UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VII
901 N. 5TH STREET
KANSAS CITY, KANSAS 66101

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ENVIRONMENTAL PROTECTION AGENCY-REGION VII
REGIONAL HEARING CLERK

IN THE MATTER OF:	)
	)
J. F. Queeny Facility	)
St. Louis, Missouri	)
EPA ID#: MOD004954111	)
	)
SWH Investments II ("Buyer"), and	)
Environmental Operations, Inc.	)
("Guarantor of Interim Measures")	)
	)
RESPONDENTS	)
	)
Proceeding under Section 7003	)
Resource Conservation and Recovery Act,	)
as amended, 42 U.S.C. § 6973	)
	)

EPA Docket No: RCRA-07-2009-0015

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ADMINISTRATIVE ORDER ON CONSENT

I. INTRODUCTION

1. The Administrator of the United States Environmental Protection Agency ("EPA") is issuing this Administrative Order on Consent ("Consent Order") to SWH Investments II ("SWH" or "Buyer") and Environmental Operations, Inc. ("EOI"), hereinafter referred to as the "Respondents," under Section 7003 of the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act of 1976 (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. § 6973. The Administrator has delegated the authority to issue Orders under Section 7003 of RCRA to the Director, Air and Waste Management Division, U.S. EPA Region 7.

2. This Consent Order is entered into voluntarily by EPA and SWH and EOI. This Consent Order addresses the former Monsanto/Solutia J.F. Queeny facility in St. Louis, Missouri ("Facility"), and provides for the performance of Interim Measures and a Final Remedy, when selected by EPA, as described in Section VIII (Work to be Performed), including any Additional Work that may be required by Section IX (Additional Work) of this Consent Order.

3. In entering into this Consent Order, the mutual objectives of EPA and Respondents are to identify, investigate, remedy, and/or prevent the potential endangerment to human health and/or the environment from activities involving releases of "solid waste" and "hazardous waste," and/or hazardous constituents of such wastes. Respondents shall finance and perform the work required to meet these objectives, in accordance with the plans, standards, specifications and schedules set forth in this Consent Order, or developed pursuant to this Consent Order.

4. EPA has notified the State of Missouri, Department of Natural Resources (MDNR) of this action pursuant to Section 7003(a) of RCRA.

II. JURISDICTION

5. This Consent Order is issued pursuant to the authority vested in the Administrator of the United States Environmental Protection Agency ("EPA")," under Section 7003 of the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act of 1976 (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. § 6973. The Administrator has delegated the authority to issue Orders under Section 7003 of RCRA to the Director, Air and Waste Management Division, U.S. EPA Region 7.

6. Respondents agree to undertake and complete all actions required by the terms and conditions of this Consent Order. In any action taken by EPA or the United States to enforce the terms of this AOC, Respondents consent to and agree not to contest the authority or jurisdiction of the EPA to issue or enforce this Consent Order, and agree not to contest the validity of this Consent Order.

7. EPA and Respondents acknowledge that this Consent Order has been negotiated by the parties in good faith and that this Consent Order is fair, reasonable, and in the public interest.

III. PARTIES BOUND

8. This Consent Order applies to and binds EPA, and the Respondents, their agents, successors, assigns, trustees, receivers, and all persons acting on behalf of the Respondents, including but not limited to contractors and consultants. The Respondents shall be responsible for and liable for any violations of this Consent Order, regardless of the use of employees, agents, contractors, or consultants to perform work required by this Consent Order.

9. No change in ownership or corporate or partnership status relating to the Facility shall alter Respondents' obligations under this Consent Order. Any conveyance of title, easement, or other interest in the Facility, or a portion of the Facility, shall not affect the Respondents' obligations under this Consent Order. Respondents shall provide a copy of this Consent Order to any subsequent owners or successors before a controlling interest in ownership rights, stock, assets or the Site is transferred. Respondents shall be responsible for and liable for completing all of the activities required pursuant to this Consent Order, regardless of whether there has been a transfer of ownership or control of the Site or whether said activities are to be performed by employees, agents, contractors, subcontractors, laboratories, or consultants of Respondents. Respondents shall provide a copy of this Consent Order within seven (7) days of the Effective Date of this Consent Order, or the date that such services are retained, to all contractors, subcontractors, laboratories, and consultants that are retained to conduct or monitor any portion of the Work performed pursuant to this Consent Order. Respondents shall condition all contracts or agreements with contractors, subcontractors, laboratories and/or consultants in connection with this Consent Order, on compliance with the terms of this Consent Order. Respondents shall ensure that its contractors, subcontractors, laboratories, and consultants comply with this Consent Order.

10. Not later than sixty (60) days prior to any voluntary transfer by Respondents of any interest in the Site or the operation of the facility, Respondents shall notify EPA of the proposed transfer. In the case of a voluntary transfer through a bankruptcy, Respondents shall notify EPA within 24 hours of the decision to transfer property. Respondents shall notify EPA of any involuntary transfers immediately upon Respondents' initial receipt of notice of any involuntary transfer. Not later than three (3) days after any transfer, Respondents shall submit copies of the transfer documents to EPA.

11. Respondents shall give written notice of this Consent Order and the land use restrictions required under this Consent Order to any successor-in-interest prior to transferring ownership or operation of the Facility, or any portion thereof, and shall notify EPA in writing at least thirty (30) days prior to such transfer. This written notice shall describe how the Respondents have assured that, despite such a transfer, all remedial actions and/or institutional controls required for the Facility by this Consent Order will be implemented and maintained for the Facility.

IV. DEFINITIONS

12. Unless otherwise expressly provided herein, terms used in this Consent Order, which are defined in RCRA or in regulations promulgated under RCRA, shall have the meaning assigned to them in RCRA or in such regulations. Whenever terms listed below are used in this Consent Order or in any documents attached hereto and incorporated hereunder, the following definitions apply:

a. "Corrective Measures Study" or "CMS" shall mean the investigation and evaluation of potential remedies which will protect human health and/or the environment from the release or potential release of hazardous wastes and/or hazardous constituents into the environment from the Facility.
b. "Day" shall mean a calendar day unless expressly stated to be a business day. Business day shall mean a day other than Saturday, Sunday, or federal holiday. In computing any period of time under this Consent Order, where the last day would fall on a Saturday, Sunday or federal holiday, the period shall run until the close of business of the next business day.
c. "EPA" shall mean the United States Environmental Protection Agency and any successor department or agencies of the United States.
d. "Facility" shall mean the property owned and operated by SWH Investments II and Environmental Operations Inc., formerly known as the Monsanto J.F. Queeny Facility, in St. Louis Missouri. A map depicting the location of the Facility, and the legal description of the Facility are set forth in Attachment 1.
e. "Final Corrective Action Remedy" shall mean the final remedy for the Facility selected by EPA after public notice and comment.
f. "Interim Measures" or "IM" shall mean those corrective actions described in Attachment 2 to address releases of hazardous wastes and/or constituents at and/or from the Facility which can be initiated in advance of implementation of the final corrective action remedy selected by EPA for the Facility.
g. "MDNR" shall mean the Missouri Department of Natural Resources.
h. "Consent Order" shall mean this Administrative Order on Consent and all attachments hereto. In the event of a conflict between this Consent Order and any provision of any other agreement, or writing, the terms and conditions of this Consent Order shall control.
i. "Paragraph" shall mean a portion of this Consent Order identified by an arabic numeral.
j. "Parties" shall mean the EPA and the Respondents.
k. "RCRA" shall mean the Resource Conservation and Recovery Act, as amended, 42 U.S.C. § 6901, et seq.
l. "RCRA Facility Investigation" or "RFI" shall mean the investigation and characterization of the source(s) of contamination and the nature, extent, direction, rate, movement and concentration of the source(s) of contamination and releases of hazardous waste, including hazardous constituents, that have been or are likely to be released into the environment from the Facility.
m. "Respondents" shall mean, jointly and/or severally, SWH Investments II ("Buyer"), and Environmental Operations, Inc., incorporated on March 1984, and

their individual agents, successors, receivers, trustees and assigns.

n. "Section" shall mean a portion of this Consent Order identified by a roman numeral.

o. "Solid Waste Management Unit" or "SWMU" shall mean any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which solid wastes have been routinely and systematically released. The definition includes regulated units (i.e., landfills, surface impoundments, waste piles and land treatment units).

V. FINDINGS OF FACT

13. The Facility encompasses approximately 38 acres of land in an area zoned for commercial and industrial use. The Facility is bordered by commercial/industrial property to the north, south and west, and a rail yard and the Mississippi River border the site to the east. A legal description and map of the Facility is set forth in Attachment 1.

14. The Facility began operation in 1901, and has manufactured more than 200 products, using more than 800 raw materials. The Facility ceased production operations in 2006. Products previously manufactured at the Facility include, but are not limited to:

-process chemicals such as maleic anhydride,
-fumaric acid,
-toluene sulfonic acid,
-paranitrophenetole;
-plasticizers such as phthalate esters and toluene sulfonamides;
-synthetic functional fluids such as Pydrauls™, Skydrols™, and coolanols;
-food and fine chemicals such as salicylic acid, aspirin, methyl salicylate, benzoic acid, and ethavan; and
-pesticide and heribicide chemicals (such as Lasso™)

15. The Facility is currently subject to a RCRA permit issued to Monsanto on November 8, 1989 (Permit No. MOD004954111), jointly by EPA and the Missouri Department of Natural Resources (MDNR), pursuant Section 3004(u) and (v) of RCRA, 42 U.S.C. 6944(u) and (v), and Missouri Hazarrdous Waste Management Law and implementing regulations. The term of the 1989 RCRA permit expired November 8, 1999, but has been administratively continued, pursuant to 40 C.F.R. 270.51.

16. The MDNR portion of the 1989 RCRA permit applies to the RCRA obligations required for the treatment, storage/and or disposal of hazardous wastes. The Facility was permitted for container storage, tank storage and incineration. The activities authorized by the state portion of the RCRA permit were the operation and maintenance of hazardous waste treatment (incinerator) and storage (tank and container) units. The permitted Hazardous Waste Management Units (HWMUs) were certified by MDNR as closed and have no further regulatory obligations for post-closure care.

17. The EPA portion of the 1989 RCRA permit sets forth what are known as "corrective action" obligations that are required to address both on- and off-site releases of RCRA regulated hazardous and solid wastes. The corrective action portion of the permit requires a RCRA facility investigation ("RFI") and a study of cleanup alternatives or "corrective actions" called a Corrective Measures Study ("CMS").

18. Effective September 1, 1997, Monsanto transferred its chemical businesses to Solutia, Inc. (Solutia). Under the agreement between the two parties, the Facility was transferred to, and has since been owned and operated by Solutia. Pursuant to this agreement, Solutia agreed to assume, and indemnify Monsanto for, certain liabilities related to its chemical businesses, including the Facility.

19. Monsanto, and/or its successor, Solutia, previously conducted investigations of the Facility as required by the 1989 Permit, and that are summarized in a RCRA Facility Investigation Report dated July 2002.

20. On June 30, 2006, Solutia submitted an "Updated 2005 Risk Assessment and Conceptual Risk Management Plan" ("Risk Assessment", or "RA") to EPA which presents the conceptual risk management plan and media cleanup objectives for the four Solid Waste Management Units (SWMUs) at the site which pose either a current or future unacceptable risk to human health and the environment. The Updated Risk Assessment and Conceptual Risk Management Plan was approved by EPA on February 28, 2007.

21. The RFI and RA process evaluated all known SWMUs at the Facility and EPA has determined that four SWMU's are carried forward in the evaluation process for Interim Measures. As summarized below, releases of solid wastes, hazardous wastes and/or hazardous constituents from four SWMUs at the Facility were determined by the updated Risk Assessment to pose potential risks to human health (under an industrial use scenario) and/or environmental receptors. Under such an industrial use scenario and risk assessment, the following four SWMUs have been determined to require further corrective action:

a. Former FF Building: The Former FF Building includes a footprint of the former building and the surrounding area including the location of a former underground storage tank (UST). The Former FF Building was a production area used for the manufacture of trichlorocarbanilide (TCC), a bacteriostat used in soap. Production of TCC began at the Facility in 1951 and in early 1991 the operations ceased and the production area was dismantled. The UST formerly stored tetrachloroethene (PCE) which was used in the production of TCC. In 1987 a release of PCE occurred from the UST which has since been removed. Monsanto installed and operated four recovery wells to mitigate the release. PCE and its degradation products trichloroethene (TCE), cis-1,2-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride have all been detected in groundwater in this area in excess of EPA's Maximum Contaminant Levels (MCLs). Free product, both Dense Non-Aqueous Phase Liquids (DNAPL) and Light Non-Aqueous Phase Liquids (LNAPL) have been found in monitoring wells in the area. The LNAPL is comprised primarily of toluene. Chlorobenzene has also been detected in groundwater in the Former FF Building area at concentrations greater than MCLs.

b. VV Building: The VV Building is an existing structure that was formerly used for the unloading, bulk storage and repackaging of products including Pydrauls™, Skydrols™ which contained polychlorinated biphenyls (PCBs). In 1993 approximately 40 cubic yards of PCB-contaminated soil was removed and disposed by the Facility at a Toxic Substances Control Act (TSCA) approved landfill. In 2004 approximately 150 cubic yards of PCB-contaminated soils were removed by the Facility and disposed at a TSCA approved landfill. Subsequent sampling found that PCBs greater than 100 parts per million (ppm) remain in subsurface soils in the VV Building area.

c. Former Acetanilides Production Area: The Former Acetanilides Production Area produced Acetanilides, or alachlor, which was sold under the product name of Lasso™. Production in the area began in 1966 and ceased in 1991. Alachlor and chlorobenzene were released to subsurface soils and groundwater beneath the Former Acetanilides Production Area. Concentrations of these constituents exceed the EPA's MCL standards for groundwater.

d. Former Bulk Chemical Storage Area: The Former Bulk Chemical Storage Area is a 1.94 acre parcel of land to the southeast which is not contiguous with the rest of the Facility. It was purchased in 1968 from Clark Oil Company and included two 500,000 gallon above ground storage tanks (ASTs) and two 300,000 gallon ASTs that were used by Clark for fuel storage. Monsanto used these ASTs until 1987 to store petroleum products, alkyl benzenes, blends of alkyl benzenes, Santitizer 154, plasticizer (p-tert-butylphenyl diphenyl phosphate), monochlorobenzene, o-nitrochlorobenzene, sodium hydroxide, and potassium hydroxide. Based on previous investigations, LNAPL comprised primarily of chlorobenzene, benzene, and ethyl benzene has been detected in groundwater in the Former Bulk Chemical Storage Area. Constituents detected in groundwater in excess of EPA's MCLs include: chlorobenzene, benzene, ethyl benzene, cis-1,2-dichloroethene and vinyl chloride. These constituents have also been detected in soils in the area at levels above risk based exposure levels.

22. On May 4, 2007, Solutia submitted a Corrective Measures Study (CMS) Report to EPA and MDNR.

23. In a letter dated April 9, 2008, Solutia informed EPA of the sale of the Facility to Respondent SWH. Respondent SWH's plans for the Facility included clearing remaining structures for purposes of light commercial and/or industrial development.

24. On May 29, 2008, Respondents SWH and EOI provided EPA with a Letter of Intent to purchase the Facility and negotiate this Consent Order in good faith to complete the remedial obligations at the Facility, to provide financial assurance to ensure the completion of the work to be performed and to effect the necessary institution controls needed to restrict the use of the property in the future to prevent unacceptable to exposures to human health and the environment.

25. In a letter dated June 6, 2008, EPA and the Missouri Department of Natural Resources (MDNR) Hazardous Waste Program (HWP) provided comment on the Corrective Measures

Study (CMS) Report prepared by Solutia. The comments from EPA concluded that four SWMUs required corrective measures, and the corrective measures are addressed in the Interim Measures Work Plan (IMWP) prepared by the Respondents as described in Section VIII (Paragraph 36) of this Consent Order. The CMS Report has not yet been approved by EPA and/or MDNR.

26. After assuming ownership and/or operation of the Facility, Respondents have proceeded with demolition of remaining structures on the property. In September 2008, Respondents submitted the IMWP that detailed remediation tasks required to allow the Facility to be redeveloped for light industrial and commercial use. This plan was updated in December 2008 and approved by EPA on February 17, 2009 (See, Attachment 2) and, in addition to other remedial work, contained conditional PCB cleanup standards of 100 ppm conditionally approved, subject to completion of a pubic notice and comment period. EPA's public notice for the proposed PCB cleanup standards commenced on May 11, 2009 and concluded on June 9, 2009, without comment received from the public, and the proposed standards are now approved as an element of the IMWP.

27. The constituents of concern released at, or from, the Facility include substances that pose known and/or potential adverse human and environmental health effects, and include but are not limited to; tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene, trans-1,2-dichloroethene, vinyl chloride, chlorobenzene, and alachlor. The potential health and/or environmental threat of the solid and/or hazardous wastes and/or hazardous constituents that may have been released from the Facility (including constituents detected above Preliminary Remediation Goals and/or MCLs), is documented in EPA's administrative record for this Consent Order and may also be found in EPA's Integrated Risk Information System (IRIS) and the Agency for Toxic Substances and Disease Registry (ASTDR) found at the following internet sites: www.epa.gov/iris/index.html and www.atsdr.cdc.gov/toxfaq.html

28. The main exposure pathways of concern for the solid wastes and/or hazardous wastes and/or constituents managed and/or released at the Facility are soil and groundwater. Specifically, persons or organisms exposed to soils and dust and/or using contaminated groundwater (by ingestion or dermal contact) may be adversely impacted by the release of solid wastes, hazardous wastes and/or constituents released at, or from, the Facility.

VI. CONCLUSIONS OF LAW AND DETERMINATIONS

29. Based on the Findings of Fact set forth above, and EPA's administrative record supporting this Consent Order, EPA has determined that:

a. Respondent SHW is currently the owner of the Facility. Respondent EOI is a guarantor and operator of the Facility for the completion of interim measures work at the Facility. Respondents SWH and EOI are each a "person" as defined in Section 1004(15) of RCRA, 42 U.S.C. § 6903(15).

b. The materials released into the environment at the Facility include discarded materials, and thus are "solid wastes" as defined in Section 1004(27) of RCRA, 42

U.S.C. § 6903(27). Certain wastes and constituents managed and released at the Facility are also hazardous wastes and/or hazardous constituents pursuant to Section 1004(5) and 3001 of RCRA and 40 C.F.R. Part 261.

c. There is, or has been, a release of solid waste, hazardous wastes and/or hazardous constituents into the environment at, or from, the Facility.

e. Respondents have contributed and/or are contributing to the handling, storage, treatment, transportation, and/or disposal of solid or hazardous wastes as a necessary part of their ownership and/or operation of the Facility, and/or their efforts to redevelop and/or remediate the Facility

f. The past and/or present "handling," "storage," "treatment," "transportation," and/or "disposal" of solid wastes or hazardous wastes containing hazardous constituents at the Facility may present an imminent and substantial endangerment to human health and/or the environment within the meaning of Section 7003(a) of RCRA, 42 U.S.C. § 6973(a).

g. The actions required by this Consent Order are necessary to protect "human health" and/or "the environment," due to the presence of contaminated soils and groundwater at levels which may pose risks to human and environmental receptors.

VII. PROJECT MANAGERS

30. EPA's Project Manager is:

Ms. Stephanie Doolan
RCRA Corrective Action Program Branch
Region 7, USEPA
901 N. 5th St.
Kansas City, Kansas 66101

As of the effective date of this Consent Order, EOI/SWH's Project Manager is:

Eric Page
Environmental Operations, Inc.
1530 South Second Street
Suite 200
St. Louis, Missouri 63104

31. Each parties' Project Manager will be responsible for overseeing the implementation of this Project. The parties shall provide written notice at least five (5) days prior to a change of their respective designated Project Managers.

32. EPA will approve/disapprove of SWH's replacement Project Manager based upon the person's qualifications and ability to effectively perform this role. The qualifications of the persons undertaking the Work for SWH shall be subject to EPA's review, for verification that

such persons meet minimum technical background and experience requirements of the EPA. All persons under the direction and supervision of Respondents' Project Manager must possess all necessary professional licenses required by federal and state law.

VIII. WORK TO BE PERFORMED

Pursuant to Section 7003 of RCRA, 42 U.S.C. 6973, Respondents hereby agree, and are hereby Ordered, to perform the following actions, in the manner and by the dates specified.

33. All sampling and data collection activities shall be conducted in accordance with the EPA approved Quality Assurance Project Plan (QAPP) approved by EPA on December 1, 2008, and any EPA approved subsequent addenda or updates to the QAPP.

34. The Respondents shall perform the work undertaken pursuant to this Consent Order and in compliance with RCRA and other applicable federal and state laws and their implementing regulations, and consistent with all relevant EPA guidance. Relevant guidance may include, but is not limited to, the "RCRA Corrective Action Plan: Final" (EPA 520-R-94-004, OSWER Directive 9902.3-2a, May 1994), "Interim Final RCRA Facility Investigation (RFI) Guidance" (EPA 530/SW-89-031), "RCRA Ground-water Monitoring: Draft Technical Guidance" (November 1992), "Test Methods for Evaluating Solid Waste" (SW-846, most recent method) and "Construction Quality Assurance for Hazardous Waste Land Disposal Facilities" (EPA 530/SW-85-031, July 1986). These and other potentially applicable guidance may be obtained at http://www.epa.gov/rcraonline/.

35. Immediately upon approval or modification by EPA of any Workplan(s) or Report(s), Respondents shall commence work and implement the tasks required by the Workplan(s) or Report(s) submitted pursuant to the Statement(s) of Work contained in Attachment 3 and in accordance with the standards, specifications and schedules stated in the Workplan(s) or Reports, as approved and/or modified by EPA.

Performance of Interim Measures

36. Based on the RFI and the RA and, subject to the discovery of new information, the parties have designed Interim Measures to perform interim source removals and/or interim treatment at the Facility before selection of the final corrective action by EPA. Respondents shall conduct Interim Measures at the Facility in accordance with the schedule and requirements of the approved Interim Measures Work Plan (IMWP) which is incorporated into and enforceable as an element of this Consent Order (Attachment 2). Pursuant to Section 7003(c) of RCRA during the performance of the required Interim Measures and until approval of the Interim Measures Completion Report, Respondents shall post notices at the Facility that work is being performed pursuant to this Consent Order. In summary and pertinent part, the approved Interim Measures Work Plan requires Respondents to perform, at a minimum, the following tasks:

a. The excavation and proper disposal of all PCB contaminated soils exceeding levels of 100 ppm PCB in the area of the former VV Building. This shall include disposal

sampling, verification sampling and backfill to surface grade using clean materials.

b. Based on verification sampling, after excavation of soils exceeding 100 ppm, and fill of excavated areas, Respondents shall delineate all areas in former VV Building area which have PCBs remaining at concentrations greater than 10 ppm, and shall install of a cap over these areas (constructed in accordance with the approved Interim Measures Workplan);

c. The installation of an adequate number of monitoring wells in the former VV Building area to demonstrate that PCB contamination in soils has not migrated to groundwater (two minimum);

d. The installation of multiple temporary injection wells at the former FF Building, Former Bulk Chemical Storage Area (FBCSA) and Acetanilides Production Area;

e. The injection of oxidation reagents into the temporary injection wells described above for the purpose of chemically destroying source material in the capillary fringe and upper saturation zone to enhance the long-term biodegradation of VOCs. The IMWP proposes three injection events. Both before and after injection of such reagents, sampling from the temporary wells shall be performed to determine the VOC concentrations in groundwater (Note: The approved IMWP states the remediation goal of this technology is to remove 75% of the remaining mass of total VOCs in subsurface soils that contribute to groundwater contamination. The groundwater treatment is expected to enhance the bioremediation of contaminants in groundwater and accelerate achieving groundwater cleanup objectives).

37. Within ninety (90) days following completion of the work required by the approved Interim Measures Work Plan, Respondents shall submit to EPA an Interim Measures Completion Report for review and approval. The Interim Measures Completion Report shall include a summary of all field activities conducted, and shall state any deviations from the approved IMWP, problems encountered, a written summary of all sampling data collected during implementation of the IMWP; and a compact disc copy of all data report forms, copies of all manifests and bills of lading along with the location(s) of the disposal facilities where solid and hazardous waste was transported and disposed, photographic documentation of the Interim Measures; and final drawings or figures depicting the limits of the excavation, sample locations and monitoring or injection well locations. Based on the performance of the interm measures, the Interim Measures Completion Report shall also discuss whether ongoing notice and/or signage is required to notify persons of potential exposure to hazardous waste and/or constituents.

38. EPA will provide Respondents written comment on the approved Interim Measures Completion Report and will identify data gaps or additional information and/or analysis determined by EPA to be necessary to compare final corrective action alternatives, and select the final corrective action remedy for the Facility.

Facility Monitoring Plan

39. Within sixty days of the effective date of this Consent Order, Respondent shall submit a Baseline Groundwater Monitoring ("BGM") Plan to EPA for review and approval. The Baseline Groundwater Monitoring Plan shall, at a minimum, propose and describe the following:

a. a sampling program to determine the effectiveness of the injection of oxidation agents to remediate groundwater contamination;
b. the activities, procedures, and applicable standards for performance of ground water monitoring to detect and evaluate the baseline conditions for groundwater and thereby establish the remaining level of groundwater contamination beneath the entire Facility and within the Interim Measures areas after completion of the required Interim Measures; and
c. the Baseline Groundwater Monitoring Plan will propose the basis for establishment of the number and location of monitoring wells to be sampled, analytical parameters, field measurements, and frequency of monitoring and reporting necessary for development of the Long Term Monitoring (LTM) Plan, that will be provided by the Respondents, if required as an element of the final corrective action selected by EPA.

40. When approved by EPA, the BGM shall be used to enforce monitoring requirements during the interim period before the final remedial measures for the Facility are selected by EPA. The goal of the parties is to allow the BGM to be incorporated into any final corrective action or monitoring that may be required as part of the final corrective action selected by EPA.

Focused Corrective Measures Study (CMS)

41. The results achieved by Respondents' performance of Interim Measures can be considered and incorporated into the Respondent's study of alternatives and recommendation for the final remedy in a Corrective Measures Study (CMS). Within sixty days of receipt of EPA's comments on the Interim Measures Completion Report, Respondents shall submit a focused Corrective Measure Study (CMS) to EPA for review and approval that addresses such comments and that is prepared in accordance with Task I of the Statement of Work in Attachment 3 and conditions requiring action that may remain after the completion of the work required by the approved IMWP. Within the proposed Focused CMS, Respondents shall propose the final corrective action remedy for the Facility, a justification of why the proposed corrective action actions are protective of human health and the environment, and proposed criteria for EPA to determine when the proposed corrective action shall be considered complete. EPA may approve the CMS without prejudice to EPA's rights and authority to select a different final corrective action remedy for the Facility.

Public Participation and Comment on EPA's Corrective Measures Selection

42. EPA will provide Respondents and the public an opportunity to review and comment on a description of EPA's proposed final corrective action remedy for the Facility, including EPA's justification for proposing such corrective actions (the "Statement of Basis").

43. EPA will notify Respondents of the final corrective action selected by EPA in a Final

Decision Document and Response to comments. The notification will include a statement of EPA's reasons for selecting the corrective measure. In the event that the use restrictions set forth in the attached Restrictive Covenant are changed (Attachment 4), within sixty (60) days after a written request by EPA, Respondents shall submit to EPA for review and approval a focused risk assessment and CMS that addresses potential exposures associated with the change in property use. Any changes in the final corrective action remedy for the Facility shall be made and selected by EPA after preparation of a revised statement of basis and appropriate public notice and comment. Respondents shall implement the changes to the final corrective action remedy in accordance with the schedule set by EPA.

Corrective Measures Implementation (CMI)

44. Within sixty (60) days of Respondents' receipt of notification of EPA's selection of the final corrective action(s) for the Facility, Respondents shall submit to EPA for its review and approval a Corrective Measures Implementation Work plan ("CMI Workplan"). The CMI Workplan shall be developed in accordance with Task IV of the Statement of Work in Attachment 3. The CMI Workplan shall be specify the design, construction, operation, maintenance, monitoring and completion criteria of the corrective measures selected by EPA. EPA will review and approve or modify this submittal in accordance with Section IX of this Consent Order (Submissions/Agency Approval/Additional Work).

45. Concurrent with the submission of a CMI Workplan, Respondents shall submit to EPA a CMI Health and Safety Plan, Operation and Maintenance Plan, and a Community Relations Plan, completed in a manner in accordance with Task IV of the Statement of Work in Attachment 3. EPA will review, comment on, approve and/or modify these submittals in accordance with Section IX of this Consent Order.

46. Upon EPA's approval of Respondents' CMI Workplan, Respondents shall implement the selected corrective measure(s) for the Facility in accordance with the EPA-approved CMI Workplan and Task II of the Statement of Work in Attachment 3. Respondents shall furnish all personnel, material, and service necessary for, or incidental to, performing the CMI at the Facility.

47. Within thirty (30) days after the completion of the implementation/construction activities required by the approved CMI Workplan, Respondents shall submit a Corrective Measures Implementation Report prepared in accordance with Task II of the Statement of Work in Attachment 3.

48. When Respondents believe that they have satisfied the EPA approved completion criteria, Respondent shall submit to EPA and MDNR a Corrective Measures Completion Report, for EPA's review and approval, in accordance with Section IX of this Consent Order, that documents how the corrective action objectives and corrective measure completion criteria have been satisfied, and that justifies why the corrective measure and/or monitoring may cease.

IX. SUBMISSIONS/AGENCY APPROVAL/ADDITIONAL WORK

49. Beginning with the month following the effective date of this Consent Order through completion of the final Corrective Measure selected by EPA, or such other time as may be agreed by the parties, Respondents shall submit to EPA bi-monthly (every other month) progress reports, which shall be submitted for each month on or before the tenth day of the month following the reporting period. Thereafter, the bi-monthly progress reports shall report on the performance of the requirements of the Statement of Work contained in Attachment 3. These bi-monthly reports may be submitted by electronic mail (with a hard copy to follow by regular mail) and shall, at a minimum, contain the following information for the previous reporting period:

a. By project, a description of the work conducted pursuant to this Consent Order during the reporting period and an estimate of the percentage of the project completed;
b. A description of all projects scheduled for completion during the reporting period which were not completed along with a statement indicating why such projects were not completed and an anticipated completion date;
c. Copies of all data and sampling and test results and all other laboratory deliverables received by Respondent during the reporting period; and
d. A description of the projects and actions which are scheduled for the following reporting period.

50. Respondents shall provide the Interim Measures deliverables, Corrective Measures Study and Reports, and Corrective Measure Implementation Workplan to EPA in accordance with the schedule contained in this Consent Order and its attachments. All submittals, Reports, Studies and/or Workplans that are approved by EPA shall be deemed incorporated into and enforceable as a part of this Consent Order.

51. EPA will review all draft or final reports, workplans and submittals, and notify Respondents in writing of EPA's approval, disapproval or modification of the report, workplan, submittal, or any part thereof (excluding monthly progress reports). Within thirty (30) days of receipt of EPA's comments pertaining to any submittal, Respondent shall amend such submittal, addressing all of EPA's comments, and resubmit same to EPA. If Respondent fails to address EPA's comments in a resubmittal, EPA may consider this a failure to submit. If EPA disapproves the revised submittal, it may modify and approve the same in accordance with its comments. In the event of such modification, EPA will notify Respondents of the modification. Upon receipt of EPA's approval or notice of modification, Respondents shall commence work and implement any approved Workplan and/or submittal (e.g., or financial assurance instruments) in accordance with the schedule and provisions contained therein. EPA approved Reports, Studies, Workplans and/or submittals shall be deemed incorporated into and part of this Consent Order.

52. All documents required for submittal to EPA (including Workplan(s), Studies, preliminary and final reports, progress reports, and other correspondence to be submitted pursuant to this Consent Order) shall be hand delivered or sent by certified mail, return receipt requested, to the Project Manager designated pursuant to Section VII (Project Managers) of this

Consent Order.

53. When new information indicates that additional work is necessary to accomplish the purposes of this Consent Order, EPA may determine that certain tasks, including, but not limited to, investigatory work or engineering evaluation, are necessary in addition to the tasks and deliverables included in the Statement of Work set forth in Attachment 3. EPA will provide written notification of the additional work to be performed by Respondents and EPA will specify the basis and reasons for its determination that the additional work is necessary. Within fifteen (15) days after the receipt of such notification, Respondents may request a meeting with EPA to discuss the additional work. Thereafter, Respondents shall perform the additional work according to an EPA-approved workplan. All additional work performed by Respondents shall be performed in accordance with this Consent Order.

54. Additionally, if EPA determines, at its sole discretion, that releases of hazardous substances, hazardous wastes and/or hazardous constituents at or from the Facility pose a potential imminent and substantial endangerment, EPA reserves the right to commence an additional enforcement action pursuant to Section 7003 of RCRA, 42 U.S.C. 6973, and/or Section 106 of CERCLA, 42 U.S.C. 9606, or any other available legal authorities, to protect human health or the environment.

X. FINANCIAL ASSURANCE

55. Within sixty (60) days of the effective date of this Consent Order, Respondents shall establish and thereafter maintain cash financial assurance for completion of the work required by the IMWP, and estimate costs for the final corrective remedy, as follows:

a. $2,100,000 for the performance of work required pursuant to the approved IMWP; and
b. $500,000 to be reserved for the performance of final RCRA corrective action, when selected by EPA.

This cash financial assurance shall be in conformance with the financial assurance mechanisms described within 40 C.F.R. §§ 265.142, 265.143, 265.144, and 265.145., but shall explicitly state the purpose of the financial assurance is to insure the work required under this Consent Order. This financial assurance may not include the "financial test" or the "corporate guarantee" (the "cash financial assurance"). This financial assurance may also not initially include a trust agreement, unless fully funded and the form of the trust agreement has been approved by EPA (See Paragraph 56, below)

56. Within thirty (30) days of the effective date of this Consent Order, Respondents shall submit a standby Trust Agreement to EPA for review and approval. Upon EPA approval of the form of a Trust Agreement, Respondents may thereafter choose to utilize a fully funded trust for the financial assurance obligations of Paragraphs 55, 57-59, if the Trust is fully funded for these costs at creation.

57. Financial assurance for the performance of work required pursuant to the approved IMWP, as required by Paragraph 55.a, shall be maintained for the Facility until such time as

Respondents are notified in writing by EPA that all such work required by the approved IMWP is complete with respect to the Facility.

58. Upon written notice to Respondents from EPA, the amount of "cash financial assurance" required pursuant to Paragraph 55.a shall be reduced on a quarterly basis to an amount equal to the money expended on work performed by Respondents pursuant to the approved IMWP (and any amendments thereto) during the previous calendar quarter pursuant to the approved IMWP (January - March, April -June, July – September, October – December By January 30 of each calendar, Respondents shall provide EPA a written estimate for the cost of performance of any remaining requirements of the IMWP, until EPA's approval of the Interim Measures Completion Report. In the event that EPA determines that the estimated costs of completion of the work required by the approved IMWP is greater than the remaining balance of cash financial assurance pursuant to Paragraph 55.a, within thirty (30) days of receipt of notice from EPA, Respondents shall establish additional cash financial assurance equal to the difference of the remaining balance maintained pursuant to Paragraphs 55.a and the amount necessary to complete the work required by the IMWP. Conversely, in the event EPA determines that the estimated cost of completion of the work required by the approved IMWP is less than the remaining balance of financial assurance pursuant to paragraph 55.a, EPA shall reduce the amount of financial assurance to that amount. At any time, at EPA's sole discretion, EPA may also approve Respondent's request for a reduction in the amount of financial assurance required pursuant to Paragraph 55.a based on the completion of tasks identified in the IMWP (Attachment II) or work for a specific SWMUs.

59. The amount and form of financial assurance for the performance of final RCRA corrective action at the Facility, as required by Paragraph 55.b, shall be maintained until such time as financial assurance equal to the amount required for performance of the final RCRA corrective action selected by EPA for the Facility has been established pursuant to this Order on Consent, or until EPA determines in writing that no further RCRA corrective action at the Facility is necessary. In the event that EPA determines the estimated cost of completion of the RCRA corrective action at the Facility is greater than the amount held in trust pursuant to Paragraph 55.b, Respondents shall contribute additional cash financial assurance equal to the difference between the remaining balance maintained pursuant to Paragraph 55.b and amount determined by EPA as the cost estimate of the final corrective action remedy. At EPA's discretion, EPA may approve that Respondents may establish other forms of financial assurance for this difference, in conformance with the financial assurance mechanisms described within 40 C.F.R. §§ 265.142, 265.143, 265.144, and 265.145.

60. Respondents are liable for the work required by this Consent Order, and the financial assurance under the provisions of this Section; however, the financial assurances for performance of the IMWP and final corrective action as required by Paragraph 55 to 59 may be established and maintained by a third party, if approved in advance by EPA. If approved by EPA, such third party financial assurances shall satisfy Respondents' financial assurance obligations pursuant to Paragraphs 55 to 59. In the event that this occurs, EPA will notify Respondents upon receipt of a document from or on behalf of such third party that financial assurance in an amount and manner sufficient to satisfy the terms of this Section has been established.

61. Respondents shall also adjust the amount held in trust pursuant to Paragraphs 55 and 56 if EPA determines that any additional Work is required, pursuant to Section IX (Additional Work), or if any other condition increases the cost of the Work to be Performed under this Consent Order. Concurrent with the approval of any additional Workplan(s) required under Section VIII (Work To Be Performed), including any work required as Additional Work under this Consent Order and/or Corrective Measures Implementation Workplan (CMI), Respondents shall submit to EPA a revised detailed written estimate(s), in current dollars, of the cost of hiring a third party to perform such Work. By January 30th of each calendar year, Respondents shall provide an annual inflation adjustment of the amount held in trust EPA for the required work based based on the prior calendar year's national consumer price index. EPA will review, approve and/or modify and approve each revised estimate pursuant to Section IX of this Consent Order. EPA will notify Respondents in writing of EPA's approval, disapproval, or modification of the revised cost estimate(s), and upon EPA approval, Respondents shall adjust the amount held in trust consistent with EPA's approval.

XI. STIPULATED PENALTIES

62. If Respondents fail to comply with any requirement of this Consent Order in a timely and satisfactory manner, Respondents shall pay stipulated penalties as set forth below:

a. For failure to submit to EPA any submittal (except the progress reports called for in Section VIII (Work to be Performed) required by this Consent Order, including the Statement of Work in Attachment 3:

i. $1,000.00 per day for the first through thirty-first day and each succeeding day of noncompliance thereafter.

b. For failure to use best efforts to obtain off-site access agreements and/or to submit a progress report required by Section VIII (Work to be Performed) of this Consent Order:

i. $300.00 per day for the first through fourteenth days of noncompliance; and

ii. $600.00 per day for the fifteenth day and each succeeding day of noncompliance thereafter..

c. For failure to complete the work specified in any Workplan submitted pursuant to Section VIII (Work to be Performed) or required by Section IX (Submissions/Agency Approval/Additional Work) of this Consent Order:

i. $750.00 per day for the first through seventh days of noncompliance;

ii. $1,500.00 per day for the eighth through thirtieth days of noncompliance; and,

iii. $2,250.00 per day for the thirty-first day and each succeeding day of noncompliance thereafter.

63. All penalties shall begin to accrue on the first business day after complete performance is

due or a violation occurs, and shall continue to accrue through the final day of correction of the noncompliance. Separate penalties may simultaneously accrue under this Consent Order for separate violations of this Consent Order.

64. All penalties owed to EPA pursuant to this Section shall be due and payable within thirty (30) days of Respondents' receipt of a written notification of the assessment thereof, unless Respondents invoke the dispute resolution under Section XIV (Dispute Resolution). Such notification will describe the noncompliance and will indicate the amount of the penalties due. Interest shall begin to accrue on the unpaid balance beginning on the thirty-first (31st) day after Respondents receives notification of the assessment of stipulated penalties. Interest shall accrue at the annual rate established by the Secretary of the Treasury pursuant to 31 U.S.C. § 3717. The interest will be assessed on the overdue amount from the due date through the date of payment.

65. All penalties shall be paid by certified or cashier's check made payable to "Treasurer of the United States" and shall be remitted to the United States Environmental Protection Agency, Fines and Penalties, Cincinnati Finance Center, PO Box 979077, St. Louis, MO, 63197-9000. All payments shall reference the name of the Facility, Respondent(s) name, and the EPA docket number of this Consent Order. A copy of the transmittal of payment shall be sent simultaneously to the EPA Project Manager. Respondents may dispute EPA's assessment of stipulated penalties by invoking the dispute resolution procedures under Section XIV (Dispute Resolution). The stipulated penalties in dispute shall continue to accrue, but payment need not be paid, during the dispute resolution period. Respondents shall pay any disputed stipulated penalties and interest, if any, in accordance with the dispute resolution decision and/or agreement. Respondents shall submit such payment within seven (7) days of receipt of such decision and/or agreement.

66. The stipulated penalties set forth in this Section do not preclude EPA from pursuing any other remedy or sanction which may be available to EPA by reason of Respondents' failure to comply with any of the requirements of this Consent Order, nor shall payment of said penalties relieve Respondents of the responsibility to comply with this Consent Order.

XII. ACCESS AND INSTITUTIONAL CONTROLS

67. If the Facility, or any other property where access or institutional controls are needed to implement this Consent Order, is owned or controlled by Respondents, Respondents shall:

a. Commencing on the effective date of this Consent Order, provide the EPA, MDNR, and their representatives and contractors, with access at all reasonable times to the Facility or such other property, for the purpose of conducting any activity related to this Consent Order including, but not limited to, the following activities:
   i. Monitoring the required Work;
   ii. Verifying any data or information submitted to EPA or MDNR;
   iii. Conducting investigations relating to contamination at or near the Facility;
   iv. Obtaining samples;
   v. Assessing the need for, planning, or implementing additional

response actions at or near the Facility;

vi. Assessing implementation of quality assurance and quality control practices as defined in the EPA-approved QAPP;

vii. Implementing the Work required pursuant to the Consent Order;

viii. Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Respondent or their agents:

ix. Assessing Respondents' compliance with this Consent Order;

x. Determining whether the Facility or other property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted, by or pursuant to this Consent Order; and

xi. Implementing, monitoring, or enforcing any institutional controls.

b. Commencing on the effective date of this Consent Order, refrain from using the Facility, or such other property, in any manner that would interfere with or adversely affect the implementation, integrity, or protectiveness of the corrective actions to be performed pursuant to this Consent Order; and

c. Execute and record in the Recorder's Office of St. Louis County, State of Missouri, a Restrictive Covenant prepared in conformance with the Environmental Covenant attached as Attachment 4 to this Consent Order, that (i) grants a right of access for the purpose of conducting any activity related to this Consent Decree including, but not limited to, those activities listed in Paragraph 67(a) of this Section, and (ii) grants the right to enforce the land/water use restrictions that EPA determines are necessary to implement, ensure non-interference with, or ensure the protectiveness of the interim measures, additional work or final corrective action(s) to be performed pursuant to this Order. Respondents shall grant the access rights and the rights to enforce the land/water use restrictions to (i) EPA, and its representatives, (ii) MDNR and its representatives, (iii) each individual Respondent and their representatives, and/or (iv) other appropriate grantees.

d. Respondents shall, within forty five (45) days of the effective date of this Order, submit to EPA for review and approval, with respect to the Facility:

i. A draft covenant or other appropriate instrument, in substantially the form set forth in Environmental Covenant attached as Attachment 4, that is enforceable under the laws of the State of Missouri, and that will prohibit the use of groundwater at the Facility and restrict future use of the Facility to non-residential uses (commercial and industrial); and

ii. A current title insurance commitment or some other evidence of title acceptable to EPA, which shows title to the land described in the covenant/instrument to be free and clear of all prior liens and encumbrances (except when those liens or encumbrances are approved by EPA or when, despite best efforts, Respondents are unable to obtain release or subordination of such prior liens or encumbrances).

e. Within fifteen (15) days of EPA's approval and acceptance of the

covenant/instrument and the title evidence, Respondents shall update the title search and, if it is determined that nothing has occurred to affect the title adversely since the effective date of the commitment, record the Covenant/instrument with the Recorder's Office of St. Louis County, Missouri.

f. Within thirty (30) days of recording the covenant/instrument, the Respondents shall provide EPA with a final title insurance policy, or other final evidence of title acceptable to EPA, and a certified copy of the original recorded covenant/instrument showing the clerk's recording stamps.

68. If the Facility, or any other property where access and/or land/water use restrictions are needed to implement this Consent Decree, is owned or controlled by persons other than any of the Respondents, Respondents shall use best efforts to secure from such persons:

a. An agreement to provide access for Respondents, as well as for EPA and MDNR, and their representatives and contractors, for the purpose of conducting any activity related to this Consent Order including, but not limited to, those activities listed in Paragraph 67(a) of this Section.

b. An agreement, enforceable by Respondents and EPA, to refrain from using the Facility, or such other property, in any manner that would interfere with or adversely affect the implementation, integrity, or protectiveness of the corrective actions to be performed pursuant to this Consent Order; and

c. The execution and recordation in the Recorder's Office of St. Louis County, Missouri, of an Environmental Covenant in conformance with the example Covenant set forth as Attachment 4 to this Consent Order, that (i) grants a right of access for the purpose of conducting any activity related to this Consent Order including, but not limited to, those activities listed in Paragraph 67(a) of this Section, and (ii) grants the right to enforce the land/water use restrictions listed in Paragraph 67(a) of this Section, or other restrictions that EPA determines are necessary to implement, ensure non-interference with, or ensure the protectiveness of the corrective actions to be performed pursuant to Consent Order. The access rights and/or rights to enforce land/water use restrictions shall be granted to EPA and MDNR and their representatives; (iii) Respondents and their representatives; and/or (iv) other appropriate grantees.

d. Within forty-five (45) days of entry of this Order, Respondents shall submit to EPA for review and approval with respect to such property:
   i. A draft covenant or other appropriate instrument, in substantially the form set forth in Attachment 4, that is enforceable under the laws of the State of Missouri, and
   ii. A current title insurance commitment or some other evidence of title acceptable to EPA, which shows title to the land described in the covenant/instrument to be free and clear of all prior liens and encumbrances (except when those liens or encumbrances are approved by

EPA or when, despite best efforts, Respondents are unable to obtain release or subordination of such prior liens or encumbrances).

e. Within fifteen (15) days of EPA's approval and acceptance of the covenant/instrument and the title evidence, Respondents shall update the title search and, if it is determined that nothing has occurred to affect the title adversely since the effective date of the commitment, the covenant/instrument shall be recorded with the Recorder's Office of St. Louis County, Missouri.

f. Within thirty (30) days of the recording of the covenant/instrument, Settling Defendants shall provide EPA with a final title insurance policy, or other final evidence of title acceptable to EPA, and a certified copy of the original recorded covenant/instrument showing the clerk's recording stamps.

69. For purposes of Section XII (Access and Institutional Controls), Paragraphs 67 and 68, of this Consent Order, "best efforts" shall includes the payment of reasonable sums of money in consideration of access, access agreements, land/water use restrictions, and/or an agreement to release or subordinate a prior lien or encumbrance.

70. Within forty-five (45) days of Respondents' receipt of EPA's Final Decision and Response to Comments that establishes EPA's selected final corrective action remedy for the Facility, Respondents shall modify the covenants required by Paragraphs 65and 66 as appropriate for the final remedy.

71. If (a) any access or land/water use restrictions required by Paragraphs 67 and 68 are not obtained within forty-five (45) days of the effective date of this Consent Order, (b) or any access or land/water use restrictions required by this Section are not submitted to EPA in draft form within forty-five (45) days of the effective date Consent Order, or (c) Respondents are unable to obtain an agreement pursuant to this Section, from the holder of a prior lien or encumbrance to release or subordinate such lien or encumbrance to the land/water use restrictions being created pursuant to this Consent Decree within forty-five (45) days of the effective date of this Consent Order, Respondents shall promptly notify EPA's Project Manager in writing, and shall include in that notification a summary of the steps that Respondents have taken to attempt to comply with this Section.

72. EPA may, as it deems appropriate, assist Respondents in obtaining access or land/water use restrictions, either in the form of contractual agreements or in the form of land/water use restrictions running with the land, or in obtaining the release or subordination of a prior lien or encumbrance.

73. If EPA determines that land/water use restrictions in the form of state or local laws, regulations, ordinances or other governmental controls are needed to implement an approved interim measure, additional work, or final corrective action remedy selected for the Facility, or to ensure the integrity and protectiveness of such actions, or to ensure non-interference such actions, Respondents shall cooperate with EPA's and/or MDNR's efforts to secure such governmental controls.

74. Notwithstanding any provision of this Consent Order, EPA and MDNR retain all of their access authorities and rights, as well as all of their rights to require land/water use restrictions, including enforcement authorities related thereto, under CERCLA, RCRA, and any other applicable statute or regulations.

XIII. RECORD PRESERVATION

75. Respondents shall retain, during the pendency of this Consent Order and for at least six (6) years after the Consent Order terminates, all data and all final documents now in their possession or control or which come into their possession or control, which relate to the subject of this Consent Order. Respondents shall notify EPA in writing ninety (90) days before destroying any such records, and give EPA the opportunity to take possession of any non-privileged documents. The Respondents' notice will refer to the effective date, caption, and docket number of this Consent Order and will be addressed EPA's Project Manager and:

Director
Air and Waste Management Division
U.S. EPA, Region 7
901 N. 5th Street
Kansas City, KS 66101

76. Respondents shall not assert any claim of privilege concerning any data gathered during any investigations or other actions required by this Consent Order.

XIV. DISPUTE RESOLUTION

77. The parties will use their best efforts to confer informally to resolve all disputes or differences of opinion regarding the obligations of this Consent Order.

78. If any party disagrees, in whole or in part, with a decision made or action taken regarding an enforceable requirement of this Consent Order, that party will notify the other party's Project Manager of the disagreement. The Project Managers will attempt to informally resolve the identified dispute. If the Project Managers cannot resolve the dispute informally, either party may pursue the matter formally by placing its objections in writing. A written objection must state the specific points in dispute, the basis for that party's position, and any matters which it considers necessary for determination.

79. The parties will in good faith attempt to resolve the dispute through formal negotiations within twenty-one (21) days, or a longer period if agreed in writing by the parties. If the parties are unable to reach an agreement through formal negotiations, within fourteen (14) business days after any formal negotiations end, the parties may submit additional written information to the Director of the Air and Waste Management Division, U.S. EPA Region 7. EPA will maintain a record of the dispute, which will contain all statements of position and any other documentation submitted pursuant to this Section.

80. Based on the record, EPA will respond to the Respondents' arguments and evidence and provide a detailed written decision on the dispute that is signed by the Director of the Air and Waste Management Division, U.S. EPA Region 7 ("EPA Dispute Decision"). No EPA decision made pursuant to this Section shall constitute a final agency action giving rise to judicial review prior to a judicial action brought by the United States to enforce the decision. In any such judicial action, Respondents shall have the burden of demonstrating that the decision of the EPA official is arbitrary and capricious or otherwise not in accordance with law. Judicial review of EPA's decision shall be on the administrative record compiled for the dispute.

XV. FORCE MAJEURE AND EXCUSABLE DELAY

81. Force majeure, for purposes of this Consent Order, is any event arising from causes not foreseen and beyond the Respondents' control that delay or prevent the timely performance of any obligation under this Consent Order, despite the Respondents' best efforts.

82. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Order, whether or not caused by a force majeure event, the Respondents must notify EPA within two business days after learning that the event may cause a delay. If the Respondents wish to claim a force majeure event, within 15 business days thereafter the Respondents must provide to EPA in writing all relevant information relating to the claim, including a proposed revised schedule.

83. If EPA determines that a delay or anticipated delay is attributable to a force majeure event, EPA will extend in writing the time to perform the obligation affected by the force majeure event for such time as EPA determines is necessary to complete the obligation.

XVI. MODIFICATION

84. This Consent Order may be modified only by mutual agreement of EPA and the Respondents. Any agreed modifications will be in writing, will be signed by all the parties, will be effective on the date of signature by EPA, and will be incorporated into this Consent Order.

XVII. RESERVATION OF RIGHTS

85. Notwithstanding any other provisions of this Consent Order, EPA and the United States retain all of its authority to take, direct, or order any and all actions necessary to protect public health or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants, or contaminants, or hazardous or solid waste or constituents of such wastes, on, at, or from the Site, including but not limited to the right to bring enforcement actions under RCRA, CERCLA, and any other applicable statutes or regulations.

86. EPA reserves all of its statutory and regulatory powers, authorities, rights, and remedies, both legal and equitable, which may pertain to Respondents' failure to comply with any of the requirements of this Consent Order, including without limitation the assessment of penalties under Section 7003 of RCRA, 42 U.S.C. § 6973.

87. Except as stated expressly herein, this Consent Order shall not be construed as a covenant not to sue, release, waiver, or limitation of any rights, remedies, powers, claims, and/or authorities, civil or criminal, which EPA has under RCRA, CERCLA, or any other statutory, regulatory, or common law authority of the United States.

88. This Consent Order is not intended to be nor shall it be construed to be a permit. Respondent acknowledges and agrees that EPA's approval of the Work and/or Work Plan does not constitute a warranty or representation that the Work and/or Work Plans will achieve the required cleanup or performance standards. Compliance by Respondent with the terms of this Consent Ordre shall not relieve Respondent of its obligations to comply with RCRA or any other applicable local, state, or federal laws and regulations.

89. Notwithstanding any other provision of this Consent Order, no action or decision by EPA pursuant to this Consent Order, including without limitation, decisions of the Regional Administrator, the Director of Region 7's Air and Waste Management Division, or any authorized representative of EPA, shall constitute final agency action giving rise to any right of judicial review prior to EPA's initiation of a judicial action to enforce this Consent Order, including an action for penalties or an action to compel Respondent's compliance with the terms and conditions of this Consent Order.

XVIII. OTHER CLAIMS

90. Respondents waive any claims or demands for compensation or payment under Sections 106(b), 111, and 112 of CERCLA against the United States or the Hazardous Substance Superfund established by 26 U.S.C. § § 9507 for, or arising out of, any activity performed or expense incurred under this Consent Order. Additionally, this Consent Order is not a decision on preauthorization of funds under Section 111(a)(2) of CERCLA.

XIX. INDEMNIFICATION OF THE UNITED STATES GOVERNMENT

91. The Respondents indemnify, save and hold harmless the United States, its agencies, departments, agents, and employees, from all claims or causes of action arising from or on account of acts or omissions of the Respondents or its officers, employees, agents, independent contractors, receivers, trustees, and assigns in carrying out activities required by this Consent Order. This indemnification will not affect or limit the rights or obligations of the Respondents or the United States under their various contracts. This indemnification will not create any obligation on the part of the Respondents to indemnify the United States from claims arising from the acts or omissions of the United States.

XX. INSURANCE

92. Prior to commencing the on-site Work under this Consent Order, Respondents shall secure, and shall maintain in force for the duration of the Consent Order and for two (2) years after completion of all activities required by this Consent Order, comprehensive general liability insurance and automobile insurance with limits of one million dollars, combined single limit, naming EPA as an additional insured. Prior to commencement of the Work under this Consent

Order, and annually thereafter on the anniversary of the Effective Date of this Consent Order, Respondents shall provide EPA with certificates of insurance and a copy of each insurance policy. If Respondents demonstrate by evidence satisfactory to EPA that its contractors and subcontractors maintain insurance equivalent to that described above, or insurance covering some or all of the same risks but in an equal or lesser amount, the Respondents need provide only that portion of the insurance described above which is not maintained by the contractors and subcontractors.

93. For the duration of this Consent Order, Respondents shall satisfy, or shall ensure that their contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of employer's liability insurance and worker's compensation insurance for all persons performing work on behalf of Respondents, in furtherance of this Consent Order. At least seven (7) days prior to commencing the Work under this Consent Order, Respondents shall certify to EPA that their contractors and subcontractors have obtained the required insurance.

XXI. SEVERABILITY

94. If any judicial or administrative authority holds any provision of this Consent Order to be invalid, the remaining provisions will remain in force and will not be affected.

XXII. TERMINATION AND SATISFACTION

95. Respondents may request that EPA issue a determination that the Respondents have met the requirements of the Consent Order for all or a portion of the Facility. Respondents may also request that EPA issue a "corrective action complete" determination for all, or a portion of, the Facility.

96. The Respondents sent will affirm their continuing obligation to preserve all records as required by Section XIII, to maintain any necessary institutional controls or other long term measures, and to recognize EPA''s reservation of rights as required in Section XVII.

XXIII. COVENANT NOT TO SUE

97. In consideration of the actions that will be performed by Respondents under the terms of this Consent Order, and except as otherwise specifically provided in this Agreement, as authorized by Section 7003(d) of RCRA and subject to public notice and comment, the EPA covenants not take administrative action against Respondents pursuant to Sections 3008(h), 3013, and 7003 of RCRA for response costs and work at the facility to address known conditions at the facility as described in the Findings of Fact of this Consent Order and existing on the effective date of this Consent Order. This covenant not to take administrative action shall take effect upon the Effective Date and is conditioned upon the complete and satisfactory performance by Respondents of all obligations under this Consent Order. This extends only to Respondents and does not extend to any other person.

98. The covenant not to sue set forth in Section XXIII above does not pertain to any matters other than those expressly identified therein. The EPA reserves, and this Consent Order is

without prejudice to, all rights against Respondents with respect to all other matters, including, but not limited to:

a. claims based on a failure by Respondents to meet a requirement of this Consent Order;

b. criminal liability;

c. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;

d. liability resulting from a new release or threat of release of hazardous substances, pollutants or contaminants at or in connection with the Facility after the Effective Date;

e. liability arising from the disposal, release or threat of release of waste materials outside of the Facility.

XXIV. PUBLIC COMMENT ON THIS CONSENT ORDER

99. EPA shall provide public notice, opportunity for a public meeting and a reasonable opportunity for public comment on the proposed settlement. After consideration of any comments submitted during a public comment period of not less than 30 days (which EPA may extend), EPA may withhold consent or seek to amend all or part of this AOC if EPA determines that comments received disclose facts or considerations which indicate that this AOC is inappropriate, improper, or inadequate.

XXIV. EFFECTIVE DATE

100. This Consent Order shall be effective upon written notice to Respondents after completion of the public comment period as specified in Section XXIV (PUBLIC COMMENT) above.

FOR RESPONDENTS::

DATE: SEP 30 2009

BY: _____
Stacie Hastie
SWH Investments II
Respondent

DATE: SEP 30 2009

BY: _____
Matt Robinson
Environmental Operations, Inc.
Respondent

FOR THE REGION 7, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: 9/30/09

BY: _____
Howard C. Bunch
Sr. Assistant Regional Counsel
U.S. Environmental Protection Agency
Region 7

IT BEING SO AGREED, IT IS HEREBY ORDERED:

DATE: 9/30/09

BY: _____
Becky Weber, Director
for Air and Waste Management Division
U.S. Environmental Protection Agency
Region 7

CERTIFICATE OF SERVICE

I hereby certify that the Original of above document was filed with the Regional Hearing Clerk, Region 7, USEPA, and copies were transmitted to the listed parties by the means noted, on this date, September 30, 2009.

9/30/09

Date:

By Federal Express
Eric Page
Environmental Operations, Inc.
1530 South Second Street
Suite 200
St. Louis, Missouri 63104

By Email (w/o attachments):
George M. von Stamwitz
Armstrong Teasdale LLP
1 Metropolitan Sq. Suite 2600
St. Louis, MO 63102

ATTACHMENT 1: MAP OF FACILITY

LEGAL DESCRIPTION

EXHIBIT "A"

PARCEL 1:
A TRACT OF LAND BEING PART OF CITY BLOCK 720, TRACT I-IIB OF KOSCIUSKO SUBDIVISION (P.B. 34 PG. 1), PART OF LESPERANCE STREET, 50 FEET WIDE, VACATED BY ORDINANCE NO. 51744, AND PART OF SECOND STREET, 60 FEET WIDE, VACATED BY ORDINANCE NO. 55641, INCLUSIVE OF THOSE STREETS AND ALLEY WAYS VACATED THEREIN, ALL IN THE CITY OF ST. LOUIS, MISSOURI AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE NORTH LINE OF LESPERANCE STREET, 50' WIDE, VACATED BY ORDINANCE NUMBER 51744 WITH THE EASTERN LINE OF THIRD STREET, 60 FEET WIDE; THENCE ALONG NORTH LINE OF LESPERANCE STREET, SOUTH 67° 00' 08" EAST 342.06 FEET TO THE CENTERLINE OF SECOND STREET, 60' WIDE, VACATED BY ORDINANCE NUMBER 55641; THENCE ALONG SAID CENTERLINE SOUTH 38° 50' 39" WEST 10.63 FEET AND SOUTH 22° 51' 00" WEST 379.42 FEET TO THE NORTH LINE OF RUSSELL AVENUE, 50 FEET WIDE; THENCE DEPARTING THE CENTERLINE OF SECOND STREET, ALONG SAID NORTH LINE OF RUSSELL AVENUE NORTH 66 °59' 53" WEST 186.18 FEET TO THE SOUTHEAST CORNER OF TRACT I-IIA OF KOSCIUSKO SUBDIVISION AS PER THE PLAT THEREOF RECORDED IN PLAT BOOK 34 PAGE1 OF THE ST. LOUIS CITY RECORDS; THENCE WITH THE EAST AND NORTH LINES OF TRACT I-IIA, NORTH 23 °01' 48" EAST 192.42 FEET AND NORTH 67° 03' 03" WEST 156.50 FEET TO THE AFORESAID EAST LINE OF THIRD STREET; THENCE ALONG SAID EAST LINE, NORTH 23° 01' 48" EAST 155.67 FEET TO A POINT OF CURVATURE; THENCE NORTHWARDLY ALONG A CURVE TO THE RIGHT HAVING A RADIUS OF 330.00 FEET WITH A DISTANCE OF 43.90 FEET TO THE POINT OF BEGINNING, ACCORDING TO A SURVEY BY THE STERLING COMPANY DURING THE MONTH OF MAY 2008 UNDER ORDER NUMBER 08-03-050.

PARCEL 2:
A TRACT OF LAND BEING A PART OF CITY BLOCK 733 OF THE CITY OF ST. LOUIS, MISSOURI, INCLUSIVE OF THOSE STREETS AND ALLEY WAYS VACATED THEREIN, AND BEING MORE PARTICULARLY DESCRIBED AS:

BEGINNING AT THE INTERSECTION OF THE SOUTH LINE OF SOUTH TRUDEAU STREET, 40 FEET WIDE, WITH THE EAST LINE OF SECOND STREET, 65 FEET WIDE; THENCE ALONG SAID SOUTH LINE OF SOUTH TRUDEAU STREET SOUTH 67° 05' 23" EAST 315.17 FEET TO THE WEST LINE OF DEKALB STREET, 60 FEET WIDE; THENCE ALONG THE WEST LINE OF DEKALB STREET SOUTH 23° 23' 25" WEST 136.26 FEET TO THE CENTERLINE OF A 20 FOOT WIDE ALLEY; THENCE ALONG SAID CENTERLINE OF 20 FOOT WIDE ALLEY NORTH 67° 05' 23" WEST 313.80 FEET TO SAID EAST LINE OF SECOND STREET; THENCE ALONG SAID EAST LINE OF SECOND STREET NORTH 22° 48' 53" EAST 136.26 FEET TO THE POINT OF BEGINNING, ACCORDING TO A SURVEY BY THE STERLING COMPANY DURING THE MONTH OF MAY 2008 UNDER ORDER NUMBER 08-03-050.

PARCEL 3:
A TRACT OF LAND BEING A PART OF LOT 1 OF THE SUBDIVISION OF BLOCK 714 AND PART OF BLOCK 706 (P.B. 60 PG. 41), ALL OF CITY BLOCKS 735, AND 6501 AND A PART OF CITY BLOCKS 723, 724 AND 738, INCLUSIVE OF THOSE STREETS AND ALLEY WAYS VACATED THEREIN, ALL IN THE CITY OF ST. LOUIS, MISSOURI AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:
BEGINNING AT THE INTERSECTION OF THE CENTERLINE OF RUSSELL (50' WIDE) AVENUE VACATED BY ORDINANCE NUMBER 50258 AN THE SOUTH LINE OF SECOND (60' WIDE) STREET, SAID POINT ALSO BEING ON THE SOUTH LINE OF LOT 1 OF A SUBDIVISION OF BLOCK 714 AND PART OF BLOCK 706 AS PER THE PLAT THEREOF RECORDED IN PLAT BOOK 60 PAGE 41 OF THE ST. LOUIS CITY RECORDS; THENCE WITH THE VACATED CENTERLINE OF RUSSELL AVENUE AND THE SOUTH LINE OF SAID LOT 1, SOUTH 66°56'57" EAST 716.34 FEET TO THE INTERSECTION OF THE CENTERLINE RUSSELL AVENUE VACATED BY ORDINANCE NUMBER 49861 AND THE CENTERLINE OF KOSCIUSKO (60' WIDE) STREET VACATED BY ORDINANCE NUMBER 50258; THENCE WITH THE CENTERLINE OF VACATED KOSCIUSKO STREET, NORTH 22°45'50" EAST 212.09 FEET TO A POINT ON THE SOUTH LINE OF LOT B OF THE SUBDIVISION OF BLOCK 714 AS PER THE PLAT THEREOF RECORDED IN PLAT BOOK 03292005 PAGE 480 OF THE ST. LOUIS CITY RECORDS; THENCE DEPARTING THE VACATED CENTERLINE OF KOSCIUSKO STREET WITH THE SOUTH LINE OF SAID LOT B, SOUTH 67°30'32" EAST 1.47 FEET TO A POINT, FROM SAID POINT A FOUND CROSS BEARS NORTH 17°11'38" EAST 0.03 FEET ; THENCE CONTINUING WITH THE SAID SOUTH LINE, NORTH 23°33'59" EAST 160.64 FEET TO A POINT; THENCE NORTH

26°57'33" EAST 30.92 FEET TO A POINT, FROM SAID POINT A FOUND COTTON PICKER SPINDLE BEARS SOUTH 04°37'20" EAST 0.04 FEET; THENCE SOUTH 82°50'37" EAST 19.95 FEET TO A FOUND COTTON PICKER SPINDLE; THENCE SOUTH 71°53'07" EAST 243.53 FEET TO A COTTON PICKER SPINDLE FOUND FOR THE INTERSECTION OF THE SOUTH LINE OF SAID SUBDIVISION OF BLOCK 714 AND THE EAST LINE OF LESPERANCE (100' WIDE) STREET VACATED BY ORDINANCE NUMBER 55123; THENCE DEPARTING THE SOUTH LINE OF SAID SUBDIVISION OF BLOCK 714, WITH THE SAID EAST LINE OF VACATED LESPERANCE STREET, SOUTH 27°28'08" WEST 77.52 FEET TO A POINT ON THE SOUTH LINE OF LESPERANCE STREET; THENCE WITH THE SAID SOUTH LINE, SOUTH 62°31'52" EAST 102.95 FEET TO A POINT OF THE EAST LINE OF CITY BLOCK 732 AND THE WEST LINE OF MISSOURI PACIFIC RAILROAD RIGHT-OF-WAY; THENCE WITH THE WEST RIGHT-OF-WAY LINE, SOUTH 18°52'52" WEST 320.64 FEET TO A POINT ON THE NORTH LINE OF RUSSELL (50' WIDE) AVENUE; THENCE WITH THE NORTH LINE OF SAID RUSSELL AVENUE, NORTH 66°56'57" WEST 37.96 FEET TO THE EAST LINE OF RUSSELL AVENUE VACATED BY ORDINANCE NUMBER 50258; THENCE WITH THE SAID EAST LINE, SOUTH 23°03'03" WEST 50.00 FEET TO A POINT ON THE SOUTH LINE OF SAID RUSSELL AVENUE; THENCE WITH THE SAID SOUTH LINE SOUTH 66°56'57" EAST 41.60 FEET TO THE AFORESAID WEST LINE OF MISSOURI PACIFIC RAILROAD RIGHT-OF-WAY; THENCE WITH THE SAID WEST RIGHT-OF-WAY LINE, SOUTH 18°52'52" WEST 305.91 FEET TO A POINT OF CURVATURE; THENCE ALONG A CURVE TO THE RIGHT WITH A RADIUS OF 680.00 FEET WITH AN ARC LENGTH OF 173.54 FEET TO A POINT OF TANGENCY; THENCE SOUTH 33°30'12" WEST 857.68 FEET TO THE CENTERLINE OF BARTON (66' WIDE) STREET; THENCE WITH THE SAID CENTERLINE OF BARTON STREET AND THE SOUTH LINE OF THAT PART OF BARTON STREET VACATED BY ORDINANCE NO. 57176, NORTH 67°00'08" WEST 218.34 FEET TO A POINT; THENCE NORTH 22° 59' 52" EAST 33.00 FEET ALONG THE WEST LINE OF SAID BARTON STREET VACATION TO THE NORTH LINE OF SAID BARTON STREET; THENCE ALONG SAID NORTH LINE OF BARTON STREET NORTH 67° 00' 08" WEST 400.17 FEET TO THE CENTERLINE OF DEKALB STREET, 60 FEET WIDE, BEING THE SOUTHWEST CORNER OF THAT PART OF DEKALB STREET VACATED BY ORDINANCE NO. 45381; THENCE ALONG SAID CENTERLINE AND THE WEST LINE OF SAID DEKALB STREET VACATION NORTH 23° 08' 39" EAST 162.50 FEET; THENCE SOUTH 67° 00' 05" EAST 185.50 FEET; THENCE NORTH 23° 17' 27" EAST 78.00 FEET; THENCE SOUTH 67° 00' 04" EAST 185.70 FEET TO THE CENTERLINE OF KOSCIUSKO STREET, 60 FEET WIDE, VACATED BY ORDINANCE NO. 57176; THENCE ALONG SAID CENTERLINE NORTH 23° 26' 15" EAST 259.77 FEET; THENCE NORTH 66° 33' 45" WEST 30.00 FEET TO THE WEST LINE OF VACATED KOSCIUSKO STREET; THENCE SOUTH 53° 18' 35" WEST 30.12 FEET TO A POINT OF CURVATURE; THENCE SOUTHWARDLY ALONG A CURVE TO THE RIGHT HAVING A RADIUS OF 320.00 FEET A DISTANCE OF 240.07 FEET; THENCE NORTH 67° 00' 02" WEST 113.69 FEET TO THE EAST LINE OF DEKALB STREET, 60 FEET WIDE; THENCE ALONG SAID EAST LINE OF DEKALB STREET NORTH 23° 08' 39" EAST 224.00 FEET; THENCE NORTH 23° 23' 25" EAST 342.70 FEET TO THE EASTWARD EXTENSION OF THE NORTH LINE OF SOUTH TRUDEAU STREET, 40 FEET WIDE; THENCE ALONG SAID EASTWARD EXTENSION AND THE NORTH LINE OF SOUTH TRUDEAU STREET NORTH 67° 05' 23" WEST 375.57 FEET TO THE EAST LINE OF SECOND STREET, 60 FEET WIDE; THENCE ALONG SAID EAST LINE OF SECOND STREET NORTH 22° 48' 53" EAST 418.63 TO THE POINT OF BEGINNING, ACCORDING TO A SURVEY BY THE STERLING COMPANY DURING THE MONTH OF MAY 2008 UNDER ORDER NUMBER 08-03-050.

PARCEL 4:

A TRACT OF LAND BEING A PART OF LOT 1 OF A SUBDIVISION OF BLOCK 714 AND PART OF BLOCK 706 (P.B. 60 PG. 41) BEING A PART OF CITY BLOCK 714, INCLUSIVE OF THOSE STREETS AND ALLEY WAYS VACATED THEREIN, IN THE CITY OF ST. LOUIS AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS: BEGINNING AT THE INTERSECTION OF THE CENTERLINE OF SECOND (60' WIDE) STREET, VACATED BY ORDINANCE NO 55641 AND THE NORTH LINE OF RUSSELL (50' WIDE) AVENUE, SAID POINT ALSO BEING THE SOUTHWEST CORNER OF LOT 1 OF A SUBDIVISION OF BLOCK 714 AND PART OF BLOCK 706 AS PER THE PLAT THEREOF RECORDED IN PLAT BOOK 60 PAGE 41 OF THE ST. LOUIS CITY RECORDS; THENCE WITH THE VACATED CENTERLINE OF SECOND STREET AND THE WEST LINE OF SAID SUBDIVISION OF BLOCK 714 AND PART OF BLOCK 706, NORTH 22°51'00" EAST 379.42 FEET AND NORTH 38°50'39" EAST 2.18 FEET TO A POINT ON THE WESTERN PROLONGATION OF THE SOUTH LINE OF THE SUBDIVISION OF BLOCK 714 AS PER THE PLAT THEREOF RECORDED IN PLAT BOOK 03292005 PAGE 480 OF THE ST. LOUIS CITY RECORDS; THENCE DEPARTING THE VACATED CENTERLINE OF SECOND STREET WITH THE SOUTH LINE OF SAID SUBDIVISION OF BLOCK 714, SOUTH 66°54'54" EAST 394.21 FEET TO A POINT; THENCE SOUTH 23°28'24" WEST 197.61 FEET TO A POINT; THENCE SOUTH 67°30'32" EAST 353.37 FEET TO A POINT IN THE CENTERLINE OF KOSCIUSKO (60' WIDE) STREET VACATED BY ORDINANCE NUMBER 50258, SAID POINT ALSO BEING ON THE EAST LINE OF AFORESAID SUBDIVISION OF BLOCK 714 AND PART OF BLOCK 706 (P.B. 60 PG. 41); THENCE WITH THE

CENTERLINE OF VACATED KOSCIUSKO STREET AND THE EAST LINE OF SAID LOT 1, SOUTH 22'45'50" WEST 212.09 FEET TO THE INTERSECTION OF THE CENTERLINE OF VACATED KOSCIUSKO STREET AND THE CENTERLINE OF RUSSELL (50' WIDE) AVENUE VACATED BY ORDINANCE NUMBERS 49861, 47995 AND 50258, SAID POINT ALSO BEING ON THE SOUTHEAST CORNER OF SAID LOT 1 OF THE SUBDIVISION OF BLOCK 714 AND PART OF BLOCK 706 (P.B. 60 PG. 41); THENCE WITH THE CENTERLINE OF VACATED RUSSELL AVENUE AND THE SOUTH LINE OF THE SUBDIVISION OF BLOCK 714 AND PART OF BLOCK 706, NORTH 66°56'57" WEST 716.34 FEET TO A POINT; THENCE DEPARTING THE VACATED CENTERLINE OF RUSSELL AVENUE, WITH THE SOUTH LINE OF THE SUBDIVISION OF BLOCK 714 AND PART OF BLOCK 706, NORTH 22°48'53" EAST 5.09 FEET TO A POINT; THENCE NORTH 22°51'00" EAST 19.91 FEET TO A POINT; THENCE NORTH 66°59'53" WEST 30.00 FEET TO THE POINT OF BEGINNING, ACCORDING TO A SURVEY BY THE STERLING COMPANY DURING THE MONTH OF MAY 2008 UNDER ORDER NUMBER 08-03-050.

PARCEL 5:
A TRACT OF LAND BEING A PART OF CITY BLOCK 872, IN THE CITY OF ST. LOUIS, MISSOURI AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:
BEGINNING AT THE INTERSECTION OF THE EAST LINE OF FIRST (106' WIDE) STREET AND THE NORTH LINE OF VICTOR (60' WIDE) STREET THENCE WITH THE EAST LINE OF SAID FIRST STREET, NORTH 33°06'49" EAST 281.25 FEET TO THE SOUTHWEST CORNER OF A TRACT OF LAND DESCRIBED IN A DEED TO RHINO ENTERPRISES RECORDED ON 07/28/98 WITH A DAILY NUMBER 215; THENCE DEPARTING THE EAST LINE OF FIRST STREET WITH THE SOUTH LINE OF RHINO ENTERPRISES TRACT, SOUTH 52°08'36" EAST 301.44 FEET TO A POINT ON THE WEST LINE OF WHARF AS DESCRIBED IN ORDINANCE NO. 5403; THENCE WITH THE WEST LINE OF SAID WHARF, SOUTH 33°13'02" WEST 268.82 FEET AND SOUTH 37°29'40" WEST 12.35 FEET TO THE NORTH LINE OF AFORESAID VICTOR STREET; THENCE WITH THE SAID NORTH LINE, NORTH 52°08'36" WEST 300.03 FEET TO THE POINT OF BEGINNING, ACCORDING TO A SURVEY BY THE STERLING COMPANY DURING THE MONTH OF MAY 2008 UNDER ORDER NUMBER 08-03-050.

PARCEL 6:
AN APPURTENANT, NON-EXCLUSIVE WATER MAIN EASEMENT ESTABLISHED BY THE EASEMENT AGREEMENT RECORDED IN BOOK 05222006 PAGE 0276.

Countersigned: Gloria Lewis
Authorized Signatory

ATTACHMENT 2: APPROVED INTERIM MEASURES WORKPLAN

RCAP RECEIVED
SEP 22 2009

Environmental Operations, Inc.

April 17, 2009

Ms. Stephanie Doolan
Project Manager
U.S. Environmental Protection Agency, Region 7
ART Division / RCRA Corrective Action
901 North 5th Street
Kansas City, Kansas 66101-2907

RE: Final Interim Measures Work Plan
Solutia – John F. Queeny Plant
St. Louis, Missouri
EPA ID No. MOD 004 954 111

Dear Ms. Doolan:

This letter accompanies the delivery of the text portion of the final *Interim Measures Work Plan* (IMWP) for the Former Solutia John F. Queeny Plant to USEPA. The final changes from the February 2009 draft incorporated those necessary to be consistent with Toxic Substances Control Act (TSCA) regulations.

I have included two additional copies of the text of the IMWP for you to pass along to Missouri Department of Natural Resources. Please let me know if you would like additional or complete copies.

I can be reached by phone at 314-480-4694, or via email at markun@environmentalops.com.

Respectfully submitted,

Mark R Underwood

Mark R Underwood / Project Manager
Environmental Operations, Inc

RCAP RECEIVED
APR 21 2009

Environmental Operations, Inc.

RCAP RECEIVED
SEP 22 2009

INTERIM MEASURES WORK PLAN

FORMER SOLUTIA QUEENY PLANT
ST. LOUIS, MISSOURI

April 2009

Prepared for:

SWH INVESTMENTS II

Prepared by:

ENVIRONMENTAL OPERATIONS, INC.

1530 SOUTH SECOND STREET

SUITE 200

ST. LOUIS, MISSOURI 63104-4500

State of Missouri Registered Professional Certification Page

I certify that I am a qualified groundwater scientist who has received a post-graduate degree in the natural sciences, and have sufficient training and experience in groundwater hydrology and related fields, as demonstrated by state registration and completion of accredited university courses, that enable me to make sound professional judgments regarding groundwater monitoring, contaminant fate and transport, and remediation of soil and groundwater. I further certify that this report was prepared by myself or by a subordinate working under my direction.

Mark R Underwood, Missouri Registered Geologist
Environmental Operations, Inc.

Eric J. Page, Missouri Registered Geologist
Environmental Operations, Inc.

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List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
APA	Former Acetanilides Production Area
AST	Above-ground storage tank
bgs	below ground surface
BTEX	Benzene, toluene, ethylbenzene, and xylenes
cm	centimeters
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMS	Corrective Measure Study
COC	Constituents of concern
DCE	Dicloroethene
DNAPL	Dense non-aqueous phase liquids
DRO	Diesel range organics
DTL	Default Target Level
EOI	Environmental Operations, Inc.
FBCSA	Former Bulk Chemical Storage Area
GCAL	Gulf Coast Analytical Laboratories, Baton Rouge, LA
GPS	Global Positioning System
GRO	Gasoline range organics
HVOC	Halogenated volatile organic compounds
IMWP	Interim Measures Work Plan
kg	kilogram
LNAPL	Light non-aqueous phase liquids

MDNR	Missouri Department of Natural Resources
MNA	Monitored Natural Attenuation
MRBCA	Missouri Risk-Based Corrective Action
mg	Milligrams
ORO	Other range organics
PAHs	polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
POTW	Publically Owned Treatment Works
PPE	Personal protective equipment
PRG	Project Remediation Goal
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
RAO	remedial action objective
RBTL	Risk Based Threshold Level
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
Site	Former Solutia Queeny Plant
SOP	Standard Operating Procedures
SWMU	Solid Waste Management Unit
TCLP	Toxic characteristic leaching process
TPH	Total petroleum hydrocarbons
TSCA	Toxic Substances Control Act
US EPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	Underground storage tank

Executive Summary

This Interim Measures Work Plan (IMWP) is prepared for SWH Investments II which recently acquired the Former Solutia J.F. Queeny Plant (Queeny Plant) located between Lesperance and Barton Streets and First and Second Streets in St Louis, Missouri. Environmental Operations, Inc. (EOI), in affiliation with SWH Investments II, is assuming the responsibilities for the environmental obligations for the Queeny Plant in order to prepare the property for redevelopment for light industrial and commercial use. The IMWP is based on site characterization activities and results summarized in the RCRA Corrective Measures Study (CMS) (URS, 2007) and other documents prepared by URS Corporation (URS) and other consultants on behalf of Solutia.

The Queeny Plant contains eight SWMUs and two Areas of Concern (AOCs) that have been addressed in the corrective action program. It is agreed by US EPA that only four SWMUs require management per the Updated Risk Assessment and Conceptual Risk Management Plan (RAM Group, Inc. and URS, January 2007) approved by US EPA on February 28, 2007. This IMWP addresses the four SWMUs that require risk management. Broadly speaking there are two major activities proposed in this IMWP to achieve acceptable conditions for redevelopment in the area of the four SWMUs. The first is excavation of Polychlorinated biphenyls (PCBs) in surface and subsurface soil in the VV Building Area (i.e., one of the SWMUs) that will be performed under RCRA authority following the risk-based cleanup according to 40 CFR 761.61(c). The second is remediation of three separate source areas for groundwater contamination in the other three SWMUs, referred to as the Former FF Building Area, the Former Acetanilides Production Area (APA), and the Former Bulk Chemical Storage Area (FBCSA).

Remedial Action Objectives (RAOs) and PRGs for the VV Building Area. The RAO for the VV Building Area is to excavate and remove soil with concentrations above the PRG. The PRG for the VV Building Area is established from TSCA PCB regulations 40 CFR 761.61(a)(4) as the total PCB concentration of 100 mg/kg in soil. Soil containing concentrations above the PRG will be excavated, transported, and disposed at a TSCA-approved facility; once confirmation sampling has been completed and all soil above the PRG has been hauled away, the excavation will eventually be backfilled to grade using clean fill material. PCB concentrations in soil above 10 mg/kg and less than 100 mg/kg are considered permissible to leave in place if there are appropriate environmental restrictions, since the property will remain industrial / commercial. These restrictions will include a surface cap that prevents potential exposure to site workers and trespassers, and there will be institutional controls through a deed restriction and operations and maintenance (O&M) plan to assure that the area remains covered by the barrier.

RAOs and PRGs for the Groundwater Source Areas. The RAO for the groundwater source areas are to remove LNAPL and residual LNAPL mass to the extent practicable in order to diminish, if not remove, potential sources of vapors and groundwater contamination. Implementation of the remediation of groundwater sources will facilitate future redevelopment areas. Additionally, the remediation of source areas is expected to facilitate natural attenuation of respective groundwater plumes. The site-specific PRG

for the groundwater source areas is to reduce contaminant mass within the source areas by 75%.

Interim Measures. The interim measures identified in this IMWP for the VV Building Area is to excavate the PCB-impacted soil above Project Remediation Goals (PRGs), transport and delivery to a Resources Conservation and Recovery Act (RCRA) Subtitle C landfill authorized to receive PCB impacted soil, and backfilling using clean material. The interim measures for the groundwater source areas are to inject reagents that will chemically destroy the source material and facilitate biodegradation. These interim measures are designed to facilitate redevelopment of the property and are consistent with suggestions from USEPA regarding the CMS review as well as discussions between EOI and USEPA. Final cleanup of groundwater will be addressed through alternate concentrations limits established through USEPA Technical Impracticability Guidance.

The primary COCs that will be regarded in the interim measure for groundwater include alachlor, benzene, chlorobenzene, toluene, and HVOCs. Thus, groundwater monitoring will be conducted from the indicator wells within and outside of the injection zone following injection events, and sampling will be for VOCs and alachlor (APA only).

1 INTRODUCTION

This Interim Measures Work Plan (IMWP) is prepared for SWH Investments II which recently acquired the Former Solutia J.F. Queeny Plant (Queeny Plant or Site) located between Lesperance and Barton Streets and First and Second Streets in St Louis, Missouri. A single address often provided for the Queeny Plant is 200 Russell Street, St Louis, Missouri. Figure 1 is a Site Location Map. SWH Investments II legally purchased the Queeny Plant and assumed the environmental obligations for the property effective June 13, 2008. Environmental Operations, Inc. (EOI), in affiliation with SWH Investments II, is assuming the responsibilities for the environmental obligations for the Queeny Plant in order to prepare the property for redevelopment for light industrial and commercial use.

The IMWP is based on site characterization activities and results summarized in the RCRA Corrective Measures Study (CMS) (URS, 2007) and other documents prepared by URS Corporation (URS) and other consultants on behalf of Solutia. The interim measures identified in this IMWP are designed to facilitate redevelopment of the property, consistent with EOI's understanding of suggestions from U. S. Environmental Protection Agency, Region VII (USEPA) regarding the CMS review as well as discussions between EOI and USEPA conducted during the period prior to the transfer of the property from Solutia to SWH Investments II.

The Queeny Plant contains eight SWMUs and two Areas of Concern (AOCs) that have been addressed in the corrective action program, and all but four have been assessed as requiring No Further Action per US EPA's RFI responses. This IMWP addresses the four SWMUs that remain open. Broadly speaking there are two major activities proposed in this IMWP to achieve acceptable conditions for redevelopment in the area of the four SWMUs. The first is excavation of Polychlorinated biphenyls (PCBs) in surface and subsurface soil in the VV Building Area (i.e., one of the SWMUs), and the second is remediation of three separate source areas for groundwater contamination in the other three SWMUs, referred to as the Former FF Building Area, the Former Acetanilides Production Area (APA), and the Former Bulk Chemical Storage Area (FBCSA). The goals for each are described below, and the methods and procedures proposed to accomplish these remediation goals are described in this IMWP.

1.1 Interim Measures Remedial Action Objectives

PCB-Impacted Soil Excavation in VV Building Area. The remedial action objectives (RAOs) for the VV Building Area interim measures are to remove the soil containing impacts from PCBs above 100 mg/kg for appropriate disposal in order to remove potential risks of exposure. An additional component of the RAO is to provide a surface cap for areas where soil remains with impacts between 10 and 100 mg/kg (as determined in the sampling plan in the "RCRA Facility Investigation Data Gap Work Plan," prepared for Solutia by O'Brien & Gere Engineers Inc. dated March 24, 2000; approved by EPA in a letter dated 4-20-2000) to prevent potential current and future exposures to PCB-impacted soil. As discussed in Section 4, the site-specific project remediation goal (PRG) is to excavate surface and subsurface soil with concentrations of PCBs above 100 milligrams per kilogram (mg/kg) and remove PCB-impacted soil from the site for

offsite disposal and eventual backfilling of the excavations with clean material. This IMWP addresses PCB-impacted soil in the vicinity of the VV Building using the following actions:

- Refined delineation of impacted areas using geoprobe sampling techniques and analyses of soil using US EPA Method 8082 (a gas chromatography – GC – method of analysis) as described in Section 6 Interim Measures Work Plan Implementation;
- Excavation of surface and subsurface soil for transportation and disposal at a RCRA Subtitle C landfill facility approved for the disposal of PCB-impacted soil (assumed at this time to be the Heritage Landfill, Roachdale, Indiana);
- Sampling of soil to confirm that soil exhibiting PCB concentrations above 100 mg/kg have been removed;
- Surveying the limits of excavation and areas where surface soil require barriers to protect against future exposures (the results of the survey will be recorded on the deed for the property as part of the Corrective Measures Implementation Work Plan);
- Backfilling of clean soil material into the excavation;
- Installation of monitoring wells to evaluate potential PCB impacts to groundwater in the vicinity of the VV Building;
- Present the plan for the VV Building area interim measures for public review and comment over a 30-day period prior to initiating the interim measures in the VV Building area as consistent with 40 CFR 761.61; and
- Completion of an Interim Measures Report that describes these activities.

The area of excavation and the areas where soil remains with PCB impacts above 10 mg/kg and below 100 mg/kg will be capped to meet the requirements of 40 CFR 264.310(a). The details of the cap will be provided in the Corrective Measures Implementation Work Plan and will coincide with development plans for the area.

Groundwater Source Area Remediation. The RAOs for the groundwater source areas are to remove LNAPL and residual LNAPL mass to the extent practicable to diminish, if not prevent, potential ongoing sources of vapors and groundwater impacts. The PRGs for groundwater source areas are to remove or reduce sources of groundwater impacts by 75% within the unconsolidated groundwater zones (i.e., silty clay unit); indicator criteria for groundwater are also developed based on existing conditions that will be established during Preliminary Investigation activities, as discussed in Section 4.

The IMWP addresses groundwater source areas using the following actions:

- Refined delineation of source areas using geoprobe sampling techniques and analysis of soil and groundwater samples to identify the presence of LNAPL and residual LNAPL during the Preliminary Investigation conducted as the first actions at the Site.
- Installation of groundwater monitoring wells that allows evaluation of plume concentrations and changes in concentration within and surrounding the groundwater source area(s).

- Installation of a network of piezometers screened across the capillary fringe within the silty clay unit that will be used to inject chemical reagents into the capillary fringe and upper saturated zone where the contaminant source material resides (anticipating that there may be multiple injection events thus necessitating installation of piezometers rather than single geoprobe injection events).
- Injection of oxidation reagents to chemically destroy source material and residuals in the capillary fringe and upper saturated zone and enhance long-term biodegradation of dissolved constituents.
- Collection of shallow groundwater samples for analyses within and adjacent to the groundwater plumes in order to evaluate that sufficient LNAPL and residual LNAPL mass removal has taken place
- Completion of an Interim Measures Report that describes these activities.

2 SITE BACKGROUND

A summary of the site background is presented herein. More complete descriptions of the site background are found in the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report (URS, 2002) and the CMS (URS, 2007).

2.1 Site Location and Description

The Queeny Plant occupies approximately 36 contiguous acres and is located in eastern St. Louis City approximately between First and Second Streets and Lesperance and Barton Streets; a separate parcel of approximately two acres (i.e., the FBSCA) lies south of the contiguous 36 acres at the northeast intersection of First and Victor Streets. The Queeny Plant is located in the western portion of the Cahokia, Illinois, U.S. Geological Survey (USGS) topographic quadrangle (**Figure 1-1**). The plant is located on the west bank of the Mississippi River at River Mile 178.

The Queeny Plant is located in an area that is zoned and developed for industrial and commercial uses and is expected to remain so for the foreseeable future. The site is proximate to a major transportation corridor provided by the Mississippi River, several interstate highways, and a large railroad center. **Figure 2-1** is an aerial photograph that shows the Queeny Plant in relation to the surrounding area. Areas surrounding the facility are used for industrial and commercial operations. Current access to the site is restricted.

2.2 Site History

The Monsanto Chemical Works began site operations on six acres at its current location in 1901 with the chemical manufacturing of Saccharin. In 1933 Monsanto Chemical Works changed its name to Monsanto Chemical Company. The company underwent another re-naming in 1964 and became the Monsanto Company. Solutia Inc. was formed from a spin-off of the chemicals business of the Monsanto Company on September 1, 1997.

Since its inception, the Queeny plant has manufactured over 200 products using over 800 raw materials. The major products have included but are not limited to the following: process chemicals such as maleic anhydride, fumaric acid, toluene sulfonic acid, and paranitrophenetole; plasticizers such as phthlate esters and toluene sulfonamides; synthetic functional fluids such as Pydrauls™, Skydrols™, and coolanols; food and fine chemicals such as salicylic acid, aspirin, methyl salicylate, benzoic acid, and ethavan; and agricultural chemicals such as Lasso ™ (i.e., acetanilides or alachlor). **Figure 2-1** depicts the maximum extent of historical operations as well as the current property configuration.

The Queeny Plant has evolved with time; a brief chronology is provided below:

- During the 1960s the facility went through several expansions. The acreage of the facility at its peak was approximately 76 acres with over 1,900 employees.
- By the 1970s, production activities and the number of buildings at the site began to decrease due to a series of sales and consolidations.
- In 1989, the analgesics business and a nine-acre parcel of land were sold to Rhone Polenc

(which became Rhodia).

- In 2005, the former Rhodia property and certain surrounding parcels that total approximately 16.5 acres were sold to Ahrens Construction. These boundary changes are reflected in **Figure 2-1**. In a letter dated May 2, 2005, Solutia notified the USEPA and MDNR of the sale and included a description of the land use restrictions.
- In December of 1990, production of Lasso™ was halted.
- In early 1991 trichlorocarbanilide (TCC) production ceased.
- In 1993, the maleic anhydride business was sold to Huntsman Specialty Chemicals.
- In 1995, the manufacture of paranitrophenatole ended.
- In 2005, Solutia announced that operations at the Queeny Plant will cease in the near future.
- In 2006, the KK Building was sold to M-W Properties, Inc. Between 1994 and 2006, M-W Properties occupied the site under a long term lease.
- In 2006, Solutia completed shut-down and decommissioning of the Queeny Plant.
- In 2008, SWH Investments II completed the purchase of the Queeny Plant from Solutia.

The site is located in an area that has been industrialized for over 100 years and is expected to remain industrial or commercial property for the foreseeable future. The plant has controlled access including a fully fenced site perimeter with locked gates, and remote video surveillance. EOI is planning to demolish all structures and surface facilities for eventual redevelopment.

2.3 Previous Investigations

Between 1983 and 2005, a number of investigations were conducted by Monsanto (Solutia), with later investigations performed under RCRA Corrective Actions. The Queeny Plant contains eight SWMUs and two Areas of Concern (AOCs) that have been addressed in the corrective action program, and all but four SWMUs have been assessed as requiring No Further Action per USEPA's RFI responses. The four SWMUs that have been assessed as requiring further action are addressed in this IMWP. One is the VV Building Area that contains soil that has been impacted by PCBs, and the other three are source areas for groundwater contamination. A summary of each is as follows.

VV Building Area. VV Building is an existing structure that served as the production area known as "Central Drumming." Activities at this location involved the unloading and bulk storage of a wide variety of liquid materials and the repackaging of these materials or a blend of these materials into smaller quantities (i.e., quarts, gallons, 5-gallon, and 55-gallon containers). The identified SWMU area associated with VV Building involves a railcar unloading area where Aroclors (i.e., PCBs) were unloaded and pumped into storage prior to repackaging for shipment. This area is primarily paved, with some of the area being covered with gravel and a rail spur.

In 1993, Monsanto replaced a section of track along the eastern side of the VV Building. In the routine testing of soil for appropriate disposal, the soil was found to contain from 15 to 150 mg/kg PCB. Approximately 40 cubic yards of soil were removed and transported to a TSCA approved landfill for disposal. In 2004, repairs were made to a water line in the northern portion

of this area. The excavated soils were found to contain PCBs. Approximately 150 cubic yards of excavated soil were removed and transported to a TSCA-approved landfill for disposal. After water line repairs were made, the excavation was backfilled with clean fill and the surface replaced with concrete. Subsequent sampling has indicated soil impacted with PCBs remains at this SWMU. **Figure 3-2** shows the location of the VV Building and the excavated areas from 1993 and 2004 and the extent of the area planned for excavation.

FF Building Area. The area associated with the FF Building that constitutes the SWMU includes the footprint of the former building (an area of approximately 150 feet by 75 feet) and the surrounding area including a former underground storage tank (UST). The ground covering in this area is asphalt, and crushed and compacted stone. This area is currently not used and no buildings are located in the area.

The FF Building was a production unit used for the manufacture of trichlorocarbanilide (TCC), a bacteriostat used in body soap. Production of TCC began at the Queeny Plant in 1951, and in early 1991 operations ceased and the facility was dismantled. One of the raw materials used in the production of TCC was PCE, which was stored in a UST that has since been removed. PCE was recovered during several months (in 1987) of operating four recovery wells (REC-1 through REC-4) which were constructed with screened intervals penetrating the top of the bedrock. LNAPL, comprised mostly of toluene, was also found beneath an area north of the former FF Building. The LNAPL covered a relatively small area surrounding monitoring well LPZ-4. Investigations planned during Preliminary Investigations will focus on the smaller discrete areas of LNAPL and residual LNAPL shown in **Figure 2-3**. This IMWP will address the LNAPL and residual LNAPL materials that remain as source material for the groundwater plume originating from this SWMU. The actions taken in this IMWP will also diminish the concentrations of DNAPL-related constituents especially within the shallow saturated zone above the bedrock.

Former Acetanilides Production Area. The APA produced acetanilides or alachlor also referred to as Lasso™, and it is located in the south-central portion of the Queeny Plant. The estimated size of this manufacturing block is 300 feet by 450 feet. This production area began operations in 1966, as a multi-product facility. The Lasso™ operations ceased in 1991. The ground covering in this area consists of buildings, asphalt, concrete foundations of former aboveground storage tanks, and railroad ballast near the railroad spur.

Based on subsurface investigation conducted in this area, several constituents used in the Lasso production (notably chlorobenzene and alachlor) were found to have leaked into the subsurface. Previous groundwater impacts identified through groundwater analyses also indicated that chlorobenzene and alachlor were at soluble limits. Thus, potential source areas for LNAPL and residual LNAPL material that remain in the subsurface will be addressed in this IMWP. **Figure 2-4** shows the APA and the monitoring wells within this area as well as distributions of the LNAPL and groundwater impacts at solubility limits in the area.

Former Bulk Chemical Storage Area. The FBCSA approximates a parallelogram shaped parcel of land approximately 285 feet by 300 feet, or approximately 1.94 acres. It was purchased by Monsanto in 1968 from Clark Oil Company and included two 500,000 gallon aboveground storage tanks (ASTs) and two 300,000 gallon ASTs that were used by Clark for fuel storage.

After the 1968 purchase, raw materials used at the Queeny Plant were unloaded from a barge terminal, located on the west bank of the Mississippi River, and pumped into these tanks for storage. Materials stored at the terminal by Monsanto and others included: petroleum products, alkyl benzenes, blends of alkyl benzenes (Purex A-220 and Canadian A-221), Santicizer 154 plasticizer (p-t-butylphenyl diphenyl phospate), monochlorobenzene, ortho-nitrochlorobenzene, sodium hydroxide, and potassium hydroxide. The use of this area was discontinued in 1987 and the tanks were removed. This area has at times been leased to other companies as open space storage.

The ground covering in this area is asphalt, crushed and compacted stone, and sparse volunteer vegetation. The SWMU is located outside of the Queeny Plant main property and site security fence, but is enclosed by a locked security fence. Based on previous investigations, a variety of constituents appear to have leaked into the subsurface from tanks or pipes leading into and out of the tanks. Specific investigations were undertaken to identify the extent of soil impacts and the extent of LNAPL and residual LNAPL materials. Based on these investigations, there are several areas where LNAPL has been observed, and these are shown in **Figure 2-5**. A sample of LNAPL from former piezometer FBSCA-PZ-5 indicates that the LNAPL is composed primarily of chlorobenzene, benzene, and ethylbenzene. This IMWP will provide procedures to address the LNAPL and residual LNAPL materials that remain as source material for the groundwater plume originating from this SWMU.

2.4 Geology and Hydrogeology

Geology

The site area is considered to be part of the Mississippi River flood plain. A significant amount of development has occurred over the past 200 years and the associated filling activities have raised the ground surface elevation and extended it eastward. The stratigraphy beneath the site consists of four main units (from top down), fill, silty clay, sand, and limestone bedrock. A bedrock high beneath the central portion of the facility affected the configuration of some of these units, and also influences groundwater conditions. The fill and silty clay unit are present across the site. The sand unit is present beneath the silty clay in the northern and southern portions of the site, away from the bedrock high. The sand, where present, extends downward to bedrock. Bedrock occurs at depths varying from 10 feet to approximately 80 feet beneath the site. Limestone bedrock underlies the site to the depths explored.

The general grain-size of alluvial-colluvial deposits above the bedrock becomes coarser with depth, from clay to sand. Four stratigraphic units have been identified beneath the facility. The upper fill unit is typically 3 to 23 feet thick; and mainly consists of silty clay but also contains sand, gravel, cinders and other debris. The former Quarry Area is an exception to this in that the fill is in excess of 100 feet thick. Below the fill, across most of the site, is a relatively lower permeability fine-grained alluvial silt and clay unit with some areas of clayey silt and interbedded sand seams. The silty clay is absent in some areas across the site, predominately in the former Quarry Area where the overburden was removed during the quarrying of the underlying limestone. The silty clay is generally gray to olive gray and moist and extends to approximately 27 feet bgs. The sand seams are usually water saturated and generally appear to be physically and hydraulically isolated.

In the northern and southern portions of the site a sand unit underlies the silty clay and extends to bedrock. The sand unit consists mainly of fine to medium sand with some silt and coarse sand. This sand unit is generally water saturated through the entire thickness of the unit. The sand is absent in the central portion of the site where a bedrock high exists. On the bedrock high, the fill and silty clay directly overlies the bedrock (i.e., the central portion of the APA and the VV Building Area).

Underlying the sand (and fill and silty clay on the bedrock high) is the bedrock unit, which is represented by the St. Louis Limestone Formation. The limestone bedrock is described as finely to coarsely crystalline, fractured, and weathered. This unit contains chert, and interbedded layers of shale and clay. In some areas, the bedrock surface is weathered, ranging in thickness from 2 to 10 feet based on borings OBW-1 through OBW-3. In the area of the bedrock high the shallowest depth to bedrock is less than 10 feet. Away from the bedrock high, the depth to bedrock is as much as 91 feet bgs. In the southeastern portion of the site, a former limestone quarry extended to over 100 feet bgs. The quarry has since been filled. The bedrock surface generally slopes to the east toward the Mississippi River. **Figure 2-6** shows the location of the former quarry and illustrates the bedrock contours beneath the Site.

A more detailed description of the geology of the four SWMUs is summarized as follows:

VV Building Area

- Fill and silty clay, 0 to 8 feet bgs
- Silt and/or sand, 8 to 9 feet bgs
- Bedrock varies from approximately 7 to 10 feet bgs

Former FF Building Area

- Fill and silty clay, 0 to 20 feet bgs
- Variable silts and sands, 20 to 31 feet bgs
- Bedrock varies from approximately 31 to 60 feet bgs

Former Acetanilides Production Area

- Fill and silty clay, 0 to 7 feet bgs
- Silty sand, 7 to 8 feet bgs
- Bedrock varies from approximately 8 to 12 feet bgs.

FBCSA

- Fill and silty clay, 0 to 22 feet bgs
- Silty sand, 22 to 36 feet bgs

- Sand, 36 to 79 feet bgs
- Bedrock approximately 79 feet bgs

Hydrogeology

On a large scale, groundwater flows characteristically from west to east in the site area toward the major groundwater discharge feature of the area, the Mississippi River. However, within the Former Queeny Plant, local groundwater flow is influenced by the bedrock high noted in the central portion of the site. Shallow groundwater in this area generally flows radially off the bedrock high and then east toward the river once it is off the bedrock high. The sand unit represents the major groundwater migration pathway due to its hydraulic properties (i.e., relatively thick and permeable). Groundwater in the bedrock unit is believed to generally flow east toward the Mississippi River. The primary pathways of flow within the bedrock are through secondary porosity features including fractures, joints, bedding planes, or solution cavities.

Groundwater at the site is encountered within three major water-bearing zones, as introduced previously. The uppermost zone is within the fill and silty clay that covers the entire site. The majority of the water in this zone is contained within the various sand lenses encountered in the silty clay; however, there are some zones of granular material in the fill that yield water. When separate, the units can only be contoured on a very local basis. This is due to characteristics such as the variable fill thickness and the silty clay unit being absent in certain areas and not containing water in certain areas. Therefore, they are contoured together and the groundwater potentiometric surface map for the fill and silty clay hydrostratigraphic unit is shown in **Figure 2-7.** The data contoured on the figure were gathered during a comprehensive gauging on February 2-4, 2005. **Table 2-1** provides the groundwater gauging measurements from February 2-4, 2005, i.e., the last sitewide gauging event. The map generally depicts water within the fill and silty clay moving radially off the bedrock high in the center portion of the site, with eventual discharge of groundwater into the Mississippi River lying east of the Site.

During previous investigations, slug tests were performed on various wells within the fill and silty clay. During this investigation, slug tests were performed on additional wells and piezometers screened in the fill and silty clay. Slug tests which effectively measure the most permeable material in the screened zone produced hydraulic conductivity values of 5.1×10^{-5} to 1.1×10^{-2} centimeters per second (cm/sec) for the fill and silty clay. These higher values are influenced by the more permeable granular material in the fill or sandy lenses in the silty clay.

The potential communication between the groundwater within the fill and silty clay and the river was evaluated during correlation monitoring conducted by O'Brien & Gere (1999). During this investigation, the communication between wells screened in the fill and silty clay at the FBCSA and Mississippi River was evaluated over a one year period. The O'Brien and Gere investigation (1999) determined that a negative or only minor communication existed between the groundwater in the fill and silty clay and the river. An investigation by URS (2007) determined that there is delayed communication between the fill and silty clay. It is speculated that the thin lenses of permeable material in the fill and silty clay unit are isolated and do not exhibit

significant communication with the river, but primarily serve as connective media with the underlying sand.

The entire thickness of the sand unit is generally confined with depths to water ranging from approximately 17 feet to 35 feet bgs. The overlying silty clay appears to confine the upper horizon of the sand unit, whereas the bedrock appears to confine the lower horizon of the sand unit. The groundwater flow direction in the sand is generally east, toward the river (**Figure 2-8**). The data contoured on the figure were gathered during a comprehensive gauging on February 2-4, 2005 (**Table 2-1**). Slug tests and pump tests performed during previous investigations produced average hydraulic conductivity values of 5.6×10^{-2} cm/sec for the sand located north and south of the bedrock high.

A comparison of the potentiometric surface in wells screened at different depths in the sand unit was conducted during the RFI Data Gap Investigation (URS, 2002). The comparison showed very little vertical component, which indicates that groundwater flow is generally horizontal. This indicates that the sand unit is the primary pathway for offsite migration.

Groundwater flow in the bedrock is expected to be through fracture, joint, bedding plane, and solution cavity systems. The flow direction in the bedrock is largely influenced by the orientation of corresponding fractures, joints, bedding planes, etc. in addition to recharge from or discharge to the river and the driving head of groundwater. Seven monitoring wells are screened in bedrock, including wells MW-2R, MW-8R, MW-13R, MW-21R, OBW-1, OBW-2, and OBW-3. Observations of groundwater elevation data in regards to the bedrock wells is summarized as follows:

- Wells MW-2R, MW-8R, OBW-1 and OBW-2 are bedrock wells above which the sand unit exists. Wells MW-2R and MW-8R are located along the eastern perimeter of the site and have associated wells MW-2B and MW-8B screened in the sand. Comparison of water levels in these wells show an upward hydraulic gradient. Wells OBW-1 and OBW-2 do not have associated wells screened solely in the sand.
- Wells MW-13R and MW-21R, and OBW-3 are located in the bedrock high where the sand unit is absent. The bedrock in this area is overlain with the fill and silty clay unit. Well MW-13R has an associated shallow well MW-13. Water levels in these wells suggest a downward gradient. MW-21R is located in the bedrock high and there are no shallow wells in the vicinity of this well. Well OBW-3 is located near well MW-9, which is screened in the fill and silty clay unit. Water levels reported for these two wells also suggest a downward hydraulic gradient

These results suggest that flow near the bedrock high area is vertically downward from the fill and silty clay to bedrock and, as the distance away from bedrock high increases, there is a reversal in the vertical direction of flow and flow is from bedrock to the sand unit. Water level measurements in bedrock wells suggest that the flow is generally from west to east (i.e., toward the river).

2.5 Ecology

The Site lies within an industrial / commercial area of St Louis, and the activities anticipated as a result of the interim measures described herein are not expected to affect areas of sensitive habitat or sensitive species. Ecological risks were evaluated as part of the site risk assessments using MDNR's Tier 1 checklists. Based on this, it was concluded that site-related constituents are not likely to result in ecological impacts at the site (RAM Group and URS, 2005A and URS, 2005B).

As part of the CA-750 Environmental Indicator evaluations, a detailed evaluation was conducted of the ecological impacts of groundwater from the FBCSA area discharging to the Mississippi River. The results of these evaluations concluded that the discharges were protective of the designated beneficial uses for the river, and were not adversely affecting ecological resources.

2.6 Previous Site Remedial Actions

To date, most of the site activities are related to site characterization actions, as summarized both previously and below with respect to the four SWMUs that are the concern of this IMWP. The following are remedial actions and related activities that have been conducted at the Former Queeny Plant:

- Small areas of soil impacted with PCBs were removed from the VV Building Area in 1993 and 2004 with disposal of excavated material at a TSCA-approved landfill.
- Removal of one UST and surrounding soil from the Former FF Building; it contained PCE and was known to have leaked
- Recovery of DNAPL (i.e., from the former PCE tank) from four deep recovery wells (REC-1 through REC-4) within the former FF Building area and associated with the former UST.
- Removal of four large ASTs and piping from the FBCSA

This IMWP provides remedial actions for the cleanup of the PCB-impacted soil area in the VV Building (SWMU) area to acceptable levels, and the cleanup of the three known LNAPL and residual LNAPL sources for groundwater contamination in the FF Building, FBCSA, and APA SWMUs.

3 NATURE AND EXTENT OF CONTAMINANTS

The four SWMU areas were identified during investigations conducted through 2005 based on analytical results showing exceedences of PCBs above the PRGs for PCBs, in the case of the VV Building area, and the presence of LNAPL and residual LNAPL that led to impacts to groundwater above acceptable concentrations in the three LNAPL source areas. **Figure 3-1** shows the location of the VV Building and the three LNAPL source areas. The nature and extent of contaminants for each SWMU is discussed below.

3.1 VV Building Area

Soil. The source of the impacts to soil in the VV Building Area (referred to as the Central Drumming Area) was uncontrolled releases during the transfer of bulk materials into smaller containers. In 1993, excavation of soil during replacement of a section of railroad track led to removal and offsite disposal of approximately 40 cubic yards of PCB-impacted soil. In 2004, excavation of soil while repairing a water line led to removal and offsite disposal of approximately 150 cubic yards of PCB-impacted soil.

In response to these two removal events, Monsanto/Solutia performed two phases of soil borings to the area in order to delineate PCB impacts to soil with a total of forty-eight borings advanced during the two investigation events. The first event occurred in 1994 with thirty-three borings (VP-1 through VP-33) advanced to delineate the extent of impacts within the upper three feet of soil. In 2004, another 15 borings were used to characterize soil to the depth of the water table or bedrock between 7 and 15.5 ft below ground surface (bgs). The combined results of these two investigations indicate that there are areas of PCB impact above the TSCA limit for leaving in place in a low occupancy area (i.e., 100 mg/kg). **Figure 3-2** shows the locations of the VV Building Area, the locations of soil borings conducted to date, and the extent of the PCB impacts to soil above PRG concentrations. **Table 3-1** provides data from the soil beneath the VV Building Area (URS, 2001 and 2007).

Groundwater. Monitoring wells have not been installed within the VV Building Area. Two monitoring wells will be installed in the area as part of the interim measures and as described in Section 6.

3.2 Former FF Building Area

A groundwater source area is located in the vicinity of the former FF Building. The source area lies generally north of the former FF Building. A summary of the results of investigations conducted at the former FF Building area is provided as follows.

Soil. During the RFI Data Gaps Investigation (URS, 2002), a total of 30 soil samples were collected for VOC analysis from 16 soil borings during investigations at the former FF Building Area (**Figure 3-3**). The key analytes identified in the former FF Building Area included toluene, chlorobenzene, benzene, ethylbenzene, PCE, and TCE.

The highest concentrations detected during the Data Gaps Investigation were detected in borings within approximately 50 ft of each other surrounding the former PCE UST (e.g., SB-B, SB-C,

SB-E, and SB-2). The impacts in soil, primarily PCE, extended to depths of approximately 10 ft bgs.

In 2004, eight soil borings, FF04-01 through FF04-08, were advanced within the former FF Building Area to better delineate the vertical and horizontal extent of potential VOC source areas and to evaluate remedial alternatives. Six of these boring locations, FF04-01 through FF04-06, were advanced to the water table at depths ranging from 20 to 35 feet and 12 soil samples were collected for VOC analysis. Temporary piezometers were installed in three of these soil borings.

In 2005, three soil borings (LPZ-4-GPB,-GPC and –GPD), were advanced within the former FF Building Area near piezometer LPZ-4 to help delineate the extent of NAPL. The borings were advanced to depths ranging from 16 to 24 feet and four samples were collected for VOC analysis. Temporary piezometers were installed in the vicinity of LPZ-4-GPB. Boring locations are shown in **Figure 3-3**, and piezometers and monitoring well locations are shown in **Figure 2-3**. **Figure 2-3** also shows the locations of NAPL based on this investigation.

In conclusion, the primary analytes of interest in soils in this area are PCE and TCE. These analytes are most prominent in a relatively limited area near the former UST. LNAPL, consisting primarily of toluene, was observed in a localized area in the fill and silty clay unit in the vicinity of LPZ-4, as shown in **Figure 2-3**.

Groundwater. Based on analytical results from monitoring wells and piezometers placed in the vicinity of the Former FF Building, the groundwater plume associated with the FF Building SWMU source area contains both LNAPL constituents, including benzene and toluene, and DNAPL constituents, including PCE, TCE, cis-1,2-DCE, and chlorobenzene. An associated groundwater impact area extends from the SMWU area toward the northern and eastern property boundaries, i.e., downgradient.

The following summary is based on data from the RFI Data Gaps Investigation (URS, 2002). Chlorobenzene and toluene were the primary constituents detected in samples from wells LPZ-1, LPZ-3 through LPZ-5, and PZ-FF3. In addition, chlorobenzene was detected in samples from wells MW-19, Piezometer-1, and REC-1 through REC-4, and toluene was detected in samples from wells LPZ-2 and PZ-FF2. The maximum concentration of chlorobenzene was 20 mg/l (MW-19). The highest concentrations of toluene were 660 mg/l in piezometer LPZ-4 and 5,700 mg/l in temporary piezometer PZ-FF3, each of which contained LNAPL. PCE, TCE, and DCE (i.e., halogenated volatile organic compounds, or HVOCs) were detected in samples from wells LPZ-1, LPZ-4, MW-3, and REC-1 through REC-4 at concentrations ranging up to 59 mg/l, 3.4 mg/l, and 19 mg/l, respectively. In addition, TCE and DCE were detected in MW-17 and PZ-FF3 and DCE was detected in LPZ-2, LPZ-5, and PZ-FF2. Vinyl chloride was detected in LPZ-1, LPZ-2, LPZ-4, LPZ-5, MW-17, MW-2B, MW-3, PZ-FF2, PZ-FF3, REC-3, and REC-4, with concentrations ranging up to 2.5 mg/l. These analytical results indicate that the highest concentrations of PCE within the fill and silty clay unit were detected in samples collected from wells within the former UST area and downgradient (i.e., northeast) from the former UST. Elevated concentrations of PCE and related degradation constituents were also found in the bedrock monitoring wells OBW-1 through OBW-3.

The continued presence of DNAPL within the fractured bedrock groundwater system suggests that there is little that can be done in the short term regarding remediation of DNAPL and residual DNAPL within the bedrock groundwater system. As a result, this IMWP will not focus on DNAPL or residual DNAPL found within the bedrock groundwater system; however, the actions proposed in this IMWP will help facilitate the degradation of DNAPL and residual DNAPL in the unconsolidated soil zone. The HVOCs in groundwater will be addressed within a future plan that addresses long-term groundwater issues. **Table 3-2** provides results from 2004 and 2005 groundwater sampling presented in the CMS (URS, 2007) for the Former FF Building area. Analytical results from groundwater taken during due diligence work by EOI in March 2008 (discussed in Section 3.5, below) indicate that concentrations of most constituents of concern have diminished within the fill and silty clay unit since 2004 and 2005 groundwater sampling.

LNAPL and DNAPL. LNAPL and DNAPL have both been observed at the former FF Building Area, in the past. Based on a number of groundwater and NAPL gauging events, LNAPL (composed primarily of toluene - CMS, 2007) and DNAPL are found within the overall source area as several discrete areas as presented in **Figure 2-3**. LNAPL was present in a limited area surrounding LPZ-4 and extending south, near temporary piezometer PZ-FF-3. During 2000, LPZ-4 contained approximately 6.06 feet of LNAPL. PZ-FF1, was placed mid-way between piezometer LPZ-4 and well REC-2. The piezometer was screened across the same interval as piezometer LPZ-4. No LNAPL was observed in this piezometer. A second temporary piezometer, PZ-FF2, was then installed mid-way between piezometers LPZ-4 and PZ-FF1. No LNAPL was observed in this piezometer. A third temporary piezometer, PZ-FF3, was then installed mid-way between piezometers LPZ-4 and PZ-FF2. Approximately 0.38 ft of LNAPL was measured in piezometer PZ-FF3. Groundwater samples for VOC analysis were collected from piezometers PZ-FF2 and PZ-FF3. The temporary piezometers were removed at the end of the Data Gap Investigation field work. Possible DNAPL was observed during the Data Gap Investigation field activities in wells LPZ-3, REC-3, and OBW-2. DNAPL was recovered from REC-1 through REC-4 for several months in 1987.

During one of the activities associated with the Data Gaps Investigation, LNAPL from piezometer LPZ-4 was purged in order to monitor LNAPL recovery. Initially, the piezometer contained approximately 6.06 ft of LNAPL which was purged dry on June 2, 2000. Within approximately two hours after purging, approximately 0.93 ft of LNAPL had accumulated. The following day (after approximately 22 hours), LNAPL was measured at 1.19 ft. Subsequent measurements completed on June 27th, July 7th and July 31st indicated 1.21 ft, 1.67 ft, and 5.70 ft of LNAPL, respectively, thereby indicating the LNAPL accumulation in the piezometer had returned to approximately pre-purging levels.

Boring and piezometer locations for the FF Building Area are shown in **Figures 3-3** and **Figure 2-3**, respectively. Gauging conducted during due diligence work in March and August 2008 (discussed in Section 3.5, below) did not show the presence of LNAPL in any of the measured wells, and groundwater sampling from several of the monitoring wells in the FF Building Area indicate a significant reduction in LNAPL and DNAPL constituents, especially within the fill and silty clay unit.

3.3 Former Bulk Chemical Storage Area

Another groundwater source area is located at the FBCSA. This source area extends approximately over the eastern half of the FBCSA to the eastern property boundary along Wharf Street. Investigations at the FBCSA have been performed to identify the extent of impacts in soil and groundwater, and to identify the extent of LNAPL within the FBCSA. Additionally, an investigation was conducted to delineate vertical impacts in groundwater offsite and downgradient of the FBCSA. Summaries of the investigations conducted at the FBCSA are provided as follows.

Soil. Several phases of soil investigations have been conducted for the FBCSA. Sampling locations from the RFI Data Gaps Investigation and the CMS investigation activities are shown in **Figure 3-4 and 3-5**, respectively. The key analytes identified in soil from the FBCSA included: chlorobenzene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno-(1,2,3-cd)pyrene, naphthalene, nitrobenzene, antimony, arsenic, barium, beryllium, cadmium, chromium, lead, and thallium.

In 2004 during supplemental investigations for the CMS, the analyses showed that chlorobenzene and benzene, toluene, ethylbenzene and xylenes (BTEX) were the main constituents of concern within the soils at the FBCSA. PCE was detected in one sample FBCSA04-04 at a concentration of 0.01 mg/kg and from a depth of 4 feet bgs.

In summary, the most significant soil impact in the FBCSA was observed on the southern and eastern portions of the site, in samples from ground surface to approximately 11 ft bgs. Sample results for chlorobenzene indicated relatively higher concentration in the southern portion of the area. The greatest SVOC concentrations occurred on the east side of the SWMU. The eastern portion of the SWMU also contained the highest concentrations of metals found in soil. The presence of impacts to soil will be addressed through placement of a cap over the FBCSA as part of redevelopment activities. The concern of the IMWP is focused on the source material for groundwater found within the capillary fringe and upper saturated zone and comprised of VOC constituents.

Groundwater. The key analytes detected in groundwater beneath this area were benzene, toluene, ethylbenzene, xylenes (BTEX), chlorobenzene, and vinyl chloride, and to a lesser extent PCE, TCE, and cis-1,2 DCE. During CMS field activities conducted in 2004 and 2005, groundwater samples were collected during four separate events from the seven existing monitoring wells (i.e., MW-24A, -24B, -25A, -25B, VW-1, VW-2, and VW-2B); and three events for the monitoring wells installed during the CMS activities downgradient of the FBCSA and along the bluff of the Mississippi River (i.e., MW-31B through MW-35B). These monitoring wells were sampled to characterize potential onsite hot spots and sources, to characterize the groundwater plume, and to assess groundwater conditions over time. Additionally, vertical profiling of groundwater was conducted by collecting groundwater samples as deep boreholes were advanced east, south, and beneath the FBCSA. These deep borehole profiles (labeled RP-1, -2A, -2B, -3, -4, -5, -6, and -7) were used to identify depths for the monitoring wells installed downgradient of the FBCSA (i.e., monitoring wells MW-31B

through MW-35B). The locations of the monitoring wells as well as profiling boreholes RP-1 to RP-7 are shown in **Figure 3-5**, and the results from analyses in 2004 are presented in **Table 3-3** and summarized as follows.

- Monitoring wells MW-24A, -25A, VW-1 and VW-2 are screened across the fill and silty clay. Chlorobenzene and BTEX were shown to be the predominant constituents in shallow groundwater at the FBCSA.
- Monitoring wells MW-24B, -25B, VW-31B, -32B, -33B, -34B, -35B, and VW-2B are screened in the sand. Chlorobenzene and BTEX were the predominant constituents in the sand groundwater unit at the FBCSA. Cis-1,2 DCE and vinyl chloride were also detected in several of these monitoring wells.
- PAHs were detected in samples from wells MW-24A, MW-25A, VW-1, and VW-2 with concentrations ranging up to 0.053 mg/l for individual constituents. The most commonly observed PAH constituents in the former Bulk Chemical Storage Area were naphthalene, benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene. The low concentrations and properties of PAHs suggest that their presence may be related to sediment entrained during sample collection, and the concentrations of PAH compounds are not considered high enough to view this area as a source for PAHs in groundwater.
- The results of sampling downgradient monitoring wells MW-31B to MW-35B which lie within the sand unit indicate the presence of benzene, chlorobenzene, and vinyl chloride with some of the detected concentrations above MCLs.

Analytical results from groundwater taken from the FBCSA during due diligence work by EOI in March 2008 (discussed in Section 3.5, below) indicate that concentrations of most constituents in sampled monitoring wells VW-1 and MW-25B diminished since the 2004 and 2005 groundwater analyses. However, concentrations of most VOC constituents in monitoring well MW-24A (which contained LNAPL) increased relative to the 2004 and 2005 sample events.

LNAPL and DNAPL. Numerous groundwater gauging and sampling events and several subsurface investigations have been conducted over the years to confirm the presence and delineate the extent of residual or free phase NAPL. Specific work was completed during CMS site investigations to further delineate the extent of LNAPL around well MW-24A. During drilling of soil borings and use of temporary piezometers in and around MW-24A, limited LNAPL was observed in gauging of MW-24A and the temporary piezometers. LNAPL was observed during nine of ten gauging events measuring from a sheen to 0.23 feet in MW-24A with a sheen also observed in FBCSA-PZ-2.

Also during CMS activities, monitoring well MW-35B was installed to assess potential DNAPL in the vicinity of the highest detected chlorobenzene concentrations in groundwater in the vicinity of the FBCSA. Monitoring well MW-35B was screened directly above bedrock. Numerous gauging events were conducted, and DNAPL was not observed in MW-35B or any other well.

Potential LNAPL was observed during the profiling of RP-2A which is located downgradient (east) of the FBCSA along the Mississippi River bluff. A soil boring was drilled and a temporary piezometer (RPZ-1) was installed to verify the presence or absence of LNAPL. Numerous gauging events were conducted, and LNAPL was not observed in RPZ-1.

LNAPL was observed in a temporary piezometer FBCSA-PZ-5 (located in the approximate center of the FBCSA) during profiling activities conducted at the FBCSA. Fifteen additional soil borings were drilled and temporary piezometers (FBCSA-PZ-7 through FBCSA-PZ-21) were installed to delineate the extent of LNAPL in the central portion of the FBCSA. Numerous gauging events were completed to evaluate for the presence of LNAPL in these temporary piezometers. The results of the gauging indicate the following with respect to LNAPL at the FBCSA, and these results are also presented in **Figure 2-5**:

- Minimal LNAPL (<0.1-foot thick) was sporadically observed in FBCSA-PZ-1, -4, -6, -7, -8, -10, -11, -14, -15 and wells MW-25A and VW-2.
- LNAPL measuring 0.1 – 1-foot thick was observed in FBCSA-PZ-2 and -20 and well MW-24A
- LNAPL at times measured in feet was observed in FBCSA-PZ-5, -16 and -17 (as much as 7 feet).

Bail-down tests were completed on FBCSA-PZ-5 during the CMS activities. The bail-down tests determined that product is very slow to recharge into the piezometer (after one month 0.63 feet of the initial nearly 5 feet removed had recharged into the piezometer). One LNAPL sample was collected from FBCSA-PZ-5 for characterization. The results show that the product is composed primarily of chlorobenzene, benzene, and ethylbenzene.

In conclusion, previous investigations have not revealed any evidence to indicate the presence of DNAPL at the FBCSA. Furthermore, the extent of LNAPL appears to be relatively isolated to a few small areas within the FBCSA. The LNAPL and residual LNAPL in the central portion of FBCSA appear to be composed primarily of chlorobenzene, benzene, and ethylbenzene. Gauging conducted during due diligence work in March and August 2008 showed the presence of LNAPL only in MW-24A at a thickness of 0.13 ft.

3.4 Former Acetanilides Production Area

The third groundwater source area is located at the APA located in the approximate center of the Former Queeny Plant. This source area covers a circular area approximately 50 feet in diameter including a cluster of four monitoring wells (i.e., GM-1, GM-2, GM-3, and MW-14) and potentially the area surrounding former piezometer APA-PZ-3 lying north of the aforementioned four monitoring wells. A summary of the results of investigations conducted at the APA is provided as follows.

Soil. A total of 25 soil borings were advanced during previous investigations, and two soil borings were advanced during the Data Gap Investigation in the former Acetanilides Production Area. A total of 48 soil samples were collected and analyzed for combinations of VOCs,

SVOCs, pesticides, PCBs, and metals. Sample locations are shown in **Figure 3-6**. The key analytes identified in the APA included: alachlor, chlorobenzene, TCE, benzo(a)pyrene, arsenic, beryllium, and mercury. Alachlor and chlorbenzene were the most prevalent constituents, detected primarily in the upper 8 to 10 feet below ground surface.

Groundwater. The APA is located above and on the southeastern side of the bedrock high. The associated groundwater impact follows the radial groundwater flow off of the bedrock high. As such, the impacted groundwater appears to extend to near the eastern and southwestern property boundaries. The key analytes identified in this source area and within the groundwater plume are principally chlorobenzene, and alachlor, with considerably lower concentrations of PCE and the associated degradation constituents (i.e., TCE, cis-1,2 DCE, and vinyl chloride).

Chlorobenzene and alachlor were detected at extremely high concentrations in piezometer APA-PZ-3, which also contained DNAPL. The concentration of alachlor from the 2004 sampling of APA-PZ-3 was 1,400 mg/l, or above the solubility limit of approximately 250 mg/l. In addition, the concentration of alachlor in well MW-14 from 2004 (220 mg/l) is near its solubility limit. The sample from MW-14 was tinted red, which, according to Solutia, is the color of the dye that was mixed in the Lasso™ formulation. The concentrations of chlorobenzene ranged up to 180 mg/l mainly within the source area (i.e., the cluster of four monitoring wells); however, the presence of chlorobenzene in groundwater appears to extend downgradient, albeit at much lower concentrations, to the eastern and southwestern property boundaries (i.e., represented by wells MW-13, MW-15, and MW-4). **Figures 2-4 and 3-7** show the locations of the piezometers and monitoring wells associated with the APA, and **Table 3-2** provides analytical results from groundwater sampling in this area during CMS activities in 2004 (URS, 2007).

Analytical results from groundwater taken during due diligence work by EOI in March 2008 (**Table 3-4**, discussed in Section 3.5, below) indicate that concentrations of most constituents of concern have diminished since the 2004 groundwater analyses.

LNAPL and DNAPL. DNAPL was observed in one of the temporary piezometers, APA-PZ-3, during the 2004 site investigation. Three additional piezometers (APA-PZ-7 through APA-PZ-9) were installed to further delineate the extent of the DNAPL. During the CMS, several gauging events were completed to evaluate the presence of DNAPL at the APA. The results of the gauging events indicate the following:

- Fluid level measurements taken at APA-PZ-3 indicated between 0.05 and 1.45 feet of free product.
- Bail-down tests completed on APA-PZ-3 determined that product is very slow to recharge into the piezometer (approximately 80% of the 0.06 feet of product that was removed had recovered over a two week period).
- A DNAPL sample for characterization was collected from APA-PZ-3. The results show that the product in APA-PZ-3 is comprised primarily of chlorobenzene, toluene, xylenes, 1,2,4-trimethylbenzene, and alachlor.

The extent of NAPL appears to be limited to a relatively small area around APA-PZ-3, and the high concentration of alachlor above the solubility limits in groundwater (1,400 mg/l from the 2004 sampling event) indicates that alachlor is a major component of the NAPL. The concentration of alachlor in well MW-14 (220 mg/l) is near its solubility limit, and the concentrations of alachlor in GM-1 (92 mg/l) and GM-2 (70 mg/l) indicate that these monitoring wells lie within the potential residual NAPL source area. Gauging conducted during due diligence work in March and August 2008 did not show the presence of LNAPL in any of the gauged wells.

3.5 Due Diligence Scope of Work

Prior to finalizing the sale of the Former Queeny Plant to SWH Investments II, EOI performed several tasks as due diligence. The Due Diligence scope of work targeted the four SWMU areas. The purpose of the Due Diligence scope of work was to provide data and information that assists in establishing the environmental liabilities and related cost estimates. The data also allowed comparison to previous data and assessment of changes to source areas and groundwater concentrations over this period of time. Due to the expedited nature of the Due Diligence, it is acknowledged that there was no EPA-approved quality assurance project plan (QAPP) or work plan in advance. However, industry standards for the collection of technically-defensible data were followed and the data reports are included on a CD enclosed with the IMWP.

The following describes the due diligence work conducted for each area. This work was performed in March 2008 with a gauging event also conducted in August 2008.

Former FF Building Area

- Gauged monitoring wells identified as within the Former FF Building LNAPL source area.
- Re-developed and sampled selected monitoring wells to provide data for groundwater plumes within the shallow fill and silty clay unit source area (LPZ-2, LPZ-3, and LPZ-4) and the bedrock aquifer (OWB-2), and downgradient of the plume (MW-17). The groundwater was analyzed for VOC's, only. The results from 2008 provided an assessment of the changes within the groundwater plume since the last sampling events in 2004 and 2005.
- Advanced three probeholes using a geoprobe within the source area in order to select soil samples for the analyses of Total Petroleum Hydrocarbons – Diesel Range Hydrocarbons (TPH-DRO) and Total Petroleum Hydrocarbons – Oil Range Hydrocarbons (TPH-ORO) using US EPA Method 8015, and Total Petroleum Hydrocarbons – Gasoline Range Hydrocarbons (TPH-GRO) using US EPA Method 8260. The soil samples were selected based on PID information from the soil cores and proximity to the capillary fringe (i.e., targeted collection of one sample from within the capillary fringe based on groundwater elevations). Results from the soil analyses were used to estimate total hydrocarbon mass and to develop the potential costs for removal of LNAPL and LNAPL residues within the source area.

Former Acetanilides Production Area

- Gauged monitoring wells identified as within the APA potential NAPL source area.
- Re-developed and sampled selected monitoring wells to provide data for the groundwater plume within the shallow fill and silty clay unit source area (GM-1, GM-2, and MW-14) and downgradient of the plume (MW-13). The groundwater was analyzed for VOC's using Method 8260 and Pesticides (i.e., alachlor) using Method 8081, and the results of the March 2008 data were compared to the 2004 data.
- Advanced two probeholes using a geoprobe within the source area in order to select soil samples for analyses of TPH-ORO, TPH-DRO, TPH-GRO, and alachlor. Results from the soil analyses were used to estimate total hydrocarbon mass and to develop a cost estimate for removal of NAPL and NAPL residues within the source area.

Former Bulk Chemical Storage Area

- Gauged monitoring wells within the FBCSA source area. Gauging identified whether free product is present within the FBCSA.
- Re-developed and sampled selected monitoring wells to provide data for the groundwater plume within the shallow fill and silty clay unit source area (VW-1, MW-24A, and MW-24B). The groundwater was analyzed for VOC's, only, and the results of the March 2008 data were compared to the 2004 and 2005 data.
- Collected soil samples from three probeholes located within the FBCSA to identify total mass of organic material for injection of chemical reagents to remove LNAPL and LNAPL residual material. The analyses were for TPH-ORO, TPH-DRO, and TPH-GRO.
- Installed three temporary piezometers within the three probeholes to identify whether LNAPL is present within the approximate center of the FBCSA.

VV Building Area

- Advanced nine geoprobe holes in selected locations to refine the lateral and vertical extent of PCB-impacted soil in the VV Building Area. The probeholes were located in the vicinity of the northern and southern impacted soil zones as follows: west of the southern impacted soil zone (i.e., outside the southeastern edge of the building), east of the easternmost data point which identifies the southern impacted soil zone (i.e., east of former boring VP-12), and north and east of the northernmost impacted soil point (i.e., north of former boring VV04-12). Soil was collected for analysis of PCBs using Method 8082 to refine the lateral and vertical extent of PCB impacts to soil for purposes of estimated costs to excavate, transport, and dispose in a TSCA-approved landfill.

Gauging. More than a dozen monitoring wells were gauged for water levels and the presence of LNAPL in March and again in August 2008 within the three groundwater source areas. In addition, there were three temporary piezometers (EOI-06, -07, and -08) that were gauged to assess whether LNAPL was present within the center of the FBCSA. In cases where the wells were less than 60 feet deep, the gauging also looked for the possible presence of DNAPL; thus, the deep bedrock wells were not able to be gauged for DNAPL.

In summary, only one well, MW-24B in the FBCSA, contained LNAPL, a measured thickness of 0.13 ft. There was no indication of DNAPL in any of the shallow (i.e., less than 60 ft) gauged wells.

Groundwater Sampling in Groundwater Source Areas. Groundwater sampling was performed for 12 monitoring wells in March 2008 in order to provide an indication of concentration changes for key constituents with respect to previous sampling events. The results for the sampling event are provided in **Table 3-4**. Based on comparison of the March 2008 data with 2004 and 2005 data, concentrations for key VOC constituents (and alachlor in the case of the APA) in the March 2008 sampling event were largely reduced from previous sampling results. The exception was in the FBCSA in the case of monitoring well MW-24A where LNAPL was found, and the concentrations of VOC constituents were higher in 2008 than in 2004 and 2005. Since the objectives of the data were to support business decisions related to both short-term and long-term costs, there is no discussion of the data provided other than the generalizations noted above.

Soil Sampling Results in Groundwater Source Areas. A total of 16 soil samples were analyzed from eight separate probeholes (i.e., two soil samples from each probehole). The analyses for alachlor, TPH-ORO, TPH-DRO, and TPH-GRO were used to help assess potential costs for the interim actions described herein. These data provided indication of total potential source material that would need to be addressed by remediation. The samples from the FBCSA indicate elevated TPH-GRO, especially in EOI-01 and EOI-03 at between 12 and 14 ft bgs. Conversely, the samples from the Former FF Building Area (EOI-06, -07, and -08) indicate that there are relatively low concentrations of TPH. The samples from the APA (EOI-04 and -05) show elevated concentrations of TPH-GRO and alachlor especially at depths of 9 to 10 ft bgs. The results of soil analyses are presented in **Table 3-5**.

Soil Sampling Results in VV Building Area. A total of nine geoprobe holes were advanced to collect seven soil samples VV Building Area. Soil samples were collected to bracket the depths and extent of potential excavation. Five of the geoprobe holes were advanced in the southern PCB soil area near the southeastern corner of the VV Building (VV-S1 through -S5) to collect six soil samples, and four of the geoprobe holes were advanced in the northern PCB soil area near the northeastern corner of the VV Building (VV-N1 through -N4). In the case of the northern area, the primary objective was to collect soil samples from greater depths that previously; however, bedrock was encountered at approximately the same depths as previously sampled (i.e., 12 to 15.5 ft). Therefore, only one soil sample was taken from the northern area. **Table 3-1** provides the results of soil sampling in the VV Building Area from the due diligence investigation.

The results of the soil sampling for PCBs combined with the sample results by URS from the RFI Data Gaps Investigation (1994) and the CMS Investigation (2004) indicate that there are two areas requiring excavation. The northern area consists of approximately 3000 square feet (333 square yards) of area that will require excavating to depths of up to 15.5 feet. The southern area consists of approximately 4200 square feet (466 square yards) that will require up to depths of approximately seven feet. The presence of shallow bedrock in these areas suggests that bedrock

may be encountered in either area during the excavations. **Figure 3-2** shows the approximate extent of these excavation areas.

4 REMEDIAL GOALS

The interim measures identified in this IMWP are designed to facilitate redevelopment of the property and are consistent with suggestions from USEPA regarding the CMS review as well as discussions between EOI and USEPA conducted during the period prior to the transfer of the property from Solutia to SWH Investments II.

4.1 RAOs and Site-Specific PRGs

The RFI Data Gaps Investigation Report (URS, 2002) and the CMS (URS, 2007) identified the primary sources, release mechanisms, migration pathways, receptors, and exposure routes for the Site and provided the basis for the identifying interim measures for the Site. RAOs and site-specific PRGs were developed as follows.

VV Building Area RAOs and PRGs. The RAO for the VV Building Area is to excavate and remove soil with concentrations above the PRG. The PRG for the VV Building Area is established from TSCA PCB regulations at 40 CFR 761.61 as the total PCB concentration of 100 mg/kg in soil. Soil containing concentrations above the PRG will be excavated, transported, and disposed at a TSCA-approved facility; once confirmation sampling has been completed and all soil above the PRG has been hauled away, the excavation will be backfilled to grade using clean fill material shortly after confirmation sampling results have indicated excavation has been completed. PCB concentrations in soil above 10 mg/kg and less than 100 mg/kg are considered permissible to leave in place if there are appropriate environmental restrictions, since the property will remain industrial / commercial. These restrictions will include surface barriers that prevent potential exposure to site workers and trespassers, and there will be institutional controls to assure that the area remains covered by the barrier. (These institutional controls will be addressed in the Corrective Measures Implementation Work Plan).

Groundwater Source Area RAOs and PRGs. The RAO for the groundwater source areas are to remove LNAPL and residual LNAPL mass to the extent practicable in order to diminish, if not remove, potential sources of vapors and groundwater contamination. Implementation of the remediation of groundwater will facilitate future redevelopment areas. Additionally, the remediation of source areas is expected to facilitate natural attenuation of respective groundwater plumes. Final cleanup of groundwater will be addressed through alternate concentration limits established through USEPA Technical Impracticability Guidance (OSWER Directive 9234.2-25).

The site-specific PRG is to reduce contaminant mass within the source areas by 75%. LNAPL does not collect in monitoring wells (as evidenced by recent gauging events) but still remains within the smear zone just above and just below the water table as residual LNAPL. The removal of 75% of the mass will removal the prospect of LNAPL flow, and it will significantly remove residual concentration to facilitate natural attenuation processes. In order to assess removal of the residual LNAPL, a benchmark concentration will be established for VOCs in groundwater sampled from "indicator wells" installed in the unconsolidated silty clay hydrogeologic unit within or immediately downgradient of source areas. This concept assumes that there is equilibrium between the mass of residual LNAPL and groundwater thus reflected by elevated

concentrations in groundwater. At least two sampling events from these wells will be used to establish the baseline concentration. Concentrations of TPH-GRO in soil will be used as surrogates to establish the extent of the source areas and thus determine the areas requiring remediation (i.e., interim measures). Once injection (the selected remediation technology) events have occurred, concentrations of VOCs in groundwater within the source areas will be monitored to establish the effectiveness of injections and determine if additional injection events are necessary. Each of these is discussed as follows.

4.2 Surrogate Soil Concentrations and Groundwater Effectiveness Indicators

Surrogate Soil Concentrations. Due to partitioning of VOC constituents found within the solids (i.e., adsorbed to naturally occurring organics and clays), liquids (i.e., residual LNAPLs), and dissolved phase constituents in groundwater, concentrations in groundwater will reflect an equilibrium with the source material found in the subsurface. This suggests that groundwater concentrations can be expected to reflect concentrations in soil, and vice versa. While groundwater may flow three-dimensionally, source material composed of residual LNAPLs will reside primarily in the capillary fringe and upper saturated interval.

To ensure delineation of a multiple-constituent source material, a single parameter will be used to identify soil source material mass if that parameter quantifies the constituents comprising the source material. The extent of the groundwater source areas, and hence the limits of the injection areas, will utilize a surrogate concentration (i.e., TPH-GRO) in soil as the single soil parameter. Once the limits of source material in soil have been identified, VOC concentrations in groundwater (and alachlor, in the APA) will be used to establish the effectiveness of interim remedial measures. The reduction of source material by interim remedial measures will shorten the expected time for long-term groundwater monitoring as well as reduce and possibly eliminate concerns for potential vapor intrusion in redevelopment over source areas.

The justification for using TPH-GRO concentrations from soil to delineate the source material is as follows. TPH-GRO concentrations include the aggregate concentrations of carbon-based liquids and solids containing less than twelve carbon atoms in a chain (i.e., C12). Thus, TPH-GRO analytical results will identify the majority, if not all of VOCs within the groundwater source areas that include BTEX and HVOC constituents, as well as alachlor. Further support for the use of TPH-GRO in soil is provided by results of analyses obtained during due diligence sampling. TPH was present in soil and groundwater within the source areas including TPH-GRO, TPH-DRO, and TPH-ORO components. As indicated in the due diligence data for soil (**Table 3-5**), the highest mass of TPH (including TPH-GRO, -DRO, and -ORO components) is found in the following samples from the depths that approximate the water table horizon: EOI-01 at 12 ft, EOI-03 at 14 ft, EOI-04 at 10 ft, and EOI-05 at 6 ft. The primary constituents of concern, including benzene, chlorobenzene, toluene, alachlor, and the HVOC constituents, are comprised in the TPH-GRO fractions.

Review of groundwater data from the source areas (**Table 3-4**) indicates that the sum of the concentrations of VOC components closely correlates to the concentration of TPH-GRO. For example, the results of monitoring well GM-1 within the APA show the sum of concentrations of all VOCs (and alachlor) to be approximately 121,000 ug/L, whereas the TPH-GRO concentration is 113,000 ug/L. Since chlorobenzene and alachlor comprise approximately 99% of the total

mass of constituents in monitoring well GM-1, it is inferred that the TPH-GRO concentration (i.e., at slightly less than the sum of the chlorobenzene and alachlor) is predominantly chlorobenzene and alachlor.

The criterion concentration for TPH-GRO that is used to establish the limits to source areas and hence the limits of the injection areas is based on MRBCA Lowest Default Target Levels (DTLs) for Residential Land Use, which is a concentration for TPH-GRO of 346 mg/kg; the DTL represents the concentration for TPH-GRO for subsurface soil that is deemed protective of residential land use (MDNR, 2005). Its use provides a single constituent to identify the extent of the source in soil as opposed to adding up the concentrations of all COCs (e.g., BTEX, HVOCs, and alachlor). While the property is not planned for residential use, it is recognized that the LNAPL and residual LNAPL comprising COCs within these source areas consist of constituents that have relatively low action levels, thus justifying use of residential over the industrial criteria.

Groundwater Injection Effectiveness Indicator. Once the area of injection has been established, groundwater sampling results from "indicator" wells within and extending outside the injection zones (possibly more than one sampling event) will be used to provide indication that injection has diminished the source material. Thus, it is concluded that diminished groundwater concentrations will correspond to diminished source material mass as a result of injection of the chemical reagents. With the PRG of 75% reduction of mass in the soil, the groundwater criteria used to indicate that source material has been diminished to an acceptable concentration is also a 75% reduction in COCs within groundwater within the source areas.

The primary COCs that will be monitored within the applicable source area includes alachlor, benzene, chlorobenzene, toluene, and HVOCs. Groundwater monitoring will be conducted from the indicator wells within and outside of the injection zone following injection events, and sampling will be for VOCs and alachlor (APA only) using EPA Methods 8260 and 8081, respectively. It may take several quarters for groundwater samples to equilibrate with soil. Thus, at least two quarterly groundwater sampling events will be performed prior to the evaluation of whether 75% reduction of mass has occurred.

4.3 Dust and Vapor Monitoring

Air monitoring and sampling associated with the PCB-impacted soil excavation and removal is not necessary due to PCB's low volatility. However, dust (which may contain PCB concentrations) will be monitored within the breathing zone of the excavation areas of the VV Building area. Efforts will be made to control the generation of fugitive dust by either modifying excavation procedures, or use of water to wet the soil.

The Updated Risk Assessment and Conceptual Risk Management Plan (RAM Group, Inc. and URS, January 2007) indicates that indoor air exposure presents an unacceptable potential future risk for workers in buildings that may be constructed in the three groundwater source areas: the Former FF Building Area, the FBCSA, and the APA. Environmental restrictive covenants will be placed over the source areas with concentrations that exceed risk-based levels for indoor air exposure unless additional vapor sampling and risk assessment indicate that the restrictions are unnecessary. Additional vapor intrusion study and risk reassessment would be submitted in a separate work plan for EPA review and approval. Any deed restrictions or institutional controls

established at the Queeny Plant will be in the form of an environmental covenant and meet the requirements of the Missouri Environmental Covenants Act, RSMo Section 260.1000 through 260.1039.

5 INTERIM MEASURE EVALUATION

An evaluation was prepared for this IMWP to identify the most technically efficient and cost effective approach to identify the technology to employ at each of the four SWMUs. A summary of this evaluation is provided in this section.

5.1 Removal Action Goals

The goals of the interim measures for the VV Building Area are the following:

- Remove impacted surface and subsurface soil (i.e., PCB concentrations above 100 mg/kg) in order to decrease potential exposures by current and potential future receptors.
- Reduce potential exposures to impacted soil remaining after the soil with concentrations above 100 mg/kg has been removed (i.e., for soil concentrations remaining above 10 mg/kg and below 100 mg/kg) by covering with clean soil/fill or a hard surface, such as asphalt.

The goals of the interim measures for the groundwater contamination source areas are the following:

- Remove LNAPL to the extent practicable from the subsurface soil in order to decrease potential exposures to future receptors.
- Remove residual LNAPL and groundwater contamination source material from the subsurface soil and groundwater to the extent practicable to diminish the spread of and facilitate the reduction of concentrations within the groundwater plume.

5.2 Evaluation of Interim Measure Alternatives

The following interim measure alternatives were considered for the VV Building Area:

- Excavation and offsite disposal;
- Ex-situ treatment and disposal;
- Institutional controls; and,
- No action.

Engineered barriers were not considered due to TSCA regulations which prohibit concentrations of 100 mg/kg being left in place over an active site. Engineered barriers are considered appropriate for the areas where PCB concentrations are less than 100 mg/kg, and the VV Building areas remaining in place with soil concentrations above 10 mg/kg and below 100 mg/kg will be subject to institutional controls addressed in a future action. The institutional controls will include capping of these areas and deed restrictions noting the surveyed extent of the areas.

The following interim measure alternatives were considered for the three groundwater source areas:

- Extraction, capture, and treatment;
- In Situ treatment of source material;
- Remediation by monitored natural attenuation (MNA)
- Institutional controls; and,
- No action.

Each alternative was evaluated based upon effectiveness, implementability, and cost. Discussions and evaluations of each alternative are provided in Appendix A. The results of this evaluation led to selection of excavation of PCB-impacted soil and offsite transport with clean fill replacement for the Building VV Area; and the use of In Situ treatment for groundwater contamination source areas. The descriptions of the selected alternatives are presented below.

5.3 Description of Interim Measures

VV Building Area

Excavation and offsite transport with clean fill replacement in excavated areas is the selected interim measure to address impacted soil above PRGs in the VV Building Area. Excavation completely removes impacted soil, and offsite disposal removes the impacted material from potential future consideration of health and safety at the Site.

Preliminary Investigation. Preliminary investigations will be conducted in the VV Building Area to identify whether non-porous surfaces (i.e., asphalt and concrete) are impacted by PCBs and to refine the limits of excavation. These activities are described more completely in Section 6, below.

Excavation. Excavation would be performed to the approximate extent of contamination based on previous analytical sampling (i.e., from 1994 and 2004 sampling events) supplemented with information from the forthcoming Preliminary Investigation. Once excavated, the limits of excavation would be sampled and compared to the PRG criterion (i.e., total PCB concentration in soil of 100 mg/kg) by sampling and analyses at the extents of excavations (i.e., sidewall and bottom sampling). **Figure 3-2** shows the extent of PCB impacts above the PRG based on existing data.

Confirmation Sampling. Once the soil is excavated, the bottoms and the sidewalls of the excavations will be sampled (using composite sampling, describe in Section 6) to confirm that the PRG is met. Additional removal of soil will be undertaken where the confirmation sample(s) is not met. Once confirmation sampling reveals that the soil above the PRG has been removed, the hole will be backfilled using clean fill material. The clean material may include clean crushed concrete, asphalt, and soil from other Site locations or from offsite locations. Confirmation sampling will not be performed where building foundation prevents access to soil.

Transport, Disposal, and Backfilling. Excavated material will be loaded on trucks certified for hazardous waste hauling for disposal at a Subtitle C landfill that accepts TSCA waste. Heritage Landfill in Roachdale, Indiana, is the likely candidate to receive this material. The excavation

would be backfilled using clean material in order to maintain the natural surface level, drainage, and topography.

Delineate Extent of PCB Impacts in Soil Requiring Cap. The soil having concentrations of PCBs between 10 mg/kg and 100 mg/kg will required a surface cover to prevent potential exposure. Based on soil analytical data from 1994, 2004, and 2008, the areas having soil greater than 10 mg/kg are largely delineated. However, several areas are not bound by definitive data. A delineation task will be performed following receipt of the post-excavation soil confirmation data. This task is described in Section 6.

Monitoring Well Installations. Two monitoring wells will be installed in the VV Building Area in order to evaluate if there were impacts to groundwater from the area. **Figure 3-2** shows the proposed locations of these two wells, one approximately downgradient of each excavation area. The monitoring wells will be constructed using a geoprobe rig. The SOP provided in the QAPP provides the procedures that will be used for installation of monitoring wells. The exact location will be determined based on the extent of excavations of the PCB-impacted soil. The monitoring wells will be constructed using 2-inch PVC casing, and the surface completions will be sub-grade.

Source Areas of Groundwater Contamination

The selected alternative for groundwater involves the injection of reagents to oxidize the LNAPL and residual LNAPL materials in the subsurface. Temporary injection wells will be installed, and multiple injection events will be conducted as necessary. The reagent will be RegenOx™, a chemical oxidant from Regenesis that is capable or treating a broad range of chemicals in soil and groundwater. It is designed to aggressively attack high concentration source areas. RegenOx ™ has two components: an oxidant and an activator. They are mixed in approximately equal parts into a solution with water. The RegenOx™ may also be combined with another Regenesis product ORC Advanced™ which slowly releases oxygen to the groundwater system to stimulate aerobic bioremediation for a more extensive period. ORC Advanced™ will be applied during the last injection event; however, ORC Advanced™ may not be injected in wells outside of the delineated residual LNAPL zone subject to a decision once monitoring data has been evaluated. Oxidizing reagents will be injected into the subsurface targeting the capillary fringe zone and the shallow saturated surface. The need for additional injection events will be based on the level of contamination, the ability for the injection well network to distribute reagents into the subsurface, and the reduction of concentrations based on analyses of groundwater from selected monitoring wells. A more detailed description of the procedures employed during the implementation of this interim measure is provided in Section 6.

6 INTERIM MEASURES WORK PLAN IMPLEMENTATION

The approach for implementation of this IMWP is simplified by the abandonment of buildings and absence of commercial and industrial activities from the Site. The approach is further simplified by the absence of buildings and concrete over the surfaces of each remediation area (i.e., the Former FF Building Area and the FBCSA are currently free of hard surfaces, whereas it is planned to have the hard surfaces and buildings removed from the impacted areas in the vicinity of the VV Building and APA). It can also be noted that the communications, electrical, and water utilities have been shut off at the Site. In August 2008, demolition activities commenced at the Site, and the VV Building, and the tanks, tank pads, piping, and road surfaces in the vicinity of the VV Building are expected to be completely removed prior to commencement of excavation activities. For the groundwater source areas, the surface structures and hard surfaces have already or will be removed allowing for open access to the remediation areas.

The goals of the interim measures are as follows:

- Remove PCB-impacted non-porous surfaces
- Remove PCB-impacted surface and subsurface soil in order to decrease potential exposures by current and potential future receptors; and,
- Reduce potential sources for current and potentially ongoing groundwater impacts.

The following IMWP tasks will be undertaken for the VV Building Area; expanded descriptions are provided in subsequent sections.

- Preliminary investigation;
- Field documentation;
- Excavation;
- Confirmation sampling;
- Waste management;
- Transportation plan for offsite disposal; and,
- Backfill and site restoration.

The following IMWP tasks will be undertaken for the three groundwater source areas; expanded descriptions are provided in subsequent sections.

- Preliminary investigations;
- Field documentation;
- Injection well installation;
- Injection Events;
- Groundwater monitoring;
- Site restoration.

6.1 Preliminary Investigations and Site Preparations

The Preliminary Investigation will be undertaken with activities planned in all four SWMUs. The purpose for the Preliminary Investigation is to refine the extent of the impacted areas that require remediation. Site preparations are necessary for the VV Building Area, and these activities will include removal of the building, tanks and tank slabs, and paved roadways. Site preparation for the APA will primarily include removal of paved surfaces and other hard surfaces. The Preliminary Investigation will also provide a baseline of data to evaluate the extent of remediation activities and the relative effectiveness of remediation actions for each of the groundwater source areas, as described below.

VV Building Area.

Preliminary Investigation in VV Building Area. Prior to excavation, a geoprobe may be employed to collect additional soil samples for analysis of PCBs in order to refine the vertical and horizontal extents of PCB impacts within selected areas. **Figure 2-2** and **Tables 3-1 and 3-7** summarize the data collected to date from the area. Bedrock (limestone) has been noted in the shallow subsurface in the area of the VV Building as shallow as 6 or 7 ft bgs. Therefore, in some areas, the vertical extent will be determined based on the depth of bedrock and samples will be taken to confirm no contamination remains above stated cleanup levels. The specific areas that will be targeted for refinement of the PCB impacts to soil are as follows:

- Sampling of soil (laterally and vertically) from the vicinity of VV04-09 and VV04-11, where PCB impacts were up to 10 ft deep and there are no samples to bound the impacts in the northeastern and eastern directions of these samples.
- Sampling of soil from the southeastern corner of Building VV between locations VP-8 and VP-26 to refine the northern extent of impacts in this area.

Soil sampling will be performed from beneath the tank pads west of locations VP-2 and VP-3 to refine the eastern extent of impacts in this area. Sample locations will be based on the grid found in 40 CFR 761 Subpart N and confirmation sampling will be based on the grid found in 40 CFR 761 Subpart O.

Site Preparation in VV Building Area. Site preparations will include demolition activities to remove the VV Building and the tanks and pads in the vicinity of VV04-06, VP-6, VP-2, and VP-3 where PCB impacts appear to extend. In addition, the road and rail spur lying over the excavation areas will need to be removed prior to excavation. These concrete and asphalt materials comprising the roadway and railspurs will be sampled for analysis of PCB according to TSCA regulations in order to determine whether there is need to dispose of these non-porous surfaces as containing PCB material. For non-porous surfaces that formerly lied beneath the VV Building, wipe samples will be collected to screen to assess PCB content. This procedure is provided in the following paragraph and in the Standard Operating Procedures (SOP) for PCB Concrete Sampling, included in the Quality Assurance Project Plan (QAPP). For the hard surfaces that either fail the wipe test or are too rough to adequately perform a wipe test, core samples will be taken from the upper one-inch of surface using a drill bit and hammer drill. This procedure is also provided in the following paragraph and in the SOP for PCB Concrete Sampling, included in the QAPP. Non-porous surfaces will be screened at all locations on the

property, and wipe samples will be taken where oily spots are located in order to determine if PCB impacts are present, as described in the following section.

Concrete Areas Wipe Sampling in VV Building Area. Wipe samples are used to evaluate the presence of PCBs on concrete, where concrete is a porous surface as defined in TSCA 40 CFR 761. According to TSCA regulations, potentially affected concrete should be sampled at the frequency of one sample per 9 square meters (i.e., 3 meters by 3 meters). Wipe samples will be collected from representative locations on each potentially impacted surface, with locations chosen to identify potential impacts to open areas as well as isolated areas of a floor (i.e., rooms off of open areas of a given floor). Preference for wipe sample locations would be given to areas that are oil-stained. Wipe samples will be collected by thoroughly wiping hexane-saturated gauze wipes over the specified area equal to 100 square centimeters (cm^2) using a disposable template. The gauze wipes will be placed in pre-cleaned, hexane preserved glassware, labeled, retained on ice for submittal to the laboratory. Surface wipe samples will be submitted under chain of custody procedures to an accredited offsite, independent laboratory for PCB analysis using USEPA Method 8082. Should the wipe samples indicate concentrations of PCBs at greater than 10 micrograms per 100 cm^2 wipe (ug/wipe) the areas of the floor that are impacted will be cleaned or removed, and confirmation samples, if applicable, will be taken of the concrete using coring techniques as described in 40 CFR 761 Subpart O.

According to TSCA regulations, the criteria for addressing concrete where wipe sample concentrations exceed 10 ug/100 cm^2 calls for collection of representative material from the upper 1-inch of the concrete within the 9-square meter area. Samples are collected by drilling five one-inch diameter holes in the concrete, using a concrete drill bit and hammer drill, to a depth of approximately one inch. This provides approximately four ounces of powder for each sample that will be collected in preserved glassware for transport to an analytical lab on ice for analysis. Method 3550 is used for the extraction method and USEPA Method 8082C the analytical method under SW-846.

The results of the concrete core samples will be used in an analogous way as if the material were soil, except, it is possible to scarify the concrete surface and remove the upper one inch as PCB impacted soil. For the practical purposes at this Site, the entire thickness of concrete will be assumed to contain PCBs as indicated by corresponding analyses. Upon receipt of the data, these surface areas will be removed and stockpiled prior to excavation according to where the material will be disposed. Thus, the concentrations of the stockpiled asphalt and concrete will be disposed as follows.

- Concentrations above the PRG of 100 mg/kg will be transported to and disposed at Heritage Landfill, an Indiana facility that has a RCRA permit to dispose of PCB-impacted soil and concrete at the concentrations found at the Queeny Site.
- Concrete or asphalt containing PCB concentrations less than 50 mg/kg will either be disposed onsite as backfill (e.g., crushed concrete), or offsite within a Subtitle D landfill as construction debris.
- Concrete or asphalt containing PCB concentrations above 50 and below 100 mg/kg will be disposed onsite, probably as crushed concrete that is backfilled into the excavation areas from which it came.

Evaluation of Soil Beneath PCB-Impacted Non-Porous Surfaces. Soil will be sampled beneath the non-porous surfaces where the PCB concentrations exceed the PRG unless previous data indicates that the soil concentrations are above the PRG and requires disposal in the Heritage landfill which is a RCRA-approved facility approved for PCB wastes. Where concrete concentrations exceed the concrete PRG, soil will be sampled similarly to the concrete with composite soil samples every 9 square meters as described in 40 CFR 761 Subpart N. These soil results will be reviewed against the PRG to determine if the soil is excavated, transported, and disposed at a RCRA-approved landfill for PCB wastes. In the case of the slab beneath Building VV, a decision may be made to core through the concrete and collect soil for analyses prior to removing the slab. US EPA will be notified if this option is selected.

Former FF Building Area.

Based on gauging conducted in March and August 2008, LNAPL is no longer found within monitoring well LP-4 or any other monitoring wells gauged within the Former FF Building Area. The Preliminary Investigation activities for the Former FF Building Area will focus on providing information that supplements existing information in delineating areas where residual LNAPL is present. In particular, soil samples will be collected from an approximate grid of 20 ft centers over the former LNAPL areas as shown on **Figure 6-1**.

Injection Area Delineation. Soil samples will be collected from selected intervals within the capillary fringe and upper saturated zone where impacts may be present (i.e., based on visual, olfactory, and PID evidence). The field geologist will determine which intervals are sampled based on visual observations, odor, and PID readings. The samples will be submitted to Gulf Coast Analytical Laboratories (GCAL) for analysis of TPH-GRO using Method 8260. The basis for determining if residual LNAPL (i.e., source material for continued groundwater contamination) is present will be PRG as described previously (i.e., TPH-GRO concentration of 346 mg/kg), which will serve as the source area surrogate indicating that sufficient residual source material is present to warrant remediation (i.e., injection). Thus, if TPH-GRO concentrations are found above 346 mg/kg, then the area will be included within the zone of RegenOx injection.

Temporary Piezometers / Injection Point Placement. Temporary piezometers will be placed in each geoprobe location in order to use the location for either "indicator wells" or converted to temporary injection wells. The temporary piezometers will be emplaced with open intervals straddling the water table, as described further below. These temporary wells will be gauged for the presence of LNAPL within approximately two weeks of installation, as another potential indicator of source material. Where the soil data indicates that there is residual source material, the temporary peizometer will be converted to an injection point. Additional injection points will be installed within the areas where the PRG criterion is exceeded in order to have injection points every 10-to-15 feet. MDNR has permit requirements for the temporary injection wells that are provided in part by this report and additionally by information contained in Appendix B of this IMWP.

Indicator Wells. There will be between four and six indicator wells installed at locations within the injection area and immediately downgradient of the injection area. Indicator wells will either be existing monitoring wells or newly installed temporary monitoring wells that are located

approximately equidistant from injection points to minimize the immediate influence of injection events. **Figure 6-1** shows the proposed locations of probeholes advanced during the Preliminary Investigation, as well as locations of temporary piezometers and indicator wells for the Former FF Building Area.

Former Acetanilides Production Area.

Based on gauging conducted in March and August 2008, there is no LNAPL found within monitoring wells MW-14, GM-1, GM-2, and GM-3 which lie within the area where previously LNAPL had been observed or the inferred based on concentrations of clorobenzene and alachlor near solubility limits. As with the Former FF Building Area, the Preliminary Investigation in the APA will focus on delineating areas where residual LNAPL may be present and installing temporary piezometers that will be converted to injection points if the soil data indicates concentrations of TPH-GRO above the PRG. **Figure 6-2** shows proposed locations of probeholes advanced during the Preliminary Investigation.

FBCSA.

Based on gauging conducted in March and August 2008, LNAPL was found only within monitoring well MW-24A (i.e., approximately 0.13 ft, or approximately 1.5 inches). The preliminary investigation in this area will focus on delineating areas where LNAPL and residual LNAPL is present in regards to the data from previous investigations at the FBCSA. As with the Former FF Building Area, the Preliminary Investigation in the FBCSA will focus on delineating areas where residual LNAPL may be present. **Figure 2-5** shows results from previous investigative efforts to delineate the LNAPL in the FBCSA. Temporary piezometers installed during the Preliminary Investigation, will be converted to injection points if the soil data indicates concentrations of TPH-GRO above the PRG. **Figure 6-3** shows the proposed locations of probeholes advanced during the Preliminary Investigation.

6.2 Field Documentation

Field documentation will be applicable to activities in all four SWMUs, and it will consist of, but not be limited to, the following.

- Daily logs. These will be kept by the Site Manager to identify the people who visit and work at the Site, use of equipment, and the activities conducted at the Site, including number of trucks removing soil for offsite disposal and bringing backfill onto the Site.
- Probehole and boring logs will be constructed based on each probehole, boring, and monitoring well. PID readings will be logged on boring log forms, and temporary piezometer, indicator monitoring well, and monitoring well construction details will be noted. All temporary piezometers and injection wells will be labeled in the field using indelible markers. Probehole locations within each of the four SWMU areas will start with FF, VV, FBCSA, or FAPA to signify the Former FF Building Area, the VV Building Area, the FBCSA, and the APA, respectively.
- Sampling area tracking. Maps and survey information will be kept to track the locations of PCB sampling and non-porous surface sampling. Sampling id's will be painted on the surface and matched with records.

- Excavation area tracking. Excavation areas will be tracked using maps and surveyed locations. Confirmation samples will be noted similarly, and confirmation sample id's will be tracked by surveyed coordinates and labeled flags in sidewall locations.
- Sampling and chain-of-custody records. The collection of all samples will be logged, and surveyed using a hand-held global positioning system (GPS), and the shipment of the samples to offsite laboratories will be recorded on chain-of-custody forms.

6.3 Excavation in VV Building Area

Figure 3-2 shows the approximate areas where PCB impacted soil exhibited concentrations greater than the PRG based on previous investigations. The performance of preliminary soil samples collected prior to implementation of the interim measures will help refine the extent of the excavation. Within these areas, soil, concrete, and asphalt material will be excavated for removal; however, the concrete and asphalt will be sampled as provided in TSCA regulations at 40 CFR 761 Subpart N in order to determine the means of disposal, as described previously. Once excavation has proceeded to the edge of the impacted area, confirmation samples will be collected. The results of the confirmation samples will be compared to the PRG, as discussed below.

There are two areas where PCB-impacted soil has been identified. The first area of excavation is from the northeastern corner of the VV Building where analytical results indicate an area of approximately 110 ft north-south and 30 ft east-west, as shown on **Figure 3-2**. The second area is from the southeastern corner of the VV Building where analytical results indicate an area of approximately 120 ft northeast-southwest and 35 ft northwest-southeast, as shown on **Figure 3-2**. The analytical results indicate that the first area may require up to 15.5 ft or greater depth of excavation, whereas the second area may require up to 7 ft or greater depth of excavation. Thus, the expected volume of excavated soil form the northern area is approximately 1800 cubic yards, and the expected volume of excavated soil from the southern area is approximately 1100 cubic yards. The depth of excavation may be constrained by the presence of bedrock in either location. In addition to the fence around the property that provides a primary level of security, the areas of excavation will be enclosed by a temporary fence at the end of each day to add a level of security around the excavation areas perimeters.

Soil from the impacted areas will be excavated using a track-hoe or excavator which can extend up to 20 ft or more. The excavated soil may be direct loaded into trucks bound for the disposal facility or stockpiled onto paved surfaces remaining intact in the vicinity of the VV Building. The soil may be staged onto paved surfaces within the vicinity of the VV Building to optimize transportation and loading. The excavator will also be used to collect samples from the sidewalls and floor of the excavation for confirmation sampling. The excavation will be left open and fenced to prevent entry until confirmation sample results have been analyzed and reviewed. Stockpiled soil will be covered with plastic tarps to prevent erosion in the event of storms.

During excavation, care will be taken to assure that dust is controlled. Potential exposure to PCBs in soil is small since PCB is not volatile and potential exposure is through PCBs attached to dust particles. Therefore, exposure to dust will be controlled during excavation activities by use of respirators to prevent inhalation of dust and PCBs that may be attached to the dust, and

use of water as spray to diminish generation of dust.

The utilities in the vicinity of the building have already been shut off. However, the sewer lines, in particular, may be needed in the future. Therefore, care will be taken while digging in the vicinity of the utility lines, as encountered, to ensure that their integrity is maintained. Excavation will be halted when approaching sewer lines.

6.4 Confirmation Sampling for VV Building Area

The areas of impacted soil above the PRG, based on the existing analytical data summarized in **Tables 3-1 and 3-7** and **Figure 3-2**, will be excavated and either stockpiled on the location of the former VV Building slab or direct loaded for disposal. The excavation will be left open for confirmation sampling and not backfilled until confirmations sampling results indicate that the PRG has been achieved.

Confirmation samples will be taken from the outside perimeter walls and the bottoms of the excavated areas. Thus, the limits of excavation will be sampled and compared to PRG concentrations. Onsite personnel will not be allowed to enter an excavation to collect confirmation samples if the depth of the hole is greater than 4 feet or the sidewalls of the excavation are in danger of collapse. Since the excavations are anticipated to be too deep for direct entry, the bucket of the excavator will be used to collect soil samples used to make the composite samples. Confirmation samples will likely be collected as the excavation progresses. Samples shall be collected as follows:

Perimeter wall confirmation samples. Composite samples shall be composed of five grab samples collected every 25 linear ft along the excavation face: one grab sample from the center of the grid area and four grab samples from each corner of the grid, with corner samples collected from a point approximately three feet from each grid edge. The collection of grab samples will be homogenized into the composite sample by mixing within a clean stainless steel bowl. The homogenized sample will be placed in a clean glass 4-ounce jar uniquely labeled to coincide with field locations. Composite samples will be analyzed for PCBs using SW-846 Method 8082.

Excavation floor confirmation samples. A single composite sample shall be composed of five grab samples collected from every gridded square area that is approximately 25 ft by 25 ft. The composite sample will be comprised of one surface grab sample from the center of the grid area and four grab samples from each corner of the grid, with corner samples collected from a point approximately three feet from each grid edge. The composite samples will be homogenized by mixing within a clean stainless steel bowl. The homogenized sample will be placed in a clean glass 4-ounce jar uniquely labeled to coincide with field locations. Composite samples will be analyzed for PCBs using SW-846 Method 8082.

Post-Excavation Delineation of Areas greater than 10 mg/kg. The soil containing PCB concentrations between 10 mg/kg and 100 mg/kg will require delineation and notation on the property deed. Additionally, the area will require a hard surface cover to prevent potential exposures. As part of this IMWP, a task will be completed to delineate the extent of soil containing greater than 10 mg/kg and less than 100 mg/kg. This task will include use of a

geoprobe to collect soil samples from outside of the excavation areas. The confirmation samples will demonstrate that the soil greater than 100 mg/kg has been removed. A geoprobe will collect samples from along the excavation limits where data does not already indicate that the criterion of 10 mg/kg has not been met. **Figure 3-2** shows the approximate limits of the 10 mg/kg PCB concentration in soil. The target areas for this task of investigation will include the areas where the line is hatched. Soil samples will be collected approximately every 25 linear feet along the stretches where data did not previously show less than 10 mg/kg, or where excavation extended beyond points where data showed less than 10 mg/kg total PCB concentration. The soil samples will be collected from three horizons: 1-surface soil; 2-approximately the depth of excavation nearest the geoprobe location; and 3-approximately ½ the distance between the surface and the depth of excavation nearest the geoprobe location. Soil will be analyzed for total PCB concentrations using USEPA Method 8082. Once the area is delineated, a survey will be performed for eventual inclusion into the property deed. The final surface may not be emplaced until the redevelopment occurs.

6.5 Waste Management for VV Building Area

PCB-impacted soil generated during the excavations at the VV Building area will be disposed offsite at Heritage Landfill in Roachdale, Indiana, a Subtitle C landfill permitted to accept TSCA PCB wastes. It is anticipated that approximately 3000 cubic yards of material (estimated to be approximately 4,200 tons) will be transported to Heritage Landfill. A local licensed hauler or a licensed hauler from Heritage Landfill will be contracted to transport the material.

It is possible that water may accumulate within the excavation prior to backfilling. If the volume of water is sufficient to impede further excavation or backfilling, then wastewaters derived from seepage into excavations and decontamination water will be pumped into steel "Baker Tanks" or equivalent. The contents of the Baker tank(s), once full, will either be treated then tested to confirm criteria are acceptable for disposal onsite through a pre-treatment permit with the Publically Owned Treatment Works (POTW), or characterized in order to ship offsite to an appropriate treatment and disposal facility.

6.6 Transportation Plan for VV Building Area

Appropriate licensed waster haulers will provide transportation of excavated waste soil and water generated during the removal action. All soils will be transported in covered trailers under a Uniform Hazardous Waste Manifest as per 40CFR 261.207 through 210. Truck traffic into and away from the Site will be staged to minimize backup of trucks. All equipment and vehicles in contact with contaminated soil will be decontaminated prior to leaving the work zone A tally of trucks and tare weights and manifests will be provided in the Interim Measures Completion Report.

6.7 Backfill and Site Restoration for VV Building Area

The excavations will be backfilled using clean fill in order to maintain the natural surface level, drainage, and topography. The thickness of clean fill will be designed to restore current site grade with consideration to potential future surface needs. The backfill material may include crushed concrete, asphalt, and clean soil from other areas of the Site. Soil is likely to be used

over the upper one-to-two feet of the surface to accommodate potential landscaping activities. The soil may be seeded with grass. In the remote chance that offsite soil and fill material are used, the material will be tested to assure that contaminated material is not brought onto the Site.

6.8 Injection Point and Indicator Well Installation for Groundwater Source Areas

Injection Points. Temporary injection points will be installed within the delineated LNAPL and residual LNAPL areas (source areas) in order to provide the means to inject reagents that will chemically destroy the contaminants. Thus, the area over which the injection wells will be placed will be defined using information from the Preliminary Investigation, along with previous investigations to delineate LNAPL that have previously occurred in each of the source areas. Based on previous LNAPL investigations in the source areas, the LNAPL resides within the silty clay unit, which has intrinsically low permeability. Therefore, the injection wells will be relatively closely spaced at between 10 and 15 ft apart on centers. The depths to water will vary from site-to-site, and thus the depth penetrated will be adjusted accordingly. Temporary piezometers installed during the Preliminary Investigation and later converted to injection point will target the capillary fringe and upper saturated interval, with the screened interval spanning approximately 5 feet (i.e., 0-to-1 feet above the water table and 4-to-5 feet below the water table). Injection points installed to fill in gaps between the converted temporary piezometers will also be constructed to similar specifications.

The initial set of injection points will be converted from temporary piezometers that were installed during the Preliminary Investigation. The initial temporary piezometers target spacing of 20-to-30 feet. The data collected from the Preliminary Investigation will identify the extent of source areas, and the temporary piezometers within the source areas (and immediately downgradient of the source areas) will be converted to injection points if it is determined that they lie within potential contamination source areas. Once the extent of source areas have been delineated, additional injection points will be installed to have the target spacing of 10-to-15 feet. The conversion of the temporary piezometer to an injection point will include placement of bentonite seals in the annular space of the piezometers above the sand filter pack as well as surface completions to facilitate injection. Temporary piezometers deemed outside of the source areas and unnecessary for monitoring purposes will be pulled, and the holes will be backfilled using bentonite chips. The surfaces surrounding the piezometers that will be converted to injection points will be completed by cutting the height of the piezometer / injection point to about 18-inches above ground surface and fitting the top of the casing with a threaded fitting that allows quick connection to the injection fluid reservoir.

Prior to injecting the fluid with the reagent, the piezometer will be used to inject a slow volume of air that will provide oxygen to the subsurface. The air will be injected using an air compressor and lines through a manifold for approximately ten points at one time. The flow rate will be between one and two cubic feet per minute. The aeration of the subsurface will stimulate microbial growth and optimize the fluid injection. Each set of ten injection points will be aerated for up to five days prior to moving onto the next set of injection points. Dissolved oxygen levels will be monitored in adjacent inactive points to help determine when to move.

The injection fluid reservoir will consist of polyethylene drums (or steel drums lined with an impervious and protective coating) which can hold the mixture of reagent and water. The reagent

fluid will be mixed in the drums using an electric drill and mixing paddle and allowed to flow via gravity into the injection point. Should the flow rates become too slow from the low-permeability subsurface, the reagent fluid may be pumped into the injection point using a water pump powered by an electrical generator.

Indicator Wells. Accompanying the injection wells will be "indicator monitoring wells" that will be sampled periodically to evaluate whether reagents have spread into the subsurface and then diminished, and whether injection has been effective. The indicator wells will either be existing monitoring wells that lie intermediate between injection piezometers, or specific piezometers that will be installed to provide the optimal location for evaluation of injection effectiveness, including locations within the injection zone and immediately downgradient of the injection well grid. The indicator wells will be monitored as often as every two weeks for field parameters (pH, electrical conductivity, oxygen reduction potential [ORP], and dissolved oxygen [DO]) monitored with a Horiba and flow-through cell. The monitoring for field parameters will allow determination when the effects of the injection (primarily noted by high DO measurements) have worn off. Once DO levels have diminished to nearly background concentrations (i.e., established from upgradient indicator wells and background concentrations), the indicator wells will be sampled for VOC using Method 8260. This sampling event will be used to evaluate additional injection events. It is anticipated that indicator wells will be sampled within several month following injection of RegenOx, and possibly longer following injection of ORC Advanced. Several monitoring events may be performed before subsequent injection events are undertaken. Target concentrations for contaminants of concern in groundwater will be established from baseline concentrations, previously discussed in Section 4.

6.9 Fluid Injection Event Procedures

There will be up to three fluid injection events in each source area. As described previously, the areal extent of each source area will be delineated using existing investigation information and the results of the Preliminary Investigation, also described previously.

The injection event will consist of injecting a reagent mixed with water into the array of injection wells. The reagents (RegenOx™ with or without an activator which chemically destroys the organic compounds in soil and groundwater, and / or ORC Advanced™ which is a treatment enhancing aerobic bioremediation) are capable or treating a broad range of chemicals in soil and groundwater. The planned approach at the Site will include initially injecting RegenOx™ with an activator for one injection event at each source area followed by a second injection of RegenOx™ without an activator. Based on relatively low concentrations of COCs within the Former FF Building Area (i.e., from the due diligence investigation), a single injection of RegenOx™ is anticipated within the source area of the Former FF Building. Two injection events of RegenOx™ are anticipated within the FBCSA source area due to the presence of higher groundwater concentrations and LNAPL. The decision to perform a second injection of RegenOx™ within the APA will be based on results from indicator monitoring wells sampling.

RegenOx™ . RegenOx™ will be mixed with water to provide a 3%-to-5% oxidant solution. Approximately one pound of oxidant and one pound of activator will be mixed with 2 gallons of water (i.e., for a 5% oxidant solution). The target quantity of oxidant and activator is 16 lb/ft (i.e., 8 lb each for the oxidant and activator). Thus for the approximately 7-ft injection zone,

there will be 112 lb of oxidant plus activator (i.e., 56 lb each). This will require 56 gallons of water to make up the 5% oxidant solution, and 94 gallons to make up a 3% oxidant solution. This will provide a displacement zone equivalent to more than one foot outward from the injection point. Following injection, the solution will spread by dispersion and diffusion through the subsurface saturated zone. The 3% oxidant solution will be used preferential to the 5% oxidant solution when the injection volume is relatively quick to enter the injection point, in order to disperse the reagent further into the subsurface. This judgment will be a field call based on the overall time constraints of the event. The activator is an iron-based compound that facilitates the chemical reaction. However, the presence of iron in the silty clay unit suggests that only one application of the activator is necessary. It is possible that another similar reagent may be used. In this case, EPA and MDNR will be notified prior to its selection and use.

ORC Advanced™. ORC Advanced™ , which comes in a powder form, will be added to the RegenOx™ solution at the rate of 15-to-35% by weight with water. Thus, using a 3% RegenOx™ solution, approximately 6.25 lb of ORC Advanced will be added per 5 gallons (i.e., for a 15% solution by weight), and using a 5% RegenOx™ solution, approximately 10.5 lbs of ORC Advanced™ will be added per 5 gallons of RegenOx™ solution (i.e., for a 15% solution by weight). Up to double the weight of ORC Advanced™ per gallon of injection solution will be used if the concentrations remain relatively high compared to the target concentration after the last RegenOx™ (only) injection event. It is possible that another similar reagent may be used. In this case, EPA and MDNR will be notified prior to its selection and use.

Injection Methodology. The injection method will use gravity flow from a polyethylene drum (or possibly two in tandem) into each injection point. However, if gravity flow does not dissipate the solution into the subsurface within a timely manner (i.e., approximately 45-to-60 minutes), then a pump will be utilized to expedite the process. There will be up to six drums (or up to six tandem pairs) utilized at one time to stage the injection event. The reagents will be dissolved into water as formulated above using a cordless drill and paddle to mix the solution. Once the solution is mixed, the hose from the drum will be opened through a ball valve at the base of the drum and hose connected to the PVC injection point. The hose fitting will be selected to match the injection point fitting for relatively quick connection and disconnection (i.e., either threaded or clamped using a hose clamp). Once the flow has started into one injection point, the solution for the next adjacent injection point will be mixed in another drum or tandem set of drums. Mixing of the solution using the drill and paddle will occur periodically (i.e., approximately every five minutes) throughout the injection period at each injection well, unless the flow into the well is very fast. Water will be hauled from drum to drum using a 250-gallon tank placed in the back of a one-ton pickup. The tank will be filled using a fire hydrant and hose. Adjustments made to these procedures will be noted in the report for these interim measures.

The reagents that will be used at the Site are relatively safe and user friendly and thus require only Level D personal protective equipment (PPE), which includes use of eye protection and impervious gloves. Additional precautions are provided in the EIO Health and Safety Plan.

6.10 Injection Effectiveness and Groundwater Monitoring

The decision to perform additional injection events will be based on concentrations of VOCs in

groundwater from "indicator wells" which will lie within the injection areas. As mentioned, the indicator wells may be either existing monitoring wells that lie within or immediately downgradient of the injection area, or temporary monitoring wells installed during the Preliminary Investigation or interim measures activities in locations that lie within or immediately downgradient of an injection area. The exact locations will be determined based on results of the Preliminary Investigation, and it is possible that one or more of the temporary piezometers will be utilized as indicator wells.

Effectiveness Criteria. The injection is considered effective if groundwater concentrations of VOCs are diminished to approximately 25% (i.e., a reduction of 75%) of the VOC concentrations observed prior to the initial injection. The VOCs noted will be the COCs including toluene, chlorobenzene, benzene, and HVOCs, as well as alachlor in the case of APA monitoring wells. The assumption in the observation of groundwater analytical data is that the source material has also diminished by 75% in order to reflect a 75% reduction in groundwater concentrations. It is planned that at least two injection events will be implemented for locations that are delineated as source areas. A maximum of three injection events are planned. The evaluation to determine whether additional injection events are warranted will be performed at least several months after an injection event, as discussed previously regarding indicator wells. The injection is deemed complete when groundwater concentrations of VOCs are reduced to 75% of the baseline concentrations of VOCs within and immediately downgradient of the source areas.

6.11 Confirmation Sampling and Site Restoration at Groundwater Source Areas

The effectiveness of the injection will be based on groundwater monitoring for VOCs, since groundwater concentrations ultimately reflect the connection to source material. Since it will take a significant period of time for the source areas to equilibrate as a result of injection events, confirmation sampling may extend for up to one year. During this period, the indicator wells will be monitored approximately quarterly, and the injection points will remain in place until it is certain that there will be no additional injection events. The target groundwater concentrations are for a reduction of VOCs by 75% of the concentrations observed during initial rounds of groundwater sampling from indicator wells.

Groundwater samples will be analyzed for VOCs using USEPA Method 8260, and alachlor using EPA Method 8081, in the case of the indicator monitoring wells within the APA. The VOC analyses will also allow determination of TPH-GRO concentrations which can be tied back to the surrogate used to evaluate the presence of source material (i.e., LNAPL and residual LNAPL).

7 PROJECT SCHEDULE AND REMEDIAL ACTION REPORT

7.1 Project Schedule

The schedule for performance of the interim measures is presented in **Figure 7-1**. It assumes that this work plan can be reviewed and approved by the first part of 2009. Preliminary field work will require approximately 8 weeks, and it is anticipated to begin within two-to-four weeks of approval of this IMWP. Once the results of the preliminary field work have been received, the remedial actions that comprise the interim actions will begin within four weeks, pending severely cold weather which could deter injection efforts.

The sequence of events covered under this IMWP is as follows:

- **Preliminary Investigation**. The first activities would include advancement of probeholes to refine delineation of the PCB-impacted soil in the VV Building Area and delineation of the extent of the source areas for groundwater contamination. This activity is expected to take approximately 8 weeks in order to step out and find the limits of PCB impacts and source areas.
- **Excavation of PCB-impacted soil**. The excavation of the PCB-impacted soil is expected to take approximately 4 weeks, with possible expansion of the excavation (i.e., due to confirmation sample results) occurring within the next two weeks. An additional week may be necessary to backfill the excavation. However, it is possible to leave the excavation open and fenced until backfill is generated from other activities at the Site. The exact timing of the excavation activities will be according to the weather and proximity to holidays. The VV Building excavation is not considered a time-critical activity.
- **Installation of VV Building monitoring wells**. There will be two temporary monitoring wells installed downgradient of each of the excavation areas. These temporary wells will be installed with an auger rig and 2-inch PVC. After several sampling events, they will be evaluated as permanent monitoring wells. This will be discussed in the forthcoming Groundwater Sampling Plan for the Queeny Plant.
- **Installation of temporary injection wells**. Upon receipt of the delineation data, the temporary injection wells will be installed, which will require about four weeks to complete. This activity is expected to require approximately 4-to-6 weeks, depending on the size of the source areas, as determined from the preliminary investigation.
- **First fluid injection event**. Injection activities will begin upon completion of temporary injection wells installations. The injection activities with the three source areas will follow one another sequentially. The first injection event is expected to require approximately 4 weeks to complete for each of the three source areas. Cold weather could impact the schedule, and USEPA will be notified if this becomes the case.
- **Monitoring after first injection event**. Initially, only field parameters will be monitored in 3-to-6 indicator wells per source area using low-flow pumping, a flow-through cell, and a Horiba meter (or equivalent) to monitor field parameters: pH, electrical conductivity, ORP, and DO. When the parameters, and especially DO, returns to approximately baseline levels (i.e., indicating that the oxygen has been consumed), then

groundwater will be sampled from indicator wells for analysis of VOCs using USEPA Method 8260. If VOCs remain elevated above the 75% reduction level, then another injection will be implemented. The field parameters will be monitored approximately every two weeks. This event is expected to extend from 6 weeks to 3 months.

- **Second fluid injection event**. The second set of injection activities will begin upon receiving sampling data that indicates the oxidant has been consumed and that groundwater concentrations remain elevated above 75% reduction of baseline concentrations. The second injection event, where implemented, may contain ORC Advanced in addition to RegenOx, and it is expected to require 3-to-4 weeks to complete, depending on the number of source areas where a second injection occurs. ORC Advanced, considered a longer lasting reagent, will be used when it is anticipated that further injections are not likely to occur.
- **Monitoring after second injection event**. The monitoring after the second injection event is expected to run similarly to that after the first injection event. The second monitoring event is expected to extend approximately 6 weeks to 3 months after the injection event, and it will probably be another 6-to-12 weeks before another injection event occurs.
- **Third fluid injection event**. The third set of injection activities will begin upon receiving sampling data that indicates the oxidant has been consumed and that groundwater concentrations remain elevated above 75% reduction of baseline concentrations. The third injection event, where implemented, will likely contain ORC Advanced and possibly RegenOx, and it is expected to require 2-to-4 weeks to complete, depending on the number of source areas where a second injection occurs.
- **Monitoring after third injection event**. The monitoring after the third injection event is expected to run similarly to that after the first injection event. The third monitoring event is expected to extend approximately 6 weeks to 3 months after the injection event, and it will probably be another 6-to-12 weeks before sufficient data is available to form a final evaluation regarding additional injections.
- **Delineation of PCBs > 10 mg/kg and less than 100 mg/kg in VV Building Area**. The area that requires pavement (i.e., where PCB concentrations are over 10 mg/kg, but less than 100 mg/kg) will be delineated in areas where the data are either incomplete or greater than 10 mg/kg. This task will use a geoprobe rig and last approximately 2 weeks; it will occur after the excavation has been completed and confirmation sampling results are in hand. Surveying will be completed immediately after the delineation has been completed.
- **Paving and Institutional Controls**. These tasks are tied to redevelopment, and their actions are not proposed as part of these interim measures.
- **Long-term groundwater monitoring**. Long-term groundwater monitoring will be initiated once the last injection event is completed. A separate Groundwater Monitoring Plan will be prepared for review by USEPA. This plan will be prepared before the end of 2009 after at least on injection event has occurred.
- **Interim Measures Report.** The Interim Measures Report will be prepared within 8 weeks of receipt of data after the last injection event. This report will include descriptions of all activities and presentation of data that supported decisions made

during the interim measures implementation. This report is anticipated to be delivered to USEPA in the first quarter of 2010.

- **Contingencies.** It is possible that the criteria established for soil and groundwater cannot be met with three injection events. In this case, EOI will notify EPA/MDNR to schedule meetings to discuss continued actions and a revised schedule. Additionally, since injection events may occur during the winter, it is possible that severe winter weather may cause some initial delays for injection.
- **Monthly Reports.** During active investigation and remediation phases of work, EOI will prepare monthly report for USEPA. These will be in addition to or appended to quarterly reports that are prepared to note progress, challenges, and concerns for the Site. Monthly reports will also note decisions and justifications for additional injection events.

7.2 Monthly Progress Reports and Interim Measures Report

Monthly progress reports will be completed after commencement of the interim measures activities. The monthly reports will be due provided on the fifth day of the new month to include activities that have occurred during the past month. It will also present any concerns or decisions that are made during the previous month. With USEPA's permission, these Monthly Progress Reports will be presented via email.

Upon completion of remedial activities and post remediation site data evaluation, an Interim Measures Report will be prepared for submittal to USEPA. The Interim Measure Report, expected in the first quarter of 2010, will provide the following:

- Description of field activities during preliminary investigation and remediation activities;
- Evaluation of soil confirmation data comparing results to the surrogate PRG criteria;
- Results of groundwater monitoring and decisions regarding additional injection events;
- Conclusions regarding the need for further remedial action for the four SWMU areas.

8 REFERENCES

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RAM Group, Inc. and URS, January 2007. Updated 2005 Risk Assessment and Conceptual Risk Management Plan for Selected Areas in Solutia – J.F. Queeny Plant.

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URS Corporation, September 2004, CA-750 Migration of Contaminated Groundwater Under Control.

URS Corporation, May 2007. RCRA Corrective Measure Study – J.F. Queeny Plant.

New Order Order Tracking

Date: 4/17/2009 11:16:34 AM

Delivery Information	Tracking Number	
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	Client ENVIRONMENTAL OPERATIONS, INC.	
	Service **Type A (2-3hr)**	Pick up Date 4/17/2009
	Delivery Date 4/17/2009	Deliver By 14:20
	Ordered By RACHEL	Vehicle Car
	Packages	Insurance **NO**
	Weight **0 Lbs**	COD $0.00

Reference
CORP

Instructions

Shipper's Signature: _____

Driver's Number: _____

Consignee's Signature: _____

Time: _____

Name (printed): _____

FIGURES

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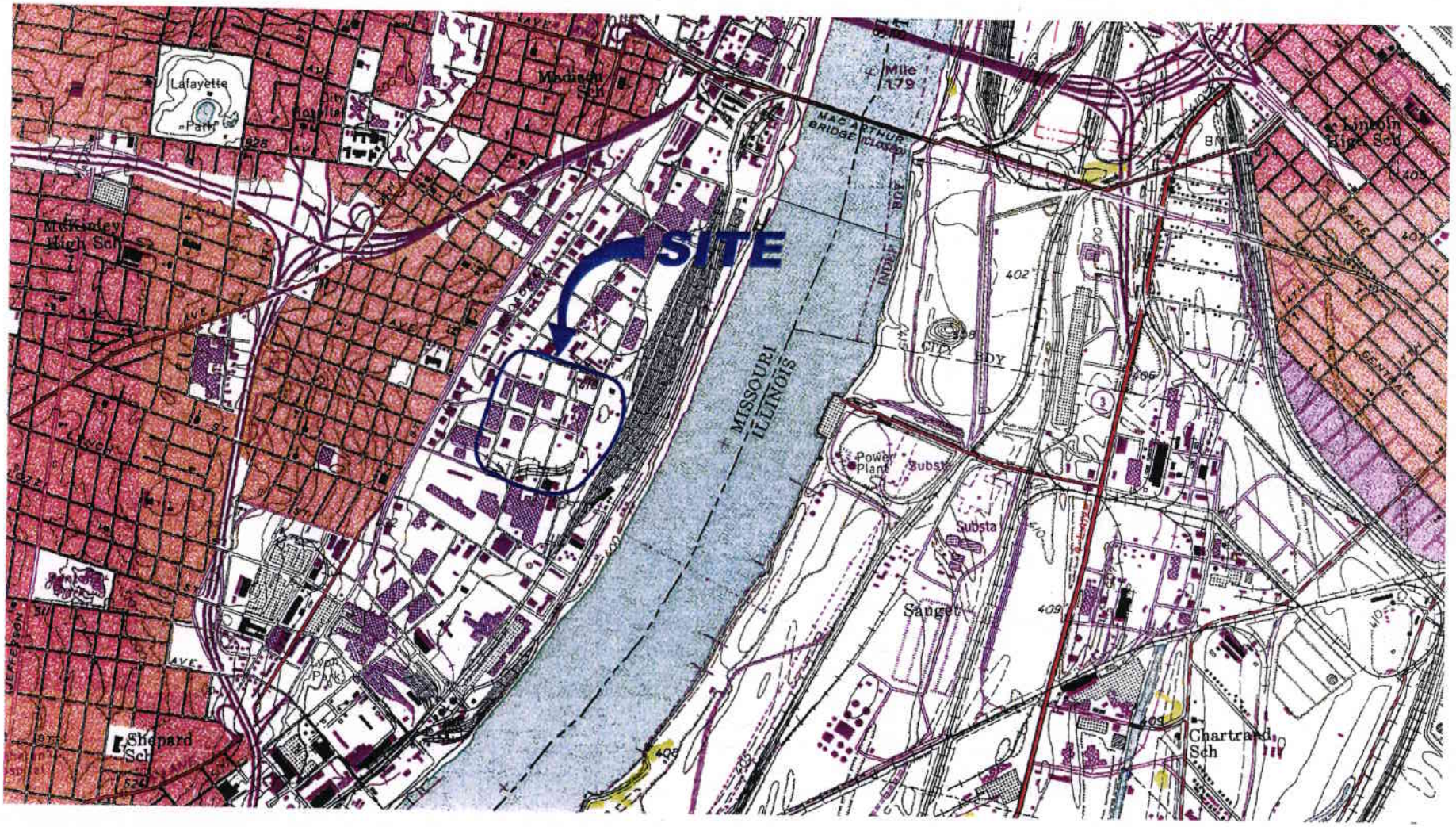

LEGEND

GENERAL LOCATION OF J.F. QUEENY PLANT

BASE MAP REFERENCE: MAP TAKEN FROM ELECTRONIC USGS DIGITAL RASTER GRAPHIC 7.5 MINUTE SERIES TOPOGRAPHIC MAP OF CAHOKIA, ILLINOIS, REVISED 1952.

N

0 2000

SCALE FEET

Site Location Map

Former Solutia Queeny Plant

Saint Louis Missouri

Figure 1-1

marcus 8/28/2008 3:19:29 PM M:\3_Eng\2950 solutia\Fig 1-1 site location map.dgn

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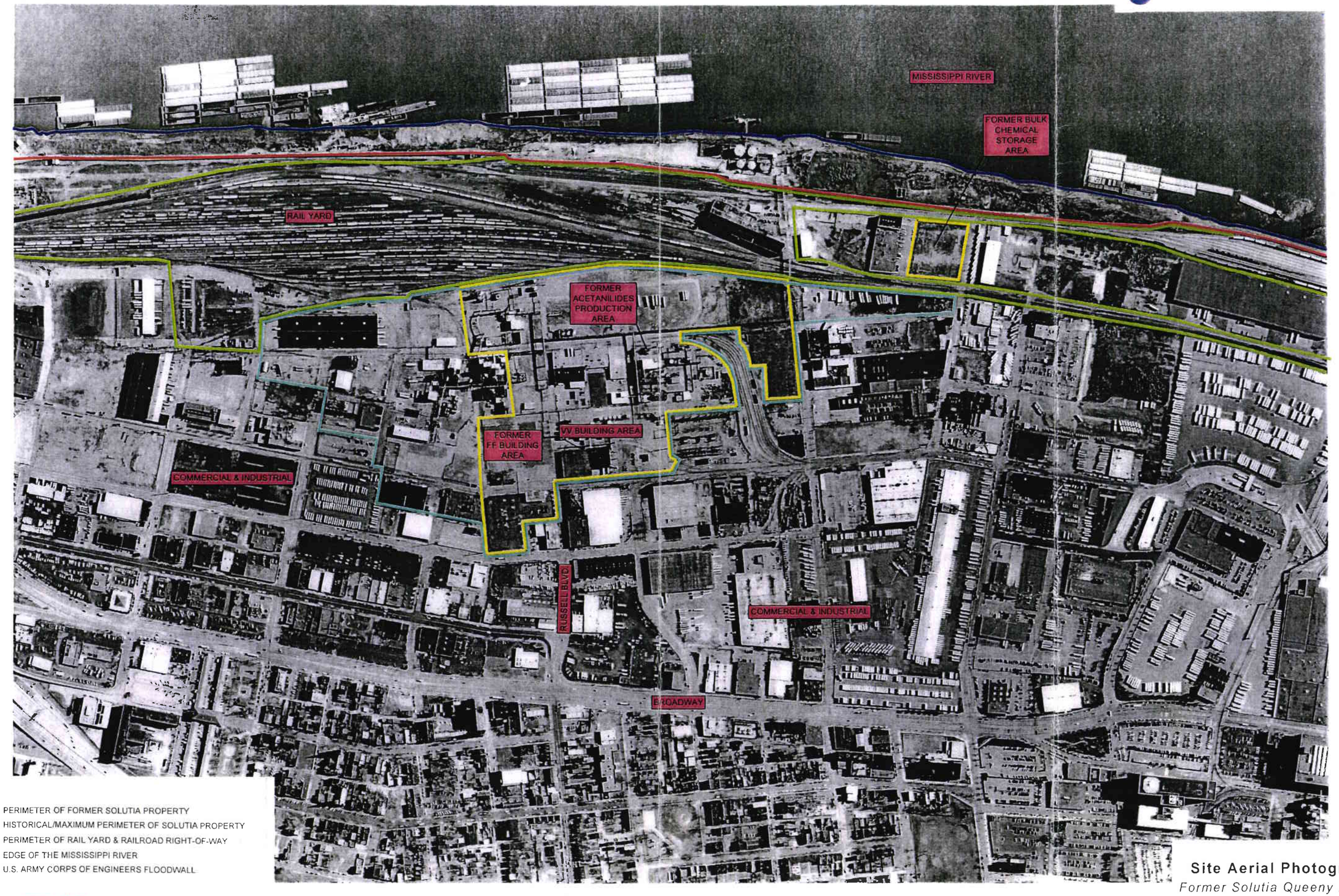


LEGEND

- PERIMETER OF FORMER SOLUTIA PROPERTY
- HISTORICAL/MAXIMUM PERIMETER OF SOLUTIA PROPERTY
- PERIMETER OF RAIL YARD & RAILROAD RIGHT-OF-WAY
- EDGE OF THE MISSISSIPPI RIVER
- U.S. ARMY CORPS OF ENGINEERS FLOODWALL

APPROXIMATE SCALE: 1IN. = 400FT

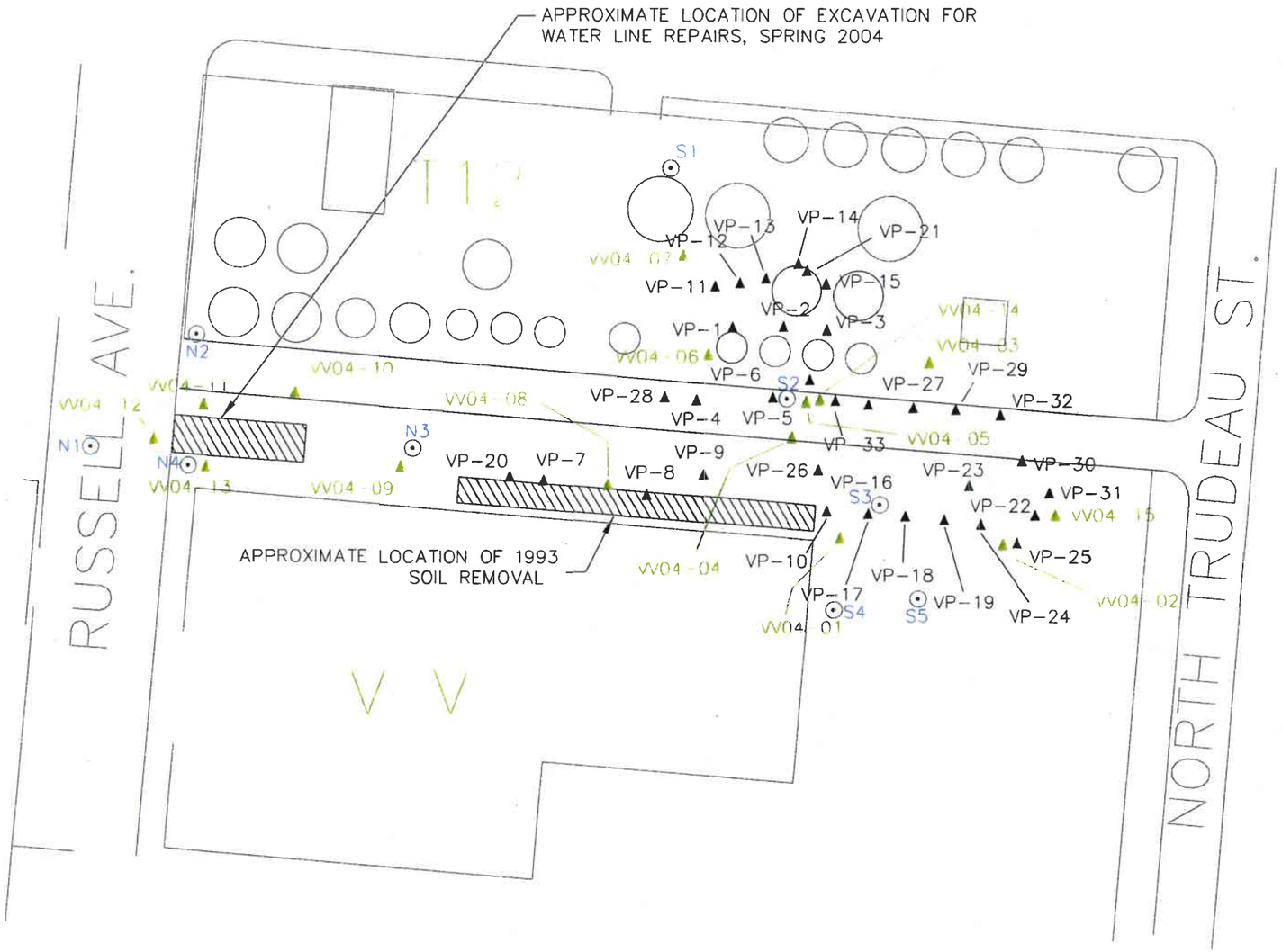
Site Aerial Photograph

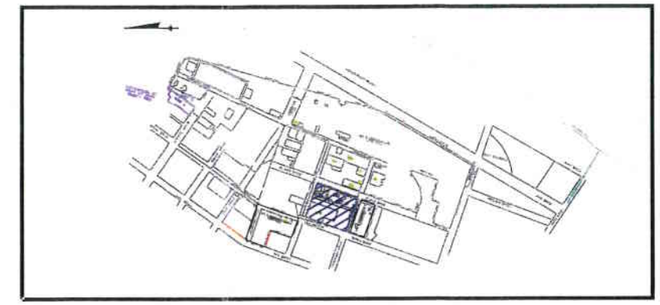
Former Solutia Queeny Plant

Saint Louis Missouri

Figure 2-1

marcus 12/9/2008 12:05:31 PM M:\3_Eng\2950 solutia\Fig 2-1 Site Aerial Photograph.dgn





KEY MAP

LEGEND:

- EOI Due Diligence Sample Location
- VV04-01 CMS SOIL BORING LOCATION
- VP-1 SOIL BORING LOCATION (PRE-CMS)
- APPROXIMATE LOCATION OF PRIOR EXCAVATIONS
- x—x— FENCE

NOTE:
SOIL SAMPLES WERE COLLECTED FROM BORINGS VV-04-15, -16 AND ANALYZED TO OBTAIN GEOCHEMICAL AND GEOTECHNICAL DATA.

0 50
1 IN. = 50 FT.

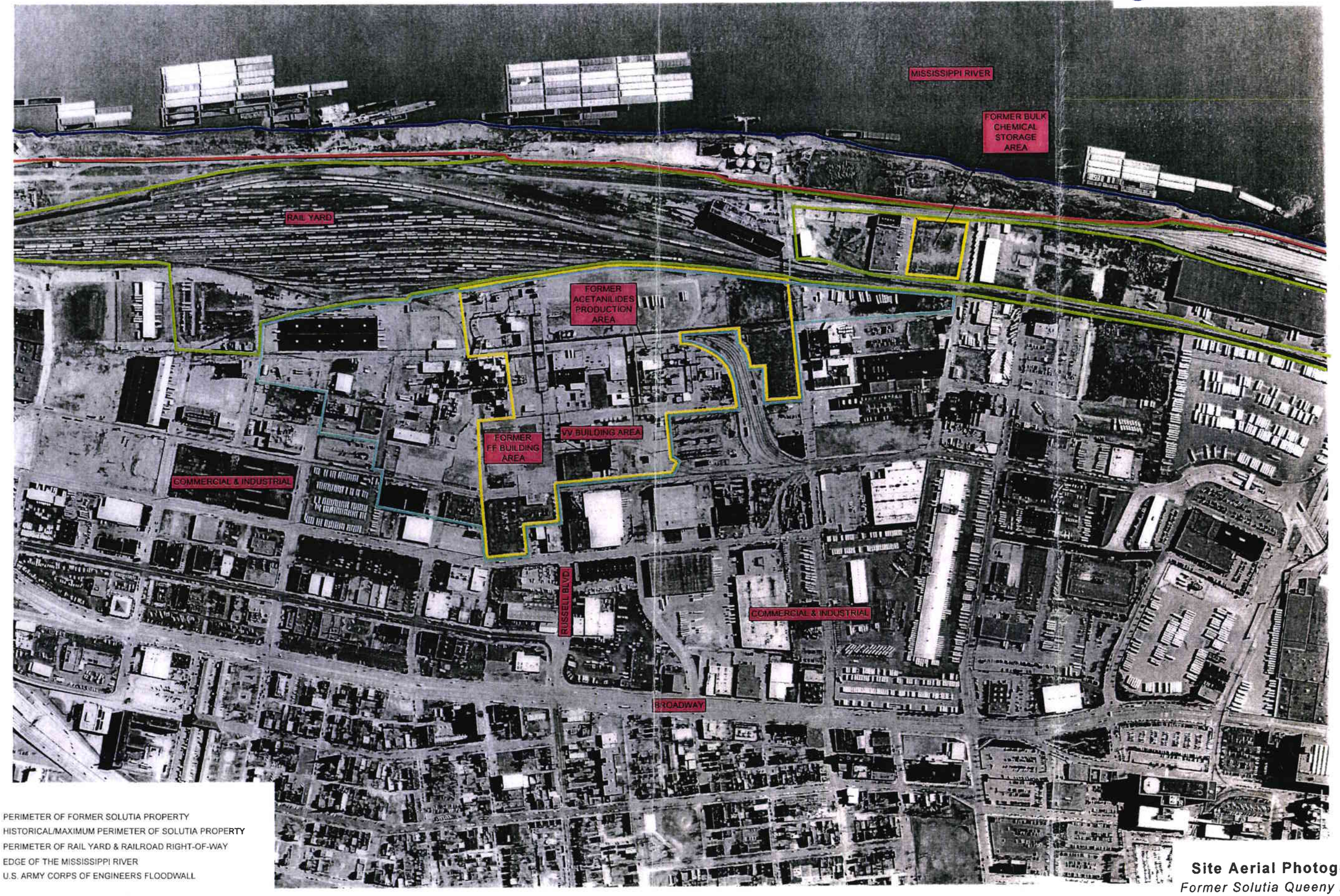
Soil Boring Locations
VV Building Area

RCRA Corrective Measures Study (CMS) Report
Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 2-2

marcus 12/9/2008 12:06:48 PM M:\3_Eng\2950 solutia\Fig 2-2 Soil Boring Locations VV Building.dgn

Environmental Operations, Inc.



LEGEND

- PERIMETER OF FORMER SOLUTIA PROPERTY
- HISTORICAL/MAXIMUM PERIMETER OF SOLUTIA PROPERTY
- PERIMETER OF RAIL YARD & RAILROAD RIGHT-OF-WAY
- EDGE OF THE MISSISSIPPI RIVER
- U.S. ARMY CORPS OF ENGINEERS FLOODWALL

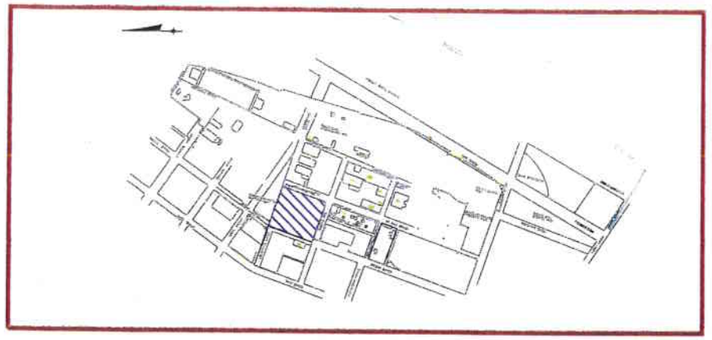
APPROXIMATE SCALE: 1IN. = 400FT

Site Aerial Photograph
Former Solutia Queeny Plant
Saint Louis Missouri

Figure 2-1

marcus 12/8/2008 12:05:31 PM M:\3_Eng\2950 solutia\Fig 2-1 Site Aerial Photograph.dgn

Environmental Operations, Inc.



KEY MAP

LEGEND:

- APPROXIMATE EXTENT OF LNAPL
- APPROXIMATE EXTENT OF DNAPL
- GROUNDWATER GAUGING LOCATION WITH LNAPL PRESENT
- GROUNDWATER GAUGING LOCATION WITH DNAPL PRESENT
- GROUNDWATER GAUGING LOCATION WITH NO NAPL PRESENT
- MONITORING WELL GROUNDWATER SAMPLING LOCATION (SAMPLED DURING CMS)
- CMS PIEZOMETER GROUNDWATER SAMPLING LOCATION (SAMPLED DURING CMS)
- FORMER PCE TANK LOCATION
- x——x—— FENCE

NOTES:

1) DNAPL WAS ONLY OBSERVED IN LPZ-3, OBW-2 AND REC-3. THE MAXIMUM THICKNESS OBSERVED IN LPZ-3 HAS BEEN 0.02 FEET.

2) LNAPL SHEEN (0.01 FEET) WAS OBSERVED IN FF-PZ-1 AND REC-1 DURING ONE GAUGING EVENT.

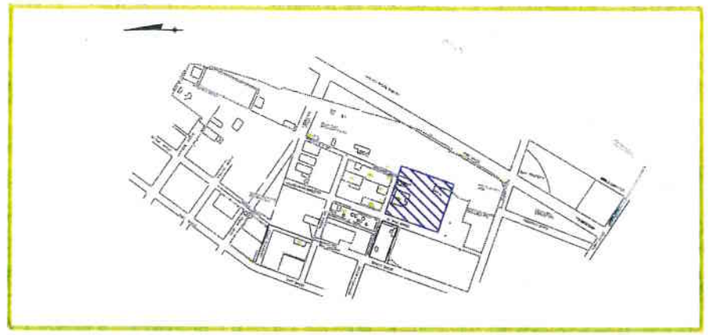
Pre-CMS Distribution of NAPL
Former FF Building Area

Former Solutia Queeny Plant
Saint Louis, Missouri

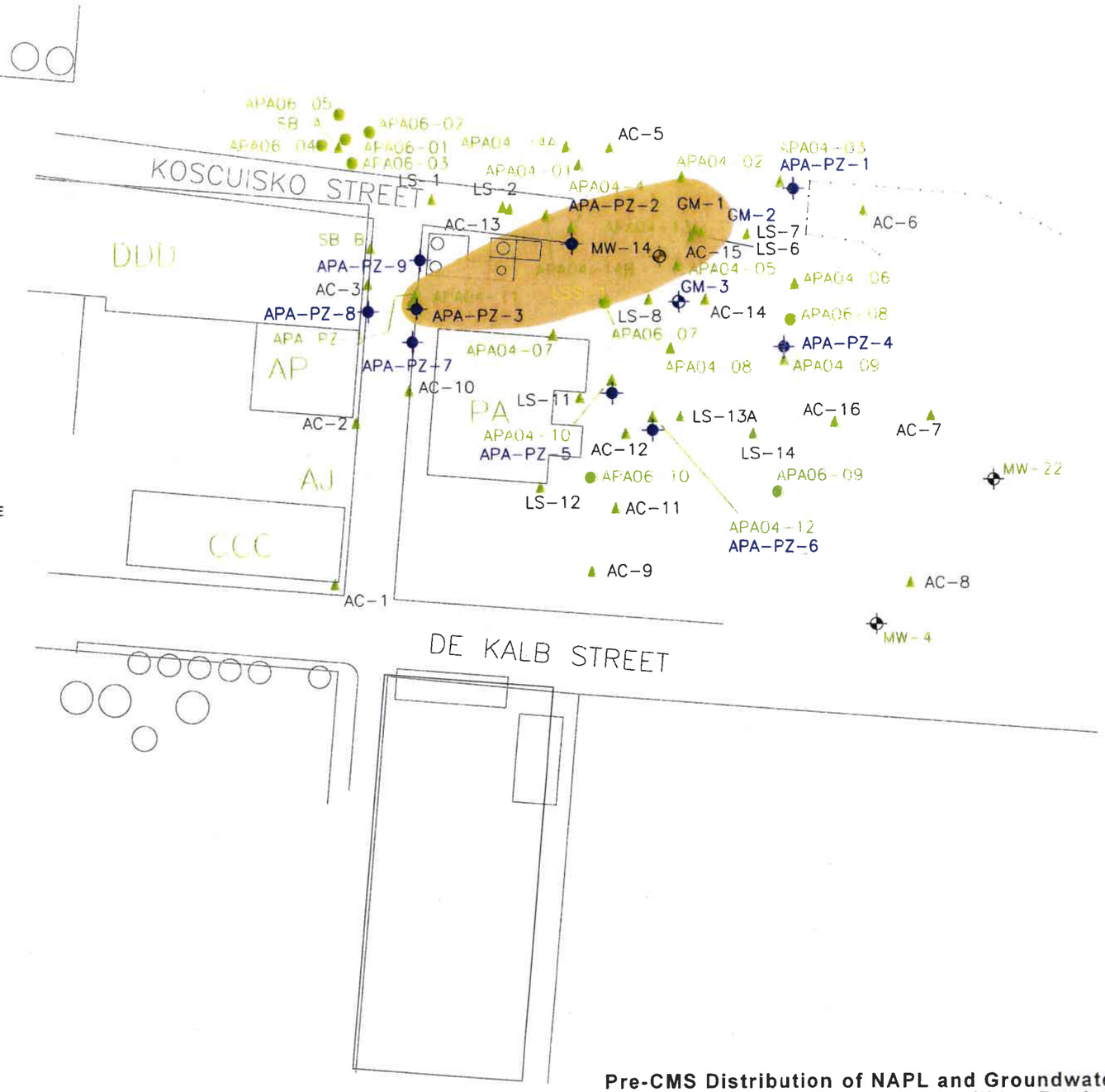
Figure 2-3

marcus 12/9/2008 12:08:14 PM M:\3_Eng\2850 solutia\Fig 2-3 Distribution of NAPL (FF Bldg).dgn

Environmental Operations, Inc.



KEY MAP



LEGEND:

- GROUNDWATER EXCEEDANCES OF ALACHOR, CHOROBENZENE AND DIBENZO(A,H)ANTHRACENE CLEANUP OBJECTIVES - (CMS,2007)
- APPROXIMATE EXTENT OF DNAPL (OBSERVED IN APA-PZ-3)
- APA04-01 CMS SOIL BORING LOCATION
- MONITORING WELL GROUNDWATER SAMPLING LOCATION (SAMPLED DURING CMS)
- CMS PIEZOMETER GROUNDWATER SAMPLING LOCATION (SAMPLED DURING CMS)
- AC-9 SOIL BORING LOCATION (PRE-CMS)
- GROUNDWATER MONITORING WELL LOCATION (NOT SAMPLED DURING CMS)
- PRE-CMS PIEZOMETER

100

1 IN. = 100 FT.

Pre-CMS Distribution of NAPL and Groundwater Impacts
Former Acetanilides Production Area

Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 2-4

marcus 12/8/2008 12:09:40 PM M:\3_Eng\2950 solutia\Fig 2-4 Exceedances of Risk Based Screening (APA).dgn

Environmental Operations, Inc.

LEGEND

TOP OF BEDROCK ELEVATION (FT MSL)

- GREATER THAN 400
- 380 TO 400
- 360 TO 380
- 340 TO 360
- LESS THAN 340

REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN (FIGURE 5) JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

300 0 300 600

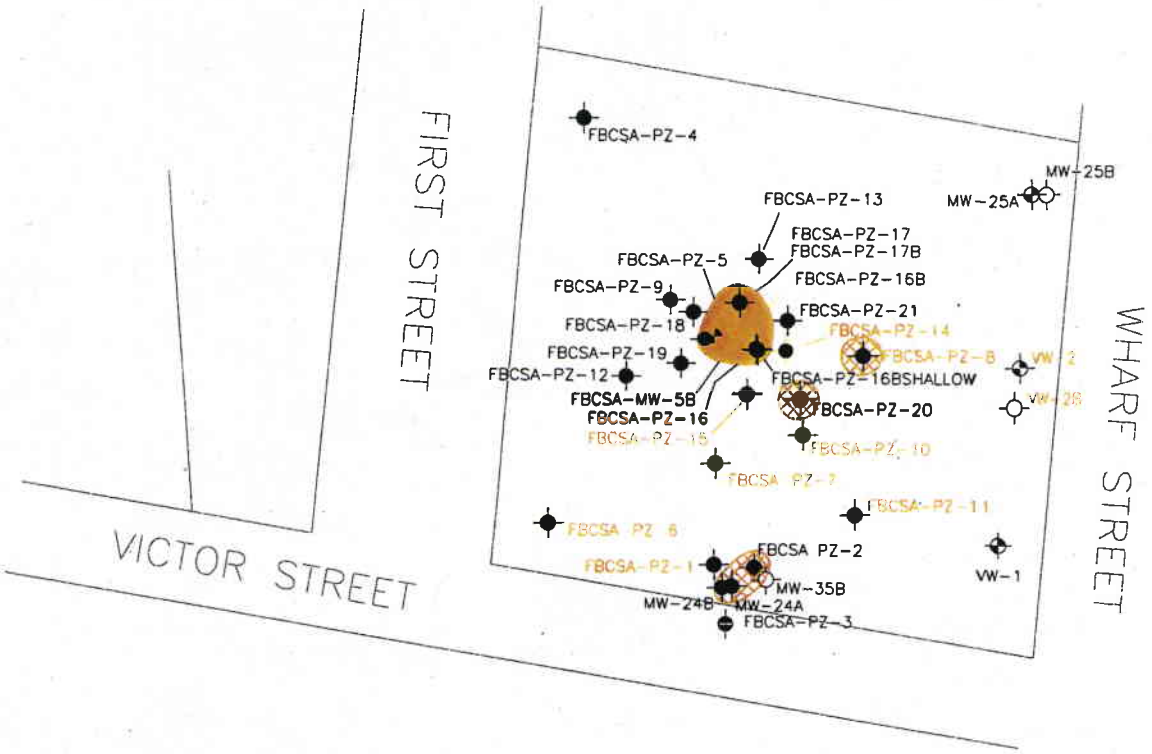
1IN. = 300FT.

Bedrock Contour Map

Former Solutia Queeny Plant

Saint Louis, Missouri

Figure 2-6



LEGEND:

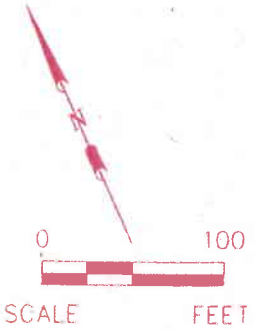
APPROXIMATE EXTENT OF LNAPL (> 1 FOOT THICK)

APPROXIMATE EXTENT OF LNAPL (MEASURING 0.1-1 FOOT THICK)

GROUNDWATER GAUGING LOCATION WITH LNAPL PRESENT (<0.1 FEET)

GROUNDWATER GAUGING LOCATIONS WITH NO LNAPL PRESENT-FOR SILTY CLAY UNIT

GROUNDWATER GAUGING LOCATIONS WITH NO LNAPL PRESENT-FOR SAND UNIT



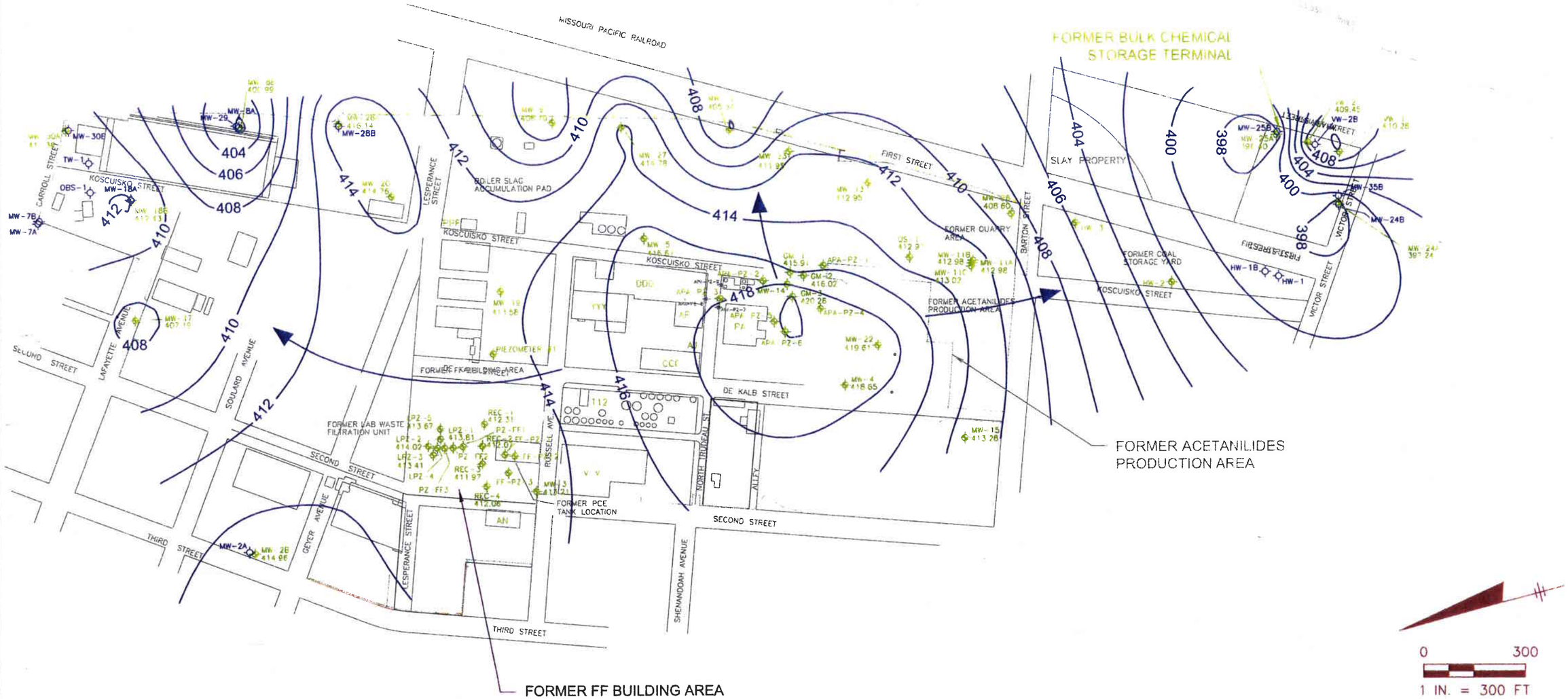
NOTE:
1) LNAPL MEASURING (< 0.1 FEET) WAS NOTED IN FBCSA PZ-1, PZ-4, PZ-6, PZ-7, PZ-8, PZ-10, PZ-11, PZ-14, PZ-15 AND WELLS MW-25A, AND VW-2.

Pre-CMS Distribution of NAPL
Former Bulk Chemical Storage Area
Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 2-5

marcus 12/9/2008 12:12:10 PM M:\3_Eng\2950 solutia\Fig 2-5 Distribution of NAPL.dgn

Environmental Operations, Inc.



LEGEND

- GROUNDWATER MONITORING WELLS AND PIEZOMETERS
- MW-15 WELLS SCREENED IN THE FILL AND SILTY CLAY UNIT
- OBW-1 WELLS SCREENED IN THE SAND OR BEDROCK UNITS (GRAYSCALE FONT)
- 388 GROUNDWATER CONTOUR (FEET, MSL) (BASED ON MEASUREMENTS RECORDED ON FEBRUARY 2-4, 2005)
- ESTIMATED GROUNDWATER FLOW DIRECTION

NOTES:

1) THE CONTOUR LINES DEPICT GENERALIZED FLOW CONDITIONS OF THE FILL AND SILTY CLAY UNIT. THE DEPRESSIONS AND MOUNDING (e.g. IN THE VICINITY OF KK BUILDING AREA AND THE FBCSA) ARE CAUSED BY THE HETEROGENOUS NATURE OF THE FILL AND SILTY CLAY UNIT.

2) WELLS REC-1 THROUGH REC-4 ARE SCREENED ACROSS THE FILL AND SILTY CLAY AND SAND UNITS. BASED ON WATER LEVEL MEASUREMENT DATA, THESE WELLS ARE INCLUDED ON THE FILL AND SILTY CLAY UNIT MAP.

REFERENCE:
RCRA FACILITY INVESTIGATION
DATA GAP WORK PLAN JOHN
F. QUEENY PLANT BY O'BRIEN
& GERE ENGINEERS, INC.,
SEPTEMBER 1999

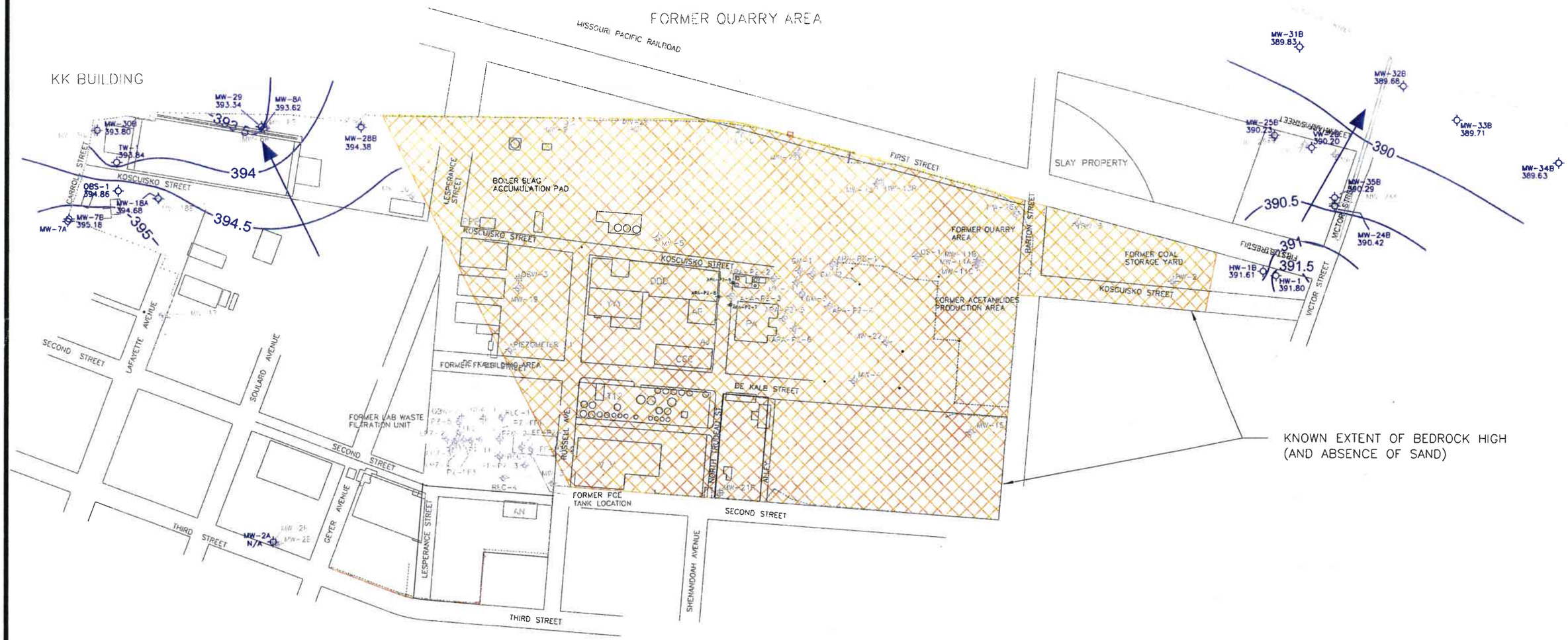
Groundwater Potentiometric Surface Map-Fill and Silty Clay Unit

Former Solution Queeny Plant
Saint Louis, Missouri

Figure 2-7

marcus 12/8/2008 12:15:18 PM M:\3_Eng\2950 solutia\Fig 2-7 Fill and Silty Clay 6-21-05.dgn

Environmental Operations, Inc.



LEGEND

- GROUNDWATER MONITORING WELLS AND PIEZOMETERS
- MW-2A — WELLS SCREENED IN THE SAND UNIT
- WELLS SCREENED IN THE FILL AND SILTY CLAY OR BEDROCK UNITS (GRAYSCALE FONT)
- SAND IS ABSENT
- —388— GROUNDWATER CONTOUR (FEET, MSL) (BASED ON MEASUREMENTS RECORDED ON FEBRUARY 2-5, 2005)
- ESTIMATED GROUNDWATER FLOW DIRECTION

0 300
1 IN. = 300 FT

REFERENCE:
RCRA FACILITY INVESTIGATION
DATA GAP WORK PLAN JOHN
F. QUEENY PLANT BY O'BRIEN
& GERE ENGINEERS, INC.,
SEPTEMBER 1999

Groundwater Potentiometric Surface Map - Sand Unit

Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 2-8

marcus 12/8/2008 12:17:48 PM M:\3_Eng\2950 solutia\Fig 2-8 Potentiometric Surface.dgn

LEGEND

- GROUNDWATER MONITORING WELLS AND PIEZOMETERS
- MW–15 WELLS SCREENED IN THE FILL & SILTY CLAY (BOLD FONT)
- WELLS SCREENED IN THE SAND OR BEDROCK (GRAYSCALE FONT)
- SOURCE AREA
- VV Building Area

NOTE:

1. LOCATION OF THE MISSISSIPPI RIVER IS APPROXIMATE.

300 0 300 600

1 IN. = 300 FT.

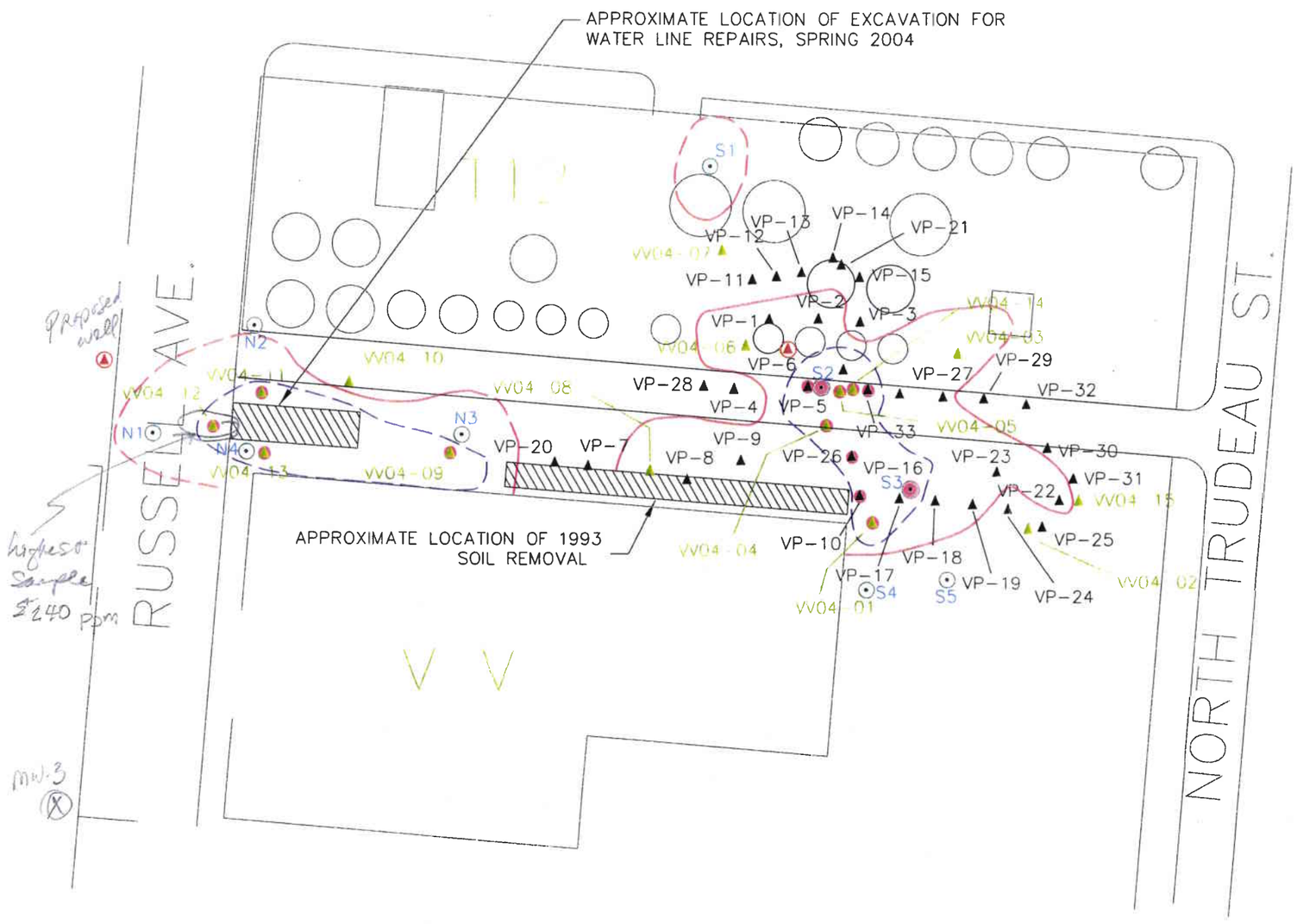
REFERENCE:
RCRA FACILITY INVESTIGATION DATA GAP WORK PLAN JOHN F. QUEENY PLANT BY O'BRIEN & GERE ENGINEERS, INC., SEPTEMBER 1999

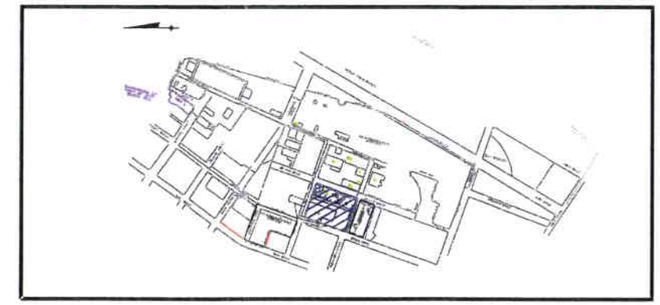
Location of VV Building Area and Groundwater Source Areas

Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 3-1

marcus 12/9/2008 12:36:52 PM M13_Eng\2950 solutia\well pz fill & silty clay concentrations fig 3-1.dgn





KEY MAP

0 50

1 IN. = 50 FT.

LEGEND:

- EOI Due Diligence Sample Location
- Proposed monitoring well location
- VV04-01 CMS SOIL BORING LOCATION
- VP-1 SOIL BORING LOCATION (PRE-CMS)
- APPROXIMATE LOCATION OF PRIOR EXCAVATIONS
- x—x— FENCE
- PCB concentration in soil exceeds 100 mg/kg
- Approximate Extent of Excavation
- Approximate line where Total PCB concentration = 10mg/kg
- Inferred concentration = 10mg/kg

NOTE:
SOIL SAMPLES WERE COLLECTED FROM BORINGS VV-04-15, -16 AND ANALYZED TO OBTAIN GEOCHEMICAL AND GEOTECHNICAL DATA.

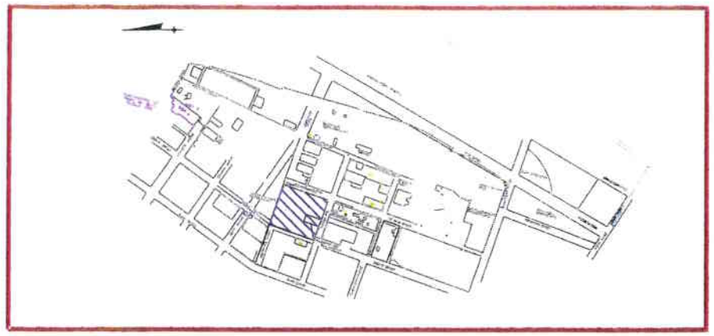
PCB Soil Sample Locations and Excavation Areas
VV Building Area

RCRA Corrective Measures Study (CMS) Report
Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 3-2

marcus 12/9/2008 12:19:14 PM M:\3_Eng\2950 solutia\Fig 3-2 VV Building.dgn

Environmental Operations, Inc.



KEY MAP

LEGEND:

- FF04-01 CMS SOIL BORING LOCATION
- SB-5 SOIL BORING LOCATION (PRE-CMS)
- FORMER PCE TANK LOCATION
- EOI Due Diligence Boring Location
- x——x—— FENCE

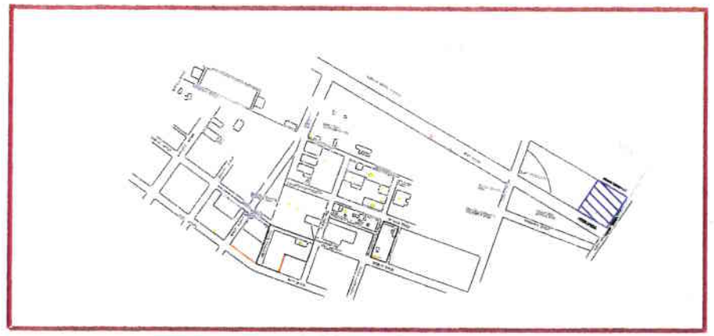
REFERENCE:
RCRA FACILITY INVESTIGATION
DATA GAP WORK PLAN JOHN
F. QUEENY PLANT BY O'BRIEN
& GERE ENGINEERS, INC.,
SEPTEMBER 1999

Soil Boring Locations
Former FF Building Area
Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 3-3

marcus 12/4/2008 10:10:25 AM M:\3_Eng\2950 solutia\Fig 3-3 Soil Boring FF bldg.dgn

Environmental Operations, Inc.



KEY MAP

x——x—— FENCE

LEGEND:

- FBCSA04-01 CMS SOIL BORING LOCATION
- SB-D RFI DATA GAP CONFIRMATORY SAMPLE
- VS-1 SOIL BORING LOCATION (PRE-CMS)
- EOI Due Diligence Boring Location

0 100

1 IN. = 100 FT.

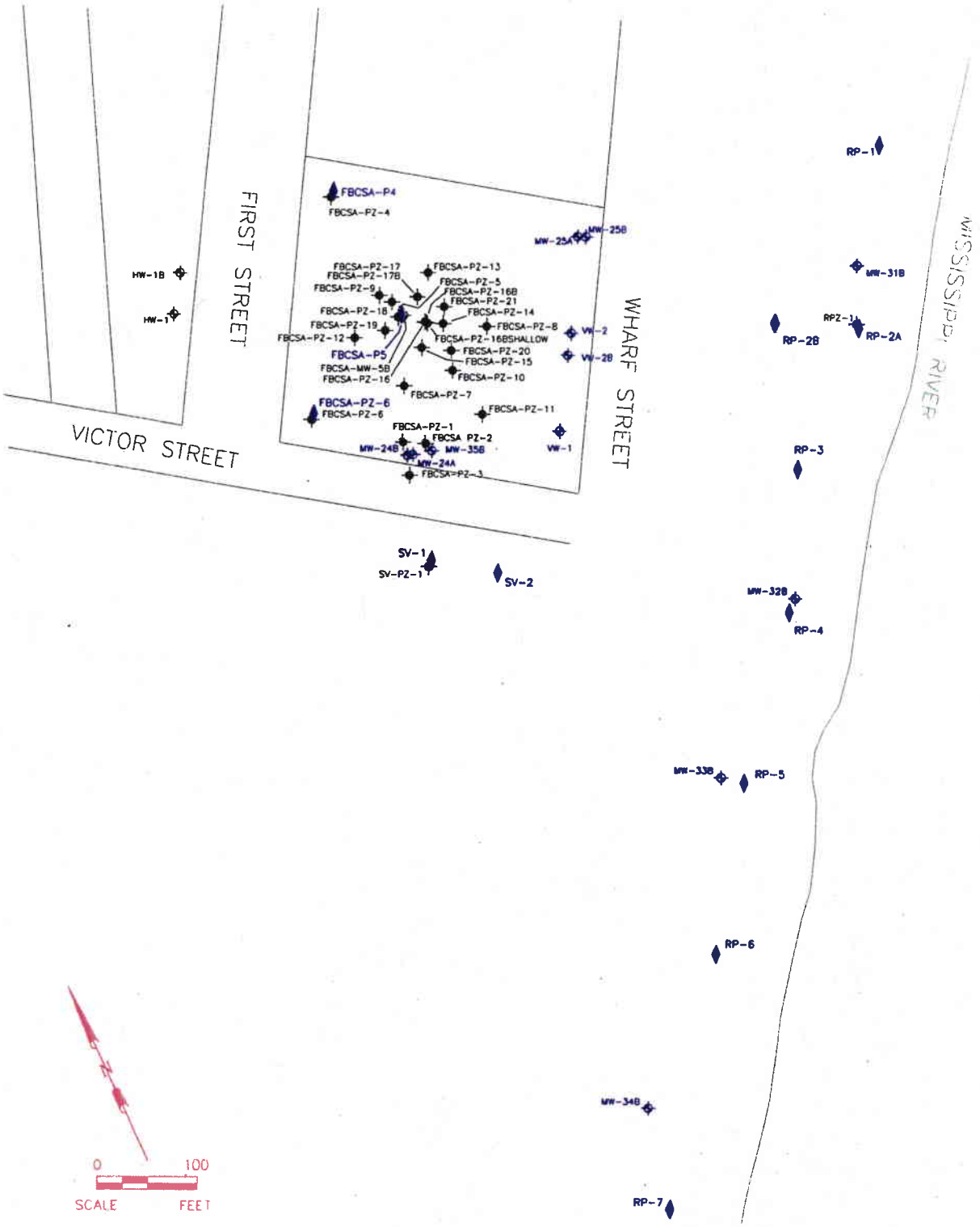
REFERENCE:
RCRA FACILITY INVESTIGATION
DATA GAP WORK PLAN JOHN
F. QUEENY PLANT BY O'BRIEN
& GERE ENGINEERS, INC.,
SEPTEMBER 1999

Soil Boring Locations
Former Bulk Chemical Storage Area
Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 3-4

marcus 12/4/2008 10:15:45 AM M:\3_Eng\2950 solutia\Fig 3-4 fbcsa Area.dgn

Environmental Operations, Inc.



LEGEND:

- MONITORING WELL GROUNDWATER SAMPLING LOCATION (SAMPLED DURING CMS)
- CMS PIEZOMETER GROUNDWATER SAMPLING LOCATION (NOT SAMPLED DURING CMS)
- GROUNDWATER PROFILING LOCATION
- GROUNDWATER MONITORING WELL LOCATION (NOT SAMPLED DURING CMS)

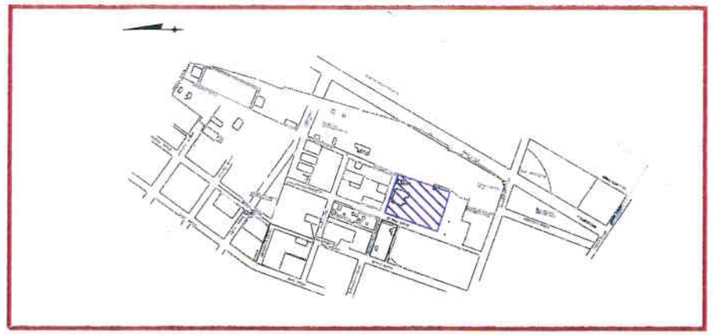
Groundwater Profiling, Monitoring Wells and Piezometer Locations - Former Bulk Chemical Storage Area

Former Solutia Queeny Plant
Saint Louis, Missouri

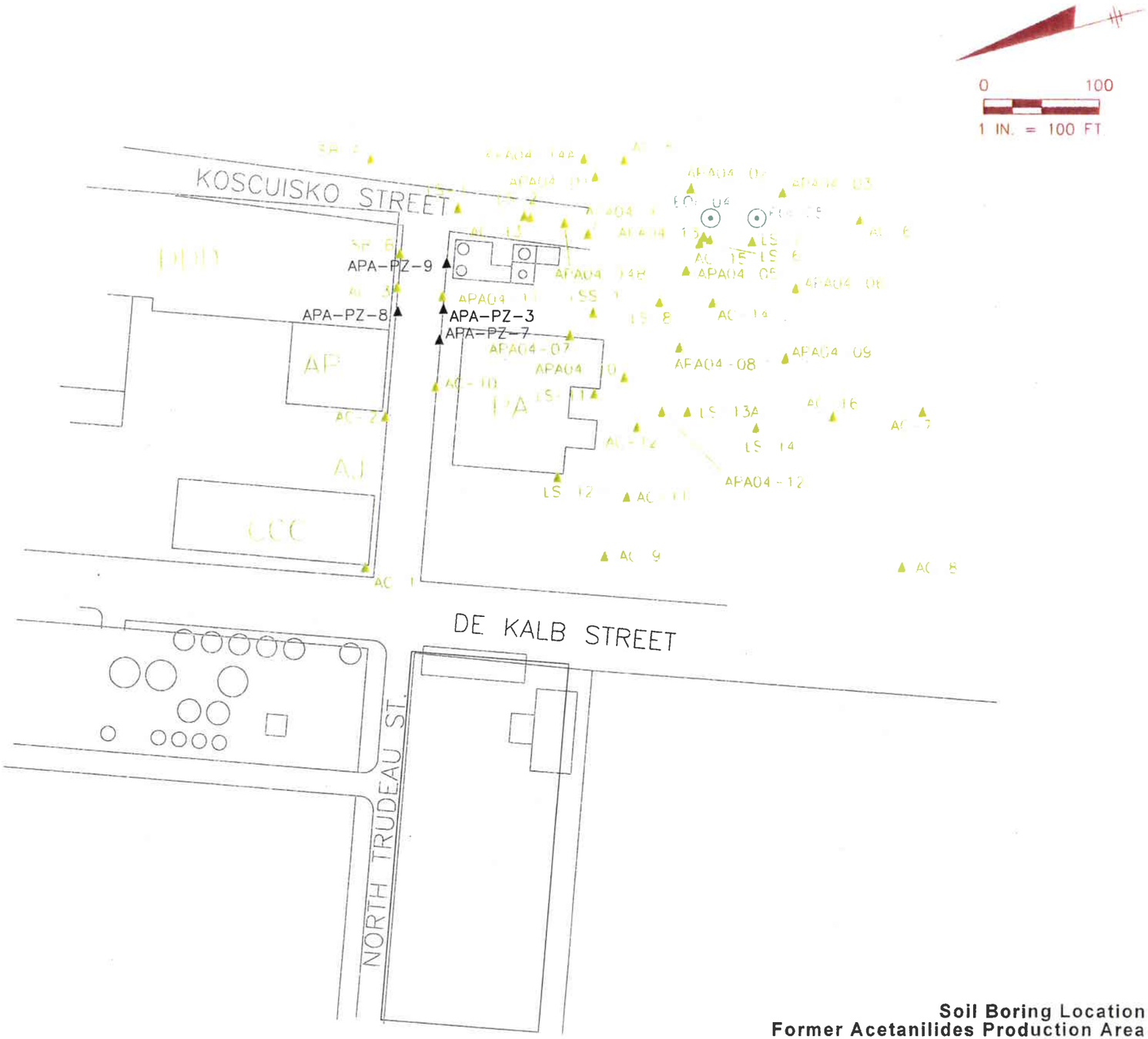
Figure 3-5

marcus 12/9/2008 12:20:42 PM M:\3_Eng\2950 solutia\Fig 3-5 fbcsa.dgn

Environmental Operations, Inc.



KEY MAP



LEGEND:

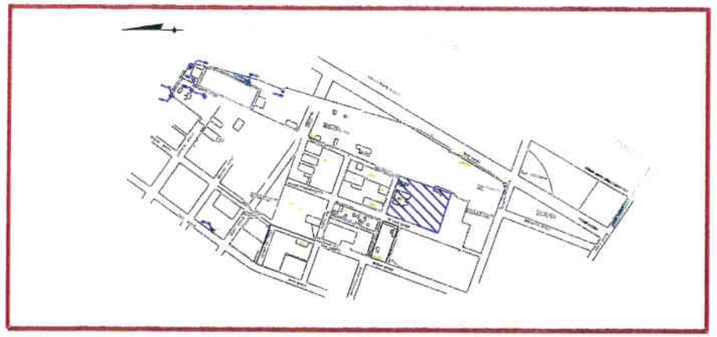
- APA04-01 CMS SOIL BORING LOCATION
- AC-9 SOIL BORING LOCATION (PRE-CMS)
- Due Diligence Soil Boring Location

Soil Boring Location
Former Acetanilides Production Area
Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 3-6

marcus 12/4/2008 10:17:13 AM M13_Eng\2950 solutia\Fig 3-6 Soil sample APA.dgn

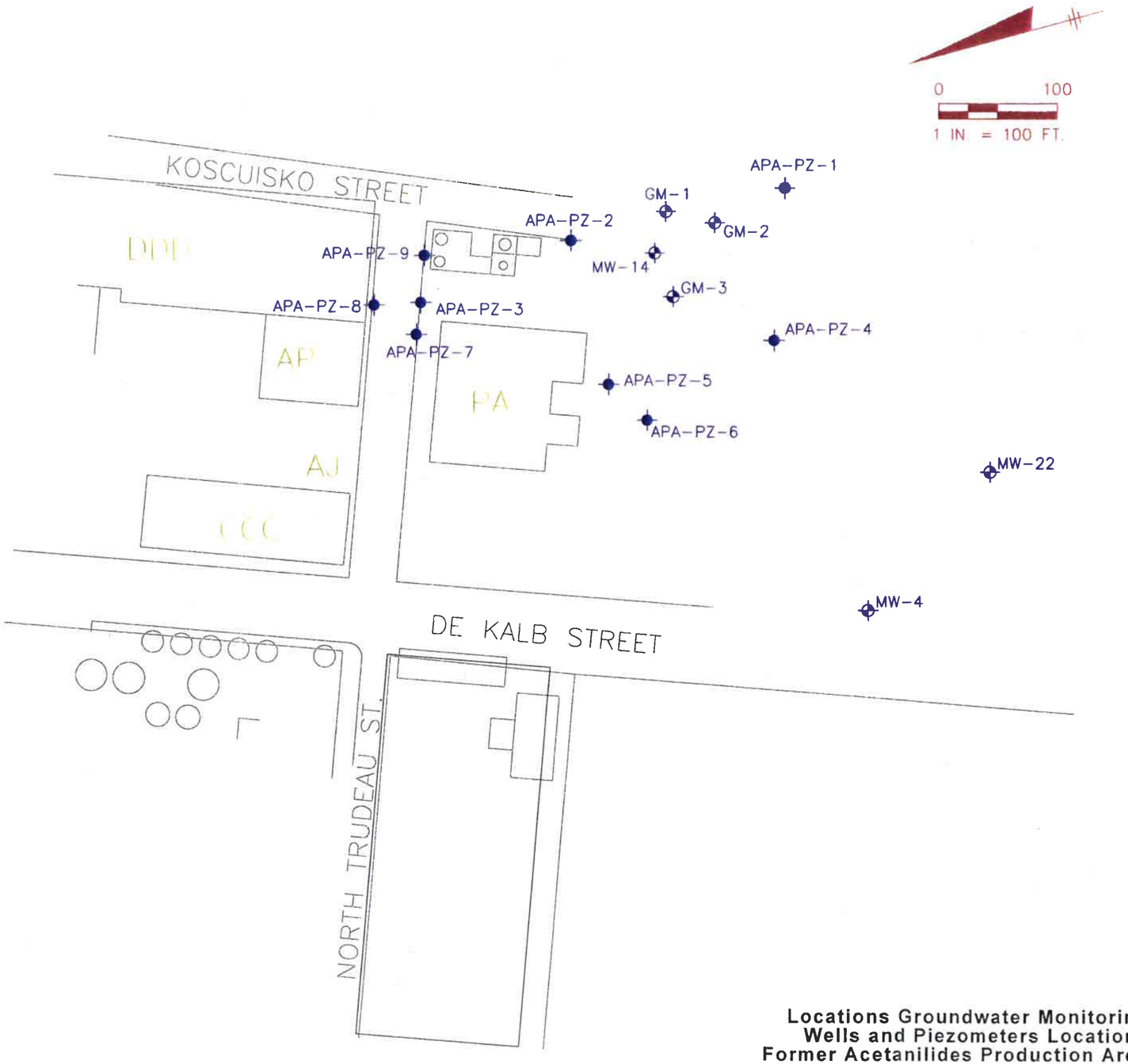
Environmental Operations, Inc.



KEY MAP

LEGEND:

- MONITORING WELL GROUNDWATER SAMPLING LOCATION
- CMS PIEZOMETER GROUNDWATER SAMPLING LOCATION



Locations Groundwater Monitoring Wells and Piezometers Locations Former Acetanilides Production Area

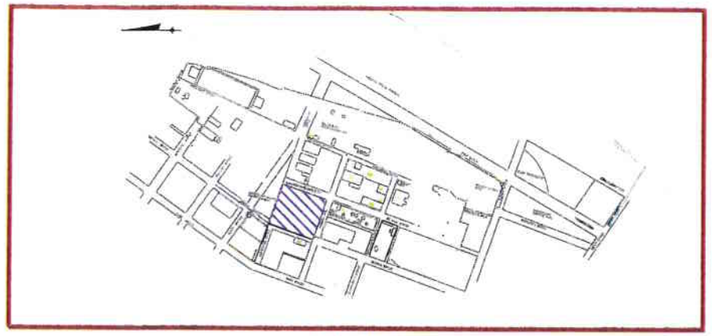
Former Solutia Queeny Plant

Saint Louis Missouri

Figure 3-7

marcus 12/9/2008 12:21:54 PM M:\3_Eng\2950 solutia\Fig 3-7 APA.dgn

Environmental Operations, Inc.



KEY MAP

LEGEND:

- APPROXIMATE EXTENT OF LNAPL
- APPROXIMATE EXTENT OF DNAPL
- GROUNDWATER GAUGING LOCATION WITH HISTORIC LNAPL PRESENT
- GROUNDWATER GAUGING LOCATION WITH HISTORIC DNAPL PRESENT
- GROUNDWATER GAUGING LOCATION WITH NO NAPL PRESENT
- FORMER PCE TANK LOCATION
- PROPOSED LOCATION OF PROBEHOLE/PIEZOMETER DURING PRELIMINARY INVESTIGATION
- x——x—— FENCE

NOTES:

1) DNAPL WAS ONLY OBSERVED IN LPZ-3, OBW-2 AND REC-3. THE MAXIMUM THICKNESS OBSERVED IN LPZ-3 HAS BEEN 0.02 FEET.

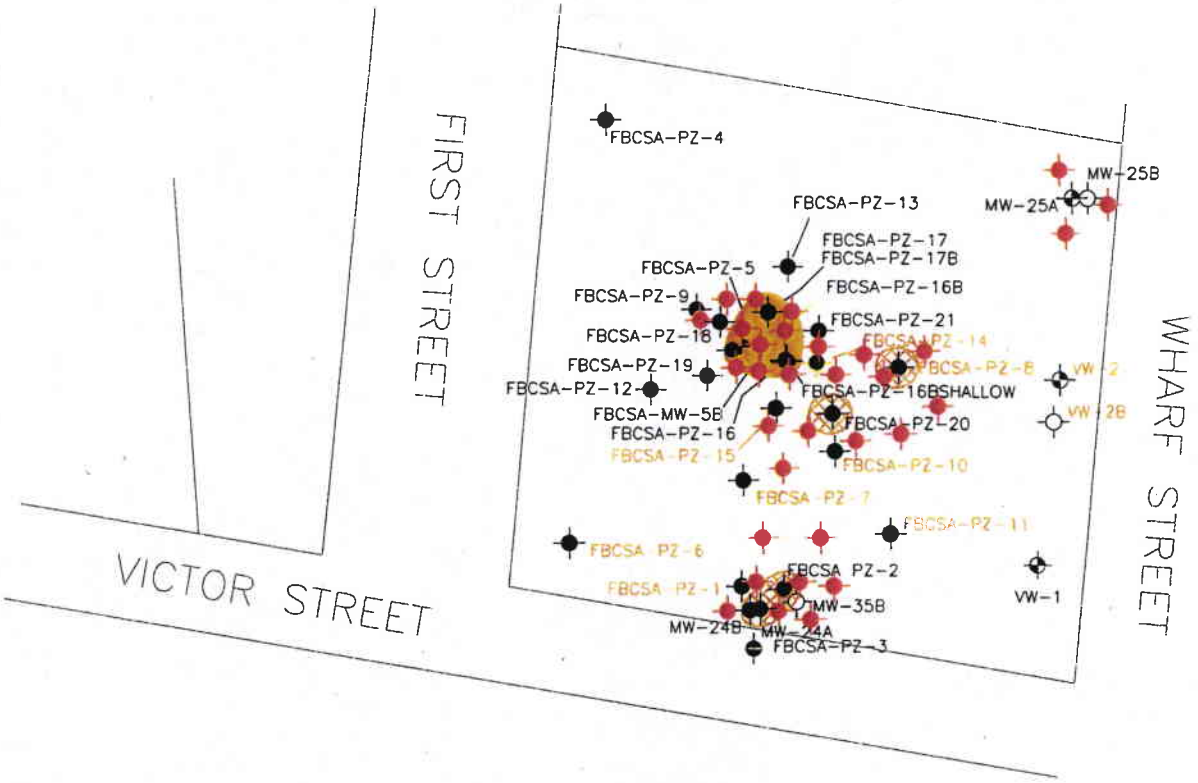
2) LNAPL SHEEN (0.01 FEET) WAS OBSERVED IN FF-PZ-1 AND REC-1 DURING ONE GAUGING EVENT.

Proposed Probehole/Piezometer Locations
Former FF Building Area

Former Solutia Queeny Plant
Saint Louis, Missouri

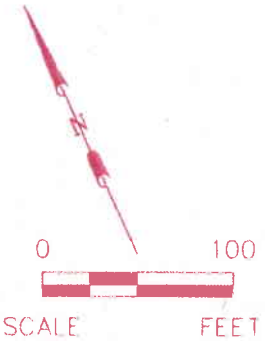
Figure 6-1

marcus 12/9/2008 12:23:37 PM M:\3_Eng\2950 solutia\Fig 6-1 Proposed Probehole Piezometer Location.dgn



LEGEND:

- APPROXIMATE EXTENT OF HISTORIC LNAPL (> 1 FOOT THICK)
- APPROXIMATE EXTENT OF HISTORIC LNAPL (MEASURING 0.1-1 FOOT THICK)
- GROUNDWATER GAUGING LOCATION WITH LNAPL PRESENT (<0.1 FEET)
- GROUNDWATER GAUGING LOCATIONS WITH NO LNAPL PRESENT-SILTY CLAY UNIT
- PROPOSED LOCATION OF PROBEHOLE/PIEZOMETER DURING PRELIMINARY INVESTIGATION
- GROUNDWATER GAUGING LOCATIONS WITH NO LNAPL PRESENT-SAND UNIT



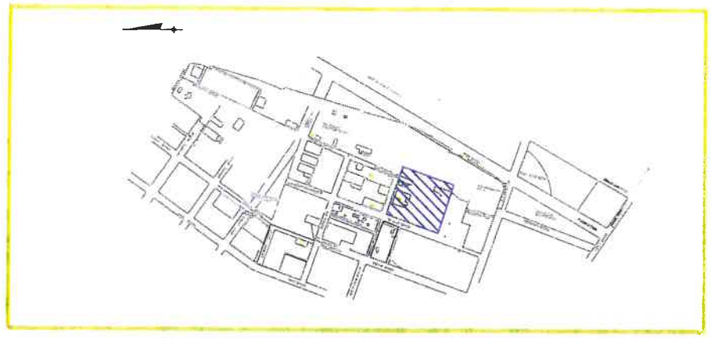
NOTE:
1) LNAPL MEASURING (< 0.1 FEET) WAS NOTED IN FBCSA PZ-1, PZ-4, PZ-6, PZ-7, PZ-8, PZ-10, PZ-11, PZ-14, PZ-15 AND WELLS MW-25A, AND VW-2.

Proposed Probeholes/Piezometer Locations
Former Bulk Chemical Storage Area

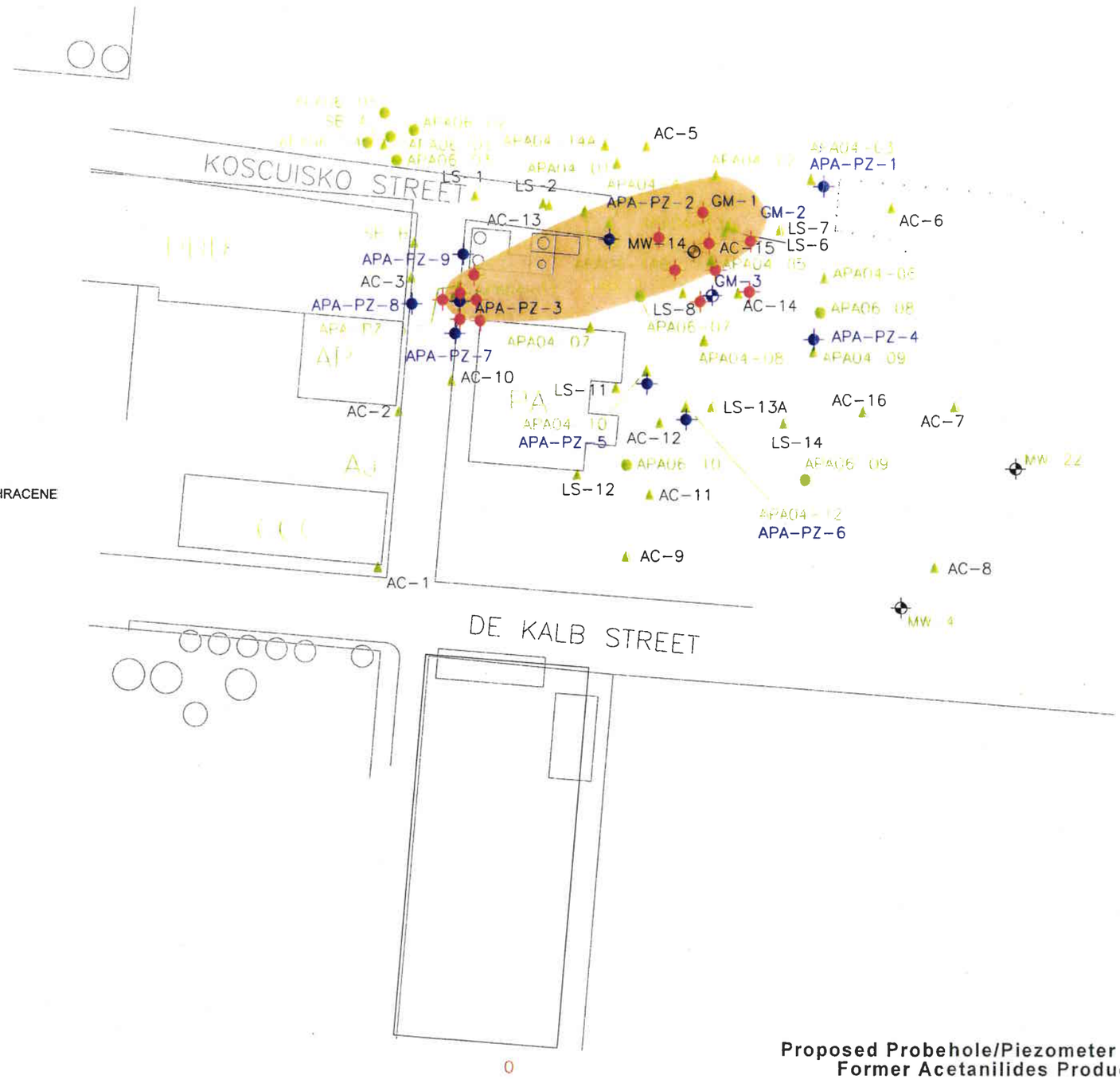
Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 6-2

Environmental Operations, Inc.



KEY MAP



LEGEND:

- GROUNDWATER EXCEEDANCES OF ALACHOR, CHOROBENZENE AND DIBENZO(A,H)ANTHRACENE CLEANUP OBJECTIVES - (CMS,2007)
- APPROXIMATE EXTENT OF DNAPL (OBSERVED IN APA-PZ-3)
- APA04-01 CMS SOIL BORING LOCATION
- MONITORING WELL GROUNDWATER SAMPLING LOCATION (SAMPLED DURING CMS)
- CMS PIEZOMETER GROUNDWATER SAMPLING LOCATION (SAMPLED DURING CMS)
- AC-9 SOIL BORING LOCATION (PRE-CMS)
- GROUNDWATER MONITORING WELL LOCATION (NOT SAMPLED DURING CMS)
- PROPOSED LOCATIONS OF PROBEHOLE/PIEZOMETER DURING PRELIMINARY INVESTIGATION
- PRE-CMS PIEZOMETER

100

1 IN. = 100 FT.

Proposed Probehole/Piezometer Locations
Former Acetanilides Production Area

Former Solutia Queeny Plant
Saint Louis, Missouri

Figure 6-3

marcus 12/8/2008 12:33:02 PM M:\3_Eng\2950 solutia\Fig 6-3 Proposed Probeholes Piezometer Locations Acetanilides Production.dgn

Figure 7-1
Project Schedule
Interim Measures Work Plan
Former Solutia Queeny Plant
St. Louis, Missouri

Task	Duration (weeks)	Weeks from Start
Preliminary Investigation	8	1–8
Excavation at VV Bldg	4	7–11
Backfilling at VV Bldg	2	12–13
Monitoring Wells Installation	1	14
Outline of PCB > 10 mg/kg	2	15–16
Installation of Injection Wells	6	9–14
First Injection Event	4	15–18
First Injection Monitoring	12	19–30
Second Injection Event	4	31–34
Second Injection Monitoring	12	35–46
Third Injection Event	4	47–50
Third Injection Monitoring	12	47–58
Final Data	2	51–52
IMWP Report Preparation	8	53–60
Paving of VV Bldg Area PCB>10 mg/kg	Schedule Forthcoming as part of Redevelopment	
Institutional Controls	Schedule Forthcoming as part of Redevelopment	

TABLES

TABLE 2-1
Monitoring Well Completion Summary and Groundwater Elevations from February 2 - 4, 2005
Former Solutia Queeny Plant
St. Louis, Missouri

Monitoring Well Identification	Top of Casing Elevation (ft MSL)	Total Well Depth (ft btoc)	Bottom of Well Elevation (ft MSL)	Screened Interval (ft btoc)	Screened Interval Elevation (ft MSL)	Depth to Water (ft btoc)	Water Elevation (ft MSL)	Comments
Fill and Silty Clay Wells								
GM-1	425.52	13.37	412.15	(8.50-13.50)	(417.02-412.02)	9.61	415.91	
GM-2	425.58	12.33	413.25	(6.75-11.75)	(418.83-413.83)	9.56	416.02	
GM-3	427.50	12.45	415.05	(7.50-12.50)	(420.00-415.00)	7.22	420.28	
HW-2	425.25	NG	NG	(16.00-31.00)	(409.25-394.25)	NG	NG	
HW-3	424.00	NG	NG	(9.00-24.00)	(415.00-400.00)	NG	NG	Bent/Not accessible
LPZ-1	423.55	21.11	402.44	(9.41-24.41)	(414.14-399.14)	9.74	413.81	
LPZ-2	423.46	22.09	401.37	(7.52-22.52)	(415.94-400.94)	9.44	414.02	
LPZ-3	423.59	22.12	401.47	(7.35-22.35)	(416.24-401.24)	10.18	413.41	DNAPL was measured from 22.10' to 22.12'
LPZ-4	424.06	NG	NG	(7.62-22.62)	416.44-401.44)	NG	NG	Not Gauged
LPZ-5	423.26	21.78	401.48	NA	NA	9.59	413.67	
MW-2B	430.80	29.28	401.52	(17.16-27.16)	(413.64-403.64)	15.84	414.96	
MW-3	425.49	30.47	395.02	(22.65-32.65)	(402.84-392.84)	12.28	413.21	
MW-4	427.39	18.32	409.07	(9.51-19.51)	(417.88-407.88)	8.74	418.65	
MW-5	426.02	15.27	410.75	(6.14-16.14)	(419.88-409.88)	9.35	416.67	
MW-8B	423.83	34.42	389.41	(25.00-35.00)	(398.83-388.83)	22.84	400.99	
MW-9	425.06	41.53	383.53	(33.92-44.42)	(391.14-380.64)	18.96	406.10	
MW-10	425.20	37.91	387.29	(33.56-43.56)	(391.64-381.64)	19.66	405.54	
MW-11A	426.21	74.30	351.91	(70.17-80.17)	(356.04-346.04)	13.23	412.98	
MW-11B	426.48	30.06	396.42	(22.44-32.44)	(404.04-394.04)	13.50	412.98	
MW-11C	426.18	25.91	400.27	(12.34-27.34)	(413.84-398.84)	13.16	413.02	
MW-13	425.93	51.84	374.09	(9.99-49.99)	(415.94-375.94)	12.98	412.95	
MW-14	425.93	NG	NG	(7.09-12.09)	(418.84-413.84)	NG	NG	NG - Due to purple dye in the well
MW-15	426.59	17.97	408.62	(13.00-18.00)	(413.59-408.59)	13.31	413.28	
MW-17	420.39	50.27	370.12	(12.25-52.25)	(408.14-368.14)	13.20	407.19	
MW-18B	423.06	42.96	380.10	(12.50-47.50)	(410.56-375.56)	10.63	412.43	
MW-19	424.08	15.34	408.74	(10.50-15.50)	(413.58-408.58)	10.50	413.58	
MW-20	423.09	26.41	396.68	(11.32-26.32)	(411.77-396.77)	8.33	414.76	
MW-22	426.70	14.61	412.09	(10.66-15.66)	(416.04-411.04)	7.09	419.61	
MW-23	424.49	24.40	400.09	(15.25-25.25)	(409.74-399.740	12.54	411.95	
MW-24A	420.80	28.24	392.56	(18.45-28.45)	(402.35-392.35)	23.56	397.24	LNAPL was measured from 23.41' to 23.56'
MW-25A	419.90	29.90	390.00	(20.76-30.76)	(399.14-389.14)	23.50	396.40	
MW-26	425.78	20.21	405.57	(10.14-20.14)	(415.64-405.64)	17.18	408.60	
MW-27	425.99	22.84	403.15	(13.65-23.65)	(412.34-402.34)	11.21	414.78	
MW-28A	422.64	12.26	410.38	(7.6-12.6)	(415.04-410.04)	6.50	416.14	LNAPL was measured from 5.41' to 6.5'
MW-30A	418.90	17.13	401.77	(8.16-18.16)	(410.74-400.74)	7.54	411.36	
QS-1	427.50	102.91	324.59	(92.79-102.79)	(334.71-324.71)	14.53	412.97	
REC-1	424.52	44.05	380.47	(20.00-40.00)	(401.58-380.58)	12.21	412.31	
REC-2	425.11	57.59	367.52	(37.50-57.50)	(384.77-364.77)	13.04	412.07	
REC-3	424.75	57.52	367.23	(36.00-56.00)	(386.54-366.54)	12.78	411.97	DNAPL was measured from 57.51' to 57.52'
REC-4	424.31	67.41	356.90	(44.00-64.00)	(378.33-358.33)	12.23	412.08	
VW-1	419.12	16.04	403.08	(6.00-16.00)	(413.12-403.12)	8.84	410.28	
VW-2	419.17	13.18	405.99	(6.00-16.00)	(413.17-403.17)	9.72	409.45	

TABLE 2-1
Monitoring Well Completion Summary and Groundwater Elevations from February 2 - 4, 2005
Former Solutia Queeny Plant
St. Louis, Missouri

Monitoring Well Identification	Top of Casing Elevation (ft MSL)	Total Well Depth (ft btoc)	Bottom of Well Elevation (ft MSL)	Screened Interval (ft btoc)	Screened Interval Elevation (ft MSL)	Depth to Water (ft btoc)	Water Elevation (ft MSL)	Comments
Sand Wells								
HW-1	423.13	47.69	375.44	(32.00-47.00)	(391.13-376.13)	31.33	391.80	
HW-1B	422.40	79.79	342.61	(70.15-80.15)	(352.25-342.25)	31.79	390.61	
MW-2A	430.84	NG	NG	(40.10-50.10)	(390.74-380.74)	NG	NG	well obstruction at 4.8 ft bgs
MW-7A	422.18	NG	NG	(42.00-52.00)	(380.18-370.18)	NG	NG	No Access
MW-7B	422.17	32.21	389.96	(23.00-33.00)	(399.17-389.17)	26.99	395.18	
MW-8A	423.75	48.19	375.56	(39.00-49.00)	(384.75-374.75)	30.13	393.62	
MW-18A	422.95	80.94	342.01	(41.41-81.41)	(381.54-341.85)	28.27	394.68	
MW-24B	420.84	44.54	376.30	(35.4-45.4)	(385.44-375.44)	30.42	390.42	
MW-25B	419.99	47.37	372.62	(37.55-47.55)	(382.44-372.44)	29.76	390.23	
MW-28B	422.73	42.10	380.63	(37.49-42.49)	(385.24-380.24)	28.35	394.38	
MW-29	423.45	83.15	340.30	(76.61-86.61)	(346.84-336.84)	30.11	393.34	
MW-30B	418.89	66.71	352.18	(66.15-76.15)	(352.74-342.74)	25.09	393.80	
MW-31B	419.58	52.29	367.29	(42.05-52.05)	(377.53-367.48)	29.75	389.83	
MW-32B	422.49	67.14	355.35	(57.30-67.30)	(365.19-355.19)	32.81	389.68	
MW-33B	419.96	66.78	353.18	(57.59-67.59)	(362.37-352.37)	30.25	389.71	
MW-34B	418.09	79.45	338.64	(69.76-79.76)	(348.33-338.33)	28.46	389.63	
MW-35B	421.09	81.78	339.31	(69.98-79.98)	(351.11-341.11)	30.80	390.29	
OBS-1	423.79	61.96	361.83	(52.97-62.97)	(370.82-360.82)	28.93	394.86	
TW-1	423.12	60.56	362.56	(50.55-61.55)	(372.57-361.57)	29.28	393.84	
VW-2B	419.55	76.80	342.75	(67.30-77.30)	(352.25-342.25)	29.35	390.20	
Bedrock Wells								
MW-2R	431.69	77.01	354.68	open hole	(368.19-352.44)	14.93	416.76	
MW-8R	423.95	129.48	294.47	(124.41-129.41)	(299.54-294.54)	28.16	395.79	
MW-13R	427.43	75.39	352.04	(70.88-75.88)	(356.55-351.55)	14.98	412.45	
MW-21R	427.17	32.10	395.07	(19.84-31.84)	(407.33-395.33)	10.17	417.00	
OBW-1	426.98	75.29	351.69	(70.54-80.54)	(356.44-346.44)	14.86	412.12	
OBW-2	426.41	99.34	327.07	(88.77-98.77)	(337.64-327.64)	14.87	411.54	DNAPL was measured from 99.17' to 99.34'
OBW-3	425.32	100.63	324.69	(85.58-100.58)	(339.74-324.74)	13.09	412.23	

Notes:
MSL = Mean Sea Level
btoc = below top of casing
Water level measurements were taken on February 2 thru 4, 2005.
NG = Not gauged.
NA = Information not available

Table 3-1
PCB Concentrations in Soil
VV Building Area
Former Solutia Queeny Plant
St. Louis, Missouri

Sample ID	Date Sampled	Sample Depth (ft bgs)	Total PCB (mg/kg)
VV04-01-4-5	6/28/04	4-5	377
VV04-01-6-7	6/28/04	6-7	335
VV04-02-5-6	6/28/04	5-6	0.8
VV04-02-7-8	6/28/04	7-8	1.1
VV04-03-6-7	6/28/04	6-7	0.2
VV04-03-8-9	6/28/04	8-9	12
VV04-04-5-6	6/28/04	5-6	211
VV04-04-6-7	6/28/04	6-7	912
VV04-05-3-4	6/28/04	3-4	556
VV04-05-6-7	6/28/04	6-7	3,610
VV04-06-5-6	6/28/04	5-6	17.6
VV04-07-5-6	6/28/04	5-6	0.2
VV04-07-8-9	6/28/04	8-9	96
VV04-06-11-12	6/28/04	11-12	97
VV04-06-11-12-D	6/28/04	11-12	45
VV04-08-5-6	6/28/04	5-6	4
VV04-08-6-7	6/29/04	6-7	8.3
VV04-08-6-7	6/29/04	6-7	16.2
VV04-08-6-7-D	6/29/04	6-7	12.8
VV04-09-7-9	7/8/04	7-9	111
VV04-10-2-4	7/8/04	2-4	4.9
VV04-10-7-9	7/8/04	7-9	5.2
VV04-11-4-6	7/8/04	4-6	3,130
VV04-11-4-6-D	7/8/04	4-6	1,086
VV04-11-8-10	7/8/04	8-10	4,800
VV04-12-10-12	7/8/04	10-12	1,375
VV04-12-13.5-15.5	7/8/04	13.5-15.5	5,240
VV04-13-4-6	7/8/04	4-6	1.4
VV04-13-8-10	7/8/04	8-10	1,480
VV04-9-4-6	7/8/04	4-6	47
VP-1	6/1/94	3	24.2
VP-2	6/1/94	2	50
VP-3	6/1/94	3	2
VP-4	6/1/94	3	U
VP-5	6/1/94	3	198.5
VP-5	3/9/94	3	261
VP-6	6/1/94	3	133.1
VP-7	6/1/94	2.8	U
VP-8	6/1/94	3	27.9
VP-9	6/1/94	3	37.7

From CMS (URS, 2007) and RFI Data Gaps (URS, 2001)

Table 3-1
PCB Concentrations in Soil
VV Building Area
Former Solutia Queeny Plant
St. Louis, Missouri

Sample ID	Date Sampled	Sample Depth (ft bgs)	Total PCB (mg/kg)
VP-10	6/1/94	2.7	105.4
VP-11	6/1/94	1.2	7.2
VP-12	6/1/94	3	8.4
VP-13	6/1/94	3	U
VP-14	6/1/94	2.5	U
VP-15	6/1/94	2.5	3.2
VP-16	6/1/94	3	16.2
VP-17	6/1/94	2	75.3
VP-18	6/1/94	2.3	66.8
VP-19	6/1/94	3	13.1
VP-20	3/9/94	2.8	0.3
VP-20	6/1/94	2.8	U
VP-21	3/9/94	2.5	0.3
VP-22	6/1/94	4	U
VP-23	6/1/94	3	70.9
VP-24	6/1/94	3	2.6
VP-25	6/1/94	3	U
VP-26	6/1/94	3	169.4
VP-27	6/1/94	3	11.0
VP-28	6/1/94	3	U
VP-29	6/1/94	3	1.1
VP-30	6/1/94	3	U
VP-31	3/11/94	3	U
VP-31	6/1/94	3	U
VP-32	6/1/94	3	U
VP-33	3/11/94	3	3,400
VP-33	6/1/94	5	114.4
VV-S1	3/28/08	10	19.9
VV-S1	3/28/08	15	21.4
VV-S2	3/28/08	6	330
VV-S3	3/28/08	5	102
VV-S3	3/28/08	6	76.5
VV-S4	3/28/08	5	2.8
VV-S5	3/28/08	5	0.58
VV-N3	3/28/08	9	16.3

Notes:
U = Not detected
ft = feet
bgs = below ground surface
mg/kg = milligrams per kilogram

From CMS (URS, 2007) and RFI Data Gaps (URS, 2001)

TABLE 3-2
Summary of 2004 - 2005 Groundwater Analytical Detections
Former Solutia Queeny Plant
St. Louis, Missouri

Group	Sample ID	Sample Date	CAS	Chemical	Result	Units
Former FF Building Area						
VOCs	FF-PZ-1	8/26/04	71-43-2	Benzene	81	ug/l
VOCs	FF-PZ-1	8/26/04	108-90-7	Chlorobenzene	12000	ug/l
VOCs	FF-PZ-1	8/26/04	156-59-2	cis 1,2-Dichloroethene	460	ug/l
VOCs	FF-PZ-1	8/26/04	127-18-4	Tetrachloroethene	790	ug/l
VOCs	FF-PZ-1	8/26/04	156-60-5	trans-1,2-Dichloroethene	58	ug/l
VOCs	FF-PZ-1	8/26/04	79-01-6	Trichloroethene	19	ug/l
VOCs	FF-PZ-1	8/26/04	75-01-4	Vinyl chloride	220	ug/l
VOCs	FF-PZ-2	8/26/04	108-90-7	Chlorobenzene	6500	ug/l
VOCs	FF-PZ-2	8/26/04	156-59-2	cis 1,2-Dichloroethene	37000	ug/l
VOCs	FF-PZ-2	8/26/04	127-18-4	Tetrachloroethene	42000	ug/l
VOCs	FF-PZ-2	8/26/04	156-60-5	trans-1,2-Dichloroethene	840	ug/l
VOCs	FF-PZ-2	8/26/04	79-01-6	Trichloroethene	2600	ug/l
VOCs	FF-PZ-2	8/26/04	75-01-4	Vinyl chloride	2500	ug/l
VOCs	FF-PZ-3	8/26/04	108-90-7	Chlorobenzene	680	ug/l
VOCs	FF-PZ-3	8/26/04	156-59-2	cis 1,2-Dichloroethene	49000	ug/l
VOCs	FF-PZ-3	8/26/04	127-18-4	Tetrachloroethene	1800	ug/l
VOCs	FF-PZ-3	8/26/04	79-01-6	Trichloroethene	1900	ug/l
VOCs	FF-PZ-3	8/26/04	75-01-4	Vinyl chloride	4300	ug/l
VOCs	LPZ-2	4/29/04	71-43-2	Benzene	14	ug/l
VOCs	LPZ-2	4/29/04	108-90-7	Chlorobenzene	14	ug/l
VOCs	LPZ-2	3/3/05	108-90-7	Chlorobenzene	37	ug/L
VOCs	LPZ-2	4/29/04	156-59-2	cis 1,2-Dichloroethene	100	ug/l
VOCs	LPZ-2	1/13/05	156-59-2	cis 1,2-Dichloroethene	170	ug/L
VOCs	LPZ-2	3/3/05	156-59-2	cis 1,2-Dichloroethene	110	ug/L
VOCs	LPZ-2	4/29/04	108-88-3	Toluene	48000	ug/l
VOCs	LPZ-2	8/25/04	108-88-3	Toluene	3800	ug/l
VOCs	LPZ-2	3/3/05	108-88-3	Toluene	4600	ug/L
VOCs	LPZ-2	4/29/04	156-60-5	trans-1,2-Dichloroethene	6	ug/l
VOCs	LPZ-2	4/29/04	79-01-6	Trichloroethene	5.1	ug/l
VOCs	LPZ-2	4/29/04	75-01-4	Vinyl chloride	60	ug/l
VOCs	LPZ-2	1/13/05	75-01-4	Vinyl chloride	140	ug/L
VOCs	LPZ-2	3/3/05	75-01-4	Vinyl chloride	110	ug/L
VOCs	LPZ-2	4/29/04	1330-20-7	Xylene	10	ug/l
VOCs	LPZ-5	4/29/04	71-43-2	Benzene	1400	ug/l
VOCs	LPZ-5	4/29/04	108-90-7	Chlorobenzene	8200	ug/l
VOCs	LPZ-5	8/25/04	108-90-7	Chlorobenzene	8300	ug/l
VOCs	LPZ-5	1/13/05	108-90-7	Chlorobenzene	7900	ug/L
VOCs	LPZ-5	3/3/05	108-90-7	Chlorobenzene	9100	ug/L
VOCs	LPZ-5	4/29/04	156-59-2	cis 1,2-Dichloroethene	3500	ug/l
VOCs	LPZ-5	4/29/04	100-41-4	Ethylbenzene	85	ug/l
VOCs	LPZ-5	4/29/04	127-18-4	Tetrachloroethene	17	ug/l
VOCs	LPZ-5	4/29/04	108-88-3	Toluene	140000	ug/l
VOCs	LPZ-5	8/25/04	108-88-3	Toluene	68000	ug/l
VOCs	LPZ-5	1/13/05	108-88-3	Toluene	65000	ug/L
VOCs	LPZ-5	3/3/05	108-88-3	Toluene	57000	ug/L
VOCs	LPZ-5	4/29/04	156-60-5	trans-1,2-Dichloroethene	48	ug/l
VOCs	LPZ-5	4/29/04	79-01-6	Trichloroethene	160	ug/l
VOCs	LPZ-5	4/29/04	75-01-4	Vinyl chloride	1500	ug/l
VOCs	LPZ-5	4/29/04	1330-20-7	Xylene	130	ug/l
VOCs	MW-3	4/30/04	108-90-7	Chlorobenzene	39	ug/l
VOCs	MW-3	8/25/04	108-90-7	Chlorobenzene	28	ug/l
VOCs	MW-3	1/13/05	108-90-7	Chlorobenzene	57	ug/L
VOCs	MW-3	3/2/05	108-90-7	Chlorobenzene	27	ug/L
VOCs	MW-3	4/30/04	156-59-2	cis 1,2-Dichloroethene	1100	ug/l
VOCs	MW-3	8/25/04	156-59-2	cis 1,2-Dichloroethene	680	ug/l
VOCs	MW-3	1/13/05	156-59-2	cis 1,2-Dichloroethene	1200	ug/L

TABLE 3-2
Summary of 2004 - 2005 Groundwater Analytical Detections
Former Solutia Queeny Plant
St. Louis, Missouri

Group	Sample ID	Sample Date	CAS	Chemical	Result	Units
Former FF Building Area (cont.)						
VOCs	MW-3	3/2/05	156-59-2	cis 1,2-Dichloroethene	710	ug/L
VOCs	MW-3	4/30/04	127-18-4	Tetrachloroethene	630	ug/l
VOCs	MW-3	8/25/04	127-18-4	Tetrachloroethene	690	ug/l
VOCs	MW-3	3/2/05	127-18-4	Tetrachloroethene	530	ug/L
VOCs	MW-3	1/13/05	156-60-5	trans-1,2-Dichloroethene	19	ug/L
VOCs	MW-3	3/2/05	156-60-5	trans-1,2-Dichloroethene	10	ug/L
VOCs	MW-3	4/30/04	79-01-6	Trichloroethene	280	ug/l
VOCs	MW-3	8/25/04	79-01-6	Trichloroethene	220	ug/l
VOCs	MW-3	1/13/05	79-01-6	Trichloroethene	380	ug/L
VOCs	MW-3	3/2/05	79-01-6	Trichloroethene	200	ug/L
VOCs	MW-3	1/13/05	75-01-4	Vinyl chloride	23	ug/L
VOCs	MW-3-D	8/25/04	108-90-7	Chlorobenzene	26	ug/l
VOCs	MW-3-D	8/25/04	156-59-2	cis 1,2-Dichloroethene	680	ug/l
VOCs	MW-3-D	8/25/04	127-18-4	Tetrachloroethene	680	ug/l
VOCs	MW-3-D	8/25/04	79-01-6	Trichloroethene	220	ug/l
VOCs	REC-1	4/30/04	108-90-7	Chlorobenzene	140	ug/l
VOCs	REC-1	8/24/04	108-90-7	Chlorobenzene	210	ug/l
VOCs	REC-1	1/13/05	108-90-7	Chlorobenzene	19	ug/L
VOCs	REC-1	4/30/04	156-59-2	cis 1,2-Dichloroethene	130	ug/l
VOCs	REC-1	8/24/04	156-59-2	cis 1,2-Dichloroethene	32	ug/l
VOCs	REC-1	1/13/05	156-59-2	cis 1,2-Dichloroethene	4	ug/L
VOCs	REC-1	4/30/04	127-18-4	Tetrachloroethene	2400	ug/l
VOCs	REC-1	8/24/04	127-18-4	Tetrachloroethene	4300	ug/l
VOCs	REC-1	1/13/05	127-18-4	Tetrachloroethene	280	ug/L
VOCs	REC-1	3/2/05	127-18-4	Tetrachloroethene	6400	ug/L
VOCs	REC-1	1/13/05	108-88-3	Toluene	3	ug/L
VOCs	REC-1	4/30/04	79-01-6	Trichloroethene	220	ug/l
VOCs	REC-1	8/24/04	79-01-6	Trichloroethene	100	ug/l
VOCs	REC-1	1/13/05	79-01-6	Trichloroethene	22	ug/L
VOCs	REC-1	3/2/05	79-01-6	Trichloroethene	140	ug/L
VOCs	REC-1-DUP	4/30/04	108-90-7	Chlorobenzene	130	ug/l
VOCs	REC-1-DUP	4/30/04	156-59-2	cis 1,2-Dichloroethene	120	ug/l
VOCs	REC-1-DUP	4/30/04	127-18-4	Tetrachloroethene	2600	ug/l
VOCs	REC-1-DUP	4/30/04	79-01-6	Trichloroethene	220	ug/l
VOCs	REC-4	4/30/04	108-90-7	Chlorobenzene	520	ug/l
VOCs	REC-4	8/24/04	108-90-7	Chlorobenzene	560	ug/l
VOCs	REC-4	1/13/05	108-90-7	Chlorobenzene	760	ug/L
VOCs	REC-4	3/2/05	108-90-7	Chlorobenzene	550	ug/L
VOCs	REC-4	4/30/04	156-59-2	cis 1,2-Dichloroethene	1100	ug/l
VOCs	REC-4	8/24/04	156-59-2	cis 1,2-Dichloroethene	1100	ug/l
VOCs	REC-4	1/13/05	156-59-2	cis 1,2-Dichloroethene	1800	ug/L
VOCs	REC-4	3/2/05	156-59-2	cis 1,2-Dichloroethene	1700	ug/L
VOCs	REC-4	4/30/04	127-18-4	Tetrachloroethene	2200	ug/l
VOCs	REC-4	8/24/04	127-18-4	Tetrachloroethene	5800	ug/l
VOCs	REC-4	1/13/05	127-18-4	Tetrachloroethene	2600	ug/L
VOCs	REC-4	3/2/05	127-18-4	Tetrachloroethene	2700	ug/L
VOCs	REC-4	4/30/04	79-01-6	Trichloroethene	4000	ug/l
VOCs	REC-4	8/24/04	79-01-6	Trichloroethene	4800	ug/l
VOCs	REC-4	1/13/05	79-01-6	Trichloroethene	6600	ug/L
VOCs	REC-4	3/2/05	79-01-6	Trichloroethene	5800	ug/L
VOCs	REC-4-DUP	1/13/05	108-90-7	Chlorobenzene	620	ug/L
VOCs	REC-4-DUP	3/2/05	108-90-7	Chlorobenzene	560	ug/L
VOCs	REC-4-DUP	1/13/05	156-59-2	cis 1,2-Dichloroethene	1600	ug/L
VOCs	REC-4-DUP	3/2/05	156-59-2	cis 1,2-Dichloroethene	1700	ug/L
VOCs	REC-4-DUP	1/13/05	127-18-4	Tetrachloroethene	2000	ug/L
VOCs	REC-4-DUP	3/2/05	127-18-4	Tetrachloroethene	2700	ug/L

TABLE 3-2
Summary of 2004 - 2005 Groundwater Analytical Detections
Former Solutia Queeny Plant
St. Louis, Missouri

Group	Sample ID	Sample Date	CAS	Chemical	Result	Units
Former FF Building Area (cont.)						
VOCs	REC-4-DUP	1/13/05	79-01-6	Trichloroethene	5100	ug/L
VOCs	REC-4-DUP	3/2/05	79-01-6	Trichloroethene	5600	ug/L
Former Bulk Chemical Storage Area						
VOCs	MW-24A	4/28/04	71-43-2	Benzene	11000	ug/l
VOCs	MW-24A	8/23/04	71-43-2	Benzene	8000	ug/l
VOCs	MW-24A	11/19/04	71-43-2	Benzene	9600	ug/l
VOCs	MW-24A	1/7/05	71-43-2	Benzene	9600	ug/l
VOCs	MW-24A	4/28/04	108-90-7	Chlorobenzene	2700	ug/l
VOCs	MW-24A	8/23/04	108-90-7	Chlorobenzene	1600	ug/l
VOCs	MW-24A	11/19/04	108-90-7	Chlorobenzene	1800	ug/l
VOCs	MW-24A	1/7/05	108-90-7	Chlorobenzene	1700	ug/l
VOCs	MW-24A	4/28/04	100-41-4	Ethylbenzene	900	ug/l
VOCs	MW-24A	8/23/04	100-41-4	Ethylbenzene	810	ug/l
VOCs	MW-24A	11/19/04	100-41-4	Ethylbenzene	910	ug/l
VOCs	MW-24A	1/7/05	100-41-4	Ethylbenzene	1000	ug/l
VOCs	MW-24A	4/28/04	108-88-3	Toluene	140	ug/l
VOCs	MW-24A	8/23/04	108-88-3	Toluene	120	ug/l
VOCs	MW-24A	11/19/04	108-88-3	Toluene	140	ug/l
VOCs	MW-24A	1/7/05	108-88-3	Toluene	140	ug/l
VOCs	MW-24A	4/28/04	1330-20-7	Xylene	3000	ug/l
VOCs	MW-24A	8/23/04	1330-20-7	Xylene	2400	ug/l
VOCs	MW-24A	11/19/04	1330-20-7	Xylene	2600	ug/l
VOCs	MW-24A	1/7/05	1330-20-7	Xylene	2800	ug/l
VOCs	MW-24A-D	8/23/04	71-43-2	Benzene	7700	ug/l
VOCs	MW-24A-D	11/19/04	71-43-2	Benzene	9800	ug/l
VOCs	MW-24A-D	8/23/04	108-90-7	Chlorobenzene	1500	ug/l
VOCs	MW-24A-D	11/19/04	108-90-7	Chlorobenzene	1800	ug/l
VOCs	MW-24A-D	8/23/04	100-41-4	Ethylbenzene	810	ug/l
VOCs	MW-24A-D	11/19/04	100-41-4	Ethylbenzene	980	ug/l
VOCs	MW-24A-D	8/23/04	108-88-3	Toluene	120	ug/l
VOCs	MW-24A-D	11/19/04	108-88-3	Toluene	140	ug/l
VOCs	MW-24A-D	8/23/04	1330-20-7	Xylene	2400	ug/l
VOCs	MW-24A-D	11/19/04	1330-20-7	Xylene	2800	ug/l
VOCs	MW-24A-DUP	4/28/04	71-43-2	Benzene	12000	ug/l
VOCs	MW-24A-DUP	4/28/04	108-90-7	Chlorobenzene	2600	ug/l
VOCs	MW-24A-DUP	4/28/04	100-41-4	Ethylbenzene	920	ug/l
VOCs	MW-24A-DUP	4/28/04	108-88-3	Toluene	140	ug/l
VOCs	MW-24A-DUP	4/28/04	1330-20-7	Xylene	3000	ug/l
VOCs	MW-24B	4/26/04	71-43-2	Benzene	18000	ug/l
VOCs	MW-24B	8/19/04	71-43-2	Benzene	29000	ug/l
VOCs	MW-24B	11/19/04	71-43-2	Benzene	20000	ug/l
VOCs	MW-24B	1/7/05	71-43-2	Benzene	32000	ug/l
VOCs	MW-24B	4/26/04	108-90-7	Chlorobenzene	130000	ug/l
VOCs	MW-24B	8/19/04	108-90-7	Chlorobenzene	190000	ug/l
VOCs	MW-24B	11/19/04	108-90-7	Chlorobenzene	110000	ug/l
VOCs	MW-24B	1/7/05	108-90-7	Chlorobenzene	100000	ug/l
VOCs	MW-24B	4/26/04	108-88-3	Toluene	1600	ug/l
VOCs	MW-24B	8/19/04	108-88-3	Toluene	2500	ug/l
VOCs	MW-24B	11/19/04	108-88-3	Toluene	880	ug/l
VOCs	MW-24B	1/7/05	108-88-3	Toluene	1100	ug/l
VOCs	MW-24B	4/26/04	1330-20-7	Xylene	640	ug/l
VOCs	MW-24B	8/19/04	1330-20-7	Xylene	1400	ug/l
VOCs	MW-25A	4/29/04	71-43-2	Benzene	210	ug/l
VOCs	MW-25A	8/23/04	71-43-2	Benzene	530	ug/l
VOCs	MW-25A	11/22/04	71-43-2	Benzene	500	ug/l
VOCs	MW-25A	1/11/05	71-43-2	Benzene	110	ug/l

TABLE 3-2
Summary of 2004 - 2005 Groundwater Analytical Detections
Former Solutia Queeny Plant
St. Louis, Missouri

Group	Sample ID	Sample Date	CAS	Chemical	Result	Units
Former Bulk Chemical Storage Area (cont.)						
VOCs	MW-25A	4/29/04	108-90-7	Chlorobenzene	2800	ug/l
VOCs	MW-25A	8/23/04	108-90-7	Chlorobenzene	2400	ug/l
VOCs	MW-25A	11/22/04	108-90-7	Chlorobenzene	3400	ug/l
VOCs	MW-25A	1/11/05	108-90-7	Chlorobenzene	520	ug/l
VOCs	MW-25A	8/23/04	100-41-4	Ethylbenzene	55	ug/l
VOCs	MW-25A	11/22/04	100-41-4	Ethylbenzene	64	ug/l
VOCs	MW-25A	1/11/05	100-41-4	Ethylbenzene	4.6	ug/l
VOCs	MW-25A	4/29/04	1330-20-7	Xylene	40	ug/l
VOCs	MW-25A	8/23/04	1330-20-7	Xylene	43	ug/l
VOCs	MW-25B	4/27/04	71-43-2	Benzene	80	ug/l
VOCs	MW-25B	8/23/04	71-43-2	Benzene	12	ug/l
VOCs	MW-25B	11/22/04	71-43-2	Benzene	200	ug/l
VOCs	MW-25B	1/11/05	71-43-2	Benzene	8.1	ug/l
VOCs	MW-25B	4/27/04	108-90-7	Chlorobenzene	330	ug/l
VOCs	MW-25B	8/23/04	108-90-7	Chlorobenzene	260	ug/l
VOCs	MW-25B	11/22/04	108-90-7	Chlorobenzene	910	ug/l
VOCs	MW-25B	1/11/05	108-90-7	Chlorobenzene	120	ug/l
VOCs	MW-25B	8/23/04	156-59-2	cis 1,2-Dichloroethene	3	ug/l
VOCs	MW-25B	1/11/05	156-59-2	cis 1,2-Dichloroethene	0.82	ug/l
VOCs	MW-31B	8/18/04	71-43-2	Benzene	15	ug/l
VOCs	MW-31B	11/18/04	71-43-2	Benzene	17	ug/l
VOCs	MW-31B	1/11/05	71-43-2	Benzene	14	ug/l
VOCs	MW-31B	8/18/04	108-90-7	Chlorobenzene	4.2	ug/l
VOCs	MW-31B	11/18/04	108-90-7	Chlorobenzene	5.8	ug/l
VOCs	MW-31B	1/11/05	108-90-7	Chlorobenzene	7.4	ug/l
VOCs	MW-31B	1/11/05	100-41-4	Ethylbenzene	0.37	ug/l
VOCs	MW-31B	8/18/04	108-88-3	Toluene	0.55	ug/l
VOCs	MW-31B	8/18/04	75-01-4	Vinyl chloride	0.97	ug/l
VOCs	MW-31B	8/18/04	1330-20-7	Xylene	1.3	ug/l
VOCs	MW-32B	8/17/04	71-43-2	Benzene	31000	ug/l
VOCs	MW-32B	11/18/04	71-43-2	Benzene	28000	ug/l
VOCs	MW-32B	1/10/05	71-43-2	Benzene	7900	ug/l
VOCs	MW-32B	11/18/04	108-90-7	Chlorobenzene	710	ug/l
VOCs	MW-32B	1/10/05	108-90-7	Chlorobenzene	620	ug/l
VOCs	MW-32B-D	8/17/04	71-43-2	Benzene	30000	ug/l
VOCs	MW-32B-D	11/18/04	71-43-2	Benzene	27000	ug/l
VOCs	MW-32B-D	11/18/04	108-90-7	Chlorobenzene	720	ug/l
VOCs	MW-32B-DUP	1/10/05	71-43-2	Benzene	8900	ug/l
VOCs	MW-32B-DUP	1/10/05	108-90-7	Chlorobenzene	760	ug/l
VOCs	MW-33B	8/17/04	108-90-7	Chlorobenzene	23000	ug/l
VOCs	MW-33B	11/18/04	108-90-7	Chlorobenzene	25000	ug/l
VOCs	MW-33B	1/10/05	108-90-7	Chlorobenzene	18000	ug/l
VOCs	MW-34B	11/18/04	71-43-2	Benzene	4.6	ug/l
VOCs	MW-34B	11/18/04	108-90-7	Chlorobenzene	9.2	ug/l
VOCs	MW-34B	1/11/05	108-90-7	Chlorobenzene	4.3	ug/l
VOCs	MW-34B	8/18/04	156-59-2	cis 1,2-Dichloroethene	0.4	ug/l
VOCs	MW-34B	11/18/04	156-59-2	cis 1,2-Dichloroethene	0.42	ug/l
VOCs	MW-34B	1/11/05	156-59-2	cis 1,2-Dichloroethene	0.56	ug/l
VOCs	MW-35B	11/19/04	71-43-2	Benzene	30	ug/l
VOCs	MW-35B	1/7/05	71-43-2	Benzene	24	ug/l
VOCs	MW-35B	11/19/04	108-90-7	Chlorobenzene	37	ug/l
VOCs	MW-35B	1/7/05	108-90-7	Chlorobenzene	32	ug/l
VOCs	MW-35B	8/18/04	156-59-2	cis 1,2-Dichloroethene	220	ug/l
VOCs	MW-35B	11/19/04	156-59-2	cis 1,2-Dichloroethene	220	ug/l
VOCs	MW-35B	1/7/05	156-59-2	cis 1,2-Dichloroethene	140	ug/l
VOCs	MW-35B	11/19/04	100-41-4	Ethylbenzene	4.2	ug/l

TABLE 3-2
Summary of 2004 - 2005 Groundwater Analytical Detections
Former Solutia Queeny Plant
St. Louis, Missouri

Group	Sample ID	Sample Date	CAS	Chemical	Result	Units
Former Bulk Chemical Storage Area (cont.)						
VOCs	MW-35B	1/7/05	100-41-4	Ethylbenzene	4.2	ug/l
VOCs	MW-35B	11/19/04	156-60-5	trans-1,2-Dichloroethene	0.8	ug/l
VOCs	MW-35B	8/18/04	75-01-4	Vinyl chloride	250	ug/l
VOCs	MW-35B	11/19/04	75-01-4	Vinyl chloride	220	ug/l
VOCs	MW-35B	1/7/05	75-01-4	Vinyl chloride	310	ug/l
VOCs	MW-35B	11/19/04	1330-20-7	Xylene	10	ug/l
VOCs	MW-35B	1/7/05	1330-20-7	Xylene	23	ug/l
VOCs	MW-35B-DUP	1/7/05	71-43-2	Benzene	25	ug/l
VOCs	MW-35B-DUP	1/7/05	108-90-7	Chlorobenzene	31	ug/l
VOCs	MW-35B-DUP	1/7/05	156-59-2	cis 1,2-Dichloroethene	140	ug/l
VOCs	MW-35B-DUP	1/7/05	100-41-4	Ethylbenzene	4.1	ug/l
VOCs	MW-35B-DUP	1/7/05	75-01-4	Vinyl chloride	300	ug/l
VOCs	MW-35B-DUP	1/7/05	1330-20-7	Xylene	12	ug/l
VOCs	VW-1	4/27/04	71-43-2	Benzene	380	ug/l
VOCs	VW-1	8/23/04	71-43-2	Benzene	210	ug/l
VOCs	VW-1	11/19/04	71-43-2	Benzene	200	ug/l
VOCs	VW-1	1/7/05	71-43-2	Benzene	310	ug/l
VOCs	VW-1	4/27/04	108-90-7	Chlorobenzene	2200	ug/l
VOCs	VW-1	8/23/04	108-90-7	Chlorobenzene	2100	ug/l
VOCs	VW-1	11/19/04	108-90-7	Chlorobenzene	1400	ug/l
VOCs	VW-1	1/7/05	108-90-7	Chlorobenzene	2100	ug/l
VOCs	VW-1	11/19/04	100-41-4	Ethylbenzene	3.6	ug/l
VOCs	VW-1	1/7/05	100-41-4	Ethylbenzene	4.4	ug/l
VOCs	VW-1	1/7/05	74-88-4	Iodomethane	14	ug/l
VOCs	VW-2	4/27/04	71-43-2	Benzene	25	ug/l
VOCs	VW-2	8/20/04	71-43-2	Benzene	6	ug/l
VOCs	VW-2	11/19/04	71-43-2	Benzene	27	ug/l
VOCs	VW-2	4/27/04	75-15-0	Carbon disulfide	7.9	ug/l
VOCs	VW-2	4/27/04	108-90-7	Chlorobenzene	1300	ug/l
VOCs	VW-2	8/20/04	108-90-7	Chlorobenzene	1400	ug/l
VOCs	VW-2	11/19/04	108-90-7	Chlorobenzene	930	ug/l
VOCs	VW-2	1/11/05	108-90-7	Chlorobenzene	410	ug/l
VOCs	VW-2B	4/26/04	71-43-2	Benzene	3.3	ug/l
VOCs	VW-2B	8/19/04	71-43-2	Benzene	3.4	ug/l
VOCs	VW-2B	11/19/04	71-43-2	Benzene	3.1	ug/l
VOCs	VW-2B	1/11/05	71-43-2	Benzene	3.7	ug/l
VOCs	VW-2B	4/26/04	75-15-0	Carbon disulfide	1.6	ug/l
VOCs	VW-2B	4/26/04	108-90-7	Chlorobenzene	20	ug/l
VOCs	VW-2B	8/19/04	108-90-7	Chlorobenzene	38	ug/l
VOCs	VW-2B	11/19/04	108-90-7	Chlorobenzene	9.8	ug/l
VOCs	VW-2B	1/11/05	108-90-7	Chlorobenzene	11	ug/l
VOCs	VW-2B	4/26/04	156-59-2	cis 1,2-Dichloroethene	13	ug/l
VOCs	VW-2B	8/19/04	156-59-2	cis 1,2-Dichloroethene	7.7	ug/l
VOCs	VW-2B	11/19/04	156-59-2	cis 1,2-Dichloroethene	4.6	ug/l
VOCs	VW-2B	1/11/05	156-59-2	cis 1,2-Dichloroethene	2.8	ug/l
VOCs	VW-2B	4/26/04	75-01-4	Vinyl chloride	180	ug/l
VOCs	VW-2B	8/19/04	75-01-4	Vinyl chloride	230	ug/l
VOCs	VW-2B	11/19/04	75-01-4	Vinyl chloride	200	ug/l
VOCs	VW-2B	1/11/05	75-01-4	Vinyl chloride	140	ug/l
Former Acetanilides Production Area						
Pesticides	APA-PZ-2	8/31/04	15972-60-8	Alachlor	14	ug/l
VOCs	APA-PZ-2	8/30/04	108-90-7	Chlorobenzene	27	ug/l
VOCs	APA-PZ-2	8/30/04	156-59-2	cis 1,2-Dichloroethene	0.48	ug/l
Pesticides	APA-PZ-3	9/1/04	15972-60-8	Alachlor	1400000	ug/l
VOCs	APA-PZ-3	8/31/04	108-90-7	Chlorobenzene	100000	ug/l
Pesticides	APA-PZ-4	8/31/04	15972-60-8	Alachlor	70	ug/l

TABLE 3-2
Summary of 2004 - 2005 Groundwater Analytical Detections
Former Solutia Queeny Plant
St. Louis, Missouri

Group	Sample ID	Sample Date	CAS	Chemical	Result	Units
Former Acetanilides Production Area (cont.)						
VOCs	APA-PZ-4	8/31/04	108-90-7	Chlorobenzene	92	ug/l
VOCs	APA-PZ-5	9/1/04	107-06-2	1,2-Dichloroethane	4.3	ug/l
VOCs	APA-PZ-5	9/1/04	108-90-7	Chlorobenzene	22	ug/l
VOCs	APA-PZ-5	9/1/04	108-88-3	Toluene	1.1	ug/l
VOCs	APA-PZ-6	9/1/04	107-06-2	1,2-Dichloroethane	19	ug/l
VOCs	APA-PZ-6	9/1/04	108-90-7	Chlorobenzene	260	ug/l
VOCs	APA-PZ-6	9/1/04	108-88-3	Toluene	6.4	ug/l
VOCs	APA-PZ-6	9/1/04	79-01-6	Trichloroethene	4.3	ug/l
Pesticides	GM-1	9/1/04	15972-60-8	Alachlor	92000	ug/l
VOCs	GM-1	9/1/04	108-90-7	Chlorobenzene	120000	ug/l
Pesticides	GM-2	8/30/04	15972-60-8	Alachlor	70000	ug/l
VOCs	GM-2	8/30/04	108-90-7	Chlorobenzene	82000	ug/l
VOCs	GM-2-D	8/30/04	108-90-7	Chlorobenzene	94000	ug/l
Pesticides	GM-3	9/1/04	15972-60-8	Alachlor	21	ug/l
VOCs	GM-3	9/1/04	108-90-7	Chlorobenzene	2100	ug/l

Table 3-3
Groundwater Vertical Profiling Analytical Results
Former Bulk Chemical Storage Area
Former Solutia Queeny Plant
St. Louis, Missouri

Analyte	Sample ID / Depth (feet below ground surface)										
	RP-1 33	RP-1 48	RP-1 63	RP-1 78	RP-1 87.5	RP-2A 32	RP-2A 32	RP-2B 47	RP-2B 62	RP-2B 77	RP-3 42
Acetone (ug/l)	**18J**	<20	<20	<20	<20	**18J**	**18J**	<20	**18J**	**6.9J**	**84**
Benzene (ug/l)	<5	<5	<5	<5	<5	<5	**89**	**360**	**26**	**12**	**1300**
Bromodichloromethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromoform (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Butanone (MEK)	<5	<5	<5	<5	<5	<5	<5	<5	**8.8**	**4.1J**	**24**
Carbon tetrachloride	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon disulfide	<10	<10	<10	**2.3J**	<10	<10	<10	<10	**2.2J**	**2.6J**	<10
Chlorobenzene (ug/l)	<5	**4.3J**	**7.8**	**9.8**	**5.2**	**2.5J**	**26**	**59J**	**14**	**23**	**140**
Chloroform (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloromethane (ug/l)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dibromochloromethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis 1,2-Dichloroethene (ug/l)	<5	<5	<5	<5	<5	<5	<5		<5	<5	<5
trans 1,2-Dichloroethene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethyl methacrylate (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene (ug/l)	<5	<5	<5	<5	<5	<5	<5	**320**	**45**	**8.9**	**7.1**
Iodomethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
4-Methyl-2-pentanone (MIBK) (ug/l)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Methylene chloride (ug/l)	**4.5JB**	**4.8JB**	**4.3JB**	**4.1JB**	**3.9JB**	**3.4JB**	**3.5JB**	**100J**	**4.8JB**	**3.5JB**	<20
Tetrachloroethene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene (ug/l)	<5	<5	<5	<5	<5	<5	**4.2J**	<5	<5	<5	**9.7**
1,1,1-Trichloroethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichloroethene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	**4.7J**	<5
Xylene (ug/l)	<5	<5	<5	<5	<5	<5	<5	**150**	**21.7J**	**3.4J**	**23**

Notes:

1) Samples were analyzed for the Site-Specific VOC analytes

2) Detections are indicated by bold text

2) <5 indicates analyte not detected at corresponding reporting limit.

3) ug/l = micrograms per liter

4) J denotes estimated value below sample reporting limit

5) B denotes analyte also present in method blank

Table 3-3
Groundwater Vertical Profiling Analytical Results
Former Bulk Chemical Storage Area
Former Solutia Queeny Plant
St. Louis, Missouri

Analyte	Sample ID / Depth (feet below ground surface)										
	RP-3 57	RP-3 72	RP-3 81.5	RP-4 48	RP-4 63	RP-4 78	RP-5 44	RP-5 59	RP-5 74	RP-5 78.5	RP-6 23
Acetone (ug/l)	<20	<20	<20	<20	<2000	<20	<20	<20	<20	<20	**15J**
Benzene (ug/l)	**73**	**5.5**	<5	<5	**2400**	**25**	<5	<5	<5	<5	<5
Bromodichloromethane (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
Bromoform (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
2-Butanone (MEK)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
Carbon tetrachloride	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
Carbon disulfide	<10	<10	<10	<10	<1000	<10	<10	<10	<10	<10	<10
Chlorobenzene (ug/l)	**2200**	**100**	**360**	**76**	**420J**	**160**	**130**	**6100**	**4700**	**3900**	<5
Chloroform (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
Chloromethane (ug/l)	<10	<10	<10	<10	<1000	<10	<10	<10	<10	<10	<10
Dibromochloromethane (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
cis 1,2-Dichloroethene (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
trans 1,2-Dichloroethene (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
Ethyl methacrylate (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
Ethylbenzene (ug/l)	**4.7J**	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
Iodomethane (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
4-Methyl-2-pentanone (MIBK) (ug/l)	<10	<10	<10	<10	<1000	<10	<10	<10	<10	<10	<10
Methylene chloride (ug/l)	<20	<20	<20	<20	**270JB**	**2.7JB**	**3.4JB**	**94JB**	**83JB**	**85JB**	<20
Tetrachloroethene (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
Toluene (ug/l)	**4.1J**	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
1,1,1-Trichloroethane (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
Trichloroethene (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5
Vinyl chloride (ug/l)	**41**	**13**	<5	<5	<500	<5	<5	<5	<5	<5	<5
Xylene (ug/l)	<5	<5	<5	<5	<500	<5	<5	<5	<5	<5	<5

Notes:

1) Samples were analyzed for the Site-Specific VOC analytes

2) Detections are indicated by bold text

2) <5 indicates analyte not detected at corresponding reporting limit.

3) ug/l = micrograms per liter

4) J denotes estimated value below sample reporting limit

5) B denotes analyte also present in method blank

Table 3-3
Groundwater Vertical Profiling Analytical Results
Former Bulk Chemical Storage Area
Former Solutia Queeny Plant
St. Louis, Missouri

Analyte	Sample ID / Depth (feet below ground surface)										
	RP-6 38	RP-6 53	RP-6 68	RP-6 77.3	RP-7 18	RP-7 33	RP-7 48	RP-7 63	RP-7 78	RP-7 84	SV-1 33
Acetone (ug/l)	<20	<20	<20	<20	<20	<20	<20	**6.1 J B**	<20	<20	<20
Benzene (ug/l)	<5	**3.1 J**	**6.8**	<5	<5	<5	<5	<5	<5	<5	<5
Bromodichloromethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromoform (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Butanone (MEK)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon tetrachloride	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5
Carbon disulfide	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chlorobenzene (ug/l)	<5	**1800**	**5800**	**300**	<5	<5	<5	<5	<5	<5	**5.4**
Chloroform (ug/l)	<5	<5	<5	<5	**13**	<5	<5	<5	<5	<5	<5
Chloromethane (ug/l)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dibromochloromethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis 1,2-Dichloroethene (ug/l)	<5	**5.3**	<5	**7.3**	<5	<5	<5	<5	<5	<5	<5
trans 1,2-Dichloroethene (ug/l)	<5	<5	<5	<5	**4.0JB**	<5	<5	<5	<5	<5	<5
Ethyl methacrylate (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iodomethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
4-Methyl-2-pentanone (MIBK) (ug/l)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Methylene chloride (ug/l)	<20	**2.8 J**	**2.3 J**	<20	<20	**3.1 JB**	**2.4 JB**	**4.1 JB**	**3.8 JB**	**3.1 JB**	**5.1JB**
Tetrachloroethene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,1-Trichloroethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichloroethene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride (ug/l)	<5	<5	**12**	**14**	<5	<5	<5	<5	<5	<5	<5
Xylene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Notes:

1) Samples were analyzed for the Site-Specific VOC analytes

2) Detections are indicated by bold text

2) <5 indicates analyte not detected at corresponding reporting limit.

3) ug/l = micrograms per liter

4) J denotes estimated value below sample reporting limit

5) B denotes analyte also present in method blank

Table 3-3
Groundwater Vertical Profiling Analytical Results
Former Bulk Chemical Storage Area
Former Solutia Queeny Plant
St. Louis, Missouri

Analyte	Sample ID / Depth (feet below ground surface)										
	SV-1 48	SV-1 63	SV-2 34	SV-2 49	SV-2 64	PZ-4 18	P4 33	P4 48	P4 63	P4 78	P5 33
Acetone (ug/l)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Benzene (ug/l)	**3.3J**	**2.1J**	<5	**2.9J**	**2.2J**	<5	<5	<5	<5	<5	**85**
Bromodichloromethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromoform (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Butanone (MEK)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon tetrachloride	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon disulfide	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chlorobenzene (ug/l)	**1200**	**510**	<5	**730**	**870**	<5	<5	<5	<5	<5	**4,500**
Chloroform (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloromethane (ug/l)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dibromochloromethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis 1,2-Dichloroethene (ug/l)	**48**	**81**	<5	**88**	**18**	<5	<5	**160**	**860**	**1200**	**3.2 J**
trans 1,2-Dichloroethene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	**2.5 J**	**4.2 J**	<5
Ethyl methacrylate (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iodomethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
4-Methyl-2-pentanone (MIBK) (ug/l)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Methylene chloride (ug/l)	**4.4JB**	**3.4JB**	**5.2JB**	**4.4JB**	**4.4JB**	<20	<20	<20	<20	<20	<20
Tetrachloroethene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,1-Trichloroethane (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichloroethene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride (ug/l)	**30**	**17**	<5	**19**	**50**	<5	<5	**130**	**180**	**280**	<5
Xylene (ug/l)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Notes:

1) Samples were analyzed for the Site-Specific VOC analytes

2) Detections are indicated by bold text

2) <5 indicates analyte not detected at corresponding reporting limit.

3) ug/l = micrograms per liter

4) J denotes estimated value below sample reporting limit

5) B denotes analyte also present in method blank

Table 3-3
Groundwater Vertical Profiling Analytical Results
Former Bulk Chemical Storage Area
Former Solutia Queeny Plant
St. Louis, Missouri

Analyte	Sample ID / Depth (feet below ground surface)									
	P5 48	P5 63	P5 78	P5 83	PZ-6 18	P6 33	P6 48	P6 63	P6 78	P6 83.5
Acetone (ug/l)	<200	<100	<200	<200	<20	**4.8 J**	**2.2 J**	**2.4 J**	<20	<20
Benzene (ug/l)	<50	<25	<50	<50	<25	**2.5 J**	<25	<25	<25	<25
Bromodichloromethane (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
Bromoform (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
2-Butanone (MEK)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
Carbon tetrachloride	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
Carbon disulfide	<100	<50	<100	<100	<10	<10	<10	<10	<10	<10
Chlorobenzene (ug/l)	**1,700**	**540**	**190**	**110**	<5	**260**	**87**	**21**	**5.3**	**5.8**
Chloroform (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
Chloromethane (ug/l)	<100	<50	<100	<100	<10	<10	<10	<10	<10	<10
Dibromochloromethane (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
cis 1,2-Dichloroethene (ug/l)	**280**	**30**	**320**	**260**	<5	<5	**14**	**34**	**650**	**310**
trans 1,2-Dichloroethene (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
Ethyl methacrylate (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
Ethylbenzene (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
Iodomethane (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
4-Methyl-2-pentanone (MIBK) (ug/l)	<100	<50	<100	<100	<10	<10	<10	<10	<10	<10
Methylene chloride (ug/l)	<50	**12 JB**	**21J**	**66JB**	<20	<20	<20	<20	<20	<20
Tetrachloroethene (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
Toluene (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
1,1,1-Trichloroethane (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
Trichloroethene (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5
Vinyl chloride (ug/l)	**220**	**190**	**660**	**530**	<5	<5	**31**	**68**	**220**	**220**
Xylene (ug/l)	<50	<25	<50	<50	<5	<5	<5	<5	<5	<5

Notes:

1) Samples were analyzed for the Site-Specific VOC analytes

2) Detections are indicated by bold text

2) <5 indicates analyte not detected at corresponding reporting limit.

3) ug/l = micrograms per liter

4) J denotes estimated value below sample reporting limit

5) B denotes analyte also present in method blank

Table 3-4
Groundwater Analytical Results
Due Diligence
Former Solutia Queeny Plant
St Louis, Missouri

Detected Constituent	Units	LPZ-3 Fmr FF Bldg 3/20/08	LPZ-2 Fmr FF Bldg 3/20/08	LPZ-4 Fmr FF Bldg 3/20/08	OBW-2 Fmr FF Bldg 3/20/08	VW-1 FBCSA 3/21/08	MW-24B FBCSA 3/21/08	MW-24A FBCSA 3/21/08	MW-17 Downgradient 3/21/08
1,2,4-Trimethylbenzene	ug/l	< 0.26	< 2.6	< 2.6	< 1.3	< 2.6	< 26	19,500	< 0.26
1,3,5-Trimethylbenzene	ug/l	< 0.27	< 2.7	< 2.7	< 1.35	< 2.7	< 27	9,950	< 0.27
Alachlor	ug/l	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	ug/l	4.02	9.3 I	< 3.1	62.9	82.4	28,000	11,300	< 0.31
Chlorobenzene	ug/l	9.46	< 3.1	9.5 I	- 12,900 -	1,780	67,600	7,770	15.6
Cis-1,2-Dichloroethene	ug/l	1.35	90.8	90.7	- 1,640 -	3.6 I	< 33	< 330	22.1
Diesel Range Organics	mg/l	6.8	115	- - -	- - -	8.92	- - -	496	- - -
Ethylbenzene	ug/l	< 0.31	< 3.1	< 3.1	2.4 I	< 3.1	136	8,040	< 0.31
Gasoline Range Organics	ug/l	< 82	14,500	18,600	91,500	5,850	198,000	2.5E+06	< 82
M&P-Xylenes	ug/l	0.96 I	< 7.7	< 7.7	< 3.85	< 7.7	193 I	17,200	< 0.77
Naphthalene	ug/l	< 0.41	< 4.1	< 4.1	< 2.05	5.5 I	< 41	5,230	< 0.41
N-Butylbenzene	ug/l	< 0.39	< 3.9	< 3.9	< 1.95	4.4 I	< 39	1,660	< 0.39
N-Propylbenzene	ug/l	0.38 I	< 3	< 3	< 1.5	76.3	< 30	3,600	< 0.3
Oil Range Organics	mg/l	1.02	0.162 I	- - -	- -	0.179 I	- - -	110	- - -
O-Xylene	ug/l	< 0.38	< 3.8	< 3.8	< 1.9	< 3.8	107	1,310	< 0.38
Tetrachloroethene	ug/l	< 0.33	< 3.3	101	64,500	265	245	1,180	2.45
Toluene	ug/l	1.13	- 5,120 -	- 7,460 -	1,620	9.9 I	222	600 I	< 0.28
Trichloroethene	ug/l	< 0.22	2.3 I	27.5	1,990	7.4 I	< 22	< 220	13.4
Vinyl Chloride	ug/l	0.97 I	59.3	17.4	20.5	< 1.2	< 12	< 120	0.72 I
Xylenes (Total)	ug/l	< 1.15	< 11.5	< 11.5	< 5.75	< 11.5	300 I	18,500	< 1.15

Analysis for THP-GRO and VOCs by US EPA Method 8260
Analysis for Alachlor by US EPA Method 8081
Analysis for TPH-Diesel Range Organics and TPH-Oil Range Organics by US EPA Method 8015
Fmr FF Bldg = Former FF Building Area
FBCSA = Former Bulk Chemical Storage Area
APA = Former Acetanilides Production Area
ug/L = micrograms per liter
mg/L = milligrams per liter

Table 3-4
Groundwater Analytical Results
Due Diligence
Former Solutia Queeny Plant
St Louis, Missouri

Detected Constituent	Units	GM-1 APA 3/24/08	GM-3 APA 3/24/08	MW-14 APA 3/24/08	MW-13 Downgradient 3/24/08	TRIP BLANK 3/24/08
1,2,4-Trimethylbenzene	ug/l	9.2 I	< 0.26	6.2 I	< 0.26	< 0.26
1,3,5-Trimethylbenzene	ug/l	< 5.4	< 0.27	< 5.4	< 0.27	< 0.27
Alachlor	ug/l	13,400	1,760 I	9,800	624 I	NA
Benzene	ug/l	20.4	< 0.31	11.6 I	1.17	< 0.31
Chlorobenzene	ug/l	107,000	178	59,800	19.4	< 0.31
Cis-1,2-Dichloroethene	ug/l	< 6.6	< 0.33	< 6.6	< 0.33	< 0.33
Diesel Range Organics	mg/l	175	14	- -	- - -	- - -
Ethylbenzene	ug/l	< 6.2	< 0.31	< 6.2	< 0.31	< 0.31
Gasoline Range Organics	ug/l	113,000	519	- - -	- - -	< 82
M&P-Xylenes	ug/l	< 15.4	< 0.77	< 15.4	< 0.77	< 0.77
Naphthalene	ug/l	< 8.2	< 0.41	< 8.2	< 0.41	< 0.41
N-Butylbenzene	ug/l	< 7.8	< 0.39	< 7.8	< 0.39	< 0.39
N-Propylbenzene	ug/l	< 6	< 0.3	< 6	< 0.3	< 0.3
Oil Range Organics	mg/l	0.203 I	0.305 I	- -	- - -	- - -
O-Xylene	ug/l	< 7.6	< 0.38	< 7.6	< 0.38	< 0.38
Tetrachloroethene	ug/l	27.8	< 0.33	8.2 I	< 0.33	< 0.33
Toluene	ug/l	6.2 I	< 0.28	< 5.6	< 0.28	0.36 I
Trichloroethene	ug/l	< 4.4	2.54	< 4.4	< 0.22	< 0.22
Vinyl Chloride	ug/l	< 2.4	< 0.12	< 2.4	< 0.12	< 0.12
Xylenes (Total)	ug/l	< 23	< 1.15	< 23	< 1.15	< 1.15

Analysis for THP-GRO and VOCs by US EPA Method 8260
Analysis for Alachlor by US EPA Method 8081
Analysis for TPH-Diesel Range Organics and TPH-Oil Range Organics by US EPA Method 8015
Fmr FF Bldg = Former FF Building Area
FBCSA = Former Bulk Chemical Storage Area
APA = Former Acetanilides Production Area
ug/L = micrograms per liter
mg/L = milligrams per liter

Table 3-5
Soil Analytical Results Summary
Due Diligence
Former Solutia Queeny Plant
St Louis, Missouri

	Units	EOI-01 5.5 3/27/08	EOI-01 12 3/27/08	EOI-02 6 3/27/08	EOI-02 13 3/27/08	EOI-03 8 3/27/08	EOI-03 14 3/27/08	EOI-04 7 3/27/08	EOI-04 10 3/27/08
Oil Range Organics	mg/kg	183	192	2,230	12 I	31.4	10.4 I	2.83 I	4.05 I
Gasoline Range Organics	mg/kg	92.8	**2400**	229	40.9	2.5	**499**	3.3	**813**
Diesel Range Organics	mg/kg	3,120	189	10,600	63.5	335	27.7	5.8 I	22.7
Alachlor	ug/kg	- - -	- - -	- - -	- - -	- - -	- -	153	132,000
Total Solid Percent	%	71.7	37.2	70	74	59.8	77.2	74.5	79.3
Iron	mg/kg	37,900	43,500	10,600	20,100	28,100	12,700	23,900	30,300
Total TPH	mg/kg	3,396	2,781	13,059	116	369	537	12	840
% TPH-GRO		3%	86%	2%	35%	1%	93%	28%	97%

	Units	EOI-05 6 3/27/08	EOI-05 9 3/27/08	EOI-06 8 3/27/08	EOI-06 10 3/27/08	EOI-07 8 3/27/08	EOI-07 11 3/27/08	EOI-08 8 3/27/08	EOI-08 10 3/27/08
Oil Range Organics	mg/kg	15.3	< 1.95	6.03 I	609	3.01 I	11.8 I	3.25 I	3.29 I
Gasoline Range Organics	mg/kg	**624**	13.7	0.372	22.6	0.228	3.98	0.233	0.456
Diesel Range Organics	mg/kg	18.4	3.12 I	16	2,180	8.46 I	8.91 I	3.58 I	3.05 I
Alachlor	ug/kg	2,300 I	583,000	- - -	- - -	- - -	- - -	- - -	- - -
Total Solids Percent	%	67.2	75	75.2	69.8	80.8	80	73.2	80.9
Iron	mg/kg	30,500	26,900	17,900	25,300	18,400	18,600	28,200	18,200
Total TPH	mg/kg	658	19	22	2,812	12	25	7	7
% TPH-GRO		95%	73%	2%	1%	2%	16%	3%	7%

Bold TPH-GRO concentration indicate potential source material where TPH-GRO > 346 mg/kg

Analysis for TPH-Gasoline Range Organics by US EPA Method 8260 and 8081 (alachlor, only)
Analysis for TPH-Diesel Range Organics and TPH-Oil Range Organics by US EPA Method 8015
Analysis for Alachlor by US EPA Method 8081
Analysis for Iron by US EPA Method 6010B
Fmr FF Bldg = Former FF Building Area
FBCSA = Former Bulk Chemical Storage Area
APA = Former Acetanilides Production Area
mg/kg = milligrams per kilogram

TABLE 3-6
Summary of 2004 Soil Analytical Detections
Former Solutia Queeny Plant
St. Louis, Missouri

Group	Sample ID	Sample Date	CAS	Chemical	Result	Units
Former FF Building Area						
VOCs	FF04-01-6	6/15/04	78-93-3	2-Butanone (MEK)	7.5	ug/kg dw
VOCs	FF04-01-6	6/15/04	67-64-1	Acetone	15	ug/kg dw
VOCs	FF04-01-6	6/15/04	71-43-2	Benzene	34	ug/kg dw
VOCs	FF04-01-6	6/15/04	108-90-7	Chlorobenzene	53	ug/kg dw
VOCs	FF04-01-6	6/15/04	127-18-4	Tetrachloroethene	3.3	ug/kg dw
VOCs	FF04-01-14	6/15/04	71-43-2	Benzene	25	ug/kg dw
VOCs	FF04-01-14	6/15/04	108-90-7	Chlorobenzene	80	ug/kg dw
VOCs	FF04-01-14	6/15/04	127-18-4	Tetrachloroethene	30	ug/kg dw
VOCs	FF04-02-10	6/15/04	108-90-7	Chlorobenzene	3900	ug/kg dw
VOCs	FF04-02-10	6/15/04	156-59-2	cis 1,2-Dichloroethene	8900	ug/kg dw
VOCs	FF04-02-10	6/15/04	156-60-5	trans-1,2-Dichloroethene	260	ug/kg dw
VOCs	FF04-02-10	6/15/04	75-01-4	Vinyl chloride	320	ug/kg dw
VOCs	FF04-02-16	6/15/04	108-90-7	Chlorobenzene	3800	ug/kg dw
VOCs	FF04-02-16	6/15/04	156-59-2	cis 1,2-Dichloroethene	12000	ug/kg dw
VOCs	FF04-02-16	6/15/04	156-60-5	trans-1,2-Dichloroethene	270	ug/kg dw
VOCs	FF04-02-16	6/15/04	75-01-4	Vinyl chloride	320	ug/kg dw
VOCs	FF04-03-8	6/18/04	108-90-7	Chlorobenzene	63000	ug/kg dw
VOCs	FF04-03-18	6/18/04	71-43-2	Benzene	200	ug/kg dw
VOCs	FF04-03-18	6/18/04	108-90-7	Chlorobenzene	7800	ug/kg dw
VOCs	FF04-03-18	6/18/04	156-59-2	cis 1,2-Dichloroethene	480	ug/kg dw
VOCs	FF04-03-18	6/18/04	75-01-4	Vinyl chloride	100	ug/kg dw
VOCs	FF04-04-10	6/15/04	75-15-0	Carbon disulfide	640	ug/kg dw
VOCs	FF04-04-10	6/15/04	108-90-7	Chlorobenzene	53	ug/kg dw
VOCs	FF04-04-10	6/15/04	156-59-2	cis 1,2-Dichloroethene	3500	ug/kg dw
VOCs	FF04-04-10	6/15/04	75-01-4	Vinyl chloride	1100	ug/kg dw
VOCs	FF04-04-16	6/15/04	75-15-0	Carbon disulfide	120	ug/kg dw
VOCs	FF04-04-16	6/15/04	108-90-7	Chlorobenzene	880	ug/kg dw
VOCs	FF04-04-16	6/15/04	156-59-2	cis 1,2-Dichloroethene	12000	ug/kg dw
VOCs	FF04-04-16	6/15/04	156-60-5	trans-1,2-Dichloroethene	69	ug/kg dw
VOCs	FF04-04-16	6/15/04	75-01-4	Vinyl chloride	2200	ug/kg dw
VOCs	FF04-05-12-14	7/2/04	67-64-1	Acetone	12	ug/kg dw
Former FF Building Area (cont.)						
VOCs	FF04-05-12-14	7/2/04	75-15-0	Carbon disulfide	3.4	ug/kg dw
VOCs	FF04-05-12-14	7/2/04	108-90-7	Chlorobenzene	100	ug/kg dw
VOCs	FF04-05-12-14	7/2/04	156-59-2	cis 1,2-Dichloroethene	17000	ug/kg dw
VOCs	FF04-05-12-14	7/2/04	127-18-4	Tetrachloroethene	14	ug/kg dw
VOCs	FF04-05-12-14	7/2/04	156-60-5	trans-1,2-Dichloroethene	110	ug/kg dw
VOCs	FF04-05-12-14	7/2/04	79-01-6	Trichloroethene	6.4	ug/kg dw
VOCs	FF04-05-12-14	7/2/04	75-01-4	Vinyl chloride	1000	ug/kg dw
VOCs	FF04-05-18-20	7/2/04	67-64-1	Acetone	13	ug/kg dw
VOCs	FF04-05-18-20	7/2/04	71-43-2	Benzene	2.4	ug/kg dw
VOCs	FF04-05-18-20	7/2/04	108-90-7	Chlorobenzene	970	ug/kg dw
VOCs	FF04-05-18-20	7/2/04	156-59-2	cis 1,2-Dichloroethene	45000	ug/kg dw
VOCs	FF04-05-18-20	7/2/04	127-18-4	Tetrachloroethene	10000	ug/kg dw
VOCs	FF04-05-18-20	7/2/04	108-88-3	Toluene	2.2	ug/kg dw
VOCs	FF04-05-18-20	7/2/04	156-60-5	trans-1,2-Dichloroethene	420	ug/kg dw
VOCs	FF04-05-18-20	7/2/04	79-01-6	Trichloroethene	6000	ug/kg dw
VOCs	FF04-05-18-20	7/2/04	75-01-4	Vinyl chloride	1200	ug/kg dw
VOCs	FF04-06-12	6/15/04	79-01-6	Trichloroethene	69000	ug/kg dw
VOCs	FF04-06-12	6/15/04	108-90-7	Chlorobenzene	450000	ug/kg dw
VOCs	FF04-06-12	6/15/04	127-18-4	Tetrachloroethene	2400000	ug/kg dw

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Group	Sample ID	Sample Date	CAS	Chemical	Result	Units
VOCs	FF04-06-12	6/15/04	156-59-2	cis 1,2-Dichloroethene	32000	ug/kg dw
VOCs	FF04-06-12-D	6/15/04	79-01-6	Trichloroethene	87000	ug/kg dw
VOCs	FF04-06-12-D	6/15/04	108-90-7	Chlorobenzene	580000	ug/kg dw
VOCs	FF04-06-12-D	6/15/04	127-18-4	Tetrachloroethene	3100000	ug/kg dw
VOCs	FF04-06-12-D	6/15/04	156-59-2	cis 1,2-Dichloroethene	38000	ug/kg dw
VOCs	FF04-06-16	6/15/04	108-90-7	Chlorobenzene	630000	ug/kg dw
VOCs	FF04-06-16	6/15/04	156-59-2	cis 1,2-Dichloroethene	22000	ug/kg dw
VOCs	FF04-06-16	6/15/04	127-18-4	Tetrachloroethene	3100000	ug/kg dw
VOCs	FF04-06-16	6/15/04	79-01-6	Trichloroethene	69000	ug/kg dw
V-V Building Area						
PCBs	VV04-01-4-5	6/28/04	53469-21-9	Aroclor-1242	320000	ug/kg dw
PCBs	VV04-01-4-5	6/28/04	11097-69-1	Aroclor-1254	57000	ug/kg dw
PCBs	VV04-01-6-7	6/28/04	53469-21-9	Aroclor-1242	300000	ug/kg dw
PCBs	VV04-01-6-7	6/28/04	11097-69-1	Aroclor-1254	35000	ug/kg dw
PCBs	VV04-02-5-6	6/28/04	53469-21-9	Aroclor-1242	730	ug/kg dw
PCBs	VV04-02-5-6	6/28/04	11097-69-1	Aroclor-1254	92	ug/kg dw
PCBs	VV04-02-7-8	6/28/04	53469-21-9	Aroclor-1242	890	ug/kg dw
PCBs	VV04-02-7-8	6/28/04	11097-69-1	Aroclor-1254	250	ug/kg dw
PCBs	VV04-03-6-7	6/28/04	12672-29-6	Aroclor-1248	130	ug/kg dw
PCBs	VV04-03-6-7	6/28/04	11097-69-1	Aroclor-1254	33	ug/kg dw
PCBs	VV04-03-8-9	6/28/04	53469-21-9	Aroclor-1242	10000	ug/kg dw
PCBs	VV04-03-8-9	6/28/04	11097-69-1	Aroclor-1254	2000	ug/kg dw
PCBs	VV04-04-5-6	6/28/04	53469-21-9	Aroclor-1242	190000	ug/kg dw
PCBs	VV04-04-5-6	6/28/04	11097-69-1	Aroclor-1254	21000	ug/kg dw
PCBs	VV04-04-6-7	6/28/04	53469-21-9	Aroclor-1242	820000	ug/kg dw
PCBs	VV04-04-6-7	6/28/04	11097-69-1	Aroclor-1254	92000	ug/kg dw
PCBs	VV04-05-3-4	6/28/04	53469-21-9	Aroclor-1242	500000	ug/kg dw
PCBs	VV04-05-3-4	6/28/04	11097-69-1	Aroclor-1254	56000	ug/kg dw
PCBs	VV04-05-6-7	6/28/04	53469-21-9	Aroclor-1242	3300000	ug/kg dw
PCBs	VV04-05-6-7	6/28/04	11097-69-1	Aroclor-1254	310000	ug/kg dw
PCBs	VV04-06-5-6	6/28/04	12672-29-6	Aroclor-1248	13000	ug/kg dw
PCBs	VV04-06-5-6	6/28/04	11097-69-1	Aroclor-1254	4600	ug/kg dw
PCBs	VV04-07-5-6	6/28/04	12672-29-6	Aroclor-1248	180	ug/kg dw
PCBs	VV04-07-5-6	6/28/04	11097-69-1	Aroclor-1254	41	ug/kg dw
PCBs	VV04-07-8-9	6/28/04	53469-21-9	Aroclor-1242	83000	ug/kg dw
PCBs	VV04-07-8-9	6/28/04	11097-69-1	Aroclor-1254	13000	ug/kg dw
PCBs	VV04-06-11-12	6/28/04	11097-69-1	Aroclor-1254	21000	ug/kg dw
PCBs	VV04-06-11-12	6/28/04	12672-29-6	Aroclor-1248	76000	ug/kg dw
PCBs	VV04-06-11-12-D	6/28/04	11097-69-1	Aroclor-1254	10000	ug/kg dw
PCBs	VV04-06-11-12-D	6/28/04	12672-29-6	Aroclor-1248	35000	ug/kg dw
PCBs	VV04-08-5-6	6/28/04	53469-21-9	Aroclor-1242	3200	ug/kg dw
V-V Building Area (cont.)						
PCBs	VV04-08-5-6	6/28/04	11097-69-1	Aroclor-1254	830	ug/kg dw
PCBs	VV04-08-6-7	6/29/04	11097-69-1	Aroclor-1254	2100	ug/kg dw
PCBs	VV04-08-6-7	6/29/04	53469-21-9	Aroclor-1242	6200	ug/kg dw
PCBs	VV04-08-6-7-D	6/29/04	11096-82-5	Aroclor-1260	1200	ug/kg dw
PCBs	VV04-08-6-7-D	6/29/04	11097-69-1	Aroclor-1254	1600	ug/kg dw
PCBs	VV04-08-6-7-D	6/29/04	53469-21-9	Aroclor-1242	10000	ug/kg dw
PCBs	VV04-09-7-9	7/8/04	53469-21-9	Aroclor-1242	97000	ug/kg dw
PCBs	VV04-09-7-9	7/8/04	11097-69-1	Aroclor-1254	10000	ug/kg dw
PCBs	VV04-09-7-9	7/8/04	11096-82-5	Aroclor-1260	4000	ug/kg dw
PCBs	VV04-10-2-4	7/8/04	53469-21-9	Aroclor-1242	3200	ug/kg dw

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Summary of 2004 Soil Analytical Detections
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Group	Sample ID	Sample Date	CAS	Chemical	Result	Units
PCBs	VV04-10-2-4	7/8/04	11097-69-1	Aroclor-1254	1200	ug/kg dw
PCBs	VV04-10-2-4	7/8/04	11096-82-5	Aroclor-1260	480	ug/kg dw
PCBs	VV04-10-7-9	7/8/04	53469-21-9	Aroclor-1242	4100	ug/kg dw
PCBs	VV04-10-7-9	7/8/04	11097-69-1	Aroclor-1254	690	ug/kg dw
PCBs	VV04-10-7-9	7/8/04	11096-82-5	Aroclor-1260	360	ug/kg dw
PCBs	VV04-11-4-6	7/8/04	11096-82-5	Aroclor-1260	190000	ug/kg dw
PCBs	VV04-11-4-6	7/8/04	11097-69-1	Aroclor-1254	340000	ug/kg dw
PCBs	VV04-11-4-6	7/8/04	53469-21-9	Aroclor-1242	2600000	ug/kg dw
PCBs	VV04-11-4-6-D	7/8/04	11096-82-5	Aroclor-1260	66000	ug/kg dw
PCBs	VV04-11-4-6-D	7/8/04	11097-69-1	Aroclor-1254	110000	ug/kg dw
PCBs	VV04-11-4-6-D	7/8/04	53469-21-9	Aroclor-1242	910000	ug/kg dw
PCBs	VV04-11-8-10	7/8/04	53469-21-9	Aroclor-1242	3900000	ug/kg dw
PCBs	VV04-11-8-10	7/8/04	11097-69-1	Aroclor-1254	740000	ug/kg dw
PCBs	VV04-11-8-10	7/8/04	11096-82-5	Aroclor-1260	160000	ug/kg dw
PCBs	VV04-12-10-12	7/8/04	53469-21-9	Aroclor-1242	1200000	ug/kg dw
PCBs	VV04-12-10-12	7/8/04	11097-69-1	Aroclor-1254	120000	ug/kg dw
PCBs	VV04-12-10-12	7/8/04	11096-82-5	Aroclor-1260	55000	ug/kg dw
PCBs	VV04-12-13.5-15.5	7/8/04	53469-21-9	Aroclor-1242	3700000	ug/kg dw
PCBs	VV04-12-13.5-15.5	7/8/04	11097-69-1	Aroclor-1254	1200000	ug/kg dw
PCBs	VV04-12-13.5-15.5	7/8/04	11096-82-5	Aroclor-1260	340000	ug/kg dw
PCBs	VV04-13-4-6	7/8/04	53469-21-9	Aroclor-1242	940	ug/kg dw
V-V Building Area (cont.)						
PCBs	VV04-13-4-6	7/8/04	11097-69-1	Aroclor-1254	220	ug/kg dw
PCBs	VV04-13-4-6	7/8/04	11096-82-5	Aroclor-1260	280	ug/kg dw
PCBs	VV04-13-8-10	7/8/04	53469-21-9	Aroclor-1242	1000000	ug/kg dw
PCBs	VV04-13-8-10	7/8/04	11097-69-1	Aroclor-1254	360000	ug/kg dw
PCBs	VV04-13-8-10	7/8/04	11096-82-5	Aroclor-1260	120000	ug/kg dw
PCBs	VV04-9-4-6	7/8/04	53469-21-9	Aroclor-1242	38000	ug/kg dw
PCBs	VV04-9-4-6	7/8/04	11097-69-1	Aroclor-1254	6200	ug/kg dw
PCBs	VV04-9-4-6	7/8/04	11096-82-5	Aroclor-1260	2800	ug/kg dw
Former Bulk Chemical Storage Area						
VOCs	FBCSA04-01-5	6/14/04	71-43-2	Benzene	2300	ug/kg dw
VOCs	FBCSA04-01-5	6/14/04	108-90-7	Chlorobenzene	190000	ug/kg dw
VOCs	FBCSA04-01-5	6/14/04	100-41-4	Ethylbenzene	620	ug/kg dw
VOCs	FBCSA04-01-5	6/14/04	1330-20-7	Xylene	790	ug/kg dw
VOCs	FBCSA04-01-5-D	6/14/04	71-43-2	Benzene	25000	ug/kg dw
VOCs	FBCSA04-01-5-D	6/14/04	108-90-7	Chlorobenzene	340000	ug/kg dw
VOCs	FBCSA04-01-5-D	6/14/04	100-41-4	Ethylbenzene	2400	ug/kg dw
VOCs	FBCSA04-01-5-D	6/14/04	108-88-3	Toluene	500	ug/kg dw
VOCs	FBCSA04-01-5-D	6/14/04	1330-20-7	Xylene	3200	ug/kg dw
VOCs	FBCSA04-01-10	6/14/04	71-43-2	Benzene	7700	ug/kg dw
VOCs	FBCSA04-01-10	6/14/04	108-90-7	Chlorobenzene	150000	ug/kg dw
VOCs	FBCSA04-01-10	6/14/04	100-41-4	Ethylbenzene	490	ug/kg dw
VOCs	FBCSA04-01-10	6/14/04	108-88-3	Toluene	160	ug/kg dw
VOCs	FBCSA04-01-10	6/14/04	1330-20-7	Xylene	880	ug/kg dw
VOCs	FBCSA04-02-5	6/14/04	71-43-2	Benzene	2000	ug/kg dw
VOCs	FBCSA04-02-5	6/14/04	108-90-7	Chlorobenzene	68000	ug/kg dw
VOCs	FBCSA04-02-5	6/14/04	100-41-4	Ethylbenzene	1200	ug/kg dw
VOCs	FBCSA04-02-5	6/14/04	108-88-3	Toluene	2100	ug/kg dw
VOCs	FBCSA04-02-5	6/14/04	1330-20-7	Xylene	9400	ug/kg dw
VOCs	FBCSA04-02-10	6/14/04	71-43-2	Benzene	690	ug/kg dw
VOCs	FBCSA04-02-10	6/14/04	108-90-7	Chlorobenzene	15000	ug/kg dw

TABLE 3-6
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Group	Sample ID	Sample Date	CAS	Chemical	Result	Units
VOCs	FBCSA04-02-10	6/14/04	100-41-4	Ethylbenzene	550	ug/kg dw
Former Bulk Chemical Storage Area (cont.)						
VOCs	FBCSA04-02-10	6/14/04	108-88-3	Toluene	740	ug/kg dw
VOCs	FBCSA04-02-10	6/14/04	1330-20-7	Xylene	2600	ug/kg dw
VOCs	FBCSA04-03-9	6/14/04	71-43-2	Benzene	20000	ug/kg dw
VOCs	FBCSA04-03-9	6/14/04	108-90-7	Chlorobenzene	340000	ug/kg dw
VOCs	FBCSA04-03-11	6/14/04	71-43-2	Benzene	5600	ug/kg dw
VOCs	FBCSA04-03-11	6/14/04	108-90-7	Chlorobenzene	72000	ug/kg dw
VOCs	FBCSA04-04-4	6/14/04	71-43-2	Benzene	2	ug/kg dw
VOCs	FBCSA04-04-4	6/14/04	108-90-7	Chlorobenzene	13	ug/kg dw
VOCs	FBCSA04-04-4	6/14/04	100-41-4	Ethylbenzene	2.3	ug/kg dw
VOCs	FBCSA04-04-4	6/14/04	127-18-4	Tetrachloroethene	11	ug/kg dw
VOCs	FBCSA04-04-4	6/14/04	108-88-3	Toluene	26	ug/kg dw
VOCs	FBCSA04-04-4	6/14/04	1330-20-7	Xylene	11	ug/kg dw
VOCs	FBCSA04-04-8	6/14/04	71-43-2	Benzene	2500	ug/kg dw
VOCs	FBCSA04-04-8	6/14/04	108-90-7	Chlorobenzene	170000	ug/kg dw
VOCs	FBCSA04-05-5	6/14/04	71-43-2	Benzene	5700	ug/kg dw
VOCs	FBCSA04-05-5	6/14/04	108-90-7	Chlorobenzene	22000	ug/kg dw
VOCs	FBCSA04-05-5	6/14/04	100-41-4	Ethylbenzene	540	ug/kg dw
VOCs	FBCSA04-05-5	6/14/04	108-88-3	Toluene	310	ug/kg dw
VOCs	FBCSA04-05-5	6/14/04	1330-20-7	Xylene	2200	ug/kg dw
VOCs	FBCSA04-05-9	6/14/04	71-43-2	Benzene	3000	ug/kg dw
VOCs	FBCSA04-05-9	6/14/04	108-90-7	Chlorobenzene	74000	ug/kg dw
Former Acetanilides Production Area						
VOCs	APA04-03-8-10	6/30/04	78-93-3	2-Butanone (MEK)	18	ug/kg dw
VOCs	APA04-03-8-10	6/30/04	67-64-1	Acetone	71	ug/kg dw
VOCs	APA04-03-8-10	6/30/04	71-43-2	Benzene	23	ug/kg dw
VOCs	APA04-03-8-10	6/30/04	75-15-0	Carbon disulfide	40	ug/kg dw
VOCs	APA04-03-8-10	6/30/04	108-90-7	Chlorobenzene	1400	ug/kg dw
VOCs	APA04-03-8-10	6/30/04	100-41-4	Ethylbenzene	3	ug/kg dw
VOCs	APA04-03-8-10	6/30/04	108-88-3	Toluene	8.6	ug/kg dw
VOCs	APA04-03-8-10	6/30/04	1330-20-7	Xylene	10	ug/kg dw
VOCs	APA04-04-8-10	7/1/04	71-43-2	Benzene	3.9	ug/kg dw
Former Acetanilides Production Area (cont.)						
VOCs	APA04-04-8-10	7/1/04	108-90-7	Chlorobenzene	4500	ug/kg dw
VOCs	APA04-05-9-11	6/30/04	107-06-2	1,2-Dichloroethane	7.2	ug/kg dw
Pesticides	APA04-05-9-11	6/30/04	15972-60-8	Alachlor	110000	ug/kg dw
VOCs	APA04-05-9-11	6/30/04	71-43-2	Benzene	9	ug/kg dw
VOCs	APA04-05-9-11	6/30/04	75-15-0	Carbon disulfide	3.2	ug/kg dw
VOCs	APA04-05-9-11	6/30/04	108-90-7	Chlorobenzene	290000	ug/kg dw
VOCs	APA04-05-9-11	6/30/04	156-59-2	cis 1,2-Dichloroethene	12000	ug/kg dw
VOCs	APA04-05-9-11	6/30/04	100-41-4	Ethylbenzene	9.4	ug/kg dw
VOCs	APA04-05-9-11	6/30/04	127-18-4	Tetrachloroethene	29	ug/kg dw
VOCs	APA04-05-9-11	6/30/04	108-88-3	Toluene	7	ug/kg dw
VOCs	APA04-05-9-11	6/30/04	1330-20-7	Xylene	76	ug/kg dw
VOCs	APA04-05-9-11-D	6/30/04	107-06-2	1,2-Dichloroethane	11	ug/kg dw
VOCs	APA04-05-9-11-D	6/30/04	67-64-1	Acetone	11	ug/kg dw
Pesticides	APA04-05-9-11-D	6/30/04	15972-60-8	Alachlor	100000	ug/kg dw
VOCs	APA04-05-9-11-D	6/30/04	71-43-2	Benzene	11	ug/kg dw
VOCs	APA04-05-9-11-D	6/30/04	108-90-7	Chlorobenzene	170000	ug/kg dw
VOCs	APA04-05-9-11-D	6/30/04	156-59-2	cis 1,2-Dichloroethene	6500	ug/kg dw
VOCs	APA04-05-9-11-D	6/30/04	100-41-4	Ethylbenzene	4.1	ug/kg dw

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Group	Sample ID	Sample Date	CAS	Chemical	Result	Units
VOCs	APA04-05-9-11-D	6/30/04	127-18-4	Tetrachloroethene	20	ug/kg dw
VOCs	APA04-05-9-11-D	6/30/04	108-88-3	Toluene	7.3	ug/kg dw
VOCs	APA04-05-9-11-D	6/30/04	1330-20-7	Xylene	42	ug/kg dw
VOCs	APA04-07-1-3	7/1/04	67-64-1	Acetone	8.3	ug/kg dw
VOCs	APA04-07-1-3	7/1/04	108-90-7	Chlorobenzene	75	ug/kg dw
Pesticides	APA04-11-10-12	7/1/04	15972-60-8	Alachlor	19000	ug/kg dw
VOCs	APA04-11-10-12	7/1/04	108-90-7	Chlorobenzene	360000	ug/kg dw
VOCs	APA04-12-10-12	7/2/04	107-06-2	1,2-Dichloroethane	25	ug/kg dw
Pesticides	APA04-12-10-12	7/2/04	15972-60-8	Alachlor	80	ug/kg dw
VOCs	APA04-12-10-12	7/2/04	108-90-7	Chlorobenzene	70	ug/kg dw
VOCs	APA04-12-10-12	7/2/04	67-66-3	Chloroform	1.1	ug/kg dw
VOCs	APA04-12-10-12	7/2/04	75-09-2	Methylene chloride	2.4	ug/kg dw
VOCs	APA04-12-10-12	7/2/04	108-88-3	Toluene	9	ug/kg dw
VOCs	APA04-12-10-12	7/2/04	79-01-6	Trichloroethene	3	ug/kg dw

TABLE 3-7
Summary of 2005 Soil Analytical Detections
Former Solutia Queeny Plant
St. Louis, Missouri

Group	Sample ID	Sample Date	CAS	Chemical	Result	Units
Former FF Building Area						
VOCs	LPZ-4-GPB-10-12	6/9/05	75-15-0	Carbon disulfide	730	ug/kg
VOCs	LPZ-4-GPB-10-12	6/9/05	108-88-3	Toluene	12000	ug/kg
VOCs	LPZ-4-GPB-15-17	6/9/05	108-88-3	Toluene	1700000	ug/kg
VOCs	LPZ-4-GPB-15-17-DUP	6/9/05	108-88-3	Toluene	600000	ug/kg
VOCs	LPZ-4-GPC-2-4	6/9/05	108-90-7	Chlorobenzene	110	ug/kg
VOCs	LPZ-4-GPC-2-4	6/9/05	156-59-2	cis 1,2-Dichloroethene	580	ug/kg
VOCs	LPZ-4-GPC-2-4	6/9/05	127-18-4	Tetrachloroethene	2200	ug/kg
VOCs	LPZ-4-GPC-2-4	6/9/05	108-88-3	Toluene	1700	ug/kg
VOCs	LPZ-4-GPC-2-4	6/9/05	79-01-6	Trichloroethene	900	ug/kg
VOCs	LPZ-4-GPC-2-4	6/9/05	1330-20-7	Xylene	730	ug/kg
VOCs	LPZ-4-GPC-10-12	6/9/05	108-88-3	Toluene	100000	ug/kg
VOCs	LPZ-4-GPD-17-19	6/9/05	108-90-7	Chlorobenzene	12	ug/kg
Former Bulk Chemical Storage Area						
VOCs	FBCSA-GP16B-9-11	6/9/05	71-43-2	Benzene	6900	ug/kg
VOCs	FBCSA-GP16B-9-11	6/9/05	108-90-7	Chlorobenzene	260000	ug/kg
VOCs	FBCSA-GP16B-9-11	6/9/05	1330-20-7	Xylene	5800	ug/kg
VOCs	FBCSA-GP16B-14-16	6/9/05	71-43-2	Benzene	4000	ug/kg
VOCs	FBCSA-GP16B-14-16	6/9/05	108-90-7	Chlorobenzene	75000	ug/kg
VOCs	FBCSA-GP17B-4-6	6/9/05	71-43-2	Benzene	1200	ug/kg
VOCs	FBCSA-GP17B-4-6	6/9/05	100-41-4	Ethylbenzene	1400	ug/kg
VOCs	FBCSA-GP17B-4-6	6/9/05	108-88-3	Toluene	710	ug/kg
VOCs	FBCSA-GP17B-4-6	6/9/05	1330-20-7	Xylene	4300	ug/kg
VOCs	FBCSA-GP5B-6-8	6/9/05	71-43-2	Benzene	6800	ug/kg
VOCs	FBCSA-GP5B-6-8	6/9/05	108-90-7	Chlorobenzene	26000	ug/kg
VOCs	FBCSA-GP5B-6-8	6/9/05	100-41-4	Ethylbenzene	5100	ug/kg
VOCs	FBCSA-GP5B-6-8	6/9/05	108-88-3	Toluene	11000	ug/kg
VOCs	FBCSA-GP5B-6-8	6/9/05	1330-20-7	Xylene	19000	ug/kg
VOCs	FBCSA-GP5B-12-14	6/9/05	71-43-2	Benzene	970	ug/kg
VOCs	FBCSA-GP5B-12-14	6/9/05	108-90-7	Chlorobenzene	580	ug/kg
VOCs	FBCSA-GP5B-12-14-DUP	6/9/05	71-43-2	Benzene	490	ug/kg
VOCs	FBCSA-GP5B-12-14-DUP	6/9/05	108-90-7	Chlorobenzene	1900	ug/kg

Appendix A

Analysis of Interim Measures Alternatives

Table A-1
Alternative Comparison for Building VV Area PCB-Impacted Soil
Former Solutia Queeny Plant
St. Louis, Missouri

Alternative	Effectiveness	Implementability	Cost	Total	Comment
Excavate and Offsite Disposal	5	5	2	12	Removes source
Ex-Situ Treatment	4	2	1	7	Cost prohibitive
Institutional Controls	1	4	5	10	Ineffective since leaves soil as is currently, and unacceptable for any use
No Action	1	5	5	11	Unacceptible to public; potential future litigation

Notes: 1 = worst 5 = best

Table A-2
Alternative Comparison for Groundwater Source Areas
Former Solutia Queeny Plant
St. Louis, Missouri

Alternative	Effectiveness	Implementability	Cost	Total	Comment
Extraction and Treatment	3	2	1	6	Cost prohibitive
In Situ Treatment of Source Areas	5	4	3	12	Attacks source areas and facilitates MNA
Monitored Natural Attenuation	1	4	4	9	With source areas unremediated, no considered effective
Institutional Controls with Monitoring	1	5	5	11	Effective over covered area; not if plume beyond covered area
No Action	1	5	5	11	Unacceptible to public; potential future litigation

Notes: 1 = worst 5 = best

ATTACHMENT 3: STATEMENT OF WORK

ATTACHMENT IV:

INTRODUCTION

1. The purpose of this Scope of Work (SOW) for the former Monsanto/Solutia Queeny Facility in St. Louis, Missouri (Facility) is to define the requirements, standards and guidelines which shall be followed by the Respondents to accomplish the following Tasks:

> Task I: If requested by EPA, to prepare a Corrective Measures Study (CMS) that identifies, compares and recommends alternatives to address the contamination at, and/or originating from, Respondent's Facility.
>
> Task II: To perform the Corrective Measures Implementation (CMI) that implements the remedy selected by EPA to prevent, mitigate, and/or remediate any migration or release of solid and/or hazardous wastes and/or hazardous constituents at, and/or from, the Facility.

In accomplishing the above Tasks, the Respondents shall comply with the provisions of the corresponding Administrative Order on Consent (Order) between the United States Environmental Protection Agency (EPA) and Respondents SWH Investments II (SWH) and Environmental Operations, Inc. (EOI) this SOW and all applicable EPA guidance (including, but not limited to, the guidance documents referenced in the Order and this SOW). The Statement of Work and schedule for currently identified work to be performed under the Order is set forth below.

TASK I: IDENTIFICATION AND DEVELOPMENT OF THE CORRECTIVE MEASURE ALTERNATIVE OR ALTERNATIVES

2. Respondents shall conduct a focused Corrective Measures Study (CMS) that shall identify, screen and develop the alternative or alternatives for removal, containment, treatment and/or other remediation of the contamination based on the overall protection of human health and the environment. This focused CMS shall take into account EPA's comments on the Interim Measures Completion Report, and shall address any issues of data gaps or additional alternatives that need to be considered for EPA to be able to select the final remedy for the Facility.

3. The CMS shall identify/develop how alternatives provide human health and environmental protection, attain media cleanup standards based on the ability of alternatives to achieve the media cleanup standards prescribed in the Order. Respondents shall identify/develop how measures control the sources of releases by describing how alternatives reduce or eliminate to the maximum extent possible further releases. Respondentsshall identify/develop methods to comply with standards for the management of wastes generated during corrective measures.

4. **Draft CMS Report.** Within sixty (60) days of EPA approval of the Interim Measures Completion Report, Respondents shall submit to EPA for approval a draft CMS Report. The

draft CMS Report shall describe a detailed evaluation of corrective measure alternatives and a recommendation as to the alternative (or alternatives) which should be selected to address contamination originating at SWMUs and/or AOCs at the Facility. The draft CMS report shall address, without limitation, all items set forth in this Task, below:

a. Statement of purpose: The draft CMS Report shall describe the purpose of the document and provide a summary description of the project;

b. Description of Current Conditions: The draft CMS Report shall include a brief discussion of any new information that has been developed since the Effective Date of the Order, including the performance of the Interim Measures. This discussion shall concentrate on those issues which could significantly affect the evaluation and selection of the corrective measure alternative(s);

c. Corrective Action Objectives

The draft CMS Report shall describe and propose Respondents' corrective action objectives. Specifically, Respondents shall propose applicable media cleanup standards for each medium where Facility-related contamination poses an unacceptable risk to human health and the environment. The corrective action objectives shall be based on promulgated federal and state standards, risk-derived standards, and all data and information gathered during the corrective action process (e.g., from interim measures, RCRA Facility Investigation, etc.), and/or other applicable guidance documents. If no specific standards exist for a given contaminant and media, the Respondents shall propose and justify a media cleanup standard for such contaminant and/or media;

d. Identification, Screening, and Development of Corrective Measure Alternatives

(1) Identification of Technologies:

(a) The draft CMS Report shall list and describe potentially applicable technologies for each affected media that may be used to achieve the corrective action objectives proposed by Respondent. The draft CMS Report shall include a table that summarizes the available technologies;

(b) The draft CMS Report may consider innovative treatment technologies, especially in situations where existing corrective measure technologies are limited. Innovative technologies are defined as those technologies utilized for source control other than incineration, solidification/stabilization, and pumping with conventional treatment for contaminated groundwater. The EPA may require treatability studies and/or on-site pilot scale studies to evaluate the effectiveness of any proposed innovative treatment technologies;

(c) Respondents may conduct, and include in the draft CMS Report, laboratory and/or bench scale studies to determine the applicability of a corrective measure technology or technologies to facility conditions. The methodology of these studies is subject to EPA review and approval;

(d) If Respondents propose laboratory and/or bench scale studies, Respondents shall develop and submit a testing plan to the EPA for review and approval that identifies the type(s) and goal(s) of the study or studies, the level of effort needed, and the procedures to be used for data management and interpretation. Upon completion of the testing, the Respondents shall evaluate the testing results to assess the technology or technologies with respect to the site-specific questions identified in the test plan; and

(e) The draft CMS Report shall summarize the testing program and its results (if studies are performed), both positive and negative.

(2) Screening of Technologies:

(a) The draft CMS Report shall present a screening of corrective measures technologies to demonstrate why certain corrective measures technologies may not prove feasible to implement given the existing set of waste and site-specific conditions; and

(b) If only one corrective measure alternative is being analyzed, the draft CMS Report shall indicate any technological limitations given waste- and site-specific conditions at the Facility for which it is being considered. Respondents shall present these findings in tabular form.

(3) Corrective Measure Development:

(a) The draft CMS Report shall assemble the technologies that pass the screening step into specific alternatives that have the potential to meet the corrective action objectives for each media: and

(b) Each alternative proposed in the draft CMS Report shall consist of an individual technology or a combination of technologies used in sequence (i.e., a treatment train). Different alternatives may be considered for separate areas of the Facility. The developed alternatives shall be carried forward for evaluation using the EPA's four General Standards for Remedies and Remedy Selection Decision Factors.

5. **General Standards for Remedies**

For each remedy which warrants a more detailed evaluation, the draft CMS Report shall provide detailed documentation of how the potential remedy will comply with each of the General Standards for Remedies listed below. These standards reflect the major technical components of remedies including cleanup of releases, source control and management of wastes that are generated by remedial activities. Specifically these standards are:

a. Be protective of human health and the environment;

b. Attain media cleanup standards set by the EPA;

c. Control the source(s) of releases so as to reduce or eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment; and

d. Comply with any applicable standards for management of wastes.

6. Any corrective measure alternative proposed by Respondents in the draft CMS Report must satisfy the four General Standards for Remedies in order to be carried forward for evaluation using the Remedy Selection Decision Factors. In evaluating the selected corrective measure alternative or alternatives, the Respondents shall prepare and submit information that documents that the specific remedy will meet the standards listed above. A detailed explanation of the General Standards for Remedies is set forth below.

7. **Any proposed Remedy must be Protective of Human Health and the Environment**

The standard for protection of human health and the environment is a general mandate of the RCRA statute. This standard requires that remedies include those measures that are needed to be protective, but are not directly related to media cleanup, source control, or management of wastes. The draft CMS Report shall include a discussion on what types of short term remedies are appropriate for the Facility in order to meet this standard. This information must be provided in addition to a discussion of how the other corrective measure alternatives meet this standard.

8. **Any proposed remedy must attain Media Cleanup Standards Set by the EPA**

Remedies will be required to attain media cleanup standards which are set by EPA (based on state or federal regulations (e.g., groundwater standards) or other standards which are set by the EPA). Certain technical aspects of the remedy, such as the practical capabilities of remedial technologies, may influence to some degree the media cleanup standards that are established. The draft CMS Report shall address whether the potential remedy will achieve the preliminary remediation objective as identified by the EPA as well as other alternative corrective action objectives that may be proposed by the Respondent. Respondents shall also include an estimate of the time frame necessary for each alternative to meet these standards.

9. **Any proposed remedy must Control the Sources of Releases**

A critical objective of any remedy proposed by Respondents must be to stop further environmental degradation by controlling or eliminating further releases that may pose a threat to human health and the environment. An effective source control program is essential to ensure the long-term effectiveness and protectiveness of the corrective action program. As part of the draft CMS Report, the Respondents shall address the issue of whether source control measures are necessary, and if so, the type of source control actions that would be appropriate. Any source control measure proposed shall include a discussion on how well the method is anticipated to work given the particular situation at the Facility and the known track record of the specific technology.

10. **Any proposed remedy must comply With Any Applicable Standards for Management of Wastes.**

The draft CMS Report shall include a discussion of how the specific waste management activities will be conducted in compliance with all applicable state or federal regulations (e.g., the land disposal restrictions).

11. **Remedy Selection Decision Factors**

Any remedy proposed by Respondents shall be evaluated according to EPA's Remedy Selection Decision Factors. The Remedy Selection Decision Factors are five factors that the EPA considers in selecting/approving a remedy that meets the four General Standards listed above. These factors represent a combination of technical measures and management controls for addressing the environmental problems at the Facility. The five factors are:

a. Long-term reliability and effectiveness;

b. Reduction in the toxicity, mobility or volume of wastes;

c. Short-term effectiveness;

d. Implementability; and

e. Cost.

The draft CMS Report shall discuss and provide information in support of Respondent's application of these factors in the evaluation of corrective action alternatives. Examples of the types of information required are provided below:

12. **Long-term Reliability and Effectiveness**

Demonstrated and expected reliability is a way of assessing the risk and effect of failure. The draft CMS Report shall consider whether the technology or a combination of technologies have been used effectively under analogous site conditions, whether failure of any one technology in the alternative would have an immediate impact on receptors, and whether the alternative would have the flexibility to deal with uncontrollable changes at the site (e.g., heavy rain storms, earthquakes, etc.). The draft CMS Report shall evaluate each corrective measure alternative in terms of the projected useful life of the overall alternative and of its component technologies. Useful life is defined as the length of time the level of effectiveness can be maintained.

13. **Reduction in the Toxicity, Mobility or Volume of Wastes**

The draft CMS Report shall discuss how the alternatives employ techniques, such as treatment technologies, to eliminate or substantially reduce the inherent potential for the wastes in SWMUs (and/or contaminated media at the Facility) to cause future environmental releases or other risks to human health and the environment. Considerations include the amount of contaminants destroyed or treated, the degree of expected reduction in toxicity, mobility, and volume, the degree to which the treatment is irreversible, and the type and quantity of residuals remaining after treatment.

14. **Short-term Effectiveness**

The draft CMS Report shall evaluate the short-term effectiveness of each of the alternatives as proposed. Short-term effectiveness considers the protection of the community and on-site work force (both Facility and remedial) during the performance of the corrective action, along with any short-term environmental impacts. An important aspect of the short-term effectiveness factor is the consideration of the time a remedy requires to attain the media cleanup standards.

15. **Implementability**

The draft CMS Report shall evaluate Respondent's ability to construct and operate each corrective measure alternative proposed. Key elements include the reliability of the technology, the ease of undertaking additional corrective action (if necessary), and the ability of the Respondents to monitor the effectiveness of the corrective action. Examples of information the draft CMS Report shall consider when assessing implementability include:

a. The administrative activities needed to implement the corrective measure alternative (e.g., permits, rights of way, offsite approvals, etc.) and the length of time these activities will take;

b. The constructability, time for implementation, and time for beneficial results;

c. The availability of adequate offsite treatment, storage capacity, disposal services, needed technical services and materials; and

d. The availability of prospective technologies for each corrective measure alternative.

16. **Cost**

The relative cost of a remedy may be considered, particularly when several different technical alternatives to remediation offer equivalent protection of human health and the environment, but vary widely in cost. When presenting cost estimates, the draft CMS Report shall include costs for engineering, site preparation, construction, materials, labor, sampling/analysis, waste management/disposal, permitting, health and safety measures, training, operation and maintenance, etc., and shall be presented in tabular form. The cost estimates for the alternatives shall be categorized as capital costs and operation and maintenance costs, and the Respondents shall present the present worth cost of each alternative using a discount rate of five (5) percent before taxes and after inflation.

17. **Final CMS Report:**

Within (60) calendar days of receipt of EPA's comments, Respondents shall finalize the CMS Report incorporating comments received from EPA on the Draft CMS Report, and shall resubmit a Final CMS Report for EPA approval. Within the Final CMS Report, the Respondents may recommend a preferred corrective measure alternative for consideration by the EPA. Such a recommendation should include a description and supporting rationale for the proposed remedy, consistent with the General Standards for Remedies and the Remedy Selection Decision Factors that appear above. EPA will review and/or approve and/or modify this submittal in accordance with Section VIII of the Order. EPA's approval of the Final CMS Report, and any recommendation for a remedy recommended by Respondents shall not bind EPA to select Respondent's recommended remedy as the final remedy selected for the facility.

TASK II - CORRECTIVE MEASURES IMPLEMENTATION

18. Within sixty (60) calendar days of receipt of notification from EPA that the public comment period for EPA's proposed remedy has been completed and EPA has selected a final corrective action for the Facility, Respondents shall submit a Corrective Measures Implementation (CMI) Workplan to EPA and the Missouri Department of Natural Resources (MDNR). The required CMI Workplan shall specify the work required for the design, construction, implementation, and continued performance monitoring, and completion criteria of EPA's selected final corrective action at the facility. EPA will review and/or approve and/or modify this submittal in accordance with Section VIII of the Order (including the updated SAP, QAPP, Health and Safety Plans and O&M Plans). The CMI Workplan shall include, at a minimum, the following elements:

a. Introduction/Purpose: The CMI Workplan shall contain a description of the purpose of the document and a summary description of the project;

b. Summary of corrective action objectives;

c. Description of the final corrective measure selected by EPA and the rationale for the remedy selection;

d. Performance expectations;

e. Preliminary design criteria and rationale;

f. General operation and maintenance requirements;

g. Startup Procedures, including all applicable system startup procedures, including operational testing;

h. Long term monitoring requirements;

i. Design and implementation considerations to implement the selected remedy, to include, but not be limited to:

(1) Anticipated technical problems;
(2) Additional engineering data that may be required;
(3) A description of any permits and regulatory requirements; and
(4) Access, easements and right-of-way.

j. Cost estimates, including the capital and O&M costs for implementing the corrective action.

1. **Project Schedule** - The CMI Workplan shall also specify a schedule for key elements of the bidding and construction process, and for the initiation of all major corrective action construction tasks.

2. **Updated SAP, QAPP, Health and Safety and O&M Plans** - The CMI Workplan also shall include updates of the referenced plans, either as amendments, or stand alone documents. The updated Plans shall be revised as appropriate to address the requirements of implementing the final corrective action for the Facility. The O&M component of the CMI Workplan shall address all elements set forth below, including but not limited to, Project Management, Waste Management Procedures and Contingency Procedures.

3. **OPERATIONS AND MAINTENANCE PLAN** - Within the CMI Workplan Respondents shall also submit to EPA an Operations and Maintenance (O&M) Plan that outlines procedures for performing operations, long-term maintenance and monitoring of the Interim Measures

required by this Statement of Work. EPA will review and/or approve and/or modify this submittal in accordance with Section VIII of the Order. The O&M Plan shall, at a minimum, include the following elements:

a. Project Management - The O&M Plan shall describe the management approach including levels of personnel authority and responsibility (including an organizational chart), lines of communication and the qualifications of key personnel who will operate and maintain the Interim Measures (including contractor personnel);

b. System description - The O&M Plan shall describe the Interim Measures and identify significant equipment, as applicable to each Interim Measure. Provide schematics or process diagrams to illustrate system design and operation;

c. Personnel Training - The O&M Plan shall describe the training process for O&M personnel, as applicable. Respondents shall prepare, and include the technical specifications governing the operation of the groundwater migration control system and LNAPL systems, and the support requirements for the following:

i. Appropriate service visits by experienced personnel to supervise the installation, adjustment, start-up and operation of the Interim Measure systems; and

ii. Training covering appropriate operational procedures once the start-up has been successfully accomplished.

d. Start-Up Procedures - The O&M Plan shall describe all applicable system start-up procedures including any operational testing;

e. Operation and Maintenance Procedures - The O&M Plan shall describe all normal operation and maintenance procedures including:

(1) A description of tasks for operation;
(2) A description of tasks for maintenance;
(3) A description of prescribed treatment or operation conditions; and
(4) A schedule showing the frequency of each O&M task.

f. Data Management and Documentation Requirements - The O&M Plan shall specify that Respondents shall collect and maintain the following information:

(1) Progress Report Information;
(2) Monitoring and Laboratory data;
(3) Records of operating costs; and
(4) Personnel, maintenance and inspection.

g. Application of Quality and Assurance Project Plan/Sampling and Analysis Plan:

The O&M Plan shall describe actions necessary to apply the QAPP and SAP (Task I) to ensure that all information, data and resulting decisions are technically sound, statistically valid and properly documented.

h. The O&M Plan shall specify a replacement schedule for equipment and installed components;

i. Waste Management Practices - The O&M Plan shall describe any solid wastes/hazardous wastes/LNAPL which may be generated by the operation of the Interim Measures and describe how they will be managed;

j. Contingency Procedures - The O&M Plan shall describe, as applicable, the following types of contingency procedures necessary to ensure system operation in a manner protective of human health and the environment:

(1) Procedures to address system breakdowns and operational problems including a list of redundant and emergency back-up equipment and procedures;

(2) Alternative procedures to be implemented if the interim measure systems suffer complete failure. The alternative procedures must be able to achieve the performance standards for the Interim Measures until system operations are restored;

(3) The O&M Plan shall specify that, in the event of a major breakdown and/or the failure of the Interim Measure, Respondents shall notify EPA and MDNR within 24 hours of the event; and

(4) The O&M Plan shall specify the procedures to be implemented in the event that the Interim Measures are experiencing major operational problems, are not performing to design specifications, and/or will not achieve the Interim Measure performance standards.

4. **Corrective Measure Completion Criteria** - The CMI Workplan shall propose the process and criteria for determining when the implemented corrective measures have achieved the corrective action objectives. The CMI Workplan shall also describe the process and criteria for determining when maintenance and monitoring may cease.

5. **Corrective Measures Implementation Report -** Within thirty (30) days after the completion of the implementation/construction activities required by the approved CMI Workplan, Respondents shall submit a Corrective Measures Implementation Report, which shall include at a minimum, the following elements:

a. A statement of the purpose of the Report;

b. A synopsis of the corrective measure, design criteria, and a certification that the corrective measure was constructed and implemented in accordance with the approved CMI Workplan;

c. An explanation and description of any modifications to the approved CMI Workplan and design specifications, and why such modifications were necessary and appropriate;

d. Copies of any sampling/test results for operational testing and/or monitoring that documents how initial operation of the corrective measure compares to design criteria;

e. A summary of significant activities that occurred during the implementation/construction, including a discussion of any problems encountered and how such problems were addressed;

f. A summary of all inspection findings (including copies of inspection reports, documents and appendices); and

g. Copies of as-built drawings and photographs.

6. **Corrective Measures Completion Report -** When Respondents believe that they has satisfied the EPA approved completion criteria, Respondents shall submit to EPA and MDNR a Corrective Measures Completion Report, for review and approval by EPA in accordance with Section VIII of the Order. The CMCR shall fully document how the corrective action objectives and corrective measure completion criteria have been satisfied, and shall justify why the corrective measure and/or monitoring may cease. The CMCR shall, at a minimum, include the following elements:

a. A synopsis of the corrective measure;

b. Corrective Measure Completion Criteria - the CMCR shall include the process and criteria used to determine, and recommend, that the corrective measure, maintenance and monitoring may cease;

c. A demonstration that the corrective action objectives and corrective measure completion criteria have been met. The CMCR shall include results of tests and/or monitoring that documents how operation of the corrective measure compares to, and satisfies, the corrective action objectives and completion criteria;

d. A summary of work accomplishments (e.g. performance levels achieved, total hours of operation, total volume treated and/or excavated volumes of media, nature and volume of wastes generated, etc.);

e. A summary of significant activities that occurred during operation of the corrective measure, including a discussion of any problems encountered and how such problems were addressed;

f. A summary of inspection findings (including copies of key inspection documents in appendices); and

g. A summary of total operation and maintenance costs.

ATTACHMENT 4: DRAFT COVENANT

Space Above for Recorder's Use Only

DOCUMENT COVER SHEET

TITLE OF DOCUMENT:	Environmental Covenant
DATE OF DOCUMENT:	_____, 2009
GRANTOR:	SWH Investments II, LLC
Mailing Address:	c/o Environmental Operations, Inc. 1530 South Second Street, Suite 200 St. Louis, Missouri 63104
GRANTEE:	Missouri Department of Natural Resources P.O. Box 176 1101 Riverside Drive Jefferson City, Missouri 65102
LEGAL DESCRIPTION:	See Exhibit A Attached Hereto

ENVIRONMENTAL COVENANT

This Environmental Covenant is entered into by and between SWH Investments II, LLC ("Grantor"), and the Missouri Department of National Resources ("Holder"), pursuant to the Missouri Environmental Covenants Act, Sections 260.1000 through 260.1039, RSMo, for the purpose of subjecting the Property (defined below) to the activity and use limitations set forth herein.

RECITALS

A. Grantor is the owner in fee simple of certain real property located in the City of St. Louis, State of Missouri, that consists of property that formerly comprised the J. F. Queeny Facility, currently subject to a RCRA permit issued to Monsanto on November 8, 1989 (Permit No. MOD004954111), jointly by EPA and the Missouri Department of Natural Resources (MDNR), pursuant Section 3004(u) and (v) of RCRA, 42 U.S.C. 6944(u) and (v), and Missouri Hazardous Waste Management Law and implementing regulations. This property is legally described in Exhibit A (the "Property" or "Facility");

B. Grantor desires to grant to Holder this Environmental Covenant, as provided in the Missouri Environmental Covenants Act, subjecting the Property to certain activity and use limitations for the purpose of ensuring the protection of human health and the environment by minimizing the potential for exposure to contamination that remains on the Property and to ensure that the Property is not developed, used, or operated in a manner incompatible with the environmental response project implemented at the Property;

C. On _____, 2009, Grantor and the United States Environmental Protection Agency ("EPA") entered into an Administrative Order on Consent ("AOC") for the performance of an environmental response project at the Property. This AOC is on file with EPA Region VII's Hearing Clerk under Docket No. _____. Pursuant to this AOC, Grantor agreed, and was ordered, to, among other things, conduct Interim Measures at the Property in accordance with the schedule and requirements of an EPA-approved Interim Measures Work Plan ("IMWP") which is incorporated into and enforceable as an element of the AOC. In summary and pertinent part, the approved IMWP requires Grantor to perform, at a minimum, the following tasks:

a. The excavation and proper disposal of all soils contaminated with polychlorinated biphenyls ("PCBs") at levels exceeding 100 parts per million ("ppm") in the area of the former VV Building located on the Property. This also includes disposal sampling, verification sampling and backfilling the area of excavation to surface grade using clean materials.

b. Based on verification sampling, after excavation of soils exceeding 100 ppm, and fill of excavated areas, Grantor is required to delineate all soil

areas associated with the former VV Building area which have PCBs remaining at concentrations greater than 10 ppm, and install a cap over these areas (constructed in accordance with the approved IMWP);

c. The installation of an adequate number of monitoring wells (a minimum of two) in the former VV Building area to demonstrate that PCB contamination in soils has not migrated to groundwater;

d. The installation of multiple temporary injection wells at the former FF Building located on the Property, with wells in the Former Bulk Chemical Storage Area ("FBCSA") and Acetanilides Production Area;

e. The injection of oxidation reagents into the temporary injection wells described above for the purpose of chemically destroying source material in the capillary fringe and upper saturation zone to enhance the long-term biodegradation of volatile organic compounds ("VOCs"). The IMWP proposes three injection events. Both before and after injection of such reagents, sampling from the temporary wells shall be performed to determine the concentrations of VOCs in the groundwater. The IMWP states the remediation goal of this technology is to remove 75% of the remaining mass of total VOCs in subsurface soils that contribute to groundwater contamination. The groundwater treatment is expected to enhance the bioremediation of contaminants in groundwater and accelerate achieving groundwater cleanup objectives.

NOW THEREFORE, the parties hereto agree as follows:

1. Parties. In addition to the Grantor and Holder named above, EPA is a party to this Environmental Covenant as a "Department" as defined in Section 260.1003(2) RSMo. All parties to this Environmental Covenant may enforce it as provided for in paragraph 5 below, and Section 260.1030(1), RSMo.

2. Activity and Use Limitations. As part of the environmental response project undertaken at the Property, Grantor hereby subjects the Property to, and agrees to comply with, the following activity and use limitations:

a. The Property shall not be used, developed, or operated in any manner that will interfere with or prohibit the implementation of the environmental response project conducted pursuant to the AOC.

b. The Property shall be restricted to commercial and/or industrial uses. Other designed uses which may create the potential for unacceptable exposures to contamination shall be prohibited (e.g., ball fields, day or residential care facilities).

c. Except as approved in advance by Holder or EPA, water wells shall not be drilled or maintained on the Property.

d. Notice shall be provided to any persons who perform subsurface excavations (e.g., utility, construction) in the area of remaining delineated soil and/or groundwater contamination (PCBs and VOCs), at the conclusion of Interim Measures and the potential need for personal protective equipment for such work. A copy of the Health and Safety Plan and the current Facility Risk Assessment, and the most recent annual groundwater sampling report, shall be made available at the Premises for review to any persons who perform subsurface excavations in the area of remaining soil and groundwater contamination.

3. Running with the Land. This Environmental Covenant shall be binding upon Grantor and its successors and assigns, and Transferees in interest, and shall run with the land, as provided in Section 260.1012, RSMo, subject to amendment or termination as set forth herein. The term "Transferee," as used in this Environmental Covenant, shall mean any future owner of any interest in the Property or any portion thereof, including, but not limited to, owners of an interest in fee simple, mortgagees, easement holders, and/or lessees.

4. Location of Administrative Record for the Environmental Response Project. The administrative record for the environmental response project conducted at the Property is located at EPA's Regional offices located 901 North 5th Street, Kansas City, Kansas 66101

5. Enforcement. Compliance with this Environmental Covenant may be enforced as provided in Section 260.1030, RSMo. Failure to timely enforce compliance with this Environmental Covenant or the activity and use limitations contained herein by any party shall not bar subsequent enforcement by such party and shall not be deemed a waiver of the party's right to take action to enforce any non-compliance. Nothing in this Environmental Covenant shall restrict any person from exercising any authority under any other applicable law.

6. Right of Access. Grantor hereby provides to Holder and EPA, and their respective agents, contractors, and employees, the right of access at all reasonable times to the Property for implementation, monitoring or enforcing this Environmental Covenant. Nothing herein shall be deemed to limit or otherwise affect the Holder's or EPA's rights of entry and access or their authority to take response actions under applicable law.

7. Notice upon Conveyance. Each instrument hereafter conveying any interest in the Property or any portion of the Property shall contain a notice of the activity and use limitations set forth in this Environmental Covenant, and shall provide the recording reference for this Environmental Covenant. The notice shall be substantially in the following form:

THE INTEREST CONVEYED HEREBY IS SUBJECT TO AN ENVIRONMENTAL COVENANT DATED _____, 2009, RECORDED IN THE OFFICE OF THE RECORDER FOR DEEDS OF THE CITY OF ST. LOUIS, MISSOURI, ON _____, 2009, AS BOOK___, PAGE ____.

Grantor/Transferee shall notify Holder and EPA within ten (10) days following each conveyance of an interest in the Property, or any portion thereof. The notice shall include the name, address, and telephone number of the Transferee, and a copy of the deed or other documentation evidencing the conveyance.

8. Notification Requirement. Grantor/Transferee shall notify Holder and EPA as soon as possible of conditions that could constitute a breach of the activity and use limitations set forth in this Environmental Covenant.

9. Representations and Warranties. Grantor hereby represents and warrants to Holder and EPA as follows:

a. Grantor has the power and authority to enter into this Environmental Covenant, to grant the rights and interests herein provided and to carry out all of Grantor's obligations hereunder;

b. Grantor is the sole owner of the Property and holds fee simple title, which is subject to the interests or encumbrances known to Grantor identified in Exhibit B hereto;

c. Grantor has identified all other parties who hold any interest in the Property and notified such parties of Grantor's intention to enter into this Environmental Covenant; and

d. This Environmental Covenant will not materially violate or contravene or constitute a material default under any other agreement, document, or instrument to which Grantor is a party or by which Grantor may be bound or affected.

10. Amendment or Termination. The Grantor shall submit to EPA for review and approval an amended Environmental Covenant upon selection of the final remedy for the Facility. This Environmental Covenant may be amended or terminated only by consent signed by Grantor, Holder, and EPA. Within thirty (30) days of signature by all required parties on any amendment or termination of this Environmental Covenant, Grantor/Transferee shall file such amended or superseding instrument for recording with the office of the recorder of the county or city (if that city is not situated in a county) in which the Property is situated, and within thirty (30) days of the date of such recording, Grantor/Transferee shall provide a file- and date-stamped copy of the recorded instrument to Holder and EPA.

11. Severability. If any provision of this Environmental Covenant is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

12. Governing Law. This Environmental Covenant shall be governed by and interpreted in accordance with the laws of the State of Missouri.

13. Recordation and Distribution. Within thirty (30) days after the date of the final required signature upon this Environmental Covenant, Grantor shall record this Environmental Covenant with the office of the recorder of the county or city (if that city is not situated in a county) in which the Property is situated. Within thirty (30) days following the recording of this Environmental Covenant, or any amendment or termination of this Environmental Covenant, Grantor/Transferee shall, in accordance with Section 260.1018, RSMo, distribute a file- and date-stamped copy of the recorded Environmental Covenant to: (a) each signatory hereto; (b) each person holding a recorded interest in the Property; (c) each person in possession of the Property; (d) each municipality or other unit of local government in which the Property is located; and (e) any other person designated by EPA.

14. Effective Date. The effective date of this Environmental Covenant shall be the date upon which the fully executed Environmental Covenant has been recorded with the office of the recorder of the county or city (if that city is not situated in a county) in which the Property is situated.

15. Notice. Any document or other item required by this Environmental Covenant to be given to another party hereto shall be sent to:

If to Grantor:

SWH Investments II, LLC
c/o Environmental Operations, Inc.
1530 South Second St., Suite 200
St. Louis, MO 63104
Attn: Stacy Hastie

If to Holder:

Missouri Department of Natural Resources
P. O. Box 176
Jefferson City, MO 65102-0176

If to EPA:

Air Waste Management Division, Director
U.S. Environmental Protection Agency, Region VII
901 North 5th Street
Kansas City, Kansas 66101

The undersigned Grantor represents and certifies that it is authorized to execute this Environmental Covenant.

IT IS SO AGREED:

FOR GRANTOR

By: _____ Date: _____
Name (print):_____
Title:_____
Address:_____
_____
_____
_____

STATE OF MISSOURI)
)
CITY OF SAINT LOUIS)

On this ___ day of _____, 2009, before me a Notary Public in and for said state, personally appeared __[NAME]_____, __[TITLE]_____ of SWH Investments II, LLC, a Missouri limited liability company, known to me to be the person who executed the within Environmental Covenant in behalf of said limited liability company and acknowledged to me that he/she executed the same for the purposes therein stated.

_____
Notary Public

FOR HOLDER

By: _____ Date: _____
Name (print): _____
Title: _____
Address: _____
_____
_____
_____

STATE OF MISSOURI)
)
COUNTY OF _____)

On this ___ day of _____, 2009, before me a Notary Public in and for said state, personally appeared __[NAME]_____, __[TITLE]_____ of [COPRORATE NAME], known to me to be the person who executed the within Environmental Covenant in behalf of said corporation and acknowledged to me that he/she executed the same for the purposes therein stated.

_____
Notary Public

FOR EPA

By: _____ Date: _____

Becky Weber, Air Waste Management Division Director
U.S. Environmental Protection Agency
901 North 5th Street
Kansas City, Kansas 66101

STATE OF KANSAS)
)
COUNTY OF WYANDOTTE)

On this ___ day of _____, 2009, before me a Notary Public in and for said state, personally appeared Becky Weber, the Director of EPA Region VII's Air Waste Management Division (or her designee), known to me to be the person who executed the within Environmental Covenant in behalf of said corporation and acknowledged to me that he/she executed the same for the purposes therein stated.

_____
Notary Public