588-9781

INSPECTION REPORT

DATE:	WORK ORDER #	WEATHER	OPERATOR.	SECTION NR:	SECTION NAME:
09/20/2007		sunny, dry	ERIC	14	
PRESENT.	VEHICLE.	CAMERA	PRESET:	CLEANED:	RATE.
	TV 118	OZ11 PAN	6	Light	0

STREET.	NEW HAVEN SCHOOL	START DEPTH:		START MH.	145
CITY.	ST.LOUIS	END DEPTH		END MH	LIFT STAT#5
STATUS:	Complete	TAPE #	092007EC	TV'D LGTH.	63 ft

INSPECT REASON:	gen. condition control	PIPE SIZE	8"
SECTION TYPE	Sanitary	MATERIAL.	VCP JT LGTH
AREA		LINING	
		TV INSPECTION #	

REMARK

1:150	POSITION		CODE	OBSERVATION	VCR #	PH	RATE
145	0.00		BUMH	Inspection Begins at Upstream Manhole	00:26:47	31a, b	0
	17.30		BJ2	Slight to Moderate Crack at joint (Cracked Joint), from 10 to 05 o'clock	00:28:20	33a	2
	17.40		DJ1	Slight Dropped Joint (>90% clear)	00:28:25	34a	1
	26.20		RJ2	Light to moderate root intrusion at joint	00:29:00	36a	2
	37.00		RJ1	Minor to light root intrusion at joint	00:29:19		1
	41.10		OSJ1	Slight Offset Joint (>90% clear)	00:29:27		1
	52.10		W4	2 to 3/4-Pipe Water Depth (Camera Underwater)	00:29:54	41a	4
	57.20		PSHP	Pipe Material or Liner Change	00:30:21	42a	0
LIFT STAT#5	63.00		EDMH	Inspection Ends at Downstream LIFT STATION #5	00:31:31	44a	0

Ace Pipe Cleaning, Inc.
727 North 1st Street, Suite 220
St Louis, MO 63102
Tel (314) 621-8393, Fax: (314) 588-9781

INSPECTION IMAGES

CITY:	STREET	DATE:	SECTION NR.	SECTION NAME:
ST.LOUIS	NEW HAVEN SCHOOL	09/20/2007	14	

IMAGE: 31a, TAPE #: 092007EC, 00:26:47
0FT, Inspection Begins at Upstream Manhole

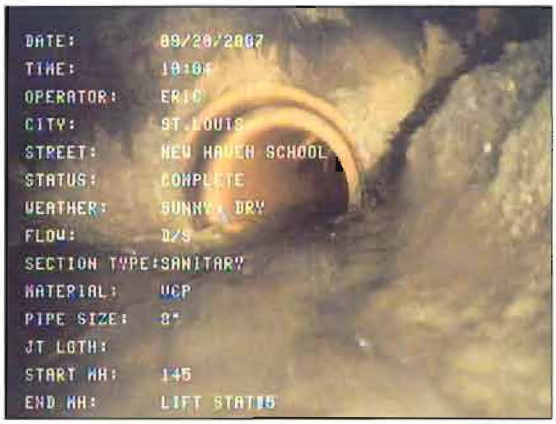

IMAGE: 31b, TAPE #: 092007EC, 00:26:47
0FT, Inspection Begins at Upstream Manhole

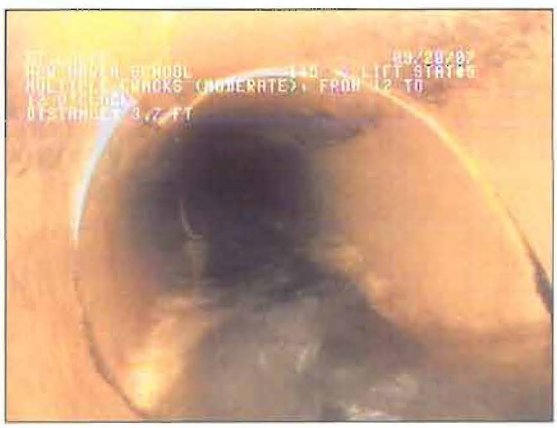

IMAGE: 32a, TAPE #: 092007EC, 00:27:51
3.7FT, Multiple Cracks (moderate), from 12 to 12 o'clock

IMAGE: 33a, TAPE #: 092007EC, 00:28:20
17.3FT, Slight to Moderate Crack at joint (Cracked Joint), from 10 to 05 o'clock

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INSPECTION IMAGES

CITY:	STREET:	DATE	SECTION NR	SECTION NAME:
ST.LOUIS	NEW HAVEN SCHOOL	09/20/2007	14	

IMAGE: 34a, TAPE #: 092007EC, 00:28:25
17.4FT, Slight Dropped Joint (>90% clear)

IMAGE: 35a, TAPE #: 092007EC, 00:28:33
19.4FT, Pipe sag (moderate) -- 25-50% dia., START

IMAGE: 36a, TAPE #: 092007EC, 00:29:00
26.2FT, Light to moderate root intrusion at joint

IMAGE: 40a, TAPE #: 092007EC, 00:29:37
47.1FT, Pipe sag (moderate) -- 25-50% dia., START

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INSPECTION IMAGES

CITY	STREET:	DATE	SECTION NR.	SECTION NAME
ST.LOUIS	NEW HAVEN SCHOOL	09/20/2007	14	

IMAGE: 41a, TAPE #. 092007EC, 00:29:54
52.1FT, 2 to 3/4-Pipe Water Depth (Camera Underwater)

IMAGE: 42a, TAPE #: 092007EC, 00:30:21
57.2FT, Pipe Material or Liner Change

IMAGE: 44a, TAPE #: 092007EC, 00:31:31
63FT, Inspection Ends at Downstream LIFT STATION #5

APPENDIX H

ANALYTICAL DATA VALIDATION REPORTS

(NOTE: VALIDATED ANALYTICAL RESULTS ARE PRESENTED AS APPENDIX I)

TASK 1 - SOIL INVESTIGATION

ORGANIC DATA QUALITY REVIEW REPORT
SW-846 METHOD 8082, 8081A

SDG: 500: 6487, 6519, 12177

PROJECT: Riverfront Superfund Site OU2/6 – Task 1 Soil Investigation for Parsons Technology Group, IL

LABORATORY: TestAmerica, Chicago, ILL

SAMPLE MATRIX: Soil SAMPLING DATE (Month/Year): September, 2007; June 2008

ANALYSES REQUESTED: SW-846 8082 and 8081A

SAMPLE NO.: 6 soil samples

DATA REVIEWER: Sammy Huntington and John Huntington

QA REVIEWER: Diane Short and Associates Inc. INITIALS/DATE: _____

Telephone Logs included Yes____ No_ X__

Contractual Violations Yes____ No _X___

The project Quality Assurance criteria, the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999, and SW-846 Methods 8081 and 8082 has been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review of these samples includes validation of all chains of custody, calibrations and QC forms referencing the QC limits in the above documents. Ten percent of the data are further reviewed for the calculation algorithms and submitted chromatograms and mass spectra as determined by the project manager. General comments regarding the data/analytical quality are part of the review when raw data are submitted.

I. DELIVERABLES

All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.
Yes __X__ No____

II. ANALYTICAL REPORT FORMS

The Analytical Report or Data Sheets are present and complete for all requested analyses.
Yes __X__ No_____

III. HOLDING TIMES

A. The contract holding times were met for all analyses (Time of sample receipt to time of extraction and from extraction to analysis)
Yes __X__ No ___

B. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (From time of sample collection to extraction).
Yes __X___ No____

C. All chains of custody are accurate with signatures and times complete.
Yes ___X__ No _____
The project manager is informed of the following and the chains are being completed for the project record.

There is a gap between relinquished and received without a FedEx air bill number. The laboratory has verified that shipping information is available for all courier services and these records are available upon request.

500-6548: Change to the body of the chain of custody without initials.
500-6487: Narrative states: "Samples P-12 used the IDs on the bottles; the COC has the same ID for both."

D. Samples were received in proper condition.
Yes __X_ No____

IV. INSTRUMENT CALIBRATION (IC) AND CONTINUING CALIBRATION (CC) VERIFICATION

A. The GC standards were analyzed at the required frequency (every 72 hours at a minimum).
Yes ___X__ No_____

B. Performance evaluation standard was run as required for pesticides, and Endrin and DDT breakdown were within limits (below 15%).
Yes ___X___ No_____ NA____

C. The chromatographic resolution and separation criteria were met.
Yes __X__ No_____

D. The suggested columns were used and the PQLs were met.
Yes __X___ No_____

E. Calibration factors for IC met the 20% RSD limit or the linear regression r > 0.995
Yes __X____ No ____

E. %D's for Continuing Calibration Factors and retention times (RT) were within the 25%D limits.
Yes ___X____ No _____

V. BLANKS

A. Laboratory blanks

1. Laboratory blanks were analyzed for every sample set and for each matrix type or once in every ten samples, whichever is more frequent.
Yes __X___ No_____

2. No blank contamination was found in the method blank.
Yes ___X__ No_____

3. Instrument blank analysis was performed following most samples that contained analytes at high concentrations.
Yes _____ No____ NA__X___
No high-concentration samples were present in the dilutions that were run.

B. Field Blanks

If field blanks were identified, no blank contamination was found.
Yes _____ No _____ NA___ X __
No field blanks are present.

VI. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

A. Matrix spike (MS) and matrix duplicate or matrix spike duplicate (MSD) were analyzed for every analyses performed and for every 20 samples or for every matrix whichever is more frequent.
Yes _____ No ___X___

No MS/MSDs are present which does not meet the 20:1 ratio. Although the Matrix Spike/Matrix Spike Duplicates did not meet the 1:20 criteria, as field duplicate(s) were supplied, the matrix precision can be evaluated and the values were acceptable.

B. The MS and MSD percent recoveries (%R) were within the limits defined by the laboratory which are the QAPP limits.
Yes _____ No____ NA _X_

C. The MSD relative percent differences (RPD) were within the defined contract or laboratory limits.
Yes _____ No____ NA _X_

D. The MS/MSD are client samples.
Yes _____ No____ NA _X_

VII. LABORATORY CONTROL SAMPLE AND DUPLICATE (LCS/LCSD)

A. Laboratory Control Sample (LCS) and LCS duplicate were analyzed for every analyses performed and for every 20 samples or for every matrix whichever is more frequent.
Yes __X___ No_____

B. The LCS percent recovery (%R) are within the limits defined by the laboratory or in the contract.
Yes __X__ No____

VIII. SURROGATE RECOVERY

A. The Surrogate spike was analyzed with every sample.
Yes ___X__ No _____

B. And met the recovery limits defined in the current contract. If recovery limits were exceeded, the sample was re-extracted and re-analyzed.
Yes __X__ No_____

IX. FIELD QC

If Field duplicates or Performance Check Compounds were identified, they met an RPD of < 35% or % recovery guidance for the project. For values reported at < 5 x the reporting limit (RL), a difference of 2 x RL is used as guidance. Data are not qualified for field duplicates as these are evaluated for the total project by the client.
Yes __X___ No_____ NA_____
One field duplicate was present in the data set. Results met the criteria.

Method	SDG	Matrix	Field Duplicate	Parent	Observations
8081A	500-6487	SOLID	P16-SS02-002.5-070911	P16-SS01-002.5-070911	OK
8082	500-6487	SOLID	P16-SS02-002.5-070911	P16-SS01-002.5-070911	OK

X. COMPOUND IDENTIFICATION

A. All raw data chromatograms and data system printouts were evaluated for all detected compounds and the identification is accurate.
Yes __X__ No ____
Per the 10% raw data review, conducted on SDG 500-12177 for 8081A and on 500-6487 for 8082.

B. Retention time limits or peak pattern identifications are met.
Yes ___X__ No____ NA_____
Per the 10% raw data review, conducted on SDG 500-12177 for 8081A and on 500-6487 for 8082.

C. Two-column confirmation was performed for all detected values.

Yes _X__ No____ NA____
Not required for PCBs (8082). Confirmation of PCB detections is by pattern matching, not second column confirmation.

D. If two column or two detector confirmation was performed, the value of the confirmation was within 25%D of the quantitation value for results > 5 x RL. If the laboratory has flagged data for %D > 40%, a JP qualifier has been added for low level results. For values below (5 x RL), the difference is not considered to impact the precision of the data.
Yes ____ No __X___ NA ____
4,4'-DDE was detected in sample MC04-SS01-001.3-080621 (lab sample 6) in SDG 500-12177 at a level just above 5x RL (54 ug/Kg). The result on the confirmation column was 7 ug/Kg, a percent difference of 87%. The result is qualified as JP87 per the above procedure.

There is significant interference in these chromatograms. Professional judgment is that the lower value should have been reported in this instance.

All other results are less than 5x RL.

XI. COMPOUND QUANTITATION AND REPORTED CRQLS
A. Raw data examination verified that all sample results were correctly calculated.
Yes __X__ No____ NA_____
Per the 10% raw data review, conducted on SDG 500-12177 for 8081A and on 500-6487 for 8082.

B. The chromatograms and general system performance were acceptable for all instruments and analytical systems.
Yes ___X__ No____
Per the 10% raw data review, conducted on SDG 500-12177 for 8081A and on 500-6487 for 8082.

XII. OVERALL ASSESSMENT OF THE CASE

Data comply with the required methods. Data are fully usable for project purposes with consideration of the following qualifications or comments.

<u>Chain of Custody and Sample Condition:</u>
The project manager is informed of the following and the chains are being completed for the project record.

There is a gap between relinquished and received without a FedEx air bill number. The laboratory has verified that shipping information is available for all courier services and these records are available upon request.

500-6548: Change to the body of the chain of custody without initials.
500-6487: Narrative states: "Samples P-12 used the IDs on the bottles, the COC has the same ID for both."

Field Duplicates:
One field duplicate was present in the data set. Results met the criteria.

Second Column Confirmation:
4,4'-DDE was detected on sample MC04-SS01-001.3-080621 (lab sample 6) in SDG 500-12177 at a level just above 5x RL (54 ug/Kg). The result on the confirmation column was 7 ug/Kg, a percent difference of 87%. The result is qualified as JP87 per the above procedure.

There is significant interference in these chromatograms. Professional judgment is that the lower value should have been reported in this instance.

All other results are less than 5x RL.

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since no reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

INORGANIC DATA QUALITY REVIEW REPORT
METALS BY ICP SW-846 METHOD 6010B AND MERCURY BY CVAA SW-846 METHOD 7471A

SDG	500-6487-1, 500-6519-1, 500-12177-1		
PROJECT	Riverfront Superfund Site OU2/6 – Task 1 Soil Investigation for Parsons, IL		
LABORATORY	TestAmerica Laboratories, Chicago		
SAMPLE MATRIX	Soil & Water	SAMPLING DATE (mo/yyyy)	September 2007 & June 2008
NO. OF SAMPLES	4 (S), 1 (S), 1 (S) = 6 soils 1 (W) = 1 aqueous sample		
ANALYSES REQUESTED	SW-846 6010B and SW-846 7471A		
SAMPLE NUMBERS	See attached results forms		
DATA REVIEWER	B. Nichols		
QA REVIEWER	Diane Short and Associates Inc.	INITIALS/DATE	

Telephone Logs included	Yes		No	×
Contractual Violations	Yes		No	×

The project QC, the EPA Contract Laboratory Program National Functional Guidelines for Inorganic Review 2002, and the SW-846 Methods and laboratory SOPs have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review includes validation of all calibrations, chains of custody, and QC forms referencing the above documents. All of the data are also further reviewed for the calculation algorithms and submitted continuing calibration blanks as determined by the Project Manager. General comments regarding the data/analytical quality are included in the review when raw data are submitted.

I. DELIVERABLES

All deliverables were present as specified in the Statement of Work (SOW) or project contract.

Yes × No ____

The following are noted for clarification:
Data were submitted for the soil samples for the ICP analysis of Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver and Zinc. Mercury was analyzed by Cold Vapor AA.
Data were submitted for the aqueous sample for the ICP analysis of Iron.
SDG 500-6487-1 was used for the full raw data review (Level IV).

II. CALIBRATIONS

A. All initial instrument calibrations were performed as defined in the SOW or project contract. All correlation coefficients of the 3 point curves were > 0.995.

Yes × No ____ N/A ____

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed at the required frequency.

Yes × No ____

Sequencing was not required, but sufficient calibrations were present to verify that the frequencies were met for client samples.

C. The ICV and CCV standard percent recovery results were within the required control limits of 90.0 – 110.0% (80 – 120 % for mercury).

Yes × No ____

III. CRDL STANDARDS

The 2 × CRDL standards were analyzed as required in the SOW.

Yes × No ____ N/A ____

IV. BLANKS

The highest blank associated with any particular analyte is used for the qualification process and is the value entered after the “B” blank descriptor.

A. The initial calibration blanks (ICB) and continuing calibration blanks (CCB) were analyzed at the required frequency.

Yes × No ____ N/A ____

Sequencing was not required, but sufficient calibration blanks were present to verify that the frequencies were met for client samples.

B. The ICB and CCB results were within the required control limits.

Yes × No ____ N/A ____

This is done as part of the 10% review of the raw data.

C. All analytes in the Leach Blank were less than the CRDL or less than 2 × the instrument detection limit (IDL or MDL), whichever is lower.

Yes _____ No _____ N/A ×

No TCLP analysis was performed.

V. PREPARATION OR METHOD BLANKS

A. Preparation or Method blanks were prepared and analyzed at the required frequency.

Yes × No _____

B. All analytes in the Preparation or Method Blank were less than the CRDL or less than the MDL, whichever is lower.

Yes _____ No ×

Analytes were found in the Method Blanks but the levels were such (result greater than 5 × blank) that qualification was not required.

C. Field, trip, decon rinse or other Field Blanks are contained and identified in the package.

Yes _____ No × N/A _____

No Field Blanks were identified for the metals analysis.

D. The reported results for the Field Blanks are less than the CRDL or less than the MDL, whichever is lower.

Yes _____ No _____ N/A ×

VI. A. ICP INTERFERENCE CHECK SAMPLE

A. The Interference Check Sample (ICS) was analyzed as required in the SOW or project contract.

Yes × No _____ N/A _____

B. The ICS percent recovery results were reported for all required ICS analytes and were within the required control limits of 80.0 – 120.0%.

Yes × No _____ N/A _____

C. ICP analysis results for analytes not required to be present in a given ICS standard were within acceptable limits.

Yes _____ No _____ N/A ×

Not applicable to limited list metals.

VI B. INTERELEMENT CORRECTION FACTORS

The Interelement Correction Factors are included and complete for all possible interferent analytes.

Yes × No _____ N/A _____

Review of other possible contaminants was not requested by the client. The full Interference table was provided, however.

VII. SPIKE SAMPLE RECOVERY

A. A Matrix (pre-digestion) Spike sample was analyzed for each digestion group and/or matrix or as required in the SOW.

Yes _____ No ×

No Matrix Spike or Matrix Spike Duplicate samples were identified or included in the data packages. Matrix effects cannot be evaluated for these matrices unless samples of similar matrix were collected for other sampling events. Although the Matrix Spike/Matrix Spike Duplicates did not meet the 1:20 criteria, as field duplicate(s) were supplied, the matrix precision can be evaluated and the values were acceptable.

B. The Matrix Spike percent recoveries were within the required control limits of 75.0 – 125.0%.

Yes _____ No _____ N/A ×

C. A Post Digestion Spike was prepared and analyzed if required.

Yes _____ No _____ N/A ×

D. The MS/MSD samples were client samples.

Yes _____ No _____ N/A ×

VIII. DUPLICATES

A. Matrix (pre-digestion) Duplicate samples were analyzed at the required frequency.

Yes _____ No ×

No Matrix Duplicate samples were identified or included in the data packages. No Matrix Duplicate samples were identified or included in the data packages. As a field duplicate was supplied, the matrix precision can be evaluated and the values were acceptable.

B. The Matrix Spike Duplicate relative percent differences (RPD) were within the required control limits (20% for water samples or 35% for soil samples) or the Reporting Limits (RL) were met if the duplicate values are less than 5 × RL (CRDL Rule). If either of the duplicate results is less than 5 × RL, the RPD is not used. The QC limit (± RL for water samples or ± 2 × RL for soil samples) used is the difference between the original and the duplicate results.

Yes _____ No _____ N/A ×

IX. LABORATORY CONTROL SAMPLE

A. Laboratory Control Samples (LCS) were analyzed at the required frequency.

Yes × No _____

B. The LCS recoveries were within the required control limits of 80.0 – 120.0%.

Yes × No _____

X. MSA RESULTS AND GRAPHITE FURNACE ANALYSIS (GFAA)

Duplicate injections were performed for all analyses and the relative standard deviations (RSD) were less than 20% for all reported results. (Method of Standard Additions (MSA) requires only a single injection).

Yes _____ No _____ N/A ×

Graphite furnace analysis was not conducted.

XI. ICP SERIAL DILUTION

A. ICP Serial Dilutions have been analyzed at the required frequency if the analyte concentrations were greater than 50 × IDL.

Yes _____ No × N/A _____

Serial Dilutions were reported from a non-client sample. Non-linear chemical or matrix effects cannot be evaluated for client samples if this sample is not provided. Only data whose values are > 50 X MDL would be impacted. This can be evaluated from the edd by searching for values > 50 x MDL. All arsenic, barium, chromium, lead and zinc reported results > 50 x MDL.

B. The percent difference (% D) criteria of ± 10.0 % were met.

Yes _____ No _____ N/A ×

C. The Serial Dilution analyses were on client samples.

Yes _____ No _____ N/A ×

XII. INSTRUMENT DETECTION LIMITS

A. The Instrument Detection Limits (IDL) have met the Quarterly reporting requirements.

Yes × No _____ N/A _____

This was determined to be acceptable during the contractual process.

B. All sample results have met the required detection limits (CRDL).

Yes × No _____ N/A _____

XIII. PREPARATION AND ANALYSIS LOGS

A. All samples were prepared and analyzed within the required holding times referenced in the SOW (time of sample receipt to preparation/distillation).

Yes × No _____

No Sampling Date was given for any of the samples on page 1 of the COC for SDG 500-6519-1. The project manager has verified that the sample date is imbedded in the sample ID which verifies the 9/12/07 date. No further action is required. The chain will be updated for this field in the project record. The laboratory listed 9/12/2007 as the Date Sampled for sample 500-6519-9, but no discussion was made in the Report Narrative.

B. All samples were analyzed within the 40 CFR 136 (Clean Water Act) or method recommended holding times (time of sample collection to date of analysis).

Yes × No _____

C. Chains of Custody (COC)

1. Chains of Custody (COC) were reviewed and all fields were complete, signatures were present and cross outs were clean and initialed.

Yes _____ No ×

The Project Manager is informed of the following and Chains of Custody are updated for the project file:

No courier airbill numbers were provided on any of the COC forms. The laboratory has verified that shipping information is available for all courier services and these records are available upon request.

SDG 500-6487-1: A cross out on page 1 of the COC was not initialed or dated. A cross out on page 2 of the COC was not dated.
SDG 500-6519-1: No Sampling Date or Matrix Type was given for any of the samples listed on page 1 of the COC. Three soil samples were incorrectly listed as aqueous samples on page 2 of the COC.
SDG 500-12177-1: No Sampling Time was given for sample 500-12177-12.

2. Samples were received at the required temperature and preservation.

Yes × No _____

XIV. FIELD QC

A. Field QC samples (duplicates, SRMs) were identified.

Yes × No _____

The following Parent Sample and associated Field Duplicate were identified.
SDG 500-6487-1
P16-SS01-002.5-070911 and P16-SS02-002.5-070911 (500-6487-9 and -08)

B. Field duplicates were within the guidance limit of < 35% RPD for water samples or < 50% RPD for soil samples. If values are less than 5 × RL, the water limit is ± 2 × RL or the soil limit is ± 4 × RL. The Project Manager will make the final determination.

Yes × No _____ N/A _____

XV. GENERAL COMMENTS

The laboratory has complied with the requested methods and the quality of the data is acceptable and usable with consideration of the following comments. No qualification has been applied.

The following are noted for clarification:
Data were submitted for the soil samples for the ICP analysis of Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver and Zinc. Mercury was analyzed by CVAA.
Data were submitted for the aqueous sample for the ICP analysis of Iron.
SDG 500-6487-1 was used for the full raw data review which is a check of the raw data, the calibration blanks and transcription for 10% of the data results per the QAPP criteria.

Qualification or Comments in Detail:

Matrix Spikes and Duplicates

No Matrix Spike or Matrix Spike Duplicate samples were identified or included in the data packages. Matrix effects and matrix precision cannot be evaluated for these matrices unless samples of similar

matrix were collected for other sampling events. As a field duplicate was supplied, the matrix precision can be evaluated and the values were acceptable.

Serial Dilution

Serial Dilutions were reported from a non-client sample. Non-linear chemical or matrix effects cannot be evaluated for client samples if this sample is not provided. Only data whose values are > 50 X MDL would be impacted. This can be evaluated from the edd by searching for values > 50 x MDL. All arsenic, barium, chromium, lead and zinc reported results > 50 x MDL.

Field Duplicates

All the Field Duplicate results were within the required laboratory control limits.

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since no reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

ORGANIC DATA QUALITY REVIEW REPORT
VOLATILE ORGANICS SW-846 METHOD 8260B,
SEMIVOLATILE ORGANICS SW-846 METHOD 8270C

SDG: VOA: 500: 6487, 6547, 6548, 6582, 6489, 6458, 12177, 6519, 6457, 6547
SVOA: 500: 6487, 6519, 12177

PROJECT: Riverfront Task 1 for Parsons Technology Group, IL

LABORATORY: TestAmerica, Chicago, ILL

SAMPLE MATRIX: Soils and Waters SAMPLING DATE (Month/Year): September 2007; June, July, 2008

ANALYSES REQUESTED: SW-846 8260B, SW-846 8270C

SAMPLE NO.: 8260B: 101 soils and 33 waters (including 9 trip blanks and 10 equipment blanks); 8270C: 6 soils

DATA REVIEWER: Sammy Huntington and John Huntington

QA REVIEWER: Diane Short and Associates Inc. INITIALS/DATE: _____

Telephone Logs included Yes____ No_ X__

Contractual Violations Yes____ No _X___

The project Quality Assurance Project Plan (QAPP), the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999, and the SW-846 Method 8260B and Method 8270C have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review of these samples includes validation of all chains of custody, calibrations and QC forms referencing the QC limits in the above documents. Ten percent of the data are further reviewed for the calculation algorithms and submitted chromatograms and mass spectra as determined by the project manager. General comments regarding the data/analytical quality are part of the review when raw data are submitted.

I. DELIVERABLES

A. All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.
Yes __X__ No ____
This report contains the review of SDG 6547, which contains both Task 1 and task 5 samples. The samples in the 2 tasks appear to share common calibration and QC data so the review of this SDG is contained in both reports.

The following is noted regarding Internal Standards. For internal standards, the forms compare the sample internal standards with the initial calibration internal standards rather than the daily standard. The validation guidance calls for comparison with the daily calibration standard. From a validation perspective the laboratory should be comparing samples with the daily standard, and daily standards should be compared with the initial calibration. Method 8260B and 8270C only require monitoring internal standards for the CCVs compared to the initial calibration. The methods only recommend monitoring for samples and do not provide requirements. The actual laboratory practice is more stringent than either validation or method requirements and no further action is required. The primary impact of this is to cause the internal standard retention times to occasionally appear to be out of the acceptance window when they are not. This is discussed in the narrative.

In SDG 500-6487, the laboratory has provided two initial calibration forms for instrument MS06. Both show identical calibration information and have the same data associated with them, but one states that the calibration was run by heated purge and one states that it was not. The laboratory has been contacted and has noted that one is for waters and the other for high level methanol. The note about heated purge is an error and the laboratory code will be corrected for the record.

In addition, it is noteworthy that the laboratory is using an initial calibration from November of 2006 for runs conducted in September of 2007, nearly a year later. It is unusual for an instrument to require no maintenance that would necessitate recalibration for that long. There is no requirement that recalibrations be done in a specific timeframe, so no qualifiers are added or action required. However, the laboratory should be able to support this long period of time between calibrations with a continuous record should it be necessary. The laboratory has verified that it can provide such records.

B. Chain of Custody Documentation was complete and accurate.
Yes __X__ No ____
The project manager is informed of the following and the chains are being completed for the project record.

There is a gap between relinquished and received without a FedEx air bill number. The laboratory has verified that shipping information is available for all courier services and these records are available upon request.

500-6548: Change to the body of the chain of custody without initials.
500-6487: Narrative states: “Samples P-12 used the ID’s on the bottles, the COC has the same ID for both.”

C. Samples were received at the required temperature, preservation and intact with no bubbles.
Yes _X__ No ___

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.
Yes __X__ No___

B. Holding Times

1. The contract holding times were met for all analyses (Time of sample receipt to time of analysis (VOA) or extraction and from extraction to analysis).
Yes ___X__ No____

2. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (14 days from time of sample collection VOA, 7 days to extraction SVOA).
Yes __X__ No ____

III. INSTRUMENT CALIBRATION - GC/MS
A. Initial Calibration
1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of >0.05.
Yes __X__ No ___ NA____

2a. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit for the CCCs.
Yes _X__ No ____ NA____

2b. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit for all other compounds or a regression curve was used.
Yes __X_ No ___ NA____

3. The 12 hour system Performance Check was performed as required in SW-846 including a check for column degradation (DDT breakdown < 20%).
Yes _X__ No_____ NA____

B. Continuing Calibration
1. The midpoint standard was analyzed for each analysis at the required frequency and the QC criteria of > 0.05 were met
Yes _____ No __X__ NA____

Acetone gave a low response factor (0.032) in one CCV. The associated sample results are qualified as JC.032 if acetone is detected, RC.032 if acetone is not detected due to the potential for low bias and false negatives.

2. The percent difference (%D) limits of $\pm$ 25% were met.
Yes ____ No ___X ___ NA___

Method 8260B: A number of CCVs had %D values out of the 25% validation limit. The outliers observed are in the table below. A negative sign indicates that the %D is indicative of a high bias. Only detected data are qualified as only detected data are quantitated. Data would only be qualified if the response factor was out indicating that the compound was not detectable at lower limits. This is not the case for any of these compounds except for one acetone which has already been qualified for low response.
Method 8270C: All %Ds are in control.

SDG	CCV Date	Lab Sam #	Analyte	RRF	%D	Qualifier
6487	9/18/07 9:34	3,5,811,12,13,14RE	Carbon disulfide		-39.5	None, ND
			Bromoform		-30.0	None, ND
6548	9/24/07 9:46	3,10,12	Acetone		43.7	None, ND
			Carbon disulfide		-30.2	None, ND

SDG	CCV Date	Lab Sam #	Analyte	RRF	%D	Qualifier
			cis-1,3-Dicloropropene		-25.6	None, ND
			trans-1,3-Dicloropropene		-25.9	None, ND
			Bromoform		-30.8	None, ND
	9/19/07 8:05	1,2,4-9,11	All in control			None
6489	9/17/07 9:51	1-9	Carbon disulfide		-29.1	None, ND
			Bromoform		-27.4	None, ND
6582	9/24/07 9:46	10	Acetone		43.7	None, ND
			Carbon disulfide		-30.2	None, ND
			cis-1,3-Dicloropropene		-25.6	None, ND
			trans-1,3-Dicloropropene		-25.9	None, ND
			Bromoform		-30.8	None, ND
12177	6/25/08 0:04	1,2,4-7,4RE,4REE	Carbon disulfide		-46.5	JC47 detect
	7/2/08 10:52	3	Acetone	.032		RC.032
6457	9/20/07 8:04	5,6	Acetone		34.7	JC35 detects
	9/19/07 14:19	4	Chloromethane		-27.3	None, ND
			Carbon disulfide		28.0	None, ND
6458	9/19/07 14:19	8RE	Chloromethane		-27.3	None, ND
			Carbon disulfide		28.0	None, ND

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB or DFTPP performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.

Yes __X__ No____ NA____

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria and the Retention times were within the required windows.

Yes ____ No __X__ NA____

Method 8260B:

Internal standard areas were out of limits for the following samples:

SDG 500-6487: Lab sample 3 ; IS1 = 45%, IS2=49%; lab sample 12 IS4 = 43%.

SDG 500-6582: Lab sample 6 (reanalyzed - reanalysis in control, no qualifiers needed).

The internal standard method is intended to compensate for variability in absolute response. This assumes that the internal standard and the associated targets vary approximately in the same manner. When the internal standard absolute response varies by more than the validation limits, the potential for bias (either high or low) can become more likely. Thus for variability such as that shown above, the associated targets are qualified as JI#, where # is the internal standard recovery. The direction of the bias cannot be inferred from the bias of the internal standard, because the effect is significant enough that it may be producing discernibly different behavior for the targets depending on the cause of the behavior. For this reason both detected and non-detected results are qualified. For sample 6487#3, the average of the IS recoveries has been used as the # in the qualifier.

Method 8270C:

Internal standard areas are in control.

VI. SURROGATE
Surrogate spikes were analyzed with every sample.
Yes __X__ No____

And met the recovery limits defined in the current contract, which are the current laboratory limits.
Yes _____ No __X___
8260B: All surrogates are in control except for one elevated recovery shown in the table below. No qualifiers are added because the potential bias is high and no targets are detected.

8270C: All surrogates are in control.

Method	SDG	Lab Sample ID	Client Sample ID	Surrogate	Results	Dil	Qualifiers
8260B	500-6548	-12	B10-EB01-070913	Dibromofluoromethane	123	1	None, ND

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE
A. Matrix spike (MS) and matrix spike duplicates (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix, whichever is more frequent.
Yes ____ No __X__
Method 8260B: There is one MS/MSDs as shown in the table which does not meet the 20 to 1 ratio criterion.
Method 8270C: There is one MS/MSDs which does meet the 20 to 1 ratio criteria.

Method	Client Sample ID (Parent)	Lab Sample ID
8260B	MC1-SS01-000.8-080621	500-12177-4
8270C	P14-SS01-003.0-070911	500-6487-4

B. The MS and MSD percent recoveries were within the limits defined in the contract, which are the current laboratory control chart limits.
Yes ___ No __X__NA ____

8260B: There are several elevated recoveries and one low recovery in the MS/MSD. The qualifiers added are summarized in the table below. Since no detections were associated with the elevated recoveries, no qualifiers are added.

8270C: The matrix spike has numerous low recoveries. The MSD has most of these same targets recovered in control. In addition, the laboratory limits have somewhat higher lower control limits than are typical for this method. Professional judgment is that there is no bias demonstrated in this case unless the recovery is out in both the MS and MSD. For this reason, only those targets have been qualified. Qualifiers added are JS#, where # is the lowest recovery observed between the MS and MSD.

Method	SDG	Parent Sample ID	Lab Sample ID	Analyte	Recovery, MS/MSD/RPD	Parent Qualifiers
8260B	500-12177	MC1-SS01-000.8-080621	4	1,1,2,2-Tetrachloroethane	52/OK/80	JS52D80
				1,1,2-Trichloroethane	OK/121/OK	None, ND
				Bromodichloromethane	OK/121/OK	None, ND
				Ethylbenzene	OK/121/OK	None, ND
				Styrene	OK/122/OK	None, ND
				Trichloroethene	175/141/OK	None, ND
				Xylenes, Total	OK/121/OK	None, ND

Method	SDG	Parent Sample ID	Lab Sample ID	Analyte	Recovery, MS/MSD/RPD	Parent Qualifiers
8270C	500-6487	P14-SS01-003.0-070911	7	1,2,4-Trichlorobenzene	58/OK/OK	None
				1,2-Dichlorobenzene	53/OK/OK	None
				1,3-Dichlorobenzene	50/OK/OK	None
				1,4-Dichlorobenzene	51/OK/OK	None
				2,2'-oxybis[1-chloropropane]	48/OK/OK	None
				2,4,5-Trichlorophenol	62/OK/OK	None
				2,4-Dichlorophenol	60/OK/OK	None
				2,6-Dinitrotoluene	62/OK/OK	None
				2-Chloronaphthalene	56/64/OK	JS56
				2-Chlorophenol	55/OK/OK	None
				2-Methylphenol	57/OK/OK	None
				2-Nitroaniline	OK/53/OK	None
				2-Nitrophenol	61/OK/OK	None
8270C	500-6487	P14-SS01-003.0-070911	7	4,6-Dinitro-2-methylphenol	26/51/66	JS26D66
8270C	500-6487	P14-SS01-003.0-070911	7	4-Bromophenyl phenyl ether	60/OK/OK	None
				4-Chloro-3-methylphenol	59/OK/OK	None
				4-Chlorophenyl phenyl ether	59/OK/OK	None
				Acenaphthene	53/62/OK	JS53
				Acenaphthylene	63/55/OK	JS55
				Anthracene	57/OK/OK	None
				Bis(2-chloroethoxy)methane	58/OK/OK	None
				Bis(2-chloroethyl)ether	48/OK/OK	None
				Bis(2-ethylhexyl) phthalate	64/OK/OK	None
				Butyl benzyl phthalate	66/OK/OK	None
				Carbazole	66/59/OK	JS59
				Dibenzofuran	56/OK/OK	None
				Diethyl phthalate	58/63/OK	JS58
				Dimethyl phthalate	66/59/OK	JS59
				Di-n-butyl phthalate	62/67/OK	JS62
				Fluoranthene	60/OK/OK	None
				Fluorene	56/OK/OK	None
				Hexachlorobenzene	61/OK/OK	None
				Hexachlorocyclopentadiene	15/OK/OK	None
				Hexachloroethane	46/OK/OK	None
				Isophorone	46/52/OK	JS46
				Naphthalene	53/OK/OK	None
				Nitrobenzene	57/OK/OK	None
				N-Nitrosodi-n-propylamine	51/OK/OK	None
				N-Nitrosodiphenylamine	56/61/OK	JS56
				Pentachlorophenol	42/OK/OK	None

Method	SDG	Parent Sample ID	Lab Sample ID	Analyte	Recovery, MS/MSD/RPD	Parent Qualifiers
				Phenanthrene	63/56/OK	JS56
				Phenol	55/OK/OK	None

C. The MSD relative percent differences (RPD) were within the defined contract limits.
Yes ___ No __X___NA____
8260B: The low recovery in the MS is associated with an MSD which is in control. Therefore the RPD is out of limits at 80% and the parent result is qualified as JD80 to indicate that the variability is greater than typical for this analyte.
8270C: One target was out of the RPD limit at 66%. This compound was qualified as JD66 since the recovery was also out in the MS and MSD.

D. The MS/MSD were client samples.
Yes _X__ No ____NA ____

VIII. LABORATORY CONTROL SAMPLE
A. A Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples.
Yes __X__ No ____
All target compounds reported were spiked.

B. The LCS percent recoveries were within the limits defined in the contract (the MS limits are used as a reference or laboratory-specific limits for this matrix are defined).
Yes ___ No __X___
8260B: Methyl isobutyl ketone and Vinyl chloride have outliers for LCS recovery. All other recoveries are in control. The vinyl chloride recovery is elevated, as are all methyl isobutyl ketone recoveries except for one. Qualifiers are not added for the high recoveries since associated samples have no detections for the impacted target compound. The low recovery is qualified JL61 for all associated samples, where the recovery in the LCS was 61%. Such results could be biased low proportional to the recovery.

The laboratory also runs LCS duplicates and has flagged a number of analytes, particularly acetone, when the RPD in the LCSD is not in control. Such outliers do not receive validation qualifiers if both recoveries are in control, which is the case.

8270C: All LCS recoveries are in control.

Method	SDG	Batch	Analyte	Recovery	Qualifiers
8260B	500-6487	22714	Methyl isobutyl ketone	130	None, ND
	500-6489	22714	Methyl isobutyl ketone	130	None, ND
	500-6519	22809	Methyl isobutyl ketone	61	JL61
	500-6547	23168	Methyl isobutyl ketone	137	None, ND
		23285	Methyl isobutyl ketone	137	None, ND
	500-6548	23161	Methyl isobutyl ketone	141	None, ND
		23161	Vinyl chloride	139	None, ND

IX. BLANKS
A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.
Yes __ X __ No ____

B. No blank contamination was found in the Method Blank.
Yes __ X __ No ____

C. If Field Blanks were identified, no blank contamination was found.
Yes ____ No __X___
Method 8260B: There are nine trip blanks and ten equipment blanks. Chloromethane was detected in two of these, and acetone in one. The only detection requiring a qualifier was the acetone detected in an equipment blank, which was associated with a sample having acetone detected at < 10x the equipment blank level. The sample result is qualified as UFB#, where # is the acetone level in the equipment blank. The result should be regarded as a non-detect.
Method 8270C: No field blanks were present.

Method	SDG	Field Blank	Lab Sample ID	Detections	Qualifiers
8260B	500-12177	MC01-TB01-080621	500-12177-12	None	None
		MC3-EB01-080621	500-12177-11	acetone 15; chloromethane 1.4	Associated acetone detection UFB15, chloromethane ND
	500-6457	T14-TB01-000.0-070910	500-6457-12	None	None
	500-6458	R17-TB01-000.0-070910	500-6458-13	None	None
	500-6487	P14-EB01-000.0-070911	500-6487-2	None	None
		P16-TB01-000.0-070911	500-6487-1	None	None
	500-6489	P6-EB01-000.0-070911	500-6489-10	None	None
		P8-TB01-000.0-070911	500-6489-11	None	None
	500-6519	C6-EB01-000.0-070912	500-6519-4	chloromethane 1.2	None, ND
		C6-TB01-000.0-070912	500-6519-1	None	None
		E2-EB01-000.0-070912	500-6519-14	None	None
	500-6547	F10-TB01-000.0-070913	500-6547-17	None	None
		K10-EB01-000.0-070913	500-6547-5	None	None
		MH156-EB01-070913	500-6547-6	None	None
	500-6548	B10-EB01-070913	500-6548-12	None	None
		E6-TB01-000.0-07913	500-6548-3	None	None
	500-6582	M10-EB01-070914	500-6582-2	None	None
			500-6582-1	None	None
		T10-EB01-070914	500-6582-3	None	None

X. FIELD QC
If Field duplicates were identified, they met a guidance RPD of < 35% for water or < 50% for soils. For values reported at < 5 x the reporting limit (RL), a difference of 2 x RL is used as guidance (4 x RL for soils). Data are not qualified for field duplicates as these are evaluated for the total project by the client.
Yes ___ No __X__ NA_____
8260B: There are 9 field duplicates. There are a few deviations from the limits above as shown in the table. This may indicate sample inhomogeneity. Particularly for SDG 6487 for the P16-SS samples, the tetrachloroethane is reported at a 10 fold dilution (23000) in the parent and at 1x (1700) in the dup. As the RL for PCE is 50, the 1700 value may have exceeded, or been near the linear range of the instrument, but was not reported as such. This can also lead to inaccurate readings.
8270C: All detections are low-level, and the duplicate meets the limits imposed.

Method	SDG	Matrix	Field Duplicate	Parent Sample	Observations
8260B	6519	Soil	B4-SS02-001.0-070912	B4-SS01-001.0-070912	OK
8260B	6547	Soil	F10-SS02-008.5-070913	F10-SS01-008.5-070913	OK
8260B	6547	Water	H10-GW02-006.4-070913	H10-GW01-006.4-070913	RPD for tetrachloroethene 53%
8260B	6582	Soil	M10-SS02-004.9-070914	M10-SS01-004.9-070914	OK
8260B	6487	Soil	P15-SS02-000.5-070911	P15-SS01-000.5-070911	OK
8260B	6487	Soil	P16-SS02-002.5-070911	P16-SS01-002.5-070911	RPD Tetrachloroethene 173% TCE Parent 140, dup ND
8260B	6457	Soil	Q17-SS02-000.5-070910	Q17-SS01-000.5-070910	OK
8260B	6489	Soil	R8-SS02-009.3-070911	R8-SS01-009.3-070911	Tetrachloroethene in sample 22, duplicate ND
8260B	6582	Soil	T10-SS02-002.0-070914	T10-SS01-002.0-070914	OK
8270C	6487	Soil	P16-SS02-002.5-070911	P16-SS01-002.5-070911	OK

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and analytical systems.

Yes _X__ No____ NA____

8260B: This is conducted on 10% basis, using SDG 500-6458 and 500-6548.

8270C: This is conducted on a 10% basis, using SDG 500-6487.

B. The suggested EQLs for the sample matrices in this set were met.

Yes __X__ No____ NA____

Five samples have been reported with dilutions of up to 10x for PCE (tetrachloroethane). The EDD does not report the 1x result for PCE, only the 10x result, which is acceptable. All other compounds are reported as required at the lowest dilution with the exception of 12177-6 (MC04-SS01-001.3-080621) which is reported only at the elevated dilution for all compounds. The lowest acceptable dilution should be reported and the laboratory did not clarify why the lower dilution was not reported.

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected compounds.

Yes __X__ No____ NA____

8260B: This is conducted on 10% basis, using SDG 500-6458 and 500-6548. There is very little interference in these chromatograms and mass spectra. Matches with target mass spectra are good, with the exception of 2-butanone. In this case the library mass spectrum is primarily of one of the cis-1,2-dichloroethene, which co-elutes with 2-butanone and the peaks for 2-butanone are obscured. The detected target is clearly 2-butanone based on its published mass spectrum.

8270C: This is conducted on a 10% basis, using SDG 500-6487. Significant interference from late-eluting hydrocarbons is present in these chromatograms and mass spectra. However, the laboratory has properly background-subtracted and the mass spectra and retention times are within acceptance windows for a match to targets.

B. Quantitation was checked to determine the accuracy of calculations for representative compounds in each internal standards quantitation set.

Yes __X__ No____ NA____

8260B: This is conducted on 10% basis, using SDG 500-6458 and 500-6548.

8270C: This is conducted on a 10% basis, using SDG 500-6487.

XIII. TENTATIVELY IDENTIFIED COMPOUNDS

TICs were properly identified and met the library identification criteria.
Yes____ No____ NA__X__
No TICs reported or requested.

XIV. OVERALL ASSESSMENT OF THE CASE

The laboratory has complied with the requested method. Data are fully usable after consideration of qualifiers.

Deliverables:
The following is noted regarding Internal Standards. For internal standards, the forms compare the sample internal standards with the initial calibration internal standards rather than the daily standard. The validation guidance calls for comparison with the daily calibration standard. From a validation perspective the laboratory should be comparing samples with the daily standard, and daily standards should be compared with the initial calibration. Method 8260B and 8270C only require monitoring internal standards for the CCVs compared to the initial calibration. The methods only recommend monitoring for samples and do not provide requirements. The actual laboratory practice is more stringent than either validation or method requirements and no further action is required. The primary impact of this is to cause the internal standard retention times to occasionally appear to be out of the acceptance window when they are not. This is discussed in the narrative.

In SDG 500-6487, the laboratory has provided two initial calibration forms for instrument MS06. Both show identical calibration information and have the same data associated with them, but one states that the calibration was run by heated purge and one states that it was not. The laboratory has been contacted and has noted that one is for waters and the other for high level methanol. The note about heated purge is an error and the laboratory code will be corrected for the record.

In addition, it is noteworthy that the laboratory is using an initial calibration from November of 2006 for runs conducted in September of 2007, nearly a year later. It is unusual for an instrument to require no maintenance that would necessitate recalibration for that long. There is no requirement that recalibrations be done in a specific timeframe, so no qualifiers are added or action required. However, the laboratory should be able to support this long period of time between calibrations with a continuous record should it be necessary. The laboratory has verified that it can provide such records.

Chain of Custody and Sample Condition:
The project manager is informed of the following and the chains are being completed for the project record.

There is a gap between relinquished and received without a FedEx air bill number. The laboratory has verified that shipping information is available for all courier services and these records are available upon request.

500-6548: Change to the body of the chain of custody without initials.
500-6487: Narrative states: “Samples P-12 used the ID’s on the bottles, the COC has the same ID for both.”

Continuing Calibrations:
Method 8260B: Acetone gave a low response factor (0.032) in one CCV. The associated sample results are qualified as JC.032 if acetone is detected, RC.032 if acetone is not detected due to the potential for low bias and false negatives.
A number of CCVs had %D values out of the 25% validation limit. The outliers observed are in the table in the text. A negative sign indicates that the %D is indicative of a high bias. Data would only be qualified if the

response factor was out indicating that the compound was not detectable at lower limits. This is not the case for any of these compounds except for one acetone which has already been qualified for low response.

Method 8270C: All %Ds are in control.

Internal Standards:
Method 8260B:
Internal standard areas were out of limits for the following samples:
SDG 500-6487: Lab sample 3 IS1 = 45%, IS2=49%; lab sample 12 IS4 = 43%.
SDG 500-6582: Lab sample 6 (reanalyzed - reanalysis in control, no qualifiers needed).

The internal standard method is intended to compensate for variability in absolute response. This assumes that the internal standard and the associated targets vary approximately in the same manner. When the internal standard absolute response varies by more than the validation limits, the potential for bias (either high or low) can become more likely. Thus for variability such as that shown above, the associated targets are qualified as JI#, where # is the internal standard recovery. The direction of the bias cannot be inferred from the bias of the internal standard, because the effect is significant enough that it may be producing discernibly different behavior for the targets depending on the cause of the behavior. For this reason both detected and non-detected results are qualified.

Method 8270C:
Internal standard areas are in control.

Surrogates:
8260B: All surrogates are in control except for one elevated recovery shown in the table within the body of this report. No qualifiers are added because the potential bias is high and no targets are detected.

8270C: All surrogates are in control.

Field Blanks:
Method 8260B: There are nine trip blanks and ten equipment blanks. Chloromethane was detected in two of these, and acetone in one. The only detection requiring a qualifier was the acetone detected in an equipment blank, which was associated with a sample having acetone detected at < 10x the equipment blank level. The sample result is qualified as UFB#, where # is the acetone level in the equipment blank. The result should be regarded as a non-detect.
Method 8270C: No field blanks were present.

LCS Recoveries:
8260B: Methyl isobutyl ketone and vinyl chloride have outliers for LCS recovery. All other recoveries are in control. The vinyl chloride recovery is elevated, as are all methyl isobutyl ketone recoveries except for one. Qualifiers are not added for the high recoveries since associated samples have no detections for the impacted target compound. The low recovery is qualified JL61 for all associated samples, where the recovery in the LCS was 61%. Such results could be biased low proportional to the recovery.

The laboratory also runs LCS duplicates and has flagged a number of analytes, particularly acetone, when the RPD in the LCSD is not in control. Such outliers do not receive validation qualifiers if both recoveries are in control, which is the case.

8270C: All LCS recoveries are in control.

Matrix Spikes:

8260B: There are several elevated recoveries and one low recovery in the MS/MSD. The qualifiers added are summarized in the table below. Since no detections were associated with the elevated recoveries, no qualifiers are added.

The low recovery in the MS is associated with an MSD which is in control. Therefore the RPD is out of limits at 80% and the parent result is qualified as JD80 to indicate that the variability is greater than typical for this analyte.

8270C: The matrix spike has numerous low recoveries. The MSD has most of these same targets recovered in control. In addition, the laboratory limits have somewhat higher lower control limits than are typical for this method. Professional judgment is that there is no bias demonstrated in this case unless the recovery is out in both the MS and MSD. For this reason, only those targets have been qualified. Qualifiers added are JS#, where # is the lowest recovery observed between the MS and MSD.

One target was out of the RPD limit at 66%. This compound was qualified as JD66 since the recovery was also out in the MS and MSD.

Field Duplicates:

8260B: There are 9 field duplicates. There are a few deviations from the limits above as shown in the table within the body of this report. This may indicate sample inhomogeneity. Particularly for SDG 6487 for the P16-SS samples, the tetrachloroethane is reported at a 10 fold dilution (23000) in the parent and at 1x (1700) in the dup. As the RL for PCE is 50, the 1700 value may have exceeded, or been near the linear range of the instrument, but was not reported as such. This can also lead to inaccurate readings.

8270C: All detections are low-level, and the duplicate meets the limits imposed.

Target Compound Identification:

8260B: This is conducted on 10% basis, using SDG 500-6458 and 500-6548. There is very little interference in these chromatograms and mass spectra. Matches with target mass spectra are good, with the exception of 2-butanone. In this case the library mass spectrum is primarily of one of the cis-1,2-dichloroethene, which co-elutes with 2-butanone and the peaks for 2-butanone are obscured. The detected target is clearly 2-butanone based on its published mass spectrum.

8270C: This is conducted on a 10% basis, using SDG 500-6487. Significant interference from late-eluting hydrocarbons is present in these chromatograms and mass spectra. However, the laboratory has properly background-subtracted and the mass spectra and retention times are within acceptance windows for a match to targets.

Sample Dilutions:

Five samples have been reported with dilutions of up to 10x for PCE (tetrachloroethane). The EDD does not report the 1x result for PCE, only the 10x result, which is acceptable. All other compounds are reported as required at the lowest dilution with the exception of 12177-6 (MC04-SS01-001.3-080621) which is reported only at the elevated dilution for all compounds. The lowest acceptable dilution should be reported and the laboratory did not clarify why the lower dilution was not reported.

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since only 2 data points have reported results that are qualified as unusable (rejected) the overall completeness for the sampling event is rounded to 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

TASK 2B – DIRECT-PUSH SAMPLING

ORGANIC DATA QUALITY REVIEW REPORT
VOLATILE ORGANICS BY SW-846 METHOD 8260B

SDG	500-11379-1, 500-11381-1, 500-11402-1, 500-18318-1, 500-18367-1		
PROJECT	Riverfront Superfund Site – Task 2b for Parsons Technology, IL		
LABORATORY	TestAmerica Laboratories, Chicago		
SAMPLE MATRIX	Water	SAMPLING DATE (mo/yyyy)	May 2008 & Apr 2009
NO. OF SAMPLES	5 (W), 2 (W), 2 (W), 8 (W), 5 (W) = 22 aqueous samples, including 4 trip blanks		
ANALYSES REQUESTED	SW-846 8260B		
SAMPLE NUMBERS	See attached results forms		
DATA REVIEWER	B. Nichols		
QA REVIEWER	Diane Short and Associates Inc.	INITIALS/DATE	

Telephone Logs included Yes____ No_ X__

Contractual Violations Yes____ No _X__

The project Quality Assurance Project Plan (QAPP), the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999, and the SW-846 Method 8260B has been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review of these samples includes validation of all chains of custody, calibrations and QC forms referencing the QC limits in the above documents. Ten percent of the data are further reviewed for the calculation algorithms and submitted chromatograms and mass spectra as determined by the Project Manager. General comments regarding the data/analytical quality are part of the review when raw data are submitted.

I. DELIVERABLES

A. All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.
Yes __X__ No ____

The following are noted for clarification:
Data were submitted for the aqueous samples for Volatile Organic (VOA) analyses. Four of the aqueous samples were designated as trip blanks. QC Prep Batch 500-38849 in SDG 500-11379-1 was used for the full raw data review (Level IV) for the VOA analyses.

B. Chain of Custody Documentation was complete and accurate.
Yes __X__ No____

The Project Manager is informed of the following and Chains of Custody are updated for the project file:
The Client Sample ID for Lab Sample 500-11379-6 was incorrectly listed on the laboratory report forms as "CSN2-GW01-027.4-080515." The Client Sample ID given on the COC for SDG 500-11379-1 is "CSN2-GW01-027.4-080514." Any reference to Lab Sample 500-11379-6 in this report will use the COC designation.

C. Samples were received at the required temperature, preservation and intact with no bubbles.
Yes __X__ No ____

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.
Yes __X__ No___

B. Holding Times
1. The contract holding times were met for all analyses (time of sample receipt to time of analysis (VOA) or extraction (SVOA), and time from extraction to analysis).
Yes __X__ No____

2. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (14 days from time of sample collection for VOA or 7 days to time of extraction for SVOA).
Yes __X__ No ____

III. INSTRUMENT CALIBRATION - GC/MS

A. Initial Calibration
1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of > 0.05.
Yes ____ No ___X ___ NA___

SDG	ICV Date	Analyte	RRF	Qualifier
500-18318-1	4/14/2009	Acetone	0.0372	JC0.0372 detects, URC.0372 NDs
500-18367-1				

Detected data are qualified "JC#," and undetected data "RC#", where # is the value of the average initial response factors. The data could be false non-detects if biased low due to the lack of sensitivity for the qualified compound.

2a. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit for the CCCs.

Yes __X__ No ___ NA____

2b. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit for all other compounds or a regression curve was used.
Yes __X__ No ___ NA____

3. The 12 hour System Performance Check was performed as required in SW-846 including a check for column degradation (DDT breakdown < 20%).
Yes __X__ No ___ NA____

A column degradation check is not required for Method 8260.

B. Continuing Calibration
1. The midpoint standard was analyzed for each analysis at the required frequency, and the QC criterion of RRF > 0.05 was met.
Yes ____ No ___X ___ NA___

The RRF for Acetone in SDG 500-18367-1 did not meet the criterion, but as the associated sample results have been qualified based on the ICV (please refer to Section III. A. 1), no qualification has been applied.

2. The percent difference (% D) limits of ± 25% were met.
Yes ____ No ___X ___ NA___

Several CCVs had % D values outside of the 25% limit. The outliers observed are presented in the following table. A negative sign indicates that the % D is indicative of a high bias.

SDG	CCV Date	Analyte	% D	Qualifier
500-11379-1	5/27/2008	Bromomethane	31.9	None (all samples ND)
500-11381-1	5/23/2008	Chloroethane	-28.0	None (all samples ND)
		Carbon disulfide	-35.3	None (all samples ND)
500-18318-1	4/29/2009	Chloromethane	28.4	None (all samples ND)
		Bromomethane	33.9	None (all samples ND)
		Acetone	44.4	JC44 detects
		Methylene chloride	31.9	None (all samples ND)
		Methyl ethyl ketone	28.8	None (all samples ND)
500-18367-1	4/30/2009	Chloroethane	36.1	None (all samples ND)
	5/01/2009	Carbon disulfide	-26.4	None (all samples ND)

Data are qualified "JC#," where # is the % D value. The data may be biased low due to calibration inconsistencies. Only detected data are qualified.

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.
Yes __X__ No ___ NA____

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria, and the retention times were within the required windows.
Yes __X__ No ___ NA____

VI. SURROGATE STANDARDS

Surrogate spikes were analyzed with every sample.
Yes __X__ No____

And met the recovery limits defined in the current contract, which are the current laboratory limits.
Yes __X__ No____

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix Spike (MS) and Matrix Spike Duplicate (MSD) samples were analyzed for every analysis performed and for every 20 samples or for every matrix, whichever is more frequent.
Yes __X__ No____

The following table contains the MS/MSD samples prepared and analyzed for the SDGs associated with this report.

SDG	Matrix	Client Sample ID	Lab Sample ID
500-11379-1	Water	CSN2-GW01-027.4-080514	500-11379-6
500-18318-1	Water	CSE07-GW01-029.5-090416	500-18318-5

B. The MS and MSD percent recoveries (% R) were within the limits defined in the contract, which are the current laboratory control chart limits.
Yes ____ No ___X ___ NA___

The following Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries were outside the limits.

SDG	Matrix	Parent Sample	Analyte	MS/MSD Recoveries	Qualifier
500-11379-1	Water	CSN2-GW01-027.4-080514	Acetone	-18/-19	JMS0
500-18318-1	Water	CSE07-GW01-029.5-090416	1,1,2-Trichloroethane	131/138	None (sample ND)

Data which do not meet the MS/MSD required recoveries are qualified "JMS#," where # is the value of the spike recovery. Only the parent sample is qualified for organic analyses. All data are qualified for low spike values. Only detected data are qualified for high spike values. When a spike is < 30% R, data are qualified "JMS#" for detected values or are rejected ("RMS#") for samples with non-detect values. A low Matrix Spike recovery indicates a possible low bias to the reported result. A high Matrix Spike recovery indicates a potential high bias. When four times (4 ×) the spike amount is less than the concentration of the analyte in the parent sample, no qualification is required as the recovery is statistically invalid. This latter condition was observed for Tetrachloroethene in SDG 500-11379-1 and in SDG 500-18318-1. The 4x spike is close for acetone, but still within the 4 x limit.

C. The MSD relative percent differences (RPD) were within the defined contract limits.
Yes __X__ No ___ NA____

D. The MS/MSD samples were client samples.
Yes __X__ No ___ NA____

VIII. LABORATORY CONTROL SAMPLE

A. A Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples.
Yes __X__ No____

All target compounds reported were spiked.

B. The LCS percent recoveries were within the limits defined in the contract. The Matrix Spike limits are used as a reference or laboratory-specific limits for each matrix are defined.
Yes ____ No__X__

SDG	Matrix	QC Prep Lot	Analyte	% R	Qualifier
500-11402-1	Water	500-38520	1,1-Dichloroethane	66	UJL66

Data which exceed the percent recovery (% R) limit are qualified "JL#," where # is the value of the spike recovery. Data could be biased low proportional to the spike recovery.

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.
Yes __X__ No____

B. No blank contamination was found in the Method Blank.
Yes ____ No__X__

Methylene chloride was detected in the Method Blank for QC Prep Lot 500-62888 for SDG 500-18367-1, but as the associated samples were non-detect for this target compound, no qualification has been applied.

C. If Field Blanks were identified, no blank contamination was found.
Yes __X__ No____

The trip blanks for VOA analysis were identified per the client as follows:
SDG 500-11379-1 MW6-TB01-080514
SDG 500-11402-1 CSN5-TB01-080516
SDG 500-18318-1 CSE04-TB01-090415
SDG 500-18367-1 CSE10-TB01-090417

X. FIELD QC

If Field duplicates were identified, they were within the guidance limit of < 30% RPD for water samples or < 50% RPD for soil samples. If values are less than 5 × RL, the water limit is ± 2 × RL or the soil limit is ± 4 × RL (CRDL Rule). Data are not qualified for field duplicates as these are evaluated for the total project by the client.

Yes ____ No ___X ___ NA___

Field duplicates were identified as follows:
SDG 500-11379-1 CSN2-GW01-027.4-080514 and CSN2-GW02-027.4-080514 (500-11379-6 and -4)
SDG 500-18318-1 CSE07-GW01-029.5-090416 and CSE07-GW02-029.5-090416 (500-18318-5 and -6)

SDG	Matrix	Parent Sample	Analyte	Observation
500-11379-1	Water	CSN2-GW01-027.4-080514	Acetone	JFD35
			1,2-Dichloroethene, total	PASS
			Trichloroethene	PASS
			Tetrachloroethene	FD55
500-18318-1	Water	CSE07-GW01-029.5-090416	1,2-Dichloroethene, total	PASS
			Trichloroethene	PASS
			Tetrachloroethene	PASS

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and analytical systems.
Yes __X__ No ___ NA____

Part of the Level IV review.

B. The suggested EQLs for the sample matrices in this set were met.
Yes __X__ No ___ NA____

Tetrachloroethene (PCE) has been diluted and reported at elevated reporting levels in several samples and the undiluted value for PCE is not reported for these samples (no 'E' laboratory flags). All other compounds have been reported at the undiluted value. The PCE has been diluted to bring it into linear range of the instrument.
There are also several 12 samples that are reported at dilutions of 5 to 100 for all compounds, which elevates the reporting limits proportionately. These dilutions appear to have been performed due to matrix interferences. Dilution is allowed per the method if clean up is not requested or possible due to the type of matrix interference.

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected compounds.
Yes __X__ No ___ NA____

Part of the Level IV review.

B. Quantitation was checked to determine the accuracy of calculations for representative compounds in each internal standards quantitation set.
Yes __X__ No ___ NA____

Part of the Level IV review.

XIII. TENTATIVELY IDENTIFIED COMPOUNDS

TICs were properly identified and met the library identification criteria.
Yes ____ No ___ NA__X__

No TICs reported or requested.

XIV. OVERALL ASSESSMENT OF THE CASE

The laboratory has complied with the requested method. Data are fully usable after consideration of qualifiers.

Deliverables

The following are noted for clarification:

Data were submitted for the aqueous samples for Volatile Organic (VOA) analyses. Four of the aqueous samples were designated as trip blanks. QC Prep Batch 500-38849 in SDG 500-11379-1 was used for the full raw data review (Level IV) for the VOA analyses.

Chain of Custody and Holding Times

The Project Manager is informed of the following and Chains of Custody are updated for the project file:

The Client Sample ID for Lab Sample 500-11379-6 was incorrectly listed on the laboratory report forms as "CSN2-GW01-027.4-080515." The Client Sample ID given on the COC for SDG 500-11379-1 is "CSN2-GW01-027.4-080514." Any reference to Lab Sample 500-11379-6 in this report will use the COC designation.

Initial Calibration

Acetone data are qualified "JC#," or "RC#" where # is the value of the average initial response factors. The data could be false non-detects if biased low due to the lack of sensitivity for the qualified compound.

Continuing Calibration

The RRF for Acetone in SDG 500-18367-1 did not meet the criterion, but as the associated sample results have been qualified based on the ICV (please refer to Section III. A. 1), no qualification has been applied.

Several CCVs had % D values outside of the 25% limit. The outliers observed are presented in the associated table. A negative sign indicates that the % D is indicative of a high bias. Data are qualified "JC#," where # is the % D value. The data may be biased low due to calibration inconsistencies. Only detected data are qualified.

Matrix Spikes and Duplicates

Data which do not meet the MS/MSD required recoveries are qualified "JMS#," where # is the value of the spike recovery. Only the parent sample is qualified for organic analyses. All data are qualified for low spike values. Only detected data are qualified for high spike values. When a spike is < 30% R, data are qualified "JMS#" for detected values or are rejected ("RMS#") for samples with non-detect values. A low Matrix Spike recovery indicates a possible low bias to the reported result. When four times (4 ×) the spike amount is less than the concentration of the analyte in the parent sample, no qualification is required as the recovery is statistically invalid. This latter condition was observed for Tetrachloroethene in SDG 500-11379-1 and in SDG 500-18318-1.

Laboratory Control Samples

Data which exceed the percent recovery (% R) limit are qualified "JL#," where # is the value of the spike recovery. Data could be biased low proportional to the spike recovery.

Method Blank

Methylene chloride was detected in the Method Blank for QC Prep Lot 500-62888 for SDG 500-18367-1, but as the associated samples were non-detect for this target compound, no qualification has been applied.

Field Blanks

The trip blanks for VOA analysis were identified per the client as follows:
SDG 500-11379-1 MW6-TB01-080514

SDG 500-11402-1 CSN5-TB01-080516
SDG 500-18318-1 CSE04-TB01-090415
SDG 500-18367-1 CSE10-TB01-090417

Reporting Limits

Tetrachloroethene (PCE) has been diluted and reported at elevated reporting levels in several samples and the undiluted value for PCE is not reported for these samples (no 'E' laboratory flags). All other compounds have been reported at the undiluted value. The PCE has been diluted to bring it into linear range of the instrument.
There are also several 12 samples that are reported at dilutions of 5 to 100 for all compounds, which elevates the reporting limits proportionately. These dilutions appear to have been performed due to matrix interferences. Dilution is allowed per the method if clean up is not requested or possible due to the type of matrix interference.

Field QC

Field duplicates were identified as follows:
SDG 500-11379-1 CSN2-GW01-027.4-080514 and CSN2-GW02-027.4-080514 (500-11379-6 and -4)
SDG 500-18318-1 CSE07-GW01-029.5-090416 and CSE07-GW02-029.5-090416 (500-18318-5 and -6)

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since 11 of 726 reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is 98.5 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

TASK 2C – RESIDENTIAL WELL SAMPLING

ORGANIC DATA QUALITY REVIEW REPORT
VOLATILE ORGANICS, EPA Method 524.2

SDG: 500-10072, 500-10541, 500-10929, 500-11380, 500-11671, 500-9986, 500-9940, 500-9794

PROJECT: Riverfront Superfund Site OU2/6, Task 2C Residential Wells for Parsons Technology, IL

LABORATORY: Test America Laboratories-Chicago, IL

SAMPLE MATRIX: Waters SAMPLING DATE (Month/Year) March , April , May 2008

ANALYSES REQUESTED: Method 524.2

SAMPLE NO.: 43 waters including 6 trip blanks

DATA REVIEWER: Sammy Huntington and John Huntington

QA REVIEWER: Diane Short and Associates Inc. INITIALS/DATE: _____

Telephone Logs included Yes____ No _X__

Contractual Violations Yes____ No _X___

The Quality Assurance Project Plans (QAPP) , the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999, Method 524.2 have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review includes validation of all chains of custody, calibrations and QC forms referencing the above documents. All of the data are further reviewed for the calculation algorithm and submitted chromatograms and mass spectra as determined by the project manager. General comments regarding the data/ analytical quality are part of the review when raw data are submitted.

I. DELIVERABLES

A. All deliverables were present as specified in the Statement of Work (SOW), or in the project contract.

Yes __X___ No__

SDG 500-9794 has been reviewed only for the samples requested by the project manager. This review is an update to the August 2008 original report.

B. Chain of Custody Documentation was complete and accurate.

Yes __X__ No__ ___

The project manager is informed of the following and the chains are being completed for the project record.

500-10072: There is no received signature, date or time. There are changes to the body of the chain of custody without initials.
500-10541: There are no answers on the sample receiving checklist.
500-11671: There is no sample receiving checklist.
500-11380: There is a second received signature, date and time 4 days after the first. There is no indication in the narrative of the significance of this. The sample receipt date shown on the reports is the first one.
500-9794: There are 3 chains of custody in the data package, one for fecal coliform and 2 for method 524.2. There is no date of receipt on one of these chains and a date of 3/1/08 on the other. The result forms list 2/29/08 as the receipt date. The project manager has been contacted and verified that the complete chain is in the project record. The date on the result forms need to be updated to 3/1/08. This has been done manually by the reviewer.

There was a gap in time between relinquished and received for all SDGs. The samples were delivered by FEDEX, but there is no air bill number. The laboratory has verified that shipping information is available for all courier services and these records are available upon request.

The sample receiving checklists do not include a date or time, although they are cross-referenced to the SDG which is noted on each chain of custody. There is no signature on the sample receiving checklist although the creator of the list is indicated by name.

C. Samples were received at the required temperature, preservation and intact with no bubbles.

Yes ___ No __X___

500-10929: Stated on the Narrative: The following samples(s) was received with headspace in the ample vial: JS25-GW01-080425 and JS25-TB01-080425. The first sample listed had one sample vial with headspace. The Trip blank had headspace in both sample vials. This information is not listed on the sample receiving checklist. The trip blank results are qualified as JQ to indicate a potential bias due to headspace. The second vial with no headspace was chosen for the other samples.

500-9794 – The exact temperature and sample condition was not noted nor the usual checklist filled out. The lab provided a narrative type of list that noted all criteria were met.

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes __ __ No __X__

SDG 500-9794: the sample receipt date is incorrect and has been hand corrected by the reviewer.

B. Holding Times
1. The contract holding times were met for all analyses (Time of sample receipt to time of analysis).
Yes __X__ No ____

2. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (14 days from time of sample collection to analysis for VOA).
Yes __X__ No ____
Samples were preserved with HCl. Method 524.2 allows 14 days hold time when this is done. All analyses were conducted in less than 14 days from sampling.

III. INSTRUMENT CALIBRATION
A. Initial Calibration
1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of >0.05.
Yes ____ No _X__ NA____
All initial calibration response factors were above 0.05 except for 1,2-dibromo-3-chloropropane. Non-detects for this compound are qualified as RC.#, where # is the response factor. This indicates a potential for false negatives due to low response.

SDG	ICAL Date	Analyte	RRF	Qualifier
500-10072	1/18/08 22:44	1,2 Dibromo-3-chloropropane	.048	RC.032
	3/21/08 23:53	1,2 Dibromo-3-chloropropane	.034	RC.032
500-10541	3/21/08 23:53	1,2 Dibromo-3-chloropropane	.034	RC.032

2. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit for the CCCs .
Yes ___ No____ NA__X__
Although this criterion has been met, it is not a requirement for Method 524.2.

2b. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit or a linear curve was used and met the 0.990 limit.
Yes __ X __ No__ NA____

C. Continuing Calibration
1. The RRF 50 standards were analyzed for each analysis at the required frequency and the validation QC criteria of > 0.05 were met for GC/MS.
Yes ____ No __ X __ NA____
The table in section 2 shows that a number of targets had response factors falling below 0.05 in the CCVs. Where not already qualified from the initial calibration, the samples are qualified as RC# for non-detects, JC# for detects, where # is the response factor observed. Such results may have a probability of bias or false negatives if the compound is expected to be present in the samples.

2. The percent difference (%D) validation limits of $\pm$ 25% were met.
Yes _____ No__ X _ NA___
The method limit for %D is 30%. This has been met in all cases. The validation limit of 25% was not met in one instance for 1,2,4 and 1,2,3-trichlorobenzene and chloromethane. These compounds are not detected, and the bias observed is high. Therefore there are no qualifiers applied for this. For SDG 500-5794, there was a calibration on 3/6/08 and only PCE was reported or reviewed from that analysis.

SDG	CCV Date	Lab Sam #	Analyte	%D	RRF	Qualifier
500-10072	3/18/08 16:07	All	1,2 Dibromo-3-chloropropane		.050	From ICAL
	3/22/08 2:49	3,4	Bromomethane		.029	RC.029
			1,2 Dibromo-3-chloropropane		.029	From ICAL
500-10541	4/10/08 21:56	All	1,2 Dibromo-3-chloropropane		.027	From ICAL
			1,2,4 Trichlorobenzene	-28.7		None, ND
			1,2,3-Trichlorobenzene	-29.5		None, ND
500-10929	5/6/08 16:03	All	Bromomethane		.032	RC.032
500-11380	5/21/08 18:53	All	Bromomethane		.029	RC.029
500-11671	5/30/08 10:04	All	Bromomethane		.037	RC.037
500-9986	3/12/08 20:14	All	Bromomethane		.049	RC.049
500-9940	3/10/08 18:59	All	Bromomethane		.029	RC.029
500-9794	3/4/08	1-11, at X1	Bromomethane		.040	RC.04
			Chloromethane	-29		None, ND
			1,2 Dibromo-3-chloropropane		0.048	RC.048
	3/5/08	14 – 22	Bromomethane		0.032	RC.032
			Chloromethane		-25.6	None, ND

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.

Yes __X___ No____ NA____

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria and the Retention times were within the required windows.

Yes __ X __ No ____ NA____

VI. SURROGATE

A. Surrogate spikes were analyzed with every sample for both methods.

Yes __X___ No____

B. And met the recovery limits defined in the current contract, which are the current laboratory limits.

Yes __X__ No _____

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix spike (MS) and matrix spike duplicates (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ___X__ No __ __

There were two MS/MSDs which meets the 1:20 ratio. For SDG 500-9794, the MS/MSD was not one of the samples designated for review, but a client sample was used.

SDG	Client Sample ID	Lab Sample ID	Prep Date
500-10072	JS37-GW01-080314	500-10072-3	3/19/2008
	JS50-GW01-080314	500-10072-2	3/19/2008

B. The MS and MSD percent recoveries were within the limits defined in the contract, which are the current laboratory control chart limits.
Yes ___ No__ X __ NA___

SDG	Batch	Lab Sample ID	Analyte	MD/MSD/RPD	Qualifiers
500-10072		2		All in control	
		3	Tetrachloroethene	OK/66/OK	None 4x

Data were not qualified as there were high levels of the compound in the sample and the spike recovery x 4 was less than the amount in the parent thus the recovery is not statistically valid. This is in concurrence with the EPA NFG criteria for spike assessment.

C. The MSD relative percent differences (RPD) were within the defined contract limits.
Yes __ X __ No ___NA___

D. The MS/MSD were client samples.
Yes __ X __ No ___NA___

VIII. LABORATORY CONTROL SAMPLE

A. A Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples.
Yes __X__ No ____

B. The LCS percent recoveries were within the limits defined in the contract (the MS limits used as a reference or laboratory-specific limits for this matrix are defined).
Yes _____ No _ X __
Bromomethane is elevated in one LCS. No qualifiers are added since the analyte is not detected in associated samples.

SDG	Lab Sam #	Analyte	LCS/LCSD/RPD	Qualifiers
500-11671	All	Bromomethane	131	None, ND

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.
Yes ___X _ No ___

B. No blank contamination was found in the Method Blank.
Yes ____ No__ X __
Naphthalene is detected at a level below the reporting limit in several method blanks. The associated samples have no detections of this compound, so no qualifiers are required.

SDG	Analyte	Result	Qualifier
500-10541	Naphthalene	0.43J	None, ND
500-10072	Naphthalene	0.37J	None, ND

C. If Field Blanks were identified, no blank contamination was found.
Yes __ X ___ No ____ NA___

There were six trip blanks. No detections were observed in any.

SDG	Client Sample ID	Lab Sample ID
500-10541	JS44-TB01-080409	500-10541-1
500-1072	JS50-TB01-080314	500-10072-1
500-10929	JS25-TB01-080425	500-10929-2
500-9940	JS07-TB01-080306	500-9940-1
500-9986	JS33-TB01-080311	500-9986-1
500-9794	MW2R TB01-000.0-080228	500-9794-22

X. FIELD QC

If Field duplicates were identified, they met a guidance RPD of < 35% for water or < 50% for soils. For values reported at < 5 x the reporting limit (RL), a difference of 2 x RL is used as guidance (3.5 x RL for soils). Data are not qualified for field duplicates as these are evaluated for the total project by the client.

Yes __X__ No ____ NA__ __

There are four field duplicates, all in control.

SDG	Duplicate	Parent	Observations
500-9986	JS10-GW02-080311	JS10-GW01-080311	Meets Criteria
500-10072	JS37-GW02-080314	JS37-GW01-080314	Meets Criteria
500-9794	JS36-INF-GW01-080228	JS36-INF-GW02-080228	Meets Criteria
	JS38-INF-GW01-080228	JS38-INF-GW01-080228	Meet Criteria

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and GC/MS analytical systems.

Yes __X__ No____ NA____

At the 10% review level, conducted on SDG 500-10072 and 500-9794.

B. The suggested EQL's for the sample matrices in this set were met.

Yes __X__ No____ NA____

Two PCE results exceeded the linear range and have been qualified JE . Both diluted and undiluted results are reported. Only PCE should be used at the diluted value. All others should be used at the lowest dilution (x1).

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected GC/MS compounds.

Yes __X__ No ____ NA____

At the 10% review level, conducted on SDG 500-10072 and 500-9794.

B. Quantitation was checked to determine the accuracy of calculation algorithm for each method and transcription was checked for all detected compounds.

Yes __X_ No ____ NA____

At the 10% review level, conducted on SDG 500-10072 and 500-9794.

XIII. OVERALL ASSESSMENT OF THE CASE

SDG 500-9794 has been reviewed only for the samples requested by the project manager. This review is an update to the August 2008 original report.

Chain of Custody and Sample Condition:
The project manager is informed of the following and the chains are being completed for the project record.

500-10072: There is no received signature, date or time. There are changes to the body of the chain of custody without initials.
500-10541: There are no answers on the sample receiving checklist.
500-11671: There is no sample receiving checklist.
500-11380: There is a second received signature, date and time 4 days after the first. There is no indication in the narrative of the significance of this. The sample receipt date shown on the reports is the first one.
500-9794: There are 3 chains of custody in the data package, one for fecal coliform and 2 for method 524.2. There is no date of receipt on one of these chains and a date of 3/1/08 on the other. The result forms list 2/29/08 as the receipt date. The project manager has been contacted and verified that the complete chain is in the project record. The date on the result forms need to be updated to 3/1/08. This has been done manually by the reviewer.
500-9794 – The exact temperature and sample condition was not noted nor the usual checklist filled out. The lab provided a narrative type of list that noted all criteria were met.

There was a gap in time between relinquished and received for all SDGs. The samples were delivered by FEDEX but there is no air bill number. The laboratory has verified that shipping information is available for all courier services and these records are available upon request.

The sample receiving checklists do not include a date or time, although they are cross-referenced to the SDG which is noted on each chain of custody. There is no signature on the sample receiving checklist although the creator of the list is indicated by name.

500-10929: Stated on the Narrative: The following samples(s) was received with headspace in the sample vial: JS25-GW01-080425 and JS25-TB01-080425. The first sample listed had two sample vials with headspace. The Trip blank had headspace in both sample vials. This information is not listed on the sample receiving checklist. The second vial with no headspace was chosen for the other samples.

Initial Calibrations:
All initial calibration response factors were above 0.05 except for 1,2-dibromo-3-chloropropane. Non-detects for this compound are qualified as RC.032 to indicate a potential for false negatives due to low response.

Continuing Calibrations:
The table in section 2 shows that a number of targets had response factors falling below 0.05 in the CCVs. Where not already qualified from the initial calibration, the samples are qualified as RC# for non-detects, JC# for detects, where # is the response factor observed. Such results may have a probability of bias or false negatives if the compound is expected to be present in the samples.

The method limit for %D is 30%. This has been met in all cases. The validation limit of 25% was not met in for 1,2,4 and 1,2,3-trichlorobenzene, and chloromethane. These compounds are not detected, and the bias observed is high. Therefore there are no qualifiers applied for this.

Method Blanks:
Naphthalene is detected at a level below the reporting limit in several method blanks. The associated samples have no detections of this compound, so no qualifiers are required.

Matrix Spike:
One compound was out of limits. Data were not qualified as there were high levels of the compound in the sample and the spike recovery x 4 was less than the amount in the parent thus the recovery is not statistically valid.

Diluted Results:
Two PCE results exceeded the linear range and have been qualified JE . Both diluted and undiluted results are reported. Only PCE should be used at the diluted value. All others should be used at the lowest dilution (x1).

Field Blanks:
There were six trip blanks. No detections were observed in any.

Field Duplicates:
There are four field duplicates, all in control.

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Thirty six reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is rounded to 98.5 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

TASK 2D – WELL INSTALLATION

DATA VALIDATION REPORT
FOR
TASK 2D SOLID AND GROUNDWATER SAMPLES COLLECTED AT THE RIVERFRONT SUPERFUND SITE, NEW HAVEN, MISSOURI IN BETWEEN MAY 2008 AND JULY 2009

OVERVIEW

This data validation summary report covers eleven surface soils, eight groundwater and associated field quality control samples collected from selected New Haven site locations between May 12, 2008 and July 24, 2009. The field quality control samples included two solid field duplicates, two solid matrix spike/matrix spike duplicates (MS/MSD), one water MS/MSD, one equipment and six trip blanks. The samples are included in eight Sample Delivery Groups (SDGs). An SDG represents the group of samples that were prepared, analyzed and reported together (i.e., the analytical batch) with common laboratory QC samples. A summary of the samples by SDG is presented in the table below.

The samples were analyzed for Volatile Organics (VOAs) using method SW 8260B. All samples were prepared and analyzed by the Test America Laboratories (TA) University Park, Illinois following the EPA method below.

SUMMARY OF SAMPLES

SDG	Matrix	Sample ID	Comment
11315	S	MW8-SS01-008.0-080513	MS/MSD
11315	S	MW10-SS01-008.0-080512	
11315	S	MW1-SS01-008.0-080512	
11315	S	MW9-SS01-005.5-080512	
11315	S	MW10-SS02-008.0-080512	FD of MW1-SS01-008.0-080512
11315	W	MW9-GW01-006.8-080512	
11315	W	MW1-GW01-026.3-080612	
11315	W	MW10-GW01-016.0-080512	
11315	W	MW9-TB01-080512	TRIP BLANK
11379	S	MW5-SS01-008.4-080514	

11379	S	MW6-SS01-007.0-080514	
11379	W	MW5-EB01-080514	EQUIPMENT BLANK
11402	W	MW6-GW01-010.2-080516	
11402	W	MW5-GW01-008.4-080516	
15105	S	MW7-SS01-005.0-081104	MS/MSD
15105	S	MW7-SS02-005.0-081104	FD of MW7-SS01-005.0-081104
15105	W	MW7-TB01-081104	TRIP BLANK
15228	W	MW7-GW01-009.5-081107	MS/MSD
15228	W	MW7-TB01-081107	TRIP BLANK
16301	S	MW8-SS01-010.0-090105	
16301	W	MW8-TB01-090105	TRIP BLANK
19295	S	MW14-SS01-010.0-090603	
19295	W	MW14-GW01-029.0-090604	
19295	W	MW14-TB01-090604	TRIP BLANK
20169	W	MW14-GW01-027.8-090722	
20169	W	MW14-TB01-090722	TRIP BLANK

S – Surface soil; W – water; MS/MSD – Matrix spike/Matrix spike duplicate; FD – field duplicate

All work was performed in accordance with the Final Quality Assurance Project Plan (QAPP) for the Remedial Investigation/Feasibility Study at the Riverfront Superfund Site Operable Unit No. 2/6 (Parsons, July 2006), which was also prepared and approved for use to ensure generation of legally defensible data.

EVALUATION CRITERIA

The data submitted by the laboratory have been reviewed and validated following the guidelines described in the Section D2.4 of the QAPP and consistent with the USEPA National Functional Guidelines for Organic Data Review (USEPA OSWER 1999). All results and supporting data included in the data packages have been reviewed and validated including laboratory quality control results, chain-of-custody forms, chromatographs, quantitation reports and mass spectral data.

SUMMARY

This section of this report discusses deviations from the QAPP, other laboratory problems, QC problems leading to qualifying of data as rejected, estimated, or not detected and the overall usability of the data.

All samples were collected, prepared and analyzed following the procedures described in the project Work Plan and the QAPP. Except as indicated in this report, all samples were prepared and analyzed within the holding times specified in the QAPP.

Target VOAs detected in the samples include acetone, 1,2-dichloroethene (total), trichloroethene, tetrachloroethene, toluene and total xylenes. The laboratory reported that samples MW9-GW01-006.8-080512 and MW1-GW01-026.3-080512 (both from SDG 11315) required dilution due to target analytes (acetone and tetrachloroethene respectively) above the calibration range. Results reported from diluted sample aliquots are indicated with '+' in the data summary tables.

No target VOAs were detected in the trip blank samples except for MW14-TB01-090604 (SDG 19295) which contained acetone. No results have been qualified, due to the trip blank contamination, because acetone was not detected in the associated samples. Acetone was also detected in the equipment blank associated with SDG 11379. No results have been qualified, due to the equipment blank contamination, because acetone was not detected in the associated samples.

The laboratory blanks associated with the samples were free of volatile contamination.

The validated analytical results including data validation qualifiers are presented in **Appendix A**. A glossary of the data qualifiers is presented in **Appendix B**.

No major QA/QC problems were found during validation of the data. No reported results have been qualified as unusable (rejected). All reported results should be considered usable as reported and qualified in this report and the associated data summary tables (**Appendix A**).

Accuracy was monitored through the use of spike samples including surrogate, MS/MSD and laboratory control spikes (LCS). Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

All surrogate percent recoveries for the samples were within the acceptance limits.

An LCS percent recovery (%R) outlier was reported for target VOC bromomethane for the LCS associated with some of the solid samples in SDG 11315. The reported recovery (201%) exceeded the upper control limit (154%). Since bromomethane was not detected in any of the associated samples, no reported results have been qualified.

LCS percent recovery (%R) outlier was reported for target VOC bromomethane for the LCS associated with some of the solid samples in SDG 11379. The reported recovery (184%) exceeded the upper control limit (154%). Since bromomethane was not detected in any of the associated samples, no reported results have been qualified.

LCS percent recovery (%R) outlier was reported for target VOC 1,1-dichloroethane for the LCS associated with the water samples in SDG 11402. The reported recovery (66%) is below the lower control limit (69%). Reported results for 1,1-dichloroethane in the associated samples have been qualified as estimated and flagged 'UJ'.

Sample MW7-SS01-005.0-081104 was designated as the MS/MSD associated with SDG 15105. Relative percent difference (%RPD) outliers were reported for all spike analytes for the MS/MSD. The laboratory attributed the outliers to the difference in the sample size used in the preparation of the MS/MSD samples. No reported results have been qualified based on the MS/MSD outliers alone.

Sample MW7-GW01-009.5-081107 was designated as the MS/MSD associated with SDG 15105. Percent recovery outliers were reported for target analytes carbon disulfide and acetone. The reported %Rs exceeded the respective upper control limits. No reported results have been qualified based on the MS/MSD outliers alone.

A laboratory control spike duplicate (LCSD) percent recovery (%R) outlier was reported for target VOA carbon disulfide for the LCSD associated with the water samples in SDG 15228. The reported recovery (152%) exceeded the upper control limit (135%). No reported results have been qualified because carbon disulfide was not detected in the associated samples.

LCS RPD outliers were reported for target VOCs bromomethane (60%), chloroethane (24%) and methyl ethyl ketone (27%) for the LCS/LCSD associated with the water samples in SDG 20169. The reported RPDs exceeded the control limit. No results have been qualified because all %Rs for the affected analytes are within control limits for both the LCS and LCSD.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected,

preserved, prepared, and analyzed following the procedures described in the QAPP except for sample MW7-GW01-009.5-081107. The laboratory reported that the vials for this sample had headspace in them. The headspace was attributed to the reaction of the preservative (acid) with the sample. Reported results for the sample have been qualified as estimated and flagged 'J/UJ' due to the problem. Six trip blanks and one equipment blank were collected in support of the samples. The field blanks were free of VOA contamination, except as indicated above.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since no reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Project Reporting Limits (PRLs). Target analytes not detected in the samples are reported at the PRL with the 'U' flag.

APPENDIX A

DATA SUMMARY TABLES FOR VALIDATED ANALYTICAL RESULTS

APPENDIX B

GLOSSARY OF DATA QUALIFIERS

GLOSSARY OF DATA VALIDATION QUALIFIERS

(NO CODE) Confirmed identification.

U Analyte was analyzed for but not detected above the adjusted project reporting limit (PRL).

UJ Analyte was not detected. The reported adjusted PRL is estimated.

J Analyte was detected; the reported value is the estimated concentration of the analyte in the sample.

R The reported result is unusable. The analyte may or may not be present in the sample.

UB Data considered being undetected at the elevated reporting limit due to laboratory or fielding blank contamination.

H Holding time or sample preservation violation.

+ Reported result obtained from diluted sample.

TASK 2E- SITE-WIDE GROUNDWATER SAMPLING

ORGANIC DATA QUALITY REVIEW REPORT
PESTICIDES BY SW-846 METHOD 8081A, PCBs BY SW-846 METHOD 8082, DISSOLVED GASES BY SOP RSK-175

SDG	PEST/PCB: 500-17508-1, 500-17651-1, 500-17676-1, 500-17766-1 RSK-175: 500-17362-2, 500-17392-2, 500-17448-2, 500-17508-2, 500-17534-2, 500-17587-2, 500-17605-2, 500-17651-2, 500-17676-2, 500-17702-2, 500-17729-2, 500-17766-2, 500-17786-2, 500-17843-2, 500-18415-2, 500-18570-2, 500-18900-2, 500-20828-4, 500-21108-2		
PROJECT	Riverfront Superfund Site, Task 2e for Parsons Technology, IL		
LABORATORY	TestAmerica Laboratories, Chicago		
SAMPLE MATRIX	Water	SAMPLING DATE (mo/yyyy)	March, April, May, August & Sept 2009
NO. OF SAMPLES	PEST/PCB: 1 (W), 3 (W), 1 (W), 1 (W) = 6 aqueous samples RSK-175: 3 (W), 4 (W), 2 (W), 2 (W), 1 (W), 2 (W), 4 (W), 4 (W), 2 (W), 2 (W), 1 (W), 2 (W), 2 (W), 3 (W), 1 (W), 3 (W), 4 (W), 1 (W), 1 (W) = 44 aqueous samples		
ANALYSES REQUESTED	SW-846 8081A and SW-846 8082 and SOP RSK-175 (Dissolved Gases)		
SAMPLE NUMBERS	See attached results forms		
DATA REVIEWER	B. Nichols		
QA REVIEWER	Diane Short and Associates Inc.	INITIALS/DATE	

Telephone Logs included Yes____ No _X___

Contractual Violations Yes____ No _X___

The project Quality Assurance criteria, the EPA Contract Laboratory Program National Functional Guidelines for Organic Review 1999, and SW-846 Methods 8081 and 8082 and SOP have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review of these samples includes validation of all chains of custody, calibrations and QC forms referencing the QC limits in the above documents. Ten percent of the data are further reviewed for the calculation algorithms and submitted chromatograms as determined by the Project Manager. General comments regarding the data/analytical quality are part of the review when raw data are submitted.

I. DELIVERABLES

All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.
Yes __X__ No____

The following are noted for clarification:
Data were submitted for some of the aqueous samples for Pesticides and PCB analyses. Data were submitted for all of the aqueous samples for Dissolved Gases analysis by RSK-175. SDG 500-17651-1 and SDG 500-20828-4 were used for the full raw data review (Level IV) for all types of analyses.

II. ANALYTICAL REPORT FORMS

The Analytical Report or Data Sheets are present and complete for all requested analyses.
Yes __X__ No____

III. HOLDING TIMES

A. The contract holding times were met for all analyses (time of sample receipt to time of extraction and time from extraction to analysis).
Yes __X__ No____

B. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (from time of sample collection to extraction).
Yes __X__ No____

C. All Chains of Custody are accurate with signatures and times complete.
Yes __X__ No____

See associated Organic Data Quality Review Report for GCMS samples for complete details.
The Project Manager is informed of the following and Chains of Custody are updated for the project file: SDG 500-21108-2: The "Relinquished by" date on the RSK-175 COC 500-3804.1 (Sub Contract COC for TestAmerica in Savannah, GA) is listed as "08/14/09" for a sample initially received on 9/12/09 by the laboratory in IL.

D. Samples were received in proper condition.
Yes __X__ No____

IV. INSTRUMENT CALIBRATION (IC) AND CONTINUING CALIBRATION (CC) VERIFICATION

A. The GC standards were analyzed at the required frequency (every 72 hours at a minimum).
Yes __X__ No____

B. Performance evaluation standard was run as required for Pesticides, and Endrin and DDT breakdown were within limits (below 15%).
Yes __X__ No ___ NA____

C. The chromatographic resolution and separation criteria were met.
Yes __X__ No____

D. The suggested columns were used, and the PQLs were met.
Yes __X__ No____

E. Calibration factors for IC met the 20% RSD (relative standard deviation) limit or the linear regression was > 0.995.

Yes ____ No__X__

RSK-175: Methane in the following SDGs did not meet the % RSD criterion.

Method	SDG	Prep QC Lot	Analyte	% RSD	Qualifier
RSK-175	500-17362-2	680-132318	Methane	21.144	JC21
	500-17392-2	680-132366	Methane	21.144	JC21
	500-17448-2	680-132596	Methane	21.144	JC21
	500-17508-2	680-132996	Methane	21.144	JC21
	500-17534-2	680-133300	Methane	21.144	JC21
	500-17587-2				
	500-17605-2				
	500-17651-2				
	500-17676-2				
	500-17702-2				
	500-17729-2	680-133976	Methane	21.144	JC21
	500-17766-2	680-134251	Methane	21.144	JC21
	500-17786-2	680-134509	Methane	21.144	JC21
	500-17843-2				

Data are qualified "JC#," where # is the % RSD value. There could be a very slight high bias to the data. The EPA validation guidance does not technically cover this method, and this bias is not uncommon for these gases.

F. Continuing Calibration Factors and retention times (RT) were within the 25% D limits.
Yes __X__ No____

8081A: The grand mean exception was used by the laboratory for the analysis of SDG 500-17766-1. No qualification was required.

V. BLANKS

A. Laboratory blanks
1. Laboratory blanks were analyzed for every sample set and for each matrix type or once in every ten samples, whichever is more frequent.
Yes __X__ No____

2. No blank contamination was found in the Method Blank.
Yes __X__ No____

3. Instrument blank analysis was performed following most samples that contained analytes at high concentrations.
Yes ____ No ___ NA__X__

No high-concentration samples were present in the dilutions that were run.

B. Field, Trip, Rinse or Other Field Blanks

If field blanks were identified, no blank contamination was found.
Yes ____ No ___ NA__X__

No field blanks are present.

VI. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix Spike (MS) and Matrix Duplicate (MD) or Matrix Spike Duplicate (MSD) samples were analyzed for every analysis performed and for every 20 samples or for every matrix, whichever is more frequent.
Yes __X__ No____

The following table contains the MS/MSD samples prepared and analyzed for the SDGs associated with this report.

Method(s)	SDG	Client Sample ID	Lab Sample ID
RSK-175	500-17392-2	MW2R-GW01-090303	500-17392-1
8081A/8082	500-17651-1	MW7US-GW01-090316	500-17651-1
RSK-175	500-17651-2	MW7US-GW01-090316	500-17651-1

B. The MS and MSD percent recoveries (% R) were within the limits defined by the laboratory which are the QAPP limits.
Yes __X__ No____

C. The MSD relative percent differences (RPD) were within the defined contract or laboratory limits.
Yes __X__ No ___ NA____

D. The MS/MSD samples were client samples.
Yes __X__ No ___ NA____

Sufficient client samples were reported to meet QAPP criteria.

VII. LABORATORY CONTROL SAMPLE

A. A Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples or for every matrix, whichever is more frequent.
Yes __X__ No____

B. The LCS percent recoveries (% R) were within the limits defined by the laboratory or in the contract.
Yes __X__ No____

VIII. SURROGATE RECOVERY

A. The Surrogate spike was analyzed with every sample.
Yes __X__ No____

RSK-175: Surrogate standards are not used for this method.

B. The recovery limits defined in the current contract were met. If recovery limits were exceeded, the sample was re-extracted and re-analyzed.
Yes __X__ No____

IX. FIELD QC

If Field duplicates or Performance Check Compounds were identified, they were within the guidance limit of < 35% RPD or the % recovery guidance for the project. If values were less than 5 × RL (Reporting Limit), a limit of ± 2 × RL is used (CRDL Rule). Data are not qualified for field duplicates as these are evaluated for the total project by the client.

Yes __X__ No ___ NA____

Field duplicates were identified as follows:
SDG 500-17392-2 MW2S-GW01-090303 and MW2S-GW02-090303 (500-17392-3 and -4)
SDG 500-17587-2 MW10UB-GW01-090311 and MW10UB-GW02-090311 (500-17587-1 and -3)
SDG 500-17605-2 MW9US-GW01-090312 and MW9US-GW02-090312 (500-17605-4 and -5)
SDG 500-17651-1 and 500-17651-2
MW1S-GW01-090316 and MW1S-GW02-090316 (500-17651-2 and -3)
SDG 500-18570-2 JS25-GW01-090429 and JS25-GW02-090429 (500-18570-3 and -4)

Method	SDG	Matrix	Parent Sample	Analyte	Observation
RSK-175	500-17392-2	Water	MW2S-GW01-090303	Methane	PASS
	500-17587-2	Water	MW10UB-GW01-090311	Methane	PASS
	500-17605-2	Water	MW9US-GW01-090312	Methane	CRDL Rule
	500-17651-2	Water	MW1S-GW01-090316	Methane	PASS

X. COMPOUND IDENTIFICATION

A. All raw data chromatograms and data system printouts were evaluated for all detected compounds, and the identification is accurate.
Yes __X__ No ____

Part of the Level IV review.

B. Retention time limits or peak pattern identifications are met.
Yes __X__ No ____

Part of the Level IV review.

C. Two-column confirmation was performed for all detected values.
Yes __X__ No ___ NA____

Method 8082: Not required for PCBs. Confirmation of PCB detections is by pattern matching, not second column confirmation.
RSK-175: This method uses a single column.

D. If two column or two detector confirmation was performed, the value of the confirmation was within 25% D of the quantitation value for results > 5 × RL. If the laboratory has flagged data for % D > 40%, a "JP" qualifier has been added for low level results. For values < 5 × RL, the difference is not considered to impact the precision of the data.
Yes __X__ No ___ NA____

XI. COMPOUND QUANTITATION AND REPORTED CRQLS

A. Raw data examination verified that all sample results were correctly calculated.
Yes __X__ No ___ NA____

Part of the Level IV review.

B. The chromatograms and general system performance were acceptable for all instruments and analytical systems.
Yes __X__ No ____

Part of the Level IV review.

XII. OVERALL ASSESSMENT OF THE CASE

Data comply with the required methods. Data are fully usable for project purposes with consideration of the following qualifications or comments.

Deliverables

The following are noted for clarification:

Data were submitted for some of the aqueous samples for Pesticides and PCB analyses. Data were submitted for all of the aqueous samples for Dissolved Gases analysis by RDK-175. SDG 500-17651-1 and SDG 500-20828-4 were used for the full raw data review (Level IV) for all types of analyses.

Chain of Custody

See associated Organic Data Quality Review Report for GCMS samples for complete details.

The Project Manager is informed of the following and Chains of Custody are updated for the project file: SDG 500-21108-2: The "Relinquished by" date on the RSK-175 COC 500-3804.1 (Sub Contract COC for TestAmerica in Savannah, GA) is listed as "08/14/09" for a sample initially received on 9/12/09 by the laboratory in IL.

Initial Calibration and Continuing Calibration

RSK-175: Methane did not meet the % RSD criterion for the Initial Calibration as described in the associated table. Data are qualified "JC#," where # is the % RSD value. There could be a very slight high bias to the data. The EPA validation guidance does not technically cover this method, and this bias is not uncommon for these gases.
8081A: The grand mean exception was used by the laboratory for the analysis of SDG 500-17766-1. No qualification was required.

Field Duplicates

Field duplicates were identified as follows:
SDG 500-17392-2 MW2S-GW01-090303 and MW2S-GW02-090303 (500-17392-3 and -4)
SDG 500-17587-2 MW10UB-GW01-090311 and MW10UB-GW02-090311 (500-17587-1 and -3)
SDG 500-17605-2 MW9US-GW01-090312 and MW9US-GW02-090312 (500-17605-4 and -5)
SDG 500-17651-1 and 500-17651-2
MW1S-GW01-090316 and MW1S-GW02-090316 (500-17651-2 and -3)
SDG 500-18570-2 JS25-GW01-090429 and JS25-GW02-090429 (500-18570-3 and -4)

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed

following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since no reported results have been qualified as unusable (rejected), the overall completeness for the sampling event is 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

ORGANIC DATA QUALITY REVIEW REPORT
VOLATILE ORGANICS BY SW-846 METHOD 8260B, SEMIVOLATILE ORGANICS BY SW-846 METHOD 8270C

SDG	VOA: 500-17362-1, 500-17392-1, 500-17448-1, 500-17508-1, 500-17534-1, 500-17587-1, 500-17605-1, 500-17651-1, 500-17676-1, 500-17702-1, 500-17729-1, 500-17766-1, 500-17786-1, 500-17843-1, 500-18415-1, 500-18570-1, 500-18900-1, 500-20828-3		
	SVOA: 500-17508-1, 500-17651-1, 500-17676-1, 500-17766-1		
PROJECT	Riverfront Superfund Site, Task 2e for Parsons Technology, IL		
LABORATORY	TestAmerica Laboratories, Chicago		
SAMPLE MATRIX	Water	SAMPLING DATE (mo/yyyy)	March, April, May & August 2009
NO. OF SAMPLES	8260B: 4 (W), 5 (W), 3 (W), 3 (W), 2 (W), 3 (W), 5 (W), 5 (W), 3 (W), 3 (W), 2 (W), 3 (W), 3 (W), 4 (W), 2 (W), 4 (W), 5 (W), 3 (W) = 62 aqueous samples, including 18 trip blanks		
	8270C: 1 (W), 3 (W), 1 (W), 1 (W) = 6 aqueous samples		
ANALYSES REQUESTED	SW-846 8260B and SW-846 8270C		
SAMPLE NUMBERS	See attached results forms		
DATA REVIEWER	B. Nichols		
QA REVIEWER	Diane Short and Associates Inc.	INITIALS/DATE	

Telephone Logs included Yes____ No_ X__

Contractual Violations Yes____ No _X__

The project Quality Assurance Project Plan (QAPP), the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999, and the SW-846 Method 8260B and Method 8270C have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review of these samples includes validation of all chains of custody, calibrations and QC forms referencing the QC limits in the above documents. Ten percent of the data are further reviewed for the calculation algorithms and submitted chromatograms and mass spectra as determined by the Project Manager. General comments regarding the data/analytical quality are part of the review when raw data are submitted.

I. DELIVERABLES

A. All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.
Yes __X__ No ____

The following are noted for clarification:
Data were submitted for the aqueous samples for Volatile Organic (VOA) and Semi-Volatile Organic (SVOA) analyses. Eighteen of the aqueous samples were designated as trip blanks (please refer to Section I. B). QC Prep Batch 500-59639 in SDG 500-17362-1, QC Prep Batch 500-60617 in SDG 500-17651-1 and QC Prep Batch 500-70875 in SDG 500-20828-3 were used for the full raw data review (Level IV) for the VOA analyses. SDG 500-17651-1 was used for the full raw data review for the SVOA analyses.

B. Chain of Custody Documentation was complete and accurate.
Yes __X__ No____

The Project Manager is informed of the following and Chains of Custody are updated for the project file:
Duplicate sample numbers ("MW8US-GW01-090323") were provided on the SDG 500-17766-1 Chain of Custody (COC) for two aqueous samples. The second sample (500-17766-2) consisted of two containers for 8260B analysis and no Sampling Time was indicated, both of which are consistent with a trip blank sample. The laboratory recorded a Sampling Time of "1200" for this sample on the Analytical Data report and Sample Summary and performed the 8260B analysis. Based on the COC, the sample was reviewed for this report as a VOA trip blank.
No Sampling Time was listed on the SDG 500-18900-1 COC for sample "MW12-GW01-090514."

C. Samples were received at the required temperature, preservation and intact with no bubbles.
Yes __X__ No ____

The Project Manager is informed of the following:
The laboratory reported in the Case Narrative for SDG 500-18415-1 that both samples, 500-18415-1 and 500-18415-2, were analyzed "from a vial with headspace." This information was not indicated on the Sample Receipt Check List. There is no indication that the headspace was outside the size limits, and no further action is taken.

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.
Yes __X__ No___

B. Holding Times
1. The contract holding times were met for all analyses (time of sample receipt to time of analysis (VOA) or extraction (SVOA), and time from extraction to analysis).
Yes __X__ No____

2. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (14 days from time of sample collection for VOA or 7 days to time of extraction for SVOA).
Yes __X__ No ____

III. INSTRUMENT CALIBRATION - GC/MS

A. Initial Calibration
1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of > 0.05.
Yes ____ No ___X ___ NA___

Method	SDG	ICV Date	Analyte	RRF	Qualifier
8260B	500-17392-1	3/12/2009	Acetone	0.0447	RC0.0447
	500-17843-1	4/01/2009	Acetone	0.0392	RC0.0392
	500-18415-1	4/14/2009	Acetone	0.0372	JC0.0372/RC.0372
	500-18570-1				
	500-18900-1				
	500-20828-3	6/17/2009	Acetone	0.0402	RC0.0402

Detected data are qualified "JC#," where # is the value of the average initial response factors. Data could be biased low. Undetected data could be false non-detects and are qualified "RC#" due to the lack of sensitivity for the qualified compound. Per the 2001 validation guidance, a limit of 0.01 is allowed for "poor responders," which includes Acetone. Data would not be qualified under that guidance.

2a. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit for the CCCs.
Yes __X__ No ___ NA____

2b. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit for all other compounds or a regression curve was used.
Yes __X__ No ___ NA____

3. The 12 hour System Performance Check was performed as required in SW-846 including a check for column degradation (DDT breakdown < 20%).
Yes ____ No _X__ NA____

A column degradation check was not included in the data packages.

B. Continuing Calibration
1. The midpoint standard was analyzed for each analysis at the required frequency, and the QC criterion of RRF > 0.05 was met.
Yes ____ No ___X ___ NA___

8260B: The RRFs for Acetone in SDGs 500-17392-1, 500-17843-1, 500-18415-1, 500-18570-1 and 500-18900-1 did not meet the criterion, but as the associated sample results have been qualified based on the ICV (please refer to Section III. A. 1), no additional qualification has been applied. The RRF for Acetone in SDG 500-17651-1 did not meet the criterion, therefore non-detect samples are qualified "RC.0413" to indicate the possible reporting of false undetected data.

2. The percent difference (% D) limits of ± 25% were met.
Yes ____ No ___X ___ NA___

Several CCVs had % D values outside of the 25% limit. The outliers observed are presented in the following table. A negative sign indicates that the % D is indicative of a high bias.

Method	SDG	CCV Date	Analyte	% D	Qualifier
8260B	500-17362-1	3/12/2009	2-Hexanone	-27.9	None (all samples ND)
	500-17651-1	3/27/2009	Bromomethane	35.5	None (all samples ND)
			Carbon disulfide	27.1	None (all samples ND)
	500-17786-1	3/28/2009	2-Hexanone	-29.9	None (all samples ND)
	500-17843-1	4/06/2009	Bromomethane	42.8	None (all samples ND)
			Methyl ethyl ketone	-34.7	None (all samples ND)
			Methyl isobutyl ketone	-31.1	None (all samples ND)
			2-Hexanone	-31.9	None (all samples ND)
	500-18415-1	5/05/2009	Methyl ethyl ketone	30.2	None (all samples ND)
	500-18570-1	5/08/2009	Methyl ethyl ketone	63.8	None (all samples ND)
	500-18900-1	5/27/2009	Methyl ethyl ketone	72.9	None (all samples ND)
	500-20828-3	8/31/2009	Bromomethane	25.8	None (all samples ND)
			Methyl ethyl ketone	66.8	None (all samples ND)
			Methyl isobutyl ketone	31.8	None (all samples ND)

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB or DFTPP performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.
Yes __X__ No ___ NA____

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria, and the retention times were within the required windows.
Yes __X__ No ___ NA____

VI. SURROGATE STANDARDS

Surrogate spikes were analyzed with every sample.
Yes __X__ No____

And met the recovery limits defined in the current contract, which are the current laboratory limits.
Yes ____ No__X__

The following Surrogate Standard recovery was outside the limits.

Method	SDG	Parent Sample	Surrogate	Recovery	Qualifier
8260B	500-17843-1	JS40-GW01-090325	1,2-Dichloroethane-d4	126	JS126

Data are qualified “JS#,” where # is the value of the recovery. Only the parent sample is qualified for organic analyses. Data could be biased very slightly high.

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix Spike (MS) and Matrix Spike Duplicate (MSD) samples were analyzed for every analysis performed and for every 20 samples or for every matrix, whichever is more frequent.
Yes __X__ No____

The following table contains the MS/MSD samples prepared and analyzed for the SDGs associated with this report.

Method	SDG	Client Sample ID	Lab Sample ID
8260B	500-17392-1	MW2R-GW01-090303	500-17392-1
8260B	500-17508-1	MW6US-GW01-090309	500-17508-1
8260B	500-17605-1	MW5UB-GW01-090312	500-17605-1
8260B	500-17651-1	MW7US-GW01-090316	500-17651-1
8270C			
8260B	500-18570-1	JS25-GW01-090429	500-18570-3

B. The MS and MSD percent recoveries (% R) were within the limits defined in the contract, which are the current laboratory control chart limits.
Yes ____ No ___X ___ NA___

The following Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries were outside the limits.

Method	SDG	Parent Sample	Analyte	MS/MSD Recoveries	Qualifier
8260B	500-17392-1	MW2R-GW01-090303	Toluene	122/123	None (sample ND)
			Xylenes	121/119	None (sample ND)
8260B	500-17508-1	MW6US-GW01-090309	1,1,1-Trichloroethane	120/128	None (sample ND)
			Carbon disulfide	127/138	None (sample ND)
			Carbon tetrachloride	121/131	None (sample ND)
8260B	500-17651-1	MW7US-GW01-090316	Carbon tetrachloride	117/144	None (sample ND)
			1,2-Dichloroethane	118/133	None (sample ND)
			Trichloroethene	103/133	JMS133
			1.1.2-Trichloroethane	108/124	None (sample ND)
8270C			2-Nitroaniline	111/110	None (sample ND)
			N-Nitrosodiphenylamine	140/143	None (sample ND)
8260B	500-18570-1	JS25-GW01-090429	1,2-Dichloroethane	126/120	None (sample ND)

Data which do not meet the MS/MSD required recoveries are qualified "JMS#," where # is the value of the spike recovery. Only the parent sample is qualified for organic analyses. Only detected data are qualified for high spike values. A high Matrix Spike recovery indicates a potential high bias. When four times (4 ×) the spike amount is less than the concentration of the analyte in the parent sample, no

qualification is required as the recovery is statistically invalid. This latter condition was observed for Tetrachloroethene in SDG 500-17651-1.

C. The MSD relative percent differences (RPD) were within the defined contract limits.
Yes ____ No ___X ___ NA___

The following analytes were outside the control limits for Matrix Spike Duplicate RPD values but per the validation guidance, data are not qualified as the spike recoveries are acceptable.

Method	SDG	Parent Sample	Analyte	RPD	Qualifier
8260B	500-17392-1	MW2R-GW01-090303	Chloroethane	21	None

D. The MS/MSD samples were client samples.
Yes __X__ No ___ NA____

VIII. LABORATORY CONTROL SAMPLE

A. A Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples.
Yes __X__ No____

All target compounds reported were spiked.

B. The LCS percent recoveries were within the limits defined in the contract. The Matrix Spike limits are used as a reference or laboratory-specific limits for each matrix are defined.
Yes ____ No__X__

8260B: Acetone in SDG 500-17362-1 and in SDG 500-18900-1 demonstrated a relative percent difference (RPD) value outside the laboratory-specific limits for LCS/LCSD recoveries. Data are not qualified for LCS/LCSD when both QC sample recoveries are acceptable.
1,2-Dichloroethane in SDG 500-17651-1 demonstrated a percent recovery (% R) value high and outside the laboratory limits. Vinyl chloride in QC Prep Batch 500-60763 in SDG 500-17702-1 demonstrated a % R value slightly high and outside the laboratory limits. Qualification is not required since the associated samples are non-detect for these target compounds.
8270C: *N*-Nitrosodiphenylamine in SDGs 500-17651-1 and 500-17676-1 demonstrated a percent recovery (% R) value high and outside the laboratory limits. Qualification is not required since the associated samples are non-detect for this target compound.
Benzo(k)fluoranthene in SDG 500-17766-1 demonstrated a slightly low recovery in the LCSD (77%). Data are not qualified for the LCSD alone as the LCS spike was acceptable (95%).

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.
Yes __X__ No____

B. No blank contamination was found in the Method Blank.
Yes __X__ No____

C. If Field Blanks were identified, no blank contamination was found.
Yes __X__ No____

The trip blanks for VOA analysis were identified per the client as follows:
SDG 500-17362-1 MW2SW-TB01-090302
SDG 500-17392-1 MW2S-TB01-090303

SDG 500-17448-1 MW1T1-TB01-090305
SDG 500-17508-1 MW6US-TB01-090309
SDG 500-17534-1 MW6SW-TB01-090310
SDG 500-17587-1 MW10UB-TB01-090311
SDG 500-17605-1 MW5UB-TB01-090312
SDG 500-17651-1 MW1S-TB01-090316
SDG 500-17676-1 MW101-TB01-090317
SDG 500-17702-1 MW103-TB01-090318
SDG 500-17729-1 BW20-TB01-090319
SDG 500-17766-1 MW8US-GW01-090329 (500-17766-2, please refer to Section I. B)
SDG 500-17786-1 BW22-TB01-090324
SDG 500-17843-1 JS39-TB01-090325
SDG 500-18415-1 JS15-TB01-090422
SDG 500-18570-1 MW9R-TB01-090428
SDG 500-18900-1 MW11-TB01-090514
SDG 500-20828-3 MW4-TB01-090825

X. FIELD QC

If Field duplicates were identified, they were within the guidance limit of < 30% RPD for water samples or < 50% RPD for soil samples. If values are less than 5 × RL, the water limit is ± 2 × RL or the soil limit is ± 4 × RL (CRDL Rule). Data are not qualified for field duplicates as these are evaluated for the total project by the client.

Yes __X__ No ___ NA____

Field duplicates were identified as follows:
SDG 500-17392-1 MW2S-GW01-090303 and MW2S-GW02-090303 (500-17392-3 and -4)
SDG 500-17587-1 MW10UB-GW01-090311 and MW10UB-GW02-090311 (500-17587-1 and -3)
SDG 500-17605-1 MW9US-GW01-090312 and MW9US-GW02-090312 (500-17605-4 and -5)
SDG 500-17651-1 MW1S-GW01-090316 and MW1S-GW02-090316 (500-17651-2 and -3)
SDG 500-18570-1 JS25-GW01-090429 and JS25-GW02-090429 (500-18570-3 and -4)

Method	SDG	Matrix	Parent Sample	Analyte	Observation
8260B	500-17392-1	Water	MW2S-GW01-090303	1,2-Dichloroethene, total	PASS
				Trichloroethene	PASS
				Tetrachloroethene	PASS
	500-17587-1	Water	MW10UB-GW01-090311	Methylene chloride	CRDL Rule
	500-17605-1	Water	MW9US-GW01-090312	Tetrachloroethene	PASS
	500-17651-1	Water	MW1S-GW01-090316	Methylene chloride	CRDL Rule
				1,2-Dichloroethene, total	PASS
				Trichloroethene	PASS
				Tetrachloroethene	PASS
	500-18570-1	Water	JS25-GW01-090429	Tetrachloroethene	PASS

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and analytical systems.
Yes __X__ No ___ NA____

Part of the Level IV review.

B. The suggested EQLs for the sample matrices in this set were met.
Yes __X__ No ___ NA____

The laboratory has not reported any 'E' flag data, so only diluted results are reported in the EDD. There are dilutions of up to 10,000 x for 1,2-Dichloroethene (total), TCE, PCE and Methylene chloride in several samples. No 1 x dilutions are reported which elevate all the reporting limits. It is recommended that the lowest dilution possible be reported. In these cases, the lowest dilution that was acceptable to run on the instruments may have been reported. Given the extreme dilutions of most of these samples, the samples were probably appropriately pre-screened. Had they been run undiluted, it could have caused damage to the instruments and significant down time to purge the system. If the client has any indication that samples might significantly exceed instrument limits, informing the laboratory would be a useful and productive step.
The client will determine if the elevated Reporting Limits (RL) meet action level criteria, but as noted, lower RLs do not seem achievable for many of these samples.

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected compounds.
Yes __X__ No ___ NA____

Part of the Level IV review.

B. Quantitation was checked to determine the accuracy of calculations for representative compounds in each internal standards quantitation set.
Yes __X__ No ___ NA____

Part of the Level IV review.

XIII. TENTATIVELY IDENTIFIED COMPOUNDS

TICs were properly identified and met the library identification criteria.
Yes ____ No ___ NA__X__

No TICs reported or requested.

XIV. OVERALL ASSESSMENT OF THE CASE

The laboratory has complied with the requested method. Data are fully usable after consideration of qualifiers.

Deliverables

The following are noted for clarification:

Data were submitted for the aqueous samples for Volatile Organic (VOA) and Semi-Volatile Organic (SVOA) analyses. Eighteen of the aqueous samples were designated as trip blanks (please refer to Section I. B). QC Prep Batch 500-59639 in SDG 500-17362-1, QC Prep Batch 500-60617 in SDG 500-17651-1 and QC Prep Batch 500-70875 in SDG 500-20828-3 were used for the full raw data review

(Level IV) for the VOA analyses. SDG 500-17651-1 was used for the full raw data review for the SVOA analyses.

Chain of Custody and Holding Times

The Project Manager is informed of the following and Chains of Custody are updated for the project file:

Duplicate sample numbers ("MW8US-GW01-090323") were provided on the SDG 500-17766-1 Chain of Custody (COC) for two aqueous samples. The second sample (500-17766-2) consisted of two containers for 8260B analysis and no Sampling Time was indicated, both of which are consistent with a trip blank sample. The laboratory recorded a Sampling Time of "1200" for this sample on the Analytical Data report and Sample Summary and performed the 8260B analysis. Based on the COC, the sample was reviewed for this report as a VOA trip blank.

No Sampling Time was listed on the SDG 500-18900-1 COC for sample "MW12-GW01-090514."

The laboratory reported in the Case Narrative for SDG 500-18415-1 that both samples, 500-18415-1 and 500-18415-2, were analyzed "from a vial with headspace." This information was not indicated on the Sample Receipt Check List. There is no indication that the headspace was outside the size limits, and no further action is taken.

Initial Calibration

8260B: Several RRF values for Acetone did not meet the criterion. Detected data are qualified "JC#," where # is the value of the average initial response factors. Data could be biased low. Undetected data could be false non-detects and are qualified "RC#" due to the lack of sensitivity for the qualified compound. Per the 2001 validation guidance, a limit of 0.01 is allowed for "poor responders," which includes Acetone. Data would not be qualified under that guidance.

A column degradation check was not included in the data packages for the semi-volatile analyses. There is no evidence of degradation in the spectra or chromatograms, and no further action is taken.

Continuing Calibration

8260B: The RRFs for Acetone in SDGs 500-17392-1, 500-17843-1, 500-18415-1, 500-18570-1 and 500-18900-1 did not meet the criterion, but as the associated sample results have been qualified based on the ICV (please refer to Section III. A. 1), no additional qualification has been applied. The RRF for Acetone in SDG 500-17651-1 did not meet the criterion, therefore non-detect samples are qualified "RC.0413" to indicate the possible reporting of false undetected data.
Several CCVs had % D values outside of the 25% limit. The outliers observed are presented in the associated table. A negative sign indicates that the % D is indicative of a high bias. As all associated samples are non-detect for these compounds, no qualification has been applied.

Surrogate Standards

The Surrogate Standard recovery for 1,2-Dichloroethane-d4 in SDG 500-17843-1 was outside the limits. Data are qualified "JS#," where # is the value of the recovery. Only the parent sample is qualified for organic analyses. Data could be biased very slightly high.

Matrix Spikes and Duplicates

Data which do not meet the MS/MSD required recoveries are qualified "JMS#," where # is the value of the spike recovery. Only the parent sample is qualified for organic analyses. Only detected data are qualified for high spike values. A high Matrix Spike recovery indicates a potential high bias. When four times (4 ×) the spike amount is less than the concentration of the analyte in the parent sample, no qualification is required as the recovery is statistically invalid. This latter condition was observed for Tetrachloroethene in SDG 500-17651-1.

Data which do not meet the Matrix Spike Duplicate RPD criteria are presented in the associated table. Qualification is not required as the spike recoveries were within limits.

Laboratory Control Samples

8260B: Acetone in SDG 500-17362-1 and in SDG 500-18900-1 demonstrated a relative percent difference (RPD) value outside the laboratory-specific limits for LCS/LCSD recoveries. Data are not qualified for LCS/LCSD when both QC sample recoveries are acceptable.
1,2-Dichloroethane in SDG 500-17651-1 demonstrated a percent recovery (% R) value high and outside the laboratory limits. Vinyl chloride in QC Prep Batch 500-60763 in SDG 500-17702-1 demonstrated a % R value slightly high and outside the laboratory limits. Qualification is not required since the associated samples are non-detect for these target compounds.
8270C: *N*-Nitrosodiphenylamine in SDGs 500-17651-1 and 500-17676-1 demonstrated a percent recovery (% R) value high and outside the laboratory limits. Qualification is not required since the associated samples are non-detect for these target compounds.
Benzo(k)fluoranthene in SDG 500-17766-1 demonstrated a slightly low (77%) recovery in the LCSD. Data are not qualified for the LCSD alone as the LCS spike (95%) was acceptable.

Sample Dilutions

The laboratory has not reported any 'E' flag data, so only diluted results are reported in the EDD. There are dilutions of up to 10,000 x for 1,2-Dichloroethene (total), TCE, PCE and Methylene chloride in several samples. No 1 x dilutions are reported which elevate all the reporting limits. It is recommended that the lowest dilution possible be reported. In these cases, the lowest dilution that was acceptable to run on the instruments may have been reported. Given the extreme dilutions of most of these samples, the samples were probably appropriately pre-screened. Had they been run undiluted, it could have caused damage to the instruments and significant down time to purge the system. If the client has any indication that samples might significantly exceed instrument limits, informing the laboratory would be a useful and productive step.
The client will determine if the elevated Reporting Limits (RL) meet action level criteria, but as noted, lower RLs do not seem achievable for many of these samples.

Field Blanks

Eighteen trip blanks were identified per the client.

Field QC

Field duplicates were identified as follows:

SDG 500-17392-1	MW2S-GW01-090303 and MW2S-GW02-090303 (500-17392-3 and -4)
SDG 500-17587-1	MW10UB-GW01-090311 and MW10UB-GW02-090311 (500-17587-1 and -3)
SDG 500-17605-1	MW9US-GW01-090312 and MW9US-GW02-090312 (500-17605-4 and -5)
SDG 500-17651-1	MW1S-GW01-090316 and MW1S-GW02-090316 (500-17651-2 and -3)
SDG 500-18570-1	JS25-GW01-090429 and JS25-GW02-090429 (500-18570-3 and -4)

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed

following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Twenty seven reported results have been qualified as unusable (rejected), therefore the overall completeness for the sampling event is rounded to 99.8 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

DATA VALIDATION REPORT
FOR
GROUNDWATER SAMPLES COLLECTED AT THE RIVERFRONT SUPERFUND SITE, NEW HAVEN, MISSOURI IN BETWEEN APRIL AND SEPTEMBER 2009

OVERVIEW

This data validation summary report covers two groundwater and associated field quality control samples collected from selected New Haven site locations between April and September 2009. The field quality control samples included two trip blank samples. The samples are included in two Sample Delivery Groups (SDGs). An SDG represents the group of samples that were prepared, analyzed and reported together (i.e., the analytical batch) with common laboratory QC samples. A summary of the samples by SDG is presented in the table below.

The samples were analyzed for Volatile Organics (VOAs) using method SW 8260B. All samples were prepared and analyzed by the Test America Laboratories (TA) University Park, Illinois following the EPA method below.

SUMMARY OF SAMPLES

SDG	Matrix	Sample ID	Comment
18573	GW	MS04BS-GW01-090428	
21444	GW	MW4-GW01-090930	
18573	W	MW9R-TB01-090428	TRIP BLANK
21444	W	MW4-TB01-090930	TRIP BLANK

GW – groundwater

All work was performed in accordance with the Final Quality Assurance Project Plan (QAPP) for the Remedial Investigation/Feasibility Study at the Riverfront Superfund Site Operable Unit No. 2/6 (Parsons, July 2006), which was also prepared and approved for use to ensure generation of legally defensible data.

EVALUATION CRITERIA

The data submitted by the laboratory have been reviewed and validated following the guidelines described in the Section D2.4 of the QAPP and consistent with the USEPA National Functional Guidelines for Organic Data Review (USEPA OSWER 1999). All results and supporting data included in the data packages have been reviewed and validated including laboratory quality control results, chain-of-custody forms, chromatographs, quantitation reports and mass spectral data.

SUMMARY

This section of this report discusses deviations from the QAPP, other laboratory problems, QC problems leading to qualifying of data as rejected, estimated, or not detected and the overall usability of the data.

All samples were collected, prepared and analyzed following the procedures described in the project Work Plan and the QAPP. Except as indicated in this report, all samples were prepared and analyzed within the holding times specified in the QAPP.

Target VOAs detected in the samples include tetrachloroethene, acetone and methyl ethyl ketone. The results reported for acetone in sample MW4-GW01-090930 and the associated trip blank have been qualified as laboratory blank contaminants.

No target VOAs were detected in the trip blank samples except for MW4-TB01-090930 (SDG 21444) which contained acetone.

The laboratory blank associated with the samples in SDG 18573 was free of volatile contamination. The laboratory blank associated with the samples in SDG 21444 contained acetone (3.6 ug/L). Reported results for acetone in the GW sample (6 ug/L) and the trip blank (5.8 ug/L) have been requalified as not detected (flagged 'U') due to the laboratory blank contamination.

The validated analytical results including data validation qualifiers are presented in **Appendix A**. A glossary of the data qualifiers is presented in **Appendix B**.

No major QA/QC problems were found during validation of the data. No reported results have been qualified as unusable (rejected). All reported results should be considered usable as reported and qualified in this report and the associated data summary tables (**Appendix A**).

Accuracy was monitored through the use of spike samples including surrogates and laboratory control spikes (LCS). Accuracy was determined by calculating the percent

recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

All surrogate percent recoveries for the samples were within the acceptance limits.

LCS percent recovery (%R) outliers were reported for target VOCs acetone, 2-hexanone and bromomethane for the LCS associated with SDG 21444. The reported recoveries exceeded the respective upper control limits. Since 2-hexanone and bromomethane were not detected in the associated samples, the reported results, for these analytes, have not been qualified. The reported results for acetone in the GW and trip blank, already qualified due to the method blank contamination, has not been further qualified.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. The trip blanks were free of VOA contamination, except as indicated above.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since no reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Project Reporting Limits (PRLs). Target analytes not detected in the samples are reported at the PRL with the ‘U’ flag.

APPENDIX A

DATA SUMMARY TABLES FOR VALIDATED ANALYTICAL RESULTS

APPENDIX B

GLOSSARY OF DATA QUALIFIERS

GLOSSARY OF DATA VALIDATION QUALIFIERS

(NO CODE) Confirmed identification.

U Analyte was analyzed for but not detected above the adjusted project reporting limit (PRL).

UJ Analyte was not detected. The reported adjusted PRL is estimated.

J Analyte was detected; the reported value is the estimated concentration of the analyte in the sample.

R The reported result is unusable. The analyte may or may not be present in the sample.

UB Data considered being undetected at the elevated reporting limit due to laboratory or fielding blank contamination.

H Holding time or sample preservation violation.

+ Reported result obtained from diluted sample.

INORGANIC DATA QUALITY REVIEW REPORT
METALS BY ICP SW-846 METHOD 6010B AND MERCURY BY CVAA SW-846 METHOD 7470A

SDG	500-17508-1, 500-17651-1, 500-17676-1, 500-17766-1		
PROJECT	Riverfront Superfund Site task 2e for Parsons Technology, IL		
LABORATORY	TestAmerica Laboratories, Chicago		
SAMPLE MATRIX	Water	SAMPLING DATE (mo/yyyy)	March 2009
NO. OF SAMPLES	1 (W), 3 (W), 1 (W), 1 (W) = 6 aqueous samples		
ANALYSES REQUESTED	SW-846 6010B and SW-846 7470A		
SAMPLE NUMBERS	See attached results forms		
DATA REVIEWER	B. Nichols		
QA REVIEWER	Diane Short and Associates Inc.	INITIALS/DATE	

Telephone Logs included	Yes		No	×
Contractual Violations	Yes		No	×

The project QC, the EPA Contract Laboratory Program National Functional Guidelines for Inorganic Review 2002, and the SW-846 Methods and laboratory SOPs have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review includes validation of all calibrations, chains of custody, and QC forms referencing the above documents. All of the data are also further reviewed for the calculation algorithms and submitted continuing calibration blanks as determined by the Project Manager. General comments regarding the data/analytical quality are included in the review when raw data are submitted.

I. DELIVERABLES

All deliverables were present as specified in the Statement of Work (SOW) or project contract.

Yes × No ____

The following are noted for clarification:
Data were submitted for all samples for the ICP analysis of Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver and Zinc. Mercury was analyzed by Cold Vapor AA.
SDG 500-17651-1 was used for the full raw data review (Level IV).

II. CALIBRATIONS

A. All initial instrument calibrations were performed as defined in the SOW or project contract. All correlation coefficients of the 3 point curves were > 0.995.

Yes × No ____ N/A ____

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed at the required frequency.

Yes × No ____

Sequencing was not required, but sufficient calibrations were present to verify that the frequencies were met for client samples.

C. The ICV and CCV standard percent recovery results were within the required control limits of 90.0 – 110.0% (80 – 120 % for mercury).

Yes × No ____

III. CRDL STANDARDS

The 2 × CRDL standards were analyzed as required in the SOW.

Yes × No ____ N/A ____

IV. BLANKS

The highest blank associated with any particular analyte is used for the qualification process and is the value entered after the “B” blank descriptor.

A. The initial calibration blanks (ICB) and continuing calibration blanks (CCB) were analyzed at the required frequency.

Yes × No ____ N/A ____

Sequencing was not required, but sufficient calibration blanks were present to verify that the frequencies were met for client samples.

B. The ICB and CCB results were within the required control limits.

Yes × No ____ N/A ____

This is done as part of the 10% review of the raw data.

C. All analytes in the Leach Blank were less than the CRDL or less than 2 × the instrument detection limit (IDL or MDL), whichever is lower.

Yes _____ No _____ N/A ×

No TCLP analysis was performed.

V. PREPARATION OR METHOD BLANKS

A. Preparation or Method blanks were prepared and analyzed at the required frequency.

Yes × No _____

B. All analytes in the Preparation or Method Blank were less than the CRDL or less than the MDL, whichever is lower.

Yes _____ No ×

Analytes were found in the Preparation Blank but the levels were such that qualification would be required only for the following analytes.

SDG	Matrix	Analyte	Result	Qualifier
500-17508-1	Water	Zinc	0.0036	UB0.0036
500-17651-1	Water	Zinc	0.0029	UB0.0029
500-17676-1	Water	Zinc	0.0058	UB0.0058

Analytes reported as contaminants in the Method Blank are qualified "UB#," where # is the value of the blank corrected to the units of the sample. Only detected data less than 5 × blank are qualified, and are fully usable as undetected values.

C. Field, trip, decon rinse or other Field Blanks are contained and identified in the package.

Yes _____ No × N/A _____

No Field Blanks were identified for the metals analysis.

D. The reported results for the Field Blanks are less than the CRDL or less than the MDL, whichever is lower.

Yes _____ No _____ N/A ×

VI. A. ICP INTERFERENCE CHECK SAMPLE

A. The Interference Check Sample (ICS) was analyzed as required in the SOW or project contract.

Yes × No _____ N/A _____

B. The ICS percent recovery results were reported for all required ICS analytes and were within the required control limits of 80.0 – 120.0%.

Yes × No _____ N/A _____

C. ICP analysis results for analytes not required to be present in a given ICS standard were within acceptable limits.

Yes _____ No _____ N/A ×

Not applicable to limited list metals.

VI B. INTERELEMENT CORRECTION FACTORS

The Interelement Correction Factors are included and complete for all possible interferent analytes.

Yes × No _____ N/A _____

Review of other possible contaminants was not requested by the client. The full Interference table was provided, however.

VII. SPIKE SAMPLE RECOVERY

A. A Matrix (pre-digestion) Spike sample was analyzed for each digestion group and/or matrix or as required in the SOW.

Yes × No _____

The following table contains the MS/MSD samples prepared and analyzed for the SDGs associated with this report.

SDG	Client Sample ID	Lab Sample ID
500-17651-1	MW7US-GW01-090316	500-17651-1

B. The Matrix Spike percent recoveries were within the required control limits of 75.0 – 125.0%.

Yes × No _____ N/A _____

C. A Post Digestion Spike was prepared and analyzed if required.

Yes _____ No _____ N/A ×

D. The MS/MSD samples were client samples.

Yes × No _____ N/A _____

VIII. DUPLICATES

A. Matrix (pre-digestion) Duplicate samples were analyzed at the required frequency.

Yes × No _____

The laboratory prepared and analyzed MS/MSD samples.

B. The Matrix Duplicate relative percent differences (RPD) were within the required control limits (20% for water samples or 35% for soil samples) or the Reporting Limits (RL) were met if the duplicate values are less than 5 × RL (CRDL Rule). If either of the duplicate results is less than 5 × RL, the RPD is not used. The QC limit (± RL for water samples or ± 2 × RL for soil samples) used is the difference between the original and the duplicate results.

Yes × No _____ N/A _____

IX. LABORATORY CONTROL SAMPLE

A. Laboratory Control Samples (LCS) were analyzed at the required frequency.

Yes × No _____

B. The LCS recoveries were within the required control limits of 80.0 – 120.0%.

Yes × No _____

X. MSA RESULTS AND GRAPHITE FURNACE ANALYSIS (GFAA)

Duplicate injections were performed for all analyses and the relative standard deviations (RSD) were less than 20% for all reported results. (Method of Standard Additions (MSA) requires only a single injection).

Yes _____ No _____ N/A ×

Graphite furnace analysis was not conducted.

XI. ICP SERIAL DILUTION

A. ICP Serial Dilutions have been analyzed at the required frequency if the analyte concentrations were greater than 50 × IDL.

Yes × No _____ N/A _____

B. The percent difference (% D) criteria of ± 10.0 % were met.

Yes × No _____ N/A _____

C. The Serial Dilution analyses were on client samples.

Yes × No _____ N/A _____

XII. INSTRUMENT DETECTION LIMITS

A. The Instrument Detection Limits (IDL) have met the Quarterly reporting requirements.

Yes × No _____ N/A _____

This was determined to be acceptable during the contractual process.

B. All sample results have met the required detection limits (CRDL).

Yes × No _____ N/A _____

XIII. PREPARATION AND ANALYSIS LOGS

A. All samples were prepared and analyzed within the required holding times referenced in the SOW (time of sample receipt to preparation/distillation).

Yes × No _____

B. All samples were analyzed within the 40 CFR 136 (Clean Water Act) or method recommended holding times (time of sample collection to date of analysis).

Yes × No _____

C. Chains of Custody (COC)

1. Chains of Custody (COC) were reviewed and all fields were complete, signatures were present and cross outs were clean and initialed.

Yes × No _____

2. Samples were received at the required temperature and preservation.

Yes × No _____

XIV. FIELD QC

A. Field QC samples (duplicates, SRMs) were identified.

Yes _____ No ×

Field duplicates were identified as follows:
SDG 500-17651-1 MW1S-GW01-090316 and MW1S-GW02-090316 (500-17651-2 and -3)

B. Field duplicates were within the guidance limit of < 35% RPD for water samples or < 50% RPD for soil samples. If values are less than 5 × RL, the water limit is ± 2 × RL or the soil limit is ± 4 × RL. The Project Manager will make the final determination.

Yes × No _____ N/A _____

Matrix	SDG	Parent Sample	Analyte	Observation
Water	500-17651-1	MW1S-GW01-090316	Barium	PASS
			Chromium	PASS
			Zinc	PASS

XV. GENERAL COMMENTS

The laboratory has complied with the requested methods and the quality of the data is acceptable and usable with consideration of the following comments.

The following are noted for clarification:
Data were submitted for all samples for the ICP analysis of Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver and Zinc. Mercury was analyzed by Cold Vapor AA.
SDG 500-17651-1 was used for the full raw data review (Level IV).

Blanks

Analytes reported as contaminants in the Method Blank are qualified "UB#," where # is the value of the blank corrected to the units of the sample. Only detected data less than 5 × blank are qualified, but are fully usable as undetected values.

Field Duplicates

Field duplicates were identified as follows:
SDG 500-17651-1 MW1S-GW01-090316 and MW1S-GW02-090316 (500-17651-2 and -3)

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed

following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since no reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

INORGANIC DATA QUALITY REVIEW REPORT
WET CHEMISTRY BY METHODS 300.0, 350.2, 353.2, 354.1, 376.1

SDG	500-17362-1, 500-17392-1, 500-17448-1, 500-17508-1, 500-17534-1, 500-17587-1,		
	500-17605-1, 500-17651-1, 500-17676-1, 500-17702-1, 500-17729-1, 500-17766-1,		
	500-17786-1, 500-17843-1, 500-18415-1, 500-18570-1, 500-18900-1, 500-20828-3,		
	500-21108-1		
PROJECT	Riverfront Superfund Site Task 2e for Parsons Technology, IL		
LABORATORY	TestAmerica Laboratories, Chicago		
SAMPLE MATRIX	Water	SAMPLING DATE (mo/yyyy)	March, April, May, August & Sept 2009
NO. OF SAMPLES	3 (W), 4 (W), 2 (W), 2 (W), 1 (W), 2 (W), 4 (W), 4 (W), 2 (W), 2 (W), 1 (W), 2 (W), 2 (W), 3 (W), 1 (W), 3 (W), 4 (W), 1 (W), 1 (W) = 44 aqueous samples		
ANALYSES REQUESTED	Method MCAWW 300.0 (Chloride and Sulfate), 350.2 (Ammonia as N), 353.2 (Nitrate/Nitrite), 354.1 (Nitrite), and 376.1 (Sulfide)		
SAMPLE NUMBERS	See attached results forms		
DATA REVIEWER	B. Nichols		
QA REVIEWER	Diane Short and Associates Inc.	INITIALS/DATE	

Telephone Logs included	Yes		No	×
Contractual Violations	Yes		No	×

The project QC, the EPA Contract Laboratory Program National Functional Guidelines for Inorganic Review 2004, and the Methods and laboratory SOPs have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review includes validation of all calibrations, chains of custody, and QC forms referencing the above documents. All of the data are also further reviewed for the calculation algorithms and submitted continuing calibration blanks as determined by the Project Manager. General comments regarding the data/analytical quality are included in the review when raw data are submitted.

I. DELIVERABLES

All deliverables were present as specified in the Statement of Work (SOW), SW-846, or project contract.

Yes × No ____

The following are noted for clarification:
SDG 500-17651-1 and SDG 500-20828-3 were used for the Level IV review.

II. CALIBRATIONS

A. All initial instrument calibrations were performed as defined in the SOW or project contract. All correlation coefficients of the 5 point curves were > 0.995.

Yes × No ____ N/A ____

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed at the required frequency.

Yes × No ____

Sequencing was not required, but sufficient calibrations were present to verify that the frequencies were met for client samples.

C. The ICV and CCV standard percent recovery (% R) results were within the required control limits of 90.0 – 110.0%.

Yes ____ No ×

The following analytes were qualified due to CCV standard % R values outside of the control limits.

SDG	Prep QC Lot	Analyte	Recovery	Qualifier
500-17766-1	500-60505	Nitrate/Nitrite	114	JC114
500-18415-1	500-62966	Nitrate/Nitrite	113	JC113

Data are qualified "JC#," where # is the % R value. The data may be biased high due to calibration inconsistencies.

III. BLANKS

The highest blank associated with any particular analyte is used for the qualification process and is the value entered after the "B" blank descriptor.

A. The initial calibration blanks (ICB) and continuing calibration blanks (CCB) were analyzed at the required frequency.

Yes × No ____ N/A ____

Sequencing was not required, but sufficient calibration blanks were present to verify that the frequencies were met for client samples.

B. The ICB and CCB results were within the required control limits.

Yes × No ____ N/A ____

One of the CCBs for Nitrate/Nitrite was out of limits, but as all associated sample results are greater than 5 × blank, no qualification has been applied. One of the CCBs for Chloride was out of limits for SDG 500-20828-3, but as the associated sample result is greater than 5 × blank, no qualification has been applied. These are part of the Level IV review.

C. All analytes in the Leach Blank were less than the CRDL or less than 2 × the instrument detection limit (IDL or MDL), whichever is lower.

Yes _____ No _____ N/A ×

No TCLP analysis was performed.

IV. PREPARATION OR METHOD BLANKS

A. Preparation or Method blanks were prepared and analyzed at the required frequency.

Yes × No _____

B. All analytes in the Preparation or Method Blank were less than the MDL.

Yes _____ No ×

Analytes were found in the Preparation Blanks, but the levels were such (results greater than 5 × blank or non-detect) that qualification was required only for the following analytes.

SDG	Matrix	Analyte	Result	Qualifier
500-17786-1	Water	Ammonia	0.075	UB0.075
500-17843-1				
500-18415-1	Water	Ammonia	0.071	UB0.071
500-18570-1	Water	Sulfide	0.45	UB0.45

Analytes reported as contaminants in the Method Blank are qualified "UB#," where # is the value of the blank corrected to the units of the sample. Only detected data less than 5 × blank are qualified, and are fully usable as undetected values.

C. Field, trip, decon rinse or other Field Blanks are contained and identified in the package.

Yes _____ No × N/A _____

D. The reported results for the Field Blanks are less than the MDL.

Yes _____ No _____ N/A ×

V. SPIKE SAMPLE RECOVERY

A. A Matrix (pre-digestion) Spike sample was prepared and analyzed for each digestion group and/or matrix or as required in the SOW.

Yes × No _____

B. The Matrix Spike percent recoveries were within the required control limits of 75.0 – 125.0%.

Yes _____ No × N/A _____

The following Matrix Spike (MS) recovery required data qualification.

SDG	Prep QC Lot	Analyte	MS/MSD Recoveries	Affected Samples	Qualifier
500-17392-1	500-59876	Chloride	126/124	All detected data	JMS126
500-21108-1	500-72203	Nitrate/ Nitrite	168/148	All detected data	JMS168

Data which do not meet the MS/MSD required recoveries are qualified "JMS#," where # is the value of the spike recovery. Data could be biased slightly high proportional to the spike recovery. Only detected data are qualified for high spike values. When four times (4 ×) the spike amount is less than the concentration of the analyte in the parent sample, no qualification is required as the recovery is statistically invalid. This latter condition was not observed for these QC lots.

C. A Post Digestion Spike was prepared and analyzed if required.

Yes _____ No _____ N/A ×

D. The MS/MSD samples were client samples.

Yes × No _____ N/A _____

VI. DUPLICATES

A. Matrix (pre-digestion) Duplicate samples were prepared and analyzed at the required frequency.

Yes × No _____

The laboratory prepared and analyzed MS/MSD samples.

B. The Matrix Spike Duplicate relative percent differences (RPD) were within the required control limits (20% for water samples or 35% for soil samples) or the Reporting Limits (RL) were met if the duplicate values are less than 5 × RL (CRDL Rule). If either of the duplicate results is less than 5 × RL, the RPD is not used. The QC limit (± RL for water samples or ± 2 × RL for soil samples) used is the difference between the original and the duplicate results.

Yes _____ No × N/A _____

The following analyte was qualified due to the Matrix Spike Duplicate RPD value outside of the control limits.

SDG	Prep QC Lot	Analyte	RPD	Qualifier
500-17729-1	500-60190	Sulfide	26	JD26

Data are qualified "JD#," where # is the RPD. As the RPD increases, the precision decreases.

VII. LABORATORY CONTROL SAMPLE

A. Laboratory Control Samples (LCS) were analyzed at the required frequency.

Yes × No _____

B. The LCS recoveries were within the required control limits of 80.0 – 120.0%.

Yes × No _____

VIII. ICP INTERFERENCE CHECK SAMPLE

A. The Interference Check Sample (ICS) was analyzed as required in the SOW or project contract.

Yes _____ No _____ N/A ×

Not applicable to wet chemistry methods.

B. The ICS percent recovery results were reported for all required ICS analytes and were within the required control limits of 85.0 – 115.0%.

Yes _____ No _____ N/A ×

IX. ICP SERIAL DILUTION

A. ICP Serial Dilutions have been analyzed at the required frequency if the analyte concentrations were greater than 50 × IDL.

Yes _____ No _____ N/A ×

Not applicable to wet chemistry methods.

B. The percent difference (% D) criteria of ± 10.0 % were met.

Yes _____ No _____ N/A ×

X. INSTRUMENT DETECTION LIMITS

A. The Instrument Detection Limits (IDL) have met the Quarterly reporting requirements.

Yes × No _____ N/A _____

This was determined to be acceptable during the contractual process. The MDLs are noted on the report forms.

B. All sample results have met the required detection limits (CRDL).

Yes × No _____ N/A _____

Some samples required dilution due to high levels of analytes. The Reporting Limits are increased proportionally for the affected analytes. The Project Manager will decide whether further evaluation is required to determine if the elevated RLs are acceptable.

XI. PREPARATION AND ANALYSIS LOGS

A. All samples were prepared and analyzed within the required holding times referenced in the SOW (time of sample receipt to preparation/distillation).

Yes × No _____

B. All samples were analyzed within the 40 CFR 136 (Clean Water Act) or method recommended holding times (time of sample collection to date of analysis).

Yes × No _____

C. Chains of Custody (COC)

1. Chains of Custody (COC) were reviewed and all fields were complete, signatures were present and cross outs were clean and initialed.

Yes × No _____

See associated Organic Data Quality Review Report for GCMS samples for complete details.
No Ammonia (as N) testing was designated on the COC for SDG 500-20828-3 or on the COC for SDG 500-21108-1.

2. Samples were received at the required temperature and preservation.

Yes × No _____

XII. FIELD QC

A. Field QC samples (duplicates, SRMs) were identified.

Yes × No _____

Field duplicates were identified as follows:

SDG 500-17392-1	MW2S-GW01-090303 and MW2S-GW02-090303 (500-17392-3 and -4)
SDG 500-17587-1	MW10UB-GW01-090311 and MW10UB-GW02-090311 (500-17587-1 and -3)
SDG 500-17605-1	MW9US-GW01-090312 and MW9US-GW02-090312 (500-17605-4 and -5)
SDG 500-17651-1	MW1S-GW01-090316 and MW1S-GW02-090316 (500-17651-2 and -3)
SDG 500-18570-1	JS25-GW01-090429 and JS25-GW02-090429 (500-18570-3 and -4)

B. Field duplicates were within the guidance limit of < 35% RPD for water samples or < 50% RPD for soil samples for wet chemistry analyses. If values are less than 5 × RL, the water limit is ± RL or the soil limit is ± 2 × RL. The Project Manager will make the final determination.

Yes _____ No × N/A _____

SDG	Matrix	Parent Sample	Analyte	Observation
500-17392-1	Water	MW2S-GW01-090303	Chloride	PASS
			Nitrate/Nitrite	PASS
			Nitrate	PASS
			Sulfate	PASS
			Ammonia	FD0.5
500-17587-1	Water	MW10UB-GW01-090311	Chloride	PASS
			Nitrate/Nitrite	FD2.4
			Nitrite	PASS
			Nitrate	FD2.4
			Sulfate	PASS
			Ammonia	CRDL Rule

500-17605-1	Water	MW9US-GW01-090312	Chloride	PASS
			Nitrate/Nitrite	FD4.6
			Nitrate	FD4.6
			Sulfate	PASS
			Ammonia	CRDL Rule
500-17651-1	Water	MW1S-GW01-090316	Chloride	PASS
			Nitrate/Nitrite	FD1.2
			Nitrate	FD71
			Sulfate	PASS
			Ammonia	PASS
500-18570-1	Water	JS25-GW01-090429	Chloride	PASS
			Nitrate/Nitrite	PASS
			Nitrite	PASS
			Nitrate	PASS
			Sulfate	PASS
			Sulfide	CRDL Rule

XIII. OVERALL ASSESSMENT

The laboratory has complied with the requested methods, and the quality of the data is acceptable and usable with consideration of the following comments.

Deliverables

The following are noted for clarification:
SDG 500-17651-1 and SDG 500-20828-3 were used for the Level IV review.

Initial and Continuing Calibrations

Nitrate/Nitrite demonstrated CCV percent recovery values outside the control limits for SDGs 500-17766-1 and 500-18415-1. Data are qualified "JC#," where # is the % R value. The data may be biased high due to calibration inconsistencies.

Blanks

One of the CCBs for Nitrate/Nitrite was out of limits, but as all associated sample results are greater than 5 × blank, no qualification has been applied. One of the CCBs for Chloride was out of limits for SDG 500-20828-3, but as the associated sample result is greater than 5 × blank, no qualification has been applied. These are part of the Level IV review.

Analytes were found in the Preparation Blanks, but the levels were such that qualification was required only as given in the associated table. Analytes reported as contaminants in the Method Blank are

qualified "UB#," where # is the value of the blank corrected to the units of the sample. Only detected data less than 5 × blank are qualified, but are fully usable as undetected values.

Matrix Spikes and Matrix Spike Duplicates

The Matrix Spike recovery for Chloride in SDG 500-17392-1 was outside the control limits. Data which do not meet the MS/MSD required recoveries are qualified "JMS#," where # is the value of the spike recovery. Data could be biased slightly high proportional to the spike recovery. Only detected data are qualified for high spike values. When four times (4 ×) the spike amount is less than the concentration of the analyte in the parent sample, no qualification is required as the recovery is statistically invalid. This latter condition was not observed for these QC lots.

Duplicates

Sulfide in SDG 500-17729-1 was qualified due to the Matrix Spike Duplicate RPD value outside of the control limits. Data are qualified "JD#," where # is the RPD. As the RPD increases, the precision decreases.

Instrument Detection Limits

Some samples required dilution due to high levels of analytes. The Reporting Limits are increased proportionally for the affected analytes. The Project Manager will decide whether further evaluation is required to determine if the elevated RLs are acceptable.

Chains of Custody

See associated Organic Data Quality Review Report for GCMS samples for complete details.
No Ammonia (as N) testing was designated on the COC for SDG 500-20828-3 or on the COC for SDG 500-21108-1.

Field QC

Field duplicates were identified as follows:

SDG 500-17392-1	MW2S-GW01-090303 and MW2S-GW02-090303 (500-17392-3 and -4)
SDG 500-17587-1	MW10UB-GW01-090311 and MW10UB-GW02-090311 (500-17587-1 and -3)
SDG 500-17605-1	MW9US-GW01-090312 and MW9US-GW02-090312 (500-17605-4 and -5)
SDG 500-17651-1	MW1S-GW01-090316 and MW1S-GW02-090316 (500-17651-2 and -3)
SDG 500-18570-1	JS25-GW01-090429 and JS25-GW02-090429 (500-18570-3 and -4)

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since no reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

TASK 3 - DNAPL INVESTIGATION

ORGANIC DATA QUALITY REVIEW REPORT
VOLATILE ORGANICS SW-846 METHOD 8260B,

SDG: 500: 6509, 7330, 7476, 7566, 6101, 5774, 7772, 7133

PROJECT: Riverfront Superfund Site, OU2/6, Task 3-DNAPL Investigation for Parsons Technology, IL

LABORATORY: Test America Laboratories-Chicago, IL

SAMPLE MATRIX: Waters SAMPLING DATE (Month/Year) July, August, September, October, November, 2007

ANALYSES REQUESTED: SW-846 8260B

SAMPLE NO.: 8260B: 32 waters including 9 trip blanks

DATA REVIEWER: Sammy Huntington and John Huntington

QA REVIEWER: Diane Short and Associates Inc. INITIALS/DATE: _____

Telephone Logs included Yes____ No _X__

Contractual Violations Yes____ No _X___

The Quality Assurance Project Plans (QAPP), the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999, and the SW-846 Method 8260B has been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review includes validation of all chains of custody, calibrations and QC forms referencing the above documents. All of the data are further reviewed for the calculation algorithm and submitted chromatograms and mass spectra as determined by the project manager. General comments regarding the data/ analytical quality are part of the review when raw data are submitted.

I. DELIVERABLES

A. All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.
Yes ___X__ No__

B. Chain of Custody Documentation was complete and accurate.
Yes _X__ No__ ___
The project manager is informed of the following and the chains are being completed for the project record.
There was a gap in time between relinquished and received. The samples were delivered by FEDEX but no air bill number is present. The laboratory has verified that shipping information is available for all courier services and these records are available upon request.

500-7566: There is no received time or date on the chain, but there is confirmation of dates from the project manager and on page 143 of the data package.
500-7772: Changes to the body and the relinquished date of the chain of custody without initials.
500-7133: Changes to the body of the chain of custody without initials

C. Samples were received at the required temperature, preservation and intact with no bubbles.
Yes ___ No __X___

500-7772: Samples were received warm at 17.9, 17.6 and 18.1. The client was notified of sample receipt non-conformance and responded to proceed with the analyses. The samples were delivered to the laboratory 3 days after shipment.

Because the samples were preserved with HCl, the degree of degradation due to biological processes should be minimal even with the temperature excursion. However, some degradation cannot be excluded and the results for these samples are qualified as JT12, indicating that the temperature was 12° above the 6° EPA maximum.

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.
Yes __ X __ No ____

B. Holding Times
1. The contract holding times were met for all analyses (Time of sample receipt to time of analysis (VOA) or extraction and from extraction to analysis).
Yes _X___ No ____

2. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (14 days from time of sample collection to analysis for VOA).
Yes __X__ No ____
500-6409: Sample Receiving Checklist stated that the samples were not received within hold times. This applies only to the ferrous iron tests, which were cancelled. This should have been clarified on the form.

III. INSTRUMENT CALIBRATION

A. Initial Calibration
1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of >0.05.

Yes __X__ No ____ NA____

2. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit for the CCCs for Method 8260 and Method 8270.
Yes __X_ No____ NA____

2b. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit or a linear curve was used and met the 0.990 limit.
Yes __X__ No___ NA____

C. Continuing Calibration
1. The RRF 50 standards were analyzed for each analysis at the required frequency and the validation QC criteria of > 0.05 were met for GC/MS.
Yes __X__ No ____ NA____

2. The percent difference (%D) validation limits of ± 25% were met.
Yes _____ No__ X _ NA___
2-Hexanone, Chloromethane, and Acetone had %D values out of the 25 % window in several CCVs. In all but one case, the bias is high, and in no case does the value indicate a likelihood of false negatives. Therefore non-detected results are not qualified.

SDG	CCV Date	Lab Sample #	Compound	%D Outlier	Qualifiers
500-7476	11/5/07 9:10	All	2-hexanone	25.7	None, ND
500-7566	11/8/07 9:42	1,2,1RE	2-Hexanone	-34.9	None, ND
500-7772	11/15/07 12:08	All	Chloromethane	-28.9	None, ND
			Acetone	-29.2	None, ND
			2-Hexanone	-48.2	None, ND
500-6329	9/5/07 13:01	1-5, 2RE, 4RE	Chloromethane	-26.3	None, ND
500-6329	9/6/08 12:53	6, 3RE,5RE,6RE	Chloromethane	-26.1	None, ND

IV. GC/MS INSTRUMENT PERFORMANCE CHECK
The BFB (8260) performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.
Yes __X___ No____ NA____

V. INTERNAL STANDARDS
The Internal Standards met the 100% upper and -50% lower limits criteria and the Retention times were within the required windows.
Yes __ X __ No ____ NA____

VI. SURROGATE
A. Surrogate spikes were analyzed with every sample for both methods.
Yes __X___ No____

B. And met the recovery limits defined in the current contract, which are the current laboratory limits.
Yes __X__ No _____

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix spike (MS) and matrix spike duplicates (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.
Yes ____ No __X__

There were no MS or MSD samples designated, nor submitted for this task. The project frequency has not been met and matrix effects cannot be determined unless this matrix is represented in one of the other task events. Although the Matrix Spike/Matrix Spike Duplicates did not meet the 1:20 criteria, as field duplicate(s) were supplied, the matrix precision can be evaluated and the values were acceptable.

B. The MS and MSD percent recoveries were within the limits defined in the contract, which are the current laboratory control chart limits.
Yes ___ No____ NA__X_

C. The MSD relative percent differences (RPD) were within the defined contract limits.
Yes ___ No____ NA__X_

D. The MS/MSD were client samples.
Yes ___ No____ NA__X_

VIII. LABORATORY CONTROL SAMPLE

A. A Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples.
Yes __X__ No ____

B. The LCS percent recoveries were within the limits defined in the contract (the MS limits used as a reference or laboratory-specific limits for this matrix are defined).
Yes _____ No _ X __
There are a few LCS outliers as shown in the table below. These are low recoveries, and results are potentially biased low for associated samples. Qualifiers are JL#, where # is the recovery observed in the LCS.

SDG	Batch	Analyte	LCS/LCSD/RPD	Qualifiers
500-7772	26573	1,2-Dichloroethane	67	JL67
		2-Hexanone	44	JL44
		Methyl Ethyl Ketone	35	JL35
		Methyl isobutyl ketone	49	JL49
500-7566	26427	2-Hexanone	45/46/OK	JL45

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.
Yes ___X _ No ___

B. No blank contamination was found in the Method Blank.
Yes __ X __ No____

C. If Field Blanks were identified, no blank contamination was found.
Yes __X___ No ____ NA___

There are nine trip blanks, all in control.

SDG	Field Blank
500-5774	U17-TB01-000.0-070730
500-6101	T13-TB01-000.0-070820
500-6329	R13-TB01-000.0-070828
500-6409	Q14-TB01-000.0-070904
500-7133	N8-TB01-071010
500-7330	A14-TB01-000.0-071016
500-7476	F8-TB01-071026
500-7566	A7-TB01--071030
500-7772	F11-TB01-071108

X. FIELD QC

If Field duplicates were identified, they met a guidance RPD of < 35% for water or < 50% for soils. For values reported at < 5 x the reporting limit (RL), a difference of 2 x RL is used as guidance (3.5 x RL for soils). Data are not qualified for field duplicates as these are evaluated for the total project by the client.

Yes __X__ No ____ NA__ __

There are two field duplicates in this set of data. Both are in control.

SDG	Field Duplicate ID	Parent Sample	Observations
500-6101	T13-GW02-021.0-070820	T13-GW01-021.0-070828	In control
500-7133	N8-GW02-024.7-071010	N8-GW01-024.7-071010D	In control

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and GC/MS analytical systems.

Yes __X_ No____ NA____

At the 10% review level, conducted on 500-6101.

B. The suggested EQL's for the sample matrices in this set were met.

Yes __X__ No____ NA____

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected GC/MS compounds.

Yes __X__ No ____ NA____

At the 10% review level, conducted on 500-6101.

B. Quantitation was checked to determine the accuracy of calculation algorithm for each method and transcription was checked for all detected compounds.

Yes _ X__ No ____ NA____

At the 10% review level, conducted on 500-6101.

XIII. OVERALL ASSESSMENT OF THE CASE

Chain of Custody and Sample Condition:
The project manager is informed of several items in the text and the chains are being completed for the project record.

500-7772: Samples were received warm at 17.9, 17.6 and 18.1. The client was notified of sample receipt non-conformance and responded to proceed with the analyses. The samples were delivered to the laboratory 3 days after shipment.

Because the samples were preserved with HCl, the degree of degradation due to biological processes should be minimal even with the temperature excursion. However, some degradation cannot be excluded and the results for these samples are qualified as JT12, indicating that the temperature was 12° above the 6° EPA maximum.

Continuing Calibrations:
2-hexanone, chloromethane, and acetone had %D values out of the 25 % window in several CCVs. In all but one case, the bias is high, and in no case does the value indicate a likelihood of false negatives. Therefore non-detected results are not qualified.

Matrix Spike (MS) and MS Duplicates

There were no MS or MSD samples designated, nor submitted for this task. The project frequency has not been met and matrix effects cannot be determined unless this matrix is represented in one of the other task events. Although the Matrix Spike/Matrix Spike Duplicates did not meet the 1:20 criteria, as field duplicate(s) were supplied, the matrix precision can be evaluated and the values were acceptable.

LCS Recoveries:
There are a few LCS outliers as shown in the table in the body of this report. These are low recoveries, and results are potentially biased low for associated samples. Qualifiers are JL#, where # is the recovery observed in the LCS.

Field Blanks:
There are nine trip blanks, all in control.

Field Duplicates:
There are two field duplicates in this set of data. Both are in control.

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since no reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

TASK 4 - SEDIMENT AND SURFACE WATER SAMPLING

ORGANIC DATA QUALITY REVIEW REPORT
PESTICIDES BY SW-846 METHOD 8081A, PCBs BY SW-846 METHOD 8082

SDG	500-12974-1		
PROJECT	Riverfront Superfund Site, Task 4 for Parsons Technology Group		
LABORATORY	TestAmerica Laboratories, Chicago		
SAMPLE MATRIX	Soil & Water	SAMPLING DATE (mo/yyyy)	August 2008
NO. OF SAMPLES	2 (S) = 2 solid samples 2 (W) = 2 aqueous samples		
ANALYSES REQUESTED	SW-846 8081A and SW-846 8082		
SAMPLE NUMBERS	See attached results forms		
DATA REVIEWER	B. Nichols		
QA REVIEWER	Diane Short and Associates Inc.	INITIALS/DATE	

Telephone Logs included Yes____ No _X___

Contractual Violations Yes____ No _X___

The project Quality Assurance criteria, the EPA Contract Laboratory Program National Functional Guidelines for Organic Review 1999, and SW-846 Methods 8081 and 8082 has been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review of these samples includes validation of all chains of custody, calibrations and QC forms referencing the QC limits in the above documents. Ten percent of the data are further reviewed for the calculation algorithms and submitted chromatograms and mass spectra as determined by the project manager. General comments regarding the data/analytical quality are part of the review when raw data are submitted.

I. DELIVERABLES

All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.
Yes __X__ No____

The following are noted for clarification:
Data were submitted for the solid and aqueous samples for Pesticides and PCB analyses. SDG 500-12974-1 was used for the full raw data review (Level IV) for both types of analyses.

II. ANALYTICAL REPORT FORMS

The Analytical Report or Data Sheets are present and complete for all requested analyses.
Yes __X__ No____

III. HOLDING TIMES

A. The contract holding times were met for all analyses (time of sample receipt to time of extraction and time from extraction to analysis).
Yes __X__ No____

B. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (from time of sample collection to extraction).
Yes __X__ No____

C. All chains of custody are accurate with signatures and times complete.
Yes __X__ No____

The Project Manager is informed of the following and Chains of Custody are updated for the project file:
SDG 500-12974-1: No Sampling Time was given for samples 500-12974-1, 500-12974-2 and 500-12974-3 on COC 062063.

D. Samples were received in proper condition.
Yes __X__ No____

IV. INSTRUMENT CALIBRATION (IC) AND CONTINUING CALIBRATION (CC) VERIFICATION

A. The GC standards were analyzed at the required frequency (every 72 hours at a minimum).
Yes __X__ No____

B. Performance evaluation standard was run as required for Pesticides, and Endrin and DDT breakdown were within limits (below 15%).
Yes __X__ No ___ NA____

C. The chromatographic resolution and separation criteria were met.
Yes __X__ No____

D. The suggested columns were used, and the PQLs were met.
Yes __X__ No____

E. Calibration factors for IC met the 20% RSD limit or the linear regression was > 0.995.
Yes __X__ No____

E. Continuing Calibration Factors and retention times (RT) were within the 25% D limits.
Yes ____ No__X__

The % D value for Methoxychlor at -53.9 was outside of the 25% limit. A negative sign indicates that the % D is indicative of a high bias. As only detected data are qualified and this target compound was not detected in any of the samples, no qualification was required.

V. BLANKS

A. Laboratory blanks
1. Laboratory blanks were analyzed for every sample set and for each matrix type or once in every ten samples, whichever is more frequent.
Yes __X__ No____

2. No blank contamination was found in the Method Blank.
Yes __X__ No____

3. Instrument blank analysis was performed following most samples that contained analytes at high concentrations.
Yes ____ No ___ NA__X__

No high-concentration samples were present in the dilutions that were run.

B. Field Blanks
If field blanks were identified, no blank contamination was found.
Yes ____ No ___ NA__X__

No field blanks are present.

VI. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix Spike (MS) and Matrix Duplicate (MD) or Matrix Spike Duplicate (MSD) samples were analyzed for every analysis performed and for every 20 samples or for every matrix, whichever is more frequent.
Yes __X__ No____

B. The MS and MSD percent recoveries (% R) were within the limits defined by the laboratory which are the QAPP limits.
Yes ____ No__X__

The following Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries required data qualification.

Method	SDG	Parent Sample	Analyte	MS/MSD Recoveries	Qualifier
8081A	500-12974-1	SD06-SD01-000.2-080801	4,4'-DDD	58/76	JMS58
			Endosulfan sulfate	58/66	JMS58
			4,4'-DDT	53/121	JMS53
			Endrin ketone	57/69	JMS57
			Endrin aldehyde	46/54	JMS46

Data which do not meet the MS/MSD required recoveries are qualified "JS#," where # is the value of the spike recovery. Only the parent sample is qualified for organic analyses. All data are qualified for low spike values. When a spike is < 30% R, data are qualified "JS#" for detected values or are rejected ("RS#") for samples with non-detect values. A low Matrix Spike recovery indicates a possible low bias to the reported result. When four times (4 ×) the spike amount is less than the concentration of the

analyte in the parent sample, no qualification is required as the recovery is statistically invalid. This latter condition and rejected data are not applicable to this data set.

C. The MSD relative percent differences (RPD) were within the defined contract or laboratory limits.
Yes ____ No __X__ NA____

The following analytes were qualified due to Matrix Spike Duplicate RPD values outside of the control limits.

Method	SDG	Parent Sample	Analyte	RPD	Qualifier
8081A	500-12974-1	SD06-SD01-000.2-080801	4,4'-DDT	69	JD69
			Methoxychlor	37	JD37

Data are qualified "JD#," where # is the RPD. As the RPD increases, the precision decreases. Only the parent sample is qualified for organic analyses.

D. The MS/MSD samples were client samples.
Yes __X__ No ___ NA____

VII. LABORATORY CONTROL SAMPLE

A. A Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples or for every matrix, whichever is more frequent.
Yes __X__ No____

B. The LCS percent recoveries (% R) were within the limits defined by the laboratory or in the contract.
Yes __X__ No____

VIII. SURROGATE RECOVERY

A. The Surrogate spike was analyzed with every sample.
Yes __X__ No____

B. And met the recovery limits defined in the current contract. If recovery limits were exceeded, the sample was re-extracted and re-analyzed.
Yes __X__ No____

IX. FIELD QC

If Field duplicates or Performance Check Compounds were identified, they were within the guidance limit of < 35% RPD or the % recovery guidance for the project. If values were less than 5 × RL (Reporting Limit), a limit of ± 2 × RL is used (CRDL Rule). Data are not qualified for field duplicates as these are evaluated for the total project by the client.

Yes ____ No __X__ NA____

Field duplicates were identified as follows:
SDG 500-12974-1 SW06-SW01-080801 and SW06-SW02-080801 (500-12974-4 and -5)
SD06-SD01-000.2-080801 and SD06-SD02-000.2-080801 (500-12974-6 and -7)

Method	SDG	Matrix	Parent Sample	Analyte	Observation
8081A	500-12974-1	Water	SW06-SW01-080801	Endosulfan I	OK
		Solid	SD06-SD01-000.2-080801	4,4'-DDT	CRDL Rule

X. COMPOUND IDENTIFICATION

A. All raw data chromatograms and data system printouts were evaluated for all detected compounds, and the identification is accurate.
Yes __X__ No ____

Part of the Level IV review.

B. Retention time limits or peak pattern identifications are met.
Yes __X__ No ____

Part of the Level IV review.

C. Two-column confirmation was performed for all detected values.
Yes __X__ No ___ NA____

Not required for PCBs (8082). Confirmation of PCB detections is by pattern matching, not second column confirmation.

D. If two column or two detector confirmation was performed, the value of the confirmation was within 25% D of the quantitation value for results > 5 × RL. If the laboratory has flagged data for % D > 40%, a "JP" qualifier has been added for low level results. For values < 5 × RL, the difference is not considered to impact the precision of the data.
Yes __X__ No ___ NA____

XI. COMPOUND QUANTITATION AND REPORTED CRQLS

A. Raw data examination verified that all sample results were correctly calculated.
Yes __X__ No ___ NA____

Part of the Level IV review.

B. The chromatograms and general system performance were acceptable for all instruments and analytical systems.
Yes __X__ No ____

Part of the Level IV review.

XII. OVERALL ASSESSMENT OF THE CASE

Data comply with the required methods. Data are fully usable for project purposes with consideration of the following qualifications or comments.

Deliverables

The following are noted for clarification:

Data were submitted for the solid and aqueous samples for Pesticides and PCB analyses. SDG 500-12974-1 was used for the full raw data review (Level IV) for both types of analyses.

Chain of Custody

The Project Manager is informed of the following and Chains of Custody are updated for the project file: SDG 500-12974-1: No Sampling Time was given for samples 500-12974-1, 500-12974-2 and 500-12974-3 on COC 062063.

Continuing Calibration

The % D value for Methoxychlor at -53.9 was outside of the 25% limit. A negative sign indicates that the % D is indicative of a high bias. As only detected data are qualified and this target compound was not detected in any of the samples, no qualification was required.

Matrix Spikes and Duplicates

Data which do not meet the MS/MSD required recoveries are presented in the associated table. Data are qualified "JMS#," where # is the value of the spike recovery. Only the parent sample is qualified for organic analyses. All data are qualified for low spike values. When a spike is < 30% R, data are qualified "JMS#" for detected values or are rejected ("RMS#") for samples with non-detect values. A low Matrix Spike recovery indicates a possible low bias to the reported result. When four times (4 ×) the spike amount is less than the concentration of the analyte in the parent sample, no qualification is required as the recovery is statistically invalid. This latter condition and rejected data are not applicable to this data set.

Data which do not meet the Matrix Spike Duplicate RPD criteria are presented in the associated table. Data are qualified "JD#," where # is the RPD. As the RPD increases, the precision decreases. Only the parent sample is qualified for organic analyses.

Field Duplicates

Field duplicates were identified as follows:

SDG 500-12974-1	SW06-SW01-080801 and SW06-SW02-080801 (500-12974-4 and -5)
	SD06-SD01-000.2-080801 and SD06-SD02-000.2-080801 (500-12974-6 and -7)

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and

analyzed for the requested parameters. Since no reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

INORGANIC DATA QUALITY REVIEW REPORT
METALS BY ICP SW-846 METHOD 6010B AND MERCURY BY CVAA SW-846 METHODS 7471A AND 7470A

SDG	500-12974-1		
PROJECT	Riverfront Superfund Site, Task 4 for Parsons Technology Group		
LABORATORY	TestAmerica Laboratories, Chicago		
SAMPLE MATRIX	Soil & Water	SAMPLING DATE (mo/yyyy)	August 2008
NO. OF SAMPLES	2 (S) = 2 solid samples 2 (W) = 2 aqueous samples		
ANALYSES REQUESTED	SW-846 6010B and SW-846 7471A and 7470A		
SAMPLE NUMBERS	See attached results forms		
DATA REVIEWER	B. Nichols		
QA REVIEWER	Diane Short and Associates Inc.	INITIALS/DATE	

Telephone Logs included	Yes		No	X
Contractual Violations	Yes		No	X

The project QC, the EPA Contract Laboratory Program National Functional Guidelines for Inorganic Review 2002, and the SW-846 Methods and laboratory SOPs have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been eXpanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review includes validation of all calibrations, chains of custody, and QC forms referencing the above documents. All of the data are also further reviewed for the calculation algorithms and submitted continuing calibration blanks as determined by the Project Manager. General comments regarding the data/analytical quality are included in the review when raw data are submitted.

I. DELIVERABLES

All deliverables were present as specified in the Statement of Work (SOW) or project contract.

Yes X No ____

The following are noted for clarification:
Data were submitted for all samples for the ICP analysis of Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver and Zinc. Mercury was analyzed by Cold Vapor AA.
SDG 500-12974-1 was used for the full raw data review (Level IV).

II. CALIBRATIONS

A. All initial instrument calibrations were performed as defined in the SOW or project contract. All correlation coefficients of the 3 point curves were > 0.995.

Yes X No ____ N/A ____

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed at the required frequency.

Yes X No ____

Sequencing was not required, but sufficient calibrations were present to verify that the frequencies were met for client samples.

C. The ICV and CCV standard percent recovery results were within the required control limits of 90.0 – 110.0% (80 – 120 % for mercury).

Yes X No ____

III. CRDL STANDARDS

The 2 X CRDL standards were analyzed as required in the SOW.

Yes X No ____ N/A ____

IV. BLANKS

The highest blank associated with any particular analyte is used for the qualification process and is the value entered after the “B” blank descriptor.

A. The initial calibration blanks (ICB) and continuing calibration blanks (CCB) were analyzed at the required frequency.

Yes X No ____ N/A ____

Sequencing was not required, but sufficient calibration blanks were present to verify that the frequencies were met for client samples.

B. The ICB and CCB results were within the required control limits.

Yes ____ No X N/A ____

This is done as part of the 10% review of the raw data.

SDG	Matrix	Analyte	Result	Qualifier
500-12974-1	Water	Lead	0.0044	UCB0.0044

Analytes reported as contaminants in the Calibration Blank are qualified "UCB#," where # is the value of the blank. Only detected data less than 5 x blank are qualified, but are fully usable as undetected values.

C. All analytes in the Leach Blank were less than the CRDL or less than 2 x the instrument detection limit (IDL or MDL), whichever is lower.

Yes _____ No _____ N/A X

No TCLP analysis was performed.

V. PREPARATION OR METHOD BLANKS

A. Preparation or Method blanks were prepared and analyzed at the required frequency.

Yes X No _____

B. All analytes in the Preparation or Method Blank were less than the CRDL or less than the MDL, whichever is lower.

Yes _____ No X

Analytes were found in the Preparation Blank but the levels were such that qualification would be required only for the following analytes.

SDG	Matrix	Analyte	Result	Qualifier
500-12974-1	Water	Zinc	0.0051	UB0.0051

Analytes reported as contaminants in the Method Blank are qualified "UB#," where # is the value of the blank corrected to the units of the sample. Only detected data less than 5 X blank are qualified, but are fully usable as undetected values.

C. Field, trip, decon rinse or other Field Blanks are contained and identified in the package.

Yes _____ No X N/A _____

No Field Blanks were identified for the metals analysis.

D. The reported results for the Field Blanks are less than the CRDL or less than the MDL, whichever is lower.

Yes _____ No _____ N/A X

VI. A. ICP INTERFERENCE CHECK SAMPLE

A. The Interference Check Sample (ICS) was analyzed as required in the SOW or project contract.

Yes X No _____ N/A _____

B. The ICS percent recovery results were reported for all required ICS analytes and were within the required control limits of 80.0 – 120.0%.

Yes X No _____ N/A _____

C. ICP analysis results for analytes not required to be present in a given ICS standard were within acceptable limits.

Yes _____ No _____ N/A X

Not applicable to limited list metals.

VI B. INTERELEMENT CORRECTION FACTORS

The Interelement Correction Factors are included and complete for all possible interferent analytes.

Yes X No _____ N/A _____

Review of other possible contaminants was not requested by the client. The full Interference table was provided, however.

VII. SPIKE SAMPLE RECOVERY

A. A Matrix (pre-digestion) Spike sample was analyzed for each digestion group and/or matrix or as required in the SOW.

Yes X No _____

B. The Matrix Spike percent recoveries were within the required control limits of 75.0 – 125.0%.

Yes _____ No X N/A _____

The following Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries required data qualification.

SDG	Prep QC Lot	Analyte	MS/MSD Recoveries	Affected Samples	Qualifier
500-12974-1	500-43743	Arsenic	124/128	Detected data	JMS128
		Barium	103/46	All data	JMS46
		Chromium	-89/-33	Detected/undetected	JMS0 or RMS0
		Lead	241/87	Detected data	JMS241

Data which do not meet the MS/MSD required recoveries are qualified "JMS#," where # is the value of the spike recovery. Only the parent sample is qualified for organic analyses. All data are qualified for low spike values. Only detected data are qualified for high spike values. When a spike is < 30% R, data are qualified "JMS#" for detected values or are rejected ("RMS#") for samples with non-detect values. A low Matrix Spike recovery indicates a possible low bias to the reported result. A high Matrix Spike recovery indicates a potential high bias. When four times (4 x) the spike amount is less than the concentration of the analyte in the parent sample, no qualification is required as the recovery is statistically invalid. This latter condition was observed for Zinc in QC batch 500-43743.

C. A Post Digestion Spike was prepared and analyzed if required.

Yes _____ No _____ N/A X

D. The MS/MSD samples were client samples.

Yes X No _____ N/A _____

VIII. DUPLICATES

A. Matrix (pre-digestion) Duplicate samples were analyzed at the required frequency.

Yes X No ____

B. The Matrix Duplicate relative percent differences (RPD) were within the required control limits (20% for water samples or 35% for soil samples) or the Reporting Limits (RL) were met if the duplicate values are less than 5 X RL (CRDL Rule). If either of the duplicate results is less than 5 x RL, the RPD is not used. The QC limit (± RL for water samples or ± 2 x RL for soil samples) used is the difference between the original and the duplicate results.

Yes ____ No X N/A ____

The following analytes were qualified due to Matrix Duplicate RPD values outside of the control limits. Total qualification for each analyte is noted.

SDG	Prep QC Lot	Analyte	Parent Sample	RPD	Total Qualification
500-12974-1	500-43743	Barium	500-12974-6	52	JMS46D52
		Cadmium		156	J*0.5
		Chromium		104	JMS0D104
		Zinc		162	JD162E12

Data are usually qualified "JD#," where # is the RPD. As the RPD increases, the precision decreases. If the CRDL Rule is used, data are qualified "J*#," where # is the difference between the original and duplicate results.

IX. LABORATORY CONTROL SAMPLE

A. Laboratory Control Samples (LCS) were analyzed at the required frequency.

Yes X No ____

B. The LCS recoveries were within the required control limits of 80.0 – 120.0%.

Yes X No ____

X. MSA RESULTS AND GRAPHITE FURNACE ANALYSIS (GFAA)

Duplicate injections were performed for all analyses and the relative standard deviations (RSD) were less than 20% for all reported results. (Method of Standard Additions (MSA) requires only a single injection).

Yes ____ No ____ N/A X

Graphite furnace analysis was not conducted.

XI. ICP SERIAL DILUTION

A. ICP Serial Dilutions have been analyzed at the required frequency if the analyte concentrations were greater than 50 x IDL.

Yes X No ____ N/A ____

B. The percent difference (% D) criteria of ± 10.0 % were met.

Yes _____ No X N/A _____

The following Serial Dilution % D values resulted in data qualification. Total qualification for each analyte is noted.

SDG	Prep QC Lot	Analyte	% D	Total Qualification
500-12974-1	500-43743	Lead	11	JMS241E11
		Zinc	12	JD162E12

Data which exceed the % D limit are qualified "JE#," where # is the value of the % D. The % D limit of ± 10.0% is valid only if the reported value in the parent sample is greater than 50 x IDL. Data could be biased, usually high, due to non-linear chemical or matrix effects.

C. The Serial Dilution analyses were on client samples.

Yes X No _____ N/A _____

XII. INSTRUMENT DETECTION LIMITS

A. The Instrument Detection Limits (IDL) have met the Quarterly reporting requirements.

Yes X No _____ N/A _____

This was determined to be acceptable during the contractual process.

B. All sample results have met the required detection limits (CRDL).

Yes X No _____ N/A _____

XIII. PREPARATION AND ANALYSIS LOGS

A. All samples were prepared and analyzed within the required holding times referenced in the SOW (time of sample receipt to preparation/distillation).

Yes X No _____

B. All samples were analyzed within the 40 CFR 136 (Clean Water Act) or method recommended holding times (time of sample collection to date of analysis).

Yes X No _____

C. Chains of Custody (COC)

1. Chains of Custody (COC) were reviewed and all fields were complete, signatures were present and cross outs were clean and initialed.

Yes _____ No X

The Project Manager is informed of the following and Chains of Custody are updated for the project file: SDG 500-12974-1: No Sampling Time was given for samples 500-12974-1, 500-12974-2 and 500-12974-3 on COC 062063.

2. Samples were received at the required temperature and preservation.

Yes X No _____

XIV. FIELD QC

A. Field QC samples (duplicates, SRMs) were identified.

Yes X No _____

Field duplicates were identified as follows:
SDG 500-12974-1 SW06-SW01-080801 and SW06-SW02-080801 (500-12974-4 and -5)
SD06-SD01-000.2-080801 and SD06-SD02-000.2-080801 (500-12974-6 and -7)

B. Field duplicates were within the guidance limit of < 35% RPD for water samples or < 50% RPD for soil samples. If values are less than 5 x RL, the water limit is ± 2 x RL or the soil limit is ± 4 x RL. The Project Manager will make the final determination.

Yes _____ No X N/A _____

Matrix	SDG	Parent Sample	Analyte	Observation
Water	500-12974-1	SW06-SW01-080801	Barium	PASS
			Lead	CRDL Rule
			Zinc	PASS
Solid		SD06-SD01-000.2-080801	Arsenic	JFD75
			Barium	PASS
			Cadmium	PASS
			Chromium	JFD94
			Lead	JFD60
			Selenium	CRDL Rule
			Silver	PASS
			Zinc	JFD122

Data are usually qualified "JFD#," where # is the RPD. As the RPD increases, the precision decreases. If the CRDL Rule is used, data are qualified "JF*#," where # is the difference between the original and duplicate results.

XV. GENERAL COMMENTS

The laboratory has complied with the requested methods and the quality of the data is acceptable and usable with consideration of the following comments.

The following are noted for clarification:
Data were submitted for all samples for the ICP analysis of Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver and Zinc. Mercury was analyzed by Cold Vapor AA.
SDG 500-12974-1 was used for the full raw data review (Level IV).

Blanks

Analytes reported as contaminants in the Calibration Blank are qualified "UCB#," where # is the value of the blank. Only detected data less than 5 x blank are qualified, but are fully usable as undetected values.

Analytes reported as contaminants in the Method Blank are qualified "UB#," where # is the value of the blank corrected to the units of the sample. Only detected data less than 5 x blank are qualified, but are fully usable as undetected values.

Matrix Spikes and Duplicates

Data which do not meet the MS/MSD required recoveries are qualified "JMS#," where # is the value of the spike recovery. Only the parent sample is qualified for organic analyses. All data are qualified for low spike values. Only detected data are qualified for high spike values. When a spike is < 30% R, data are qualified "JMS#" for detected values or are rejected ("RMS#") for samples with non-detect values. A low Matrix Spike recovery indicates a possible low bias to the reported result. A high Matrix Spike recovery indicates a potential high bias. When four times (4 x) the spike amount is less than the concentration of the analyte in the parent sample, no qualification is required as the recovery is statistically invalid. This latter condition was observed for Zinc in QC batch 500-43743.

For Matrix Duplicate RPD values outside the control limits, data are usually qualified "JD#," where # is the RPD. As the RPD increases, the precision decreases. If the CRDL Rule is used, data are qualified "J*#," where # is the difference between the original and duplicate results.

Serial Dilution

Data which exceed the % D limit are qualified "JE#," where # is the value of the % D. The % D limit of ± 10.0% is valid only if the reported value in the parent sample is greater than 50 x IDL. Data could be biased, usually high, due to non-linear chemical or matrix effects.

Chains of Custody

The Project Manager is informed of the following and Chains of Custody are updated for the project file:
SDG 500-12974-1: No Sampling Time was given for samples 500-12974-1, 500-12974-2 and 500-12974-3 on COC 062063.

Field Duplicates

Field duplicates were identified as follows:

SDG 500-12974-1	SW06-SW01-080801 and SW06-SW02-080801 (500-12974-4 and -5)
	SD06-SD01-000.2-080801 and SD06-SD02-000.2-080801 (500-12974-6 and -7)

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard

methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since no reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

ORGANIC DATA QUALITY REVIEW REPORT
VOLATILE ORGANICS BY SW-846 METHOD 8260B, SEMIVOLATILE ORGANICS BY SW-846 METHOD 8270C

SDG	VOA: 500-12974-1, 500-13011-1, 500-18152-1, 500-18572-1, 500-20828-2		
	SVOA: 500-12974-1		
PROJECT	Riverfront Superfund Site, Task 4 for Parsons Technology Group		
LABORATORY	TestAmerica Laboratories, Chicago		
SAMPLE MATRIX	Soil & Water	SAMPLING DATE (mo/yyyy)	August 2008 & April 2009 & August 2009
NO. OF SAMPLES	8260B: 3 (S), 3 (S), 3 (S) = 9 solid samples, including 3 trip blanks 4 (W), 4 (W), 7 (W), 2 (W), 5 (W) = 22 aqueous samples, including 1 trip blank		
	8270C: 2 (S) = 2 solid samples 2 (W) = 2 aqueous samples		
ANALYSES REQUESTED	SW-846 8260B and SW-846 8270C		
SAMPLE NUMBERS	See attached results forms		
DATA REVIEWER	B. Nichols		
QA REVIEWER	Diane Short and Associates Inc.	INITIALS/DATE	

Telephone Logs included Yes____ No_ X__

Contractual Violations Yes____ No _X___

The project Quality Assurance Project Plan (QAPP), the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999, and the SW-846 Method 8260B and Method 8270C have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review of these samples includes validation of all chains of custody, calibrations and QC forms referencing the QC limits in the above documents. Ten percent of the data are further reviewed for the calculation algorithms and submitted chromatograms and mass spectra as determined by the project manager. General comments regarding the data/analytical quality are part of the review when raw data are submitted.

I. DELIVERABLES

A. All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.
Yes __X__ No ____

The following are noted for clarification:
Data were submitted for the solid and aqueous samples for Volatile Organic (VOA) and Semi-Volatile Organic (SVOA) analyses. Four of the aqueous samples were designated as trip blanks. SDG 500-12974-1 was used for the full raw data review (Level IV) for both types of analyses. Five aqueous samples, including one trip blank, were submitted for VOA analysis separately and reviewed at a later date. SDG 500-20828-2 was used for the Level IV review.

The following is noted regarding Internal Standards. For internal standards, the forms compare the sample internal standards with the initial calibration internal standards rather than the daily standard. The validation guidance calls for comparison with the daily calibration standard. From a validation perspective the laboratory should be comparing samples with the daily standard, and daily standards should be compared with the initial calibration. Methods 8260B and 8270C only require monitoring internal standards for the CCVs compared to the initial calibration. The methods only recommend monitoring for samples and do not provide requirements. The actual laboratory practice is more stringent than either validation or method requirements, and no further action is required. The primary impact of this is to cause the internal standard retention times to occasionally appear to be out of the acceptance window when they are not. This is discussed in the applicable narrative.

B. Chain of Custody Documentation was complete and accurate.
Yes __X__ No ____

The Project Manager is informed of the following and Chains of Custody are updated for the project file:
SDG 500-12974-1: No Sampling Time was given for samples 500-12974-1, 500-12974-2 and 500-12974-3 on COC 062063.
SDG 500-13011-1: A cross out on COC 062064 was not initialed or dated.
SDG 500-18152-1: A cross out on the COC was not initialed or dated.
SDG 500-18572-1: The sample ID is written over, and the Trip Blank is not on the COC. There is a note, however in Comments: "Report results of Trip Blank MW9R-TB01-090428 from the other chain on this shipment with these results also." As the Trip Blank is with the same shipment, proper procedures have been followed.

C. Samples were received at the required temperature, preservation and intact with no bubbles.
Yes __X__ No ____

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.
Yes __X__ No___

B. Holding Times
1. The contract holding times were met for all analyses (time of sample receipt to time of analysis (VOA) or extraction (SVOA), and time from extraction to analysis).
Yes __X__ No____

SDG 500-18152-1: The samples were received on 4/10/2009 at 1030 hours per the COC. For the three solid samples (500-18152-6, -8 and -10), the Date Prepared is given as 04/09/2009 on the Analytical Data Report Forms for 8260B Volatile Organic Compounds (GC/MS).

2. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (14 days from time of sample collection for VOA or 7 days to time of extraction for SVOA).
Yes __X__ No ____

III. INSTRUMENT CALIBRATION - GC/MS

A. Initial Calibration
1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of > 0.05.
Yes ____ No __X__ NA____

SDG 500-18572-1: The RRF for Acetone was reported as 0.037. Non-detect data are qualified "URC0.037" to indicate possible false undetected data due to low sensitivity.
SDG 500-20828-2: The RRF for Acetone was reported as 0.040. Non-detect data are qualified "URC0.040" to indicate possible false undetected data due to low sensitivity.
Acetone is a common "poor responder."

2a. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit for the CCCs.
Yes __X__ No ___ NA____

2b. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit for all other compounds or a regression curve was used.
Yes __X__ No ___ NA____

3. The 12 hour System Performance Check was performed as required in SW-846 including the SVOA DDT/Endrin breakdown check.
Yes __X__ No ___ NA____

A column degradation check was not included in the data packages and there is no evidence of column breakdown so no further action is taken.

B. Continuing Calibration
1. The midpoint standard was analyzed for each analysis at the required frequency, and the QC criterion of RRF > 0.05 was met.
Yes ____ No __X__ NA____

SDG 500-18572-1: The RRF for Acetone was reported as 0.044. Data have been qualified from the ICAL.

2. The percent difference (% D) limits of ± 25% were met.
Yes ____ No __X__ NA___

Several CCVs had % D values outside of the 25% limit. The outliers observed are presented in the following table. A negative sign indicates that the % D is indicative of a high bias.

Method	SDG	CCV Date	Analyte	% D	Qualifier
8260B	500-12974-1	8/06/2008	Chloromethane	-27.0	None (all samples ND)
			Carbon disulfide	48.8	None (all samples ND)
			Acetone	-26.8	None (all samples ND)
8270C		8/11/2008	2,2'-Oxybis[1-chloropropane]	-38.1	None (all samples ND)
			N-Nitrosodi-n-propylamine	-27.0	None (all samples ND)
			Hexachlorocyclopentadiene	-45.3	None (all samples ND)
			2-Nitroaniline	-32.4	None (all samples ND)
			3-Nitroaniline	-34.9	None (all samples ND)
			4-Nitroaniline	-46.5	None (all samples ND)
8260B	500-13011-1	8/07/2008	Carbon disulfide	44.3	None (all samples ND)
			Chloroethane	25.4	None (all samples ND)
			Acetone	-25.6	JC26
8260B	500-18152-1	4/19/2009	Carbon tetrachloride	39.8	None (all samples ND)
			2-Hexanone	27.1	None (all samples ND)
			Acetone	-31.1	JC31
8260B	500-20828-2	8/31/2009	Bromomethane	25.8	None (all samples ND)
			2-Butanone (MEK)	66.8	None (all samples ND)
			Methyl isobutyl ketone	31.8	None (all samples ND)

Data are qualified "JC#," where # is the % D. Only detected data are qualified. The qualifier indicates variability in instrument response to the noted compound. As non-detected data are not quantitated, no qualifier is applied if the response is acceptable.

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB or DFTPP performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.
Yes __X__ No ___ NA____

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria, and the retention times were within the required windows.
Yes __X__ No ___ NA____

VI. SURROGATE STANDARDS

Surrogate spikes were analyzed with every sample.
Yes __X__ No____

And met the recovery limits defined in the current contract, which are the current laboratory limits.
Yes __X__ No____

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix Spike (MS) and Matrix Spike Duplicate (MSD) samples were analyzed for every analysis performed and for every 20 samples or for every matrix, whichever is more frequent.
Yes __X__ No____

B. The MS and MSD percent recoveries (% R) were within the limits defined in the contract, which are the current laboratory control chart limits.
Yes ____ No __X__ NA___

The following Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries required data qualification.

Method	SDG	Parent Sample	Analyte	MS/MSD Recoveries	Qualifier
8270C	500-12974-1	SW06-SW01-080801	Benzo[a]anthracene	69/57	JMS57
			Chrysene	71/58	JMS58
		SD06-SD01-000.2-080801	Hexachlorocyclopentadiene	0/0	URMS0
8260B	500-18152-1	SW01-SW01-090409	1,2-Dichloroethane	122/110	None (sample ND)

Data which do not meet the MS/MSD required recoveries are qualified "JMS#," where # is the value of the spike recovery. Only the parent sample is qualified for organic analyses. All data are qualified for low spike values. Only detected data are qualified for high spike values. When a spike is < 30% R, data are qualified "JMS#" for detected values or are rejected ("RMS#") for samples with non-detect values. A low Matrix Spike recovery indicates a possible low bias to the reported result. A high Matrix Spike recovery indicates a potential high bias. When four times (4 ×) the spike amount is less than the concentration of the analyte in the parent sample, no qualification is required as the recovery is statistically invalid. This latter condition and rejected spike data were not applicable to these samples.

C. The MSD relative percent differences (RPD) were within the defined contract limits.
Yes ____ No __X__ NA___

The following analytes were qualified due to Matrix Spike Duplicate RPD values outside of the control limits.

Method	SDG	Parent Sample	Analyte	RPD	Qualifier
8260B	500-12974-1	SD06-SD01-000.2-080801	Chloroethane	58	JD58
8270C		SW06-SW01-080801	4-Bromophenyl phenyl ether	23	JD23
			Hexachlorobenzene	23	JD23
			Pyrene	22	JD22
			Benzo[b]fluoranthene	25	JD25
		SD06-SD01-000.2-080801	3,3'-Dichlorobenzidine	57	JD57
8260B	500-	SW01-SW01-090409	Methyl ethyl ketone	28	JD28

	18152-1				

Data are qualified "JD#," where # is the RPD. As the RPD increases, the precision decreases. Only the parent sample is qualified for organic analyses.

D. The MS/MSD samples were client samples.
Yes __X__ No ___ NA____

VIII. LABORATORY CONTROL SAMPLE

A. A Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples.
Yes __X__ No____

All target compounds reported were spiked.

B. The LCS percent recoveries were within the limits defined in the contract. The Matrix Spike limits are used as a reference or laboratory-specific limits for each matrix are defined.
Yes ____ No__X__

8260B: 1,1,2-Trichloroethane and Vinyl chloride in SDG 500-18152-1 demonstrated outliers for LCS recovery. The recoveries are higher than the limits specified. All other recoveries are in control. Qualifiers are not required for the high recoveries since the associated samples have no detections for the target compounds.

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.
Yes __X__ No____

B. No blank contamination was found in the Method Blank.
Yes __X__ No____

C. If Field Blanks were identified, no blank contamination was found.
Yes __X__ No____

The trip blanks were identified per the client as follows:

SDG 500-12974-1	SW03-TB01-080801
SDG 500-13011-1	SW11-TB01-080804
SDG 500-18152-1	SW8-TB01-090408
SDG 500-18572-1	MW9R-TB01-090428
SDG 500-20828-2	MW4-TB01-090825

X. FIELD QC

If Field duplicates were identified, they were within the guidance limit of < 30% RPD for water samples or < 50% RPD for soil samples. If values are less than 5 × RL, the water limit is ± 2 × RL or the soil limit is ± 4 × RL (CRDL Rule). Data are not qualified for field duplicates as these are evaluated for the total project by the client.

Yes ____ No __X__ NA___

Field duplicates were identified as follows:

SDG 500-12974-1	SW06-SW01-080801 and SW06-SW02-080801 (500-12974-4 and -5)
	SD06-SD01-000.2-080801 and SD06-SD02-000.2-080801 (500-12974-6 and -7)

Method	SDG	Matrix	Parent Sample	Analyte	Observation
8260B	500-12974-1	Water	SW06-SW01-080801	Trichloroethene	PASS
		Solid	SD06-SD01-000.2-080801	Trichloroethene	PASS
8270C		Solid	SD06-SD01-000.2-080801	Fluoranthene	CRDL Rule
				Pyrene	CRDL Rule
				Benzo[a]anthracene	CRDL Rule
				Chrysene	CRDL Rule
				Benzo[b]fluoranthene	CRDL Rule
				Benzo[k]fluoranthene	CRDL Rule
				Benzo[a]pyrene	CRDL Rule
				Indeno[1,2,3-cd]pyrene	CRDL Rule
				Dibenz[a,h]anthracene	CRDL Rule
				Benzo[g,h,i]perylene	CRDL Rule

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and analytical systems.
Yes __X__ No ___ NA____

Part of the Level IV review.

B. The suggested EQLs for the sample matrices in this set were met.
Yes __X__ No ___ NA____

Part of the Level IV review.

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected compounds.
Yes __X__ No ___ NA____

Part of the Level IV review.

B. Quantitation was checked to determine the accuracy of calculations for representative compounds in each internal standards quantitation set.
Yes __X__ No ___ NA____

Part of the Level IV review.

XIII. TENTATIVELY IDENTIFIED COMPOUNDS

TICs were properly identified and met the library identification criteria.
Yes ____ No ___ NA__X__

No TICs reported or requested.

XIV. OVERALL ASSESSMENT OF THE CASE

The laboratory has complied with the requested method. Data are fully usable after consideration of qualifiers.

Deliverables

The following are noted for clarification:

Data were submitted for the solid and aqueous samples for Volatile Organic and Semi-Volatile Organic analyses. Four of the aqueous samples were designated as trip blanks. SDG 500-12974-1 was used for the full raw data review (Level IV) for both types of analyses. Five aqueous samples, including one trip blank, were submitted for VOA analysis separately and reviewed at a later date. SDG 500-20828-2 was used for the Level IV review.
The following is noted regarding Internal Standards. For internal standards, the forms compare the sample internal standards with the initial calibration internal standards rather than the daily standard. The validation guidance calls for comparison with the daily calibration standard. From a validation perspective the laboratory should be comparing samples with the daily standard, and daily standards should be compared with the initial calibration. Methods 8260B and 8270C only require monitoring internal standards for the CCVs compared to the initial calibration. The methods only recommend monitoring for samples and do not provide requirements. The actual laboratory practice is more stringent than either validation or method requirements and no further action is required. The primary impact of this is to cause the internal standard retention times to occasionally appear to be out of the acceptance window when they are not. This is discussed in the narrative.

Chain of Custody and Holding Times

The Project Manager is informed of the following and Chains of Custody are updated for the project file:
SDG 500-12974-1: No Sampling Time was given for samples 500-12974-1, 500-12974-2 and 500-12974-3 on COC 062063.
SDG 500-13011-1: A cross out on COC 062064 was not initialed or dated.
SDG 500-18152-1: A cross out on the COC was not initialed or dated.
SDG 500-18572-1: The sample ID is written over, and the Trip Blank is not on the COC. There is a note, however in Comments: "Report results of Trip Blank MW9R-TB01-090428 from the other chain on this shipment with these results also." As the Trip Blank is with the same shipment, proper procedures have been followed.

SDG 500-18152-1: The samples were received on 4/10/2009 at 1030 hours per the COC. For the three solid samples (500-18152-6, -8 and -10), the Date Prepared is given as 04/09/2009 on the Analytical Data Report Forms for 8260B Volatile Organic Compounds (GC/MS).

Initial and Continuing Calibrations

SDG 500-19572-1: The RRF for Acetone was reported as 0.037. Non-detect data are qualified "RC0.037" to indicate possible false undetected data due to low sensitivity.
SDG 500-20828-2: The RRF for Acetone was reported as 0.040. Non-detect data are qualified "RC0.040" to indicate possible false undetected data due to low sensitivity.
Acetone is a common "poor responder."

A SVOA column degradation check was not included in the data packages. The raw data review does not indicate column breakdown and no further action is taken.

SDG 500-18572-1: The RRF for Acetone was reported as 0.044. Data have been qualified from the ICAL.

Several CCVs had % D values outside of the 25% limit. The outliers observed are presented in the associated table. A negative sign indicates that the % D is indicative of a high bias. Data are qualified "JC#," where # is the % D. Only detected data are qualified. The qualifier indicates variability in instrument response to the noted compound. As non-detected data are not quantitated, no qualifier is applied if the response is acceptable.

Matrix Spikes and Duplicates

Data which do not meet the MS/MSD required recoveries are qualified "JMS#," where # is the value of the spike recovery. Only the parent sample is qualified for organic analyses. All data are qualified for low spike values. Only detected data are qualified for high spike values. When a spike is < 30% R, data are qualified "JMS#" for detected values or are rejected ("RMS#") for samples with non-detect values. A low Matrix Spike recovery indicates a possible low bias to the reported result. A high Matrix Spike recovery indicates a potential high bias. When four times (4 ×) the spike amount is less than the concentration of the analyte in the parent sample, no qualification is required as the recovery is statistically invalid. This latter condition and rejected spike data were not applicable to these samples.

Data which do not meet the Matrix Spike Duplicate RPD criteria are presented in the associated table. Data are qualified "JD#," where # is the RPD. As the RPD increases, the precision decreases. Only the parent sample is qualified for organic analyses.

Laboratory Control Samples

8260B: 1,1,2-Trichloroethane and Vinyl chloride in SDG 500-18152-1 demonstrated outliers for LCS recovery. The recoveries are higher than the limits specified. All other recoveries are in control. Qualifiers are not required for the high recoveries since the associated samples have no detections for the target compounds.

Field Blanks

The trip blanks were identified per the client as follows:

SDG 500-12974-1	SW03-TB01-080801
SDG 500-13011-1	SW11-TB01-080804
SDG 500-18152-1	SW8-TB01-090408
SDG 500-18572-1	MW9R-TB01-090428
SDG 500-20828-2	MW4-TB01-090825

Field Duplicates

Field duplicates were identified as follows:

SDG 500-12974-1	SW06-SW01-080801 and SW06-SW02-080801 (500-12974-4 and -5)
	SD06-SD01-000.2-080801 and SD06-SD02-000.2-080801 (500-12974-6 and -7)

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since 6 reported results have been qualified as unusable (rejected) for Acetone, the overall completeness for the sampling event is 99.3 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

TASK 5 - SANITARY SEWER INSPECTION AND SAMPLING

ORGANIC DATA QUALITY REVIEW REPORT
VOLATILE ORGANICS SW-846 METHOD 8260B,

SDG: 500: 6675, 6721, 11312, 6674, 6547, 6548, 6674

PROJECT: Riverfront Superfund Site OU2/6 Task 5 Sanitary Sewer Inspection and Sampling for Parsons Technology , IL

LABORATORY: Test America Laboratories-Chicago, IL

SAMPLE MATRIX: Soils and Waters SAMPLING DATE (Month/Year) May 2008; Sept 2007

ANALYSES REQUESTED: SW-846 8260B

SAMPLE NO.: 8260B: 57 soil including 23 waters including 6 trip blanks and 7 equipment blanks

DATA REVIEWER: Sammy Huntington and John Huntington

QA REVIEWER: Diane Short and Associates Inc. INITIALS/DATE: _____

Telephone Logs included Yes____ No _X__

Contractual Violations Yes____ No _X___

The Quality Assurance Project Plan (QAPP), the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999, and the SW-846 Method 8260B has been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review includes validation of all chains of custody, calibrations and QC forms referencing the above documents. All of the data are further reviewed for the calculation algorithm and submitted chromatograms and mass spectra as determined by the project manager. General comments regarding the data/ analytical quality are part of the review when raw data are submitted.

I. DELIVERABLES

A. All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.

Yes ___X__ No__

It is noted that one of the electronic deliverables (edd) was not in the same format as all the other edds. The project manager has requested a resubmittal of the edd for this SDG to complete the project edd and all edds have been updated.

This report contains the review of SDG 6547 and 6548, which contains both Task 1 and task 5 samples. The samples in the 2 tasks appear to share common calibration and QC data so the review of this SDG is contained in both reports.

B. Chain of Custody Documentation was complete and accurate.

Yes __X__ No_____

The project manager is informed of the following and the chains are being completed for the project record.

There was a gap in time between relinquished and received. The samples were delivered by FEDEX but no air bill number was present. The laboratory has been contacted and will supply shipping records upon request.

C. Samples were received at the required temperature, preservation and intact with no bubbles.

Yes _ X __ No ____

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes __ X __ No ____

B. Holding Times

1. The contract holding times were met for all analyses (Time of sample receipt to time of analysis (VOA) or extraction and from extraction to analysis).

Yes __X__ No ____

2. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (14 days from time of sample collection to analysis for VOA.

Yes __X__ No ____

III. INSTRUMENT CALIBRATION

A. Initial Calibration

1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of >0.05.

Yes __X__ No ____ NA____

2. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit for the CCCs for Method 8260 and Method 8270.

Yes _X__ No____ NA____

2b. The relative standard deviation (RSD) for the five-point calibration was within the 30% limit or a linear curve was used and met the 0.990 limit.

Yes __X__ No___ NA____

It is also notable that the initial calibrations have been used in some cases for a very long period without instrument recalibration. The calibration curve developed for MS06 was conducted on 11/20/2006. It was applied to samples analyzed in September of 2007, nearly a year later. It is unusual for an instrument to remain in service for that long without some level of instrument maintenance activity that would require recalibration. This is not a deviation or a matter requiring qualification of data, simply an observation.

C. Continuing Calibration
1. The RRF 50 standards were analyzed for each analysis at the required frequency and the validation QC criteria of > 0.05 were met for GC/MS.
Yes __X__ No ____ NA____

2. The percent difference (%D) validation limits of ± 25% were met.
Yes _____ No__ X _ NA___
Several CCVs show %D values outside of the validation limits of 25%. If the associated samples have detections of such targets, results are qualified as JC#, where # is the observed %D. If the associated samples have no detections, results are not qualified unless the %D is so high as to suggest the possibility of false negatives. Qualifiers have been issued for some detections of carbon disulfide and acetone.

SDG	CCV Date	Lab Sample #	Compound	%D Outlier	Qualifiers
500-6547	9/24/07 9:46	12,13	Acetone	43.7	None, ND
			cis-1,3-Dichloropropene	-25.6	None, ND
			Bromoform	-34.3	None, ND
			trans-1,3-Dichloropropene	-25.9	None, ND
	9/24/07 21.17	1-4,7	Acetone	42.7	JC43 detects
			Methylene Chloride	27.1	None, ND
	9/18/07 8:05	8-11, 14-16	All in control		None
500-6674	9/25/07 9:29	11-13	Bromomethane	26.6	None, ND
			Acetone	36.0	None, ND
	9/26/07 9:07	1-10, 14-18	Acetone	33.2	None, ND
500-11312	5/15/08 8:04	1,6-11	Carbon Disulfide	-38.2	None, ND
	5/16/08 8:14	2-5	Carbon Disulfide	-42.8	JC43 detect
500-6675	9/28/07 12:24	10-11	All in control		None
	9/26/07 9:07	1-4	Acetone	33.2	None, ND
	9/27/07 8:23	5-9	2-Hexanone	25.2	None, ND

SDG	CCV Date	Lab Sam #	Analyte	RRF	%D	Qualifier
6548	9/24/07 9:46	3,10,12	Acetone		43.7	None, ND
			Carbon disulfide		-30.2	None, ND
			cis-1,3-Dicloropropene		-25.6	None, ND

SDG	CCV Date	Lab Sam #	Analyte	RRF	%D	Qualifier
			trans-1,3-Dicloropropene		-25.9	None, ND
			Bromoform		-30.8	None, ND
	9/19/07 8:05	1,2,4-9,11	All in control			None

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB (8260) performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.

Yes __X___ No____ NA____

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria and the Retention times were within the required windows.

Yes __ __ No __X__ NA____

The internal standard is out for one sample.

SDG 500-6548: Lab sample 9 IS1 = 48%, IS3 = 48%, IS4=36%.

The internal standard method is intended to compensate for variability in absolute response. This assumes that the internal standard and the associated targets vary approximately in the same manner. When the internal standard absolute response varies by more than the validation limits, the potential for bias (either high or low) can become more likely. Thus for variability such as that shown above, the associated targets are qualified as JI#, where # is the internal standard recovery. The direction of the bias cannot be inferred from the bias of the internal standard, because the effect is significant enough that it may be producing discernibly different behavior for the targets depending on the cause of the behavior. For this reason both detected and non-detected results are qualified.

VI. SURROGATE

A. Surrogate spikes were analyzed with every sample for both methods.

Yes __X___ No____

B. And met the recovery limits defined in the current contract, which are the current laboratory limits.

Yes ____ No __X___

8260B: All surrogates are in control except for one elevated recovery shown in the table below. No qualifiers are added because the potential bias is high and no targets are detected.

Method	SDG	Lab Sample ID	Client Sample ID	Surrogate	Results	Dil	Qualifiers
8260B	500-6548	-12	B10-EB01-070913	Dibromofluoromethane	123	1	None, ND

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix spike (MS) and matrix spike duplicates (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.

Yes _____ No __ X __

There is one MS/MSD for soils, which does not meet the 20:1 ratio. There is no MS/MSD for waters. The matrix effects for these samples cannot be determined unless samples of a similar matrix have been collected during the other sampling events. Although the Matrix Spike/Matrix Spike

Duplicates did not meet the 1:20 criteria, as field duplicate(s) were supplied, the matrix precision can be evaluated and the values were acceptable.

Method	SDG	Client Sample ID	Lab Sample ID
8260B	500-11312	SDF1-SS01-011.0-080512	500-11312-1

B. The MS and MSD percent recoveries were within the limits defined in the contract, which are the current laboratory control chart limits.
Yes ___ No __X__ NA___
Bromomethane was recovered high in the MS/MSD. No qualifiers are issued since the parent sample did not have a detection for this analyte.

SDG	Lab Sample ID	Analyte	MD/MSD/RPD	Matrix	Qualifiers
500-11312	#1	Bromomethane	164/210/OK	Soil	None, ND in parent

C. The MSD relative percent differences (RPD) were within the defined contract limits.
Yes __ X __ No ___NA___

D. The MS/MSD were client samples.
Yes __ X __ No ___NA___

VIII. LABORATORY CONTROL SAMPLE
A. A Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples.
Yes __X__ No ____

B. The LCS percent recoveries were within the limits defined in the contract (the MS limits used as a reference or laboratory-specific limits for this matrix are defined).
Yes _____ No _ X __
Outliers are observed for Acetone, Methyl isobutyl ketone (4-Methyl-2-pentanone), vinyl chloride and Bromomethane. Qualifiers are added for low recoveries as JL# to all associated samples, where # is the recovery. For high recoveries, only detections are qualified JL#. In the case of acetone in SDG 500-6547, the laboratory ran an LCSD and although both recoveries meet the lab limits, the RPD is high. Thus there is an indication of greater variability than normal for this target. No qualifiers are added since the recoveries are in control. With the outliers observed in this set of data no qualifiers have been required.

SDG	Batch	Analyte	LCS/LCSD/RPD	Qualifiers
500-6547	22792	Acetone	OK/OK/31	None, recovery in control
	23168	Methyl isobutyl ketone	137	None, ND
	23285	Methyl isobutyl ketone	137	None, ND
500-6674	23285	Methyl isobutyl ketone	137	None, ND
500-11312	37843	Bromomethane	201	None, ND
500-6548	23161	Methyl isobutyl ketone	141	None, ND
	23161	Vinyl chloride	139	None, ND

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.
Yes __X__ No ___

B. No blank contamination was found in the Method Blank.
Yes __ X __ No____

C. If Field Blanks were identified, no blank contamination was reported unless noted .
Yes _____ No ___ NA___
There are six trip blanks and seven equipment blanks present.

One equipment blank had acetone present at 8.3 ug/L. One of the associated samples had acetone at a level less than 10x the equipment blank and is qualified as UFB8.3.

Method	SDG	Field Blank	Lab Sample ID
8260B	500-11312	SDF1-TB01-080512	500-11312-13
	500-11312	SDF3-EB01-080513	500-11312-12
	500-6547	F10-TB01-000.0-070913	500-6547-17
	500-6547	K10-EB01-000.0-070913	500-6547-5
	500-6547	MH156-EB01-070913	500-6547-6
	500-6674	A05-EB01-070918	500-6674-12
	500-6674	B01-TB01-070918	500-6674-11
	500-6675	C01-TB01-070919	500-6675-11
	500-6721	A04-EB01-070920	500-6721-9
	500-6721	C05-EB01-070920	500-6721-8
	500-6721	C05-TB01-070920	500-6721-6
	500-6548	B10-EB01-070913	500-6548-12
		E6-TB01-000.0-07913	500-6548-3

SDG	Lab Sam #	Analyte	Result	Qualifiers
500-11312	12	Acetone	8.3	UFB8.3 associated sample < 10x field blank

X. FIELD QC

If Field duplicates were identified, they met a guidance RPD of < 35% for water or < 50% for soils. For values reported at < 5 x the reporting limit (RL), a difference of 2 x RL is used as guidance (3.5 x RL for soils). Data are not qualified for field duplicates as these are evaluated for the total project by the client.
Yes ____ No __X__ NA__ __
There are 5 field duplicates for the solids and one field duplicate for the waters. The water field duplicate has a high RPD for methyl ethyl ketone (which has an unusually low reporting limit for this project) and should probably not be expected to be reproducible at the levels detected. One soil sample has a high-level detection of toluene in the parent sample and the associated field blank is a non-detect. As only one compound lacks precision, there is no clear explanation of the outlier. It is possible a sample mis-assignment has occurred and the project manager is informed of the outlier. The detection in the sample appears to be clearly established.
.

SDG	Field Duplicate	Matrix	Parent Sample	Observations
6674	A05-SS02-013.0-070918	SOLID	A05-SS01-013.0-070918	In control
6674	B02-SS02-009.0-070919	SOLID	B02-SS01-009.0-070919	In control
6721	C05-SS02-015.0-070920	SOLID	C05-SS01-015.0-070920	In control
6547	MH409-SD02-070913	SOLID	MH409-SD01-070913	Toluene 1300 ug/Kg in parent, 68U in duplicate
6547	MH409-SR02-070913	WATER	MH409-SR01-070913	Methyl ethyl ketone RPD =44
11312	SDF5-SS02-008.0-080513	SOLID	SDF5-SS01-008.0-080513	In control

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and GC/MS analytical systems.

Yes __X__ No____ NA____

The raw data review was conducted on 500-6547 and 500-6548. There is very little interference in these chromatograms and mass spectra. Matches with target mass spectra are good, with the exception of 2-butanone. In this case the library mass spectrum is primarily of one of the cis-1,2-dichloroethene, which co-elutes with 2-butanone and the peaks for 2-butanone are obscured. The detected target is clearly 2-butanone based on its published mass spectrum.

B. The suggested EQL's for the sample matrices in this set were met.

Yes __X__ No____ NA____

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected GC/MS compounds.

Yes __X__ No ____ NA____

At the 10% review level, conducted on 500-6547.

B. Quantitation was checked to determine the accuracy of calculation algorithm for each method and transcription was checked for all detected compounds.

Yes __X_ No ____ NA____

At the 10% review level, conducted on 500-6547.

XIII. OVERALL ASSESSMENT OF THE CASE

The laboratory has complied with the requested method. Data are fully usable after consideration of qualifiers.

<u>Deliverables</u>

It is noted that one of the electronic deliverables (edd) was not in the same format as all the other edds. The updated edd has been requested by the project manager to complete the database format and all edd are now updated.

<u>Chain of Custody and Sample Condition:</u>

The project manager is informed of the following and the chains are being completed for the project record.

There was a gap in time between relinquished and received. The samples were delivered by FEDEX but no air bill number was present. The laboratory has shipping records which can be supplied upon request.

Continuing Calibrations:
Several CCVs show %D values outside of the validation limits of 25%. If the associated samples have detections of such targets, results are qualified as JC#, where # is the observed %D. If the associated samples have no detections, results are not qualified unless the %D is so high as to suggest the possibility of false negatives. Qualifiers have been issued for some detections of carbon disulfide and acetone.

MS/MSD:
There is one MS/MSD for soils, which does not meet the 20:1 ratio. There is no MS/MSD for waters.

The matrix effects for these samples cannot be fully determined unless samples of a similar matrix have been collected during the other sampling events. Although the Matrix Spike/Matrix Spike Duplicates did not meet the 1:20 criteria, as field duplicate(s) were supplied, the matrix precision can be evaluated and the values were acceptable.

Bromomethane was recovered high in the one soil MS/MSD. No qualifiers are issued since the parent sample did not have a detection for this analyte.

Internal Standard:
The internal standard is out for one sample.

- SDG 500-6548: Lab sample 9 IS1 = 48%, IS3 = 48%, IS4=36%.

The internal standard method is intended to compensate for variability in absolute response. This assumes that the internal standard and the associated targets vary approximately in the same manner. When the internal standard absolute response varies by more than the validation limits, the potential for bias (either high or low) can become more likely. Thus for variability such as that shown above, the associated targets are qualified as JI#, where # is the internal standard recovery. The direction of the bias cannot be inferred from the bias of the internal standard, because the effect is significant enough that it may be producing discernibly different behavior for the targets depending on the cause of the behavior. For this reason both detected and non-detected results are qualified.

Surrogate:
All surrogates are in control except for one elevated recovery shown in the table below. No qualifiers are added because the potential bias is high and no targets are detected.

Method	SDG	Lab Sample ID	Client Sample ID	Surrogate	Results	Dil	Qualifiers
8260B	500-6548	-12	B10-EB01-070913	Dibromofluoromethane	123	1	None, ND

Field Blanks:
There are six trip blanks and seven equipment blanks present.

One equipment blank had acetone present at 8.3 ug/L. One of the associated samples had acetone at a level less than 10x the equipment blank and is qualified as UFB8.3.

Field Duplicates:
There are 5 field duplicates for the solids and one field duplicate for the waters. The water field duplicate has a high RPD for methyl ethyl ketone (which has an unusually low reporting limit for this project) and should probably not be expected to be reproducible at the levels detected. One soil sample has a high-level detection of toluene in the parent sample and the associated field blank is a non-detect.

As only one compound lacks precision, there is not clear tracking of the outlier. It is possible a sample mis-assignment has occurred and the project manager is informed of the outlier. The detection in the sample appears to be clearly established.

The data comply with the required methods and are usable with the consideration of the qualifications or comments indicated in the preceding sections of this report.

Accuracy was monitored through the use of spike samples including matrix spikes and laboratory control spikes. Accuracy was determined by calculating the percent recovery of the spiked analytes. Except as indicated in this report, all accuracy results were in control.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. Except as indicated in this report, representativeness was in control.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units. Except as indicated in this report, comparability was in control.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since no reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Reporting Limits (RLs). Except as indicated in this report, sensitivity was in control.

Precision was monitored through the use of data from field duplicates. Precision was in control.

SOIL VAPOR SAMPLING

DATA VALIDATION REPORT
FOR
AIR SAMPLES COLLECTED AT THE RIVERFRONT SUPERFUND SITE, NEW HAVEN, MISSOURI IN SEPTEMBER 2009

OVERVIEW

This data validation summary report covers eight air samples collected from selected New Haven site locations in September 2009. The samples included one field duplicate sample. Sample SVI3-SG02-010.2-090911 is the field duplicate of sample SVI3-SG01-010.2-090911. The samples are included in two Sample Delivery Groups (SDGs). An SDG represents the group of samples that were prepared, analyzed and reported together (i.e., the analytical batch) with common laboratory QC samples. A summary of the samples by SDG is presented in the table below.

The samples were analyzed for Volatile Organics (VOAs) using EPA method TO-15. All samples were prepared and analyzed by the Test America Laboratories (TA) Knoxville, Tennessee following the EPA method above.

SUMMARY OF SAMPLES

SDG	Matrix	Sample ID	Comment
H9I50174	Air	SVI3-SG01-010.2-090911	
H9I50174	Air	SVI3-SG02-010.2-090911	FD of SVI3-SG01-010.2-090911
H9I50174	Air	SVI2-SG01-010.0-090911	
H9I50174	Air	SVI-AM01-090911	Ambient sample
H9I50174	Air	SVI-AM01-090914	Ambient sample
H9I50174	Air	SVI4-SG01-009.9-090914	
H9I50174	Air	SVI5-SG01-010.8-090914	
H9I150163	Air	SVI1-SG01-009.8-090911	

All work was performed in accordance with the Final Quality Assurance Project Plan (QAPP) for the Remedial Investigation/Feasibility Study at the Riverfront Superfund Site

Operable Unit No. 2/6 (Parsons, July 2006), which was also prepared and approved for use to ensure generation of legally defensible data.

EVALUATION CRITERIA

The data submitted by the laboratory have been reviewed and validated following the guidelines described in the Section D2.4 of the QAPP and consistent with the USEPA National Functional Guidelines for Organic Data Review (USEPA OSWER 1999). All results and supporting data included in the data packages have been reviewed and validated including laboratory quality control results, chain-of-custody forms, chromatographs, quantitation reports and mass spectral data.

SUMMARY

This section of this report discusses deviations from the QAPP, other laboratory problems, QC problems leading to qualifying of data as rejected, estimated, or not detected and the overall usability of the data.

All samples were collected, prepared and analyzed following the procedures described in the project Work Plan and the QAPP. Except as indicated in this report, all samples were prepared and analyzed within the holding times specified in the QAPP.

Target VOAs detected in the samples include tetrachloroethene, trichloroethene, and cis-1,2-dichloroethene. The laboratory reported that six of the eight samples required dilution. The reporting limits have been adjusted to reflect the dilutions. Results reported from the diluted samples are indicated with '+' in the data tables.

The laboratory blanks associated with the samples in were free of volatile contamination.

The validated analytical results including data validation qualifiers are presented in **Appendix A**. A glossary of the data qualifiers is presented in **Appendix B**.

No QA/QC problems were found during validation of the data. No reported results have been qualified as unusable (rejected). All reported results should be considered usable as reported and qualified in this report and the associated data summary tables (**Appendix A**).

Accuracy was monitored through the use of spike samples including surrogates and laboratory control spikes (LCS). Accuracy was determined by calculating the percent recovery of the spiked analytes. All accuracy results were in control.

All surrogate percent recoveries for the samples were within the acceptance limits.

Precision was monitored through the review of the data for the field duplicate samples. Sample SVI3-SG02-010.2-090911 is the field duplicate of sample SVI3-SG01-010.2-090911. No target analytes was detected in either the parent or field duplicate samples.

Representativeness was monitored through the review of the sampling, handling, preparation, and analytical methods used for the samples. All samples were collected, preserved, prepared, and analyzed following the procedures described in the QAPP. The trip blanks were free of VOA contamination, except as indicated above.

Comparability was monitored through the use of standard sampling and analytical methods. Comparability was determined by reviewing the analytical results to ensure that only the standard methods described in the QAPP were used and that the results were reported using the appropriate units.

Completeness was determined by calculating the percentage of measurements judged to be usable compared to the total number of measurements planned. All samples collected were prepared and analyzed for the requested parameters. Since no reported results have been qualified as unusable (rejected) the overall completeness for the sampling event is 100 percent.

Sensitivity was monitored through the use of Method Detection Limits (MDLs) and Project Reporting Limits (PRLs). Target analytes not detected in the samples are reported at the PRL with the ‘U’ flag.

APPENDIX A

DATA SUMMARY TABLES FOR VALIDATED ANALYTICAL RESULTS

APPENDIX B

GLOSSARY OF DATA QUALIFIERS

GLOSSARY OF DATA VALIDATION QUALIFIERS

(NO CODE) Confirmed identification.

U Analyte was analyzed for but not detected above the adjusted project reporting limit (PRL).

UJ Analyte was not detected. The reported adjusted PRL is estimated.

J Analyte was detected; the reported value is the estimated concentration of the analyte in the sample.

R The reported result is unusable. The analyte may or may not be present in the sample.

UB Data considered being undetected at the elevated reporting limit due to laboratory or fielding blank contamination.

H Holding time or sample preservation violation.

+ Reported result obtained from diluted sample.

APPENDIX I
VALIDATED ANALYTICAL RESULTS

GLOSSARY OF DATA VALIDATION QUALIFIERS

(NO CODE) Confirmed identification.

U Analyte was analyzed for but not detected above the adjusted project reporting limit (PRL).

UJ Analyte was not detected. The reported adjusted PRL is estimated.

J Analyte was detected; the reported value is the estimated concentration of the analyte in the sample.

R The reported result is unusable. The analyte may or may not be present in the sample.

UB Data considered being undetected at the elevated reporting limit due to laboratory or field blank contamination.

H Holding time or sample preservation violation.

+ Reported result obtained from diluted sample.

NA Not Analyzed

SAMPLE NOMENCLATURE EXPLANATION

XXXX-XX01-0.0-yymmdd	Sample location-Sample Type-Depth in feet-date in yymmdd.
XX01	Original Sample.
XX02	Field duplicate.
TB01	Trip blank in cooler X for the day.
FB01/EB01	Equipment blank collected from equipment used for sampling.
SS	Soil Sample collected for Task 1 - Soil Investigation.
GWP1	Groundwater sample collected during pumping condition for Task 2a - Interval screening at JS14 and JS36.
GWS1	Groundwater sample collected during static condition for Task 2a - Interval screening at JS14 and JS36.
CSE/CSN	Overburden groundwater sample collected from direct push borings north of Boeuf Lutheran Road.
JS36-INF-GW01-yymmdd	Residential well sample collected from the Influent ports on a residential treatment system at JS36 for Task 2c-Residential Well Sampling.
JS33-GW01-yymmdd	Residential well sample collected from JS33 for either Task 2c-Residential Well Sampling or as a sentinel well for Task 2e- Site-wide Groundwater Sampling (Round 1).
W3-GW01-yymmdd	Water sample collected from New Haven Municipal Well W3 for Task 2c-Residential Well Sampling.
MWX-GW01-XXX.X-yymmdd	Monitoring well sample collected from the specific depth of XXX.X feet below ground surface for Task 2e- Site-wide Groundwater Sampling (Round 1).
R15-GW01-025.5-070831	Groundwater sample collected from R15 at 25.5 feet on August 31, 2007.
SW01	Surface water sample associated with Task 4 - Sediment and Surface Water Sampling.
SD01	Sediment sample associated with Task 4 - Sediment and Surface Water Sampling.
SDF2	Soil sample collected adjacent to sewer defects for Task 5 - Sanitary Sewer Inspection and Sampling.
MHXXX	Manhole associated with Task 5 - Sanitary Sewer Inspection and Sampling.
LSXX	Lift Station associated with Task 5 - Sanitary Sewer Inspection and Sampling.

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	B2	B2	B4	B4	B4	B8
		Sample ID:	B2-SS01-001.0-070912	B2-SS01-018.0-070912	B4-SS01-001.0-070912	B4-SS01-004.0-070912	B4-SS02-001.0-070912	B8-SS01-001.4-070912
		Lab Sample Id:	500-6519-10	500-6519-11	500-6519-7	500-6519-9	500-6519-8	500-6519-5
		Depth:	1	18	1	4	1	1.4
		SDG:	6519	6519	6519	6519	6519	6519
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	4 U	3.8 U	4.3 U	4.3 U	4.3 U	3.9 U
71-43-2	Benzene	ug/Kg	0.64 U	0.61 U	0.69 U	0.69 U	0.7 U	0.63 U
75-27-4	Bromodichloromethane	ug/Kg	0.53 U	0.51 U	0.57 U	0.57 U	0.58 U	0.52 U
75-25-2	Bromoform	ug/Kg	0.69 U	0.66 U	0.74 U	0.74 U	0.75 U	0.68 U
74-83-9	Bromomethane	ug/Kg	2.9 U	2.7 U	3.1 U	3.1 U	3.1 U	2.8 U
75-15-0	Carbon disulfide	ug/Kg	0.93 U	0.89 U	1 U	1 U	1 U	0.92 U
56-23-5	Carbon tetrachloride	ug/Kg	0.68 U	0.65 U	0.73 U	0.73 U	0.74 U	0.67 U
108-90-7	Chlorobenzene	ug/Kg	0.52 U	0.5 U	0.56 U	0.56 U	0.57 U	0.51 U
75-00-3	Chloroethane	ug/Kg	2.9 U	2.7 U	3.1 U	3.1 U	3.1 U	2.8 U
67-66-3	Chloroform	ug/Kg	0.63 U	0.6 U	0.68 U	0.68 U	0.69 U	0.62 U
74-87-3	Chloromethane	ug/Kg	1.2 U	1.2 U	1.3 U	1.3 U	1.3 U	1.2 U
124-48-1	Dibromochloromethane	ug/Kg	0.6 U	0.58 U	0.65 U	0.65 U	0.66 U	0.59 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.55 U	0.52 U	0.59 U	0.59 U	0.6 U	0.54 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.51 U	0.49 U	0.55 U	0.55 U	0.55 U	0.5 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.2 U	1.2 U	1.3 U	1.3 U	1.3 U	1.2 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.2 U	1.2 U	1.3 U	1.3 U	1.3 U	1.2 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.51 U	0.49 U	0.55 U	0.55 U	0.55 U	0.5 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.54 U	0.51 U	0.58 U	0.58 U	0.59 U	0.53 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.56 U	0.53 U	0.6 U	0.6 U	0.61 U	0.55 U
100-41-4	Ethylbenzene	ug/Kg	0.59 U	0.57 U	0.64 U	0.64 U	0.65 U	0.59 U
591-78-6	2-Hexanone	ug/Kg	1.1 U	1.1 U	1.2 U	1.2 U	1.2 U	1.1 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2 U	2 U	2.2 U	2.2 U	2.2 U	2 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.67 U	0.64 U	0.72 U	0.72 U	0.73 U	0.66 U
75-09-2	Methylene Chloride	ug/Kg	1.5 U	1.4 U	1.6 U	1.6 U	1.6 U	1.5 U
100-42-5	Styrene	ug/Kg	0.58 U	0.55 U	0.62 U	0.62 U	0.63 U	0.57 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.66 U	0.63 U	0.71 U	0.71 U	0.72 U	0.65 U
127-18-4	Tetrachloroethene	ug/Kg	0.84 U	0.8 U	0.9 U	0.91 U	0.91 U	0.82 U
108-88-3	Toluene	ug/Kg	1.6 U	1.5 U	1.7 U	1.7 U	1.7 U	1.6 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.67 U	0.64 U	0.72 U	0.72 U	0.73 U	0.66 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.76 U	0.73 U	0.82 U	0.83 U	0.83 U	0.75 U
79-01-6	Trichloroethene	ug/Kg	0.61 U	0.59 U	0.66 U	0.66 U	0.67 U	0.6 U
75-01-4	Vinyl chloride	ug/Kg	0.72 U	0.69 U	0.78 U	0.79 U	0.79 U	0.71 U
1330-20-7	Xylenes, Total	ug/Kg	1.7 U	1.6 U	1.8 U	1.8 U	1.8 U	1.6 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	B2	B2	B4	B4	B4	B8
		Sample ID:	B2-SS01-001.0-070912	B2-SS01-018.0-070912	B4-SS01-001.0-070912	B4-SS01-004.0-070912	B4-SS02-001.0-070912	B8-SS01-001.4-070912
		Lab Sample Id:	500-6519-10	500-6519-11	500-6519-7	500-6519-9	500-6519-8	500-6519-5
		Depth:	1	18	1	4	1	1.4
		SDG:	6519	6519	6519	6519	6519	6519
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	8.4 U	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	12 U	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	14 U	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	6.4 U	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	9.6 U	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	20 J	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	6.8 U	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	8.9 U	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	43 U	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	56 U	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	56 U	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	50 U	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	57 U	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	51 U	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	120 U	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	200 U	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	44 U	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	53 U	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	46 U	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	15 J	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	22 U	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	40 U	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	42 U	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	39 U	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	47 U	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	47 U	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	89 U	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	52 U	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	89 U	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	46 U	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	52 U	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	53 U	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	B2	B2	B4	B4	B4	B8
		Sample ID:	B2-SS01-001.0-070912	B2-SS01-018.0-070912	B4-SS01-001.0-070912	B4-SS01-004.0-070912	B4-SS02-001.0-070912	B8-SS01-001.4-070912
		Lab Sample Id:	500-6519-10	500-6519-11	500-6519-7	500-6519-9	500-6519-8	500-6519-5
		Depth:	1	18	1	4	1	1.4
		SDG:	6519	6519	6519	6519	6519	6519
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	160 U	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	580 U	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	66 U	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	57 U	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	23 J	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	8.9 U	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	8.8 U	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	43 U	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	220 U	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	45 U	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	22 U	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	48 U	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	49 U	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	56 U	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	71 U	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	7.9 U	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	58 U	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	180 U	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	81 U	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	11 U	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	110 U	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	140 U	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	54 U	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	46 U	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	49 U	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	280 U	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	13 U	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	53 U	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	18 J	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	46 U	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	120 U	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	86 U	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	B2	B2	B4	B4	B4	B8
		Sample ID:	B2-SS01-001.0-070912	B2-SS01-018.0-070912	B4-SS01-001.0-070912	B4-SS01-004.0-070912	B4-SS02-001.0-070912	B8-SS01-001.4-070912
		Lab Sample Id:	500-6519-10	500-6519-11	500-6519-7	500-6519-9	500-6519-8	500-6519-5
		Depth:	1	18	1	4	1	1.4
		SDG:	6519	6519	6519	6519	6519	6519
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	0.68 U	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	0.42 U	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	0.38 U	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	0.73 U	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	0.73 U	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	1.2 U	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	0.94 U	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	0.38 U	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	0.59 U	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	0.69 U	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	0.42 U	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	0.91 U	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	0.45 U	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	0.2 U	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	0.79 U	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	0.8 U	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	0.38 U	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	0.29 U	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	0.46 U	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	0.62 U	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	3.8 U	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	7.1 U	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	5.9 U	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	5.7 U	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	6.2 U	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	4.6 U	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	4.7 U	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	4.2 U	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	15	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	310	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	0.48	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	18	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	31	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	41	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	0.64 J	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	0.13 U	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	41	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	B8	B10	B10	C6	C6	D10
		Sample ID:	B8-SS01-011.2-070912	B10-SS01-003.5-070913	B10-SS01-014.0-070913	C6-SS01-001.7-070912	C6-SS01-014.7-070912	D10-SS01-002.0-07913
		Lab Sample Id:	500-6519-6	500-6548-8	500-6548-11	500-6519-2	500-6519-3	500-6548-6
		Depth:	11.2	3.5	14	1.7	14.7	2
		SDG:	6519	6548	6548	6519	6519	6548
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/12/2007	9/13/2007	9/13/2007	9/12/2007	9/12/2007	9/13/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	3.6 U	6.2 U	3.9 U	4.6 U	3.7 U	4.9 U
71-43-2	Benzene	ug/Kg	0.57 U	1 U	0.63 U	0.73 U	0.59 U	0.78 U
75-27-4	Bromodichloromethane	ug/Kg	0.47 U	0.83 U	0.52 U	0.61 U	0.49 U	0.65 U
75-25-2	Bromoform	ug/Kg	0.61 U	1.1 U	0.67 U	0.79 U	0.63 U	0.84 U
74-83-9	Bromomethane	ug/Kg	2.6 U	4.5 U	2.8 U	3.3 U	2.7 U	3.5 U
75-15-0	Carbon disulfide	ug/Kg	0.83 U	1.5 U	0.91 U	1.1 U	0.86 U	1.1 U
56-23-5	Carbon tetrachloride	ug/Kg	0.61 U	1.1 U	0.66 U	0.78 U	0.63 U	0.83 U
108-90-7	Chlorobenzene	ug/Kg	0.46 U	0.81 U	0.51 U	0.6 U	0.48 U	0.63 U
75-00-3	Chloroethane	ug/Kg	2.6 U	4.5 U	2.8 U	3.3 U	2.7 U	3.5 U
67-66-3	Chloroform	ug/Kg	0.56 U	0.99 U	0.62 U	0.72 U	0.58 U	0.77 U
74-87-3	Chloromethane	ug/Kg	1.1 U	1.9 U	1.2 U	1.4 U	1.1 U	1.5 U
124-48-1	Dibromochloromethane	ug/Kg	0.54 U	0.94 U	0.59 U	0.69 U	0.56 U	0.74 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.49 U	0.86 U	0.54 U	0.63 U	0.51 U	0.67 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.46 U	0.8 U	0.5 U	0.59 U	0.47 U	0.62 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.1 U	1.9 U	1.2 U	1.4 U	1.1 U	1.5 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.1 U	1.9 U	1.2 U	1.4 U	1.1 U	1.5 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.46 U	0.8 U	0.5 U	0.59 U	0.47 U	0.62 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.48 U	0.84 U	0.53 U	0.62 U	0.5 U	0.66 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.5 U	0.87 U	0.55 U	0.64 U	0.51 U	0.68 U
100-41-4	Ethylbenzene	ug/Kg	0.53 U	0.93 U	0.58 U	0.68 U	0.55 U	0.72 U
591-78-6	2-Hexanone	ug/Kg	1 U	1.7 U	1.1 U	1.3 U	1 U	1.4 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	1.8 U	3.2 U	2 U	2.3 U	1.9 U	2.5 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.6 U	1 U	0.65 U	0.77 U	0.62 U	0.82 U
75-09-2	Methylene Chloride	ug/Kg	1.3 U	2.3 U	1.5 U	1.7 U	1.4 U	1.8 U
100-42-5	Styrene	ug/Kg	0.51 U	0.9 U	0.56 U	0.66 U	0.53 U	0.7 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.59 U	1 U	0.65 U	0.76 U	0.61 U	0.8 U
127-18-4	Tetrachloroethene	ug/Kg	0.75 U	1.3 U	0.82 U	0.96 U	0.77 U	1 U
108-88-3	Toluene	ug/Kg	1.4 U	2.5 U	1.5 U	1.8 U	1.5 U	1.9 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.6 U	1 U	0.65 U	0.77 U	0.62 U	0.82 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.68 U	1.2 U	0.75 U	0.87 U	0.7 U	0.93 U
79-01-6	Trichloroethene	ug/Kg	0.55 U	0.96 U	0.6 U	0.7 U	0.57 U	0.75 U
75-01-4	Vinyl chloride	ug/Kg	0.65 U	1.1 U	0.71 U	0.83 U	0.67 U	0.88 U
1330-20-7	Xylenes, Total	ug/Kg	1.5 U	2.6 U	1.6 U	1.9 U	1.5 U	2 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	B8	B10	B10	C6	C6	D10
		Sample ID:	B8-SS01-011.2-070912	B10-SS01-003.5-070913	B10-SS01-014.0-070913	C6-SS01-001.7-070912	C6-SS01-014.7-070912	D10-SS01-002.0-07913
		Lab Sample Id:	500-6519-6	500-6548-8	500-6548-11	500-6519-2	500-6519-3	500-6548-6
		Depth:	11.2	3.5	14	1.7	14.7	2
		SDG:	6519	6548	6548	6519	6519	6548
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/12/2007	9/13/2007	9/13/2007	9/12/2007	9/12/2007	9/13/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	B8	B10	B10	C6	C6	D10
		Sample ID:	B8-SS01-011.2-070912	B10-SS01-003.5-070913	B10-SS01-014.0-070913	C6-SS01-001.7-070912	C6-SS01-014.7-070912	D10-SS01-002.0-07913
		Lab Sample Id:	500-6519-6	500-6548-8	500-6548-11	500-6519-2	500-6519-3	500-6548-6
		Depth:	11.2	3.5	14	1.7	14.7	2
		SDG:	6519	6548	6548	6519	6519	6548
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/12/2007	9/13/2007	9/13/2007	9/12/2007	9/12/2007	9/13/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	B8	B10	B10	C6	C6	D10
		Sample ID:	B8-SS01-011.2-070912	B10-SS01-003.5-070913	B10-SS01-014.0-070913	C6-SS01-001.7-070912	C6-SS01-014.7-070912	D10-SS01-002.0-07913
		Lab Sample Id:	500-6519-6	500-6548-8	500-6548-11	500-6519-2	500-6519-3	500-6548-6
		Depth:	11.2	3.5	14	1.7	14.7	2
		SDG:	6519	6548	6548	6519	6519	6548
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/12/2007	9/13/2007	9/13/2007	9/12/2007	9/12/2007	9/13/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	D10	D4	D4	E2	E2	E6
		Sample ID:	D10-SS01-010.0-07913	D4-SS01-002.0-070912	D4-SS01-011.4-070912	E2-SS01-002.0-070912	E2-SS01-011.0-070912	E6-SS01-001.0-07913
		Lab Sample Id:	500-6548-7	500-6519-15	500-6519-16	500-6519-12	500-6519-13	500-6548-1
		Depth:	10	2	11.4	2	11	1
		SDG:	6548	6519	6519	6519	6519	6548
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/13/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/13/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	3.9 U	4.5 U	3.7 U	3.9 U	3.6 U	4.8 U
71-43-2	Benzene	ug/Kg	0.63 U	0.73 U	0.6 U	0.63 U	0.58 U	0.78 U
75-27-4	Bromodichloromethane	ug/Kg	0.52 U	0.6 U	0.5 U	0.52 U	0.48 U	0.64 U
75-25-2	Bromoform	ug/Kg	0.68 U	0.78 U	0.64 U	0.67 U	0.62 U	0.83 U
74-83-9	Bromomethane	ug/Kg	2.8 U	3.3 U	2.7 U	2.8 U	2.6 U	3.5 U
75-15-0	Carbon disulfide	ug/Kg	0.91 U	1.1 U	0.87 U	0.91 U	0.84 U	1.1 U
56-23-5	Carbon tetrachloride	ug/Kg	0.67 U	0.77 U	0.63 U	0.66 U	0.61 U	0.82 U
108-90-7	Chlorobenzene	ug/Kg	0.51 U	0.59 U	0.49 U	0.51 U	0.47 U	0.63 U
75-00-3	Chloroethane	ug/Kg	2.8 U	3.3 U	2.7 U	2.8 U	2.6 U	3.5 U
67-66-3	Chloroform	ug/Kg	0.62 U	0.72 U	0.59 U	0.62 U	0.57 U	0.76 U
74-87-3	Chloromethane	ug/Kg	1.2 U	1.4 U	1.1 U	1.2 U	1.1 U	1.5 U
124-48-1	Dibromochloromethane	ug/Kg	0.59 U	0.68 U	0.56 U	0.59 U	0.54 U	0.73 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.54 U	0.62 U	0.51 U	0.54 U	0.49 U	0.66 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.5 U	0.58 U	0.48 U	0.5 U	0.46 U	0.62 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.2 U	1.4 U	1.1 U	1.2 U	1.1 U	1.5 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.2 U	1.4 U	1.1 U	1.2 U	1.1 U	1.5 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.5 U	0.58 U	0.48 U	0.5 U	0.46 U	0.62 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.53 U	0.61 U	0.5 U	0.53 U	0.49 U	0.65 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.55 U	0.63 U	0.52 U	0.54 U	0.5 U	0.67 U
100-41-4	Ethylbenzene	ug/Kg	0.58 U	0.67 U	0.56 U	0.58 U	0.54 U	0.72 U
591-78-6	2-Hexanone	ug/Kg	1.1 U	1.3 U	1 U	1.1 U	1 U	1.3 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2 U	2.3 U	1.9 U	2 U	1.8 U	2.5 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.66 U	0.76 U	0.63 U	0.65 U	0.6 U	0.81 U
75-09-2	Methylene Chloride	ug/Kg	1.5 U	1.7 U	1.4 U	1.5 U	1.3 U	1.8 U
100-42-5	Styrene	ug/Kg	0.57 U	0.65 U	0.54 U	0.56 U	0.52 U	0.7 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.65 U	0.75 U	0.62 U	0.64 U	0.6 U	0.8 U
127-18-4	Tetrachloroethene	ug/Kg	0.82 U	0.95 U	0.78 U	0.82 U	0.75 U	1 U
108-88-3	Toluene	ug/Kg	1.6 U	1.8 U	1.5 U	1.5 U	1.4 U	1.9 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.66 U	0.76 U	0.63 U	0.65 U	0.6 U	0.81 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.75 U	0.86 U	0.71 U	0.74 U	0.69 U	0.92 U
79-01-6	Trichloroethene	ug/Kg	0.6 U	0.7 U	0.57 U	0.6 U	0.55 U	0.74 U
75-01-4	Vinyl chloride	ug/Kg	0.71 U	0.82 U	0.68 U	0.71 U	0.65 U	0.88 U
1330-20-7	Xylenes, Total	ug/Kg	1.6 U	1.9 U	1.6 U	1.6 U	1.5 U	2 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	D10	D4	D4	E2	E2	E6
		Sample ID:	D10-SS01-010.0-07913	D4-SS01-002.0-070912	D4-SS01-011.4-070912	E2-SS01-002.0-070912	E2-SS01-011.0-070912	E6-SS01-001.0-07913
		Lab Sample Id:	500-6548-7	500-6519-15	500-6519-16	500-6519-12	500-6519-13	500-6548-1
		Depth:	10	2	11.4	2	11	1
		SDG:	6548	6519	6519	6519	6519	6548
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/13/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/13/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	D10	D4	D4	E2	E2	E6
		Sample ID:	D10-SS01-010.0-07913	D4-SS01-002.0-070912	D4-SS01-011.4-070912	E2-SS01-002.0-070912	E2-SS01-011.0-070912	E6-SS01-001.0-07913
		Lab Sample Id:	500-6548-7	500-6519-15	500-6519-16	500-6519-12	500-6519-13	500-6548-1
		Depth:	10	2	11.4	2	11	1
		SDG:	6548	6519	6519	6519	6519	6548
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/13/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/13/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	D10	D4	D4	E2	E2	E6
		Sample ID:	D10-SS01-010.0-07913	D4-SS01-002.0-070912	D4-SS01-011.4-070912	E2-SS01-002.0-070912	E2-SS01-011.0-070912	E6-SS01-001.0-07913
		Lab Sample Id:	500-6548-7	500-6519-15	500-6519-16	500-6519-12	500-6519-13	500-6548-1
		Depth:	10	2	11.4	2	11	1
		SDG:	6548	6519	6519	6519	6519	6548
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/13/2007	9/12/2007	9/12/2007	9/12/2007	9/12/2007	9/13/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	E6	E8	E8	F10	F10	F10
		Sample ID:	E6-SS01-015.2-07913	E8-SS01-001.5-07913	E8-SS01-013.0-07913	F10-SS01-003.0-070913	F10-SS01-008.5-070913	F10-SS02-008.5-070913
		Lab Sample Id:	500-6548-2	500-6548-4	500-6548-5	500-6547-14	500-6547-15	500-6547-16
		Depth:	15.2	1.5	13	3	8.5	8.5
		SDG:	6548	6548	6548	6547	6547	6547
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	4 U	4.4 U	3.8 U	4 U	5 U	6 U
71-43-2	Benzene	ug/Kg	0.64 U	0.71 U	0.61 U	0.65 U	0.8 U	0.97 U
75-27-4	Bromodichloromethane	ug/Kg	0.53 U	0.59 U	0.51 U	0.53 U	0.66 U	0.8 U
75-25-2	Bromoform	ug/Kg	0.69 U	0.76 U	0.66 U	0.69 U	0.85 U	1 U
74-83-9	Bromomethane	ug/Kg	2.9 U	3.2 U	2.8 U	2.9 U	3.6 U	4.4 U
75-15-0	Carbon disulfide	ug/Kg	0.93 U	1 U	0.89 U	0.93 U	1.2 U	1.4 U
56-23-5	Carbon tetrachloride	ug/Kg	0.68 U	0.75 U	0.65 U	0.68 U	0.84 U	1 U
108-90-7	Chlorobenzene	ug/Kg	0.52 U	0.58 U	0.5 U	0.52 U	0.65 U	0.79 U
75-00-3	Chloroethane	ug/Kg	2.9 U	3.2 U	2.8 U	2.9 U	3.6 U	4.4 U
67-66-3	Chloroform	ug/Kg	0.63 U	0.7 U	0.61 U	0.64 U	0.79 U	0.96 U
74-87-3	Chloromethane	ug/Kg	1.2 U	1.3 U	1.2 U	1.2 U	1.5 U	1.8 U
124-48-1	Dibromochloromethane	ug/Kg	0.6 U	0.67 U	0.58 U	0.61 U	0.75 U	0.91 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.55 U	0.61 U	0.53 U	0.55 U	0.68 U	0.83 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.51 U	0.57 U	0.49 U	0.51 U	0.64 U	0.77 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.2 U	1.3 U	1.2 U	1.2 U	1.5 U	1.8 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.2 U	1.3 U	1.2 U	1.2 U	15	16
78-87-5	1,2-Dichloropropane	ug/Kg	0.51 U	0.57 U	0.49 U	0.51 U	0.64 U	0.77 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.54 U	0.6 U	0.52 U	0.54 U	0.67 U	0.82 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.56 U	0.62 U	0.53 U	0.56 U	0.69 U	0.84 U
100-41-4	Ethylbenzene	ug/Kg	0.6 U	0.66 U	0.57 U	0.6 U	0.74 U	0.9 U
591-78-6	2-Hexanone	ug/Kg	1.1 U	1.2 U	1.1 U	1.1 U	1.4 U	1.7 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2 U	2.3 U	2 U	2.1 U	2.5 U	3.1 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.67 U	0.74 U	0.64 U	0.67 U	0.83 U	1 U
75-09-2	Methylene Chloride	ug/Kg	1.5 U	1.7 U	1.4 U	1.5 U	1.8 U	2.2 U
100-42-5	Styrene	ug/Kg	0.58 U	0.64 U	0.55 U	0.58 U	0.72 U	0.87 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.66 U	0.73 U	0.63 U	0.66 U	0.82 U	1 U
127-18-4	Tetrachloroethene	ug/Kg	0.84 U	0.93 U	0.8 U	0.84 U	220	220
108-88-3	Toluene	ug/Kg	1.6 U	1.8 U	1.5 U	1.6 U	2 U	2.4 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.67 U	0.74 U	0.64 U	0.67 U	0.83 U	1 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.76 U	0.85 U	0.73 U	0.77 U	0.95 U	1.2 U
79-01-6	Trichloroethene	ug/Kg	0.61 U	0.68 U	0.59 U	0.62 U	42	42
75-01-4	Vinyl chloride	ug/Kg	0.73 U	0.8 U	0.69 U	0.73 U	0.9 U	1.1 U
1330-20-7	Xylenes, Total	ug/Kg	1.7 U	1.9 U	1.6 U	1.7 U	2.1 U	2.5 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	E6	E8	E8	F10	F10	F10
		Sample ID:	E6-SS01-015.2-07913	E8-SS01-001.5-07913	E8-SS01-013.0-07913	F10-SS01-003.0-070913	F10-SS01-008.5-070913	F10-SS02-008.5-070913
		Lab Sample Id:	500-6548-2	500-6548-4	500-6548-5	500-6547-14	500-6547-15	500-6547-16
		Depth:	15.2	1.5	13	3	8.5	8.5
		SDG:	6548	6548	6548	6547	6547	6547
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	E6	E8	E8	F10	F10	F10
		Sample ID:	E6-SS01-015.2-07913	E8-SS01-001.5-07913	E8-SS01-013.0-07913	F10-SS01-003.0-070913	F10-SS01-008.5-070913	F10-SS02-008.5-070913
		Lab Sample Id:	500-6548-2	500-6548-4	500-6548-5	500-6547-14	500-6547-15	500-6547-16
		Depth:	15.2	1.5	13	3	8.5	8.5
		SDG:	6548	6548	6548	6547	6547	6547
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	E6	E8	E8	F10	F10	F10
		Sample ID:	E6-SS01-015.2-07913	E8-SS01-001.5-07913	E8-SS01-013.0-07913	F10-SS01-003.0-070913	F10-SS01-008.5-070913	F10-SS02-008.5-070913
		Lab Sample Id:	500-6548-2	500-6548-4	500-6548-5	500-6547-14	500-6547-15	500-6547-16
		Depth:	15.2	1.5	13	3	8.5	8.5
		SDG:	6548	6548	6548	6547	6547	6547
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	H10	H10	K10	K10	M10	M10
		Sample ID:	H10-SS01-006.4-070913	H10-SS01-103.5-070913	K10-SS01-002.5-070913	K10-SS01-006.0-070913	M10-SS01-003.0-070914	M10-SS01-004.9-070914
		Lab Sample Id:	500-6547-9	500-6547-8	500-6547-10	500-6547-11	500-6582-4	500-6582-5
		Depth:	6.4	3.5	2.5	6	3	4.9
		SDG:	6547	6547	6547	6547	6582	6582
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/14/2007	9/14/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	4 U	4.3 U	5.2 U	5.5 U	4.6 U	5.1 U
71-43-2	Benzene	ug/Kg	0.64 U	0.68 U	0.83 U	0.89 U	0.74 U	0.82 U
75-27-4	Bromodichloromethane	ug/Kg	0.53 U	0.57 U	0.68 U	0.73 U	0.61 U	0.67 U
75-25-2	Bromoform	ug/Kg	0.69 U	0.73 U	0.89 U	0.95 U	0.79 U	0.88 U
74-83-9	Bromomethane	ug/Kg	2.9 U	3.1 U	3.7 U	4 U	3.3 U	3.7 U
75-15-0	Carbon disulfide	ug/Kg	0.93 U	0.99 U	1.2 U	1.3 U	1.1 U	1.2 U
56-23-5	Carbon tetrachloride	ug/Kg	0.68 U	0.72 U	0.88 U	0.94 U	0.78 U	0.86 U
108-90-7	Chlorobenzene	ug/Kg	0.52 U	0.56 U	0.67 U	0.72 U	0.6 U	0.66 U
75-00-3	Chloroethane	ug/Kg	2.9 U	3.1 U	3.7 U	4 U	3.3 U	3.7 U
67-66-3	Chloroform	ug/Kg	0.63 U	0.67 U	0.82 U	0.87 U	0.73 U	0.81 U
74-87-3	Chloromethane	ug/Kg	1.2 U	1.3 U	1.6 U	1.7 U	1.4 U	1.5 U
124-48-1	Dibromochloromethane	ug/Kg	0.61 U	0.64 U	0.78 U	0.84 U	0.69 U	0.77 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.55 U	0.59 U	0.71 U	0.76 U	0.63 U	0.7 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.51 U	0.55 U	0.66 U	0.71 U	0.59 U	0.65 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.2 U	1.3 U	1.6 U	1.7 U	1.4 U	1.5 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.2 U	1.3 U	1.6 U	1.7 U	6.9	1.5 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.51 U	0.55 U	0.66 U	0.71 U	0.59 U	0.65 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.54 U	0.58 U	0.7 U	0.75 U	0.62 U	0.69 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.56 U	0.6 U	0.72 U	0.77 U	0.64 U	0.71 U
100-41-4	Ethylbenzene	ug/Kg	0.6 U	0.63 U	0.77 U	0.82 U	0.68 U	0.76 U
591-78-6	2-Hexanone	ug/Kg	1.1 U	1.2 U	1.4 U	1.5 U	1.3 U	1.4 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2 U	2.2 U	2.6 U	2.8 U	2.3 U	2.6 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.67 U	0.71 U	0.87 U	0.93 U	0.77 U	0.85 U
75-09-2	Methylene Chloride	ug/Kg	1.5 U	1.6 U	1.9 U	2.1 U	1.7 U	1.9 U
100-42-5	Styrene	ug/Kg	0.58 U	0.61 U	0.75 U	0.8 U	0.66 U	0.73 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.66 U	0.7 U	0.85 U	0.91 U	0.76 U	0.84 U
127-18-4	Tetrachloroethene	ug/Kg	56	0.89 U	27	180	150	61
108-88-3	Toluene	ug/Kg	1.6 U	1.7 U	2 U	2.2 U	1.8 U	2 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.67 U	0.71 U	0.87 U	0.93 U	0.77 U	0.85 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.76 U	0.81 U	0.99 U	1.1 U	0.88 U	0.97 U
79-01-6	Trichloroethene	ug/Kg	7.4	0.65 U	0.79 U	0.85 U	22	0.78 U
75-01-4	Vinyl chloride	ug/Kg	0.73 U	0.77 U	0.94 U	1 U	0.83 U	0.92 U
1330-20-7	Xylenes, Total	ug/Kg	1.7 U	1.8 U	2.2 U	2.3 U	1.9 U	2.1 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	H10	H10	K10	K10	M10	M10
		Sample ID:	H10-SS01-006.4-070913	H10-SS01-103.5-070913	K10-SS01-002.5-070913	K10-SS01-006.0-070913	M10-SS01-003.0-070914	M10-SS01-004.9-070914
		Lab Sample Id:	500-6547-9	500-6547-8	500-6547-10	500-6547-11	500-6582-4	500-6582-5
		Depth:	6.4	3.5	2.5	6	3	4.9
		SDG:	6547	6547	6547	6547	6582	6582
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/14/2007	9/14/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	H10	H10	K10	K10	M10	M10
		Sample ID:	H10-SS01-006.4-070913	H10-SS01-103.5-070913	K10-SS01-002.5-070913	K10-SS01-006.0-070913	M10-SS01-003.0-070914	M10-SS01-004.9-070914
		Lab Sample Id:	500-6547-9	500-6547-8	500-6547-10	500-6547-11	500-6582-4	500-6582-5
		Depth:	6.4	3.5	2.5	6	3	4.9
		SDG:	6547	6547	6547	6547	6582	6582
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/14/2007	9/14/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	H10	H10	K10	K10	M10	M10
		Sample ID:	H10-SS01-006.4-070913	H10-SS01-103.5-070913	K10-SS01-002.5-070913	K10-SS01-006.0-070913	M10-SS01-003.0-070914	M10-SS01-004.9-070914
		Lab Sample Id:	500-6547-9	500-6547-8	500-6547-10	500-6547-11	500-6582-4	500-6582-5
		Depth:	6.4	3.5	2.5	6	3	4.9
		SDG:	6547	6547	6547	6547	6582	6582
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/14/2007	9/14/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	M10	MC02	MC02	MC03	MC03	MC04
		Sample ID:	M10-SS02-004.9-070914	MC02-SS01-000.6-080621	MC02-SS01-002.7-080621	MC03-SS01-000.7-080621	MC03-SS01-005.0-080621	MC04-SS01-001.3-080621
		Lab Sample Id:	500-6582-8	500-12177-7	500-12177-8	500-12177-1	500-12177-2	500-12177-6
		Depth:	4.9	0.6	2.7	0.7	5	1.3
		SDG:	6582	12177	12177	12177	12177	12177
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/14/2007	6/21/2008	6/21/2008	6/21/2008	6/21/2008	6/21/2008
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	5.1 U	1.8 U	2.5 U	11 U	1.7 U	1.7 U
71-43-2	Benzene	ug/Kg	0.82 U	0.79 U	1.1 U	0.96 U	0.75 U	0.74 U
75-27-4	Bromodichloromethane	ug/Kg	0.68 U	0.72 U	1 U	0.88 U	0.69 U	0.68 U
75-25-2	Bromoform	ug/Kg	0.88 U	0.92 U	1.3 U	1.1 U	0.88 U	0.87 U
74-83-9	Bromomethane	ug/Kg	3.7 U	2 U	2.9 U	2.5 U	1.9 U	1.9 U
75-15-0	Carbon disulfide	ug/Kg	1.2 U	0.87 U	1.2 U	3 J	0.83 U	0.82 U
56-23-5	Carbon tetrachloride	ug/Kg	0.86 U	0.87 U	1.2 U	1.1 U	0.83 U	0.82 U
108-90-7	Chlorobenzene	ug/Kg	0.66 U	0.63 U	0.9 U	0.77 U	0.6 U	0.59 U
75-00-3	Chloroethane	ug/Kg	3.7 U	1.1 U	1.6 U	1.4 U	1.1 U	1 U
67-66-3	Chloroform	ug/Kg	0.81 U	0.91 U	1.3 U	1.1 U	0.86 U	0.85 U
74-87-3	Chloromethane	ug/Kg	1.5 U	1.5 U	2.1 U	1.8 U	1.4 U	1.4 U
124-48-1	Dibromochloromethane	ug/Kg	0.77 U	0.77 U	1.1 U	0.94 U	0.73 U	0.72 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.7 U	0.89 U	1.3 U	1.1 U	0.85 U	0.84 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.65 U	1 U	1.5 U	1.2 U	0.97 U	0.96 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.5 U	0.81 U	1.2 U	1 U	0.78 U	0.77 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.5 U	3.5 J	2.5 U	2.1 U	1.7 U	1.7 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.65 U	0.87 U	1.2 U	1.1 U	0.83 U	0.82 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.69 U	0.74 U	1.1 U	0.9 U	0.71 U	0.7 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.71 U	0.89 U	1.3 U	1.1 U	0.85 U	0.84 U
100-41-4	Ethylbenzene	ug/Kg	0.76 U	0.66 U	0.94 U	0.8 U	0.63 U	0.62 U
591-78-6	2-Hexanone	ug/Kg	1.4 U	1.1 U	1.6 U	1.4 U	1.1 U	1 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2.6 U	1.7 U	2.4 U	2 U	1.6 U	1.6 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.85 U	1.4 U	2 U	1.7 U	1.3 U	1.3 U
75-09-2	Methylene Chloride	ug/Kg	1.9 U	0.72 U	1 U	0.88 U	0.69 U	0.68 U
100-42-5	Styrene	ug/Kg	0.73 U	0.69 U	1 U	0.85 U	0.66 U	0.65 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.84 U	1.1 U	1.6 U	1.4 U	1.1 U	1 U
127-18-4	Tetrachloroethene	ug/Kg	100	25	9.4	53	3.9 J	6.7
108-88-3	Toluene	ug/Kg	2 U	0.81 U	7.9	1 U	0.78 U	0.77 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.85 U	0.82 U	1.2 U	1 U	0.79 U	0.78 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.97 U	1.7 U	2.4 U	2 U	1.6 U	1.6 U
79-01-6	Trichloroethene	ug/Kg	0.78 U	3.3 J	1.3 U	5.2 J	0.85 U	0.84 U
75-01-4	Vinyl chloride	ug/Kg	0.92 U	1.3 U	1.9 U	1.6 U	1.2 U	1.2 U
1330-20-7	Xylenes, Total	ug/Kg	2.1 U	1.4 U	2 U	1.7 U	1.3 U	1.3 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	M10	MC02	MC02	MC03	MC03	MC04
		Sample ID:	M10-SS02-004.9-070914	MC02-SS01-000.6-080621	MC02-SS01-002.7-080621	MC03-SS01-000.7-080621	MC03-SS01-005.0-080621	MC04-SS01-001.3-080621
		Lab Sample Id:	500-6582-8	500-12177-7	500-12177-8	500-12177-1	500-12177-2	500-12177-6
		Depth:	4.9	0.6	2.7	0.7	5	1.3
		SDG:	6582	12177	12177	12177	12177	12177
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/14/2007	6/21/2008	6/21/2008	6/21/2008	6/21/2008	6/21/2008
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	4.8 U
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	4 U
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	4.4 U
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	4.8 U
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	3.5 U
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	8.3 U
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	6.5 U
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	8 U
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	23 U
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	25 U
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	32 U
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	15 U
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	17 U
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	14 U
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	92 U
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	150 U
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	17 U
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	33 U
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	16 U
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	5.9 U
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	4.6 U
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	14 U
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	19 U
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	20 U
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	21 U
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	55 U
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	40 U
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	19 U
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	69 U
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	15 U
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	15 U
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	17 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	M10	MC02	MC02	MC03	MC03	MC04
		Sample ID:	M10-SS02-004.9-070914	MC02-SS01-000.6-080621	MC02-SS01-002.7-080621	MC03-SS01-000.7-080621	MC03-SS01-005.0-080621	MC04-SS01-001.3-080621
		Lab Sample Id:	500-6582-8	500-12177-7	500-12177-8	500-12177-1	500-12177-2	500-12177-6
		Depth:	4.9	0.6	2.7	0.7	5	1.3
		SDG:	6582	12177	12177	12177	12177	12177
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/14/2007	6/21/2008	6/21/2008	6/21/2008	6/21/2008	6/21/2008
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	46 U
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	210 U
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	20 U
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	20 U
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	4.9 U
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	4 U
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	5.4 U
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	22 U
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	130 U
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	20 U
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	4.9 U
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	15 U
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	21 U
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	37 U
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	35 U
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	3.9 U
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	21 U
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	74 U
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	81 U
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	6.9 U
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	46 U
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	66 U
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	26 U
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	11 U
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	20 U
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	140 U
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	3.3 U
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	33 U
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	4.4 U
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	19 U
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	53 U
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	38 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	M10	MC02	MC02	MC03	MC03	MC04
		Sample ID:	M10-SS02-004.9-070914	MC02-SS01-000.6-080621	MC02-SS01-002.7-080621	MC03-SS01-000.7-080621	MC03-SS01-005.0-080621	MC04-SS01-001.3-080621
		Lab Sample Id:	500-6582-8	500-12177-7	500-12177-8	500-12177-1	500-12177-2	500-12177-6
		Depth:	4.9	0.6	2.7	0.7	5	1.3
		SDG:	6582	12177	12177	12177	12177	12177
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/14/2007	6/21/2008	6/21/2008	6/21/2008	6/21/2008	6/21/2008
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	7.5 J+
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	54 J+
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	18 +
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	3.2 U
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	3.2 U
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	5.1 U
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	4.1 U
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	1.7 U
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	2.6 U
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	3 U
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	3.7 J+
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	3.9 U
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	32 +
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	13 +
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	3.4 U
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	17 +
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	1.7 U
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	1.3 U
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	2 U
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	2.7 U
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	17 U
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	8 U
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	10 U
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	6.9 U
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	11 U
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	9.6 U
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	6.7 U
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	6.9 U
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	5.1
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	120
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	0.036 U
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	15
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	7
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	27
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	0.42 U
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	0.11 U
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	19

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	MC05	MC05	MC1	MC4	MC5	N12
		Sample ID:	MC05-SS01-001.3-080621	MC05-SS02-009.0-080621	MC1-SS01-000.8-080621	MC4-SS01-006.6-080621	MC5-SS01-009.0-080621	N12-SS01-001.0-070911
		Lab Sample Id:	500-12177-9	500-12177-10	500-12177-4	500-12177-3	500-12177-5	500-6487-13
		Depth:	1.3	9	0.8	6.6	9	1
		SDG:	12177	12177	12177	12177	12177	6487
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	6/21/2008	6/21/2008	6/21/2008	6/21/2008	6/21/2008	9/11/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	1.7 U	2.4 U	2.1 U	8900 R	2.7 U	4.2 U
71-43-2	Benzene	ug/Kg		1.1 U	0.93 U	400 U	1.2 U	0.67 U
75-27-4	Bromodichloromethane	ug/Kg	0.68 U	0.98 U	0.85 U	1200 U	1.1 U	0.55 U
75-25-2	Bromoform	ug/Kg	0.88 U	1.3 U	1.1 U	2100 U	1.4 U	0.72 U
74-83-9	Bromomethane	ug/Kg	1.9 U	2.8 U	2.4 U	1800 U	3.1 U	3 U
75-15-0	Carbon disulfide	ug/Kg	0.82 U	1.2 U	1 U	870 U	1.3 U	0.97 U
56-23-5	Carbon tetrachloride	ug/Kg		1.2 U	1 U	1400 U	1.3 U	0.71 U
108-90-7	Chlorobenzene	ug/Kg	0.6 U	0.85 U	0.74 U	1200 U	0.97 U	0.54 U
75-00-3	Chloroethane	ug/Kg	1.1 U	1.5 U	1.3 U	1800 U	1.7 U	3 U
67-66-3	Chloroform	ug/Kg	0.86 U	1.2 U	1.1 U	900 U	1.4 U	0.66 U
74-87-3	Chloromethane	ug/Kg	1.4 U	2 U	1.8 U	2000 U	2.3 U	1.3 U
124-48-1	Dibromochloromethane	ug/Kg	0.73 U	1 U	0.91 U	1300 U	1.2 U	0.63 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.84 U	1.2 U	1.1 U	1200 U	1.4 U	0.57 U
107-06-2	1,2-Dichloroethane	ug/Kg		1.4 U	1.2 U	1500 U	1.6 U	0.53 U
75-35-4	1,1-Dichloroethene	ug/Kg	0.77 U	1.1 U	0.96 U	1500 U	1.3 U	1.3 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.7 U	2.4 U	2.1 U	2000 U	2.7 U	1.3 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.82 U	1.2 U	1 U	1500 U	1.3 U	0.53 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.7 U	1 U	0.88 U	1200 U	1.1 U	0.56 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.84 U	1.2 U	1.1 U	1000 U	1.4 U	0.58 U
100-41-4	Ethylbenzene	ug/Kg	0.62 U	0.89 U	0.78 U	660 U	1 U	0.62 U
591-78-6	2-Hexanone	ug/Kg	1.1 U	1.5 U	1.3 U	2300 U	1.7 U	1.2 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	1.6 U	2.3 U	2 U	4400 U	2.6 U	2.1 U
108-10-1	methyl isobutyl ketone	ug/Kg	1.3 U	1.9 U	1.6 U	2100 U	2.1 U	0.7 U
75-09-2	Methylene Chloride	ug/Kg	0.68 U	0.98 U	0.85 U	1200 U	1.1 U	1.6 U
100-42-5	Styrene	ug/Kg	0.66 U	0.94 U	0.82 U	1000 U	1.1 U	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	1.1 U	1.5 U	1.3 UJ	1700 U	1.7 U	0.69 U
127-18-4	Tetrachloroethene	ug/Kg	3.9 J	230	9.3	290000	140	5.1
108-88-3	Toluene	ug/Kg	0.77 U	1.1 U	0.96 U	490 U	1.3 U	1.6 U
71-55-6	1,1,1-Trichloroethane	ug/Kg		1.1 U	0.97 U	1500 U	1.3 U	0.7 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	1.6 U	2.3 U	2 U	2100 U	2.6 U	0.8 U
79-01-6	Trichloroethene	ug/Kg	0.84 U	1.2 U	1.1 U	1000 U	1.4 U	0.64 U
75-01-4	Vinyl chloride	ug/Kg	1.2 U	1.8 U	1.5 U	1100 U	2 U	0.76 U
1330-20-7	Xylenes, Total	ug/Kg	1.3 U	1.9 U	1.6 U	1000 U	2.1 U	1.7 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	MC05	MC05	MC1	MC4	MC5	N12
		Sample ID:	MC05-SS01-001.3-080621	MC05-SS02-009.0-080621	MC1-SS01-000.8-080621	MC4-SS01-006.6-080621	MC5-SS01-009.0-080621	N12-SS01-001.0-070911
		Lab Sample Id:	500-12177-9	500-12177-10	500-12177-4	500-12177-3	500-12177-5	500-6487-13
		Depth:	1.3	9	0.8	6.6	9	1
		SDG:	12177	12177	12177	12177	12177	6487
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	6/21/2008	6/21/2008	6/21/2008	6/21/2008	6/21/2008	9/11/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	MC05	MC05	MC1	MC4	MC5	N12
		Sample ID:	MC05-SS01-001.3-080621	MC05-SS02-009.0-080621	MC1-SS01-000.8-080621	MC4-SS01-006.6-080621	MC5-SS01-009.0-080621	N12-SS01-001.0-070911
		Lab Sample Id:	500-12177-9	500-12177-10	500-12177-4	500-12177-3	500-12177-5	500-6487-13
		Depth:	1.3	9	0.8	6.6	9	1
		SDG:	12177	12177	12177	12177	12177	6487
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	6/21/2008	6/21/2008	6/21/2008	6/21/2008	6/21/2008	9/11/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	MC05	MC05	MC1	MC4	MC5	N12
		Sample ID:	MC05-SS01-001.3-080621	MC05-SS02-009.0-080621	MC1-SS01-000.8-080621	MC4-SS01-006.6-080621	MC5-SS01-009.0-080621	N12-SS01-001.0-070911
		Lab Sample Id:	500-12177-9	500-12177-10	500-12177-4	500-12177-3	500-12177-5	500-6487-13
		Depth:	1.3	9	0.8	6.6	9	1
		SDG:	12177	12177	12177	12177	12177	6487
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	6/21/2008	6/21/2008	6/21/2008	6/21/2008	6/21/2008	9/11/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	N12	P10	P10	P12	P12	P14
		Sample ID:	N12-SS01-002.0-070911	P10-SS01-002.5-070914	P10-SS01-005.3-070914	P12-SS01-000.5-070911	P12-SS01-002.0-070911	P14-SS01-000.0-070911
		Lab Sample Id:	500-6487-14	500-6582-6	500-6582-7	500-6487-12	500-6487-11	500-6487-10
		Depth:	2	2.5	5.3	0.5	2	0
		SDG:	6487	6582	6582	6487	6487	6487
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/14/2007	9/14/2007	9/11/2007	9/11/2007	9/11/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	4.8 U	5.6 U	4.2 U	4.7 U	4.8 U	55 U
71-43-2	Benzene	ug/Kg	0.77 U	0.9 U	0.68 U	0.76 U	0.77 U	4 U
75-27-4	Bromodichloromethane	ug/Kg	0.64 U	0.75 U	0.56 U	0.63 U	0.64 U	7.6 U
75-25-2	Bromoform	ug/Kg	0.83 U	0.97 U	0.73 U	0.82 U	0.83 U	16 U
74-83-9	Bromomethane	ug/Kg	3.5 U	4.1 U	3 U	3.4 U	3.5 U	44 U
75-15-0	Carbon disulfide	ug/Kg	1.1 U	1.3 U	0.98 U	1.1 U	1.1 U	8.1 U
56-23-5	Carbon tetrachloride	ug/Kg	0.82 U	0.95 U	0.72 U	0.8 U	0.81 U	27 U
108-90-7	Chlorobenzene	ug/Kg	0.63 U	0.73 U	0.55 U	0.62 U	0.62 U	11 U
75-00-3	Chloroethane	ug/Kg	3.5 U	4.1 U	3 U	3.4 U	3.5 U	17 U
67-66-3	Chloroform	ug/Kg	0.76 U	0.89 U	0.67 U	0.75 U	0.76 U	9 U
74-87-3	Chloromethane	ug/Kg	1.5 U	1.7 U	1.3 U	1.4 U	1.5 U	18 U
124-48-1	Dibromochloromethane	ug/Kg	0.73 U	0.85 U	0.64 U	0.72 U	0.73 U	12 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.66 U	0.77 U	0.58 U	0.65 U	0.66 U	9 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.62 U	0.72 U	0.54 U	0.61 U	0.61 U	11 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.5 U	1.7 U	1.3 U	1.4 U	1.5 U	12 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	5.9	1.7 U	1.3 U	1.4 U	1.5 U	17 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.62 U	0.72 U	0.54 U	0.61 U	0.61 U	12 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.65 U	0.76 U	0.57 U	0.64 U	0.65 U	8.5 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.67 U	0.78 U	0.59 U	0.66 U	0.67 U	17 U
100-41-4	Ethylbenzene	ug/Kg	0.72 U	0.84 U	0.63 U	0.71 U	0.71 U	7.6 U
591-78-6	2-Hexanone	ug/Kg	1.3 U	1.6 U	1.2 U	1.3 U	1.3 U	55 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2.5 U	2.9 U	2.2 U	2.4 U	2.5 U	50 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.81 U	0.94 U	0.71 U	0.79 U	0.8 U	57 U
75-09-2	Methylene Chloride	ug/Kg	1.8 U	2.1 U	1.6 U	1.8 U	1.8 U	27 U
100-42-5	Styrene	ug/Kg	0.69 U	0.81 U	0.61 U	0.68 U	0.69 U	14 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.8 U	0.93 U	0.7 U	0.78 UJ	0.79 U	12 U
127-18-4	Tetrachloroethene	ug/Kg	260	53	110	140	6.5	920
108-88-3	Toluene	ug/Kg	1.9 U	2.2 U	1.7 U	1.9 U	1.9 U	5.4 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.81 U	0.94 U	0.71 U	0.79 U	0.8 U	7.2 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.92 U	1.1 U	0.81 U	0.9 U	0.91 U	15 U
79-01-6	Trichloroethene	ug/Kg	17	21	5	0.73 U	0.74 U	9.9 U
75-01-4	Vinyl chloride	ug/Kg	0.87 U	1 U	0.77 U	0.86 U	0.87 U	11 U
1330-20-7	Xylenes, Total	ug/Kg	2 U	2.4 U	1.8 U	2 U	2 U	19 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	N12	P10	P10	P12	P12	P14
		Sample ID:	N12-SS01-002.0-070911	P10-SS01-002.5-070914	P10-SS01-005.3-070914	P12-SS01-000.5-070911	P12-SS01-002.0-070911	P14-SS01-000.0-070911
		Lab Sample Id:	500-6487-14	500-6582-6	500-6582-7	500-6487-12	500-6487-11	500-6487-10
		Depth:	2	2.5	5.3	0.5	2	0
		SDG:	6487	6582	6582	6487	6487	6487
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/14/2007	9/14/2007	9/11/2007	9/11/2007	9/11/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	7.5 U
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	11 U
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	13 U
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	5.8 U
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	8.6 U
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	11 U
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	6.1 U
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	7.9 U
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	38 U
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	50 U
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	50 U
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	45 U
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	51 U
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	46 U
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	110 U
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	180 U
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	40 U
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	47 U
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	42 U
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	9.4 U
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	19 U
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	36 U
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	38 U
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	35 U
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	42 U
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	42 U
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	80 U
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	47 U
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	80 U
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	41 U
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	47 U
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	47 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	N12	P10	P10	P12	P12	P14
		Sample ID:	N12-SS01-002.0-070911	P10-SS01-002.5-070914	P10-SS01-005.3-070914	P12-SS01-000.5-070911	P12-SS01-002.0-070911	P14-SS01-000.0-070911
		Lab Sample Id:	500-6487-14	500-6582-6	500-6582-7	500-6487-12	500-6487-11	500-6487-10
		Depth:	2	2.5	5.3	0.5	2	0
		SDG:	6487	6582	6582	6487	6487	6487
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/14/2007	9/14/2007	9/11/2007	9/11/2007	9/11/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	140 U
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	520 U
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	59 U
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	51 U
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	14 U
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	7.9 U
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	7.8 U
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	39 U
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	190 U
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	40 U
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	20 U
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	43 U
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	44 U
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	50 U
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	64 U
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	7.1 U
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	52 U
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	160 U
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	72 U
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	9.5 U
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	100 U
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	130 U
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	48 U
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	42 U
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	44 U
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	250 U
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	11 U
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	47 U
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	8.5 U
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	41 U
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	110 U
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	77 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	N12	P10	P10	P12	P12	P14
		Sample ID:	N12-SS01-002.0-070911	P10-SS01-002.5-070914	P10-SS01-005.3-070914	P12-SS01-000.5-070911	P12-SS01-002.0-070911	P14-SS01-000.0-070911
		Lab Sample Id:	500-6487-14	500-6582-6	500-6582-7	500-6487-12	500-6487-11	500-6487-10
		Depth:	2	2.5	5.3	0.5	2	0
		SDG:	6487	6582	6582	6487	6487	6487
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/14/2007	9/14/2007	9/11/2007	9/11/2007	9/11/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	0.58 U
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	0.36 U
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	0.33 U
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	0.62 U
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	0.62 U
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	1 U
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	0.81 U
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	0.33 U
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	0.5 U
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	0.59 U
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	0.36 U
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	0.78 U
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	0.38 U
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	0.18 U
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	0.68 U
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	0.69 U
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	0.33 U
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	0.25 U
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	0.39 U
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	0.54 U
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	3.3 U
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	6.1 U
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	5 U
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	4.9 U
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	5.4 U
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	3.9 U
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	4 U
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	3.6 U
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	0.5 J
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	20
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	0.084 J
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	3.2
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	0.34 J
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	5.9 U
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	0.42 U
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	0.11 U
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	2 J

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	P14	P15	P15	P15	P16	P16
		Sample ID:	P14-SS01-003.0-070911	P15-SS01-000.5-070911	P15-SS01-002.5-070911	P15-SS02-000.5-070911	P16-SS01-000.5-070911	P16-SS01-002.5-070911
		Lab Sample Id:	500-6487-7	500-6487-5	500-6487-4	500-6487-3	500-6487-6	500-6487-9
		Depth:	3	0.5	2.5	0.5	0.5	2.5
		SDG:	6487	6487	6487	6487	6487	6487
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	4 U	3.9 U	59 U	4.1 UJ	63 U	59 U
71-43-2	Benzene	ug/Kg	0.65 U	0.63 U	4.2 U	0.66 UJ	4.5 U	4.2 U
75-27-4	Bromodichloromethane	ug/Kg	0.53 U	0.52 U	8.2 U	0.55 UJ	8.7 U	8.2 U
75-25-2	Bromoform	ug/Kg	0.69 U	0.67 U	17 U	0.71 U	18 U	17 U
74-83-9	Bromomethane	ug/Kg	2.9 U	2.8 U	47 U	3 UJ	49 U	47 U
75-15-0	Carbon disulfide	ug/Kg	0.94 U	0.91 U	8.6 U	0.96 UJ	9.2 U	8.7 U
56-23-5	Carbon tetrachloride	ug/Kg	0.68 U	0.66 U	28 U	0.7 UJ	30 U	28 U
108-90-7	Chlorobenzene	ug/Kg	0.52 U	0.51 U	12 U	0.54 U	12 U	12 U
75-00-3	Chloroethane	ug/Kg	2.9 U	2.8 U	18 U	3 UJ	19 U	18 U
67-66-3	Chloroform	ug/Kg	0.64 U	0.62 U	9.6 U	0.65 UJ	10 U	9.6 U
74-87-3	Chloromethane	ug/Kg	1.2 U	1.2 U	20 U	1.2 UJ	21 U	20 U
124-48-1	Dibromochloromethane	ug/Kg	0.61 U	0.59 U	12 U	0.62 U	13 U	13 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.55 U	0.54 U	9.6 U	0.57 UJ	10 U	9.6 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.52 U	0.5 U	12 U	0.53 UJ	13 U	12 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.2 U	1.2 U	13 U	1.2 UJ	14 U	13 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.2 U	1.2 U	18 U	1.2 UJ	79 J	18 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.52 U	0.5 U	12 U	0.53 UJ	13 U	13 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.54 U	0.53 U	9.1 U	0.56 UJ	9.7 U	9.2 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.56 U	0.54 U	18 U	0.58 UJ	19 U	18 U
100-41-4	Ethylbenzene	ug/Kg	0.6 U	0.58 U	8.2 U	0.62 U	8.7 U	8.2 U
591-78-6	2-Hexanone	ug/Kg	1.1 U	1.1 U	59 U	1.2 U	63 U	59 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2.1 U	2 U	53 U	2.1 UJ	57 U	54 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.67 U	0.65 U	61 U	0.69 UJ	65 U	61 U
75-09-2	Methylene Chloride	ug/Kg	1.5 U	1.5 U	28 U	1.5 UJ	30 U	28 U
100-42-5	Styrene	ug/Kg	0.58 U	0.56 U	15 U	0.6 U	16 U	15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.66 U	0.64 U	13 U	0.68 U	14 U	13 U
127-18-4	Tetrachloroethene	ug/Kg	0.84 U	48	2200	63	15000	1700
108-88-3	Toluene	ug/Kg	1.6 U	1.5 U	5.8 U	1.6 UJ	6.1 U	5.8 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.67 U	0.65 U	7.7 U	0.69 UJ	8.2 U	7.7 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.77 U	0.74 U	16 U	0.79 UJ	17 U	16 U
79-01-6	Trichloroethene	ug/Kg	0.62 U	0.6 U	11 U	0.63 UJ	100	11 U
75-01-4	Vinyl chloride	ug/Kg	0.73 U	0.71 U	12 U	0.75 UJ	13 U	12 U
1330-20-7	Xylenes, Total	ug/Kg	1.7 U	1.6 U	21 U	1.7 U	22 U	21 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	P14	P15	P15	P15	P16	P16
		Sample ID:	P14-SS01-003.0-070911	P15-SS01-000.5-070911	P15-SS01-002.5-070911	P15-SS02-000.5-070911	P16-SS01-000.5-070911	P16-SS01-002.5-070911
		Lab Sample Id:	500-6487-7	500-6487-5	500-6487-4	500-6487-3	500-6487-6	500-6487-9
		Depth:	3	0.5	2.5	0.5	0.5	2.5
		SDG:	6487	6487	6487	6487	6487	6487
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	7.4 UJ	NA	NA	NA	NA	7.4 U
208-96-8	Acenaphthylene	ug/Kg	11 UJ	NA	NA	NA	NA	11 U
120-12-7	Anthracene	ug/Kg	12 U	NA	NA	NA	NA	12 U
56-55-3	Benzo[a]anthracene	ug/Kg	17 J	NA	NA	NA	NA	31 J
50-32-8	Benzo[a]pyrene	ug/Kg	22 J	NA	NA	NA	NA	36
205-99-2	Benzo[b]fluoranthene	ug/Kg	39	NA	NA	NA	NA	61
191-24-2	Benzo[g,h,i]perylene	ug/Kg	18 J	NA	NA	NA	NA	21 J
207-08-9	Benzo[k]fluoranthene	ug/Kg	16 J	NA	NA	NA	NA	18 J
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	38 U	NA	NA	NA	NA	38 U
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	49 U	NA	NA	NA	NA	49 U
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	50 U	NA	NA	NA	NA	50 U
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	44 U	NA	NA	NA	NA	45 U
85-68-7	Butyl benzyl phthalate	ug/Kg	50 U	NA	NA	NA	NA	50 U
86-74-8	Carbazole	ug/Kg	45 UJ	NA	NA	NA	NA	46 U
59-50-7	4-Chloro-3-methylphenol	ug/Kg	110 U	NA	NA	NA	NA	110 U
106-47-8	4-Chloroaniline	ug/Kg	170 U	NA	NA	NA	NA	170 U
91-58-7	2-Chloronaphthalene	ug/Kg	39 UJ	NA	NA	NA	NA	39 U
95-57-8	2-Chlorophenol	ug/Kg	46 U	NA	NA	NA	NA	47 U
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	41 U	NA	NA	NA	NA	41 U
218-01-9	Chrysene	ug/Kg	31 J	NA	NA	NA	NA	43
53-70-3	Dibenz(a,h)anthracene	ug/Kg	19 U	NA	NA	NA	NA	19 U
132-64-9	Dibenzofuran	ug/Kg	36 U	NA	NA	NA	NA	36 U
95-50-1	1,2-Dichlorobenzene	ug/Kg	37 U	NA	NA	NA	NA	38 U
541-73-1	1,3-Dichlorobenzene	ug/Kg	35 U	NA	NA	NA	NA	35 U
106-46-7	1,4-Dichlorobenzene	ug/Kg	41 U	NA	NA	NA	NA	41 U
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	42 U	NA	NA	NA	NA	42 U
120-83-2	2,4-Dichlorophenol	ug/Kg	79 U	NA	NA	NA	NA	79 U
84-66-2	Diethyl phthalate	ug/Kg	46 UJ	NA	NA	NA	NA	46 U
105-67-9	2,4-Dimethylphenol	ug/Kg	79 U	NA	NA	NA	NA	79 U
131-11-3	Dimethyl phthalate	ug/Kg	40 UJ	NA	NA	NA	NA	40 U
84-74-2	Di-n-butyl phthalate	ug/Kg	46 UJ	NA	NA	NA	NA	46 U
117-84-0	Di-n-octyl phthalate	ug/Kg	47 U	NA	NA	NA	NA	47 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	P14	P15	P15	P15	P16	P16
		Sample ID:	P14-SS01-003.0-070911	P15-SS01-000.5-070911	P15-SS01-002.5-070911	P15-SS02-000.5-070911	P16-SS01-000.5-070911	P16-SS01-002.5-070911
		Lab Sample Id:	500-6487-7	500-6487-5	500-6487-4	500-6487-3	500-6487-6	500-6487-9
		Depth:	3	0.5	2.5	0.5	0.5	2.5
		SDG:	6487	6487	6487	6487	6487	6487
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	140 UJ	NA	NA	NA	NA	140 U
51-28-5	2,4-Dinitrophenol	ug/Kg	510 U	NA	NA	NA	NA	520 U
121-14-2	2,4-Dinitrotoluene	ug/Kg	59 U	NA	NA	NA	NA	59 U
606-20-2	2,6-Dinitrotoluene	ug/Kg	50 U	NA	NA	NA	NA	50 U
206-44-0	Fluoranthene	ug/Kg	50	NA	NA	NA	NA	64
86-73-7	Fluorene	ug/Kg	7.8 U	NA	NA	NA	NA	7.9 U
118-74-1	Hexachlorobenzene	ug/Kg	7.7 U	NA	NA	NA	NA	7.8 U
87-68-3	Hexachlorobutadiene	ug/Kg	38 U	NA	NA	NA	NA	39 U
77-47-4	Hexachlorocyclopentadiene	ug/Kg	190 U	NA	NA	NA	NA	190 U
67-72-1	Hexachloroethane	ug/Kg	39 U	NA	NA	NA	NA	40 U
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	19 U	NA	NA	NA	NA	20 U
78-59-1	Isophorone	ug/Kg	43 UJ	NA	NA	NA	NA	43 U
91-57-6	2-Methylnaphthalene	ug/Kg	44 U	NA	NA	NA	NA	44 U
95-48-7	2-Methylphenol	ug/Kg	50 U	NA	NA	NA	NA	50 U
15831-10-4	3 & 4 Methylphenol	ug/Kg	63 U	NA	NA	NA	NA	63 U
91-20-3	Naphthalene	ug/Kg	7 U	NA	NA	NA	NA	7 U
88-74-4	2-Nitroaniline	ug/Kg	52 U	NA	NA	NA	NA	52 U
99-09-2	3-Nitroaniline	ug/Kg	160 U	NA	NA	NA	NA	160 U
100-01-6	4-Nitroaniline	ug/Kg	71 U	NA	NA	NA	NA	72 U
98-95-3	Nitrobenzene	ug/Kg	9.3 U	NA	NA	NA	NA	9.4 U
88-75-5	2-Nitrophenol	ug/Kg	99 U	NA	NA	NA	NA	99 U
100-02-7	4-Nitrophenol	ug/Kg	120 U	NA	NA	NA	NA	120 U
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	48 U	NA	NA	NA	NA	48 U
86-30-6	N-Nitrosodiphenylamine	ug/Kg	41 UJ	NA	NA	NA	NA	41 U
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	43 U	NA	NA	NA	NA	43 U
87-86-5	Pentachlorophenol	ug/Kg	250 U	NA	NA	NA	NA	250 U
85-01-8	Phenanthrene	ug/Kg	19 J	NA	NA	NA	NA	14 J
108-95-2	Phenol	ug/Kg	47 U	NA	NA	NA	NA	47 U
129-00-0	Pyrene	ug/Kg	41	NA	NA	NA	NA	50
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	41 U	NA	NA	NA	NA	41 U
95-95-4	2,4,5-Trichlorophenol	ug/Kg	110 U	NA	NA	NA	NA	110 U
88-06-2	2,4,6-Trichlorophenol	ug/Kg	76 U	NA	NA	NA	NA	77 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	P14	P15	P15	P15	P16	P16
		Sample ID:	P14-SS01-003.0-070911	P15-SS01-000.5-070911	P15-SS01-002.5-070911	P15-SS02-000.5-070911	P16-SS01-000.5-070911	P16-SS01-002.5-070911
		Lab Sample Id:	500-6487-7	500-6487-5	500-6487-4	500-6487-3	500-6487-6	500-6487-9
		Depth:	3	0.5	2.5	0.5	0.5	2.5
		SDG:	6487	6487	6487	6487	6487	6487
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	0.57 U	NA	NA	NA	NA	0.56 U
72-55-9	4,4'-DDE	ug/Kg	0.36 U	NA	NA	NA	NA	0.35 U
50-29-3	4,4'-DDT	ug/Kg	0.32 U	NA	NA	NA	NA	0.32 U
309-00-2	Aldrin	ug/Kg	0.62 U	NA	NA	NA	NA	0.6 U
319-84-6	alpha-BHC	ug/Kg	0.62 U	NA	NA	NA	NA	0.6 U
319-85-7	beta-BHC	ug/Kg	0.99 U	NA	NA	NA	NA	0.97 U
319-86-8	delta-BHC	ug/Kg	0.8 U	NA	NA	NA	NA	0.78 U
58-89-9	gamma-BHC (Lindane)	ug/Kg	0.32 U	NA	NA	NA	NA	0.32 U
5103-71-9	alpha-Chlordane	ug/Kg	0.5 U	NA	NA	NA	NA	0.49 U
5103-74-2	gamma-Chlordane	ug/Kg	0.58 U	NA	NA	NA	NA	0.57 U
60-57-1	Dieldrin	ug/Kg	0.36 U	NA	NA	NA	NA	0.35 U
959-98-8	Endosulfan I	ug/Kg	0.77 U	NA	NA	NA	NA	0.75 U
33213-65-9	Endosulfan II	ug/Kg	0.38 U	NA	NA	NA	NA	0.37 U
1031-07-8	Endosulfan sulfate	ug/Kg	0.17 U	NA	NA	NA	NA	0.17 U
72-20-8	Endrin	ug/Kg	0.67 U	NA	NA	NA	NA	0.66 U
7421-93-4	Endrin aldehyde	ug/Kg	0.68 U	NA	NA	NA	NA	0.67 U
53494-70-5	Endrin ketone	ug/Kg	0.32 U	NA	NA	NA	NA	0.32 U
76-44-8	Heptachlor	ug/Kg	0.25 U	NA	NA	NA	NA	0.24 U
1024-57-3	Heptachlor epoxide	ug/Kg	0.39 U	NA	NA	NA	NA	0.38 U
72-43-5	Methoxychlor	ug/Kg	0.53 U	NA	NA	NA	NA	0.52 U
8001-35-2	Toxaphene	ug/Kg	3.2 U	NA	NA	NA	NA	3.2 U
	PCBs							
12674-11-2	PCB-1016	ug/Kg	6 U	NA	NA	NA	NA	5.9 U
11104-28-2	PCB-1221	ug/Kg	5 U	NA	NA	NA	NA	4.9 U
11141-16-5	PCB-1232	ug/Kg	4.9 U	NA	NA	NA	NA	4.8 U
53469-21-9	PCB-1242	ug/Kg	5.3 U	NA	NA	NA	NA	5.2 U
12672-29-6	PCB-1248	ug/Kg	3.9 U	NA	NA	NA	NA	3.8 U
11097-69-1	PCB-1254	ug/Kg	4 U	NA	NA	NA	NA	32
11096-82-5	PCB-1260	ug/Kg	3.6 U	NA	NA	NA	NA	3.5 U
	METALS							
7440-38-2	Arsenic	mg/Kg	1.4	NA	NA	NA	NA	3.3
7440-39-3	Barium	mg/Kg	23	NA	NA	NA	NA	53
7440-43-9	Cadmium	mg/Kg	0.22	NA	NA	NA	NA	0.3
7440-47-3	Chromium	mg/Kg	5.6	NA	NA	NA	NA	7
7439-92-1	Lead	mg/Kg	2.1	NA	NA	NA	NA	4.8
7439-97-6	Mercury	ug/Kg	6.6 J	NA	NA	NA	NA	9.3 J
7782-49-2	Selenium	mg/Kg	0.39 U	NA	NA	NA	NA	0.36 U
7440-22-4	Silver	mg/Kg	0.1 U	NA	NA	NA	NA	0.1 J
7440-66-6	Zinc	mg/Kg	5.8	NA	NA	NA	NA	29

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	P16	P6	P6	P8	P8	Q13
		Sample ID:	P16-SS02-002.5-070911	P6-SS01-000.5-070911	P6-SS01-012.0-070911	P8-SS01-000.5-070911	P8-SS01-006.0-070911	Q13-SS01-000.5-070910
		Lab Sample Id:	500-6487-8	500-6489-8	500-6489-9	500-6489-7	500-6489-6	500-6458-3
		Depth:	2.5	0.5	12	0.5	6	0.5
		SDG:	6487	6489	6489	6489	6489	6458
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/10/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	65 U	3.9 U	5.1 U	4.9 U	6.3 U	67 U
71-43-2	Benzene	ug/Kg	4.7 U	0.63 U	0.82 U	0.79 U	1 U	4.8 U
75-27-4	Bromodichloromethane	ug/Kg	9 U	0.52 U	0.68 U	0.65 U	0.84 U	9.2 U
75-25-2	Bromoform	ug/Kg	19 U	0.67 U	0.88 U	0.85 U	1.1 U	19 U
74-83-9	Bromomethane	ug/Kg	52 U	2.8 U	3.7 U	3.6 U	4.6 U	53 U
75-15-0	Carbon disulfide	ug/Kg	9.6 U	0.91 U	1.2 U	1.1 U	1.5 U	9.8 U
56-23-5	Carbon tetrachloride	ug/Kg	31 U	0.66 U	0.87 U	0.84 U	1.1 U	32 U
108-90-7	Chlorobenzene	ug/Kg	13 U	0.51 U	0.66 U	0.64 U	0.82 U	13 U
75-00-3	Chloroethane	ug/Kg	20 U	2.8 U	3.7 U	3.6 U	4.6 U	21 U
67-66-3	Chloroform	ug/Kg	11 U	0.62 U	0.81 U	0.78 U	1 U	11 U
74-87-3	Chloromethane	ug/Kg	22 U	1.2 U	1.5 U	1.5 U	1.9 U	22 U
124-48-1	Dibromochloromethane	ug/Kg	14 U	0.59 U	0.77 U	0.75 U	0.95 U	14 U
75-34-3	1,1-Dichloroethane	ug/Kg	11 U	0.54 U	0.7 U	0.68 U	0.87 U	11 U
107-06-2	1,2-Dichloroethane	ug/Kg	13 U	0.5 U	0.65 U	0.63 U	0.81 U	14 U
75-35-4	1,1-Dichloroethene	ug/Kg	14 U	1.2 U	1.5 U	1.5 U	1.9 U	15 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	87 J	1.2 U	1.5 U	1.5 U	1.9 U	21 U
78-87-5	1,2-Dichloropropane	ug/Kg	14 U	0.5 U	0.65 U	0.63 U	0.81 U	14 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	10 U	0.53 U	0.69 U	0.67 U	0.85 U	10 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	20 U	0.54 U	0.71 U	0.69 U	0.88 U	20 U
100-41-4	Ethylbenzene	ug/Kg	9 U	0.58 U	0.76 U	0.73 U	0.94 U	9.2 U
591-78-6	2-Hexanone	ug/Kg	65 U	1.1 U	1.4 U	1.4 U	1.8 U	67 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	59 U	2 U	2.6 U	2.5 U	3.2 U	60 U
108-10-1	methyl isobutyl ketone	ug/Kg	68 U	0.65 U	0.85 U	0.83 U	1.1 U	69 U
75-09-2	Methylene Chloride	ug/Kg	31 U	1.5 U	1.9 U	1.8 U	2.4 U	32 U
100-42-5	Styrene	ug/Kg	17 U	0.56 U	0.74 U	0.71 U	0.91 U	17 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	14 U	0.64 U	0.84 U	0.81 U	1 U	15 U
127-18-4	Tetrachloroethene	ug/Kg	23000	0.82 U	1.1 U	1 U	11	2100
108-88-3	Toluene	ug/Kg	6.4 U	1.5 U	2 U	2 U	2.5 U	6.5 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	8.5 U	0.65 U	0.85 U	0.83 U	1.1 U	8.7 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	18 U	0.74 U	0.97 U	0.94 U	1.2 U	18 U
79-01-6	Trichloroethene	ug/Kg	140	0.6 U	0.78 U	0.76 U	0.97 U	12 U
75-01-4	Vinyl chloride	ug/Kg	13 U	0.71 U	0.92 U	0.9 U	1.1 U	14 U
1330-20-7	Xylenes, Total	ug/Kg	23 U	1.6 U	2.1 U	2.1 U	2.6 U	23 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	P16	P6	P6	P8	P8	Q13
		Sample ID:	P16-SS02-002.5-070911	P6-SS01-000.5-070911	P6-SS01-012.0-070911	P8-SS01-000.5-070911	P8-SS01-006.0-070911	Q13-SS01-000.5-070910
		Lab Sample Id:	500-6487-8	500-6489-8	500-6489-9	500-6489-7	500-6489-6	500-6458-3
		Depth:	2.5	0.5	12	0.5	6	0.5
		SDG:	6487	6489	6489	6489	6489	6458
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/10/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	7.6 U	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	11 U	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	13 U	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	8.5 J	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	8.7 U	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	21 J	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	6.2 U	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	8.1 U	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	39 U	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	51 U	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	51 U	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	46 U	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	52 U	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	47 U	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	110 U	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	180 U	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	40 U	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	48 U	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	42 U	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	16 J	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	20 U	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	37 U	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	39 U	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	36 U	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	42 U	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	43 U	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	81 U	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	47 U	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	81 U	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	41 U	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	47 U	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	48 U	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	P16	P6	P6	P8	P8	Q13
		Sample ID:	P16-SS02-002.5-070911	P6-SS01-000.5-070911	P6-SS01-012.0-070911	P8-SS01-000.5-070911	P8-SS01-006.0-070911	Q13-SS01-000.5-070910
		Lab Sample Id:	500-6487-8	500-6489-8	500-6489-9	500-6489-7	500-6489-6	500-6458-3
		Depth:	2.5	0.5	12	0.5	6	0.5
		SDG:	6487	6489	6489	6489	6489	6458
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/10/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	140 U	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	530 U	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	60 U	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	52 U	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	28 J	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	8.1 U	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	8 U	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	39 U	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	200 U	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	41 U	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	20 U	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	44 U	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	45 U	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	51 U	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	65 U	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	7.2 U	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	53 U	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	160 U	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	73 U	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	9.6 U	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	100 U	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	130 U	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	49 U	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	42 U	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	44 U	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	260 U	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	11 U	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	48 U	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	24 J	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	42 U	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	110 U	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	78 U	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	P16	P6	P6	P8	P8	Q13
		Sample ID:	P16-SS02-002.5-070911	P6-SS01-000.5-070911	P6-SS01-012.0-070911	P8-SS01-000.5-070911	P8-SS01-006.0-070911	Q13-SS01-000.5-070910
		Lab Sample Id:	500-6487-8	500-6489-8	500-6489-9	500-6489-7	500-6489-6	500-6458-3
		Depth:	2.5	0.5	12	0.5	6	0.5
		SDG:	6487	6489	6489	6489	6489	6458
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/10/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	0.59 U	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	0.36 U	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	0.33 U	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	0.63 U	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	0.63 U	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	1 U	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	0.82 U	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	0.33 U	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	0.51 U	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	0.6 U	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	0.36 U	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	0.78 U	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	0.39 U	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	0.18 U	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	0.68 U	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	0.7 U	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	0.33 U	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	0.25 U	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	0.4 U	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	0.54 U	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	3.3 U	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	6.2 U	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	5.1 U	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	5 U	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	5.4 U	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	4 U	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	47	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	3.6 U	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	2.8	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	47	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	0.29	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	6.1	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	5	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	13 J	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	0.41 U	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	0.11 U	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	24	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	Q13	Q16	Q16	Q17	Q17	Q17
		Sample ID:	Q13-SS01-002.0-070910	Q16-SS01-000.5-070910	Q16-SS01-001.0-070910	Q17-SS01-000.5-070910	Q17-SS01-002.9-070910	Q17-SS02-000.5-070910
		Lab Sample Id:	500-6458-1	500-6457-10	500-6457-4	500-6457-5	500-6457-11	500-6457-6
		Depth:	2	0.5	1	0.5	2.9	0.5
		SDG:	6458	6457	6457	6457	6457	6457
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	3.9 U	4.4 U	61 U	160 J	4.1 U	200 J
71-43-2	Benzene	ug/Kg	0.62 U	0.7 U	4.3 U	0.91 U	0.66 U	0.72 U
75-27-4	Bromodichloromethane	ug/Kg	0.51 U	0.58 U	8.4 U	0.75 U	0.55 U	0.6 U
75-25-2	Bromoform	ug/Kg	0.66 U	0.76 U	17 U	0.98 U	0.71 U	0.78 U
74-83-9	Bromomethane	ug/Kg	2.8 U	3.2 U	48 U	4.1 U	3 U	3.3 U
75-15-0	Carbon disulfide	ug/Kg	0.9 U	1 U	8.9 U	1.3 U	0.96 U	1 U
56-23-5	Carbon tetrachloride	ug/Kg	0.66 U	0.75 U	29 U	0.97 U	0.7 U	0.77 U
108-90-7	Chlorobenzene	ug/Kg	0.5 U	0.57 U	12 U	0.74 U	0.54 U	0.59 U
75-00-3	Chloroethane	ug/Kg	2.8 U	3.2 U	19 U	4.1 U	3 U	3.3 U
67-66-3	Chloroform	ug/Kg	0.61 U	0.69 U	9.9 U	0.9 U	0.65 U	0.71 U
74-87-3	Chloromethane	ug/Kg	1.2 U	1.3 U	20 U	1.7 U	1.2 U	1.4 U
124-48-1	Dibromochloromethane	ug/Kg	0.58 U	0.66 U	13 U	0.86 U	0.62 U	0.68 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.53 U	0.6 U	9.9 U	0.78 U	0.57 U	0.62 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.49 U	0.56 U	12 U	0.73 U	0.53 U	0.58 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.2 U	1.3 U	13 U	1.7 U	1.2 U	1.4 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.2 U	1.3 U	19 U	1.7 U	1.2 U	1.4 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.49 U	0.56 U	13 U	0.73 U	0.53 U	0.58 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.52 U	0.59 U	9.4 U	0.77 U	0.56 U	0.61 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.54 U	0.61 U	18 U	0.79 U	0.58 U	0.63 U
100-41-4	Ethylbenzene	ug/Kg	0.57 U	0.65 U	8.4 U	0.85 U	0.61 U	0.67 U
591-78-6	2-Hexanone	ug/Kg	1.1 U	1.2 U	61 U	1.6 U	1.2 U	1.3 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2 U	2.2 U	55 U	7	2.1 U	9.9
108-10-1	methyl isobutyl ketone	ug/Kg	0.65 U	0.74 U	63 U	0.95 U	0.69 U	0.76 U
75-09-2	Methylene Chloride	ug/Kg	1.4 U	1.6 U	29 U	2.1 U	1.5 U	1.7 U
100-42-5	Styrene	ug/Kg	0.56 U	0.63 U	16 U	0.82 U	0.59 U	0.65 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.64 U	0.72 U	13 U	0.94 U	0.68 U	0.74 U
127-18-4	Tetrachloroethene	ug/Kg	87	49	490	1.2 U	0.86 U	0.94 U
108-88-3	Toluene	ug/Kg	1.5 U	1.7 U	5.9 U	2.3 U	1.6 U	1.8 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.65 U	0.74 U	7.9 U	0.95 U	0.69 U	0.76 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.74 U	0.84 U	16 U	1.1 U	0.79 U	0.86 U
79-01-6	Trichloroethene	ug/Kg	0.59 U	0.67 U	11 U	0.87 U	0.63 U	0.69 U
75-01-4	Vinyl chloride	ug/Kg	0.7 U	0.8 U	12 U	1 U	0.75 U	0.82 U
1330-20-7	Xylenes, Total	ug/Kg	1.6 U	1.8 U	21 U	2.4 U	1.7 U	1.9 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	Q13	Q16	Q16	Q17	Q17	Q17
		Sample ID:	Q13-SS01-002.0-070910	Q16-SS01-000.5-070910	Q16-SS01-001.0-070910	Q17-SS01-000.5-070910	Q17-SS01-002.9-070910	Q17-SS02-000.5-070910
		Lab Sample Id:	500-6458-1	500-6457-10	500-6457-4	500-6457-5	500-6457-11	500-6457-6
		Depth:	2	0.5	1	0.5	2.9	0.5
		SDG:	6458	6457	6457	6457	6457	6457
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	Q13	Q16	Q16	Q17	Q17	Q17
		Sample ID:	Q13-SS01-002.0-070910	Q16-SS01-000.5-070910	Q16-SS01-001.0-070910	Q17-SS01-000.5-070910	Q17-SS01-002.9-070910	Q17-SS02-000.5-070910
		Lab Sample Id:	500-6458-1	500-6457-10	500-6457-4	500-6457-5	500-6457-11	500-6457-6
		Depth:	2	0.5	1	0.5	2.9	0.5
		SDG:	6458	6457	6457	6457	6457	6457
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	Q13	Q16	Q16	Q17	Q17	Q17
		Sample ID:	Q13-SS01-002.0-070910	Q16-SS01-000.5-070910	Q16-SS01-001.0-070910	Q17-SS01-000.5-070910	Q17-SS01-002.9-070910	Q17-SS02-000.5-070910
		Lab Sample Id:	500-6458-1	500-6457-10	500-6457-4	500-6457-5	500-6457-11	500-6457-6
		Depth:	2	0.5	1	0.5	2.9	0.5
		SDG:	6458	6457	6457	6457	6457	6457
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	R10	R10	R13	R13	R17	R17
		Sample ID:	R10-SS01-002.0-070914	R10-SS01-003.5-070914	R13-SS01-000.5-070910	R13-SS01-001.5-070910	R17-SS01-000.5-070910	R17-SS01-003.5-070910
		Lab Sample Id:	500-6582-9	500-6582-10	500-6458-2	500-6458-4	500-6458-12	500-6458-7
		Depth:	2	3.5	0.5	1.5	0.5	3.5
		SDG:	6582	6582	6458	6458	6458	6458
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/14/2007	9/14/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	4.2 U	6 U	5.1 U	4.2 U	4 U	4.5 U
71-43-2	Benzene	ug/Kg	0.68 U	0.96 U	0.82 U	0.68 U	0.65 U	0.73 U
75-27-4	Bromodichloromethane	ug/Kg	0.56 U	0.8 U	0.68 U	0.56 U	0.53 U	0.6 U
75-25-2	Bromoform	ug/Kg	0.73 U	1 U	0.88 U	0.73 U	0.69 U	0.78 U
74-83-9	Bromomethane	ug/Kg	3 U	4.3 U	3.7 U	3 U	2.9 U	3.3 U
75-15-0	Carbon disulfide	ug/Kg	0.98 U	1.4 U	1.2 U	0.98 U	0.94 U	1.1 U
56-23-5	Carbon tetrachloride	ug/Kg	0.72 U	1 U	0.86 U	0.72 U	0.68 U	0.77 U
108-90-7	Chlorobenzene	ug/Kg	0.55 U	0.78 U	0.66 U	0.55 U	0.52 U	0.59 U
75-00-3	Chloroethane	ug/Kg	3 U	23 U	3.7 U	3 U	2.9 U	3.3 U
67-66-3	Chloroform	ug/Kg	0.67 U	0.95 U	0.81 U	0.67 U	0.64 U	0.72 U
74-87-3	Chloromethane	ug/Kg	1.3 U	1.8 U	1.5 U	1.3 U	1.2 U	1.4 U
124-48-1	Dibromochloromethane	ug/Kg	0.64 U	0.91 U	0.77 U	0.64 U	0.61 U	0.68 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.58 U	0.82 U	0.7 U	0.58 U	0.55 U	0.62 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.54 U	0.77 U	0.65 U	0.54 U	0.51 U	0.58 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.3 U	1.8 U	1.5 U	1.3 U	1.2 U	1.4 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.3 U	1.8 U	1.5 U	1.3 U	1.2 U	1.4 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.54 U	0.77 U	0.65 U	0.54 U	0.51 U	0.58 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.57 U	0.81 U	0.69 U	0.57 U	0.54 U	0.61 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.59 U	0.84 U	0.71 U	0.59 U	0.56 U	0.63 U
100-41-4	Ethylbenzene	ug/Kg	0.63 U	0.89 U	0.76 U	0.63 U	0.6 U	0.67 U
591-78-6	2-Hexanone	ug/Kg	1.2 U	1.7 U	1.4 U	1.2 U	1.1 U	1.3 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2.2 U	3.1 U	2.6 U	2.2 U	2.1 U	2.3 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.71 U	1 U	0.85 U	0.71 U	0.67 U	0.76 U
75-09-2	Methylene Chloride	ug/Kg	1.6 U	2.2 U	1.9 U	1.6 U	1.5 U	1.7 U
100-42-5	Styrene	ug/Kg	0.61 U	0.87 U	0.73 U	0.61 U	0.58 U	0.65 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.7 U	0.99 U	0.84 U	0.7 U	0.66 U	0.75 U
127-18-4	Tetrachloroethene	ug/Kg	100	380	6.4	24	0.84 U	0.95 U
108-88-3	Toluene	ug/Kg	1.7 U	2.4 U	2 U	1.7 U	1.6 U	1.8 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.71 U	1 U	0.85 U	0.71 U	0.67 U	0.76 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.8 U	1.1 U	0.97 U	0.81 U	0.77 U	0.86 U
79-01-6	Trichloroethene	ug/Kg	6.4	0.92 U	0.78 U	0.65 U	0.62 U	0.69 U
75-01-4	Vinyl chloride	ug/Kg	0.76 U	1.1 U	0.92 U	0.77 U	0.73 U	0.82 U
1330-20-7	Xylenes, Total	ug/Kg	1.8 U	2.5 U	2.1 U	1.8 U	1.7 U	1.9 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	R10	R10	R13	R13	R17	R17
		Sample ID:	R10-SS01-002.0-070914	R10-SS01-003.5-070914	R13-SS01-000.5-070910	R13-SS01-001.5-070910	R17-SS01-000.5-070910	R17-SS01-003.5-070910
		Lab Sample Id:	500-6582-9	500-6582-10	500-6458-2	500-6458-4	500-6458-12	500-6458-7
		Depth:	2	3.5	0.5	1.5	0.5	3.5
		SDG:	6582	6582	6458	6458	6458	6458
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/14/2007	9/14/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	R10	R10	R13	R13	R17	R17
		Sample ID:	R10-SS01-002.0-070914	R10-SS01-003.5-070914	R13-SS01-000.5-070910	R13-SS01-001.5-070910	R17-SS01-000.5-070910	R17-SS01-003.5-070910
		Lab Sample Id:	500-6582-9	500-6582-10	500-6458-2	500-6458-4	500-6458-12	500-6458-7
		Depth:	2	3.5	0.5	1.5	0.5	3.5
		SDG:	6582	6582	6458	6458	6458	6458
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/14/2007	9/14/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	R10	R10	R13	R13	R17	R17
		Sample ID:	R10-SS01-002.0-070914	R10-SS01-003.5-070914	R13-SS01-000.5-070910	R13-SS01-001.5-070910	R17-SS01-000.5-070910	R17-SS01-003.5-070910
		Lab Sample Id:	500-6582-9	500-6582-10	500-6458-2	500-6458-4	500-6458-12	500-6458-7
		Depth:	2	3.5	0.5	1.5	0.5	3.5
		SDG:	6582	6582	6458	6458	6458	6458
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/14/2007	9/14/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	R6	R6	R8	R8	R8	S13
		Sample ID:	R6-SS01-000.5-070911	R6-SS01-012.0-070911	R8-SS01-000.5-070911	R8-SS01-009.3-070911	R8-SS02-009.3-070911	S13-SS01-000.5-070910
		Lab Sample Id:	500-6489-4	500-6489-1	500-6489-5	500-6489-2	500-6489-3	500-6458-6
		Depth:	0.5	12	0.5	9.3	9.3	0.5
		SDG:	6489	6489	6489	6489	6489	6458
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/10/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	5 U	5.7 U	5.6 U	4.3 U	4.7 U	5.2 U
71-43-2	Benzene	ug/Kg	0.8 U	0.91 U	0.9 U	0.69 U	0.75 U	0.84 U
75-27-4	Bromodichloromethane	ug/Kg	0.66 U	0.75 U	0.74 U	0.57 U	0.62 U	0.7 U
75-25-2	Bromoform	ug/Kg	0.85 U	0.98 U	0.96 U	0.74 U	0.81 U	0.9 U
74-83-9	Bromomethane	ug/Kg	3.6 U	4.1 U	4 U	3.1 U	3.4 U	3.8 U
75-15-0	Carbon disulfide	ug/Kg	1.2 U	1.3 U	1.3 U	1 U	1.1 U	1.2 U
56-23-5	Carbon tetrachloride	ug/Kg	0.84 U	0.96 U	0.95 U	0.73 U	0.8 U	0.89 U
108-90-7	Chlorobenzene	ug/Kg	0.65 U	0.74 U	0.73 U	0.56 U	0.61 U	0.68 U
75-00-3	Chloroethane	ug/Kg	3.6 U	4.1 U	4 U	3.1 U	3.4 U	3.8 U
67-66-3	Chloroform	ug/Kg	0.78 U	0.9 U	0.88 U	0.68 U	0.74 U	0.83 U
74-87-3	Chloromethane	ug/Kg	1.5 U	1.7 U	1.7 U	1.3 U	1.4 U	1.6 U
124-48-1	Dibromochloromethane	ug/Kg	0.75 U	0.86 U	0.84 U	0.65 U	0.71 U	0.79 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.68 U	0.78 U	0.77 U	0.59 U	0.64 U	0.72 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.63 U	0.73 U	0.71 U	0.55 U	0.6 U	0.67 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.5 U	1.7 U	1.7 U	1.3 U	1.4 U	1.6 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.5 U	1.7 U	1.7 U	1.3 U	1.4 U	1.6 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.63 U	0.73 U	0.71 U	0.55 U	0.6 U	0.67 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.67 U	0.77 U	0.75 U	0.58 U	0.63 U	0.71 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.69 U	0.79 U	0.78 U	0.6 U	0.65 U	0.73 U
100-41-4	Ethylbenzene	ug/Kg	0.74 U	0.85 U	0.83 U	0.64 U	0.7 U	0.78 U
591-78-6	2-Hexanone	ug/Kg	1.4 U	1.6 U	1.6 U	1.2 U	1.3 U	1.5 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2.5 U	2.9 U	2.9 U	2.2 U	2.4 U	2.7 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.83 U	0.95 U	0.93 U	0.72 U	0.78 U	0.88 U
75-09-2	Methylene Chloride	ug/Kg	1.8 U	2.1 U	2.1 U	1.6 U	1.7 U	2 U
100-42-5	Styrene	ug/Kg	0.71 U	0.82 U	0.8 U	0.62 U	0.68 U	0.76 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.82 U	0.94 U	0.92 U	0.71 U	0.77 U	0.87 U
127-18-4	Tetrachloroethene	ug/Kg	1 U	1.2 U	1.2 U	22	0.98 U	47
108-88-3	Toluene	ug/Kg	2 U	2.2 U	2.2 U	1.7 U	1.9 U	2.1 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.83 U	0.95 U	0.93 U	0.72 U	0.78 U	0.88 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.95 U	1.1 U	1.1 U	0.82 U	0.89 U	1 U
79-01-6	Trichloroethene	ug/Kg	0.76 U	0.87 U	0.86 U	0.66 U	0.72 U	0.81 U
75-01-4	Vinyl chloride	ug/Kg	0.9 U	1 U	1 U	0.78 U	0.85 U	0.95 U
1330-20-7	Xylenes, Total	ug/Kg	2.1 U	2.4 U	2.3 U	1.8 U	2 U	2.2 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	R6	R6	R8	R8	R8	S13
		Sample ID:	R6-SS01-000.5-070911	R6-SS01-012.0-070911	R8-SS01-000.5-070911	R8-SS01-009.3-070911	R8-SS02-009.3-070911	S13-SS01-000.5-070910
		Lab Sample Id:	500-6489-4	500-6489-1	500-6489-5	500-6489-2	500-6489-3	500-6458-6
		Depth:	0.5	12	0.5	9.3	9.3	0.5
		SDG:	6489	6489	6489	6489	6489	6458
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/10/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	R6	R6	R8	R8	R8	S13
		Sample ID:	R6-SS01-000.5-070911	R6-SS01-012.0-070911	R8-SS01-000.5-070911	R8-SS01-009.3-070911	R8-SS02-009.3-070911	S13-SS01-000.5-070910
		Lab Sample Id:	500-6489-4	500-6489-1	500-6489-5	500-6489-2	500-6489-3	500-6458-6
		Depth:	0.5	12	0.5	9.3	9.3	0.5
		SDG:	6489	6489	6489	6489	6489	6458
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/10/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	R6	R6	R8	R8	R8	S13
		Sample ID:	R6-SS01-000.5-070911	R6-SS01-012.0-070911	R8-SS01-000.5-070911	R8-SS01-009.3-070911	R8-SS02-009.3-070911	S13-SS01-000.5-070910
		Lab Sample Id:	500-6489-4	500-6489-1	500-6489-5	500-6489-2	500-6489-3	500-6458-6
		Depth:	0.5	12	0.5	9.3	9.3	0.5
		SDG:	6489	6489	6489	6489	6489	6458
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/11/2007	9/10/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	S13	S15	S15	S17	S17	T10
		Sample ID:	S13-SS01-001.0-070910	S15-SS01-000.5-070910	S15-SS01-002.5-070910	S17-SS01-000.5-070910	S17-SS01-002.7-070910	T10-SS01-002.0-070914
		Lab Sample Id:	500-6458-5	500-6458-9	500-6458-8	500-6458-11	500-6458-10	500-6582-11
		Depth:	1	0.5	2.5	0.5	2.7	2
		SDG:	6458	6458	6458	6458	6458	6582
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/14/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	4.3 U	64 UJ	62 U	4.3 U	4.2 U	4.1 U
71-43-2	Benzene	ug/Kg	0.69 U	4.6 U	4.5 U	0.68 U	0.68 U	0.66 U
75-27-4	Bromodichloromethane	ug/Kg	0.57 U	8.9 U	8.6 U	0.56 U	0.56 U	0.55 U
75-25-2	Bromoform	ug/Kg	0.74 U	18 UJ	18 U	0.73 U	0.73 U	0.71 U
74-83-9	Bromomethane	ug/Kg	3.1 U	51 UJ	49 U	3.1 U	3.1 U	3 U
75-15-0	Carbon disulfide	ug/Kg	1 U	9.4 UJ	9.1 U	0.99 U	0.98 U	0.96 U
56-23-5	Carbon tetrachloride	ug/Kg	0.73 U	31 U	30 U	0.72 U	0.72 U	0.7 U
108-90-7	Chlorobenzene	ug/Kg	0.56 U	13 UJ	12 U	0.55 U	0.55 U	0.54 U
75-00-3	Chloroethane	ug/Kg	3.1 U	20 UJ	19 U	3.1 U	3.1 U	3 U
67-66-3	Chloroform	ug/Kg	0.68 U	10 UJ	10 U	0.67 U	0.67 U	0.65 U
74-87-3	Chloromethane	ug/Kg	1.3 U	21 UJ	21 U	1.3 U	1.3 U	1.2 U
124-48-1	Dibromochloromethane	ug/Kg	0.65 U	14 UJ	13 U	0.64 U	0.64 U	0.62 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.59 U	10 UJ	10 U	0.58 U	0.58 U	0.57 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.55 U	13 U	13 U	0.54 U	0.54 U	0.53 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.3 U	14 UJ	14 U	1.3 U	1.3 U	1.2 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.3 U	20 U	19 U	1.3 U	1.3 U	1.2 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.55 U	14 U	13 U	0.54 U	0.54 U	0.53 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.58 U	9.9 U	9.6 U	0.57 U	0.57 U	0.56 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.6 U	19 U	19 U	0.59 U	0.59 U	0.57 U
100-41-4	Ethylbenzene	ug/Kg	0.64 U	8.9 UJ	8.6 U	0.63 U	0.63 U	0.61 U
591-78-6	2-Hexanone	ug/Kg	1.2 U	64 UJ	62 U	1.2 U	1.2 U	1.1 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2.2 U	58 UJ	56 U	2.2 U	2.2 U	2.1 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.72 U	66 U	64 U	0.71 U	0.71 U	0.69 U
75-09-2	Methylene Chloride	ug/Kg	1.6 U	31 UJ	30 U	1.6 U	1.6 U	1.5 U
100-42-5	Styrene	ug/Kg	0.62 U	17 UJ	16 U	0.61 U	0.61 U	0.59 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.71 U	14 UJ	14 U	0.7 U	0.7 U	0.68 U
127-18-4	Tetrachloroethene	ug/Kg	13	470 J	21000	0.89 U	0.89 U	0.86 U
108-88-3	Toluene	ug/Kg	1.7 U	6.3 U	6.1 U	1.7 U	1.7 U	1.6 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.72 U	8.4 UJ	8.1 U	0.71 U	0.71 U	0.69 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.82 U	17 U	17 U	0.81 U	0.81 U	0.79 U
79-01-6	Trichloroethene	ug/Kg	0.66 U	11 U	11 U	0.65 U	0.65 U	0.63 U
75-01-4	Vinyl chloride	ug/Kg	0.78 U	13 UJ	13 U	0.77 U	0.77 U	0.75 U
1330-20-7	Xylenes, Total	ug/Kg	1.8 U	22 UJ	22 U	1.8 U	1.8 U	1.7 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	S13	S15	S15	S17	S17	T10
		Sample ID:	S13-SS01-001.0-070910	S15-SS01-000.5-070910	S15-SS01-002.5-070910	S17-SS01-000.5-070910	S17-SS01-002.7-070910	T10-SS01-002.0-070914
		Lab Sample Id:	500-6458-5	500-6458-9	500-6458-8	500-6458-11	500-6458-10	500-6582-11
		Depth:	1	0.5	2.5	0.5	2.7	2
		SDG:	6458	6458	6458	6458	6458	6582
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/14/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	S13	S15	S15	S17	S17	T10
		Sample ID:	S13-SS01-001.0-070910	S15-SS01-000.5-070910	S15-SS01-002.5-070910	S17-SS01-000.5-070910	S17-SS01-002.7-070910	T10-SS01-002.0-070914
		Lab Sample Id:	500-6458-5	500-6458-9	500-6458-8	500-6458-11	500-6458-10	500-6582-11
		Depth:	1	0.5	2.5	0.5	2.7	2
		SDG:	6458	6458	6458	6458	6458	6582
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/14/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	S13	S15	S15	S17	S17	T10
		Sample ID:	S13-SS01-001.0-070910	S15-SS01-000.5-070910	S15-SS01-002.5-070910	S17-SS01-000.5-070910	S17-SS01-002.7-070910	T10-SS01-002.0-070914
		Lab Sample Id:	500-6458-5	500-6458-9	500-6458-8	500-6458-11	500-6458-10	500-6582-11
		Depth:	1	0.5	2.5	0.5	2.7	2
		SDG:	6458	6458	6458	6458	6458	6582
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/14/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	T10	T14	T14	T15	T15	T16
		Sample ID:	T10-SS02-002.0-070914	T14-SS01-000.5-070910	T14-SS01-001.7-070910	T15-SS01-000.5-070910	T15-SS01-001.5-070910	T16-SS01-000.5-070910
		Lab Sample Id:	500-6582-12	500-6457-7	500-6457-9	500-6457-8	500-6457-2	500-6457-1
		Depth:	2	0.5	1.7	0.5	1.5	0.5
		SDG:	6582	6457	6457	6457	6457	6457
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/14/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	4.3 U	4 U	4.1 U	3.9 U	4.8 U	4.2 U
71-43-2	Benzene	ug/Kg	0.7 U	0.64 U	0.66 U	0.63 U	0.77 U	0.68 U
75-27-4	Bromodichloromethane	ug/Kg	0.57 U	0.53 U	0.54 U	0.52 U	0.63 U	0.56 U
75-25-2	Bromoform	ug/Kg	0.75 U	0.68 U	0.71 U	0.67 U	0.82 U	0.73 U
74-83-9	Bromomethane	ug/Kg	3.1 U	2.9 U	3 U	2.8 U	3.4 U	3 U
75-15-0	Carbon disulfide	ug/Kg	1 U	0.92 U	0.96 U	0.91 U	1.1 U	0.98 U
56-23-5	Carbon tetrachloride	ug/Kg	0.74 U	0.67 U	0.7 U	0.66 U	0.81 U	0.72 U
108-90-7	Chlorobenzene	ug/Kg	0.56 U	0.52 U	0.54 U	0.51 U	0.62 U	0.55 U
75-00-3	Chloroethane	ug/Kg	3.1 U	2.9 U	3 U	2.8 U	3.4 U	3 U
67-66-3	Chloroform	ug/Kg	0.69 U	0.63 U	0.65 U	0.62 U	0.76 U	0.67 U
74-87-3	Chloromethane	ug/Kg	1.3 U	1.2 U	1.2 U	1.2 U	1.4 U	1.3 U
124-48-1	Dibromochloromethane	ug/Kg	0.66 U	0.6 U	0.62 U	0.59 U	0.72 U	0.64 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.59 U	0.54 U	0.56 U	0.54 U	0.66 U	0.58 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.55 U	0.51 U	0.53 U	0.5 U	0.61 U	0.54 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.3 U	1.2 U	1.2 U	1.2 U	1.4 U	1.3 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.3 U	1.2 U	1.2 U	1.2 U	1.4 U	1.3 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.55 U	0.51 U	0.53 U	0.5 U	0.61 U	0.54 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.58 U	0.53 U	0.55 U	0.53 U	0.64 U	0.57 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.6 U	0.55 U	0.57 U	0.54 U	0.67 U	0.59 U
100-41-4	Ethylbenzene	ug/Kg	0.64 U	0.59 U	0.61 U	0.58 U	0.71 U	0.63 U
591-78-6	2-Hexanone	ug/Kg	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	1.2 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2.2 U	2 U	2.1 U	2 U	2.4 U	2.2 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.73 U	0.66 U	0.69 U	0.65 U	0.8 U	0.71 U
75-09-2	Methylene Chloride	ug/Kg	1.6 U	1.5 U	1.5 U	1.5 U	1.8 U	1.6 U
100-42-5	Styrene	ug/Kg	0.62 U	0.57 U	0.59 U	0.56 U	0.69 U	0.61 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.72 U	0.65 U	0.68 U	0.64 U	0.79 U	0.7 U
127-18-4	Tetrachloroethene	ug/Kg	0.91 U	0.83 U	0.86 U	0.82 U	1 U	0.88 U
108-88-3	Toluene	ug/Kg	1.7 U	1.6 U	1.6 U	1.5 U	1.9 U	1.7 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.73 U	0.66 U	0.69 U	0.65 U	0.8 U	0.71 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.83 U	0.76 U	0.78 U	0.74 U	0.91 U	0.81 U
79-01-6	Trichloroethene	ug/Kg	0.67 U	0.61 U	0.63 U	0.6 U	0.73 U	0.65 U
75-01-4	Vinyl chloride	ug/Kg	0.79 U	0.72 U	0.75 U	0.71 U	0.87 U	0.77 U
1330-20-7	Xylenes, Total	ug/Kg	1.8 U	1.7 U	1.7 U	1.6 U	2 U	1.8 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	T10	T14	T14	T15	T15	T16
		Sample ID:	T10-SS02-002.0-070914	T14-SS01-000.5-070910	T14-SS01-001.7-070910	T15-SS01-000.5-070910	T15-SS01-001.5-070910	T16-SS01-000.5-070910
		Lab Sample Id:	500-6582-12	500-6457-7	500-6457-9	500-6457-8	500-6457-2	500-6457-1
		Depth:	2	0.5	1.7	0.5	1.5	0.5
		SDG:	6582	6457	6457	6457	6457	6457
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/14/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	T10	T14	T14	T15	T15	T16
		Sample ID:	T10-SS02-002.0-070914	T14-SS01-000.5-070910	T14-SS01-001.7-070910	T15-SS01-000.5-070910	T15-SS01-001.5-070910	T16-SS01-000.5-070910
		Lab Sample Id:	500-6582-12	500-6457-7	500-6457-9	500-6457-8	500-6457-2	500-6457-1
		Depth:	2	0.5	1.7	0.5	1.5	0.5
		SDG:	6582	6457	6457	6457	6457	6457
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/14/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007
	COMPOUND	UNITS:						
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	T10	T14	T14	T15	T15	T16
		Sample ID:	T10-SS02-002.0-070914	T14-SS01-000.5-070910	T14-SS01-001.7-070910	T15-SS01-000.5-070910	T15-SS01-001.5-070910	T16-SS01-000.5-070910
		Lab Sample Id:	500-6582-12	500-6457-7	500-6457-9	500-6457-8	500-6457-2	500-6457-1
		Depth:	2	0.5	1.7	0.5	1.5	0.5
		SDG:	6582	6457	6457	6457	6457	6457
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/14/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007	9/10/2007
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	T16	B10	C6	C6	E2	E6
		Sample ID:	T16-SS01-001.4-070910	B10-EB01-070913	C6-EB01-000.0-070912	C6-TB01-000.0-070912	E2-EB01-000.0-070912	E6-TB01-000.0-07913
		Lab Sample Id:	500-6457-3	500-6548-12	500-6519-4	500-6519-1	500-6519-14	500-6548-3
		Depth:	1.4	NA	NA	NA	NA	NA
		SDG:	6457	6548	6519	6519	6519	6548
		Matrix:	Soil	Water	Water	Water	Water	Water
		Sampled:	9/10/2007	9/13/2007	9/12/2007	9/12/2007	9/12/2007	9/13/2007
	COMPOUND	UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L
	VOLATILES							
67-64-1	Acetone	ug/Kg	4.5 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
71-43-2	Benzene	ug/Kg	0.72 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
75-27-4	Bromodichloromethane	ug/Kg	0.6 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-25-2	Bromoform	ug/Kg	0.77 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
74-83-9	Bromomethane	ug/Kg	3.2 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U
75-15-0	Carbon disulfide	ug/Kg	1 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
56-23-5	Carbon tetrachloride	ug/Kg	0.76 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
108-90-7	Chlorobenzene	ug/Kg	0.59 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
75-00-3	Chloroethane	ug/Kg	3.2 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
67-66-3	Chloroform	ug/Kg	0.71 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
74-87-3	Chloromethane	ug/Kg	1.4 U	0.2 U	1.2	0.2 U	0.2 U	0.2 U
124-48-1	Dibromochloromethane	ug/Kg	0.68 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.62 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.58 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.4 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.4 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.58 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.61 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.63 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
100-41-4	Ethylbenzene	ug/Kg	0.67 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
591-78-6	2-Hexanone	ug/Kg	1.3 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2.3 U	1 U	1 U	1 U	1 U	1 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.75 U	0.92 U	0.92 U	0.92 UJ	0.92 U	0.92 U
75-09-2	Methylene Chloride	ug/Kg	1.7 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
100-42-5	Styrene	ug/Kg	0.65 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.74 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
127-18-4	Tetrachloroethene	ug/Kg	0.94 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
108-88-3	Toluene	ug/Kg	1.8 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.75 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.86 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
79-01-6	Trichloroethene	ug/Kg	0.69 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
75-01-4	Vinyl chloride	ug/Kg	0.82 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
1330-20-7	Xylenes, Total	ug/Kg	1.9 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	T16	B10	C6	C6	E2	E6
		Sample ID:	T16-SS01-001.4-070910	B10-EB01-070913	C6-EB01-000.0-070912	C6-TB01-000.0-070912	E2-EB01-000.0-070912	E6-TB01-000.0-07913
		Lab Sample Id:	500-6457-3	500-6548-12	500-6519-4	500-6519-1	500-6519-14	500-6548-3
		Depth:	1.4	NA	NA	NA	NA	NA
		SDG:	6457	6548	6519	6519	6519	6548
		Matrix:	Soil	Water	Water	Water	Water	Water
		Sampled:	9/10/2007	9/13/2007	9/12/2007	9/12/2007	9/12/2007	9/13/2007
	COMPOUND	UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	T16	B10	C6	C6	E2	E6
		Sample ID:	T16-SS01-001.4-070910	B10-EB01-070913	C6-EB01-000.0-070912	C6-TB01-000.0-070912	E2-EB01-000.0-070912	E6-TB01-000.0-07913
		Lab Sample Id:	500-6457-3	500-6548-12	500-6519-4	500-6519-1	500-6519-14	500-6548-3
		Depth:	1.4	NA	NA	NA	NA	NA
		SDG:	6457	6548	6519	6519	6519	6548
		Matrix:	Soil	Water	Water	Water	Water	Water
		Sampled:	9/10/2007	9/13/2007	9/12/2007	9/12/2007	9/12/2007	9/13/2007
	COMPOUND	UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	T16	B10	C6	C6	E2	E6
		Sample ID:	T16-SS01-001.4-070910	B10-EB01-070913	C6-EB01-000.0-070912	C6-TB01-000.0-070912	E2-EB01-000.0-070912	E6-TB01-000.0-07913
		Lab Sample Id:	500-6457-3	500-6548-12	500-6519-4	500-6519-1	500-6519-14	500-6548-3
		Depth:	1.4	NA	NA	NA	NA	NA
		SDG:	6457	6548	6519	6519	6519	6548
		Matrix:	Soil	Water	Water	Water	Water	Water
		Sampled:	9/10/2007	9/13/2007	9/12/2007	9/12/2007	9/12/2007	9/13/2007
	COMPOUND	UNITS:		ug/L	ug/L	ug/L	ug/L	ug/L
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	F10	H10	H10	K10	M10	M10
		Sample ID:	F10-TB01-000.0-070913	H10-GW01-006.4-070913	H10-GW02-006.4-070913	K10-EB01-000.0-070913	M10-EB01-070914	M10-TB01-070914
		Lab Sample Id:	500-6547-17	500-6547-3	500-6547-4	500-6547-5	500-6582-2	500-6582-1
		Depth:	NA	6.4	6.4	NA	NA	NA
		SDG:	6547	6547	6547	6547	6582	6582
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/14/2007	9/14/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	VOLATILES							
67-64-1	Acetone	ug/Kg	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
71-43-2	Benzene	ug/Kg	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
75-27-4	Bromodichloromethane	ug/Kg	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-25-2	Bromoform	ug/Kg	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
74-83-9	Bromomethane	ug/Kg	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U
75-15-0	Carbon disulfide	ug/Kg	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
56-23-5	Carbon tetrachloride	ug/Kg	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
108-90-7	Chlorobenzene	ug/Kg	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
75-00-3	Chloroethane	ug/Kg	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
67-66-3	Chloroform	ug/Kg	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
74-87-3	Chloromethane	ug/Kg	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
124-48-1	Dibromochloromethane	ug/Kg	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
75-35-4	1,1-Dichloroethene	ug/Kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	0.34 U	1.2 J	1.9 J	0.34 U	0.34 U	0.34 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
100-41-4	Ethylbenzene	ug/Kg	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
591-78-6	2-Hexanone	ug/Kg	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	1 U	1 U	1 U	1 U	1 U	1 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U
75-09-2	Methylene Chloride	ug/Kg	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
100-42-5	Styrene	ug/Kg	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
127-18-4	Tetrachloroethene	ug/Kg	0.18 U	11	19	0.18 U	0.18 U	0.18 U
108-88-3	Toluene	ug/Kg	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
79-01-6	Trichloroethene	ug/Kg	0.13 U	1.7	3.2	0.13 U	0.13 U	0.13 U
75-01-4	Vinyl chloride	ug/Kg	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
1330-20-7	Xylenes, Total	ug/Kg	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	F10	H10	H10	K10	M10	M10
		Sample ID:	F10-TB01-000.0-070913	H10-GW01-006.4-070913	H10-GW02-006.4-070913	K10-EB01-000.0-070913	M10-EB01-070914	M10-TB01-070914
		Lab Sample Id:	500-6547-17	500-6547-3	500-6547-4	500-6547-5	500-6582-2	500-6582-1
		Depth:	NA	6.4	6.4	NA	NA	NA
		SDG:	6547	6547	6547	6547	6582	6582
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/14/2007	9/14/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	F10	H10	H10	K10	M10	M10
		Sample ID:	F10-TB01-000.0-070913	H10-GW01-006.4-070913	H10-GW02-006.4-070913	K10-EB01-000.0-070913	M10-EB01-070914	M10-TB01-070914
		Lab Sample Id:	500-6547-17	500-6547-3	500-6547-4	500-6547-5	500-6582-2	500-6582-1
		Depth:	NA	6.4	6.4	NA	NA	NA
		SDG:	6547	6547	6547	6547	6582	6582
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/14/2007	9/14/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	F10	H10	H10	K10	M10	M10
		Sample ID:	F10-TB01-000.0-070913	H10-GW01-006.4-070913	H10-GW02-006.4-070913	K10-EB01-000.0-070913	M10-EB01-070914	M10-TB01-070914
		Lab Sample Id:	500-6547-17	500-6547-3	500-6547-4	500-6547-5	500-6582-2	500-6582-1
		Depth:	NA	6.4	6.4	NA	NA	NA
		SDG:	6547	6547	6547	6547	6582	6582
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/14/2007	9/14/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	MC01	MC3	P14	P16	P6	P8
		Sample ID:	MC01-TB01-080621	MC3-EB01-080621	P14-EB01-000.0-070911	P16-TB01-000.0-070911	P6-EB01-000.0-070911	P8-TB01-000.0-070911
		Lab Sample Id:	500-12177-12	500-12177-11	500-6487-2	500-6487-1	500-6489-10	500-6489-11
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	12177	12177	6487	6487	6489	6489
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	6/21/2008	6/21/2008	9/11/2007	9/11/2007	9/11/2007	9/11/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	VOLATILES							
67-64-1	Acetone	ug/Kg	1.2 R	15 J	1.4 U	1.4 U	1.4 U	1.4 U
71-43-2	Benzene	ug/Kg	0.16 U	0.16 U	0.23 U	0.23 U	0.23 U	0.23 U
75-27-4	Bromodichloromethane	ug/Kg	0.18 U	0.18 U	0.22 U	0.22 U	0.22 U	0.22 U
75-25-2	Bromoform	ug/Kg	0.3 U	0.3 U	0.32 U	0.32 U	0.32 U	0.32 U
74-83-9	Bromomethane	ug/Kg	0.44 U	0.44 U	0.59 U	0.59 U	0.59 U	0.59 U
75-15-0	Carbon disulfide	ug/Kg	0.39 U	0.39 U	0.15 U	0.15 U	0.15 U	0.15 U
56-23-5	Carbon tetrachloride	ug/Kg	0.21 U	0.21 U	0.34 U	0.34 U	0.34 U	0.34 U
108-90-7	Chlorobenzene	ug/Kg	0.17 U	0.17 U	0.15 U	0.15 U	0.15 U	0.15 U
75-00-3	Chloroethane	ug/Kg	0.45 U	0.45 U	0.32 U	0.32 U	0.32 U	0.32 U
67-66-3	Chloroform	ug/Kg	0.13 U	0.13 U	0.14 U	0.14 U	0.14 U	0.14 U
74-87-3	Chloromethane	ug/Kg	0.33 U	1.4	0.2 U	0.2 U	0.2 U	0.2 U
124-48-1	Dibromochloromethane	ug/Kg	0.19 U	0.19 U	0.22 U	0.22 U	0.22 U	0.22 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.18 U	0.18 U	0.15 U	0.15 U	0.15 U	0.15 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.22 U	0.22 U	0.25 U	0.25 U	0.25 U	0.25 U
75-35-4	1,1-Dichloroethene	ug/Kg	0.22 U	0.22 U	0.25 U	0.25 U	0.25 U	0.25 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	0.3 U	0.3 U	0.34 U	0.34 U	0.34 U	0.34 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.23 U	0.23 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.16 U	0.16 U	0.15 U	0.15 U	0.15 U	0.15 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.13 U	0.13 U	0.16 U	0.16 U	0.16 U	0.16 U
100-41-4	Ethylbenzene	ug/Kg	0.17 U	0.17 U	0.21 U	0.21 U	0.21 U	0.21 U
591-78-6	2-Hexanone	ug/Kg	0.77 U	0.77 U	0.99 U	0.99 U	0.99 U	0.99 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	0.83 U	0.83 U	1 U	1 U	1 U	1 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.58 U	0.58 U	0.92 U	0.92 U	0.92 U	0.92 U
75-09-2	Methylene Chloride	ug/Kg	0.99 U	0.99 U	0.24 U	0.24 U	0.24 U	0.24 U
100-42-5	Styrene	ug/Kg	0.15 U	0.15 U	0.18 U	0.18 U	0.18 U	0.18 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.25 U	0.25 U	0.34 U	0.34 U	0.34 U	0.34 U
127-18-4	Tetrachloroethene	ug/Kg	0.14 U	0.14 U	0.18 U	0.18 U	0.18 U	0.18 U
108-88-3	Toluene	ug/Kg	0.16 U	0.16 U	0.18 U	0.18 U	0.18 U	0.18 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.23 U	0.23 U	0.17 U	0.17 U	0.17 U	0.17 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.32 U	0.32 U	0.24 U	0.24 U	0.24 U	0.24 U
79-01-6	Trichloroethene	ug/Kg	0.2 U	0.2 U	0.13 U	0.13 U	0.13 U	0.13 U
75-01-4	Vinyl chloride	ug/Kg	0.23 U	0.23 U	0.16 U	0.16 U	0.16 U	0.16 U
1330-20-7	Xylenes, Total	ug/Kg	0.33 U	0.33 U	0.55 U	0.55 U	0.55 U	0.55 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	MC01	MC3	P14	P16	P6	P8
		Sample ID:	MC01-TB01-080621	MC3-EB01-080621	P14-EB01-000.0-070911	P16-TB01-000.0-070911	P6-EB01-000.0-070911	P8-TB01-000.0-070911
		Lab Sample Id:	500-12177-12	500-12177-11	500-6487-2	500-6487-1	500-6489-10	500-6489-11
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	12177	12177	6487	6487	6489	6489
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	6/21/2008	6/21/2008	9/11/2007	9/11/2007	9/11/2007	9/11/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	MC01	MC3	P14	P16	P6	P8
		Sample ID:	MC01-TB01-080621	MC3-EB01-080621	P14-EB01-000.0-070911	P16-TB01-000.0-070911	P6-EB01-000.0-070911	P8-TB01-000.0-070911
		Lab Sample Id:	500-12177-12	500-12177-11	500-6487-2	500-6487-1	500-6489-10	500-6489-11
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	12177	12177	6487	6487	6489	6489
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	6/21/2008	6/21/2008	9/11/2007	9/11/2007	9/11/2007	9/11/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	SEMIVOLATILES							
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	MC01	MC3	P14	P16	P6	P8
		Sample ID:	MC01-TB01-080621	MC3-EB01-080621	P14-EB01-000.0-070911	P16-TB01-000.0-070911	P6-EB01-000.0-070911	P8-TB01-000.0-070911
		Lab Sample Id:	500-12177-12	500-12177-11	500-6487-2	500-6487-1	500-6489-10	500-6489-11
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	12177	12177	6487	6487	6489	6489
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	6/21/2008	6/21/2008	9/11/2007	9/11/2007	9/11/2007	9/11/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	PESTICIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	R17	T10	T14
		Sample ID:	R17-TB01-000.0-070910	T10-EB01-070914	T14-TB01-000.0-070910
		Lab Sample Id:	500-6458-13	500-6582-3	500-6457-12
		Depth:	NA	NA	NA
		SDG:	6458	6582	6457
		Matrix:	Water	Water	Water
		Sampled:	9/10/2007	9/14/2007	9/10/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L
	VOLATILES				
67-64-1	Acetone	ug/Kg	1.4 U	1.4 U	1.4 U
71-43-2	Benzene	ug/Kg	0.23 U	0.23 U	0.23 U
75-27-4	Bromodichloromethane	ug/Kg	0.22 U	0.22 U	0.22 U
75-25-2	Bromoform	ug/Kg	0.32 U	0.32 U	0.32 U
74-83-9	Bromomethane	ug/Kg	0.59 U	0.59 U	0.59 U
75-15-0	Carbon disulfide	ug/Kg	0.15 U	0.15 U	0.15 U
56-23-5	Carbon tetrachloride	ug/Kg	0.34 U	0.34 U	0.34 U
108-90-7	Chlorobenzene	ug/Kg	0.15 U	0.15 U	0.15 U
75-00-3	Chloroethane	ug/Kg	0.32 U	0.32 U	0.32 U
67-66-3	Chloroform	ug/Kg	0.14 U	0.14 U	0.14 U
74-87-3	Chloromethane	ug/Kg	0.2 U	0.2 U	0.2 U
124-48-1	Dibromochloromethane	ug/Kg	0.22 U	0.22 U	0.22 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.15 U	0.15 U	0.15 U
107-06-2	1,2-Dichloroethane	ug/Kg	0.25 U	0.25 U	0.25 U
75-35-4	1,1-Dichloroethene	ug/Kg	0.25 U	0.25 U	0.25 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	0.34 U	0.34 U	0.34 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.15 U	0.15 U	0.15 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.16 U	0.16 U	0.16 U
100-41-4	Ethylbenzene	ug/Kg	0.21 U	0.21 U	0.21 U
591-78-6	2-Hexanone	ug/Kg	0.99 U	0.99 U	0.99 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	1 U	1 U	1 U
108-10-1	methyl isobutyl ketone	ug/Kg	0.92 U	0.92 U	0.92 U
75-09-2	Methylene Chloride	ug/Kg	0.24 U	0.24 U	0.24 U
100-42-5	Styrene	ug/Kg	0.18 U	0.18 U	0.18 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	0.34 U	0.34 U	0.34 U
127-18-4	Tetrachloroethene	ug/Kg	0.18 U	0.18 U	0.18 U
108-88-3	Toluene	ug/Kg	0.18 U	0.18 U	0.18 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.17 U	0.17 U	0.17 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	0.24 U	0.24 U	0.24 U
79-01-6	Trichloroethene	ug/Kg	0.13 U	0.13 U	0.13 U
75-01-4	Vinyl chloride	ug/Kg	0.16 U	0.16 U	0.16 U
1330-20-7	Xylenes, Total	ug/Kg	0.55 U	0.55 U	0.55 U

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	R17	T10	T14
		Sample ID:	R17-TB01-000.0-070910	T10-EB01-070914	T14-TB01-000.0-070910
		Lab Sample Id:	500-6458-13	500-6582-3	500-6457-12
		Depth:	NA	NA	NA
		SDG:	6458	6582	6457
		Matrix:	Water	Water	Water
		Sampled:	9/10/2007	9/14/2007	9/10/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L
	SEMIVOLATILES				
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	R17	T10	T14
		Sample ID:	R17-TB01-000.0-070910	T10-EB01-070914	T14-TB01-000.0-070910
		Lab Sample Id:	500-6458-13	500-6582-3	500-6457-12
		Depth:	NA	NA	NA
		SDG:	6458	6582	6457
		Matrix:	Water	Water	Water
		Sampled:	9/10/2007	9/14/2007	9/10/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L
	SEMIVOLATILES				
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA

Table AI.1
Task 1 - Soil Investigation Analytical Data

		Location:	R17	T10	T14
		Sample ID:	R17-TB01-000.0-070910	T10-EB01-070914	T14-TB01-000.0-070910
		Lab Sample Id:	500-6458-13	500-6582-3	500-6457-12
		Depth:	NA	NA	NA
		SDG:	6458	6582	6457
		Matrix:	Water	Water	Water
		Sampled:	9/10/2007	9/14/2007	9/10/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L
	PESTICIDES				
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA
	PCBs				
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA
	METALS				
7440-38-2	Arsenic	mg/Kg	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA

Table AI.2
Task 2b - Groundwater Data in Overburden North of Boeuf Lutheran Road

		Location:	CSE04	CSE04	CSE05	CSE06	CSE07
		Sample ID:	CSE04-GW01-042.0-090415	CSE04-TB01-090415	CSE05-GW01-039.4-090415	CSE06-GW01-032.5-090416	CSE07-GW01-029.5-090416
		Lab Sample Id:	500-18318-1	500-18318-2	500-18318-3	500-18318-4	500-18318-5
		Depth:	42	NA	39.4	32.5	29.5
		SDG:	18318	18318	18318	18318	18318
		Matrix:	Water	Water	Water	Water	Water
		Sampled:	4/15/2009	4/15/2009	4/15/2009	4/16/2009	4/16/2009
	COMPOUND	UNITS:					
	VOLATILES						
67-64-1	Acetone	ug/L	12 R	1.2 R	24 R	5.4 J	6 R
71-43-2	Benzene	ug/L	1.6 U	0.16 U	3.2 U	0.16 U	0.8 U
75-27-4	Bromodichloromethane	ug/L	1.8 U	0.18 U	3.6 U	0.18 U	0.9 U
75-25-2	Bromoform	ug/L	3 U	0.3 U	6 U	0.3 U	1.5 U
74-83-9	Bromomethane	ug/L	4.4 U	0.44 U	8.8 U	0.44 U	2.2 U
75-15-0	Carbon disulfide	ug/L	3.9 U	0.39 U	7.8 U	0.39 U	2 U
56-23-5	Carbon tetrachloride	ug/L	2.1 U	0.21 U	4.2 U	0.21 U	1 U
108-90-7	Chlorobenzene	ug/L	1.7 U	0.17 U	3.4 U	0.17 U	0.85 U
75-00-3	Chloroethane	ug/L	4.5 U	0.45 U	9 U	0.45 U	2.2 U
67-66-3	Chloroform	ug/L	1.3 U	0.13 U	2.6 U	0.13 U	0.65 U
74-87-3	Chloromethane	ug/L	3.3 U	0.33 U	6.6 U	0.33 U	1.6 U
124-48-1	Dibromochloromethane	ug/L	1.9 U	0.19 U	3.8 U	0.19 U	0.95 U
75-34-3	1,1-Dichloroethane	ug/L	1.8 U	0.18 U	3.6 U	0.18 U	0.9 U
107-06-2	1,2-Dichloroethane	ug/L	2.2 U	0.22 U	4.4 U	0.22 U	1.1 U
75-35-4	1,1-Dichloroethene	ug/L	2.2 U	0.22 U	4.4 U	0.22 U	1.1 U
540-59-0	1,2-Dichloroethene, Total	ug/L	32	0.3 U	64	8.4	9
78-87-5	1,2-Dichloropropane	ug/L	2.3 U	0.23 U	4.6 U	0.23 U	1.2 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	1.6 U	0.16 U	3.2 U	0.16 U	0.8 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	1.3 U	0.13 U	2.6 U	0.13 U	0.65 U
100-41-4	Ethylbenzene	ug/L	1.7 U	0.17 U	3.4 U	0.17 U	0.85 U
591-78-6	2-Hexanone	ug/L	7.7 U	0.77 U	15 U	0.77 U	3.8 U
78-93-3	Methyl Ethyl Ketone	ug/L	8.3 U	0.83 U	17 U	0.83 U	4.2 U
108-10-1	methyl isobutyl ketone	ug/L	5.8 U	0.58 U	12 U	0.58 U	2.9 U
75-09-2	Methylene Chloride	ug/L	9.9 U	0.99 U	20 U	0.99 U	5 U
100-42-5	Styrene	ug/L	1.5 U	0.15 U	3 U	0.15 U	0.75 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	2.5 U	0.25 U	5 U	0.25 U	1.2 U
127-18-4	Tetrachloroethene	ug/L	1500 +	0.14 U	2800 +	590 +	710 +
108-88-3	Toluene	ug/L	1.6 U	0.16 U	3.2 U	0.16 U	0.8 U
71-55-6	1,1,1-Trichloroethane	ug/L	2.3 U	0.23 U	4.6 U	0.23 U	1.2 U
79-00-5	1,1,2-Trichloroethane	ug/L	3.2 U	0.32 U	6.4 U	0.32 U	1.6 U
79-01-6	Trichloroethene	ug/L	63	0.2 U	220	46	47
75-01-4	Vinyl chloride	ug/L	2.3 U	0.23 U	4.6 U	0.23 U	1.2 U
1330-20-7	Xylenes, Total	ug/L	3.3 U	0.33 U	6.6 U	0.33 U	1.6 U

Table AI.2
Task 2b - Groundwater Data in Overburden North of Boeuf Lutheran Road

		Location:	CSE07	CSE08	CSE10	CSE10	CSE11
		Sample ID:	CSE07-GW02-029.5-090416	CSE08-GW01-012.3-090417	CSE10-GW01-005.2-090417	CSE10-TB01-090417	CSE11-GW01-004.5-090416
		Lab Sample Id:	500-18318-6	500-18367-3	500-18367-2	500-18367-1	500-18318-7
		Depth:	29.5	12.3	5.2	NA	4.5
		SDG:	18318	18367	18367	18367	18318
		Matrix:	Water	Water	Water	Water	Water
		Sampled:	4/16/2009	4/17/2009	4/17/2009	4/17/2009	4/16/2009
	COMPOUND	UNITS:					
	VOLATILES						
67-64-1	Acetone	ug/L	1.2 R	6 R	1.2 R	1.2 R	1.2 R
71-43-2	Benzene	ug/L	0.16 U	0.8 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.9 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	1.5 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	2.2 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	2 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	1 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.85 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	2.2 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.65 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	1.6 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.95 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.9 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	1.1 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	1.1 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	11	27	0.3 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	1.2 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.8 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.65 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.85 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	3.8 U	0.77 U	0.77 U	0.77 U
78-93-3	Methyl Ethyl Ketone	ug/L	0.83 U	4.2 U	0.83 U	0.83 U	0.83 U
108-10-1	methyl isobutyl ketone	ug/L	0.58 U	2.9 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	5 U	0.99 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.75 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	870 +	560 +	0.14 U	0.14 U	0.14 U
108-88-3	Toluene	ug/L	0.16 U	0.8 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	1.2 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	1.6 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	65	95	0.2 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	1.2 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	1.6 U	0.33 U	0.33 U	0.33 U

Table AI.2
Task 2b - Groundwater Data in Overburden North of Boeuf Lutheran Road

		Location:	CSE12	CSN01	CSN06	CSN2	CSN2
		Sample ID:	CSE12-GW01-006.0-090416	CSN01-GW01-027.4-090417	CSN06-GW01-033.7-090417	CSN2-GW01-008.0-080514	CSN2-GW01-027.4-080515
		Lab Sample Id:	500-18318-8	500-18367-5	500-18367-4	500-11381-1	500-11379-6
		Depth:	6	27.4	33.7	8	27.4
		SDG:	18318	18367	18367	11381	11379
		Matrix:	Water	Water	Water	Water	Water
		Sampled:	4/16/2009	4/17/2009	4/17/2009	5/14/2008	5/14/2008
	COMPOUND	UNITS:					
	VOLATILES						
67-64-1	Acetone	ug/L	10 J	6 R	6 R	11	35 J+
71-43-2	Benzene	ug/L	0.16 U	0.8 U	0.8 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.9 U	0.9 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	1.5 U	1.5 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	2.2 U	2.2 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	2 U	2 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	1 U	1 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.85 U	0.85 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	2.2 U	2.2 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.65 U	0.65 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	1.6 U	1.6 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.95 U	0.95 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.9 U	0.9 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	1.1 U	1.1 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	1.1 U	1.1 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	31	9.6	0.3 U	4.2 +
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	1.2 U	1.2 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.8 U	0.8 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.65 U	0.65 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.85 U	0.85 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	3.8 U	3.8 U	0.77 U	0.77 U
78-93-3	Methyl Ethyl Ketone	ug/L	0.83 U	4.2 U	4.2 U	0.83 U	0.83 U
108-10-1	methyl isobutyl ketone	ug/L	0.58 U	2.9 U	2.9 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	5 U	5 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.75 U	0.75 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	1.2 U	1.2 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	1.2	720 +	770 +	0.14 U	170 +
108-88-3	Toluene	ug/L	0.16 U	0.8 U	0.8 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	1.2 U	1.2 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	1.6 U	1.6 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	80	56	0.2 U	17 +
75-01-4	Vinyl chloride	ug/L	0.23 U	1.2 U	1.2 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	1.6 U	1.6 U	0.33 U	0.33 U

Table AI.2
Task 2b - Groundwater Data in Overburden North of Boeuf Lutheran Road

		Location:	CSN2	CSN3	CSN3	CSN4	CSN5
		Sample ID:	CSN2-GW02-027.4-080514	CSN3-GW01-016.0-080515	CSN3-GW01-025.7-080515	CSN4-GW01-026.8-080515	CSN5-GW01-027.0-080516
		Lab Sample Id:	500-11379-4	500-11381-2	500-11379-7	500-11379-5	500-11402-2
		Depth:	27.4	16	25.7	26.8	27
		SDG:	11379	11381	11379	11379	11402
		Matrix:	Water	Water	Water	Water	Water
		Sampled:	5/14/2008	5/15/2008	5/15/2008	5/15/2008	5/16/2008
	COMPOUND	UNITS:					
	VOLATILES						
67-64-1	Acetone	ug/L	1.2 U	1.2 U	1.2 U	5.6 +	12
71-43-2	Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 UJ
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	3.1 +	0.3 U	0.3 U	8.1 +	11
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U
78-93-3	Methyl Ethyl Ketone	ug/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
108-10-1	methyl isobutyl ketone	ug/L	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	300 +	0.14 U	52	260 +	780 +
108-88-3	Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	15 +	0.2 U	4.4	34 +	70
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U

Table AI.2
Task 2b - Groundwater Data in Overburden North of Boeuf Lutheran Road

		Location:	CSN5	MW6
		Sample ID:	CSN5-TB01-080516	MW6-TB01-080514
		Lab Sample Id:	500-11402-1	500-11379-8
		Depth:	NA	NA
		SDG:	11402	11379
		Matrix:	Water	Water
		Sampled:	5/16/2008	5/14/2008
	COMPOUND	UNITS:		
	VOLATILES			
67-64-1	Acetone	ug/L	1.2 U	1.2 U
71-43-2	Benzene	ug/L	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 UJ	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U
78-93-3	Methyl Ethyl Ketone	ug/L	0.83 U	0.83 U
108-10-1	methyl isobutyl ketone	ug/L	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	0.14 U	0.14 U
108-88-3	Toluene	ug/L	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	DM21	JS07	JS07	JS10	JS10	JS11
		Sample ID:	DM21-GW01-080306	JS07-GW01-080306	JS07-TB01-080306	JS10-GW01-080311	JS10-GW02-080311	JS11-GW01-080306
		Lab Sample Id:	500-9940-5	500-9940-2	500-9940-1	500-9986-5	500-9986-6	500-9940-3
		Depth:	NA	415	NA	NA	NA	NA
		SDG:	9940	9940	9940	9986	9986	9940
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/6/2008	3/6/2008	3/6/2008	3/11/2008	3/11/2008	3/6/2008
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
71-43-2	Benzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
108-86-1	Bromobenzene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-97-5	Bromochloromethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
75-27-4	Bromodichloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-25-2	Bromoform	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
74-83-9	Bromomethane	ug/L	0.49 R	0.49 R	0.49 R	0.49 R	0.49 R	0.49 R
104-51-8	n-Butylbenzene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
135-98-8	sec-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
98-06-6	tert-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
56-23-5	Carbon tetrachloride	ug/L	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
108-90-7	Chlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-00-3	Chloroethane	ug/L	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
67-66-3	Chloroform	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
74-87-3	Chloromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
95-49-8	2-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
106-43-4	4-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
124-48-1	Chlorodibromomethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
96-12-8	1,2-Dibromo-3-Chloropropane	ug/L	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
106-93-4	1,2-Dibromoethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
74-95-3	Dibromomethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-71-8	Dichlorodifluoromethane	ug/L	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
95-50-1	1,2-Dichlorobenzene	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
541-73-1	1,3-Dichlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
106-46-7	1,4-Dichlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-34-3	1,1-Dichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
107-06-2	1,2-Dichloroethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-35-4	1,1-Dichloroethene	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
156-59-2	cis-1,2-Dichloroethene	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
156-60-5	trans-1,2-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
563-58-6	1,1-Dichloropropene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
78-87-5	1,2-Dichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
594-20-7	2,2-Dichloropropane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
142-28-9	1,3-Dichloropropane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
100-41-4	Ethylbenzene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
87-68-3	Hexachlorobutadiene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
98-82-8	Isopropylbenzene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
99-87-6	4-Isopropyltoluene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1634-04-4	Methyl tert-butyl ether	ug/L	0.13 U	0.13 U	0.13 U	0.16 J	0.16 J	0.13 U
75-09-2	Methylene Chloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
91-20-3	Naphthalene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
103-65-1	N-Propylbenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	DM21	JS07	JS07	JS10	JS10	JS11
		Sample ID:	DM21-GW01-080306	JS07-GW01-080306	JS07-TB01-080306	JS10-GW01-080311	JS10-GW02-080311	JS11-GW01-080306
		Lab Sample Id:	500-9940-5	500-9940-2	500-9940-1	500-9986-5	500-9986-6	500-9940-3
		Depth:	NA	415	NA	NA	NA	NA
		SDG:	9940	9940	9940	9986	9986	9940
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/6/2008	3/6/2008	3/6/2008	3/11/2008	3/11/2008	3/6/2008
	COMPOUND	UNITS:						
	VOLATILES							
100-42-5	Styrene	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
630-20-6	1,1,1,2-Tetrachloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
127-18-4	Tetrachloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
108-88-3	Toluene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
87-61-6	1,2,3-Trichlorobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
120-82-1	1,2,4-Trichlorobenzene	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
75-69-4	Trichlorofluoromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
96-18-4	1,2,3-Trichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
95-63-6	1,2,4-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
108-67-8	1,3,5-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-01-4	Vinyl chloride	ug/L	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
1330-20-7	Xylenes, Total	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	JS12	JS14	JS15	JS20	JS25	JS25
		Sample ID:	JS12-GW01-080311	JS14-INF-GW01-080228	JS15-GW01-080306	JS20-GW01-080306	JS25-GW01-080425	JS25-GW01-080527
		Lab Sample Id:	500-9986-9	500-9794-11	500-9940-6	500-9940-4	500-10929-1	500-11671-2
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	9986	9794	9940	9940	10929	11671
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/11/2008	2/28/2008	3/6/2008	3/6/2008	4/25/2008	5/27/2008
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
71-43-2	Benzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
108-86-1	Bromobenzene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-97-5	Bromochloromethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
75-27-4	Bromodichloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-25-2	Bromoform	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
74-83-9	Bromomethane	ug/L	0.49 R	0.49 R	0.49 R	0.49 R	0.49 R	0.49 R
104-51-8	n-Butylbenzene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
135-98-8	sec-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
98-06-6	tert-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
56-23-5	Carbon tetrachloride	ug/L	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
108-90-7	Chlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-00-3	Chloroethane	ug/L	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
67-66-3	Chloroform	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
74-87-3	Chloromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
95-49-8	2-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
106-43-4	4-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
124-48-1	Chlorodibromomethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
96-12-8	1,2-Dibromo-3-Chloropropane	ug/L	0.29 U	0.29 R	0.29 U	0.29 U	0.29 U	0.29 U
106-93-4	1,2-Dibromoethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
74-95-3	Dibromomethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-71-8	Dichlorodifluoromethane	ug/L	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
95-50-1	1,2-Dichlorobenzene	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
541-73-1	1,3-Dichlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
106-46-7	1,4-Dichlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-34-3	1,1-Dichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
107-06-2	1,2-Dichloroethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-35-4	1,1-Dichloroethene	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
156-59-2	cis-1,2-Dichloroethene	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
156-60-5	trans-1,2-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
563-58-6	1,1-Dichloropropene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
78-87-5	1,2-Dichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
594-20-7	2,2-Dichloropropane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
142-28-9	1,3-Dichloropropane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
100-41-4	Ethylbenzene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
87-68-3	Hexachlorobutadiene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
98-82-8	Isopropylbenzene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
99-87-6	4-Isopropyltoluene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1634-04-4	Methyl tert-butyl ether	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.21 J	0.13 U
75-09-2	Methylene Chloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
91-20-3	Naphthalene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
103-65-1	N-Propylbenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	JS12	JS14	JS15	JS20	JS25	JS25
		Sample ID:	JS12-GW01-080311	JS14-INF-GW01-080228	JS15-GW01-080306	JS20-GW01-080306	JS25-GW01-080425	JS25-GW01-080527
		Lab Sample Id:	500-9986-9	500-9794-11	500-9940-6	500-9940-4	500-10929-1	500-11671-2
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	9986	9794	9940	9940	10929	11671
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/11/2008	2/28/2008	3/6/2008	3/6/2008	4/25/2008	5/27/2008
	COMPOUND	UNITS:						
	VOLATILES							
100-42-5	Styrene	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
630-20-6	1,1,1,2-Tetrachloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
127-18-4	Tetrachloroethene	ug/L	0.22 U	37	0.22 U	0.22 U	21	0.22 U
108-88-3	Toluene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
87-61-6	1,2,3-Trichlorobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
120-82-1	1,2,4-Trichlorobenzene	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
75-69-4	Trichlorofluoromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.43	0.2 U	0.2 U	0.73	0.2 U
96-18-4	1,2,3-Trichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
95-63-6	1,2,4-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
108-67-8	1,3,5-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-01-4	Vinyl chloride	ug/L	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
1330-20-7	Xylenes, Total	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	JS25	JS27	JS29	JS33	JS33	JS36
		Sample ID:	JS25-TB01-080425	JS27-GW01-080409	JS29-GW01-080311	JS33-GW01-080311	JS33-TB01-080311	JS36-INF-GW01-080228
		Lab Sample Id:	500-10929-2	500-10541-6	500-9986-4	500-9986-2	500-9986-1	500-9794-2
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	10929	10541	9986	9986	9986	9794
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/25/2008	4/9/2008	3/11/2008	3/11/2008	3/11/2008	2/28/2008
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	2.1 UJQ	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
71-43-2	Benzene	ug/L	0.19 UJQ	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
108-86-1	Bromobenzene	ug/L	0.13 UJQ	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-97-5	Bromochloromethane	ug/L	0.27 UJQ	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
75-27-4	Bromodichloromethane	ug/L	0.19 UJQ	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-25-2	Bromoform	ug/L	0.17 UJQ	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
74-83-9	Bromomethane	ug/L	0.49 R	0.49 U	0.49 R	0.49 R	0.49 R	0.49 R
104-51-8	n-Butylbenzene	ug/L	0.14 UJQ	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
135-98-8	sec-Butylbenzene	ug/L	0.17 UJQ	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
98-06-6	tert-Butylbenzene	ug/L	0.17 UJQ	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
56-23-5	Carbon tetrachloride	ug/L	0.38 UJQ	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
108-90-7	Chlorobenzene	ug/L	0.19 UJQ	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-00-3	Chloroethane	ug/L	0.36 UJQ	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
67-66-3	Chloroform	ug/L	0.2 UJQ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
74-87-3	Chloromethane	ug/L	0.31 UJQ	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
95-49-8	2-Chlorotoluene	ug/L	0.18 UJQ	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
106-43-4	4-Chlorotoluene	ug/L	0.18 UJQ	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
124-48-1	Chlorodibromomethane	ug/L	0.16 UJQ	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
96-12-8	1,2-Dibromo-3-Chloropropane	ug/L	0.29 UJQ	0.29 R	0.29 U	0.29 U	0.29 U	0.29 R
106-93-4	1,2-Dibromoethane	ug/L	0.27 UJQ	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
74-95-3	Dibromomethane	ug/L	0.18 UJQ	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-71-8	Dichlorodifluoromethane	ug/L	0.46 UJQ	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
95-50-1	1,2-Dichlorobenzene	ug/L	0.23 UJQ	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
541-73-1	1,3-Dichlorobenzene	ug/L	0.19 UJQ	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
106-46-7	1,4-Dichlorobenzene	ug/L	0.17 UJQ	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-34-3	1,1-Dichloroethane	ug/L	0.23 UJQ	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
107-06-2	1,2-Dichloroethane	ug/L	0.19 UJQ	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-35-4	1,1-Dichloroethene	ug/L	0.24 UJQ	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
156-59-2	cis-1,2-Dichloroethene	ug/L	0.25 UJQ	0.25 U	0.25 U	0.25 U	0.25 U	2.2
156-60-5	trans-1,2-Dichloroethene	ug/L	0.22 UJQ	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
563-58-6	1,1-Dichloropropene	ug/L	0.19 UJQ	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
78-87-5	1,2-Dichloropropane	ug/L	0.22 UJQ	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
594-20-7	2,2-Dichloropropane	ug/L	0.33 UJQ	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
142-28-9	1,3-Dichloropropane	ug/L	0.19 UJQ	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 UJQ	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.21 UJQ	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
100-41-4	Ethylbenzene	ug/L	0.18 UJQ	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
87-68-3	Hexachlorobutadiene	ug/L	0.2 UJQ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
98-82-8	Isopropylbenzene	ug/L	0.15 UJQ	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
99-87-6	4-Isopropyltoluene	ug/L	0.15 UJQ	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1634-04-4	Methyl tert-butyl ether	ug/L	0.13 UJQ	0.13 U	0.15 J	0.13 U	0.13 U	0.13 U
75-09-2	Methylene Chloride	ug/L	0.21 UJQ	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
91-20-3	Naphthalene	ug/L	0.13 UJQ	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
103-65-1	N-Propylbenzene	ug/L	0.19 UJQ	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	JS25	JS27	JS29	JS33	JS33	JS36
		Sample ID:	JS25-TB01-080425	JS27-GW01-080409	JS29-GW01-080311	JS33-GW01-080311	JS33-TB01-080311	JS36-INF-GW01-080228
		Lab Sample Id:	500-10929-2	500-10541-6	500-9986-4	500-9986-2	500-9986-1	500-9794-2
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	10929	10541	9986	9986	9986	9794
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/25/2008	4/9/2008	3/11/2008	3/11/2008	3/11/2008	2/28/2008
	COMPOUND	UNITS:						
	VOLATILES							
100-42-5	Styrene	ug/L	0.3 UJQ	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
630-20-6	1,1,1,2-Tetrachloroethane	ug/L	0.2 UJQ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.15 UJQ	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
127-18-4	Tetrachloroethene	ug/L	0.22 UJ	0.7	0.22 U	0.22 U	0.22 U	280 +
108-88-3	Toluene	ug/L	0.21 UJQ	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
87-61-6	1,2,3-Trichlorobenzene	ug/L	0.12 UJQ	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
120-82-1	1,2,4-Trichlorobenzene	ug/L	0.1 UJQ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
75-69-4	Trichlorofluoromethane	ug/L	0.31 UJQ	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.16 UJQ	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.25 UJQ	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
79-01-6	Trichloroethene	ug/L	0.2 UJQ	0.2 U	0.2 U	0.2 U	0.2 U	5
96-18-4	1,2,3-Trichloropropane	ug/L	0.22 UJQ	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
95-63-6	1,2,4-Trimethylbenzene	ug/L	0.17 UJQ	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
108-67-8	1,3,5-Trimethylbenzene	ug/L	0.17 UJQ	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-01-4	Vinyl chloride	ug/L	0.29 UJQ	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
1330-20-7	Xylenes, Total	ug/L	0.44 UJQ	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	JS36	JS37	JS37	JS38	JS38	JS39
		Sample ID:	JS36-INF-GW02-080228	JS37-GW01-080314	JS37-GW02-080314	JS38-INF-GW01-080228	JS38-INF-GW02-080228	JS39-GW01-080409
		Lab Sample Id:	500-9794-3	500-10072-3	500-10072-4	500-9794-15	500-9794-16	500-10541-4
		Depth:	NA	297	NA	NA	NA	385
		SDG:	9794	10072	10072	9794	9794	10541
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	2/28/2008	3/14/2008	3/14/2008	2/28/2008	2/28/2008	4/9/2008
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	2.1 U	11 U	11 U	2.1 U	2.1 U	2.1 U
71-43-2	Benzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
108-86-1	Bromobenzene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-97-5	Bromochloromethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
75-27-4	Bromodichloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-25-2	Bromoform	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
74-83-9	Bromomethane	ug/L	0.49 R	0.49 U	0.49 U	0.49 R	0.49 R	0.49 U
104-51-8	n-Butylbenzene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
135-98-8	sec-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
98-06-6	tert-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
56-23-5	Carbon tetrachloride	ug/L	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
108-90-7	Chlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-00-3	Chloroethane	ug/L	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
67-66-3	Chloroform	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
74-87-3	Chloromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
95-49-8	2-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
106-43-4	4-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
124-48-1	Chlorodibromomethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
96-12-8	1,2-Dibromo-3-Chloropropane	ug/L	0.29 R	0.29 R	0.29 R	0.29 U	0.29 U	0.29 R
106-93-4	1,2-Dibromoethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
74-95-3	Dibromomethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-71-8	Dichlorodifluoromethane	ug/L	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
95-50-1	1,2-Dichlorobenzene	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
541-73-1	1,3-Dichlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
106-46-7	1,4-Dichlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-34-3	1,1-Dichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
107-06-2	1,2-Dichloroethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-35-4	1,1-Dichloroethene	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
156-59-2	cis-1,2-Dichloroethene	ug/L	2.4	1.1	0.92	0.25 U	0.25 U	0.25 U
156-60-5	trans-1,2-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
563-58-6	1,1-Dichloropropene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
78-87-5	1,2-Dichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
594-20-7	2,2-Dichloropropane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
142-28-9	1,3-Dichloropropane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
100-41-4	Ethylbenzene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
87-68-3	Hexachlorobutadiene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
98-82-8	Isopropylbenzene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
99-87-6	4-Isopropyltoluene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1634-04-4	Methyl tert-butyl ether	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
75-09-2	Methylene Chloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
91-20-3	Naphthalene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
103-65-1	N-Propylbenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	JS36	JS37	JS37	JS38	JS38	JS39
		Sample ID:	JS36-INF-GW02-080228	JS37-GW01-080314	JS37-GW02-080314	JS38-INF-GW01-080228	JS38-INF-GW02-080228	JS39-GW01-080409
		Lab Sample Id:	500-9794-3	500-10072-3	500-10072-4	500-9794-15	500-9794-16	500-10541-4
		Depth:	NA	297	NA	NA	NA	385
		SDG:	9794	10072	10072	9794	9794	10541
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	2/28/2008	3/14/2008	3/14/2008	2/28/2008	2/28/2008	4/9/2008
	COMPOUND	UNITS:						
	VOLATILES							
100-42-5	Styrene	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
630-20-6	1,1,1,2-Tetrachloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
127-18-4	Tetrachloroethene	ug/L	290 +	51 +	58 +	6.8	6.5	0.22 U
108-88-3	Toluene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
87-61-6	1,2,3-Trichlorobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
120-82-1	1,2,4-Trichlorobenzene	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
75-69-4	Trichlorofluoromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
79-01-6	Trichloroethene	ug/L	5.9	1 U	1.1 J	0.3	0.28	0.2 U
96-18-4	1,2,3-Trichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
95-63-6	1,2,4-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
108-67-8	1,3,5-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-01-4	Vinyl chloride	ug/L	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
1330-20-7	Xylenes, Total	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	JS40	JS41	JS42	JS43	JS44	JS44
		Sample ID:	JS40-GW01-080409	JS41-GW01-080528	JS42-GW01-080311	JS43-GW01-080514	JS44-GW01-080409	JS44-TB01-080409
		Lab Sample Id:	500-10541-5	500-11671-3	500-9986-7	500-11380-1	500-10541-2	500-10541-1
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	10541	11671	9986	11380	10541	10541
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/9/2008	5/28/2008	3/11/2008	5/14/2008	4/9/2008	4/9/2008
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
71-43-2	Benzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
108-86-1	Bromobenzene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-97-5	Bromochloromethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
75-27-4	Bromodichloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-25-2	Bromoform	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
74-83-9	Bromomethane	ug/L	0.49 U	0.49 R	0.49 R	0.49 R	0.49 U	0.49 U
104-51-8	n-Butylbenzene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
135-98-8	sec-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
98-06-6	tert-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
56-23-5	Carbon tetrachloride	ug/L	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
108-90-7	Chlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-00-3	Chloroethane	ug/L	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
67-66-3	Chloroform	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
74-87-3	Chloromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
95-49-8	2-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
106-43-4	4-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
124-48-1	Chlorodibromomethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
96-12-8	1,2-Dibromo-3-Chloropropane	ug/L	0.29 R	0.29 U	0.29 U	0.29 U	0.29 R	0.29 R
106-93-4	1,2-Dibromoethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
74-95-3	Dibromomethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-71-8	Dichlorodifluoromethane	ug/L	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
95-50-1	1,2-Dichlorobenzene	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
541-73-1	1,3-Dichlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
106-46-7	1,4-Dichlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-34-3	1,1-Dichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
107-06-2	1,2-Dichloroethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-35-4	1,1-Dichloroethene	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
156-59-2	cis-1,2-Dichloroethene	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
156-60-5	trans-1,2-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
563-58-6	1,1-Dichloropropene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
78-87-5	1,2-Dichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
594-20-7	2,2-Dichloropropane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
142-28-9	1,3-Dichloropropane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
100-41-4	Ethylbenzene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
87-68-3	Hexachlorobutadiene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
98-82-8	Isopropylbenzene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
99-87-6	4-Isopropyltoluene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1634-04-4	Methyl tert-butyl ether	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
75-09-2	Methylene Chloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
91-20-3	Naphthalene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
103-65-1	N-Propylbenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	JS40	JS41	JS42	JS43	JS44	JS44
		Sample ID:	JS40-GW01-080409	JS41-GW01-080528	JS42-GW01-080311	JS43-GW01-080514	JS44-GW01-080409	JS44-TB01-080409
		Lab Sample Id:	500-10541-5	500-11671-3	500-9986-7	500-11380-1	500-10541-2	500-10541-1
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	10541	11671	9986	11380	10541	10541
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/9/2008	5/28/2008	3/11/2008	5/14/2008	4/9/2008	4/9/2008
	COMPOUND	UNITS:						
	VOLATILES							
100-42-5	Styrene	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
630-20-6	1,1,1,2-Tetrachloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
127-18-4	Tetrachloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
108-88-3	Toluene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
87-61-6	1,2,3-Trichlorobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
120-82-1	1,2,4-Trichlorobenzene	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
75-69-4	Trichlorofluoromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
96-18-4	1,2,3-Trichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
95-63-6	1,2,4-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
108-67-8	1,3,5-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-01-4	Vinyl chloride	ug/L	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
1330-20-7	Xylenes, Total	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	JS45	JS47	JS50	JS50	JS51	JS52
		Sample ID:	JS45-GW01-080409	JS47-GW01-080311	JS50-GW01-080314	JS50-TB01-080314	JS51-GW01-080311	JS52-INF-GW01-080228
		Lab Sample Id:	500-10541-3	500-9986-8	500-10072-2	500-10072-1	500-9986-3	500-9794-7
		Depth:	NA	390	400	NA	NA	NA
		SDG:	10541	9986	10072	10072	9986	9794
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/9/2008	3/11/2008	3/14/2008	3/14/2008	3/11/2008	2/28/2008
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
71-43-2	Benzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
108-86-1	Bromobenzene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-97-5	Bromochloromethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
75-27-4	Bromodichloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-25-2	Bromoform	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
74-83-9	Bromomethane	ug/L	0.49 U	0.49 R	0.49 U	0.49 U	0.49 R	0.49 R
104-51-8	n-Butylbenzene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
135-98-8	sec-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
98-06-6	tert-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
56-23-5	Carbon tetrachloride	ug/L	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
108-90-7	Chlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-00-3	Chloroethane	ug/L	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
67-66-3	Chloroform	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
74-87-3	Chloromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
95-49-8	2-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
106-43-4	4-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
124-48-1	Chlorodibromomethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
96-12-8	1,2-Dibromo-3-Chloropropane	ug/L	0.29 R	0.29 U	0.29 R	0.29 R	0.29 U	0.29 R
106-93-4	1,2-Dibromoethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
74-95-3	Dibromomethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-71-8	Dichlorodifluoromethane	ug/L	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
95-50-1	1,2-Dichlorobenzene	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
541-73-1	1,3-Dichlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
106-46-7	1,4-Dichlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-34-3	1,1-Dichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
107-06-2	1,2-Dichloroethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-35-4	1,1-Dichloroethene	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
156-59-2	cis-1,2-Dichloroethene	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
156-60-5	trans-1,2-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
563-58-6	1,1-Dichloropropene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
78-87-5	1,2-Dichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
594-20-7	2,2-Dichloropropane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
142-28-9	1,3-Dichloropropane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
100-41-4	Ethylbenzene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
87-68-3	Hexachlorobutadiene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
98-82-8	Isopropylbenzene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
99-87-6	4-Isopropyltoluene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1634-04-4	Methyl tert-butyl ether	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
75-09-2	Methylene Chloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
91-20-3	Naphthalene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
103-65-1	N-Propylbenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	JS45	JS47	JS50	JS50	JS51	JS52
		Sample ID:	JS45-GW01-080409	JS47-GW01-080311	JS50-GW01-080314	JS50-TB01-080314	JS51-GW01-080311	JS52-INF-GW01-080228
		Lab Sample Id:	500-10541-3	500-9986-8	500-10072-2	500-10072-1	500-9986-3	500-9794-7
		Depth:	NA	390	400	NA	NA	NA
		SDG:	10541	9986	10072	10072	9986	9794
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/9/2008	3/11/2008	3/14/2008	3/14/2008	3/11/2008	2/28/2008
	COMPOUND	UNITS:						
	VOLATILES							
100-42-5	Styrene	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
630-20-6	1,1,1,2-Tetrachloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
127-18-4	Tetrachloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	5.3
108-88-3	Toluene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
87-61-6	1,2,3-Trichlorobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
120-82-1	1,2,4-Trichlorobenzene	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
75-69-4	Trichlorofluoromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.25
96-18-4	1,2,3-Trichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
95-63-6	1,2,4-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
108-67-8	1,3,5-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-01-4	Vinyl chloride	ug/L	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
1330-20-7	Xylenes, Total	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	MW13	MW2R	MW2R	PA53	PA55	W3
		Sample ID:	MW13-GW01-080409	MW2R-GW01-000.0-080228	MW2R-TB01-000.0-080228	PA53-GW01-080527	PA55-GW01-000.0-080228	W3-GW01-000_0-080229
		Lab Sample Id:	500-10541-7	500-9794-20	500-9794-22	500-11671-1	500-9794-21	500-9794-19
		Depth:	NA	369.8	NA	NA	387	NA
		SDG:	10541	9794	9794	11671	9794	9794
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/9/2008	2/28/2008	2/28/2008	5/27/2008	2/28/2008	2/29/2008
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
71-43-2	Benzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
108-86-1	Bromobenzene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-97-5	Bromochloromethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
75-27-4	Bromodichloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-25-2	Bromoform	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
74-83-9	Bromomethane	ug/L	0.49 U	0.49 R	0.49 U	0.49 R	0.49 U	0.49 R U
104-51-8	n-Butylbenzene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
135-98-8	sec-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
98-06-6	tert-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
56-23-5	Carbon tetrachloride	ug/L	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
108-90-7	Chlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-00-3	Chloroethane	ug/L	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
67-66-3	Chloroform	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
74-87-3	Chloromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
95-49-8	2-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
106-43-4	4-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
124-48-1	Chlorodibromomethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
96-12-8	1,2-Dibromo-3-Chloropropane	ug/L	0.29 R	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
106-93-4	1,2-Dibromoethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
74-95-3	Dibromomethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-71-8	Dichlorodifluoromethane	ug/L	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
95-50-1	1,2-Dichlorobenzene	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
541-73-1	1,3-Dichlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
106-46-7	1,4-Dichlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-34-3	1,1-Dichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
107-06-2	1,2-Dichloroethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-35-4	1,1-Dichloroethene	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
156-59-2	cis-1,2-Dichloroethene	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
156-60-5	trans-1,2-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
563-58-6	1,1-Dichloropropene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
78-87-5	1,2-Dichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
594-20-7	2,2-Dichloropropane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
142-28-9	1,3-Dichloropropane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
100-41-4	Ethylbenzene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
87-68-3	Hexachlorobutadiene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
98-82-8	Isopropylbenzene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
99-87-6	4-Isopropyltoluene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1634-04-4	Methyl tert-butyl ether	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
75-09-2	Methylene Chloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
91-20-3	Naphthalene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
103-65-1	N-Propylbenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U

Table AI.3
Task 2c - Residential Well Sampling Groundwater Data

		Location:	MW13	MW2R	MW2R	PA53	PA55	W3
		Sample ID:	MW13-GW01-080409	MW2R-GW01-000.0-080228	MW2R-TB01-000.0-080228	PA53-GW01-080527	PA55-GW01-000.0-080228	W3-GW01-000_0-080229
		Lab Sample Id:	500-10541-7	500-9794-20	500-9794-22	500-11671-1	500-9794-21	500-9794-19
		Depth:	NA	369.8	NA	NA	387	NA
		SDG:	10541	9794	9794	11671	9794	9794
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/9/2008	2/28/2008	2/28/2008	5/27/2008	2/28/2008	2/29/2008
	COMPOUND	UNITS:						
	VOLATILES							
100-42-5	Styrene	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
630-20-6	1,1,1,2-Tetrachloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
127-18-4	Tetrachloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
108-88-3	Toluene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
87-61-6	1,2,3-Trichlorobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
120-82-1	1,2,4-Trichlorobenzene	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
75-69-4	Trichlorofluoromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
96-18-4	1,2,3-Trichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
95-63-6	1,2,4-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
108-67-8	1,3,5-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-01-4	Vinyl chloride	ug/L	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
1330-20-7	Xylenes, Total	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	BW20	BW20	BW21A	BW21	BW22	BW22
		Sample ID:	BW20-GW01-090319	BW20-TB01-090319	BW21A-GW01-090318	BW21-GW01-090324	BW22-GW01-090324	BW22-TB01-090324
		Lab Sample Id	500-17729-1	500-17729-2	500-17702-3	500-17786-3	500-17786-2	500-17786-1
		Depth:	20	NA	52.5	440	260	NA
		SDG:	17729	17729	17702	17786	17786	17786
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/19/2009	3/19/2009	3/18/2009	3/24/2009	3/24/2009	3/24/2009
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1200 U	1.2 U	6 U	1.2 U	1.2 U	1.2 U
71-43-2	Benzene	ug/L	160 U	0.16 U	0.8 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	180 U	0.18 U	0.9 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	300 U	0.3 U	1.5 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	440 U	0.44 U	2.2 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	390 U	0.39 U	2 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	210 U	0.21 U	1 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	170 U	0.17 U	0.85 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	450 U	0.45 U	2.2 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	130 U	0.13 U	0.65 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	330 U	0.33 U	1.6 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	190 U	0.19 U	0.95 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	180 U	0.18 U	0.9 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	220 U	0.22 U	1.1 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	220 U	0.22 U	1.1 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	300 U	0.3 U	78	0.3 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	230 U	0.23 U	1.2 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	160 U	0.16 U	0.8 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	130 U	0.13 U	0.65 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	170 U	0.17 U	0.85 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	770 U	0.77 U	3.8 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	830 U	0.83 U	4.2 U	0.83 U	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	580 U	0.58 U	2.9 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	990 U	0.99 U	5 U	0.99 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	150 U	0.15 U	0.75 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	250 U	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	190000 +	0.14 U	810 +	0.14 U	0.14 U	0.14 U
108-88-3	Toluene	ug/L	160 U	0.16 U	0.8 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	230 U	0.23 U	1.2 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	320 U	0.32 U	1.6 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	200 U	0.2 U	150	0.2 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	230 U	0.23 U	1.2 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	330 U	0.33 U	1.6 U	0.33 U	0.33 U	0.33 U
	RISK 175							
74-84-0	Ethane	ug/L	0.35 U	NA	0.35 U	0.35 U	0.35 U	NA
74-85-1	Ethylene	ug/L	0.33 U	NA	0.33 U	0.33 U	0.33 U	NA
74-82-8	Methane	ug/L	0.26 J	NA	0.19 J	0.71 J	9.9 J	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	BW20	BW20	BW21A	BW21	BW22	BW22
		Sample ID:	BW20-GW01-090319	BW20-TB01-090319	BW21A-GW01-090318	BW21-GW01-090324	BW22-GW01-090324	BW22-TB01-090324
		Lab Sample Id	500-17729-1	500-17729-2	500-17702-3	500-17786-3	500-17786-2	500-17786-1
		Depth:	20	NA	52.5	440	260	NA
		SDG:	17729	17729	17702	17786	17786	17786
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/19/2009	3/19/2009	3/18/2009	3/24/2009	3/24/2009	3/24/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/L	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/L	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/L	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	BW20	BW20	BW21A	BW21	BW22	BW22
		Sample ID:	BW20-GW01-090319	BW20-TB01-090319	BW21A-GW01-090318	BW21-GW01-090324	BW22-GW01-090324	BW22-TB01-090324
		Lab Sample Id	500-17729-1	500-17729-2	500-17702-3	500-17786-3	500-17786-2	500-17786-1
		Depth:	20	NA	52.5	440	260	NA
		SDG:	17729	17729	17702	17786	17786	17786
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/19/2009	3/19/2009	3/18/2009	3/24/2009	3/24/2009	3/24/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/L	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/L	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/L	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/L	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	BW20	BW20	BW21A	BW21	BW22	BW22
		Sample ID:	BW20-GW01-090319	BW20-TB01-090319	BW21A-GW01-090318	BW21-GW01-090324	BW22-GW01-090324	BW22-TB01-090324
		Lab Sample Id	500-17729-1	500-17729-2	500-17702-3	500-17786-3	500-17786-2	500-17786-1
		Depth:	20	NA	52.5	440	260	NA
		SDG:	17729	17729	17702	17786	17786	17786
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/19/2009	3/19/2009	3/18/2009	3/24/2009	3/24/2009	3/24/2009
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/L	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/L	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/L	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/L	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/L	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/L	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/L	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/L	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/L	NA	NA	NA	NA	NA	NA
	OTHER							
7664-41-7	Ammonia (as N)	mg/L	1.3		0.2	0.29 U	0.12 U	
16887-00-6	Chloride	mg/L	64		44	1.9	2.8	
14797-55-8	Nitrogen, Nitrate	mg/L	3.3		1.1	0.02 U	0.18	
STL00217	Nitrogen, Nitrate Nitrite	mg/L	3.7		1.1	0.02 U	0.18	
14797-65-0	Nitrogen, Nitrite	mg/L	0.44		0.0042 U	0.0042 U	0.0042 U	
14808-79-8	Sulfate	mg/L	330		16	11	4.5	
18496-25-8	Sulfide	mg/L	0.31 J		1.5	0.31 U	0.31 U	

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	JS15	JS15	JS20	JS25	JS25	JS39
		Sample ID:	JS15-GW01-090422	JS15-TB01-090422	JS20-GW01-090325	JS25-GW01-090429	JS25-GW02-090429	JS39-GW01-090325
		Lab Sample Id	500-18415-1	500-18415-2	500-17843-3	500-18570-3	500-18570-4	500-17843-1
		Depth:	425	NA	NA	473	473	385
		SDG:	18415	18415	17843	18570	18570	17843
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/22/2009	4/22/2009	3/25/2009	4/29/2009	4/29/2009	3/25/2009
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.2 R	1.2 R	1.2 R	1.2 R	1.2 R	1.2 R
71-43-2	Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	0.14 U	0.14 U	0.14 U	7.1	7.9	0.14 U
108-88-3	Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
	RISK 175							
74-84-0	Ethane	ug/L	0.35 U	NA	0.35 U	0.35 U	0.35 U	0.35 U
74-85-1	Ethylene	ug/L	0.33 U	NA	0.33 U	0.33 U	0.33 U	0.33 U
74-82-8	Methane	ug/L	0.19 U	NA	0.25 J	0.19 U	0.19 U	0.35 J

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	JS15	JS15	JS20	JS25	JS25	JS39
		Sample ID:	JS15-GW01-090422	JS15-TB01-090422	JS20-GW01-090325	JS25-GW01-090429	JS25-GW02-090429	JS39-GW01-090325
		Lab Sample Id	500-18415-1	500-18415-2	500-17843-3	500-18570-3	500-18570-4	500-17843-1
		Depth:	425	NA	NA	473	473	385
		SDG:	18415	18415	17843	18570	18570	17843
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/22/2009	4/22/2009	3/25/2009	4/29/2009	4/29/2009	3/25/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/L	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/L	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/L	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	JS15	JS15	JS20	JS25	JS25	JS39
		Sample ID:	JS15-GW01-090422	JS15-TB01-090422	JS20-GW01-090325	JS25-GW01-090429	JS25-GW02-090429	JS39-GW01-090325
		Lab Sample Id	500-18415-1	500-18415-2	500-17843-3	500-18570-3	500-18570-4	500-17843-1
		Depth:	425	NA	NA	473	473	385
		SDG:	18415	18415	17843	18570	18570	17843
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/22/2009	4/22/2009	3/25/2009	4/29/2009	4/29/2009	3/25/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/L	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/L	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/L	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/L	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	JS15	JS15	JS20	JS25	JS25	JS39
		Sample ID:	JS15-GW01-090422	JS15-TB01-090422	JS20-GW01-090325	JS25-GW01-090429	JS25-GW02-090429	JS39-GW01-090325
		Lab Sample Id	500-18415-1	500-18415-2	500-17843-3	500-18570-3	500-18570-4	500-17843-1
		Depth:	425	NA	NA	473	473	385
		SDG:	18415	18415	17843	18570	18570	17843
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/22/2009	4/22/2009	3/25/2009	4/29/2009	4/29/2009	3/25/2009
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/L	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/L	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/L	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/L	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/L	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/L	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/L	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/L	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/L	NA	NA	NA	NA	NA	NA
	OTHER							
7664-41-7	Ammonia (as N)	mg/L	0.13 U		0.38	0.065 U	0.065 U	0.52
16887-00-6	Chloride	mg/L	2.6		2.4	80	72	1.8
14797-55-8	Nitrogen, Nitrate	mg/L	0.063 J		0.32	2.5	2.4	0.021 J
STL00217	Nitrogen, Nitrate Nitrite	mg/L	0.063 J		0.32	2.5	2.4	0.021 J
14797-65-0	Nitrogen, Nitrite	mg/L	0.0042 U		0.0042 U	0.011 J	0.013 J	0.0042 U
14808-79-8	Sulfate	mg/L	11		8.2	14	14	14
18496-25-8	Sulfide	mg/L	0.31 U		0.31 U	0.43 U	0.31 U	0.31 U

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	JS39	JS40	MW1S	MW1S	MW1S	MW1SW
		Sample ID:	JS39-TB01-090325	JS40-GW01-090325	MW1S-GW01-090316	MW1S-GW02-090316	MW1S-TB01-090316	MW1SW-GW01-090303
		Lab Sample Id	500-17843-2	500-17843-4	500-17651-2	500-17651-3	500-17651-5	500-17392-2
		Depth:	NA	NA	29.1	29.1	NA	111.2
		SDG:	17843	17843	17651	17651	17651	17392
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/25/2009	3/25/2009	3/16/2009	3/16/2009	3/16/2009	3/3/2009
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.2 R	1.2 R	12 R	12 R	1.2 R	1.2 R
71-43-2	Benzene	ug/L	0.16 U	0.16 U	1.6 U	1.6 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	1.8 U	1.8 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	3 U	3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	4.4 U	4.4 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	3.9 U	3.9 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	2.1 U	2.1 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	1.7 U	1.7 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	4.5 U	4.5 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	1.3 U	1.3 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	3.3 U	3.3 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	1.9 U	1.9 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	1.8 U	1.8 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	2.2 U	2.2 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	2.2 U	2.2 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U	40	41	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	2.3 U	2.3 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	1.6 U	1.6 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	1.3 U	1.3 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	1.7 U	1.7 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	7.7 U	7.7 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	0.83 U	8.3 U	8.3 U	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.58 U	5.8 U	5.8 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U	28	9.9 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	1.5 U	1.5 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	2.5 U	2.5 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	0.14 U	0.14 U	2000 +	2100 +	0.14 U	2.3
108-88-3	Toluene	ug/L	0.16 U	0.16 U	1.6 U	1.6 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	2.3 U	2.3 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	3.2 U	3.2 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	87	94	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U	2.3 U	2.3 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	3.3 U	3.3 U	0.33 U	0.33 U
	RISK 175							
74-84-0	Ethane	ug/L	NA	0.35 U	0.35 U	0.35 U	NA	0.35 U
74-85-1	Ethylene	ug/L	NA	0.33 U	0.33 U	0.33 U	NA	0.33 U
74-82-8	Methane	ug/L	NA	0.44 J	0.21 J	0.21 J	NA	0.44 J

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	JS39	JS40	MW1S	MW1S	MW1S	MW1SW
		Sample ID:	JS39-TB01-090325	JS40-GW01-090325	MW1S-GW01-090316	MW1S-GW02-090316	MW1S-TB01-090316	MW1SW-GW01-090303
		Lab Sample Id	500-17843-2	500-17843-4	500-17651-2	500-17651-3	500-17651-5	500-17392-2
		Depth:	NA	NA	29.1	29.1	NA	111.2
		SDG:	17843	17843	17651	17651	17651	17392
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/25/2009	3/25/2009	3/16/2009	3/16/2009	3/16/2009	3/3/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	NA	0.057 U	0.058 U	NA	NA
208-96-8	Acenaphthylene	ug/L	NA	NA	0.057 U	0.058 U	NA	NA
120-12-7	Anthracene	ug/L	NA	NA	0.067 U	0.068 U	NA	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	0.065 U	0.066 U	NA	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	0.043 U	0.044 U	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	0.041 U	0.042 U	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	0.11 U	0.11 U	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	0.077 U	0.079 U	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	0.14 U	0.14 U	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	0.24 U	0.24 U	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	1.9 U	1.9 U	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	0.16 U	0.16 U	NA	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	0.2 U	0.2 U	NA	NA
86-74-8	Carbazole	ug/L	NA	NA	0.8 U	0.82 U	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	2.4 U	2.4 U	NA	NA
106-47-8	4-Chloroaniline	ug/L	NA	NA	0.76 U	0.78 U	NA	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	0.17 U	0.17 U	NA	NA
95-57-8	2-Chlorophenol	ug/L	NA	NA	0.21 U	0.21 U	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	0.24 U	0.24 U	NA	NA
218-01-9	Chrysene	ug/L	NA	NA	0.067 U	0.068 U	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	0.056 U	0.057 U	NA	NA
132-64-9	Dibenzofuran	ug/L	NA	NA	0.24 U	0.24 U	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	0.2 U	0.2 U	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	0.21 U	0.21 U	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	0.2 U	0.2 U	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	0.25 U	0.25 U	NA	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	3.1 U	3.2 U	NA	NA
84-66-2	Diethyl phthalate	ug/L	NA	NA	0.2 U	0.2 U	NA	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	1.1 U	1.1 U	NA	NA
131-11-3	Dimethyl phthalate	ug/L	NA	NA	0.13 U	0.13 U	NA	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	0.63 U	0.64 U	NA	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	1.7 U	1.7 U	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	1.8 U	1.8 U	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	JS39	JS40	MW1S	MW1S	MW1S	MW1SW
		Sample ID:	JS39-TB01-090325	JS40-GW01-090325	MW1S-GW01-090316	MW1S-GW02-090316	MW1S-TB01-090316	MW1SW-GW01-090303
		Lab Sample Id	500-17843-2	500-17843-4	500-17651-2	500-17651-3	500-17651-5	500-17392-2
		Depth:	NA	NA	29.1	29.1	NA	111.2
		SDG:	17843	17843	17651	17651	17651	17392
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/25/2009	3/25/2009	3/16/2009	3/16/2009	3/16/2009	3/3/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	3 U	3.1 U	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	0.44 U	0.45 U	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	0.12 U	0.12 U	NA	NA
206-44-0	Fluoranthene	ug/L	NA	NA	0.067 U	0.068 U	NA	NA
86-73-7	Fluorene	ug/L	NA	NA	0.056 U	0.057 U	NA	NA
118-74-1	Hexachlorobenzene	ug/L	NA	NA	0.065 U	0.066 U	NA	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	0.25 U	0.25 U	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	4.3 U	4.4 U	NA	NA
67-72-1	Hexachloroethane	ug/L	NA	NA	0.25 U	0.25 U	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	0.071 U	0.072 U	NA	NA
78-59-1	Isophorone	ug/L	NA	NA	0.57 U	0.58 U	NA	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	0.16 U	0.16 U	NA	NA
95-48-7	2-Methylphenol	ug/L	NA	NA	0.42 U	0.43 U	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	0.19 U	0.19 U	NA	NA
91-20-3	Naphthalene	ug/L	NA	NA	0.098 U	0.1 U	NA	NA
88-74-4	2-Nitroaniline	ug/L	NA	NA	0.54 U	0.55 U	NA	NA
99-09-2	3-Nitroaniline	ug/L	NA	NA	0.98 U	1 U	NA	NA
100-01-6	4-Nitroaniline	ug/L	NA	NA	2.3 U	2.3 U	NA	NA
98-95-3	Nitrobenzene	ug/L	NA	NA	0.29 U	0.3 U	NA	NA
88-75-5	2-Nitrophenol	ug/L	NA	NA	0.63 U	0.64 U	NA	NA
100-02-7	4-Nitrophenol	ug/L	NA	NA	2.4 U	2.4 U	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	0.15 U	0.15 U	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	0.2 U	0.2 U	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	0.2 U	0.2 U	NA	NA
87-86-5	Pentachlorophenol	ug/L	NA	NA	2.1 U	2.1 U	NA	NA
85-01-8	Phenanthrene	ug/L	NA	NA	0.07 U	0.071 U	NA	NA
108-95-2	Phenol	ug/L	NA	NA	1.3 U	1.3 U	NA	NA
129-00-0	Pyrene	ug/L	NA	NA	0.07 U	0.071 U	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	0.24 U	0.24 U	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	2.5 U	2.6 U	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	0.66 U	0.67 U	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	JS39	JS40	MW1S	MW1S	MW1S	MW1SW
		Sample ID:	JS39-TB01-090325	JS40-GW01-090325	MW1S-GW01-090316	MW1S-GW02-090316	MW1S-TB01-090316	MW1SW-GW01-090303
		Lab Sample Id	500-17843-2	500-17843-4	500-17651-2	500-17651-3	500-17651-5	500-17392-2
		Depth:	NA	NA	29.1	29.1	NA	111.2
		SDG:	17843	17843	17651	17651	17651	17392
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/25/2009	3/25/2009	3/16/2009	3/16/2009	3/16/2009	3/3/2009
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/L	NA	NA	0.009 U	0.0093 U	NA	NA
72-55-9	4,4'-DDE	ug/L	NA	NA	0.0088 U	0.0091 U	NA	NA
50-29-3	4,4'-DDT	ug/L	NA	NA	0.0077 U	0.0079 U	NA	NA
309-00-2	Aldrin	ug/L	NA	NA	0.014 U	0.014 U	NA	NA
319-84-6	alpha-BHC	ug/L	NA	NA	0.011 U	0.011 U	NA	NA
319-85-7	beta-BHC	ug/L	NA	NA	0.015 U	0.015 U	NA	NA
319-86-8	delta-BHC	ug/L	NA	NA	0.013 U	0.013 U	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	0.0096 U	0.0099 U	NA	NA
5103-71-9	alpha-Chlordane	ug/L	NA	NA	0.0084 U	0.0086 U	NA	NA
5103-74-2	gamma-Chlordane	ug/L	NA	NA	0.0098 U	0.01 U	NA	NA
60-57-1	Dieldrin	ug/L	NA	NA	0.0076 U	0.0078 U	NA	NA
959-98-8	Endosulfan I	ug/L	NA	NA	0.0051 U	0.0052 U	NA	NA
33213-65-9	Endosulfan II	ug/L	NA	NA	0.0062 U	0.0064 U	NA	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	0.0088 U	0.009 U	NA	NA
72-20-8	Endrin	ug/L	NA	NA	0.0088 U	0.009 U	NA	NA
7421-93-4	Endrin aldehyde	ug/L	NA	NA	0.01 U	0.01 U	NA	NA
53494-70-5	Endrin ketone	ug/L	NA	NA	0.01 U	0.01 U	NA	NA
76-44-8	Heptachlor	ug/L	NA	NA	0.014 U	0.014 U	NA	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	0.0087 U	0.0089 U	NA	NA
72-43-5	Methoxychlor	ug/L	NA	NA	0.012 U	0.013 U	NA	NA
8001-35-2	Toxaphene	ug/L	NA	NA	0.17 U	0.17 U	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	NA	0.081 U	0.083 U	NA	NA
11104-28-2	PCB-1221	ug/L	NA	NA	0.15 U	0.15 U	NA	NA
11141-16-5	PCB-1232	ug/L	NA	NA	0.079 U	0.081 U	NA	NA
53469-21-9	PCB-1242	ug/L	NA	NA	0.077 U	0.079 U	NA	NA
12672-29-6	PCB-1248	ug/L	NA	NA	0.079 U	0.081 U	NA	NA
11097-69-1	PCB-1254	ug/L	NA	NA	0.062 U	0.063 U	NA	NA
11096-82-5	PCB-1260	ug/L	NA	NA	0.088 U	0.091 U	NA	NA
	METALS							
7440-38-2	Arsenic	mg/L	NA	NA	0.0028 U	0.0028 U	NA	NA
7440-39-3	Barium	mg/L	NA	NA	0.25	0.24	NA	NA
7440-43-9	Cadmium	mg/L	NA	NA	0.00046 U	0.00046 U	NA	NA
7440-47-3	Chromium	mg/L	NA	NA	0.0029 J	0.0033 J	NA	NA
7439-92-1	Lead	mg/L	NA	NA	0.0018 U	0.0018 U	NA	NA
7439-97-6	Mercury	ug/L	NA	NA	0.065 U	0.065 U	NA	NA
7782-49-2	Selenium	mg/L	NA	NA	0.0042 U	0.0042 U	NA	NA
7440-22-4	Silver	mg/L	NA	NA	0.0012 U	0.0012 U	NA	NA
7440-66-6	Zinc	mg/L	NA	NA	0.0036 U	0.0036 U	NA	NA
	OTHER							
7664-41-7	Ammonia (as N)	mg/L		0.093 U	0.31	0.22	NA	0.77
16887-00-6	Chloride	mg/L		4.8	24	23	NA	9.1 J
14797-55-8	Nitrogen, Nitrate	mg/L		0.02 U	1.1	2.3	NA	0.23
STL00217	Nitrogen, Nitrate Nitrite	mg/L		0.02 U	1.1	2.3	NA	0.23
14797-65-0	Nitrogen, Nitrite	mg/L		0.013 J	0.0042 U	0.0042 U	NA	0.0042 U
14808-79-8	Sulfate	mg/L		9.4	19	18	NA	5.6
18496-25-8	Sulfide	mg/L		0.31 U	0.31 U	0.31 U	NA	0.31 U

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW1T1	MW1T1	MW1UB	MW2R	MW2S	MW2S
		Sample ID:	MW1T1-GW01-090305	MW1T1-TB01-090305	MW1UB-GW01-090305	MW2R-GW01-090303	MW2S-GW01-090303	MW2S-GW02-090303
		Lab Sample Id	500-17448-1	500-17448-2	500-17448-3	500-17392-1	500-17392-3	500-17392-4
		Depth:	75.3	NA	43.6	369.8	20.4	20.4
		SDG:	17448	17448	17448	17392	17392	17392
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/5/2009	3/5/2009	3/5/2009	3/3/2009	3/3/2009	3/3/2009
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.2 U	1.2 U	12 U	1.2 R	1.2 R	1.2 R
71-43-2	Benzene	ug/L	0.16 U	0.16 U	1.6 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	1.8 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	4.4 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	3.9 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	2.1 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	1.7 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	4.5 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	1.3 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	3.3 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	1.9 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	1.8 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	2.2 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	2.2 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U	44	0.3 U	1.6 J	1.6 J
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	2.3 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	1.6 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	1.3 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	1.7 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	7.7 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	0.83 U	8.3 U	0.83 U	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.58 U	5.8 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U	9.9 U	0.99 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	1.5 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	2.5 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	1.6	0.14 U	1700 +	0.14 U	22	20
108-88-3	Toluene	ug/L	0.16 U	0.16 U	1.6 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	2.3 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	3.2 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	100	0.2 U	1.5	1.4
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U	2.3 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	3.3 U	0.33 U	0.33 U	0.33 U
	RISK 175							
74-84-0	Ethane	ug/L	0.35 U	NA	1.1	0.35 U	0.35 U	0.35 U
74-85-1	Ethylene	ug/L	0.33 U	NA	1.2	0.33 U	0.33 U	0.33 U
74-82-8	Methane	ug/L	0.31 J	NA	0.56 J	0.42 J	0.45 J	0.41 J

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW1T1	MW1T1	MW1UB	MW2R	MW2S	MW2S
		Sample ID:	MW1T1-GW01-090305	MW1T1-TB01-090305	MW1UB-GW01-090305	MW2R-GW01-090303	MW2S-GW01-090303	MW2S-GW02-090303
		Lab Sample Id	500-17448-1	500-17448-2	500-17448-3	500-17392-1	500-17392-3	500-17392-4
		Depth:	75.3	NA	43.6	369.8	20.4	20.4
		SDG:	17448	17448	17448	17392	17392	17392
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/5/2009	3/5/2009	3/5/2009	3/3/2009	3/3/2009	3/3/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/L	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/L	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/L	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW1T1	MW1T1	MW1UB	MW2R	MW2S	MW2S
		Sample ID:	MW1T1-GW01-090305	MW1T1-TB01-090305	MW1UB-GW01-090305	MW2R-GW01-090303	MW2S-GW01-090303	MW2S-GW02-090303
		Lab Sample I	500-17448-1	500-17448-2	500-17448-3	500-17392-1	500-17392-3	500-17392-4
		Depth:	75.3	NA	43.6	369.8	20.4	20.4
		SDG:	17448	17448	17448	17392	17392	17392
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/5/2009	3/5/2009	3/5/2009	3/3/2009	3/3/2009	3/3/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/L	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/L	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/L	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/L	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW1T1	MW1T1	MW1UB	MW2R	MW2S	MW2S
		Sample ID:	MW1T1-GW01-090305	MW1T1-TB01-090305	MW1UB-GW01-090305	MW2R-GW01-090303	MW2S-GW01-090303	MW2S-GW02-090303
		Lab Sample Id	500-17448-1	500-17448-2	500-17448-3	500-17392-1	500-17392-3	500-17392-4
		Depth:	75.3	NA	43.6	369.8	20.4	20.4
		SDG:	17448	17448	17448	17392	17392	17392
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/5/2009	3/5/2009	3/5/2009	3/3/2009	3/3/2009	3/3/2009
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/L	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/L	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/L	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/L	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/L	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/L	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/L	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/L	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/L	NA	NA	NA	NA	NA	NA
	OTHER							
7664-41-7	Ammonia (as N)	mg/L	0.048 U	NA	0.048 U	0.048 U	0.83	0.37
16887-00-6	Chloride	mg/L	1.8	NA	27	2.5 J	61 J	66 J
14797-55-8	Nitrogen, Nitrate	mg/L	0.065 J	NA	0.87	0.095 J	2.1	2.1
STL00217	Nitrogen, Nitrate Nitrite	mg/L	0.065 J	NA	0.87	0.095 J	2.1	2.1
14797-65-0	Nitrogen, Nitrite	mg/L	0.0042 U	NA	0.0042 U	0.0042 U	0.0042 U	0.0042 U
14808-79-8	Sulfate	mg/L	11	NA	25	4.5	20	23
18496-25-8	Sulfide	mg/L	0.31 U	NA	0.31 U	0.31 U	0.31 U	0.31 U

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW2S	MW2SW	MW2SW	MW2T2	MW2T3	MW4
		Sample ID:	MW2S-TB01-090303	MW2SW-GW01-090302	MW2SW-TB01-090302	MW2T2-GW01-090302	MW2T3-GW01-090302	MW4-GW01-090930
		Lab Sample Id	500-17392-5	500-17362-1	500-17362-4	500-17362-3	500-17362-2	500-21444-1
		Depth:	NA	56.3	NA	116	195	NA
		SDG:	17392	17362	17362	17362	17362	21444
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/3/2009	3/2/2009	3/2/2009	3/2/2009	3/2/2009	9/30/2009
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.2 R	1.2 U	1.2 U	1.2 U	1.2 U	6 U
71-43-2	Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.15 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.13 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.45 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.66 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.32 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.36 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.15 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.14 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.17 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.12 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.14 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.23 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.26 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.21 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.22 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	28
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.77 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.52 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.17 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.27 U
127-18-4	Tetrachloroethene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.2 U
108-88-3	Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.17 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.14 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.22 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.16 U
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.15 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.42 U
	RISK 175							
74-84-0	Ethane	ug/L	NA	0.35 U	NA	0.35 U	0.35 U	NA
74-85-1	Ethylene	ug/L	NA	0.33 U	NA	0.33 U	0.33 U	NA
74-82-8	Methane	ug/L	NA	0.88 J	NA	0.49 J	0.44 J	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW2S	MW2SW	MW2SW	MW2T2	MW2T3	MW4
		Sample ID:	MW2S-TB01-090303	MW2SW-GW01-090302	MW2SW-TB01-090302	MW2T2-GW01-090302	MW2T3-GW01-090302	MW4-GW01-090930
		Lab Sample Id	500-17392-5	500-17362-1	500-17362-4	500-17362-3	500-17362-2	500-21444-1
		Depth:	NA	56.3	NA	116	195	NA
		SDG:	17392	17362	17362	17362	17362	21444
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/3/2009	3/2/2009	3/2/2009	3/2/2009	3/2/2009	9/30/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/L	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/L	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/L	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW2S	MW2SW	MW2SW	MW2T2	MW2T3	MW4
		Sample ID:	MW2S-TB01-090303	MW2SW-GW01-090302	MW2SW-TB01-090302	MW2T2-GW01-090302	MW2T3-GW01-090302	MW4-GW01-090930
		Lab Sample Id	500-17392-5	500-17362-1	500-17362-4	500-17362-3	500-17362-2	500-21444-1
		Depth:	NA	56.3	NA	116	195	NA
		SDG:	17392	17362	17362	17362	17362	21444
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/3/2009	3/2/2009	3/2/2009	3/2/2009	3/2/2009	9/30/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/L	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/L	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/L	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/L	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW2S	MW2SW	MW2SW	MW2T2	MW2T3	MW4
		Sample ID:	MW2S-TB01-090303	MW2SW-GW01-090302	MW2SW-TB01-090302	MW2T2-GW01-090302	MW2T3-GW01-090302	MW4-GW01-090930
		Lab Sample Id	500-17392-5	500-17362-1	500-17362-4	500-17362-3	500-17362-2	500-21444-1
		Depth:	NA	56.3	NA	116	195	NA
		SDG:	17392	17362	17362	17362	17362	21444
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/3/2009	3/2/2009	3/2/2009	3/2/2009	3/2/2009	9/30/2009
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/L	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/L	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/L	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/L	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/L	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/L	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/L	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/L	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/L	NA	NA	NA	NA	NA	NA
	OTHER							
7664-41-7	Ammonia (as N)	mg/L	NA	0.27	NA	0.11 J	0.062 J	NA
16887-00-6	Chloride	mg/L	NA	2.1	NA	1.8	1.8	NA
14797-55-8	Nitrogen, Nitrate	mg/L	NA	0.02 U	NA	0.02 U	0.02 U	NA
STL00217	Nitrogen, Nitrate Nitrite	mg/L	NA	0.02 U	NA	0.02 U	0.02 U	NA
14797-65-0	Nitrogen, Nitrite	mg/L	NA	0.0042 U	NA	0.0042 U	0.0042 U	NA
14808-79-8	Sulfate	mg/L	NA	9.4	NA	8.5	12	NA
18496-25-8	Sulfide	mg/L	NA	0.31 U	NA	0.31 U	0.31 U	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW4	MW4	MW04A	MW04B	MW04B	MW5UB
		Sample ID:	MW4-TB01-090825	MW4-TB01-090930	MW04A-GW01-090514	MW04B-GW01-090514	MW04BS-GW01-090428	MW5UB-GW01-090312
		Lab Sample Id	500-20828-10	500-21444-2	500-18900-4	500-18900-3	500-18573-3	500-17605-1
		Depth:	NA	NA	28	130	NA	50.8
		SDG:	20828	21444	18900	18900	18573	17605
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	8/25/2009	9/30/2009	5/14/2009	5/14/2009	4/28/2009	3/12/2009
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.2 R	5.8 U	1.2 R	1.2 R	1.2 U	1.2 U
71-43-2	Benzene	ug/L	0.16 U	0.15 U	0.16 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.13 U	0.18 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.45 U	0.44 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.66 U	0.39 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.32 U	0.21 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.36 U	0.45 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.15 U	0.13 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.14 U	0.33 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.17 U	0.19 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.12 U	0.18 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.14 U	0.22 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.26 U	2.6	0.3 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.19 U	0.23 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.21 U	0.13 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.22 U	0.17 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	2.8 U	0.83 U	0.83 U	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.77 U	0.58 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.52 U	0.99 U	0.99 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.17 U	0.15 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.27 U	0.25 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	0.14 U	0.2 U	460 +	0.14 U	4.1	0.14 U
108-88-3	Toluene	ug/L	0.16 U	0.17 U	0.16 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.14 U	0.23 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.22 U	0.32 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.16 U	14	0.2 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	0.15 U	0.23 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.42 U	0.33 U	0.33 U	0.33 U	0.33 U
	RISK 175							
74-84-0	Ethane	ug/L	NA	NA	3.5 U	8.6	NA	0.35 U
74-85-1	Ethylene	ug/L	NA	NA	3.3 U	4	NA	0.33 U
74-82-8	Methane	ug/L	NA	NA	1.9 U	27	NA	0.23 J

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW4	MW4	MW04A	MW04B	MW04B	MW5UB
		Sample ID:	MW4-TB01-090825	MW4-TB01-090930	MW04A-GW01-090514	MW04B-GW01-090514	MW04BS-GW01-090428	MW5UB-GW01-090312
		Lab Sample Id	500-20828-10	500-21444-2	500-18900-4	500-18900-3	500-18573-3	500-17605-1
		Depth:	NA	NA	28	130	NA	50.8
		SDG:	20828	21444	18900	18900	18573	17605
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	8/25/2009	9/30/2009	5/14/2009	5/14/2009	4/28/2009	3/12/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/L	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/L	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/L	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW4	MW4	MW04A	MW04B	MW04B	MW5UB
		Sample ID:	MW4-TB01-090825	MW4-TB01-090930	MW04A-GW01-090514	MW04B-GW01-090514	MW04BS-GW01-090428	MW5UB-GW01-090312
		Lab Sample Id	500-20828-10	500-21444-2	500-18900-4	500-18900-3	500-18573-3	500-17605-1
		Depth:	NA	NA	28	130	NA	50.8
		SDG:	20828	21444	18900	18900	18573	17605
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	8/25/2009	9/30/2009	5/14/2009	5/14/2009	4/28/2009	3/12/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/L	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/L	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/L	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/L	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW4	MW4	MW04A	MW04B	MW04B	MW5UB
		Sample ID:	MW4-TB01-090825	MW4-TB01-090930	MW04A-GW01-090514	MW04B-GW01-090514	MW04BS-GW01-090428	MW5UB-GW01-090312
		Lab Sample Id	500-20828-10	500-21444-2	500-18900-4	500-18900-3	500-18573-3	500-17605-1
		Depth:	NA	NA	28	130	NA	50.8
		SDG:	20828	21444	18900	18900	18573	17605
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	8/25/2009	9/30/2009	5/14/2009	5/14/2009	4/28/2009	3/12/2009
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/L	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/L	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/L	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/L	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/L	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/L	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/L	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/L	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/L	NA	NA	NA	NA	NA	NA
	OTHER							
7664-41-7	Ammonia (as N)	mg/L	NA	NA	0.23	0.065 U	NA	0.17 J
16887-00-6	Chloride	mg/L	NA	NA	34	4.7	NA	13
14797-55-8	Nitrogen, Nitrate	mg/L	NA	NA	3.4	0.016 U	NA	0.94
STL00217	Nitrogen, Nitrate Nitrite	mg/L	NA	NA	3.4	0.016 U	NA	0.96
14797-65-0	Nitrogen, Nitrite	mg/L	NA	NA	0.002 U	0.002 U	NA	0.016 J
14808-79-8	Sulfate	mg/L	NA	NA	16	22	NA	11
18496-25-8	Sulfide	mg/L	NA	NA	0.31 U	0.31 U	NA	0.31 U

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW5UB	MW6R	MW6SW	MW6SW	MW6US	MW6US
		Sample ID:	MW5UB-TB01-090312	MW6R-GW01-090309	MW6SW-GW01-090310	MW6SW-TB01-090310	MW6US-GW01-090309	MW6US-TB01-090309
		Lab Sample Id	500-17605-2	500-17508-2	500-17534-1	500-17534-2	500-17508-1	500-17508-3
		Depth:	NA	450.8	141	NA	73	NA
		SDG:	17605	17508	17534	17534	17508	17508
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/12/2009	3/9/2009	3/10/2009	3/10/2009	3/9/2009	3/9/2009
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
71-43-2	Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
108-88-3	Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
	RISK 175							
74-84-0	Ethane	ug/L	NA	0.35 U	0.35 U	NA	0.35 U	NA
74-85-1	Ethylene	ug/L	NA	0.33 U	0.33 U	NA	0.33 U	NA
74-82-8	Methane	ug/L	NA	0.36 J	0.3 J	NA	0.31 J	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW5UB	MW6R	MW6SW	MW6SW	MW6US	MW6US
		Sample ID:	MW5UB-TB01-090312	MW6R-GW01-090309	MW6SW-GW01-090310	MW6SW-TB01-090310	MW6US-GW01-090309	MW6US-TB01-090309
		Lab Sample Id	500-17605-2	500-17508-2	500-17534-1	500-17534-2	500-17508-1	500-17508-3
		Depth:	NA	450.8	141	NA	73	NA
		SDG:	17605	17508	17534	17534	17508	17508
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/12/2009	3/9/2009	3/10/2009	3/10/2009	3/9/2009	3/9/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA	0.058 U	NA
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA	0.058 U	NA
120-12-7	Anthracene	ug/L	NA	NA	NA	NA	0.068 U	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA	0.066 U	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA	0.044 U	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA	0.042 U	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA	0.11 U	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA	0.079 U	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA	0.14 U	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA	0.24 U	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA	1.9 U	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA	0.16 U	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA	0.2 U	NA
86-74-8	Carbazole	ug/L	NA	NA	NA	NA	0.82 U	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA	2.4 U	NA
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA	0.78 U	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA	0.17 U	NA
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA	0.21 U	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA	0.24 U	NA
218-01-9	Chrysene	ug/L	NA	NA	NA	NA	0.068 U	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA	0.057 U	NA
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA	0.24 U	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA	0.2 U	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA	0.21 U	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA	0.2 U	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA	0.25 U	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA	3.2 U	NA
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA	0.2 U	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA	1.1 U	NA
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA	0.13 U	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA	0.64 U	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA	1.7 U	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA	1.8 U	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW5UB	MW6R	MW6SW	MW6SW	MW6US	MW6US
		Sample ID:	MW5UB-TB01-090312	MW6R-GW01-090309	MW6SW-GW01-090310	MW6SW-TB01-090310	MW6US-GW01-090309	MW6US-TB01-090309
		Lab Sample Id	500-17605-2	500-17508-2	500-17534-1	500-17534-2	500-17508-1	500-17508-3
		Depth:	NA	450.8	141	NA	73	NA
		SDG:	17605	17508	17534	17534	17508	17508
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/12/2009	3/9/2009	3/10/2009	3/10/2009	3/9/2009	3/9/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA	3.1 U	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	0.45 U	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	0.12 U	NA
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA	0.068 U	NA
86-73-7	Fluorene	ug/L	NA	NA	NA	NA	0.057 U	NA
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA	0.066 U	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA	0.25 U	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA	4.4 U	NA
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA	0.25 U	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA	0.072 U	NA
78-59-1	Isophorone	ug/L	NA	NA	NA	NA	0.58 U	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA	0.17 J	NA
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA	0.43 U	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA	0.19 U	NA
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA	0.29 J	NA
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA	0.55 U	NA
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA	1 U	NA
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA	2.3 U	NA
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA	0.3 U	NA
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA	0.64 U	NA
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA	2.4 U	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA	0.15 U	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA	0.2 U	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA	0.2 U	NA
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA	2.1 U	NA
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA	0.071 U	NA
108-95-2	Phenol	ug/L	NA	NA	NA	NA	1.3 U	NA
129-00-0	Pyrene	ug/L	NA	NA	NA	NA	0.071 U	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA	0.24 U	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA	2.6 U	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA	0.67 U	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW5UB	MW6R	MW6SW	MW6SW	MW6US	MW6US
		Sample ID:	MW5UB-TB01-090312	MW6R-GW01-090309	MW6SW-GW01-090310	MW6SW-TB01-090310	MW6US-GW01-090309	MW6US-TB01-090309
		Lab Sample Id	500-17605-2	500-17508-2	500-17534-1	500-17534-2	500-17508-1	500-17508-3
		Depth:	NA	450.8	141	NA	73	NA
		SDG:	17605	17508	17534	17534	17508	17508
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/12/2009	3/9/2009	3/10/2009	3/10/2009	3/9/2009	3/9/2009
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA	0.0089 U	NA
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA	0.0087 U	NA
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA	0.0075 U	NA
309-00-2	Aldrin	ug/L	NA	NA	NA	NA	0.014 U	NA
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA	0.011 U	NA
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA	0.015 U	NA
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA	0.013 U	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA	0.0094 U	NA
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA	0.0082 U	NA
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA	0.0096 U	NA
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA	0.0075 U	NA
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA	0.005 U	NA
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA	0.0061 U	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA	0.0086 U	NA
72-20-8	Endrin	ug/L	NA	NA	NA	NA	0.0086 U	NA
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA	0.0099 U	NA
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA	0.0098 U	NA
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA	0.014 U	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA	0.0085 U	NA
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA	0.012 U	NA
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA	0.17 U	NA
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA	0.13 U	NA
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA	0.14 U	NA
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA	0.069 U	NA
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA	0.12 U	NA
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA	0.16 U	NA
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA	0.11 U	NA
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA	0.096 U	NA
	METALS							
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA	0.0028 U	NA
7440-39-3	Barium	mg/L	NA	NA	NA	NA	0.096	NA
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA	0.00046 U	NA
7440-47-3	Chromium	mg/L	NA	NA	NA	NA	0.005 J	NA
7439-92-1	Lead	mg/L	NA	NA	NA	NA	0.0018 U	NA
7439-97-6	Mercury	ug/L	NA	NA	NA	NA	0.065 U	NA
7782-49-2	Selenium	mg/L	NA	NA	NA	NA	0.0042 U	NA
7440-22-4	Silver	mg/L	NA	NA	NA	NA	0.0012 U	NA
7440-66-6	Zinc	mg/L	NA	NA	NA	NA	0.014 U	NA
	OTHER							
7664-41-7	Ammonia (as N)	mg/L	NA	0.12 J	0.19 J	NA	0.077 J	NA
16887-00-6	Chloride	mg/L	NA	1.9	4.5	NA	3.8	NA
14797-55-8	Nitrogen, Nitrate	mg/L	NA	0.02 U	0.11	NA	0.098 J	NA
STL00217	Nitrogen, Nitrate Nitrite	mg/L	NA	0.02 U	0.11	NA	0.098 J	NA
14797-65-0	Nitrogen, Nitrite	mg/L	NA	0.0073 J	0.0042 U	NA	0.0042 U	NA
14808-79-8	Sulfate	mg/L	NA	13	6.7	NA	10	NA
18496-25-8	Sulfide	mg/L	NA	0.31 U	0.31 U	NA	0.31 U	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW7SW	MW7US	MW8US	MW9R	MW9R	MW9SW
		Sample ID:	MW7SW-GW01-090323	MW7US-GW01-090316	MW8US-GW01-090323	MW9R-GW01-090428	MW9R-TB01-090428	MW9SW-GW01-090312
		Lab Sample Id	500-17766-3	500-17651-1	500-17766-1	500-18570-2	500-18570-1	500-17605-3
		Depth:	94	26	95	421.2	NA	125
		SDG:	17766	17651	17766	18570	18570	17605
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/23/2009	3/16/2009	3/23/2009	4/28/2009	4/28/2009	3/12/2009
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.2 U	6 R	1.2 U	6.8 J	1.2 R	1.2 U
71-43-2	Benzene	ug/L	0.16 U	0.8 U	0.16 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.9 U	0.18 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	1.5 U	0.3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	2.2 U	0.44 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	2 U	0.39 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	1 U	0.21 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.85 U	0.17 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	2.2 U	0.45 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.65 U	0.13 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	1.6 U	0.33 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.95 U	0.19 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.9 U	0.18 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	1.1 U	0.22 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	1.1 U	0.22 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	38	0.3 U	0.3 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	1.2 U	0.23 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.8 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.65 U	0.13 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.85 U	0.17 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	3.8 U	0.77 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	4.2 U	0.83 U	46	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	2.9 U	0.58 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	5 U	0.99 U	0.99 U	0.99 U	5.2
100-42-5	Styrene	ug/L	0.15 U	0.75 U	0.15 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	0.14 U	750 +	0.14 U	0.14 U	0.14 U	2.4
108-88-3	Toluene	ug/L	0.16 U	0.8 U	0.16 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	1.2 U	0.23 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	1.6 U	0.32 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	140 J	0.2 U	0.2 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	1.2 U	0.23 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	1.6 U	0.33 U	0.33 U	0.33 U	0.33 U
	RISK 175							
74-84-0	Ethane	ug/L	0.37	0.35 U	0.35 U	0.35 U	NA	0.35 U
74-85-1	Ethylene	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	NA	0.33 U
74-82-8	Methane	ug/L	2.9 J	0.26 J	0.39 J	0.7	NA	0.37 J

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW7SW	MW7US	MW8US	MW9R	MW9R	MW9SW
		Sample ID:	MW7SW-GW01-090323	MW7US-GW01-090316	MW8US-GW01-090323	MW9R-GW01-090428	MW9R-TB01-090428	MW9SW-GW01-090312
		Lab Sample Id	500-17766-3	500-17651-1	500-17766-1	500-18570-2	500-18570-1	500-17605-3
		Depth:	94	26	95	421.2	NA	125
		SDG:	17766	17651	17766	18570	18570	17605
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/23/2009	3/16/2009	3/23/2009	4/28/2009	4/28/2009	3/12/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	0.057 U	0.055 U	NA	NA	NA
208-96-8	Acenaphthylene	ug/L	NA	0.057 U	0.055 U	NA	NA	NA
120-12-7	Anthracene	ug/L	NA	0.067 U	0.065 U	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	0.065 U	0.063 U	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	0.044 U	0.042 U	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	0.042 U	0.04 U	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	0.11 U	0.1 U	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	0.078 U	0.075 U	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	0.14 U	0.13 U	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	0.24 U	0.23 U	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	1.9 U	1.8 U	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	0.16 U	0.15 U	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	0.2 U	0.19 U	NA	NA	NA
86-74-8	Carbazole	ug/L	NA	0.81 U	0.78 U	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	2.4 U	2.3 U	NA	NA	NA
106-47-8	4-Chloroaniline	ug/L	NA	0.77 U	0.74 U	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	0.17 U	0.16 U	NA	NA	NA
95-57-8	2-Chlorophenol	ug/L	NA	0.21 U	0.2 U	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	0.24 U	0.23 U	NA	NA	NA
218-01-9	Chrysene	ug/L	NA	0.067 U	0.065 U	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	0.056 U	0.054 U	NA	NA	NA
132-64-9	Dibenzofuran	ug/L	NA	0.24 U	0.23 U	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	0.2 U	0.19 U	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	0.21 U	0.2 U	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	0.2 U	0.19 U	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	0.25 U	0.24 U	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	3.2 U	3 U	NA	NA	NA
84-66-2	Diethyl phthalate	ug/L	NA	0.2 U	0.19 U	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	1.1 U	1 U	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/L	NA	0.13 U	0.12 U	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	0.63 U	0.61 U	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	1.7 U	1.6 U	NA	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	1.8 U	1.7 U	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW7SW	MW7US	MW8US	MW9R	MW9R	MW9SW
		Sample ID:	MW7SW-GW01-090323	MW7US-GW01-090316	MW8US-GW01-090323	MW9R-GW01-090428	MW9R-TB01-090428	MW9SW-GW01-090312
		Lab Sample Id	500-17766-3	500-17651-1	500-17766-1	500-18570-2	500-18570-1	500-17605-3
		Depth:	94	26	95	421.2	NA	125
		SDG:	17766	17651	17766	18570	18570	17605
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/23/2009	3/16/2009	3/23/2009	4/28/2009	4/28/2009	3/12/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	3.1 U	3 U	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	0.45 U	0.43 U	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	0.12 U	0.11 U	NA	NA	NA
206-44-0	Fluoranthene	ug/L	NA	0.067 U	0.065 U	NA	NA	NA
86-73-7	Fluorene	ug/L	NA	0.056 U	0.054 U	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/L	NA	0.065 U	0.063 U	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	0.25 U	0.24 U	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	4.4 U	4.2 U	NA	NA	NA
67-72-1	Hexachloroethane	ug/L	NA	0.25 U	0.24 U	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	0.071 U	0.069 U	NA	NA	NA
78-59-1	Isophorone	ug/L	NA	0.57 U	0.55 U	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	0.16 U	0.15 U	NA	NA	NA
95-48-7	2-Methylphenol	ug/L	NA	0.43 U	0.41 U	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	0.19 U	0.18 U	NA	NA	NA
91-20-3	Naphthalene	ug/L	NA	0.099 U	0.095 U	NA	NA	NA
88-74-4	2-Nitroaniline	ug/L	NA	0.54 U	0.52 U	NA	NA	NA
99-09-2	3-Nitroaniline	ug/L	NA	0.99 U	0.95 U	NA	NA	NA
100-01-6	4-Nitroaniline	ug/L	NA	2.3 U	2.2 U	NA	NA	NA
98-95-3	Nitrobenzene	ug/L	NA	0.3 U	0.29 U	NA	NA	NA
88-75-5	2-Nitrophenol	ug/L	NA	0.63 U	0.61 U	NA	NA	NA
100-02-7	4-Nitrophenol	ug/L	NA	2.4 U	2.3 U	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	0.15 U	0.14 U	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	0.2 U	0.19 U	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	0.2 U	0.19 U	NA	NA	NA
87-86-5	Pentachlorophenol	ug/L	NA	2.1 U	2 U	NA	NA	NA
85-01-8	Phenanthrene	ug/L	NA	0.07 U	0.068 U	NA	NA	NA
108-95-2	Phenol	ug/L	NA	1.3 U	1.2 U	NA	NA	NA
129-00-0	Pyrene	ug/L	NA	0.07 U	0.068 U	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	0.24 U	0.23 U	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	2.6 U	2.5 U	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	0.66 U	0.64 U	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW7SW	MW7US	MW8US	MW9R	MW9R	MW9SW
		Sample ID:	MW7SW-GW01-090323	MW7US-GW01-090316	MW8US-GW01-090323	MW9R-GW01-090428	MW9R-TB01-090428	MW9SW-GW01-090312
		Lab Sample Id	500-17766-3	500-17651-1	500-17766-1	500-18570-2	500-18570-1	500-17605-3
		Depth:	94	26	95	421.2	NA	125
		SDG:	17766	17651	17766	18570	18570	17605
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/23/2009	3/16/2009	3/23/2009	4/28/2009	4/28/2009	3/12/2009
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/L	NA	0.0092 U	0.0089 U	NA	NA	NA
72-55-9	4,4'-DDE	ug/L	NA	0.009 U	0.0087 U	NA	NA	NA
50-29-3	4,4'-DDT	ug/L	NA	0.0078 U	0.0075 U	NA	NA	NA
309-00-2	Aldrin	ug/L	NA	0.014 U	0.014 U	NA	NA	NA
319-84-6	alpha-BHC	ug/L	NA	0.011 U	0.011 U	NA	NA	NA
319-85-7	beta-BHC	ug/L	NA	0.015 U	0.015 U	NA	NA	NA
319-86-8	delta-BHC	ug/L	NA	0.013 U	0.013 U	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	0.0098 U	0.0094 U	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/L	NA	0.0085 U	0.0082 U	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/L	NA	0.01 U	0.0096 U	NA	NA	NA
60-57-1	Dieldrin	ug/L	NA	0.0077 U	0.0075 U	NA	NA	NA
959-98-8	Endosulfan I	ug/L	NA	0.0052 U	0.005 U	NA	NA	NA
33213-65-9	Endosulfan II	ug/L	NA	0.0064 U	0.0061 U	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	0.0089 U	0.0086 U	NA	NA	NA
72-20-8	Endrin	ug/L	NA	0.0089 U	0.0086 U	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/L	NA	0.01 U	0.0099 U	NA	NA	NA
53494-70-5	Endrin ketone	ug/L	NA	0.01 U	0.0098 U	NA	NA	NA
76-44-8	Heptachlor	ug/L	NA	0.014 U	0.014 U	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	0.0088 U	0.0085 U	NA	NA	NA
72-43-5	Methoxychlor	ug/L	NA	0.013 U	0.012 U	NA	NA	NA
8001-35-2	Toxaphene	ug/L	NA	0.17 U	0.17 U	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	0.082 U	0.079 U	NA	NA	NA
11104-28-2	PCB-1221	ug/L	NA	0.15 U	0.14 U	NA	NA	NA
11141-16-5	PCB-1232	ug/L	NA	0.08 U	0.077 U	NA	NA	NA
53469-21-9	PCB-1242	ug/L	NA	0.078 U	0.075 U	NA	NA	NA
12672-29-6	PCB-1248	ug/L	NA	0.08 U	0.077 U	NA	NA	NA
11097-69-1	PCB-1254	ug/L	NA	0.063 U	0.06 U	NA	NA	NA
11096-82-5	PCB-1260	ug/L	NA	0.09 U	0.087 U	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/L	NA	0.0028 U	0.0028 U	NA	NA	NA
7440-39-3	Barium	mg/L	NA	0.14	0.1	NA	NA	NA
7440-43-9	Cadmium	mg/L	NA	0.00046 U	0.00046 U	NA	NA	NA
7440-47-3	Chromium	mg/L	NA	0.0016 J	0.0016 U	NA	NA	NA
7439-92-1	Lead	mg/L	NA	0.0018 U	0.0018 U	NA	NA	NA
7439-97-6	Mercury	ug/L	NA	0.065 U	0.065 U	NA	NA	NA
7782-49-2	Selenium	mg/L	NA	0.0042 U	0.0042 U	NA	NA	NA
7440-22-4	Silver	mg/L	NA	0.0012 U	0.0012 U	NA	NA	NA
7440-66-6	Zinc	mg/L	NA	0.0036 U	0.083	NA	NA	NA
	OTHER							
7664-41-7	Ammonia (as N)	mg/L	0.27	0.14 J	0.17 J	0.065 U	NA	0.078 J
16887-00-6	Chloride	mg/L	2.2	45	19	4.4	NA	100
14797-55-8	Nitrogen, Nitrate	mg/L	0.045 J	1.2	6.1	0.016 U	NA	4
STL00217	Nitrogen, Nitrate Nitrite	mg/L	0.058 J	1.2	6.1	0.016 U	NA	4
14797-65-0	Nitrogen, Nitrite	mg/L	0.013 J	0.0042 U	0.0051 J	0.0083 J	NA	0.0042 U
14808-79-8	Sulfate	mg/L	5.1	16	45	14	NA	19
18496-25-8	Sulfide	mg/L	0.31 U	0.31 U	0.31 U	0.83 U	NA	0.31 U

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW9US	MW9US	MW10UB	MW10UB	MW10UB	MW11
		Sample ID:	MW9US-GW01-090312	MW9US-GW02-090312	MW10UB-GW01-090311	MW10UB-GW02-090311	MW10UB-TB01-090311	MW11-GW01-090514
		Lab Sample Id	500-17605-4	500-17605-5	500-17587-1	500-17587-3	500-17587-2	500-18900-1
		Depth:	57.4	57.4	48	48	NA	92.3
		SDG:	17605	17605	17587	17587	17587	18900
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/12/2009	3/12/2009	3/11/2009	3/11/2009	3/11/2009	5/14/2009
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 R
71-43-2	Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U	0.99 U	3.5	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	3.4	3.4	0.14 U	0.14 U	0.14 U	0.14 U
108-88-3	Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
	RISK 175							
74-84-0	Ethane	ug/L	0.35 U	0.35 U	0.35 U	0.35 U	NA	3.5 U
74-85-1	Ethylene	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	NA	3.3 U
74-82-8	Methane	ug/L	0.19 J	0.19 J	0.3 J	0.29 J	NA	1.9 U

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW9US	MW9US	MW10UB	MW10UB	MW10UB	MW11
		Sample ID:	MW9US-GW01-090312	MW9US-GW02-090312	MW10UB-GW01-090311	MW10UB-GW02-090311	MW10UB-TB01-090311	MW11-GW01-090514
		Lab Sample I	500-17605-4	500-17605-5	500-17587-1	500-17587-3	500-17587-2	500-18900-1
		Depth:	57.4	57.4	48	48	NA	92.3
		SDG:	17605	17605	17587	17587	17587	18900
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/12/2009	3/12/2009	3/11/2009	3/11/2009	3/11/2009	5/14/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/L	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/L	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/L	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW9US	MW9US	MW10UB	MW10UB	MW10UB	MW11
		Sample ID:	MW9US-GW01-090312	MW9US-GW02-090312	MW10UB-GW01-090311	MW10UB-GW02-090311	MW10UB-TB01-090311	MW11-GW01-090514
		Lab Sample I	500-17605-4	500-17605-5	500-17587-1	500-17587-3	500-17587-2	500-18900-1
		Depth:	57.4	57.4	48	48	NA	92.3
		SDG:	17605	17605	17587	17587	17587	18900
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/12/2009	3/12/2009	3/11/2009	3/11/2009	3/11/2009	5/14/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/L	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/L	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/L	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/L	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW9US	MW9US	MW10UB	MW10UB	MW10UB	MW11
		Sample ID:	MW9US-GW01-090312	MW9US-GW02-090312	MW10UB-GW01-090311	MW10UB-GW02-090311	MW10UB-TB01-090311	MW11-GW01-090514
		Lab Sample Id	500-17605-4	500-17605-5	500-17587-1	500-17587-3	500-17587-2	500-18900-1
		Depth:	57.4	57.4	48	48	NA	92.3
		SDG:	17605	17605	17587	17587	17587	18900
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	3/12/2009	3/12/2009	3/11/2009	3/11/2009	3/11/2009	5/14/2009
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/L	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/L	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA	NA	NA
	METALS							
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/L	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/L	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/L	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/L	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/L	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/L	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/L	NA	NA	NA	NA	NA	NA
	OTHER							
7664-41-7	Ammonia (as N)	mg/L	0.17 J	0.093 J	0.19 J	0.074 J	NA	0.097 J
16887-00-6	Chloride	mg/L	75	71	12	12	NA	5
14797-55-8	Nitrogen, Nitrate	mg/L	0.4	5	0.02 U	2.4	NA	2
STL00217	Nitrogen, Nitrate Nitrite	mg/L	0.4	5	0.24	2.6	NA	2
14797-65-0	Nitrogen, Nitrite	mg/L	0.0042 U	0.0042 U	0.24	0.24	NA	0.002 U
14808-79-8	Sulfate	mg/L	23	23	10	10	NA	10
18496-25-8	Sulfide	mg/L	0.31 U	0.31 U	0.31 U	0.31 U	NA	0.31 U

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW11	MW12	MW13	MW14	MW14	MW101
		Sample ID:	MW11-TB01-090514	MW12-GW01-090514	MW13-GW01-090316	MW14US-GW01-033.0-0908	MW14US-GW01-090910	MW101-GW01-090317
		Lab Sample I	500-18900-5	500-18900-2	500-17651-4	500-20828-6	500-21108-1	500-17676-1
		Depth:	NA	91	NA	33	33	53.5
		SDG:	18900	18900	17651	20828	21108	17676
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	5/14/2009	5/14/2009	3/16/2009	8/26/2009	9/10/2009	3/17/2009
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.2 R	1.2 R	1.2 R	1.2 R		1.2 U
71-43-2	Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U		0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U		0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U		0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U		0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U		0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U		0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U		0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U		0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U		0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U		0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U		0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U		0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U		0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U		0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U	0.3 U	0.3 U		0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U		0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U		0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U		0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U		0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U		0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	0.83 U	0.83 U	0.83 U		0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.58 U	0.58 U	0.58 U		0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U	0.99 U	0.99 U		0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U		0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U		0.25 U
127-18-4	Tetrachloroethene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U		16
108-88-3	Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U		0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U		0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U		0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U		0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U	0.23 U	0.23 U		0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U		0.33 U
	RISK 175							
74-84-0	Ethane	ug/L	NA	3.5 U	0.35 U	NA	0.43	0.35 U
74-85-1	Ethylene	ug/L	NA	3.3 U	0.33 U	NA	0.33 U	0.33 U
74-82-8	Methane	ug/L	NA	68	0.19 J	NA	2.1	0.19 J

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW11	MW12	MW13	MW14	MW14	MW101
		Sample ID:	MW11-TB01-090514	MW12-GW01-090514	MW13-GW01-090316	MW14US-GW01-033.0-0908	MW14US-GW01-090910	MW101-GW01-090317
		Lab Sample I	500-18900-5	500-18900-2	500-17651-4	500-20828-6	500-21108-1	500-17676-1
		Depth:	NA	91	NA	33	33	53.5
		SDG:	18900	18900	17651	20828	21108	17676
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	5/14/2009	5/14/2009	3/16/2009	8/26/2009	9/10/2009	3/17/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA	NA	0.058 U
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA	NA	0.058 U
120-12-7	Anthracene	ug/L	NA	NA	NA	NA	NA	0.068 U
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA	NA	0.066 U
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA	NA	0.044 U
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA	NA	0.042 U
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA	NA	0.11 U
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA	NA	0.079 U
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA	NA	0.14 U
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA	NA	0.24 U
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA	NA	1.9 U
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	0.16 U
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA	NA	0.2 U
86-74-8	Carbazole	ug/L	NA	NA	NA	NA	NA	0.82 U
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA	NA	2.4 U
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA	NA	0.78 U
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA	NA	0.17 U
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA	NA	0.21 U
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	0.24 U
218-01-9	Chrysene	ug/L	NA	NA	NA	NA	NA	0.068 U
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA	NA	0.057 U
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA	NA	0.24 U
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	0.2 U
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	0.21 U
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	0.2 U
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA	NA	0.25 U
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA	NA	3.2 U
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA	NA	0.2 U
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA	NA	1.1 U
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA	NA	0.13 U
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA	NA	0.64 U
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA	NA	1.7 U
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA	NA	1.8 U

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW11	MW12	MW13	MW14	MW14	MW101
		Sample ID:	MW11-TB01-090514	MW12-GW01-090514	MW13-GW01-090316	MW14US-GW01-033.0-0908	MW14US-GW01-090910	MW101-GW01-090317
		Lab Sample I	500-18900-5	500-18900-2	500-17651-4	500-20828-6	500-21108-1	500-17676-1
		Depth:	NA	91	NA	33	33	53.5
		SDG:	18900	18900	17651	20828	21108	17676
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	5/14/2009	5/14/2009	3/16/2009	8/26/2009	9/10/2009	3/17/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA	NA	3.1 U
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	0.45 U
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	0.12 U
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA	NA	0.068 U
86-73-7	Fluorene	ug/L	NA	NA	NA	NA	NA	0.057 U
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA	NA	0.066 U
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA	NA	0.25 U
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA	NA	4.4 U
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA	NA	0.25 U
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA	NA	0.072 U
78-59-1	Isophorone	ug/L	NA	NA	NA	NA	NA	0.58 U
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA	NA	0.16 U
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA	NA	1.3 J
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA	NA	0.33 J
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA	NA	0.42 J
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA	NA	0.55 U
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA	NA	1 U
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA	NA	2.3 U
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA	NA	0.3 U
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA	NA	0.64 U
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA	NA	2.4 U
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA	NA	0.15 U
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA	NA	0.2 U
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA	NA	0.2 U
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA	NA	2.1 U
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA	NA	0.071 U
108-95-2	Phenol	ug/L	NA	NA	NA	NA	NA	10
129-00-0	Pyrene	ug/L	NA	NA	NA	NA	NA	0.071 U
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA	NA	0.24 U
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	2.6 U
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	0.67 U

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW11	MW12	MW13	MW14	MW14	MW101
		Sample ID:	MW11-TB01-090514	MW12-GW01-090514	MW13-GW01-090316	MW14US-GW01-033.0-0908	MW14US-GW01-090910	MW101-GW01-090317
		Lab Sample Id	500-18900-5	500-18900-2	500-17651-4	500-20828-6	500-21108-1	500-17676-1
		Depth:	NA	91	NA	33	33	53.5
		SDG:	18900	18900	17651	20828	21108	17676
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	5/14/2009	5/14/2009	3/16/2009	8/26/2009	9/10/2009	3/17/2009
	COMPOUND	UNITS:						
	PESTICIDES							
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA	NA	0.0092 U
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA	NA	0.009 U
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA	NA	0.0078 U
309-00-2	Aldrin	ug/L	NA	NA	NA	NA	NA	0.014 U
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA	NA	0.011 U
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA	NA	0.015 U
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA	NA	0.013 U
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA	NA	0.0098 U
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA	NA	0.0085 U
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA	NA	0.01 U
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA	NA	0.0077 U
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA	NA	0.0052 U
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA	NA	0.0064 U
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA	NA	0.0089 U
72-20-8	Endrin	ug/L	NA	NA	NA	NA	NA	0.0089 U
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA	NA	0.01 U
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA	NA	0.01 U
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA	NA	0.014 U
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA	NA	0.0088 U
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA	NA	0.013 U
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA	NA	0.17 U
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA	NA	0.082 U
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA	NA	0.15 U
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA	NA	0.08 U
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA	NA	0.078 U
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA	NA	0.08 U
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA	NA	0.063 U
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA	NA	0.09 U
	METALS							
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA	NA	0.0028 U
7440-39-3	Barium	mg/L	NA	NA	NA	NA	NA	0.098
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA	NA	0.00046 U
7440-47-3	Chromium	mg/L	NA	NA	NA	NA	NA	0.0053 J
7439-92-1	Lead	mg/L	NA	NA	NA	NA	NA	0.0018 U
7439-97-6	Mercury	ug/L	NA	NA	NA	NA	NA	0.065 U
7782-49-2	Selenium	mg/L	NA	NA	NA	NA	NA	0.0042 U
7440-22-4	Silver	mg/L	NA	NA	NA	NA	NA	0.0012 U
7440-66-6	Zinc	mg/L	NA	NA	NA	NA	NA	0.0032 U
	OTHER							
7664-41-7	Ammonia (as N)	mg/L	NA	0.065 U	0.39	NA	0.065 U	0.17 J
16887-00-6	Chloride	mg/L	NA	18	2	NA	81	5.4
14797-55-8	Nitrogen, Nitrate	mg/L	NA	7	0.2	NA	1.3	0.32
STL00217	Nitrogen, Nitrate Nitrite	mg/L	NA	7	0.2	NA	1.3 J	0.32
14797-65-0	Nitrogen, Nitrite	mg/L	NA	0.002 U	0.0042 U	NA	0.002 U	0.0042 U
14808-79-8	Sulfate	mg/L	NA	13	10	NA	44	13
18496-25-8	Sulfide	mg/L	NA	0.31 U	0.31 U	NA	0.31 U	0.31 U

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW101	MW102	MW103	MW103	PA53
		Sample ID:	MW101-TB01-090317	MW102-GW01-090317	MW103-GW01-090318	MW103-TB01-090318	PA53-GW01-090826
		Lab Sample Id	500-17676-3	500-17676-2	500-17702-1	500-17702-2	500-20828-7
		Depth:	NA	56	61	NA	NA
		SDG:	17676	17676	17702	17702	20828
		Matrix:	Water	Water	Water	Water	Water
		Sampled:	3/17/2009	3/17/2009	3/18/2009	3/18/2009	8/26/2009
	COMPOUND	UNITS:					
	VOLATILES						
67-64-1	Acetone	ug/L	1.2 U	1.2 U	1.2 U	1.2 U	1.2 R
71-43-2	Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
108-88-3	Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
	RISK 175						
74-84-0	Ethane	ug/L	NA	0.35 U	0.35 U	NA	0.35 U
74-85-1	Ethylene	ug/L	NA	0.33 U	0.33 U	NA	0.33 U
74-82-8	Methane	ug/L	NA	0.19 J	0.19 J	NA	0.19 U

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW101	MW102	MW103	MW103	PA53
		Sample ID:	MW101-TB01-090317	MW102-GW01-090317	MW103-GW01-090318	MW103-TB01-090318	PA53-GW01-090826
		Lab Sample Id	500-17676-3	500-17676-2	500-17702-1	500-17702-2	500-20828-7
		Depth:	NA	56	61	NA	NA
		SDG:	17676	17676	17702	17702	20828
		Matrix:	Water	Water	Water	Water	Water
		Sampled:	3/17/2009	3/17/2009	3/18/2009	3/18/2009	8/26/2009
	COMPOUND	UNITS:					
	SEMIVOLATILES						
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/L	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/L	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/L	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW101	MW102	MW103	MW103	PA53
		Sample ID:	MW101-TB01-090317	MW102-GW01-090317	MW103-GW01-090318	MW103-TB01-090318	PA53-GW01-090826
		Lab Sample Id	500-17676-3	500-17676-2	500-17702-1	500-17702-2	500-20828-7
		Depth:	NA	56	61	NA	NA
		SDG:	17676	17676	17702	17702	20828
		Matrix:	Water	Water	Water	Water	Water
		Sampled:	3/17/2009	3/17/2009	3/18/2009	3/18/2009	8/26/2009
	COMPOUND	UNITS:					
	SEMIVOLATILES						
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/L	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/L	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/L	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/L	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA	NA

Table AI.4
Task 2e - Site-wide Groundwater Sampling Data - Round 1

		Location:	MW101	MW102	MW103	MW103	PA53
		Sample ID:	MW101-TB01-090317	MW102-GW01-090317	MW103-GW01-090318	MW103-TB01-090318	PA53-GW01-090826
		Lab Sample Id	500-17676-3	500-17676-2	500-17702-1	500-17702-2	500-20828-7
		Depth:	NA	56	61	NA	NA
		SDG:	17676	17676	17702	17702	20828
		Matrix:	Water	Water	Water	Water	Water
		Sampled:	3/17/2009	3/17/2009	3/18/2009	3/18/2009	8/26/2009
	COMPOUND	UNITS:					
	PESTICIDES						
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/L	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/L	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA	NA
	PCBs						
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA	NA
	METALS						
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/L	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/L	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/L	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/L	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/L	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/L	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/L	NA	NA	NA	NA	NA
	OTHER						
7664-41-7	Ammonia (as N)	mg/L	NA	0.82	0.4	NA	0.065 U
16887-00-6	Chloride	mg/L	NA	11	18	NA	5.3
14797-55-8	Nitrogen, Nitrate	mg/L	NA	0.66	4.7	NA	1.6
STL00217	Nitrogen, Nitrate Nitrite	mg/L	NA	0.66	4.7	NA	1.6
14797-65-0	Nitrogen, Nitrite	mg/L	NA	0.0042 U	0.0042 U	NA	0.002 U
14808-79-8	Sulfate	mg/L	NA	19	28	NA	9.7
18496-25-8	Sulfide	mg/L	NA	0.31 U	0.31 U	NA	0.31 U

Table AI.5
Task 3 - DNAPL Investigation Data

		Location:	A14	A14	A7	A7	F11	F11
		Sample ID:	A14-GW01-035.8-071016	A14-TB01-000.0-071016	A7-GW01-072.7-071030	A7-TB01--071030	F11-GW01-031.3-071108	F11-TB01-071108
		Lab Sample Id:	500-7330-1	500-7330-3	500-7566-2	500-7566-3	500-7772-1	500-7772-2
		Depth:	35.8	NA	72.7	NA	31.3	NA
		SDG:	7330	7330	7566	7566	7772	7772
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	10/16/2007	10/16/2007	10/30/2007	11/1/2007	11/8/2007	11/8/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.4 U	1.4 U	1.4 U	1.4 U	2.8 UJ	1.4 UJ
71-43-2	Benzene	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.46 UJ	0.23 UJ
75-27-4	Bromodichloromethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.44 UJ	0.22 UJ
75-25-2	Bromoform	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.64 UJ	0.32 UJ
74-83-9	Bromomethane	ug/L	0.59 U	0.59 U	0.59 U	0.59 U	1.2 UJ	0.59 UJ
75-15-0	Carbon disulfide	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.3 UJ	0.15 UJ
56-23-5	Carbon tetrachloride	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.68 UJ	0.34 UJ
108-90-7	Chlorobenzene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.3 UJ	0.15 UJ
75-00-3	Chloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.64 UJ	0.32 UJ
67-66-3	Chloroform	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.28 UJ	0.14 UJ
74-87-3	Chloromethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.4 UJ	0.2 UJ
124-48-1	Dibromochloromethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.44 UJ	0.22 UJ
75-34-3	1,1-Dichloroethane	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.3 UJ	0.15 UJ
107-06-2	1,2-Dichloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.5 UJ	0.25 UJ
75-35-4	1,1-Dichloroethene	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.5 UJ	0.25 UJ
540-59-0	1,2-Dichloroethene, Total	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	84 J+	0.34 UJ
78-87-5	1,2-Dichloropropane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.38 UJ	0.19 UJ
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.3 UJ	0.15 UJ
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.32 UJ	0.16 UJ
100-41-4	Ethylbenzene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.42 UJ	0.21 UJ
591-78-6	2-Hexanone	ug/L	0.99 U	0.99 U	0.99 U	0.99 UJ	2 UJ	0.99 UJ
78-93-3	Methyl Ethyl Ketone	ug/L	1 U	1 U	1 U	1 U	3.3 J+	1 UJ
108-10-1	methyl isobutyl ketone	ug/L	0.92 U	0.92 U	0.92 U	0.92 U	1.8 UJ	0.92 UJ
75-09-2	Methylene Chloride	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.48 UJ	0.24 UJ
100-42-5	Styrene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.36 UJ	0.18 UJ
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.68 UJ	0.34 UJ
127-18-4	Tetrachloroethene	ug/L	10	0.18 U	62	0.18 U	820 J+	9 J
108-88-3	Toluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	3.2 J+	0.18 UJ
71-55-6	1,1,1-Trichloroethane	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.34 UJ	0.17 UJ
79-00-5	1,1,2-Trichloroethane	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.48 UJ	0.24 UJ
79-01-6	Trichloroethene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	430 J+	0.13 UJ
75-01-4	Vinyl chloride	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.32 UJ	0.16 UJ
1330-20-7	Xylenes, Total	ug/L	0.55 U	0.55 U	0.55 U	0.55 U	1.1 UJ	0.55 UJ

Table AI.5
Task 3 - DNAPL Investigation Data

		Location:	F8	F8	J8	L12	N12	N8
		Sample ID:	F8-GW01-062.5-071026	F8-TB01-071026	J8-GW01-030.5-071101	L12-GW01-025.5-071017	N12-GW01-025.5-071011	N8-GW01-024.7-071010D
		Lab Sample Id:	500-7476-1	500-7476-2	500-7566-1	500-7330-2	500-7133-3	500-7133-1
		Depth:	62.5	NA	30.5	25.5	25.5	24.7
		SDG:	7476	7476	7566	7330	7133	7133
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	10/26/2007	10/26/2007	11/1/2007	10/17/2007	10/11/2007	10/10/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.4 U	1.4 U	14 U	1400 U	140 U	7
71-43-2	Benzene	ug/L	0.23 U	0.23 U	2.3 U	230 U	23 U	0.23 U
75-27-4	Bromodichloromethane	ug/L	0.22 U	0.22 U	2.2 U	220 U	22 U	0.22 U
75-25-2	Bromoform	ug/L	0.32 U	0.32 U	3.2 U	320 U	32 U	0.32 U
74-83-9	Bromomethane	ug/L	0.59 U	0.59 U	5.9 U	590 U	59 U	0.59 U
75-15-0	Carbon disulfide	ug/L	0.15 U	0.15 U	1.5 U	150 U	15 U	0.15 U
56-23-5	Carbon tetrachloride	ug/L	0.34 U	0.34 U	3.4 U	340 U	34 U	0.34 U
108-90-7	Chlorobenzene	ug/L	0.15 U	0.15 U	1.5 U	150 U	15 U	0.15 U
75-00-3	Chloroethane	ug/L	0.32 U	0.32 U	3.2 U	320 U	32 U	0.32 U
67-66-3	Chloroform	ug/L	0.14 U	0.14 U	1.4 U	140 U	14 U	0.14 U
74-87-3	Chloromethane	ug/L	0.2 U	0.2 U	2 U	200 U	20 U	0.2 U
124-48-1	Dibromochloromethane	ug/L	0.22 U	0.22 U	2.2 U	220 U	22 U	0.22 U
75-34-3	1,1-Dichloroethane	ug/L	0.15 U	0.15 U	1.5 U	150 U	15 U	0.15 U
107-06-2	1,2-Dichloroethane	ug/L	0.25 U	0.25 U	2.5 U	250 U	25 U	0.25 U
75-35-4	1,1-Dichloroethene	ug/L	0.25 U	0.25 U	2.5 U	250 U	25 U	0.25 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.34 U	0.34 U	81	340 U	300	0.34 U
78-87-5	1,2-Dichloropropane	ug/L	0.19 U	0.19 U	1.9 U	190 U	19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.15 U	0.15 U	1.5 U	150 U	15 U	0.15 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	1.6 U	160 U	16 U	0.16 U
100-41-4	Ethylbenzene	ug/L	0.21 U	0.21 U	2.1 U	210 U	21 U	0.21 U
591-78-6	2-Hexanone	ug/L	0.99 U	0.99 U	9.9 U	990 U	99 U	0.99 U
78-93-3	Methyl Ethyl Ketone	ug/L	1 U	1 U	10 U	1000 U	100 U	1 U
108-10-1	methyl isobutyl ketone	ug/L	0.92 U	0.92 U	9.2 U	920 U	92 U	0.92 U
75-09-2	Methylene Chloride	ug/L	0.24 U	0.24 U	2.4 U	240 U	24 U	0.24 U
100-42-5	Styrene	ug/L	0.18 U	0.18 U	1.8 U	180 U	18 U	0.18 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.34 U	0.34 U	3.4 U	340 U	34 U	0.34 U
127-18-4	Tetrachloroethene	ug/L	100	0.18 U	2100 +	240000 +	45000 +	130 +
108-88-3	Toluene	ug/L	0.18 U	0.18 U	1.8 U	180 U	18 U	0.18 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.17 U	0.17 U	1.7 U	170 U	17 U	0.17 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.24 U	0.24 U	2.4 U	240 U	24 U	0.24 U
79-01-6	Trichloroethene	ug/L	0.13 U	0.13 U	130	130 U	470	0.13 U
75-01-4	Vinyl chloride	ug/L	0.16 U	0.16 U	1.6 U	160 U	16 U	0.16 U
1330-20-7	Xylenes, Total	ug/L	0.55 U	0.55 U	5.5 U	550 U	55 U	0.55 U

Table AI.5
Task 3 - DNAPL Investigation Data

		Location:	N8	N8	P13	P14	P16	P17
		Sample ID:	N8-GW02-024.7-071010	N8-TB01-071010	P13-GW01-022.6-070828	P14-GW01-022.3-070828	P16-GW01-023.5-070904	P17-GW01-020.9-070803
		Lab Sample Id:	500-7133-2	500-7133-4	500-6329-4	500-6329-3	500-6409-4	500-5774-3
		Depth:	24.7	NA	22.6	22.3	23.5	20.9
		SDG:	7133	7133	6329	6329	6409	5774
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	10/10/2007	10/10/2007	8/28/2007	8/28/2007	9/4/2007	8/3/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	5.5	1.4 U	140 U	140 U	1.4 U	27
71-43-2	Benzene	ug/L	0.23 U	0.23 U	23 U	23 U	0.23 U	0.23 U
75-27-4	Bromodichloromethane	ug/L	0.22 U	0.22 U	22 U	22 U	0.22 U	0.22 U
75-25-2	Bromoform	ug/L	0.32 U	0.32 U	32 U	32 U	0.32 U	0.32 U
74-83-9	Bromomethane	ug/L	0.59 U	0.59 U	59 U	59 U	0.59 U	0.59 U
75-15-0	Carbon disulfide	ug/L	0.15 U	0.15 U	15 U	15 U	0.15 U	0.15 U
56-23-5	Carbon tetrachloride	ug/L	0.34 U	0.34 U	34 U	34 U	0.34 U	0.34 U
108-90-7	Chlorobenzene	ug/L	0.15 U	0.15 U	15 U	15 U	0.15 U	0.15 U
75-00-3	Chloroethane	ug/L	0.32 U	0.32 U	32 U	32 U	0.32 U	0.32 U
67-66-3	Chloroform	ug/L	0.14 U	0.14 U	14 U	14 U	0.14 U	0.14 U
74-87-3	Chloromethane	ug/L	0.2 U	0.2 U	20 U	20 U	4.3	0.2 U
124-48-1	Dibromochloromethane	ug/L	0.22 U	0.22 U	22 U	22 U	0.22 U	0.22 U
75-34-3	1,1-Dichloroethane	ug/L	0.15 U	0.15 U	15 U	15 U	0.15 U	0.15 U
107-06-2	1,2-Dichloroethane	ug/L	0.25 U	0.25 U	25 U	25 U	0.25 U	0.25 U
75-35-4	1,1-Dichloroethene	ug/L	0.25 U	0.25 U	25 U	25 U	0.25 U	0.25 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.34 U	0.34 U	140 J+	110 J+	10	4.8
78-87-5	1,2-Dichloropropane	ug/L	0.19 U	0.19 U	19 U	19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.15 U	0.15 U	15 U	15 U	0.15 U	0.15 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	16 U	16 U	0.16 U	0.16 U
100-41-4	Ethylbenzene	ug/L	0.21 U	0.21 U	21 U	97 J+	0.21 U	0.21 U
591-78-6	2-Hexanone	ug/L	0.99 U	0.99 U	99 U	99 U	0.99 U	0.99 U
78-93-3	Methyl Ethyl Ketone	ug/L	1 U	1 U	100 U	100 U	1 U	1 U
108-10-1	methyl isobutyl ketone	ug/L	0.92 U	0.92 U	92 U	92 U	0.92 U	0.92 U
75-09-2	Methylene Chloride	ug/L	0.24 U	0.24 U	24 U	24 U	0.24 U	0.24 U
100-42-5	Styrene	ug/L	0.18 U	0.18 U	18 U	18 U	0.18 U	0.18 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.34 U	0.34 U	34 U	34 U	0.34 U	0.34 U
127-18-4	Tetrachloroethene	ug/L	110 +	0.18 U	84000 +	150000 +	880 +	21
108-88-3	Toluene	ug/L	0.18 U	0.18 U	18 U	18 U	0.18 U	15
71-55-6	1,1,1-Trichloroethane	ug/L	0.17 U	0.17 U	17 U	17 U	0.17 U	0.17 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.24 U	0.24 U	24 U	24 U	0.24 U	0.24 U
79-01-6	Trichloroethene	ug/L	0.13 U	0.13 U	420 +	320	2.9	1
75-01-4	Vinyl chloride	ug/L	0.16 U	0.16 U	16 U	16 U	0.16 U	0.16 U
1330-20-7	Xylenes, Total	ug/L	0.55 U	0.55 U	55 U	500	3.4	0.55 U

Table AI.5
Task 3 - DNAPL Investigation Data

		Location:	Q14	Q14	Q15.5	R13	R13	R15
		Sample ID:	Q14-GW01-023.2-070904	Q14-TB01-000.0-070904	Q15.5-GW01-025.0-07083	R13-GW01-022.0-070828	R13-TB01-000.0-070828	R15-GW01-025.5-070831
		Lab Sample Id:	500-6409-3	500-6409-2	500-6329-5	500-6329-2	500-6329-1	500-6329-6
		Depth:	23.2	NA	25	22	NA	25.5
		SDG:	6409	6409	6329	6329	6329	6329
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	9/4/2007	9/4/2007	8/31/2007	8/28/2007	8/28/2007	8/31/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.4 U	1.4 U	140 U	7 U	1.4 U	14 U
71-43-2	Benzene	ug/L	0.23 U	0.23 U	23 U	1.2 U	0.23 U	2.3 U
75-27-4	Bromodichloromethane	ug/L	0.22 U	0.22 U	22 U	1.1 U	0.22 U	2.2 U
75-25-2	Bromoform	ug/L	0.32 U	0.32 U	32 U	1.6 U	0.32 U	3.2 U
74-83-9	Bromomethane	ug/L	0.59 U	0.59 U	59 U	3 U	0.59 U	5.9 U
75-15-0	Carbon disulfide	ug/L	0.15 U	0.15 U	15 U	0.75 U	0.15 U	1.5 U
56-23-5	Carbon tetrachloride	ug/L	0.34 U	0.34 U	34 U	1.7 U	0.34 U	3.4 U
108-90-7	Chlorobenzene	ug/L	7	0.15 U	15 U	0.75 U	0.15 U	1.5 U
75-00-3	Chloroethane	ug/L	0.32 U	0.32 U	32 U	1.6 U	0.32 U	3.2 U
67-66-3	Chloroform	ug/L	0.14 U	0.14 U	14 U	0.7 U	0.14 U	1.4 U
74-87-3	Chloromethane	ug/L	0.2 U	0.2 U	20 U	1 U	0.2 U	2 U
124-48-1	Dibromochloromethane	ug/L	0.22 U	0.22 U	22 U	1.1 U	0.22 U	2.2 U
75-34-3	1,1-Dichloroethane	ug/L	0.15 U	0.15 U	15 U	0.75 U	0.15 U	1.5 U
107-06-2	1,2-Dichloroethane	ug/L	0.25 U	0.25 U	25 U	1.3 U	0.25 U	2.5 U
75-35-4	1,1-Dichloroethene	ug/L	0.25 U	0.25 U	25 U	1.3 U	0.25 U	2.5 U
540-59-0	1,2-Dichloroethene, Total	ug/L	60	0.34 U	34 U	7.8 J+	0.34 U	6.8 J+
78-87-5	1,2-Dichloropropane	ug/L	0.19 U	0.19 U	19 U	0.95 U	0.19 U	1.9 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.15 U	0.15 U	15 U	0.75 U	0.15 U	1.5 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	16 U	0.8 U	0.16 U	1.6 U
100-41-4	Ethylbenzene	ug/L	37	0.21 U	300 +	1.1 U	0.21 U	2.1 U
591-78-6	2-Hexanone	ug/L	0.99 U	0.99 U	99 U	5 U	0.99 U	9.9 U
78-93-3	Methyl Ethyl Ketone	ug/L	1 U	1 U	100 U	5 U	1 U	10 U
108-10-1	methyl isobutyl ketone	ug/L	0.92 U	0.92 U	92 U	4.6 U	0.92 U	9.2 U
75-09-2	Methylene Chloride	ug/L	0.24 U	0.24 U	24 U	1.2 U	0.24 U	2.4 U
100-42-5	Styrene	ug/L	0.18 U	0.18 U	18 U	0.9 U	0.18 U	1.8 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.34 U	0.34 U	34 U	1.7 U	0.34 U	3.4 U
127-18-4	Tetrachloroethene	ug/L	38000 +	0.18 U	70000 +	1600 +	0.18 U	6600 +
108-88-3	Toluene	ug/L	6	0.18 U	18 U	0.9 U	0.18 U	1.8 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.17 U	0.17 U	17 U	0.85 U	0.17 U	1.7 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.24 U	0.24 U	24 U	1.2 U	0.24 U	2.4 U
79-01-6	Trichloroethene	ug/L	74	0.13 U	60 J+	10	0.13 U	9.3 J+
75-01-4	Vinyl chloride	ug/L	0.16 U	0.16 U	16 U	0.8 U	0.16 U	1.6 U
1330-20-7	Xylenes, Total	ug/L	190	0.55 U	1700 +	2.8 U	0.55 U	5.5 U

Table AI.5
Task 3 - DNAPL Investigation Data

		Location:	R17	T13	T13	T13	T15	T17
		Sample ID:	R17-GW01-020.2-070803	T13-GW01-021.0-070828	T13-GW02-021.0-070820	T13-TB01-000.0-070820	T15-GW01-020.3-070820	T17-GW01-020.3-070802
		Lab Sample Id:	500-5774-4	500-6101-2	500-6101-3	500-6101-1	500-6101-4	500-5774-2
		Depth:	20.2	21	21	NA	20.3	20.3
		SDG:	5774	6101	6101	6101	6101	5774
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	8/3/2007	8/20/2007	8/20/2007	8/20/2007	8/20/2007	8/2/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
71-43-2	Benzene	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
75-27-4	Bromodichloromethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-25-2	Bromoform	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
74-83-9	Bromomethane	ug/L	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U
75-15-0	Carbon disulfide	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
56-23-5	Carbon tetrachloride	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
108-90-7	Chlorobenzene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
75-00-3	Chloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
67-66-3	Chloroform	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
74-87-3	Chloromethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
124-48-1	Dibromochloromethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-34-3	1,1-Dichloroethane	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
107-06-2	1,2-Dichloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
75-35-4	1,1-Dichloroethene	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.34 U	8.4	7.8	0.34 U	3.6	1.7 J
78-87-5	1,2-Dichloropropane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
100-41-4	Ethylbenzene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
591-78-6	2-Hexanone	ug/L	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
78-93-3	Methyl Ethyl Ketone	ug/L	1 U	1 U	1 U	1 U	1 U	1 U
108-10-1	methyl isobutyl ketone	ug/L	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U
75-09-2	Methylene Chloride	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
100-42-5	Styrene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
127-18-4	Tetrachloroethene	ug/L	2.1	210 +	230 +	0.18 U	99	42
108-88-3	Toluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
79-01-6	Trichloroethene	ug/L	0.13 U	23	23	0.13 U	4.9	2.5
75-01-4	Vinyl chloride	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
1330-20-7	Xylenes, Total	ug/L	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U

Table AI.5
Task 3 - DNAPL Investigation Data

		Location:	U17	U17
		Sample ID:	U17-GW01-023.5-070730	U17-TB01-000.0-070730
		Lab Sample Id:	500-5774-1	500-5774-5
		Depth:	23.5	NA
		SDG:	5774	5774
		Matrix:	Water	Water
		Sampled:	7/30/2007	7/30/2007
	COMPOUND	UNITS:		
	VOLATILES			
67-64-1	Acetone	ug/L	1.4 U	1.4 U
71-43-2	Benzene	ug/L	0.23 U	0.23 U
75-27-4	Bromodichloromethane	ug/L	0.22 U	0.22 U
75-25-2	Bromoform	ug/L	0.32 U	0.32 U
74-83-9	Bromomethane	ug/L	0.59 U	0.59 U
75-15-0	Carbon disulfide	ug/L	0.15 U	0.15 U
56-23-5	Carbon tetrachloride	ug/L	0.34 U	0.34 U
108-90-7	Chlorobenzene	ug/L	0.15 U	0.15 U
75-00-3	Chloroethane	ug/L	0.32 U	0.32 U
67-66-3	Chloroform	ug/L	0.14 U	0.14 U
74-87-3	Chloromethane	ug/L	0.2 U	0.2 U
124-48-1	Dibromochloromethane	ug/L	0.22 U	0.22 U
75-34-3	1,1-Dichloroethane	ug/L	0.15 U	0.15 U
107-06-2	1,2-Dichloroethane	ug/L	0.25 U	0.25 U
75-35-4	1,1-Dichloroethene	ug/L	0.25 U	0.25 U
540-59-0	1,2-Dichloroethene, Total	ug/L	13	0.34 U
78-87-5	1,2-Dichloropropane	ug/L	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.15 U	0.15 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.16 U	0.16 U
100-41-4	Ethylbenzene	ug/L	0.21 U	0.21 U
591-78-6	2-Hexanone	ug/L	0.99 U	0.99 U
78-93-3	Methyl Ethyl Ketone	ug/L	1 U	1 U
108-10-1	methyl isobutyl ketone	ug/L	0.92 U	0.92 U
75-09-2	Methylene Chloride	ug/L	0.24 U	0.24 U
100-42-5	Styrene	ug/L	0.18 U	0.18 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.34 U	0.34 U
127-18-4	Tetrachloroethene	ug/L	29	0.18 U
108-88-3	Toluene	ug/L	0.18 U	0.18 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.17 U	0.17 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.24 U	0.24 U
79-01-6	Trichloroethene	ug/L	7.5	0.13 U
75-01-4	Vinyl chloride	ug/L	0.16 U	0.16 U
1330-20-7	Xylenes, Total	ug/L	0.55 U	0.55 U

Table AI.6
Task 4 - Sediment Sampling Data

		Location:	SD01	SD02	SD03	SD04	SD06	SD06
		Sample ID:	SD01-SD01-090409	SD02-SD01-090409	SD03-SD01-000.2-080801	SD04-SD01-090409	SD06-SD01-000.2-080801	SD06-SD02-000.2-080801
		Lab Sample Id:	500-18152-10	500-18152-8	500-12974-3	500-18152-6	500-12974-6	500-12974-7
		Depth:	NA	NA	0.2	NA	0.2	0.2
		SDG:	18152	18152	12974	18152	12974	12974
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	4/9/2009	4/9/2009	8/1/2008	4/9/2009	8/1/2008	8/1/2008
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	96 J	1.9 U	2.1 U	2.1 U	2.1 U	1.6 U
71-43-2	Benzene	ug/Kg	0.83 U	0.86 U	0.95 U	0.95 U	0.93 U	0.72 U
75-27-4	Bromodichloromethane	ug/Kg	0.76 U	0.79 U	0.87 U	0.87 U	0.86 U	0.66 U
75-25-2	Bromoform	ug/Kg	0.97 U	1 U	1.1 U	1.1 U	1.1 U	0.84 U
74-83-9	Bromomethane	ug/Kg	2.1 U	2.2 U	2.5 U	2.4 U	2.4 U	1.9 U
75-15-0	Carbon disulfide	ug/Kg	0.92 U	0.95 U	1.1 U	1 U	1 U	0.79 U
56-23-5	Carbon tetrachloride	ug/Kg	0.92 U	0.95 U	1.1 U	1 U	1 U	0.79 U
108-90-7	Chlorobenzene	ug/Kg	0.66 U	0.69 U	0.76 U	0.76 U	0.75 U	0.57 U
75-00-3	Chloroethane	ug/Kg	1.2 U	1.2 U	1.3 J	1.3 U	1.3 J	1 J
67-66-3	Chloroform	ug/Kg	0.95 U	0.99 U	1.1 U	1.1 U	1.1 U	0.83 U
74-87-3	Chloromethane	ug/Kg	1.6 U	1.6 U	1.8 U	1.8 U	1.8 J	1.3 U
124-48-1	Dibromochloromethane	ug/Kg	0.81 U	0.84 U	0.93 U	0.92 U	0.91 U	0.7 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.94 U	0.97 U	1.1 U	1.1 U	1.1 U	0.81 U
107-06-2	1,2-Dichloroethane	ug/Kg	1.1 U	1.1 U	1.2 U	1.2 U	1.2 U	0.93 U
75-35-4	1,1-Dichloroethene	ug/Kg	0.86 U	0.89 U	0.98 U	0.98 U	0.97 U	0.74 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.9 U	1.9 U	2.1 U	2.1 U	2.1 U	1.6 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.92 U	0.95 U	1.1 U	1 U	1 U	0.79 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.78 U	0.81 U	0.89 U	0.89 U	0.88 U	0.67 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.94 U	0.97 U	1.1 U	1.1 U	1.1 U	0.81 U
100-41-4	Ethylbenzene	ug/Kg	0.69 U	0.72 U	0.79 U	0.79 U	0.78 U	0.6 U
591-78-6	2-Hexanone	ug/Kg	1.2 U	1.2 U	1.3 U	1.3 U	1.3 U	1 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	1.8 U	1.8 U	2 U	2 U	2 U	1.5 U
108-10-1	methyl isobutyl ketone	ug/Kg	1.5 U	1.5 U	1.7 U	1.7 U	1.6 U	1.3 U
75-09-2	Methylene Chloride	ug/Kg	0.76 U	0.79 U	0.87 U	0.87 U	0.86 U	0.66 U
100-42-5	Styrene	ug/Kg	0.73 U	0.76 U	0.84 U	0.83 U	0.82 U	0.63 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	1.2 U	1.2 U	1.3 U	1.3 U	1.3 U	1 U
127-18-4	Tetrachloroethene	ug/Kg	0.78 U	0.81 U	0.89 U	0.89 U	3.2 J	2.1 J
108-88-3	Toluene	ug/Kg	0.86 U	0.89 U	0.98 U	0.98 U	0.97 U	0.74 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.87 U	0.9 U	0.99 U	0.99 U	0.98 U	0.75 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	1.8 U	1.8 U	2 U	2 U	2 U	1.5 U
79-01-6	Trichloroethene	ug/Kg	0.94 U	0.97 U	1.1 U	1.1 U	1.1 U	0.81 U
75-01-4	Vinyl chloride	ug/Kg	1.4 U	1.4 U	1.6 U	1.6 U	1.5 U	1.2 U
1330-20-7	Xylenes, Total	ug/Kg	1.5 U	1.5 U	1.7 U	1.7 U	1.6 U	1.3 U

Table AI.6
Task 4 - Sediment Sampling Data

		Location:	SD01	SD02	SD03	SD04	SD06	SD06
		Sample ID:	SD01-SD01-090409	SD02-SD01-090409	SD03-SD01-000.2-080801	SD04-SD01-090409	SD06-SD01-000.2-080801	SD06-SD02-000.2-080801
		Lab Sample Id:	500-18152-10	500-18152-8	500-12974-3	500-18152-6	500-12974-6	500-12974-7
		Depth:	NA	NA	0.2	NA	0.2	0.2
		SDG:	18152	18152	12974	18152	12974	12974
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	4/9/2009	4/9/2009	8/1/2008	4/9/2009	8/1/2008	8/1/2008
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA	NA	4.7 U	4.6 U
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA	NA	3.9 U	3.9 U
120-12-7	Anthracene	ug/Kg	NA	NA	NA	NA	4.3 U	4.3 U
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA	NA	18 J	4.6 U
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA	NA	67	3.4 U
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA	NA	64	8 U
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA	NA	27 J	6.3 U
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA	NA	43	7.8 U
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA	NA	23 U	23 U
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA	NA	24 U	24 U
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA	NA	31 U	31 U
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	15 U	15 U
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA	NA	16 U	16 U
86-74-8	Carbazole	ug/Kg	NA	NA	NA	NA	14 U	14 U
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA	NA	91 U	89 U
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA	NA	140 U	140 U
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA	NA	17 U	17 U
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA	NA	32 U	32 U
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA	NA	15 U	15 U
218-01-9	Chrysene	ug/Kg	NA	NA	NA	NA	36 J	5.7 U
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA	NA	9.7 J	4.5 U
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA	NA	14 U	14 U
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	18 U	18 U
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	19 U	19 U
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA	NA	20 U	20 U
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA	NA	54 J	54 U
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA	NA	40 U	39 U
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA	NA	19 U	19 U
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA	NA	68 U	67 U
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA	NA	14 U	14 U
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA	NA	15 U	15 U
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA	NA	17 U	17 U
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA	NA	45 U	44 U

Table AI.6
Task 4 - Sediment Sampling Data

		Location:	SD01	SD02	SD03	SD04	SD06	SD06
		Sample ID:	SD01-SD01-090409	SD02-SD01-090409	SD03-SD01-000.2-080801	SD04-SD01-090409	SD06-SD01-000.2-080801	SD06-SD02-000.2-080801
		Lab Sample Id:	500-18152-10	500-18152-8	500-12974-3	500-18152-6	500-12974-6	500-12974-7
		Depth:	NA	NA	0.2	NA	0.2	0.2
		SDG:	18152	18152	12974	18152	12974	12974
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	4/9/2009	4/9/2009	8/1/2008	4/9/2009	8/1/2008	8/1/2008
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA	NA	200 U	200 U
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	20 U	20 U
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA	NA	20 U	19 U
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA	NA	27 J	4.7 U
86-73-7	Fluorene	ug/Kg	NA	NA	NA	NA	3.9 U	3.9 U
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA	NA	5.4 U	5.3 U
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA	NA	22 U	21 U
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA	NA	130 R	120 U
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA	NA	20 U	19 U
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA	NA	27 J	4.7 U
78-59-1	Isophorone	ug/Kg	NA	NA	NA	NA	15 U	15 U
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA	NA	21 U	21 U
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA	NA	37 U	36 U
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA	NA	34 U	34 U
91-20-3	Naphthalene	ug/Kg	NA	NA	NA	NA	3.8 U	3.7 U
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA	NA	20 U	20 U
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA	NA	73 U	72 U
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA	NA	80 U	78 U
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA	NA	6.8 U	6.7 U
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA	NA	45 U	44 U
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA	NA	65 U	64 U
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA	NA	26 U	25 U
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA	NA	11 U	11 U
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA	NA	19 U	19 U
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA	NA	140 U	130 U
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA	NA	3.2 U	3.2 U
108-95-2	Phenol	ug/Kg	NA	NA	NA	NA	33 U	32 U
129-00-0	Pyrene	ug/Kg	NA	NA	NA	NA	47	4.3 U
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA	NA	18 U	18 U
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA	NA	52 U	51 U
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA	NA	37 U	37 U

Table AI.6
Task 4 - Sediment Sampling Data

		Location:	SD01	SD02	SD03	SD04	SD06	SD06
		Sample ID:	SD01-SD01-090409	SD02-SD01-090409	SD03-SD01-000.2-080801	SD04-SD01-090409	SD06-SD01-000.2-080801	SD06-SD02-000.2-080801
		Lab Sample Id:	500-18152-10	500-18152-8	500-12974-3	500-18152-6	500-12974-6	500-12974-7
		Depth:	NA	NA	0.2	NA	0.2	0.2
		SDG:	18152	18152	12974	18152	12974	12974
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	4/9/2009	4/9/2009	8/1/2008	4/9/2009	8/1/2008	8/1/2008
	COMPOUND	UNITS:						
	PESTCIDES							
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA	NA	0.59 J	0.59 U
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA	NA	0.37 U	0.37 U
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA	NA	1.5 J	0.34 U
309-00-2	Aldrin	ug/Kg	NA	NA	NA	NA	0.64 U	0.64 U
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA	NA	0.64 U	0.64 U
319-85-7	beta-BHC	ug/Kg	NA	NA	NA	NA	1 U	1 U
319-86-8	delta-BHC	ug/Kg	NA	NA	NA	NA	0.83 U	0.83 U
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA	NA	0.33 U	0.34 U
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA	NA	0.51 U	0.52 U
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA	NA	0.6 U	0.61 U
60-57-1	Dieldrin	ug/Kg	NA	NA	NA	NA	0.37 U	0.37 U
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA	NA	0.79 U	0.8 U
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA	NA	0.39 U	0.39 U
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA	NA	0.18 J	0.18 U
72-20-8	Endrin	ug/Kg	NA	NA	NA	NA	0.69 U	0.69 U
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA	NA	0.7 J	0.71 U
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA	NA	0.33 J	0.34 U
76-44-8	Heptachlor	ug/Kg	NA	NA	NA	NA	0.26 U	0.26 U
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA	NA	0.4 U	0.4 U
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA	NA	0.55 J	0.55 U
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA	NA	3.3 U	3.4 U
	PCBs							
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA	NA	8 U	8.1 U
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA	NA	10 U	10 U
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA	NA	6.9 U	6.9 U
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA	NA	11 U	11 U
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA	NA	9.7 U	9.8 U
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA	NA	6.7 U	6.7 U
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA	NA	6.9 U	6.9 U
	INORGANICS							
7440-38-2	Arsenic	mg/Kg	NA	NA	NA	NA	15 J	33 J
7440-39-3	Barium	mg/Kg	NA	NA	NA	NA	520 J	640
7440-43-9	Cadmium	mg/Kg	NA	NA	NA	NA	0.56 J	0.44 J
7440-47-3	Chromium	mg/Kg	NA	NA	NA	NA	58 J	21 J
7439-92-1	Lead	mg/Kg	NA	NA	NA	NA	28 J	52 J
7439-97-6	Mercury	ug/Kg	NA	NA	NA	NA	7.6 U	7.6 U
7782-49-2	Selenium	mg/Kg	NA	NA	NA	NA	0.42 U	0.53 J
7440-22-4	Silver	mg/Kg	NA	NA	NA	NA	0.44 J	0.29 J
7440-66-6	Zinc	mg/Kg	NA	NA	NA	NA	320 J	78 J

Table AI.6
Task 4 - Sediment Sampling Data

		Location:	SD08	SD11	SD910
		Sample ID:	SD08-SD01-000.2-080804	SD11-SD01-000.2-080804	SD910-SD01-000.2-080804
		Lab Sample Id:	500-13011-6	500-13011-5	500-13011-7
		Depth:	0.2	0.2	0.2
		SDG:	13011	13011	13011
		Matrix:	Soil	Soil	Soil
		Sampled:	8/4/2008	8/4/2008	8/4/2008
	COMPOUND	UNITS:			
	VOLATILES				
67-64-1	Acetone	ug/Kg	15 J	2 U	2.1 U
71-43-2	Benzene	ug/Kg	1.1 U	0.9 U	0.96 U
75-27-4	Bromodichloromethane	ug/Kg	0.99 U	0.83 U	0.88 U
75-25-2	Bromoform	ug/Kg	1.3 U	1.1 U	1.1 U
74-83-9	Bromomethane	ug/Kg	2.8 U	2.3 U	2.5 U
75-15-0	Carbon disulfide	ug/Kg	1.2 U	0.99 U	1.1 U
56-23-5	Carbon tetrachloride	ug/Kg	1.2 U	0.99 U	1.1 U
108-90-7	Chlorobenzene	ug/Kg	0.86 U	0.72 U	0.77 U
75-00-3	Chloroethane	ug/Kg	1.5 U	1.3 U	1.4 U
67-66-3	Chloroform	ug/Kg	1.2 U	1 U	1.1 U
74-87-3	Chloromethane	ug/Kg	2 U	1.7 U	1.8 U
124-48-1	Dibromochloromethane	ug/Kg	1 U	0.88 U	0.94 U
75-34-3	1,1-Dichloroethane	ug/Kg	1.2 U	1 U	1.1 U
107-06-2	1,2-Dichloroethane	ug/Kg	1.4 U	1.2 U	1.2 U
75-35-4	1,1-Dichloroethene	ug/Kg	1.1 U	0.93 U	0.99 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	2.4 U	2 U	2.1 U
78-87-5	1,2-Dichloropropane	ug/Kg	1.2 U	0.99 U	1.1 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	1 U	0.85 U	0.9 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	1.2 U	1 U	1.1 U
100-41-4	Ethylbenzene	ug/Kg	0.9 U	0.75 U	0.8 U
591-78-6	2-Hexanone	ug/Kg	1.5 U	1.3 U	1.4 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	2.3 U	1.9 U	2 U
108-10-1	methyl isobutyl ketone	ug/Kg	1.9 U	1.6 U	1.7 U
75-09-2	Methylene Chloride	ug/Kg	0.99 U	0.83 U	0.88 U
100-42-5	Styrene	ug/Kg	0.95 U	0.79 U	0.85 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	1.5 U	1.3 U	1.4 U
127-18-4	Tetrachloroethene	ug/Kg	1 U	0.85 U	0.9 U
108-88-3	Toluene	ug/Kg	1.1 U	0.93 U	0.99 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	1.1 U	0.94 U	1 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	2.3 U	1.9 U	2 U
79-01-6	Trichloroethene	ug/Kg	1.2 U	1 U	1.1 U
75-01-4	Vinyl chloride	ug/Kg	1.8 U	1.5 U	1.6 U
1330-20-7	Xylenes, Total	ug/Kg	1.9 U	1.6 U	1.7 U

Table AI.6
Task 4 - Sediment Sampling Data

		Location:	SD08	SD11	SD910
		Sample ID:	SD08-SD01-000.2-080804	SD11-SD01-000.2-080804	SD910-SD01-000.2-080804
		Lab Sample Id:	500-13011-6	500-13011-5	500-13011-7
		Depth:	0.2	0.2	0.2
		SDG:	13011	13011	13011
		Matrix:	Soil	Soil	Soil
		Sampled:	8/4/2008	8/4/2008	8/4/2008
	COMPOUND	UNITS:			
	SEMIVOLATILES				
83-32-9	Acenaphthene	ug/Kg	NA	NA	NA
208-96-8	Acenaphthylene	ug/Kg	NA	NA	NA
120-12-7	Anthracene	ug/Kg	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/Kg	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/Kg	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/Kg	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/Kg	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/Kg	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/Kg	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/Kg	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/Kg	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/Kg	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/Kg	NA	NA	NA
86-74-8	Carbazole	ug/Kg	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/Kg	NA	NA	NA
106-47-8	4-Chloroaniline	ug/Kg	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/Kg	NA	NA	NA
95-57-8	2-Chlorophenol	ug/Kg	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/Kg	NA	NA	NA
218-01-9	Chrysene	ug/Kg	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/Kg	NA	NA	NA
132-64-9	Dibenzofuran	ug/Kg	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/Kg	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/Kg	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/Kg	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/Kg	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/Kg	NA	NA	NA
84-66-2	Diethyl phthalate	ug/Kg	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/Kg	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/Kg	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/Kg	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/Kg	NA	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/Kg	NA	NA	NA

Table AI.6
Task 4 - Sediment Sampling Data

		Location:	SD08	SD11	SD910
		Sample ID:	SD08-SD01-000.2-080804	SD11-SD01-000.2-080804	SD910-SD01-000.2-080804
		Lab Sample Id:	500-13011-6	500-13011-5	500-13011-7
		Depth:	0.2	0.2	0.2
		SDG:	13011	13011	13011
		Matrix:	Soil	Soil	Soil
		Sampled:	8/4/2008	8/4/2008	8/4/2008
	COMPOUND	UNITS:			
	SEMIVOLATILES				
51-28-5	2,4-Dinitrophenol	ug/Kg	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/Kg	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/Kg	NA	NA	NA
206-44-0	Fluoranthene	ug/Kg	NA	NA	NA
86-73-7	Fluorene	ug/Kg	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/Kg	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/Kg	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/Kg	NA	NA	NA
67-72-1	Hexachloroethane	ug/Kg	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/Kg	NA	NA	NA
78-59-1	Isophorone	ug/Kg	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/Kg	NA	NA	NA
95-48-7	2-Methylphenol	ug/Kg	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/Kg	NA	NA	NA
91-20-3	Naphthalene	ug/Kg	NA	NA	NA
88-74-4	2-Nitroaniline	ug/Kg	NA	NA	NA
99-09-2	3-Nitroaniline	ug/Kg	NA	NA	NA
100-01-6	4-Nitroaniline	ug/Kg	NA	NA	NA
98-95-3	Nitrobenzene	ug/Kg	NA	NA	NA
88-75-5	2-Nitrophenol	ug/Kg	NA	NA	NA
100-02-7	4-Nitrophenol	ug/Kg	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/Kg	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/Kg	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/Kg	NA	NA	NA
87-86-5	Pentachlorophenol	ug/Kg	NA	NA	NA
85-01-8	Phenanthrene	ug/Kg	NA	NA	NA
108-95-2	Phenol	ug/Kg	NA	NA	NA
129-00-0	Pyrene	ug/Kg	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/Kg	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/Kg	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/Kg	NA	NA	NA

Table AI.6
Task 4 - Sediment Sampling Data

		Location:	SD08	SD11	SD910
		Sample ID:	SD08-SD01-000.2-080804	SD11-SD01-000.2-080804	SD910-SD01-000.2-080804
		Lab Sample Id:	500-13011-6	500-13011-5	500-13011-7
		Depth:	0.2	0.2	0.2
		SDG:	13011	13011	13011
		Matrix:	Soil	Soil	Soil
		Sampled:	8/4/2008	8/4/2008	8/4/2008
	COMPOUND	UNITS:			
	PESTCIDES				
72-54-8	4,4'-DDD	ug/Kg	NA	NA	NA
72-55-9	4,4'-DDE	ug/Kg	NA	NA	NA
50-29-3	4,4'-DDT	ug/Kg	NA	NA	NA
309-00-2	Aldrin	ug/Kg	NA	NA	NA
319-84-6	alpha-BHC	ug/Kg	NA	NA	NA
319-85-7	beta-BHC	ug/Kg	NA	NA	NA
319-86-8	delta-BHC	ug/Kg	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/Kg	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/Kg	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/Kg	NA	NA	NA
60-57-1	Dieldrin	ug/Kg	NA	NA	NA
959-98-8	Endosulfan I	ug/Kg	NA	NA	NA
33213-65-9	Endosulfan II	ug/Kg	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/Kg	NA	NA	NA
72-20-8	Endrin	ug/Kg	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/Kg	NA	NA	NA
53494-70-5	Endrin ketone	ug/Kg	NA	NA	NA
76-44-8	Heptachlor	ug/Kg	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/Kg	NA	NA	NA
72-43-5	Methoxychlor	ug/Kg	NA	NA	NA
8001-35-2	Toxaphene	ug/Kg	NA	NA	NA
	PCBs				
12674-11-2	PCB-1016	ug/Kg	NA	NA	NA
11104-28-2	PCB-1221	ug/Kg	NA	NA	NA
11141-16-5	PCB-1232	ug/Kg	NA	NA	NA
53469-21-9	PCB-1242	ug/Kg	NA	NA	NA
12672-29-6	PCB-1248	ug/Kg	NA	NA	NA
11097-69-1	PCB-1254	ug/Kg	NA	NA	NA
11096-82-5	PCB-1260	ug/Kg	NA	NA	NA
	INORGANICS				
7440-38-2	Arsenic	mg/Kg	NA	NA	NA
7440-39-3	Barium	mg/Kg	NA	NA	NA
7440-43-9	Cadmium	mg/Kg	NA	NA	NA
7440-47-3	Chromium	mg/Kg	NA	NA	NA
7439-92-1	Lead	mg/Kg	NA	NA	NA
7439-97-6	Mercury	ug/Kg	NA	NA	NA
7782-49-2	Selenium	mg/Kg	NA	NA	NA
7440-22-4	Silver	mg/Kg	NA	NA	NA
7440-66-6	Zinc	mg/Kg	NA	NA	NA

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	SW01	SW02	SW03	SW04	SW06	SW06
		Sample ID:	SW01-SW01-090409	SW02-SW01-090409	SW03-SW01-080801	SW04-SW01-090409	SW06-SW01-080801	SW06-SW02-080801
		Lab Sample Id:	500-18152-9	500-18152-7	500-12974-2	500-18152-5	500-12974-4	500-12974-5
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	18152	18152	12974	18152	12974	12974
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/9/2009	4/9/2009	8/1/2008	4/9/2009	8/1/2008	8/1/2008
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
71-43-2	Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 J	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	7.5	0.99 U	0.99 U	3.3	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	4.5	4.3
108-88-3	Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	SW01	SW02	SW03	SW04	SW06	SW06
		Sample ID:	SW01-SW01-090409	SW02-SW01-090409	SW03-SW01-080801	SW04-SW01-090409	SW06-SW01-080801	SW06-SW02-080801
		Lab Sample Id:	500-18152-9	500-18152-7	500-12974-2	500-18152-5	500-12974-4	500-12974-5
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	18152	18152	12974	18152	12974	12974
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/9/2009	4/9/2009	8/1/2008	4/9/2009	8/1/2008	8/1/2008
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA	0.057 U	0.056 U
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA	0.057 U	0.056 U
120-12-7	Anthracene	ug/L	NA	NA	NA	NA	0.067 U	0.065 U
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA	0.065 J	0.063 U
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA	0.044 U	0.042 U
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA	0.042 J	0.04 U
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA	0.11 U	0.11 U
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA	0.078 U	0.076 U
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA	0.14 U	0.13 U
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA	0.24 U	0.23 U
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA	1.9 U	1.8 U
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA	0.16 J	0.15 U
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA	0.2 U	0.19 U
86-74-8	Carbazole	ug/L	NA	NA	NA	NA	0.81 U	0.79 U
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA	2.4 U	2.3 U
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA	0.77 U	0.75 U
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA	0.17 U	0.16 U
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA	0.21 U	0.2 U
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA	0.24 U	0.23 U
218-01-9	Chrysene	ug/L	NA	NA	NA	NA	0.067 J	0.065 U
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA	0.056 U	0.055 U
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA	0.24 U	0.23 U
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA	0.2 U	0.19 U
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA	0.21 U	0.2 U
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA	0.2 U	0.19 U
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA	0.25 U	0.24 U
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA	3.2 U	3.1 U
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA	0.2 U	0.19 U
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA	1.1 U	1.1 U
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA	0.13 U	0.12 U
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA	0.63 U	0.62 U
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA	1.7 U	1.6 U
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA	1.8 U	1.7 U

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	SW01	SW02	SW03	SW04	SW06	SW06
		Sample ID:	SW01-SW01-090409	SW02-SW01-090409	SW03-SW01-080801	SW04-SW01-090409	SW06-SW01-080801	SW06-SW02-080801
		Lab Sample Id:	500-18152-9	500-18152-7	500-12974-2	500-18152-5	500-12974-4	500-12974-5
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	18152	18152	12974	18152	12974	12974
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/9/2009	4/9/2009	8/1/2008	4/9/2009	8/1/2008	8/1/2008
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA	3.1 U	3 U
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	0.45 U	0.43 U
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	0.12 U	0.12 U
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA	0.067 U	0.065 U
86-73-7	Fluorene	ug/L	NA	NA	NA	NA	0.056 U	0.055 U
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA	0.065 J	0.063 U
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA	0.25 U	0.24 U
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA	4.4 U	4.2 U
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA	0.25 U	0.24 U
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA	0.071 U	0.069 U
78-59-1	Isophorone	ug/L	NA	NA	NA	NA	0.57 U	0.56 U
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA	0.16 U	0.15 U
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA	0.43 U	0.41 U
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA	0.19 U	0.18 U
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA	0.099 U	0.096 U
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA	0.54 U	0.53 U
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA	0.99 U	0.96 U
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA	2.3 U	2.2 U
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA	0.3 U	0.29 U
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA	0.63 U	0.62 U
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA	2.4 U	2.3 U
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA	0.15 U	0.14 U
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA	0.2 U	0.19 U
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA	0.2 U	0.19 U
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA	2.1 U	2 U
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA	0.07 U	0.068 U
108-95-2	Phenol	ug/L	NA	NA	NA	NA	1.3 U	1.2 U
129-00-0	Pyrene	ug/L	NA	NA	NA	NA	0.07 J	0.068 U
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA	0.24 U	0.23 U
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA	2.6 U	2.5 U
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA	0.66 U	0.64 U

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	SW01	SW02	SW03	SW04	SW06	SW06
		Sample ID:	SW01-SW01-090409	SW02-SW01-090409	SW03-SW01-080801	SW04-SW01-090409	SW06-SW01-080801	SW06-SW02-080801
		Lab Sample Id:	500-18152-9	500-18152-7	500-12974-2	500-18152-5	500-12974-4	500-12974-5
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	18152	18152	12974	18152	12974	12974
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/9/2009	4/9/2009	8/1/2008	4/9/2009	8/1/2008	8/1/2008
	COMPOUND	UNITS:						
	PESTCIDES							
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA	0.0055 U	0.0055 U
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA	0.0047 U	0.0047 U
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA	0.0052 U	0.0052 U
309-00-2	Aldrin	ug/L	NA	NA	NA	NA	0.0042 U	0.0042 U
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA	0.0032 U	0.0032 U
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA	0.0034 U	0.0034 U
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA	0.0074 U	0.0074 U
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA	0.0034 U	0.0034 U
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA	0.0045 U	0.0045 U
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA	0.005 U	0.005 U
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA	0.0043 U	0.0043 U
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA	0.051	0.05
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA	0.0037 U	0.0037 U
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA	0.0077 U	0.0077 U
72-20-8	Endrin	ug/L	NA	NA	NA	NA	0.0083 U	0.0083 U
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA	0.0067 U	0.0067 U
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA	0.0052 U	0.0052 U
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA	0.0039 U	0.0039 U
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA	0.0038 U	0.0038 U
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA	0.011 U	0.011 U
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA	0.05 U	0.05 U
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA	0.093 U	0.093 U
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA	0.12 U	0.12 U
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA	0.2 U	0.2 U
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA	0.15 U	0.15 U
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA	0.23 U	0.23 U
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA	0.061 U	0.061 U
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA	0.073 U	0.073 U
	INORGANICS							
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA	0.0028 U	0.0028 U
7440-39-3	Barium	mg/L	NA	NA	NA	NA	0.16	0.16
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA	0.00046 U	0.00046 U
7440-47-3	Chromium	mg/L	NA	NA	NA	NA	0.0016 U	0.0016 U
7439-92-1	Lead	mg/L	NA	NA	NA	NA	0.0027 U	0.0018 U
7439-97-6	Mercury	ug/L	NA	NA	NA	NA	0.065 U	0.065 U
7782-49-2	Selenium	mg/L	NA	NA	NA	NA	0.0042 U	0.0042 U
7440-22-4	Silver	mg/L	NA	NA	NA	NA	0.0012 U	0.0012 U
7440-66-6	Zinc	mg/L	NA	NA	NA	NA	0.0048 U	0.0068 U

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	SW08	SW08	SW11	SW12	SW13	SW14
		Sample ID:	SW08-SW01-080804	SW08-SW01-090825	SW11-SW01-080804	SW12-SW01-090825	SW13-SW01-090825	SW14-SW01-090825
		Lab Sample Id:	500-13011-3	500-20828-2	500-13011-2	500-20828-3	500-20828-4	500-20828-5
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	13011	20828	13011	20828	20828	20828
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	8/4/2008	8/25/2009	8/4/2008	8/25/2009	8/25/2009	8/25/2009
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.2 U	1.2 R	1.2 U	1.2 R	1.2 R	1.2 R
71-43-2	Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	4.1	6.6	0.3 U	0.3 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	3.5	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
108-88-3	Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	2.3	1.5	0.2 U	0.2 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	3.6	0.23 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	SW08	SW08	SW11	SW12	SW13	SW14
		Sample ID:	SW08-SW01-080804	SW08-SW01-090825	SW11-SW01-080804	SW12-SW01-090825	SW13-SW01-090825	SW14-SW01-090825
		Lab Sample Id:	500-13011-3	500-20828-2	500-13011-2	500-20828-3	500-20828-4	500-20828-5
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	13011	20828	13011	20828	20828	20828
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	8/4/2008	8/25/2009	8/4/2008	8/25/2009	8/25/2009	8/25/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/L	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/L	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/L	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	SW08	SW08	SW11	SW12	SW13	SW14
		Sample ID:	SW08-SW01-080804	SW08-SW01-090825	SW11-SW01-080804	SW12-SW01-090825	SW13-SW01-090825	SW14-SW01-090825
		Lab Sample Id:	500-13011-3	500-20828-2	500-13011-2	500-20828-3	500-20828-4	500-20828-5
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	13011	20828	13011	20828	20828	20828
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	8/4/2008	8/25/2009	8/4/2008	8/25/2009	8/25/2009	8/25/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/L	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/L	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/L	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/L	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	SW08	SW08	SW11	SW12	SW13	SW14
		Sample ID:	SW08-SW01-080804	SW08-SW01-090825	SW11-SW01-080804	SW12-SW01-090825	SW13-SW01-090825	SW14-SW01-090825
		Lab Sample Id:	500-13011-3	500-20828-2	500-13011-2	500-20828-3	500-20828-4	500-20828-5
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	13011	20828	13011	20828	20828	20828
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	8/4/2008	8/25/2009	8/4/2008	8/25/2009	8/25/2009	8/25/2009
	COMPOUND	UNITS:						
	PESTCIDES							
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/L	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/L	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA	NA	NA
	INORGANICS							
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/L	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/L	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/L	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/L	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/L	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/L	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/L	NA	NA	NA	NA	NA	NA

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	SW8	SW8U1	SW8U2	SW8U3	SW910	MW4
		Sample ID:	SW8-SW01-090408	SW8U1-SW01-090409	SW8U2-SW01-090409	SW8U3-SW01-090429	SW910-SW01-080808	MW4-TB01-090825
		Lab Sample Id:	500-18152-1	500-18152-3	500-18152-4	500-18572-1	500-13011-4	500-20828-9
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	18152	18152	18152	18572	13011	20828
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/8/2009	4/9/2009	4/9/2009	4/29/2009	8/4/2008	8/25/2009
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	1.2 U	1.2 U	1.2 U	1.2 R	1.2 U	1.2 R
71-43-2	Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U	6	0.3 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	14	2.2	19	0.14 U	0.14 U	0.14 U
108-88-3	Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	2.2	0.2 U	2.8	0.2 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	SW8	SW8U1	SW8U2	SW8U3	SW910	MW4
		Sample ID:	SW8-SW01-090408	SW8U1-SW01-090409	SW8U2-SW01-090409	SW8U3-SW01-090429	SW910-SW01-080808	MW4-TB01-090825
		Lab Sample Id:	500-18152-1	500-18152-3	500-18152-4	500-18572-1	500-13011-4	500-20828-9
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	18152	18152	18152	18572	13011	20828
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/8/2009	4/9/2009	4/9/2009	4/29/2009	8/4/2008	8/25/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA	NA	NA
120-12-7	Anthracene	ug/L	NA	NA	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
86-74-8	Carbazole	ug/L	NA	NA	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA	NA	NA
218-01-9	Chrysene	ug/L	NA	NA	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	SW8	SW8U1	SW8U2	SW8U3	SW910	MW4
		Sample ID:	SW8-SW01-090408	SW8U1-SW01-090409	SW8U2-SW01-090409	SW8U3-SW01-090429	SW910-SW01-080808	MW4-TB01-090825
		Lab Sample Id:	500-18152-1	500-18152-3	500-18152-4	500-18572-1	500-13011-4	500-20828-9
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	18152	18152	18152	18572	13011	20828
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/8/2009	4/9/2009	4/9/2009	4/29/2009	8/4/2008	8/25/2009
	COMPOUND	UNITS:						
	SEMIVOLATILES							
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA	NA	NA
86-73-7	Fluorene	ug/L	NA	NA	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA	NA	NA
78-59-1	Isophorone	ug/L	NA	NA	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA	NA	NA
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA	NA	NA
108-95-2	Phenol	ug/L	NA	NA	NA	NA	NA	NA
129-00-0	Pyrene	ug/L	NA	NA	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA	NA	NA

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	SW8	SW8U1	SW8U2	SW8U3	SW910	MW4
		Sample ID:	SW8-SW01-090408	SW8U1-SW01-090409	SW8U2-SW01-090409	SW8U3-SW01-090429	SW910-SW01-080808	MW4-TB01-090825
		Lab Sample Id:	500-18152-1	500-18152-3	500-18152-4	500-18572-1	500-13011-4	500-20828-9
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	18152	18152	18152	18572	13011	20828
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	4/8/2009	4/9/2009	4/9/2009	4/29/2009	8/4/2008	8/25/2009
	COMPOUND	UNITS:						
	PESTCIDES							
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA	NA	NA
309-00-2	Aldrin	ug/L	NA	NA	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA	NA	NA
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA	NA	NA
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA	NA	NA
72-20-8	Endrin	ug/L	NA	NA	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA	NA	NA
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA	NA	NA
	PCBs							
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA	NA	NA
	INORGANICS							
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA	NA	NA
7440-39-3	Barium	mg/L	NA	NA	NA	NA	NA	NA
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA	NA	NA
7440-47-3	Chromium	mg/L	NA	NA	NA	NA	NA	NA
7439-92-1	Lead	mg/L	NA	NA	NA	NA	NA	NA
7439-97-6	Mercury	ug/L	NA	NA	NA	NA	NA	NA
7782-49-2	Selenium	mg/L	NA	NA	NA	NA	NA	NA
7440-22-4	Silver	mg/L	NA	NA	NA	NA	NA	NA
7440-66-6	Zinc	mg/L	NA	NA	NA	NA	NA	NA

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	MW9R	SW03	SW11	SW8
		Sample ID:	MW9R-TB01-090428	SW03-TB01-080801	SW11-TB01-080804	SW8-TB01-090408
		Lab Sample Id:	500-18572-2	500-12974-1	500-13011-1	500-18152-2
		Depth:	NA	NA	NA	NA
		SDG:	18572	12974	13011	18152
		Matrix:	Water	Water	Water	Water
		Sampled:	4/28/2009	8/1/2008	8/4/2008	4/8/2009
	COMPOUND	UNITS:				
	VOLATILES					
67-64-1	Acetone	ug/L	1.2 R	1.2 U	1.2 U	1.2 U
71-43-2	Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U
78-93-3	2-Butanone (MEK)	ug/L	0.83 U	0.83 U	0.83 U	0.83 U
108-10-1	4-Methyl-2-pentanone (MIBK)	ug/L	0.58 U	0.58 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/L	0.99 U	0.99 U	0.99 U	0.99 U
100-42-5	Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U
108-88-3	Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/L	0.23 U	0.23 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	MW9R	SW03	SW11	SW8
		Sample ID:	MW9R-TB01-090428	SW03-TB01-080801	SW11-TB01-080804	SW8-TB01-090408
		Lab Sample Id:	500-18572-2	500-12974-1	500-13011-1	500-18152-2
		Depth:	NA	NA	NA	NA
		SDG:	18572	12974	13011	18152
		Matrix:	Water	Water	Water	Water
		Sampled:	4/28/2009	8/1/2008	8/4/2008	4/8/2009
	COMPOUND	UNITS:				
	SEMIVOLATILES					
83-32-9	Acenaphthene	ug/L	NA	NA	NA	NA
208-96-8	Acenaphthylene	ug/L	NA	NA	NA	NA
120-12-7	Anthracene	ug/L	NA	NA	NA	NA
56-55-3	Benzo[a]anthracene	ug/L	NA	NA	NA	NA
50-32-8	Benzo[a]pyrene	ug/L	NA	NA	NA	NA
205-99-2	Benzo[b]fluoranthene	ug/L	NA	NA	NA	NA
191-24-2	Benzo[g,h,i]perylene	ug/L	NA	NA	NA	NA
207-08-9	Benzo[k]fluoranthene	ug/L	NA	NA	NA	NA
111-91-1	Bis(2-chloroethoxy)methane	ug/L	NA	NA	NA	NA
111-44-4	Bis(2-chloroethyl)ether	ug/L	NA	NA	NA	NA
117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	NA	NA	NA	NA
101-55-3	4-Bromophenyl phenyl ether	ug/L	NA	NA	NA	NA
85-68-7	Butyl benzyl phthalate	ug/L	NA	NA	NA	NA
86-74-8	Carbazole	ug/L	NA	NA	NA	NA
59-50-7	4-Chloro-3-methylphenol	ug/L	NA	NA	NA	NA
106-47-8	4-Chloroaniline	ug/L	NA	NA	NA	NA
91-58-7	2-Chloronaphthalene	ug/L	NA	NA	NA	NA
95-57-8	2-Chlorophenol	ug/L	NA	NA	NA	NA
7005-72-3	4-Chlorophenyl phenyl ether	ug/L	NA	NA	NA	NA
218-01-9	Chrysene	ug/L	NA	NA	NA	NA
53-70-3	Dibenz(a,h)anthracene	ug/L	NA	NA	NA	NA
132-64-9	Dibenzofuran	ug/L	NA	NA	NA	NA
95-50-1	1,2-Dichlorobenzene	ug/L	NA	NA	NA	NA
541-73-1	1,3-Dichlorobenzene	ug/L	NA	NA	NA	NA
106-46-7	1,4-Dichlorobenzene	ug/L	NA	NA	NA	NA
91-94-1	3,3'-Dichlorobenzidine	ug/L	NA	NA	NA	NA
120-83-2	2,4-Dichlorophenol	ug/L	NA	NA	NA	NA
84-66-2	Diethyl phthalate	ug/L	NA	NA	NA	NA
105-67-9	2,4-Dimethylphenol	ug/L	NA	NA	NA	NA
131-11-3	Dimethyl phthalate	ug/L	NA	NA	NA	NA
84-74-2	Di-n-butyl phthalate	ug/L	NA	NA	NA	NA
117-84-0	Di-n-octyl phthalate	ug/L	NA	NA	NA	NA
534-52-1	4,6-Dinitro-2-methylphenol	ug/L	NA	NA	NA	NA

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	MW9R	SW03	SW11	SW8
		Sample ID:	MW9R-TB01-090428	SW03-TB01-080801	SW11-TB01-080804	SW8-TB01-090408
		Lab Sample Id:	500-18572-2	500-12974-1	500-13011-1	500-18152-2
		Depth:	NA	NA	NA	NA
		SDG:	18572	12974	13011	18152
		Matrix:	Water	Water	Water	Water
		Sampled:	4/28/2009	8/1/2008	8/4/2008	4/8/2009
	COMPOUND	UNITS:				
	SEMIVOLATILES					
51-28-5	2,4-Dinitrophenol	ug/L	NA	NA	NA	NA
121-14-2	2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA
606-20-2	2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA
206-44-0	Fluoranthene	ug/L	NA	NA	NA	NA
86-73-7	Fluorene	ug/L	NA	NA	NA	NA
118-74-1	Hexachlorobenzene	ug/L	NA	NA	NA	NA
87-68-3	Hexachlorobutadiene	ug/L	NA	NA	NA	NA
77-47-4	Hexachlorocyclopentadiene	ug/L	NA	NA	NA	NA
67-72-1	Hexachloroethane	ug/L	NA	NA	NA	NA
193-39-5	Indeno[1,2,3-cd]pyrene	ug/L	NA	NA	NA	NA
78-59-1	Isophorone	ug/L	NA	NA	NA	NA
91-57-6	2-Methylnaphthalene	ug/L	NA	NA	NA	NA
95-48-7	2-Methylphenol	ug/L	NA	NA	NA	NA
15831-10-4	3 & 4 Methylphenol	ug/L	NA	NA	NA	NA
91-20-3	Naphthalene	ug/L	NA	NA	NA	NA
88-74-4	2-Nitroaniline	ug/L	NA	NA	NA	NA
99-09-2	3-Nitroaniline	ug/L	NA	NA	NA	NA
100-01-6	4-Nitroaniline	ug/L	NA	NA	NA	NA
98-95-3	Nitrobenzene	ug/L	NA	NA	NA	NA
88-75-5	2-Nitrophenol	ug/L	NA	NA	NA	NA
100-02-7	4-Nitrophenol	ug/L	NA	NA	NA	NA
621-64-7	N-Nitrosodi-n-propylamine	ug/L	NA	NA	NA	NA
86-30-6	N-Nitrosodiphenylamine	ug/L	NA	NA	NA	NA
108-60-1	2,2'-oxybis[1-chloropropane]	ug/L	NA	NA	NA	NA
87-86-5	Pentachlorophenol	ug/L	NA	NA	NA	NA
85-01-8	Phenanthrene	ug/L	NA	NA	NA	NA
108-95-2	Phenol	ug/L	NA	NA	NA	NA
129-00-0	Pyrene	ug/L	NA	NA	NA	NA
120-82-1	1,2,4-Trichlorobenzene	ug/L	NA	NA	NA	NA
95-95-4	2,4,5-Trichlorophenol	ug/L	NA	NA	NA	NA
88-06-2	2,4,6-Trichlorophenol	ug/L	NA	NA	NA	NA

Table AI.7
Task 4 - Surface Water Sampling Data

		Location:	MW9R	SW03	SW11	SW8
		Sample ID:	MW9R-TB01-090428	SW03-TB01-080801	SW11-TB01-080804	SW8-TB01-090408
		Lab Sample Id:	500-18572-2	500-12974-1	500-13011-1	500-18152-2
		Depth:	NA	NA	NA	NA
		SDG:	18572	12974	13011	18152
		Matrix:	Water	Water	Water	Water
		Sampled:	4/28/2009	8/1/2008	8/4/2008	4/8/2009
	COMPOUND	UNITS:				
	PESTCIDES					
72-54-8	4,4'-DDD	ug/L	NA	NA	NA	NA
72-55-9	4,4'-DDE	ug/L	NA	NA	NA	NA
50-29-3	4,4'-DDT	ug/L	NA	NA	NA	NA
309-00-2	Aldrin	ug/L	NA	NA	NA	NA
319-84-6	alpha-BHC	ug/L	NA	NA	NA	NA
319-85-7	beta-BHC	ug/L	NA	NA	NA	NA
319-86-8	delta-BHC	ug/L	NA	NA	NA	NA
58-89-9	gamma-BHC (Lindane)	ug/L	NA	NA	NA	NA
5103-71-9	alpha-Chlordane	ug/L	NA	NA	NA	NA
5103-74-2	gamma-Chlordane	ug/L	NA	NA	NA	NA
60-57-1	Dieldrin	ug/L	NA	NA	NA	NA
959-98-8	Endosulfan I	ug/L	NA	NA	NA	NA
33213-65-9	Endosulfan II	ug/L	NA	NA	NA	NA
1031-07-8	Endosulfan sulfate	ug/L	NA	NA	NA	NA
72-20-8	Endrin	ug/L	NA	NA	NA	NA
7421-93-4	Endrin aldehyde	ug/L	NA	NA	NA	NA
53494-70-5	Endrin ketone	ug/L	NA	NA	NA	NA
76-44-8	Heptachlor	ug/L	NA	NA	NA	NA
1024-57-3	Heptachlor epoxide	ug/L	NA	NA	NA	NA
72-43-5	Methoxychlor	ug/L	NA	NA	NA	NA
8001-35-2	Toxaphene	ug/L	NA	NA	NA	NA
	PCBs					
12674-11-2	PCB-1016	ug/L	NA	NA	NA	NA
11104-28-2	PCB-1221	ug/L	NA	NA	NA	NA
11141-16-5	PCB-1232	ug/L	NA	NA	NA	NA
53469-21-9	PCB-1242	ug/L	NA	NA	NA	NA
12672-29-6	PCB-1248	ug/L	NA	NA	NA	NA
11097-69-1	PCB-1254	ug/L	NA	NA	NA	NA
11096-82-5	PCB-1260	ug/L	NA	NA	NA	NA
	INORGANICS					
7440-38-2	Arsenic	mg/L	NA	NA	NA	NA
7440-39-3	Barium	mg/L	NA	NA	NA	NA
7440-43-9	Cadmium	mg/L	NA	NA	NA	NA
7440-47-3	Chromium	mg/L	NA	NA	NA	NA
7439-92-1	Lead	mg/L	NA	NA	NA	NA
7439-97-6	Mercury	ug/L	NA	NA	NA	NA
7782-49-2	Selenium	mg/L	NA	NA	NA	NA
7440-22-4	Silver	mg/L	NA	NA	NA	NA
7440-66-6	Zinc	mg/L	NA	NA	NA	NA

Table AI.8
Task 5 - Sewer Sediment and Soil (Adjacent to Sewer defects) Sampling Data - Sewer Downgradient of the Former Kellwood Facility

		Location:	LS4	MH145	MH331	MH407	MH409	MH409
		Sample ID:	LS4-SD01-070920	MH155-SD01-070919	MH331-SD-070918	MH407-SD01-070913	MH409-SD01-070913	MH409-SD02-070913
		Lab Sample Id:	500-6721-4	500-6675-3	500-6674-4	500-6548-9	500-6547-12	500-6547-13
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	6721	6675	6674	6548	6547	6547
		Matrix:	Soil	Soil	Soil	Soil	Soil	Soil
		Sampled:	9/20/2007	9/19/2007	9/18/2007	9/13/2007	9/13/2007	9/13/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/Kg	15 U	4800	79 U	63 UJ	710 U	700 U
71-43-2	Benzene	ug/Kg	2.3 U	12 U	13 U	10 UJ	51 U	50 U
75-27-4	Bromodichloromethane	ug/Kg	2.2 U	10 U	10 U	8.4 UJ	98 U	97 U
75-25-2	Bromoform	ug/Kg	2.2 U	13 U	14 U	11 UJ	200 U	200 U
74-83-9	Bromomethane	ug/Kg	6 U	55 U	57 U	45 UJ	560 U	550 U
75-15-0	Carbon disulfide	ug/Kg	5.5 U	18 U	18 U	15 UJ	100 U	100 U
56-23-5	Carbon tetrachloride	ug/Kg	3.5 U	13 U	13 U	11 UJ	340 U	340 U
108-90-7	Chlorobenzene	ug/Kg	3.1 U	9.9 U	10 U	8.2 UJ	140 U	140 U
75-00-3	Chloroethane	ug/Kg	8 U	55 U	57 U	45 UJ	220 U	220 U
67-66-3	Chloroform	ug/Kg	2.1 U	12 U	12 U	10 UJ	120 U	110 U
74-87-3	Chloromethane	ug/Kg	4.1 U	23 U	24 U	19 UJ	240 U	230 U
124-48-1	Dibromochloromethane	ug/Kg	2.7 U	11 U	12 U	9.5 UJ	150 U	150 U
75-34-3	1,1-Dichloroethane	ug/Kg	2.3 U	10 U	11 U	8.7 UJ	120 U	110 U
107-06-2	1,2-Dichloroethane	ug/Kg	2.8 U	9.7 U	10 U	8.1 UJ	140 U	140 U
75-35-4	1,1-Dichloroethene	ug/Kg	4.9 U	23 U	24 U	19 UJ	160 U	150 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	4.3 U	23 U	24 U	19 UJ	220 U	220 U
78-87-5	1,2-Dichloropropane	ug/Kg	2.5 U	9.7 U	10 U	8.1 UJ	150 U	150 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	2.6 U	10 U	11 U	8.5 UJ	110 U	110 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	2.1 U	11 U	11 U	8.8 UJ	210 U	210 U
100-41-4	Ethylbenzene	ug/Kg	3.2 U	11 U	12 U	9.4 UJ	98 U	97 U
591-78-6	2-Hexanone	ug/Kg	6 U	21 U	22 U	18 UJ	710 U	700 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	8 U	2500	40 U	32 UJ	640 U	630 U
108-10-1	methyl isobutyl ketone	ug/Kg	3.8 U	13 U	13 U	11 UJ	730 U	720 U
75-09-2	Methylene Chloride	ug/Kg	5.5 U	28 U	29 U	100 J	340 U	340 U
100-42-5	Styrene	ug/Kg	2.2 U	11 U	11 U	9.1 UJ	180 U	180 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	2.9 U	13 U	13 U	10 UJ	160 U	150 U
127-18-4	Tetrachloroethene	ug/Kg	3.5 U	16 U	170	290 J	220 U	220 U
108-88-3	Toluene	ug/Kg	2.8 U	30 U	31 U	25 UJ	1300	68 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	2.7 U	13 U	13 U	11 UJ	92 U	91 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	4.6 U	15 U	15 U	12 UJ	190 U	190 U
79-01-6	Trichloroethene	ug/Kg	3.9 U	12 U	12 U	9.7 UJ	130 U	130 U
75-01-4	Vinyl chloride	ug/Kg	3.6 U	14 U	14 U	11 UJ	140 U	140 U
1330-20-7	Xylenes, Total	ug/Kg	8 U	32 U	33 U	26 UJ	250 U	240 U

Table AI.8
Task 5 - Sewer Sediment and Soil (Adjacent to Sewer defects) Sampling Data - Sewer Downgradient of the Former Kellwood Facility

		Location:	SDF1	SDF1	SDF2	SDF2	SDF3
		Sample ID:	SDF1-SS01-006.0-080512	SDF1-SS01-011.0-080512	SDF2-SS01-006.0-080513	SDF2-SS01-014.0-080513	SDF3-SS01-005.0-080513
		Lab Sample Id:	500-11312-6	500-11312-1	500-11312-2	500-11312-4	500-11312-9
		Depth:	6	11	6	14	5
		SDG:	11312	11312	11312	11312	11312
		Matrix:	Soil	Soil	Soil	Soil	Soil
		Sampled:	5/12/2008	5/12/2008	5/13/2008	5/13/2008	5/13/2008
	COMPOUND	UNITS:					
	VOLATILES						
67-64-1	Acetone	ug/Kg	1.9 U	1.9 U	99	72 U	2.2 U
71-43-2	Benzene	ug/Kg	0.84 U	0.87 U	0.77 U	0.91 U	0.97 U
75-27-4	Bromodichloromethane	ug/Kg	0.77 U	0.8 U	0.71 U	0.83 U	0.89 U
75-25-2	Bromoform	ug/Kg	0.98 U	1 U	0.91 U	1.1 U	1.1 U
74-83-9	Bromomethane	ug/Kg	2.2 U	2.3 U	2 U	2.4 U	2.5 U
75-15-0	Carbon disulfide	ug/Kg	0.92 U	0.96 U	0.85 U	1 U	1.1 U
56-23-5	Carbon tetrachloride	ug/Kg	0.92 U	0.96 U	0.85 U	1 U	1.1 U
108-90-7	Chlorobenzene	ug/Kg	0.67 U	0.7 U	0.62 U	0.73 U	0.78 U
75-00-3	Chloroethane	ug/Kg	1.2 U	1.2 U	1.1 U	1.3 U	1.4 U
67-66-3	Chloroform	ug/Kg	0.96 U	1 U	0.89 U	1 U	1.1 U
74-87-3	Chloromethane	ug/Kg	1.6 U	1.6 U	1.4 U	1.7 U	1.8 U
124-48-1	Dibromochloromethane	ug/Kg	0.82 U	0.85 U	0.75 U	0.89 U	0.95 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.94 U	0.98 U	0.87 U	1 U	1.1 U
107-06-2	1,2-Dichloroethane	ug/Kg	1.1 U	1.1 U	1 U	1.2 U	1.3 U
75-35-4	1,1-Dichloroethene	ug/Kg	0.87 U	0.9 U	0.8 U	0.94 U	1 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.9 U	1.9 U	1.7 U	2 U	2.2 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.92 U	0.96 U	0.85 U	1 U	1.1 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.79 U	0.82 U	0.72 U	0.86 U	0.91 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.94 U	0.98 U	0.87 U	1 U	1.1 U
100-41-4	Ethylbenzene	ug/Kg	0.7 U	0.73 U	0.64 U	0.76 U	0.81 U
591-78-6	2-Hexanone	ug/Kg	1.2 U	1.2 U	1.1 U	1.3 U	1.4 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	1.8 U	1.8 U	19	6.3	2.1 U
108-10-1	methyl isobutyl ketone	ug/Kg	1.5 U	1.5 U	1.4 U	1.6 U	1.7 U
75-09-2	Methylene Chloride	ug/Kg	0.77 U	0.8 U	0.71 U	0.83 U	0.89 U
100-42-5	Styrene	ug/Kg	0.74 U	0.77 U	0.68 U	0.8 U	0.86 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	1.2 U	1.2 U	1.1 U	1.3 U	1.4 U
127-18-4	Tetrachloroethene	ug/Kg	0.79 U	0.82 U	0.72 U	0.86 U	0.91 U
108-88-3	Toluene	ug/Kg	0.87 U	0.9 U	0.8 U	0.94 U	1 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.88 U	0.91 U	0.81 U	0.95 U	1 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	1.8 U	1.8 U	1.6 U	1.9 U	2.1 U
79-01-6	Trichloroethene	ug/Kg	0.94 U	0.98 U	0.87 U	1 U	1.1 U
75-01-4	Vinyl chloride	ug/Kg	1.4 U	1.4 U	1.3 U	1.5 U	1.6 U
1330-20-7	Xylenes, Total	ug/Kg	1.5 U	1.5 U	1.4 U	1.6 U	1.7 U

Table AI.8
Task 5 - Sewer Sediment and Soil (Adjacent to Sewer defects) Sampling Data - Sewer Downgradient of the Former Kellwood Facility

		Location:	SDF3	SDF4	SDF4	SDF5	SDF5
		Sample ID:	SDF3-SS01-007.0-080513	SDF4-SS01-006.0-080513	SDF4-SS01-008.0-080513	SDF5-SS01-006.0-080513	SDF5-SS01-008.0-080513
		Lab Sample Id:	500-11312-7	500-11312-8	500-11312-3	500-11312-5	500-11312-10
		Depth:	7	6	8	6	8
		SDG:	11312	11312	11312	11312	11312
		Matrix:	Soil	Soil	Soil	Soil	Soil
		Sampled:	5/13/2008	5/13/2008	5/13/2008	5/13/2008	5/13/2008
	COMPOUND	UNITS:					
	VOLATILES						
67-64-1	Acetone	ug/Kg	1.8 U	2 U	1.6 U	2 U	1.7 U
71-43-2	Benzene	ug/Kg	0.8 U	0.9 U	0.7 U	0.91 U	0.77 U
75-27-4	Bromodichloromethane	ug/Kg	0.73 U	0.83 U	0.64 U	0.84 U	0.71 U
75-25-2	Bromoform	ug/Kg	0.94 U	1.1 U	0.82 U	1.1 U	0.91 U
74-83-9	Bromomethane	ug/Kg	2.1 U	2.3 U	1.8 U	2.4 U	2 U
75-15-0	Carbon disulfide	ug/Kg	0.88 U	1 U	0.77 U	3.1 J	0.85 U
56-23-5	Carbon tetrachloride	ug/Kg	0.88 U	1 U	0.77 U	1 U	0.85 U
108-90-7	Chlorobenzene	ug/Kg	0.64 U	0.72 U	0.56 U	0.73 U	0.62 U
75-00-3	Chloroethane	ug/Kg	1.1 U	1.3 U	0.98 U	1.3 U	1.1 U
67-66-3	Chloroform	ug/Kg	0.92 U	1 U	0.8 U	1.1 U	0.89 U
74-87-3	Chloromethane	ug/Kg	1.5 U	1.7 U	1.3 U	1.7 U	1.4 U
124-48-1	Dibromochloromethane	ug/Kg	0.78 U	0.88 U	0.68 U	0.89 U	0.75 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.9 U	1 U	0.79 U	1 U	0.87 U
107-06-2	1,2-Dichloroethane	ug/Kg	1 U	1.2 U	0.9 U	1.2 U	1 U
75-35-4	1,1-Dichloroethene	ug/Kg	0.83 U	0.93 U	0.72 U	0.95 U	0.8 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.8 U	2 U	1.6 U	2 U	1.7 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.88 U	1 U	0.77 U	1 U	0.85 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.75 U	0.85 U	0.65 U	0.86 U	0.72 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.9 U	1 U	0.79 U	1 U	0.87 U
100-41-4	Ethylbenzene	ug/Kg	0.67 U	0.75 U	0.58 U	0.76 U	0.64 U
591-78-6	2-Hexanone	ug/Kg	1.1 U	1.3 U	0.98 U	1.3 U	1.1 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	1.7 U	1.9 U	1.5 U	1.9 U	1.6 U
108-10-1	methyl isobutyl ketone	ug/Kg	1.4 U	1.6 U	1.2 U	1.6 U	1.4 U
75-09-2	Methylene Chloride	ug/Kg	0.73 U	0.83 U	0.64 U	0.84 U	0.71 U
100-42-5	Styrene	ug/Kg	0.7 U	0.79 U	0.61 U	0.81 U	0.68 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	1.1 U	1.3 U	0.98 U	1.3 U	1.1 U
127-18-4	Tetrachloroethene	ug/Kg	0.75 U	0.85 U	0.65 U	0.86 U	0.72 U
108-88-3	Toluene	ug/Kg	0.83 U	0.93 U	0.72 U	0.95 U	0.8 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.84 U	0.94 U	0.73 U	0.96 U	0.81 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	1.7 U	1.9 U	1.5 U	1.9 U	1.6 U
79-01-6	Trichloroethene	ug/Kg	0.9 U	1 U	0.79 U	1 U	0.87 U
75-01-4	Vinyl chloride	ug/Kg	1.3 U	1.5 U	1.1 U	1.5 U	1.3 U
1330-20-7	Xylenes, Total	ug/Kg	1.4 U	1.6 U	1.2 U	1.6 U	1.4 U

Table AI.8
Task 5 - Sewer Sediment and Soil (Adjacent to Sewer defects) Sampling Data - Sewer Downgradient of the Former Kellwood Facility

		Location:	SDF5	SDF1	SDF3
		Sample ID:	SDF5-SS02-008.0-080513	SDF1-TB01-080512	SDF3-EB01-080513
		Lab Sample Id:	500-11312-11	500-11312-13	500-11312-12
		Depth:	8	NA	NA
		SDG:	11312	11312	11312
		Matrix:	Soil	Water	Water
		Sampled:	5/13/2008	5/12/2008	5/13/2008
	COMPOUND	UNITS:		ug/L	ug/L
	VOLATILES				
67-64-1	Acetone	ug/Kg	1.8 U	1.2 U	8.3
71-43-2	Benzene	ug/Kg	0.8 U	0.16 U	0.16 U
75-27-4	Bromodichloromethane	ug/Kg	0.74 U	0.18 U	0.18 U
75-25-2	Bromoform	ug/Kg	0.95 U	0.3 U	0.3 U
74-83-9	Bromomethane	ug/Kg	2.1 U	0.44 U	0.44 U
75-15-0	Carbon disulfide	ug/Kg	0.89 U	0.39 U	0.39 U
56-23-5	Carbon tetrachloride	ug/Kg	0.89 U	0.21 U	0.21 U
108-90-7	Chlorobenzene	ug/Kg	0.64 U	0.17 U	0.17 U
75-00-3	Chloroethane	ug/Kg	1.1 U	0.45 U	0.45 U
67-66-3	Chloroform	ug/Kg	0.93 U	0.13 U	0.13 U
74-87-3	Chloromethane	ug/Kg	1.5 U	0.33 U	0.33 U
124-48-1	Dibromochloromethane	ug/Kg	0.78 U	0.19 U	0.19 U
75-34-3	1,1-Dichloroethane	ug/Kg	0.91 U	0.18 U	0.18 U
107-06-2	1,2-Dichloroethane	ug/Kg	1 U	0.22 U	0.22 U
75-35-4	1,1-Dichloroethene	ug/Kg	0.83 U	0.22 U	0.22 U
540-59-0	1,2-Dichloroethene, Total	ug/Kg	1.8 U	0.3 U	0.3 U
78-87-5	1,2-Dichloropropane	ug/Kg	0.89 U	0.23 U	0.23 U
10061-01-5	cis-1,3-Dichloropropene	ug/Kg	0.76 U	0.16 U	0.16 U
10061-02-6	trans-1,3-Dichloropropene	ug/Kg	0.91 U	0.13 U	0.13 U
100-41-4	Ethylbenzene	ug/Kg	0.67 U	0.17 U	0.17 U
591-78-6	2-Hexanone	ug/Kg	1.1 U	0.77 U	0.77 U
78-93-3	Methyl Ethyl Ketone	ug/Kg	1.7 U	0.83 U	0.83 U
108-10-1	methyl isobutyl ketone	ug/Kg	1.4 U	0.58 U	0.58 U
75-09-2	Methylene Chloride	ug/Kg	0.74 U	0.99 U	0.99 U
100-42-5	Styrene	ug/Kg	0.71 U	0.15 U	0.15 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/Kg	1.1 U	0.25 U	0.25 U
127-18-4	Tetrachloroethene	ug/Kg	0.76 U	0.14 U	0.14 U
108-88-3	Toluene	ug/Kg	0.83 U	0.16 U	0.16 U
71-55-6	1,1,1-Trichloroethane	ug/Kg	0.84 U	0.23 U	0.23 U
79-00-5	1,1,2-Trichloroethane	ug/Kg	1.7 U	0.32 U	0.32 U
79-01-6	Trichloroethene	ug/Kg	0.91 U	0.2 U	0.2 U
75-01-4	Vinyl chloride	ug/Kg	1.3 U	0.23 U	0.23 U
1330-20-7	Xylenes, Total	ug/Kg	1.4 U	0.33 U	0.33 U

Table AI.9
Task 5 - Sewer Water Sampling Data - Sewer Downgradient of Former Kellwood Facility

Kellwood		Location:	LS4	MH145	MH156	MH156	MH331	MH405
		Sample ID:	LS4-SR01-070920	MH155-SR01-070919	MH156-EB01-070913	MH156-SR01-070913	MH331-SR01-070918	MH405-SR01-070920
		Lab Sample Id:	500-6721-5	500-6675-10	500-6547-6	500-6547-7	500-6674-13	500-6721-7
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	6721	6675	6547	6547	6674	6721
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	9/20/2007	9/19/2007	9/13/2007	9/13/2007	9/19/2007	9/20/2007
	COMPOUND	UNITS:						
	VOLATILES							
67-64-1	Acetone	ug/L	130	32	1.4 U	19 J	18	60
71-43-2	Benzene	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
75-27-4	Bromodichloromethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-25-2	Bromoform	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
74-83-9	Bromomethane	ug/L	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U
75-15-0	Carbon disulfide	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
56-23-5	Carbon tetrachloride	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
108-90-7	Chlorobenzene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
75-00-3	Chloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
67-66-3	Chloroform	ug/L	1.3	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
74-87-3	Chloromethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	1.8	0.2 U
124-48-1	Dibromochloromethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-34-3	1,1-Dichloroethane	ug/L	0.15 U	0.15 U	0.15 U	0.15 J	0.15 U	0.15 U
107-06-2	1,2-Dichloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
75-35-4	1,1-Dichloroethene	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
78-87-5	1,2-Dichloropropane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
100-41-4	Ethylbenzene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
591-78-6	2-Hexanone	ug/L	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
78-93-3	Methyl Ethyl Ketone	ug/L	1 U	1 U	1 U	17	5.6	14
108-10-1	methyl isobutyl ketone	ug/L	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U
75-09-2	Methylene Chloride	ug/L	0.24 U	0.24 U	0.24 U	0.24 J	0.24 U	0.24 U
100-42-5	Styrene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
127-18-4	Tetrachloroethene	ug/L	1.2	0.18 U	0.18 U	4.3	2.3	0.18 U
108-88-3	Toluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
79-01-6	Trichloroethene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
75-01-4	Vinyl chloride	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
1330-20-7	Xylenes, Total	ug/L	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U

Table AI.9
Task 5 - Sewer Water Sampling Data - Sewer Downgradient of Former Kellwood Facility

Kellwood		Location:	MH407	MH409	MH409	LS4	MH145	MH156
		Sample ID:	MH407-SR01-070913	MH409-SR01-070913	MH409-SR02-070913	LS4-SR01-070920	MH155-SR01-070919	MH156-SR01-070913
		Lab Sample Id:	500-6548-10	500-6547-1	500-6547-2	500-6721-5	500-6675-10	500-6547-7
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	6548	6547	6547	6721	6675	6547
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	9/13/2007	9/13/2007	9/13/2007	9/20/2007	9/19/2007	9/13/2007
	COMPOUND	UNITS:				ug/L	ug/L	ug/L
	VOLATILES							
67-64-1	Acetone	ug/L	18	25 J	18 J	130	32	19 J
71-43-2	Benzene	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
75-27-4	Bromodichloromethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-25-2	Bromoform	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
74-83-9	Bromomethane	ug/L	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U
75-15-0	Carbon disulfide	ug/L	1.4 J	2.8 J	3 J	0.15 U	0.15 U	0.15 U
56-23-5	Carbon tetrachloride	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
108-90-7	Chlorobenzene	ug/L	0.15 U	1	1.1	0.15 U	0.15 U	0.15 U
75-00-3	Chloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
67-66-3	Chloroform	ug/L	0.14 U	0.14 U	0.14 U	1.3	0.14 U	0.14 U
74-87-3	Chloromethane	ug/L	0.2 U	1.2	1.8	0.2 U	0.2 U	0.2 U
124-48-1	Dibromochloromethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-34-3	1,1-Dichloroethane	ug/L	0.15 U	0.15 UJ	0.15 J	0.15 U	0.15 U	0.15 J
107-06-2	1,2-Dichloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
75-35-4	1,1-Dichloroethene	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
78-87-5	1,2-Dichloropropane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
100-41-4	Ethylbenzene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
591-78-6	2-Hexanone	ug/L	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
78-93-3	Methyl Ethyl Ketone	ug/L	56	16	25	1 U	1 U	17
108-10-1	methyl isobutyl ketone	ug/L	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U
75-09-2	Methylene Chloride	ug/L	0.24 U	0.24 U	0.24 J	0.24 U	0.24 U	0.24 J
100-42-5	Styrene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
127-18-4	Tetrachloroethene	ug/L	0.18 U	0.18 U	0.18 U	1.2	0.18 U	4.3
108-88-3	Toluene	ug/L	0.18 U	1.2	1.1	0.18 U	0.18 U	0.18 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
79-01-6	Trichloroethene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
75-01-4	Vinyl chloride	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
1330-20-7	Xylenes, Total	ug/L	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U

Table AI.9
Task 5 - Sewer Water Sampling Data - Sewer Downgradient of Former Kellwood Facility

Kellwood		Location:	MH331	MH405	MH407	MH409	MH409	MH156
		Sample ID:	MH331-SR01-070918	MH405-SR01-070920	MH407-SR01-070913	MH409-SR01-070913	MH409-SR02-070913	MH156-EB01-070913
		Lab Sample Id:	500-6674-13	500-6721-7	500-6548-10	500-6547-1	500-6547-2	500-6547-6
		Depth:	NA	NA	NA	NA	NA	NA
		SDG:	6674	6721	6548	6547	6547	6547
		Matrix:	Water	Water	Water	Water	Water	Water
		Sampled:	9/19/2007	9/20/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007
	COMPOUND	UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	VOLATILES							
67-64-1	Acetone	ug/L	18	60	18	25 J	18 J	1.4 U
71-43-2	Benzene	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
75-27-4	Bromodichloromethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-25-2	Bromoform	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
74-83-9	Bromomethane	ug/L	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U
75-15-0	Carbon disulfide	ug/L	0.15 U	0.15 U	1.4 J	2.8 J	3 J	0.15 U
56-23-5	Carbon tetrachloride	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
108-90-7	Chlorobenzene	ug/L	0.15 U	0.15 U	0.15 U	1	1.1	0.15 U
75-00-3	Chloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
67-66-3	Chloroform	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
74-87-3	Chloromethane	ug/L	1.8	0.2 U	0.2 U	1.2	1.8	0.2 U
124-48-1	Dibromochloromethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
75-34-3	1,1-Dichloroethane	ug/L	0.15 U	0.15 U	0.15 U	0.15 UJ	0.15 J	0.15 U
107-06-2	1,2-Dichloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
75-35-4	1,1-Dichloroethene	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
540-59-0	1,2-Dichloroethene, Total	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
78-87-5	1,2-Dichloropropane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
10061-01-5	cis-1,3-Dichloropropene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
10061-02-6	trans-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
100-41-4	Ethylbenzene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
591-78-6	2-Hexanone	ug/L	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
78-93-3	Methyl Ethyl Ketone	ug/L	5.6	14	56	16	25	1 U
108-10-1	methyl isobutyl ketone	ug/L	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U
75-09-2	Methylene Chloride	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 J	0.24 U
100-42-5	Styrene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
79-34-5	1,1,2,2-Tetrachloroethane	ug/L	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
127-18-4	Tetrachloroethene	ug/L	2.3	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
108-88-3	Toluene	ug/L	0.18 U	0.18 U	0.18 U	1.2	1.1	0.18 U
71-55-6	1,1,1-Trichloroethane	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
79-00-5	1,1,2-Trichloroethane	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
79-01-6	Trichloroethene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
75-01-4	Vinyl chloride	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
1330-20-7	Xylenes, Total	ug/L	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U

APPENDIX J
ECOLOGICAL RISK ASSESSMENT

ECOLOGICAL RISK ASSESSMENT MEMORANDUM FOR OU2/OU6

2002 ECOLOGICAL RISK ASSESSMENT SUMMARY

A Baseline Ecological Risk Assessment (BERA) was previously conducted for the Riverfront Superfund Site (Black and Veatch, 2002). The evaluation included Operable Units OU1 through OU4, although the study area was defined as all watersheds potentially affected by the Riverfront Site, based on a review of surficial topography. Thus the study area evaluated in the 2002 BERA included OU6 as shown in Figure 3-2 from the aforementioned report. Most terrestrial habitats within the study area were developed residentially or commercially; however, there was some undeveloped land that included forest areas adjacent to streams or floodplains and some agricultural fields. Aquatic habitats in the study area consisted of the Missouri River (adjacent to OU1) and several small streams that originate within the study area. The streams in OU3 and 4 flow directly to the Missouri River. For OU2, one small stream (tributary 500) flows southward into Boeuf Creek, which flows for approximately eight miles until it discharges to the Missouri River. Although there are several state and federal threatened and endangered species reported as occurring in Franklin County, Missouri; none of the species are known to occur within the study area.

Constituents evaluated in the BERA included tetrachloroethene (PCE) and related volatile compounds based on the history and known discharges at the site. Specifically, the constituents of potential ecological concern (COPECs) were: PCE, trichloroethene (TCE), cis-dichloroethene (cis-DCE), trans-DCE, vinyl chloride, and benzene. The exposure pathways evaluated included soil and contaminated food ingestion for terrestrial receptors and groundwater discharging to surface waters for aquatic receptors. Media evaluated included floodplain surface soil, sediment, surface water and plant tissue. None of the COPECs are considered bioaccumulative.

In the 2002 BERA, concentrations of COPECs in surface soil were compared to several sources of ecological toxicity including the USEPA Region 4 ecological screening values; USEPA Region 5 RCRA Ecological Data Quality Levels (EDQLs) (USEPA 1999); Toxicological Benchmarks (Efroymson, et al., 1997) and Canadian Environmental Quality Guidelines (CCMOE, 1999). Sediment and surface water concentrations were compared to USEPA Region 5 EDQLs or Ecotox Thresholds (USEPA, 1996). Calculated wildlife intakes via ingestion were compared to Toxicological Benchmarks for Wildlife (Sample et al., 1996).

Target compounds were not detected in the floodplain, although reporting limits in soil for TCE and vinyl chloride were higher than the screening levels. PCE and toluene were the only site-related compounds detected in sediments; however, the detections were below the screening values. Again, vinyl chloride had a higher reporting limit than its screening level in sediment.

In surface water, PCE, cis-DCE, toluene, TCE and vinyl chloride were detected; however, most detections were below applicable screening levels. Two samples of surface water contained PCE at levels above its screening value. The samples were collected from a tributary of Boeuf Creek downgradient of OU2. The 2002 BERA

concluded that given the high volatility of PCE in surface water, it was likely that the PCE would rapidly volatilize into the atmosphere. For herbivorous wildlife, none of the target compounds were present at levels that indicated a significant risk.

As a result of the BERA, no further ecological investigation or analyses were recommended for the Riverfront Site (Black and Veatch, 2002). A Preliminary Remediation Goal (PRG) of 8.9 µg/L of PCE in surface water was recommended that would be protective of aquatic receptors. The PRG was based on the USEPA Region 5 EDQL.

UPDATES TO 2002 ECOLOGICAL RISK ASSESSMENT

After the 2002 BERA was prepared, additional samples were collected from the streams and tributaries in the study area. In addition, soil, surface water and sediment samples were collected in association with the investigation of OU2 and OU6. Thus, the conclusions of the 2002 BERA were re-assessed in light of this additional information. Surface soil (0 – 3' below ground surface (bgs)), were compared to USEPA Region 5 Ecological Screening Levels (ESLs), which replaced the Region 5 EDQLs. Only one site-related compound, PCE, was detected in surface soils above the Region ESLs. It was detected at two locations at depths of 0.5' and 2.5' bgs in an area north of the Kellwood facility that has little available habitat for wildlife. Since only 2 of 56 soil samples had detected concentrations of PCE above the screening level in a developed portion of the Site, these isolated detections are not expected to pose a risk to terrestrial ecological receptors. Three other non-site related compounds were detected in four surface soil samples collected from the site. Each compound (4,4-DDE, endrin aldehyde, and Arcolor-1254) was detected once in four samples. Since these compounds are not site related; they were not evaluated further (Table 1).

In surface water samples collected from tributaries of Boeuf Creek, one site-related compound (PCE) was detected in several samples above the USEPA Region 5 ESL. Four non-site related compounds were also detected; however, since these compounds (trichlorofluoromethane, benzo(a)anthracene, chrysene and hexachlorobenzene) are not site-related, they were not evaluated further (Table 2). The highest concentrations of PCE were detected at a small spring on the 500 tributary (located immediately upstream of 500TB-2). The USGS described the spring as a pool at the base of a large cottonwood tree that has since blown over (personal communication). The spring is in a pool in the bed of the 500 tributary, and thus could not be directly sampled without the influence of the flow in the 500 tributary. The discharge of the spring was too low for the USGS to measure it by taking the difference in the flow of the drainage upstream and downstream of the spring. Although it was not directly sampled, the maximum PCE concentration (100 µg/L in July 2002), measured immediately downstream of the spring indicates that impacts to wildlife are minimal.

For PCE, the maximum detected concentration was compared to the Region 3 BTAG screening level for freshwater (USEPA, 2006). The Region 3 BTAG screening benchmarks have been updated more recently than the Region 5 ESLs (2006 versus 2003). The Region 3 BTAG has a screening value of 111 µg/L for PCE in freshwater, which is a chronic exposure screening value. Thus, since the maximum detection of PCE in surface waters is below the Region 3 BTAG value, PCE is not bioaccumulative

in aquatic ecosystems. Also, since PCE was only detected above the Region 5 ESL occasionally in 2002 and in localized areas, the risk to aquatic life due to the detections of PCE in surface waters is minimal.

In sediment samples collected from the tributaries of Boeuf Creek (Table 3), no site-related compounds were detected above USEPA Region 5 ESLs; however, PCE was detected in one of eight sediment samples. Three non-site related volatile compounds (acetone, chloroethane and chloromethane) were also detected in sediment samples collected from the tributaries. Acetone was detected twice at concentrations above its screening level; while chloroethane and chloromethane do not have published screening levels available for comparison. In addition, five metals, arsenic, barium, lead, selenium, and zinc were detected in a single sediment sample above their respective screening levels. Since there were no site-related compounds detected in sediments above applicable screening levels, the sediments in the tributaries of Boeuf Creek were not further evaluated.

Since no site-related COPECs were detected at frequencies or concentrations likely to pose a risk to ecological receptors, no further ecological investigations or assessments are recommended. In the 2002 BERA, a PRG of 8.9 µg/L for PCE was established in surface water. This concentration was based on the Region 5 EDQL. However, in 2003, Region 5 updated the EDQLs to ESLs, and a new level of 45 µg/L was established for PCE. Region 3 updated their surface water screening benchmarks in 2006 and established a level of 111 µg/L for PCE. This updated Region 3 BTAG screening benchmark is now proposed as the new PRG for PCE in surface water.

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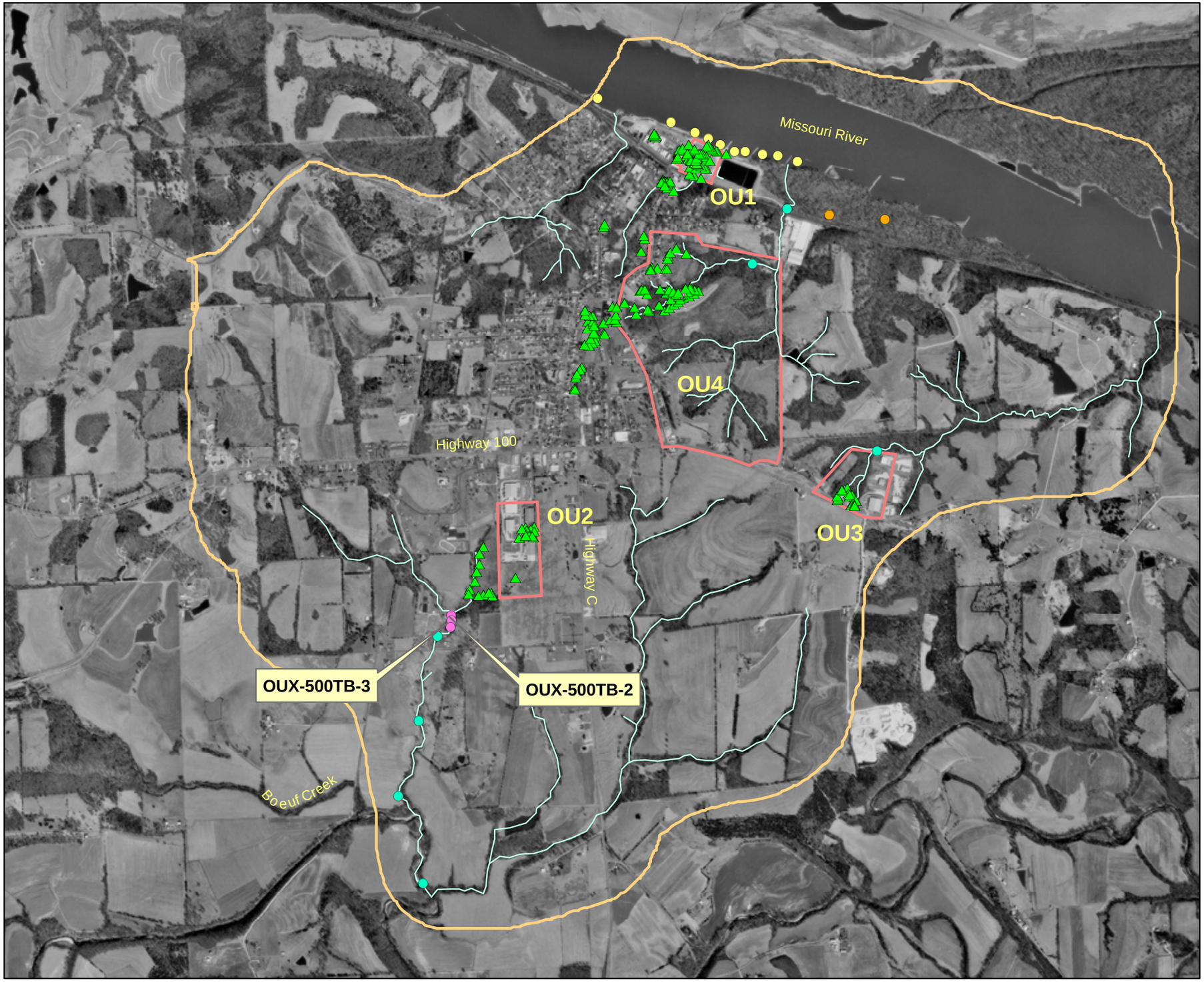

Legend

Sample Type

- Soil
- Surface Water
- Sediment/Surface Water
- Soil/Sediment/Surface Water
- Vegetation
- Operable Units
- Streams
- ERA Study Area

N
W E
S

0 6501,300 2,600 3,900 5,200

Feet

1:20,396

Black & Veatch Special Projects Corp.
Turnersville, New Jersey

Riverfront Superfund Site
Ecological Risk Assessment
New Haven, Missouri

Figure 3-2
Sample Locations

Drawn By: DGP	Scale: 1:20396
Checked By: DGP	Project No: 046134.0107
Approved By: DGP	Date: July 11, 2002

Table 3-2
Analytical Results for Target Compounds Detected in Sediment and Comparison to ESVs
Riverfront Site
New Haven, Missouri

Target Compound	OUR-SD-MR01		OUR-SD-MR04		OUR-SD-MR05		OUR-SD-MR06		OUR-SD-MR07		OUR-SD-MR08		OUR-SD-MR09		OUR-SD-MR10	
Benzene	4.25	U	3.05	U	3.05	U	4.7	U	3.35	U	4.45	U	3.75	U	3.95	U
cis-Dichloroethene (cis-DCE)	2.15	U	1.55	U	1.5	U	2.35	U	1.65	U	2.25	U	1.85	U	2	U
Tetrachloroethene (PCE)	4.25	U	3.05	U	3.05	U	4.7	U	3.35	U	4.45	U	3.75	U	3.95	U
Toluene	4.25	U	3.05	U	3.05	U	19		3.35	U	4.45	U	270		3.95	U
trans-Dichloroethene (t-DCE)	4.3	U	3.1	U	3	U	4.7	U	3.3	U	4.5	U	3.7	U	4	U
Trichloroethene (TCE)	4.25	U	3.05	U	3.05	U	4.7	U	3.35	U	4.45	U	3.75	U	3.95	U
Vinyl chloride (VC)	8.5	U	6	U	6	U	9.5	U	6.5	U	9	U	7.5	U	8	U

Table 3-2
Analytical Results for Target Compounds Detected in Sediment and Comparison to ESVs
Riverfront Site
New Haven, Missouri

Target Compound	OUX-SD-EC03		OUX-SD-EC04		OUX-SD-EC05		OUX-SD-EC06		OUX-SD-EC07		OUX-SD-EC08		OUX-SD-EC09		OUX-SD-EC11	
Benzene	4.1	U	2.95	U	3.65	U	3.15	U	3.05	U	3.55	U	3.6	U	3.15	U
cis-Dichloroethene (cis-DCE)	2.05	U	1.5	U	1.8	U	1.55	U	1.55	U	1.75	U	1.8	U	1.55	U
Tetrachloroethene (PCE)	4.1	U	2.95	U	2.8	J	1.8	J	3.05	U	3.55	U	3.6	U	3.15	U
Toluene	4.1	U	2.95	U	3.65	U	3.15	U	3.05	U	3.55	U	3.6	U	3.15	U
trans-Dichloroethene (t-DCE)	4.1	U	3	U	3.6	U	3.1	U	3.1	U	3.5	U	3.6	U	3.1	U
Trichloroethene (TCE)	4.1	U	2.95	U	3.65	U	3.15	U	3.05	U	3.55	U	3.6	U	3.15	U
Vinyl chloride (VC)	8	U	6	U	7.5	U	6.5	U	12	U	7	U	7	U	6.5	U

Table 3-2
Analytical Results for Target Compounds Detected in Sediment and Comparison to ESVs
Riverfront Site
New Haven, Missouri

Target Compound	Total Samples	Total Detections	Minimum Detected	Maximum Concentration	Ecological Screening Value	Total Detections > Screening Value	Screening HQ Based on Maximum	Selected as PCOPEC?
Benzene	16	0	na	na	**57**	0	***na***	NO
cis-Dichloroethene (cis-DCE)	16	0	na	na	**208.94**	0	***na***	NO
Tetrachloroethene (PCE)	16	2	1.7	4.7	**195.83**	0	***0.02***	NO
Toluene	16	2	1.7	270	**670**	0	***0.40***	NO
trans-Dichloroethene (t-DCE)	16	0	na	na	**208.94**	0	***na***	NO
Trichloroethene (TCE)	16	0	na	na	**179.56**	0	***na***	NO
Vinyl chloride (VC)	16	0	na	na	**2**	0	***na***	NO

Table 3-3
Analytical Results for Target Compounds Detected in Surface Water and Comparison to ESVs
Riverfront Site
New Haven, Missouri

Target Compound	OU4-210TB-C5		OU4-210TB-C6		OU4-210TB-C7		OUR-MR01		OUR-MR02		OUR-MR03		OUR-MR04		OUR-MR05		OUR-MR06	
Benzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-Dichloroethene (cis-DCE)	0.95	J	0.4	J	0.23	J	1	U	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene (PCE)	7.4		5		0.36	J	1	U	1	U	1	U	1	U	1	U	1	U
Toluene	1	U	1	U	1	U	0.98	J	0.76	J	0.76	J	0.59	J	0.65	J	0.5	J
trans-Dichloroethene (t-DCE)	1	U	0.5	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Trichloroethene (TCE)	0.57	J	0.36	J	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Vinyl chloride (VC)	1	U	2	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U

Table 3-3
Analytical Results for Target Compounds Detected in Surface Water and Comparison to ESVs
Riverfront Site
New Haven, Missouri

Target Compound	OUR-MR07		OUR-MR08		OUR-MR09		OUR-MR10		OUX-500TB-2		OUX-500TB-3		OUX-500TB-4		OUX-EC03		OUX-EC04	
Benzene	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
cis-Dichloroethene (cis-DCE)	1	U	1	U	1	U	1	U	0.37	J	0.74	J	1	U	1.7		1	U
Tetrachloroethene (PCE)	1	U	1	U	1	U	1	U	15		31		1	U	1	U	1	U
Toluene	0.57	J	0.48	J	0.57	J	0.58	J	1	U	1	U	1	U	0.74	J	1	U
trans-Dichloroethene (t-DCE)	1	U	1	U	1	U	1	U	0.5	U	1	U	1	U	0.5	U	0.5	U
Trichloroethene (TCE)	1	U	1	U	1	U	1	U	2		4.2		1	U	1	U	1	U
Vinyl chloride (VC)	1	U	1	U	1	U	1	U	2	U	1	U	1	U	0.55	J	2	U

Table 3-3
Analytical Results for Target Compounds Detected in Surface Water and Comparison to ESVs
Riverfront Site
New Haven, Missouri

Target Compound	OUX-EC05		OUX-EC06		OUX-EC07		OUX-EC08		OUX-EC09		OUX-EC11	
Benzene	1	U	1	U	1	U	1	U	1	U	1	U
cis-Dichloroethene (cis-DCE)	0.41	J	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene (PCE)	2.7		8.9		1.3		0.33	J	1	U	1	U
Toluene	1	U	1	U	1	U	1	U	1	U	1	U
trans-Dichloroethene (t-DCE)	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	1	U	1	U	1	U	1	U	1	U	1	U
Vinyl chloride (VC)	2	U	2	U	2	U	2	U	2	U	2	U

Table 3-3
Analytical Results for Target Compounds Detected in Surface Water and Comparison to ESVs
Riverfront Site
New Haven, Missouri

Target Compound	Total Samples	Total Detections	Minimum Detected	Maximum Concentration	Ecological Screening Value	Total Detections > Screening Value	Screening HQ Based on Maximum	Selected as PCOPEC?
Benzene	24	0	na	na	46	0	na	NO
cis-Dichloroethene (cis-DCE)	24	7	0.23	1.7	310	0	0.005	NO
Tetrachloroethene (PCE)	24	8	0.33	31	8.9	2	**3.48**	YES
Toluene	24	11	0.48	1	130	0	0.01	NO
trans-Dichloroethene (t-DCE)	24	0	na	na	310	0	na	NO
Trichloroethene (TCE)	24	4	0.36	4.2	75	0	0.06	NO
Vinyl chloride (VC)	24	1	0.55	2	9.2	0	0.22	NO

TABLE 1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Background Value (3)	Ecological Screening Level (mg/kg) (4)	COPEC Flag (Y/N)	Rationale for Selection or Deletion (5)
Soil (<3 feet)		**Volatile Organic Compounds**										
	67641	Acetone	1.80E-01 J	1.80E-01 J	mg/kg	Q17 (0.5)	1 / 56	0.18	-	2.50E+00	N	BSL
	75150	Carbon disulfide	3.00E-03 J	3.00E-03 J	mg/kg	MC03 (0.7)	1 / 56	0.003	-	9.41E-02	N	BSL
	540590	1,2-Dichloroethene - total	3.50E-03 J	7.90E-02 J	mg/kg	P16 (0.5)	4 / 56	0.079	-	7.84E-01	N	BSL
	78933	Methyl Ethyl Ketone	8.45E-03	8.45E-03	mg/kg	Q17 (0.5)	1 / 56	0.00845	-	8.90E+01	N	BSL
	127184	Tetrachloroethene	3.90E-03 J	2.10E+01	mg/kg	S15 (2.5)	38 / 56	21	-	9.92E+00	Y	ASL
	108883	Toluene	7.90E-03	7.90E-03	mg/kg	MC02 (2.7)	1 / 56	0.0079	-	1.22E+00	N	BSL
	79016	Trichloroethene	3.00E-03 J	1.00E-01 J	mg/kg	P16 (0.5)	7 / 56	0.1	-	1.24E+01	N	BSL
		Semi-Volatile Organic Compounds										
	56553	Benzo(a)anthracene	1.70E-02 J	1.98E-02 J	mg/kg	P16 (2.5)	2 / 4	0.0198	-	1.1	N	BSL
	50328	Benzo(a)pyrene	2.20E-02 J	2.24E-02 J	mg/kg	P16 (2.5)	2 / 4	0.0224	-	1.1	N	BSL
	205992	Benzo(b)fluoranthene	3.90E-02	4.10E-02	mg/kg	P16 (2.5)	2 / 4	0.041	-	1.1	N	BSL
	191242	Benzo(ghi)perylene	1.36E-02 J	1.80E-02 J	mg/kg	P14 (3.0)	2 / 4	0.018	-	1.1	N	BSL
	207089	Benzo(k)fluoranthene	1.31E-02 J	1.60E-02 J	mg/kg	P14 (3.0)	2 / 4	0.016	-	1.1	N	BSL
	218019	Chrysene	2.95E-02 J	3.10E-02 J	mg/kg	P14 (3.0)	2 / 4	0.031	-	1.1	N	BSL
	206440	Fluoranthene	4.60E-01 J	5.00E-02	mg/kg	P14 (3.0)	2 / 4	0.05	-	1.1	N	BSL
	85018	Phenanthrene	1.25E-02 J	1.90E-02 J	mg/kg	P14 (3.0)	2 / 4	0.019	-	1.1	N	BSL
	129000	Pyrene	3.70E-02 J	4.10E-02	mg/kg	P14 (3.0)	2 / 4	0.041	-	1.1	N	BSL
		Pesticides										
	72548	4,4'-DDD	7.50E-03 J+	7.50E-03 J+	mg/kg	MC04 (1.3)	1 / 4	0.0075	-	0.021	N	BSL
	72559	4,4'-DDE	5.40E-02 J+	5.40E-02 J+	mg/kg	MC04 (1.3)	1 / 4	0.054	-	0.021	Y	ASL
	50293	4,4'-DDT	1.80E-02 J+	1.80E-02 J+	mg/kg	MC04 (1.3)	1 / 4	0.018	-	0.021	N	BSL
	60571	Dieldrin	3.70E-03 J+	3.70E-03 J+	mg/kg	MC04 (1.3)	1 / 4	0.0037	-	0.0049	N	BSL
	33213659	Endosulfan II	3.20E-02 J+	3.20E-02 J+	mg/kg	MC04 (1.3)	1 / 4	0.032	-	0.119	N	BSL
	1031078	Endosulfan Sulfate	1.30E-02 J+	1.30E-02 J+	mg/kg	MC04 (1.3)	1 / 4	0.013	-	0.0358	N	BSL
	7421934	Endrin Aldehyde	1.70E-02 J+	1.70E-02 J+	mg/kg	MC04 (1.3)	1 / 4	0.017	-	0.0105	Y	ASL
		PCBs										
	11097691	Aroclor 1254	3.95E-02	3.95E-02	mg/kg	P16 (2.5)	1 / 4	0.0395	-	0.000332	Y	ASL

TABLE 1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Background Value (3)	Ecological Screening Level (mg/kg) (4)	COPEC Flag (Y/N)	Rationale for Selection or Deletion (5)
Soil (<3 feet)		**Metals**										
	7440382	Arsenic	5.00E-01 J	5.10E+00	mg/kg	MC04 (1.3)	4 / 4	5.1	-	18	N	BSL
	7440393	Barium	2.00E+01	1.20E+02	mg/kg	MC04 (1.3)	4 / 4	120	-	330	N	BSL
	7440439	Cadmium	8.40E-02 J	2.95E-01	mg/kg	P16 (2.5)	3 / 4	0.295	-	0.36	N	BSL
	16065831	Chromium	3.20E+00	1.50E+01	mg/kg	MC04 (1.3)	4 / 4	15	-	2.60E+01	N	BSL
	7439921	Lead	3.40E-01 J	7.00E+00	mg/kg	MC04 (1.3)	4 / 4	7	-	11	N	BSL
	7487947	Mercury	6.60E-03 J	2.70E-02	mg/kg	MC04 (1.3)	3 / 4	0.027	-	0.1	N	BSL
	7440224	Silver	1.05E-01 J	1.05E-01 J	mg/kg	P16 (2.5)	1 / 4	0.105	-	4.2	N	BSL
	7440666	Zinc	2.00E+00 J	2.65E+01	mg/kg	P16 (2.5)	4 / 4	26.5	-	46	N	BSL

Footnotes:

(1) J - denotes estimated concentration.

(2) Maximum concentrations are used for screening.

(3) Background values are not available for the site and not used for COPC screenings .

(4) Sources for the "Ecological Screening Level": The Soil Screening Levels (SSLs) and the USEPA Region 5 ESLs if a SSL is unavailable.

(5) BSL - below screening. ASL - above screening.

Shaded compounds selected as COPCs.

TABLE 2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Background Value (3)	Region 5 ESL (ug/L) (4)	Region 3 BTAG Value (ug/l) (5)	COPC Flag (Y/N)	Rationale for Selection or Deletion (6)
Surface Water Tributaries (Boeuf Creek)		**Volatile Organic Compounds**											
	71432	Benzene	1.00E-02	7.00E-02	ug/l	500TB-3	4 / 76	0.07	-	1.14E+02	3.70E+02	N	BSL
	156592	cis-1,2-Dichloroethene	1.00E-02	6.60E+00	ug/l	SW08	40 / 92	6.6	-	9.70E+02	5.90E+02	N	BSL
	156605	trans-1,2-Dichloroethene	1.00E-02	3.60E-01	ug/l	500TB-2	12 / 76	0.36	-	9.70E+02	5.90E+02	N	BSL
	75092	Methylene Chloride	2.90E-01 J	7.50E+00	ug/l	SW01	4 / 17	7.5	-	9.40E+02	9.81E+01	N	BSL
	127184	Tetrachloroethene	2.00E-02	1.00E+02	ug/l	500TB-2	46 / 92	100	-	4.50E+01	1.11E+02	Y	ASL
	79016	Trichloroethene	5.00E-02	1.26E+01	ug/l	500TB-2	37 / 92	12.63	-	4.70E+01	2.10E+01	N	BSL
	75694	Trichlorofluoromethane	1.00E-02	1.00E-02	ug/l	500TB-1A and 550TB-2	2 / 2	0.01	-	-	-	Y	ASL
	75014	Vinyl Chloride	1.40E-01	3.37E+01	ug/l	500TB-3	6 / 92	33.67	-	9.30E+02	9.30E+02	N	BSL
		Semi-Volatile Organic Compounds											
	101553	4-Bromophenyl phenyl ether	1.60E-01 J	1.60E-01 J	ug/l	SW06	1 / 1	0.16	-	1.50E+00	1.50E+00	N	BSL
	56553	Benzo(a)anthracene	6.50E-02 J	6.50E-02 J	ug/l	SW06	1 / 1	0.065	-	2.50E-02	1.80E-02	Y	ASL
	205992	Benzo(b)fluoranthene	4.20E-02 J	4.20E-02 J	ug/l	SW06	1 / 1	0.042	-	9.07E+00	-	N	BSL
	218019	Chrysene	6.70E-02 J	6.70E-02 J	ug/l	SW06	1 / 1	0.067	-	-	-	Y	No SL
	118741	Hexachlorobenzene	6.50E-02 J	6.50E-02 J	ug/l	SW06	1 / 1	0.065	-	3.00E-04	3.00E-04	Y	ASL
	129000	Pyrene	7.00E-02 J	7.00E-02 J	ug/l	SW06	1 / 1	0.07	-	3.00E-01	2.50E-02	N	BSL
		Pesticides											
	33213659	Endosulfan II	5.10E-02	5.10E-02	ug/l	SW06	1 / 1	0.051	-	5.60E-02	5.10E-02	N	BSL
		Metals											
	7440393	Barium	1.60E+02	1.60E+02	ug/l	SW06	1 / 1	160	-	2.20E+02	4.00E+00	N	BSL

Footnote Instructions:

(1) J - denotes estimated concentration.

(2) Maximum concentrations are used for screening.

(3) Background values are not available for the site and not used for COPC screenings .

(4) USEPA Region 5 Ecological Screening Levels.

(5) Region 3 BTAG Freshwater Screening Benchmark (July 2006).

(6) BSL - below screening level. ASL - above screening level.

Only detected surface water concentrations are presented.

Surface water tributaries sampled by the USGS in 2001 and 2002 were included in the evaluation.

Shaded compounds selected as COPCs.

TABLE 3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Sediment Samples
Riverfront Superfund Site - OU2/OU6

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Background Value (3)	Region 5 ESL (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Boeuf Creek		**Volatile Organic Compounds**										
Tributaries	67641	Acetone	1.50E-02 J	9.60E-02 J	mg/kg	SD01	2 / 8	9.60E-02	-	9.90E-03	Y	ASL
	75003	Chloroethane	1.15E-03 J	1.30E-03 J	mg/kg	SD03/SD06	2 / 8	1.30E-03	-	-	Y	No SL
	74873	Chloromethane	1.80E-03 J	1.80E-03 J	mg/kg	SD06	1 / 8	1.80E-03	-	-	Y	No SL
	127184	Tetrachloroethene	2.65E-03 J	2.65E-03 J	mg/kg	SD06	1 / 8	2.65E-03	-	9.90E-01	N	BSL
		Semi-Volatile Organic Compounds										
	91941	3,3'-Dichlorobenzidine	5.40E-02 J	5.40E-02 J	mg/kg	SD06	1 / 1	0.054	-	0.127	N	BSL
	56553	Benzo(a)anthracene	1.13E-02 J	1.13E-02 J	mg/kg	SD06	1 / 1	0.0113	-	0.108	N	BSL
	50328	Benzo(a)pyrene	3.52E-02 J	3.52E-02 J	mg/kg	SD06	1 / 1	0.0352	-	0.15	N	BSL
	205992	Benzo(b)fluoranthene	3.60E-02 J	3.60E-02 J	mg/kg	SD06	1 / 1	0.036	-	10.4	N	BSL
	191242	Benzo(ghi)perylene	1.67E-02 J	1.67E-02 J	mg/kg	SD06	1 / 1	0.01665	-	0.17	N	BSL
	207089	Benzo(k)fluoranthene	2.54E-02 J	2.54E-02 J	mg/kg	SD06	1 / 1	0.0254	-	0.24	N	BSL
	218019	Chrysene	2.09E-02 J	2.09E-02 J	mg/kg	SD06	1 / 1	0.02085	-	0.166	N	BSL
	53703	Dibenz(a,h)anthracene	7.10E-03 J	7.10E-03 J	mg/kg	SD06	1 / 1	0.0071	-	0.033	N	BSL
	206440	Fluoranthene	1.59E-02 J	1.59E-02 J	mg/kg	SD06	1 / 1	0.01585	-	0.423	N	BSL
	193395	Indeno(1,2,3-cd)pyrene	1.59E-02 J	1.59E-02 J	mg/kg	SD06	1 / 1	0.01585	-	0.2	N	BSL
	129000	Pyrene	2.57E-02 J	2.57E-02 J	mg/kg	SD06	1 / 1	0.02565	-	0.195	N	BSL
		Pesticides										
	72548	4,4'-DDD	5.90E-04 J	5.90E-04 J	mg/kg	SD06	1 / 1	0.00059	-	0.00488	N	BSL
	50293	4,4'-DDT	9.20E-04 J	9.20E-04 J	mg/kg	SD06	1 / 1	0.00092	-	0.00416	N	BSL
	33213659	Endosulfan Sulfate	1.80E-04 J	1.80E-04 J	mg/kg	SD06	1 / 1	0.00018	-	0.0346	N	BSL
	7421934	Endrin aldehyde	7.05E-04 J	7.05E-04 J	mg/kg	SD06	1 / 1	0.000705	-	0.48	N	BSL
		Endrin ketone	3.35E-04 J	3.35E-04 J	mg/kg	SD06	1 / 1	0.000335	-	0.00222	N	BSL
	72435	Methoxychlor	5.50E-04 J	5.50E-04 J	mg/kg	SD06	1 / 1	0.00055	-	0.0136	N	BSL
		Metals										
	7440382	Arsenic	2.40E+01 J	2.40E+01 J	mg/kg	SD06	1 / 1	24	-	9.79	Y	ASL
	7440393	Barium	5.80E+02	5.80E+02	mg/kg	SD06	1 / 1	580	-	-	Y	No SL
	7440439	Cadmium	5.00E-01 J	5.00E-01 J	mg/kg	SD06	1 / 1	0.5	-	0.99	N	BSL
	16065831	Chromium	3.95E+01 J	3.95E+01 J	mg/kg	SD06	1 / 1	39.5	-	43.4	N	BSL
	7439921	Lead	4.00E+01 J	4.00E+01 J	mg/kg	SD06	1 / 1	40	-	35.8	Y	ASL
	7782492	Selenium	4.75E-01 J	4.75E-01 J	mg/kg	SD06	1 / 1	0.475	-	-	Y	No SL
	7440224	Silver	3.65E-01 J	3.65E-01 J	mg/kg	SD06	1 / 1	0.365	-	0.5	N	BSL
	7440666	Zinc	1.99E+02 J	1.99E+02 J	mg/kg	SD06	1 / 1	199	-	121	Y	ASL

Footnote Instructions:

(1) J-denotes estimated concentratoin. B-denotes blank contamination.

(2) Maximum concentrations are used for screening.

(3) Background values are not available for the site and not used for COPC screenings .

(4) Source(s) for the "Screening Toxicity Value": The Region 5 Ecological Screening Levels (August, 2003).

(5) BSL - below screening. ASL - above screening.

* Surrogate compound values are used for compounds without the toxicity values: fluoranthene is used for benzo(g,h,i)perylene; anthracene is used for phenanthrene; Endosulfan for Sndosulfan sulfate; and Endrin for endrin aldehyde and endrin ketone.

Shaded compounds selected as COPCs

APPENDIX K
HUMAN HEALTH RISK ASSESSMENT

HUMAN HEALTH
RISK ASSESSMENT

OPERABLE UNIT NO. 2/6
RIVERFRONT SUPERFUND SITE

New Haven, Missouri

Prepared For:

USEPA
Region 7

Prepared on behalf of Kellwood Company by:

PARSONS

June 2010

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1.0 EXECUTIVE SUMMARY

A Human Health Risk Assessment (HHRA) report for Operable Units (OUs) 2 and 6 of the Riverfront Superfund Site in New Haven, Franklin County, Missouri was prepared to evaluate potential impacts to human health posed by chemical constituents in soil, groundwater, surface water, and sediments. The risk assessment process combines information on opportunities for exposure to site-related constituents with information on their toxic characteristics to generate a quantitative estimate of risk. The risk assessment was performed in accordance with the United States Environmental Protection Agency (USEPA) Superfund Risk Assessment Guidance (USEPA, 1989, 1991, 1996, 2001, 2003, & 2004) and Missouri Department of Natural Resources (MDNR) Division of Hazardous Waste Management Commission Risk-Based Corrective Action Process (March 2, 2009) for selecting chemicals of potential concern (COPCs). Data used in the evaluation were collected from soils, groundwater, surface water, and sediments. When site-specific data were not available, standard defaults were used. Methods used in this risk assessment are consistent with USEPA guidance documents.

The potential receptors identified include on-site commercial/industrial workers and site trespassers. Based on the historical industrial use, the zoning, and the active industrial use of the surrounding land, the reasonable future use for the area in the vicinity of the former facility (OU2) is to remain industrial. The receptors identified under the reasonable future industrial land use include commercial/industrial workers, construction workers, and site trespassers. A future residential scenario was also evaluated for OU2 to evaluate a "no action" alternative. Additionally, a current residential scenario was also evaluated for OU6. This evaluation consisted of comparing concentrations detected in the wells of residents prior to any treatment or remediation systems to applicable drinking water standards and inhalation of volatiles from shallow groundwater. Last, inhalation risks to occupants of the nearby high school were also evaluated.

The risks to a current/future commercial/industrial worker, a current/future trespasser, a future construction worker, and a future resident of OU2 were quantified via calculation of daily intake and comparison to acceptable reference doses. The potential exposure pathways evaluated include soil ingestion, soil dermal contact, inhalation of particulates in surface soil, inhalation of soil volatile chemicals in indoor and outdoor air, inhalation of groundwater volatile chemicals in indoor and outdoor air, sediment direct contact and surface water dermal contact. A future groundwater use scenario was also evaluated, which assumed that a groundwater drinking water well could be installed anywhere within OU2. Risks to current residents were also evaluated for drinking untreated groundwater and inhalation of volatiles in indoor air from shallow groundwater. Risks to occupants of the high school were evaluated via a comparison of measured soil gas vapor levels to accepted screening levels.

The risk assessment results are summarized as follows:

- The total cancer risk and total hazard index (HI) resulting from exposure to COPCs in soil and groundwater for a current/future industrial worker (outdoor) were calculated to

be 7.6 x 10^{-6} and 0.018, respectively. The total cancer risk is within the risk range of 1 x 10^{-4} and 1 x 10^{-6} and the HI is below the target hazard level of 1; therefore, potential exposure to chemicals in soil and groundwater would not result in adverse health effects for this receptor.

- The total cancer risk and the total HI resulting from exposure to COPCs in soil and groundwater for a current/future industrial worker (indoor) are 1.9 x 10^{-3} and 0.96. The total cancer risk exceeds the target cancer risk range of 1 x 10^{-4} and 1 x 10^{-6} but the total HI is below the target hazard level of 1. The primary chemical and pathway of concern is tetrachloroethene (PCE) associated with the inhalation of soil volatiles in indoor air and inhalation of groundwater volatiles in indoor air. Locations where concentrations of PCE exceed target concentrations are underneath and north of the former Kellwood facility (soil) and south and southwest of the former Kellwood facility (groundwater).
- The total cancer risk and total HI resulting from direct contact of the COPCs in soil and groundwater for a future construction worker were calculated to be 6.6 x 10^{-7} and 0.015, respectively. The total cancer risk is below the target cancer risk range of 1 x 10^{-4} and 1 x 10^{-6} and the HI is below the target hazard level of 1; thus, potential exposure to chemicals in soil and groundwater would not result in adverse health effects for this receptor.
- The total cancer risk and total HI resulting from exposure to COPCs in soil, shallow groundwater, sediment and surface water for a juvenile trespasser were calculated to be 2.6 x 10^{-5} and 0.038, respectively. The total cancer risk is within the target cancer risk range of 1 x 10^{-4} to 1 x 10^{-6}, and the total HI is below the target hazard level of 1. Therefore, potential exposure to chemicals in soil, shallow groundwater, surface water and sediment would not result in adverse health effects for this receptor.
- The total cancer risk and total HI resulting from exposure to COPCs in soil and groundwater (volatilizing to indoor air) for a future resident living anywhere within OU2 were calculated to be 9.4 x 10^{-3} and 6.9, respectively. The total cancer risk and the total HI exceed the target cancer risk range of 1 x 10^{-4} and 1 x 10^{-6}, and the target hazard level of 1. The pathways of concern are incidental ingestion, inhalation and dermal contact with impacted soil, the inhalation of soil volatiles in indoor air, and the inhalation of groundwater volatiles in indoor air exposure pathways. The risk is primarily driven from the inhalation of soil and groundwater volatiles in indoor air. The primary chemical of concern associated with this pathway PCE. In addition, the total cancer risk and total HI resulting from exposure to COPCs in deep groundwater as tap water for a future resident living anywhere within OU2 were calculated to be 5.5 x 10^{-3} and 2.9, respectively. The total cancer risk and the total HI exceed the target cancer risk range of 1 x 10^{-4} and 1 x 10^{-6}, and the target hazard level of 1. The pathways of concern are ingestion, and inhalation and dermal contact with deep groundwater used for tap water purposes. The risk is primarily driven from the ingestion of PCE in deep groundwater. However, the inhalation of soil and groundwater volatiles in indoor air and ingestion of tap water in OU2would be complete only if a residential building is constructed in the impacted area

and a drinking water well was installed. Locations where concentrations of PCE exceed target concentrations are underneath and adjacent to (north and west of) the former Kellwood facility (soil) and south and southwest of the former Kellwood facility (groundwater). In addition, the input parameters for the Johnson and Ettinger model, which was used to evaluate the indoor air exposure pathways, are conservative.

- The concentrations detected in the wells of several residents in OU6 exceed current drinking water standards prior to treatment. The total cancer risk and total HI resulting from exposure to COPCs in deep groundwater as tap water for a current/future resident drinking groundwater prior to treatment were calculated to be 3.3×10^{-3} and 1.9, respectively. The total cancer risk and the total HI exceed the target cancer risk range of 1×10^{-4} and 1×10^{-6}, and the target hazard level of 1. The risk is primarily driven from the ingestion of PCE in deep groundwater. Thus, treatment systems must be maintained at these homes.
- The total cancer risks resulting from exposure to PCE volatizing from shallow groundwater near the northern end of OU6 for a resident were calculated to range from 7.3×10^{-7} to 2.5×10^{-5}, depending on depth. Calculated cancer risks for TCE and the total HIs for other VOCs detected in shallow groundwater near OU6 were below the acceptable risk range of 1×10^{-4} and 1×10^{-6} and the target hazard level of 1.
- The results of the comparison of soil gas samples collected near the high school show that PCE, the only detected constituent (and only detected at location SVI-5), exceeds the USEPA residential air screening level, but is below the USEPA industrial air screening level and all specified Missouri target levels for both residential and non-residential use.

Based these results, the primary conclusions of the risk assessment are:

- The total cancer risk and total hazard index exceed target ranges for potential future residents in OU2 in the area where DNAPL is present and near the former Kellwood facility through incidental ingestion, inhalation, dermal contact with impacted soil and inhalation of indoor air (volatilizing from either soil or groundwater) or ingestion of groundwater from a future drinking water well. Current zoning of this area is commercial/industrial.

- The total cancer risk and total hazard index exceed target ranges for industrial workers through inhalation of indoor air in the area where DNAPL is present and the former Kellwood facility.

- The total cancer risk and total HI exceed the target ranges for residents in OU6 using groundwater as tap water prior to any treatment. The risk is primarily driven from the ingestion of PCE in deep groundwater. Thus, treatment systems must be maintained at these homes.

- The total cancer risk is within the target risk range for residents living near the former Kellwood facility via inhalation of indoor air (volatilizing from groundwater) and the total hazard index is below target levels.
- The results of the comparison of soil gas samples collected near the high school show that PCE, the only detected constituent (and only detected at location SVI-5), exceeds the USEPA residential air screening level, but is below the USEPA industrial air screening level and all specified Missouri target levels for both residential and non-residential use. Given that the exposure assumptions for a teacher/administrator/janitorial scenario would be similar to an industrial worker scenario, further evaluation of the teacher/administrator/janitorial receptor group is not warranted at this time. Further evaluation of a student scenario is also not warranted since a student's exposure would be even less than that of a teacher or a typical residential scenario.

2.0 BACKGROUND INFORMATION

2.1 Facility Description

The former Kellwood facility is part of an industrial park that was developed in the mid-1970s. It is located at 202 Industrial Drive, south of State Highway 100 and west of Highway C (Figure 2.2). The principal feature of the former Kellwood Facility (currently a facility operated by Metalcraft Enterprises, a division of Tubular Steel) is a privately owned manufacturing building (about 60,000 square feet), including a concrete drive. There are several other manufacturing and warehousing facilities located in the industrial park.

Operable Units 2 (OU2) and 6 (OU6) at the Riverfront National Priorities List (NPL) Site constitute two of the six Operable Units (OUs) of the Riverfront Superfund Site. OU2 includes the historic operations on and in the Former Kellwood Facility, and areas where chemicals of potential concern (COPCs) may have come to be located. Historical investigative activities have revealed that there are residual levels of PCE within OU2. OU6 constitutes the residential wells south of OU2, which have been collectively defined as OU6.

New Haven is part of the Salem Plateau physiographic subprovince of the Ozark Plateau. The physiographic setting of New Haven is moderate to rugged terrain formed with steep valleys and thin soils, characteristic of the Ozark Plateau. In the upland areas, there are loess deposits as thick as 15 feet overlying the typical Salem Plateau cherty, silty clay material. Because New Haven is located along the Missouri River, topography in the area caused by the gradual uplift of the Ozark Dome, and erosion of uplifted rocks by precipitation, runoff, and stream flow, is accentuated. The land surface elevation ranges from 470 feet above sea level to 920 feet above sea level. An east-west trending ridge, along which State Highway 100 runs, lies about 1 mile to the south of the Missouri River, and divides the Missouri River valley to the north and the Boeuf Creek valley to the south.

2.2 Site History

Beginning in 1973, Kellwood Company began operating a tube mill (where small diameter aluminum tubing was made from aluminum coils and a metal fabrication operation where aluminum was cut, swaged, bent, and hole-punched) at 202 Industrial Drive. Kellwood's operations on Industrial Drive were sold to American Recreation Products, Inc. (ARP), an independent company, on September 30, 1985. In November 1988, Kellwood bought ARP. In March 1989, ARP sold the facility at 202 Industrial Drive to Metalcraft Enterprises. Metalcraft Enterprises, a subsidiary of Tubular Steel Inc., manufactures a variety of metal parts on a contract basis at the former Kellwood facility. Examples of parts manufactured include lawn equipment handles and frames and frames for motorized shopping carts. Raw tubing and sheet metal is cut, bent, punched, drilled, and welded. Parsons does not have an inventory of the classes of chemicals used at the facility, but assumes that lubricants, coolants, cleaners (probably including at least some solvents), and welding gasses are used as a part of their operations.

In approximately 1990, ARP and Kellwood Company were informed by the State of Missouri that a former employee had stated that at some period during the operation of the tube mill, one or more employees of the tube mill disposed of cleaning solvent containing PCE or trichloroethene (TCE) on the City-owned property just to the north of 202 Industrial Drive.

In April 1994, Kellwood and MDNR entered into an agreement to remediate the soils on the city-owned property north of the Former Kellwood Facility, and to monitor groundwater. In accordance with this plan, soils with concentrations of PCE exceeding 380,000 micrograms per kilogram (µg/kg) were excavated and sent to an off-site incinerator. To meet the remedial objective of reducing individual levels of PCE and its degradation products in the soil to a concentration of 1,000 µg/kg or below, the remaining soil was landfarmed. This work was completed by Geotechnology under contract to Kellwood. In addition, Geotechnology installed, at Kellwood's expense, a French drain system between the landfarm and the current Metalcraft facility and installed three monitoring wells north of the Former Kellwood Facility (MW-101, MW-102, and MW-103). As part of the 1995 agreement with MDNR, municipal well W3, the French drain system, and the three monitoring wells north of the Former Kellwood Facility (MW-101, MW-102, and MW-103) were sampled on a quarterly basis until March 2004. In June 2004, Kellwood submitted a written request to MDNR to end the 1994 monitoring agreement, with the understanding that sampling of these wells would be continued as part of the RI.

In 1999, following the landfarming activities, a Phase I and Phase II environmental site assessment was performed by EMA on behalf of a prospective purchaser on properties near the landfarm area. PCE was detected in two downgradient monitoring wells, OU2-MW-2 and OU2-MW-2A, and in a well located approximately 600 feet southwest of the landfarm area (OU2-MW-4).

Between 1999 and 2002, USGS installed groundwater monitoring wells, and collected soil, groundwater, residential well, sediment, surface water, and tree core samples in the vicinity of the Former Kellwood Facility. PCE was detected in each of these media. The entire Riverfront Site was listed as a Federal NPL or Superfund site on October 19, 2000. Currently, the shallow groundwater in portions of OU2 contains PCE above the Maximum Contaminant Level (MCL). The current National Primary Drinking Water Regulations (NPDWR or primary standards) for PCE and TCE (a breakdown product of PCE) sets the MCL for each of these compounds at 5 micrograms per liter (µg/L).

Based on current information, OU2 is not suspected to have been a source of compounds for city wells W1 and W2. OU2 may have affected selected private wells south of OU2 (i.e., in OU6). W3 is located 1,000 feet north of the Former Kellwood Facility. Quarterly sampling performed from 1994 to date at W3 has not shown any COPCs.

Kellwood began the investigation of OU2 and OU6 with the voluntary Residential Well Investigation (RWI). The RWI addresses residential wells south of OU2, which have been collectively defined as OU6 of the Riverfront Superfund Site. The Interval Screening Phase of the RWI was completed between July and August 2004. In addition, two monitoring well clusters (MW1 and MW2) were installed south of OU2 between September and November 2004.

These wells were sampled in December 2004 and February 2005. The available data from the RWI from 2008 and 2009 are being used with the historical data to complete and scope this risk assessment.

Impacted media include site soil, shallow groundwater, and sediment/surface water of Boeuf Creek. Deep groundwater is also impacted; but at low concentrations than found in the shallower zones.

2.4 Summary of Regional and Site Geology

New Haven is underlain by the geologic units of the Ozark Aquifer, a marine sedimentary, primarily carbonate, rock formation. The Ozark Aquifer is composed of eight lithological units, from top to bottom: the St. Peter Sandstone, Powell Dolomite, Cotter Dolomite, Jefferson City Dolomite, Roubidoux Formation, Gasconade Dolomite, Eminence Dolomite, and Potosi Dolomite. These formations, which are cherty dolostones and sandstones Cambrian and Ordovician in age, can be described as follows:

The St. Peter Sandstone: The St. Peter Sandstone is less than 40 feet thick, where present. It is exposed approximately one-third mile to the west of OU2, and can be recognized as a fine-grained cemented quartz sandstone that is generally tan, reddish-tan, or white in color.

The Powell Dolomite: The Powell Dolomite, where present, consists of a dolostone with medium to thick bedding, which is tan in color and finely crystalline, containing little to no chert. The Powell Dolomite contains greenish-grey mudstone/shale beds that are as much as 2 feet thick in the lower 50 to 70 feet of the formation. The Powell and Cotter Dolomites are the bedrock units most commonly exposed in the New Haven Area.

The Cotter Dolomite: The Cotter Dolomite ranges from 85 to 300 feet thick and is a tan, finely crystalline, silty to sandy, cherty dolostone, with thin greenish-grey mudstone/shale beds, and dark-reddish brown, fine-grained well cemented sandstone beds, typically less than 2 feet thick. The Cotter Dolomite contains two notable sandstone units, the Upper Sandstone and the Swan Creek Sandstone. The Upper Sandstone consists of approximately 4 to 5 feet of massively bedded, fine-grained sandstone. It consistently outcrops at an altitude of about 550 feet mean sea level (MSL) in many of the New Haven Creeks. The top of the upper sandstone is at a depth of approximately 47 feet at MW-101 at the northwest corner of the former Kellwood facility. It is not present at all locations in the area of OU2 and OU6. The Swan Creek Sandstone lies approximately 60 feet below the Upper Sandstone. It is generally an 8 to 10 foot layer of fine-grained, well-cemented sandstone within a layer of 15 to 20 foot thick sandy dolostone. The Swan Creek Sandstone does not outcrop, except far to the southeast, along Boeuf Creek. The Swan Creek sandstone member is present at 131 feet below ground surface (bgs) at MW 6SW, and at 113 feet bgs at MW 9SW. A distinguishing characteristic of the sandstone beds of the Cotter Dolomite is that they are thicker and contain greater quantities of chert.

The Jefferson City Dolomite: Beneath the Cotter Dolomite is the Jefferson City Dolomite, a layer fairly indistinguishable from the overlying Cotter Dolomite. Because of their

similar lithologies, they are grouped together. The Jefferson City Dolomite is a tan to light grey, fine to medium crystalline dolostone or argillaceous dolostone, containing greenish-grey mudstone/shale beds and several chert-rich zones. It varies between 150 and 165 feet thick in the New Haven area and does not crop out as a surface feature.

The Roubidoux Formation: Frequently used for domestic supply wells in New Haven, as discussed in Section 2.3, the Roubidoux Formation is variable in grain size and mineralogic composition. It is an approximately 115-foot layer consisting of sandstone, sandy dolomite, dolostone, mudstone, chert, and cherty dolostone. It can be most easily differentiated from the Jefferson City dolomite by a distinct increase in chert, and a marked change to a more weathered orange-brown color at the top of the formation. The Roubidoux Formation contains a 20 to 30-foot interval of fine-grained, poorly cemented, well-sorted quartzose sandstone approximately 20 to 40 feet from the top of the unit.

The Gasconade Dolomite: This formation underlies the Roubidoux Formation and has an average thickness in New Haven of about 305 feet. The Gasconade Dolomite is divided into the Upper and Lower Gasconade, and the Basal Gunter Sandstone member. The Upper Gasconade is characterized as massively bedded dolostone with little to no chert or sandstone, in contrast to the Lower Gasconade which contains abundant chert including massive chert beds 10 to 20 feet thick. The Upper Gasconade is approximately 35 to 50 feet thick in New Haven and is less permeable then the Roubidoux Formation above, and the Lower Gasconade below. The Gunter Sandstone in the New Haven area, despite its name, is a dolostone containing less than 10 percent sand.

Eminence Dolomite: Underlying the Gasconade is the Eminence Dolomite, a medium to coarsely crystalline dolostone, with less than 5 percent chert and sand. This is the youngest formation of the Cambrian in New Haven. The Eminence Dolomite varies between 145 and 180 feet thick beneath New Haven.

Potosi Dolomite: The Eminence Dolomite overlies the Potosi Dolomite, the lowermost formation in the Ozark aquifer. The Potosi Dolomite is a massively to thickly bedded, very porous, "vuggy" dolostone, averaging 200 feet thick in the area. As discussed below in Section 2.4, the Potosi Dolomite is often used for high capacity wells, such as the Pepsi Well.

The bedrock units that can be found exposed in the New Haven area are the Ordovician formations of the St. Peter Sandstone, Powell Dolomite, and Cotter Dolomite.

New Haven, Missouri is covered by several unconsolidated surficial deposits including Quaternary-Age loess, residual deposits of the Buffalo Series, Quaternary-Age alluvium, and Quaternary-Age terrace deposits. The youngest of these is the loess, deposited in the Pleistocene epoch, consisting of uniform silt, tan to light brown, wind blown particles, with small amounts of clay locally. The loess is located primarily at topographic highs in the area. It ranges between 0 to over 20 feet thick.

The Buffalo Series Deposits are a residual deposit from the weathering of the underlying Powell and Cotter Dolomites. They are divided into two subunits, the Buffalo A Subunit, and the Buffalo O Subunit. The Buffalo A Subunit is generally a stiff, orange-brown sandy or silty clay with small quantities of chert, less than 5 feet thick, and underlying the Quaternary-Age Loess. The Buffalo O Subunit is much thinner then the Buffalo A Subunit and is mixed with colluvial deposits, so that the combined deposit is less than 1 foot thick and is generally only found on slopes along the bluffs of the Missouri River Valley and, therefore, is not likely to be found in OU2.

The Quaternary-Age alluvium is found in the flood plains of the streams, and tends to consist of organic-rich deposits of silt and clay. The area around Boeuf Creek and its tributaries contains large alluvial deposits with chert gravel. The Quaternary-Age Terrace Deposits are also found near Boeuf Creek and are similar to the alluvial deposits, but are at a higher altitude, and were deposited in an earlier stream deposition event.

New Haven is part of the Ozark Plateau, a broad structural and topographic dome characterized by karst topography. Regionally, the Ozark Plateau is characterized by dissolution-induced sinkholes, caves, fractures, and underground drainage. The Ozark Plateau is underlain by a broad asymmetrical anticlinal arch, whose gently-dipping limb faces south toward the Ouachita Mountains.

Bedrock units in New Haven regionally dip to the northeast. The bedrock is fractured and jointed throughout, southeast-northwest and southwest-northeast. Observations of outcrops along Highway 100 in western Franklin County and in the vicinity of OU2/OU6 indicate that the surficial bedrock contains a number of local variations in the dip of the rock units. There are three major structures in the OU2 area: the Wildcat Creek Anticline, the Park Creek Structure, and the Berger Creek Bluff Fault, all trending northwest-southeast (USEPA, 2003 and Starbuck, 2002).

The Berger Creek Bluff Fault is northeast of OU2, and runs through the center of New Haven, just to the northeast of the Pepsi facility and southwest of OU4. This structure is exposed along a bluff to the northwest of New Haven, where it is a series of three faults about 50 feet apart with offsets of 3 to 10 feet. The Berger Creek Bluff Fault most likely extends to the southeast, following highs in the upper sandstone unit and a lineament to the southeast of New Haven.

The Wildcat Creek Anticline, lying to the southeast of OU2, was observed in an outcrop along a branch of Wildcat Creek located in the western half of Section 1, T44N, R3W (Starbuck, 2002). Flanks of this anticline dip to the southwest and northeast. More evidence of folded bedrock was also observed north of the outcrop along the same branch of Wildcat Creek.

The Park Creek Structure is delimited by faults trending to the northwest and northeast. The structure is expressed through uncharacteristic dips and altitudes of the upper sandstone of the Cotter Dolomite along a creek to the southwest of OU2, exposures of St. Peter Sandstone

encountered at altitudes much lower than anticipated, and a northeast trending fault bounding an outcrop of the St. Peter Sandstone just south of Highway 100 in the western part of the city, west of OU2.

Geophysical surveying performed by Parsons in July 2004 identified a resistivity anomaly west of the northern well nest (MW1) installed as part of the RWI (Parsons, 2005). This trough in the bedrock was interpreted to be a geologic feature, and may indicate a vertical offset of strata. A possible fault was also identified east of the southern well nest (MW2) and JS-38, in MDNR geophysical results from September 2004. The Interval Screening performed in July 2004 identified an offset in the transmissive zones between JS-37 and JS-38 that could indicate a fault, or that beds are dipping to the North

2.5 Summary of Regional and Site Hydrogeology

There are two primary aquifers in the New Haven area: the Missouri River alluvial aquifer and the bedrock Ozark Aquifer (USEPA, 2003). The Department of Natural Resources has determined that there are no Missouri River alluvial sediments in the vicinity of OU2. While there are Quaternary alluvial deposits southwest of the site, the only aquifer in the vicinity of OU2 is the bedrock Ozark aquifer. The bedrock Ozark aquifer beneath OU2 consists of two distinct flow systems: a shallow flow system and a deep flow system. The shallow bedrock flow system includes the Cotter Dolomite and Jefferson City Dolomite. The deep bedrock flow system includes the Roubidoux Formation and older geological formations, including the Gasconade, Eminence and Potosi Dolomite.

The Ozark Aquifer is found throughout New Haven and OU2. It consists of a thick sequence of water-bearing dolostone, limestone, and sandstone formations with varying water-yielding capacities. The uppermost bedrock units found in New Haven are the St. Peter Sandstone, Powell Dolomite, Cotter Dolomite, and Jefferson City Dolomite. Beneath the Cotter and Jefferson City Dolomites, the geologic formations which comprise the Ozark aquifer are, in order of increasing age, the Roubidoux Formation, the Gasconade Dolomite, the Gunter Sandstone Member of the Gasconade Dolomite, the Eminence Dolomite, and the Potosi Dolomite.

The St. Peter Sandstone, as discussed above, is less than 40 feet thick when present, and is only found in places such as the Park Creek Structure. In New Haven, it is exposed approximately one third of a mile to the west of OU2. The Powell and Cotter Dolomites are the bedrock units most often exposed in the New Haven area. The partial erosion of these units creates considerable variance in their thicknesses in the New Haven area. Where present, the Powell is as thick as 95 feet; the Cotter ranges from 85 to 300 feet thick. The Cotter and Jefferson City Dolomites contain numerous thin shale and mudstone partings and are less permeable than the underlying formations of the Ozark aquifer, which helps to obstruct groundwater from discharging to the lower units (Imes and Emmett, 1994). The Powell, Cotter, and Jefferson City Dolomites all produce small yields, locally producing only 5 to 15 gallons per minute (gpm).

According to the USGS/USEPA well survey, many of the domestic wells in the New Haven area (where there is information available) are open to portions of the Cotter Dolomite, Jefferson City Dolomite, and/or the underlying Roubidoux Formation. The Roubidoux Formation (which produces about 15 to 50 gpm) is used for newer domestic supply wells, and is probably the most widely used formation in the Salem Plateau for domestic supply (Miller and Vandike, 1997). Yields from the Roubidoux Formation in areas such as New Haven where the formation is buried several hundred feet, are often larger than the average elsewhere (Miller and Vandike,1997). It is believed that the significant recharge area for the Roubidoux Formation is located approximately 15 miles southwest of New Haven where the Roubidoux Formation is exposed at the surface.

High capacity wells are drilled into formations with higher production yields. The deeper units, in particular the Gunter Sandstone Member of the Gasconade Dolomite and the Potosi Dolomite, produce greater quantities of water and are therefore desirable for high-capacity municipal and industrial wells. Recharge to the Gasconade, Eminence and Potosi Dolomite flow system occurs primarily along a regional east-west trending topographic divide across southern Missouri, about 90 miles south of New Haven. Wells open to the Gunter Sandstone Member have an average yield of only 40 to 50 gpm; however, yields from production wells open to this unit locally are found to be as large as 200 to 500 gpm (Miller and Vandike, 1997). Most of the high capacity wells in the area, including New Haven municipal wells W1, W2, and W4, and the Pepsi well are drilled into the Potosi Dolomite, which is the lowest unit of the Ozark Aquifer, and a unit that is known to be very porous and full of vugs (small dissolution voids). The Potosi Dolomite has predictably high yields ranging from 200 to 1,000 gpm. City well W3 was also originally drilled into the Potosi Dolomite to take advantage of the high production yields, but because of a problem with turbidity, the lower part of the well was plugged leaving the well open instead to the Gasconade and Eminence Dolomites, which have a notably smaller, yet still reasonably high yield of approximately 75 to 250 gpm (Miller and Vandike, 1997).

As part of the site investigation by the USEPA, the USGS inventoried the domestic wells and high production wells in the New Haven area during the spring of 1999. During the inventory, water level measurements were taken in selected wells within 5 to 6 miles of New Haven on the south side of the Missouri River. Results of the inventory indicate that water levels are the highest along the topographic ridge between the Missouri River and Boeuf Creek, north of OU2, and in the uplands south of Boeuf Creek, and are lowest along Boeuf Creek and the Missouri River. The highest water levels (more than 580 feet MSL) are west of New Haven and several miles south of New Haven. Shallow groundwater flows from topographic highs toward the topographic lows at the discharge areas along Boeuf Creek and the Missouri River. In the immediate vicinity of New Haven, a shallow groundwater divide is centered along State Highway 100 south of the topographic divide.

Most domestic wells in the New Haven area are less than 400 feet deep, and are open to Cotter Dolomite, Jefferson City Dolomite, and/or the upper part of the Roubidoux Formation. The municipal wells are much deeper (more than 800 feet deep) with deeper casings, and therefore are open to the deep groundwater flow system. The Pepsi well is open from the

Roubidoux Formation to the Potosi Dolomite. Municipal wells W1 and W2 had relatively shallow casing depths (less than 220 feet). Municipal well W1 was open from the lower Cotter Dolomite to the Potosi Dolomite, and municipal well W2 was open from the Jefferson City Dolomite to the Potosi Dolomite. Both of these wells have been abandoned.

The static water elevations measured in municipal wells W3 and W4 and in the nearby Pepsi well ranged from 493 to 500 feet MSL when these wells were drilled in 1988, 1994, and 1965, respectively. The potentiometric map of shallow groundwater (Cotter/Jefferson City Dolomites) in the area indicates water elevations of approximately 525 feet MSL. As discussed in the OU1/OU3 RI Report (USEPA, 2003), these head differences suggest a potential downward gradient of approximately 0.15 feet/foot between the Cotter/Jefferson City Dolomite and the deeper formations (Roubidoux, lower Gasconade Dolomite, upper Potosi Dolomite). The downward gradient decreases with increasing distance away from the shallow groundwater divide, and the vertical gradient reverses and points upward, near the Missouri River where the regional flow system dominates. This last assertion is supported by tests performed by USGS in municipal well W2 from 1999 to 2000 and by head differentials monitored in wells BW-01 and BW-00 (USEPA, 2003, and USEPA, 2001). These tests, which included geophysical logging (including caliper, natural gamma, borehole fluid, electromagnetic induction, and borehole video logs, together with borehole flow meter tests), detected upward vertical flow in this well borehole. The results of this testing were included in the 2001 Expanded Site Investigation/Remedial Investigation Results report and the 2003 Focused Remedial Investigation Report for OU1 and OU3, (prepared by USGS for EPA).

The interval screening portion of the RWI identified both JS-37 and JS-38 as vertical conduits for contaminant migration from the shallow bedrock to the lower portions of the Cotter and Jefferson City formations. JS-38 is also open to the upper 15 to 20 feet of the Roubidoux Formation, but not to the Roubidoux Formation sand. Interval screening testing was also performed at JS-14 and JS-36 in 2007. This testing indicated that these wells also served as vertical conduits for downward migration of constituents. Both JS-14 and JS-36 are terminated in the lower portions of the Jefferson City. Liners have been installed in JS-14, JS-36 and JS-38 to reduce the downward migration of constituents from shallow portions of the well to the lower portions. Bentonite grout was placed in the lower portion of JS-37 to minimize vertical movement in the borehole.

2.6 Site Surface Water Hydrology

The major body of water in New Haven is the Missouri River, which borders the Northern edge of town. There are a number of small creeks and tributaries in the area, including Boeuf Creek, which lies to the south of OU2. The small creeks in the vicinity of OU2 are typically unnamed and referred to by number.

A surface water divide between small tributaries that flow north directly to the Missouri River and tributaries that flow into Boeuf Creek lies along and north of Highway 100. Surface water in the area of OU2 and OU6 flows south via Wildcat Creek and a number of smaller

tributaries to Boeuf Creek, which flows to the east before turning north to empty into the Missouri River. The small tributaries that drain the area of OU2 and OU6 and feed Wildcat Creek and Boeuf Creek typically have very low flows except following a precipitation event. The upper reaches of these drainages are ephemeral.

New Haven is a recharge area for groundwater and has an average annual precipitation of approximately 40 inches (USEPA, 2003). Regionally, groundwater flows to the north/northeast (USEPA, 2003). There is a shallow groundwater divide and south of this divide, shallow groundwater flows from OU2 south towards Boeuf Creek. A surface water divide is just north of the shallow groundwater divide.

3.0 CHEMICAL CHARACTERIZATION

This section describes the results of previous and recent assessment activities and identifies the chemicals of potential concern (COPCs) that will be used in the quantitative risk assessment. In addition, the physical and chemical properties of the COPCs are briefly discussed.

3.1 Previous Investigation Activities

Historic investigation activities for the facility are summarized in chronological order below. Additional site-wide investigations were performed in 2007 through 2009 according to various work plans for the site and are summarized in Section 3.2.

3.1.1 MDNR (1989-1993)

3.1.1.1 Soil Investigation

On September 11, 1989, MDNR performed an investigation of the New Haven Public Water Supply Site. The Division of Environmental Quality, Laboratory Services Program, collected four soil samples and one water sample. One of these soil samples was collected in OU2, on the northern side of the Former Kellwood manufacturing building. The sample was analyzed for metals and volatile organic compounds (VOCs). Tetrachloroethylene (PCE) was detected in this sample at a concentration of 13,000 µg/kg, and trichloroethylene (TCE) was detected at 6,500 µg/kg (MDNR, 1989).

3.1.1.2 Groundwater Investigation

Between May 1988 and September 1993, MDNR collected numerous samples from W3, and one sample from the Pepsi well. Neither PCE nor TCE was detected in the samples above the laboratory detection limits (MDNR, 1988).

3.1.2 Geotechnology (1991-1998)

In 1991, Geotechnology, Inc. submitted a Final Contamination Delineation Plan for the Former Kellwood facility to MDNR. In 1994, an agreement was reached between Kellwood and MDNR for the remediation of soils containing PCE and TCE at the former Kellwood facility. Soils with concentrations of PCE exceeding 380,000 µg/kg (approximately 90 cubic yards) were excavated and sent to an off-site incinerator. To meet the remedial objective of reducing the highest observed levels of PCE and its degradation products in the soil to a concentration of 1,000 µg/kg or below, the remaining soil was land-farmed. The results of soil investigations performed prior to, and after the land-farming, are described below.

3.1.2.1 Soil Investigation

In 1991, prior to the land-farming activities, 16 borings (B-1 through B-16) were advanced at OU2. Continuous soil samples were collected and field screened with a photoionization detector (PID) for the presence of volatile organic vapors. Laboratory analysis of these soil samples indicated that the primary COPC was PCE.

One composite sample was collected over the entire depth of each boring; total boring depths ranged from 1 foot to 9 feet below ground surface (bgs). PCE was detected in 11 of the 16 samples. The highest level of PCE (810,000 µg/kg) was found at B-7, approximately 80 feet north of the former Kellwood manufacturing building, and 150 feet east of Industrial Drive. Several other VOCs were also encountered in various borings.

In addition, a composite sample prepared from aliquots of the most impacted boring according to PID readings was analyzed for Toxic Characteristic Leaching Procedure (TCLP) metals; no metals were detected above TCLP limits in this sample. A sample prepared from the aliquots with PID readings greater than 100,000 µg/kg was analyzed for TCLP VOCs; PCE was detected in this sample at 8,800 micrograms per liter (µg/L), above the regulatory limit of 700 µg/L.

In 1993, Geotechnology installed three monitoring wells north of the former Kellwood facility (MW 101, MW 102, and MW 103). During installation of these wells, soil samples were also collected from each of the well boreholes, between 0 and 3 feet bgs. VOCs were not detected in any of the three soil samples.

3.1.2.2 Removal Action/Land-farming

In 1994, Geotechnology began off-site disposal of soil with concentrations greater than or equal to 380,000 µg/kg PCE or 260,000 µg/kg of TCE. Soil and weathered rock, totaling approximately 90 cubic yards, with VOC levels between 610,000 and 3,000,000 µg/kg, were removed using a trackhoe and transported to an off-site location for incineration. Additionally, as part of the subsequent land-farming effort, the area was periodically plowed/disked to expose and volatilize organic compounds adsorbed to the remaining soil, to meet a cleanup objective of 1,000 µg/kg.

To monitor the progress of the land-farming activities, the soil was periodically sampled, and in 1998, a Final Soil Sampling Report was issued to MDNR. The results of the last round of sampling, which occurred on June 25, 1998, indicated that the VOC concentrations in the soil at the land-farm sampling grid locations were below 1,000 µg/kg. Kellwood received a letter dated August 25, 1998, from MDNR stating that no further action regarding the soil was required.

Subsequent soil sampling performed by USGS in 2001 found elevated levels of PCE (3.3 mg/kg in a laboratory sample, 17.6 mg/kg from the field GC) in selected soil samples.

3.1.2.3 Groundwater Investigation

In 1993, three monitoring wells (MW 101, MW 102, and MW 103) were installed north of the former Kellwood facility. MW 101 and MW 102 were screened between 35 and 55 feet bgs, and MW 103 was screened between 40 and 60 feet bgs, tapping the upper sandstone marker bed of the Cotter Dolomite. Between 1993 and 2003, these three wells were monitored quarterly by Geotechnology, as outlined in an agreement between Kellwood and MDNR. Parsons performed quarterly monitoring of these wells between November 2003 and March 2004. The results, which were submitted quarterly to MDNR and USEPA, showed low levels of VOCs (less than 10 µg/L) in MW-101. The results for MW-102 and MW-103 were non-detect. These sampling results are consistent with sampling results from the RI.

3.1.3 Environmental Management Alternatives (EMA)

In 1999, EMA performed a Phase I and limited Phase II Environmental Site Assessment (ESA) of the former Kellwood plant property. At that time, and currently, this was the site of a metal fabrication facility operated by Metalcraft Enterprises. The Phase I and II were done for Excaliber Acquisition Corporation as part of a proposed property transfer.

3.1.3.1 Groundwater Investigation

As part of the Phase II ESA, EMA installed six monitoring wells. Three of the wells (MW 1, MW 2, and MW 5) were screened between approximately 51 and 61 feet bgs. MW 3 was screened from 45 to 55 feet bgs, MW 4 was screened from approximately 41 to 51 feet bgs, and MW 2A was screened between approximately 2 and 3 feet bgs. The report concluded that groundwater flow at the former Kellwood facility was to the south and southwest.

EMA collected groundwater samples from each well. PCE, TCE and cis-1,2 dichloroethene (cis-1,2 DCE) were detected in the loading dock area and south-southwest of the former Kellwood facility.

EMA also collected three samples of plant wastewater to evaluate discharges to the city municipal wastewater system (New Haven Publicly Owned Treatment Works [POTW]). Detectable concentrations of VOCs and semi-volatile organic compounds (SVOCs) were not found, although the detection limit of one of the samples was elevated due to the presence of soap.

3.1.3.2 Soil Investigation

As part of the Phase II ESA, EMA drilled five test borings, field screened soil boring samples, and collected one soil sample (MW 2) for analytical testing. The sample contained PCE at a concentration of 339,000 µg/kg, TCE at 2,100 µg/kg, and cis-1,2 DCE at 5,620 µg/kg at the northeast corner of the former Kellwood facility, near DNAPL borehole N-12.

3.1.4 USGS and Black & Veatch (2000 to Present)

The USGS and Black & Veatch launched an investigation of the New Haven area as part of the OU1 and OU3 RI. Results of this investigation, as they relate to OU2, are described below.

3.1.4.1 Soil Investigation

In 2001, USGS collected samples from five test pits located north of the former Kellwood facility. The test pits ranged from 1 to 2 feet deep. In addition, soil samples were collected during the installation of monitoring wells BW-21A and direct push boring OU2-GPM01. PCE was detected in several test pits, and in the borehole samples from BW-21A and OU2-GPM01. Soil samples from the test pits had concentrations of VOCs that were consistent with the samples collected as a part of this RI. Soil samples were also collected from four locations at which sediment samples were collected. The samples collected from 0-0.2 feet bgs at these locations were classified as sediment samples, and the samples collected from 0-0.5 feet bgs at these locations were classified as soil samples. PCE was not detected in these samples.

3.1.4.2 Groundwater and Residential Well Investigation

From 2000 to 2002, the USGS installed and sampled new monitoring wells in OU2, sampled existing wells in the area that had been installed as part of previous investigations, and sampled W3. PCE was detected in several of the monitoring wells but not in W3.

Since 1999, the USGS has inventoried and sampled residential wells in the New Haven area. Five residential wells to the south of the former Kellwood facility (JS-14, JS-36, JS-37, JS-38, and JS-52) were found to contain PCE. In response to these detections, Kellwood voluntarily installed whole-house carbon filtration systems at four of these residences (JS-14, JS-36, JS-38, and JS-52), and maintained and sampled those wells in accordance with AOC CERCLA-07-2002-0091 (2002 AOC), and voluntarily extended a city water line at one residence (JS-37). Additionally, the casing for well JS-50 was voluntarily extended to 200 feet bgs by Kellwood to protect against possible VOC infiltration from shallower depths. As part of the 2002 AOC, the whole-house carbon filtration systems at JS-14, JS-36, JS-38, and JS-52 are sampled on a quarterly basis to measure treatment effectiveness. The results of the quarterly residential sampling are submitted to USEPA as part of quarterly monitoring reports required by the 2002 AOC. The data collected from the untreated water from residential wells in 2008 and 2009 were evaluated as part of this risk assessment to evaluate the risk to residents prior to any treatment.

Well Installation Advisory

In response to the residential well detections, MDNR issued an initial water well installation advisory for the New Haven area in September 2002. For the area south of New Haven (southeast of the former Kellwood facility) the advisory recommended 200 feet of casing, full-length grouting, and a 10-inch borehole diameter for any new residential wells.

A rule amendment became effective on April 30, 2006 that applied to wells in an area referred to as Special Area 3, defined as Sec 36, Township 45, Range 3W; Sec 2, N ½ Sec 11, SW ¼ Sec 1 and NW ¼ Sec 12, Township 44, Range 3W. This rule amendment (and prior to its finalization, an emergency rule) set new drilling and construction standards for water wells and heat pump wells. The standards included in the rule amendment are:

- Consultation with MDNR prior to installing any water well or heat pump well.
- Analysis of a water sample prior to deepening of any existing well.
- Containerization of drilling derived solids and liquids and analysis for determination of proper disposal.
- Including a sampling point within 10 feet of the wellhead for any new or deepened wells in the area.
- Analysis of a water sample from any new or deepened wells within 60 days.
- At any event at which DNAPL is encountered, cease drilling, collect a DNAPL sample for analysis, and plug the borehole full-length with high-solids bentonite grout.

3.1.4.3 Surface Water and Sediment Investigation

A surface water and sediment investigation, performed from 2000 to 2002 by USGS, tested Boeuf Creek and several tributaries in the vicinity of OU2 for VOCs. PCE and TCE were found in several stream water samples collected in the 500 and 510 tributaries that run just to the west of OU2. Concentrations of up to 100 µg/L were detected near the confluence of the 500 and 510 tributaries. Only one sample (OUX-710TB-6) in the eastern tributaries contained PCE and TCE in 2000; when this location was re-sampled in 2002, PCE and TCE were not detected.

Stream sediment samples were taken from 0 to 0.2 feet bgs in the 510 tributary that runs just west of OU2. PCE was detected at an estimated concentration of 1.8 µg/kg in sample OUX-EC06. No other chemicals were detected in any sediment samples.

3.1.4.4 Sewer Investigation

An investigation of the sewer lines servicing New Haven was performed by USGS during 2001 and 2002. This investigation showed PCE and TCE at selected locations (lift stations and manholes) in the sanitary sewer system. All of the locations with detections of PCE and TCE were downstream of the former Kellwood facility.

Slightly elevated levels of organics, including PCE and TCE, were found in LS5, a lift station located west of the former Kellwood facility. Numerous field gas chromatograph (GC) samples and samples for laboratory analysis were collected from LS5. The field GC samples

were collected from diffusion bag samplers placed in the lift station in order to obtain a four-day average PCE concentration. Since most of the laboratory samples were instantaneous grab samples, the analytical laboratory results are not necessarily comparable to the field GC results. Field GC results indicated that PCE was present at LS5 at concentrations ranging from 0.05 to 24.46 µg/L, whereas laboratory grab samples detected PCE ranging from 1.6 to 5.4 µg/L. TCE (up to 69.8 µg/L), 1,2 dichloroethylene (1,2 DCE) (up to 201 µg/L), vinyl chloride (up to 97.7 µg/L), and benzene (up to 7.3 µg/L) were also found in field GC samples collected from LS5.

Low levels of organics, including PCE and TCE, were also found in LS4, a lift station located east of the former Kellwood facility. Field GC results indicated that PCE was present at LS4 at a concentration of 0.03 µg/L, whereas laboratory grab samples detected PCE at a concentration of 1.2 µg/L. TCE (0.04 µg/L), 1,2 DCE (0.18 µg/L), and benzene (0.34 µg/L) were also found in field GC samples collected from LS4.

PCE was detected in samples collected from manholes northeast of the former Kellwood facility (up to 7 µg/L at MH407; and up to 3.2 µg/L at MH154) and north of the former Kellwood facility (up to 19.6 µg/L at MH156S; and up to 0.45 µg/L at MH156N).

3.1.4.5 Biota Sampling

In 2001 and 2002, a tree core survey was completed in the vicinity of OU2 by USGS. Several samples directly north of the former Kellwood manufacturing building contained PCE. PCE was also detected in samples collected southwest of the former Kellwood manufacturing building. The extent of PCE detections in the tree core samples is consistent with the extent of detections in shallow groundwater for samples collected as a part of this RI.

3.1.5 Parsons (Residential Well Investigation)

In June 2004, Kellwood agreed to perform an expedited bedrock well installation and residential well sampling effort. The purpose of this RWI was to gain additional understanding about detections of PCE in certain residential wells (OU6) south of OU2 along Boeuf-Lutheran Road and in the Wildcat Creek Development along Highway C. The RWI was conducted in phases, the first of which was the interval screening, which was followed by monitoring well installation and two rounds of groundwater sampling. Details of this investigation were presented in a report dated April 2005 (Parsons, 2005). A summary is provided below.

3.1.5.1 Interval Screening

Interval screening was performed at two residential wells, JS-37 and JS-38 in July 2004 (Parsons, 2005). Borehole geophysics, including an optical televiewer, a natural gamma probe, a fluid resistivity/temperature probe, and a heat pulse flow meter, were used to identify transmissive intervals and intervals with the potential to carry VOCs into each well. Flow, fluid resistivity, and temperature measurements were collected both during static conditions (to

identify intervals providing the greatest yield to the well) and while pumping (to verify the highest yielding intervals under residential well pumping conditions).

Based on the interval screening results, there appeared to be multiple transmissive zones present in the vicinity of the residential wells. At well JS-37, four intervals were identified that contributed significant flow to the well. At well JS-38, two such zones were identified.

The uppermost transmissive zone in JS-37 may correlate with the Swan Creek sandstone. This interval is likely to be present in the cased portion of well JS-38. Analytical data collected during the interval screening indicated the presence of higher PCE, TCE and cis-1,2 DCE levels in well JS-37 compared to well JS-38. PCE concentrations under static conditions are higher in the shallow samples in well JS-37. This well had a downward flow of just under 0.2 gpm in the borehole under static conditions.

Concentrations of PCE varied little with depth in well JS-38, under both static and stressed conditions. This well was observed to have a downward flow of approximately 0.5 gpm in the borehole under static conditions. Based on reports of the conditions in which the well casing was grouted in place, it is possible that the seal between the casing of well JS-38 and the borehole is ineffective. The high flows that were observed immediately beneath the bottom of the casing reinforced this concern. Based on these findings, a liner was installed in JS-38 to seal off water from the portion of the borehole above the packer, including the water entering the well from around the casing. The downward flow of PCE in this well is the likely source of PCE in the well for the adjacent home, JS-52. JS-52 was lined shortly after it was installed and is believed to have an effective seal that prevents water from shallow depths from entering the well.

3.1.5.2 Monitoring Wells

Between September and November 2004, a total of eight monitoring wells were installed south of OU2 at the MW 1 (northern) and MW 2 (southern) locations. These wells were sampled during drilling to provide information on the extent and magnitude of impacted groundwater, and to screen and case wells at appropriate depths.

During the first round of monitoring well sampling, conducted in December 2004, VOCs were only detected in the shallowest wells in each well cluster. A second round of sampling was conducted in February 2005 to verify these results. The data were compiled and submitted to USEPA in the Draft Residential Well Investigation Report (Parsons April 2005). The results from the second round of sampling showed that impacts above EPA MCLs in groundwater in the vicinity of well nest MW 1 were limited to the interface between the overburden and the bedrock (MW 1S). Impacts in groundwater below MCLs were encountered at depths of 49 to 75 feet in MW 1T1 (1 µg/L of PCE detected on February 2, 2005; the analytes were below detection limits on December 16, 2004). Monitoring well MW 1SW, which was cased through the zone encompassing the overburden/bedrock interface and the next transmissive zone (49 to 75 feet

bgs), and was installed as open hole in a deeper transmissive zone (Swan Creek Sandstone), was not impacted.

Monitoring well MW-2S, which is screened across the overburden-bedrock interface contained PCE at estimated concentrations less than the practical quantitation limit of 1 µg/L during both sampling events.

3.2 Parsons Investigation Activities (2007 – 2009)

A characterization investigation was conducted from September 2007 through September 2009. The characterization consisted of five primary tasks:

- Task 1 – Soil Investigation
- Task 2 – Groundwater Investigation
- Task 3 – DNAPL Investigation
- Task 4 – Sewer Investigation
- Task 5 – Sediment and Surface Water Investigation

In addition, a separate soil gas investigation was conducted for a nearby school in September 2009. Each of these investigations is discussed in detail in Section 3 of the RI Report and summarized in the following subsections.

3.2.1 Soil Investigation (Task 1)

The goal of the soil investigation was to determine the extent and magnitude of COPCs in soil in the vicinity of the Former Kellwood Facility. To achieve this objective a sampling grid was surveyed in over the landfarm area, the loading dock of the Former Kellwood Facility, and the area to the southwest of the landfarm area. Borings were advanced and multiple samples were collected at 37 different grid locations between September 10 and 13, 2007. Typically, two soil samples were collected for analysis from each boring: one surface soil (0 to 6 inches bgs) sample and a second at a depth interval where PID field screening indicated the highest level of constituents. A total of 81 samples were collected for analysis, including 8 field duplicates (Figure 3.1a).

A summary of analytical results are presented in Appendix J of the RI/FS report. A summary of the data used specifically for the risk assessment is provided in Appendix A. PCE was detected in 41 of the samples. PCE breakdown products, specifically TCE and 1,2-DCE (total), were detected in 11 samples. Five samples were analyzed for SVOCs, pesticides/PCBs and selected metals in addition to VOCs.

As part of the soil investigation, four Shelby tube geotechnical samples were also collected; one each at grid locations B2, E2, P6, and R6. The samples were analyzed for total organic carbon, total porosity, water content, and bulk density.

3.2.2 Groundwater Investigation (Task 2)

The goal of the groundwater investigation at OU2 of the Riverfront Superfund Site, along with data gathered from OU6, was to determine the horizontal and vertical extent and magnitude of PCE concentrations in groundwater and to determine the geologic, hydrologic, and geochemical factors that affect the distribution and migration of PCE in the subsurface. The groundwater investigation task at OU2 and OU6 was divided into seven components, or subtasks: interval screening, direct-push sampling, residential well sampling, monitoring well installation and sampling, site-wide groundwater sampling, aquifer testing, and surveying (Figure 3.1b). The major subtasks associated with the risk assessment are described below.

Direct Push Borings – A total of eighteen direct push borings were advanced to evaluate the presence of PCE in water in the overburden as well as to determine the depth to bedrock profile in the area of the south end of the industrial park and adjoining property to the west. Twelve borings were advanced along a generally east-west line. Two jogs in the line were required in order to obtain access from the City of New Haven (for the industrial park property) and the New Haven School District (for the west end of the transect). Depth to bedrock in the eastern two borings was generally shallow, combined with a relatively higher land surface elevation. Depth to bedrock in the five borings of the east-west transect that extend to the west edge of the industrial park was greater than 25 feet. The western end of the transect had shallow depths to bedrock. Depth to bedrock on the north-south transect varied relatively little. The greatest depth to bedrock was at CSN6, which was at a higher land surface than the other borings of the north-south transect. Because the direct push data were collected to evaluate the presence/absence of PCE in the overburden and determine depth to bedrock, the data were not used for risk assessment purposes.

Residential Well Sampling – Prior to the start of the OU2 RI, the USEPA and USGS had begun sampling of selected residential drinking water wells located south of OU2 in the area now known as OU6. As part of the groundwater investigation portion of this RI, another round of sampling was conducted at these wells, as seen on Figure 3.1b. The residential wells included (based on homeowner consent) were:

JS-07	JS-27	JS-41	JS-51
JS-10	JS-29	JS-42	JS-52*
JS-11	JS-33	JS-43	DM-21
JS-12	JS-36	JS-44	PA-53
JS-14*	JS-37	JS-45	PA-55*
JS-15	JS-38*	JS-47	MW-13
JS-20	JS-39	JS-50	MW-2R
JS-25	JS-40		

Wells denoted with an asterisk (*) are located at residences that are sampled on a quarterly basis as part of the OU6 Quarterly Groundwater Monitoring Program. The sampling took place between March, 2008 and May, 2008.

Site-Wide Groundwater Sampling – The following wells were sampled in accordance to the Work Plan (newly installed wells are listed with an asterisk*):

- MW1 cluster (MW-1S, MW-1T1, MW-1SW, MW-1UB*)
- MW2 cluster (MW-2S, MW-2SW, MW-2T2, MW-2T3, MW-2R)
- MW4* (MW4A, MW-4B, MW-4BS, MW4) (installed by the USGS)
- MW-5UB*
- MW6 cluster* (MW-6US, MW-6SW, MW-6R)
- MW7 cluster* (MW-7US, MW-7SW)
- MW8*
- MW9 cluster* (MW-9US, MW-9SW, MW-9R)
- MW10-UB*
- MW11* (installed by the USGS)
- MW12* (installed by the USGS)
- MW13
- MW-14US*
- MW-101
- MW-102
- MW-103
- BW-20
- BW-21
- BW-21A
- BW-22

In addition to the monitoring wells listed above, five sentinel wells were chosen from local residences. These five wells were: JS-15, JS-20, JS-39, JS-40, and PA-53. Also, the former industrial well at Beaver Brand Hats (JS-25) was sampled.

3.2.3 DNAPL Investigation (Task 3)

The DNAPL investigation consisted of installing core holes into the upper portion of the bedrock in the area where the disposal of PCE occurred. A grid on 30-foot centers was established across the open lot north of the Former Kellwood Facility and extending to the west and northwest of the Former Kellwood Facility. Core holes were drilled at selected nodes of the grid and FLUTe liners were then placed in the borehole. The FLUTe liners have a treated surface that produces a stain when it comes into contact with free-phase hydrocarbons. The FLUTe liner was left in the borehole a minimum of two hours to allow the reactive liner to interact with potential NAPL. The liner was then removed from the borehole and was turned right-side out and examined for stains indicating the presence of NAPL. Where NAPL was indicated, the liner was laid out adjacent to the core along with a measuring tape and photographed for documentation. Because the DNAPL investigation was conducted to evaluate

the presence/absence of DNAPL, the results of these investigation activities were not included in this risk assessment evaluation.

3.2.4 Sewer Investigation (Task 4)

Sewer water and sewer sediment samples were collected from several manholes and lift stations to evaluate the presence of PCE and its breakdown products in these media. Sediment was not present in MH-156 or in MH-405. Seven sewer water samples and five sewer sediment samples were analyzed. PCE was detected in three of the seven sewer water samples. TCE, 1,2-DCE, and vinyl chloride were not found at detectable concentrations in the sewer water samples. PCE was detected in two of the sewer sediment samples. The other three sewer sediment samples did not contain PCE at a detectable concentration. None of the samples contained detectable concentrations of TCE, 1,2-DCE, or vinyl chloride.

Three soil borings were advanced along the sewer segment at the south end of Maupin Avenue. Four soil borings were advanced along the sewer segment along Miller Street from Maiden Lane northward. Four soil borings were advanced along the sewer segment paralleling Maupin Avenue north of Mary Hammack Street. A total of 32 soil samples were analyzed from the 18 borings (Figure 3.1c). None of the samples contained PCE, TCE, 1,2-DCE, or vinyl chloride at detectable concentrations; however, a few VOCs were detected at low concentrations.

Because the sewer water and sediment in the manholes were removed shortly after the samples were collected, only the soil data adjacent to the sewer lines were evaluated in this risk assessment.

3.2.5 Sediment and Surface Water Investigation (Task 5)

Sediment and surface water samples were collected from 13 locations (Figure 3.1c). USGS collected surface water samples from four locations, access to three of which Parsons had been denied access to. The fourth sample was collected from SW-08. The USGS transferred the samples to Parsons for analysis. Samples SW8U1, SW8U2 and SW8U3 were collected upstream of SW-08 to refine upstream concentrations in the tributary identified as 600. The surface water samples were collected during periods of low flow to minimize the potential for dilution of concentrations due to runoff. Attempts to measure the streamflow using a flowmeter were unsuccessful due to the low velocity and the small depth of water in the low flow conditions. The flow velocity was estimated by timing the movement of a leaf on the water through a distance measured with a tape. Estimates of the water depth and width were also made with a measuring tape. PCE was detected in 5 of the 17 samples. TCE was detected in three samples. 1,2-DCE was detected in two samples. Samples were collected from SW-08 on three different occasions. The concentration of PCE at SW-08 ranged from 14 ug/L to non-detect.

3.2.6 Soil Gas Investigation

Five soil gas samples were collected from near New Haven High School east of OU2 (Figure 3.15). Samples were collected September 2009 and analyzed for VOCs. PCE was the only VOC detected and it was detected in one sample at a concentration of 200 ug/m^3.

3.3 Data Evaluation and Data Usability for the Risk Assessment

The next step of the risk assessment is to evaluate the available data to determine if these data are of sufficient quality for inclusion in the risk assessment.

Table 1 in Appendix A summarizes the data collected at the site and the inclusion/exclusion rationales for the risk assessment. Analytical data from samples collected from soil, groundwater, surface water, and sediment in site investigations between 2001 and 2009 were used. Sample analyses included VOCs, SVOCs, metals, pesticides and PCBs.

The usability of analytical data was evaluated for compliance with the data quality objectives (DQOs) set forth in the various work plans developed for the site. The quality and integrity of samples collected during site-wide investigation activities were monitored by the collection of quality assurance/quality control (QA/QC) samples including matrix spike/matrix spike duplicates (MS/MSD) and field duplicates, routine preparation of various QA/QC blanks, equipment calibration documentation, and equipment decontamination documentation. Upon receipt from the laboratory, an internal review of the analytical data was completed to ensure that laboratory QA/QC procedures were maintained. For the data collected by Parsons in support of the RI investigation, the data were validated in accordance with the approved QAPP with the exception of the following:

- The 34 groundwater samples collected during the monitoring well installation were used for field screening purposes only and were not included in the risk assessment evaluation. As such, the associated data were not validated.

- The 4 groundwater sample results for JS-14, JS-36, JS-38, and JS-52 from the third quarter 2009 residential well sampling as a part of the 2002 AOC were not validated.

The 2007 – 2009 data validation reports are presented in Appendix H and the validated analytical results are presented in Appendix I of the RI (Parsons, 2010).

Blank contamination is evaluated based on the results of the field and laboratory blank data. Typically, common laboratory chemicals (such as acetone) are eliminated if detected concentrations are within ten times the associated blank concentrations (USEPA, 1989). All other chemicals are eliminated if detected concentrations are within five times blank concentrations (USEPA, 1989). In addition, sample quantitation limits (SQLs) must be sufficiently low such that chemicals can be detected at levels of potential concern. Data were reviewed to determine if SQL are sufficiently low. Analytes not detected ("U"-qualified) in any

sample of a given matrix were excluded from the risk assessment data set for that matrix. Values reported as estimated ("J" qualified) were included in the risk assessment data sets and used the same way as positive data that do not have this qualifier. As a conservative approach, data with other estimated qualifiers (e.g. “E” and “B”) were included in the risk assessment data set and used the same way as positive data that do not have the qualifier. When two or more values are available for a given sample/location/date (e.g., duplicates or replicates), the maximum of the values were used since there were several instances where agreement between the field sample and the field duplicate did not meet site-specific data quality objectives (e.g., PCE and TCE in soil at P16).

3.4 Identification of Chemicals of Potential Concern (COPCs)

Although the presence of many chemicals may be identified in the environmental samples collected during site investigative activities, the risk assessment is typically driven by a few chemicals and exposure pathways. In order to streamline the process and focus efforts on important issues, several methods have been developed by the regulatory agencies and the scientific community for the identification of chemicals and pathways that contribute significantly to the total risks posed by a site. A risk-based screening approach was used for the selection of COPCs to be further evaluated in the detailed risk assessment. This approach is based on USEPA-developed methodology and follows standard risk assessment procedures.

The maximum concentration of a chemical was compared with chemical- and medium-specific risk-based screening concentrations (RBSCs). The RBSCs are defined as concentrations that are not expected to result in any adverse impact based on exposure conditions that serve as the basis for the calculation. A chemical was selected as a COPC if its maximum concentration exceeded the RBSC. To ensure a cumulative cancer risk of 10^{-6} or less, and a hazard level of 1.0 or less, Regional Screening Levels (RSLs) (USEPA, 2009) were adopted as the RBSCs and used for the comparison. If the maximum concentration of a chemical detected, for any specific media, exceeds or is equal to the RSL concentration that is equivalent to a 10^{-6} cancer risk, or exceeds or is equal to the RSL concentration that is equivalent to a hazard quotient of 0.1, the chemical is considered a COPC. National Ambient Water Quality Criteria (AWQC) or Missouri surface water criteria (10 CSR 20-7.031) for a non-drinking water human receptor were also used as RBSCs to further select COPCs when available for surface water. Maximum contaminant levels (MCLs) were not used as RBSCs to further select COPCs. MCLs will be used as the criteria to meet federal ARARs for the groundwater pathway. However, many MCLs are technology based and not risk based, which is why MCLs cannot be used as the sole basis for clean-up of groundwater. Background levels are not used for COPC screening because site-specific background levels are not available. Comparison to regional background information is discussed in the uncertainty section because it is important to determine site-related impacts. For chemicals without RSLs, surrogate compounds were used based on toxicological and structural similarities. For example, fluoranthene is used for benzo(g,h,i)perylene, and anthracene is used for phenanthrene.

For the indoor air exposure pathways, VOCs were defined as all compounds with Henry's Law Constants greater than 1E-05 atm-L/mol-K and molecular weights less than 200 g/mol. The maximum detected concentrations of the VOCs in soil and groundwater were then input into the EPA Johnson and Ettinger screening models (SL-SCREEN and GW-SCREEN, version 3.1; 02/04) to obtain the indoor air concentrations. The estimated indoor air concentrations (infinite source building concentrations) were then compared to ambient air RSLs to select COPCs for the indoor air exposure pathways. The indoor air screening models are included in Appendix B.

Listed below are the RBSCs that were used for the identification of COPCs that were further evaluated in the risk assessment.

For Constituents in Soils

- The RSLs calculated for soils under a residential scenario were adopted as RBSCs for selecting COPCs in surface (<3 feet) and subsurface (0-10 feet) soil samples. A cutoff of 3 feet was chosen in accordance with Missouri risk-based corrective action rules definition of surface soil (MDNR, March 2009). If the maximum concentration of a chemical detected exceeds the RSLs, the chemical is considered a COPC. RSLs for a cancer endpoint of 1×10^{-6} and a non-cancer endpoint of 0.1 were utilized for both surface and subsurface soils.

For Constituents in Groundwater

- The RSLs calculated for tap water were adopted as RBSCs for selecting COPCs in groundwater samples. If the maximum concentration of a chemical detected exceeds the RSLs, the chemical is considered a COPC. RBSCs for a cancer endpoint of 1×10^{-6} and a non-cancer endpoint of 0.1 were utilized.

For Constituents in Surface Water and Sediments

- The RSLs calculated for soils under a residential scenario and tap water were adopted as RBSCs for selecting COPCs in surface water and sediment samples. If the maximum concentration of a chemical detected exceeds the RSLs, the chemical is considered a COPC. RBSCs for a cancer endpoint of 1×10^{-6} and a non-cancer endpoint of 0.1 were utilized. In addition, AWQCs or Missouri surface water Criteria for a non-drinking water human receptor were used as additional screening criteria to determine surface water COPCs when they are more conservative or RSLs are not available. Chemicals were eliminated from further consideration if the maximum concentrations of these COPCs were below the surface water screening criteria.

Frequency of detection, range of detected concentrations, average of detected concentrations, and RBSCs for soils, groundwater, surface water and sediments are summarized in Tables 1 through 9. The sample locations are presented on Figures 3.1a through c and 3.15.

Tables 1, 2 and 3 summarize the chemicals detected in soil and the rationale for selecting COPCs. A total of seven VOCs, nine SVOCs, one PCB, seven pesticides and eight metals were detected in soils at a depth less than 3 feet (Table 1). Using the risk-based screening approach, one VOC (PCE), one SVOC (benzo(a)pyrene), and one metal (arsenic) were selected as COPCs in soils at a depth less than 3 feet.

A total of seven VOCs, nine SVOCs, one PCB, seven pesticides, and nine metals were detected in soils at depths 0 – 10 feet (Table 2a). Using the risk-based screening approach, one VOC (PCE), one SVOC (benzo(a)pyrene), and one metal (arsenic) were selected COPCs in soils at depths of 0 – 10 feet. In addition, off-site subsurface soils (0 – 15 feet) were also evaluated adjacent to sewer lines near the facility. Three VOCs (acetone, carbon disulfide and methyl ketone) were detected in the off-site soils near the sewer lines. Using the risk-based screening approach, no COPCs were identified in these off-site soils adjacent to the sewer lines (Table 2b).

For indoor air, COPCs in soils 0 – 10 feet were used as there were no detections below a depth of 10 feet. One VOC (PCE) was identified as a COPC in soils for the indoor air exposure pathway (Table 3).

Tables 4, 5, and 6a and 6b summarize the chemicals detected in groundwater and the rationale for selecting COPCs. A total of five VOCs, five SVOCs, and three metals were detected in shallow (upper sand/upper bedrock) groundwater (Table 4). Using the risk-based screening approach, four VOCs (1,2-dichloroethene, methylene chloride, PCE, and TCE) and one SVOC (naphthalene) were selected as COPCs in shallow groundwater (Table 4).

A total of six VOCs (acetone, methyl ethyl ketone, methylene chloride, PCE, TCE, and vinyl chloride) were detected in deep (Swan Creek/Lower Jefferson City/Roubidoux) groundwater (Table 5). Using the risk-based screening approach, four VOCs (methylene chloride, PCE, TCE and vinyl chloride) were selected as COPCs in deep groundwater (Table 5). Note that a quantitative evaluation of the upper bedrock and upper sand aquifers was not conducted since these units are unlikely to have potable use. The upper sandstone is less than 80 feet deep in the impacted area, and there is a minimum casing length of 80 feet specified for Sensitive Area A [10 CSR 232-3.100 (1)(A)], which includes the Site. In addition, while the aquifer may yield enough water to meet the standard of ¼ gallon per minute, due to the short water column that a well would have, the well would not have enough storage capacity, and thus would not meet the yield on a "sustained basis." Likewise, although the Swan Creek formation is deeper and would have a modest storage in the well bore, a typical domestic well pump would run the well dry within 10 minutes of pumping, and then require approximately one hour to recharge before pumping again. Thus, the sustained basis criteria would not be met and these aquifers were not quantitatively evaluated in this risk assessment for a drinking water scenario.

Four VOC compounds (1,2-dichloroethene-total, methylene chloride, PCE, and trichloroethene) and two SVOCs (2-methylnaphthalene and naphthalene) were evaluated as COPCs in shallow groundwater for the indoor air exposure pathway (Table 6a). Using the risk based approach, one COPC, PCE, was identified for the groundwater to indoor air pathway using the Johnson and Ettinger model to estimate screening concentrations of VOCs in indoor air. The

indoor air pathway was also evaluated for the shallow groundwater for the residents in OU6. Using the maximum detected groundwater concentration in the wells south of OU2 and within OU6, an indoor air concentration was calculated using the Johnson and Ettinger model and one COPC, PCE, was identified for the groundwater to indoor air pathway for residents in OU6 (Table 6b).

In addition, five soil gas vapor samples were collected near neighboring New Haven High School. One VOC, PCE, was detected in one soil gas sample but the concentration was below applicable screening levels. Results are presented in Appendix C and on Table 6c.

In addition to the above groundwater samples, residential wells were sampled as part of the investigation for OU6 and four select residential wells are sampled as part of a quarterly monitoring program. A total of eight VOCs (Table 7) have been detected in the groundwater wells of nearby residents prior to treatment in 2008 and 2009 (Appendix A). Using the risk-based screening approach, two VOCs, PCE and TCE, were identified as COPCs in the residential wells (Table 7).

Table 8 summarizes the chemicals detected in surface water and the rationale for selecting COPCs. A total of eight VOCs (benzene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, methylene chloride, PCE, trichloroethene, trichlorofluoromethane and vinyl chloride), six SVOCs (4-bromophenyl phenyl ether, benzo(a)anthracene, benzo(b)fluoranthene, chrysene, hexachlorobenzene, and pyrene), one pesticide (Endosulfan II), and one metal (barium) were detected in surface water. The SVOCs were all detected near the detection limit and were not detected in the duplicate sample that was also collected. Using the risk-based screening approach, methylene chloride, PCE, trichloroethene, vinyl chloride, 4-bromophenyl phenyl ether, benzo(a)anthracene, benzo(b)fluoranthene, chrysene and hexachlorobenzene, were identified as COPCs in surface water.

Table 9 summarizes the chemicals detected in sediment and the rationale for selecting COPCs. A total of four VOCs (acetone, chloroethane, chloromethane and PCE), eleven SVOCs (3,3'-dichlorobenzidine, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, dibenz(ah)anthracene, fluoranthene, indeno(123-cd)pyrene, and pyrene), six pesticides (4,4'-DDD, 4,4'-DDT, Endosulfan Sulfate, Endrin aldehyde, Endrin ketone, and methoxychlor) and eight metals (arsenic, barium, cadmium, chromium, lead, selenium, silver and zinc) were detected in sediment samples. Using the risk-based screening approach, one SVOC (benzo(a)pyrene) and one metal (arsenic) were selected as COPCs in sediments.

3.5 Physical and Chemical Properties of the COPCs

The physical and chemical properties of the COPCs influence the environmental fate and transport in conjunction with the environmental transformation processes affecting them and the characteristics of the environment. The physical and chemical characteristics of the COPCs are presented in Table 10. For the chemical 4-bromophenyl phenyl ether, which was detected in one

sediment sample, there are little data available; therefore, this compound was not evaluated quantitatively in this risk assessment.

4.0 EXPOSURE ASSESSMENT

The exposure assessment is typically performed to estimate the type and magnitude of exposures to the COPCs that are present at or migrating from sites included in the risk assessment. The results of the exposure assessment will be integrated with chemical-specific toxicity information (described in Section 5) in order to characterize human health risks potentially associated with these sites (described in Section 6). This section summarizes the exposure assumptions that will be used in the human health risk assessment.

The purpose of the exposure assessment is to identify the exposure pathways through which a receptor may potentially be exposed to constituents originating at a site. Typically, this involves projecting concentrations along actual or hypothetical pathways between sources and receptors.

4.1 Conceptual Site Model

The Conceptual Site Model (Figure 4) illustrates the exposure pathways that identify the focus of the risk assessment. Exposure pathways describe the movement of chemicals from sources (e.g., chemicals in soil or surface water) to exposure points, where receptors (i.e., potentially exposed populations) may come in contact with the chemicals. An exposure pathway is typically defined by the following elements (USEPA, 1989):

- A source and mechanism of constituent release to the environment;
- An environmental transport medium (e.g., soil, water) for the released constituents;
- A point of potential contact with the contaminated medium (i.e., point of exposure); and
- An exposure route (e.g., inhalation, ingestion, dermal contact) at the point of exposure.

An exposure pathway is considered complete only if all four components are present. In conducting the risk assessment, only complete exposure pathways were evaluated quantitatively.

Described below is a conceptual site model developed for the site.

4.1.1 Known and Suspected Sources of COPCs and Release Mechanisms

Based on the history of the site and the results of site investigations, the primary source of COPCs are solvents due to historical operation. Primary release mechanisms may include direct release, leaching, erosion, and precipitation associated runoff. Surface and subsurface soils and groundwater that have been impacted may act as secondary sources of COPCs through mechanisms such as leaching of chemicals from soils, surface runoff, groundwater recharge to surface water and wind and mechanical erosion of chemicals in soils. The secondary sources of

COPCs are impacted soil and groundwater migration to surface water and sediments and potential off-site residential drinking water wells.

4.1.2 Retention or Transport Media

The media directly impacted are soil and groundwater. Dust is considered a potential transport medium, because COPCs in soil may become entrained in fugitive dust. Surface runoff is considered a transport medium because precipitation from storm events may have generated episodic overland flow and carried COPCs away from the impacted areas. Groundwater is a transport medium of concern for COPCs where discharge to surface water bodies adjacent to the site.

4.1.3 Transport Pathways

Release mechanisms and transport pathways were evaluated on a media-by-media basis. Listed below are potential cross-media transfer mechanisms of COPCs:

- COPCs in subsurface soil leaching into groundwater underlying the site.
- COPCs in surface soil migrating to surface water and sediment adjacent to the site through surface runoff.
- COPCs in groundwater transport to surface water and sediment through groundwater recharge.
- COPCs in soil and groundwater transport to the atmosphere via volatilization or fugitive dust emission.
- COPCs in soil and groundwater transport to indoor air via vapor migration.

4.1.4 Exposure Route and Exposure Point

The impacted media are soil, groundwater, surface water and sediments. An exposure route is the means by which the contaminant actually contacts the body. Exposure routes include incidental ingestion and dermal contact with soils, inhalation of volatiles from soil and groundwater, inhalation of dust generated from soil and dermal contact with sediments and surface water.

Exposure points are defined as the points at which a receptor is likely to come in contact with a chemical of concern. For incidental ingestion and dermal contact, the exposure point is the impacted area. For inhalation, the exposure point is ambient air, or air in an enclosed space.

4.1.5 Receptors and Exposure Scenarios

The potential for exposure is analyzed from two perspectives: examination of current land use and consideration of potential future land use. Commercial workers, construction

workers, and site trespassers are the current on-site human receptors for OU2. The anticipated future land use for OU2 should remain the same as the current land use based on the historical use and the zoning of the site and surrounding properties. However, a residential future use scenario for OU2 is also evaluated as a "no action" alternative when evaluating mitigation of potential exposures. OU6 is currently used for residential use and that use is unlikely to change in the future, thus, residents were the only receptors evaluated for OU6.

Based on current and potential future land use conditions, the known or potential on-site human receptors may include the following:

Human Receptors	Current Use	Potential Future Use
Routine Commercial/Industrial Workers	Yes	Potential
Construction Workers	No	Potential
Trespassers	Potential	Potential
Residents	No – On-site Yes – Off-site	Potential

The potential exposure to surface water and sediment were evaluated as part of the trespasser scenario.

Presented below is an overview of populations of potential concern selected for further evaluation in the Human Health Risk Assessment (HHRA):

- Current Land Use Scenario: Commercial/Industrial Workers

  The site is currently a manufacturing facility with limited access. Commercial/industrial workers and potential site trespassers are the receptors under the current scenario. Because the commercial/industrial worker and site trespassers are the same for both the current and potential future scenarios, the risk to future scenarios was quantified since more conservative assumptions were used in the calculations of the risk for future receptors. These conservative assumptions included accounting for soils beneath buildings, which are currently inaccessible, higher exposure frequencies and durations.

- Industrial/Commercial Future Land Use Scenario: Industrial, and Construction Workers and Site Trespassers

  Commercial and construction workers are potential future receptors because commercial land use is a potential future use and construction activities could take place. Additionally, trespassers are potential future receptors.

- Residential Future Land Use Scenario: Residents

  Although the reasonable future use of OU2 is industrial, a potential future residential scenario for all of OU2/OU6 is also evaluated under a potential "no remedial" action alternative analysis. Under this scenario, residents (adults and children) are the potential future receptors. Residents were conservatively assumed to be exposed to subsurface soils in the event that future re-grading of soils is conducted.

4.1.6 Potential Exposure Pathways

The potentially complete exposure pathways are summarized in the conceptual site model for the current and future exposure scenarios (Figure 4). The potential complete exposure pathways evaluated in this risk assessment are listed in Table 11. As shown in Table 11, the completed exposure pathways include the following:

For a current/future juvenile trespasser, incidental ingestion, inhalation and dermal contact with COPCs in the surface soil (0-3'), incidental ingestion, inhalation and dermal contact with sediment, inhalation of volatiles from shallow groundwater, and incidental ingestion and dermal contact with surface water during wading are potentially complete exposure pathways.

For a current/future industrial outdoor worker, incidental ingestion, inhalation and dermal contact with COPCs in the surface soil (0-3'), and inhalation of COPCs in ambient air volatilized from impacted groundwater are potentially complete exposure pathways.

For a current/future industrial indoor worker, incidental ingestion of indoor dust derived from outside soil, inhalation of COPCs in soil and groundwater volatilized from impacted soil and groundwater are potentially complete exposure pathways.

For a future construction worker, incidental ingestion, inhalation and dermal contact with COPCs in the mixed soil, and inhalation of COPCs in ambient air volatilized from impacted groundwater are potentially complete exposure pathways.

For current (OU6 only) and future (OU2 and OU6) residents (adult and child), incidental ingestion, inhalation and dermal contact with COPCs in the mixed soil, inhalation of COPCs in soil volatilized to indoor air, and inhalation of COPCs in indoor and ambient air volatilized from impacted groundwater are potentially complete exposure pathways.

For a current/future residential groundwater user (adult and child), ingestion, inhalation and dermal contact with COPCs in groundwater during showering are potentially complete exposure pathways.

The incomplete exposure pathways and rationales under current scenario include the groundwater ingestion, and inhalation and dermal contact during shower exposure pathways because drinking water wells have not been identified at OU2. Groundwater ingestion, inhalation and dermal contact pathways for OU6 are also currently incomplete due to the treatment systems that have been installed; however, this pathway may be complete in the future

should the treatment systems be removed or become inoperable. These pathways were not further investigated in this risk assessment since the groundwater drinking pathway was already identified as a pathway of concern (Table 7) and current and future risks have been addressed through the installation of remediation systems. However, to evaluate the potential exposure to soil vapor by residents in OU6, additional soil vapor sampling will be conducted as described in Soil Vapor Sampling Addendum (Parsons, May 2010). Ingestion of fish is not complete pathway because the nearby surface water bodies are too small to be considered fishable waters.

4.2 Quantification of Exposure Point Concentrations and Chemical Intakes

The COPCs and the exposure point concentrations (EPCs) used in the risk assessment are summarized in Tables 12.1, 12.2, 12.3, 12.4, 12.5 and 12.6 for clarity. Table 12.1 presents the exposure point concentrations for shallow groundwater for ambient air. Table 12.2 presents the exposure point concentrations for deep groundwater used for tap water. Table 12.3 presents the exposure point concentrations for soil. Table 12.4 presents the exposure point concentrations for soil to indoor air. Table 12.5 presents the exposure point concentrations for sediments. Table 12.6 present the exposure point concentrations for surface water. For the COPCs identified in surface water and sediments, the maximum concentrations were used as the EPCs due to limited number of samples, except for PCE. A 95% UCL was calculated using the USEPA ProUCL Version 4.00.04 software for PCE since over 90 samples were collected from many tributaries within OU6. Only 60 samples were used to calculate the 95% UCL for PCE in surface water due to the lack of detection limits for 32 of the samples. For groundwater COPCs, the maximum detected concentration was used as the EPC. For the only VOC (PCE) that was identified as a COPC in soil, a 95% Upper Confidence Limit (UCL) of the arithmetic mean was calculated using the USEPA ProUCL Version 4.00.04 software. ProUCL recommendations regarding the most appropriate UCL to estimate the EPC was followed based on the dataset. The maximum detected concentration of any duplicates was used to calculate the 95% UCL. 95% UCLs were not calculated for the other identified COPCs in soil due to the limited number of samples for these compounds. The 95% UCL calculation sheets are included in Appendix D.

The soil data were separated into near surface soil (<3 feet) (Table 1) and mixed soil (0-10 feet) (Table 2a) for the direct contact exposure pathways. Surface soil EPCs (0-3 feet) were used for the commercial and trespasser scenarios. Mixed soil EPCs (0-10') were used for the residential and construction worker scenarios. Ten feet below ground surface was utilized as the mixed soil range since no compounds were detected above detection limits in soil samples collected below 10 feet. Table 13 summarizes the exposure point concentrations associated with the two soil intervals. Typically, surface soil is defined as the top 2 centimeters of soil by USEPA (USEPA 1996 and 2002); however, since soil samples were collected in 1 foot intervals in accordance with the approved work plans, the state of Missouri's definition of surface soils (Missouri defines surficial soils as being between 0-3 feet) were followed to complete the risk assessment in order to have a more robust data set. For the COPCs identified in sediments and surface water, the maximum COPC concentrations detected are used due to the limited number of data points.

In order to calculate a quantitative risk, exposures are evaluated via a quantitative expression of chemical-specific intakes for each potentially completed exposure pathway by integration of data gathered in the exposure assessment (i.e., the extent, frequency, and duration of exposure for the populations and pathways of concern).

The potential for human receptors to be exposed to the contaminated media through relevant routes of exposure (e.g., inhalation, ingestion and dermal contact) was evaluated. Exposure pathways considered not to be applicable, based on site-specific information, were excluded from the quantitative evaluation in the baseline risk assessment. The rationale for the elimination of certain exposure pathways was provided in previous sections.

Described below is the basic equation used to calculate the human intake of COPCs (USEPA, 1989):

$$I = C \times \frac{CR \times EF \times ED}{BW} \times \frac{1}{AT}$$

Where:

I = daily intake (mg of chemical per kg of body weight per day)

C = concentration of COPC (e.g., mg/kg in soil, mg/L in water or mg/m^3 in air)

CR = contact rate; the amount of contaminated medium contacted over the exposure period (e.g., mg/day for soil, L/day for water and m^3/day for air)

EF = exposure frequency; describes how often exposure occurs (days/year).

ED = exposure duration; describes how long exposure occurs (years).

BW = body weight; the average body weight over the exposure period (kg).

AT = averaging time; period over which exposure is averaged (days).

Each of the intake variables in the above equation consists of a range of values in the literature. To account for uncertainties associated with parameter values, conservative exposure intake scenarios were evaluated in this risk assessment. The conservative approach is designed to estimate daily intakes by receptor populations using default values, which primarily represent 95th percentile estimates.

The exposure parameters that were used in the human health risk assessment are summarized in Table 14.

4.3 Models Used in Exposure Assessment

Described below are models that were used to determine concentration terms necessary for estimating intake of COPCs.

4.3.1 Models for Estimating Concentrations of Airborne COPCs from Soil

Concentrations of airborne chemicals from soil were evaluated as volatiles and particulates using the following equation (USEPA, 1996):

Concentration in Air (mg/m^3) = Concentration in Soil (mg/kg) x ([1/VF] or [1/PEF])

where:

VF = Volatilization factor (m^3/kg). It relates the concentration of a volatilized chemical to its concentration in soils.

PEF = Particulate emission factor (m^3/kg). It relates the concentration of a chemical in fugitive dust particles to its concentration in soils.

For the purpose of the risk assessment, VF and PEF values were derived using the most current USEPA model (USEPA, 1996). Detailed information with respect to the calculation of concentrations of airborne chemicals is presented in Appendix E.

4.3.3 Models for Inhalation of COPCs Volatilized from Soil into Indoor Air

Indoor air EPCs were estimated from soil concentrations using USEPA's (2004c) version of the Johnson and Ettinger (J&E) model. This model (USEPA, 2004c) is a one-dimensional analytical solution to passive diffusion and convective vapor-transport through the vadose zone, and consists of the following two components: 1) diffusion through the unsaturated zone; and 2) convective and diffusive transport into the building. The vapor intrusion models used, SL-SCREEN and SL-ADV, are designed to evaluate only a single contaminant and only when the soil concentration is at or below the soil saturation limit (i.e., a three-phase system). Using these models when a residual phase is present can result in an overestimation of the soil vapor concentration and subsequently, the building vapor concentration (EQM, 2000). Instead, when NAPL is present, a residual phase occurs when the sorbed phase, aqueous phase, and vapor phase of each chemical have reached saturation in soil and the guidance recommends that the NAPL J&E model should be used. Since additional investigations are planned in the NAPL area, further assessment of the indoor air pathway in this area and the applicability of the J&E NAPL model will be included as an addendum to this risk assessment.

4.3.3.1 Diffusion Of Volatiles Through The Unsaturated Zone

Diffusion through the unsaturated (vadose) zone is estimated based on the following equation (USEPA, 2004c):

$$D_T^{eff} = D_a(\theta_a^{3.33} / n^2) + (D_W / H'_{TS})(\theta_w^{3.33} / n^2)$$

where:

D_T^{eff} = Total overall effective diffusion coefficient (cm^2/s);

D_a = Diffusivity in air (cm^2/s);

θ_a = Soil air-filled porosity (cm^3/cm^3);

n = Soil total porosity (cm^3/cm^3);

D_w = Diffusivity in water (cm^2/s);

θ_w = Soil water-filled porosity (cm^3/cm^3); and

H'_{ts} = Henry's law constant at the system temperature (dimensionless).

4.3.3.2 Convective and Diffusive Transport

Under the assumption that mass transfer is steady state, the solution for the attenuation coefficient (α) is calculated as (USEPA, 2004c):

$$\alpha = \frac{\left(\frac{D_T^{eff} A_B}{Q_{building} L_T}\right) \times e^{\left(\frac{Q_{soil} L_{crack}}{D_{crack} A_{crack}}\right)}}{\left\{e^{\left(\frac{Q_{soil} L_{crack}}{D_{crack} A_{crack}}\right)} + \left(\frac{D_T^{eff} A_B}{Q_{building} L_T}\right) + \left(\frac{D_T^{eff} A_B}{Q_{soil} L_T}\right) \times \left[e^{\left(\frac{Q_{soil} L_{crack}}{D_{crack} A_{crack}}\right)} - 1\right]\right\}}$$

where:

α = Steady-state attenuation coefficient (unitless);

D_T^{eff} = Total overall effective diffusion coefficient (cm^2/s);

A_B = Area of the enclosed space below grade (cm^2);

$Q_{building}$ = Building ventilation rate (cm^3/s);

L_T = Source-building separation (cm);

Q_{soil} = Volumetric flow rate of soil gas into the enclosed space (cm^3/s);

L_{crack} = Enclosed space foundation or slab thickness (cm);

A_{crack} = Area of total cracks (cm^2); and

D_{crack} = Effective diffusion coefficient through the cracks (cm^2/s) (assumed equivalent

to D_T^{eff}.

Indoor air concentrations ($C_{building}$) of chemicals volatilized from the subsurface soil were calculated using the following equation (USEPA, 2004c):

where:

$$C_{building} = \alpha \times C_{source}$$

α = Steady-state attenuation coefficient (unitless); and

C_{source} = Measured soil-gas concentration at the source (g/cm^3-v).

The electronic spreadsheets that are available for download from the USEPA website incorporate the algorithms described above and were used to estimate indoor air concentrations and subsequent risks and/or hazards associated with inhalation of chemicals volatilized from subsurface soil-gas into indoor air.

The effective total fluid saturation, soil intrinsic permeability, soil relative air permeability, and soil effective vapor permeability parameters are directly related to soil type (USEPA, 2004c). The subsurface geology is primarily silty clay in the top 10 feet. The silty clay soil type was used in the models.

Each of the intake variables in the above equation consists of a range of values in the literature. To account for uncertainties associated with parameter values, conservative exposure intake scenarios were evaluated in this risk assessment. The conservative approach is designed to estimate daily intakes by receptor populations using default values, which primarily represent 95th percentile estimates. The exposure parameters that were used in the human health risk assessment are summarized in Table 14.

4.3.4 Models for Estimating Concentration of Groundwater COPC Vapor in Ambient Air

The ASTM model (ASTM, 1998) was used to estimate exposure to VOCs in ambient air from groundwater. Concentrations of groundwater COPC vapor in ambient air were evaluated using the following equation:

Concentration in Air (mg/m^3) = Concentration in Water (mg/l) x VFgw, amb

Where:

VFgw, amb = Groundwater to air volatilization factor (mg/m^3-air/mg/l-water)

$$VFgw,amb = \frac{H}{\left\{1+\left[\frac{U_{air}\delta_{air}L_{gw}}{WD_{ws}^{eff}}\right]\right\}} \times 103$$

Detailed equations are presented in Appendix E.

5.0 TOXICITY ASSESSMENT

The toxicity assessment provides a framework for characterizing the relationship between the magnitude of exposure to a COPC and the nature and likelihood of adverse health effects that may result from such exposure. In the risk assessment, chemical toxicity is typically divided into two categories: carcinogenic and noncarcinogenic. Potential health effects are evaluated separately for these two categories, because their toxicity criteria are based on different mechanistic assumptions and associated risks are expressed in different units. This section provides an overview of the methodology used to develop a toxicity assessment. This section includes the toxicity information that will be used in the HHRA.

5.1 Sources of Toxicity Information

Pertinent toxicological information on COPCs was selected from the following sources, in descending order of hierarchy:

- Integrated Risk Information System (IRIS)

  IRIS is an USEPA electronic database containing up-to-date health risk and EPA regulatory information for numerous chemicals. IRIS contains only toxicity criteria that have been verified by the USEPA Work Groups and, consequently, is considered to be the preferred source of toxicity information. Information on IRIS always supersedes all other sources.

- EPA's Provisional Peer Reviewed Toxicity Values (PPRTVs)

  The Office of Research and Development/National Center for Environmental Assessment/Superfund Health Risk Technical Support Center (STSC) develops PPRTVs on a chemical specific basis when requested by EPA's Superfund program.

- Other Toxicity Values

  Additional EPA and non-EPA sources of toxicity information. Priority should be given to those sources of information that are the most current, the basis for which is transparent and publicly available, and which have been peer reviewed. The additional sources used in the risk assessment include the following sources.

  - The California Environmental Protection Agency (Cal EPA) toxicity values (http://www.oehha.ca.gov/risk/chemicalDB//index.asp).
  - The Oak Ridge National Laboratory Risk Assessment Information System toxicity values (http://risk/lsd.ornl.gov/index.shtml).
  - The Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs) (http://www.atsdr.cdc.gov/mrls.html).

The toxicity profiles for the COPCs can be found in the Oak Ridge National Laboratory Risk Assessment Information System and the ATSDR websites.

5.2 Methodology for Evaluating Carcinogenic Effects

For purposes of assessing risks associated with potential carcinogens, the USEPA has adopted the science policy position as follows (USEPA, 2005): "In the absence of sufficiently, scientifically justifiable mode of action information, EPA generally takes public health-protective, default positions regarding the interpretation of toxicologic and epidemiologic data...cancer risks are assumed to conform with low dose linearity."

Carcinogenic risks associated with a given level of exposure to potential carcinogens are typically extrapolated based on slope factors or unit risks. Slope factors are the upper 95th percent confidence limit of the slope of the dose-response curve, expressed in terms of risk per unit dose [given in $(mg/kg\text{-}day)^{-1}$]. Unit risks relate the risk of cancer development with the concentration of carcinogen in the given medium, expressed as either risk per unit concentration in air [given in $(\mu g/m^3)^{-1}$] or drinking water [given in $(\mu g/L)^{-1}$].

Current USEPA Superfund guidance for calculating a dermal slope factor is to adjust the oral slope factor with an oral absorption factor specific for that chemical. It should be noted that the oral absorption factor used in the calculation refers to absorption of the constituents in the species upon which the slope factor is based; i.e., generally not absorption data in humans.

The equation for extrapolation of a default dermal slope factor is as follows:

Default Dermal Slope Factor $[(mg/kg\text{-}day)^{-1}]$

= Oral Slope Factor $[(mg/kg\text{-}day)^{-1}]$

÷ Oral Absorption Factor (%)

5.3 Methodology for Evaluating Noncarcinogenic Effects

The USEPA has adopted the science policy position that protective mechanisms (such as repair, detoxification, and compensation) must be overcome before the adverse systemic health effect is manifested. Therefore, a range of exposures exists from zero to some finite value that can be tolerated by the organism without appreciable risk of expressing adverse effects.

The approach used by the USEPA to gauge the potential noncarcinogenic effects is to identify the upper boundary of the tolerance range (threshold) for each chemical and to derive an estimate of the exposure below which adverse health effects are not expected to occur. Such an estimate calculated for the oral route of exposure is an oral reference dose (RfD), and for the inhalation route of exposure is an inhalation reference concentration (RfC). The oral RfD is typically expressed as mg chemical per kg body weight per day, and the inhalation RfC is

usually expressed in terms of concentration in the air (i.e., mg chemical per m^3 of air). For inhalation exposures, current USEPA (1996, 2002a, 2009a) guidance does not recommend estimating body weight normalized intakes (i.e., intakes in terms of mg/kg-day) as are used to estimate intakes for ingestion and dermal absorption. Instead, current guidance recommends that risks and hazards be estimated from exposure frequency and duration normalized air concentrations as shown below:

$$HQ_{inhalation} = \frac{C_{air} \times EF \times ED \times ET}{RfC \times AT \times 365\,days/year}$$

where:

AT	= Averaging time (years)
C_{air}	= COPC concentration in airborne dust or outdoor air ($\mu g/m^3$)
ED	= Exposure duration (years)
EF	= Exposure frequency (days/year)
ET	= Fraction of day spent at the Facility (unitless)
HQ	= Hazard quotient for each COPC (unitless)
RfC	= inhalation reference concentration ($\mu g/m^3$)

Currently, two types of oral RfDs/inhalation RfCs are available from the USEPA, depending on the length of exposure being evaluated (chronic or subchronic). Chronic oral RfDs/inhalation RfCs are specifically developed to be protective for long-term exposure to a compound, and are generally used to evaluate the noncarcinogenic effects associated with exposure periods of approximately 10 percent of a human lifetime or more. Subchronic oral RfDs/inhalation RfCs are useful for characterizing potential noncarcinogenic effects associated with shorter-term exposures such as for construction workers. Current guidelines for Superfund program risk assessment require that subchronic oral RfDs/inhalation RfCs be used to evaluate the potential noncarcinogenic effects of exposure periods that last for more than 30 days up to 10% of the human lifespan (USEPA, 2009). As a conservative approach, chronic oral RfDs/inhalation RfCs were used to assess noncarcinogenic risks to children.

Toxicological criteria specifically derived for gauging potential human health concerns associated with the dermal route of exposure have not been developed by USEPA. For purposes of the HHRA, default dermal RfD values were extrapolated from oral RfDs, if:

- Health effects following exposure are not route-specific.
- Portal-of-entry effects (e.g., dermatitis associated with dermal exposure and respiratory effects associated with inhalation exposure) are not the principal effects of concern.

Exposures with the dermal route are generally calculated as absorbed doses, while oral RfDs are expressed as administered doses. Therefore, adjustments are necessary to match the dermal exposure estimates with the oral RfDs. Current USEPA Superfund guidance is to adjust

the oral RfD with an oral absorption factor (i.e., percent chemical that is absorbed) in order to extrapolate a default dermal RfD, which is expressed in terms of absorbed dose. It should be noted that the oral absorption factor used in the calculation refers to absorption of the constituents in the species upon which the reference dose is based; i.e., generally not absorption data in humans.

The equation for extrapolation of a default RfD is as follows:

Dermal RfD (absorbed dose in mg/kg-day) =

Oral RfD (administered dose in mg/kg-day) x Oral Absorption Factor (%)

5.4 Toxicological Information for COPCs

The toxicity values for the COPCs are summarized in Tables 15 and 16. Information presented in Tables 15 and 16 includes EPA weight of evidence classification, route-specific slope factors for carcinogenic effects, and chronic and subchronic RfD/RfC for noncarcinogenic effects.

6.0 RISK CHARACTERIZATION

In risk characterization, information obtained from the exposure and toxicity assessments were integrated to characterize the potential risks posed by COPCs selected for the risk assessment.

Risk can be described using two general criteria: the excess lifetime cancer risk for chemicals that are thought to be potential human carcinogens and the hazard quotient (HQ) for chemicals that cause non-carcinogenic effects. Current regulatory methodology assumes that cancer risks and HQs can be summed across exposure routes for all media to derive a "total site risk" (USEPA, 1989). This section provides the methodology to perform quantitative risk estimates for the human receptors identified in previous sections.

6.1 Excess Lifetime Cancer Risk

Potential risks for carcinogenic effects are typically estimated by calculating excess lifetime cancer risks (CR) as a result of exposure to carcinogens. Calculation of a CR for an exposure pathway involves multiplying the chronic daily intake for each chemical by its upper-bound cancer slope factor, as described by the following equation (USEPA, 1989):

$$CR = CDI \times SF$$

where:

CR = Cancer risk (unitless)

CDI = Chronic daily intake of chemicals (expressed in mg/kg-day);

SF = Slope factor [expressed in $(mg/kg\text{-}day)^{-1}$];

Chemical-specific SF values were used in the calculation, if available; values extrapolated from a surrogate were used, if necessary.

A cancer risk of 1×10^{-6} or less (for carcinogens) indicates that the estimated exposure dose is below USEPA-identified acceptable levels for protection against adverse impacts and it is unlikely that even sensitive populations will experience adverse health effects. For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper-bound lifetime cancer risk to an individual of between one in ten thousand (10^{-4}) and one in a million (10^{-6}).

6.2 Hazard Quotient

Potential risks for noncarcinogenic effects are typically estimated by calculating the hazard quotient (HQ) for each COPC, using the following equation:

$$HQ = \frac{CDI}{RfD}$$

where:

CDI = Chronic daily intake of chemicals (expressed in mg/kg-day)

RfD = Reference dose (expressed in mg/kg-day); chemical-specific RfD values were used in the calculation if available, values extrapolated from a surrogate were used if necessary

When the HQ for a COPC exceeds unity (one), there may be concern for potential noncancer effects for that COPC.

6.3 Risk for Multiple COPCs

For clarity, the methodology to be used for characterizing risk associated with exposures to multiple chemicals is briefly outlined as follows:

1. Organize outputs of exposure and toxicity assessments by the duration and route of exposure for each population.

   The total upper-bound excess lifetime CRs and the HQs is tabulated separately for each COPC.

2. Quantify total carcinogenic and noncarcinogenic risks for each pathway by summing the risks estimated for each COPC.

   The total upper-bound excess lifetime CR for each pathway is obtained by summing CRs calculated for individual COPCs. For known or suspected carcinogens, exposure levels that represent an excess upper-bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} are considered to be acceptable by the USEPA.

   The sum of the HQs of all COPCs under consideration is termed the hazard index (HI). The HI is a useful reference point for gauging the potential noncarcinogenic effects of environmental exposures to complex exposures. In general, a HI that is less than or equal to one is regarded as not likely to be associated with any health risks, and is, therefore, less likely to be of regulatory concern than hazard indices greater than one. However, a conclusion should not be categorically drawn that all HI's greater than one are "unacceptable" because of the following reasons:

   - There is perhaps one order of magnitude or greater uncertainty inherent in estimates of oral RfDs and inhalation RfCs due to the conservative approach used to derive these estimates.

- There are uncertainties related to the assumption that individual HQ's are additive.

Therefore, if the HI exceeds one, the sum of the HQs may be re-calculated by segregating the chemicals into subgroups based on the target organs affected and the mechanism of action.

3. Estimate overall risks that affect each population over the same time period by combining risks across pathways.

   In order to address the possibility of a population that is likely to be exposed to more than one pathway, risks were combined across different pathways that are likely to affect the same population over the same time periods.

The HQ is the ratio of the estimated exposure dose to the non-carcinogenic toxicity value [Reference Dose (RfD) or Reference concentration (RfC)]. This ratio is used to evaluate the risk of non-cancer health effects due to exposure to a constituent. Once the HQ values for each of the non-carcinogenic COCs have been calculated, they are summed to determine the HI. A HI greater than 1 indicates that the estimated exposure dose for that receptor exceeds acceptable levels for protection against non-cancer effects. Although a HI of less than 1 suggests that non-cancer health effects should not occur, a HI of slightly greater than 1 does not necessarily indicate that adverse effects will occur. This is because of the uncertainty inherent in the toxicity values used in the calculations. Uncertainties inherent in the risk assessment process are discussed in Section 7.0.

Calculation of the total cancer risk and total HI for the current and future exposed populations are summarized in Tables 17.1 through 17.6. The total cancer risk and total HI resulting from exposure to COPCs in soil and groundwater for a current/future industrial worker (outdoor) were calculated to be 7.6×10^{-6} and 0.018, respectively. The total cancer risk and the total HI resulting from exposure to COPCs in soil and groundwater for a current/future industrial worker (indoor) are 1.9×10^{-3} and 0.96. The total cancer risk and total HI resulting from direct contact of the COPCs in soil and groundwater for a future construction worker were calculated to be 6.6×10^{-7} and 0.015, respectively. The total cancer risk and total HI resulting from exposure to COPCs in soil, shallow groundwater, sediment and surface water for a trespasser were calculated to be 2.6×10^{-5} and 0.0.38, respectively. The total cancer risk and total HI resulting from exposure to COPCs in soil and groundwater volatilizing to indoor air for a future resident living anywhere within OU2 were calculated to be 9.4×10^{-3} and 6.9 (both adult and child), respectively, and 5.5×10^{-3} and 2.93, respectively for a future drinking groundwater user in OU2. The total cancer risk and total HI resulting from exposure to COPCs in deep groundwater used as tap water prior to treatment for a current/future residential groundwater user (adult and child) living in OU6 were calculated to be 3.3×10^{-3} and 1.9. The total cancer risk for a resident exposed to VOCs in shallow groundwater via indoor air ranged from 7.3×10^{-7} to 2.5×10^{-5}, depending on the depth the concentration. The risk and hazard calculation sheets are included in Appendix E.

The total cancer risk and the total HI exceed the target cancer risk range of 1×10^{-4} and 1×10^{-6}, and the target hazard level of 1 for the following receptors: industrial indoor worker, a future resident for OU2, and a current or future resident of OU6 if they drink untreated groundwater. For the future resident in OU2, the pathways of concern are incidental ingestion, inhalation, and dermal contact with impacted soil; the inhalation of soil volatiles in indoor air; the inhalation of groundwater volatiles in indoor air, and use of groundwater as tap water exposure pathways. The risk is primarily driven from the inhalation of PCE in indoor air and ingestion of groundwater as tap water. The total cancer risk and the total HI associated with soil to indoor air pathway are 5.6×10^{-3} and 3.7. The total cancer risk and the total HI associated with only groundwater to indoor air exposure pathway are 3.7×10^{-3} and 2.4. The primary COPCs are PCE (soil and groundwater) and arsenic (soil). Locations where concentrations of PCE exceed target concentrations are underneath and immediately adjacent to (north and west of) the former Kellwood facility (soil) and south and southwest of the former Kellwood facility (groundwater). For the industrial indoor worker, the risk is from PCE in soil and groundwater volatilizing to indoor air. This is the only COPC identified for this pathway. Locations where concentrations of PCE exceed target concentrations are underneath and north of the former Kellwood facility (soil) and south and southwest of the former Kellwood facility (groundwater).

7.0 UNCERTAINTY

All risk assessments involve the use of assumptions, professional judgments, and imperfect data to varying degrees, which results in uncertainty in the final estimates of hazard and risk. Risk assessment in general is highly conservative and often is based on conservative assumptions and scenarios. Uncertainty can be introduced into a human health risk assessment at every step of the process outlined in this document. Uncertainties are present in a risk assessment because it requires the integration of the following:

- The release of pollutants into the environment;
- The fate and transport of pollutants, in a variety of different and variable environments, by processes that are often poorly understood or too complex to quantify accurately;
- The potential for adverse health effects in humans based on extrapolations from animal studies; and
- The probability of adverse effects in a human population that is highly variable with respect to genetics, age, activity level, and lifestyle.

There are several categories of uncertainty associated with risk assessment. One is the initial selection of chemicals for analyses and, therefore, which chemicals are used to characterize risk from exposure. A second category is the selection of exposure scenarios that are conservative (i.e., protective of human health) and yet which are probable. Additional uncertainties are inherent in the exposure assessment for individual substances and individual exposures. Those uncertainties are driven by the degree of reliability of the chemical monitoring data, the models used to estimate EPCs in the absence of monitoring data, and the population intake parameters (e.g., exposure factors). A third category is the availability of toxicity information for the COPCs to address all potential routes of exposure. Finally, additional uncertainties are incorporated into the risk assessment when exposures to several substances are summed.

7.1 Uncertainty Associated with Data Evaluation and Selection of Chemicals of Potential Concern

The selection of site-related COPCs was based upon the results of the sampling and analytical program established for the Site. The factors that contribute to the uncertainties associated with the identification of COPCs are inherent in the data collection and data evaluation processes, including appropriate sample locations, adequate sample quantities, laboratory analyses, data validation, and treatment of validated samples.

The predominant sources of uncertainty and potential bias associated with site characterization are based on the procedures used for site investigation (including sampling plan design and the methods used for sample collection, handling, and analysis) and the procedures

used for data evaluation. In general, a very comprehensive sampling program was implemented to account for the chemicals most likely to be present as a result of past Site history and activities. Although certain areas were not characterized due to limited access (e.g., areas underneath the buildings), it is reasonably expected that the impact from those areas is adequately represented by the data collected from nearby locations. An exception to this is that only one surface water and one sediment sample were analyzed for SVOCs and metals in accordance with the approved work plan to determine the presence/absence of these compounds. Although neither class of compounds are expected to be present in the surface waters and sediments in OU2/OU6 as they are not site-related compounds and because they have not been detected at elevated concentrations in other media, a single sample from each media is not adequate to characterize these media. Therefore, the estimated risk to receptors exposed to these compounds in these media may be underestimated.

Data with estimated qualifiers were considered as detected numbers used in the risk assessment, which will result in overestimating the actual risks/hazards. All non-detected compounds were eliminated as COPCs, which may result in underestimating the actual risk/hazards because some of the detection limits in soil and groundwater are more than one order of magnitude greater than risk-based screening levels.

Background information is not used for selection of COPCs because the site-specific background is not available because the site and surrounding area have been an industrialized urban area since 1800s. Some of the metals detected may be associated with native background instead of site-related. The maximum arsenic concentration of 5.1 mg/kg detected in surface soil (<3 feet) is within the background range for U.S. soils. Lack of site-specific background data means that the incremental risk due to site-related compounds could not be quantified.

In addition, some compounds that were below accepted screening levels were eliminated from further consideration in the risk assessment. Doing so may underestimate the total risk, although the additional risk contributed by these eliminated compounds is thought to be minimal.

7.2 Uncertainty Associated with Exposure Assessment

Conservative fate and transport models were used to estimate indoor and ambient air concentrations of COPCs volatilized from soil and groundwater. The models are highly sensitive to site-specific variables such as soil moisture content and soil organic carbon content. The model results are typically conservative, which tends to overestimate risk, although depending on the parameters and inputs, risks can also be underestimated.

The exposure assessment is based on an RME scenario, which is defined by USEPA as the highest exposure that could reasonably be expected to occur for a given exposure pathway at a site (USEPA, 1989). To achieve this goal, the RME is based on highly conservative exposure assumptions. For example, the evaluation assumes that a maintenance worker will be present on-site for 100 days per year for 25 years and a commercial worker will be present on-site for 250 days per year for 25 years. For a construction worker, exposure was assumed to occur over

six months, which may be greater than most site construction projects. This and other upper-bound estimates of exposure most likely overestimate the potential health risks associated with exposure to the COPCs in soil. A central tendency scenario was not calculated because remediation goals are not developed based on central tendency scenario.

7.3 Uncertainty Associated with Toxicity Assessment

One of the largest sources of uncertainty in any risk assessment is associated with the scientific community's limited understanding of the toxicity of most chemicals in humans following exposure to the low concentrations generally encountered in the environment. The majority of available toxicity data are from animal studies, which are then extrapolated using mathematical models or multiple uncertainty factors to generate toxicity criteria used to predict what might occur in humans. Sources of conservatism in the toxicity criteria used in this evaluation include:

- The use of conservative methods and assumptions to extrapolate from high dose animal studies to predict the possible response in humans at exposure levels far below those administered to animals;
- The assumption that chemicals considered to be carcinogens do not have thresholds (i.e., for all doses greater than zero, some risk is assumed to be present); and
- The fact that epidemiological studies (i.e., human exposure studies) are limited and are not generally considered in a quantitative manner in deriving toxicity values.

The toxicity criteria used in the HHRA are based on an evaluation of noncarcinogenic and carcinogenic health risks that were developed using different methods. The noncarcinogenic criteria (i.e., oral and inhalation RfDs) incorporate multiple uncertainty factors to account for limitations in the quality or quantity of available data (e.g., animal data in lieu of human data).

Use of chronic toxicity criteria for a subchronic exposure duration, however, is conservative and likely to overestimate the HI.

7.4 Uncertainty Associated with Risk Characterization

One source of uncertainty that is unique to risk characterization is the assumption that the total risk associated with exposure to multiple chemicals is equal to the sum of the individual risks for each chemical (i.e., the risks are additive). Other possible interactions include synergism, where the total risk is higher than the sum of the individual risks, and antagonism, where the total risk is lower than the sum of the individual risks.

Current USEPA guidance for risk assessment of chemical mixtures (USEPA, 1989) recommends assuming an additive effect following exposure to multiple chemicals. As currently practiced, risk assessments of chemical mixtures generally sum cancer risks regardless of tumor type and sum non-cancer hazard indices regardless of toxic endpoint or mode of action. Given

the available experimental data, this approach likely overestimates potential risks associated with simultaneous exposure to multiple chemicals; however, since most of the risk in this assessment is primarily due to one chemical, the interactions of multiple chemicals has minimal overall effect on this risk assessment.

In summary, given that the largest sources of uncertainty generally result in overestimates of exposure or risk, it is believed that results presented in this document are based on conservative estimates.

8.0 SUMMARY AND CONCLUSIONS

The risk assessment results are summarized as follows:

- The total cancer risk and total HI resulting from exposure to COPCs in soil and groundwater for a current/future industrial worker (outdoor) were calculated to be 7.6 x 10^{-6} and 0.018, respectively. The total cancer risk is within the risk range of 1 x 10^{-4} and 1 x 10^{-6} and the HI is below the target hazard level of 1; therefore, potential exposure to chemicals in soil and groundwater would not result in adverse health effects for this receptor.
- The total cancer risk and the total HI resulting from exposure to COPCs in soil and groundwater for a current/future industrial worker (indoor) are 1.9 x 10^{-3} and 0.96. The total cancer risk exceeds the target cancer risk range of 1 x 10^{-4} and 1 x 10^{-6} but the total HI is below the target hazard level of 1. The primary chemical and pathway of concern is PCE associated with the inhalation of soil volatiles in indoor air and inhalation of groundwater volatiles in indoor air. Locations where concentrations of PCE exceed target concentrations are underneath and north of the former Kellwood facility (soil) and south and southwest of the former Kellwood facility (groundwater).
- The total cancer risk and total HI resulting from direct contact of the COPCs in soil and groundwater for a future construction worker were calculated to be 6.6 x 10^{-7} and 0.015, respectively. The total cancer risk is below the target cancer risk range of 1 x 10^{-4} and 1 x 10^{-6} and the HI is below the target hazard level of 1; thus, potential exposure to chemicals in soil and groundwater would not result in adverse health effects for this receptor.
- The total cancer risk and total HI resulting from exposure to COPCs in soil, shallow groundwater, sediment and surface water for a juvenile trespasser were calculated to be 2.6 x 10^{-5} and 0.038, respectively. The total cancer risk is within the target cancer risk range of 1 x 10^{-4} to 1 x 10^{-6}, and the total HI is below the target hazard level of 1. Therefore, potential exposure to chemicals in soil, shallow groundwater, surface water and sediment would not result in adverse health effects for this receptor.
- The total cancer risk and total HI resulting from exposure to COPCs in soil and groundwater for a future resident living anywhere within OU2 were calculated to be 9.4 x 10^{-3} and 6.9, respectively. The total cancer risk and the total HI exceed the target cancer risk range of 1 x 10^{-4} and 1 x 10^{-6}, and the target hazard level of 1. The pathways of concern are incidental ingestion, inhalation and dermal contact with impacted soil, the inhalation of soil volatiles in indoor air, and the inhalation of groundwater volatiles in indoor air exposure pathways. The risk is primarily driven from the inhalation of soil and groundwater volatiles in indoor air. The primary chemical of concern associated with this pathway PCE. In addition, the total cancer risk and total HI resulting from exposure to COPCs in deep groundwater as tap water for a future resident living anywhere within OU2 were calculated to be 5.5 x 10^{-3} and 2.9, respectively. The total cancer risk and the total HI exceed the target cancer risk range of 1 x 10^{-4} and 1 x 10^{-6}, and the target hazard

level of 1. The pathways of concern are ingestion, and inhalation and dermal contact with deep groundwater used for tap water purposes. The risk is primarily driven from the ingestion of PCE in deep groundwater. However, the inhalation of soil and groundwater volatiles in indoor air and ingestion of tap water in OU2 would be complete only if a residential building is constructed in the impacted area and a drinking water well installed in OU2. Locations where concentrations of PCE exceed target concentrations are underneath and immediately adjacent to (north and west of) the former Kellwood facility (soil) and south and southwest of the former Kellwood facility (groundwater). In addition, the input parameters for the Johnson and Ettinger model, which was used to evaluate the indoor air exposure pathways, are conservative.

- The concentrations detected in the wells of several residents in OU6 exceed current drinking water standards prior to treatment. The total cancer risk and total HI resulting from exposure to COPCs in deep groundwater as tap water for a current/future resident drinking groundwater prior to treatment were calculated to be 3.3×10^{-3} and 1.9, respectively. The total cancer risk and the total HI exceed the target cancer risk range of 1×10^{-4} and 1×10^{-6}, and the target hazard level of 1. The risk is primarily driven from the ingestion of PCE in deep groundwater. Thus, treatment systems must be maintained at these homes.
- The total cancer risks resulting from exposure to PCE volatizing from shallow groundwater near the northern end of OU6 for a resident were calculated to range from 7.3×10^{-7} to 2.5×10^{-5}, depending on the depth the concentration. Calculated cancer risks for TCE and the total HIs for other VOCs detected in shallow groundwater near OU6 were below the acceptable risk range of 1×10^{-4} and 1×10^{-6} and the target hazard level of 1.
- The results of the comparison of soil gas samples collected near the high school show that PCE, the only detected constituent (and only detected at location SVI-5), exceeds the USEPA residential air screening level, but is below the USEPA industrial air screening level and all specified Missouri target levels for both residential and non-residential use.

Based on these results, the primary conclusions of the risk assessment are:

- The total cancer risk and total hazard index exceed target ranges for potential future residents in OU2 where DNAPL is present and near the former Kellwood facility through incidental ingestion, inhalation, dermal contact with impacted soil, inhalation of indoor air (volatilizing from either soil or groundwater) and ingestion of groundwater from a future drinking water well. Current zoning of this area is commercial/industrial.

- The total cancer risk and total hazard index exceed target ranges for industrial workers through inhalation of indoor air in the area where DNAPL is present at the former Kellwood facility.

- The total cancer risk and total HI exceed the target ranges for residents in OU6 using groundwater as tap water prior to any treatment. The risk is primarily driven from the ingestion of PCE in deep groundwater. Thus, treatment systems must be maintained at these homes.

- The total cancer risk is within the target risk range for residents living near the former Kellwood facility via inhalation of indoor air (volatilizing from groundwater) and the total hazard index is below target levels.

- The results of the comparison of soil gas samples collected near the high school show that PCE, the only detected constituent (and only detected at location SVI-5), exceeds the USEPA residential air screening level, but is below the USEPA industrial air screening level and all specified Missouri target levels for both residential and non-residential use. Given that the exposure assumptions for a teacher/administrator/janitorial scenario would be similar to an industrial worker scenario, further evaluation of the teacher/administrator/janitorial receptor group is not warranted at this time. Further evaluation of a student scenario is also not warranted since a student's exposure would be even less than that of a teacher or a typical residential scenario.

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TABLES

TABLE 1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current and Future
Medium:	Soil
Exposure Medium:	Soil - Surface

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (mg/kg) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Soil (<3 feet)		**Volatile Organic Compounds**										
	67641	Acetone	2.00E-01 J	2.00E-01 J	mg/kg	Q17 (0.5)	1 / 56	0.2	-	6100 nc	N	BSL
	75150	Carbon disulfide	3.00E-03 J	3.00E-03 J	mg/kg	MC03 (0.7)	1 / 56	0.003	-	67 nc	N	BSL
	540590	1,2-Dichloroethene - total	3.50E-03 J	8.70E-02 J	mg/kg	P16 (0.5)	4 / 56	0.087	-	70 nc	N	BSL
	78933	Methyl Ethyl Ketone	9.90E-03	9.90E-03	mg/kg	Q17 (0.5)	1 / 56	0.0099	-	2800 ns	N	BSL
	127184	Tetrachloroethene	3.90E-03 J	2.30E+01	mg/kg	P16 (0.5)	38 / 56	23	-	0.57 c	Y	ASL
	108883	Toluene	7.90E-03	7.90E-03	mg/kg	MC02 (2.7)	1 / 56	0.0079	-	500 ns	N	BSL
	79016	Trichloroethene	3.00E-03 J	1.40E-01 J	mg/kg	P16 (0.5)	7 / 56	0.14	-	2.8 c	N	BSL
		Semi-Volatile Organic Compounds										
	56553	Benzo(a)anthracene	1.70E-02 J	3.10E-02 J	mg/kg	P16 (2.5)	2 / 4	0.031	-	0.15 c	N	BSL
	50328	Benzo(a)pyrene	2.20E-02 J	3.60E-02 J	mg/kg	P16 (2.5)	2 / 4	0.036	-	0.0152 c	Y	ASL
	205992	Benzo(b)fluoranthene	3.90E-02	6.10E-02	mg/kg	P16 (2.5)	2 / 4	0.061	-	0.15 c	N	BSL
	191242	Benzo(ghi)perylene*	1.36E-02 J	2.10E-02 J	mg/kg	P16 (2.5)	2 / 4	0.021	-	230 nc	N	BSL
	207089	Benzo(k)fluoranthene	1.31E-02 J	1.80E-02 J	mg/kg	P16 (2.5)	2 / 4	0.018	-	1.5 c	N	BSL
	218019	Chrysene	2.95E-02 J	4.30E-02 J	mg/kg	P16 (2.5)	2 / 4	0.043	-	15 c	N	BSL
	206440	Fluoranthene	4.60E-01 J	6.40E-02	mg/kg	P16 (2.5)	2 / 4	0.064	-	230 nc	N	BSL
	85018	Phenanthrene*	1.25E-02 J	1.90E-02 J	mg/kg	P14 (3.0)	2 / 4	0.019	-	1700 nc	N	BSL
	129000	Pyrene	3.70E-02 J	5.00E-02	mg/kg	P16 (2.5)	2 / 4	0.05	-	170 nc	N	BSL
		Pesticides										
	72548	4,4'-DDD	7.50E-03 J+	7.50E-03 J+	mg/kg	MC04 (1.3)	1 / 4	0.0075	-	2.0 c	N	BSL
	72559	4,4'-DDE	5.40E-02 J+	5.40E-02 J+	mg/kg	MC04 (1.3)	1 / 4	0.054	-	1.4 c	N	BSL
	50293	4,4'-DDT	1.80E-02 J+	1.80E-02 J+	mg/kg	MC04 (1.3)	1 / 4	0.018	-	1.7 c	N	BSL
	60571	Dieldrin	3.70E-03 J+	3.70E-03 J+	mg/kg	MC04 (1.3)	1 / 4	0.0037	-	0.03 c	N	BSL
	33213659	Endosulfan II	3.20E-02 J+	3.20E-02 J+	mg/kg	MC04 (1.3)	1 / 4	0.032	-	37 nc	N	BSL
	1031078	Endosulfan Sulfate	1.30E-02 J+	1.30E-02 J+	mg/kg	MC04 (1.3)	1 / 4	0.013	-	37 nc	N	BSL
	7421934	Endrin Aldehyde	1.70E-02 J+	1.70E-02 J+	mg/kg	MC04 (1.3)	1 / 4	0.017	-	1.8 nc	N	BSL
		PCBs										
	11097691	Aroclor 1254	3.95E-02	4.70E-02	mg/kg	P16 (2.5)	1 / 4	0.047	-	0.22 c	N	BSL

TABLE 1

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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (mg/kg) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Soil (<3 feet)		**Metals**										
	7440382	Arsenic	5.00E-01 J	5.10E+00	mg/kg	MC04 (1.3)	4 / 4	5.1	-	0.39 c	Y	ASL
	7440393	Barium	2.00E+01	1.20E+02	mg/kg	MC04 (1.3)	4 / 4	120	-	1500 nc	N	BSL
	7440439	Cadmium	8.40E-02 J	3.00E-01	mg/kg	P16 (2.5)	3 / 4	0.3	-	7 nc	N	BSL
	16065831	Chromium	3.20E+00	1.50E+01	mg/kg	MC04 (1.3)	4 / 4	15	-	280 c	N	BSL
	7439921	Lead	3.40E-01 J	7.00E+00	mg/kg	MC04 (1.3)	4 / 4	7	-	40 nL	N	BSL
	7487947	Mercury	6.60E-03 J	2.70E-02	mg/kg	MC04 (1.3)	3 / 4	0.027	-	2.3 nc	N	BSL
	7440224	Silver	1.05E-01 J	1.00E-01 J	mg/kg	P16 (2.5)	1 / 4	0.1	-	39 nc	N	BSL
	7440666	Zinc	2.00E+00 J	2.90E+01	mg/kg	P16 (2.5)	4 / 4	29	-	2300 nc	N	BSL

Footnotes:

(1) J - denotes estimated concentration.

(2) Maximum concentrations are used for screening.

(3) Background values are not available for the site and not used for COPC screenings .

(4) Source(s) for the "Screening Toxicity Value": The Regional Screening Levels for Residential Use (U.S. EPA, 2009) multiplied by 0.1 for noncarcinogens (nc) and a risk of 1E-06 for carcinogens (c).

(5) BSL - below screening. ASL - above screening.

* Surrogate compound values are used for compounds without the toxicity values: fluoranthene is used for benzo(g,h,i)perylene;
anthracene is used for phenanthrene; Endosulfan for Endosulfan II and Endosulfan Sulfate; and Endrin for Endrin Aldehyde.

Shaded compounds selected as COPCs.

TABLE 2a

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current and Future
Medium:	Soil
Exposure Medium:	Soil-Subsurface

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (mg/kg) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Subsurface Soil (0-10 feet)		**Volatile Organic Compounds**										
	67641	Acetone	2.00E-01 J	2.00E-01 J	mg/kg	Q17 (0.5)	1 / 72	0.2	-	6100 nc	N	BSL
	75150	Carbon disulfide	3.00E-03 J	3.00E-03 J	mg/kg	MC03 (0.7)	1 / 72	0.003	-	67 nc	N	BSL
	540590	1,2-Dichloroethene, total	3.50E-03 J	8.70E-02 J	mg/kg	P16 (0.5)	7 / 72	0.087	-	70 nc	N	BSL
	78933	Methyl Ethyl Ketone	8.45E-03	9.90E-03	mg/kg	Q17 (0.5)	1 / 72	0.0099	-	2800 ns	N	BSL
	127184	Tetrachloroethene	3.90E-03 J	2.90E+02	mg/kg	MC04 (6.6)	42 / 72	290	-	0.57 c	Y	ASL
	108883	Toluene	7.90E-03	7.90E-03	mg/kg	MC02 (2.7)	1 / 72	0.0079	-	500 ns	N	BSL
	79016	Trichloroethene	3.30E-03 J	1.40E-01	mg/kg	P16 (0.5)	12 / 72	0.14	-	2.8 c	N	BSL
		Semi-Volatile Organic Compounds										
	56553	Benzo(a)anthracene	1.70E-02 J	3.10E-02 J	mg/kg	P16 (2.5)	2 / 5	0.031	-	0.15 c	N	BSL
	50328	Benzo(a)pyrene	2.20E-02 J	3.60E-02 J	mg/kg	P16 (2.5)	2 / 5	0.036	-	0.0152 c	Y	ASL
	205992	Benzo(b)fluoranthene	3.90E-02	6.10E-02	mg/kg	P16 (2.5)	3 / 5	0.061	-	0.15 c	N	BSL
	191242	Benzo(ghi)perylene*	1.36E-02 J	2.10E-02 J	mg/kg	P16 (2.5)	2 / 5	0.021	-	230 nc	N	BSL
	207089	Benzo(k)fluoranthene	1.31E-02 J	1.80E-02 J	mg/kg	P16 (2.5)	2 / 5	0.018	-	1.5 c	N	BSL
	218019	Chrysene	2.95E-02 J	4.30E-02 J	mg/kg	P16 (2.5)	3 / 5	0.043	-	15 c	N	BSL
	206440	Fluoranthene	4.60E-02 J	6.40E-02	mg/kg	P16 (2.5)	3 / 5	0.064	-	230 nc	N	BSL
	85018	Phenanthrene*	1.25E-02 J	1.90E-02 J	mg/kg	P14 (3.0)	2 / 5	0.019	-	1700 nc	N	BSL
	129000	Pyrene	3.70E-02 J	5.00E-02	mg/kg	P16 (2.5)	3 / 5	0.05	-	170 nc	N	BSL
		PCBs										
	11097691	Aroclor 1254	3.95E-02	4.70E-02	mg/kg	P16 (2.5)	1 / 5	0.047	-	0.22 c	N	BSL
		Pesticides										
	72548	4,4'-DDD	7.50E-03 J+	7.50E-03 J+	mg/kg	MC04 (1.3)	1 / 5	0.0075	-	2.0 c	N	BSL
	72559	4,4'-DDE	5.40E-02 J+	5.40E-02 J+	mg/kg	MC04 (1.3)	1 / 5	0.054	-	1.4 c	N	BSL
	50293	4,4'-DDT	1.80E-02 J+	1.80E-02 J+	mg/kg	MC04 (1.3)	1 / 5	0.018	-	1.7 c	N	BSL
	60571	Dieldrin	3.70E-03 J+	3.70E-03 J+	mg/kg	MC04 (1.3)	1 / 5	0.0037	-	0.03 c	N	BSL
	33213659	Endosulfan II	3.20E-02 J+	3.20E-02 J+	mg/kg	MC04 (1.3)	1 / 5	0.032	-	37 nc	N	BSL
	1031078	Endosulfan Sulfate	1.30E-02 J+	1.30E-02 J+	mg/kg	MC04 (1.3)	1 / 5	0.013	-	37 nc	N	BSL
	7421934	Endrin Aldehyde	1.70E-02 J+	1.70E-02 J+	mg/kg	MC04 (1.3)	1 / 5	0.017	-	1.8 nc	N	BSL

TABLE 2a

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current and Future
Medium:	Soil
Exposure Medium:	Soil-Subsurface

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (mg/kg) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Subsurface Soil		**Metals**										
(0-10 feet)	7440382	Arsenic	5.00E-01 J	1.50E+01	mg/kg	B04 (4.0)	5 / 5	15	-	0.39 c	Y	ASL
	7440393	Barium	2.00E+01	3.10E+02	mg/kg	B04 (4.0)	5 / 5	310	-	1500 nc	N	BSL
	7440439	Cadmium	8.40E-02 J	4.80E-01	mg/kg	B04 (4.0)	4 / 5	0.48	-	7 nc	N	BSL
	16065831	Chromium	3.20E+00	1.80E+01	mg/kg	B04 (4.0)	5 / 5	18	-	280 c	N	BSL
	7439921	Lead	3.40E-01 J	3.10E+01	mg/kg	B04 (4.0)	5 / 5	31	-	40 nL	N	BSL
	7487947	Mercury	6.60E-03 J	4.10E-02	mg/kg	B04 (4.0)	4 / 5	0.041	-	2.3 nc	N	BSL
	7782492	Selenium	6.40E-01 J	6.40E-01 J	mg/kg	B04 (4.0)	1 / 5	0.64	-	39 nc	N	BSL
	7440224	Silver	1.05E-02 J	1.00E-01 J	mg/kg	P16 (2.5)	1 / 5	0.1	-	39 nc	N	BSL
	7440666	Zinc	2.00E+00 J	4.10E+01	mg/kg	B04 (4.0)	5 / 5	41	-	2300 nc	N	BSL

Footnote Instructions:

(1) J - denotes estimated concentration.

(2) Maximum concentrations are used for screening.

(3) Background values are not available for the site and not used for COPC screenings .

(4) Source(s) for the "Screening Toxicity Value": The Regional Screening Levels for Residential Use (U.S. EPA, 2009) multiplied by 0.1 for noncarcinogens (nc) and a risk of 1E-06 for carcinogens (c).

(5) BSL - below screening. ASL - above screening.

* Surrogate compound values are used for compounds without the toxicity values: fluoranthene is used for benzo(g,h,i)perylene;

anthracene is used for phenanthrene; Endosulfan for Endosulfan II and Endosulfan Sulfate; and Endrin for Endrin Aldehyde.

Note that the subsurface detection frequencies are for the soil samples collected on the former Kellwood facility.

Shaded compounds selected as COPCs.

TABLE 2b

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current and Future
Medium:	Soil
Exposure Medium:	Soil - Sewer

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (mg/kg) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Soil (0-15 feet)		**Volatile Organic Compounds**										
	67641	Acetone	9.90E-02	9.90E-02	mg/kg	SDF2	1 / 32	0.099	-	6100 nc	N	BSL
	75150	Carbon disulfide	3.10E-03 J	3.10E-03 J	mg/kg	SDF5	1 / 32	0.0031	-	67 nc	N	BSL
	78933	Methyl Ethyl Ketone	6.30E-03	1.90E-02	mg/kg	SDF2	2 / 32	0.019	-	2800 ns	N	BSL

Footnotes:

(1) J - denotes estimated concentration.

(2) Maximum concentrations are used for screening.

(3) Background values are not available for the site and not used for COPC screenings .

(4) Source(s) for the "Screening Toxicity Value": The Regional Screening Levels for Residential Use (U.S. EPA, 2009) multiplied by 0.1 for noncarcinogens (nc) and a risk of 1E-06 for carcinogens (c).

(5) BSL - below screening. ASL - above screening.

TABLE 3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Maximum Soil Concentration mg/kg	Concentration Used for Screening ug/m^3 (2)	Background Value (3)	Screening Toxicity Value (N/C) ug/m^3 (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
On-property building		**Volatile Organic Compounds**								
	67641	Acetone	2.00E-01	1.33E-03	-	3200 nc	-	-	N	BSL
	75150	Carbon disulfide	3.00E-03	5.52E-03	-	73 nc	-	-	N	BSL
	156605	1,2-Dichloroethene, total	8.70E-02	4.15E-02	-	6.3 nc	-	-	N	BSL
	78933	Methyl Ethyl Ketone	9.90E-03	6.19E-05	-	520 nc	-	-	N	BSL
	127184	Tetrachloroethene	2.90E+02	3.90E+04	-	0.41 c	-	-	Y	ASL
	108883	Toluene	7.90E-03	1.34E-03	-	520 nc	-	-	N	BSL
	79016	Trichloroethene	1.40E-01	3.76E-02	-	1.2 c	-	-	N	BSL

(1) Maximum concentration detected in soil. The occurrence and distribution of compounds in surface and subsurface soil are presented in Tables 1 and 2, respectively.

(2) Indoor air concentrations calculated from maximum soil concentrations using SL-SCREEN (version 3.1; 02/04). Infinite source building concentration was used for screening purposes. Calculations are presented in Appendix B.

(3) Background values are not available for the site and not used for COPC screenings .

(4) Source(s) for the "Screening Toxicity Value": The Regional Screening Levels (RSLs) (U.S. EPA, 2009) for residential air and reduced with a factor of 10 for non-cancer. Additional notation indicates cancer (c) or non-cancer (nc).

(5) BSL - Below screening level. ASL - Above screening level.

Only VOCs defined as Henry's Law Constants greater than 1E-05 and molecular weight less than 200 are presented in the table.

For compounds that are not available in SL-SCREEN model, trans-1,2-dichloroethene is used for total 1,2-dichloroethene to calculate levels for screening.

TABLE 4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current and Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (ug/l) (2)	Background Value (3)	Screening Toxicity Value (ug/l) (4)	Potential ARAR/TBC Value	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Shallow Groundwater		**Volatile Organic Compounds**											
	540590	1,2-Dichloroethene, total	1.60E+00 J	7.80E+01	ug/l	BW21A	6 / 19	78	-	33 nc	-	Y	ASL
	75092	Methylene chloride	3.50E+00	1.90E+01	ug/l	MW1S	2 / 19	18.95	-	4.8 c	5 (MCL)	Y	ASL
	127184	Tetrachloroethene	1.60E+00	1.90E+05	ug/l	BW20	18 / 92	190000	-	0.11 c	5 (MCL)	Y	ASL
	79016	Trichloroethene	1.45E+00	1.50E+02	ug/l	BW21A	12 / 92	150	-	1.7 c	5 (MCL)	Y	ASL
	75014	Vinyl Chloride	9.22E+00	9.22E+00	ug/l	MW04A	1 / 89	9.22	-	0.016 c	2 (MCL)	N	Low Detection Freq.
		Semi-Volatile Organic Compounds											
	91576	2-Methylnaphthalene	1.70E-01 J	1.70E-01 J	ug/l	MW6US	1 / 5	0.17	-	15 nc	-	N	BSL
	95487	2-Methylphenol	1.30E+00 J	1.30E+00 J	ug/l	MW101	1 / 5	1.3	-	180 nc	-	N	BSL
	106445	4-Methylphenol	3.30E-01 J	3.30E-01 J	ug/l	MW101	1 / 5	0.33	-	18 nc	-	N	BSL
	91203	Naphthalene	4.20E-01 J	2.90E-01 J	ug/l	MW101	2 / 5	0.29	-	0.14 c	-	Y	ASL
	108952	Phenol	1.00E+01	1.00E+01	ug/l	MW101	1 / 5	10	-	1100 nc	-	N	BSL
		Metals											
	74400393	Barium	9.80E+01	2.45E+02	ug/l	MW1S	5 / 5	245	-	730 nc	2000 MCL	N	BSL
	16065831	Chromium	1.60E+00 J	5.30E+00 J	ug/l	MW101	4 / 5	5.3	-	5500 nc	100 MCL	N	BSL
	7440666	Zinc	8.30E+01	8.30E+01	ug/l	MW8US	1 / 5	83	-	1100 nc	-	N	BSL

Footnote Instructions:

(1) J - denotes estimated concentration.

(2) Maximum concentrations are used for screening.

(3) Background values are not available for the site and not used for COPC screenings .

(4) Source(s) for the "Screening Toxicity Value" - the Regional Screening Levels (RSLs) for tap water (U.S. EPA, 2009).

Additional notation indiates cancer (c) or non-cancer (nc) endpoint. NA - not applicable or not available.

(5) BSL - below screening level. ASL - above screening level. NSL - no screening level.

* Surrogate compound values are used for compounds without the toxicity values: naphthalene is used as a surrogate for 2-methylnaphthalene.

Shaded compounds selected as COPCs.

TABLE 5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Drinking Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (ug/l) (2)	Background Value (3)	Screening Toxicity Value (ug/l) (4)	Potential ARAR/TBC Value	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Tap Water		**Volatile Organic Compounds**											
	67641	Acetone	6.80E+00 J	6.80E+00 J	ug/l	MW9R	1 / 22	6.8	-	2200 nc	-	N	BSL
	78933	Methyl Ethyl Ketone	2.80E+01	4.60E+01	ug/l	MW9R	2 / 17	46	-	710 nc	-	N	BSL
	75092	Methylene Chloride	5.20E+00	5.20E+00	ug/l	MW9SW	1 / 22	5.2	-	4.8 c	5 (MCL)	Y	ASL
	127184	Tetrachloroethene	5.00E-02	4.91E+02	ug/l	MW04B	16 / 54	491	-	0.11 c	5 (MCL)	Y	ASL
	79016	Trichloroethene	7.00E-02	8.80E+00	ug/l	MW04B	6 / 54	8.8	-	2.0 c	5(MCL)	Y	ASL
	75014	Vinyl Chloride	3.80E-01 J	3.61E+00	ug/l	MW04B	8 / 54	3.61	-	0.016 c	2 (MCL)	Y	ASL

Footnote Instructions:

(1) J - denotes estimated concentration.

(2) Maximum concentrations are used for screening.

(3) Background values are not available for the site and not used for COPC screenings .

(4) Source(s) for the "Screening Toxicity Value" - the Regional Screening Levels (RSLs) for tap water (U.S. EPA, 2009).
Additional notation indiates cancer (c) or non-cancer (nc) endpoint.

(5) BSL - below screening level. ASL - above screening level.

Shaded compounds selected as COPCs.

TABLE 6a

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (ug/m^3) (2)	Background Value (3)	Screening Toxicity Value (ug/m^3) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
On-Site Building		**Volatile Organic Compounds**										
	540590	1,2-Dichloroethene, total	1.60E+00 J	7.80E+01	ug/l	BW21A	6 / 19	6.02E-01	-	6.3 nc	N	BSL
	75092	Methylene chloride	3.50E+00	1.90E+01	ug/l	MW1S	2 / 19	1.09E-01	-	5.2 c	N	BSL
	127184	Tetrachloroethene	1.60E+00	1.90E+05	ug/l	BW20	9 / 19	1.41E+03	-	0.41 c	Y	ASL
	79016	Trichloroethene	1.45E+00	1.50E+02	ug/l	BW21A	6 / 19	9.95E-01	-	1.2 c	N	BSL
		Semi-Volatile Organic Compounds							-			
	91576	2-Methylnaphthalene	1.70E-01 J	1.70E-01 J	ug/l	MW6US	1 / 5	2.80E-04	-	0.072 c	N	BSL
	91203	Naphthalene	4.20E-01 J	2.90E-01 J	ug/l	MW101	2 / 5	5.56E-04	-	0.072 c	N	BSL

Footnote Instructions:

(1) J - denotes estimated concentration.

(2) Indoor air concentrations calculated from maximum groundwater concentrations using GW-SCREEN (version 3.1; 02/04). The infinite source building concentrations are used for screening purposes. Calculations are presented in Appendix D.

(3) Background values are not available for the site and not used for COPC screenings .

(4) Source(s) for the "Screening Toxicity Value" - Regional Screening Levels (RSLs) from USEPA (2009) were used. Additional notation indiates cancer (c) or non-cancer (nc) endpoint.

(5) BSL - below screening level. ASL - above screening level.

Only VOCs defined as those with molecular weight below 200 and henry's law constants above 1E-5 are presented in the table.

TABLE 6b

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Groundwater - Shallow Near OU6
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Groundwater Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Concentration Used for Screening (ug/m^3) (2)	Background Value (3)	Screening Toxicity Value (ug/m^3) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Residential Home		**Volatile Organic Compounds**								
	127184	Tetrachloroethene	2.10E+03	ug/l	MW1S	1.04E+01	-	0.41 c	Y	ASL
	79016	Trichloroethene	1.00E+02	ug/l	MW1UB	7.80E-01	-	1.2 c	N	BSL

Footnote Instructions:

(1) Multiple, site-specific model run were conducted for varying depths of groundwater. Refer to Appendix D for calculations..

(2) Indoor air concentrations calculated from groundwater concentrations using GW-ADV (version 3.1; 02/04). The infinite source building concentrations are used for screening purposes. Calculations are presented in Appendix D.

(3) Background values are not available for the site and not used for COPC screenings .

(4) Source(s) for the "Screening Toxicity Value" - Regional Screening Levels (RSLs) from USEPA (2009) were used.

(5) BSL - below screening level. ASL - above screening level.

Additional notation indiates cancer (c) or non-cancer (nc) endpoint.

Only TCE and PCE are presented for this exposure pathway.

TABLE 6c

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Soil Gas - Near High School
Exposure Medium:	Indoor Air

Sample Location	**USEPA Target Soil Gas Concentration for Residential Use[(1)]**	**USEPA Target Soil Gas Concentration for Industrial Use[(2)]**	**Missouri Tier 1 Risk-Based Target Level for for Indoor Air for Residential Use[(3)]**	**Missouri Tier 1 Risk-Based Target Level for Indoor Air for Non-Residential Use[(4)]**	**Missouri Tier 1 Risk-Based Target Level for Soil Vapor for Indoor Inhalation for Residential Use[(5)]**	**Missouri Tier 1 Risk-Based Target Level for Soil Vapor for Indoor Inhalation for Non-Residential Use[(6)]**	**Units**	SVI1	SVI2	SVI3	SVI3*	SVI4	SVI5	Ambient Air**	
Sample Depth (feet)								9.8	10	10.2	10.2	9.9	10.8	**--**	**--**
Sample Collection Date								11-Sep-09	11-Sep-09	11-Sep-09	11-Sep-09	14-Sep-09	14-Sep-09	11-Sep-09	14-Sep-09
Compound															
Tetracholoethene (PCE)	41	210	427	909	380	1,990	ug/m^3	ND	ND	ND	ND	ND	**200**	**2.8**	ND
Trichloroethene (TCE)	120	610	1,280	2,730	1,040	5,440	ug/m^3	ND	ND	ND	ND	ND	ND	**1.9**	ND
cis-1,2-dichloroethene (cDCE)	NA	NA	2,090	6,820	1,820	14,600	ug/m^3	ND	ND	ND	ND	ND	ND	**0.94**	ND

Notes

(1) USEPA target soil gas concentration is based on the December 2009 RSL for residential air (USEPA, 2009) where the soil gas to indoor air attenuation factor = 0.01 (USEPA, 2008).

(2) USEPA target soil gas concentration is based on the December 2009 RSL for industrial air (USEPA, 2009) where the soil gas to indoor air attenuation factor = 0.01 (USEPA, 2008).

(3) Target level is based on Missouri Risk-Based Corrective Action (Missouri, 2006) Tier 1 for silty soil in indoor air for residential use (Table B-3) with a soil attenuation factor of 0.01 (USEPA, 2008).

(4) Target level is based on Missouri Risk-Based Corrective Action (Missouri, 2006) Tier 1 for silty soil in indoor air for non-residential use (Table B-6) with a soil attenuation factor of 0.01 (USEPA, 2008).

(5) Target level is based on Missouri Risk-Based Corrective Action (Missouri, 2006) Tier 1 for silty soil in soil vapor for residential use (Table B-3).

(6) Target level is based on Missouri Risk-Based Corrective Action (Missouri, 2006) Tier 1 for silty soil in soil vapor for non-residential use (Table B-6).

*: Duplicate Sample

<14: Compound not detected

Bolded cells indicate detected compounds

**:Ambient air samples were collected as background samples from outdoor air

NA = Not available

TABLE 7

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current
Medium:	Groundwater
Exposure Medium:	Drinking Groundwater - Residents in OU6 - Prior to Treatment

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (ug/l) (2)	Background Value (3)	Screening Toxicity Value (ug/l) (4)	Potential ARAR/TBC Value	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Residential		**Volatile Organic Compounds**											
Tap Water	156592	cis-1,2-Dichloroethene	1.01E+00	2.60E+00	ug/l	JS36	7 / 62	2.6	-	37 nc	70 (MCL)	N	BSL
	1634044	MTBE	1.50E-01 J	2.10E-01 J	ug/l	JS25	3 / 32	0.21	-	12 c	-	N	BSL
	127184	Tetrachloroethne	5.60E-01	3.10E+02	ug/l	JS36	35 / 62	310	-	0.11	5 (MCL)	Y	ASL
	79016	Trichloroethene	2.50E-01	7.20E+00	ug/l	JS36	21 / 62	7.2	-	1.7 c	5 (MCL)	Y	ASL

Footnote Instructions:

(1) J - denotes estimated concentration.

(2) Maximum concentrations are used for screening.

(3) Background values are not available for the site and not used for COPC screenings .

(4) Source(s) for the "Screening Toxicity Value" - the Regional Screening Levels (RSLs) for tap water (U.S. EPA, 2009).
Additional notation indiates cancer (c) or non-cancer (nc) endpoint.

(5) BSL - below screening level. ASL - above screening level.

Shaded compounds selected as COPCs.

TABLE 8

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current and Future
Medium:	Surface water
Exposure Medium:	Surface water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Background Value (3)	AWQC (ug/L) (4)	Regional Screening Level Tap Water (ug/L) (5)	MCLs (ug/L) (6)	Missouri Surface Water Criteria (ug/L) (7)	COPC Flag (Y/N)	Rationale for Selection or Deletion (8)
Boeuf Creek Tributaries		**Volatile Organic Compounds**													
	71432	Benzene	1.00E-02	7.00E-02	ug/l	500TB-3	4 / 76	0.07	-	51	0.41 c	5	71	N	BSL
	156592	cis-1,2-Dichloroethene	1.00E-02	6.60E+00	ug/l	SW08	40 / 92	6.6	-	1.00E+04	37 nc	70	-	N	BSL
	156605	trans-1,2-Dichloroethene	1.00E-02	3.60E-01	ug/l	500TB-2	12 / 76	0.36	-	1.00E+04	110 nc	100	140000	N	BSL
	75092	Methylene Chloride	2.90E-01 J	7.50E+00	ug/l	SW01	4 / 17	7.5	-	5.90E+02	4.8 c	6	1600	Y	ASL
	127184	Tetrachloroethene*	2.00E-02	1.00E+02	ug/l	500TB-2	47 / 92	100	-	3.30E+00	0.11 c	5	8.85	Y	ASL
	79016	Trichloroethene	5.00E-02	1.26E+01	ug/l	500TB-2	37 / 92	12.63	-	3.00E+01	1.7 c	5	80	Y	ASL
	75694	Trichlorofluoromethane	1.00E-02	1.00E-02	ug/l	500TB-1A and 550TB-2	2 / 2	0.01	-	-	-	-	860000	N	BSL
	75014	Vinyl Chloride	1.40E-01	3.37E+01	ug/l	500TB-3	6 / 92	33.67	-	2.40E+00	0.016 c	2	525	Y	ASL
		Semi-Volatile Organic Compounds													
	101553	4-Bromophenyl phenyl ether	1.60E-01 J	1.60E-01 J	ug/l	SW06	1 / 1	0.16	-	-	-	-	-	Y	No SL
	56553	Benzo(a)anthracene	6.50E-02 J	6.50E-02 J	ug/l	SW06	1 / 1	0.065	-	1.80E-02	2.90E-02	-	0.049	Y	ASL
	205992	Benzo(b)fluoranthene	4.20E-02 J	4.20E-02 J	ug/l	SW06	1 / 1	0.042	-	1.80E-02	2.90E-02	-	0.049	Y	ASL
	218019	Chrysene	6.70E-02 J	6.70E-02 J	ug/l	SW06	1 / 1	0.067	-	1.80E-02	2.90E+00	-	0.049	Y	ASL
	118741	Hexachlorobenzene	6.50E-02 J	6.50E-02 J	ug/l	SW06	1 / 1	0.065	-	2.90E-04	4.20E-02	1	0.00074	Y	ASL
	129000	Pyrene	7.00E-02 J	7.00E-02 J	ug/l	SW06	1 / 1	0.07	-	4.00E+03	110 c	-	11000	N	BSL
		Pesticides													
	33213659	Endosulfan II	5.10E-02	5.10E-02	ug/l	SW06	1 / 1	0.051	-	8.90E+01	**22 c**	-	-	N	BSL
		Metals													
	7440393	Barium	1.60E+02	1.60E+02	ug/l	SW06	1 / 1	160	-	NA	**730 nc**	2000	-	N	BSL

Footnote Instructions:

(1) J - denotes estimated concentration.

(2) Maximum concentrations are used for screening.

(3) Background values are not available for the site and not used for COPC screenings .

(4) USEPA (2002) National Recommended Water Quality Criteria for human health based on consumption of organism only.

(5) EPA Regional Screening Levels (RSLs) for tap water.

Target Cancer Risk = 1E-6; Target Hazard Quotient =1.

The RSLs, if based on noncancer risk, were adjusted by multiplying 0.1 to represent a target hazard quotient of 0.1.

Additional notation indiates cancer (c) or non-cancer (nc) endpoint.

(6) Maximum Contaminant Limit (MCL) (U.S. EPA 2002).

(7) Missouri Water Criteria for human health under non-drinking water scenario (MDNR, 2009; 10 CSR 20-7.031).

(8) BSL - below screening level. ASL - above screening level.

Only detected surface water concentrations are presented.

For screening, used lowest value of the AWQC, RSLs, MCLs or Missouri SW Criteria (in bold).

TABLE 9

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current and Future
Medium:	Sediment
Exposure Medium:	Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Boeuf Creek		**Volatile Organic Compounds**										
	67641	Acetone	1.50E-02 J	9.60E-02 J	mg/kg	SD01	2 / 8	9.60E-02	-	6100 nc	N	BSL
	75003	Chloroethane	1.15E-03 J	1.30E-03 J	mg/kg	SD03/SD06	2 / 8	1.30E-03	-	1600 nc	N	BSL
	74873	Chloromethane	1.80E-03 J	1.80E-03 J	mg/kg	SD06	1 / 8	1.80E-03	-	12 nc	N	BSL
	127184	Tetrachloroethene	2.65E-03 J	2.65E-03 J	mg/kg	SD06	1 / 8	2.65E-03	-	0.57 c	N	BSL
		Semi-Volatile Organic Compounds										
	91941	3,3'-Dichlorobenzidine	5.40E-02 J	5.40E-02 J	mg/kg	SD06	1 / 1	0.054	-	1.1 c	N	BSL
	56553	Benzo(a)anthracene	1.13E-02 J	1.13E-02 J	mg/kg	SD06	1 / 1	0.0113	-	0.15 c	N	BSL
	50328	Benzo(a)pyrene	3.52E-02 J	3.52E-02 J	mg/kg	SD06	1 / 1	0.0352	-	0.015	Y	ASL
	205992	Benzo(b)fluoranthene	3.60E-02 J	3.60E-02 J	mg/kg	SD06	1 / 1	0.036	-	0.15	N	BSL
	191242	Benzo(ghi)perylene	1.67E-02 J	1.67E-02 J	mg/kg	SD06	1 / 1	0.01665	-	230 nc	N	BSL
	207089	Benzo(k)fluoranthene	2.54E-02 J	2.54E-02 J	mg/kg	SD06	1 / 1	0.0254	-	1.5 c	N	BSL
	218019	Chrysene	2.09E-02 J	2.09E-02 J	mg/kg	SD06	1 / 1	0.02085	-	15 c	N	BSL
	53703	Dibenz(a,h)anthracene	7.10E-03 J	7.10E-03 J	mg/kg	SD06	1 / 1	0.0071	-	0.015 c	N	BSL
	206440	Fluoranthene	1.59E-02 J	1.59E-02 J	mg/kg	SD06	1 / 1	0.01585	-	230 nc	N	BSL
	193395	Indeno(1,2,3-cd)pyrene	1.59E-02 J	1.59E-02 J	mg/kg	SD06	1 / 1	0.01585	-	0.15 c	N	BSL
	129000	Pyrene	2.57E-02 J	2.57E-02 J	mg/kg	SD06	1 / 1	0.02565	-	170 nc	N	BSL
		Pesticides										
	72548	4,4'-DDD	5.90E-04 J	5.90E-04 J	mg/kg	SD06	1 / 1	0.00059	-	2 c	N	BSL
	50293	4,4'-DDT	9.20E-04 J	9.20E-04 J	mg/kg	SD06	1 / 1	0.00092	-	1.7 c	N	BSL
	33213659	Endosulfan Sulfate	1.80E-04 J	1.80E-04 J	mg/kg	SD06	1 / 1	0.00018	-	37 nc	N	BSL
		Endrin aldehyde	7.05E-04 J	7.05E-04 J	mg/kg	SD06	1 / 1	0.000705	-	1.8 nc	N	BSL
		Endrin ketone	3.35E-04 J	3.35E-04 J	mg/kg	SD06	1 / 1	0.000335	-	1.8 nc	N	BSL
	72435	Methoxychlor	5.50E-04 J	5.50E-04 J	mg/kg	SD06	1 / 1	0.00055	-	31 nc	N	BSL
		Metals										
	7440382	Arsenic	2.40E+01 J	2.40E+01 J	mg/kg	SD06	1 / 1	24	-	0.39 c	Y	ASL
	7440393	Barium	5.80E+02	5.80E+02	mg/kg	SD06	1 / 1	580	-	1500 nc	N	BSL
	7440439	Cadmium	5.00E-01 J	5.00E-01 J	mg/kg	SD06	1 / 1	0.5	-	7 nc	N	BSL
	16065831	Chromium	3.95E+01 J	3.95E+01 J	mg/kg	SD06	1 / 1	39.5	-	12000 nc	N	BSL
	7439921	Lead	4.00E+01 J	4.00E+01 J	mg/kg	SD06	1 / 1	40	-	40 nc	N	= SL
	7782492	Selenium	4.75E-01 J	4.75E-01 J	mg/kg	SD06	1 / 1	0.475	-	39 nc	N	BSL
	7440224	Silver	3.65E-01 J	3.65E-01 J	mg/kg	SD06	1 / 1	0.365	-	39 nc	N	BSL
	7440666	Zinc	1.99E+02 J	1.99E+02 J	mg/kg	SD06	1 / 1	199	-	2300 nc	N	BSL

TABLE 9

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current and Future
Medium:	Sediment
Exposure Medium:	Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)

Footnote Instructions:

(1) J-denotes estimated concentratoin. B-denotes blank contamination.

(2) Maximum concentrations are used for screening.

(3) Background values are not available for the site and not used for COPC screenings .

(4) Source(s) for the "Screening Toxicity Value": The Regional Residential Screening Level (U.S. EPA, 2009) and reduced by a factor of 10 for noncarcinogens. Additional notation indicates cancer (c) or nc

(5) BSL - below screening. ASL - above screening.

* Surrogate compound values are used for compounds without the toxicity values: fluoranthene is used for benzo(g,h,i)perylene; anthracene is used for phenanthrene; Endosulfan for Sndosulfan sulfate; and Endrin for endrin aldehyde and endrin ketone.

Shaded compounds selected as COPCs

TABLE 10
PHYSICAL PROPERTIES FOR CHEMICALS OF POTENTIAL CONCERN

Riverfront Superfund Site - OU2/OU6

COPC[b/]	CAS Number[c/]	Parameter Value[a/] H'	Ref[d/]	D^{air} (cm^2/s)[e/]	Ref	D^{wat} (cm^2/s)[e/]	Ref	Koc (L/kg)[e/]	Ref	Kd (cm^3/g)[e/]	Ref	OAF	Ref	DAF	Ref
Volatile Organic Compounds															
Methylene Chloride	75-09-2	1.30E-01	RSL	1.00E-01	RSL	1.35E-05	RSL	2.37E+01	RSL	1.42E-01	CA	**	U	--	-
Naphthalene	91-20-3	1.80E-02	RSL	6.00E-02	RSL	8.40E-06	RSL	1.84E+03	RSL	1.10E+01	CA	**	U	0.13	U
Tetrachloroethylene (PCE)	127-18-4	7.20E-01	RSL	5.00E-02	RSL	9.50E-06	RSL	1.07E+02	RSL	6.42E-01	CA	**	U	--	-
Trichloroethylene (TCE)	79-01-6	4.00E-01	RSL	6.90E-02	RSL	1.00E-05	RSL	6.77E+01	RSL	4.06E-01	CA	**	U	--	-
1,2-Dichloroethene, total	540-59-0	1.70E-01	RSL	9.00E-02	RSL	1.10E-05	RSL	4.38E+01	RSL	2.63E-01	CA	**	U	--	-
Vinyl Chloride	75-01-4	1.10E+00	RSL	1.10E-01	RSL	1.20E-05	RSL	2.37E+01	RSL	1.42E-01	CA	**	U	--	-
Semivolatile Organic Compounds															
Benzo(a)anthracene	56-55-3	4.90E-04	RSL	5.10E-02	SSL	9.00E-06	SSL	2.31E+05	RSL	1.39E+03	CA	**	U	0.13	U
Benzo(a)pyrene	50-32-8	1.90E-05	RSL	4.30E-02	SSL	9.00E-06	SSL	7.87E+05	RSL	4.72E+03	CA	**	U	0.13	U
Chrysene	218-01-9	2.10E-04	RSL	2.48E-02	SSL	6.21E-06	SSL	2.36E+05	RSL	1.42E+03	CA	**	U	0.13	U
Hexachlorobenzene	118-74-1	7.00E-02	RSL	5.42E-02	SSL	5.91E-06	SSL	3.38E+03	RSL	2.03E+01	CA	**	U	0.1	U
4-bromophenyl phenyl ether	101-55-3	--	-	--	-	--	-	--	-	--	-	--	-	--	-
Inorganics															
Arsenic	7440-38-2	--	NU	--	NU	--	NU	--	NU	31	SSL	**	U	0.03	U

a/ Parameters defined as: H' = Henry's law constant (unitless); D^{air} = Diffusivity in air; D^{wat} = Diffusivity in water; Koc = Organic carbon partition coefficient; Kd = Soil-water partition coefficient; OAF = Oral absorption factor; DAF = Dermal absorption factor.

b/ COPC = Chemical of potential concern.

c/ CAS = Chemical abstracts service number.

d/ Ref = References; RSL = USEPA (2009, Inorganic K_d value based on a site specific pH of 8.0); U = USEPA (2004b); CA = Calculated per USEPA (1996a) guidance; NU = Not used.

e/ Units are defined as: cm^2/s = Square centimeters per second; L/kg = Liters per kilogram; and cm^3/g = Cubic centimeters per gram.

f/ "**" = Per USEPA (2001b) guidance, toxicity factors were not adjusted for chemicals with gastrointestinal absorption values greater than 50-percent.

g/ "--" = Data unavailable.

TABLE 11

SELECTION OF EXPOSURE PATHWAYS

Riverfront Superfund Site - OU2 and OU6

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Soil	Soil	Surface soil (0-3')	Site Workers	Adult	Ingestion	Quant	The site is currently occupied by Metalcraft Industries.
						Dermal contact	Quant	The site is currently occupied by Metalcraft Industries.
				Trespassers	Juvenile	Ingestion	Quant	Although the access to the facility is limited, trespassers may be able to gain access to some areas of OU2/OU6.
						Dermal contact	Quant	Although the access to the facility is limited, trespassers may be able to gain access to some areas of OU2/OU6.
			Mixed soil (0-10')	Construction Workers	Adult	Ingestion	None	No construction activities occur at the site.
						Dermal	None	No construction activities occur at the site.
			Ambient Air (0-3')	Site Workers	Adult	Inhalation	Quant	The site is currently occupied by Metalcraft Industries.
				Trespassers	Juvenile	Inhalation	Quant	Although the access to the facility is limited, trespassers may be able to gain access to some areas of OU2/OU6.
				Construction Workers	Adult	Inhalation	None	No construction activities occur at the site.
			Indoor Air (0-10')	Site Workers	Adult	Inhalation	Quant	The site is currently occupied by Metalcraft Industries.
	Groundwater	Groundwater	Ambient Air	Site Workers	Adult	Inhalation	Quant	Although the site is occupied by Metalcraft Industries, the groundwater volatilization to ambient air pathway is insigificant comparing to the soil direct contact exposure pathways.
				Trespassers	Juvenile	Inhalation	Quant	Although the access to the facility is limited, trespassers may be able to gain access to some areas of OU2/OU6.
				Construction Workers	Adult	Inhalation	None	No construction activities occur at the site.
			Indoor Air	Site Workers	Adult	Inhalation	Quant	The site is currently occupied by Metalcraft Industries.
				High School Occupants	Adult and Juvenile	Inhalation	Quant	The school is currently occupied by high school teachers, students and maintenance employees.
				Residents	Adult and Child	Inhalation	Quant	Evaluated for the shallow groundwater at the north end of OU6; however, additional sampling is being conducted to further evaluate this pathway.
			Shallow Groundwater	Construction Workers	Adult	Dermal Contact	None	No construction activities occur at the site.
			Tap Water	Commercial Workers	Adult	Ingestion Inhalation duirng showering Dermal contact during showering	None	Groundwater at the site is not used for potable consumption.
				Residents	Adult and Child	Ingestion Inhalation duirng showering Dermal contact during showering	Quant	Although residents currently have in-house treatment systems to remove contaminants prior to consumption, the concentrations in tap water were evaluated prior to treatment.

TABLE 11

SELECTION OF EXPOSURE PATHWAYS

Riverfront Superfund Site - OU2 and OU6

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current (cont.)	Surface Water	Surface Water	Boeuf Creek Tributaries	Trespassers	Juvenile	Dermal contact	Quant	Human exposures through swimming in the tributaries are unlikely because the tributaries are shallow. Wading is a potentially complete exposure pathway since the depths of the tributaries is shallow.
	Sediment	Sediment	Bouef Creek Tributaries	Trespassers	Juvenile	Incidental Ingestion	Quant	Human exposures through swimming in the tributaries are unlikely because the tributaries are shallow. However, there is potential for a trespasser to be exposed to sediment while wading.
						Dermal contact	Quant	Human exposures through swimming in the tributaries are unlikely because the tributaries are shallow. However, there is potential for a trespasser to be exposed to sediment while wading.
						Inhalation	Quant	Human exposures through swimming in the tributaries are unlikely because the tributaries are shallow. However, there is potential for a trespasser to be exposed to sediment while wading.
Future	Soil	Soil	Surface soil (0-3')	Commercial Workers (Outdoor)	Adult	Ingestion	Quant	Under the anticipated future commercial scenario, commercial workers may be exposed to the contaminated soil.
						Dermal contact	Quant	Under the anticipated future commercial scenario, commercial workers may be exposed to the contaminated soil.
				Trespassers	Juvenile	Ingestion	Quant	Under the anticipated future commercial scenario, a juvenile trespasser may be exposed to the contaminated soil.
						Dermal contact	Quant	Under the anticipated future commercial scenario, a juvenile trespasser may be exposed to the contaminated soil.
			Mixed soil (0-10')	Construction Workers	Adult	Ingestion	Quant	Under the anticipated future commercial scenario, construction workers may be exposed to the contaminated soil.
						Dermal contact	Quant	Under the anticipated future commercial scenario, construction workers may be exposed to the contaminated soil.
			Mixed soil (0-10')	Future Residents - OU2	Adult and child	Ingestion	Quant	Although the anticipated future use for the site is industrial, a future residential scenario is also evaluated for the site. A future resident may be exposed to the contaminated soil.
						Dermal contact	Quant	Although the anticipated future use for the site is industrial, a hypothetical residential scenario is also evaluated for the site. A hypothetical resident may be exposed to the contaminated soil.
			Ambient Air (0-3')	Commercial Workers (Outdoor)	Adult	Inhalation	Quant	Under the anticipated future commercial scenario, commercial workers may be exposed to the contaminated soil through soil volatilization to ambient air.
				Trespassers	Juvenile	Inhalation	Quant	Under the anticipated future commercial scenario, a juvenile trespasser may be exposed to the contaminated soil through soil volatilization to ambient air.
			Mixed (0-10')	Construction Workers	Adult	Inhalation	Quant	Under the anticipated future commercial scenario, construction workers may be exposed to the contaminated soil through soil volatilization to ambient air.
Future (con't)	Soil (con't)	Soil (con't)	Mixed (0-10')	Future Residents - OU2	Adult and child	Inhalation	Quant	Although the anticipated future use for the site is industrial, a future residential scenario is also evaluated for the site. A future resident may be exposed to the contaminated soil.

TABLE 11

SELECTION OF EXPOSURE PATHWAYS

Riverfront Superfund Site - OU2 and OU6

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
			Indoor Air (0-10')	Commercial Workers (Indoor)	Adult	Inhalation	Quant	Under the anticipated future commercial scenario, commercial workers may be exposed to the contaminated soil through soil volatilization to indoor air.
				Future Residents - OU2	Adult and child	Inhalation	Quant	Under the future residential scenario, residents may be exposed to the contaminated soil through soil volatilization to indoor air.
	Groundwater	Groundwater	Ambient Air	Commercial Workers (Outdoor)	Adult	Inhalation	Quant	Under the anticipated future commercial scenario, commercial workers may be exposed to the contaminated groundwater through groundwater volatilzation to ambient air.
				Trespassers	Juvenile	Inhalation	Quant	Under the anticipated future commercial scenario, a juvenile trespasser may be exposed to the contaminated groundwater through groundwater volatilization to ambient air.
				Construction Workers	Adult	Inhalation	Quant	Under the anticipated future commercial scenario, construction workers may be exposed to the contaminated groundwater through groundwater volatilization to ambient air.
				Future Residents - OU2	Adult and child	Inhalation	Quant	Although the anticipated future use for the site is industrial, a future residential scenario is also evaluated for the site. A future resident may be exposed to the contaminated groundwater.
			Indoor Air	Commercial Workers (Indoor)	Adult	Inhalation	Quant	Under the anticipated future commercial scenario, commercial workers may be exposed to the contaminated groundwater through groundwater volatilization to indoor air.
				Future Residents - OU2	Adult and child	Inhalation	Quant	Under the future residential scenario, residents may be exposed to the contaminated groundwater through groundwater volatilization to indoor air.
				High School Occupants	Adult and Juvenile	Inhalation	Quant	The site is currently occupied by high school teachers, students and maintenance employees.
			Shallow Groundwater	Construction Workers	Adult	Dermal Contact	None	The groundwater dermal contact is considered an incomplete exposure pathway because the typical depth to groundwater on-site is deeper than 10 feet, which is deeper than normal construction activity.
			Tap Water	Future Groundwater Users (Residents) - OU2	Adult and child	Ingestion Inhalation during showering Dermal contact during showering	Quant	Although groundwater at the site is not used for potable consumption and no drinking water wells are identified at the site, a future groundwater user is considered because there is no groundwater use restriction to prevent any drinking water wells to be installed on-property.
	Surface Water	Surface Water	Boeuf Creek Tributaries	Trespassers	Juvenile	Dermal contact	Quant	Human exposures through swimming in thetribu taries are unlikely because they are shallow. Wading is a potentially complete exposure pathway.
	Sediment	Sediment	Boeuf Creek Tributaries	Trespassers	Juvenile	Direct contact including Incidental Ingestion, inhalation and dermal contact.	Quant	Although human exposures through swimming in the tributaries are unlikely; wading is a potential activity. There is potential for a trespasser to be exposed to sediment.

TABLE 12.1

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Groundwater-shallow (on-site)
Exposure Medium:	Ambient Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
	Naphthalene	mg/l	NA	NA	2.90E-04	2.90E-04	mg/l	max.	Few samples
	1,2-Dichloroethene (total)	mg/l	NA	NA	7.80E-02	7.80E-02	mg/l	max.	Less than 20 samples
	Methylene chloride	mg/l	NA	NA	1.90E-02	1.90E-02	mg/l	max.	Less than 20 samples
	Tetrachloroethene	mg/l	NA	NA	1.90E+02	1.90E+02	mg/l	max.	Less than 20 samples
	Trichloroethene	mg/l	NA	NA	1.50E-01	1.50E-01	mg/l	max.	Less than 20 samples

NA - Not applicable max. - maximum concentration

See Table 4 for maximum concentrations of COPCs in shallow groundwater presented in this table.

TABLE 12.2

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Groundwater-Deep
Exposure Medium:	Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Tap Water	Methylene Chloride	mg/l	NA	NA	5.20E-03	5.20E-03	mg/l	max.	Standard Practice
	Tetrachloroethene	mg/l	NA	NA	4.91E+02	4.91E+02	mg/l	max.	Standard Practice

NA - Not applicable

max. - maximum concentration

See Table 5 for maximum concentrations of COPCs in deep groundwater presented in this table.

TABLE 12.3

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) (1)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (2)	Rationale
Surface Soil (<3 feet)	Arsenic	mg/kg	NA	NA	5.10E+00	5.10E+00	mg/kg	Max	Few samples
	Benzo(a)pyrene	mg/kg	NA	NA	3.60E-02	3.60E-02	mg/kg	Max	Few samples
	Tetrachloroethene	mg/kg	2.29E+00	7.26E+00	2.30E+01	7.26E+00	mg/kg	99% KM (Chebyshev) UCL	representative
Residential Mixed Soil (0-10 feet)	Arsenic	mg/kg	5.06E+00	NA	1.50E+01	1.50E+01	mg/kg	Max	Few samples
	Benzo(a)pyrene	mg/kg	2.90E-02	NA	3.60E-02	3.60E-02	mg/kg	Max	Few samples
	Tetrachloroethene	mg/kg	8.94E+00	3.04E+01	2.90E+02	3.04E+01	mg/kg	97.5% KM (Chebyshev) UCL	representative

(1) recommended UCL values per ProUCL distributions. (2) ProUCL recommended distributions. max. = maximum concentration

TABLE 12.4

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) (1)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (2)	Rationale
On-property Building	Tetrachloroethene	ug/m^3	--	--	3.90E+04	3.90E+04	ug/m^3	max.	Standard Practice

(1) Recommended UCL values per ProUCL distributions. "--" not calculated.

(2) ProUCL recommended distributions. Max.- maximum concentration

TABLE 12.5

EXPOSURE POINT CONCENTRATION SUMMARY

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Sediments
Exposure Medium:	Sediments

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) (1)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (2)	Rationale
Boeuf Creek	Benzo(a)pyrene	mg/kg	--	--	3.52E-02	3.52E-02	mg/kg	max.	Only Sample
Tributaries	Arsenic	mg/kg	--	--	2.40E+01	2.40E+01	mg/kg	max.	Only Sample

(1) Recommended UCL values per ProUCL distributions. "--" not calculated. (2) ProUCL recommended distributior Max.- maximum concentration

TABLE 12.6

EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution) (1)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic (2)	Rationale
Boeuf Creek	Methylene Chloride	mg/L	NA	NA	7.50E-03	7.50E-03	mg/L	max.	Standard practice
Tributaries	Tetrachloroethene	mg/L	2.18E+01	3.02E+01	1.00E-01	3.02E+01	mg/L	95% KM (Chebyshev) UCL	Standard practice
	Trichloroethene	mg/L	NA	NA	1.26E-02	1.26E-02	mg/L	max.	Standard practice
	Vinyl chloride	mg/L	NA	NA	3.37E-02	3.37E-02	mg/L	max.	Standard practice
	Benzo(a)anthracene	mg/L	NA	NA	1.60E-04	1.60E-04	mg/L	max.	Only sample
	Benzo(b)fluoranthene	mg/L	NA	NA	4.20E-05	4.20E-05	mg/L	max.	Only sample
	Chrysene	mg/L	NA	NA	6.70E-05	6.70E-05	mg/L	max.	Only sample
	Hexachlorobenzene	mg/L	NA	NA	6.50E-05	6.50E-05	mg/L	max.	Only sample

(1) recommended UCL values per ProUCL distributions. NA-Not calculated.

(2) ProUCL recommended distributions. Max.- maximum concentration

TABLE 13

EXPOSURE POINT CONCENTRATIONS ASSOCIATED WITH SOIL EXPOSURE

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Chemical of Potential Concern	Surface Soil (0-3') mg/kg	Mixed Soil (0-10') mg/kg
Tetrachloroethylene	7.26E+00	3.04E+01
Benzo(a)pyrene	3.60E-02	3.60E-02
Arsenic	5.10E+00	1.50E+01

TABLE 14.1

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Workers (Outdoor)	Adult	Ambient Air	CA	Chemical Concentration in Air	calculated	mg/m3	calculated	Intake (ug/m3) = (CA x ED x ET x EF)/(AT)
				Cw	Chemical Concentration in Groundwater	site specific	ug/l	see Table 12.1	CA=Cw x VFgw,amb
				ET	Fraction EF in contact with air	0.333	unitless	EPA, 2002	Dwseff (cm^2/sec)=L_{GW}/[(hv/Dseff)+(hcap/Dcapeff)]
				EF	Exposure Frequency	250	days/year	EPA, 2002	Dseff=Dair x ($\theta as^{3.33}/\theta t^2$) + Dwat x (1/H) x ($\theta ws^{3.33}/\theta t^2$)
				ED	Exposure Duration	25	years	EPA, 2002	Dcapeff=Dair x ($\theta acap^{3.33}/\theta t^2$) + Dwat x (1/H) x ($\theta wcap^{3.33}/\theta t^2$)
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	9125	days	Average over the exposure duration/EPA, 2002	
	Construction Workers	Adult	Ambient Air	CA	Chemical Concentration in Air	calculated	mg/m^3	calculated	Intake (ug/m3) = (CA x ED x ET x EF)/(AT)
				Cw	Chemical Concentration in Groundwater	site specific	ug/l	see Table 12.1	CA=Cw x VFgw,amb
				ET	Fraction EF in contact with air	0.333	unitless	EPA, 2002	Dwseff (cm^2/sec)=L_{GW}/[(hv/Dseff)+(hcap/Dcapeff)]
				EF	Exposure Frequency	120	days/year	a 6 month (5 working days per week) construction project/professional Judgement	Dseff=Dair x ($\theta as^{3.33}/\theta t^2$) + Dwat x (1/H) x ($\theta ws^{3.33}/\theta t^2$)
				ED	Exposure Duration	0.5	years	EPA, 2002	Dcapeff=Dair x ($\theta acap^{3.33}/\theta t^2$) + Dwat x (1/H) x ($\theta wcap^{3.33}/\theta t^2$)
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	180	days	Average over the exposure duration/EPA, 2002	
	Trespasser	Juvenile	Ambient Air	CA	Chemical Concentration in Air	calculated	mg/m3	calculated	Intake (ug/m3) = (CA x ED x ET x EF)/(AT)
				Cw	Chemical Concentration in Groundwater	site specific	ug/l	see Table 12.1	CA=Cw x VFgw,amb
				ET	Fraction EF in contact with air	0.333	unitless	EPA, 2002	Dwseff (cm^2/sec)=L_{GW}/[(hv/Dseff)+(hcap/Dcapeff)]
				EF	Exposure Frequency	45	days/year	Default, RAIS, 2009	Dseff=Dair x ($\theta as^{3.33}/\theta t^2$) + Dwat x (1/H) x ($\theta ws^{3.33}/\theta t^2$)
				ED	Exposure Duration	10	years	9 to 18 years/professional Judgement	Dcapeff=Dair x ($\theta acap^{3.33}/\theta t^2$) + Dwat x (1/H) x ($\theta wcap^{3.33}/\theta t^2$)
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	3650	days	Average over the exposure duration/EPA, 2002	
				VFgw,amb	volatilization factor, groundwater to ambient air	calculated	cm^3-water/cm^3-air	calculated	
				DFamb	Dispersion factor for ambient air	10	cm/s	ASTM, 1998	
				Heff	Effective Henry's law coefficient	chemical specific	cm^3-water/cm^3-air	see Table 10	
				Lgw	Depth to groundwater	431.29	cm	site-specific	
				Dwseff	Effective diffusivity - ave. water table to surface	calculated	cm^2/sec	calculated	
				hv	Vadose zone thickness	426.29	cm	site-specific	

TABLE 14.1

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation (cont.)				hcap	Capillary zone thickness	5	cm	ASTM, 1998	
				Dseff	Effective diffusivity - vadose zone soil	calculated	cm^2/sec	calculated	
				Dcapeff	Effective diffusivity - capillary fringe zone	calculated	cm^2/sec	calculated	
				Dair	Molecular diffusion coefficient in air	chemical specific	cm^2/sec	see Table 10	
				Dwat	Molecular diffusion coefficient in water	chemical specific	cm^2/sec	see Table 10	
				θas	Volumetric air content in vadose zone soils	0.31	cm^3/cm^3	ASTM, 1998	
				θws	Volumetric water content in vadose zone soils	0.12	cm^3/cm^3	ASTM, 1998	
				θt	Total soil porosity vadose zone	0.43	cm^3/cm^3	ASTM, 1998	
				θacap	Volumetric air content in capillary zone soils	0.043	cm^3/cm^3	ASTM, 1998	
				θwcap	Volumetric water content in capillary zone soils	0.387	cm^3/cm^3	ASTM, 1998	

ASTM, 1998: American Society for Testing and Materials (ASTM), 1998. Standard Provisional Guide for Risk-Based Corrective Action. Designation: PS 104-98.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, December.

USEPA, 2004c: User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings, February.

TABLE 14.2

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Residents	Adult/child	Tap Water	CW	Constituent Concentration in Groundwater	site specific	mg/l	see Table 12.2	Chronic Daily Intake(CDI) (mg/kg-d) =
				IR	Water Ingestion Rate	2/1	l/day	USEPA, 1991/USEPA, 1980	(CW x IR x EF x ED)/(BW x AT)
				EF	Exposure Frequency	350	days/year	EPA, 2002	
				ED	Exposure Duration	24/6	years	EPA, 2002	
				BW	Body Weight	70/15	kg	EPA, 2002	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	8760/2190	days	Average over the exposure duration/EPA, 2002	
Dermal Contact	Residents	Adult/child	Tap Water	CW	Chemical Concentration in Groundwater	site specific	mg/l	see Table 12.2	Dermally Absorbed Dose (DAD) (mg/kg-d) =
				CF1	Conversion Factor 1	0.001	mg/μg	--	(DAevent x EV x EF x ED x SA)/(BW x AT)
				CF2	Conversion Factor 2	0.001	L/cm^3	--	Organics:
				DAevent	Dermally absorbed dose per event per area of skin exposed	Chemical-Specific	mg/cm^2-event	EPA, 2004b	If Tevent < T*, then: DA event = $2FA \times Kp \times Cw \times (6\tau event \times Tevent/3.14)^{1/2}$
				Tevent	Exposure Time	1/0.58	hr/event	EPA, 2004b	If Tevent>t*, then: DA event =
				FA	Fraction of absorbed dose	Chemical-Specific	dimensionless	EPA, 2004b	$FA \times Kp \times Cw \times CF1 \times CF2 \times [Tevent/(1+B) + 2\tau event(1+3B+3B^2)/(1+B)^2]$
				K_P	Permeability Coefficient from Water	Chemical-Specific	cm/hr	EPA, 2004b	Inorganics:
				T	Lag time per event	Chemical-Specific	hr/event	EPA, 2004b	DA event = Kp x Cw x Tevent x CF1 x CF2
				t*	Time to reach steady-state	Chemical-Specific	hr	EPA, 2004b	
				B	Dimensionless ration of Kp of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis.	Chemical-Specific	dimensionless	EPA, 2004b	
				EV	Event Frequency	1	events/day	EPA, 2004b	
				SA	Skin Surface Area Available for Contact	18000/6600	cm^2	EPA, 2004b	
				EF	Exposure Frequency	350	days/year	EPA, 2004b	
				ED	Exposure Duration	24/6	years	EPA, 2004b	
				BW	Body Weight	70/15	kg	EPA, 2004b	
				AT-c	Averaging Time (Cancer)	25,550	days	EPA, 2004b	
				AT-nc	Averaging Time (Non-Cancer)	8760/2190	days	EPA, 2004b	

TABLE 14.2

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Residents	Adult/child	Tap Water	CW	Constituent Concentration in Groundwater	site specific	mg/l	see Table 12.2	Chronic Daily Intake(CDI) (mg/kg-d) = (CW x IR x tevent x EV x K x EF x ED)/(BW x AT)
				IR	Water Inhalation Rate	0.83/0.42	(m^3/hr)	USEPA Region 9, 2004 (assumed 1/2 of the inhalation rate for a child)	
				tevent	Event Duration	1	hr/event	USEPA 2009	
				EV	Event Frequency	1	event/day	USEPA 2009	
				K	Volatilization Factor	0.5	L/m^3	USEPA 2009	
				EF	Exposure Frequency	350	days/year	EPA, 2002	
				ED	Exposure Duration	24/6	years	EPA, 2002	
				BW	Body Weight	70/15	kg	EPA, 2002	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	8760/2190	days	Average over the exposure duration/EPA, 2002	

USEPA, 1997: Exposure Factor Handbook, August.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, December.

USEPA, 2004b: Risk Assessment Guidance for Superfund v.1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), July.

USEPA 2009: User's Guide and Background Technical Document for USEPA Regional Screening Level (RSLs) Table.

TABLE 14.3

VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Industrial Workers Outdoor	Adult	Surface soil	CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-3')	Chronic Daily Intake(CDI) (mg/kg-d) = (CS x IR x CF x FI x EF x ED)/(BW x AT)
				IR	Soil Ingestion Rate	100	mg/day	EPA, 2002	
				CF	Conversion Factor	1.00E-06	kg/mg	EPA, 2002	
				FI	Fraction Ingested	1	unitless	100% ingested/conservative assumption	
				EF	Exposure Frequency	225	days/year	EPA, 2002	
				ED	Exposure Duration	25	years	EPA, 2002	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	9125	days	Average over the exposure duration/EPA, 2002	
	Industrial Workers Indoor	Adult	Indoor Dust	CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-3')	Chronic Daily Intake(CDI) (mg/kg-d) = (CS x IR x CF x FI x EF x ED)/(BW x AT)
				IR	Soil Ingestion Rate	100	mg/day	EPA, 2002	
				CF	Conversion Factor	1.00E-06	kg/mg	EPA, 2002	
				FI	Fraction Ingested	1	unitless	100% ingested/conservative assumption	
				EF	Exposure Frequency	250	days/year	EPA, 2002	
				ED	Exposure Duration	25	years	EPA, 2002	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	9125	days	Average over the exposure duration/EPA, 2002	
	Construction Workers	Adult	Mixed soil	CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-10')	Chronic Daily Intake(CDI) (mg/kg-d) = (CS x IR x CF x FI x EF x ED)/(BW x AT)
				IR	Soil Ingestion Rate	330	mg/day	EPA, 2002	
				CF	Conversion Factor	1.00E-06	kg/mg	EPA, 2002	
				FI	Fraction Ingested	1	unitless	100% ingested/conservative assumption	
				EF	Exposure Frequency	120	days/year	Default, RAIS, 2009	
				ED	Exposure Duration	0.5	years	EPA, 2002	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	365	days	Average over the exposure duration/EPA, 2002	
	Trespassers	Juvenile	Surface soil	CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-3')	Chronic Daily Intake(CDI) (mg/kg-d) = (CS x IR x CF x FI x EF x ED)/(BW x AT)
				IR	Soil Ingestion Rate	100	mg/day	Adult default value/EPA, 2002	
				CF	Conversion Factor	1.00E-06	kg/mg	EPA, 2002	
				FI	Fraction Ingested	1	unitless	100% ingested/conservative assumption	

TABLE 14.3

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
				EF	Exposure Frequency	45	days/year	Default, RAIS, 2009	
				ED	Exposure Duration	10	years	9 to 18 years/professional Judgement	
				BW	Body Weight	53	kg	9 to 18 years old/professional Judgement	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	3650	days	Average over the exposure duration/EPA, 2002	

TABLE 14.3

VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal Contact	Industrial Workers Outdoor	Adult	Surface soil	CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-3')	Dermal Absorbed Dose (DAD) (mg/kg-d) =
				CF	Conversion Factor	1.00E-06	kg/mg	EPA, 2002	(DAevent x EV x EF x ED x SA)/(BW x AT)
				AF	Soil to Skin Adherence Factor	0.2	mg/cm^2	EPA, 2004b	where
				ABS	Dermal Absorption Factor	chemical-specific	unitless	EPA, 2004b	Absorbed Dose per Event (DA event) (mg/cm^2-event) =
				SA	Skin Surface Area	3300	cm^2	EPA, 2004b	(CS x CF) x AF x ABS
				EV	Event Frequency	1	events/day	EPA, 2004b	
				EF	Exposure Frequency	225	days/year	EPA, 2002	
				ED	Exposure Duration	25	years	EPA, 2002	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	9125	days	Average over the exposure duration/EPA, 2002	
	Construction Workers	Adult	Mixed soil	CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-10')	Dermal Absorbed Dose (DAD) (mg/kg-d) =
				CF	Conversion Factor	1.00E-06	kg/mg	EPA, 2002	(DAevent x EV x EF x ED x SA)/(BW x AT)
				AF	Soil to Skin Adherence Factor	0.3	mg/cm^2	EPA, 2004b	where
				ABS	Dermal Absorption Factor	chemical-specific	unitless	EPA, 2004b	Absorbed Dose per Event (DA event) (mg/cm^2-event) =
				SA	Skin Surface Area	3300	cm^2	EPA, 2004b	(CS x CF) x AF x ABS
				EV	Event Frequency	1	events/day	EPA, 2004b	
				EF	Exposure Frequency	120	days/year	a 6 month (5 working days per week) construction project/professional Judgement	
				ED	Exposure Duration	0.5	years	EPA, 2002	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	180	days	Average over the exposure duration/EPA, 2002	
	Trespassers	Juvenile	Surface soil	CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-3')	Dermal Absorbed Dose (DAD) (mg/kg-d) =
				CF	Conversion Factor	1.00E-06	kg/mg	EPA, 2002	(DAevent x EV x EF x ED x SA)/(BW x AT)
				AF	Soil to Skin Adherence Factor	0.2	mg/cm^2	EPA, 2004b	where
				ABS	Dermal Absorption Factor	chemical-specific	unitless	EPA, 2004b	Absorbed Dose per Event (DA event) (mg/cm^2-event) =
				SA	Skin Surface Area	4285	cm^2	Default, RAIS, 2009	(CS x CF) x AF x ABS
				EV	Event Frequency	1	events/day	EPA, 2004b	
				EF	Exposure Frequency	45	days/year	Default, RAIS, 2009	
				ED	Exposure Duration	10	years	9 to 18 years/professional Judgement	
				BW	Body Weight	53	kg	9 to 18 years old/professional Judgement	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	3650	days	Average over the exposure duration/EPA, 2002	

TABLE 14.3

VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Workers Outdoor	Adult	Surface soil	CA	Chemical Concentration in Air	calculated	ug/m^3	calculated	Risk = [CA x EF x ED x ET x URF]/(AT-C)
				CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-3')	HQ = (CA x EF x ED x ET)/(RfC x AT-N)
				EF	Exposure Frequency	225	days/year	EPA, 2002	CA = (1/VF+1/PEF) x CS
				ED	Exposure Duration	25	years	EPA, 2002	$VF = Q/C \times [(3.1416 \times Da \times T)^{1/2}]/[2 \times \rho b \times Da] \times (10^{-4}\ m^2/cm^2)$
				ET	Fraction of EF in Contact with Soil	1	Unitless	Conservative assumption/professional Judgement	$PEF=Q/C \times (3600)/(0.036 \times (1-V) \times (Um/Ut)^3 \times F(x))$
				URF	Inhalation Unit Risk Factor	chemical-specific	$(ug/m^3)^{-1}$	see Table 16.2	
				RfC	Inhalation Reference Concentration	chemical-specific	ug/m^3	see Table 15.2	
				VF	Volatilization Factor	calculated	m^3/kg	see Appendix E	
				PEF	Particulate Emission Factor	calculated	m^3/kg	see Appendix E	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	9125	days	Average over the exposure duration/EPA, 2002	
	Construction Workers	Adult	Mixed soil	CA	Chemical Concentration in Air	calculated	ug/m^3	calculated	Risk = [CA x EF x ED x ET x URF]/(AT-C)
				CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-10')	HQ = (CA x EF x ED x ET)/(RfC x AT-N)
				EF	Exposure Frequency	120	days/year	Default, RAIS, 2009	CA = (1/VF+1/PEF) x CS
				ED	Exposure Duration	0.5	years	EPA, 2002	$VF = Q/C \times [(3.1416 \times Da \times T)^{1/2}]/[2 \times \rho b \times Da] \times (10^{-4}\ m^2/cm^2)$
				ET	Fraction of EF in Contact with Soil	1	Unitless	Conservative assumption/professional Judgement	$PEF=Q/C \times (3600)/(0.036 \times (1-V) \times (Um/Ut)^3 \times F(x))$
				URF	Inhalation Unit Risk Factor	chemical-specific	$(ug/m^3)^{-1}$	see Table 16.2	
				RfC	Inhalation Reference Concentration	chemical-specific	ug/m^3	see Table 15.2	
				VF	Volatilization Factor	calculated	m^3/kg	see Appendix E	
				PEF	Particulate Emission Factor	calculated	m^3/kg	see Appendix E	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	180	days	Average over the exposure duration/EPA, 2002	
	Trespassers	Juvenile	Surface soil	CA	Chemical Concentration in Air	calculated	ug/m^3	calculated	Risk = [CA x EF x ED x ET x URF]/(AT-C)
				CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-3')	HQ = (CA x EF x ED x ET)/(RfC x AT-N)
				EF	Exposure Frequency	45	days/year	Default, RAIS, 2009	CA = (1/VF+1/PEF) x CS
				ED	Exposure Duration	10	years	9 to 18 years/professional Judgement	$VF = Q/C \times [(3.1416 \times Da \times T)^{1/2}]/[2 \times \rho b \times Da] \times (10^{-4}\ m^2/cm^2)$
				ET	Fraction of EF in Contact with Soil	0.083	Unitless	Conservative assumption/professional Judgement	$PEF=Q/C \times (3600)/(0.036 \times (1-V) \times (Um/Ut)^3 \times F(x))$
				URF	Inhalation Unit Risk Factor	chemical-specific	$(ug/m^3)^{-1}$	see Table 16.2	
				RfC	Inhalation Reference Concentration	chemical-specific	ug/m^3	see Table 15.2	
				VF	Volatilization Factor	calculated	m^3/kg	see Appendix E	

TABLE 14.3

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation (cont.)	Trespassers (cont.)	Juvenile	Surface soil	PEF	Particulate Emission Factor	calculated	m^3/kg	see Appendix E	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	3650	days	Average over the exposure duration/EPA, 2002	
				Q/C	inverse of the mean concentration at center of square source	64.78	g/m^2-s per kg/m^3	Chicago (0.5 acres)/EPA, 1996	Kd=Koc x foc
Inhalation	Industrial Workers	Adult	Indoor Air	Cair	Chemical Concentration in Air	calculated	ug/m^3	calculated	Risk = [CA x EF x ED x URF]/(AT-C)
				CS	Chemical Concentration in Soil	site specific	ug/kg	Multiply 1000 for concentrations in Table 12.5	HQ = (CA x EF x ED)/(RfC x AT-N)
				EF	Exposure Frequency	250	days/year	EPA, 2002	CA -Johnson and Ettinger model
				ED	Exposure Duration	25	years	EPA, 2002	See Appendix C for calculations.
				URF	Inhalation Unit Risk Factor	chemical-specific	$(ug/m^3)^{-1}$	see Table 16.2	
				RfC	Inhalation Reference Concentration	chemical-specific	ug/m^3	see Table 15.2	
				AT-C	Averaging Time -Cancer	25550	days	EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	9125	days	EPA, 2002	
				T_S	Average soil-groundwater temperature	11	°C	site specific	
				L_F	Depth below grade to bottom of enclosed space floor	15	cm	Assuming future industrial buildings will not have basements/USEPA, 2004c	
				L_t	Depth below grade to top of contamination	201.17	cm	Sampling depth for subsurface soil/site-specific	
				L_b	Depth below grade to bottom of contamination	0	cm	Default if value is unknown/USEPA, 2004c	
				SCS Soil Type	Soil Conservation Service Soil Type	SC	g/cm^3	site-specific shallow soil	
				ρ_b	Soil dry bulk density	1.6	g/cm^3	site-specific	
				q_T	Soil total porosity	0.41	unitless	site-specific	
				q_{ws}	Soil water-filled porosity	0.27	(cm^3-water/cm^3-soil)	site-specific	
				f_{oc}	Soil organic carbon fraction	0.0052	unitless	site-specfic	
				L_{crack}	Enclosed space floor thickness	10	cm	USEPA Recommended Default value/USEPA, 2004c	
				ΔP	Soil-building pressure differential ($g/cm\text{-}s^2$)[a/]	40	($g/cm\text{-}s^2$)	USEPA Recommended Default value/USEPA, 2004c	
				L_B	Enclosed space floor length	1219.2	cm	On-site building	
				W_B	Enclosed space floor width	2438.4	cm	On-site building	
				H_B	Enclosed space height	365.76	cm	Industrial structure	

TABLE 14.3

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation (cont.)				W_B	Floor-wall seam crack width	0.1	cm	USEPA Recommended Default value/USEPA, 2004c	
				ER	Indoor air exchange rate	0.83	1/hr	Indoor exchange rate for an industrial building/ASTM, 1998	

USEPA, 1996: Soil Screening Guidance: User's Guide. OSWER. Pub 9355.4-23, April.

ASTM, 1998: American Society for Testing and Materials (ASTM), 1998. Standard Provisional Guide for Risk-Based Corrective Action. Designation: PS 104-98.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, December.

USEPA, 2004b: Risk Assessment Guidance for Superfund v.1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), July.

USEPA, 2004c: User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings, February.

TABLE 14.4

VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Hypothetical Residents	Adult/child	Surface soil	CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-10')	Chronic Daily Intake(CDI) (mg/kg-d) = (CS x IR x CF x FI x EF x ED)/(BW x AT)
				IR	Soil Ingestion Rate (adult)	100/200	mg/day	EPA, 2002	
				CF	Conversion Factor	1.00E-06	kg/mg	EPA, 2002	
				FI	Fraction Ingested	1	unitless	Professional Judgement	
				EF	Exposure Frequency	350	days/year	EPA, 2002	
				ED	Exposure Duration (adult)	24/6	years	EPA, 2002	
				BW	Body Weight (adult)	70/15	kg	EPA, 2002	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer (adult)	8760/2190	days	Average over the exposure duration/EPA, 2002	
Dermal Contact	Hypothetical Residents	Adult/child	Surface soil	CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-10')	Dermal Absorbed Dose (DAD) (mg/kg-d) = (DAevent x EV x EF x ED x SA)/(BW x AT) where Absorbed Dose per Event (DA event) (mg/cm^2-event) = (CS x CF) x AF x ABS
				CF	Conversion Factor	1.00E-06	kg/mg	EPA, 2002	
				AF	Soil to Skin Adherence Factor	0.07/0.2	mg/cm^2	EPA, 2004b	
				ABS	Dermal Absorption Factor	chemical-specific	unitless	EPA, 2004b	
				SA	Skin Surface Area	5700/2800	cm^2	EPA, 2004b	
				EV	Event Frequency	1	events/day	EPA, 2004b	
				EF	Exposure Frequency	350	days/year	EPA, 2002	
				ED	Exposure Duration (adult)	24/6	years	EPA, 2002	
				BW	Body Weight (adult)	70/15	kg	EPA, 2002	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer (adult)	8760/2190	days	Average over the exposure duration/EPA, 2002	
Inhalation	Hypothetical Residents	Adult	Surface soil	CA	Chemical Concentration in Air	calculated	ug/m^3	calculated	Risk = [CA x EF x ED x ET x URF]/(AT-C) HQ = (CA x EF x ED x ET)/(RfC x AT-N) CA = (1/VF+1/PEF) x CS VF = Q/C x [(3.1416 x Da x T)$^{1/2}$]/[2 x ρb x Da] x (10^{-4} m^2/cm^2) PEF=Q/C x (3600)/(0.036 x (1-V) x (Um/Ut)^3 x F(x)) Da=[(θa$^{3.33}$ x Di x H +θw$^{3.33}$x Dw)/θt^2]/(ρb x Kd +θw +θa x H) (See Appendix B for detail calculations)
				CS	Chemical Concentration in Soil	site specific	mg/kg	see Table 13 (0-10')	
				EF	Exposure Frequency	350	days/year	EPA, 2002	
				ED	Exposure Duration	24/6	years	EPA, 2002	
				ET	Fraction of EF in Contact with Soil	1	Unitless	professional Judgement	
				URF	Inhalation Unit Risk Factor	chemical-specific	(ug/m^3)$^{-1}$	see Table 16.2	
				RfC	Inhalation Reference Concentration	chemical-specific	ug/m^3	see Table 15.2	
				VF	Volatilization Factor	calculated	m^3/kg	see Appendix E	

TABLE 14.4

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation (cont.)				PEF	Particulate Emission Factor	calculated	m^3/kg	see Appendix E	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	8760/2190	days	Average over the exposure duration/EPA, 2002	
				Da	apparent diffusivity	calculated	cm^2/s	calculated	$Da=[(\theta a^{3.33} \times Di \times H + \theta w^{3.33} \times Dw)/\theta t^2]/(\rho b \times Kd + \theta w + \theta a \times H)$
				Q/C	inverse of the mean concentration at center of square source	64.78	g/m^2-s per kg/m	Chicago (0.5 acres)/EPA, 1996	$Kd=Koc \times foc$
				T	exposure interval	9.5×10^8	s	EPA, 1996	
				ρb	dry soil bulk density	1.5	g/cm^3	EPA, 1996	
				θt	total soil porosity	0.43	cm^3/cm^3	EPA, 1996	
				θa	air-filled soil porosity	0.28	cm^3/cm^3	EPA, 1996	
				θw	water-filled soil porosity	0.15	cm^3/cm^3	EPA, 1996	
				Di	diffusivity in air at 25°C	chemical-specific	cm^2/s	EPA, 1996	
				Dw	diffusivity in water at 25°C	chemical-specific	cm^2/s	EPA, 1996	
				H	dimensionless henry's law constant	chemical-specific	unitless	see Table 10	
				Kd	soil-water partition coefficient	calculated	cm^3/g	calculated	
				Koc	organic carbon partition coefficient	chemical-specific	cm^3/g	see Table 10	
				foc	fractional organic carbon content of soil	0.002	g oc/g soil	default for sandy soil	
				V	fraction of vegetative cover	0.5	unitless	EPA, 1996	
				Um	mean annual windspeed	4.69	m/s	EPA, 1996	
				Ut	Equivalent threshold value of windspeed at 7m	11.32	m/s	EPA, 1996	
				F(x)	Function dependent on Um/Ut	0.194	unitless	EPA, 1996	
Inhalation	Hypothetical Residents	Adult&child	Indoor Air	Cair	Chemical Concentration in Air	calculated	ug/m^3	calculated	Risk = [CA x EF x ED x URF]/(AT-C)
				CS	Chemical Concentration in Soil	site specific	ug/kg	calculated	HQ = (CA x EF x ED)/(RfC x AT-N)
				EF	Exposure Frequency	350	days/year	EPA, 2002	CA -Johnson and Ettinger model
				ED	Exposure Duration	30	years	EPA, 2002	See Appendix B for calculations.
				URF	Inhalation Unit Risk Factor	chemical-specific	$(ug/m^3)^{-1}$	see Table 16.2	
				RfC	Inhalation Reference Concentration	chemical-specific	ug/m^3	see Table 15.2	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	10950	days	Average over the exposure duration/EPA, 2002	
				T_S	Average soil-groundwater temperature	11	°C	site specific	

TABLE 14.4

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation (cont.)	Hypothetical Residents	Adult&child	Indoor Air	L_F	Depth below grade to bottom of enclosed space floor	200	cm	Assuming future residential buildings with basements/USEPA, 2004c	
				L_t	Depth below grade to top of contamination	201.17	cm	Sampling depth for subsurface soil/site-specific	
				L_b	Depth below grade to bottom of contamination	0	cm	Default if value is unknown/USEPA, 2004c	
				ha	Thickness of soil stratum A	201.168	cm	site specific	
				hb	Thickness of soil stratum B	60.96	cm	site specific	
				SCS Soil Type	Soil stratum A	SC	g/cm^3	site-specific shallow soil	
				ρ_b	Soil dry bulk density	1.6	g/cm^3	site-specific shallow soil	
				q_T	Soil total porosity	0.41	unitless	site-specific shallow soil	
				q_{ws}	Soil water-filled porosity	0.27	(cm^3-water/cm^3-soil)	site-specific shallow soil	
				f_{oc}	Soil organic carbon fraction	0.0052	unitless	site-specific shallow soil	
				L_{crack}	Enclosed space floor thickness	10	cm	USEPA Recommended Default value/USEPA, 2004c	
				ΔP	Soil-building pressure differential ($g/cm\text{-}s^2$)[a/]	40	($g/cm\text{-}s^2$)	USEPA Recommended Default value/USEPA, 2004c	
				L_B	Enclosed space floor length	1000	cm	Small On-site building	

TABLE 14.4

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation (cont.)	Hypothetical Residents	Adult	Indoor Air	W_B	Enclosed space floor width	1000	cm	Small On-site building	
				H_B	Enclosed space height	365.76	cm	Residential structure	
				W_B	Floor-wall seam crack width	0.1	cm	USEPA Recommended Default value/USEPA, 2004c	
				ER	Indoor air exchange rate	0.25	1/hr	USEPA Recommended Default value/USEPA, 2004c	

USEPA, 1996b: Soil Screening Guidance: User's Guide. OSWER. Pub 9355.4-23.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, December.

USEPA, 2004b: Risk Assessment Guidance for Superfund v.1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), July.

USEPA, 2004c: User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings, February.

TABLE 14.5

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Sediment
Exposure Medium:	Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Juvenile	Sediment	CS	Chemical Concentration in Sediment	site specific	mg/kg	see Table 12.5	Chronic Daily Intake(CDI) (mg/kg-d) =
				IR	Sediment Ingestion Rate	100	mg/day	Adult default value/EPA, 2002	(CS x IR x CF x FI x EF x ED)/(BW x AT)
				CF	Conversion Factor	1.00E-06	kg/mg	EPA, 2002	
				FI	Fraction Ingested	1	unitless	100% ingested/conservative assumption	
				EF	Exposure Frequency	45	days/year	Default, RAIS, 2009	
				ED	Exposure Duration	10	years	9 to 18 years/professional Judgement	
				BW	Body Weight	53	kg	9 to 18 years old/professional Judgement	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	3650	days	Average over the exposure duration/EPA, 2002	
Dermal Contact	Trespassers	Juvenile	Sediment	CS	Chemical Concentration in Sediment	site specific	mg/kg	see Table 12.5	Dermal Absorbed Dose (DAD) (mg/kg-d) =
				CF	Conversion Factor	1.00E-06	kg/mg	EPA, 2002	(DAevent x EV x EF x ED x SA)/(BW x AT)
				AF	Soil to Skin Adherence Factor	0.2	mg/cm^2	EPA, 2004b	where
				ABS	Dermal Absorption Factor	chemical-specific	unitless	EPA, 2004b	Absorbed Dose per Event (DA event) (mg/cm^2-event) =
				SA	Skin Surface Area	4285	cm^2	Default, RAIS, 2009	(CS x CF) x AF x ABS
				EV	Event Frequency	1	events/day	EPA, 2004b	
				EF	Exposure Frequency	45	days/year	Default, RAIS, 2009	
				ED	Exposure Duration	10	years	9 to 18 years/professional Judgement	
				BW	Body Weight	53	kg	9 to 18 years old/professional Judgement	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	3650	days	Average over the exposure duration/EPA, 2002	
Inhalation	Trespassers	Juvenile	Sediment	CA	Chemical Concentration in Air	calculated	ug/m^3	calculated	Risk = [CA x EF x ED x ET x URF]/(AT-C)
				CS	Chemical Concentration in Sediment	site specific	mg/kg	see Table 12.5	HQ = (CA x EF x ED x ET)/(RfC x AT-N)
				EF	Exposure Frequency	45	days/year	Default, RAIS, 2009	CA = (1/VF+1/PEF) x CS
				ED	Exposure Duration	10	years	9 to 18 years/professional Judgement	VF = Q/C x $[(3.1416 \times Da \times T)^{1/2}]/[2 \times \rho b \times Da] \times (10^{-4}\ m^2/cm^2)$
				ET	Fraction of EF in Contact with Soil	1	Unitless	Conservative assumption/professional Judgement	PEF=Q/C x (3600)/(0.036 x (1-V) x $(Um/Ut)^3$ x F(x))
				URF	Inhalation Unit Risk Factor	chemical-specific	$(ug/m^3)^{-1}$	see Table 16.2	
				RfC	Inhalation Reference Concentration	chemical-specific	ug/m^3	see Table 15.2	
				VF	Volatilization Factor	calculated	m^3/kg	see Appendix E	

TABLE 14.5

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Sediment
Exposure Medium:	Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation (cont.)	Trespassers (cont.)	Juvenile	Sediment	PEF	Particulate Emission Factor	calculated	m^3/kg	see Appendix E	
				AT-C	Averaging Time -Cancer	25550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-N	Averaging Time-Non-Cancer	3650	days	Average over the exposure duration/EPA, 2002	
				Q/C	inverse of the mean concentration at center of square source	83.22	g/m^2-s per kg/m^3	Chicago (0.5 acres)/EPA, 1996	Kd=Koc x foc

USEPA, 1996: Soil Screening Guidance: User's Guide. OSWER. Pub 9355.4-23, April.

ASTM, 1998: American Society for Testing and Materials (ASTM), 1998. Standard Provisional Guide for Risk-Based Corrective Action. Designation: PS 104-98.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, December.

USEPA, 2004b: Risk Assessment Guidance for Superfund v.1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), July.

USEPA, 2004c: User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings, February.

TABLE 14.6

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Values	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal Contact	Trespasser	Juvenile	Boeuf Creek Tirbutaries	CSW	Chemical Concentration in Surface Water	site specific	mg/l	see Table 12.6	Dermally Absorbed Dose (DAD) (mg/kg-d) =
				CF1	Conversion Factor 1	0.001	mg/μg	--	(DAevent x EV x EF x ED x SA)/(BW x AT)
				CF2	Conversion Factor 2	0.001	L/cm^3	--	Organics:
				DAevent	Dermally absorbed dose per event per area of skin exposed	Chemical-Specific	mg/cm^2-event	EPA, 2004b	If Tevent < T*, then: DA event = $2FA \times Kp \times Cw \times (6\tau event \times Tevent/3.14)^{1/2}$
				Tevent	Exposure Time	2.00	hr/event	USEPA, 1997	If Tevent>t*, then: DA event =
				FA	Fraction of absorbed dose	Chemical-Specific	dimensionless	EPA, 2004b	$FA \times Kp \times Cw \times CF1 \times CF2 \times [Tevent/(1+B) + 2\tau event(1+3B+3B^2)/(1+B)^2]$
				K_P	Permeability Coefficient from Water	Chemical-Specific	cm/hr	EPA, 2004b	Inorganics:
				T	Lag time per event	Chemical-Specific	hr/event	EPA, 2004b	DA event = Kp x Cw x Tevent x CF1 x CF2
				t*	Time to reach steady-state	Chemical-Specific	hr	EPA, 2004b	
				B	Dimensionless ration of Kp of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis.	Chemical-Specific	dimensionless	EPA, 2004b	
				EV	Event Frequency	1	events/day	EPA, 2004b	
				SA	Skin Surface Area Available for Contact	4,258	cm^2	EPA, 1997	
				EF	Exposure Frequency	45	days/year	Default, RAIS, 2009	
				ED	Exposure Duration	10	years	9 to 18 years/professional Judgement	
				BW	Body Weight	53	kg	9 to 18 years old/professional Judgement	
				AT-c	Averaging Time (Cancer)	25,550	days	Conventional human lifespan (exposure averaged over lifespan)/EPA, 2002	
				AT-nc	Averaging Time (Non-Cancer)	3,650	days	Average over the exposure duration/EPA, 2002	

USEPA, 1997: Exposure Factor Handbook, August.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, December.

USEPA, 2004b: Risk Assessment Guidance for Superfund v.1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment).

TABLE 15.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Riverfront Superfund Site - OU2/OU6

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units	(1)	Value (2)	Units			Source(s) (3)	Date(s) (MM/DD/YYYY)
Arsenic	Chronic	3.00E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin	3	IRIS	04/01/09
	Subchronic	3.00E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin	3	HEAST	1997
Benzo(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chrysene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	Chronic	2.00E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Body weight	3000	IRIS	04/01/09
	Subchronic	6.00E-01	mg/kg-day	1	6.00E-01	mg/kg-day	Body weight	3000	ATSDR	2009
Methylene chloride	Chronic	6.00E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Liver	100	IRIS	04/01/09
	Subchronic	6.00E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Liver	100	HEAST	1997
Tetrachloroethene	Chronic	1.00E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1000	IRIS	04/01/09
	Subchronic	1.00E-01	mg/kg-day	1	1.00E-01	mg/kg-day	Liver	1000	HEAST	1997
Trichloroethylene	N/A	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloroethylene, total	Chronic	9.00E-03	mg/kg/day	1	9.00E-03	mg/kg/day	Liver	1000	RSL	04/01/09
	Subchronic	1.00E-01	mg/kg-day	1	1.00E-01	mg/kg-day	Blood	1000	PPRTV	2009
Hexachlorobenzene	Chronic	8.00E-04	mg/kg/day	1	8.00E-04	mg/kg/day	Liver	100	IRIS	04/01/09
Vinyl chloride	Chronic	3.00E-03	mg/kg/day	1	3.00E-03	mg/kg/day	Liver	30	IRIS	08/07/00

(1) Source: see Table 10.

(2) RfDABS = RfDo X ABSGI

(3) For IRIS values, the date IRIS was searched is provided.
For HEAST values, a reference to the PRGs is provided.
For NCEA values, a reference to the PRGs is provided.

IRIS = Integrated Risk Information System
NCEA = National Center for Environmental Assessment
RSL = U.S. EPA Regional Screening Levels
HEAST= Health Effects Assessment Summary Tables

N/A = Not Applicable or Not Available

TABLE 15.2

NON-CANCER TOXICITY DATA -- INHALATION

Riverfront Superfund Site - OU2/OU6

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units			Source(s) (2)	Date(s) (MM/DD/YYYY)
Arsenic	Chronic Subchronic	3.00E-05	mg/m^3			CAL	
Benzo(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chrysene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	Chronic Subchronic	3.00E-03	mg/m^3	nasal	3000	IRIS	10/1/09
Methylene chloride	Chronic Subchronic	1.10E+00	mg/m^3	Liver	100	ATSDR	2009
Tetrachloroethene	Chronic Subchronic	2.70E-01	mg/m^3	N/A	N/A	ATSDR	2009
Trichloroethylene	Chronic Subchronic	1.00E-02	mg/m^3	Lung	N/A	NY	2006
1,2-Dichloroethylene, total	Chronic Subchronic	6.00E-02	mg/m3			USEPA	2009
Hexachlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vinyl Chloride	Chronic Subchronic	1.00E-01	mg/m3	Liver	30	IRIS	08/07/00

N/A = Not Applicable or Not Available

(2) For IRIS values, the date IRIS was searched is provided.
For HEAST values, a reference to the RSLs is provided.
For NCEA values, a reference to the RSLs is provided.

IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables
RSL = U.S. EPA Regional Screening Levels Tables
Cal = California Toxicity Criteria Database

Table 16.1

CANCER TOXICITY DATA -- ORAL/DERMAL

Riverfront Superfund Site - OU2/OU6

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units	(1)	Value (2)	Units	(3)	Source(s) (4)	Date(s) (MM/DD/YYYY)
Arsenic	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	10/2/09
Benzo(a)anthracene	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/2/09
Benzo(a)pyrene	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/2/09
Benzo(b)fluoranthene	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/2/09
Chrysene	7.30E-03	$(mg/kg\text{-}day)^{-1}$	1	7.30E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/2/09
Naphthalene	N/A	N/A	N/A	N/A	N/A	C	IRIS	10/2/09
Methylene chloride	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1	7.50E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	10/2/09
Tetrachloroethene	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1	5.40E-01	$(mg/kg\text{-}day)^{-1}$	N/A	IRIS	10/2/09
Trichloroethylene	1.30E-02	$(mg/kg\text{-}day)^{-1}$	1	1.30E-01	$(mg/kg\text{-}day)^{-1}$	B1	CALEPA	10/2/09
1,2-Dichloroethylene, total	N/A	N/A	1	N/A	N/A	D	IRIS	10/2/09
Hexachlorobenzene	1.60E+00	(mg/kg-day)-1	1	1.60E+00	(mg/kg-day)-1	B2	IRIS	10/2/09
Vinyl Chloride	7.20E-01	(mg/kg-day)-1	1	7.20E-01	(mg/kg-day)-1	A	IRSI	10/2/09

(1) Source: see Table 10.

(2) $SF_{ABS} = \frac{SF_O}{ABS_{GI}}$

(3) Weight of Evidence/EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

(4) IRIS = Integrated Risk Information System

RSL = U.S. EPA Regional Screening Levels

CALEPA = California

N/A = Not Applicable or Not Available

TABLE 16.2

CANCER TOXICITY DATA -- INHALATION
Riverfront Superfund Site - OU2/OU6

Chemical of Potential Concern	Unit Risk		Weight of Evidence/ Cancer Guideline Description (2)	Unit Risk : Inhalation CSF	
	Value	Units		Source(s) (3)	Date(s) (MM/DD/YYYY)
Arsenic	4.30E-03	$(\mu g/m^3)^{-1}$	A	IRIS	10/2/09
Benzo(a)anthracene	1.10E-04	$(\mu g/m^3)^{-1}$	B2	CAL	2009
Benzo(a)pyrene	1.10E-03	$(\mu g/m^3)^{-1}$	B2	CAL	2009
Benzo(b)fluoranthene	1.10E-04	$(\mu g/m^3)^{-1}$	B2	CAL	2009
Chrysene	1.10E-05	$(\mu g/m^3)^{-1}$	B2	CAL	2009
Naphthalene	3.40E-05	$(\mu g/m^3)^{-1}$	C	CAL	10/2/09
Methylene chloride	4.70E-07	$(\mu g/m^3)^{-1}$	B2	IRIS	10/2/09
Tetrachloroethene	5.90E-06	$(\mu g/m^3)^{-1}$	N/A	CAL	2004
Trichloroethylene	2.00E-06	$(\mu g/m^3)^{-1}$	B1	CAL	2004
1,2-Dichloroethylene, total	N/A	N/A	D	IRIS	10/2/09
Hexachlorobenzene	4.60E-04	$(\mu g/m^3)^{-1}$	B2	IRIS	N/A
Vinyl chloride	4.40E-06	$(\mu g/m^3)^{-1}$	A	IRIS	8/7/00

(1) SFi = Unit Risk x Adjustment Factor or Inhalation RfD

(2) Weight of Evidence/EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

(3) IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = National Center for Environmental Assessment

RSL = U.S. EPA Regional Screening Levels

N/A = Not applicable or Not available

For IRIS values, the date IRIS was searched is provided.

For HEAST values, a reference of the PRGs is provided.

TABLE 17.1

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Receptor Population:	Industrial Workers (Outdoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Surface soil (0-3')	Ingestion	Tetrachloroethylene	7.26	mg/kg	1.9E-06	mg/kg-day	0.54	1/mg/kg-day	1.0E-06	5.3E-06	mg/kg-day	0.01	mg/kg-day	5.3E-04
				Benzo(a)pyrene	0.036	mg/kg	7.1E-09	mg/kg-day	7.3	1/mg/kg-day	5.1E-08	2.0E-08	mg/kg-day	-	mg/kg-day	-
				Arsenic	5.1	mg/kg	1.6E-06	mg/kg-day	1.5	1/mg/kg-day	2.4E-06	4.5E-06	mg/kg-day	0.0003	mg/kg-day	1.5E-02
			Exp. Route Total								3.5E-06					1.5E-02
			Dermal Contact	Tetrachloroethylene	7.26	mg/kg	-	mg/kg-day	0.54	1/mg/kg-day	-	-	mg/kg-day	0.01	mg/kg-day	-
				Benzo(a)pyrene	0.036	mg/kg	6.0E-09	mg/kg-day	7.3	1/mg/kg-day	4.4E-08	1.7E-08	mg/kg-day	-	mg/kg-day	-
				Arsenic	5.1	mg/kg	3.2E-07	mg/kg-day	1.5	1/mg/kg-day	4.8E-07	8.9E-07	mg/kg-day	0.0003	mg/kg-day	3.0E-03
			Exp. Route Total								5.2E-07					3.0E-03
		(0-10')	Inhalation	Tetrachloroethylene	3.04E+01	mg/kg	6.12E-01	ug/m^3	0.0000059	(ug/m^3)$^{-1}$	3.6E-06	1.17E-03	ug/m^3	270	ug/m^3	4.3E-06
				Benzo(a)pyrene	3.04E+00	mg/kg	1.85E-09	ug/m^3	0.0011	(ug/m^3)$^{-1}$	2.0E-12	5.18E-12	ug/m^3	-	ug/m^3	-
				Arsenic	1.50E+01	mg/kg	7.71E-07	ug/m^3	0.0043	(ug/m^3)$^{-1}$	3.3E-09	2.16E-09	ug/m^3	3.00E-02	ug/m^3	7.2E-08
			Exp. Route Total								3.6E-06					4.4E-06
		Exposure Point Total									7.6E-06					1.8E-02
	Exposure Medium Total										7.6E-06					1.8E-02
Medium Total											7.6E-06					1.8E-02
Groundwater	Air	Ambient	Inhalation	1,2-Dichloroethene, total	0.078	mg/l	4.9E-07	ug/m3	-	1/ug/m3	-	1.4E-06	ug/m3	6.0E+01	ug/m3	2.31E-08
				Naphthalene	0.00029	mg/l	3.9E-10	ug/m3	3.4E-05	1/ug/m3	1.3E-14	1.1E-09	ug/m3	3.0E+00	ug/m3	3.7E-10
				Methylene chloride	0.019	mg/l	1.2E-07	ug/m3	4.7E-07	1/ug/m3	5.7E-14	3.4E-07	ug/m3	1.1E+03	ug/m3	3.1E-10
				Tetrachloroethene	190	mg/l	2.0E-03	ug/m3	5.9E-06	1/ug/m3	1.2E-08	5.7E-03	ug/m3	2.7E+02	ug/m3	2.1E-05
				Trichloroethene	0.15	mg/l	1.3E-06	ug/m3	2.0E-06	1/ug/m3	2.7E-12	3.8E-06	ug/m3	1.0E+01	ug/m3	3.8E-07
			Exp. Route Total								1.2E-08					2.1E-05
		Exposure Point Total									1.2E-08					2.1E-05
	Exposure Medium Total										1.2E-08					2.1E-05
Medium Total											1.2E-08					2.1E-05
Total of Receptor Risks Across All Media											7.6E-06	Total of Receptor Hazards Across All Media				1.8E-02

Values for soil ingestion, dermal contact and inhalation are from the RAIS risk tool calculator, 2010.

TABLE 17.2

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Receptor Population:	Industrial Workers (Indoor)
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration[1] Value	Intake/Exposure Concentration[1] Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration[1] Value	Intake/Exposure Concentration[1] Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Soil	Air	On-property building	Inhalation	Tetrachloroethene	2.90E+02	mg/kg	5.13E+02	ug/m^3	5.9E-06	(ug/m^3)$^{-1}$	7.4E-04	5.13E+02	ug/m^3	6.0E-01	mg/m^3	5.9E-01
			Exp. Route Total								7.4E-04					5.90E-01
		Exposure Point Total									7.4E-04					5.90E-01
	Exposure Medium Total										7.4E-04					5.90E-01
	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration[1] Value	Intake/Exposure Concentration[1] Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Non-Cancer Hazard Calculations: Intake/Exposure Concentration[1] Value	Intake/Exposure Concentration[1] Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
	Dust[2]	On-property building	Ingestion	Benzo(a)pyrene	0.016	mg/kg	5.6E-09	mg/kg-day	7.3	1/mg/kg-day	4.1E-08	1.6E-08	mg/kg-day	-	mg/kg-day	-
				Arsenic	2.27	mg/kg	7.9E-07	mg/kg-day	1.5	1/mg/kg-day	1.2E-06	2.2E-06	mg/kg-day	0.0003	mg/kg-day	7.4E-03
			Exp. Route Total								1.2E-06					7.4E-03
		Exposure Point Total									1.2E-06					7.40E-03
	Exposure Medium Total										1.2E-06					7.40E-03
Medium Total											7.4E-04					5.97E-01
Groundwater	Air	On-property	Inhalation	Tetrachloroethene	1.90E+05	ug/L	3.10E+01	ug/m^3	5.9E-06	(ug/m^3)$^{-1}$	4.5E-04	3.11E+02	ug/m^3	6.0E-01	mg/m^3	3.6E-01
			Exp. Route Total								4.5E-04					3.60E-01
		Exposure Point Total									4.5E-04					3.60E-01
	Exposure Medium Total										4.5E-04					3.60E-01
Medium Total											4.5E-04					3.60E-01
Total of Receptor Risks Across All Media											1.9E-03	Total of Receptor Hazards Across All Media				0.96

(1) See Appendix B for Johnson and Ettinger model for calculation of total cancer risk and hazard quotients.

(2) The incidental ingestion of indoor dust tracked into an indoor environment is based on a concentration in indoor dust of 0.445 x concentration in outdoor soil (Alceon, 1996).

TABLE 17.3

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Future
Receptor Population:	Construction Workers
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Mixed soil (0-10')	Ingestion	Tetrachloroethylene	3.04E+01	mg/kg	1.7E-07	mg/kg-day	0.54	1/mg/kg-day	9.0E-08	7.8E-06	mg/kg-day	0.01	mg/kg-day	7.8E-04
				Benzo(a)pyrene	3.60E-02	mg/kg	4.0E-10	mg/kg-day	7.3	1/mg/kg-day	2.9E-09	5.8E-09	mg/kg-day	-	mg/kg-day	0.0E+00
				Arsenic	1.50E+01	mg/kg	3.4E-07	mg/kg-day	1.5	1/mg/kg-day	5.1E-07	3.9E-06	mg/kg-day	0.0003	mg/kg-day	1.3E-02
			Exp. Route Total								6.0E-07					1.4E-02
			Dermal Contact	Tetrachloroethylene	3.04E+01	mg/kg	-	mg/kg-day	0.54	1/mg/kg-day	-	-	mg/kg-day	0.01	mg/kg-day	-
				Benzo(a)pyrene	3.60E-02	mg/kg	1.6E-10	mg/kg-day	7.3	1/mg/kg-day	1.1E-09	2.3E-09	mg/kg-day	-	mg/kg-day	-
				Arsenic	1.50E+01	mg/kg	1.5E-08	mg/kg-day	1.5	1/mg/kg-day	2.2E-08	3.5E-07	mg/kg-day	0.0003	mg/kg-day	1.2E-03
			Exp. Route Total								2.3E-08					1.2E-03
			Inhalation	Tetrachloroethylene	3.04E+01	mg/kg	6.53E-03	ug/m^3	0.0000059	$(ug/m^3)^{-1}$	3.9E-08	1.45E-04	ug/m^3	0.27	ug/m^3	2.4E-04
				Benzo(a)pyrene	3.60E-02	mg/kg	1.97E-11	ug/m^3	0.0011	$(ug/m^3)^{-1}$	2.2E-14	2.87E-13	ug/m^3	-	ug/m^3	-
				Arsenic	1.50E+01	mg/kg	8.23E-09	ug/m^3	0.0043	$(ug/m^3)^{-1}$	3.5E-11	1.92E-10	ug/m^3	0.00003	ug/m^3	1.3E-05
			Exp. Route Total								3.9E-08					2.5E-04
		Exposure Point Total									6.6E-07					1.5E-02
	Exposure Medium Total										6.6E-07					1.5E-02
Medium Total											6.6E-07					1.5E-02
Groundwater	Air	Ambient	Inhalation	1,2-Dichloroethene, total	0.078	mg/l	4.7E-09	ug/m3	-	(ug/m3)-1	-	6.6E-07	ug/m3	6.0E+01	ug/m3	1.11E-08
				Naphthalene	0.00029	mg/l	3.8E-12	ug/m3	3.4E-05	(ug/m3)-1	1.3E-16	5.3E-10	ug/m3	3.0E+00	ug/m3	1.8E-10
				Methylene chloride	0.019	mg/l	1.2E-09	ug/m3	4.7E-07	(ug/m3)-1	5.4E-16	1.6E-07	ug/m3	1.1E+03	ug/m3	1.5E-10
				Tetrachloroethene	190	mg/l	2.0E-05	ug/m3	5.9E-06	(ug/m3)-1	1.2E-10	2.7E-03	ug/m3	2.7E+02	ug/m3	1.0E-05
				Trichloroethene	0.15	mg/l	1.3E-08	ug/m3	2.0E-06	(ug/m3)-1	2.6E-14	1.8E-06	ug/m3	1.0E+01	ug/m3	1.8E-07
			Exp. Route Total								1.2E-10					1.0E-05
		Exposure Point Total									1.2E-10					1.0E-05
	Exposure Medium Total										1.2E-10					1.0E-05
Medium Total											1.2E-10					1.0E-05
Total of Receptor Risks Across All Media											6.6E-07	Total of Receptor Hazards Across All Media				1.5E-02

Values for soil ingestion, dermal contact and inhalation are from the RAIS risk tool calculator, 2010.

TABLE 17.4

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/future
Receptor Population:	Trespasser
Receptor Age:	Juvenile

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Surface soil	Ingestion	Tetrachloroethylene	7.26	mg/kg	1.7E-06	mg/kg-day	0.54	1/mg/kg-day	9.1E-07	1.7E-06	mg/kg-day	0.01	mg/kg-day	1.7E-04
				Benzo(a)pyrene	0.036	mg/kg	8.4E-09	mg/kg-day	7.3	1/mg/kg-day	6.1E-08	8.4E-09	mg/kg-day	-	mg/kg-day	-
				Arsenic	5.1	mg/kg	1.2E-06	mg/kg-day	1.5	1/mg/kg-day	1.8E-06	1.2E-06	mg/kg-day	0.0003	mg/kg-day	4.0E-03
			Exp. Route Total								2.8E-06					4.1E-03
			Dermal Contact	Tetrachloroethylene	7.26	mg/kg	1.4E-05	mg/kg-day	0.54	1/mg/kg-day	7.8E-06	1.4E-05	mg/kg-day	0.01	mg/kg-day	1.4E-03
				Benzo(a)pyrene	0.036	mg/kg	9.3E-09	mg/kg-day	7.3	1/mg/kg-day	6.8E-08	9.3E-09	mg/kg-day	-	mg/kg-day	-
				Arsenic	5.1	mg/kg	3.1E-07	mg/kg-day	1.5	1/mg/kg-day	4.6E-07	3.1E-07	mg/kg-day	0.0003	mg/kg-day	1.0E-03
			Exp. Route Total								8.3E-06					2.5E-03
			Inhalation	Tetrachloroethylene	7.26E+03	ug/kg	1.95E-02	ug/m^3	0.0000059	$(ug/m^3)^{-1}$	1.2E-07	1.95E-02	ug/m^3	2.71E+02	ug/m^3	7.2E-05
				Benzo(a)pyrene	3.60E+01	ug/kg	2.58E-10	ug/m^3	0.0011	$(ug/m^3)^{-1}$	2.8E-13	2.58E-10	ug/m^3	-	ug/m^3	-
				Arsenic	5.10E+03	ug/kg	3.65E-08	ug/m^3	0.0043	$(ug/m^3)^{-1}$	1.6E-10	3.65E-08	ug/m^3	3.00E-02	ug/m^3	1.2E-06
			Exp. Route Total								1.2E-07					7.3E-05
		Exposure Point Total									1.1E-05					6.7E-03
	Exposure Medium Total										1.1E-05					6.7E-03
Medium Total											1.1E-05					6.7E-03
Sediment	Sediment	Creek Bank	Incidential Ingestion	Benzo(a)pyrene	3.52E-02	mg/kg	8.2E-09	mg/kg-day	7.3E+00	1/mg/kg-day	6.0E-08	8.2E-09	mg/kg-day	-	mg/kg-day	-
				Arsenic	2.40E+01	mg/kg	5.6E-06	mg/kg-day	1.5E+00	1/mg/kg-day	8.4E-06	5.6E-06	mg/kg-day	3.0E-04	mg/kg-day	1.9E-02
			Exp. Route Total								8.4E-06					1.9E-02
			Dermal Contact	Benzo(a)pyrene	3.52E-02	mg/kg	9.1E-09	mg/kg-day	7.3E+00	1/mg/kg-day	6.7E-08	9.1E-09	mg/kg-day	-	mg/kg-day	-
				Arsenic	2.40E+01	mg/kg	1.4E-06	mg/kg-day	1.5E+00	1/mg/kg-day	2.2E-06	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	4.8E-03
			Exp. Route Total								2.2E-06					4.8E-03
			Inhalation	Benzo(a)pyrene	3.52E-02	mg/kg	2.6E-10	ug/m3	1.1E-03	1/ug/m3	-	2.6E-10	ug/m3	-	ug/m3	-
				Arsenic	2.40E+01	mg/kg	3.6E-08	ug/m3	4.3E-03	1/ug/m3	1.6E-10	3.6E-08	ug/m3	3.0E-02	ug/m3	1.2E-06
			Exp. Route Total								1.6E-10					1.2E-06
		Exposure Point Total									1.1E-05					2.3E-02
	Exposure Medium Total										1.1E-05					2.3E-02
Medium Total											1.1E-05					2.3E-02
Groundwater	Air	Ambient	Inhalation	Naphthalene	4.8353E-12	ug/m3	2.8E-14	ug/m3	-	1/ug/m3	-	2.0E-13	ug/m3	3.0E+00	ug/m3	6.6E-14
				cis-1,2-Dichloroethene	6.0679E-09	ug/m3	3.56E-11	ug/m3	-	1/ug/m3	-	2.5E-10	ug/m3	6.0E+01	ug/m3	4.2E-12
				Methylene chloride	1.4784E-09	ug/m3	8.7E-12	ug/m3	7.5E-03	1/ug/m3	6.5E-14	6.1E-11	ug/m3	1.1E+03	ug/m3	5.5E-14
				Tetrachloroethene	2.4963E-05	ug/m3	1.5E-07	ug/m3	5.4E-01	1/ug/m3	7.9E-08	1.0E-06	ug/m3	2.7E+02	ug/m3	3.8E-09

TABLE 17.4

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/future
Receptor Population:	Trespasser
Receptor Age:	Juvenile

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Trichloroethene	1.6463E-08	ug/m3	9.7E-11	ug/m3	4.0E-01	1/ug/m3	3.9E-11	6.8E-10	ug/m3	1.0E+01	ug/m3	6.8E-11
			Exp. Route Total								7.9E-08					3.9E-09
		Exposure Point Total									7.9E-08					3.9E-09
	Exposure Medium Total										7.9E-08					3.9E-09
Medium Total											7.9E-08					3.9E-09
Surface Water	Surface Water	Shallow	Ingestion	Methylene chloride	7.50E-03	mg/L	1.3E-07	mg/kg-day	7.5E-03	1/mg/kg-day	9.4E-10	8.7E-07	mg/kg-day	6.0E-02	mg/kg-day	1.5E-05
				Tetrachloroethene	3.02E-02	mg/L	5.0E-07	mg/kg-day	5.4E-01	1/mg/kg-day	2.7E-07	3.5E-06	mg/kg-day	1.0E-02	mg/kg-day	3.5E-04
				Trichloroethene	1.26E-02	mg/L	2.1E-07	mg/kg-day	1.3E-02	1/mg/kg-day	2.7E-09	1.5E-06	mg/kg-day	-	mg/kg-day	-
				Benzo(a)anthracene	6.50E-05	mg/L	1.1E-09	mg/kg-day	7.3E-01	1/mg/kg-day	7.9E-10	7.6E-09	mg/kg-day	-	mg/kg-day	-
				Benzo(b)fluoranthene	4.20E-05	mg/L	7.0E-10	mg/kg-day	7.3E-01	1/mg/kg-day	5.1E-10	4.9E-09	mg/kg-day	-	mg/kg-day	-
				Chrysene	6.70E-05	mg/L	1.1E-09	mg/kg-day	7.3E-03	1/mg/kg-day	8.1E-12	7.8E-09	mg/kg-day	-	mg/kg-day	-
				Vinyl chloride	3.37E-02	mg/L	5.6E-07	mg/kg-day	7.2E-01	1/mg/kg-day	4.0E-07	3.9E-06	mg/kg-day	3.0E-03	mg/kg-day	1.3E-03
				Hexachlorobenzene	6.50E-05	mg/L	1.1E-09	mg/kg-day	1.6E+00	1/mg/kg-day	1.7E-09	7.6E-09	mg/kg-day	8.0E-04	mg/kg-day	9.5E-06
			Exp. Route Total								6.8E-07					1.7E-03
			Dermal Contact	Methylene chloride	7.50E-03	mg/L	1.0E-07	mg/kg-day	7.5E-03	1/mg/kg-day	7.5E-10	7.0E-07	mg/kg-day	6.0E-02	mg/kg-day	1.2E-05
				Tetrachloroethene	3.02E-02	mg/L	5.4E-06	mg/kg-day	5.4E-01	1/mg/kg-day	2.9E-06	3.8E-05	mg/kg-day	1.0E-02	mg/kg-day	3.8E-03
				Trichloroethene	1.26E-02	mg/L	6.6E-07	mg/kg-day	1.3E-02	1/mg/kg-day	8.5E-09	4.6E-06	mg/kg-day	-	mg/kg-day	-
				Benzo(a)anthracene	6.50E-05	mg/L	2.4E-07	mg/kg-day	7.3E-01	1/mg/kg-day	1.8E-07	1.7E-06	mg/kg-day	-	mg/kg-day	-
				Benzo(b)fluoranthene	4.20E-05	mg/L	2.7E-07	mg/kg-day	7.3E-01	1/mg/kg-day	2.0E-07	1.9E-06	mg/kg-day	-	mg/kg-day	-
				Chrysene	6.70E-05	mg/L	2.6E-07	mg/kg-day	7.3E-03	1/mg/kg-day	1.9E-09	1.8E-06	mg/kg-day	-	mg/kg-day	-
				Vinyl chloride	3.37E-02	mg/L	6.6E-07	mg/kg-day	7.2E-01	1/mg/kg-day	4.7E-07	4.6E-06	mg/kg-day	3.0E-03	mg/kg-day	1.5E-03
				Hexachlorobenzene	6.50E-05	mg/L	8.9E-09	mg/kg-day	1.6E+00	1/mg/kg-day	1.4E-08	6.3E-07	mg/kg-day	8.0E-04	mg/kg-day	7.9E-04
			Exp. Route Total								3.8E-06					6.1E-03
		Exposure Point Total									4.5E-06					7.8E-03
	Exposure Medium Total										4.5E-06					7.8E-03
Medium Total											4.5E-06					7.8E-03
											Total of Receptor Risks Across All Media					2.6E-05
																Total of Receptor Hazards Across All Media
																3.8E-02

Calculations and values are presented in Appendix E.

TABLE 17.5

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe: Future

Receptor Population: Future Residents OU2

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration(1)		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration(1)		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Mixed soil (0-10')	Ingestion	Tetrachloroethylene	30.4	mg/kg	4.8E-05	mg/kg-day	0.54	1/mg/kg-day	2.6E-05	3.9E-04	mg/kg-day	0.01	mg/kg-day	3.9E-02
				Benzo(a)pyrene	0.036	mg/kg	2.4E-07	mg/kg-day	7.3	1/mg/kg-day	1.8E-06	4.6E-07	mg/kg-day	-	mg/kg-day	-
				Arsenic	15	mg/kg	2.4E-05	mg/kg-day	1.5	1/mg/kg-day	3.5E-05	1.9E-04	mg/kg-day	0.0003	mg/kg-day	6.4E-01
			Exp. Route Total								6.3E-05					6.8E-01
			Dermal Contact	Tetrachloroethylene	30.4	mg/kg	-	mg/kg-day	0.54	1/mg/kg-day	-	-	mg/kg-day	0.01	mg/kg-day	-
				Benzo(a)pyrene	0.036	mg/kg	9.3E-08	mg/kg-day	7.3	1/mg/kg-day	6.8E-07	1.7E-07	mg/kg-day	-	mg/kg-day	-
				Arsenic	15	mg/kg	2.2E-06	mg/kg-day	1.5	1/mg/kg-day	3.3E-06	1.6E-05	mg/kg-day	0.0003	mg/kg-day	5.4E-02
			Exp. Route Total								4.0E-06					5.4E-02
			Inhalation Ambient Air	Tetrachloroethylene	3.04E+04	ug/kg	3.43E+00	ug/m^3	5.9E-06	$(ug/m^3)^{-1}$	2.0E-05	7.99E-03	ug/m^3	0.27	ug/m^3	3.0E-02
				Benzo(a)pyrene	3.60E+01	ug/kg	2.63E-08	ug/m^3	0.0011	$(ug/m^3)^{-1}$	2.9E-11	2.42E-11	ug/m^3	-	ug/m^3	-
				Arsenic	1.50E+04	ug/kg	4.32E-06	ug/m^3	0.0043	$(ug/m^3)^{-1}$	1.9E-08	1.01E-08	ug/m^3	3.00E-05	ug/m^3	3.4E-04
			Exp. Route Total								2.0E-05					3.0E-02
		Exposure Medium Total									8.7E-05					7.6E-01
		Air Indoor	On-property building	Inhalation	Tetrachloroethene	2.90E+02	mg/kg	2.3E+03	ug/m^3	5.9E-06	$(ug/m^3)^{-1}$	5.6E-03	2.3E+03	ug/m^3	6.0E-01	mg/m^3	3.7E+00
				Exp. Route Total								5.6E-03					3.7E+00
			Exposure Point Total									5.6E-03					3.7E+00
		Exposure Medium Total										5.6E-03					3.7E+00
Medium Total												5.7E-03					4.5E+00
Groundwater		Air Indoor	On-property building	Inhalation	Tetrachloroethene	1.90E+05	ug/L	1.5E+03	ug/m^3	5.9E-06	$(ug/m^3)^{-1}$	3.7E-03	1.5E+03	ug/m^3	6.0E-01	mg/m^3	2.4E+00
				Exp. Route Total								3.7E-03					2.4E+00
			Exposure Point Total									3.7E-03					2.4E+00
		Exposure Medium Total										3.7E-03					2.4E+00
Medium Total												3.7E-03					2.4E+00
											Total of Receptor Risks Across All Media	9.4E-03				Total of Receptor Hazards Across All Media	6.9E+00

(1) See Appendix B for Johnson and Ettinger model for calculation of total cancer risk and hazard quotients for indoor air and Appendix E for the soil intake calculations.

TABLE 17.6

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe: Future

Receptor Population: Future Drinking Groundwater User - OU2

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Tap Water	Ingestion	Methylene chloride	5.20E-03	mg/l	7.7E-05	mg/kg-day	7.50E-03	1/mg/kg-day	5.81E-07	1.4E-04	mg/kg-day	6.00E-02	mg/kg-day	2.37E-03
				Tetrachloroethene	4.91E-01	mg/l	7.3E-03	mg/kg-day	5.40E-01	1/mg/kg-day	3.94E-03	1.4E-02	mg/kg-day	1.00E-02	mg/kg-day	1.35E+00
				Trichloroethene	8.80E-03	mg/l	1.3E-04	mg/kg-day	1.30E-02	1/mg/kg-day	1.70E-06	2.4E-04	mg/kg-day	-	mg/kg-day	-
				Vinyl Chloride	3.61E-03	mg/l	2.9E-04	mg/kg-day	7.20E-01	1/mg/kg-day	2.12E-04	9.9E-05	mg/kg-day	3.00E-03	mg/kg-day	3.30E-02
			Exp. Route Total								4.2E-03					1.4E+00
			Dermal Contact	Methylene chloride	5.20E-03	mg/l	1.6E-06	mg/kg-day	7.50E-03	1/mg/kg-day	1.18E-08	2.63E-06	mg/kg-day	6.00E-02	mg/kg-day	4.38E-05
				Tetrachloroethene	4.91E-01	mg/l	1.4E-03	mg/kg-day	5.40E-01	1/mg/kg-day	7.56E-04	2.35E-03	mg/kg-day	1.00E-02	mg/kg-day	2.35E-01
				Trichloroethene	8.80E-03	mg/l	8.7E-06	mg/kg-day	1.30E-02	1/mg/kg-day	1.13E-07	1.46E-05	mg/kg-day	-	mg/kg-day	-
				Vinyl Chloride	3.61E-03	mg/l	1.6E-05	mg/kg-day	7.20E-01	1/mg/kg-day	1.14E-05	4.33E-06	mg/kg-day	3.00E-03	mg/kg-day	1.44E-03
			Exp. Route Total								7.7E-04					2.4E-01
			Inhalation	Methylene chloride	5.20E-03	mg/l	1.1E+00	ug/m3	4.70E-07	1/ug/m3	5.03E-07	2.49E-03	mg/m3	1.10E+00	mg/m3	2.26E-03
				Tetrachloroethene	4.91E-01	mg/l	1.0E+02	ug/m3	5.90E-06	1/ug/m3	5.96E-04	2.35E-01	mg/m3	2.70E-01	mg/m3	8.70E-01
				Trichloroethene	8.80E-03	mg/l	1.8E+00	ug/m3	2.00E-06	1/ug/m3	3.62E-06	4.22E-03	mg/m3	1.00E-02	mg/m3	4.22E-01
				Vinyl Chloride	3.61E-03	mg/l	2.6E+00	ug/m3	4.40E-06	1/ug/m3	1.12E-05	1.73E-03	mg/m3	1.00E-01	mg/m3	1.73E-02
			Exp. Route Total								6.1E-04					1.3E+00
		Exposure Point Total									5.5E-03					2.9E+00
	Exposure Medium Total										5.5E-03					2.9E+00
Medium Total											5.5E-03					2.9E+00
											Total of Receptor Risks Across All Media	5.5E-03		Total of Receptor Hazards Aıss All Media		2.93

TABLE 17.7

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

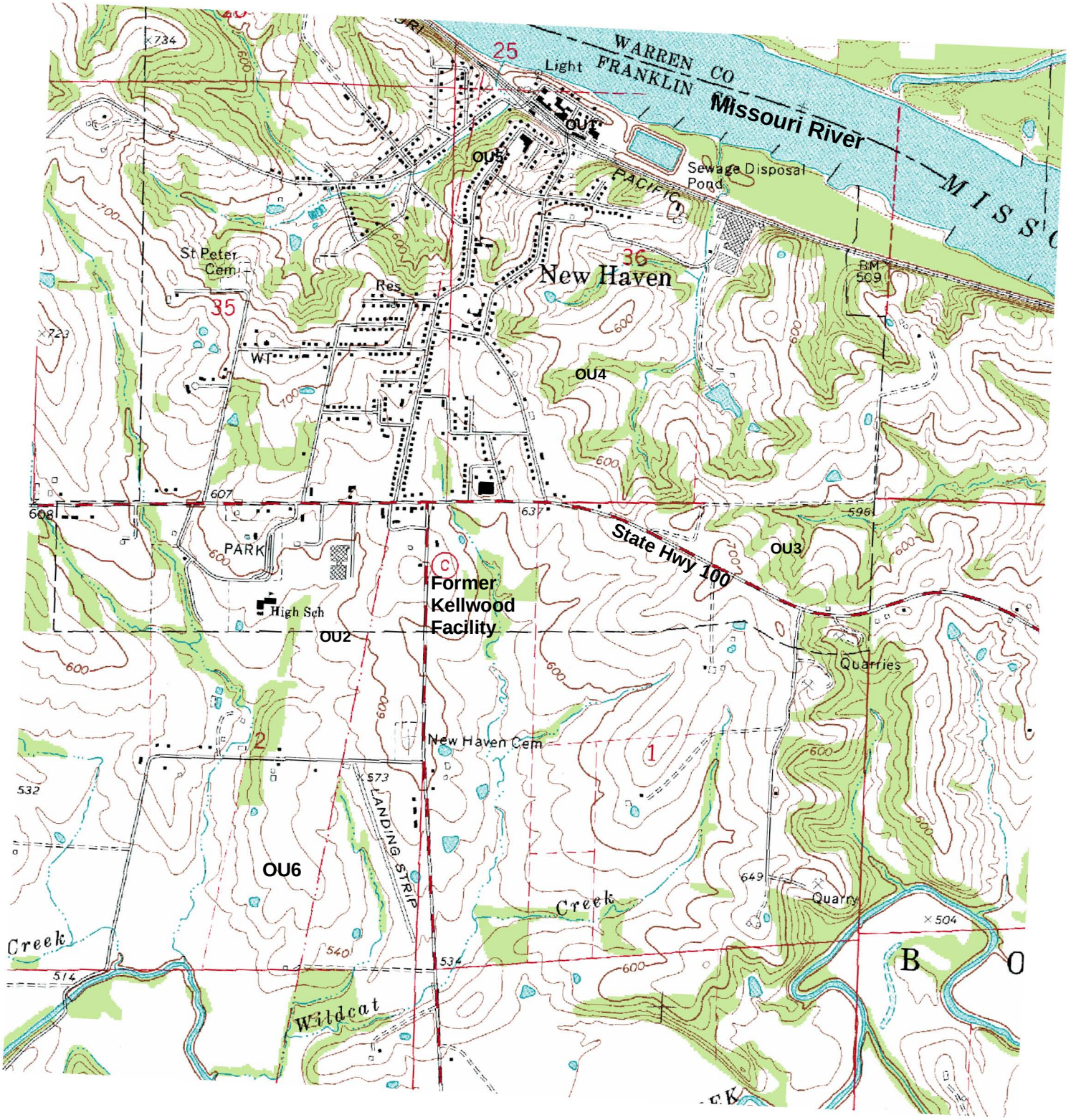
REASONABLE MAXIMUM EXPOSURE

Riverfront Superfund Site - OU2/OU6

Scenario Timeframe:	Current/Future
Receptor Population:	Current/Future Drinking Groundwater User - OU6
	Prior to treatment

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Tap Water	Ingestion	Tetrachloroethene	3.10E-01	mg/l	4.6E-03	mg/kg-day	5.40E-01	1/mg/kg-day	2.49E-03	8.5E-03	mg/kg-day	1.00E-02	mg/kg-day	8.49E-01
				Trichloroethene	7.20E-03	mg/l	1.1E-04	mg/kg-day	1.30E-02	1/mg/kg-day	1.39E-06	2.0E-04	mg/kg-day	-	mg/kg-day	-
			Exp. Route Total								2.5E-03					8.5E-01
			Dermal Contact	Tetrachloroethene	3.10E-01	mg/l	8.8E-04	mg/kg-day	5.40E-01	1/mg/kg-day	4.76E-04	1.48E-03	mg/kg-day	1.00E-02	mg/kg-day	1.48E-01
				Trichloroethene	7.20E-03	mg/l	7.1E-06	mg/kg-day	1.30E-02	1/mg/kg-day	9.26E-08	1.19E-05	mg/kg-day	-	mg/kg-day	-
			Exp. Route Total								4.8E-04					1.5E-01
			Inhalation	Tetrachloroethene	3.10E-01	mg/l	6.4E+01	ug/m3	5.90E-06	1/ug/m3	3.76E-04	1.49E-01	mg/m3	2.70E-01	mg/m3	5.52E-01
				Trichloroethene	7.20E-03	mg/l	1.5E+00	ug/m3	2.00E-06	1/ug/m3	2.96E-06	3.45E-03	mg/m3	1.00E-02	mg/m3	3.45E-01
			Exp. Route Total								3.8E-04					9.0E-01
		Exposure Point Total									3.3E-03					1.9E+00
	Exposure Medium Total										3.3E-03					1.9E+00
Medium Total											3.3E-03					1.9E+00
											Total of Receptor Risks Across All Media	3.3E-03		Total of Receptor Hazards Ass All Media		1.9

FIGURES



N
W E
S

Meters

0 355 710 1,420

Legend

Operable Unit (OU)

new haven city boundary

Source: OU1/OU3 RI Report (USEPA, 2003)

Figure 2.2

Site Map

Riverfront Superfund Site OU2/6
New Haven, Missouri

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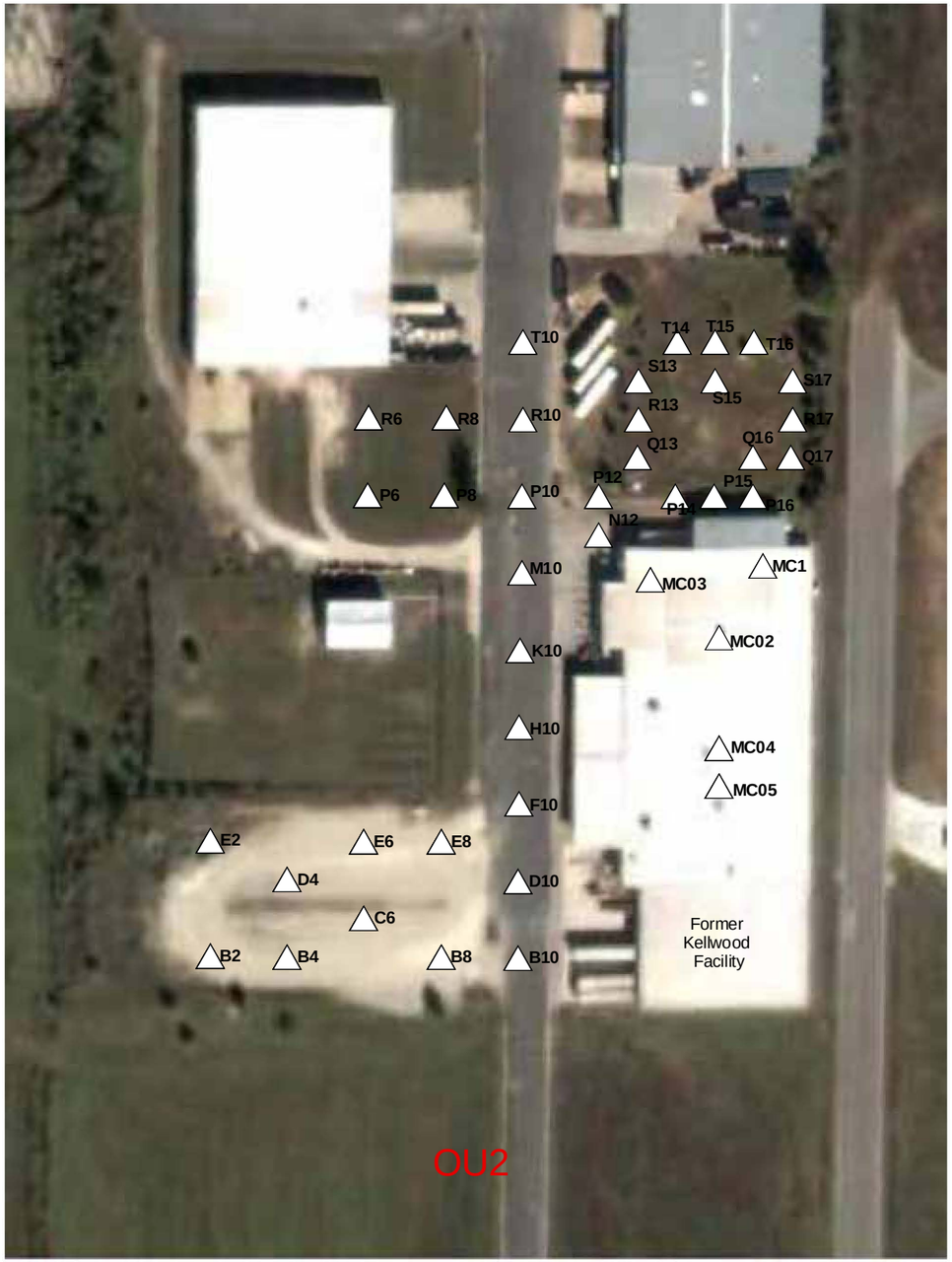
9/25/09

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202



Soil Investigation

DNAPL Investigation

N
W E
S

0 45 90 180 270 360
Feet

DNAPL Testing Location

Soil Investigation

Figure 3.1a

Site Plan With Remedial Investigation Sampling Locations

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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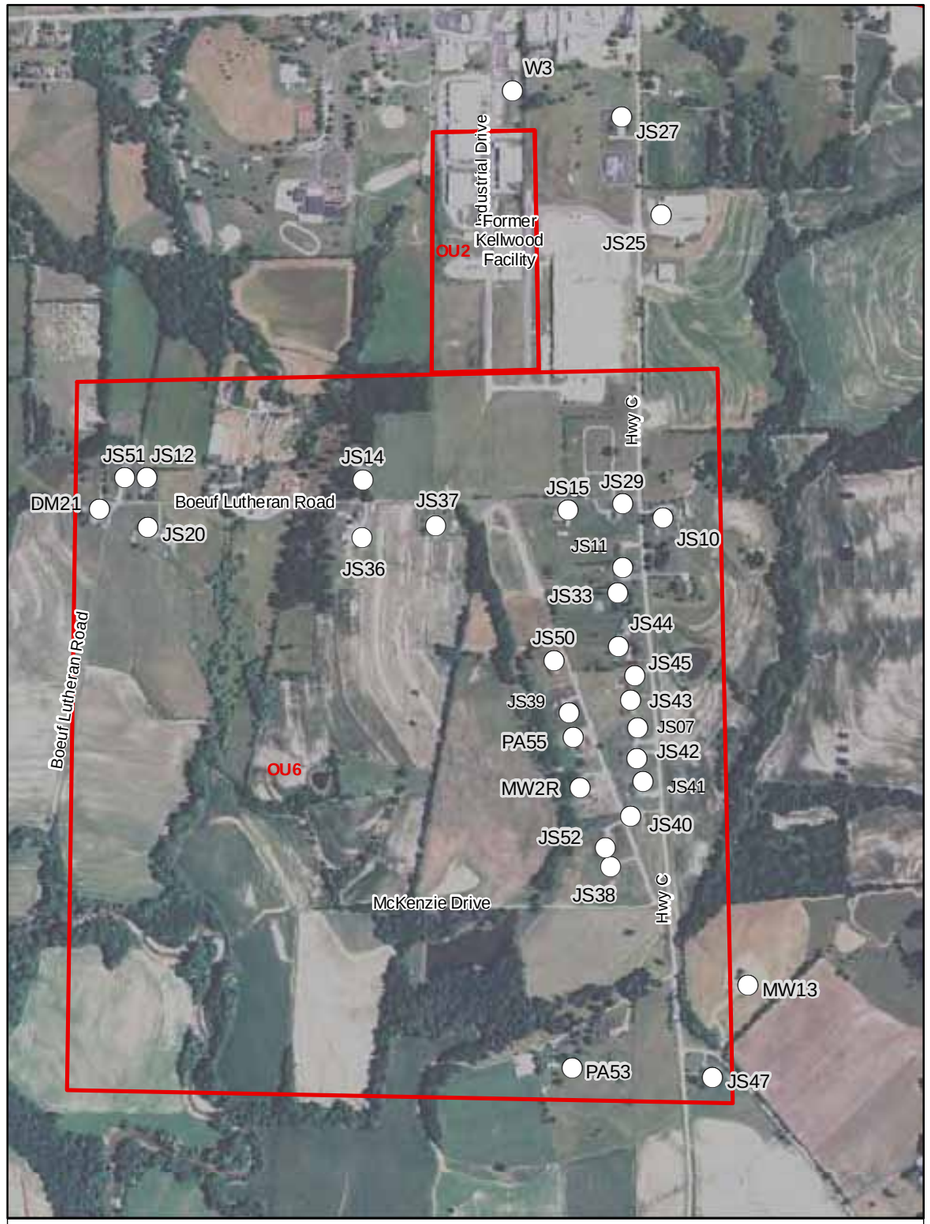
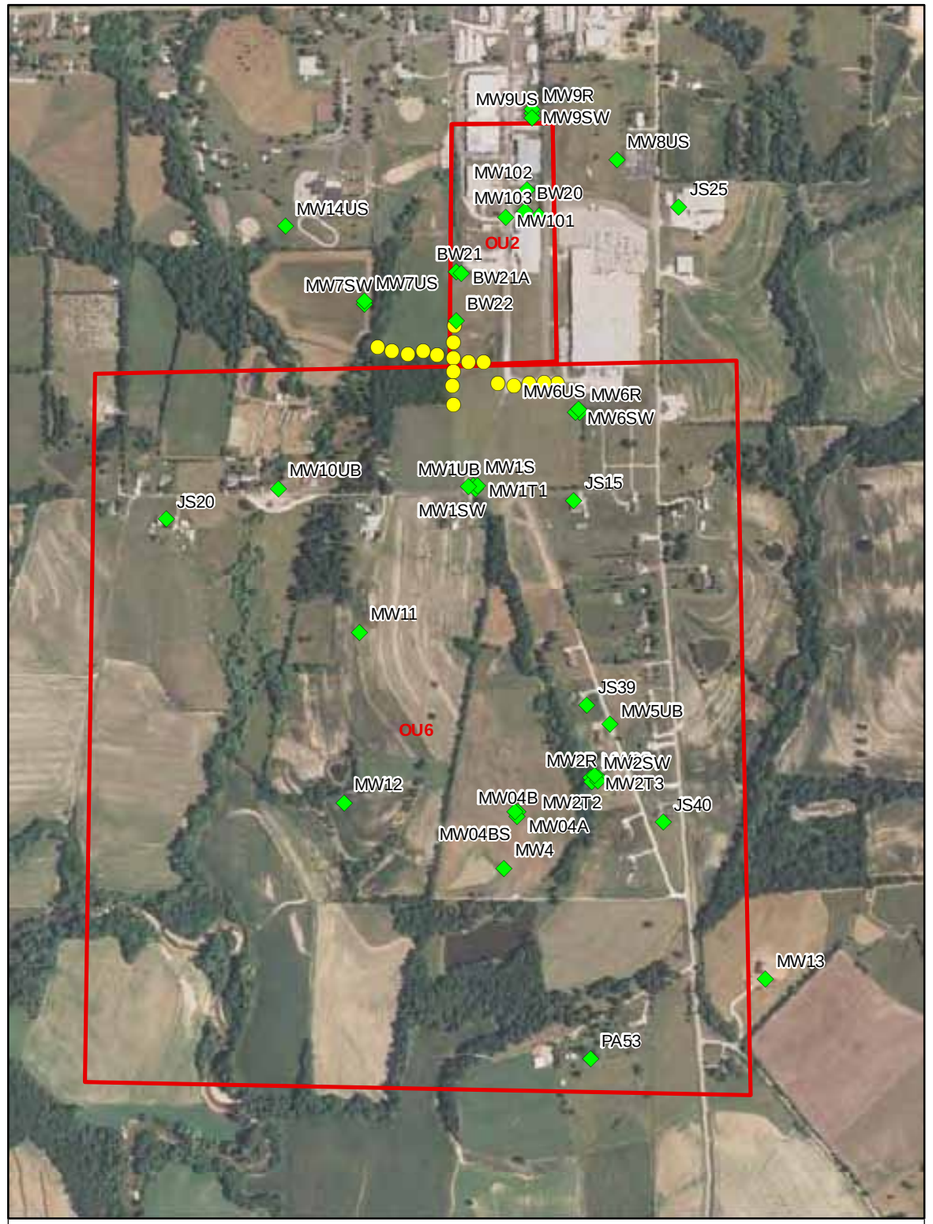


Residential Well Sampling



Groundwater Investigation (Task 2b, 2d, 2e)

0 465 930 1,860 2,790 3,720 Feet

N W E S

- Task 2b: Direct-push Sampling North of Boeuf Lutheran Road; See Figure 3.3 for details on sample IDs
- Task 2c: Residential Well Sampling
- Task 2d/2e: Monitoring Well Installation and Site-wide Groundwater Sampling

Figure 3.1b

Site Plan With Remedial Investigation Sampling Locations

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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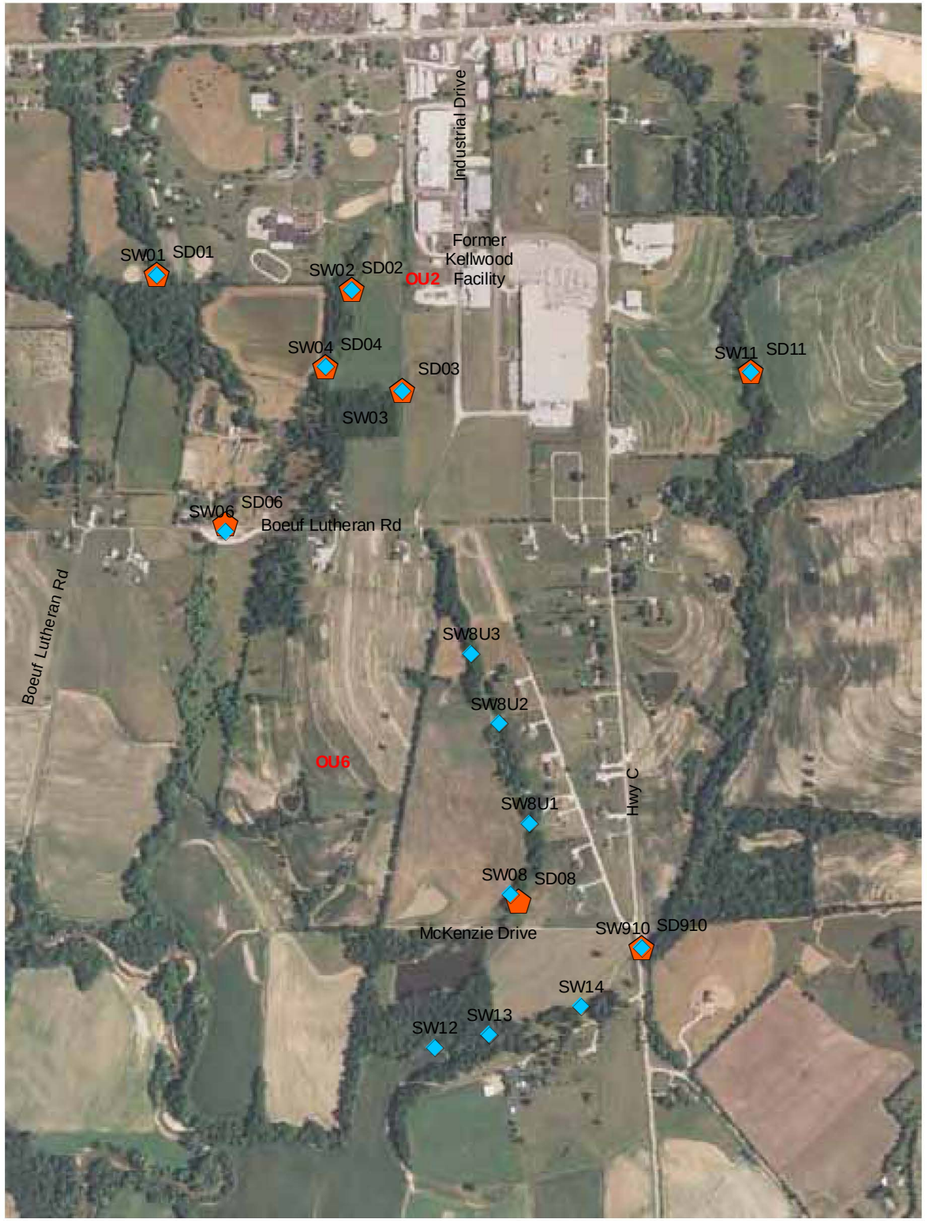

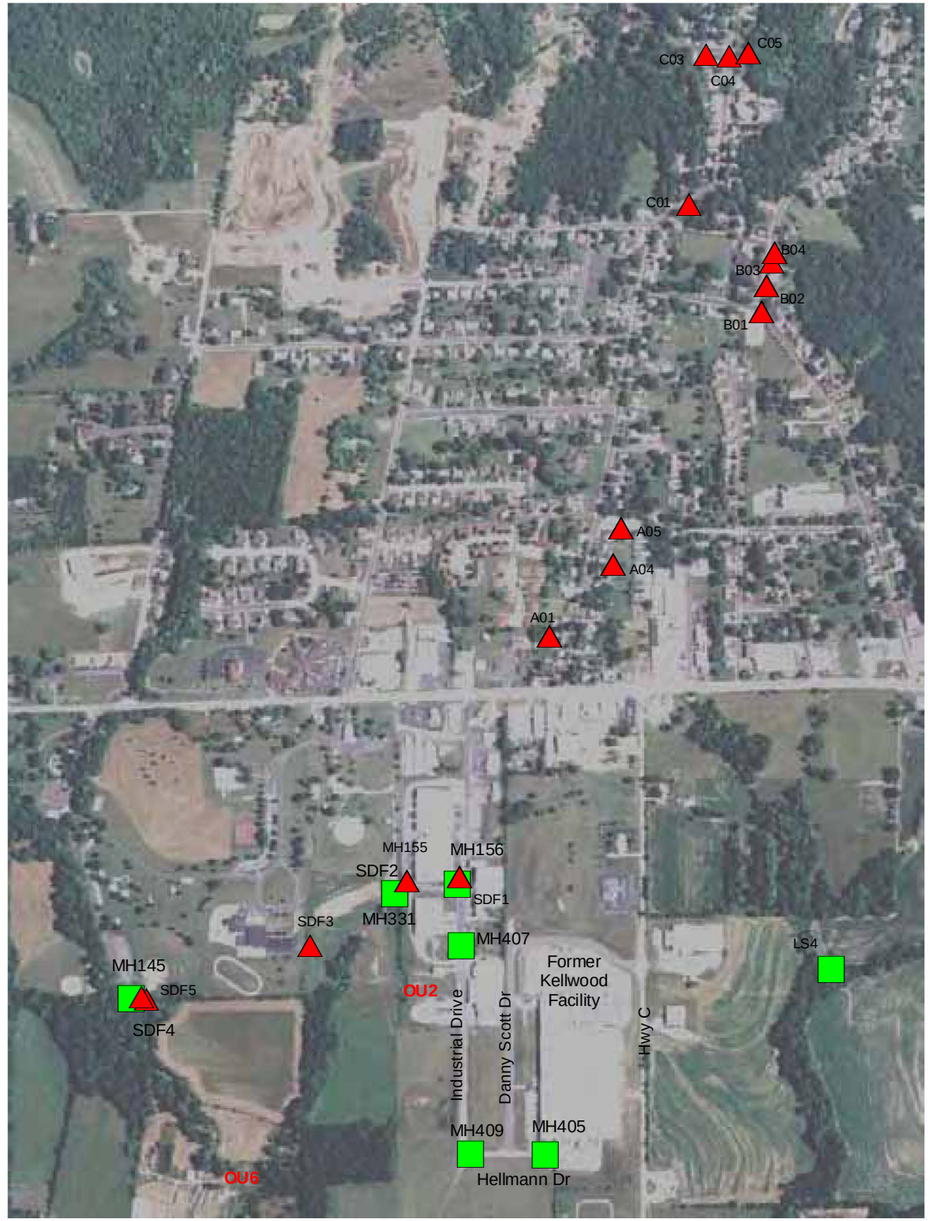

Feet

0 365 730 1,460 2,190 2,920

- Task 4: Surface Water
- Task 4: Sediment

N

W E

S

Feet

0 330 660 1,320 1,980 2,640

- Task 5: Sewer Sediment
- Task 5: Soil Adjacent to Sewer
- Task 5: Sewer Water

Figure 3.1c

Site Plan With
Remedial Investigation
Sampling Locations

Riverfront Superfund Site OU2/6
New Haven, Missouri

PARSONS
40 LA RIVIERE DRIVE, SUITE 350, BUFFALO, NY 14202

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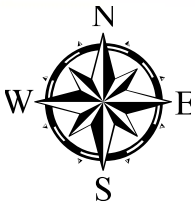
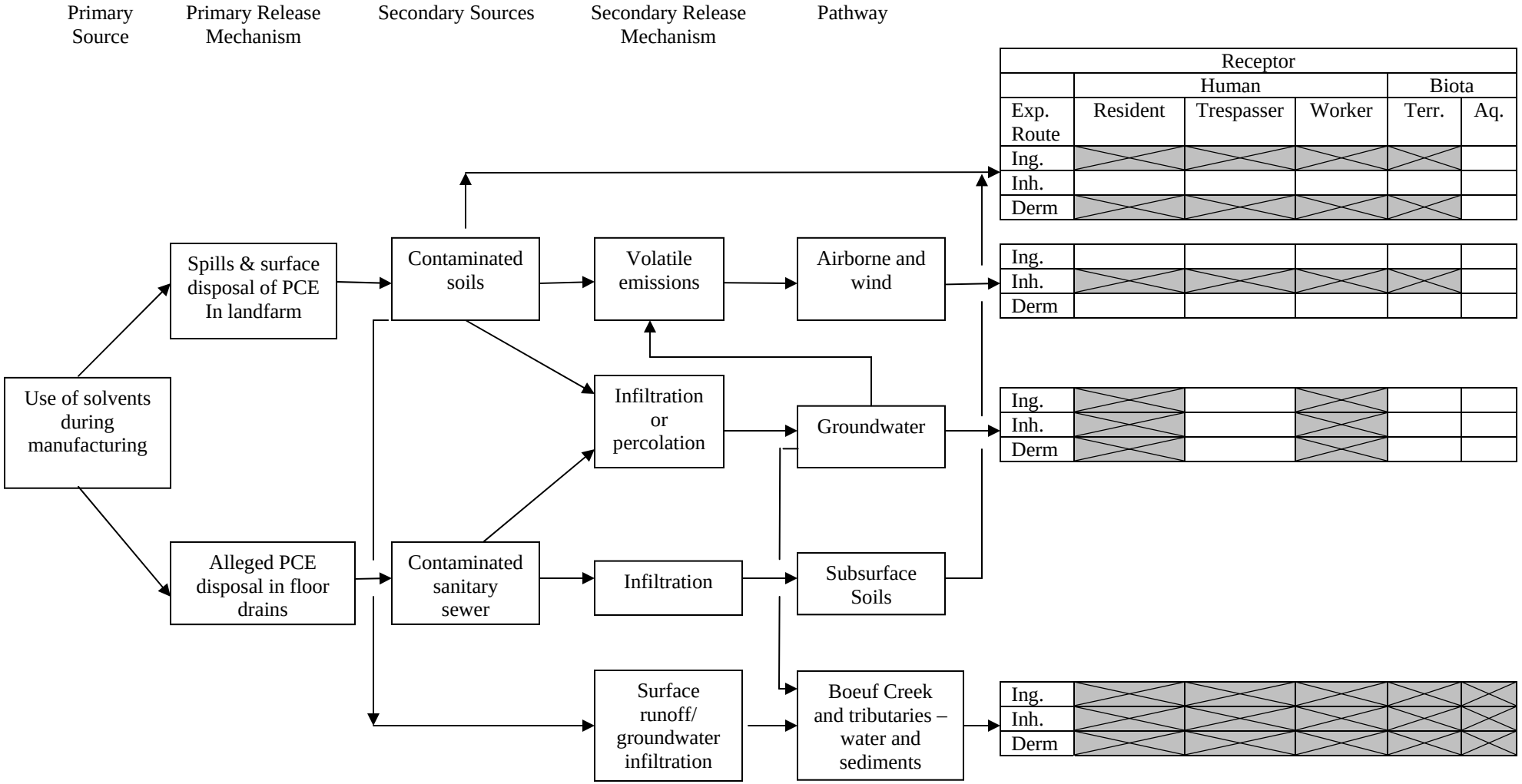

N
W
E
S

FIGURE 4
CONCEPTUAL EXPOSURE PATHWAY ANALYSIS, HUMAN AND ENVIRONMENTAL EXPOSURE
OPERABLE UNIT 2, RIVERFRONT SUPERFUND SITE
NEW HAVEN, MISSOURI



Derm. – Dermal Contact
Ing. – Ingestion
Inh. – Inhalation

Terr. – Terrestrial
Aq. – Aquatic
Potential Exposure Pathway

May 26, 2005

APPENDIX A

SUMMARY OF ANALYTICAL DATA

APPENDIX A
TABLE 1
Data Summary
Kellwood Facility
New Haven, Missouri

Project	Date	Environmental Data	Medium	Included/Excl	Reasons for Exclusion
MDNR Soil Investigation	1989	Yes	Soil	Excluded	Validation reports for the data are unavailable and more recent data were collected from the area.
MDNR Groundwater Sampling	1989 - 1993	Yes	Groundwater	Excluded	More recent data are available for W3 and PCE and TCE were not detected in either W3 or the Pepsi well.
Geotechnology Soil Sampling, Land-farming and Removal	1991-1998	Yes	Soil	Excluded	Composite samples collected over 1 - 9 feet and soils were either removed or land-farmed and more recent data were collected from the area.
Geotechnology Groundwater Sampling	1993-2003	Yes	Groundwater	Excluded	More recent data are available for the 3 wells sampled (MW-101, MW-102 and MW-103) duirng this timeframe.
EMA Phase I/II Groundwater Investigation	1999	Yes	Groundwater; Wastewater	Excluded	More recent data are available for the 6 wells sampled (MW-1, MW-2, MW-2A, MW-3, MW-4 and MW-5). No detections in the wastewater samples.
EMA Phase I/II Soil Investigation	1999	Yes	Soil	Excluded	More recent data are available (N-12) for the 1 soil sample (MW-2) collected during this investigation.
USGS and Black & Veatch Soil Investigation	2001	Yes	Soil	Excluded	More recent data have been collected in the area and the data collected in 2001 had issues with head space in the sample bottles and the data were not validated.
USGS and Black & Veatch Groundwater Investigations	1999 - 2009	Yes	Groundwater and Drinking Water	Included	Groundwater/drinking water wells sampled by USGS/contractor in 2008 and 2009 were included in the risk assessment.
USGS and Black & Veatch Surface Water and Sediment Investigations	2000 - 2002	Yes	Surface Water and Sediment	Included	N/A

APPENDIX A
TABLE 1
Data Summary
Kellwood Facility
New Haven, Missouri

Project	Date	Environmental Data	Medium	Included/Excl	Reasons for Exclusion
USGS and Black & Veatch Sewer Investigation	2001 - 2002	No	Not applicable	Excluded	Samples were collected from lift stations and manholes and are not representative of environmental samples.
USGS and Black & Veatch Biota Sampling	2001 - 2002	Yes	Tree Cores	Excluded	Biota samples were considered in the ecological risk assessment; however, it was previously concluded that none of the detected compounds were found to present a significant risk.
Residential Well Sampling	2003 - Present	Yes	Drinking Water	Included	Included data from 2008 to 3rd quarter 2009 to represent current conditions
Parsons RI Investigation - Soil (Task 1)	2007 - 2009	Yes	Soil	Included	N/A
Parsons RI Investigation - Groundwater (Task 2)	2007 - 2009	Yes	Groundwater	Included	Data were included except for the direct push data, which were conducted to determine presence/absence of PCE in overburden.
Parsons RI Investigation - DNAPL Investigation (Task 3)	2007 - 2009	No	Groundwater	Excluded	Data were excluded since they were collected to determine the presence/absence of DNAPL.
Parsons RI Investigation - Sewer Investigation (Task 4)	2007 - 2009	Yes	Soil	Included	Because the sewer water and sediment in the manholes were removed shortly after the samples were collected, only the soil data adjacent to the sewer lines were evaluated in the risk assessment
Parsons RI Investigation - Surface Water and Sediment Investigation (Task 5)	2007 - 2009	Yes	Surface Water and Sediment	Included	N/A
Parsons RI Investigation - Soil Gas	Jul-05	Yes	Soil Gas	Included	N/A

N/A - Not applicable

Appendix A
Summary of Soil (0-3') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	B02-SS01 1.0 070912	B04-SS01 1.0 070912	B04-SS02 1.0 070912 Duplicate	B08-SS01 1.4 070912	C06-SS01 1.7 070912	D04-SS01 2.0 070912	D10-SS01 2.0 07913	E02-SS01 2.0 070912	E06-SS01 1.0 07913	E08-SS01 1.5 07913	F10-SS01 3.0 070913	K10-SS01 2.5 070913	MC01-SS01 0.8 080621	MC02-SS01 0.6 080621	MC02-SS01 2.7 080621	MC03-SS01 0.7 080621	MC04-SS01 1.3 080621
VOCs:																		
1,1,1-Trichloroethane	ug/kg	0.67 U	0.72 U	0.73 U	0.66 U	0.77 U	0.76 U	0.82 U	0.65 U	0.81 U	0.74 U	0.67 U	0.87 U	0.97 U	0.82 U	1.2 U	1.0 U	0.78 U
1,1,2,2-Tetrachloroethane	ug/kg	0.66 U	0.71 U	0.72 U	0.65 U	0.76 U	0.75 U	0.80 U	0.64 U	0.80 U	0.73 U	0.66 U	0.85 U	1.3 UJ	1.1 U	1.6 U	1.4 U	1.0 U
1,1,2-Trichloroethane	ug/kg	0.76 U	0.82 U	0.83 U	0.75 U	0.87 U	0.86 U	0.93 U	0.74 U	0.92 U	0.85 U	0.77 U	0.99 U	2.0 U	1.7 U	2.4 U	2.0 U	1.6 U
1,1-Dichloroethane	ug/kg	0.55 U	0.59 U	0.60 U	0.54 U	0.63 U	0.62 U	0.67 U	0.54 U	0.66 U	0.61 U	0.55 U	0.71 U	1.1 U	0.89 U	1.3 U	1.1 U	0.84 U
1,1-Dichloroethene	ug/kg	1.2 U	1.3 U	1.3 U	1.2 U	1.4 U	1.4 U	1.5 U	1.2 U	1.5 U	1.3 U	1.2 U	1.6 U	0.96 U	0.81 U	1.2 U	1.0 U	0.77 U
1,2-Dichloroethane	ug/kg	0.51 U	0.55 U	0.55 U	0.50 U	0.59 U	0.58 U	0.62 U	0.50 U	0.62 U	0.57 U	0.51 U	0.66 U	1.2 U	1.0 U	1.5 U	1.2 U	0.96 U
1,2-Dichloroethene, Total	ug/kg	1.2 U	1.3 U	1.3 U	1.2 U	1.4 U	1.4 U	1.5 U	1.2 U	1.5 U	1.3 U	1.2 U	1.6 U	2.1 U	3.5 J	2.5 U	2.1 U	1.7 U
1,2-Dichloropropane	ug/kg	0.51 U	0.55 U	0.55 U	0.50 U	0.59 U	0.58 U	0.62 U	0.50 U	0.62 U	0.57 U	0.51 U	0.66 U	1.0 U	0.87 U	1.2 U	1.1 U	0.82 U
2-Hexanone	ug/kg	1.1 U	1.2 U	1.2 U	1.1 U	1.3 U	1.3 U	1.4 U	1.1 U	1.3 U	1.2 U	1.1 U	1.4 U	1.3 U	1.1 U	1.6 U	1.4 U	1.0 U
Acetone	ug/kg	4.0 U	4.3 U	4.3 U	3.9 U	4.6 U	4.5 U	4.9 U	3.9 U	4.8 U	4.4 U	4.0 U	5.2 U	2.1 U	1.8 U	2.5 U	11 U	1.7 U
Benzene	ug/kg	0.64 U	0.69 U	0.70 U	0.63 U	0.73 U	0.73 U	0.78 U	0.63 U	0.78 U	0.71 U	0.65 U	0.83 U	0.93 U	0.79 U	1.1 U	0.96 U	0.74 U
Bromodichloromethane	ug/kg	0.53 U	0.57 U	0.58 U	0.52 U	0.61 U	0.60 U	0.65 U	0.52 U	0.64 U	0.59 U	0.53 U	0.68 U	0.85 U	0.72 U	1.0 U	0.88 U	0.68 U
Bromoform	ug/kg	0.69 U	0.74 U	0.75 U	0.68 U	0.79 U	0.78 U	0.84 U	0.67 U	0.83 U	0.76 U	0.69 U	0.89 U	1.1 U	0.92 U	1.3 U	1.1 U	0.87 U
Bromomethane	ug/kg	2.9 U	3.1 U	3.1 U	2.8 U	3.3 U	3.3 U	3.5 U	2.8 U	3.5 U	3.2 U	2.9 U	3.7 U	2.4 U	2.0 U	2.9 U	2.5 U	1.9 U
Carbon disulfide	ug/kg	0.93 U	1.0 U	1.0 U	0.92 U	1.1 U	1.1 U	1.1 U	0.91 U	1.1 U	1.0 U	0.93 U	1.2 U	1.0 U	0.87 U	1.2 U	3.0 J	0.82 U
Carbon tetrachloride	ug/kg	0.68 U	0.73 U	0.74 U	0.67 U	0.78 U	0.77 U	0.83 U	0.66 U	0.82 U	0.75 U	0.68 U	0.88 U	1.0 U	0.87 U	1.2 U	1.1 U	0.82 U
Chlorobenzene	ug/kg	0.52 U	0.56 U	0.57 U	0.51 U	0.60 U	0.59 U	0.63 U	0.51 U	0.63 U	0.58 U	0.52 U	0.67 U	0.74 U	0.63 U	0.90 U	0.77 U	0.59 U
Chloroethane	ug/kg	2.9 U	3.1 U	3.1 U	2.8 U	3.3 U	3.3 U	3.5 U	2.8 U	3.5 U	3.2 U	2.9 U	3.7 U	1.3 U	1.1 U	1.6 U	1.4 U	1.0 U
Chloroform	ug/kg	0.63 U	0.68 U	0.69 U	0.62 U	0.72 U	0.72 U	0.77 U	0.62 U	0.76 U	0.70 U	0.64 U	0.82 U	1.1 U	0.91 U	1.3 U	1.1 U	0.85 U
Chloromethane	ug/kg	1.2 U	1.3 U	1.3 U	1.2 U	1.4 U	1.4 U	1.5 U	1.2 U	1.5 U	1.3 U	1.2 U	1.6 U	1.8 U	1.5 U	2.1 U	1.8 U	1.4 U
cis-1,3-Dichloropropene	ug/kg	0.54 U	0.58 U	0.59 U	0.53 U	0.62 U	0.61 U	0.66 U	0.53 U	0.65 U	0.60 U	0.54 U	0.70 U	0.88 U	0.74 U	1.1 U	0.90 U	0.70 U
Dibromochloromethane	ug/kg	0.60 U	0.65 U	0.66 U	0.59 U	0.69 U	0.68 U	0.74 U	0.59 U	0.73 U	0.67 U	0.61 U	0.78 U	0.91 U	0.77 U	1.1 U	0.94 U	0.72 U
Ethylbenzene	ug/kg	0.59 U	0.64 U	0.65 U	0.59 U	0.68 U	0.67 U	0.72 U	0.58 U	0.72 U	0.66 U	0.60 U	0.77 U	0.78 U	0.66 U	0.94 U	0.80 U	0.62 U
Methyl Ethyl Ketone	ug/kg	2.0 U	2.2 U	2.2 U	2.0 U	2.3 U	2.3 U	2.5 U	2.0 U	2.5 U	2.3 U	2.1 U	2.6 U	2.0 U	1.7 U	2.4 U	2.0 U	1.6 U
Methyl Isobutyl Ketone	ug/kg	0.67 U	0.72 U	0.73 U	0.66 U	0.77 U	0.76 U	0.82 U	0.65 U	0.81 U	0.74 U	0.67 U	0.87 U	1.6 U	1.4 U	2.0 U	1.7 U	1.3 U
Methylene Chloride	ug/kg	1.5 U	1.6 U	1.6 U	1.5 U	1.7 U	1.7 U	1.8 U	1.5 U	1.8 U	1.7 U	1.5 U	1.9 U	0.85 U	0.72 U	1.0 U	0.88 U	0.68 U
Styrene	ug/kg	0.58 U	0.62 U	0.63 U	0.57 U	0.66 U	0.65 U	0.70 U	0.56 U	0.70 U	0.64 U	0.58 U	0.75 U	0.82 U	0.69 U	1.0 U	0.85 U	0.65 U
Tetrachloroethene	ug/kg	0.84 U	0.90 U	0.91 U	0.82 U	0.96 U	0.95 U	1.0 U	0.82 U	1.0 U	0.93 U	0.84 U	27	9.3	25	9.4	53	6.7
Toluene	ug/kg	1.6 U	1.7 U	1.7 U	1.6 U	1.8 U	1.8 U	1.9 U	1.5 U	1.9 U	1.8 U	1.6 U	2.0 U	0.96 U	0.81 U	7.9	1.0 U	0.77 U
trans-1,3-Dichloropropene	ug/kg	0.56 U	0.60 U	0.61 U	0.55 U	0.64 U	0.63 U	0.68 U	0.54 U	0.67 U	0.62 U	0.56 U	0.72 U	1.1 U	0.89 U	1.3 U	1.1 U	0.84 U
Trichloroethene	ug/kg	0.61 U	0.66 U	0.67 U	0.60 U	0.70 U	0.70 U	0.75 U	0.60 U	0.74 U	0.68 U	0.62 U	0.79 U	1.1 U	3.3 J	1.3 U	5.2 J	0.84 U
Vinyl chloride	ug/kg	0.72 U	0.78 U	0.79 U	0.71 U	0.83 U	0.82 U	0.88 U	0.71 U	0.88 U	0.80 U	0.73 U	0.94 U	1.5 U	1.3 U	1.9 U	1.6 U	1.2 U
Xylenes, Total	ug/kg	1.7 U	1.8 U	1.8 U	1.6 U	1.9 U	1.9 U	2.0 U	1.6 U	2.0 U	1.9 U	1.7 U	2.2 U	1.6 U	1.4 U	2.0 U	1.7 U	1.3 U
SVOCs																		
1,2,4-Trichlorobenzene	ug/kg																	19 U
1,2-Dichlorobenzene	ug/kg																	19 U
1,3-Dichlorobenzene	ug/kg																	20 U
1,4-Dichlorobenzene	ug/kg																	21 U
2,2'-oxybis[1-chloropropane]	ug/kg																	20 U
2,4,5-Trichlorophenol	ug/kg																	53 U
2,4,6-Trichlorophenol	ug/kg																	38 U
2,4-Dichlorophenol	ug/kg																	40 U
2,4-Dimethylphenol	ug/kg																	69 U
2,4-Dinitrophenol	ug/kg																	210 U
2,4-Dinitrotoluene	ug/kg																	20 U
2,6-Dinitrotoluene	ug/kg																	20 U
2-Chloronaphthalene	ug/kg																	17 U
2-Chlorophenol	ug/kg																	33 U
2-Methylnaphthalene	ug/kg																	21 U

Appendix A
Summary of Soil (0-3') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	MC05-SS01 1.3 080621	M10-SS01 3.0 070914	N12-SS01 1.0 070911	N12-SS01 2.0 070911	P06-SS01 0.5 070911	P08-SS01 0.5 070911	P10-SS01 2.5 070914	P12-SS01 0.5 070911	P12-SS01 2.0 070911	P14-SS01 0.0 070911	P14-SS01 3.0 070911	P15-SS01 0.5 070911	P15-SS02 0.5 070911 Duplicate	P15-SS01 2.5 070911	P16-SS01 0.5 070911	P16-SS01 2.5 070911	P16-SS02 2.5 070911 Duplicate
VOCs:																		
1,1,1-Trichloroethane	ug/kg		0.77 U	0.70 U	0.81 U	0.65 U	0.83 U	0.94 U	0.79 U	0.80 U	7.2 U	0.67 U	0.65 U	0.69 UJ	7.7 U	8.2 U	7.7 U	8.5 U
1,1,2,2-Tetrachloroethane	ug/kg	1.1 U	0.76 U	0.69 U	0.80 U	0.64 U	0.81 U	0.93 U	0.78 UJ	0.79 U	12 U	0.66 U	0.64 U	0.68 U	13 U	14 U	13 U	14 U
1,1,2-Trichloroethane	ug/kg	1.6 U	0.88 U	0.80 U	0.92 U	0.74 U	0.94 U	1.1 U	0.90 U	0.91 U	15 U	0.77 U	0.74 U	0.79 UJ	16 U	17 U	16 U	18 U
1,1-Dichloroethane	ug/kg	0.84 U	0.63 U	0.57 U	0.66 U	0.54 U	0.68 U	0.77 U	0.65 U	0.66 U	9.0 U	0.55 U	0.54 U	0.57 UJ	9.6 U	10 U	9.6 U	11 U
1,1-Dichloroethene	ug/kg	0.77 U	1.4 U	1.3 U	1.5 U	1.2 U	1.5 U	1.7 U	1.4 U	1.5 U	12 U	1.2 U	1.2 U	1.2 UJ	13 U	14 U	13 U	14 U
1,2-Dichloroethane	ug/kg		0.59 U	0.53 U	0.62 U	0.50 U	0.63 U	0.72 U	0.61 U	0.61 U	11 U	0.52 U	0.50 U	0.53 UJ	12 U	13 U	12 U	13 U
1,2-Dichloroethene, Total	ug/kg	1.7 U	6.9	1.3 U	5.9	1.2 U	1.5 U	1.7 U	1.4 U	1.5 U	17 U	1.2 U	1.2 U	1.2 UJ	18 U	79 J	18 U	87 J
1,2-Dichloropropane	ug/kg	0.82 U	0.59 U	0.53 U	0.62 U	0.50 U	0.63 U	0.72 U	0.61 U	0.61 U	12 U	0.52 U	0.50 U	0.53 UJ	12 U	13 U	13 U	14 U
2-Hexanone	ug/kg	1.1 U	1.3 U	1.2 U	1.3 U	1.1 U	1.4 U	1.6 U	1.3 U	1.3 U	55 U	1.1 U	1.1 U	1.2 U	59 U	63 U	59 U	65 U
Acetone	ug/kg	1.7 U	4.6 U	4.2 U	4.8 U	3.9 U	4.9 U	5.6 U	4.7 U	4.8 U	55 U	4.0 U	3.9 U	4.1 UJ	59 U	63 U	59 U	65 U
Benzene	ug/kg		0.74 U	0.67 U	0.77 U	0.63 U	0.79 U	0.90 U	0.76 U	0.77 U	4.0 U	0.65 U	0.63 U	0.66 UJ	4.2 U	4.5 U	4.2 U	4.7 U
Bromodichloromethane	ug/kg	0.68 U	0.61 U	0.55 U	0.64 U	0.52 U	0.65 U	0.75 U	0.63 U	0.64 U	7.6 U	0.53 U	0.52 U	0.55 UJ	8.2 U	8.7 U	8.2 U	9.0 U
Bromoform	ug/kg	0.88 U	0.79 U	0.72 U	0.83 U	0.67 U	0.85 U	0.97 U	0.82 U	0.83 U	16 U	0.69 U	0.67 U	0.71 U	17 U	18 U	17 U	19 U
Bromomethane	ug/kg	1.9 U	3.3 U	3.0 U	3.5 U	2.8 U	3.6 U	4.1 U	3.4 U	3.5 U	44 U	2.9 U	2.8 U	3.0 UJ	47 U	49 U	47 U	52 U
Carbon disulfide	ug/kg	0.82 U	1.1 U	0.97 U	1.1 U	0.91 U	1.1 U	1.3 U	1.1 U	1.1 U	8.1 U	0.94 U	0.91 U	0.96 UJ	8.6 U	9.2 U	8.7 U	9.6 U
Carbon tetrachloride	ug/kg		0.78 U	0.71 U	0.82 U	0.66 U	0.84 U	0.95 U	0.80 U	0.81 U	27 U	0.68 U	0.66 U	0.70 UJ	28 U	30 U	28 U	31 U
Chlorobenzene	ug/kg	0.60 U	0.60 U	0.54 U	0.63 U	0.51 U	0.64 U	0.73 U	0.62 U	0.62 U	11 U	0.52 U	0.51 U	0.54 U	12 U	12 U	12 U	13 U
Chloroethane	ug/kg	1.1 U	3.3 U	3.0 U	3.5 U	2.8 U	3.6 U	4.1 U	3.4 U	3.5 U	17 U	2.9 U	2.8 U	3.0 UJ	18 U	19 U	18 U	20 U
Chloroform	ug/kg	0.86 U	0.73 U	0.66 U	0.76 U	0.62 U	0.78 U	0.89 U	0.75 U	0.76 U	9.0 U	0.64 U	0.62 U	0.65 UJ	9.6 U	10 U	9.6 U	11 U
Chloromethane	ug/kg	1.4 U	1.4 U	1.3 U	1.5 U	1.2 U	1.5 U	1.7 U	1.4 U	1.5 U	18 U	1.2 U	1.2 U	1.2 UJ	20 U	21 U	20 U	22 U
cis-1,3-Dichloropropene	ug/kg	0.70 U	0.62 U	0.56 U	0.65 U	0.53 U	0.67 U	0.76 U	0.64 U	0.65 U	8.5 U	0.54 U	0.53 U	0.56 UJ	9.1 U	9.7 U	9.2 U	10 U
Dibromochloromethane	ug/kg	0.73 U	0.69 U	0.63 U	0.73 U	0.59 U	0.75 U	0.85 U	0.72 U	0.73 U	12 U	0.61 U	0.59 U	0.62 U	12 U	13 U	13 U	14 U
Ethylbenzene	ug/kg	0.62 U	0.68 U	0.62 U	0.72 U	0.58 U	0.73 U	0.84 U	0.71 U	0.71 U	7.6 U	0.60 U	0.58 U	0.62 U	8.2 U	8.7 U	8.2 U	9.0 U
Methyl Ethyl Ketone	ug/kg	1.6 U	2.3 U	2.1 U	2.5 U	2.0 U	2.5 U	2.9 U	2.4 U	2.5 U	50 U	2.1 U	2.0 U	2.1 UJ	53 U	57 U	54 U	59 U
Methyl Isobutyl Ketone	ug/kg	1.3 U	0.77 U	0.70 U	0.81 U	0.65 U	0.83 U	0.94 U	0.79 U	0.80 U	57 U	0.67 U	0.65 U	0.69 UJ	61 U	65 U	61 U	68 U
Methylene Chloride	ug/kg	0.68 U	1.7 U	1.6 U	1.8 U	1.5 U	1.8 U	2.1 U	1.8 U	1.8 U	27 U	1.5 U	1.5 U	1.5 UJ	28 U	30 U	28 U	31 U
Styrene	ug/kg	0.66 U	0.66 U	0.60 U	0.69 U	0.56 U	0.71 U	0.81 U	0.68 U	0.69 U	14 U	0.58 U	0.56 U	0.60 U	15 U	16 U	15 U	17 U
Tetrachloroethene	ug/kg	3.9 J	150	5.1	260	0.82 U	1.0 U	53	140	6.5	920	0.84 U	48	63	2200	15000	1700	23000
Toluene	ug/kg	0.77 U	1.8 U	1.6 U	1.9 U	1.5 U	2.0 U	2.2 U	1.9 U	1.9 U	5.4 U	1.6 U	1.5 U	1.6 UJ	5.8 U	6.1 U	5.8 U	6.4 U
trans-1,3-Dichloropropene	ug/kg	0.84 U	0.64 U	0.58 U	0.67 U	0.54 U	0.69 U	0.78 U	0.66 U	0.67 U	17 U	0.56 U	0.54 U	0.58 UJ	18 U	19 U	18 U	20 U
Trichloroethene	ug/kg	0.84 U	22	0.64 U	17	0.60 U	0.76 U	21	0.73 U	0.74 U	9.9 U	0.62 U	0.60 U	0.63 UJ	11 U	100	11 U	140
Vinyl chloride	ug/kg	1.2 U	0.83 U	0.76 U	0.87 U	0.71 U	0.90 U	1.0 U	0.86 U	0.87 U	11 U	0.73 U	0.71 U	0.75 UJ	12 U	13 U	12 U	13 U
Xylenes, Total	ug/kg	1.3 U	1.9 U	1.7 U	2.0 U	1.6 U	2.1 U	2.4 U	2.0 U	2.0 U	19 U	1.7 U	1.6 U	1.7 U	21 U	22 U	21 U	23 U
SVOCs																		
1,2,4-Trichlorobenzene	ug/kg										41 U	41 U					41 U	42 U
1,2-Dichlorobenzene	ug/kg										38 U	37 U					38 U	39 U
1,3-Dichlorobenzene	ug/kg										35 U	35 U					35 U	36 U
1,4-Dichlorobenzene	ug/kg										42 U	41 U					41 U	42 U
2,2'-oxybis[1-chloropropane]	ug/kg										44 U	43 U					43 U	44 U
2,4,5-Trichlorophenol	ug/kg										110 U	110 U					110 U	110 U
2,4,6-Trichlorophenol	ug/kg										77 U	76 U					77 U	78 U
2,4-Dichlorophenol	ug/kg										80 U	79 U					79 U	81 U
2,4-Dimethylphenol	ug/kg										80 U	79 U					79 U	81 U
2,4-Dinitrophenol	ug/kg										520 U	510 U					520 U	530 U
2,4-Dinitrotoluene	ug/kg										59 U	59 U					59 U	60 U
2,6-Dinitrotoluene	ug/kg										51 U	50 U					50 U	52 U
2-Chloronaphthalene	ug/kg										40 U	39 UJ					39 U	40 U
2-Chlorophenol	ug/kg										47 U	46 U					47 U	48 U
2-Methylnaphthalene	ug/kg										44 U	44 U					44 U	45 U

Appendix A
Summary of Soil (0-3') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	Q13-SS01 0.5 070910	Q13-SS01 2.0 070910	Q16-SS01 0.5 070910	Q16-SS01 1.0 070910	Q17-SS01 0.5 070910	Q17-SS02 0.5 070910 Duplicate	Q17-SS01 2.9 070910	R06-SS01 0.5 070911	R08-SS01 0.5 070911	R10-SS01 2.0 070914	R13-SS01 0.5 070910	R13-SS01 1.5 070910	R17-SS01 0.5 070910	S13-SS01 0.5 070910	S13-SS01 1.0 070910	S15-SS01 0.5 070910	S15-SS01 2.5 070910
VOCs:																		
1,1,1-Trichloroethane	ug/kg	8.7 U	0.65 U	0.74 U	7.9 U	0.95 U	0.76 U	0.69 U	0.83 U	0.93 U	0.71 U	0.85 U	0.71 U	0.67 U	0.88 U	0.72 U	8.4 UJ	8.1 U
1,1,2,2-Tetrachloroethane	ug/kg	15 U	0.64 U	0.72 U	13 U	0.94 U	0.74 U	0.68 U	0.82 U	0.92 U	0.70 U	0.84 U	0.70 U	0.66 U	0.87 U	0.71 U	14 UJ	14 U
1,1,2-Trichloroethane	ug/kg	18 U	0.74 U	0.84 U	16 U	1.1 U	0.86 U	0.79 U	0.95 U	1.1 U	0.80 U	0.97 U	0.81 U	0.77 U	1.0 U	0.82 U	17 U	17 U
1,1-Dichloroethane	ug/kg	11 U	0.53 U	0.60 U	9.9 U	0.78 U	0.62 U	0.57 U	0.68 U	0.77 U	0.58 U	0.70 U	0.58 U	0.55 U	0.72 U	0.59 U	10 UJ	10 U
1,1-Dichloroethene	ug/kg	15 U	1.2 U	1.3 U	13 U	1.7 U	1.4 U	1.2 U	1.5 U	1.7 U	1.3 U	1.5 U	1.3 U	1.2 U	1.6 U	1.3 U	14 UJ	14 U
1,2-Dichloroethane	ug/kg	14 U	0.49 U	0.56 U	12 U	0.73 U	0.58 U	0.53 U	0.63 U	0.71 U	0.54 U	0.65 U	0.54 U	0.51 U	0.67 U	0.55 U	13 U	13 U
1,2-Dichloroethene, Total	ug/kg	21 U	1.2 U	1.3 U	19 U	1.7 U	1.4 U	1.2 U	1.5 U	1.7 U	1.3 U	1.5 U	1.3 U	1.2 U	1.6 U	1.3 U	20 U	19 U
1,2-Dichloropropane	ug/kg	14 U	0.49 U	0.56 U	13 U	0.73 U	0.58 U	0.53 U	0.63 U	0.71 U	0.54 U	0.65 U	0.54 U	0.51 U	0.67 U	0.55 U	14 U	13 U
2-Hexanone	ug/kg	67 U	1.1 U	1.2 U	61 U	1.6 U	1.3 U	1.2 U	1.4 U	1.6 U	1.2 U	1.4 U	1.2 U	1.1 U	1.5 U	1.2 U	64 UJ	62 U
Acetone	ug/kg	67 U	3.9 U	4.4 U	61 U	160 J	200 J	4.1 U	5.0 U	5.6 U	4.2 U	5.1 U	4.2 U	4.0 U	5.2 U	4.3 U	64 UJ	62 U
Benzene	ug/kg	4.8 U	0.62 U	0.70 U	4.3 U	0.91 U	0.72 U	0.66 U	0.80 U	0.90 U	0.68 U	0.82 U	0.68 U	0.65 U	0.84 U	0.69 U	4.6 U	4.5 U
Bromodichloromethane	ug/kg	9.2 U	0.51 U	0.58 U	8.4 U	0.75 U	0.60 U	0.55 U	0.66 U	0.74 U	0.56 U	0.68 U	0.56 U	0.53 U	0.70 U	0.57 U	8.9 U	8.6 U
Bromoform	ug/kg	19 U	0.66 U	0.76 U	17 U	0.98 U	0.78 U	0.71 U	0.85 U	0.96 U	0.73 U	0.88 U	0.73 U	0.69 U	0.90 U	0.74 U	18 UJ	18 U
Bromomethane	ug/kg	53 U	2.8 U	3.2 U	48 U	4.1 U	3.3 U	3.0 U	3.6 U	4.0 U	3.0 U	3.7 U	3.0 U	2.9 U	3.8 U	3.1 U	51 UJ	49 U
Carbon disulfide	ug/kg	9.8 U	0.90 U	1.0 U	8.9 U	1.3 U	1.0 U	0.96 U	1.2 U	1.3 U	0.98 U	1.2 U	0.98 U	0.94 U	1.2 U	1.0 U	9.4 UJ	9.1 U
Carbon tetrachloride	ug/kg	32 U	0.66 U	0.75 U	29 U	0.97 U	0.77 U	0.70 U	0.84 U	0.95 U	0.72 U	0.86 U	0.72 U	0.68 U	0.89 U	0.73 U	31 U	30 U
Chlorobenzene	ug/kg	13 U	0.50 U	0.57 U	12 U	0.74 U	0.59 U	0.54 U	0.65 U	0.73 U	0.55 U	0.66 U	0.55 U	0.52 U	0.68 U	0.56 U	13 UJ	12 U
Chloroethane	ug/kg	21 U	2.8 U	3.2 U	19 U	4.1 U	3.3 U	3.0 U	3.6 U	4.0 U	3.0 U	3.7 U	3.0 U	2.9 U	3.8 U	3.1 U	20 UJ	19 U
Chloroform	ug/kg	11 U	0.61 U	0.69 U	9.9 U	0.90 U	0.71 U	0.65 U	0.78 U	0.88 U	0.67 U	0.81 U	0.67 U	0.64 U	0.83 U	0.68 U	10 UJ	10 U
Chloromethane	ug/kg	22 U	1.2 U	1.3 U	20 U	1.7 U	1.4 U	1.2 U	1.5 U	1.7 U	1.3 U	1.5 U	1.3 U	1.2 U	1.6 U	1.3 U	21 UJ	21 U
cis-1,3-Dichloropropene	ug/kg	10 U	0.52 U	0.59 U	9.4 U	0.77 U	0.61 U	0.56 U	0.67 U	0.75 U	0.57 U	0.69 U	0.57 U	0.54 U	0.71 U	0.58 U	9.9 U	9.6 U
Dibromochloromethane	ug/kg	14 U	0.58 U	0.66 U	13 U	0.86 U	0.68 U	0.62 U	0.75 U	0.84 U	0.64 U	0.77 U	0.64 U	0.61 U	0.79 U	0.65 U	14 UJ	13 U
Ethylbenzene	ug/kg	9.2 U	0.57 U	0.65 U	8.4 U	0.85 U	0.67 U	0.61 U	0.74 U	0.83 U	0.63 U	0.76 U	0.63 U	0.60 U	0.78 U	0.64 U	8.9 UJ	8.6 U
Methyl Ethyl Ketone	ug/kg	60 U	2.0 U	2.2 U	55 U	7.0	9.9	2.1 U	2.5 U	2.9 U	2.2 U	2.6 U	2.2 U	2.1 U	2.7 U	2.2 U	58 UJ	56 U
Methyl Isobutyl Ketone	ug/kg	69 U	0.65 U	0.74 U	63 U	0.95 U	0.76 U	0.69 U	0.83 U	0.93 U	0.71 U	0.85 U	0.71 U	0.67 U	0.88 U	0.72 U	66 U	64 U
Methylene Chloride	ug/kg	32 U	1.4 U	1.6 U	29 U	2.1 U	1.7 U	1.5 U	1.8 U	2.1 U	1.6 U	1.9 U	1.6 U	1.5 U	2.0 U	1.6 U	31 UJ	30 U
Styrene	ug/kg	17 U	0.56 U	0.63 U	16 U	0.82 U	0.65 U	0.59 U	0.71 U	0.80 U	0.61 U	0.73 U	0.61 U	0.58 U	0.76 U	0.62 U	17 UJ	16 U
Tetrachloroethene	ug/kg	2100	87	49	490	1.2 U	0.94 U	0.86 U	1.0 U	1.2 U	100	6.4	24	0.84 U	47	13	470 J	21000
Toluene	ug/kg	6.5 U	1.5 U	1.7 U	5.9 U	2.3 U	1.8 U	1.6 U	2.0 U	2.2 U	1.7 U	2.0 U	1.7 U	1.6 U	2.1 U	1.7 U	6.3 U	6.1 U
trans-1,3-Dichloropropene	ug/kg	20 U	0.54 U	0.61 U	18 U	0.79 U	0.63 U	0.58 U	0.69 U	0.78 U	0.59 U	0.71 U	0.59 U	0.56 U	0.73 U	0.60 U	19 U	19 U
Trichloroethene	ug/kg	12 U	0.59 U	0.67 U	11 U	0.87 U	0.69 U	0.63 U	0.76 U	0.86 U	6.4	0.78 U	0.65 U	0.62 U	0.81 U	0.66 U	11 U	11 U
Vinyl chloride	ug/kg	14 U	0.70 U	0.80 U	12 U	1.0 U	0.82 U	0.75 U	0.90 U	1.0 U	0.76 U	0.92 U	0.77 U	0.73 U	0.95 U	0.78 U	13 UJ	13 U
Xylenes, Total	ug/kg	23 U	1.6 U	1.8 U	21 U	2.4 U	1.9 U	1.7 U	2.1 U	2.3 U	1.8 U	2.1 U	1.8 U	1.7 U	2.2 U	1.8 U	22 UJ	22 U
SVOCs																		
1,2,4-Trichlorobenzene	ug/kg																	
1,2-Dichlorobenzene	ug/kg																	
1,3-Dichlorobenzene	ug/kg																	
1,4-Dichlorobenzene	ug/kg																	
2,2'-oxybis[1-chloropropane]	ug/kg																	
2,4,5-Trichlorophenol	ug/kg																	
2,4,6-Trichlorophenol	ug/kg																	
2,4-Dichlorophenol	ug/kg																	
2,4-Dimethylphenol	ug/kg																	
2,4-Dinitrophenol	ug/kg																	
2,4-Dinitrotoluene	ug/kg																	
2,6-Dinitrotoluene	ug/kg																	
2-Chloronaphthalene	ug/kg																	
2-Chlorophenol	ug/kg																	
2-Methylnaphthalene	ug/kg																	

Appendix A
Summary of Soil (0-3') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	S17-SS01 0.5 070910	S17-SS01 2.7 070910	T10-SS01 2.0 070914	T10-SS02 2.0 070914 Duplicate	T14-SS01 0.5 070910	T14-SS01 1.7 070910	T15-SS01 0.5 070910	T15-SS01 1.5 070910	T16-SS01 0.5 070910	T16-SS01 1.4 070910
VOCs:											
1,1,1-Trichloroethane	ug/kg	0.71 U	0.71 U	0.69 U	0.73 U	0.66 U	0.69 U	0.65 U	0.80 U	0.71 U	0.75 U
1,1,2,2-Tetrachloroethane	ug/kg	0.70 U	0.70 U	0.68 U	0.72 U	0.65 U	0.68 U	0.64 U	0.79 U	0.70 U	0.74 U
1,1,2-Trichloroethane	ug/kg	0.81 U	0.81 U	0.79 U	0.83 U	0.76 U	0.78 U	0.74 U	0.91 U	0.81 U	0.86 U
1,1-Dichloroethane	ug/kg	0.58 U	0.58 U	0.57 U	0.59 U	0.54 U	0.56 U	0.54 U	0.66 U	0.58 U	0.62 U
1,1-Dichloroethene	ug/kg	1.3 U	1.3 U	1.2 U	1.3 U	1.2 U	1.2 U	1.2 U	1.4 U	1.3 U	1.4 U
1,2-Dichloroethane	ug/kg	0.54 U	0.54 U	0.53 U	0.55 U	0.51 U	0.53 U	0.50 U	0.61 U	0.54 U	0.58 U
1,2-Dichloroethene, Total	ug/kg	1.3 U	1.3 U	1.2 U	1.3 U	1.2 U	1.2 U	1.2 U	1.4 U	1.3 U	1.4 U
1,2-Dichloropropane	ug/kg	0.54 U	0.54 U	0.53 U	0.55 U	0.51 U	0.53 U	0.50 U	0.61 U	0.54 U	0.58 U
2-Hexanone	ug/kg	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	1.2 U	1.3 U
Acetone	ug/kg	4.3 U	4.2 U	4.1 U	4.3 U	4.0 U	4.1 U	3.9 U	4.8 U	4.2 U	4.5 U
Benzene	ug/kg	0.68 U	0.68 U	0.66 U	0.70 U	0.64 U	0.66 U	0.63 U	0.77 U	0.68 U	0.72 U
Bromodichloromethane	ug/kg	0.56 U	0.56 U	0.55 U	0.57 U	0.53 U	0.54 U	0.52 U	0.63 U	0.56 U	0.60 U
Bromoform	ug/kg	0.73 U	0.73 U	0.71 U	0.75 U	0.68 U	0.71 U	0.67 U	0.82 U	0.73 U	0.77 U
Bromomethane	ug/kg	3.1 U	3.1 U	3.0 U	3.1 U	2.9 U	3.0 U	2.8 U	3.4 U	3.0 U	3.2 U
Carbon disulfide	ug/kg	0.99 U	0.98 U	0.96 U	1.0 U	0.92 U	0.96 U	0.91 U	1.1 U	0.98 U	1.0 U
Carbon tetrachloride	ug/kg	0.72 U	0.72 U	0.70 U	0.74 U	0.67 U	0.70 U	0.66 U	0.81 U	0.72 U	0.76 U
Chlorobenzene	ug/kg	0.55 U	0.55 U	0.54 U	0.56 U	0.52 U	0.54 U	0.51 U	0.62 U	0.55 U	0.59 U
Chloroethane	ug/kg	3.1 U	3.1 U	3.0 U	3.1 U	2.9 U	3.0 U	2.8 U	3.4 U	3.0 U	3.2 U
Chloroform	ug/kg	0.67 U	0.67 U	0.65 U	0.69 U	0.63 U	0.65 U	0.62 U	0.76 U	0.67 U	0.71 U
Chloromethane	ug/kg	1.3 U	1.3 U	1.2 U	1.3 U	1.2 U	1.2 U	1.2 U	1.4 U	1.3 U	1.4 U
cis-1,3-Dichloropropene	ug/kg	0.57 U	0.57 U	0.56 U	0.58 U	0.53 U	0.55 U	0.53 U	0.64 U	0.57 U	0.61 U
Dibromochloromethane	ug/kg	0.64 U	0.64 U	0.62 U	0.66 U	0.60 U	0.62 U	0.59 U	0.72 U	0.64 U	0.68 U
Ethylbenzene	ug/kg	0.63 U	0.63 U	0.61 U	0.64 U	0.59 U	0.61 U	0.58 U	0.71 U	0.63 U	0.67 U
Methyl Ethyl Ketone	ug/kg	2.2 U	2.2 U	2.1 U	2.2 U	2.0 U	2.1 U	2.0 U	2.4 U	2.2 U	2.3 U
Methyl Isobutyl Ketone	ug/kg	0.71 U	0.71 U	0.69 U	0.73 U	0.66 U	0.69 U	0.65 U	0.80 U	0.71 U	0.75 U
Methylene Chloride	ug/kg	1.6 U	1.6 U	1.5 U	1.6 U	1.5 U	1.5 U	1.5 U	1.8 U	1.6 U	1.7 U
Styrene	ug/kg	0.61 U	0.61 U	0.59 U	0.62 U	0.57 U	0.59 U	0.56 U	0.69 U	0.61 U	0.65 U
Tetrachloroethene	ug/kg	0.89 U	0.89 U	0.86 U	0.91 U	0.83 U	0.86 U	0.82 U	1.0 U	0.88 U	0.94 U
Toluene	ug/kg	1.7 U	1.7 U	1.6 U	1.7 U	1.6 U	1.6 U	1.5 U	1.9 U	1.7 U	1.8 U
trans-1,3-Dichloropropene	ug/kg	0.59 U	0.59 U	0.57 U	0.60 U	0.55 U	0.57 U	0.54 U	0.67 U	0.59 U	0.63 U
Trichloroethene	ug/kg	0.65 U	0.65 U	0.63 U	0.67 U	0.61 U	0.63 U	0.60 U	0.73 U	0.65 U	0.69 U
Vinyl chloride	ug/kg	0.77 U	0.77 U	0.75 U	0.79 U	0.72 U	0.75 U	0.71 U	0.87 U	0.77 U	0.82 U
Xylenes, Total	ug/kg	1.8 U	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.6 U	2.0 U	1.8 U	1.9 U
SVOCs											
1,2,4-Trichlorobenzene	ug/kg										
1,2-Dichlorobenzene	ug/kg										
1,3-Dichlorobenzene	ug/kg										
1,4-Dichlorobenzene	ug/kg										
2,2'-oxybis[1-chloropropane]	ug/kg										
2,4,5-Trichlorophenol	ug/kg										
2,4,6-Trichlorophenol	ug/kg										
2,4-Dichlorophenol	ug/kg										
2,4-Dimethylphenol	ug/kg										
2,4-Dinitrophenol	ug/kg										
2,4-Dinitrotoluene	ug/kg										
2,6-Dinitrotoluene	ug/kg										
2-Chloronaphthalene	ug/kg										
2-Chlorophenol	ug/kg										
2-Methylnaphthalene	ug/kg										

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Summary of Soil (0-3') Analytical Results
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Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	B02-SS01 1.0 070912	B04-SS01 1.0 070912	B04-SS02 1.0 070912 Duplicate	B08-SS01 1.4 070912	C06-SS01 1.7 070912	D04-SS01 2.0 070912	D10-SS01 2.0 07913	E02-SS01 2.0 070912	E06-SS01 1.0 07913	E08-SS01 1.5 07913	F10-SS01 3.0 070913	K10-SS01 2.5 070913	MC01-SS01 0.8 080621	MC02-SS01 0.6 080621	MC02-SS01 2.7 080621	MC03-SS01 0.7 080621	MC04-SS01 1.3 080621
2-Methylphenol	ug/kg																	37 U
2-Nitroaniline	ug/kg																	21 U
2-Nitrophenol	ug/kg																	46 U
3 & 4 Methylphenol	ug/kg																	35 U
3,3'-Dichlorobenzidine	ug/kg																	55 U
3-Nitroaniline	ug/kg																	74 U
4,6-Dinitro-2-methylphenol	ug/kg																	46 U
4-Bromophenyl phenyl ether	ug/kg																	15 U
4-Chloro-3-methylphenol	ug/kg																	92 U
4-Chloroaniline	ug/kg																	150 U
4-Chlorophenyl phenyl ether	ug/kg																	16 U
4-Methylphenol	ug/kg																	
4-Nitroaniline	ug/kg																	81 U
4-Nitrophenol	ug/kg																	66 U
Acenaphthene	ug/kg																	4.8 U
Acenaphthylene	ug/kg																	4.0 U
Anthracene	ug/kg																	4.4 U
Benzo[a]anthracene	ug/kg																	4.8 U
Benzo[a]pyrene	ug/kg																	3.5 U
Benzo[b]fluoranthene	ug/kg																	8.3 U
Benzo[g,h,i]perylene	ug/kg																	6.5 U
Benzo[k]fluoranthene	ug/kg																	8.0 U
Bis(2-chloroethoxy)methane	ug/kg																	23 U
Bis(2-chloroethyl)ether	ug/kg																	25 U
Bis(2-ethylhexyl) phthalate	ug/kg																	32 U
Butyl benzyl phthalate	ug/kg																	17 U
Carbazole	ug/kg																	14 U
Chrysene	ug/kg																	5.9 U
Dibenz(a,h)anthracene	ug/kg																	4.6 U
Dibenzofuran	ug/kg																	14 U
Diethyl phthalate	ug/kg																	19 U
Dimethyl phthalate	ug/kg																	15 U
Di-n-butyl phthalate	ug/kg																	15 U
Di-n-octyl phthalate	ug/kg																	17 U
Fluoranthene	ug/kg																	4.9 U
Fluorene	ug/kg																	4.0 U
Hexachlorobenzene	ug/kg																	5.4 U
Hexachlorobutadiene	ug/kg																	22 U
Hexachlorocyclopentadiene	ug/kg																	130 U
Hexachloroethane	ug/kg																	20 U
Indeno[1,2,3-cd]pyrene	ug/kg																	4.9 U
Isophorone	ug/kg																	15 U
Naphthalene	ug/kg																	3.9 U
Nitrobenzene	ug/kg																	6.9 U
N-Nitrosodi-n-propylamine	ug/kg																	26 U
N-Nitrosodiphenylamine	ug/kg																	11 U
Pentachlorophenol	ug/kg																	140 U
Phenanthrene	ug/kg																	3.3 U
Phenol	ug/kg																	33 U
Pyrene	ug/kg																	4.4 U

Appendix A
Summary of Soil (0-3') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	MC05-SS01 1.3 080621	M10-SS01 3.0 070914	N12-SS01 1.0 070911	N12-SS01 2.0 070911	P06-SS01 0.5 070911	P08-SS01 0.5 070911	P10-SS01 2.5 070914	P12-SS01 0.5 070911	P12-SS01 2.0 070911	P14-SS01 0.0 070911	P14-SS01 3.0 070911	P15-SS01 0.5 070911	P15-SS02 0.5 070911 Duplicate	P15-SS01 2.5 070911	P16-SS01 0.5 070911	P16-SS01 2.5 070911	P16-SS02 2.5 070911 Duplicate
2-Methylphenol	ug/kg										50 U	50 U					50 U	51 U
2-Nitroaniline	ug/kg										52 U	52 U					52 U	53 U
2-Nitrophenol	ug/kg										100 U	99 U					99 U	100 U
3 & 4 Methylphenol	ug/kg																	
3,3'-Dichlorobenzidine	ug/kg										42 U	42 U					42 U	43 U
3-Nitroaniline	ug/kg										160 U	160 U					160 U	160 U
4,6-Dinitro-2-methylphenol	ug/kg										140 U	140 UJ					140 U	140 U
4-Bromophenyl phenyl ether	ug/kg										45 U	44 U					45 U	46 U
4-Chloro-3-methylphenol	ug/kg										110 U	110 U					110 U	110 U
4-Chloroaniline	ug/kg										180 U	170 U					170 U	180 U
4-Chlorophenyl phenyl ether	ug/kg										42 U	41 U					41 U	42 U
4-Methylphenol	ug/kg										64 U	63 U					63 U	65 U
4-Nitroaniline	ug/kg										72 U	71 U					72 U	73 U
4-Nitrophenol	ug/kg										130 U	120 U					120 U	130 U
Acenaphthene	ug/kg										7.5 U	7.4 UJ					7.4 U	7.6 U
Acenaphthylene	ug/kg										11 U	11 UJ					11 U	11 U
Anthracene	ug/kg										13 U	12 U					12 U	13 U
Benzo[a]anthracene	ug/kg										5.8 U	17 J					31 J	8.5 J
Benzo[a]pyrene	ug/kg										8.6 U	22 J					36	8.7 U
Benzo[b]fluoranthene	ug/kg										11 U	39					61	21 J
Benzo[g,h,i]perylene	ug/kg										6.1 U	18 J					21 J	6.2 U
Benzo[k]fluoranthene	ug/kg										7.9 U	16 J					18 J	8.1 U
Bis(2-chloroethoxy)methane	ug/kg										38 U	38 U					38 U	39 U
Bis(2-chloroethyl)ether	ug/kg										50 U	49 U					49 U	51 U
Bis(2-ethylhexyl) phthalate	ug/kg										50 U	50 U					50 U	51 U
Butyl benzyl phthalate	ug/kg										51 U	50 U					50 U	52 U
Carbazole	ug/kg										46 U	45 UJ					46 U	47 U
Chrysene	ug/kg										9.4 U	31 J					43	16 J
Dibenz(a,h)anthracene	ug/kg										19 U	19 U					19 U	20 U
Dibenzofuran	ug/kg										36 U	36 U					36 U	37 U
Diethyl phthalate	ug/kg										47 U	46 UJ					46 U	47 U
Dimethyl phthalate	ug/kg										41 U	40 UJ					40 U	41 U
Di-n-butyl phthalate	ug/kg										47 U	46 UJ					46 U	47 U
Di-n-octyl phthalate	ug/kg										47 U	47 U					47 U	48 U
Fluoranthene	ug/kg										14 U	50					64	28 J
Fluorene	ug/kg										7.9 U	7.8 U					7.9 U	8.1 U
Hexachlorobenzene	ug/kg										7.8 U	7.7 U					7.8 U	8.0 U
Hexachlorobutadiene	ug/kg										39 U	38 U					39 U	39 U
Hexachlorocyclopentadiene	ug/kg										190 U	190 U					190 U	200 U
Hexachloroethane	ug/kg										40 U	39 U					40 U	41 U
Indeno[1,2,3-cd]pyrene	ug/kg										20 U	19 U					20 U	20 U
Isophorone	ug/kg										43 U	43 UJ					43 U	44 U
Naphthalene	ug/kg										7.1 U	7.0 U					7.0 U	7.2 U
Nitrobenzene	ug/kg										9.5 U	9.3 U					9.4 U	9.6 U
N-Nitrosodi-n-propylamine	ug/kg										48 U	48 U					48 U	49 U
N-Nitrosodiphenylamine	ug/kg										42 U	41 UJ					41 U	42 U
Pentachlorophenol	ug/kg										250 U	250 U					250 U	260 U
Phenanthrene	ug/kg										11 U	19 J					14 J	11 U
Phenol	ug/kg										47 U	47 U					47 U	48 U
Pyrene	ug/kg										8.5 U	41					50	24 J

Appendix A
Summary of Soil (0-3') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	Q13-SS01 0.5 070910	Q13-SS01 2.0 070910	Q16-SS01 0.5 070910	Q16-SS01 1.0 070910	Q17-SS01 0.5 070910	Q17-SS02 0.5 070910 Duplicate	Q17-SS01 2.9 070910	R06-SS01 0.5 070911	R08-SS01 0.5 070911	R10-SS01 2.0 070914	R13-SS01 0.5 070910	R13-SS01 1.5 070910	R17-SS01 0.5 070910	S13-SS01 0.5 070910	S13-SS01 1.0 070910	S15-SS01 0.5 070910	S15-SS01 2.5 070910
2-Methylphenol	ug/kg																	
2-Nitroaniline	ug/kg																	
2-Nitrophenol	ug/kg																	
3 & 4 Methylphenol	ug/kg																	
3,3'-Dichlorobenzidine	ug/kg																	
3-Nitroaniline	ug/kg																	
4,6-Dinitro-2-methylphenol	ug/kg																	
4-Bromophenyl phenyl ether	ug/kg																	
4-Chloro-3-methylphenol	ug/kg																	
4-Chloroaniline	ug/kg																	
4-Chlorophenyl phenyl ether	ug/kg																	
4-Methylphenol	ug/kg																	
4-Nitroaniline	ug/kg																	
4-Nitrophenol	ug/kg																	
Acenaphthene	ug/kg																	
Acenaphthylene	ug/kg																	
Anthracene	ug/kg																	
Benzo[a]anthracene	ug/kg																	
Benzo[a]pyrene	ug/kg																	
Benzo[b]fluoranthene	ug/kg																	
Benzo[g,h,i]perylene	ug/kg																	
Benzo[k]fluoranthene	ug/kg																	
Bis(2-chloroethoxy)methane	ug/kg																	
Bis(2-chloroethyl)ether	ug/kg																	
Bis(2-ethylhexyl) phthalate	ug/kg																	
Butyl benzyl phthalate	ug/kg																	
Carbazole	ug/kg																	
Chrysene	ug/kg																	
Dibenz(a,h)anthracene	ug/kg																	
Dibenzofuran	ug/kg																	
Diethyl phthalate	ug/kg																	
Dimethyl phthalate	ug/kg																	
Di-n-butyl phthalate	ug/kg																	
Di-n-octyl phthalate	ug/kg																	
Fluoranthene	ug/kg																	
Fluorene	ug/kg																	
Hexachlorobenzene	ug/kg																	
Hexachlorobutadiene	ug/kg																	
Hexachlorocyclopentadiene	ug/kg																	
Hexachloroethane	ug/kg																	
Indeno[1,2,3-cd]pyrene	ug/kg																	
Isophorone	ug/kg																	
Naphthalene	ug/kg																	
Nitrobenzene	ug/kg																	
N-Nitrosodi-n-propylamine	ug/kg																	
N-Nitrosodiphenylamine	ug/kg																	
Pentachlorophenol	ug/kg																	
Phenanthrene	ug/kg																	
Phenol	ug/kg																	
Pyrene	ug/kg																	

Appendix A
Summary of Soil (0-3') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Location Depth Date		S17-SS01 0.5 070910	S17-SS01 2.7 070910	T10-SS01 2.0 070914	T10-SS02 2.0 070914	T14-SS01 0.5 070910	T14-SS01 1.7 070910	T15-SS01 0.5 070910	T15-SS01 1.5 070910	T16-SS01 0.5 070910	T16-SS01 1.4 070910
Analyte/Parameter Name	Units				Duplicate						
2-Methylphenol	ug/kg										
2-Nitroaniline	ug/kg										
2-Nitrophenol	ug/kg										
3 & 4 Methylphenol	ug/kg										
3,3'-Dichlorobenzidine	ug/kg										
3-Nitroaniline	ug/kg										
4,6-Dinitro-2-methylphenol	ug/kg										
4-Bromophenyl phenyl ether	ug/kg										
4-Chloro-3-methylphenol	ug/kg										
4-Chloroaniline	ug/kg										
4-Chlorophenyl phenyl ether	ug/kg										
4-Methylphenol	ug/kg										
4-Nitroaniline	ug/kg										
4-Nitrophenol	ug/kg										
Acenaphthene	ug/kg										
Acenaphthylene	ug/kg										
Anthracene	ug/kg										
Benzo[a]anthracene	ug/kg										
Benzo[a]pyrene	ug/kg										
Benzo[b]fluoranthene	ug/kg										
Benzo[g,h,i]perylene	ug/kg										
Benzo[k]fluoranthene	ug/kg										
Bis(2-chloroethoxy)methane	ug/kg										
Bis(2-chloroethyl)ether	ug/kg										
Bis(2-ethylhexyl) phthalate	ug/kg										
Butyl benzyl phthalate	ug/kg										
Carbazole	ug/kg										
Chrysene	ug/kg										
Dibenz(a,h)anthracene	ug/kg										
Dibenzofuran	ug/kg										
Diethyl phthalate	ug/kg										
Dimethyl phthalate	ug/kg										
Di-n-butyl phthalate	ug/kg										
Di-n-octyl phthalate	ug/kg										
Fluoranthene	ug/kg										
Fluorene	ug/kg										
Hexachlorobenzene	ug/kg										
Hexachlorobutadiene	ug/kg										
Hexachlorocyclopentadiene	ug/kg										
Hexachloroethane	ug/kg										
Indeno[1,2,3-cd]pyrene	ug/kg										
Isophorone	ug/kg										
Naphthalene	ug/kg										
Nitrobenzene	ug/kg										
N-Nitrosodi-n-propylamine	ug/kg										
N-Nitrosodiphenylamine	ug/kg										
Pentachlorophenol	ug/kg										
Phenanthrene	ug/kg										
Phenol	ug/kg										
Pyrene	ug/kg										

Appendix A
Summary of Soil (0-3') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	B02-SS01 1.0 070912	B04-SS01 1.0 070912	B04-SS02 1.0 070912 Duplicate	B08-SS01 1.4 070912	C06-SS01 1.7 070912	D04-SS01 2.0 070912	D10-SS01 2.0 07913	E02-SS01 2.0 070912	E06-SS01 1.0 07913	E08-SS01 1.5 07913	F10-SS01 3.0 070913	K10-SS01 2.5 070913	MC01-SS01 0.8 080621	MC02-SS01 0.6 080621	MC02-SS01 2.7 080621	MC03-SS01 0.7 080621	MC04-SS01 1.3 080621
Pesticides																		
4,4'-DDD	ug/kg																	7.5 J+
4,4'-DDE	ug/kg																	54 J+
4,4'-DDT	ug/kg																	18 +
Aldrin	ug/kg																	3.2 U
alpha-BHC	ug/kg																	3.2 U
alpha-Chlordane	ug/kg																	2.6 U
beta-BHC	ug/kg																	5.1 U
delta-BHC	ug/kg																	4.1 U
Dieldrin	ug/kg																	3.7 J+
Endosulfan I	ug/kg																	3.9 U
Endosulfan II	ug/kg																	32 +
Endosulfan sulfate	ug/kg																	13 +
Endrin	ug/kg																	3.4 U
Endrin aldehyde	ug/kg																	17 +
Endrin ketone	ug/kg																	1.7 U
gamma-BHC (Lindane)	ug/kg																	1.7 U
gamma-Chlordane	ug/kg																	3.0 U
Heptachlor	ug/kg																	1.3 U
Heptachlor epoxide	ug/kg																	2.0 U
Methoxychlor	ug/kg																	2.7 U
Toxaphene	ug/kg																	17 U
PCBs																		
PCB-1016	ug/kg																	8.0 U
PCB-1221	ug/kg																	10 U
PCB-1232	ug/kg																	6.9 U
PCB-1242	ug/kg																	11 U
PCB-1248	ug/kg																	9.6 U
PCB-1254	ug/kg																	6.7 U
PCB-1260	ug/kg																	6.9 U
Metals																		
Arsenic	mg/kg																	5.1
Barium	mg/kg																	120
Cadmium	mg/kg																	0.036 U
Chromium	mg/kg																	15
Lead	mg/kg																	7.0
Mercury	mg/kg																	0.027
Selenium	mg/kg																	0.42 U
Silver	mg/kg																	0.11 U
Zinc	mg/kg																	19

Appendix A
Summary of Soil (0-3') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	MC05-SS01 1.3 080621	M10-SS01 3.0 070914	N12-SS01 1.0 070911	N12-SS01 2.0 070911	P06-SS01 0.5 070911	P08-SS01 0.5 070911	P10-SS01 2.5 070914	P12-SS01 0.5 070911	P12-SS01 2.0 070911	P14-SS01 0.0 070911	P14-SS01 3.0 070911	P15-SS01 0.5 070911	P15-SS02 0.5 070911 Duplicate	P15-SS01 2.5 070911	P16-SS01 0.5 070911	P16-SS01 2.5 070911	P16-SS02 2.5 070911 Duplicate
Pesticides																		
4,4'-DDD	ug/kg										0.58 U	0.57 U					0.56 U	0.59 U
4,4'-DDE	ug/kg										0.36 U	0.36 U					0.35 U	0.36 U
4,4'-DDT	ug/kg										0.33 U	0.32 U					0.32 U	0.33 U
Aldrin	ug/kg										0.62 U	0.62 U					0.60 U	0.63 U
alpha-BHC	ug/kg										0.62 U	0.62 U					0.60 U	0.63 U
alpha-Chlordane	ug/kg										0.50 U	0.50 U					0.49 U	0.51 U
beta-BHC	ug/kg										1.0 U	0.99 U					0.97 U	1.0 U
delta-BHC	ug/kg										0.81 U	0.80 U					0.78 U	0.82 U
Dieldrin	ug/kg										0.36 U	0.36 U					0.35 U	0.36 U
Endosulfan I	ug/kg										0.78 U	0.77 U					0.75 U	0.78 U
Endosulfan II	ug/kg										0.38 U	0.38 U					0.37 U	0.39 U
Endosulfan sulfate	ug/kg										0.18 U	0.17 U					0.17 U	0.18 U
Endrin	ug/kg										0.68 U	0.67 U					0.66 U	0.68 U
Endrin aldehyde	ug/kg										0.69 U	0.68 U					0.67 U	0.70 U
Endrin ketone	ug/kg										0.33 U	0.32 U					0.32 U	0.33 U
gamma-BHC (Lindane)	ug/kg										0.33 U	0.32 U					0.32 U	0.33 U
gamma-Chlordane	ug/kg										0.59 U	0.58 U					0.57 U	0.60 U
Heptachlor	ug/kg										0.25 U	0.25 U					0.24 U	0.25 U
Heptachlor epoxide	ug/kg										0.39 U	0.39 U					0.38 U	0.40 U
Methoxychlor	ug/kg										0.54 U	0.53 U					0.52 U	0.54 U
Toxaphene	ug/kg										3.3 U	3.2 U					3.2 U	3.3 U
PCBs																		
PCB-1016	ug/kg										6.1 U	6.0 U					5.9 U	6.2 U
PCB-1221	ug/kg										5.0 U	5.0 U					4.9 U	5.1 U
PCB-1232	ug/kg										4.9 U	4.9 U					4.8 U	5.0 U
PCB-1242	ug/kg										5.4 U	5.3 U					5.2 U	5.4 U
PCB-1248	ug/kg										3.9 U	3.9 U					3.8 U	4.0 U
PCB-1254	ug/kg										4.0 U	4.0 U					32	47
PCB-1260	ug/kg										3.6 U	3.6 U					3.5 U	3.6 U
Metals																		
Arsenic	mg/kg										0.50 J	1.4					3.3	2.8
Barium	mg/kg										20	23					53	47
Cadmium	mg/kg										0.084 J	0.22					0.30	0.29
Chromium	mg/kg										3.2	5.6					7.0	6.1
Lead	mg/kg										0.34 J	2.1					4.8	5.0
Mercury	mg/kg										0.0059 U	0.0066 J					0.0093 J	0.013 J
Selenium	mg/kg										0.42 U	0.39 U					0.36 U	0.41 U
Silver	mg/kg										0.11 U	0.10 U					0.10 J	0.11 U
Zinc	mg/kg										2.0 J	5.8					29	24

Appendix A
Summary of Soil (0-3') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	Q13-SS01 0.5 070910	Q13-SS01 2.0 070910	Q16-SS01 0.5 070910	Q16-SS01 1.0 070910	Q17-SS01 0.5 070910	Q17-SS02 0.5 070910 Duplicate	Q17-SS01 2.9 070910	R06-SS01 0.5 070911	R08-SS01 0.5 070911	R10-SS01 2.0 070914	R13-SS01 0.5 070910	R13-SS01 1.5 070910	R17-SS01 0.5 070910	S13-SS01 0.5 070910	S13-SS01 1.0 070910	S15-SS01 0.5 070910	S15-SS01 2.5 070910
Pesticides																		
4,4'-DDD	ug/kg																	
4,4'-DDE	ug/kg																	
4,4'-DDT	ug/kg																	
Aldrin	ug/kg																	
alpha-BHC	ug/kg																	
alpha-Chlordane	ug/kg																	
beta-BHC	ug/kg																	
delta-BHC	ug/kg																	
Dieldrin	ug/kg																	
Endosulfan I	ug/kg																	
Endosulfan II	ug/kg																	
Endosulfan sulfate	ug/kg																	
Endrin	ug/kg																	
Endrin aldehyde	ug/kg																	
Endrin ketone	ug/kg																	
gamma-BHC (Lindane)	ug/kg																	
gamma-Chlordane	ug/kg																	
Heptachlor	ug/kg																	
Heptachlor epoxide	ug/kg																	
Methoxychlor	ug/kg																	
Toxaphene	ug/kg																	
PCBs																		
PCB-1016	ug/kg																	
PCB-1221	ug/kg																	
PCB-1232	ug/kg																	
PCB-1242	ug/kg																	
PCB-1248	ug/kg																	
PCB-1254	ug/kg																	
PCB-1260	ug/kg																	
Metals																		
Arsenic	mg/kg																	
Barium	mg/kg																	
Cadmium	mg/kg																	
Chromium	mg/kg																	
Lead	mg/kg																	
Mercury	mg/kg																	
Selenium	mg/kg																	
Silver	mg/kg																	
Zinc	mg/kg																	

Appendix A
Summary of Soil (0-3') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Location Depth Date		S17-SS01 0.5 070910	S17-SS01 2.7 070910	T10-SS01 2.0 070914	T10-SS02 2.0 070914	T14-SS01 0.5 070910	T14-SS01 1.7 070910	T15-SS01 0.5 070910	T15-SS01 1.5 070910	T16-SS01 0.5 070910	T16-SS01 1.4 070910
Analyte/Parameter Name	Units				Duplicate						
Pesticides											
4,4'-DDD	ug/kg										
4,4'-DDE	ug/kg										
4,4'-DDT	ug/kg										
Aldrin	ug/kg										
alpha-BHC	ug/kg										
alpha-Chlordane	ug/kg										
beta-BHC	ug/kg										
delta-BHC	ug/kg										
Dieldrin	ug/kg										
Endosulfan I	ug/kg										
Endosulfan II	ug/kg										
Endosulfan sulfate	ug/kg										
Endrin	ug/kg										
Endrin aldehyde	ug/kg										
Endrin ketone	ug/kg										
gamma-BHC (Lindane)	ug/kg										
gamma-Chlordane	ug/kg										
Heptachlor	ug/kg										
Heptachlor epoxide	ug/kg										
Methoxychlor	ug/kg										
Toxaphene	ug/kg										
PCBs											
PCB-1016	ug/kg										
PCB-1221	ug/kg										
PCB-1232	ug/kg										
PCB-1242	ug/kg										
PCB-1248	ug/kg										
PCB-1254	ug/kg										
PCB-1260	ug/kg										
Metals											
Arsenic	mg/kg										
Barium	mg/kg										
Cadmium	mg/kg										
Chromium	mg/kg										
Lead	mg/kg										
Mercury	mg/kg										
Selenium	mg/kg										
Silver	mg/kg										
Zinc	mg/kg										

Appendix A
Summary of Mixed Soil (0-10') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	B02-SS01 1.0 070912	B04-SS01 1.0 070912	B04-SS02 1.0 070912 Duplicate	B04-SS01 4.0 070912	B08-SS01 1.4 070912	B10-SS01 3.5 070913	C06-SS01 1.7 070912	D04-SS01 2.0 070912	D10-SS01 2.0 07913	D10-SS01 10.0 07913	E02-SS01 2.0 070912	E06-SS01 1.0 07913	E08-SS01 1.5 07913	F10-SS01 3.0 070913	F10-SS01 8.5 070913	F10-SS02 8.5 070913 Duplicate	H10-SS01 3.5 070913
VOCs:																		
1,1,1-Trichloroethane	ug/kg	0.67 U	0.72 U	0.73 U	0.72 U	0.66 U	1.0 U	0.77 U	0.76 U	0.82 U	0.66 U	0.65 U	0.81 U	0.74 U	0.67 U	0.83 U	1.0 U	0.71 U
1,1,2,2-Tetrachloroethane	ug/kg	0.66 U	0.71 U	0.72 U	0.71 U	0.65 U	1.0 U	0.76 U	0.75 U	0.80 U	0.65 U	0.64 U	0.80 U	0.73 U	0.66 U	0.82 U	1.0 U	0.70 U
1,1,2-Trichloroethane	ug/kg	0.76 U	0.82 U	0.83 U	0.83 U	0.75 U	1.2 U	0.87 U	0.86 U	0.93 U	0.75 U	0.74 U	0.92 U	0.85 U	0.77 U	0.95 U	1.2 U	0.81 U
1,1-Dichloroethane	ug/kg	0.55 U	0.59 U	0.60 U	0.59 U	0.54 U	0.86 U	0.63 U	0.62 U	0.67 U	0.54 U	0.54 U	0.66 U	0.61 U	0.55 U	0.68 U	0.83 U	0.59 U
1,1-Dichloroethene	ug/kg	1.2 U	1.3 U	1.3 U	1.3 U	1.2 U	1.9 U	1.4 U	1.4 U	1.5 U	1.2 U	1.2 U	1.5 U	1.3 U	1.2 U	1.5 U	1.8 U	1.3 U
1,2-Dichloroethane	ug/kg	0.51 U	0.55 U	0.55 U	0.55 U	0.50 U	0.80 U	0.59 U	0.58 U	0.62 U	0.50 U	0.50 U	0.62 U	0.57 U	0.51 U	0.64 U	0.77 U	0.55 U
1,2-Dichloroethene, Total	ug/kg	1.2 U	1.3 U	1.3 U	1.3 U	1.2 U	1.9 U	1.4 U	1.4 U	1.5 U	1.2 U	1.2 U	1.5 U	1.3 U	1.2 U	15	16	1.3 U
1,2-Dichloropropane	ug/kg	0.51 U	0.55 U	0.55 U	0.55 U	0.50 U	0.80 U	0.59 U	0.58 U	0.62 U	0.50 U	0.50 U	0.62 U	0.57 U	0.51 U	0.64 U	0.77 U	0.55 U
2-Hexanone	ug/kg	1.1 U	1.2 U	1.2 U	1.2 U	1.1 U	1.7 U	1.3 U	1.3 U	1.4 U	1.1 U	1.1 U	1.3 U	1.2 U	1.1 U	1.4 U	1.7 U	1.2 U
Acetone	ug/kg	4.0 U	4.3 U	4.3 U	4.3 U	3.9 U	6.2 U	4.6 U	4.5 U	4.9 U	3.9 U	3.9 U	4.8 U	4.4 U	4.0 U	5.0 U	6.0 U	4.3 U
Benzene	ug/kg	0.64 U	0.69 U	0.70 U	0.69 U	0.63 U	1.0 U	0.73 U	0.73 U	0.78 U	0.63 U	0.63 U	0.78 U	0.71 U	0.65 U	0.80 U	0.97 U	0.68 U
Bromodichloromethane	ug/kg	0.53 U	0.57 U	0.58 U	0.57 U	0.52 U	0.83 U	0.61 U	0.60 U	0.65 U	0.52 U	0.52 U	0.64 U	0.59 U	0.53 U	0.66 U	0.80 U	0.57 U
Bromoform	ug/kg	0.69 U	0.74 U	0.75 U	0.74 U	0.68 U	1.1 U	0.79 U	0.78 U	0.84 U	0.68 U	0.67 U	0.83 U	0.76 U	0.69 U	0.85 U	1.0 U	0.73 U
Bromomethane	ug/kg	2.9 U	3.1 U	3.1 U	3.1 U	2.8 U	4.5 U	3.3 U	3.3 U	3.5 U	2.8 U	2.8 U	3.5 U	3.2 U	2.9 U	3.6 U	4.4 U	3.1 U
Carbon disulfide	ug/kg	0.93 U	1.0 U	1.0 U	1.0 U	0.92 U	1.5 U	1.1 U	1.1 U	1.1 U	0.91 U	0.91 U	1.1 U	1.0 U	0.93 U	1.2 U	1.4 U	0.99 U
Carbon tetrachloride	ug/kg	0.68 U	0.73 U	0.74 U	0.73 U	0.67 U	1.1 U	0.78 U	0.77 U	0.83 U	0.67 U	0.66 U	0.82 U	0.75 U	0.68 U	0.84 U	1.0 U	0.72 U
Chlorobenzene	ug/kg	0.52 U	0.56 U	0.57 U	0.56 U	0.51 U	0.81 U	0.60 U	0.59 U	0.63 U	0.51 U	0.51 U	0.63 U	0.58 U	0.52 U	0.65 U	0.79 U	0.56 U
Chloroethane	ug/kg	2.9 U	3.1 U	3.1 U	3.1 U	2.8 U	4.5 U	3.3 U	3.3 U	3.5 U	2.8 U	2.8 U	3.5 U	3.2 U	2.9 U	3.6 U	4.4 U	3.1 U
Chloroform	ug/kg	0.63 U	0.68 U	0.69 U	0.68 U	0.62 U	0.99 U	0.72 U	0.72 U	0.77 U	0.62 U	0.62 U	0.76 U	0.70 U	0.64 U	0.79 U	0.96 U	0.67 U
Chloromethane	ug/kg	1.2 U	1.3 U	1.3 U	1.3 U	1.2 U	1.9 U	1.4 U	1.4 U	1.5 U	1.2 U	1.2 U	1.5 U	1.3 U	1.2 U	1.5 U	1.8 U	1.3 U
cis-1,3-Dichloropropene	ug/kg	0.54 U	0.58 U	0.59 U	0.58 U	0.53 U	0.84 U	0.62 U	0.61 U	0.66 U	0.53 U	0.53 U	0.65 U	0.60 U	0.54 U	0.67 U	0.82 U	0.58 U
Dibromochloromethane	ug/kg	0.60 U	0.65 U	0.66 U	0.65 U	0.59 U	0.94 U	0.69 U	0.68 U	0.74 U	0.59 U	0.59 U	0.73 U	0.67 U	0.61 U	0.75 U	0.91 U	0.64 U
Ethylbenzene	ug/kg	0.59 U	0.64 U	0.65 U	0.64 U	0.59 U	0.93 U	0.68 U	0.67 U	0.72 U	0.58 U	0.58 U	0.72 U	0.66 U	0.60 U	0.74 U	0.90 U	0.63 U
Methyl Ethyl Ketone	ug/kg	2.0 U	2.2 U	2.2 U	2.2 U	2.0 U	3.2 U	2.3 U	2.3 U	2.5 U	2.0 U	2.0 U	2.5 U	2.3 U	2.1 U	2.5 U	3.1 U	2.2 U
Methyl Isobutyl Ketone	ug/kg	0.67 U	0.72 U	0.73 U	0.72 U	0.66 U	1.0 U	0.77 U	0.76 U	0.82 U	0.66 U	0.65 U	0.81 U	0.74 U	0.67 U	0.83 U	1.0 U	0.71 U
Methylene Chloride	ug/kg	1.5 U	1.6 U	1.6 U	1.6 U	1.5 U	2.3 U	1.7 U	1.7 U	1.8 U	1.5 U	1.5 U	1.8 U	1.7 U	1.5 U	1.8 U	2.2 U	1.6 U
Styrene	ug/kg	0.58 U	0.62 U	0.63 U	0.62 U	0.57 U	0.90 U	0.66 U	0.65 U	0.70 U	0.57 U	0.56 U	0.70 U	0.64 U	0.58 U	0.72 U	0.87 U	0.61 U
Tetrachloroethene	ug/kg	0.84 U	0.90 U	0.91 U	0.91 U	0.82 U	1.3 U	0.96 U	0.95 U	1.0 U	0.82 U	0.82 U	1.0 U	0.93 U	0.84 U	220	220	0.89 U
Toluene	ug/kg	1.6 U	1.7 U	1.7 U	1.7 U	1.6 U	2.5 U	1.8 U	1.8 U	1.9 U	1.6 U	1.5 U	1.9 U	1.8 U	1.6 U	2.0 U	2.4 U	1.7 U
trans-1,3-Dichloropropene	ug/kg	0.56 U	0.60 U	0.61 U	0.60 U	0.55 U	0.87 U	0.64 U	0.63 U	0.68 U	0.55 U	0.54 U	0.67 U	0.62 U	0.56 U	0.69 U	0.84 U	0.60 U
Trichloroethene	ug/kg	0.61 U	0.66 U	0.67 U	0.66 U	0.60 U	0.96 U	0.70 U	0.70 U	0.75 U	0.60 U	0.60 U	0.74 U	0.68 U	0.62 U	42	42	0.65 U
Vinyl chloride	ug/kg	0.72 U	0.78 U	0.79 U	0.79 U	0.71 U	1.1 U	0.83 U	0.82 U	0.88 U	0.71 U	0.71 U	0.88 U	0.80 U	0.73 U	0.90 U	1.1 U	0.77 U
Xylenes, Total	ug/kg	1.7 U	1.8 U	1.8 U	1.8 U	1.6 U	2.6 U	1.9 U	1.9 U	2.0 U	1.6 U	1.6 U	2.0 U	1.9 U	1.7 U	2.1 U	2.5 U	1.8 U
SVOCs																		
1,2,4-Trichlorobenzene	ug/kg				46 U													
1,2-Dichlorobenzene	ug/kg				42 U													
1,3-Dichlorobenzene	ug/kg				39 U													
1,4-Dichlorobenzene	ug/kg				47 U													
2,2'-oxybis[1-chloropropane]	ug/kg				49 U													
2,4,5-Trichlorophenol	ug/kg				120 U													
2,4,6-Trichlorophenol	ug/kg				86 U													
2,4-Dichlorophenol	ug/kg				89 U													
2,4-Dimethylphenol	ug/kg				89 U													
2,4-Dinitrophenol	ug/kg				580 U													
2,4-Dinitrotoluene	ug/kg				66 U													
2,6-Dinitrotoluene	ug/kg				57 U													
2-Chloronaphthalene	ug/kg				44 U													
2-Chlorophenol	ug/kg				53 U													
2-Methylnaphthalene	ug/kg				49 U													

Appendix A
Summary of Mixed Soil (0-10') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	H10-SS01 6.4 070913	K10-SS01 2.5 070913	K10-SS01 6.0 070913	MC01-SS01 0.8 080621	MC02-SS01 0.6 080621	MC02-SS01 2.7 080621	MC03-SS01 0.7 080621	MC03-SS01 5.0 080621	MC04-SS01 1.3 080621	MC04-SS01 6.6 080621	MC05-SS01 1.3 080621	MC05-SS01 9.0 080621	MC05-SS02 9.0 080621 Duplicate	M10-SS01 3.0 070914	M10-SS01 4.9 070914	M10-SS02 4.9 070914 Duplicate	N12-SS01 1.0 070911
VOCs:																		
1,1,1-Trichloroethane	ug/kg	0.67 U	0.87 U	0.93 U	0.97 U	0.82 U	1.2 U	1.0 U	0.79 U	0.78 U	1500 U		1.3 U	1.1 U	0.77 U	0.85 U	0.85 U	0.70 U
1,1,2,2-Tetrachloroethane	ug/kg	0.66 U	0.85 U	0.91 U	1.3 UJ	1.1 U	1.6 U	1.4 U	1.1 U	1.0 U	1700 U	1.1 U	1.7 U	1.5 U	0.76 U	0.84 U	0.84 U	0.69 U
1,1,2-Trichloroethane	ug/kg	0.76 U	0.99 U	1.1 U	2.0 U	1.7 U	2.4 U	2.0 U	1.6 U	1.6 U	2100 U	1.6 U	2.6 U	2.3 U	0.88 U	0.97 U	0.97 U	0.80 U
1,1-Dichloroethane	ug/kg	0.55 U	0.71 U	0.76 U	1.1 U	0.89 U	1.3 U	1.1 U	0.85 U	0.84 U	1200 U	0.84 U	1.4 U	1.2 U	0.63 U	0.70 U	0.70 U	0.57 U
1,1-Dichloroethene	ug/kg	1.2 U	1.6 U	1.7 U	0.96 U	0.81 U	1.2 U	1.0 U	0.78 U	0.77 U	1500 U	0.77 U	1.3 U	1.1 U	1.4 U	1.5 U	1.5 U	1.3 U
1,2-Dichloroethane	ug/kg	0.51 U	0.66 U	0.71 U	1.2 U	1.0 U	1.5 U	1.2 U	0.97 U	0.96 U	1500 U		1.6 U	1.4 U	0.59 U	0.65 U	0.65 U	0.53 U
1,2-Dichloroethene, Total	ug/kg	1.2 U	1.6 U	1.7 U	2.1 U	3.5 J	2.5 U	2.1 U	1.7 U	1.7 U	2000 U	1.7 U	2.7 U	2.4 U	6.9	1.5 U	1.5 U	1.3 U
1,2-Dichloropropane	ug/kg	0.51 U	0.66 U	0.71 U	1.0 U	0.87 U	1.2 U	1.1 U	0.83 U	0.82 U	1500 U	0.82 U	1.3 U	1.2 U	0.59 U	0.65 U	0.65 U	0.53 U
2-Hexanone	ug/kg	1.1 U	1.4 U	1.5 U	1.3 U	1.1 U	1.6 U	1.4 U	1.1 U	1.0 U	2300 U	1.1 U	1.7 U	1.5 U	1.3 U	1.4 U	1.4 U	1.2 U
Acetone	ug/kg	4.0 U	5.2 U	5.5 U	2.1 U	1.8 U	2.5 U	11 U	1.7 U	1.7 U	8900 R	1.7 U	2.7 U	2.4 U	4.6 U	5.1 U	5.1 U	4.2 U
Benzene	ug/kg	0.64 U	0.83 U	0.89 U	0.93 U	0.79 U	1.1 U	0.96 U	0.75 U	0.74 U	400 U		1.2 U	1.1 U	0.74 U	0.82 U	0.82 U	0.67 U
Bromodichloromethane	ug/kg	0.53 U	0.68 U	0.73 U	0.85 U	0.72 U	1.0 U	0.88 U	0.69 U	0.68 U	1200 U	0.68 U	1.1 U	0.98 U	0.61 U	0.67 U	0.68 U	0.55 U
Bromoform	ug/kg	0.69 U	0.89 U	0.95 U	1.1 U	0.92 U	1.3 U	1.1 U	0.88 U	0.87 U	2100 U	0.88 U	1.4 U	1.3 U	0.79 U	0.88 U	0.88 U	0.72 U
Bromomethane	ug/kg	2.9 U	3.7 U	4.0 U	2.4 U	2.0 U	2.9 U	2.5 U	1.9 U	1.9 U	1800 U	1.9 U	3.1 U	2.8 U	3.3 U	3.7 U	3.7 U	3.0 U
Carbon disulfide	ug/kg	0.93 U	1.2 U	1.3 U	1.0 U	0.87 U	1.2 U	3.0 J	0.83 U	0.82 U	870 U	0.82 U	1.3 U	1.2 U	1.1 U	1.2 U	1.2 U	0.97 U
Carbon tetrachloride	ug/kg	0.68 U	0.88 U	0.94 U	1.0 U	0.87 U	1.2 U	1.1 U	0.83 U	0.82 U	1400 U		1.3 U	1.2 U	0.78 U	0.86 U	0.86 U	0.71 U
Chlorobenzene	ug/kg	0.52 U	0.67 U	0.72 U	0.74 U	0.63 U	0.90 U	0.77 U	0.60 U	0.59 U	1200 U	0.60 U	0.97 U	0.85 U	0.60 U	0.66 U	0.66 U	0.54 U
Chloroethane	ug/kg	2.9 U	3.7 U	4.0 U	1.3 U	1.1 U	1.6 U	1.4 U	1.1 U	1.0 U	1800 U	1.1 U	1.7 U	1.5 U	3.3 U	3.7 U	3.7 U	3.0 U
Chloroform	ug/kg	0.63 U	0.82 U	0.87 U	1.1 U	0.91 U	1.3 U	1.1 U	0.86 U	0.85 U	900 U	0.86 U	1.4 U	1.2 U	0.73 U	0.81 U	0.81 U	0.66 U
Chloromethane	ug/kg	1.2 U	1.6 U	1.7 U	1.8 U	1.5 U	2.1 U	1.8 U	1.4 U	1.4 U	2000 U	1.4 U	2.3 U	2.0 U	1.4 U	1.5 U	1.5 U	1.3 U
cis-1,3-Dichloropropene	ug/kg	0.54 U	0.70 U	0.75 U	0.88 U	0.74 U	1.1 U	0.90 U	0.71 U	0.70 U	1200 U	0.70 U	1.1 U	1.0 U	0.62 U	0.69 U	0.69 U	0.56 U
Dibromochloromethane	ug/kg	0.61 U	0.78 U	0.84 U	0.91 U	0.77 U	1.1 U	0.94 U	0.73 U	0.72 U	1300 U	0.73 U	1.2 U	1.0 U	0.69 U	0.77 U	0.77 U	0.63 U
Ethylbenzene	ug/kg	0.60 U	0.77 U	0.82 U	0.78 U	0.66 U	0.94 U	0.80 U	0.63 U	0.62 U	660 U	0.62 U	1.0 U	0.89 U	0.68 U	0.76 U	0.76 U	0.62 U
Methyl Ethyl Ketone	ug/kg	2.0 U	2.6 U	2.8 U	2.0 U	1.7 U	2.4 U	2.0 U	1.6 U	1.6 U	4400 U	1.6 U	2.6 U	2.3 U	2.3 U	2.6 U	2.6 U	2.1 U
Methyl Isobutyl Ketone	ug/kg	0.67 U	0.87 U	0.93 U	1.6 U	1.4 U	2.0 U	1.7 U	1.3 U	1.3 U	2100 U	1.3 U	2.1 U	1.9 U	0.77 U	0.85 U	0.85 U	0.70 U
Methylene Chloride	ug/kg	1.5 U	1.9 U	2.1 U	0.85 U	0.72 U	1.0 U	0.88 U	0.69 U	0.68 U	1200 U	0.68 U	1.1 U	0.98 U	1.7 U	1.9 U	1.9 U	1.6 U
Styrene	ug/kg	0.58 U	0.75 U	0.80 U	0.82 U	0.69 U	1.0 U	0.85 U	0.66 U	0.65 U	1000 U	0.66 U	1.1 U	0.94 U	0.66 U	0.73 U	0.73 U	0.60 U
Tetrachloroethene	ug/kg	56	27	180	9.3	25	9.4	53	3.9 J	6.7	290000	3.9 J	140	230	150	61	100	5.1
Toluene	ug/kg	1.6 U	2.0 U	2.2 U	0.96 U	0.81 U	7.9	1.0 U	0.78 U	0.77 U	490 U	0.77 U	1.3 U	1.1 U	1.8 U	2.0 U	2.0 U	1.6 U
trans-1,3-Dichloropropene	ug/kg	0.56 U	0.72 U	0.77 U	1.1 U	0.89 U	1.3 U	1.1 U	0.85 U	0.84 U	1000 U	0.84 U	1.4 U	1.2 U	0.64 U	0.71 U	0.71 U	0.58 U
Trichloroethene	ug/kg	7.4	0.79 U	0.85 U	1.1 U	3.3 J	1.3 U	5.2 J	0.85 U	0.84 U	1000 U	0.84 U	1.4 U	1.2 U	22	0.78 U	0.78 U	0.64 U
Vinyl chloride	ug/kg	0.73 U	0.94 U	1.0 U	1.5 U	1.3 U	1.9 U	1.6 U	1.2 U	1.2 U	1100 U	1.2 U	2.0 U	1.8 U	0.83 U	0.92 U	0.92 U	0.76 U
Xylenes, Total	ug/kg	1.7 U	2.2 U	2.3 U	1.6 U	1.4 U	2.0 U	1.7 U	1.3 U	1.3 U	1000 U	1.3 U	2.1 U	1.9 U	1.9 U	2.1 U	2.1 U	1.7 U
SVOCs																		
1,2,4-Trichlorobenzene	ug/kg									19 U								
1,2-Dichlorobenzene	ug/kg									19 U								
1,3-Dichlorobenzene	ug/kg									20 U								
1,4-Dichlorobenzene	ug/kg									21 U								
2,2'-oxybis[1-chloropropane]	ug/kg									20 U								
2,4,5-Trichlorophenol	ug/kg									53 U								
2,4,6-Trichlorophenol	ug/kg									38 U								
2,4-Dichlorophenol	ug/kg									40 U								
2,4-Dimethylphenol	ug/kg									69 U								
2,4-Dinitrophenol	ug/kg									210 U								
2,4-Dinitrotoluene	ug/kg									20 U								
2,6-Dinitrotoluene	ug/kg									20 U								
2-Chloronaphthalene	ug/kg									17 U								
2-Chlorophenol	ug/kg									33 U								
2-Methylnaphthalene	ug/kg									21 U								

Appendix A
Summary of Mixed Soil (0-10') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	N12-SS01 2.0 070911	P06-SS01 0.5 070911	P08-SS01 0.5 070911	P08-SS01 6.0 070911	P10-SS01 2.5 070914	P10-SS01 5.3 070914	P12-SS01 0.5 070911	P12-SS01 2.0 070911	P14-SS01 0.0 070911	P14-SS01 3.0 070911	P15-SS01 0.5 070911	P15-SS02 0.5 070911 Duplicate	P15-SS01 2.5 070911	P16-SS01 0.5 070911	P16-SS01 2.5 070911	P16-SS02 2.5 070911 Duplicate	Q13-SS01 0.5 070910
VOCs:																		
1,1,1-Trichloroethane	ug/kg	0.81 U	0.65 U	0.83 U	1.1 U	0.94 U	0.71 U	0.79 U	0.80 U	7.2 U	0.67 U	0.65 U	0.69 UJ	7.7 U	8.2 U	7.7 U	8.5 U	8.7 U
1,1,2,2-Tetrachloroethane	ug/kg	0.80 U	0.64 U	0.81 U	1.0 U	0.93 U	0.70 U	0.78 UJ	0.79 U	12 U	0.66 U	0.64 U	0.68 U	13 U	14 U	13 U	14 U	15 U
1,1,2-Trichloroethane	ug/kg	0.92 U	0.74 U	0.94 U	1.2 U	1.1 U	0.81 U	0.90 U	0.91 U	15 U	0.77 U	0.74 U	0.79 UJ	16 U	17 U	16 U	18 U	18 U
1,1-Dichloroethane	ug/kg	0.66 U	0.54 U	0.68 U	0.87 U	0.77 U	0.58 U	0.65 U	0.66 U	9.0 U	0.55 U	0.54 U	0.57 UJ	9.6 U	10 U	9.6 U	11 U	11 U
1,1-Dichloroethene	ug/kg	1.5 U	1.2 U	1.5 U	1.9 U	1.7 U	1.3 U	1.4 U	1.5 U	12 U	1.2 U	1.2 U	1.2 UJ	13 U	14 U	13 U	14 U	15 U
1,2-Dichloroethane	ug/kg	0.62 U	0.50 U	0.63 U	0.81 U	0.72 U	0.54 U	0.61 U	0.61 U	11 U	0.52 U	0.50 U	0.53 UJ	12 U	13 U	12 U	13 U	14 U
1,2-Dichloroethene, Total	ug/kg	5.9	1.2 U	1.5 U	1.9 U	1.7 U	1.3 U	1.4 U	1.5 U	17 U	1.2 U	1.2 U	1.2 UJ	18 U	79 J	18 U	87 J	21 U
1,2-Dichloropropane	ug/kg	0.62 U	0.50 U	0.63 U	0.81 U	0.72 U	0.54 U	0.61 U	0.61 U	12 U	0.52 U	0.50 U	0.53 UJ	12 U	13 U	13 U	14 U	14 U
2-Hexanone	ug/kg	1.3 U	1.1 U	1.4 U	1.8 U	1.6 U	1.2 U	1.3 U	1.3 U	55 U	1.1 U	1.1 U	1.2 U	59 U	63 U	59 U	65 U	67 U
Acetone	ug/kg	4.8 U	3.9 U	4.9 U	6.3 U	5.6 U	4.2 U	4.7 U	4.8 U	55 U	4.0 U	3.9 U	4.1 UJ	59 U	63 U	59 U	65 U	67 U
Benzene	ug/kg	0.77 U	0.63 U	0.79 U	1.0 U	0.90 U	0.68 U	0.76 U	0.77 U	4.0 U	0.65 U	0.63 U	0.66 UJ	4.2 U	4.5 U	4.2 U	4.7 U	4.8 U
Bromodichloromethane	ug/kg	0.64 U	0.52 U	0.65 U	0.84 U	0.75 U	0.56 U	0.63 U	0.64 U	7.6 U	0.53 U	0.52 U	0.55 UJ	8.2 U	8.7 U	8.2 U	9.0 U	9.2 U
Bromoform	ug/kg	0.83 U	0.67 U	0.85 U	1.1 U	0.97 U	0.73 U	0.82 U	0.83 U	16 U	0.69 U	0.67 U	0.71 U	17 U	18 U	17 U	19 U	19 U
Bromomethane	ug/kg	3.5 U	2.8 U	3.6 U	4.6 U	4.1 U	3.0 U	3.4 U	3.5 U	44 U	2.9 U	2.8 U	3.0 UJ	47 U	49 U	47 U	52 U	53 U
Carbon disulfide	ug/kg	1.1 U	0.91 U	1.1 U	1.5 U	1.3 U	0.98 U	1.1 U	1.1 U	8.1 U	0.94 U	0.91 U	0.96 UJ	8.6 U	9.2 U	8.7 U	9.6 U	9.8 U
Carbon tetrachloride	ug/kg	0.82 U	0.66 U	0.84 U	1.1 U	0.95 U	0.72 U	0.80 U	0.81 U	27 U	0.68 U	0.66 U	0.70 UJ	28 U	30 U	28 U	31 U	32 U
Chlorobenzene	ug/kg	0.63 U	0.51 U	0.64 U	0.82 U	0.73 U	0.55 U	0.62 U	0.62 U	11 U	0.52 U	0.51 U	0.54 U	12 U	12 U	12 U	13 U	13 U
Chloroethane	ug/kg	3.5 U	2.8 U	3.6 U	4.6 U	4.1 U	3.0 U	3.4 U	3.5 U	17 U	2.9 U	2.8 U	3.0 UJ	18 U	19 U	18 U	20 U	21 U
Chloroform	ug/kg	0.76 U	0.62 U	0.78 U	1.0 U	0.89 U	0.67 U	0.75 U	0.76 U	9.0 U	0.64 U	0.62 U	0.65 UJ	9.6 U	10 U	9.6 U	11 U	11 U
Chloromethane	ug/kg	1.5 U	1.2 U	1.5 U	1.9 U	1.7 U	1.3 U	1.4 U	1.5 U	18 U	1.2 U	1.2 U	1.2 UJ	20 U	21 U	20 U	22 U	22 U
cis-1,3-Dichloropropene	ug/kg	0.65 U	0.53 U	0.67 U	0.85 U	0.76 U	0.57 U	0.64 U	0.65 U	8.5 U	0.54 U	0.53 U	0.56 UJ	9.1 U	9.7 U	9.2 U	10 U	10 U
Dibromochloromethane	ug/kg	0.73 U	0.59 U	0.75 U	0.95 U	0.85 U	0.64 U	0.72 U	0.73 U	12 U	0.61 U	0.59 U	0.62 U	12 U	13 U	13 U	14 U	14 U
Ethylbenzene	ug/kg	0.72 U	0.58 U	0.73 U	0.94 U	0.84 U	0.63 U	0.71 U	0.71 U	7.6 U	0.60 U	0.58 U	0.62 U	8.2 U	8.7 U	8.2 U	9.0 U	9.2 U
Methyl Ethyl Ketone	ug/kg	2.5 U	2.0 U	2.5 U	3.2 U	2.9 U	2.2 U	2.4 U	2.5 U	50 U	2.1 U	2.0 U	2.1 UJ	53 U	57 U	54 U	59 U	60 U
Methyl Isobutyl Ketone	ug/kg	0.81 U	0.65 U	0.83 U	1.1 U	0.94 U	0.71 U	0.79 U	0.80 U	57 U	0.67 U	0.65 U	0.69 UJ	61 U	65 U	61 U	68 U	69 U
Methylene Chloride	ug/kg	1.8 U	1.5 U	1.8 U	2.4 U	2.1 U	1.6 U	1.8 U	1.8 U	27 U	1.5 U	1.5 U	1.5 UJ	28 U	30 U	28 U	31 U	32 U
Styrene	ug/kg	0.69 U	0.56 U	0.71 U	0.91 U	0.81 U	0.61 U	0.68 U	0.69 U	14 U	0.58 U	0.56 U	0.60 U	15 U	16 U	15 U	17 U	17 U
Tetrachloroethene	ug/kg	260	0.82 U	1.0 U	11	53	110	140	6.5	920	0.84 U	48	63	2200	15000	1700	23000	2100
Toluene	ug/kg	1.9 U	1.5 U	2.0 U	2.5 U	2.2 U	1.7 U	1.9 U	1.9 U	5.4 U	1.6 U	1.5 U	1.6 UJ	5.8 U	6.1 U	5.8 U	6.4 U	6.5 U
trans-1,3-Dichloropropene	ug/kg	0.67 U	0.54 U	0.69 U	0.88 U	0.78 U	0.59 U	0.66 U	0.67 U	17 U	0.56 U	0.54 U	0.58 UJ	18 U	19 U	18 U	20 U	20 U
Trichloroethene	ug/kg	17	0.60 U	0.76 U	0.97 U	21	5.0	0.73 U	0.74 U	9.9 U	0.62 U	0.60 U	0.63 UJ	11 U	100	11 U	140	12 U
Vinyl chloride	ug/kg	0.87 U	0.71 U	0.90 U	1.1 U	1.0 U	0.77 U	0.86 U	0.87 U	11 U	0.73 U	0.71 U	0.75 UJ	12 U	13 U	12 U	13 U	14 U
Xylenes, Total	ug/kg	2.0 U	1.6 U	2.1 U	2.6 U	2.4 U	1.8 U	2.0 U	2.0 U	19 U	1.7 U	1.6 U	1.7 U	21 U	22 U	21 U	23 U	23 U
SVOCs																		
1,2,4-Trichlorobenzene	ug/kg									41 U	41 U					41 U	42 U	
1,2-Dichlorobenzene	ug/kg									38 U	37 U					38 U	39 U	
1,3-Dichlorobenzene	ug/kg									35 U	35 U					35 U	36 U	
1,4-Dichlorobenzene	ug/kg									42 U	41 U					41 U	42 U	
2,2'-oxybis[1-chloropropane]	ug/kg									44 U	43 U					43 U	44 U	
2,4,5-Trichlorophenol	ug/kg									110 U	110 U					110 U	110 U	
2,4,6-Trichlorophenol	ug/kg									77 U	76 U					77 U	78 U	
2,4-Dichlorophenol	ug/kg									80 U	79 U					79 U	81 U	
2,4-Dimethylphenol	ug/kg									80 U	79 U					79 U	81 U	
2,4-Dinitrophenol	ug/kg									520 U	510 U					520 U	530 U	
2,4-Dinitrotoluene	ug/kg									59 U	59 U					59 U	60 U	
2,6-Dinitrotoluene	ug/kg									51 U	50 U					50 U	52 U	
2-Chloronaphthalene	ug/kg									40 U	39 UJ					39 U	40 U	
2-Chlorophenol	ug/kg									47 U	46 U					47 U	48 U	
2-Methylnaphthalene	ug/kg									44 U	44 U					44 U	45 U	

Appendix A
Summary of Mixed Soil (0-10') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	Q13-SS01 2.0 070910	Q16-SS01 0.5 070910	Q16-SS01 1.0 070910	Q17-SS01 0.5 070910	Q17-SS02 0.5 070910 Duplicate	Q17-SS01 2.9 070910	R06-SS01 0.5 070911	R08-SS01 0.5 070911	R08-SS01 9.3 070911	R08-SS02 9.3 070911 Duplicate	R10-SS01 2.0 070914	R10-SS01 3.5 070914	R13-SS01 0.5 070910	R13-SS01 1.5 070910	R17-SS01 0.5 070910	R17-SS01 3.5 070910	S13-SS01 0.5 070910
VOCs:																		
1,1,1-Trichloroethane	ug/kg	0.65 U	0.74 U	7.9 U	0.95 U	0.76 U	0.69 U	0.83 U	0.93 U	0.72 U	0.78 U	0.71 U	9.8 U	0.85 U	0.71 U	0.67 U	0.76 U	0.88 U
1,1,2,2-Tetrachloroethane	ug/kg	0.64 U	0.72 U	13 U	0.94 U	0.74 U	0.68 U	0.82 U	0.92 U	0.71 U	0.77 U	0.70 U	17 U	0.84 U	0.70 U	0.66 U	0.75 U	0.87 U
1,1,2-Trichloroethane	ug/kg	0.74 U	0.84 U	16 U	1.1 U	0.86 U	0.79 U	0.95 U	1.1 U	0.82 U	0.89 U	0.80 U	20 U	0.97 U	0.81 U	0.77 U	0.86 U	1.0 U
1,1-Dichloroethane	ug/kg	0.53 U	0.60 U	9.9 U	0.78 U	0.62 U	0.57 U	0.68 U	0.77 U	0.59 U	0.64 U	0.58 U	12 U	0.70 U	0.58 U	0.55 U	0.62 U	0.72 U
1,1-Dichloroethene	ug/kg	1.2 U	1.3 U	13 U	1.7 U	1.4 U	1.2 U	1.5 U	1.7 U	1.3 U	1.4 U	1.3 U	17 U	1.5 U	1.3 U	1.2 U	1.4 U	1.6 U
1,2-Dichloroethane	ug/kg	0.49 U	0.56 U	12 U	0.73 U	0.58 U	0.53 U	0.63 U	0.71 U	0.55 U	0.60 U	0.54 U	15 U	0.65 U	0.54 U	0.51 U	0.58 U	0.67 U
1,2-Dichloroethene, Total	ug/kg	1.2 U	1.3 U	19 U	1.7 U	1.4 U	1.2 U	1.5 U	1.7 U	1.3 U	1.4 U	1.3 U	23 U	1.5 U	1.3 U	1.2 U	1.4 U	1.6 U
1,2-Dichloropropane	ug/kg	0.49 U	0.56 U	13 U	0.73 U	0.58 U	0.53 U	0.63 U	0.71 U	0.55 U	0.60 U	0.54 U	16 U	0.65 U	0.54 U	0.51 U	0.58 U	0.67 U
2-Hexanone	ug/kg	1.1 U	1.2 U	61 U	1.6 U	1.3 U	1.2 U	1.4 U	1.6 U	1.2 U	1.3 U	1.2 U	75 U	1.4 U	1.2 U	1.1 U	1.3 U	1.5 U
Acetone	ug/kg	3.9 U	4.4 U	61 U	160 J	200 J	4.1 U	5.0 U	5.6 U	4.3 U	4.7 U	4.2 U	75 U	5.1 U	4.2 U	4.0 U	4.5 U	5.2 U
Benzene	ug/kg	0.62 U	0.70 U	4.3 U	0.91 U	0.72 U	0.66 U	0.80 U	0.90 U	0.69 U	0.75 U	0.68 U	5.4 U	0.82 U	0.68 U	0.65 U	0.73 U	0.84 U
Bromodichloromethane	ug/kg	0.51 U	0.58 U	8.4 U	0.75 U	0.60 U	0.55 U	0.66 U	0.74 U	0.57 U	0.62 U	0.56 U	10 U	0.68 U	0.56 U	0.53 U	0.60 U	0.70 U
Bromoform	ug/kg	0.66 U	0.76 U	17 U	0.98 U	0.78 U	0.71 U	0.85 U	0.96 U	0.74 U	0.81 U	0.73 U	21 U	0.88 U	0.73 U	0.69 U	0.78 U	0.90 U
Bromomethane	ug/kg	2.8 U	3.2 U	48 U	4.1 U	3.3 U	3.0 U	3.6 U	4.0 U	3.1 U	3.4 U	3.0 U	59 U	3.7 U	3.0 U	2.9 U	3.3 U	3.8 U
Carbon disulfide	ug/kg	0.90 U	1.0 U	8.9 U	1.3 U	1.0 U	0.96 U	1.2 U	1.3 U	1.0 U	1.1 U	0.98 U	11 U	1.2 U	0.98 U	0.94 U	1.1 U	1.2 U
Carbon tetrachloride	ug/kg	0.66 U	0.75 U	29 U	0.97 U	0.77 U	0.70 U	0.84 U	0.95 U	0.73 U	0.80 U	0.72 U	36 U	0.86 U	0.72 U	0.68 U	0.77 U	0.89 U
Chlorobenzene	ug/kg	0.50 U	0.57 U	12 U	0.74 U	0.59 U	0.54 U	0.65 U	0.73 U	0.56 U	0.61 U	0.55 U	15 U	0.66 U	0.55 U	0.52 U	0.59 U	0.68 U
Chloroethane	ug/kg	2.8 U	3.2 U	19 U	4.1 U	3.3 U	3.0 U	3.6 U	4.0 U	3.1 U	3.4 U	3.0 U	4.3 U	3.7 U	3.0 U	2.9 U	3.3 U	3.8 U
Chloroform	ug/kg	0.61 U	0.69 U	9.9 U	0.90 U	0.71 U	0.65 U	0.78 U	0.88 U	0.68 U	0.74 U	0.67 U	12 U	0.81 U	0.67 U	0.64 U	0.72 U	0.83 U
Chloromethane	ug/kg	1.2 U	1.3 U	20 U	1.7 U	1.4 U	1.2 U	1.5 U	1.7 U	1.3 U	1.4 U	1.3 U	25 U	1.5 U	1.3 U	1.2 U	1.4 U	1.6 U
cis-1,3-Dichloropropene	ug/kg	0.52 U	0.59 U	9.4 U	0.77 U	0.61 U	0.56 U	0.67 U	0.75 U	0.58 U	0.63 U	0.57 U	12 U	0.69 U	0.57 U	0.54 U	0.61 U	0.71 U
Dibromochloromethane	ug/kg	0.58 U	0.66 U	13 U	0.86 U	0.68 U	0.62 U	0.75 U	0.84 U	0.65 U	0.71 U	0.64 U	16 U	0.77 U	0.64 U	0.61 U	0.68 U	0.79 U
Ethylbenzene	ug/kg	0.57 U	0.65 U	8.4 U	0.85 U	0.67 U	0.61 U	0.74 U	0.83 U	0.64 U	0.70 U	0.63 U	10 U	0.76 U	0.63 U	0.60 U	0.67 U	0.78 U
Methyl Ethyl Ketone	ug/kg	2.0 U	2.2 U	55 U	7.0	9.9	2.1 U	2.5 U	2.9 U	2.2 U	2.4 U	2.2 U	68 U	2.6 U	2.2 U	2.1 U	2.3 U	2.7 U
Methyl Isobutyl Ketone	ug/kg	0.65 U	0.74 U	63 U	0.95 U	0.76 U	0.69 U	0.83 U	0.93 U	0.72 U	0.78 U	0.71 U	78 U	0.85 U	0.71 U	0.67 U	0.76 U	0.88 U
Methylene Chloride	ug/kg	1.4 U	1.6 U	29 U	2.1 U	1.7 U	1.5 U	1.8 U	2.1 U	1.6 U	1.7 U	1.6 U	36 U	1.9 U	1.6 U	1.5 U	1.7 U	2.0 U
Styrene	ug/kg	0.56 U	0.63 U	16 U	0.82 U	0.65 U	0.59 U	0.71 U	0.80 U	0.62 U	0.68 U	0.61 U	20 U	0.73 U	0.61 U	0.58 U	0.65 U	0.76 U
Tetrachloroethene	ug/kg	87	49	490	1.2 U	0.94 U	0.86 U	1.0 U	1.2 U	22	0.98 U	100	380	6.4	24	0.84 U	0.95 U	47
Toluene	ug/kg	1.5 U	1.7 U	5.9 U	2.3 U	1.8 U	1.6 U	2.0 U	2.2 U	1.7 U	1.9 U	1.7 U	7.4 U	2.0 U	1.7 U	1.6 U	1.8 U	2.1 U
trans-1,3-Dichloropropene	ug/kg	0.54 U	0.61 U	18 U	0.79 U	0.63 U	0.58 U	0.69 U	0.78 U	0.60 U	0.65 U	0.59 U	23 U	0.71 U	0.59 U	0.56 U	0.63 U	0.73 U
Trichloroethene	ug/kg	0.59 U	0.67 U	11 U	0.87 U	0.69 U	0.63 U	0.76 U	0.86 U	0.66 U	0.72 U	6.4	13 U	0.78 U	0.65 U	0.62 U	0.69 U	0.81 U
Vinyl chloride	ug/kg	0.70 U	0.80 U	12 U	1.0 U	0.82 U	0.75 U	0.90 U	1.0 U	0.78 U	0.85 U	0.76 U	15 U	0.92 U	0.77 U	0.73 U	0.82 U	0.95 U
Xylenes, Total	ug/kg	1.6 U	1.8 U	21 U	2.4 U	1.9 U	1.7 U	2.1 U	2.3 U	1.8 U	2.0 U	1.8 U	26 U	2.1 U	1.8 U	1.7 U	1.9 U	2.2 U
SVOCs																		
1,2,4-Trichlorobenzene	ug/kg																	
1,2-Dichlorobenzene	ug/kg																	
1,3-Dichlorobenzene	ug/kg																	
1,4-Dichlorobenzene	ug/kg																	
2,2'-oxybis[1-chloropropane]	ug/kg																	
2,4,5-Trichlorophenol	ug/kg																	
2,4,6-Trichlorophenol	ug/kg																	
2,4-Dichlorophenol	ug/kg																	
2,4-Dimethylphenol	ug/kg																	
2,4-Dinitrophenol	ug/kg																	
2,4-Dinitrotoluene	ug/kg																	
2,6-Dinitrotoluene	ug/kg																	
2-Chloronaphthalene	ug/kg																	
2-Chlorophenol	ug/kg																	
2-Methylnaphthalene	ug/kg																	

Appendix A
Summary of Mixed Soil (0-10') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	S13-SS01 1.0 070910	S15-SS01 0.5 070910	S15-SS01 2.5 070910	S17-SS01 0.5 070910	S17-SS01 2.7 070910	T10-SS01 2.0 070914	T10-SS02 2.0 070914 Duplicate	T14-SS01 0.5 070910	T14-SS01 1.7 070910	T15-SS01 0.5 070910	T15-SS01 1.5 070910	T16-SS01 0.5 070910	T16-SS01 1.4 070910	MW1-SS01 8.0 080512 (OU6)	MW10-SS01 8.0 080512 (OU6)	MW10-SS02 8.0 080512 Duplicate	MW14-SS01 10.0 090603 West of OU2
VOCs:																		
1,1,1-Trichloroethane	ug/kg	0.72 U	8.4 UJ	8.1 U	0.71 U	0.71 U	0.69 U	0.73 U	0.66 U	0.69 U	0.65 U	0.80 U	0.71 U	0.75 U	0.9 U	0.91 U	0.93 U	0.82 U
1,1,2,2-Tetrachloroethane	ug/kg	0.71 U	14 UJ	14 U	0.70 U	0.70 U	0.68 U	0.72 U	0.65 U	0.68 U	0.64 U	0.79 U	0.70 U	0.74 U	1.2 U	1.2 U	1.2 U	1.1 U
1,1,2-Trichloroethane	ug/kg	0.82 U	17 U	17 U	0.81 U	0.81 U	0.79 U	0.83 U	0.76 U	0.78 U	0.74 U	0.91 U	0.81 U	0.86 U	1.8 U	1.8 U	1.9 U	1.7 U
1,1-Dichloroethane	ug/kg	0.59 U	10 UJ	10 U	0.58 U	0.58 U	0.57 U	0.59 U	0.54 U	0.56 U	0.54 U	0.66 U	0.58 U	0.62 U	0.97 U	0.98 U	1 U	0.89 U
1,1-Dichloroethene	ug/kg	1.3 U	14 UJ	14 U	1.3 U	1.3 U	1.2 U	1.3 U	1.2 U	1.2 U	1.2 U	1.4 U	1.3 U	1.4 U	0.89 U	0.9 U	0.92 U	0.81 U
1,2-Dichloroethane	ug/kg	0.55 U	13 U	13 U	0.54 U	0.54 U	0.53 U	0.55 U	0.51 U	0.53 U	0.50 U	0.61 U	0.54 U	0.58 U	1.1 U	1.1 U	1.1 U	1 U
1,2-Dichloroethene, Total	ug/kg	1.3 U	20 U	19 U	1.3 U	1.3 U	1.2 U	1.3 U	1.2 U	1.2 U	1.2 U	1.4 U	1.3 U	1.4 U	1.9 U	1.9 U	2 U	1.8 U
1,2-Dichloropropane	ug/kg	0.55 U	14 U	13 U	0.54 U	0.54 U	0.53 U	0.55 U	0.51 U	0.53 U	0.50 U	0.61 U	0.54 U	0.58 U	0.95 U	0.96 U	0.98 U	0.87 U
2-Hexanone	ug/kg	1.2 U	64 UJ	62 U	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	1.2 U	1.3 U	1.2 U	1.2 U	1.2 U	1.1 U
Acetone	ug/kg	4.3 U	64 UJ	62 U	4.3 U	4.2 U	4.1 U	4.3 U	4.0 U	4.1 U	3.9 U	4.8 U	4.2 U	4.5 U	1.9 U	1.9 U	2 U	1.8 U
Benzene	ug/kg	0.69 U	4.6 U	4.5 U	0.68 U	0.68 U	0.66 U	0.70 U	0.64 U	0.66 U	0.63 U	0.77 U	0.68 U	0.72 U	0.86 U	0.87 U	0.88 U	0.79 U
Bromodichloromethane	ug/kg	0.57 U	8.9 U	8.6 U	0.56 U	0.56 U	0.55 U	0.57 U	0.53 U	0.54 U	0.52 U	0.63 U	0.56 U	0.60 U	0.79 U	0.79 U	0.81 U	0.72 U
Bromoform	ug/kg	0.74 U	18 UJ	18 U	0.73 U	0.73 U	0.71 U	0.75 U	0.68 U	0.71 U	0.67 U	0.82 U	0.73 U	0.77 U	1 U	1 U	1 U	0.92 U
Bromomethane	ug/kg	3.1 U	51 UJ	49 U	3.1 U	3.1 U	3.0 U	3.1 U	2.9 U	3.0 U	2.8 U	3.4 U	3.0 U	3.2 U	2.2 U	2.2 U	2.3 U	2 U
Carbon disulfide	ug/kg	1.0 U	9.4 UJ	9.1 U	0.99 U	0.98 U	0.96 U	1.0 U	0.92 U	0.96 U	0.91 U	1.1 U	0.98 U	1.0 U	0.95 U	0.96 U	0.98 U	0.87 U
Carbon tetrachloride	ug/kg	0.73 U	31 U	30 U	0.72 U	0.72 U	0.70 U	0.74 U	0.67 U	0.70 U	0.66 U	0.81 U	0.72 U	0.76 U	0.95 U	0.96 U	0.98 U	0.87 U
Chlorobenzene	ug/kg	0.56 U	13 UJ	12 U	0.55 U	0.55 U	0.54 U	0.56 U	0.52 U	0.54 U	0.51 U	0.62 U	0.55 U	0.59 U	0.69 U	0.69 U	0.71 U	0.63 U
Chloroethane	ug/kg	3.1 U	20 UJ	19 U	3.1 U	3.1 U	3.0 U	3.1 U	2.9 U	3.0 U	2.8 U	3.4 U	3.0 U	3.2 U	1.2 U	1.2 U	1.2 U	1.1 U
Chloroform	ug/kg	0.68 U	10 UJ	10 U	0.67 U	0.67 U	0.65 U	0.69 U	0.63 U	0.65 U	0.62 U	0.76 U	0.67 U	0.71 U	0.99 U	1 U	1 U	0.91 U
Chloromethane	ug/kg	1.3 U	21 UJ	21 U	1.3 U	1.3 U	1.2 U	1.3 U	1.2 U	1.2 U	1.2 U	1.4 U	1.3 U	1.4 U	1.6 U	1.6 U	1.7 U	1.5 U
cis-1,3-Dichloropropene	ug/kg	0.58 U	9.9 U	9.6 U	0.57 U	0.57 U	0.56 U	0.58 U	0.53 U	0.55 U	0.53 U	0.64 U	0.57 U	0.61 U	0.81 U	0.82 U	0.83 U	0.74 U
Dibromochloromethane	ug/kg	0.65 U	14 UJ	13 U	0.64 U	0.64 U	0.62 U	0.66 U	0.60 U	0.62 U	0.59 U	0.72 U	0.64 U	0.68 U	0.84 U	0.85 U	0.86 U	0.77 U
Ethylbenzene	ug/kg	0.64 U	8.9 UJ	8.6 U	0.63 U	0.63 U	0.61 U	0.64 U	0.59 U	0.61 U	0.58 U	0.71 U	0.63 U	0.67 U	0.72 U	0.72 U	0.74 U	0.66 U
Methyl Ethyl Ketone	ug/kg	2.2 U	58 UJ	56 U	2.2 U	2.2 U	2.1 U	2.2 U	2.0 U	2.1 U	2.0 U	2.4 U	2.2 U	2.3 U	1.8 U	1.8 U	1.9 U	1.7 U
Methyl Isobutyl Ketone	ug/kg	0.72 U	66 U	64 U	0.71 U	0.71 U	0.69 U	0.73 U	0.66 U	0.69 U	0.65 U	0.80 U	0.71 U	0.75 U	1.5 U	1.5 U	1.6 U	1.4 U
Methylene Chloride	ug/kg	1.6 U	31 UJ	30 U	1.6 U	1.6 U	1.5 U	1.6 U	1.5 U	1.5 U	1.5 U	1.8 U	1.6 U	1.7 U	0.79 U	0.79 U	0.81 U	0.72 U
Styrene	ug/kg	0.62 U	17 UJ	16 U	0.61 U	0.61 U	0.59 U	0.62 U	0.57 U	0.59 U	0.56 U	0.69 U	0.61 U	0.65 U	0.76 U	0.76 U	0.78 U	0.69 U
Tetrachloroethene	ug/kg	13	470 J	21000	0.89 U	0.89 U	0.86 U	0.91 U	0.83 U	0.86 U	0.82 U	1.0 U	0.88 U	0.94 U	0.81 U	0.82 U	0.83 U	0.74 U
Toluene	ug/kg	1.7 U	6.3 U	6.1 U	1.7 U	1.7 U	1.6 U	1.7 U	1.6 U	1.6 U	1.5 U	1.9 U	1.7 U	1.8 U	0.89 U	0.9 U	0.92 U	0.81 U
trans-1,3-Dichloropropene	ug/kg	0.60 U	19 U	19 U	0.59 U	0.59 U	0.57 U	0.60 U	0.55 U	0.57 U	0.54 U	0.67 U	0.59 U	0.63 U	0.97 U	0.98 U	1 u	0.89 U
Trichloroethene	ug/kg	0.66 U	11 U	11 U	0.65 U	0.65 U	0.63 U	0.67 U	0.61 U	0.63 U	0.60 U	0.73 U	0.65 U	0.69 U	0.97 U	0.98 U	1 U	0.89 U
Vinyl chloride	ug/kg	0.78 U	13 UJ	13 U	0.77 U	0.77 U	0.75 U	0.79 U	0.72 U	0.75 U	0.71 U	0.87 U	0.77 U	0.82 U	1.4 U	1.4 U	1.5 U	1.3 U
Xylenes, Total	ug/kg	1.8 U	22 UJ	22 U	1.8 U	1.8 U	1.7 U	1.8 U	1.7 U	1.7 U	1.6 U	2.0 U	1.8 U	1.9 U	1.5 U	1.5 U	1.6 U	1.4 U
SVOCs																		
1,2,4-Trichlorobenzene	ug/kg																	
1,2-Dichlorobenzene	ug/kg																	
1,3-Dichlorobenzene	ug/kg																	
1,4-Dichlorobenzene	ug/kg																	
2,2'-oxybis[1-chloropropane]	ug/kg																	
2,4,5-Trichlorophenol	ug/kg																	
2,4,6-Trichlorophenol	ug/kg																	
2,4-Dichlorophenol	ug/kg																	
2,4-Dimethylphenol	ug/kg																	
2,4-Dinitrophenol	ug/kg																	
2,4-Dinitrotoluene	ug/kg																	
2,6-Dinitrotoluene	ug/kg																	
2-Chloronaphthalene	ug/kg																	
2-Chlorophenol	ug/kg																	
2-Methylnaphthalene	ug/kg																	

Appendix A
Summary of Mixed Soil (0-10') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Location	MW5-SS01	MW6-SS01	MW7-SS01	MW7-SS02	MW8-SS01	MW8-SS01	MW90SS01
Depth	8.4	7.0	5.0	5.0	8.0	10.0	5.5
Date	080514	080514	081104	081104	080513	090105	080512
Analyte/Parameter Name	Units	(OU6)	(OU6)	West of OU2	Duplicate	East of OU2	East of OU2	North of OU2
VOCs:								
1,1,1-Trichloroethane	ug/kg	0.94 U	0.79 U	0.95 U	0.75 U	1.1 U	1.1 U	0.98 U
1,1,2,2-Tetrachloroethane	ug/kg	1.3 U	1.1 U	1.3 U	1 U	1.4 U	1.5 U	1.3 U
1,1,2-Trichloroethane	ug/kg	1.9 U	1.6 U	1.9 U	1.5 U	2.1 U	2.3 U	2 U
1,1-Dichloroethane	ug/kg	1 U	0.85 U	1 U	0.81 U	1.1 U	1.2 U	1.1 U
1,1-Dichloroethene	ug/kg	0.93 U	0.78 U	0.94 U	0.74 U	1 U	1.1 U	0.97 U
1,2-Dichloroethane	ug/kg	1.2 U	0.98 U	1.2 U	0.92 U	1.3 U	1.4 U	1.2 U
1,2-Dichloroethene, Total	ug/kg	2 U	1.7 U	2 U	1.6 U	2.2 U	2.4 U	2.1 U
1,2-Dichloropropane	ug/kg	0.99 U	0.84 U	1 U	0.79 U	1.1 U	1.2 U	1 U
2-Hexanone	ug/kg	1.3 U	1.1 U	1.3 U	1 U	1.4 U	1.5 U	1.3 U
Acetone	ug/kg	2 U	1.7 U	2 U	1.6 U	2.2 U	2.4 U	2.1 U
Benzene	ug/kg	0.9 U	0.76 U	0.91 U	0.71 U	1 U	1.1 U	0.94 U
Bromodichloromethane	ug/kg	0.82 U	0.69 U	0.84 U	0.66 U	0.92 U	0.99 U	0.86 U
Bromoform	ug/kg	1.1 U	0.89 U	1.1 U	0.84 U	1.2 U	1.3 U	1.1 U
Bromomethane	ug/kg	2.3 U	2 U	2.4 U	1.8 U	2.6 U	2.8 U	2.4 U
Carbon disulfide	ug/kg	0.99 U	0.84 U	1 U	0.79 U	1.1 U	1.2 U	1 U
Carbon tetrachloride	ug/kg	0.99 U	0.84 U	1 U	0.79 U	1.1 U	1.2 U	1 U
Chlorobenzene	ug/kg	0.72 U	0.6 U	0.73 U	0.57 U	0.8 U	0.87 U	0.75 U
Chloroethane	ug/kg	1.3 U	1.1 U	1.3 U	1 U	1.4 U	1.5 U	1.3 U
Chloroform	ug/kg	1 U	0.87 U	1.1 U	0.82 U	1.2 U	1.2 U	1.1 U
Chloromethane	ug/kg	1.7 U	1.4 U	1.7 U	1.3 U	1.9 U	2 U	1.8 U
cis-1,3-Dichloropropene	ug/kg	0.85 U	0.71 U	0.86 U	0.67 U	0.94 U	1 U	0.88 U
Dibromochloromethane	ug/kg	0.88 U	0.74 U	0.89 U	0.7 U	0.98 U	1.1 U	0.92 U
Ethylbenzene	ug/kg	0.75 U	0.63 U	0.76 U	0.6 U	0.84 U	0.9 U	0.78 U
Methyl Ethyl Ketone	ug/kg	1.9 U	1.6 U	1.9 U	1.5 U	2.1 U	2.3 U	2 U
Methyl Isobutyl Ketone	ug/kg	1.6 U	1.3 U	1.6 U	1.3 U	1.8 U	1.9 U	1.7 U
Methylene Chloride	ug/kg	0.82 U	0.69 U	0.84 U	0.66 U	0.92 U	0.99 U	0.86 U
Styrene	ug/kg	0.79 U	0.67 U	0.8 U	0.63 U	0.89 U	0.95 U	0.83 U
Tetrachloroethene	ug/kg	0.85 U	0.71 U	0.86 U	0.67 U	0.94 U	1 U	0.88 U
Toluene	ug/kg	0.93 U	0.78 U	0.94 U	0.74 U	1 U	1.1 U	0.97 U
trans-1,3-Dichloropropene	ug/kg	1 U	0.85 U	1 U	0.81 U	1.1 U	1.2 U	1.1 U
Trichloroethene	ug/kg	1 U	0.85 U	1 U	0.81 U	1.1 U	1.2 U	1.1 U
Vinyl chloride	ug/kg	1.5 U	1.2 U	1.5 U	1.2 U	1.7 U	1.8 U	1.5 U
Xylenes, Total	ug/kg	1.6 U	1.3 U	1.6 U	1.3 U	1.8 U	1.9 U	1.7 U
SVOCs								
1,2,4-Trichlorobenzene	ug/kg							
1,2-Dichlorobenzene	ug/kg							
1,3-Dichlorobenzene	ug/kg							
1,4-Dichlorobenzene	ug/kg							
2,2'-oxybis[1-chloropropane]	ug/kg							
2,4,5-Trichlorophenol	ug/kg							
2,4,6-Trichlorophenol	ug/kg							
2,4-Dichlorophenol	ug/kg							
2,4-Dimethylphenol	ug/kg							
2,4-Dinitrophenol	ug/kg							
2,4-Dinitrotoluene	ug/kg							
2,6-Dinitrotoluene	ug/kg							
2-Chloronaphthalene	ug/kg							
2-Chlorophenol	ug/kg							
2-Methylnaphthalene	ug/kg							

Appendix A
Summary of Mixed Soil (0-10') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	B02-SS01 1.0 070912	B04-SS01 1.0 070912	B04-SS02 1.0 070912 Duplicate	B04-SS01 4.0 070912	B08-SS01 1.4 070912	B10-SS01 3.5 070913	C06-SS01 1.7 070912	D04-SS01 2.0 070912	D10-SS01 2.0 07913	D10-SS01 10.0 07913	E02-SS01 2.0 070912	E06-SS01 1.0 07913	E08-SS01 1.5 07913	F10-SS01 3.0 070913	F10-SS01 8.5 070913	F10-SS02 8.5 070913 Duplicate	H10-SS01 3.5 070913
2-Methylphenol	ug/kg				56 U													
2-Nitroaniline	ug/kg				58 U													
2-Nitrophenol	ug/kg				110 U													
3 & 4 Methylphenol	ug/kg																	
3,3'-Dichlorobenzidine	ug/kg				47 U													
3-Nitroaniline	ug/kg				180 U													
4,6-Dinitro-2-methylphenol	ug/kg				160 U													
4-Bromophenyl phenyl ether	ug/kg				50 U													
4-Chloro-3-methylphenol	ug/kg				120 U													
4-Chloroaniline	ug/kg				200 U													
4-Chlorophenyl phenyl ether	ug/kg				46 U													
4-Methylphenol	ug/kg				71 U													
4-Nitroaniline	ug/kg				81 U													
4-Nitrophenol	ug/kg				140 U													
Acenaphthene	ug/kg				8.4 U													
Acenaphthylene	ug/kg				12 U													
Anthracene	ug/kg				14 U													
Benzo[a]anthracene	ug/kg				6.4 U													
Benzo[a]pyrene	ug/kg				9.6 U													
Benzo[b]fluoranthene	ug/kg				20 J													
Benzo[g,h,i]perylene	ug/kg				6.8 U													
Benzo[k]fluoranthene	ug/kg				8.9 U													
Bis(2-chloroethoxy)methane	ug/kg				43 U													
Bis(2-chloroethyl)ether	ug/kg				56 U													
Bis(2-ethylhexyl) phthalate	ug/kg				56 U													
Butyl benzyl phthalate	ug/kg				57 U													
Carbazole	ug/kg				51 U													
Chrysene	ug/kg				15 J													
Dibenz(a,h)anthracene	ug/kg				22 U													
Dibenzofuran	ug/kg				40 U													
Diethyl phthalate	ug/kg				52 U													
Dimethyl phthalate	ug/kg				46 U													
Di-n-butyl phthalate	ug/kg				52 U													
Di-n-octyl phthalate	ug/kg				53 U													
Fluoranthene	ug/kg				23 J													
Fluorene	ug/kg				8.9 U													
Hexachlorobenzene	ug/kg				8.8 U													
Hexachlorobutadiene	ug/kg				43 U													
Hexachlorocyclopentadiene	ug/kg				220 U													
Hexachloroethane	ug/kg				45 U													
Indeno[1,2,3-cd]pyrene	ug/kg				22 U													
Isophorone	ug/kg				48 U													
Naphthalene	ug/kg				7.9 U													
Nitrobenzene	ug/kg				11 U													
N-Nitrosodi-n-propylamine	ug/kg				54 U													
N-Nitrosodiphenylamine	ug/kg				46 U													
Pentachlorophenol	ug/kg				280 U													
Phenanthrene	ug/kg				13 U													
Phenol	ug/kg				53 U													
Pyrene	ug/kg				18 J													

Appendix A
Summary of Mixed Soil (0-10') Analytical Results
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New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	H10-SS01 6.4 070913	K10-SS01 2.5 070913	K10-SS01 6.0 070913	MC01-SS01 0.8 080621	MC02-SS01 0.6 080621	MC02-SS01 2.7 080621	MC03-SS01 0.7 080621	MC03-SS01 5.0 080621	MC04-SS01 1.3 080621	MC04-SS01 6.6 080621	MC05-SS01 1.3 080621	MC05-SS01 9.0 080621	MC05-SS02 9.0 080621 Duplicate	M10-SS01 3.0 070914	M10-SS01 4.9 070914	M10-SS02 4.9 070914 Duplicate	N12-SS01 1.0 070911
2-Methylphenol	ug/kg									37 U								
2-Nitroaniline	ug/kg									21 U								
2-Nitrophenol	ug/kg									46 U								
3 & 4 Methylphenol	ug/kg									35 U								
3,3'-Dichlorobenzidine	ug/kg									55 U								
3-Nitroaniline	ug/kg									74 U								
4,6-Dinitro-2-methylphenol	ug/kg									46 U								
4-Bromophenyl phenyl ether	ug/kg									15 U								
4-Chloro-3-methylphenol	ug/kg									92 U								
4-Chloroaniline	ug/kg									150 U								
4-Chlorophenyl phenyl ether	ug/kg									16 U								
4-Methylphenol	ug/kg																	
4-Nitroaniline	ug/kg									81 U								
4-Nitrophenol	ug/kg									66 U								
Acenaphthene	ug/kg									4.8 U								
Acenaphthylene	ug/kg									4.0 U								
Anthracene	ug/kg									4.4 U								
Benzo[a]anthracene	ug/kg									4.8 U								
Benzo[a]pyrene	ug/kg									3.5 U								
Benzo[b]fluoranthene	ug/kg									8.3 U								
Benzo[g,h,i]perylene	ug/kg									6.5 U								
Benzo[k]fluoranthene	ug/kg									8.0 U								
Bis(2-chloroethoxy)methane	ug/kg									23 U								
Bis(2-chloroethyl)ether	ug/kg									25 U								
Bis(2-ethylhexyl) phthalate	ug/kg									32 U								
Butyl benzyl phthalate	ug/kg									17 U								
Carbazole	ug/kg									14 U								
Chrysene	ug/kg									5.9 U								
Dibenz(a,h)anthracene	ug/kg									4.6 U								
Dibenzofuran	ug/kg									14 U								
Diethyl phthalate	ug/kg									19 U								
Dimethyl phthalate	ug/kg									15 U								
Di-n-butyl phthalate	ug/kg									15 U								
Di-n-octyl phthalate	ug/kg									17 U								
Fluoranthene	ug/kg									4.9 U								
Fluorene	ug/kg									4.0 U								
Hexachlorobenzene	ug/kg									5.4 U								
Hexachlorobutadiene	ug/kg									22 U								
Hexachlorocyclopentadiene	ug/kg									130 U								
Hexachloroethane	ug/kg									20 U								
Indeno[1,2,3-cd]pyrene	ug/kg									4.9 U								
Isophorone	ug/kg									15 U								
Naphthalene	ug/kg									3.9 U								
Nitrobenzene	ug/kg									6.9 U								
N-Nitrosodi-n-propylamine	ug/kg									26 U								
N-Nitrosodiphenylamine	ug/kg									11 U								
Pentachlorophenol	ug/kg									140 U								
Phenanthrene	ug/kg									3.3 U								
Phenol	ug/kg									33 U								
Pyrene	ug/kg									4.4 U								

Appendix A
Summary of Mixed Soil (0-10') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

Location Depth Date	N12-SS01 2.0 070911	P06-SS01 0.5 070911	P08-SS01 0.5 070911	P08-SS01 6.0 070911	P10-SS01 2.5 070914	P10-SS01 5.3 070914	P12-SS01 0.5 070911	P12-SS01 2.0 070911	P14-SS01 0.0 070911	P14-SS01 3.0 070911	P15-SS01 0.5 070911	P15-SS02 0.5 070911 Duplicate	P15-SS01 2.5 070911	P16-SS01 0.5 070911	P16-SS01 2.5 070911	P16-SS02 2.5 070911 Duplicate	Q13-SS01 0.5 070910
Analyte/Parameter Name	Units																
2-Methylphenol	ug/kg									50 U	50 U					50 U	51 U	
2-Nitroaniline	ug/kg									52 U	52 U					52 U	53 U	
2-Nitrophenol	ug/kg									100 U	99 U					99 U	100 U	
3 & 4 Methylphenol	ug/kg																	
3,3'-Dichlorobenzidine	ug/kg									42 U	42 U					42 U	43 U	
3-Nitroaniline	ug/kg									160 U	160 U					160 U	160 U	
4,6-Dinitro-2-methylphenol	ug/kg									140 U	140 UJ					140 U	140 U	
4-Bromophenyl phenyl ether	ug/kg									45 U	44 U					45 U	46 U	
4-Chloro-3-methylphenol	ug/kg									110 U	110 U					110 U	110 U	
4-Chloroaniline	ug/kg									180 U	170 U					170 U	180 U	
4-Chlorophenyl phenyl ether	ug/kg									42 U	41 U					41 U	42 U	
4-Methylphenol	ug/kg									64 U	63 U					63 U	65 U	
4-Nitroaniline	ug/kg									72 U	71 U					72 U	73 U	
4-Nitrophenol	ug/kg									130 U	120 U					120 U	130 U	
Acenaphthene	ug/kg									7.5 U	7.4 UJ					7.4 U	7.6 U	
Acenaphthylene	ug/kg									11 U	11 UJ					11 U	11 U	
Anthracene	ug/kg									13 U	12 U					12 U	13 U	
Benzo[a]anthracene	ug/kg									5.8 U	17 J					31 J	8.5 J	
Benzo[a]pyrene	ug/kg									8.6 U	22 J					36	8.7 U	
Benzo[b]fluoranthene	ug/kg									11 U	39					61	21 J	
Benzo[g,h,i]perylene	ug/kg									6.1 U	18 J					21 J	6.2 U	
Benzo[k]fluoranthene	ug/kg									7.9 U	16 J					18 J	8.1 U	
Bis(2-chloroethoxy)methane	ug/kg									38 U	38 U					38 U	39 U	
Bis(2-chloroethyl)ether	ug/kg									50 U	49 U					49 U	51 U	
Bis(2-ethylhexyl) phthalate	ug/kg									50 U	50 U					50 U	51 U	
Butyl benzyl phthalate	ug/kg									51 U	50 U					50 U	52 U	
Carbazole	ug/kg									46 U	45 UJ					46 U	47 U	
Chrysene	ug/kg									9.4 U	31 J					43	16 J	
Dibenz(a,h)anthracene	ug/kg									19 U	19 U					19 U	20 U	
Dibenzofuran	ug/kg									36 U	36 U					36 U	37 U	
Diethyl phthalate	ug/kg									47 U	46 UJ					46 U	47 U	
Dimethyl phthalate	ug/kg									41 U	40 UJ					40 U	41 U	
Di-n-butyl phthalate	ug/kg									47 U	46 UJ					46 U	47 U	
Di-n-octyl phthalate	ug/kg									47 U	47 U					47 U	48 U	
Fluoranthene	ug/kg									14 U	50					64	28 J	
Fluorene	ug/kg									7.9 U	7.8 U					7.9 U	8.1 U	
Hexachlorobenzene	ug/kg									7.8 U	7.7 U					7.8 U	8.0 U	
Hexachlorobutadiene	ug/kg									39 U	38 U					39 U	39 U	
Hexachlorocyclopentadiene	ug/kg									190 U	190 U					190 U	200 U	
Hexachloroethane	ug/kg									40 U	39 U					40 U	41 U	
Indeno[1,2,3-cd]pyrene	ug/kg									20 U	19 U					20 U	20 U	
Isophorone	ug/kg									43 U	43 UJ					43 U	44 U	
Naphthalene	ug/kg									7.1 U	7.0 U					7.0 U	7.2 U	
Nitrobenzene	ug/kg									9.5 U	9.3 U					9.4 U	9.6 U	
N-Nitrosodi-n-propylamine	ug/kg									48 U	48 U					48 U	49 U	
N-Nitrosodiphenylamine	ug/kg									42 U	41 UJ					41 U	42 U	
Pentachlorophenol	ug/kg									250 U	250 U					250 U	260 U	
Phenanthrene	ug/kg									11 U	19 J					14 J	11 U	
Phenol	ug/kg									47 U	47 U					47 U	48 U	
Pyrene	ug/kg									8.5 U	41					50	24 J	

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Summary of Mixed Soil (0-10') Analytical Results
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Location Depth Date	Q13-SS01 2.0 070910	Q16-SS01 0.5 070910	Q16-SS01 1.0 070910	Q17-SS01 0.5 070910	Q17-SS02 0.5 070910	Q17-SS01 2.9 070910	R06-SS01 0.5 070911	R08-SS01 0.5 070911	R08-SS01 9.3 070911	R08-SS02 9.3 070911	R10-SS01 2.0 070914	R10-SS01 3.5 070914	R13-SS01 0.5 070910	R13-SS01 1.5 070910	R17-SS01 0.5 070910	R17-SS01 3.5 070910	S13-SS01 0.5 070910
Analyte/Parameter Name	Units					Duplicate					Duplicate							
2-Methylphenol	ug/kg																
2-Nitroaniline	ug/kg																
2-Nitrophenol	ug/kg																
3 & 4 Methylphenol	ug/kg																
3,3'-Dichlorobenzidine	ug/kg																
3-Nitroaniline	ug/kg																
4,6-Dinitro-2-methylphenol	ug/kg																
4-Bromophenyl phenyl ether	ug/kg																
4-Chloro-3-methylphenol	ug/kg																
4-Chloroaniline	ug/kg																
4-Chlorophenyl phenyl ether	ug/kg																
4-Methylphenol	ug/kg																
4-Nitroaniline	ug/kg																
4-Nitrophenol	ug/kg																
Acenaphthene	ug/kg																
Acenaphthylene	ug/kg																
Anthracene	ug/kg																
Benzo[a]anthracene	ug/kg																
Benzo[a]pyrene	ug/kg																
Benzo[b]fluoranthene	ug/kg																
Benzo[g,h,i]perylene	ug/kg																
Benzo[k]fluoranthene	ug/kg																
Bis(2-chloroethoxy)methane	ug/kg																
Bis(2-chloroethyl)ether	ug/kg																
Bis(2-ethylhexyl) phthalate	ug/kg																
Butyl benzyl phthalate	ug/kg																
Carbazole	ug/kg																
Chrysene	ug/kg																
Dibenz(a,h)anthracene	ug/kg																
Dibenzofuran	ug/kg																
Diethyl phthalate	ug/kg																
Dimethyl phthalate	ug/kg																
Di-n-butyl phthalate	ug/kg																
Di-n-octyl phthalate	ug/kg																
Fluoranthene	ug/kg																
Fluorene	ug/kg																
Hexachlorobenzene	ug/kg																
Hexachlorobutadiene	ug/kg																
Hexachlorocyclopentadiene	ug/kg																
Hexachloroethane	ug/kg																
Indeno[1,2,3-cd]pyrene	ug/kg																
Isophorone	ug/kg																
Naphthalene	ug/kg																
Nitrobenzene	ug/kg																
N-Nitrosodi-n-propylamine	ug/kg																
N-Nitrosodiphenylamine	ug/kg																
Pentachlorophenol	ug/kg																
Phenanthrene	ug/kg																
Phenol	ug/kg																
Pyrene	ug/kg																

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Analyte/Parameter Name	Location Depth Date Units	S13-SS01 1.0 070910 ug/kg	S15-SS01 0.5 070910 ug/kg	S15-SS01 2.5 070910 ug/kg	S17-SS01 0.5 070910 ug/kg	S17-SS01 2.7 070910 ug/kg	T10-SS01 2.0 070914 ug/kg	T10-SS02 2.0 070914 Duplicate ug/kg	T14-SS01 0.5 070910 ug/kg	T14-SS01 1.7 070910 ug/kg	T15-SS01 0.5 070910 ug/kg	T15-SS01 1.5 070910 ug/kg	T16-SS01 0.5 070910 ug/kg	T16-SS01 1.4 070910 ug/kg	MW1-SS01 8.0 080512 (OU6) ug/kg	MW10-SS01 8.0 080512 (OU6) ug/kg	MW10-SS02 8.0 080512 Duplicate ug/kg	MW14-SS01 10.0 090603 West of OU2 ug/kg
2-Methylphenol	ug/kg																	
2-Nitroaniline	ug/kg																	
2-Nitrophenol	ug/kg																	
3 & 4 Methylphenol	ug/kg																	
3,3'-Dichlorobenzidine	ug/kg																	
3-Nitroaniline	ug/kg																	
4,6-Dinitro-2-methylphenol	ug/kg																	
4-Bromophenyl phenyl ether	ug/kg																	
4-Chloro-3-methylphenol	ug/kg																	
4-Chloroaniline	ug/kg																	
4-Chlorophenyl phenyl ether	ug/kg																	
4-Methylphenol	ug/kg																	
4-Nitroaniline	ug/kg																	
4-Nitrophenol	ug/kg																	
Acenaphthene	ug/kg																	
Acenaphthylene	ug/kg																	
Anthracene	ug/kg																	
Benzo[a]anthracene	ug/kg																	
Benzo[a]pyrene	ug/kg																	
Benzo[b]fluoranthene	ug/kg																	
Benzo[g,h,i]perylene	ug/kg																	
Benzo[k]fluoranthene	ug/kg																	
Bis(2-chloroethoxy)methane	ug/kg																	
Bis(2-chloroethyl)ether	ug/kg																	
Bis(2-ethylhexyl) phthalate	ug/kg																	
Butyl benzyl phthalate	ug/kg																	
Carbazole	ug/kg																	
Chrysene	ug/kg																	
Dibenz(a,h)anthracene	ug/kg																	
Dibenzofuran	ug/kg																	
Diethyl phthalate	ug/kg																	
Dimethyl phthalate	ug/kg																	
Di-n-butyl phthalate	ug/kg																	
Di-n-octyl phthalate	ug/kg																	
Fluoranthene	ug/kg																	
Fluorene	ug/kg																	
Hexachlorobenzene	ug/kg																	
Hexachlorobutadiene	ug/kg																	
Hexachlorocyclopentadiene	ug/kg																	
Hexachloroethane	ug/kg																	
Indeno[1,2,3-cd]pyrene	ug/kg																	
Isophorone	ug/kg																	
Naphthalene	ug/kg																	
Nitrobenzene	ug/kg																	
N-Nitrosodi-n-propylamine	ug/kg																	
N-Nitrosodiphenylamine	ug/kg																	
Pentachlorophenol	ug/kg																	
Phenanthrene	ug/kg																	
Phenol	ug/kg																	
Pyrene	ug/kg																	

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	Location Depth Date	MW5-SS01 8.4 080514	MW6-SS01 7.0 080514	MW7-SS01 5.0 081104	MW7-SS02 5.0 081104	MW8-SS01 8.0 080513	MW8-SS01 10.0 090105	MW90SS01 5.5 080512
Analyte/Parameter Name	Units	(OU6)	(OU6)	West of OU2	Duplicate	East of OU2	East of OU2	North of OU2
2-Methylphenol	ug/kg							
2-Nitroaniline	ug/kg							
2-Nitrophenol	ug/kg							
3 & 4 Methylphenol	ug/kg							
3,3'-Dichlorobenzidine	ug/kg							
3-Nitroaniline	ug/kg							
4,6-Dinitro-2-methylphenol	ug/kg							
4-Bromophenyl phenyl ether	ug/kg							
4-Chloro-3-methylphenol	ug/kg							
4-Chloroaniline	ug/kg							
4-Chlorophenyl phenyl ether	ug/kg							
4-Methylphenol	ug/kg							
4-Nitroaniline	ug/kg							
4-Nitrophenol	ug/kg							
Acenaphthene	ug/kg							
Acenaphthylene	ug/kg							
Anthracene	ug/kg							
Benzo[a]anthracene	ug/kg							
Benzo[a]pyrene	ug/kg							
Benzo[b]fluoranthene	ug/kg							
Benzo[g,h,i]perylene	ug/kg							
Benzo[k]fluoranthene	ug/kg							
Bis(2-chloroethoxy)methane	ug/kg							
Bis(2-chloroethyl)ether	ug/kg							
Bis(2-ethylhexyl) phthalate	ug/kg							
Butyl benzyl phthalate	ug/kg							
Carbazole	ug/kg							
Chrysene	ug/kg							
Dibenz(a,h)anthracene	ug/kg							
Dibenzofuran	ug/kg							
Diethyl phthalate	ug/kg							
Dimethyl phthalate	ug/kg							
Di-n-butyl phthalate	ug/kg							
Di-n-octyl phthalate	ug/kg							
Fluoranthene	ug/kg							
Fluorene	ug/kg							
Hexachlorobenzene	ug/kg							
Hexachlorobutadiene	ug/kg							
Hexachlorocyclopentadiene	ug/kg							
Hexachloroethane	ug/kg							
Indeno[1,2,3-cd]pyrene	ug/kg							
Isophorone	ug/kg							
Naphthalene	ug/kg							
Nitrobenzene	ug/kg							
N-Nitrosodi-n-propylamine	ug/kg							
N-Nitrosodiphenylamine	ug/kg							
Pentachlorophenol	ug/kg							
Phenanthrene	ug/kg							
Phenol	ug/kg							
Pyrene	ug/kg							

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Analyte/Parameter Name	Location Depth Date Units	B02-SS01 1.0 070912	B04-SS01 1.0 070912	B04-SS02 1.0 070912 Duplicate	B04-SS01 4.0 070912	B08-SS01 1.4 070912	B10-SS01 3.5 070913	C06-SS01 1.7 070912	D04-SS01 2.0 070912	D10-SS01 2.0 07913	D10-SS01 10.0 07913	E02-SS01 2.0 070912	E06-SS01 1.0 07913	E08-SS01 1.5 07913	F10-SS01 3.0 070913	F10-SS01 8.5 070913	F10-SS02 8.5 070913 Duplicate	H10-SS01 3.5 070913
Pesticides																		
4,4'-DDD	ug/kg				0.68 U													
4,4'-DDE	ug/kg				0.42 U													
4,4'-DDT	ug/kg				0.38 U													
Aldrin	ug/kg				0.73 U													
alpha-BHC	ug/kg				0.73 U													
alpha-Chlordane	ug/kg				0.59 U													
beta-BHC	ug/kg				1.2 U													
delta-BHC	ug/kg				0.94 U													
Dieldrin	ug/kg				0.42 U													
Endosulfan I	ug/kg				0.91 U													
Endosulfan II	ug/kg				0.45 U													
Endosulfan sulfate	ug/kg				0.20 U													
Endrin	ug/kg				0.79 U													
Endrin aldehyde	ug/kg				0.80 U													
Endrin ketone	ug/kg				0.38 U													
gamma-BHC (Lindane)	ug/kg				0.38 U													
gamma-Chlordane	ug/kg				0.69 U													
Heptachlor	ug/kg				0.29 U													
Heptachlor epoxide	ug/kg				0.46 U													
Methoxychlor	ug/kg				0.62 U													
Toxaphene	ug/kg				3.8 U													
PCBs																		
PCB-1016	ug/kg				7.1 U													
PCB-1221	ug/kg				5.9 U													
PCB-1232	ug/kg				5.7 U													
PCB-1242	ug/kg				6.2 U													
PCB-1248	ug/kg				4.6 U													
PCB-1254	ug/kg				4.7 U													
PCB-1260	ug/kg				4.2 U													
Metals																		
Arsenic	mg/kg				15													
Barium	mg/kg				310													
Cadmium	mg/kg				0.48													
Chromium	mg/kg				18													
Lead	mg/kg				31													
Mercury	mg/kg				0.041													
Selenium	mg/kg				0.64 J													
Silver	mg/kg				0.13 U													
Zinc	mg/kg				41													

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Analyte/Parameter Name	Location Depth Date Units	H10-SS01 6.4 070913	K10-SS01 2.5 070913	K10-SS01 6.0 070913	MC01-SS01 0.8 080621	MC02-SS01 0.6 080621	MC02-SS01 2.7 080621	MC03-SS01 0.7 080621	MC03-SS01 5.0 080621	MC04-SS01 1.3 080621	MC04-SS01 6.6 080621	MC05-SS01 1.3 080621	MC05-SS01 9.0 080621	MC05-SS02 9.0 080621 Duplicate	M10-SS01 3.0 070914	M10-SS01 4.9 070914	M10-SS02 4.9 070914 Duplicate	N12-SS01 1.0 070911
Pesticides																		
4,4'-DDD	ug/kg									7.5 J+								
4,4'-DDE	ug/kg									54 J+								
4,4'-DDT	ug/kg									18 +								
Aldrin	ug/kg									3.2 U								
alpha-BHC	ug/kg									3.2 U								
alpha-Chlordane	ug/kg									2.6 U								
beta-BHC	ug/kg									5.1 U								
delta-BHC	ug/kg									4.1 U								
Dieldrin	ug/kg									3.7 J+								
Endosulfan I	ug/kg									3.9 U								
Endosulfan II	ug/kg									32 +								
Endosulfan sulfate	ug/kg									13 +								
Endrin	ug/kg									3.4 U								
Endrin aldehyde	ug/kg									17 +								
Endrin ketone	ug/kg									1.7 U								
gamma-BHC (Lindane)	ug/kg									1.7 U								
gamma-Chlordane	ug/kg									3.0 U								
Heptachlor	ug/kg									1.3 U								
Heptachlor epoxide	ug/kg									2.0 U								
Methoxychlor	ug/kg									2.7 U								
Toxaphene	ug/kg									17 U								
PCBs																		
PCB-1016	ug/kg									8.0 U								
PCB-1221	ug/kg									10 U								
PCB-1232	ug/kg									6.9 U								
PCB-1242	ug/kg									11 U								
PCB-1248	ug/kg									9.6 U								
PCB-1254	ug/kg									6.7 U								
PCB-1260	ug/kg									6.9 U								
Metals																		
Arsenic	mg/kg									5.1								
Barium	mg/kg									120								
Cadmium	mg/kg									0.036 U								
Chromium	mg/kg									15								
Lead	mg/kg									7.0								
Mercury	mg/kg									0.027								
Selenium	mg/kg									0.42 U								
Silver	mg/kg									0.11 U								
Zinc	mg/kg									19								

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Analyte/Parameter Name	Location Depth Date Units	N12-SS01 2.0 070911	P06-SS01 0.5 070911	P08-SS01 0.5 070911	P08-SS01 6.0 070911	P10-SS01 2.5 070914	P10-SS01 5.3 070914	P12-SS01 0.5 070911	P12-SS01 2.0 070911	P14-SS01 0.0 070911	P14-SS01 3.0 070911	P15-SS01 0.5 070911	P15-SS02 0.5 070911 Duplicate	P15-SS01 2.5 070911	P16-SS01 0.5 070911	P16-SS01 2.5 070911	P16-SS02 2.5 070911 Duplicate	Q13-SS01 0.5 070910
Pesticides																		
4,4'-DDD	ug/kg									0.58 U	0.57 U					0.56 U	0.59 U	
4,4'-DDE	ug/kg									0.36 U	0.36 U					0.35 U	0.36 U	
4,4'-DDT	ug/kg									0.33 U	0.32 U					0.32 U	0.33 U	
Aldrin	ug/kg									0.62 U	0.62 U					0.60 U	0.63 U	
alpha-BHC	ug/kg									0.62 U	0.62 U					0.60 U	0.63 U	
alpha-Chlordane	ug/kg									0.50 U	0.50 U					0.49 U	0.51 U	
beta-BHC	ug/kg									1.0 U	0.99 U					0.97 U	1.0 U	
delta-BHC	ug/kg									0.81 U	0.80 U					0.78 U	0.82 U	
Dieldrin	ug/kg									0.36 U	0.36 U					0.35 U	0.36 U	
Endosulfan I	ug/kg									0.78 U	0.77 U					0.75 U	0.78 U	
Endosulfan II	ug/kg									0.38 U	0.38 U					0.37 U	0.39 U	
Endosulfan sulfate	ug/kg									0.18 U	0.17 U					0.17 U	0.18 U	
Endrin	ug/kg									0.68 U	0.67 U					0.66 U	0.68 U	
Endrin aldehyde	ug/kg									0.69 U	0.68 U					0.67 U	0.70 U	
Endrin ketone	ug/kg									0.33 U	0.32 U					0.32 U	0.33 U	
gamma-BHC (Lindane)	ug/kg									0.33 U	0.32 U					0.32 U	0.33 U	
gamma-Chlordane	ug/kg									0.59 U	0.58 U					0.57 U	0.60 U	
Heptachlor	ug/kg									0.25 U	0.25 U					0.24 U	0.25 U	
Heptachlor epoxide	ug/kg									0.39 U	0.39 U					0.38 U	0.40 U	
Methoxychlor	ug/kg									0.54 U	0.53 U					0.52 U	0.54 U	
Toxaphene	ug/kg									3.3 U	3.2 U					3.2 U	3.3 U	
PCBs																		
PCB-1016	ug/kg									6.1 U	6.0 U					5.9 U	6.2 U	
PCB-1221	ug/kg									5.0 U	5.0 U					4.9 U	5.1 U	
PCB-1232	ug/kg									4.9 U	4.9 U					4.8 U	5.0 U	
PCB-1242	ug/kg									5.4 U	5.3 U					5.2 U	5.4 U	
PCB-1248	ug/kg									3.9 U	3.9 U					3.8 U	4.0 U	
PCB-1254	ug/kg									4.0 U	4.0 U					32	47	
PCB-1260	ug/kg									3.6 U	3.6 U					3.5 U	3.6 U	
Metals																		
Arsenic	mg/kg									0.50 J	1.4					3.3	2.8	
Barium	mg/kg									20	23					53	47	
Cadmium	mg/kg									0.084 J	0.22					0.30	0.29	
Chromium	mg/kg									3.2	5.6					7.0	6.1	
Lead	mg/kg									0.34 J	2.1					4.8	5.0	
Mercury	mg/kg									0.0059 U	0.0066 J					0.0093 J	0.013 J	
Selenium	mg/kg									0.42 U	0.39 U					0.36 U	0.41 U	
Silver	mg/kg									0.11 U	0.10 U					0.10 J	0.11 U	
Zinc	mg/kg									2.0 J	5.8					29	24	

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Analyte/Parameter Name	Location Depth Date Units	Q13-SS01 2.0 070910	Q16-SS01 0.5 070910	Q16-SS01 1.0 070910	Q17-SS01 0.5 070910	Q17-SS02 0.5 070910 Duplicate	Q17-SS01 2.9 070910	R06-SS01 0.5 070911	R08-SS01 0.5 070911	R08-SS01 9.3 070911	R08-SS02 9.3 070911 Duplicate	R10-SS01 2.0 070914	R10-SS01 3.5 070914	R13-SS01 0.5 070910	R13-SS01 1.5 070910	R17-SS01 0.5 070910	R17-SS01 3.5 070910	S13-SS01 0.5 070910
Pesticides																		
4,4'-DDD	ug/kg																	
4,4'-DDE	ug/kg																	
4,4'-DDT	ug/kg																	
Aldrin	ug/kg																	
alpha-BHC	ug/kg																	
alpha-Chlordane	ug/kg																	
beta-BHC	ug/kg																	
delta-BHC	ug/kg																	
Dieldrin	ug/kg																	
Endosulfan I	ug/kg																	
Endosulfan II	ug/kg																	
Endosulfan sulfate	ug/kg																	
Endrin	ug/kg																	
Endrin aldehyde	ug/kg																	
Endrin ketone	ug/kg																	
gamma-BHC (Lindane)	ug/kg																	
gamma-Chlordane	ug/kg																	
Heptachlor	ug/kg																	
Heptachlor epoxide	ug/kg																	
Methoxychlor	ug/kg																	
Toxaphene	ug/kg																	
PCBs																		
PCB-1016	ug/kg																	
PCB-1221	ug/kg																	
PCB-1232	ug/kg																	
PCB-1242	ug/kg																	
PCB-1248	ug/kg																	
PCB-1254	ug/kg																	
PCB-1260	ug/kg																	
Metals																		
Arsenic	mg/kg																	
Barium	mg/kg																	
Cadmium	mg/kg																	
Chromium	mg/kg																	
Lead	mg/kg																	
Mercury	mg/kg																	
Selenium	mg/kg																	
Silver	mg/kg																	
Zinc	mg/kg																	

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Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units	S13-SS01 1.0 070910	S15-SS01 0.5 070910	S15-SS01 2.5 070910	S17-SS01 0.5 070910	S17-SS01 2.7 070910	T10-SS01 2.0 070914	T10-SS02 2.0 070914 Duplicate	T14-SS01 0.5 070910	T14-SS01 1.7 070910	T15-SS01 0.5 070910	T15-SS01 1.5 070910	T16-SS01 0.5 070910	T16-SS01 1.4 070910	MW1-SS01 8.0 080512 (OU6)	MW10-SS01 8.0 080512 (OU6)	MW10-SS02 8.0 080512 Duplicate	MW14-SS01 10.0 090603 West of OU2
Pesticides																		
4,4'-DDD	ug/kg																	
4,4'-DDE	ug/kg																	
4,4'-DDT	ug/kg																	
Aldrin	ug/kg																	
alpha-BHC	ug/kg																	
alpha-Chlordane	ug/kg																	
beta-BHC	ug/kg																	
delta-BHC	ug/kg																	
Dieldrin	ug/kg																	
Endosulfan I	ug/kg																	
Endosulfan II	ug/kg																	
Endosulfan sulfate	ug/kg																	
Endrin	ug/kg																	
Endrin aldehyde	ug/kg																	
Endrin ketone	ug/kg																	
gamma-BHC (Lindane)	ug/kg																	
gamma-Chlordane	ug/kg																	
Heptachlor	ug/kg																	
Heptachlor epoxide	ug/kg																	
Methoxychlor	ug/kg																	
Toxaphene	ug/kg																	
PCBs																		
PCB-1016	ug/kg																	
PCB-1221	ug/kg																	
PCB-1232	ug/kg																	
PCB-1242	ug/kg																	
PCB-1248	ug/kg																	
PCB-1254	ug/kg																	
PCB-1260	ug/kg																	
Metals																		
Arsenic	mg/kg																	
Barium	mg/kg																	
Cadmium	mg/kg																	
Chromium	mg/kg																	
Lead	mg/kg																	
Mercury	mg/kg																	
Selenium	mg/kg																	
Silver	mg/kg																	
Zinc	mg/kg																	

Appendix A
Summary of Mixed Soil (0-10') Analytical Results
Task 1 - Soil Investigation
Riverfront Superfund Site
New Haven, Missouri

	Location Depth Date	MW5-SS01 8.4 080514	MW6-SS01 7.0 080514	MW7-SS01 5.0 081104	MW7-SS02 5.0 081104	MW8-SS01 8.0 080513	MW8-SS01 10.0 090105	MW90SS01 5.5 080512
Analyte/Parameter Name	Units	(OU6)	(OU6)	West of OU2	Duplicate	East of OU2	East of OU2	North of OU2
Pesticides								
4,4'-DDD	ug/kg							
4,4'-DDE	ug/kg							
4,4'-DDT	ug/kg							
Aldrin	ug/kg							
alpha-BHC	ug/kg							
alpha-Chlordane	ug/kg							
beta-BHC	ug/kg							
delta-BHC	ug/kg							
Dieldrin	ug/kg							
Endosulfan I	ug/kg							
Endosulfan II	ug/kg							
Endosulfan sulfate	ug/kg							
Endrin	ug/kg							
Endrin aldehyde	ug/kg							
Endrin ketone	ug/kg							
gamma-BHC (Lindane)	ug/kg							
gamma-Chlordane	ug/kg							
Heptachlor	ug/kg							
Heptachlor epoxide	ug/kg							
Methoxychlor	ug/kg							
Toxaphene	ug/kg							
PCBs								
PCB-1016	ug/kg							
PCB-1221	ug/kg							
PCB-1232	ug/kg							
PCB-1242	ug/kg							
PCB-1248	ug/kg							
PCB-1254	ug/kg							
PCB-1260	ug/kg							
Metals								
Arsenic	mg/kg							
Barium	mg/kg							
Cadmium	mg/kg							
Chromium	mg/kg							
Lead	mg/kg							
Mercury	mg/kg							
Selenium	mg/kg							
Silver	mg/kg							
Zinc	mg/kg							

Appendix A
Summary of Residential Well Analytical Results
Task 2c - Resdiential Well Sampling
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Date Units	DM21-GW01 080306	JS07-GW01 080306	JS10-GW01 080311	JS10-GW02 080311 Duplicate	JS11-GW01 080306	JS12-GW01 080311	JS14-INF-GW01 080228	JS14-INF-GW01 080527	JS14-INF-GW01 080924	JS14-INF-GW01 081208	JS14-INF-GW01 090225	JS14-INF-GW01 090527	JS14-INF-GW01 090812	JS15-GW01 080306	JS20-GW01 080306	JS25-GW01 080425	JS25-GW01 080527 Re-sample	JS27-GW01 080409	JS27-GW01 080922
1,2-Dichloroethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	
1,2-Dichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U							0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	
1,3,5-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U							0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	
1,3-Dichlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	
1,3-Dichloropropane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	
1,4-Dichlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U							0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	
2,2-Dichloropropane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U							0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	
1,1,1,2-Tetrachloroethane	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	
1,1,1-Trichloroethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U							0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	
1,1,2,2-Tetrachloroethane	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U							0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	
1,1,2-Trichloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U							0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	
1,1-Dichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U							0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	
1,1-Dichloroethene	ug/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U							0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	
1,1-Dichloropropene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	
1,2,3-Trichlorobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U							0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	
1,2,3-Trichloropropane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U							0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	
1,2,4-Trichlorobenzene	ug/L	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	
1,2,4-Trimethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U							0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	
1,2-Dibromo-3-Chloropropane	ug/L	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 R							0.29 U	0.29 U	0.29 U	0.29 U	0.29 R	
1,2-Dibromoethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U							0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	
1,2-Dichlorobenzene	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U							0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	
2-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U							0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	
4-Chlorotoluene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U							0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	
4-Isopropyltoluene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U							0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	
Acetone	ug/L	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U							2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	
Benzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	
Bromobenzene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U							0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	
Bromochloromethane	ug/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U							0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	
Bromodichloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	
Bromoform	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U							0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	
Bromomethane	ug/L	0.49 R	0.49 R	0.49 R	0.49 R	0.49 R	0.49 R	0.49 R							0.49 R	0.49 R	0.49 R	0.49 R	0.49 U	
Carbon tetrachloride	ug/L	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U							0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	
Chlorobenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	
Chlorodibromomethane	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U							0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	
Chloroethane	ug/L	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U							0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	
Chloroform	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	
Chloromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U							0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	
cis-1,2-Dichloroethene	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.37 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U							0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	
Dibromomethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U							0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	
Dichlorodifluoromethane	ug/L	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U							0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	
Ethylbenzene	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U							0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	
Hexachlorobutadiene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U							0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	
Isopropylbenzene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U							0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	
Methyl tert-butyl ether	ug/L	0.13 U	0.13 U	0.16 J	0.16 J	0.13 U	0.13 U	0.13 U							0.13 U	0.13 U	0.21 J	0.13 U	0.13 U	
Methylene Chloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U							0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	
Naphthalene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U							0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	
n-Butylbenzene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U							0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	
N-Propylbenzene	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	
sec-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U							0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	
Styrene	ug/L	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U							0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	
tert-Butylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U							0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	
Tetrachloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	37	32	19	15	14	13	12	0.22 U	0.22 U	21	0.22 U	0.70	0.56
Toluene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U							0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	
trans-1,2-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U							0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	
trans-1,3-Dichloropropene	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U							0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	
Trichloroethene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.43	0.37 J	0.41 J	0.47 J	0.31 J	0.39 J	0.38 J	0.20 U	0.20 U	0.73	0.20 U	0.20 U	0.20 U
Trichlorofluoromethane	ug/L	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U							0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	
Vinyl chloride	ug/L	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U							0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	
Xylenes, Total	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U							0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	

Appendix A
Summary of Residential Well Analytical Results
Task 2c - Resdiential Well Sampling
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Date Units	JS27-GW01 081211	JS27-GW01 090415	JS27-GW01 090602	JS27-GW01 090812	JS29-GW01 080311	JS33-GW01 080311	JS36-INF-GW01 080228	JS36-INF-GW02 080228 Duplicate	JS36-INF-GW01 080527	JS36-INF-GW01 080922	JS36-INF-GW01 081208	JS36-INF-GW01 090225	JS36-INF-GW01 090527	JS36-INF-GW01 090812	JS37-GW01 080314	JS37-GW02 080314 Duplicate	JS38-INF-GW01 080228	JS38-INF-GW02 080228 Duplicate	JS38-INF-GW01 080527
1,2-Dichloroethane	ug/L					0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	
1,2-Dichloropropane	ug/L					0.22 U	0.22 U	0.22 U	0.22 U							0.22 U	0.22 U	0.22 U	0.22 U	
1,3,5-Trimethylbenzene	ug/L					0.17 U	0.17 U	0.17 U	0.17 U							0.17 U	0.17 U	0.17 U	0.17 U	
1,3-Dichlorobenzene	ug/L					0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	
1,3-Dichloropropane	ug/L					0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	
1,4-Dichlorobenzene	ug/L					0.17 U	0.17 U	0.17 U	0.17 U							0.17 U	0.17 U	0.17 U	0.17 U	
2,2-Dichloropropane	ug/L					0.33 U	0.33 U	0.33 U	0.33 U							0.33 U	0.33 U	0.33 U	0.33 U	
1,1,1,2-Tetrachloroethane	ug/L					0.20 U	0.20 U	0.20 U	0.20 U							0.20 U	0.20 U	0.20 U	0.20 U	
1,1,1-Trichloroethane	ug/L					0.16 U	0.16 U	0.16 U	0.16 U							0.16 U	0.16 U	0.16 U	0.16 U	
1,1,2,2-Tetrachloroethane	ug/L					0.15 U	0.15 U	0.15 U	0.15 U							0.15 U	0.15 U	0.15 U	0.15 U	
1,1,2-Trichloroethane	ug/L					0.25 U	0.25 U	0.25 U	0.25 U							0.25 U	0.25 U	0.25 U	0.25 U	
1,1-Dichloroethane	ug/L					0.23 U	0.23 U	0.23 U	0.23 U							0.23 U	0.23 U	0.23 U	0.23 U	
1,1-Dichloroethene	ug/L					0.24 U	0.24 U	0.24 U	0.24 U							0.24 U	0.24 U	0.24 U	0.24 U	
1,1-Dichloropropene	ug/L					0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	
1,2,3-Trichlorobenzene	ug/L					0.12 U	0.12 U	0.12 U	0.12 U							0.60 U	0.12 U	0.12 U	0.12 U	
1,2,3-Trichloropropane	ug/L					0.22 U	0.22 U	0.22 U	0.22 U							0.22 U	0.22 U	0.22 U	0.22 U	
1,2,4-Trichlorobenzene	ug/L					0.10 U	0.10 U	0.10 U	0.10 U							0.10 U	0.10 U	0.10 U	0.10 U	
1,2,4-Trimethylbenzene	ug/L					0.17 U	0.17 U	0.17 U	0.17 U							0.17 U	0.17 U	0.17 U	0.17 U	
1,2-Dibromo-3-Chloropropane	ug/L					0.29 U	0.29 U	0.29 R	0.29 R							0.29 R	0.29 R	0.29 U	0.29 U	
1,2-Dibromoethane	ug/L					0.27 U	0.27 U	0.27 U	0.27 U							0.27 U	0.27 U	0.27 U	0.27 U	
1,2-Dichlorobenzene	ug/L					0.23 U	0.23 U	0.23 U	0.23 U							0.23 U	0.23 U	0.23 U	0.23 U	
2-Chlorotoluene	ug/L					0.18 U	0.18 U	0.18 U	0.18 U							0.18 U	0.18 U	0.18 U	0.18 U	
4-Chlorotoluene	ug/L					0.18 U	0.18 U	0.18 U	0.18 U							0.18 U	0.18 U	0.18 U	0.18 U	
4-Isopropyltoluene	ug/L					0.15 U	0.15 U	0.15 U	0.15 U							0.15 U	0.15 U	0.15 U	0.15 U	
Acetone	ug/L					2.1 U	2.1 U	2.1 U	2.1 U							11 U	11 U	2.1 U	2.1 U	
Benzene	ug/L					0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	
Bromobenzene	ug/L					0.13 U	0.13 U	0.13 U	0.13 U							0.13 U	0.13 U	0.13 U	0.13 U	
Bromochloromethane	ug/L					0.27 U	0.27 U	0.27 U	0.27 U							0.27 U	0.27 U	0.27 U	0.27 U	
Bromodichloromethane	ug/L					0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	
Bromoform	ug/L					0.17 U	0.17 U	0.17 U	0.17 U							0.17 U	0.17 U	0.17 U	0.17 U	
Bromomethane	ug/L					0.49 R	0.49 R	0.49 R	0.49 R							0.49 U	0.49 U	0.49 R	0.49 R	
Carbon tetrachloride	ug/L					0.38 U	0.38 U	0.38 U	0.38 U							0.38 U	0.38 U	0.38 U	0.38 U	
Chlorobenzene	ug/L					0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	
Chlorodibromomethane	ug/L					0.16 U	0.16 U	0.16 U	0.16 U							0.16 U	0.16 U	0.16 U	0.16 U	
Chloroethane	ug/L					0.36 U	0.36 U	0.36 U	0.36 U							0.36 U	0.36 U	0.36 U	0.36 U	
Chloroform	ug/L					0.20 U	0.20 U	0.20 U	0.20 U							0.20 U	0.20 U	0.20 U	0.20 U	
Chloromethane	ug/L					0.31 U	0.31 U	0.31 U	0.31 U							0.31 U	0.31 U	0.31 U	0.31 U	
cis-1,2-Dichloroethene	ug/L	0.25 U	0.25 U	0.37 U	0.37 U	0.25 U	0.25 U	2.2	2.4	0.25 U	2.1	2.3	2.3	2.3	2.6	1.1	0.92	0.25 U	0.25 U	0.25 U
cis-1,3-Dichloropropene	ug/L					0.16 U	0.16 U	0.16 U	0.16 U							0.16 U	0.16 U	0.16 U	0.16 U	
Dibromomethane	ug/L					0.18 U	0.18 U	0.18 U	0.18 U							0.18 U	0.18 U	0.18 U	0.18 U	
Dichlorodifluoromethane	ug/L					0.46 U	0.46 U	0.46 U	0.46 U							0.46 U	0.46 U	0.46 U	0.46 U	
Ethylbenzene	ug/L					0.18 U	0.18 U	0.18 U	0.18 U							0.18 U	0.18 U	0.18 U	0.18 U	
Hexachlorobutadiene	ug/L					0.20 U	0.20 U	0.20 U	0.20 U							0.20 U	0.20 U	0.20 U	0.20 U	
Isopropylbenzene	ug/L					0.15 U	0.15 U	0.15 U	0.15 U							0.15 U	0.15 U	0.15 U	0.15 U	
Methyl tert-butyl ether	ug/L					0.15 J	0.13 U	0.13 U	0.13 U							0.13 U	0.13 U	0.13 U	0.13 U	
Methylene Chloride	ug/L					0.21 U	0.21 U	0.21 U	0.21 U							0.21 U	0.21 U	0.21 U	0.21 U	
Naphthalene	ug/L					0.13 U	0.13 U	0.13 U	0.13 U							0.13 U	0.13 U	0.13 U	0.13 U	
n-Butylbenzene	ug/L					0.14 U	0.14 U	0.14 U	0.14 U							0.14 U	0.14 U	0.14 U	0.14 U	
N-Propylbenzene	ug/L					0.19 U	0.19 U	0.19 U	0.19 U							0.19 U	0.19 U	0.19 U	0.19 U	
sec-Butylbenzene	ug/L					0.17 U	0.17 U	0.17 U	0.17 U							0.17 U	0.17 U	0.17 U	0.17 U	
Styrene	ug/L					0.30 U	0.30 U	0.30 U	0.30 U							0.30 U	0.30 U	0.30 U	0.30 U	
tert-Butylbenzene	ug/L					0.17 U	0.17 U	0.17 U	0.17 U							0.17 U	0.17 U	0.17 U	0.17 U	
Tetrachloroethene	ug/L	0.97	1.2	1.4	0.79	0.22 U	0.22 U	280 +	290 +	310	210	190	230	290	290	51 +	58 +	6.8	6.5	8.1
Toluene	ug/L					0.21 U	0.21 U	0.21 U	0.21 U							0.21 U	0.21 U	0.21 U	0.21 U	
trans-1,2-Dichloroethene	ug/L					0.22 U	0.22 U	0.22 U	0.22 U							0.22 U	0.22 U	0.22 U	0.22 U	
trans-1,3-Dichloropropene	ug/L					0.21 U	0.21 U	0.21 U	0.21 U							0.21 U	0.21 U	0.21 U	0.21 U	
Trichloroethene	ug/L	0.20 U	0.20 U	0.37 U	0.37 U	0.20 U	0.20 U	5.0	5.9	6.4	5.2	7.2	5.9	6.2	6.1	1.0 U	1.1 J	0.30	0.28	0.39 J
Trichlorofluoromethane	ug/L					0.31 U	0.31 U	0.31 U	0.31 U							0.31 U	0.31 U	0.31 U	0.31 U	
Vinyl chloride	ug/L					0.29 U	0.29 U	0.29 U	0.29 U							0.29 U	0.29 U	0.29 U	0.29 U	
Xylenes, Total	ug/L					0.44 U	0.44 U	0.44 U	0.44 U							0.44 U	0.44 U	0.44 U	0.44 U	

Appendix A
Summary of Residential Well Analytical Results
Task 2c - Resdiential Well Sampling
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Date / Units	JS38-INF-GW01 080924	JS38-INF-GW01 081208	JS38-INF-GW01 090415	JS38-INF-GW01 090527	JS38-INF-GW01 090812	JS39-GW01 080409	JS40-GW01 080409	JS41-GW01 080528	JS42-GW01 080311	JS43-GW01 080514	JS44-GW01 080409	JS45-GW01 080409	JS47-GW01 080311	JS50-GW01 080314	JS51-GW01 080311	JS52-INF-GW01 080228	JS52-INF-GW01 080527	JS52-INF-GW01 080924	JS52-INF-GW01 081208
1,2-Dichloroethane	ug/L						0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U			
1,2-Dichloropropane	ug/L						0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U			
1,3,5-Trimethylbenzene	ug/L						0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U			
1,3-Dichlorobenzene	ug/L						0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U			
1,3-Dichloropropane	ug/L						0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U			
1,4-Dichlorobenzene	ug/L						0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U			
2,2-Dichloropropane	ug/L						0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U			
1,1,1,2-Tetrachloroethane	ug/L						0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U			
1,1,1-Trichloroethane	ug/L						0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U			
1,1,2,2-Tetrachloroethane	ug/L						0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U			
1,1,2-Trichloroethane	ug/L						0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U			
1,1-Dichloroethane	ug/L						0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U			
1,1-Dichloroethene	ug/L						0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U			
1,1-Dichloropropene	ug/L						0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U			
1,2,3-Trichlorobenzene	ug/L						0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U			
1,2,3-Trichloropropane	ug/L						0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U			
1,2,4-Trichlorobenzene	ug/L						0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U			
1,2,4-Trimethylbenzene	ug/L						0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U			
1,2-Dibromo-3-Chloropropane	ug/L						0.29 R	0.29 R	0.29 U	0.29 U	0.29 U	0.29 R	0.29 R	0.29 U	0.29 R	0.29 U	0.29 R			
1,2-Dibromoethane	ug/L						0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U			
1,2-Dichlorobenzene	ug/L						0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U			
2-Chlorotoluene	ug/L						0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U			
4-Chlorotoluene	ug/L						0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U			
4-Isopropyltoluene	ug/L						0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U			
Acetone	ug/L						2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U			
Benzene	ug/L						0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U			
Bromobenzene	ug/L						0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U			
Bromochloromethane	ug/L						0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U			
Bromodichloromethane	ug/L						0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U			
Bromoform	ug/L						0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U			
Bromomethane	ug/L						0.49 U	0.49 U	0.49 R	0.49 R	0.49 R	0.49 U	0.49 U	0.49 R	0.49 U	0.49 R	0.49 R			
Carbon tetrachloride	ug/L						0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U			
Chlorobenzene	ug/L						0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U			
Chlorodibromomethane	ug/L						0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U			
Chloroethane	ug/L						0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U			
Chloroform	ug/L						0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U			
Chloromethane	ug/L						0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U			
cis-1,2-Dichloroethene	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.37 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
cis-1,3-Dichloropropene	ug/L						0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U			
Dibromomethane	ug/L						0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U			
Dichlorodifluoromethane	ug/L						0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U			
Ethylbenzene	ug/L						0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U			
Hexachlorobutadiene	ug/L						0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U			
Isopropylbenzene	ug/L						0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U			
Methyl tert-butyl ether	ug/L						0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U			
Methylene Chloride	ug/L						0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U			
Naphthalene	ug/L						0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U			
n-Butylbenzene	ug/L						0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U			
N-Propylbenzene	ug/L						0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U			
sec-Butylbenzene	ug/L						0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U			
Styrene	ug/L						0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U			
tert-Butylbenzene	ug/L						0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U			
Tetrachloroethene	ug/L	6.6	5.5	4.7	4.6	4.7	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	5.3	4.3	4.9	2.8
Toluene	ug/L						0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U			
trans-1,2-Dichloroethene	ug/L						0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U			
trans-1,3-Dichloropropene	ug/L						0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U			
Trichloroethene	ug/L	0.25 J	0.33 J	0.20 U	0.20 U	0.37 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.25	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane	ug/L						0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U			
Vinyl chloride	ug/L						0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U			
Xylenes, Total	ug/L						0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U			

Appendix A
Summary of Residential Well Analytical Results
Task 2c - Resdiential Well Sampling
Riverfront Superfund Site
New Haven, Missouri

Location	JS52-INF-GW01	JS52-INF-GW01	JS52-INF-GW01	MW13-GW01	MW2R-GW01	MW2R-GW01	PA53-GW01	PA55-GW01	W3-GW01
Date	090225	090602	090812	080409	080228	090922	080527	080228	080229
Analyte/Parameter Name	Units					(USGS - FIELD GC)			
1,2-Dichloroethane	ug/L			0.19 U	0.19 U		0.19 U	0.19 U	0.19 U
1,2-Dichloropropane	ug/L			0.22 U	0.22 U		0.22 U	0.22 U	0.22 U
1,3,5-Trimethylbenzene	ug/L			0.17 U	0.17 U		0.17 U	0.17 U	0.17 U
1,3-Dichlorobenzene	ug/L			0.19 U	0.19 U		0.19 U	0.19 U	0.19 U
1,3-Dichloropropane	ug/L			0.19 U	0.19 U		0.19 U	0.19 U	0.19 U
1,4-Dichlorobenzene	ug/L			0.17 U	0.17 U		0.17 U	0.17 U	0.17 U
2,2-Dichloropropane	ug/L			0.33 U	0.33 U		0.33 U	0.33 U	0.33 U
1,1,1,2-Tetrachloroethane	ug/L			0.20 U	0.20 U		0.20 U	0.20 U	0.20 U
1,1,1-Trichloroethane	ug/L			0.16 U	0.16 U		0.16 U	0.16 U	0.16 U
1,1,2,2-Tetrachloroethane	ug/L			0.15 U	0.15 U		0.15 U	0.15 U	0.15 U
1,1,2-Trichloroethane	ug/L			0.25 U	0.25 U		0.25 U	0.25 U	0.25 U
1,1-Dichloroethane	ug/L			0.23 U	0.23 U		0.23 U	0.23 U	0.23 U
1,1-Dichloroethene	ug/L			0.24 U	0.24 U		0.24 U	0.24 U	0.24 U
1,1-Dichloropropene	ug/L			0.19 U	0.19 U		0.19 U	0.19 U	0.19 U
1,2,3-Trichlorobenzene	ug/L			0.12 U	0.12 U		0.12 U	0.12 U	0.12 U
1,2,3-Trichloropropane	ug/L			0.22 U	0.22 U		0.22 U	0.22 U	0.22 U
1,2,4-Trichlorobenzene	ug/L			0.10 U	0.10 U		0.10 U	0.10 U	0.10 U
1,2,4-Trimethylbenzene	ug/L			0.17 U	0.17 U		0.17 U	0.17 U	0.17 U
1,2-Dibromo-3-Chloropropane	ug/L			0.29 R	0.29 U		0.29 U	0.29 U	0.29 U
1,2-Dibromoethane	ug/L			0.27 U	0.27 U		0.27 U	0.27 U	0.27 U
1,2-Dichlorobenzene	ug/L			0.23 U	0.23 U		0.23 U	0.23 U	0.23 U
2-Chlorotoluene	ug/L			0.18 U	0.18 U		0.18 U	0.18 U	0.18 U
4-Chlorotoluene	ug/L			0.18 U	0.18 U		0.18 U	0.18 U	0.18 U
4-Isopropyltoluene	ug/L			0.15 U	0.15 U		0.15 U	0.15 U	0.15 U
Acetone	ug/L			2.1 U	2.1 U		2.1 U	2.1 U	2.1 U
Benzene	ug/L			0.19 U	0.19 U		0.19 U	0.19 U	0.19 U
Bromobenzene	ug/L			0.13 U	0.13 U		0.13 U	0.13 U	0.13 U
Bromochloromethane	ug/L			0.27 U	0.27 U		0.27 U	0.27 U	0.27 U
Bromodichloromethane	ug/L			0.19 U	0.19 U		0.19 U	0.19 U	0.19 U
Bromoform	ug/L			0.17 U	0.17 U		0.17 U	0.17 U	0.17 U
Bromomethane	ug/L			0.49 U	0.49 R		0.49 R	0.49 U	0.49 U
Carbon tetrachloride	ug/L			0.38 U	0.38 U		0.38 U	0.38 U	0.38 U
Chlorobenzene	ug/L			0.19 U	0.19 U		0.19 U	0.19 U	0.19 U
Chlorodibromomethane	ug/L			0.16 U	0.16 U		0.16 U	0.16 U	0.16 U
Chloroethane	ug/L			0.36 U	0.36 U		0.36 U	0.36 U	0.36 U
Chloroform	ug/L			0.20 U	0.20 U		0.20 U	0.20 U	0.20 U
Chloromethane	ug/L			0.31 U	0.31 U		0.31 U	0.31 U	0.31 U
cis-1,2-Dichloroethene	ug/L	0.25 U	0.37 U	0.25 U	0.25 U		0.25 U	0.25 U	0.25 U
cis-1,3-Dichloropropene	ug/L			0.16 U	0.16 U		0.16 U	0.16 U	0.16 U
Dibromomethane	ug/L			0.18 U	0.18 U		0.18 U	0.18 U	0.18 U
Dichlorodifluoromethane	ug/L			0.46 U	0.46 U		0.46 U	0.46 U	0.46 U
Ethylbenzene	ug/L			0.18 U	0.18 U		0.18 U	0.18 U	0.18 U
Hexachlorobutadiene	ug/L			0.20 U	0.20 U		0.20 U	0.20 U	0.20 U
Isopropylbenzene	ug/L			0.15 U	0.15 U		0.15 U	0.15 U	0.15 U
Methyl tert-butyl ether	ug/L			0.13 U	0.13 U		0.13 U	0.13 U	0.13 U
Methylene Chloride	ug/L			0.21 U	0.21 U		0.21 U	0.21 U	0.21 U
Naphthalene	ug/L			0.13 U	0.13 U		0.13 U	0.13 U	0.13 U
n-Butylbenzene	ug/L			0.14 U	0.14 U		0.14 U	0.14 U	0.14 U
N-Propylbenzene	ug/L			0.19 U	0.19 U		0.19 U	0.19 U	0.19 U
sec-Butylbenzene	ug/L			0.17 U	0.17 U		0.17 U	0.17 U	0.17 U
Styrene	ug/L			0.30 U	0.30 U		0.30 U	0.30 U	0.30 U
tert-Butylbenzene	ug/L			0.17 U	0.17 U		0.17 U	0.17 U	0.17 U
Tetrachloroethene	ug/L	5.3	5.4	4.4	0.22 U	0.22 U	ND	0.22 U	0.22 U
Toluene	ug/L				0.21 U	0.21 U		0.21 U	0.21 U
trans-1,2-Dichloroethene	ug/L				0.22 U	0.22 U		0.22 U	0.22 U
trans-1,3-Dichloropropene	ug/L				0.21 U	0.21 U		0.21 U	0.21 U
Trichloroethene	ug/L	0.25 J	0.37 U	0.37 U	0.20 U	0.20 U	ND	0.20 U	0.20 U
Trichlorofluoromethane	ug/L				0.31 U	0.31 U		0.31 U	0.31 U
Vinyl chloride	ug/L				0.29 U	0.29 U	ND	0.29 U	0.29 U
Xylenes, Total	ug/L				0.44 U	0.44 U		0.44 U	0.44 U

Appendix A
Summary of Sitewide Groundwater Monitoring Results
Task 2e - Sitewide Groundwater Sampling
Riverfront Superfund Site
New Haven, Missouri

Location Date Aquifer	BW22-GW01 090324 Jeff/Roub	JS15-GW01 090422	JS20-GW01 090325	JS25-GW01 090429	JS25-GW02 090429	JS39-GW01 090325	JS40-GW01 090325	MW04B-GW01 090316 Swan/Jeff	MW04B-GW01 090317 Swan/Jeff	MW04B-GW01 090324 Swan/Jeff	MW04B-GW01 090325 Swan/Jeff	MW04B-GW01 090420 Swan/Jeff	MW04B-GW01 090421 Swan/Jeff	MW04B-GW01 090514 Swan/Jeff
Analyte/Parameter Name	Units	RESIDENTIAL	RESIDENTIAL	RESIDENTIAL	RESID - Dup	RESIDENTIAL	RESIDENTIAL	(USGS - FIELD GC)	(USGS - FIELD GC)	(USGS - FIELD GC)	(USGS - FIELD GC)	(USGS - FIELD GC)	(USGS - FIELD GC)	
VOCs:														
1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U						0.23 U
1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U						0.25 U
1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U						0.32 U
1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U						0.18 U
1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U						0.22 U
1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U						0.22 U
1,2-Dichloroethene, Total	ug/L	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U						0.30 U
1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U						0.23 U
2-Butanone (MEK)	ug/L													
2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U						0.77 U
4-Methyl-2-pentanone (MIBK)	ug/L													
Acetone	ug/L	1.2 U	1.2 R	1.2 R	1.2 R	1.2 R	1.2 R	1.2 R						1.2 R
Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U						0.16 U
Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U						0.18 U
Bromoform	ug/L	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U						0.30 U
Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U						0.44 U
Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U						0.39 U
Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U						0.21 U
Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U						0.17 U
Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U						0.45 U
Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U						0.13 U
Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U						0.33 U
cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U						0.16 U
Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U						0.19 U
Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U						0.17 U
Methyl Ethyl Ketone	ug/L	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U						0.83 U
Methyl Isobutyl Ketone	ug/L	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U						0.58 U
Methylene Chloride	ug/L	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U						0.99 U
Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U						0.15 U
Tetrachloroethene	ug/L	0.14 U	0.14 U	0.14 U	7.1	7.9	0.14 U	0.14 U	19.4	491	77	362	0.77	1.18	0.14 U
Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U						0.16 U
trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U						0.13 U
Trichloroethene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.2	8.8	ND	1.06	ND	ND	0.20 U
Vinyl chloride	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	ND	ND	ND	3.61	1.9	1.33	0.23 U
Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U							0.33 U
SVOCs:														
1,2,4-Trichlorobenzene	ug/L													
1,2-Dichlorobenzene	ug/L													
1,3-Dichlorobenzene	ug/L													
1,4-Dichlorobenzene	ug/L													
2,2'-oxybis[1-chloropropane]	ug/L													
2,4,5-Trichlorophenol	ug/L													
2,4,6-Trichlorophenol	ug/L													
2,4-Dichlorophenol	ug/L													
2,4-Dimethylphenol	ug/L													
2,4-Dinitrophenol	ug/L													
2,4-Dinitrotoluene	ug/L													
2,6-Dinitrotoluene	ug/L													
2-Chloronaphthalene	ug/L													
2-Chlorophenol	ug/L													
2-Methylnaphthalene	ug/L													
2-Methylphenol	ug/L													

Appendix A
Summary of Sitewide Groundwater Monitoring Results
Task 2e - Sitewide Groundwater Sampling
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Date Aquifer Units	MW11-GW01 090210 Swan (USGS - FIELD GC)	MW11-GW01 090210 Swan (USGS - FIELD GC)	MW11-GW01 090514 Swan	MW12-GW01 090302 Swan (USGS - FIELD GC)	MW12-GW01 090306 Swan (USGS - FIELD GC)	MW12-GW01 090309 Swan (USGS - LAB)	MW12-GW01 090514 Swan	MW13-GW01 090316 RESIDENTIAL	MW2R-GW01 090303 RESIDENTIAL	MW2R-GW01 090922 (USGS-FIELD GC)	MW2SW-GW01 090302 Swan	MW2T2-GW01 090302 Jef/Roub	MW2T3-GW01 090302 Jeff/Roub	MW6R-GW01 080925 Jeff/Roub (USGS - FIELD GC)
VOCs:															
1,1,1-Trichloroethane	ug/L			0.23 U				0.23 U	0.23 U	0.23 U		0.23 U	0.23 U	0.23 U	
1,1,2,2-Tetrachloroethane	ug/L			0.25 U				0.25 U	0.25 U	0.25 U		0.25 U	0.25 U	0.25 U	
1,1,2-Trichloroethane	ug/L			0.32 U				0.32 U	0.32 U	0.32 U		0.32 U	0.32 U	0.32 U	
1,1-Dichloroethane	ug/L			0.18 U				0.18 U	0.18 U	0.18 U		0.18 U	0.18 U	0.18 U	
1,1-Dichloroethene	ug/L			0.22 U				0.22 U	0.22 U	0.22 U		0.22 U	0.22 U	0.22 U	
1,2-Dichloroethane	ug/L			0.22 U				0.22 U	0.22 U	0.22 U		0.22 U	0.22 U	0.22 U	
1,2-Dichloroethene, Total	ug/L			0.30 U				0.30 U	0.30 U	0.30 U		0.30 U	0.30 U	0.30 U	
1,2-Dichloropropane	ug/L			0.23 U				0.23 U	0.23 U	0.23 U		0.23 U	0.23 U	0.23 U	
2-Butanone (MEK)	ug/L								0.83 U			0.83 U	0.83 U	0.83 U	
2-Hexanone	ug/L			0.77 U				0.77 U	0.77 U	0.77 U		0.77 U	0.77 U	0.77 U	
4-Methyl-2-pentanone (MIBK)	ug/L								0.58 U			0.58 U	0.58 U	0.58 U	
Acetone	ug/L			1.2 R				1.2 R	1.2 R	1.2 R		1.2 U	1.2 U	1.2 U	
Benzene	ug/L			0.16 U				0.16 U	0.16 U	0.16 U		0.16 U	0.16 U	0.16 U	
Bromodichloromethane	ug/L			0.18 U				0.18 U	0.18 U	0.18 U		0.18 U	0.18 U	0.18 U	
Bromoform	ug/L			0.30 U				0.30 U	0.30 U	0.30 U		0.30 U	0.30 U	0.30 U	
Bromomethane	ug/L			0.44 U				0.44 U	0.44 U	0.44 U		0.44 U	0.44 U	0.44 U	
Carbon disulfide	ug/L			0.39 U				0.39 U	0.39 U	0.39 U		0.39 U	0.39 U	0.39 U	
Carbon tetrachloride	ug/L			0.21 U				0.21 U	0.21 U	0.21 U		0.21 U	0.21 U	0.21 U	
Chlorobenzene	ug/L			0.17 U				0.17 U	0.17 U	0.17 U		0.17 U	0.17 U	0.17 U	
Chloroethane	ug/L			0.45 U				0.45 U	0.45 U	0.45 U		0.45 U	0.45 U	0.45 U	
Chloroform	ug/L			0.13 U				0.13 U	0.13 U	0.13 U		0.13 U	0.13 U	0.13 U	
Chloromethane	ug/L			0.33 U				0.33 U	0.33 U	0.33 U		0.33 U	0.33 U	0.33 U	
cis-1,3-Dichloropropene	ug/L			0.16 U				0.16 U	0.16 U	0.16 U		0.16 U	0.16 U	0.16 U	
Dibromochloromethane	ug/L			0.19 U				0.19 U	0.19 U	0.19 U		0.19 U	0.19 U	0.19 U	
Ethylbenzene	ug/L			0.17 U				0.17 U	0.17 U	0.17 U		0.17 U	0.17 U	0.17 U	
Methyl Ethyl Ketone	ug/L			0.83 U				0.83 U		0.83 U					
Methyl Isobutyl Ketone	ug/L			0.58 U				0.58 U		0.58 U					
Methylene Chloride	ug/L			0.99 U				0.99 U	0.99 U	0.99 U		0.99 U	0.99 U	0.99 U	
Styrene	ug/L			0.15 U				0.15 U	0.15 U	0.15 U		0.15 U	0.15 U	0.15 U	
Tetrachloroethene	ug/L	ND	ND	0.14 U	ND	ND	ND	0.14 U	0.14 U	0.14 U	ND	0.14 U	0.14 U	0.14 U	ND
Toluene	ug/L			0.16 U				0.16 U	0.16 U	0.16 U		0.16 U	0.16 U	0.16 U	
trans-1,3-Dichloropropene	ug/L			0.13 U				0.13 U	0.13 U	0.13 U		0.13 U	0.13 U	0.13 U	
Trichloroethene	ug/L	ND	ND	0.20 U	ND	ND	ND	0.20 U	0.20 U	0.20 U	ND	0.20 U	0.20 U	0.20 U	0.23
Vinyl chloride	ug/L	ND	ND	0.23 U	0.76	0.43	ND	0.23 U	0.23 U	0.23 U	ND	0.23 U	0.23 U	0.23 U	ND
Xylenes, Total	ug/L			0.33 U				0.33 U	0.33 U	0.33 U		0.33 U	0.33 U	0.33 U	
SVOCs:															
1,2,4-Trichlorobenzene	ug/L														
1,2-Dichlorobenzene	ug/L														
1,3-Dichlorobenzene	ug/L														
1,4-Dichlorobenzene	ug/L														
2,2'-oxybis[1-chloropropane]	ug/L														
2,4,5-Trichlorophenol	ug/L														
2,4,6-Trichlorophenol	ug/L														
2,4-Dichlorophenol	ug/L														
2,4-Dimethylphenol	ug/L														
2,4-Dinitrophenol	ug/L														
2,4-Dinitrotoluene	ug/L														
2,6-Dinitrotoluene	ug/L														
2-Chloronaphthalene	ug/L														
2-Chlorophenol	ug/L														
2-Methylnaphthalene	ug/L														
2-Methylphenol	ug/L														

Appendix A
Summary of Sitewide Groundwater Monitoring Results
Task 2e - Sitewide Groundwater Sampling
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Analyte/Parameter Name	Location Date Aquifer Units	MW6R-GW01 081205 Jeff/Roub (USGS - LAB)	MW6R-GW01 090309 Jeff/Roub	MW6SW-GW01 080819 Swan (USGS - LAB)	MW6SW-GW01 090310 Swan	MW7SW-GW01 081210 Swan (USGS - FIELD GC)	MW7SW-GW01 081211 Swan (USGS - FIELD GC)	MW7SW-GW01 081211 Swan (USGS - LAB)	MW7SW-GW01 090114 Swan (USGS - LAB)	MW7SW-GW01 090323 Swan	MW9R-GW01 081016 Jeff/Roub	MW9R-GW01 090428 Jeff/Roub	MW9SW-GW01 080903 Swan (USGS - FIELD GC)	MW9SW-GW01 080905 Swan (USGS - FIELD GC)	MW9SW-GW01 080908 Swan (USGS - FIELD GC)
VOCs:															
1,1,1-Trichloroethane	ug/L		0.23 U		0.23 U					0.23 U		0.23 U			
1,1,2,2-Tetrachloroethane	ug/L		0.25 U		0.25 U					0.25 U		0.25 U			
1,1,2-Trichloroethane	ug/L		0.32 U		0.32 U					0.32 U		0.32 U			
1,1-Dichloroethane	ug/L		0.18 U		0.18 U					0.18 U		0.18 U			
1,1-Dichloroethene	ug/L		0.22 U		0.22 U					0.22 U		0.22 U			
1,2-Dichloroethane	ug/L		0.22 U		0.22 U					0.22 U		0.22 U			
1,2-Dichloroethene, Total	ug/L		0.30 U		0.30 U					0.30 U		0.30 U			
1,2-Dichloropropane	ug/L		0.23 U		0.23 U					0.23 U		0.23 U			
2-Butanone (MEK)	ug/L									0.83 U					
2-Hexanone	ug/L		0.77 U		0.77 U					0.77 U		0.77 U			
4-Methyl-2-pentanone (MIBK)	ug/L									0.58 U					
Acetone	ug/L		1.2 U		1.2 U					1.2 U		6.8 J			
Benzene	ug/L		0.16 U		0.16 U					0.16 U		0.16 U			
Bromodichloromethane	ug/L		0.18 U		0.18 U					0.18 U		0.18 U			
Bromoform	ug/L		0.30 U		0.30 U					0.30 U		0.30 U			
Bromomethane	ug/L		0.44 U		0.44 U					0.44 U		0.44 U			
Carbon disulfide	ug/L		0.39 U		0.39 U					0.39 U		0.39 U			
Carbon tetrachloride	ug/L		0.21 U		0.21 U					0.21 U		0.21 U			
Chlorobenzene	ug/L		0.17 U		0.17 U					0.17 U		0.17 U			
Chloroethane	ug/L		0.45 U		0.45 U					0.45 U		0.45 U			
Chloroform	ug/L		0.13 U		0.13 U					0.13 U		0.13 U			
Chloromethane	ug/L		0.33 U		0.33 U					0.33 U		0.33 U			
cis-1,3-Dichloropropene	ug/L		0.16 U		0.16 U					0.16 U		0.16 U			
Dibromochloromethane	ug/L		0.19 U		0.19 U					0.19 U		0.19 U			
Ethylbenzene	ug/L		0.17 U		0.17 U					0.17 U		0.17 U			
Methyl Ethyl Ketone	ug/L		0.83 U		0.83 U							46			
Methyl Isobutyl Ketone	ug/L		0.58 U		0.58 U							0.58 U			
Methylene Chloride	ug/L		0.99 U		0.99 U					0.99 U		0.99 U			
Styrene	ug/L		0.15 U		0.15 U					0.15 U		0.15 U			
Tetrachloroethene	ug/L	ND	0.14 U	ND	0.14 U	9.35	1.16	1.6	0.14 U	0.14 U	1.0 U	0.14 U	ND	ND	ND
Toluene	ug/L		0.16 U		0.16 U					0.16 U		0.16 U			
trans-1,3-Dichloropropene	ug/L		0.13 U		0.13 U					0.13 U		0.13 U			
Trichloroethene	ug/L	ND	0.20 U	ND	0.20 U	1.32	0.07	0.20 U	0.20 U	0.20 U	1.0 U	0.20 U	ND	ND	ND
Vinyl chloride	ug/L	ND	0.23 U	ND	0.23 U	ND	ND	0.23 U	0.23 U	0.23 U	1.0 U	0.23 U	ND	ND	ND
Xylenes, Total	ug/L		0.33 U		0.33 U					0.33 U		0.33 U			
SVOCs:															
1,2,4-Trichlorobenzene	ug/L														
1,2-Dichlorobenzene	ug/L														
1,3-Dichlorobenzene	ug/L														
1,4-Dichlorobenzene	ug/L														
2,2'-oxybis[1-chloropropane]	ug/L														
2,4,5-Trichlorophenol	ug/L														
2,4,6-Trichlorophenol	ug/L														
2,4-Dichlorophenol	ug/L														
2,4-Dimethylphenol	ug/L														
2,4-Dinitrophenol	ug/L														
2,4-Dinitrotoluene	ug/L														
2,6-Dinitrotoluene	ug/L														
2-Chloronaphthalene	ug/L														
2-Chlorophenol	ug/L														
2-Methylnaphthalene	ug/L														
2-Methylphenol	ug/L														

Appendix A
Summary of Sitewide Groundwater Monitoring Results
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Analyte/Parameter Name	Location Date Aquifer Units	MW9SW-GW01 080908 Swan (USGS - FIELD GC)	MW9SW-GW01 080923 Swan (USGS - LAB)	MW9SW-GW01 080929 Swan (USGS - LAB)	MW9SW-GW01 080813 Swan (USGS - LAB)	MW9SW-GW01 090312 Swan	MW04BS-GW01 090428 Swan	MW04BS-GW01 090428 Swan (USGS - FIELD GC)	PA53-GW01 090826 RESIDENTIAL	MW4-GW01 090729 Jeff/Roub (USGS - FIELD GC)	MW4-GW01 090729 Jeff/Roub (USGS - FIELD GC)	MW4-GW01 090812 Jeff/Roub (USGS - FIELD GC)	MW4-GW01 090825 Jeff/Roub (USGS - FIELD GC)	MW4-GW01 090930 Jeff/Roub
VOCs:														
1,1,1-Trichloroethane	ug/L					0.23 U	0.23 U		0.23 U					0.14 U
1,1,2,2-Tetrachloroethane	ug/L					0.25 U	0.25 U		0.25 U					0.27 U
1,1,2-Trichloroethane	ug/L					0.32 U	0.32 U		0.32 U					0.22 U
1,1-Dichloroethane	ug/L					0.18 U	0.18 U		0.18 U					0.12 U
1,1-Dichloroethene	ug/L					0.22 U	0.22 U		0.22 U					0.23 U
1,2-Dichloroethane	ug/L					0.22 U	0.22 U		0.22 U					0.14 U
1,2-Dichloroethene, Total	ug/L					0.30 U	0.30 U		0.30 U					0.26 U
1,2-Dichloropropane	ug/L					0.23 U	0.23 U		0.23 U					0.19 U
2-Butanone (MEK)	ug/L													
2-Hexanone	ug/L					0.77 U	0.77 U		0.77 U					0.77 U
4-Methyl-2-pentanone (MIBK)	ug/L													
Acetone	ug/L					1.2 U	1.2 U		1.2 R					2.1 U
Benzene	ug/L					0.16 U	0.16 U		0.16 U					0.15 U
Bromodichloromethane	ug/L					0.18 U	0.18 U		0.18 U					0.13 U
Bromoform	ug/L					0.30 U	0.30 U		0.30 U					0.30 U
Bromomethane	ug/L					0.44 U	0.44 U		0.44 U					0.45 U
Carbon disulfide	ug/L					0.39 U	0.39 U		0.39 U					0.66 U
Carbon tetrachloride	ug/L					0.21 U	0.21 U		0.21 U					0.32 U
Chlorobenzene	ug/L					0.17 U	0.17 U		0.17 U					0.17 U
Chloroethane	ug/L					0.45 U	0.45 U		0.45 U					0.36 U
Chloroform	ug/L					0.13 U	0.13 U		0.13 U					0.15 U
Chloromethane	ug/L					0.33 U	0.33 U		0.33 U					0.14 U
cis-1,3-Dichloropropene	ug/L					0.16 U	0.16 U		0.16 U					0.16 U
Dibromochloromethane	ug/L					0.19 U	0.19 U		0.19 U					0.17 U
Ethylbenzene	ug/L					0.17 U	0.17 U		0.17 U					0.22 U
Methyl Ethyl Ketone	ug/L					0.83 U	0.83 U		0.83 U					28
Methyl Isobutyl Ketone	ug/L					0.58 U	0.58 U		0.58 U					0.77 U
Methylene Chloride	ug/L					5.2	0.99 U		0.99 U					0.52 U
Styrene	ug/L					0.15 U	0.15 U		0.15 U					0.17 U
Tetrachloroethene	ug/L	ND	2.2	ND	ND	2.4	4.1	4.1	0.14 U	0.5	1.37	ND	ND	0.20 U
Toluene	ug/L					0.16 U	0.16 U		0.16 U					0.17 U
trans-1,3-Dichloropropene	ug/L					0.13 U	0.13 U		0.13 U					0.21 U
Trichloroethene	ug/L	ND	1.0 U	ND	ND	0.20 U	0.20 U	ND	0.20 U	ND	ND	ND	ND	0.16 U
Vinyl chloride	ug/L	ND	1.0 U	ND	ND	0.23 U	0.23 U	ND	0.23 U	1.19	0.83	0.38	ND	0.15 U
Xylenes, Total	ug/L					0.33 U	0.33 U		0.33 U					0.42 U
SVOCs:														
1,2,4-Trichlorobenzene	ug/L													
1,2-Dichlorobenzene	ug/L													
1,3-Dichlorobenzene	ug/L													
1,4-Dichlorobenzene	ug/L													
2,2'-oxybis[1-chloropropane]	ug/L													
2,4,5-Trichlorophenol	ug/L													
2,4,6-Trichlorophenol	ug/L													
2,4-Dichlorophenol	ug/L													
2,4-Dimethylphenol	ug/L													
2,4-Dinitrophenol	ug/L													
2,4-Dinitrotoluene	ug/L													
2,6-Dinitrotoluene	ug/L													
2-Chloronaphthalene	ug/L													
2-Chlorophenol	ug/L													
2-Methylnaphthalene	ug/L													
2-Methylphenol	ug/L													

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Analyte/Parameter Name	Location Date Aquifer Units	BW22-GW01 090324 Jeff/Roub	JS15-GW01 090422 RESIDENTIAL	JS20-GW01 090325 RESIDENTIAL	JS25-GW01 090429 RESIDENTIAL	JS25-GW02 090429 RESID - Dup	JS39-GW01 090325 RESIDENTIAL	JS40-GW01 090325 RESIDENTIAL	MW04B-GW01 090316 Swan/Jeff (USGS - FIELD GC)	MW04B-GW01 090317 Swan/Jeff (USGS - FIELD GC)	MW04B-GW01 090324 Swan/Jeff (USGS - FIELD GC)	MW04B-GW01 090325 Swan/Jeff (USGS - FIELD GC)	MW04B-GW01 090420 Swan/Jeff (USGS - FIELD GC)	MW04B-GW01 090421 Swan/Jeff (USGS - FIELD GC)	MW04B-GW01 090514 Swan/Jeff
2-Nitroaniline	ug/L														
2-Nitrophenol	ug/L														
3 & 4 Methylphenol	ug/L														
3,3'-Dichlorobenzidine	ug/L														
3-Nitroaniline	ug/L														
4,6-Dinitro-2-methylphenol	ug/L														
4-Bromophenyl phenyl ether	ug/L														
4-Chloro-3-methylphenol	ug/L														
4-Chloroaniline	ug/L														
4-Chlorophenyl phenyl ether	ug/L														
4-Nitroaniline	ug/L														
4-Nitrophenol	ug/L														
Acenaphthene	ug/L														
Acenaphthylene	ug/L														
Anthracene	ug/L														
Benzo[a]anthracene	ug/L														
Benzo[a]pyrene	ug/L														
Benzo[b]fluoranthene	ug/L														
Benzo[g,h,i]perylene	ug/L														
Benzo[k]fluoranthene	ug/L														
Bis(2-chloroethoxy)methane	ug/L														
Bis(2-chloroethyl)ether	ug/L														
Bis(2-ethylhexyl) phthalate	ug/L														
Butyl benzyl phthalate	ug/L														
Carbazole	ug/L														
Chrysene	ug/L														
Dibenz(a,h)anthracene	ug/L														
Dibenzofuran	ug/L														
Diethyl phthalate	ug/L														
Dimethyl phthalate	ug/L														
Di-n-butyl phthalate	ug/L														
Di-n-octyl phthalate	ug/L														
Fluoranthene	ug/L														
Fluorene	ug/L														
Hexachlorobenzene	ug/L														
Hexachlorobutadiene	ug/L														
Hexachlorocyclopentadiene	ug/L														
Hexachloroethane	ug/L														
Indeno[1,2,3-cd]pyrene	ug/L														
Isophorone	ug/L														
Naphthalene	ug/L														
Nitrobenzene	ug/L														
N-Nitrosodi-n-propylamine	ug/L														
N-Nitrosodiphenylamine	ug/L														
Pentachlorophenol	ug/L														
Phenanthrene	ug/L														
Phenol	ug/L														
Pyrene	ug/L														
Pesticides:															
4,4'-DDD	ug/L														
4,4'-DDE	ug/L														
4,4'-DDT	ug/L														
Aldrin	ug/L														

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Analyte/Parameter Name	Location Date Aquifer Units	MW11-GW01 090210 Swan (USGS - FIELD GC)	MW11-GW01 090210 Swan (USGS - FIELD GC)	MW11-GW01 090514 Swan	MW12-GW01 090302 Swan (USGS - FIELD GC)	MW12-GW01 090306 Swan (USGS - FIELD GC)	MW12-GW01 090309 Swan (USGS - LAB)	MW12-GW01 090514 Swan	MW13-GW01 090316 RESIDENTIAL	MW2R-GW01 090303 RESIDENTIAL	MW2R-GW01 090922 (USGS-FIELD GC)	MW2SW-GW01 090302 Swan	MW2T2-GW01 090302 Jef/Roub	MW2T3-GW01 090302 Jeff/Roub	MW6R-GW01 080925 Jeff/Roub (USGS - FIELD GC)
2-Nitroaniline	ug/L														
2-Nitrophenol	ug/L														
3 & 4 Methylphenol	ug/L														
3,3'-Dichlorobenzidine	ug/L														
3-Nitroaniline	ug/L														
4,6-Dinitro-2-methylphenol	ug/L														
4-Bromophenyl phenyl ether	ug/L														
4-Chloro-3-methylphenol	ug/L														
4-Chloroaniline	ug/L														
4-Chlorophenyl phenyl ether	ug/L														
4-Nitroaniline	ug/L														
4-Nitrophenol	ug/L														
Acenaphthene	ug/L														
Acenaphthylene	ug/L														
Anthracene	ug/L														
Benzo[a]anthracene	ug/L														
Benzo[a]pyrene	ug/L														
Benzo[b]fluoranthene	ug/L														
Benzo[g,h,i]perylene	ug/L														
Benzo[k]fluoranthene	ug/L														
Bis(2-chloroethoxy)methane	ug/L														
Bis(2-chloroethyl)ether	ug/L														
Bis(2-ethylhexyl) phthalate	ug/L														
Butyl benzyl phthalate	ug/L														
Carbazole	ug/L														
Chrysene	ug/L														
Dibenz(a,h)anthracene	ug/L														
Dibenzofuran	ug/L														
Diethyl phthalate	ug/L														
Dimethyl phthalate	ug/L														
Di-n-butyl phthalate	ug/L														
Di-n-octyl phthalate	ug/L														
Fluoranthene	ug/L														
Fluorene	ug/L														
Hexachlorobenzene	ug/L														
Hexachlorobutadiene	ug/L														
Hexachlorocyclopentadiene	ug/L														
Hexachloroethane	ug/L														
Indeno[1,2,3-cd]pyrene	ug/L														
Isophorone	ug/L														
Naphthalene	ug/L														
Nitrobenzene	ug/L														
N-Nitrosodi-n-propylamine	ug/L														
N-Nitrosodiphenylamine	ug/L														
Pentachlorophenol	ug/L														
Phenanthrene	ug/L														
Phenol	ug/L														
Pyrene	ug/L														
Pesticides:															
4,4'-DDD	ug/L														
4,4'-DDE	ug/L														
4,4'-DDT	ug/L														
Aldrin	ug/L														

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Analyte/Parameter Name	Location Date Aquifer Units	MW6R-GW01 081205 Jeff/Roub (USGS - LAB)	MW6R-GW01 090309 Jeff/Roub	MW6SW-GW01 080819 Swan (USGS - LAB)	MW6SW-GW01 090310 Swan	MW7SW-GW01 081210 Swan (USGS - FIELD GC)	MW7SW-GW01 081211 Swan (USGS - FIELD GC)	MW7SW-GW01 081211 Swan (USGS - LAB)	MW7SW-GW01 090114 Swan (USGS - LAB)	MW7SW-GW01 090323 Swan	MW9R-GW01 081016 Jeff/Roub	MW9R-GW01 090428 Jeff/Roub	MW9SW-GW01 080903 Swan (USGS - FIELD GC)	MW9SW-GW01 080905 Swan (USGS - FIELD GC)	MW9SW-GW01 080908 Swan (USGS - FIELD GC)
2-Nitroaniline	ug/L														
2-Nitrophenol	ug/L														
3 & 4 Methylphenol	ug/L														
3,3'-Dichlorobenzidine	ug/L														
3-Nitroaniline	ug/L														
4,6-Dinitro-2-methylphenol	ug/L														
4-Bromophenyl phenyl ether	ug/L														
4-Chloro-3-methylphenol	ug/L														
4-Chloroaniline	ug/L														
4-Chlorophenyl phenyl ether	ug/L														
4-Nitroaniline	ug/L														
4-Nitrophenol	ug/L														
Acenaphthene	ug/L														
Acenaphthylene	ug/L														
Anthracene	ug/L														
Benzo[a]anthracene	ug/L														
Benzo[a]pyrene	ug/L														
Benzo[b]fluoranthene	ug/L														
Benzo[g,h,i]perylene	ug/L														
Benzo[k]fluoranthene	ug/L														
Bis(2-chloroethoxy)methane	ug/L														
Bis(2-chloroethyl)ether	ug/L														
Bis(2-ethylhexyl) phthalate	ug/L														
Butyl benzyl phthalate	ug/L														
Carbazole	ug/L														
Chrysene	ug/L														
Dibenz(a,h)anthracene	ug/L														
Dibenzofuran	ug/L														
Diethyl phthalate	ug/L														
Dimethyl phthalate	ug/L														
Di-n-butyl phthalate	ug/L														
Di-n-octyl phthalate	ug/L														
Fluoranthene	ug/L														
Fluorene	ug/L														
Hexachlorobenzene	ug/L														
Hexachlorobutadiene	ug/L														
Hexachlorocyclopentadiene	ug/L														
Hexachloroethane	ug/L														
Indeno[1,2,3-cd]pyrene	ug/L														
Isophorone	ug/L														
Naphthalene	ug/L														
Nitrobenzene	ug/L														
N-Nitrosodi-n-propylamine	ug/L														
N-Nitrosodiphenylamine	ug/L														
Pentachlorophenol	ug/L														
Phenanthrene	ug/L														
Phenol	ug/L														
Pyrene	ug/L														
Pesticides:															
4,4'-DDD	ug/L														
4,4'-DDE	ug/L														
4,4'-DDT	ug/L														
Aldrin	ug/L														

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Location Date Aquifer	MW9SW-GW01 080908 Swan	MW9SW-GW01 080923 Swan	MW9SW-GW01 080929 Swan	MW9SW-GW01 080813 Swan	MW9SW-GW01 090312 Swan	MW04BS-GW01 090428 Swan	MW04BS-GW01 090428 Swan	PA53-GW01 090826	MW4-GW01 090729 Jeff/Roub	MW4-GW01 090729 Jeff/Roub	MW4-GW01 090812 Jeff/Roub	MW4-GW01 090825 Jeff/Roub	MW4-GW01 090930 Jeff/Roub
Analyte/Parameter Name	Units	(USGS - FIELD GC)	(USGS - LAB)	(USGS - LAB)	(USGS - LAB)			(USGS - FIELD GC)	RESIDENTIAL	(USGS - FIELD GC)	(USGS - FIELD GC)	(USGS - FIELD GC)	(USGS - FIELD GC)	
2-Nitroaniline	ug/L													
2-Nitrophenol	ug/L													
3 & 4 Methylphenol	ug/L													
3,3'-Dichlorobenzidine	ug/L													
3-Nitroaniline	ug/L													
4,6-Dinitro-2-methylphenol	ug/L													
4-Bromophenyl phenyl ether	ug/L													
4-Chloro-3-methylphenol	ug/L													
4-Chloroaniline	ug/L													
4-Chlorophenyl phenyl ether	ug/L													
4-Nitroaniline	ug/L													
4-Nitrophenol	ug/L													
Acenaphthene	ug/L													
Acenaphthylene	ug/L													
Anthracene	ug/L													
Benzo[a]anthracene	ug/L													
Benzo[a]pyrene	ug/L													
Benzo[b]fluoranthene	ug/L													
Benzo[g,h,i]perylene	ug/L													
Benzo[k]fluoranthene	ug/L													
Bis(2-chloroethoxy)methane	ug/L													
Bis(2-chloroethyl)ether	ug/L													
Bis(2-ethylhexyl) phthalate	ug/L													
Butyl benzyl phthalate	ug/L													
Carbazole	ug/L													
Chrysene	ug/L													
Dibenz(a,h)anthracene	ug/L													
Dibenzofuran	ug/L													
Diethyl phthalate	ug/L													
Dimethyl phthalate	ug/L													
Di-n-butyl phthalate	ug/L													
Di-n-octyl phthalate	ug/L													
Fluoranthene	ug/L													
Fluorene	ug/L													
Hexachlorobenzene	ug/L													
Hexachlorobutadiene	ug/L													
Hexachlorocyclopentadiene	ug/L													
Hexachloroethane	ug/L													
Indeno[1,2,3-cd]pyrene	ug/L													
Isophorone	ug/L													
Naphthalene	ug/L													
Nitrobenzene	ug/L													
N-Nitrosodi-n-propylamine	ug/L													
N-Nitrosodiphenylamine	ug/L													
Pentachlorophenol	ug/L													
Phenanthrene	ug/L													
Phenol	ug/L													
Pyrene	ug/L													
Pesticides:														
4,4'-DDD	ug/L													
4,4'-DDE	ug/L													
4,4'-DDT	ug/L													
Aldrin	ug/L													

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Analyte/Parameter Name	Location Date Aquifer Units	BW22-GW01 090324 Jeff/Roub	JS15-GW01 090422 RESIDENTIAL	JS20-GW01 090325 RESIDENTIAL	JS25-GW01 090429 RESIDENTIAL	JS25-GW02 090429 RESID - Dup	JS39-GW01 090325 RESIDENTIAL	JS40-GW01 090325 RESIDENTIAL	MW04B-GW01 090316 Swan/Jeff (USGS - FIELD GC)	MW04B-GW01 090317 Swan/Jeff (USGS - FIELD GC)	MW04B-GW01 090324 Swan/Jeff (USGS - FIELD GC)	MW04B-GW01 090325 Swan/Jeff (USGS - FIELD GC)	MW04B-GW01 090420 Swan/Jeff (USGS - FIELD GC)	MW04B-GW01 090421 Swan/Jeff (USGS - FIELD GC)	MW04B-GW01 090514 Swan/Jeff
alpha-BHC	ug/L														
alpha-Chlordane	ug/L														
beta-BHC	ug/L														
delta-BHC	ug/L														
Dieldrin	ug/L														
Endosulfan I	ug/L														
Endosulfan II	ug/L														
Endosulfan sulfate	ug/L														
Endrin	ug/L														
Endrin aldehyde	ug/L														
Endrin ketone	ug/L														
gamma-BHC (Lindane)	ug/L														
gamma-Chlordane	ug/L														
Heptachlor	ug/L														
Heptachlor epoxide	ug/L														
Methoxychlor	ug/L														
Toxaphene	ug/L														
PCBs:															
PCB-1016	ug/L														
PCB-1221	ug/L														
PCB-1232	ug/L														
PCB-1242	ug/L														
PCB-1248	ug/L														
PCB-1254	ug/L														
PCB-1260	ug/L														
Metals:															
Arsenic	ug/L														
Barium	ug/L														
Cadmium	ug/L														
Chromium	ug/L														
Lead	ug/L														
Mercury	ug/L														
Selenium	ug/L														
Silver	ug/L														
Zinc	ug/L														
Other Parameters:															
Ammonia (as N)	mg/L	0.12 U	0.13 U	0.38	0.065 U	0.065 U	0.52	0.093 U							0.065 U
Chloride	mg/L	2.8	2.6	2.4	80	72	1.8	4.8							4.7
Ethane	ug/L	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U							8.6
Ethylene	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U							4.0
Methane	ug/L	9.9 J	0.19 U	0.25 J	0.19 U	0.19 U	0.35 J	0.44 J							27
Nitrogen, Nitrate	mg/L	0.18	0.063 J	0.32	2.5	2.4	0.021 J	0.020 U							0.016 U
Nitrogen, Nitrate Nitrite	mg/L	0.18	0.063 J	0.32	2.5	2.4	0.021 J	0.020 U							0.016 U
Nitrogen, Nitrite	mg/L	0.0042 U	0.0042 U	0.0042 U	0.011 J	0.013 J	0.0042 U	0.013 J							0.0020 U
Sulfate	mg/L	4.5	11	8.2	14	14	14	9.4							22
Sulfide	mg/L	0.31 U	0.31 U	0.31 U	0.43 U	0.31 U	0.31 U	0.31 U							0.31 U

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Analyte/Parameter Name	Location Date Aquifer Units	MW11-GW01 090210 Swan (USGS - FIELD GC)	MW11-GW01 090210 Swan (USGS - FIELD GC)	MW11-GW01 090514 Swan	MW12-GW01 090302 Swan (USGS - FIELD GC)	MW12-GW01 090306 Swan (USGS - FIELD GC)	MW12-GW01 090309 Swan (USGS - LAB)	MW12-GW01 090514 Swan	MW13-GW01 090316 RESIDENTIAL	MW2R-GW01 090303 RESIDENTIAL	MW2R-GW01 090922 (USGS-FIELD GC)	MW2SW-GW01 090302 Swan	MW2T2-GW01 090302 Jef/Roub	MW2T3-GW01 090302 Jeff/Roub	MW6R-GW01 080925 Jeff/Roub (USGS - FIELD GC)
alpha-BHC	ug/L														
alpha-Chlordane	ug/L														
beta-BHC	ug/L														
delta-BHC	ug/L														
Dieldrin	ug/L														
Endosulfan I	ug/L														
Endosulfan II	ug/L														
Endosulfan sulfate	ug/L														
Endrin	ug/L														
Endrin aldehyde	ug/L														
Endrin ketone	ug/L														
gamma-BHC (Lindane)	ug/L														
gamma-Chlordane	ug/L														
Heptachlor	ug/L														
Heptachlor epoxide	ug/L														
Methoxychlor	ug/L														
Toxaphene	ug/L														
PCBs:															
PCB-1016	ug/L														
PCB-1221	ug/L														
PCB-1232	ug/L														
PCB-1242	ug/L														
PCB-1248	ug/L														
PCB-1254	ug/L														
PCB-1260	ug/L														
Metals:															
Arsenic	ug/L														
Barium	ug/L														
Cadmium	ug/L														
Chromium	ug/L														
Lead	ug/L														
Mercury	ug/L														
Selenium	ug/L														
Silver	ug/L														
Zinc	ug/L														

Other Parameters:

Ammonia (as N)	mg/L			0.097 J				0.065 U	0.39	0.048 U		0.27	0.11 J	0.062 J	
Chloride	mg/L			5.0				18	2.0	2.5 J		2.1	1.8	1.8	
Ethane	ug/L			3.5 U				3.5 U	0.35 U	0.35 U		0.35 U	0.35 U	0.35 U	
Ethylene	ug/L			3.3 U				3.3 U	0.33 U	0.33 U		0.33 U	0.33 U	0.33 U	
Methane	ug/L			1.9 U				68	0.19 J	0.42 J		0.88 J	0.49 J	0.44 J	
Nitrogen, Nitrate	mg/L			2.0				7.0	0.20	0.095 J		0.020 U	0.020 U	0.020 U	
Nitrogen, Nitrate Nitrite	mg/L			2.0				7.0	0.20	0.095 J		0.020 U	0.020 U	0.020 U	
Nitrogen, Nitrite	mg/L			0.0020 U				0.0020 U	0.0042 U	0.0042 U		0.0042 U	0.0042 U	0.0042 U	
Sulfate	mg/L			10				13	10	4.5		9.4	8.5	12	
Sulfide	mg/L			0.31 U				0.31 U	0.31 U	0.31 U		0.31 U	0.31 U	0.31 U	

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Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Date Aquifer Units	MW6R-GW01 081205 Jeff/Roub (USGS - LAB)	MW6R-GW01 090309 Jeff/Roub	MW6SW-GW01 080819 Swan (USGS - LAB)	MW6SW-GW01 090310 Swan	MW7SW-GW01 081210 Swan (USGS - FIELD GC)	MW7SW-GW01 081211 Swan (USGS - FIELD GC)	MW7SW-GW01 081211 Swan (USGS - LAB)	MW7SW-GW01 090114 Swan (USGS - LAB)	MW7SW-GW01 090323 Swan	MW9R-GW01 081016 Jeff/Roub	MW9R-GW01 090428 Jeff/Roub	MW9SW-GW01 080903 Swan (USGS - FIELD GC)	MW9SW-GW01 080905 Swan (USGS - FIELD GC)	MW9SW-GW01 080908 Swan (USGS - FIELD GC)
alpha-BHC	ug/L														
alpha-Chlordane	ug/L														
beta-BHC	ug/L														
delta-BHC	ug/L														
Dieldrin	ug/L														
Endosulfan I	ug/L														
Endosulfan II	ug/L														
Endosulfan sulfate	ug/L														
Endrin	ug/L														
Endrin aldehyde	ug/L														
Endrin ketone	ug/L														
gamma-BHC (Lindane)	ug/L														
gamma-Chlordane	ug/L														
Heptachlor	ug/L														
Heptachlor epoxide	ug/L														
Methoxychlor	ug/L														
Toxaphene	ug/L														
PCBs:															
PCB-1016	ug/L														
PCB-1221	ug/L														
PCB-1232	ug/L														
PCB-1242	ug/L														
PCB-1248	ug/L														
PCB-1254	ug/L														
PCB-1260	ug/L														
Metals:															
Arsenic	ug/L														
Barium	ug/L														
Cadmium	ug/L														
Chromium	ug/L														
Lead	ug/L														
Mercury	ug/L														
Selenium	ug/L														
Silver	ug/L														
Zinc	ug/L														

Other Parameters:															
Ammonia (as N)	mg/L		0.12 J		0.19 J					0.27		0.065 U			
Chloride	mg/L		1.9		4.5					2.2		4.4			
Ethane	ug/L		0.35 U		0.35 U					0.37		0.35 U			
Ethylene	ug/L		0.33 U		0.33 U					0.33 U		0.33 U			
Methane	ug/L		0.36 J		0.30 J					2.9 J		0.70			
Nitrogen, Nitrate	mg/L		0.020 U		0.11					0.045 J		0.016 U			
Nitrogen, Nitrate Nitrite	mg/L		0.020 U		0.11					0.058 J		0.016 U			
Nitrogen, Nitrite	mg/L		0.0073 J		0.0042 U					0.013 J		0.0083 J			
Sulfate	mg/L		13		6.7					5.1		14			
Sulfide	mg/L		0.31 U		0.31 U					0.31 U		0.83 U			

Appendix A
Summary of Sitewide Groundwater Monitoring Results
Task 2e - Sitewide Groundwater Sampling
Riverfront Superfund Site
New Haven, Missouri

Location Date Aquifer	MW9SW-GW01 080908 Swan	MW9SW-GW01 080923 Swan	MW9SW-GW01 080929 Swan	MW9SW-GW01 080813 Swan	MW9SW-GW01 090312 Swan	MW04BS-GW01 090428 Swan	MW04BS-GW01 090428 Swan	PA53-GW01 090826	MW4-GW01 090729 Jeff/Roub	MW4-GW01 090729 Jeff/Roub	MW4-GW01 090812 Jeff/Roub	MW4-GW01 090825 Jeff/Roub	MW4-GW01 090930 Jeff/Roub
Analyte/Parameter Name	Units	(USGS - FIELD GC)	(USGS - LAB)	(USGS - LAB)	(USGS - LAB)			(USGS - FIELD GC)	RESIDENTIAL	(USGS - FIELD GC)	(USGS - FIELD GC)	(USGS - FIELD GC)	(USGS - FIELD GC)	
alpha-BHC	ug/L													
alpha-Chlordane	ug/L													
beta-BHC	ug/L													
delta-BHC	ug/L													
Dieldrin	ug/L													
Endosulfan I	ug/L													
Endosulfan II	ug/L													
Endosulfan sulfate	ug/L													
Endrin	ug/L													
Endrin aldehyde	ug/L													
Endrin ketone	ug/L													
gamma-BHC (Lindane)	ug/L													
gamma-Chlordane	ug/L													
Heptachlor	ug/L													
Heptachlor epoxide	ug/L													
Methoxychlor	ug/L													
Toxaphene	ug/L													
PCBs:														
PCB-1016	ug/L													
PCB-1221	ug/L													
PCB-1232	ug/L													
PCB-1242	ug/L													
PCB-1248	ug/L													
PCB-1254	ug/L													
PCB-1260	ug/L													
Metals:														
Arsenic	ug/L													
Barium	ug/L													
Cadmium	ug/L													
Chromium	ug/L													
Lead	ug/L													
Mercury	ug/L													
Selenium	ug/L													
Silver	ug/L													
Zinc	ug/L													
Other Parameters:														
Ammonia (as N)	mg/L					0.078 J			0.065 U					0.078 J
Chloride	mg/L					100			5.3					100
Ethane	ug/L					0.35 U			0.35 U					0.35 U
Ethylene	ug/L					0.33 U			0.33 U					0.33 U
Methane	ug/L					0.37 J			0.19 U					0.37 J
Nitrogen, Nitrate	mg/L					4.0			1.6					4.0
Nitrogen, Nitrate Nitrite	mg/L					4.0			1.6					4.0
Nitrogen, Nitrite	mg/L					0.0042 U			0.002 U					0.0042 U
Sulfate	mg/L					19			9.7					19
Sulfide	mg/L					0.31 U			0.31 U					0.31 U

Appendix A
Summary of Surface Water Analytical Results
Task 4 - Sediment/Surface Water Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Date / Units	SW01-SW01 090409	SW02-SW01 090409	SW03-SW01 080801	SW04-SW01 090409	SW06-SW01 080801	SW06-SW02 080801 Duplicate	SW08-SW01 080804	SW8-SW01 090408 Resample	SW08-SW01 090825 Resample	SW11-SW01 080804	SW8U1-SW01 090409	SW8U2-SW01 090409	SW8U3-SW01 090429	SW910-SW01 080808	SW12-SW01 090825	SW13-SW01 090825	SW14-SW01 090825
VOCs:																		
1,1,1-Trichloroethane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
1,1,2,2-Tetrachloroethane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,1,2-Trichloroethane	ug/L	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
1,1-Dichloroethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
1,1-Dichloroethene	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
1,2-Dichloroethane	ug/L	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
1,2-Dichloroethene, Total	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	4.1	0.3 U	6.6	0.3 U	0.3 U	6	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,2-Dichloropropane	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
2-Butanone (MEK)	ug/L					0.83 U	0.83 U	0.83 U			0.83 U				0.83 U			0.83 U
2-Hexanone	ug/L	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U
4-Methyl-2-pentanone (MIBK)	ug/L					0.58 U	0.58 U	0.58 U			0.58 U				0.58 U			0.58 U
Acetone	ug/L	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 R	1.2 U	1.2 U	1.2 U	1.2 R	1.2 U	1.2 R	1.2 R	1.2 R
Benzene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
Bromodichloromethane	ug/L	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
Bromoform	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Bromomethane	ug/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
Carbon disulfide	ug/L	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
Carbon tetrachloride	ug/L	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Chlorobenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Chloroethane	ug/L	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Chloroform	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Chloromethane	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
cis-1,3-Dichloropropene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
Dibromochloromethane	ug/L	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Ethylbenzene	ug/L	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Methyl Ethyl Ketone	ug/L	0.83 J	0.83 U	0.83 U	0.83 U				0.83 U	0.83 U		0.83 U	0.83 U	0.83 U		0.83 U	0.83 U	0.83 U
Methyl Isobutyl Ketone	ug/L	0.58 U	0.58 U	0.58 U	0.58 U				0.58 U	0.58 U		0.58 U	0.58 U	0.58 U		0.58 U	0.58 U	0.58 U
Methylene Chloride	ug/L	7.5	0.99 U	0.99 U	3.3	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U	0.99 U
Styrene	ug/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Tetrachloroethene	ug/L	0.14 U	0.14 U	0.14 U	0.14 U	4.5	4.3	3.5	14	0.14 U	0.14 U	2.2	19	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Toluene	ug/L	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
trans-1,3-Dichloropropene	ug/L	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.3	2.2	1.5	0.2 U	0.2 U	2.8	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl chloride	ug/L	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	3.6	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
Xylenes, Total	ug/L	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
SVOCs:																		
1,2,4-Trichlorobenzene	ug/L					0.24 U	0.23 U											
1,2-Dichlorobenzene	ug/L					0.2 U	0.19 U											
1,3-Dichlorobenzene	ug/L					0.21 U	0.2 U											
1,4-Dichlorobenzene	ug/L					0.2 U	0.19 U											
2,2'-oxybis[1-chloropropane]	ug/L					0.2 U	0.19 U											
2,4,5-Trichlorophenol	ug/L					2.6 U	2.5 U											
2,4,6-Trichlorophenol	ug/L					0.66 U	0.64 U											
2,4-Dichlorophenol	ug/L					3.2 U	3.1 U											
2,4-Dimethylphenol	ug/L					1.1 U	1.1 U											
2,4-Dinitrophenol	ug/L					3.1 U	3 U											
2,4-Dinitrotoluene	ug/L					0.45 U	0.43 U											
2,6-Dinitrotoluene	ug/L					0.12 U	0.12 U											
2-Chloronaphthalene	ug/L					0.17 U	0.16 U											
2-Chlorophenol	ug/L					0.21 U	0.2 U											
2-Methylnaphthalene	ug/L					0.16 U	0.15 U											
2-Methylphenol	ug/L					0.43 U	0.41 U											
2-Nitroaniline	ug/L					0.54 U	0.53 U											
2-Nitrophenol	ug/L					0.63 U	0.62 U											
3 & 4 Methylphenol	ug/L					0.19 U	0.18 U											
3,3'-Dichlorobenzidine	ug/L					0.25 U	0.24 U											
3-Nitroaniline	ug/L					0.99 U	0.96 U											
4,6-Dinitro-2-methylphenol	ug/L					1.8 U	1.7 U											
4-Bromophenyl phenyl ether	ug/L					0.16 J	0.15 U											
4-Chloro-3-methylphenol	ug/L					2.4 U	2.3 U											

Appendix A
Summary of Surface Water Analytical Results
Task 4 - Sediment/Surface Water Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Date Units	SW01-SW01 090409	SW02-SW01 090409	SW03-SW01 080801	SW04-SW01 090409	SW06-SW01 080801	SW06-SW02 080801 Duplicate	SW08-SW01 080804	SW8-SW01 090408 Resample	SW08-SW01 090825 Resample	SW11-SW01 080804	SW8U1-SW01 090409	SW8U2-SW01 090409	SW8U3-SW01 090429	SW910-SW01 080808	SW12-SW01 090825	SW13-SW01 090825	SW14-SW01 090825
4-Chloroaniline	ug/L					0.77 U	0.75 U											
4-Chlorophenyl phenyl ether	ug/L					0.24 U	0.23 U											
4-Nitroaniline	ug/L					2.3 U	2.2 U											
4-Nitrophenol	ug/L					2.4 U	2.3 U											
Acenaphthene	ug/L					0.057 U	0.056 U											
Acenaphthylene	ug/L					0.057 U	0.056 U											
Anthracene	ug/L					0.067 U	0.065 U											
Benzo[a]anthracene	ug/L					0.065 J	0.063 U											
Benzo[a]pyrene	ug/L					0.044 U	0.042 U											
Benzo[b]fluoranthene	ug/L					0.042 J	0.04 U											
Benzo[g,h,i]perylene	ug/L					0.11 U	0.11 U											
Benzo[k]fluoranthene	ug/L					0.078 U	0.076 U											
Bis(2-chloroethoxy)methane	ug/L					0.14 U	0.13 U											
Bis(2-chloroethyl)ether	ug/L					0.24 U	0.23 U											
Bis(2-ethylhexyl) phthalate	ug/L					1.9 U	1.8 U											
Butyl benzyl phthalate	ug/L					0.2 U	0.19 U											
Carbazole	ug/L					0.81 U	0.79 U											
Chrysene	ug/L					0.067 J	0.065 U											
Dibenz(a,h)anthracene	ug/L					0.056 U	0.055 U											
Dibenzofuran	ug/L					0.24 U	0.23 U											
Diethyl phthalate	ug/L					0.2 U	0.19 U											
Dimethyl phthalate	ug/L					0.13 U	0.12 U											
Di-n-butyl phthalate	ug/L					0.63 U	0.62 U											
Di-n-octyl phthalate	ug/L					1.7 U	1.6 U											
Fluoranthene	ug/L					0.067 U	0.065 U											
Fluorene	ug/L					0.056 U	0.055 U											
Hexachlorobenzene	ug/L					0.065 J	0.063 U											
Hexachlorobutadiene	ug/L					0.25 U	0.24 U											
Hexachlorocyclopentadiene	ug/L					4.4 U	4.2 U											
Hexachloroethane	ug/L					0.25 U	0.24 U											
Indeno[1,2,3-cd]pyrene	ug/L					0.071 U	0.069 U											
Isophorone	ug/L					0.57 U	0.56 U											
Naphthalene	ug/L					0.099 U	0.096 U											
Nitrobenzene	ug/L					0.3 U	0.29 U											
N-Nitrosodi-n-propylamine	ug/L					0.15 U	0.14 U											
N-Nitrosodiphenylamine	ug/L					0.2 U	0.19 U											
Pentachlorophenol	ug/L					2.1 U	2 U											
Phenanthrene	ug/L					0.07 U	0.068 U											
Phenol	ug/L					1.3 U	1.2 U											
Pyrene	ug/L					0.07 J	0.068 U											
Toxaphene	ug/L					0.05 U	0.05 U											
Pesticides:																		
4,4'-DDD	ug/L					0.0055 U	0.0055 U											
4,4'-DDE	ug/L					0.0047 U	0.0047 U											
4,4'-DDT	ug/L					0.0052 U	0.0052 U											
Aldrin	ug/L					0.0042 U	0.0042 U											
alpha-BHC	ug/L					0.0032 U	0.0032 U											
alpha-Chlordane	ug/L					0.0045 U	0.0045 U											
beta-BHC	ug/L					0.0034 U	0.0034 U											
delta-BHC	ug/L					0.0074 U	0.0074 U											
Dieldrin	ug/L					0.0043 U	0.0043 U											
Endosulfan I	ug/L					0.051	0.05											
Endosulfan II	ug/L					0.0037 U	0.0037 U											
Endosulfan sulfate	ug/L					0.0077 U	0.0077 U											
Endrin	ug/L					0.0083 U	0.0083 U											
Endrin aldehyde	ug/L					0.0067 U	0.0067 U											
Endrin ketone	ug/L					0.0052 U	0.0052 U											
gamma-BHC (Lindane)	ug/L					0.0034 U	0.0034 U											
gamma-Chlordane	ug/L					0.005 U	0.005 U											
Heptachlor	ug/L					0.0039 U	0.0039 U											
Heptachlor epoxide	ug/L					0.0038 U	0.0038 U											

Appendix A
Summary of Surface Water Analytical Results
Task 4 - Sediment/Surface Water Investigation
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Date Units	SW01-SW01 090409	SW02-SW01 090409	SW03-SW01 080801	SW04-SW01 090409	SW06-SW01 080801	SW06-SW02 080801 Duplicate	SW08-SW01 080804	SW8-SW01 090408 Resample	SW08-SW01 090825 Resample	SW11-SW01 080804	SW8U1-SW01 090409	SW8U2-SW01 090409	SW8U3-SW01 090429	SW910-SW01 080808	SW12-SW01 090825	SW13-SW01 090825	SW14-SW01 090825
Methoxychlor	ug/L					0.011 U	0.011 U											
PCBs:																		
PCB-1016	ug/L					0.093 U	0.093 U											
PCB-1221	ug/L					0.12 U	0.12 U											
PCB-1232	ug/L					0.2 U	0.2 U											
PCB-1242	ug/L					0.15 U	0.15 U											
PCB-1248	ug/L					0.23 U	0.23 U											
PCB-1254	ug/L					0.061 U	0.061 U											
PCB-1260	ug/L					0.073 U	0.073 U											
Metals:																		
Arsenic	ug/L					2.8 U	2.8 U											
Barium	ug/L					160	160											
Cadmium	ug/L					0.46 U	0.46 U											
Chromium	ug/L					1.6 U	1.6 U											
Lead	ug/L					2.7 U	1.8 U											
Mercury	ug/L					0.065 U	0.065 U											
Selenium	ug/L					4.2 U	4.2 U											
Silver	ug/L					1.2 U	1.2 U											
Zinc	ug/L					4.8 U	6.8 U											

Appendix A
Summary of USGS Surface Water Analytical Results
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	Location Analysis type Date Units	500TB-0 field GC 4/19/2001	500TB-1 field GC 1/24/2001	500TB-1 field GC 4/19/2001	500TB-1A field GC 2/8/2001	500TB-1B field GC 4/19/2001	500TB-1C field GC 4/19/2001	500TB-2 field GC 2/8/2001	500TB-2 field GC 4/19/2001	500TB-2 lab 06/13/01	500TB-2 lab 08/28/01
Tetrachloroethene	ug/L	0	0	0.02	0	40.14	31.6	31.5	29.75	32	56
Trichloroethene	ug/L	0	0	0	0	4.67	3.92	3.8	3.43	4.2	8.1
cis-Dichloroethene	ug/L	0.03	0	0.35	0	2.04	2.56	2.04	1.71	0.82 J	1.7 J
trans-Dichloroethene	ug/L	0	0	0	0	0.02	0.01	0	0.01	<1	<2
Vinyl chloride	ug/L	0	0.14	0	0	0	0	0	0	<1	<2
Toluene	ug/L									<1	<2
Benzene	ug/L	0	0	0	0.01	0	0	0.01	0	<1	<2
Trichlorofluoromethane	ug/L									--	--
Methylene Chloride	ug/L										

All data are from USGS spreadsheets.
"0" are non-detects but detection limits were not specified.

Appendix A
Summary of USGS Surface Water Analytical Results
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	500TB-2 field GC 11/16/2001	500TB-2 field GC 11/16/2001	500TB-2 lab 11/16/01	500TB-2 field GC 3/14/2002	500TB-2 lab 03/14/02	500TB-2 lab 07/29/02	500TB-2 field GC 7/29/2002	500TB-3 field GC 1/24/2001	500TB-3 lab 01/24/01	500TB-3 field GC 2/8/2001	500TB-3A field GC 4/19/2001
Tetrachloroethene	70.08	68.06	58	9.5	15.0	100.0	85.9	43.78	31	25.1	28.45
Trichloroethene	9.88	12.63	8.6	2.67	2.0	11.0	10.9	4.78	4.2	3.77	3.83
cis-Dichloroethene	3.98	4.77	1.9 J	2.34	0.37 J	2.3 J	1.5	4.16	0.74 J	3.21	2.44
trans-Dichloroethene	0.36	0.04	<2	0	<.5	<2.5	0	0.08	<1	0	0.01
Vinyl chloride	0	0	<2	0	<2	<2.5	0	33.67	<1	0	0
Toluene			<2		<1	<2.5			<1		
Benzene	0	0	<2	0	<1	<2.5	0	0	<1	0.07	0
Trichlorofluoromethane			--		--	4.1 J			1.5		
Methylene Chloride									.29 J		

Appendix A
Summary of USGS Surface Water Analytical Results
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	500TB-4 lab 02/08/01	500TB-4 field GC 4/19/2001	500TB-4A field GC 4/19/2001	500TB-4B field GC 4/19/2001	500TB-4C field GC 4/19/2001	500TB-5 field GC 2/8/2001	500TB-5 field GC 4/19/2001	500TB-6 field GC 4/19/2001	500TB-7 field GC 3/14/2002	500TB-8 field GC 3/14/2002	500TB-A field GC 2/23/2001	500TB-B field GC 2/23/2001
Tetrachloroethene	<1	26.75	23.33	28.56	18.22	14.76	16.96	14.49	2.65	3.74	0	0
Trichloroethene	<1	3.42	2.72	5.03	2.68	2.14	0	0	0.66	2.14	0	0
cis-Dichloroethene	<1	2.21	1.65	0.4	0.09	1.86	0.98	1.2	0.12	0.06	0	0
trans-Dichloroethene	<1	0.01	0.01	0	0	0	0	0	0	0	0	0
Vinyl chloride	<1	0	0	0	0	0	0	0	0	0	0	0
Toluene	<1											
Benzene	<1	0	0	0	0	0.01	0	0	0	0	0	0
Trichlorofluoromethane	--											
Methylene Chloride												

Appendix A
Summary of USGS Surface Water Analytical Results
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	510TB-0A field GC 4/18/2001	510TB-0B field GC 4/18/2001	510TB-1 field GC 1/24/2001	510TB-2 field GC 1/24/2001	510TB-2A field GC 4/19/2001	510TB-2A field GC 4/19/2001	512TB-01 field GC 4/18/2001	700TB-0.1 field GC 9/24/2002	700TB-0.2 field GC 9/24/2002	700TB-0.3 field GC 9/24/2002	700TB-1 field GC 3/4/2002	700TB-2 field GC 3/4/2002
Tetrachloroethene	0.01	0.03	0	2	1.66	1.76	0	0	0	0	0	0
Trichloroethene	0	0	0	0.46	0.33	0.41	0	0	0	0	0	0
cis-Dichloroethene	0.21	0.01	0.94	0.32	1.06	0.31	0.01	0	0	0	0	0
trans-Dichloroethene	0.08	0	0	0	0	0	0.01	0	0	0	0	0
Vinyl chloride	0	0	11.36	0.94	0	0	0	0	0	0	0	0
Toluene												
Benzene	0	0	0	0	0	0	0	0	0	0	0	0
Trichlorofluoromethane												
Methylene Chloride												

Appendix A
Summary of USGS Surface Water Analytical Results
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	700TB-3 field GC 3/4/2002	700TB-3 field GC 3/13/2002	700TB-3 field GC 3/13/2002	700TB-5 field GC 3/5/2002	OUX-700TB-6 field GC 3/13/2002	710TB-1 field GC 3/4/2002	710TB-2 field GC 3/4/2002	710TB-3 field GC 3/4/2002	710TB-4 field GC 3/5/2002	710TB-5 field GC 3/5/2002	710TB-6 field GC 8/15/2000	710TB-6 field GC 3/5/2002
Tetrachloroethene	0	0	0	0	0	0	0	0	0	0	44	0
Trichloroethene	0	0	0	0	0	0	0	0	0	0	0.22	0
cis-Dichloroethene	0	0	0	0	0	0	0	0	0	0	0	0
trans-Dichloroethene	0	0	0	0	0	0	0	0	0	0	0	0
Vinyl chloride	0	0	0	0	0	0	0	0	0	0	0	0
Toluene												
Benzene	0	0	0	0	0	0	0	0	0	0	0	0
Trichlorofluoromethane												
Methylene Chloride												

Appendix A
Summary of USGS Surface Water Analytical Results
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	710TB-8 field GC 8/16/2000	710TB-9 field GC 3/5/2002	712TB-1 field GC 3/4/2002	720TB-1 field GC 3/4/2002	720TB-2 field GC 3/4/2002	720TB-3 field GC 3/4/2002	730TB-1 field GC 3/13/2002	740TB-1 field GC 3/13/2002	EC06 field GC 3/14/2002	EC06 lab 03/14/02	EC07 field GC 3/14/2002	EC07 lab 03/14/02
Tetrachloroethene	0	0	0	0	0	0	0	0	7.33	8.9	2.41	1.3
Trichloroethene	0	0	0	0	0	0	0	0	2.72	1.	1.45	<1
cis-Dichloroethene	0	0	0	0	0	0	0	0	0.14	<1	0	<1
trans-Dichloroethene	0	0	0	0	0	0	0	0	0	<.5	0	<.5
Vinyl chloride	0	0	0	0	0	0	0	0	0	<2	0	<2
Toluene										<1		<1
Benzene	0	0	0	0	0	0	0	0	0	<1	0	<1
Trichlorofluoromethane										--		--
Methylene Chloride												

Appendix A
Summary of USGS Surface Water Analytical Results
Riverfront Superfund Site
New Haven, Missouri

Analyte/Parameter Name	EC08 field GC 3/14/2002	EC08 lab 03/14/02	EC09 field GC 3/14/2002	EC09 lab 03/14/02	JF60 field GC 4/18/2001	JS-223 field GC 3/14/2002	OUX-740TB-1 field GC 3/13/2002
Tetrachloroethene	0.47	0.33 J	0	<1	0.02	2.85	0
Trichloroethene	0.05	<1	0	<1	0	3.03	0
cis-Dichloroethene	0	<1	0	<1	0.02	4.86	0
trans-Dichloroethene	0	<.5	0	<.5	0.01	0	0
Vinyl chloride	0	<2	0	<2	0	0	0
Toluene		<1		<1			
Benzene	0	<1	0	<1	0	0	0
Trichlorofluoromethane		--		--			
Methylene Chloride							

Appendix A
Summary of Sediment Analytical Results
Task 4 - Sediment/Surface Water Investigation
New Haven, Missouri

Analyte/Parameter Name	Location Date Units	SD01-SD01 090409	SD02-SD01 090409	SD03-SD01 080801	SD04-SD01 090409	SD06-SD01 080801	SD06-SD02 080801 Duplicate	SD08-SD01 080804	SD11-SD01 080804	SD910-SD01 080804
VOCs:										
1,1,1-Trichloroethane	ug/kg	0.87 U	0.9 U	0.99 U	0.99 U	0.98 U	0.75 U	1.1 U	0.94 U	1 U
1,1,2,2-Tetrachloroethane	ug/kg	1.2 U	1.2 U	1.3 U	1.3 U	1.3 U	1 U	1.5 U	1.3 U	1.4 U
1,1,2-Trichloroethane	ug/kg	1.8 U	1.8 U	2 U	2 U	2 U	1.5 U	2.3 U	1.9 U	2 U
1,1-Dichloroethane	ug/kg	0.94 U	0.97 U	1.1 U	1.1 U	1.1 U	0.81 U	1.2 U	1 U	1.1 U
1,1-Dichloroethene	ug/kg	0.86 U	0.89 U	0.98 U	0.98 U	0.97 U	0.74 U	1.1 U	0.93 U	0.99 U
1,2-Dichloroethane	ug/kg	1.1 U	1.1 U	1.2 U	1.2 U	1.2 U	0.93 U	1.4 U	1.2 U	1.2 U
1,2-Dichloroethene, Total	ug/kg	1.9 U	1.9 U	2.1 U	2.1 U	2.1 U	1.6 U	2.4 U	2 U	2.1 U
1,2-Dichloropropane	ug/kg	0.92 U	0.95 U	1.1 U	1 U	1 U	0.79 U	1.2 U	0.99 U	1.1 U
2-Hexanone	ug/kg	1.2 U	1.2 U	1.3 U	1.3 U	1.3 U	1 U	1.5 U	1.3 U	1.4 U
Acetone	ug/kg	96 J	1.9 U	2.1 U	2.1 U	2.1 U	1.6 U	15 J	2 U	2.1 U
Benzene	ug/kg	0.83 U	0.86 U	0.95 U	0.95 U	0.93 U	0.72 U	1.1 U	0.9 U	0.96 U
Bromodichloromethane	ug/kg	0.76 U	0.79 U	0.87 U	0.87 U	0.86 U	0.66 U	0.99 U	0.83 U	0.88 U
Bromoform	ug/kg	0.97 U	1 U	1.1 U	1.1 U	1.1 U	0.84 U	1.3 U	1.1 U	1.1 U
Bromomethane	ug/kg	2.1 U	2.2 U	2.5 U	2.4 U	2.4 U	1.9 U	2.8 U	2.3 U	2.5 U
Carbon disulfide	ug/kg	0.92 U	0.95 U	1.1 U	1 U	1 U	0.79 U	1.2 U	0.99 U	1.1 U
Carbon tetrachloride	ug/kg	0.92 U	0.95 U	1.1 U	1 U	1 U	0.79 U	1.2 U	0.99 U	1.1 U
Chlorobenzene	ug/kg	0.66 U	0.69 U	0.76 U	0.76 U	0.75 U	0.57 U	0.86 U	0.72 U	0.77 U
Chloroethane	ug/kg	1.2 U	1.2 U	1.3 J	1.3 U	1.3 J	1 J	1.5 U	1.3 U	1.4 U
Chloroform	ug/kg	0.95 U	0.99 U	1.1 U	1.1 U	1.1 U	0.83 U	1.2 U	1 U	1.1 U
Chloromethane	ug/kg	1.6 U	1.6 U	1.8 U	1.8 U	1.8 J	1.3 U	2 U	1.7 U	1.8 U
cis-1,3-Dichloropropene	ug/kg	0.78 U	0.81 U	0.89 U	0.89 U	0.88 U	0.67 U	1 U	0.85 U	0.9 U
Dibromochloromethane	ug/kg	0.81 U	0.84 U	0.93 U	0.92 U	0.91 U	0.7 U	1 U	0.88 U	0.94 U
Ethylbenzene	ug/kg	0.69 U	0.72 U	0.79 U	0.79 U	0.78 U	0.6 U	0.9 U	0.75 U	0.8 U
Methyl Ethyl Ketone	ug/kg	1.8 U	1.8 U	2 U	2 U	2 U	1.5 U	2.3 U	1.9 U	2 U
methyl isobutyl ketone	ug/kg	1.5 U	1.5 U	1.7 U	1.7 U	1.6 U	1.3 U	1.9 U	1.6 U	1.7 U
Methylene Chloride	ug/kg	0.76 U	0.79 U	0.87 U	0.87 U	0.86 U	0.66 U	0.99 U	0.83 U	0.88 U
Styrene	ug/kg	0.73 U	0.76 U	0.84 U	0.83 U	0.82 U	0.63 U	0.95 U	0.79 U	0.85 U
Tetrachloroethene	ug/kg	0.78 U	0.81 U	0.89 U	0.89 U	3.2 J	2.1 J	1 U	0.85 U	0.9 U
Toluene	ug/kg	0.86 U	0.89 U	0.98 U	0.98 U	0.97 U	0.74 U	1.1 U	0.93 U	0.99 U
trans-1,3-Dichloropropene	ug/kg	0.94 U	0.97 U	1.1 U	1.1 U	1.1 U	0.81 U	1.2 U	1 U	1.1 U
Trichloroethene	ug/kg	0.94 U	0.97 U	1.1 U	1.1 U	1.1 U	0.81 U	1.2 U	1 U	1.1 U
Vinyl chloride	ug/kg	1.4 U	1.4 U	1.6 U	1.6 U	1.5 U	1.2 U	1.8 U	1.5 U	1.6 U
Xylenes, Total	ug/kg	1.5 U	1.5 U	1.7 U	1.7 U	1.6 U	1.3 U	1.9 U	1.6 U	1.7 U
SVOCs:										
1,2,4-Trichlorobenzene	ug/kg					18 U	18 U			
1,2-Dichlorobenzene	ug/kg					18 U	18 U			
1,3-Dichlorobenzene	ug/kg					19 U	19 U			
1,4-Dichlorobenzene	ug/kg					20 U	20 U			
2,2'-oxybis[1-chloropropane]	ug/kg					19 U	19 U			
2,4,5-Trichlorophenol	ug/kg					52 U	51 U			
2,4,6-Trichlorophenol	ug/kg					37 U	37 U			
2,4-Dichlorophenol	ug/kg					40 U	39 U			
2,4-Dimethylphenol	ug/kg					68 U	67 U			
2,4-Dinitrophenol	ug/kg					200 U	200 U			
2,4-Dinitrotoluene	ug/kg					20 U	20 U			
2,6-Dinitrotoluene	ug/kg					20 U	19 U			

Appendix A
Summary of Sediment Analytical Results
Task 4 - Sediment/Surface Water Investigation
New Haven, Missouri

Analyte/Parameter Name	Location Date Units	SD01-SD01 090409	SD02-SD01 090409	SD03-SD01 080801	SD04-SD01 090409	SD06-SD01 080801	SD06-SD02 080801 Duplicate	SD08-SD01 080804	SD11-SD01 080804	SD910-SD01 080804
2-Chloronaphthalene	ug/kg					17 U	17 U			
2-Chlorophenol	ug/kg					32 U	32 U			
2-Methylnaphthalene	ug/kg					21 U	21 U			
2-Methylphenol	ug/kg					37 U	36 U			
2-Nitroaniline	ug/kg					20 U	20 U			
2-Nitrophenol	ug/kg					45 U	44 U			
3 & 4 Methylphenol	ug/kg					34 U	34 U			
3,3'-Dichlorobenzidine	ug/kg					54 J	54 U			
3-Nitroaniline	ug/kg					73 U	72 U			
4,6-Dinitro-2-methylphenol	ug/kg					45 U	44 U			
4-Bromophenyl phenyl ether	ug/kg					15 U	15 U			
4-Chloro-3-methylphenol	ug/kg					91 U	89 U			
4-Chloroaniline	ug/kg					140 U	140 U			
4-Chlorophenyl phenyl ether	ug/kg					15 U	15 U			
4-Nitroaniline	ug/kg					80 U	78 U			
4-Nitrophenol	ug/kg					65 U	64 U			
Acenaphthene	ug/kg					4.7 U	4.6 U			
Acenaphthylene	ug/kg					3.9 U	3.9 U			
Anthracene	ug/kg					4.3 U	4.3 U			
Benzo[a]anthracene	ug/kg					18 J	4.6 U			
Benzo[a]pyrene	ug/kg					67	3.4 U			
Benzo[b]fluoranthene	ug/kg					64	8 U			
Benzo[g,h,i]perylene	ug/kg					27 J	6.3 U			
Benzo[k]fluoranthene	ug/kg					43	7.8 U			
Bis(2-chloroethoxy)methane	ug/kg					23 U	23 U			
Bis(2-chloroethyl)ether	ug/kg					24 U	24 U			
Bis(2-ethylhexyl) phthalate	ug/kg					31 U	31 U			
Butyl benzyl phthalate	ug/kg					16 U	16 U			
Carbazole	ug/kg					14 U	14 U			
Chrysene	ug/kg					36 J	5.7 U			
Dibenz(a,h)anthracene	ug/kg					9.7 J	4.5 U			
Dibenzofuran	ug/kg					14 U	14 U			
Diethyl phthalate	ug/kg					19 U	19 U			
Dimethyl phthalate	ug/kg					14 U	14 U			
Di-n-butyl phthalate	ug/kg					15 U	15 U			
Di-n-octyl phthalate	ug/kg					17 U	17 U			
Fluoranthene	ug/kg					27 J	4.7 U			
Fluorene	ug/kg					3.9 U	3.9 U			
Hexachlorobenzene	ug/kg					5.4 U	5.3 U			
Hexachlorobutadiene	ug/kg					22 U	21 U			
Hexachlorocyclopentadiene	ug/kg					130 R	120 U			
Hexachloroethane	ug/kg					20 U	19 U			
Indeno[1,2,3-cd]pyrene	ug/kg					27 J	4.7 U			
Isophorone	ug/kg					15 U	15 U			
Naphthalene	ug/kg					3.8 U	3.7 U			
Nitrobenzene	ug/kg					6.8 U	6.7 U			
N-Nitrosodi-n-propylamine	ug/kg					26 U	25 U			
N-Nitrosodiphenylamine	ug/kg					11 U	11 U			

Appendix A
Summary of Sediment Analytical Results
Task 4 - Sediment/Surface Water Investigation
New Haven, Missouri

Analyte/Parameter Name	Location Date Units	SD01-SD01 090409	SD02-SD01 090409	SD03-SD01 080801	SD04-SD01 090409	SD06-SD01 080801	SD06-SD02 080801 Duplicate	SD08-SD01 080804	SD11-SD01 080804	SD910-SD01 080804
Pentachlorophenol	ug/kg					140 U	130 U			
Phenanthrene	ug/kg					3.2 U	3.2 U			
Phenol	ug/kg					33 U	32 U			
Pyrene	ug/kg					47	4.3 U			
Pesticides:										
4,4'-DDD	ug/kg					0.59 J	0.59 U			
4,4'-DDE	ug/kg					0.37 U	0.37 U			
4,4'-DDT	ug/kg					1.5 J	0.34 U			
Aldrin	ug/kg					0.64 U	0.64 U			
alpha-BHC	ug/kg					0.64 U	0.64 U			
alpha-Chlordane	ug/kg					0.51 U	0.52 U			
beta-BHC	ug/kg					1 U	1 U			
delta-BHC	ug/kg					0.83 U	0.83 U			
Dieldrin	ug/kg					0.37 U	0.37 U			
Endosulfan I	ug/kg					0.79 U	0.8 U			
Endosulfan sulfate	ug/kg					0.18 J	0.18 U			
Endrin	ug/kg					0.69 U	0.69 U			
Endrin aldehyde	ug/kg					0.7 J	0.71 U			
Endrin ketone	ug/kg					0.33 J	0.34 U			
gamma-BHC (Lindane)	ug/kg					0.33 U	0.34 U			
gamma-Chlordane	ug/kg					0.6 U	0.61 U			
Heptachlor	ug/kg					0.26 U	0.26 U			
Heptachlor epoxide	ug/kg					0.4 U	0.4 U			
Methoxychlor	ug/kg					0.55 J	0.55 U			
Toxaphene	ug/kg					3.3 U	3.4 U			
PCBs:										
PCB-1016	ug/kg					8 U	8.1 U			
PCB-1221	ug/kg					10 U	10 U			
PCB-1232	ug/kg					6.9 U	6.9 U			
PCB-1242	ug/kg					11 U	11 U			
PCB-1248	ug/kg					9.7 U	9.8 U			
PCB-1254	ug/kg					6.7 U	6.7 U			
PCB-1260	ug/kg					6.9 U	6.9 U			
Metals:										
Arsenic	mg/kg					15 J	33 J			
Barium	mg/kg					520 J	640			
Cadmium	mg/kg					0.56 J	0.44 J			
Chromium	mg/kg					58 J	21 J			
Lead	mg/kg					28 J	52 J			
Mercury	mg/kg					0.0076 U	0.0076 U			
Selenium	mg/kg					0.42 U	0.53 J			
Silver	mg/kg					0.44 J	0.29 J			
Zinc	mg/kg					320 J	78 J			

Appendix A
Summary of Sewer Soil Analytical Results
Task 5 - Sewer Investigation
New Haven, Missouri

Location	A01-SS01	A01-SS02	A04-SS01	A04-SS01	A05-SS01	A05-SS01	A05-SS02	B01-SS01	B01-SS01	B02-SS01	B02-SS02	B02-SS01
Depth	1.5	4.0	1.5	5.0	7.0	13.0	13.0	9.0	15.0	9.0	9.0	12.8
Date	070919	070919	070919	070919	070918	070918	070918	070918	070918	070919	070919	070919
Analyte/Parameter Name	Units						Duplicate				Duplicate	
1,1,1-Trichloroethane	ug/kg	0.7 U	0.91 U	0.77 U	0.75 U	0.57 U	0.67 U	0.7 U	0.68 U	0.74 U	0.63 U	0.69 U	0.9 U
1,1,2,2-Tetrachloroethane	ug/kg	0.69 U	0.9 U	0.76 U	0.74 U	0.56 U	0.66 U	0.69 U	0.67 U	0.73 U	0.62 U	0.68 U	0.89 U
1,1,2-Trichloroethane	ug/kg	0.79 U	1 U	0.88 U	0.85 U	0.65 U	0.76 U	0.79 U	0.77 U	0.85 U	0.71 U	0.78 U	1 U
1,1-Dichloroethane	ug/kg	0.57 U	0.75 U	0.63 U	0.61 U	0.47 U	0.55 U	0.57 U	0.56 U	0.61 U	0.51 U	0.56 U	0.74 U
1,1-Dichloroethene	ug/kg	1.3 U	1.6 U	1.4 U	1.3 U	1 U	1.2 U	1.3 U	1.2 U	1.3 U	1.1 U	1.2 U	1.6 U
1,2-Dichloroethane	ug/kg	0.53 U	0.69 U	0.59 U	0.57 U	0.44 U	0.51 U	0.53 U	0.52 U	0.57 U	0.48 U	0.53 U	0.69 U
1,2-Dichloroethene, Total	ug/kg	1.3 U	1.6 U	1.4 U	1.3 U	1 U	1.2 U	1.3 U	1.2 U	1.3 U	1.1 U	1.2 U	1.6 U
1,2-Dichloropropane	ug/kg	0.53 U	0.69 U	0.59 U	0.57 U	0.44 U	0.51 U	0.53 U	0.52 U	0.57 U	0.48 U	0.53 U	0.69 U
2-Hexanone	ug/kg	1.2 U	1.5 U	1.3 U	1.2 U	0.95 U	1.1 U	1.2 U	1.1 U	1.2 U	1 U	1.1 U	1.5 U
Acetone	ug/kg	4.2 U	5.4 U	4.6 U	4.5 U	3.4 U	4 U	4.2 U	4.1 U	4.4 U	3.7 U	4.1 U	5.4 U
Benzene	ug/kg	0.67 U	0.87 U	0.74 U	0.71 U	0.55 U	0.64 U	0.67 U	0.65 U	0.71 U	0.6 U	0.66 U	0.86 U
Bromodichloromethane	ug/kg	0.55 U	0.72 U	0.61 U	0.59 U	0.45 U	0.53 U	0.55 U	0.54 U	0.59 U	0.5 U	0.55 U	0.71 U
Bromoform	ug/kg	0.72 U	0.94 U	0.79 U	0.77 U	0.59 U	0.69 U	0.72 U	0.7 U	0.76 U	0.64 U	0.71 U	0.92 U
Bromomethane	ug/kg	3 U	3.9 U	3.3 U	3.2 U	2.5 U	2.9 U	3 U	2.9 U	3.2 U	2.7 U	3 U	3.9 U
Carbon disulfide	ug/kg	0.97 U	1.3 U	1.1 U	1 U	0.79 U	0.93 U	0.97 U	0.94 U	1 U	0.87 U	0.96 U	1.2 U
Carbon tetrachloride	ug/kg	0.71 U	0.92 U	0.78 U	0.76 U	0.58 U	0.68 U	0.71 U	0.69 U	0.75 U	0.64 U	0.7 U	0.91 U
Chlorobenzene	ug/kg	0.54 U	0.71 U	0.6 U	0.58 U	0.44 U	0.52 U	0.54 U	0.53 U	0.58 U	0.49 U	0.54 U	0.7 U
Chloroethane	ug/kg	3 U	3.9 U	3.3 U	3.2 U	2.5 U	2.9 U	3 U	2.9 U	3.2 U	2.7 U	3 U	3.9 U
Chloroform	ug/kg	0.66 U	0.86 U	0.73 U	0.7 U	0.54 U	0.63 U	0.66 U	0.64 U	0.7 U	0.59 U	0.65 U	0.85 U
Chloromethane	ug/kg	1.3 U	1.6 U	1.4 U	1.3 U	1 U	1.2 U	1.3 U	1.2 U	1.3 U	1.1 U	1.2 U	1.6 U
cis-1,3-Dichloropropene	ug/kg	0.56 U	0.73 U	0.62 U	0.6 U	0.46 U	0.54 U	0.56 U	0.55 U	0.6 U	0.51 U	0.56 U	0.72 U
Dibromochloromethane	ug/kg	0.63 U	0.82 U	0.69 U	0.67 U	0.51 U	0.61 U	0.63 U	0.61 U	0.67 U	0.57 U	0.62 U	0.81 U
Ethylbenzene	ug/kg	0.62 U	0.81 U	0.68 U	0.66 U	0.51 U	0.6 U	0.62 U	0.6 U	0.66 U	0.56 U	0.61 U	0.8 U
Methyl Ethyl Ketone	ug/kg	2.1 U	2.8 U	2.3 U	2.3 U	1.7 U	2 U	2.1 U	2.1 U	2.3 U	1.9 U	2.1 U	2.7 U
Methyl Isobutyl Ketone	ug/kg	0.7 U	0.91 U	0.77 U	0.75 U	0.57 U	0.67 U	0.7 U	0.68 U	0.74 U	0.63 U	0.69 U	0.9 U
Methylene Chloride	ug/kg	1.6 U	2 U	1.7 U	1.7 U	1.3 U	1.5 U	1.5 U	1.5 U	1.7 U	1.4 U	1.5 U	2 U
Styrene	ug/kg	0.6 U	0.78 U	0.66 U	0.64 U	0.49 U	0.58 U	0.6 U	0.58 U	0.64 U	0.54 U	0.59 U	0.77 U
Tetrachloroethene	ug/kg	0.87 U	1.1 U	0.96 U	0.93 U	0.71 U	0.84 U	0.87 U	0.85 U	0.93 U	0.78 U	0.86 U	1.1 U
Toluene	ug/kg	1.6 U	2.1 U	1.8 U	1.8 U	1.3 U	1.6 U	1.6 U	1.6 U	1.8 U	1.5 U	1.6 U	2.1 U
trans-1,3-Dichloropropene	ug/kg	0.58 U	0.76 U	0.64 U	0.62 U	0.48 U	0.56 U	0.58 U	0.57 U	0.62 U	0.52 U	0.57 U	0.75 U
Trichloroethene	ug/kg	0.64 U	0.83 U	0.7 U	0.68 U	0.52 U	0.61 U	0.64 U	0.62 U	0.68 U	0.57 U	0.63 U	0.82 U
Vinyl chloride	ug/kg	0.76 U	0.99 U	0.83 U	0.81 U	0.62 U	0.73 U	0.75 U	0.74 U	0.8 U	0.68 U	0.75 U	0.97 U
Xylenes, Total	ug/kg	1.7 U	2.3 U	1.9 U	1.9 U	1.4 U	1.7 U	1.7 U	1.7 U	1.9 U	1.6 U	1.7 U	2.2 U

Appendix A
Summary of Sewer Soil Analytical Results
Task 5 - Sewer Investigation
New Haven, Missouri

Location Depth Date		B02-SS01 14.8 070918	B03-SS01 9.0 070918	B04-SS01 6.0 070919	B04-SS01 9.0 070918	B04-SS01 11.6 070918	C01-SS01 4.0 070919	C01-SS01 5.5 070919	C03-SS01 4.0 070919	C03-SS01 8.4 070919	C04-SS01 14.7 070919	C05-SS01 10.0 070920	C05-SS01 15.0 070920
Analyte/Parameter Name	Units												
1,1,1-Trichloroethane	ug/kg	0.66 U	0.62 U	0.75 U	0.66 U	0.79 U	0.77 U	0.75 U	0.77 U	0.87 U	0.78 U	0.56 U	0.66 U
1,1,2,2-Tetrachloroethane	ug/kg	0.65 U	0.61 U	0.74 U	0.65 U	0.78 U	0.76 U	0.74 U	0.76 U	0.86 U	0.77 U	0.6 U	0.71 U
1,1,2-Trichloroethane	ug/kg	0.75 U	0.71 U	0.86 U	0.75 U	0.9 U	0.87 U	0.85 U	0.88 U	0.99 U	0.89 U	0.97 U	1.1 U
1,1-Dichloroethane	ug/kg	0.54 U	0.51 U	0.62 U	0.54 U	0.64 U	0.63 U	0.61 U	0.63 U	0.71 U	0.64 U	0.47 U	0.56 U
1,1-Dichloroethene	ug/kg	1.2 U	1.1 U	1.4 U	1.2 U	1.4 U	1.4 U	1.4 U	1.4 U	1.6 U	1.4 U	1 U	1.2 U
1,2-Dichloroethane	ug/kg	0.51 U	0.47 U	0.57 U	0.5 U	0.6 U	0.59 U	0.57 U	0.59 U	0.66 U	0.6 U	0.58 U	0.68 U
1,2-Dichloroethene, Total	ug/kg	1.2 U	1.1 U	1.4 U	1.2 U	1.4 U	1.4 U	1.4 U	1.4 U	1.6 U	1.4 U	0.89 U	1.1 U
1,2-Dichloropropane	ug/kg	0.51 U	0.47 U	0.57 U	0.5 U	0.6 U	0.59 U	0.57 U	0.59 U	0.66 U	0.6 U	0.51 U	0.61 U
2-Hexanone	ug/kg	1.1 U	1 U	1.3 U	1.1 U	1.3 U	1.3 U	1.2 U	1.3 U	1.4 U	1.3 U	1.3 U	1.5 U
Acetone	ug/kg	3.9 U	3.7 U	4.5 U	3.9 U	4.7 U	4.6 U	4.5 U	4.6 U	5.2 U	4.7 U	3.2 U	3.7 U
Benzene	ug/kg	0.63 U	0.59 U	0.72 U	0.63 U	0.75 U	0.73 U	0.72 U	0.74 U	0.83 U	0.75 U	0.47 U	0.56 U
Bromodichloromethane	ug/kg	0.52 U	0.49 U	0.6 U	0.52 U	0.62 U	0.61 U	0.59 U	0.61 U	0.69 U	0.62 U	0.46 U	0.55 U
Bromoform	ug/kg	0.68 U	0.64 U	0.77 U	0.68 U	0.81 U	0.79 U	0.77 U	0.8 U	0.89 U	0.8 U	0.46 U	0.55 U
Bromomethane	ug/kg	2.8 U	2.7 U	3.2 U	2.8 U	3.4 U	3.3 U	3.2 U	3.3 U	3.7 U	3.4 U	1.3 U	1.5 U
Carbon disulfide	ug/kg	0.92 U	0.86 U	1 U	0.92 U	1.1 U	1.1 U	1 U	1.1 U	1.2 U	1.1 U	1.2 U	1.4 U
Carbon tetrachloride	ug/kg	0.67 U	0.63 U	0.76 U	0.67 U	0.8 U	0.78 U	0.76 U	0.78 U	0.88 U	0.79 U	0.74 U	0.87 U
Chlorobenzene	ug/kg	0.51 U	0.48 U	0.59 U	0.51 U	0.61 U	0.6 U	0.58 U	0.6 U	0.67 U	0.61 U	0.65 U	0.77 U
Chloroethane	ug/kg	2.8 U	2.7 U	3.2 U	2.8 U	3.4 U	3.3 U	3.2 U	3.3 U	3.7 U	3.4 U	1.7 U	2 U
Chloroform	ug/kg	0.62 U	0.59 U	0.71 U	0.62 U	0.74 U	0.72 U	0.71 U	0.73 U	0.82 U	0.74 U	0.44 U	0.52 U
Chloromethane	ug/kg	1.2 U	1.1 U	1.4 U	1.2 U	1.4 U	1.4 U	1.4 U	1.4 U	1.6 U	1.4 U	0.85 U	1 U
cis-1,3-Dichloropropene	ug/kg	0.53 U	0.5 U	0.61 U	0.53 U	0.63 U	0.62 U	0.6 U	0.62 U	0.7 U	0.63 U	0.55 U	0.64 U
Dibromochloromethane	ug/kg	0.6 U	0.56 U	0.68 U	0.6 U	0.71 U	0.69 U	0.68 U	0.7 U	0.78 U	0.71 U	0.56 U	0.66 U
Ethylbenzene	ug/kg	0.59 U	0.55 U	0.67 U	0.59 U	0.7 U	0.68 U	0.67 U	0.69 U	0.77 U	0.69 U	0.66 U	0.78 U
Methyl Ethyl Ketone	ug/kg	2 U	1.9 U	2.3 U	2 U	2.4 U	2.3 U	2.3 U	2.4 U	2.7 U	2.4 U	1.7 U	2 U
Methyl Isobutyl Ketone	ug/kg	0.66 U	0.62 U	0.75 U	0.66 U	0.79 U	0.77 U	0.75 U	0.77 U	0.87 U	0.78 U	0.79 U	0.93 U
Methylene Chloride	ug/kg	1.5 U	1.4 U	1.7 U	1.5 U	1.7 U	1.7 U	1.7 U	1.7 U	1.9 U	1.7 U	1.2 U	1.4 U
Styrene	ug/kg	0.57 U	0.53 U	0.65 U	0.57 U	0.68 U	0.66 U	0.65 U	0.67 U	0.75 U	0.67 U	0.46 U	0.55 U
Tetrachloroethene	ug/kg	0.83 U	0.77 U	0.94 U	0.83 U	0.98 U	0.96 U	0.94 U	0.97 U	1.1 U	0.98 U	0.72 U	0.86 U
Toluene	ug/kg	1.6 U	1.5 U	1.8 U	1.6 U	1.9 U	1.8 U	1.8 U	1.8 U	2 U	1.8 U	0.58 U	0.68 U
trans-1,3-Dichloropropene	ug/kg	0.55 U	0.52 U	0.63 U	0.55 U	0.66 U	0.64 U	0.62 U	0.65 U	0.72 U	0.65 U	0.44 U	0.52 U
Trichloroethene	ug/kg	0.61 U	0.57 U	0.69 U	0.61 U	0.72 U	0.7 U	0.69 U	0.71 U	0.8 U	0.72 U	0.82 U	0.97 U
Vinyl chloride	ug/kg	0.72 U	0.67 U	0.82 U	0.72 U	0.85 U	0.83 U	0.81 U	0.84 U	0.94 U	0.85 U	0.75 U	0.88 U
Xylenes, Total	ug/kg	1.7 U	1.5 U	1.9 U	1.7 U	2 U	1.9 U	1.9 U	1.9 U	2.2 U	2 U	1.7 U	2 U

Appendix A
Summary of Sewer Soil Analytical Results
Task 5 - Sewer Investigation
New Haven, Missouri

Analyte/Parameter Name	Location Depth Date Units Duplicate	C05-SS02 15.0 070920 ug/kg Duplicate	SDF1-SS01 6.0 080512 ug/kg	SDF1-SS01 11.0 080512 ug/kg	SDF2-SS01 6.0 080513 ug/kg	SDF2-SS01 14.0 080513 ug/kg	SDF3-SS01 5.0 080513 ug/kg	SDF3-SS01 7.0 080513 ug/kg	SDF4-SS01 6.0 080513 ug/kg	SDF4-SS01 8.0 080513 ug/kg	SDF5-SS01 6.0 080513 ug/kg	SDF5-SS01 8.0 080513 ug/kg	SDF5-SS02 8.0 080513 ug/kg Duplicate
1,1,1-Trichloroethane	ug/kg	0.69 U	0.88 U	0.91 U	0.81 U	0.95 U	1 U	0.84 U	0.94 U	0.73 U	0.96 U	0.81 U	0.84 U
1,1,2,2-Tetrachloroethane	ug/kg	0.74 U	1.2 U	1.2 U	1.1 U	1.3 U	1.4 U	1.1 U	1.3 U	0.98 U	1.3 U	1.1 U	1.1 U
1,1,2-Trichloroethane	ug/kg	1.2 U	1.8 U	1.8 U	1.6 U	1.9 U	2.1 U	1.7 U	1.9 U	1.5 U	1.9 U	1.6 U	1.7 U
1,1-Dichloroethane	ug/kg	0.58 U	0.94 U	0.98 U	0.87 U	1 U	1.1 U	0.9 U	1 U	0.79 U	1 U	0.87 U	0.91 U
1,1-Dichloroethene	ug/kg	1.3 U	0.87 U	0.9 U	0.8 U	0.94 U	1 U	0.83 U	0.93 U	0.72 U	0.95 U	0.8 U	0.83 U
1,2-Dichloroethane	ug/kg	0.71 U	1.1 U	1.1 U	1 U	1.2 U	1.3 U	1 U	1.2 U	0.9 U	1.2 U	1 U	1 U
1,2-Dichloroethene, Total	ug/kg	1.1 U	1.9 U	1.9 U	1.7 U	2 U	2.2 U	1.8 U	2 U	1.6 U	2 U	1.7 U	1.8 U
1,2-Dichloropropane	ug/kg	0.64 U	0.92 U	0.96 U	0.85 U	1 U	1.1 U	0.88 U	1 U	0.77 U	1 U	0.85 U	0.89 U
2-Hexanone	ug/kg	1.6 U	1.2 U	1.2 U	1.1 U	1.3 U	1.4 U	1.1 U	1.3 U	0.98 U	1.3 U	1.1 U	1.1 U
Acetone	ug/kg	3.9 U	1.9 U	1.9 U	99	72 U	2.2 U	1.8 U	2 U	1.6 U	2 U	1.7 U	1.8 U
Benzene	ug/kg	0.58 U	0.84 U	0.87 U	0.77 U	0.91 U	0.97 U	0.8 U	0.9 U	0.7 U	0.91 U	0.77 U	0.8 U
Bromodichloromethane	ug/kg	0.57 U	0.77 U	0.8 U	0.71 U	0.83 U	0.89 U	0.73 U	0.83 U	0.64 U	0.84 U	0.71 U	0.74 U
Bromoform	ug/kg	0.57 U	0.98 U	1 U	0.91 U	1.1 U	1.1 U	0.94 U	1.1 U	0.82 U	1.1 U	0.91 U	0.95 U
Bromomethane	ug/kg	1.6 U	2.2 U	2.3 U	2 U	2.4 U	2.5 U	2.1 U	2.3 U	1.8 U	2.4 U	2 U	2.1 U
Carbon disulfide	ug/kg	1.4 U	0.92 U	0.96 U	0.85 U	1 U	1.1 U	0.88 U	1 U	0.77 U	3.1 J	0.85 U	0.89 U
Carbon tetrachloride	ug/kg	0.91 U	0.92 U	0.96 U	0.85 U	1 U	1.1 U	0.88 U	1 U	0.77 U	1 U	0.85 U	0.89 U
Chlorobenzene	ug/kg	0.81 U	0.67 U	0.7 U	0.62 U	0.73 U	0.78 U	0.64 U	0.72 U	0.56 U	0.73 U	0.62 U	0.64 U
Chloroethane	ug/kg	2.1 U	1.2 U	1.2 U	1.1 U	1.3 U	1.4 U	1.1 U	1.3 U	0.98 U	1.3 U	1.1 U	1.1 U
Chloroform	ug/kg	0.55 U	0.96 U	1 U	0.89 U	1 U	1.1 U	0.92 U	1 U	0.8 U	1.1 U	0.89 U	0.93 U
Chloromethane	ug/kg	1.1 U	1.6 U	1.6 U	1.4 U	1.7 U	1.8 U	1.5 U	1.7 U	1.3 U	1.7 U	1.4 U	1.5 U
cis-1,3-Dichloropropene	ug/kg	0.68 U	0.79 U	0.82 U	0.72 U	0.86 U	0.91 U	0.75 U	0.85 U	0.65 U	0.86 U	0.72 U	0.76 U
Dibromochloromethane	ug/kg	0.69 U	0.82 U	0.85 U	0.75 U	0.89 U	0.95 U	0.78 U	0.88 U	0.68 U	0.89 U	0.75 U	0.78 U
Ethylbenzene	ug/kg	0.82 U	0.7 U	0.73 U	0.64 U	0.76 U	0.81 U	0.67 U	0.75 U	0.58 U	0.76 U	0.64 U	0.67 U
Methyl Ethyl Ketone	ug/kg	2.1 U	1.8 U	1.8 U	19	6.3	2.1 U	1.7 U	1.9 U	1.5 U	1.9 U	1.6 U	1.7 U
Methyl Isobutyl Ketone	ug/kg	0.97 U	1.5 U	1.5 U	1.4 U	1.6 U	1.7 U	1.4 U	1.6 U	1.2 U	1.6 U	1.4 U	1.4 U
Methylene Chloride	ug/kg	1.4 U	0.77 U	0.8 U	0.71 U	0.83 U	0.89 U	0.73 U	0.83 U	0.64 U	0.84 U	0.71 U	0.74 U
Styrene	ug/kg	0.57 U	0.74 U	0.77 U	0.68 U	0.8 U	0.86 U	0.7 U	0.79 U	0.61 U	0.81 U	0.68 U	0.71 U
Tetrachloroethene	ug/kg	0.9 U	0.79 U	0.82 U	0.72 U	0.86 U	0.91 U	0.75 U	0.85 U	0.65 U	0.86 U	0.72 U	0.76 U
Toluene	ug/kg	0.71 U	0.87 U	0.9 U	0.8 U	0.94 U	1 U	0.83 U	0.93 U	0.72 U	0.95 U	0.8 U	0.83 U
trans-1,3-Dichloropropene	ug/kg	0.55 U	0.94 U	0.98 U	0.87 U	1 U	1.1 U	0.9 U	1 U	0.79 U	1 U	0.87 U	0.91 U
Trichloroethene	ug/kg	1 U	0.94 U	0.98 U	0.87 U	1 U	1.1 U	0.9 U	1 U	0.79 U	1 U	0.87 U	0.91 U
Vinyl chloride	ug/kg	0.92 U	1.4 U	1.4 U	1.3 U	1.5 U	1.6 U	1.3 U	1.5 U	1.1 U	1.5 U	1.3 U	1.3 U
Xylenes, Total	ug/kg	2.1 U	1.5 U	1.5 U	1.4 U	1.6 U	1.7 U	1.4 U	1.6 U	1.2 U	1.6 U	1.4 U	1.4 U

APPENDIX B

INDOOR AIR COPC MODELS

APPENDIX B

JOHNSON AND ETTINGER MODELS

J&E SOIL SCREENING MODEL RUNS

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
67641	2.00E-01	Acetone

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
200	400	11	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)
SC	1.63	0.385	0.197	0.002

ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
1.24E-01	1.14E-05	3.87E-05	25	6,955	329.20	508.10	5.75E-01	1.00E+06	0.0E+00	3.5E-01	L

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	4,000	2.00E-01	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm-m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.80E+06	2.22E-04	200	7,547	2.07E-05	8.86E-04	1.76E-04	3.59E-03	200

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)
200	1.15E-03	1.45E+00	0.10	8.33E+01	3.59E-03	4.00E+02	1.00E+252	9.16E-04	1.33E-03

Unit risk factor, URF (µg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	3.5E-01

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.22E+08	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.6E-06

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
75150	3.00E-03	Carbon disulfide

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
200	400	11	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	0.002	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
1.04E-01	1.00E-05	3.02E-02	25	6,391	319.00	552.00	4.57E+01	1.19E+03	0.0E+00	7.0E-01	L

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	4,000	3.00E-03	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.80E+06	2.22E-04	200	6,675	1.73E-02	7.44E-01	1.76E-04	2.69E-03	200

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)
200	9.14E-02	7.49E+00	0.10	8.33E+01	2.69E-03	4.00E+02	#NUM!	7.37E-04	5.52E-03

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	7.0E-01

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	3.53E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	7.6E-06

MESSAGE SUMMARY BELOW:

END

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
60571	3.20E-02	Dieldrin

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
200	400	11	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	0.002	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
1.25E-02	4.74E-06	1.51E-05	25	17,000	613.32	842.25	2.14E+04	1.95E-01	4.6E-03	1.8E-04	S

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	4,000	3.20E-02	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.80E+06	2.22E-04	200	24,498	1.96E-06	8.42E-05	1.76E-04	2.02E-03	200

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
200	4.28E+01	6.28E-05	0.10	8.33E+01	2.02E-03	4.00E+02	#NUM!	5.87E-04	3.69E-08

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
4.6E-03	1.8E-04

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	8.37E+03	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
7.0E-11	2.0E-07

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
78933	9.90E-03	Methylethylketone (2-butanone)

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
200	400	11	SC		

MORE ↓

Lookup Soil Parameters

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	0.002	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
8.08E-02	9.80E-06	5.58E-05	25	7,481	352.50	536.78	2.30E+00	2.23E+05	0.0E+00	5.0E+00	L

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (μg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	4,000	9.90E-03	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm-m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.80E+06	2.22E-04	200	8,407	2.77E-05	1.19E-03	1.76E-04	2.34E-03	200

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
200	4.60E-03	9.37E-02	0.10	8.33E+01	2.34E-03	4.00E+02	#NUM!	6.60E-04	6.19E-05

Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	5.0E+00

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.80E+07	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.2E-08

MESSAGE SUMMARY BELOW:

END

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
127184	2.90E+05	Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
200	400	11	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	0.002	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01	L

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (μg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	4,000	9.44E+04	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.80E+06	2.22E-04	200	9,543	8.30E-03	3.56E-01	1.76E-04	1.86E-03	200

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
200	3.10E-01	7.12E+07	0.10	8.33E+01	1.86E-03	4.00E+02	#NUM!	5.48E-04	3.90E+04

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
5.9E-06	6.0E-01

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	9.44E+04	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
9.5E-02	6.2E+01

MESSAGE SUMMARY BELOW:

MESSAGE: Soil conc. >= saturation (Csat). Risk/HQ calculated at Csat.

END

DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
79016	1.40E-01	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
200	400	11	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)
SC	1.63	0.385	0.197	0.002

ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	1.1E-04	4.0E-02	L

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	4,000	1.40E-01	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm-m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.80E+06	2.22E-04	200	8,544	5.05E-03	2.17E-01	1.76E-04	2.04E-03	200

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)
200	3.32E-01	6.34E+01	0.10	8.33E+01	2.04E-03	4.00E+02	#NUM!	5.92E-04	3.76E-02

Unit risk factor, URF (µg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
1.1E-04	4.0E-02

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	7.03E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.7E-06	9.0E-04

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
108883	7.90E-03	Toluene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
200	400	11	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SC	1.63	0.385	0.197	0.002	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
8.70E-02	8.60E-06	6.62E-03	25	7,930	383.78	591.79	1.82E+02	5.26E+02	0.0E+00	4.0E-01	L

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	4,000	7.90E-03	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.80E+06	2.22E-04	200	9,144	3.10E-03	1.33E-01	1.76E-04	2.25E-03	200

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
200	3.64E-01	2.10E+00	0.10	8.33E+01	2.25E-03	4.00E+02	#NUM!	6.41E-04	1.34E-03

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	4.0E-01

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.63E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.2E-06

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
156605	8.70E-02	trans-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
200	400	11	SC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)
SC	1.63	0.385	0.197	0.002

ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
7.07E-02	1.19E-05	9.36E-03	25	6,717	320.85	516.50	5.25E+01	6.30E+03	0.0E+00	7.0E-02	L

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	4,000	8.70E-02	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm-m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.80E+06	2.22E-04	200	7,126	5.17E-03	2.22E-01	1.76E-04	1.83E-03	200

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)
200	1.05E-01	7.68E+01	0.10	8.33E+01	1.83E-03	4.00E+02	#NUM!	5.40E-04	4.15E-02

Unit risk factor, URF (µg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
NA	7.0E-02

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.58E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	5.7E-04

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

SL-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemica
127184	2.90E+05	Tetrachloroethylene

MORE

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	15	201.168	0	201.168			SC		

MORE

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
Lookup Soil Parameters					Lookup Soil Parameters					Lookup Soil Parameters				
SC	1.6	0.41	0.27	0.0052										

MORE

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1219.2	2438.4	365.76	0.1	0.83	

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01	L

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
7.88E+08	186.168	0.140	ERROR	ERROR	0.522	1.74E-09	0.686	1.20E-09	7,315	2.01E+05	2.51E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.08E+06	2.37E-04	15	9,543	8.30E-03	3.56E-01	1.76E-04	6.16E-04	0.00E+00	0.00E+00	6.16E-04	186.168	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
8.06E-01	7.12E+07	0.10	2.19E+00	6.16E-04	7.32E+02	1.42E+21	7.20E-06	5.13E+02	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	5.9E-06	6.0E-01

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.01E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
7.4E-04	5.9E-01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

SL-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemica
127184	2.90E+05	Tetrachloroethylene

MORE

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, h_B (cm)	ENTER Thickness of soil stratum C, h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	201.168	0	201.168			SC		

MORE

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
Lookup Soil Parameters					Lookup Soil Parameters					Lookup Soil Parameters				
LS	1.6	0.41	0.27	0.0052										

MORE

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	365.76	0.1	0.25	

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	1.168	0.140	ERROR	ERROR	0.522	1.74E-09	0.686	1.20E-09	4,000	2.01E+05	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
1.80E+06	2.22E-04	200	9,543	8.30E-03	3.56E-01	1.76E-04	6.16E-04	0.00E+00	0.00E+00	6.16E-04	1.168	200

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
8.06E-01	7.12E+07	0.10	8.25E-01	6.16E-04	4.00E+02	3.51E+14	3.25E-05	2.31E+03	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	5.9E-06	6.0E-01

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.01E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.6E-03	3.7E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

J&E GROUNDWATER SCREENING MODEL RUNS

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
91576	1.70E-01	2-Methylnaphthalene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	11	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

ABC

DATA ENTRY SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
5.22E-02	7.75E-06	5.17E-04	25	12,600	514.26	761.00	2.81E+03	2.46E+01	0.0E+00	7.0E-02

END

DATA ENTRY SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	16,228	1.34E-04	5.75E-03	1.76E-04	1.39E-03	2.92E-04	8.88E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	9.77E-01	0.10	8.33E+01	1.39E-03	4.00E+02	#NUM!	2.87E-04	2.80E-04	NA	7.0E-02

DATA ENTRY SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.46E+04	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.8E-06

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75092	1.90E+01	Methylene chloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	11	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	1.17E+01	1.30E+04	4.7E-07	3.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,023	1.22E-03	5.22E-02	1.76E-04	2.61E-03	5.38E-05	3.21E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	9.93E+02	0.10	8.33E+01	2.61E-03	4.00E+02	#NUM!	1.10E-04	1.09E-01	4.7E-07	3.0E+00

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
NA	NA	NA	1.30E+07	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.1E-08	3.5E-05

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
91203	2.90E-01	Naphthalene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	11	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
5.90E-02	7.50E-06	4.82E-04	25	10,373	491.14	748.40	2.00E+03	3.10E+01	0.0E+00	3.0E-03

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	12,902	1.65E-04	7.07E-03	1.76E-04	1.56E-03	2.31E-04	8.36E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	2.05E+00	0.10	8.33E+01	1.56E-03	4.00E+02	#NUM!	2.71E-04	5.56E-04	NA	3.0E-03

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
NA	NA	NA	3.10E+04	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.8E-04

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	1.90E+05	Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	11	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	9,543	8.30E-03	3.56E-01	1.76E-04	1.86E-03	9.13E-06	5.92E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	6.76E+07	0.10	8.33E+01	1.86E-03	4.00E+02	#NUM!	2.08E-05	1.41E+03	5.9E-06	6.0E-01

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.4E-03	2.3E+00

MESSAGE SUMMARY BELOW:

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156605	7.80E+01	trans-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	11	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.07E-02	1.19E-05	9.36E-03	25	6,717	320.85	516.50	5.25E+01	6.30E+03	0.0E+00	7.0E-02

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,126	5.17E-03	2.22E-01	1.76E-04	1.83E-03	1.56E-05	9.92E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.73E+04	0.10	8.33E+01	1.83E-03	4.00E+02	#NUM!	3.48E-05	6.02E-01	NA	7.0E-02

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
NA	NA	NA	6.30E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.2E-03

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	1.50E+02	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	11	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

OR

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	1.1E-04	4.0E-02

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,544	5.05E-03	2.17E-01	1.76E-04	2.04E-03	1.36E-05	8.74E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	3.25E+04	0.10	8.33E+01	2.04E-03	4.00E+02	#NUM!	3.07E-05	9.95E-01	1.1E-04	4.0E-02

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
4.5E-05	2.4E-02

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

J&E GROUNDWATER ADVANCED ON-SITE MODEL RUNS

DATA ENTRY SHEET

GW-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	1.90E+05	Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
11	15	246.888	246.888	0	0	A	SC	SC		

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
Lookup Soil Parameters				Lookup Soil Parameters				Lookup Soil Parameters			
SC	1.60	0.410	0.27								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1219.2	2438.4	365.76	0.1	0.83	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	231.888	0.140	ERROR	ERROR	0.522	1.74E-09	0.686	1.20E-09	30.00	0.41	0.055	0.355	7,315

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.51E+05	3.08E+06	2.37E-04	15	9,543	8.30E-03	3.56E-01	1.76E-04	6.16E-04	0.00E+00	0.00E+00	3.20E-05	1.83E-04	231.888

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	6.76E+07	0.10	2.19E+00	6.16E-04	7.32E+02	1.42E+21	4.60E-06	3.11E+02	5.9E-06	6.0E-01

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
4.5E-04	3.6E-01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

GW-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	1.90E+05	Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28) Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	246.888	246.888	0	0	A	SC	SC		

MORE ↓

Stratum A SCS soil type (Lookup Soil Parameters)	Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B SCS soil type (Lookup Soil Parameters)	Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C SCS soil type (Lookup Soil Parameters)	Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SC	1.60	0.410	0.27								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	365.76	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	46.888	0.140	ERROR	ERROR	0.522	1.74E-09	0.686	1.20E-09	30.00	0.41	0.055	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.80E+06	2.22E-04	200	9,543	8.30E-03	3.56E-01	1.76E-04	6.16E-04	0.00E+00	0.00E+00	3.20E-05	4.85E-05	46.888

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	6.76E+07	0.10	8.25E-01	6.16E-04	4.00E+02	3.51E+14	2.25E-05	1.52E+03	5.9E-06	6.0E-01

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.7E-03	2.4E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

J&E GROUNDWATER ADVANCED MODEL RUNS – OFF- SITE RESIDENCES BY VARYING DEPTHS

DATA ENTRY SHEET

GW-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	2.20E+02	Trichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
14	200	1200.912	335.28	60.96	804.672	C	SIC	SIC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216	S	1.66	0.375	0.054	SIC	1.38	0.481	0.216

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	365.76	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	2.0E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	1000.912	0.265	0.321	0.265	0.284	1.49E-09	0.844	1.26E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.80E+06	2.22E-04	200	8,507	5.93E-03	2.52E-01	1.77E-04	4.10E-03	1.28E-02	4.10E-03	3.40E-05	1.71E-04	1000.912

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	5.53E+04	0.10	8.64E-01	4.10E-03	4.00E+02	1.94E+02	8.96E-06	4.96E-01	2.0E-06	6.0E-01

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
4.1E-07	7.9E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

GW-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	9.40E+01	Trichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
14	200	886.968	213.36	673.608	0	B	SC	SIC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216	SC	1.63	0.385	0.197				

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	365.76	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	2.0E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	686.968	0.265	0.188	ERROR	0.284	1.49E-09	0.844	1.26E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.80E+06	2.22E-04	200	8,507	5.93E-03	2.52E-01	1.77E-04	4.10E-03	2.04E-03	0.00E+00	1.23E-05	2.50E-04	686.968

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	2.36E+04	0.10	8.64E-01	4.10E-03	4.00E+02	1.94E+02	1.47E-05	3.48E-01	2.0E-06	6.0E-01

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.9E-07	5.6E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

GW-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	1.50E+00	Trichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
14	200	621.792	426.72	195.072	0	B	S	SIC		

MORE ↓

Stratum A SCS soil type (Lookup Soil Parameters)	Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B SCS soil type (Lookup Soil Parameters)	Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C SCS soil type (Lookup Soil Parameters)	Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216	S	1.66	0.375	0.054				

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	365.76	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	2.0E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	421.792	0.265	0.321	ERROR	0.284	1.49E-09	0.844	1.26E-09	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.80E+06	2.22E-04	200	8,507	5.93E-03	2.52E-01	1.77E-04	4.10E-03	1.28E-02	0.00E+00	5.09E-04	4.11E-03	421.792

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	3.77E+02	0.10	8.64E-01	4.10E-03	4.00E+02	1.94E+02	3.26E-05	1.23E-02	2.0E-06	6.0E-01

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.0E-08	2.0E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

GW-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	2.80E+03	Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
14	200	1200.912	335.28	60.96	804.672	C	SIC	SIC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216	S	1.66	0.375	0.054	SIC	1.38	0.481	0.216

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	365.76	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	1000.912	0.265	0.321	0.265	0.284	1.49E-09	0.844	1.26E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.80E+06	2.22E-04	200	9,513	9.92E-03	4.21E-01	1.77E-04	3.74E-03	1.16E-02	3.74E-03	2.77E-05	1.40E-04	1000.912

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	1.18E+06	0.10	8.64E-01	3.74E-03	4.00E+02	3.25E+02	7.68E-06	9.05E+00	5.9E-06	6.0E-01

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.2E-05	1.4E-02

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

GW-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	2.10E+03	Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28) Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
14	200	886.968	213.36	673.608	0	B	SC	SIC		

MORE ↓

Stratum A SCS soil type (Lookup Soil Parameters)	Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B SCS soil type (Lookup Soil Parameters)	Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C SCS soil type (Lookup Soil Parameters)	Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216	SC	1.63	0.385	0.197				

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	365.76	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	686.968	0.265	0.188	ERROR	0.284	1.49E-09	0.844	1.26E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.80E+06	2.22E-04	200	9,513	9.92E-03	4.21E-01	1.77E-04	3.74E-03	1.86E-03	0.00E+00	8.36E-06	1.75E-04	686.968

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	8.84E+05	0.10	8.64E-01	3.74E-03	4.00E+02	3.25E+02	1.18E-05	1.04E+01	5.9E-06	6.0E-01

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.5E-05	1.7E-02

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

GW-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	2.20E+01	Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28) Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
14	200	621.792	426.72	195.072	0	B	S	SIC		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B SCS soil type (Lookup Soil Parameters)	Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C SCS soil type (Lookup Soil Parameters)	Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216	S	1.66	0.375	0.054				

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	365.76	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	421.792	0.265	0.321	ERROR	0.284	1.49E-09	0.844	1.26E-09	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.80E+06	2.22E-04	200	9,513	9.92E-03	4.21E-01	1.77E-04	3.74E-03	1.16E-02	0.00E+00	4.63E-04	3.74E-03	421.792

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	9.26E+03	0.10	8.64E-01	3.74E-03	4.00E+02	3.25E+02	3.24E-05	3.00E-01	5.9E-06	6.0E-01

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
7.3E-07	4.8E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

GW-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	1.00E+02	Trichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28) Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
14	200	1328.928	762	566.928	0	B	S	SIC		

MORE ↓

Stratum A SCS soil type (Lookup Soil Parameters)	Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B SCS soil type (Lookup Soil Parameters)	Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C SCS soil type (Lookup Soil Parameters)	Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SIC	1.38	0.481	0.216	S	1.66	0.375	0.054				

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	365.76	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	2.0E-06	6.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	1128.928	0.265	0.321	ERROR	0.284	1.49E-09	0.844	1.26E-09	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.80E+06	2.22E-04	200	8,507	5.93E-03	2.52E-01	1.77E-04	4.10E-03	1.28E-02	0.00E+00	5.09E-04	5.28E-03	1128.928

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	2.52E+04	0.10	8.64E-01	4.10E-03	4.00E+02	1.94E+02	3.10E-05	7.80E-01	2.0E-06	6.0E-01

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
6.4E-07	1.2E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

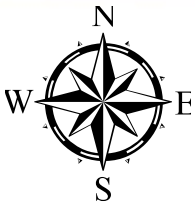
APPENDIX C

SOIL GAS SAMPLING RESULTS

TABLE 3.21
SUMMARY OF SOIL VAPOR MONITORING DATA
RIVERFRONT SUPERFUND SITE OU2/OU6
NEW HAVEN, MISSOURI

Sample Location	USEPA Target Soil Gas Concentration for Residential Use[1]	USEPA Target Soil Gas Concentration for Industrial Use[2]	Missouri Tier 1 Risk-Based Target Level for for Indoor Air for Residential Use[3]	Missouri Tier 1 Risk-Based Target Level for Indoor Air for Non-Residential Use[4]	Missouri Tier 1 Risk-Based Target Level for Soil Vapor for Indoor Inhalation for Residential Use[5]	Missouri Tier 1 Risk-Based Target Level for Soil Vapor for Indoor Inhalation for Non-Residential Use[6]	Units	SVI1	SVI2	SVI3	SVI3*	SVI4	SVI5	Ambient Air**	
Sample Depth (feet)								9.8	10	10.2	10.2	9.9	10.8	--	--
Sample Collection Date								11-Sep-09	11-Sep-09	11-Sep-09	11-Sep-09	14-Sep-09	14-Sep-09	11-Sep-09	14-Sep-09
Compound															
Tetracholoethene (PCE)	41	210	427	909	380	1,990	ug/m^3	ND	ND	ND	ND	ND	**200**	**2.8**	ND
Trichloroethene (TCE)	120	610	1,280	2,730	1,040	5,440	ug/m^3	ND	ND	ND	ND	ND	ND	**1.9**	ND
cis-1,2-dichloroethene (cDCE)	NA	NA	2,090	6,820	1,820	14,600	ug/m^3	ND	ND	ND	ND	ND	ND	**0.94**	ND

Notes
(1) USEPA target soil gas concentration is based on the December 2009 RSL for residential air (USEPA, 2009) where the soil gas to indoor air attenuation factor = 0.01 (USEPA, 2008).
(2) USEPA target soil gas concentration is based on the December 2009 RSL for industrial air (USEPA, 2009) where the soil gas to indoor air attenuation factor = 0.01 (USEPA, 2008).
(3) Target level is based on Missouri Risk-Based Corrective Action (Missouri, 2006) Tier 1 for silty soil in indoor air for residential use (Table B-3) with a soil attenuation factor of 0.01 (USEPA, 2008).
(4) Target level is based on Missouri Risk-Based Corrective Action (Missouri, 2006) Tier 1 for silty soil in indoor air for non-residential use (Table B-6) with a soil attenuation factor of 0.01 (USEPA, 2008).
(5) Target level is based on Missouri Risk-Based Corrective Action (Missouri, 2006) Tier 1 for silty soil in soil vapor for residential use (Table B-3).
(6) Target level is based on Missouri Risk-Based Corrective Action (Missouri, 2006) Tier 1 for silty soil in soil vapor for non-residential use (Table B-6).
*: Duplicate Sample
<14: Compound not detected
Bolded cells indicate detected compounds
**:Ambient air samples were collected as background samples from outdoor air
NA = Not available


N
W
E
S

APPENDIX D

95% UCL CALCULATIONS

95% UCL Input Data
Soil - 0 - 3'
Riverfront Superfund Site - OU2/OU6

PCE	D_PCE	BaP	D_BaP	Ar	D_Ar
0.00084	0	0.0035	0	5.1	1
0.00091	0	0.00086	0	0.5	1
0.00082	0	0.022	1	1.4	1
0.00096	0	0.036	1	3.3	1
0.00095	0				
0.001	0				
0.00082	0				
0.001	0				
0.00093	0				
0.00084	0				
0.027	1				
0.0093	1				
0.025	1				
0.0094	1				
0.053	1				
0.0067	1				
0.0039	1				
0.15	1				
0.0051	1				
0.26	1				
0.00082	0				
0.001	0				
0.053	1				
0.14	1				
0.0065	1				
0.92	1				
0.00084	0				
0.063	1				
2.2	1				
15	1				
23	1				
2.1	1				
0.087	1				
0.049	1				
0.49	1				
0.0012	0				
0.00086	0				
0.001	0				
0.0012	0				
0.1	1				
0.0064	1				
0.024	1				
0.00084	0				
0.047	1				
0.013	1				
0.47	1				
21	1				
0.00089	0				
0.00089	0				
0.00091	0				
0.00083	0				
0.00086	0				
0.00082	0				
0.001	0				
0.00088	0				
0.00094	0				

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	P:\Kellwood_Risk_Assessments\Human Health Risk\June 2010 Revisions\Soil 0-3 UCLs-raw data-rev.ws
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

PCE

General Statistics

Number of Valid Data	56	Number of Detected Data	29
Number of Distinct Detected Data	28	Number of Non-Detect Data	27
		Percent Non-Detects	48.21%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0039	Minimum Detected	-5.547
Maximum Detected	23	Maximum Detected	3.135
Mean of Detected	2.287	Mean of Detected	-2.291
SD of Detected	6.136	SD of Detected	2.522
Minimum Non-Detect	8.2000E-4	Minimum Non-Detect	-7.106
Maximum Non-Detect	0.0012	Maximum Non-Detect	-6.725

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	27
Number treated as Detected	29
Single DL Non-Detect Percentage	48.21%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.419	Shapiro Wilk Test Statistic	0.91
5% Shapiro Wilk Critical Value	0.926	5% Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.184	Mean	-4.894
SD	4.527	SD	3.264
95% DL/2 (t) UCL	2.197	95% H-Stat (DL/2) UCL	3.919
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-5.476
		SD in Log Scale	3.904
		Mean in Original Scale	1.184
		SD in Original Scale	4.527
		95% Percentile Bootstrap UCL	2.251
		95% BCA Bootstrap UCL	2.561

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.23	Data do not follow a Discernable Distribution (0.05)
Theta Star	9.949	
nu star	13.33	
A-D Test Statistic	3.095	Nonparametric Statistics

5% A-D Critical Value	0.885
K-S Test Statistic	0.885
5% K-S Critical Value	0.179

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	1.0000E-9
Maximum	23
Mean	1.752
Median	0.12
SD	4.602
k star	0.145
Theta star	12.07
Nu star	16.26
AppChi2	8.143
95% Gamma Approximate UCL	3.498
95% Adjusted Gamma UCL	3.565

Note: DL/2 is not a recommended method.

Kaplan-Meier (KM) Method	
Mean	1.186
SD	4.486
SE of Mean	0.61
95% KM (t) UCL	2.207
95% KM (z) UCL	2.19
95% KM (jackknife) UCL	2.198
95% KM (bootstrap t) UCL	3.047
95% KM (BCA) UCL	2.365
95% KM (Percentile Bootstrap) UCL	2.253
95% KM (Chebyshev) UCL	3.845
97.5% KM (Chebyshev) UCL	4.996
99% KM (Chebyshev) UCL	7.256

Potential UCLs to Use

99% KM (Chebyshev) UCL	7.256

BaP

General Statistics

Number of Valid Data	4	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	2
		Percent Non-Detects	50.00%

Warning: This data set only has 4 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable BaP was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Ar

General Statistics

Number of Valid Observations	4	Number of Distinct Observations	4

Warning: This data set only has 4 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Ar was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

95% UCL Input Data
Soil - 0 -10'
Riverfront Superfund Site - OU2/OU6

PCE	D_PCE	BaP	D_BaP	Ar	D_Ar
0.00084	0	0.0035	0	5.1	1
0.00091	0	0.00086	0	0.5	1
0.00082	0	0.022	1	1.4	1
0.00096	0	0.036	1	3.3	1
0.00095	0	0.0096	0	15	1
0.001	0				
0.00082	0				
0.001	0				
0.00093	0				
0.00084	0				
0.027	1				
0.0093	1				
0.025	1				
0.0094	1				
0.053	1				
0.0067	1				
0.0039	1				
0.15	1				
0.0051	1				
0.26	1				
0.00082	0				
0.001	0				
0.053	1				
0.14	1				
0.0065	1				
0.92	1				
0.00084	0				
0.063	1				
2.2	1				
15	1				
23	1				
2.1	1				
0.087	1				
0.049	1				
0.49	1				
0.0012	0				
0.00086	0				
0.001	0				
0.0012	0				
0.1	1				
0.0064	1				
0.024	1				
0.00084	0				
0.047	1				
0.013	1				
0.47	1				
21	1				
0.00089	0				
0.00089	0				
0.00091	0				
0.00083	0				

95% UCL Input Data
Soil - 0 -10'
Riverfront Superfund Site - OU2/OU6

PCE	D_PCE	BaP	D_BaP	Ar	D_Ar
0.00086	0				
0.00082	0				
0.001	0				
0.00088	0				
0.00094	0				
0.00091	0				
0.0013	0				
0.00082	0				
0.22	1				
0.00089	0				
0.056	1				
0.18	1				
0.0039	1				
290	1				
0.23	1				
0.1	1				
0.011	1				
0.11	1				
0.022	1				
0.38	1				
0.00095	0				

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	P:\Kellwood_Risk_Assessments\Human Health Risk\June 2010 Revisions\Soil 0-10 UCLs-raw data-rev.w
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

PCE

General Statistics

Number of Valid Data	72	Number of Detected Data	40
Number of Distinct Detected Data	37	Number of Non-Detect Data	32
		Percent Non-Detects	44.44%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0039	Minimum Detected	-5.547
Maximum Detected	290	Maximum Detected	5.67
Mean of Detected	8.941	Mean of Detected	-2.192
SD of Detected	45.88	SD of Detected	2.595
Minimum Non-Detect	8.2000E-4	Minimum Non-Detect	-7.106
Maximum Non-Detect	0.0013	Maximum Non-Detect	-6.645

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	32
Number treated as Detected	40
Single DL Non-Detect Percentage	44.44%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.207	Shapiro Wilk Test Statistic	0.91
5% Shapiro Wilk Critical Value	0.94	5% Shapiro Wilk Critical Value	0.94
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4.967	Mean	-4.632
SD	34.3	SD	3.354
95% DL/2 (t) UCL	11.7	95% H-Stat (DL/2) UCL	7.253
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-5.085
		SD in Log Scale	3.89
		Mean in Original Scale	4.967
		SD in Original Scale	34.3
		95% Percentile Bootstrap UCL	12.82
		95% BCA Bootstrap UCL	20.2

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.176	Data do not follow a Discernable Distribution (0.05)
Theta Star	50.91	
nu star	14.05	
A-D Test Statistic	6.28	Nonparametric Statistics

5% A-D Critical Value	0.92
K-S Test Statistic	0.92
5% K-S Critical Value	0.155

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	1.0000E-9
Maximum	290
Mean	5.144
Median	0.012
SD	34.28
k star	0.0846
Theta star	60.78
Nu star	12.19
AppChi2	5.351
95% Gamma Approximate UCL	11.72
95% Adjusted Gamma UCL	11.92

Note: DL/2 is not a recommended method.

Kaplan-Meier (KM) Method

Mean	4.969
SD	34.06
SE of Mean	4.065
95% KM (t) UCL	11.74
95% KM (z) UCL	11.66
95% KM (jackknife) UCL	11.71
95% KM (bootstrap t) UCL	66.56
95% KM (BCA) UCL	12.8
95% KM (Percentile Bootstrap) UCL	12.83
95% KM (Chebyshev) UCL	22.69
97.5% KM (Chebyshev) UCL	30.36
99% KM (Chebyshev) UCL	45.42

Potential UCLs to Use

97.5% KM (Chebyshev) UCL	30.36

BaP

General Statistics

Number of Valid Data	5	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	3
		Percent Non-Detects	60.00%

Raw Statistics

Minimum Detected	0.022
Maximum Detected	0.036
Mean of Detected	0.029
SD of Detected	0.0099
Minimum Non-Detect	8.6000E-4
Maximum Non-Detect	0.0096

Log-transformed Statistics

Minimum Detected	-3.817
Maximum Detected	-3.324
Mean of Detected	-3.57
SD of Detected	0.348
Minimum Non-Detect	-7.059
Maximum Non-Detect	-4.646

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	3
Number treated as Detected	2
Single DL Non-Detect Percentage	60.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A

Data not Normal at 5% Significance Level

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.013
SD	0.0155
95% DL/2 (t) UCL	0.0278

Maximum Likelihood Estimate(MLE) Method	N/A

MLE method failed to converge properly

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-5.316
SD	1.818
95% H-Stat (DL/2) UCL	16.83

Log ROS Method

Mean in Log Scale	N/A
SD in Log Scale	N/A
Mean in Original Scale	N/A
SD in Original Scale	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.0248
SD	0.0056
SE of Mean	0.00354
95% KM (t) UCL	0.0324
95% KM (z) UCL	0.0306
95% KM (jackknife) UCL	0.0366
95% KM (bootstrap t) UCL	0.0248
95% KM (BCA) UCL	0.036
95% KM (Percentile Bootstrap) UCL	0.036
95% KM (Chebyshev) UCL	0.0402
97.5% KM (Chebyshev) UCL	0.0469
99% KM (Chebyshev) UCL	0.06

Potential UCLs to Use

95% KM (t) UCL	0.0324
95% KM (% Bootstrap) UCL	0.036

Ar

General Statistics

Number of Valid Observations	5	Number of Distinct Observations	5

Raw Statistics	
Minimum	0.5
Maximum	15
Mean	5.06
Median	3.3
SD	5.833
Coefficient of Variation	1.153
Skewness	1.749

Log-transformed Statistics	
Minimum of Log Data	-0.693
Maximum of Log Data	2.708
Mean of log Data	1.035
SD of log Data	1.29

Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 5 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.815
Shapiro Wilk Critical Value	0.762

Data appear Normal at 5% Significance Level

Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.995
Shapiro Wilk Critical Value	0.762

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution	
95% Student's-t UCL	10.62
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	11.53
95% Modified-t UCL	10.96

Assuming Lognormal Distribution	
95% H-UCL	346.9
95% Chebyshev (MVUE) UCL	17.17
97.5% Chebyshev (MVUE) UCL	22.36
99% Chebyshev (MVUE) UCL	32.58

Gamma Distribution Test	
k star (bias corrected)	0.528
Theta Star	9.589
MLE of Mean	5.06
MLE of Standard Deviation	6.966
nu star	5.277
Approximate Chi Square Value (.05)	1.282
Adjusted Level of Significance	0.0086
Adjusted Chi Square Value	0.612
Anderson-Darling Test Statistic	0.202
Anderson-Darling 5% Critical Value	0.692
Kolmogorov-Smirnov Test Statistic	0.164
Kolmogorov-Smirnov 5% Critical Value	0.365

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution	
95% Approximate Gamma UCL	20.82
95% Adjusted Gamma UCL	43.61

Data Distribution
Data appear Normal at 5% Significance Level

Nonparametric Statistics	
95% CLT UCL	9.351
95% Jackknife UCL	10.62
95% Standard Bootstrap UCL	8.995
95% Bootstrap-t UCL	19.32
95% Hall's Bootstrap UCL	27.27
95% Percentile Bootstrap UCL	9.38
95% BCA Bootstrap UCL	10.68
95% Chebyshev(Mean, Sd) UCL	16.43
97.5% Chebyshev(Mean, Sd) UCL	21.35
99% Chebyshev(Mean, Sd) UCL	31.01

Potential UCL to Use	Use 95% Student's-t UCL	10.62

Surface Water Input Data - PCE

PCE	D_PCE
0.14	0
0.14	0
0.14	0
0.14	0
4.5	1
4.3	1
3.5	1
14	1
0.14	0
0.14	0
2.2	1
19	1
0.14	0
0.14	0
0.14	0
0.14	0
0.14	0
0.02	1
40.14	1
31.6	1
31.5	1
29.75	1
32	1
56	1
70.08	1
68.06	1
58	1
9.5	1
15.0	1
100.0	1
85.9	1
43.78	1
31	1
25.1	1
28.45	1
1	0
26.75	1
23.33	1
28.56	1
18.22	1
14.76	1
16.96	1
14.49	1
2.65	1
3.74	1
0.01	1

Surface Water Input Data - PCE

0.03	1
2	1
1.66	1
1.76	1
44	1
7.33	1
8.9	1
2.41	1
1.3	1
0.47	1
0.33	1
1	0
0.02	1
2.85	1

1				**General UCL Statistics for Data Sets with Non-Detects**								
2	**User Selected Options**											
3	From File			C:\Documents and Settings\P0095056\My Documents\Kellwood_Risk_Assessments\May 2010 Revisions\App D								
4	Full Precision			OFF								
5	Confidence Coefficient			95%								
6	Number of Bootstrap Operations			2000								
7												
8												
9	**PCE**											
10												
11	**General Statistics**											
12	Number of Valid Data			60		Number of Detected Data					47	
13	Number of Distinct Detected Data			46		Number of Non-Detect Data					13	
14						Percent Non-Detects					21.67%	
15												
16	**Raw Statistics**					**Log-transformed Statistics**						
17	Minimum Detected			0.01		Minimum Detected					-4.605	
18	Maximum Detected			100		Maximum Detected					4.605	
19	Mean of Detected			21.83		Mean of Detected					1.908	
20	SD of Detected			24.24		SD of Detected					2.28	
21	Minimum Non-Detect			0.14		Minimum Non-Detect					-1.966	
22	Maximum Non-Detect			1		Maximum Non-Detect					0	
23												
24	Note: Data have multiple DLs - Use of KM Method is recommended					Number treated as Non-Detect					19	
25	For all methods (except KM, DL/2, and ROS Methods),					Number treated as Detected					41	
26	Observations < Largest ND are treated as NDs					Single DL Non-Detect Percentage					31.67%	
27												
28	**UCL Statistics**											
29	**Normal Distribution Test with Detected Values Only**					**Lognormal Distribution Test with Detected Values Only**						
30	Shapiro Wilk Test Statistic			0.825		Shapiro Wilk Test Statistic					0.839	
31	5% Shapiro Wilk Critical Value			0.946		5% Shapiro Wilk Critical Value					0.946	
32	**Data not Normal at 5% Significance Level**					**Data not Lognormal at 5% Significance Level**						
33												
34	**Assuming Normal Distribution**					**Assuming Lognormal Distribution**						
35	DL/2 Substitution Method					DL/2 Substitution Method						
36	Mean			17.13		Mean					0.984	
37	SD			23.22		SD					2.703	
38	95% DL/2 (t) UCL			22.14		95% H-Stat (DL/2) UCL					646.7	
39												
40	Maximum Likelihood Estimate(MLE) Method					Log ROS Method						
41	Mean			10.75		Mean in Log Scale					1.072	
42	SD			30.37		SD in Log Scale					2.617	
43	95% MLE (t) UCL			17.3		Mean in Original Scale					17.14	
44	95% MLE (Tiku) UCL			17.7		SD in Original Scale					23.21	
45						95% Percentile Bootstrap UCL					22.28	
46						95% BCA Bootstrap UCL					22.88	
47												
48	**Gamma Distribution Test with Detected Values Only**					**Data Distribution Test with Detected Values Only**						
49	k star (bias corrected)			0.515		**Data appear Gamma Distributed at 5% Significance Level**						
50	Theta Star			42.37								
51	nu star			48.42								
52												

53				A-D Test Statistic	0.581		**Nonparametric Statistics**					
54				5% A-D Critical Value	0.811					Kaplan-Meier (KM) Method		
55				K-S Test Statistic	0.811					Mean		17.1
56				5% K-S Critical Value	0.136					SD		23.04
57	**Data appear Gamma Distributed at 5% Significance Level**									SE of Mean		3.007
58										95% KM (t) UCL		22.13
59	**Assuming Gamma Distribution**									95% KM (z) UCL		22.05
60				Gamma ROS Statistics using Extrapolated Data						95% KM (jackknife) UCL		22.12
61				Minimum	1E-09					95% KM (bootstrap t) UCL		22.97
62				Maximum	100					95% KM (BCA) UCL		21.95
63				Mean	17.28					95% KM (Percentile Bootstrap) UCL		22.25
64				Median	4.463					95% KM (Chebyshev) UCL		30.21
65				SD	23.12					97.5% KM (Chebyshev) UCL		35.88
66				k star	0.185					99% KM (Chebyshev) UCL		47.03
67				Theta star	93.39							
68				Nu star	22.21		**Potential UCLs to Use**					
69				AppChi2	12.49					95% KM (Chebyshev) UCL		30.21
70				95% Gamma Approximate UCL	30.72							
71				95% Adjusted Gamma UCL	31.17							
72	**Note: DL/2 is not a recommended method.**											
73												

APPENDIX E

RISK AND HAZARD QUOTIENT CALCULATIONS

Worker **Equation Inputs for Soil/Sediment**

Variable	Value
EF_{ow} (exposure frequency) d/yr	225
ED_{ow} (exposure duration) yr	25
LT (lifetime) yr	70
BW_{ow} (body weight)	70
IR_{ow} (soil ingestion rate) mg/day	100
SA_{ow} (surface area) cm^2/day	3300
AF_{ow} (skin adherence factor) mg/cm^2	0.2

Outdoor Worker - Soil Exposure 0-3'

Output generated 16MAY2010:19:58:48

Worker RISK for Soil/Sediment

Outdoor Worker - Soil Exposure 0-3'

Chemical	Chronic RfD (mg/kg-day)	Ingestion SF (mg/kg-day)⁻¹	Chronic RfC (mg/m³)	Inhalation Unit Risk (\µg/m³)⁻¹	ABS_{gi}	ABS_d
Arsenic, Inorganic	3.00E-04	1.50E+00	3.00E-05	4.30E-03	1	0.03
Benzo[a]pyrene	-	7.30E+00	-	1.10E-03	1	0.13
Dichloroethylene, 1,2- (Mixed Isomers)	9.00E-03	-	6.00E-02	-	1	-
Methylene Chloride	6.00E-02	7.50E-03	1.10E+00	4.70E-07	1	-
Naphthalene	2.00E-02	-	3.00E-03	3.40E-05	1	0.13
Tetrachloroethylene	1.00E-02	5.40E-01	2.70E-01	5.90E-06	1	-
Trichloroethylene	-	1.30E-02	1.00E-02	2.00E-06	1	-
*Total Risk/HI	-	-	-	-	-	-

Output generated 16MAY2010:19:58:48

Worker RISK for Soil/Sediment

Outdoor Worker - Soil Exposure 0-3'

D_{ia}	D_{iw}	H[`]	K_d	Volatilization Factor (m^3/kg)	Particulate Emission Factor (m^3/kg)	Concentration (mg/kg)	Ingestion Noncarcinogenic CDI	Inhalation Particulates and Volatiles Noncarcinogenic CDI
-	-	-	29	-	1.43E+09	5.1	4.49E-06	7.34E-10
-	-	0.0000187	-	-	1.43E+09	0.036	3.17E-08	5.18E-12
0.09	0.0000105	0.167	0.2376	3.85E+03	1.43E+09	-	-	-
0.0999	0.0000125	0.133	0.1302	3.40E+03	1.43E+09	-	-	-
0.0605	8.38E-6	0.018	9.24	7.19E+04	1.43E+09	-	-	-
0.0505	9.46E-6	0.724	0.5694	3.65E+03	1.43E+09	7.26	6.39E-06	4.09E-04
0.0687	0.0000102	0.403	0.3642	3.43E+03	1.43E+09	-	-	-
-	-	-	-	-	-	-	-	-

Output generated 16MAY2010:19:58:48

Worker RISK for Soil/Sediment

Outdoor Worker - Soil Exposure 0-3'

Dermal Noncarcinogenic CDI	Ingestion Carcinogenic CDI	Inhalation Particulates and Volatiles Carcinogenic CDI	Dermal Carcinogenic CDI	Ingestion HQ	Inhalation Particulates and Volatiles HQ	Dermal HQ	Total HI	Ingestion Risk	Inhalation Particulates and Volatiles Risk	Dermal Risk	Total Risk
8.89E-07	1.60E-06	2.62E-07	3.18E-07	1.50E-02	2.45E-05	2.96E-03	1.80E-02	2.41E-06	1.13E-09	4.76E-07	2.88E-06
2.72E-08	1.13E-08	1.85E-09	9.71E-09	-	-	-	-	8.27E-08	2.04E-12	7.09E-08	1.54E-07
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	2.28E-06	1.46E-01	-	6.39E-04	1.52E-03	-	2.15E-03	1.23E-06	8.62E-07	-	2.10E-06
-	-	-	-	-	-	-	-	-	-	-	-
-	*-*	*-*	*-*	*1.56E-02*	*1.54E-03*	*2.96E-03*	*2.01E-02*	*3.72E-06*	*8.63E-07*	*5.47E-07*	*5.13E-06*

Output generated 16MAY2010:19:58:48

Worker **Equation Inputs for Ambient Air**

Variable	Value
EF_w (exposure frequency) d/yr	225
ED_w (exposure duration) years	25
LT (lifetime) yr	70
ET_w (exposure time) hours	8

Outdoor Worker - Soil Exposure 0-3'

Output generated 16MAY2010:19:58:48

Worker RISK for Ambient Air

Outdoor Worker - Soil Exposure 0-3'

Chemical	Inhalation Unit Risk (\µg/m³)⁻¹	Chronic RfC (mg/m³)	Concentration (\µg/m^3)	Inhalation Ambient Air Noncarcinogenic CDI	Inhalation Ambient Air Carcinogenic CDI	Inhalation Ambient Air HQ	Inhalation Ambient Air Risk
Arsenic, Inorganic	4.30E-03	3.00E-05	-	-	-	-	-
Benzo[a]pyrene	1.10E-03	-	-	-	-	-	-
Dichloroethylene, 1,2- (Mixed Isomers)	-	6.00E-02	6.07E-9	1.25E-12	4.45E-10	2.08E-11	-
Methylene Chloride	4.70E-07	1.10E+00	1.48E-9	3.04E-13	1.09E-10	2.76E-13	5.10E-17
Naphthalene	3.40E-05	3.00E-03	4.84E-12	9.95E-16	3.55E-13	3.32E-13	1.21E-17
Tetrachloroethylene	5.90E-06	2.70E-01	0.000025	5.14E-09	1.83E-06	1.90E-08	1.08E-11
Trichloroethylene	2.00E-06	1.00E-02	1.65E-9	3.39E-13	1.21E-10	3.39E-11	2.42E-16
*Total Risk/HI	-	-	-	-	-	*1.91E-08*	*1.08E-11*

Output generated 16MAY2010:19:58:48

Worker **Equation Inputs for Soil/Sediment**

Variable	Value
EF_{ow} (exposure frequency) d/yr	225
ED_{ow} (exposure duration) yr	25
LT (lifetime) yr	70
BW_{ow} (body weight)	70
IR_{ow} (soil ingestion rate) mg/day	100
SA_{ow} (surface area) cm^2/day	3300
AF_{ow} (skin adherence factor) mg/cm^2	0.2

Outdoor Worker - Soil Exposure 0-10'

Output generated 17MAY2010:00:29:37

Worker RISK for Soil/Sediment

Outdoor Worker - Soil Exposure 0-10'

Chemical	Chronic RfD (mg/kg-day)	Ingestion SF (mg/kg-day)⁻¹	Chronic RfC (mg/m³)	Inhalation Unit Risk (\µg/m³)⁻¹	ABS_{gi}	ABS_d
Arsenic, Inorganic	3.00E-04	1.50E+00	3.00E-05	4.30E-03	1	0.03
Benzo[a]pyrene	-	7.30E+00	-	1.10E-03	1	0.13
Tetrachloroethylene	1.00E-02	5.40E-01	2.70E-01	5.90E-06	1	-
*Total Risk/HI	-	-	-	-	-	-

D_{ia}	D_{iw}	H[`]	K_d	Volatilization Factor (m^3/kg)	Particulate Emission Factor (m^3/kg)	Concentration (mg/kg)	Ingestion Noncarcinogenic CDI	Inhalation Particulates and Volatiles Noncarcinogenic CDI
-	-	-	29	-	1.43E+09	15	1.32E-05	2.16E-09
-	-	0.0000187	-	-	1.43E+09	0.036	3.17E-08	5.18E-12
0.0505	9.46E-6	0.724	0.5694	3.65E+03	1.43E+09	30.4	2.68E-05	1.71E-03
-	-	-	-	-	-	-	-	-

Dermal Noncarcinogenic CDI	Ingestion Carcinogenic CDI	Inhalation Particulates and Volatiles Carcinogenic CDI	Dermal Carcinogenic CDI	Ingestion HQ	Inhalation Particulates and Volatiles HQ	Dermal HQ	Total HI	Ingestion Risk	Inhalation Particulates and Volatiles Risk	Dermal Risk	Total Risk
2.62E-06	4.72E-06	7.71E-07	9.34E-07	4.40E-02	7.20E-05	8.72E-03	5.28E-02	7.08E-06	3.32E-09	1.40E-06	8.48E-06
2.72E-08	1.13E-08	1.85E-09	9.71E-09	-	-	-	-	8.27E-08	2.04E-12	7.09E-08	1.54E-07
-	9.56E-06	6.12E-01	-	2.68E-03	6.35E-03	-	9.02E-03	5.16E-06	3.61E-06	-	8.77E-06
-	-	-	-	*4.67E-02*	*6.42E-03*	*8.72E-03*	*6.18E-02*	*1.23E-05*	*3.61E-06*	*1.47E-06*	*1.74E-05*

Output generated 17MAY2010:00:29:37

INHALATION OF VOLATILES IN OUTDOOR AIR FROM GROUNDWATER
FUTURE COMMERCIAL WORKER

NON-CARCINOGEN

Intake (ug/m3) = (CA x ED x ET x EF)/(AT)

Chemical of Concern	Concent. in Air (CA) (ug/m3)	Exposure Duration (ED) (yrs)	Fraction of EF in Contact with Air (ET)	Exposure Frequency (EF) (days/yr)	Averaging Time (AT) (days)	Intake (ug/m3)
Naphthalene	4.84E-09	25	0.333	250	9125	1.10E-09
1,2-Dichloroethene, total	6.07E-06	25	0.333	250	9125	1.38E-06
Methylene chloride	1.48E-06	25	0.333	250	9125	3.37E-07
Tetrachloroethene	2.50E-02	25	0.333	250	9125	5.69E-03
Trichloroethene	1.65E-05	25	0.333	250	9125	3.75E-06

CARCINOGEN

Intake (ug/m3) = (CA x ED x ET x EF)/(AT)

Chemical of Concern	Concent. in Air (CA) (ug/m3)	Exposure Duration (ED) (yrs)	Fraction of EF in Contact with Air (ET)	Exposure Frequency (EF) (days/yr)	Averaging Time (AT) (days)	Intake (ug/m3)
Naphthalene	4.84E-09	25	0.333	250	25550	3.94E-10
1,2-Dichloroethene, total	6.07E-06	25	0.333	250	25550	4.94E-07
Methylene chloride	1.48E-06	25	0.333	250	25550	1.20E-07
Tetrachloroethene	2.50E-02	25	0.333	250	25550	2.03E-03
Trichloroethene	1.65E-05	25	0.333	250	25550	1.34E-06

INHALATION OF VOLATILES IN OUTDOOR AIR FROM GROUNDWATER
FUTURE COMMERCIAL WORKER

CAair= **CAgw x VFgw,amb**

Chemical of Concern	Concent. in Air (CA) (ug/m3)	Concent. in Groundwater (CA) (ug/L)	VFgw,amb (cm^3-water/ cm^3-air)
Naphthalene	4.84E-09	0.29	1.67E-08
1,2-Dichloroethene, total	6.07E-06	78	7.78E-08
Methylene chloride	1.48E-06	19	7.78E-08
Tetrachloroethene	2.50E-02	190000	1.31E-07
Trichloroethene	1.65E-05	150	1.10E-07

One liter of water weighs 1 kg.

VFgw,amb= **1/[(1+(DFamb x Lgw)/(Dweff))x1/Heff]**

VFgw,amb volatilization factor, groundwater to ambient air (cm^3-water/cm^3-air)
Dweff effective diffusivity - avg. water table to surface (cm^2/sec)
DFamb dispersion factor for ambient air (cm/s)
Heff effective Henry's law coefficient (cm^3 -water/cm^3 -air)
Lgw depth to groundwater (cm)

Chemical of Concern	VFgw,amb (cm^3-water/ cm^3-air)	DFamb (cm/s)	Heff (cm^3-water/ cm^3-air)	Lgw (cm)	Dweff (cm^2/sec)
Naphthalene	1.67E-08	10	1.80E-02	431.29	4.00E-03
1,2-Dichloroethene, total	7.78E-08	10	1.70E-01	431.29	1.97E-03
Methylene chloride	7.78E-08	10	1.30E-01	431.29	2.58E-03
Tetrachloroethene	1.31E-07	10	7.20E-01	431.29	7.87E-04
Trichloroethene	1.10E-07	10	4.00E-01	431.29	1.18E-03

Dweff (cm^2/sec)= **Lgw/[(hv/Dseff)+(hcap/Dcapeff)]**

INHALATION OF VOLATILES IN OUTDOOR AIR FROM GROUNDWATER
FUTURE COMMERCIAL WORKER

Dseff	effective diffusivity - vadose zone soils (cm^2/sec)
Dcapeff	effective diffusivity - capillary fringe zone (cm^2/sec)
hv	vadose zone thickness (cm)
hcap	capillary zone thickness (cm)
Lgw	depth to groundwater (cm), Lgw=hv + hcap

Chemical of Concern	Dwseff (cm^2/sec)	Dseff (cm^2/sec)	Dcapeff (cm^2/sec)	hv (cm)	hcap	Lgw
Naphthalene	4.00E-03	6.57E-03	1.16E-04	426.29	5	431.29
1,2-Dichloroethene, total	1.97E-03	9.85E-03	2.85E-05	426.29	5	431.29
Methylene chloride	2.58E-03	1.09E-02	3.90E-05	426.29	5	431.29
Tetrachloroethene	7.87E-04	5.47E-03	1.06E-05	426.29	5	431.29
Trichloroethene	1.18E-03	7.55E-03	1.62E-05	426.29	5	431.29

Dseff= **Dair x ($\theta as^{3.33}/\theta t^2$) + Dwat x (1/H) x ($\theta ws^{3.33}/\theta t^2$)**

Dair	molecular diffusion coefficient in air (cm^2/sec)
Dwat	molecular diffusion coefficient in water (cm^2/sec)
θas	volumetric air content in vadose zone soils (cm^3/cm^3)
θws	volumetric water content in vadose zone soils (cm^3/cm^3)
θt	total soil porosity vadose zone (cm^3/cm^3)

Chemical of Concern	Dseff (cm^2/sec)	θas (cm^3/cm^3)	θt (cm^3/cm^3)	θws (cm^3/cm^3)	H (dimensionless)	Dair (cm^2/sec)	Dwat (cm^2/sec)
Naphthalene	6.57E-03	0.31	0.43	0.12	1.80E-02	6.00E-02	8.40E-06
1,2-Dichloroethene, total	9.85E-03	0.31	0.43	0.12	1.70E-01	9.00E-02	1.10E-05
Methylene chloride	1.09E-02	0.31	0.43	0.12	1.30E-01	1.00E-01	1.35E-05
Tetrachloroethene	5.47E-03	0.31	0.43	0.12	7.20E-01	5.00E-02	9.50E-06
Trichloroethene	7.55E-03	0.31	0.43	0.12	4.00E-01	6.90E-02	1.00E-05

INHALATION OF VOLATILES IN OUTDOOR AIR FROM GROUNDWATER
FUTURE COMMERCIAL WORKER

Dcapeff= **$Dair \times (\theta acap^{3.33}/\theta t^2) + Dwat \times (1/H) \times (\theta wcap^{3.33}/\theta t^2)$**

$\theta acap$ volumetric air content in capillary zone soils (cm^3/cm^3)
$\theta wcap$ volumetric water content in capillary zone soils (cm^3/cm^3)

Chemical of Concern	Dcapeff (cm^2/sec)	$\theta acap$ (cm^3/cm^3)	θt (cm^3/cm^3)	$\theta wcap$ (cm^3/cm^3)	H (dimensionless)	Dair (cm^2/sec)	Dwat (cm^2/sec)
Naphthalene	1.16E-04	0.043	0.43	0.387	1.80E-02	6.00E-02	8.40E-06
1,2-Dichloroethene, total	2.85E-05	0.043	0.43	0.387	1.70E-01	9.00E-02	1.10E-05
Methylene chloride	3.90E-05	0.043	0.43	0.387	1.30E-01	1.00E-01	1.35E-05
Tetrachloroethene	1.06E-05	0.043	0.43	0.387	7.20E-01	5.00E-02	9.50E-06
Trichloroethene	1.62E-05	0.043	0.43	0.387	4.00E-01	6.90E-02	1.00E-05

GROUNDWATER OUTDOOR INHALATION
FUTURE COMMERCIAL WORKER

GROUNDWATER INHALATION

	CARCINOGEN			NON-CARCINOGEN		
Chemical of Concern	**Intake (ug/m3)**	**URF (ug/m3)-1**	**Cancer Risk**	**Intake (ug/m3)**	**RfC (ug/m3)**	**Hazard Quotient**
Naphthalene	3.94E-10	3.40E-05	1.34E-14	1.10E-09	3.00E+00	3.68E-10
1,2-Dichloroethene, total	4.94E-07	-	-	1.38E-06	6.00E+01	2.31E-08
Methylene chloride	1.20E-07	4.70E-07	5.66E-14	3.37E-07	1.10E+03	3.07E-10
Tetrachloroethene	2.03E-03	5.90E-06	1.20E-08	5.69E-03	2.70E+02	2.11E-05
Trichloroethene	1.34E-06	2.00E-06	2.68E-12	3.75E-06	1.00E+01	3.75E-07
		Total Risk	**1.20E-08**		Hazard Index	**2.15E-05**

Worker **Equation Inputs for Soil/Sediment**

Variable	Value
EF_{ow} (exposure frequency) d/yr	250
ED_{ow} (exposure duration) yr	25
LT (lifetime) yr	70
BW_{ow} (body weight)	70
IR_{ow} (soil ingestion rate) mg/day	100
SA_{ow} (surface area) cm^2/day	3300
AF_{ow} (skin adherence factor) mg/cm^2	0.2

Indoor Worker - Exposure to Indoor Dust Tracked Inside from Outside Soil

Output generated 17MAY2010:11:04:09

Worker RISK for Soil/Sediment

Chemical	Chronic RfD (mg/kg-day)	Ingestion SF (mg/kg-day)⁻¹	Chronic RfC (mg/m³)	Inhalation Unit Risk (µg/m³)⁻¹	ABS_{gi}	ABS_d	D_{ia}
Arsenic, Inorganic	3.00E-04	1.50E+00	3.00E-05	4.30E-03	1	0.03	-
Benzo[a]pyrene	-	7.30E+00	-	1.10E-03	1	0.13	-
*Total Risk/HI	-	-	-	-	-	-	-

D_{iw}	H[`]	K_d	Volatilization Factor (m^3/kg)	Particulate Emission Factor (m^3/kg)	Concentration (mg/kg)	Ingestion Noncarcinogenic CDI	Inhalation Particulates and Volatiles Noncarcinogenic CDI	Dermal Noncarcinogenic CDI
-	-	29	-	1.43E+09	2.27	2.22E-06	3.63E-10	4.40E-07
-	0.0000187	-	-	1.43E+09	0.016	1.57E-08	2.56E-12	1.34E-08
-	-	-	-	-	-	-	-	-

Ingestion Carcinogenic CDI	Inhalation Particulates and Volatiles Carcinogenic CDI	Dermal Carcinogenic CDI	Ingestion HQ	Inhalation Particulates and Volatiles HQ	Dermal HQ	Total HI	Ingestion Risk	Inhalation Particulates and Volatiles Risk	Dermal Risk	Total Risk
7.93E-07	1.30E-07	1.57E-07	7.40E-03	1.21E-05	1.47E-03	8.88E-03	1.19E-06	5.58E-10	2.36E-07	1.43E-06
5.59E-09	9.14E-10	4.80E-09	-	-	-	-	4.08E-08	1.01E-12	3.50E-08	7.58E-08
-	-	-	*7.40E-03*	*1.21E-05*	*1.47E-03*	*8.88E-03*	*1.23E-06*	*5.59E-10*	*2.71E-07*	*1.50E-06*

Indoor Worker - Exposure to Indoor Dust Tracked Inside from Outside Soil

Output generated 17MAY2010:11:04:09

Indoor Worker Equation Inputs for Soil/Sediment

Variable	Value
EF_{iw} (exposure frequency) d/yr	250
ED_{iw} (exposure duration) yr	25
LT (lifetime) yr	70
ET_{iw} (exposure time) hr	8
BW_{iw} (body weight)	70
IR_{iw} (soil ingestion rate) mg/day	50

Indoor Worker - Exposure to Soil

Output generated 16MAY2010:20:42:08

Indoor Worker RISK for Soil/Sediment

Indoor Worker - Exposure to Soil

Chemical	Chronic RfD (mg/kg-day)	Ingestion SF (mg/kg-day)⁻¹	Chronic RfC (mg/m³)	Inhalation Unit Risk (\µg/m³)⁻¹
Arsenic, Inorganic	3.00E-04	1.50E+00	3.00E-05	4.30E-03
Benzo[a]pyrene	-	7.30E+00	-	1.10E-03
Dichloroethylene, 1,2- (Mixed Isomers)	9.00E-03	-	6.00E-02	-
Methylene Chloride	6.00E-02	7.50E-03	1.10E+00	4.70E-07
Naphthalene	2.00E-02	-	3.00E-03	3.40E-05
Tetrachloroethylene	1.00E-02	5.40E-01	2.70E-01	5.90E-06
Trichloroethylene	-	1.30E-02	1.00E-02	2.00E-06
*Total Risk/HI	-	-	-	-

Output generated 16MAY2010:20:42:08

Indoor Worker RISK for Soil/Sediment

Indoor Worker - Exposure to Soil

D_{ia}	D_{iw}	H[`]	K_d	Volatilization Factor (m^3/kg)	Particulate Emission Factor (m^3/kg)	Concentration (mg/kg)	Ingestion Noncarcinogenic CDI
-	-	-	29	-	1.43E+09	5.1	2.50E-06
-	-	0.0000187	-	-	1.43E+09	0.036	1.76E-08
0.09	0.0000105	0.167	0.2376	3.85E+03	1.43E+09	-	-
0.0999	0.0000125	0.133	0.1302	3.40E+03	1.43E+09	-	-
0.0605	8.38E-6	0.018	9.24	7.19E+04	1.43E+09	-	-
0.0505	9.46E-6	0.724	0.5694	3.65E+03	1.43E+09	7.26	3.55E-06
0.0687	0.0000102	0.403	0.3642	3.43E+03	1.43E+09	-	-
-	-	-	-	-	-	-	-

Output generated 16MAY2010:20:42:08

Indoor Worker RISK for Soil/Sediment

Indoor Worker - Exposure to Soil

Inhalation Particulates and Volatiles Noncarcinogenic CDI	Ingestion Carcinogenic CDI	Inhalation Particulates and Volatiles Carcinogenic CDI	Ingestion HQ	Inhalation Particulates and Volatiles HQ	Total HI	Ingestion Risk	Inhalation Particulates and Volatiles Risk	Total Risk
8.16E-10	8.91E-07	2.91E-07	8.32E-03	2.72E-05	8.34E-03	1.34E-06	1.25E-09	1.34E-06
5.76E-12	6.29E-09	2.06E-09	-	-	-	4.59E-08	2.26E-12	4.59E-08
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
4.55E-04	1.27E-06	1.62E-01	3.55E-04	1.68E-03	2.04E-03	6.85E-07	9.58E-07	1.64E-06
-	-	-	-	-	-	-	-	-
-	*-*	*-*	*8.67E-03*	*1.71E-03*	*1.04E-02*	*2.07E-06*	*9.59E-07*	*3.03E-06*

Output generated 16MAY2010:20:42:08

Indoor Worker Equation Inputs for Ambient Air

Variable	Value
EF_w (exposure frequency) d/yr	250
ED_w (exposure duration) years	25
LT (lifetime) yr	70
ET_w (exposure time) hours	8

Indoor Worker - Exposure to Soil

Output generated 16MAY2010:20:42:08

Indoor Worker RISK for Ambient Air

Indoor Worker - Exposure to Soil

Chemical	Inhalation Unit Risk (\µg/m³)⁻¹	Chronic RfC (mg/m³)	Concentration (\µg/m^3)	Inhalation Ambient Air Noncarcinogenic CDI	Inhalation Ambient Air Carcinogenic CDI	Inhalation Ambient Air HQ	Inhalation Ambient Air Risk
Arsenic, Inorganic	4.30E-03	3.00E-05	-	-	-	-	-
Benzo[a]pyrene	1.10E-03	-	-	-	-	-	-
Dichloroethylene, 1,2- (Mixed Isomers)	-	6.00E-02	6.07E-9	1.39E-12	4.95E-10	2.31E-11	-
Methylene Chloride	4.70E-07	1.10E+00	1.48E-9	3.38E-13	1.21E-10	3.07E-13	5.67E-17
Naphthalene	3.40E-05	3.00E-03	4.84E-12	1.11E-15	3.95E-13	3.68E-13	1.34E-17
Tetrachloroethylene	5.90E-06	2.70E-01	0.000025	5.71E-09	2.04E-06	2.11E-08	1.20E-11
Trichloroethylene	2.00E-06	1.00E-02	1.65E-8	3.77E-12	1.35E-09	3.77E-10	2.69E-15
*Total Risk/HI	-	-	-	-	-	2.15E-08	1.20E-11

Output generated 16MAY2010:20:42:08

Excavation Worker Equation Inputs for Soil/Sediment

Variable	Value
EF_{ew} (exposure frequency) d/yr	120
ED_{ew} (exposure duration) yr	0.5
LT (lifetime) yr	70
BW_{ew} (body weight) kg	70
IR_{ew} (soil ingestion rate) mg/day	330
SA_{ew} (surface area) cm^2/day	3300
AF_{ew} (skin adherence factor) mg/cm^2	0.3

Output generated 16MAY2010:20:23:10

Excavation Worker RISK for Soil/Sediment

Chemical	Chronic RfD (mg/kg-day)	Ingestion SF (mg/kg-day)⁻¹	Chronic RfC (mg/m³)	Inhalation Unit Risk (\µg/m³)⁻¹	ABS_{gi}	ABS_{d}
Arsenic, Inorganic	3.00E-04	1.50E+00	3.00E-05	4.30E-03	1	0.03
Benzo[a]pyrene	-	7.30E+00	-	1.10E-03	1	0.13
Dichloroethylene, 1,2- (Mixed Isomers)	9.00E-03	-	6.00E-02	-	1	-
Methylene Chloride	6.00E-02	7.50E-03	1.10E+00	4.70E-07	1	-
Naphthalene	2.00E-02	-	3.00E-03	3.40E-05	1	0.13
Tetrachloroethylene	1.00E-02	5.40E-01	2.70E-01	5.90E-06	1	-
Trichloroethylene	-	1.30E-02	1.00E-02	2.00E-06	1	-
*Total Risk/HI	-	-	-	-	-	-

Output generated 16MAY2010:20:23:10

Excavation Worker RISK for Soil/Sediment

D_{ia}	D_{iw}	H[`]	K_d	Volatilization Factor (m^3/kg)	Particulate Emission Factor (m^3/kg)	Concentration (mg/kg)	Ingestion Noncarcinogenic CDI	Inhalation Particulates and Volatiles Noncarcinogenic CDI
-	-	-	29	-	1.43E+09	15	2.32E-05	1.15E-09
-	-	0.0000187	-	-	1.43E+09	0.036	5.58E-08	2.76E-12
0.09	0.0000105	0.167	0.2376	3.85E+03	1.43E+09	-	-	-
0.0999	0.0000125	0.133	0.1302	3.40E+03	1.43E+09	-	-	-
0.0605	8.38E-6	0.018	9.24	7.19E+04	1.43E+09	-	-	-
0.0505	9.46E-6	0.724	0.5694	3.65E+03	1.43E+09	30.4	4.71E-05	9.14E-04
0.0687	0.0000102	0.403	0.3642	3.43E+03	1.43E+09	-	-	-
-	-	-	-	-	-	-	-	-

Output generated 16MAY2010:20:23:10

Excavation Worker RISK for Soil/Sediment

Dermal Noncarcinogenic CDI	Ingestion Carcinogenic CDI	Inhalation Particulates and Volatiles Carcinogenic CDI	Dermal Carcinogenic CDI	Ingestion HQ	Inhalation Particulates and Volatiles HQ	Dermal HQ	Total HI	Ingestion Risk	Inhalation Particulates and Volatiles Risk	Dermal Risk	Total Risk
2.09E-06	1.66E-07	8.23E-09	1.49E-08	7.75E-02	3.84E-05	6.97E-03	8.45E-02	2.49E-07	3.54E-11	2.24E-08	2.72E-07
2.18E-08	3.99E-10	1.97E-11	1.55E-10	-	-	-	-	2.91E-09	2.17E-14	1.13E-09	4.04E-09
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	3.37E-07	6.53E-03	-	4.71E-03	3.38E-03	-	8.10E-03	1.82E-07	3.85E-08	-	2.20E-07
-	-	-	-	-	-	-	-	-	-	-	-
-	*-*	*-*	*-*	*8.22E-02*	*3.42E-03*	*6.97E-03*	*9.26E-02*	*4.34E-07*	*3.85E-08*	*2.36E-08*	*4.96E-07*

Output generated 16MAY2010:20:23:10

Excavation Worker Equation Inputs for Ambient Air

Variable	Value
EF_{ew} (exposure frequency) d/yr	120
ED_{ew} (exposure duration) years	0.5
LT (lifetime) yr	70
ET_{ew} (exposure time) hours	8

Output generated 16MAY2010:20:23:10

Excavation Worker RISK for Ambient Air

Chemical	Inhalation Unit Risk (\µg/m³)⁻¹	Chronic RfC (mg/m³)	Concentration (\µg/m^3)	Inhalation Ambient Air Noncarcinogenic CDI	Inhalation Ambient Air Carcinogenic CDI	Inhalation Ambient Air HQ	Inhalation Ambient Air Risk
Arsenic, Inorganic	4.30E-03	3.00E-05	-	-	-	-	-
Benzo[a]pyrene	1.10E-03	-	-	-	-	-	-
Dichloroethylene, 1,2- (Mixed Isomers)	-	6.00E-02	6.07E-9	6.65E-13	4.75E-12	1.11E-11	-
Methylene Chloride	4.70E-07	1.10E+00	1.48E-9	1.62E-13	1.16E-12	1.47E-13	5.45E-19
Naphthalene	3.40E-05	3.00E-03	4.84E-12	5.30E-16	3.79E-15	1.77E-13	1.29E-19
Tetrachloroethylene	5.90E-06	2.70E-01	0.000025	2.74E-09	1.96E-08	1.01E-08	1.15E-13
Trichloroethylene	2.00E-06	1.00E-02	1.65E-8	1.81E-12	1.29E-11	1.81E-10	2.58E-17
*Total Risk/HI	-	-	-	-	-	1.03E-08	1.15E-13

Output generated 16MAY2010:20:23:10

INHALATION OF VOLATILES IN OUTDOOR AIR FROM GROUNDWATER
FUTURE CONSTRUCTION WORKER

NON-CARCINOGEN

Intake (ug/m3) = (CA x ED x ET x EF)/(AT)

Chemical of Potential Concern	Concent. in Air (CA) (ug/m3)	Exposure Duration (ED) (yrs)	Fraction of EF in Contact with Air (ET)	Exposure Frequency (EF) (days/yr)	Averaging Time (AT) (days)	Intake (ug/m3)
Naphthalene	4.84E-09	0.5	0.333	120	182.5	5.29E-10
1,2-Dichloroethene, total	6.07E-06	0.5	0.333	120	182.5	6.64E-07
Methylene chloride	1.48E-06	0.5	0.333	120	182.5	1.62E-07
Tetrachloroethene	2.50E-02	0.5	0.333	120	182.5	2.73E-03
Trichloroethene	1.65E-05	0.5	0.333	120	182.5	1.80E-06

CARCINOGEN

Intake (ug/m3) = (CA x ED x ET x EF)/(AT)

Chemical of Potential Concern	Concent. in Air (CA) (ug/m3)	Exposure Duration (ED) (yrs)	Fraction of EF in Contact with Air (ET)	Exposure Frequency (EF) (days/yr)	Averaging Time (AT) (days)	Intake (ug/m3)
Naphthalene	4.84E-09	0.5	0.333	120	25550	3.78E-12
1,2-Dichloroethene, total	6.07E-06	0.5	0.333	120	25550	4.75E-09
Methylene chloride	1.48E-06	0.5	0.333	120	25550	1.16E-09
Tetrachloroethene	2.50E-02	0.5	0.333	120	25550	1.95E-05
Trichloroethene	1.65E-05	0.5	0.333	120	25550	1.29E-08

INHALATION OF VOLATILES IN OUTDOOR AIR FROM GROUNDWATER
FUTURE CONSTRUCTION WORKER

CAair= **CAgw x VFgw,amb**

Chemical of Potential Concern	Concent. in Air (CA) (ug/m3)	Concent. in Groundwater (CA) (ug/L)	VFgw,amb (cm^3-water/ cm^3-air)
Naphthalene	4.84E-09	0.29	1.67E-08
1,2-Dichloroethene, total	6.07E-06	78	7.78E-08
Methylene chloride	1.48E-06	19	7.78E-08
Tetrachloroethene	2.50E-02	190000	1.31E-07
Trichloroethene	1.65E-05	150	1.10E-07

One liter of water weighs 1 kg.

VFgw,amb= **1/[(1+(DFamb x Lgw)/(Dweff))x1/Heff]**

VFgw,amb volatilization factor, groundwater to ambient air (cm^3-water/cm^3-air)
Dweff effective diffusivity - avg. water table to surface (cm^2/sec)
DFamb dispersion factor for ambient air (cm/s)
Heff effective Henry's law coefficient (cm^3 -water/cm^3 -air)
Lgw depth to groundwater (cm)

Chemical of Potential Concern	VFgw,amb (cm^3-water/ cm^3-air)	DFamb (cm/s)	Heff (cm^3-water/ cm^3-air)	Lgw (cm)	Dweff (cm^2/sec)
Naphthalene	1.67E-08	10	1.80E-02	431.29	4.00E-03
1,2-Dichloroethene, total	7.78E-08	10	1.70E-01	431.29	1.97E-03
Methylene chloride	7.78E-08	10	1.30E-01	431.29	2.58E-03
Tetrachloroethene	1.31E-07	10	7.20E-01	431.29	7.87E-04
Trichloroethene	1.10E-07	10	4.00E-01	431.29	1.18E-03

Dweff (cm^2/sec)= **Lgw/[(hv/Dseff)+(hcap/Dcapeff)]**

INHALATION OF VOLATILES IN OUTDOOR AIR FROM GROUNDWATER
FUTURE CONSTRUCTION WORKER

Dseff	effective diffusivity - vadose zone soils (cm^2/sec)
Dcapeff	effective diffusivity - capillary fringe zone (cm^2/sec)
hv	vadose zone thickness (cm)
hcap	capillary zone thickness (cm)
Lgw	depth to groundwater (cm), Lgw=hv + hcap

Chemical of Potential Concern	Dwseff (cm^2/sec)	Dseff (cm^2/sec)	Dcapeff (cm^2/sec)	hv (cm)	hcap	Lgw
Naphthalene	4.00E-03	6.57E-03	1.16E-04	426.29	5	431.29
1,2-Dichloroethene, total	1.97E-03	9.85E-03	2.85E-05	426.29	5	431.29
Methylene chloride	2.58E-03	1.09E-02	3.90E-05	426.29	5	431.29
Tetrachloroethene	7.87E-04	5.47E-03	1.06E-05	426.29	5	431.29
Trichloroethene	1.18E-03	7.55E-03	1.62E-05	426.29	5	431.29

Dseff= **Dair x ($\theta as^{3.33}/\theta t^2$) + Dwat x (1/H) x ($\theta ws^{3.33}/\theta t^2$)**

Dair	molecular diffusion coefficient in air (cm^2/sec)
Dwat	molecular diffusion coefficient in water (cm^2/sec)
θas	volumetric air content in vadose zone soils (cm^3/cm^3)
θws	volumetric water content in vadose zone soils (cm^3/cm^3)
θt	total soil porosity vadose zone (cm^3/cm^3)

Chemical of Potential Concern	Dseff (cm^2/sec)	θas (cm^3/cm^3)	θt (cm^3/cm^3)	θws (cm^3/cm^3)	H (dimensionless)	Dair (cm^2/sec)	Dwat (cm^2/sec)
Naphthalene	6.57E-03	0.31	0.43	0.12	1.80E-02	6.00E-02	8.40E-06
1,2-Dichloroethene, total	9.85E-03	0.31	0.43	0.12	1.70E-01	9.00E-02	1.10E-05
Methylene chloride	1.09E-02	0.31	0.43	0.12	1.30E-01	1.00E-01	1.35E-05
Tetrachloroethene	5.47E-03	0.31	0.43	0.12	7.20E-01	5.00E-02	9.50E-06
Trichloroethene	7.55E-03	0.31	0.43	0.12	4.00E-01	6.90E-02	1.00E-05

Dcapeff= **Dair x ($\theta acap^{3.33}/\theta t^2$) + Dwat x (1/H) x ($\theta wcap^{3.33}/\theta t^2$)**

INHALATION OF VOLATILES IN OUTDOOR AIR FROM GROUNDWATER
FUTURE CONSTRUCTION WORKER

θacap volumetric air content in capillary zone soils (cm^3/cm^3)
θwcap volumetric water content in capillary zone soils (cm^3/cm^3)

Chemical of Potential Concern	Dcapeff (cm^2/sec)	θacap (cm^3/cm^3)	θt (cm^3/cm^3)	θwcap (cm^3/cm^3)	H (dimensionless)	Dair (cm^2/sec)	Dwat (cm^2/sec)
Naphthalene	1.16E-04	0.043	0.43	0.387	1.80E-02	6.00E-02	8.40E-06
1,2-Dichloroethene, total	2.85E-05	0.043	0.43	0.387	1.70E-01	9.00E-02	1.10E-05
Methylene chloride	3.90E-05	0.043	0.43	0.387	1.30E-01	1.00E-01	1.35E-05
Tetrachloroethene	1.06E-05	0.043	0.43	0.387	7.20E-01	5.00E-02	9.50E-06
Trichloroethene	1.62E-05	0.043	0.43	0.387	4.00E-01	6.90E-02	1.00E-05

GROUNDWATER OUTDOOR INHALATION
FUTURE CONSTRUCTION WORKER

GROUNDWATER INHALATION

Chemical of Potential Concern	CARCINOGEN			NON-CARCINOGEN		
	Intake (ug/m3)	URF (ug/m3)-1	Cancer Risk	Intake (ug/m3)	RfC (ug/m3)	Hazard Quotient
Naphthalene	3.78E-12	3.40E-05	1.29E-16	5.29E-10	3.00E+00	1.76E-10
1,2-Dichloroethene, total	4.75E-09	-	-	6.64E-07	6.00E+01	1.11E-08
Methylene chloride	1.16E-09	4.70E-07	5.43E-16	1.62E-07	1.10E+03	1.47E-10
Tetrachloroethene	1.95E-05	5.90E-06	1.15E-10	2.73E-03	2.70E+02	1.01E-05
Trichloroethene	1.29E-08	2.00E-06	2.57E-14	1.80E-06	1.00E+01	1.80E-07
		Total Risk	**1.15E-10**		Hazard Index	**1.03E-05**

NCIDENTAL INGESTION OF SURFACE SOIL
FUTURE JUVENILE TRESPASSER

NON-CARCINOGEN

Intake (mg/kg) = (Csoil x IR x ED x EF x CF)/(BW x AT)

Chemical of Concern	Concent. in Soil (Csoil) (mg/kg)	Ingestion Rate (IR) (mg/day)	Exposure Duration (ED) (yrs)	Conversion Factor (CF) (kg/mg)	Exposure Frequency (EF) (days/yr)	Body Weight (BW) (kg)	Averaging Time (AT) (days)	Intake (mg/kg-day)
Tetrachloroethene	7.26E+00	1.00E+02	10	1.00E-06	45	53	3650	1.69E-06
Benzo(a)pyrene	3.60E-02	1.00E+02	10	1.00E-06	45	53	3650	8.37E-09
Arsenic	5.10E+00	1.00E+02	10	1.00E-06	45	53	3650	1.19E-06

CARCINOGEN

Intake (mg/kg) = (Csoil x ED x EF x CF)/(BW x AT)

Chemical of Concern	Concent. in Soil (Csoil) (mg/kg)	Ingestion Rate (IR) (mg/day)	Exposure Duration (ED) (yrs)	Conversion Factor (CF) (kg/mg)	Exposure Frequency (EF) (days/yr)	Body Weight (BW) (kg)	Averaging Time (AT) (days)	Intake (mg/kg-day)
Tetrachloroethene	7.26E+00	1.00E+02	70	1.00E-06	45	53	25550	1.69E-06
Benzo(a)pyrene	3.60E-02	1.00E+02	70	1.00E-06	45	53	25550	8.37E-09
Arsenic	5.10E+00	1.00E+02	70	1.00E-06	45	53	25550	1.19E-06

INHALATION OF VOLATILES/PARTICULATES FROM SURFACE SOIL
FUTURE JUVENILE TRESPASSER

NON-CARCINOGEN

Intake (mg/kg-day) = (Cair x EF x ED x ET)/(AT)

Chemical of Concern	Concent. in Air (CA) (ug/m3)	Concent. In Soil (Csoil) (ug/kg)	VF (m3/kg)	PEF (m3/kg)	Exposure Frequency (EF) (days/yr)	Exposure Duration (ED) (yrs)	Fraction of EF in Contact with Soil (ET)	Averaging Time (AT) (days)	Intake (ug/m3)
Tetrachloroethene	1.91E+00	7.26E+03	3.81E+03	-	4.50E+01	10	0.083	3650	1.95E-02
Benzo(a)pyrene	2.52E-08	3.60E+01	-	1.43E+09	4.50E+01	10	0.083	3650	2.58E-10
Arsenic	3.57E-06	5.10E+03	-	1.43E+09	4.50E+01	10	0.083	3650	3.65E-08

Cair - VOC = Csoil/VF
Cair - Particulate = Csoil/PEF (non-VOCs)

CARCINOGEN

Intake (mg/kg-day) = (Cair x EF x ED x ET)/(AT)

Chemical of Concern	Concent. in Air (CA) (ug/m3)	Concent. In Soil (Csoil) (ug/kg)	VF (m3/kg)	PEF (m3/kg)	Exposure Frequency (EF) (days/yr)	Exposure Duration (ED) (yrs)	Fraction of EF in Contact with Soil (ET)	Averaging Time (AT) (days)	Intake (ug/m3)
Tetrachloroethene	1.91E+00	7.26E+03	3.81E+03	-	4.50E+01	70	0.083	25550	1.95E-02
Benzo(a)pyrene	2.52E-08	3.60E+01	-	1.43E+09	4.50E+01	70	0.083	25550	2.58E-10
Arsenic	3.57E-06	5.10E+03	-	1.43E+09	4.50E+01	70	0.083	25550	3.65E-08

DERMAL CONTACT WITH SURFACE SOIL
FUTURE JUVENILE TRESPASSER

NON-CARCINOGEN

Intake (mg/kg-day) = (Csoil x EF x ED x SA x AF x DAF x CF x EV)/(BW x AT)

Chemical of Concern	Concent. in Surface Soil (Csoil) (mg/kg)	Exposure Frequency (EF) (days/yr)	Exposure Duration (ED) (yrs)	Body Surface Area (SA) (cm2)	Soil-to-Skin Adherence Factor (AF) (mg/cm2-event)	Dermal Soil Absorp. Factor (DAF) (unitless)	Conversion Factor (CF) kg/mg)	Event Frequency (EV) (events/day)	Body Weight (BW) (kg)	Averaging Time (AT) (days)	Intake (mg/kg-day)
Tetrachloroethene	7.26E+00	45	10	4285	0.2	1	1.00E-06	1	53	3650	1.45E-05
Benzo(a)pyrene	3.60E-02	45	10	4285	0.2	0.13	1.00E-06	1	53	3650	9.33E-09
Arsenic	5.10E+00	45	10	4285	0.2	0.03	1.00E-06	1	53	3650	3.05E-07

CARCINOGEN

Intake (mg/kg-day) = (Csoil x EF x ED x SA x AF x DAF x CF x EV)/(BW x AT)

Chemical of Concern	Concent. in Surface Soil (Csoil) (mg/kg)	Exposure Frequency (EF) (days/yr)	Exposure Duration (ED) (yrs)	Body Surface Area (SA) (cm2)	Soil-to-Skin Adherence Factor (AF) (mg/cm2-event)	Dermal Soil Absorp. Factor (DAF) (unitless)	Conversion Factor (CF) kg/mg)	Event Frequency (EV) (events/day)	Body Weight (BW) (kg)	Averaging Time (AT) (days)	Intake (mg/kg-day)
Tetrachloroethene	7.26E+00	45	70	4285	0.2	1	1.00E-06	1	53	25550	1.45E-05
Benzo(a)pyrene	3.60E-02	45	70	4285	0.2	0.13	1.00E-06	1	53	25550	9.33E-09
Arsenic	5.10E+00	45	70	4285	0.2	0.03	1.00E-06	1	53	25550	3.05E-07

SOIL RISK AND HAZARD INDICES - TRESPASSER

Chemical of Concern	CARCINOGEN			NON-CARCINOGEN		
	Ingestion Intake	SFo	Cancer Risk	Ingestion Intake	RfDo	Hazard Quotient
Tetrachloroethene	1.69E-06	5.40E-01	9.E-07	1.69E-06	1.00E-02	1.69E-04
Benzo(a)pyrene	8.37E-09	7.30E+00	6.E-08	8.37E-09	-	-
Arsenic	1.19E-06	1.50E+00	2.E-06	1.19E-06	3.00E-04	3.95E-03
		Total Risk	**3.E-06**		Hazard Index	**4.12E-03**

Chemical of Concern	CARCINOGEN			NON-CARCINOGEN		
	Inhalation Intake	URF	Cancer Risk	Inhalation Intake	RfC	Hazard Quotient
Tetrachloroethene	1.95E-02	5.90E-06	1.E-07	1.95E-02	2.70E-01	7.22E-02
Benzo(a)pyrene	2.58E-10	1.10E-03	3.E-13	2.58E-10	-	-
Arsenic	3.65E-08	4.30E-03	2.E-10	3.65E-08	3.00E-05	1.22E-03
		Total Risk	**1.E-07**		Hazard Index	**7.34E-02**

Chemical of Concern	CARCINOGEN			NON-CARCINOGEN		
	Dermal Intake	SFd	Cancer Risk	Dermal Intake	RfDd	Hazard Quotient
Tetrachloroethene	1.45E-05	5.40E-01	8.E-06	1.45E-05	1.00E-02	1.45E-03
Benzo(a)pyrene	9.33E-09	7.30E+00	7.E-08	9.33E-09	-	-
Arsenic	3.05E-07	1.50E+00	5.E-07	3.05E-07	3.00E-04	1.02E-03
		Total Risk	**8.E-06**		Hazard Index	**2.46E-03**

TOTALS:	1.E-05	8.E-02

NCIDENTAL INGESTION OF SEDIMENT
FUTURE JUVENILE TRESPASSER

NON-CARCINOGEN

Intake (mg/kg) = (Csed x IR x ED x EF x CF)/(BW x AT)

Chemical of Concern	Concent. in Sediment (Csed) (mg/kg)	Ingestion Rate (IR) (mg/day)	Exposure Duration (ED) (yrs)	Conversion Factor (CF) (kg/mg)	Exposure Frequency (EF) (days/yr)	Body Weight (BW) (kg)	Averaging Time (AT) (days)	Intake (mg/kg-day)
Benzo(a)pyrene	3.52E-02	1.00E+02	10	1.00E-06	45	53	3650	8.19E-09
Arsenic	2.40E+01	1.00E+02	10	1.00E-06	45	53	3650	5.58E-06

CARCINOGEN

Intake (mg/kg) = (Csed x ED x EF x CF)/(BW x AT)

Chemical of Concern	Concent. in Sediment (Csed) (mg/kg)	Ingestion Rate (IR) (mg/day)	Exposure Duration (ED) (yrs)	Conversion Factor (CF) (kg/mg)	Exposure Frequency (EF) (days/yr)	Body Weight (BW) (kg)	Averaging Time (AT) (days)	Intake (mg/kg-day)
Benzo(a)pyrene	3.52E-02	1.00E+02	70	1.00E-06	45	53	25550	8.19E-09
Arsenic	2.40E+01	1.00E+02	70	1.00E-06	45	53	25550	5.58E-06

INHALATION OF VOLATILES/PARTICULATES FROM SEDIMENT
FUTURE JUVENILE TRESPASSER

NON-CARCINOGEN

Intake (mg/kg-day) = (Cair x EF x ED x ET)/(AT)

Chemical of Concern	Concent. in Air (CA) (ug/m3)	Concent. In Sediment (Csed) (ug/kg)	VF (m3/kg)	PEF (m3/kg)	Exposure Frequency (EF) (days/yr)	Exposure Duration (ED) (yrs)	Fraction of EF in Contact with Sediment (ET)	Averaging Time (AT) (days)	Intake (ug/m3)
Benzo(a)pyrene	2.52E-08	3.60E+01	-	1.43E+09	4.50E+01	10	0.083	3650	2.58E-10
Arsenic	3.57E-06	5.10E+03	-	1.43E+09	4.50E+01	10	0.083	3650	3.65E-08

Cair - VOC = Csed/VF
Cair - Particulate = Csed/PEF (non-VOCs)

CARCINOGEN

Intake (mg/kg-day) = (Cair x EF x ED x ET)/(AT)

Chemical of Concern	Concent. in Air (CA) (ug/m3)	Concent. In Sediment (Csed) (ug/kg)	VF (m3/kg)	PEF (m3/kg)	Exposure Frequency (EF) (days/yr)	Exposure Duration (ED) (yrs)	Fraction of EF in Contact with Sediment (ET)	Averaging Time (AT) (days)	Intake (ug/m3)
Benzo(a)pyrene	2.52E-08	3.60E+01	-	1.43E+09	4.50E+01	70	0.083	25550	2.58E-10
Arsenic	3.57E-06	5.10E+03	-	1.43E+09	4.50E+01	70	0.083	25550	3.65E-08

DERMAL CONTACT WITH SEDIMENT
FUTURE JUVENILE TRESPASSER

NON-CARCINOGEN

Intake (mg/kg-day) = (Csed x EF x ED x SA x AF x DAF x CF x EV)/(BW x AT)

Chemical of Concern	Concent. in Surface Sediment (Csed) (mg/kg)	Exposure Frequency (EF) (days/yr)	Exposure Duration (ED) (yrs)	Body Surface Area (SA) (cm2)	Soil-to-Skin Adherence Factor (AF) (mg/cm2-event)	Dermal Absorp. Factor (DAF) (unitless)	Conversion Factor (CF) kg/mg	Event Frequency (EV) (events/day)	Body Weight (BW) (kg)	Averaging Time (AT) (days)	Intake (mg/kg-day)
Benzo(a)pyrene	3.52E-02	45	10	4285	0.2	0.13	1.00E-06	1	53	3650	9.12E-09
Arsenic	2.40E+01	45	10	4285	0.2	0.03	1.00E-06	1	53	3650	1.44E-06

CARCINOGEN

Intake (mg/kg-day) = (Csed x EF x ED x SA x AF x DAF x CF x EV)/(BW x AT)

Chemical of Concern	Concent. in Surface Sediment (Csed) (mg/kg)	Exposure Frequency (EF) (days/yr)	Exposure Duration (ED) (yrs)	Body Surface Area (SA) (cm2)	Soil-to-Skin Adherence Factor (AF) (mg/cm2-event)	Dermal Absorp. Factor (DAF) (unitless)	Conversion Factor (CF) kg/mg	Event Frequency (EV) (events/day)	Body Weight (BW) (kg)	Averaging Time (AT) (days)	Intake (mg/kg-day)
Benzo(a)pyrene	3.52E-02	45	70	4285	0.2	0.13	1.00E-06	1	53	25550	9.12E-09
Arsenic	2.40E+01	45	70	4285	0.2	0.03	1.00E-06	1	53	25550	1.44E-06

SEDIMENT RISK AND HAZARD INDICES - TRESPASSER

Chemical of Concern	CARCINOGEN			NON-CARCINOGEN		
	Ingestion Intake	SFo	Cancer Risk	Ingestion Intake	RfDo	Hazard Quotient
Benzo(a)pyrene	8.19E-09	7.30E+00	6.E-08	8.19E-09	-	-
Arsenic	5.58E-06	1.50E+00	8.E-06	5.58E-06	3.00E-04	1.86E-02
		Total Risk	**8.E-06**		Hazard Index	**1.86E-02**

Chemical of Concern	CARCINOGEN			NON-CARCINOGEN		
	Inhalation Intake	URF	Cancer Risk	Inhalation Intake	RfC	Hazard Quotient
Benzo(a)pyrene	2.58E-10	1.10E-03	3.E-13	2.58E-10	-	-
Arsenic	3.65E-08	4.30E-03	2.E-10	3.65E-08	3.00E-05	1.22E-03
		Total Risk	**2.E-10**		Hazard Index	**1.22E-03**

Chemical of Concern	CARCINOGEN			NON-CARCINOGEN		
	Dermal Intake	SFd	Cancer Risk	Dermal Intake	RfDd	Hazard Quotient
Benzo(a)pyrene	9.12E-09	7.30E+00	7.E-08	9.12E-09	-	-
Arsenic	1.44E-06	1.50E+00	2.E-06	1.44E-06	3.00E-04	4.78E-03
		Total Risk	**2.E-06**		Hazard Index	**4.78E-03**

TOTALS:	1.E-05	2.E-02

INHALATION OF VOLATILES IN OUTDOOR AIR FROM GROUNDWATER
FUTURE JUVENILE TRESPASSER

NON-CARCINOGEN

Intake (ug/m3) = (CA x ED x ET x EF)/(AT)

Chemical of Concern	Concent. in Air (CA) (ug/m3)	Exposure Duration (ED) (yrs)	Fraction of EF in Contact with Air (ET)	Exposure Frequency (EF) (days/yr)	Averaging Time (AT) (days)	Intake (ug/m3)
Naphthalene	4.84E-12	10	0.333	45	3650	1.99E-13
cis-1,2-Dichloroethene	6.07E-09	10	0.333	45	3650	2.49E-10
Methylene chloride	1.48E-09	10	0.333	45	3650	6.07E-11
Tetrachloroethene	2.50E-05	10	0.333	45	3650	1.02E-06
Trichloroethene	1.65E-08	10	0.333	45	3650	6.76E-10

CARCINOGEN

Intake (ug/m3) = (CA x ED x ET x EF)/(AT)

Chemical of Concern	Concent. in Air (CA) (ug/m3)	Exposure Duration (ED) (yrs)	Fraction of EF in Contact with Air (ET)	Exposure Frequency (EF) (days/yr)	Averaging Time (AT) (days)	Intake (ug/m3)
Naphthalene	4.84E-12	10	0.333	45	25550	2.84E-14
1,2-Dichloroethene, total	6.07E-09	10	0.333	45	25550	3.56E-11
Methylene chloride	1.48E-09	10	0.333	45	25550	8.67E-12
Tetrachloroethene	2.50E-05	10	0.333	45	25550	1.46E-07
Trichloroethene	1.65E-08	10	0.333	45	25550	9.66E-11

INHALATION OF VOLATILES IN OUTDOOR AIR FROM GROUNDWATER
FUTURE JUVENILE TRESPASSER

CAair= **CAgw x VFgw,amb**

Chemical of Concern	Concent. in Air (CA) (mg/kg)	Concent. in Groundwater (CA) (mg/L)	VFgw,amb (cm^3-water/ cm^3-air)
Naphthalene	4.84E-12	0.00029	1.67E-08
1,2-Dichloroethene, total	6.07E-09	0.078	7.78E-08
Methylene chloride	1.48E-09	0.019	7.78E-08
Tetrachloroethene	2.50E-05	190	1.31E-07
Trichloroethene	1.65E-08	0.15	1.10E-07

One liter of water weighs 1 kg.

VFgw,amb= **1/[(1+(DFamb x Lgw)/(Dwseff))x1/Heff]**

VFgw,amb volatilization factor, groundwater to ambient air (cm^3-water/cm^3-air)
Dwseff effective diffusivity - avg. water table to surface (cm^2/sec)
DFamb dispersion factor for ambient air (cm/s)
Heff effective Henry's law coefficient (cm^3 -water/cm^3 -air)
Lgw depth to groundwater (cm)

Chemical of Concern	VFgw,amb (cm^3-water/ cm^3-air)	DFamb (cm/s)	Heff (cm^3-water/ cm^3-air)	Lgw (cm)	Dwseff (cm^2/sec)
Naphthalene	1.67E-08	10	1.80E-02	431.29	4.00E-03
1,2-Dichloroethene, total	7.78E-08	10	1.70E-01	431.29	1.97E-03
Methylene chloride	7.78E-08	10	1.30E-01	431.29	2.58E-03
Tetrachloroethene	1.31E-07	10	7.20E-01	431.29	7.87E-04
Trichloroethene	1.10E-07	10	4.00E-01	431.29	1.18E-03

Dwseff (cm^2/sec)= **Lgw/[(hv/Dseff)+(hcap/Dcapeff)]**

INHALATION OF VOLATILES IN OUTDOOR AIR FROM GROUNDWATER
FUTURE JUVENILE TRESPASSER

Dseff	effective diffusivity - vadose zone soils (cm^2/sec)
Dcapeff	effective diffusivity - capillary fringe zone (cm^2/sec)
hv	vadose zone thickness (cm)
hcap	capillary zone thickness (cm)
Lgw	depth to groundwater (cm), Lgw=hv + hcap

Chemical of Concern	Dwseff (cm^2/sec)	Dseff (cm^2/sec)	Dcapeff (cm^2/sec)	hv (cm)	hcap	Lgw
Naphthalene	4.00E-03	6.57E-03	1.16E-04	426.29	5	431.29
1,2-Dichloroethene, total	1.97E-03	9.85E-03	2.85E-05	426.29	5	431.29
Methylene chloride	2.58E-03	1.09E-02	3.90E-05	426.29	5	431.29
Tetrachloroethene	7.87E-04	5.47E-03	1.06E-05	426.29	5	431.29
Trichloroethene	1.18E-03	7.55E-03	1.62E-05	426.29	5	431.29

Dseff= **Dair x ($\theta as^{3.33}/\theta t^2$) + Dwat x (1/H) x ($\theta ws^{3.33}/\theta t^2$)**

Dair	molecular diffusion coefficient in air (cm^2/sec)
Dwat	molecular diffusion coefficient in water (cm^2/sec)
θas	volumetric air content in vadose zone soils (cm^3/cm^3)
θws	volumetric water content in vadose zone soils (cm^3/cm^3)
θt	total soil porosity vadose zone (cm^3/cm^3)

Chemical of Concern	Dseff (cm^2/sec)	θas (cm^3/cm^3)	θt (cm^3/cm^3)	θws (cm^3/cm^3)	H (dimensionless)	Dair (cm^2/sec)	Dwat (cm^2/sec)
Naphthalene	6.57E-03	0.31	0.43	0.12	1.80E-02	6.00E-02	8.40E-06
1,2-Dichloroethene, total	9.85E-03	0.31	0.43	0.12	1.70E-01	9.00E-02	1.10E-05
Methylene chloride	1.09E-02	0.31	0.43	0.12	1.30E-01	1.00E-01	1.35E-05
Tetrachloroethene	5.47E-03	0.31	0.43	0.12	7.20E-01	5.00E-02	9.50E-06
Trichloroethene	7.55E-03	0.31	0.43	0.12	4.00E-01	6.90E-02	1.00E-05

Dcapeff= **Dair x ($\theta acap^{3.33}/\theta t^2$) + Dwat x (1/H) x ($\theta wcap^{3.33}/\theta t^2$)**

INHALATION OF VOLATILES IN OUTDOOR AIR FROM GROUNDWATER
FUTURE JUVENILE TRESPASSER

θacap volumetric air content in capillary zone soils (cm^3/cm^3)
θwcap volumetric water content in capillary zone soils (cm^3/cm^3)

Chemical of Concern	Dcapeff (cm^2/sec)	θacap (cm^3/cm^3)	θt (cm^3/cm^3)	θwcap (cm^3/cm^3)	H (dimensionless)	Dair (cm^2/sec)	Dwat (cm^2/sec)
Naphthalene	1.16E-04	0.043	0.43	0.387	1.80E-02	6.00E-02	8.40E-06
1,2-Dichloroethene, total	2.85E-05	0.043	0.43	0.387	1.70E-01	9.00E-02	1.10E-05
Methylene chloride	3.90E-05	0.043	0.43	0.387	1.30E-01	1.00E-01	1.35E-05
Tetrachloroethene	1.06E-05	0.043	0.43	0.387	7.20E-01	5.00E-02	9.50E-06
Trichloroethene	1.62E-05	0.043	0.43	0.387	4.00E-01	6.90E-02	1.00E-05

GROUNDWATER OUTDOOR INHALATION
FUTURE JUVENILE TRESPASSER

GROUNDWATER INHALATION

Chemical of Concern	CARCINOGEN			NON-CARCINOGEN		
	Intake	Slope Factor	Cancer Risk	Intake	RfDinh	Hazard Quotient
Naphthalene	2.84E-14	-	-	1.99E-13	3.00E+00	6.62E-14
1,2-Dichloroethene, total	3.56E-11	-	-	2.49E-10	6.00E+01	-
Methylene chloride	8.67E-12	7.50E-03	6.50E-14	6.07E-11	1.10E+03	5.52E-14
Tetrachloroethene	1.46E-07	5.40E-01	7.91E-08	1.02E-06	2.70E+02	3.80E-09
Trichloroethene	9.66E-11	4.00E-01	3.86E-11	6.76E-10	1.00E+01	6.76E-11
		Total Risk	**7.91E-08**		Hazard Index	**3.86E-09**

NCIDENTAL INGESTION OF SURFACE WATER
FUTURE JUVENILE TRESPASSER

NON-CARCINOGEN

Intake (mg/kg) = (Csw x IR x ED x EF x CF)/(BW x AT)

Chemical of Concern	Concent. in Surface Water (Csw) (ug/L)	Ingestion Rate (IR) (L/day)	Exposure Duration (ED) (yrs)	Conversion Factor (CF) (mg/ug)	Exposure Frequency (EF) (days/yr)	Body Weight (BW) (kg)	Averaging Time (AT) (days)	Intake (mg/kg-day)
Methylene Chloride	7.50E+00	5.00E-02	10	1.00E-03	45	53	3650	8.72E-07
Tetrachloroethene	3.02E+01	5.00E-02	10	1.00E-03	45	53	3650	3.51E-06
Trichloroethene	1.26E+01	5.00E-02	10	1.00E-03	45	53	3650	1.47E-06
Vinyl Chloride	3.37E+01	5.00E-02	10	1.00E-03	45	53	3650	3.92E-06
Benzo(a)anthracene	6.50E-02	5.00E-02	10	1.00E-03	45	53	3650	7.56E-09
Benzo(b)fluoranthene	4.20E-02	5.00E-02	10	1.00E-03	45	53	3650	4.88E-09
Chrysene	6.70E-02	5.00E-02	10	1.00E-03	45	53	3650	7.79E-09
Hexachlorobenzene	6.50E-02	5.00E-02	10	1.00E-03	45	53	3650	7.56E-09

CARCINOGEN

Intake (mg/kg) = (Csw x IR x ED x EF x CF)/(BW x AT)

Chemical of Concern	Concent. in Surface Water (Csw) (ug/L)	Ingestion Rate (IR) (L/day)	Exposure Duration (ED) (yrs)	Conversion Factor (CF) (mg/ug)	Exposure Frequency (EF) (days/yr)	Body Weight (BW) (kg)	Averaging Time (AT) (days)	Intake (mg/kg-day)
Methylene Chloride	7.50E+00	5.00E-02	10	1.00E-03	45	53	25550	1.25E-07
Tetrachloroethene	3.02E+01	5.00E-02	10	1.00E-03	45	53	25550	5.02E-07
Trichloroethene	1.26E+01	5.00E-02	10	1.00E-03	45	53	25550	2.10E-07
Vinyl Chloride	3.37E+01	5.00E-02	10	1.00E-03	45	53	25550	5.59E-07
Benzo(a)anthracene	6.50E-02	5.00E-02	10	1.00E-03	45	53	25550	1.08E-09
Benzo(b)fluoranthene	4.20E-02	5.00E-02	10	1.00E-03	45	53	25550	6.98E-10
Chrysene	6.70E-02	5.00E-02	10	1.00E-03	45	53	25550	1.11E-09
Hexachlorobenzene	6.50E-02	5.00E-02	10	1.00E-03	45	53	25550	1.08E-09

DERMAL CONTACT WITH SURFACE WATER
FUTURE JUVENILE TRESPASSER

NON-CARCINOGEN

Intake (mg/kg-day) = DAevent x EV x EF x ED x SA)/(BW x AT)

Chemical of Concern	Daevent (mg/cm2-event)	Exposure Frequency (EF) (days/yr)	Exposure Duration (ED) (yrs)	Body Surface Area (SA) (cm2)	Event Frequency (EV) (events/day)	Body Weight (BW) (kg)	Averaging Time (AT) (days)	Dermal Absorbed Dose (mg/kg-day)
Methylene Chloride	7.00E-08	45	10	4285	1	53	3650	6.98E-07
Tetrachloroethene	3.80E-06	45	10	4285	1	53	3650	3.79E-05
Trichloroethene	4.60E-07	45	10	4285	1	53	3650	4.59E-06
Vinyl Chloride	4.60E-07	45	10	4285	1	53	3650	4.59E-06
Benzo(a)anthracene	1.70E-07	45	10	4285	1	53	3650	1.69E-06
Benzo(b)fluoranthene	1.90E-07	45	10	4285	1	53	3650	1.89E-06
Chrysene	1.80E-07	45	10	4285	1	53	3650	1.79E-06
Hexachlorobenzene	6.30E-08	45	10	4285	1	53	3650	6.28E-07

CARCINOGEN

Intake (mg/kg-day) = DAevent x EV x EF x ED x SA)/(BW x AT)

Chemical of Concern	DAevent (mg/cm2-event)	Exposure Frequency (EF) (days/yr)	Exposure Duration (ED) (yrs)	Body Surface Area (SA) (cm2)	Event Frequency (EV) (events/day)	Body Weight (BW) (kg)	Averaging Time (AT) (days)	Dermal Absorbed Dose (mg/kg-day)
Methylene Chloride	7.00E-08	45	10	4285	1	53	25550	9.97E-08
Tetrachloroethene	3.80E-06	45	10	4285	1	53	25550	5.41E-06
Trichloroethene	4.60E-07	45	10	4285	1	53	25550	6.55E-07
Vinyl Chloride	4.60E-07	45	10	4285	1	53	25550	6.55E-07
Benzo(a)anthracene	1.70E-07	45	10	4285	1	53	25550	2.42E-07
Benzo(b)fluoranthene	1.90E-07	45	10	4285	1	53	25550	2.71E-07
Chrysene	1.80E-07	45	10	4285	1	53	25550	2.56E-07
Hexachlorobenzene	6.30E-08	45	10	4285	1	53	25550	8.97E-08

SURFACE WATER RISK AND HAZARD INDICES - TRESPASSER

Chemical of Concern	CARCINOGEN			NON-CARCINOGEN		
	Ingestion Intake	SFo	Cancer Risk	Ingestion Intake	RfDo	Hazard Quotient
Methylene Chloride	1.25E-07	7.50E-03	9.E-10	8.72E-07	6.00E-02	1.E-05
Tetrachloroethene	5.02E-07	5.40E-01	3.E-07	3.51E-06	1.00E-02	4.E-04
Trichloroethene	2.10E-07	1.30E-02	3.E-09	1.47E-06	-	-
Vinyl Chloride	5.59E-07	7.20E-01	4.E-07	3.92E-06	3.00E-03	1.E-03
Benzo(a)anthracene	1.08E-09	7.30E-01	8.E-10	7.56E-09	-	-
Benzo(b)fluoranthene	6.98E-10	7.30E-01	5.E-10	4.88E-09	-	-
Chrysene	1.11E-09	7.30E-03	8.E-12	7.79E-09	-	-
Hexachlorobenzene	1.08E-09	1.60E+00	2.E-09	7.56E-09	8.00E-04	9.E-06
		Total Risk	**7.E-07**		Hazard Index	**2.E-03**

Chemical of Concern	CARCINOGEN			NON-CARCINOGEN		
	Dermal Intake	SFd	Cancer Risk	Dermal Intake	RfDd	Hazard Quotient
Methylene Chloride	9.97E-08	7.50E-03	7.E-10	6.98E-07	6.00E-02	1.E-05
Tetrachloroethene	5.41E-06	5.40E-01	3.E-06	3.79E-05	1.00E-02	4.E-03
Trichloroethene	6.55E-07	1.30E-02	9.E-09	4.59E-06	-	-
Vinyl Chloride	6.55E-07	7.20E-01	5.E-07	4.59E-06	3.00E-03	2.E-03
Benzo(a)anthracene	2.42E-07	7.30E-01	2.E-07	1.69E-06	-	-
Benzo(b)fluoranthene	2.71E-07	7.30E-01	2.E-07	1.89E-06	-	-
Chrysene	2.56E-07	7.30E-03	2.E-09	1.79E-06	-	-
Hexachlorobenzene	8.97E-08	1.60E+00	1.E-07	6.28E-07	8.00E-04	8.E-04
		Total Risk	**4.E-06**		Hazard Index	**6.E-03**

TOTALS:	5.E-06	8.E-03

Resident Equation Inputs for Soil

Future Resident - Soil Exposure

Variable	Value
EF_r (exposure frequency) d/yr	350
ED_r (exposure duration - resident) years	30
ED_{0-2} (exposure duration first phase) years	2
ED_{2-6} (exposure duration second phase) years	4
ED_{6-16} (exposure duration third phase) years	10
ED_{16-30} (exposure duration fourth phase) years	14
LT (lifetime - resident) yr	70
ET_r (exposure time - resident) hours	24
BW_a (body weight - adult) kg	70
BW_c (body weight - child) kg	15
ED_c (exposure duration - child) years	6
IRS_a (soil intake rate - adult) mg/day	100
IRS_c (soil intake rate - child) mg/day	200
SA_a (skin surface area - adult) cm^2/day	5700
SA_c (skin surface area - child) cm^2/day	2800
AF_a (skin adherence factor - adult) mg/cm^2	0.07
AF_c (skin adherence factor - child) mg/cm^2	0.2
IFS_{adi} (age-adjusted soil ingestion factor) mg-yr/kg-day	114.3
DFS_{adi} (age-adjusted soil dermal factor) mg-yr/kg-day	360.8
$IFSM_{adi}$ (mutagenic age-adjusted soil ingestion factor) mg-yr/kg-day	489.5
$DFSM_{adj}$ (mutagenic age-adjusted soil dermal factor) mg-yr/kg-day	1445

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Resident RISK for Soil

Future Resident - Soil Exposure

Chemical	Chronic RfD (mg/kg-day)	Ingestion SF (mg/kg-day)⁻¹	Chronic RfC (mg/m³)	Inhalation Unit Risk (\µg/m³)⁻¹	ABS_{gi}	ABS_{derm}
Arsenic, Inorganic	3.00E-04	1.50E+00	3.00E-05	4.30E-03	1	0.03
Benzo[a]pyrene	-	7.30E+00	-	1.10E-03	1	0.13
Dichloroethylene, 1,2- (Mixed Isomers)	9.00E-03	-	6.00E-02	-	1	-
Methylene Chloride	6.00E-02	7.50E-03	1.10E+00	4.70E-07	1	-
Naphthalene	2.00E-02	-	3.00E-03	3.40E-05	1	0.13
Tetrachloroethylene	1.00E-02	5.40E-01	2.70E-01	5.90E-06	1	-
Trichloroethylene	-	1.32E-02	1.00E-02	2.00E-06	1	-
*Total Risk/HI	-	-	-	-	-	-

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Resident RISK for Soil

Future Resident - Soil Exposure

D_{ia}	D_{iw}	H[`]	K_d	Volatilization Factor (m^3/kg)	Particulate Emission Factor (m^3/kg)	Concentration (mg/kg)	Ingestion Noncarcinogenic CDI	Inhalation Particulates and Volatiles Noncarcinogenic CDI
-	-	-	29	-	1.43E+09	15	1.92E-04	1.01E-08
-	-	0.0000187	-	-	1.43E+09	0.036	4.60E-07	2.42E-11
0.09	0.0000105	0.167	0.2376	3.85E+03	1.43E+09	-	-	-
0.0999	0.0000125	0.133	0.1302	3.40E+03	1.43E+09	-	-	-
0.0605	8.38E-6	0.018	9.24	7.19E+04	1.43E+09	-	-	-
0.0505	9.46E-6	0.724	0.5694	3.65E+03	1.43E+09	30.4	3.89E-04	7.99E-03
0.0687	0.0000102	0.403	0.3642	3.43E+03	1.43E+09	-	-	-
-	-	-	-	-	-	-	-	-

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Resident RISK for Soil

Future Resident - Soil Exposure

Dermal Noncarcinogenic CDI	Ingestion Carcinogenic CDI	Inhalation Particulates and Volatiles Carcinogenic CDI	Dermal Carcinogenic CDI	Ingestion HQ	Inhalation Particulates and Volatiles HQ	Dermal HQ	Total HI	Ingestion Risk	Inhalation Particulates and Volatiles Risk	Dermal Risk	Total Risk
1.61E-05	2.35E-05	4.32E-06	2.22E-06	6.39E-01	3.36E-04	5.37E-02	6.93E-01	3.52E-05	1.86E-08	3.34E-06	3.86E-05
1.68E-07	2.41E-07	2.63E-08	9.26E-08	-	-	-	-	1.76E-06	2.89E-11	6.76E-07	2.44E-06
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	4.76E-05	3.43E+00	-	3.89E-02	2.96E-02	-	6.85E-02	2.57E-05	2.02E-05	-	4.59E-05
-	-	-	-	-	-	-	-	-	-	-	-
-	*-*	*-*	*-*	*6.78E-01*	*2.99E-02*	*5.37E-02*	*7.62E-01*	*6.27E-05*	*2.02E-05*	*4.01E-06*	*8.69E-05*

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Resident Equation Inputs for Ambient Air

Variable	Value
ET_r (exposure time) hours/day	24
EF_r (exposure frequency) d/yr	350
ED_r (exposure duration - resident) years	30
ED_{0-2} (exposure duration first phase) years	2
ED_{2-6} (exposure duration second phase) years	4
ED_{6-16} (exposure duration third phase) years	10
ED_{16-30} (exposure duration fourth phase) years	14
LT (lifetime - resident) yr	70

Future Resident - Soil Exposure

Output generated 16MAY2010:17:13:09

Resident RISK for Ambient Air

Future Resident - Soil Exposure

Chemical	Inhalation Unit Risk (\µg/m³)⁻¹	Chronic RfC (mg/m³)	Concentration (\µg/m^3)	Inhalation Ambient Air Noncarcinogenic CDI	Inhalation Ambient Air Carcinogenic CDI	Inhalation Ambient Air HQ	Inhalation Ambient Air Risk
Arsenic, Inorganic	4.30E-03	3.00E-05	-	-	-	-	-
Benzo[a]pyrene	1.10E-03	-	-	-	-	-	-
Dichloroethylene, 1,2- (Mixed Isomers)	-	6.00E-02	6.07E-9	5.82E-12	2.49E-09	9.70E-11	-
Methylene Chloride	4.70E-07	1.10E+00	1.48E-9	1.42E-12	6.08E-10	1.29E-12	2.86E-16
Naphthalene	3.40E-05	3.00E-03	4.84E-12	4.64E-15	1.99E-12	1.55E-12	6.76E-17
Tetrachloroethylene	5.90E-06	2.70E-01	0.000025	2.40E-08	1.03E-05	8.88E-08	6.06E-11
Trichloroethylene	2.00E-06	1.00E-02	1.65E-8	1.58E-11	6.78E-09	1.58E-09	1.36E-14
*Total Risk/HI	-	-	-	-	-	*9.05E-08*	*6.06E-11*

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Resident Equation Inputs for Tap Water

Future Resident - OU2

Variable	Value
EF_r (exposure frequency) d/yr	350
ED_r (exposure duration - resident) years	30
ED_{0-2} (exposure duration first phase) years	2
ED_{2-6} (exposure duration second phase) years	4
ED_{6-16} (exposure duration third phase) years	10
ED_{16-30} (exposure duration fourth phase) years	14
LT (lifetime - resident) yr	70
ET_r (exposure time) hours/day	24
EV_c (events - child) events/day	1
BW_a (body weight - adult) kg	70
BW_c (body weight - child) kg	15
ED_c (exposure duration - child) years	6
IRW_a (water intake rate - adult) L/day	2
IRW_c (water intake rate - child) L/day	1
K (volatilization factor of Andelman) L/m^3	0.5
SA_a (skin surface area - adult) cm^2	18000
SA_c (skin surface area - child) cm^2	6600
ET_c (exposure time - child) hours/event	1
IFW_{adi} (adjusted intake factor) L-yr/kg-day	1.086
DFW_{adj} (adjusted dermal factor) cm^2-yr-hr/kg-day	6219.4
$IFWM_{adi}$ (mutagenic adjusted intake factor) L-yr/kg-day	3.39
$DFWM_{adj}$ (mutagenic adjusted dermal factor) cm^2-yr-hr/kg-day	20642

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Resident RISK for Tap Water

Future Resident - OU2

Chemical	Chronic RfD (mg/kg-day)	Ingestion SF (mg/kg-day)⁻¹	Chronic RfC (mg/m³)	Inhalation Unit Risk (\µg/m³)⁻¹	RAGSe GIABS (unitless)
Arsenic, Inorganic	3.00E-04	1.50E+00	3.00E-05	4.30E-03	1
Benzo[a]pyrene	-	7.30E+00	-	1.10E-03	1
Dichloroethylene, 1,2- (Mixed Isomers)	9.00E-03	-	6.00E-02	-	1
Methylene Chloride	6.00E-02	7.50E-03	1.10E+00	4.70E-07	1
Naphthalene	2.00E-02	-	3.00E-03	3.40E-05	1
Tetrachloroethylene	1.00E-02	5.40E-01	2.70E-01	5.90E-06	1
Trichloroethylene	-	1.32E-02	1.00E-02	2.00E-06	1
*Total Risk/HI	-	-	-	-	-

K_p (cm/hour)	Concentration (ug/L)	Ingestion Noncarcinogenic CDI	Inhalation Volatiles Noncarcinogenic CDI	Dermal Noncarcinogenic CDI	Ingestion Carcinogenic CDI	Inhalation Volatiles Carcinogenic CDI	Dermal Carcinogenic CDI	Ingestion HQ
0.001	-	-	-	-	-	-	-	-
0.713	-	-	-	-	-	-	-	-
0.011	-	-	-	-	-	-	-	-
0.00354	0.0052	1.42E-07	2.49E-06	2.63E-09	7.74E-08	1.07E-03	1.57E-09	2.37E-06
0.0466	-	-	-	-	-	-	-	-
0.0334	491	1.35E-02	2.35E-01	2.35E-03	7.30E-03	1.01E+02	1.40E-03	**1.35E+00**
0.0116	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	***1.35E+00***

Inhalation Volatiles HQ	Dermal HQ	Total HI	Ingestion Risk	Inhalation Volatiles Risk	Dermal Risk	Total Risk
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
2.27E-06	4.39E-08	4.68E-06	5.80E-10	5.02E-10	1.18E-11	1.09E-09
-	-	-	-	-	-	-
8.72E-01	2.35E-01	**2.45E+00**	**3.94E-03**	**5.95E-04**	**7.54E-04**	**5.29E-03**
-	-	-	-	-	-	-
8.72E-01	*2.35E-01*	***2.45E+00***	***3.94E-03***	***5.95E-04***	***7.54E-04***	***5.29E-03***

Output generated 16MAY2010:17:13:09

Resident Equation Inputs for Tap Water

Variable	Value
EF_r (exposure frequency) d/yr	350
ED_r (exposure duration - resident) years	30
ED_{0-2} (exposure duration first phase) years	2
ED_{2-6} (exposure duration second phase) years	4
ED_{6-16} (exposure duration third phase) years	10
ED_{16-30} (exposure duration fourth phase) years	14
LT (lifetime - resident) yr	70
ET_r (exposure time) hours/day	24
EV_c (events - child) events/day	1
BW_a (body weight - adult) kg	70
BW_c (body weight - child) kg	15
ED_c (exposure duration - child) years	6
IRW_a (water intake rate - adult) L/day	2
IRW_c (water intake rate - child) L/day	1
K (volatilization factor of Andelman) L/m^3	0.5
SA_a (skin surface area - adult) cm^2	18000
SA_c (skin surface area - child) cm^2	6600
ET_c (exposure time - child) hours/event	1
IFW_{adi} (adjusted intake factor) L-yr/kg-day	1.086
DFW_{adj} (adjusted dermal factor) cm^2-yr-hr/kg-day	6219.4
$IFWM_{adi}$ (mutagenic adjusted intake factor) L-yr/kg-day	3.39
$DFWM_{adj}$ (mutagenic adjusted dermal factor) cm^2-yr-hr/kg-day	20642

Future Potential Resident in OU2 Using Groundwater as Tap Water Prior to Treatment

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Resident RISK for Tap Water

Chemical	Chronic RfD (mg/kg-day)	Ingestion SF (mg/kg-day)⁻¹	Chronic RfC (mg/m³)	Inhalation Unit Risk (\µg/m³)⁻¹	RAGSe GIABS (unitless)
Methylene Chloride	6.00E-02	7.50E-03	1.10E+00	4.70E-07	1
Tetrachloroethylene	1.00E-02	5.40E-01	2.70E-01	5.90E-06	1
Trichloroethylene	-	1.30E-02	1.00E-02	2.00E-06	1
Vinyl Chloride	3.00E-03	7.20E-01	1.00E-01	4.40E-06	1
*Total Risk/HI	-	-	-	-	-

K_p (cm/hour)	Concentration (ug/L)	Ingestion Noncarcinogenic CDI	Inhalation Volatiles Noncarcinogenic CDI	Dermal Noncarcinogenic CDI	Ingestion Carcinogenic CDI	Inhalation Volatiles Carcinogenic CDI	Dermal Carcinogenic CDI	Ingestion HQ
0.00354	5.2	1.42E-04	2.49E-03	2.63E-06	7.74E-05	1.07E+00	1.57E-06	2.37E-03
0.0334	491	1.35E-02	2.35E-01	2.35E-03	7.30E-03	1.01E+02	1.40E-03	**1.35E+00**
0.0116	8.8	2.41E-04	4.22E-03	1.46E-05	1.31E-04	1.81E+00	8.70E-06	-
0.00838	3.61	9.89E-05	1.73E-03	4.33E-06	2.94E-04	2.55E+00	1.59E-05	3.30E-02
-	-	-	-	-	-	-	-	***1.38E+00***

Inhalation Volatiles HQ	Dermal HQ	Total HI	Ingestion Risk	Inhalation Volatiles Risk	Dermal Risk	Total Risk
2.27E-03	4.39E-05	4.68E-03	5.80E-07	5.02E-07	1.18E-08	1.09E-06
8.72E-01	2.35E-01	**2.45E+00**	**3.94E-03**	**5.95E-04**	**7.54E-04**	**5.29E-03**
4.22E-01	-	4.22E-01	1.70E-06	3.62E-06	1.13E-07	5.43E-06
1.73E-02	1.44E-03	5.17E-02	**2.12E-04**	1.12E-05	1.14E-05	**2.35E-04**
1.31E+00	*2.36E-01*	***2.93E+00***	***4.16E-03***	***6.11E-04***	***7.66E-04***	***5.54E-03***

Future Potential Resident in OU2 Using Groundwater as Tap Water Prior to Treatment

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Resident Equation Inputs for Tap Water

Resident Using Groundwater as Tap Water in OU6 Prior to Treatment

Variable	Value
EF_r (exposure frequency) d/yr	350
ED_r (exposure duration - resident) years	30
ED_{0-2} (exposure duration first phase) years	2
ED_{2-6} (exposure duration second phase) years	4
ED_{6-16} (exposure duration third phase) years	10
ED_{16-30} (exposure duration fourth phase) years	14
LT (lifetime - resident) yr	70
ET_r (exposure time) hours/day	24
EV_c (events - child) events/day	1
BW_a (body weight - adult) kg	70
BW_c (body weight - child) kg	15
ED_c (exposure duration - child) years	6
IRW_a (water intake rate - adult) L/day	2
IRW_c (water intake rate - child) L/day	1
K (volatilization factor of Andelman) L/m^3	0.5
SA_a (skin surface area - adult) cm^2	18000
SA_c (skin surface area - child) cm^2	6600
ET_c (exposure time - child) hours/event	1
IFW_{adi} (adjusted intake factor) L-yr/kg-day	1.086
DFW_{adj} (adjusted dermal factor) cm^2-yr-hr/kg-day	6219.4
$IFWM_{adi}$ (mutagenic adjusted intake factor) L-yr/kg-day	3.39
$DFWM_{adj}$ (mutagenic adjusted dermal factor) cm^2-yr-hr/kg-day	20642

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Resident RISK for Tap Water

Chemical	Chronic RfD (mg/kg-day)	Ingestion SF (mg/kg-day)⁻¹	Chronic RfC (mg/m³)	Inhalation Unit Risk (\µg/m³)⁻¹	RAGSe GIABS (unitless)
Tetrachloroethylene	1.00E-02	5.40E-01	2.70E-01	5.90E-06	1
Trichloroethylene	-	1.30E-02	1.00E-02	2.00E-06	1
*Total Risk/HI	-	-	-	-	-

K_p (cm/hour)	Concentration (ug/L)	Ingestion Noncarcinogenic CDI	Inhalation Volatiles Noncarcinogenic CDI	Dermal Noncarcinogenic CDI	Ingestion Carcinogenic CDI	Inhalation Volatiles Carcinogenic CDI	Dermal Carcinogenic CDI	Ingestion HQ
0.0334	310	8.49E-03	1.49E-01	1.48E-03	4.61E-03	6.37E+01	8.82E-04	8.49E-01
0.0116	7.2	1.97E-04	3.45E-03	1.19E-05	1.07E-04	1.48E+00	7.12E-06	-
-	-	-	-	-	-	-	-	*8.49E-01*

Inhalation Volatiles HQ	Dermal HQ	Total HI	Ingestion Risk	Inhalation Volatiles Risk	Dermal Risk	Total Risk
5.50E-01	1.48E-01	**1.55E+00**	**2.49E-03**	**3.76E-04**	**4.76E-04**	**3.34E-03**
3.45E-01	-	3.45E-01	**1.39E-06**	**2.96E-06**	9.25E-08	**4.44E-06**
8.96E-01	*1.48E-01*	***1.89E+00***	***2.49E-03***	***3.79E-04***	***4.76E-04***	***3.35E-03***

Resident Using Groundwater as Tap Water in OU6 Prior to Treatment

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