17006 /

ENVIRON

May 16, 2001

Mr. Myron Waters
Indiana Department of Environmental Management
100 Senate Ave
Suite N045
Indianapolis, IN 46204

RE: Southern Concrete Pad Area, ECC Superfund Site
Indianapolis, Indiana

Dear Mr. Waters:

Please find enclosed 3 copies of the *Technical Memorandum, Closure by Removal or Decontamination of the Southern Concrete Pad Area, ECC Superfund Site, Indianapolis, Indiana*. Please contact me at (847) 444-9200 if you have any questions or require additional information.

Sincerely,

ENVIRON International Corporation

Jennifer A. Wilkie, Ph.D.
Senior Associate

cc: Mr. Michael McAteer – USEPA
Mr. Tim Harrison – CH2M Hill
Mr. Phil Smith – CH2M Hill
Dr. Roy Ball – ENVIRON International Corporation
Norman Bernstein, Esq.

157
5/01

TECHNICAL MEMORANDUM
CLOSURE BY REMOVAL OR DECONTAMINATION OF THE SOUTHERN CONCRETE PAD AREA ECC SUPERFUND SITE INDIANAPOLIS, INDIANA

Prepared by:
ENVIRON International Corporation
740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

Prepared for:
Envirochem Trustees

May 2001

INTRODUCTION

The requirements for excavation of the soils underlying the former Southern Concrete Pad Area (SCPA) of the Environmental Conservation and Chemical Corporation Superfund Site (the "ECC Site") are set forth in Section 2.1.1 and Appendix F of Revised Exhibit A[1]. Paragraph 5.3 of Appendix F specifies that the "then current IDEM RCRA clean closure criteria will be established for this site using the then current IDEM RCRA clean closure regulations and guidance." The "current IDEM RCRA clean closure regulations and guidance" is IDEM's Risk Integrated System of Closure[2] (RISC).

RISC provides both a risk-based default approach applicable to all sites and a flexible approach, which includes site-specific data and/or alternate models for site closure, for all IDEM remediation programs (including RCRA). The purpose of this Technical Memorandum is to compare the results of the ECC Site SCPA exit sampling (collected in accordance with Paragraphs 2 and 3 of Appendix F) to the provisions of RISC that apply to IDEM RCRA closure. IDEM currently refers to "clean closure" as "closure by removal or decontamination."

SCP EXCAVATION AND SAMPLING

A location map for the ECC Site is provided as Figure 1 and an ECC Site SCPA base map is provided as Figure 2. The excavation of the soils underlying the ECC Site SCPA took place during the summer of 1998. The minimum limits of excavation were the lateral extent of the concrete pad and a minimum depth of nine feet. The maximum limits of excavation were defined in Revised Exhibit A[3]. The actual limits of excavation were determined by visual inspection or by field screening[4].

---

[1] Revised Exhibit A, May 7, 1997, Revision 2.

[2] RISC is described in the User's Guide, dated February 15, 2001 and in the Technical Guide, dated February 15, 2001.

[3] The maximum safe depth was defined based on the recommendation of an independent Indiana-registered engineer specializing in geotechnical engineering (p. 4 of Revised Exhibit A). The maximum lateral extent of the excavation was defined in Appendix F of Revised Exhibit A as the top of the bank of Unnamed Ditch to the east, the road to Northside Landfill to the south, the western fence bordering the support zone to the west, and the edge of the concrete pad to the north.

[4] Revised Exhibit A, May 7, 1997, Revision 2, p. 2.

Post excavation confirmatory soil samples (Confirmation Samples) were collected from the bottom and sidewalls of the open excavation in June and July of 1998 in accordance with Paragraphs 2 and 3 of Appendix F to Revised Exhibit A. Sample locations are shown in Figure 3. Sidewall samples were generally collected at a depth of one-half the total excavation depth. The Confirmation Samples were analyzed for Volatile Organic Compounds (VOCs) and Semivolatile Organic Compounds (SVOCs) using USEPA's Methods 8260A and 8270B, respectively.

THEORY OF GROUND WATER AQUIFER PROPERTIES

Due to the low permeability of the overlying till, subsurface water is present in the sand and gravel unit under confined conditions, meaning that the potentiometric surface (the elevation to which water will rise in a well that penetrates the unit) is higher in elevation than the top of the sand and gravel unit[5]. The difference between a confined and an unconfined aquifer is illustrated in Figure 4. Because the potentiometric surface of a confined aquifer is located at a higher elevation than the top of the aquifer, the hydraulic pressure forces ground water upwards. A confined aquifer is commonly described as existing under artesian conditions. Clearly, the permeability of surficial geologic units and whether the uppermost aquifer is confined or unconfined has significant implications for the migration of contamination from soil to ground water[6].

In an unconfined shallow aquifer, soil contamination in the vadose zone partitions into infiltrating rain water (leachate) and is transported due to gravity through the vadose zone to the water table, where the leachate comingles with ground water. The infiltration process is also referred to as advection. Other transport phenomena also occur in the soil, such as dispersion (caused by advection) and molecular diffusion, but they are minor compared to advection, which is the primary transport mechanism for transport of soil contamination in the vadose zone into a shallow, unconfined aquifer. This geological configuration represents a significant potential for ground water contamination.

[5] R. Allen Freeze and John A. Cherry, Groundwater, 1979, Prentice-Hall, Inc., pp. 48-49.
[6] R.C. Berg, J.P. Kempton, and K. Cartwright, Potential for Contamination of Shallow Aquifers in Illinois, Illinois State Geological Survey, Circular 532, 1984.

In contrast, a confined shallow aquifer is, by definition, below an overlying low-permeability unit. The combination of an overlying low permeability unit and the upward (artesian) pressure of the underlying ground water is a significant barrier to downward contaminant transport via advection. In the absence of advection, the only significant transport phenomenon to carry soil contamination to ground water is molecular diffusion.

GEOLOGY AND HYDROGEOLOGY OF THE ECC SITE SCPA

The uppermost aquifer below the ECC Site SCPA is a sand and gravel unit, the top of which is present between 14 to 30 feet below ground surface (bgs). This aquifer is overlain by a low permeability till (clay to silty clay with sand) that creates a confined condition for subsurface water in the underlying sand and gravel. Figures 5 through 8 provide geological cross sections for the ECC Site SCPA. As shown in Figures 5 and 6, the till is thinner on the north end of the ECC Site SCPA (approximately 14 to 20 feet thick, and is continuous vertically. On the south end of the ECC Site SCPA, the till is thicker (approximately 30 feet thick), but contains horizontally discontinuous sand and gravel lenses. These lenses are generally present in the lower portion of the till. Figures 7 and 8 show the thickness of the till and the presence of horizontal discontinuous sand and gravel lenses from east to west. The potentiometric surface, as denoted with an inverted triangle in Figures 5 through 8, is located within the till.

RISK-BASED SITE ASSESSMENT MODELS

The unconfined aquifer scenario, since it represents the "worst-case" geology for ground water contamination, forms the basis of the analysis of the migration to ground water pathway in many risk-based site assessment methodologies, including the USEPA's Soil Screening Level (SSL) Guidance[7] and the American Society for Testing and Materials (ASTM) Guidance for Risk-Based Corrective Action at Petroleum Release Sites[8]. RISC has adopted the USEPA's SSL equations for the calculation of indirect contact remediation objectives. The SSL equations describe the partitioning of organic contaminants from the organic matter associated with soil into infiltrating rain water and the dilution that occurs upon mixing of the leachate with the ground water. In other

[7] USEPA, Soil Screening Guidance: User's Guide (April 1996) and Technical Background Document (May 1996).

words, the SSL conceptual model is based on an unconfined, or water table, aquifer. The SSL User's Guide describes the applicability of the SSL migration to ground water equations[9]:

> "The methodology for developing SSLs for the migration to ground water pathway was designed for use during the early stages of a site evaluation when information about subsurface conditions may be limited. Hence, the methodology is based on rather conservative, simplified assumptions about the release and transport of contaminants in the subsurface (Exhibit 12[10]). These assumptions are inherent in the SSL equations and should be reviewed for consistency with the conceptual site model (...) to determine the applicability of SSLs to the migration to ground water pathway."

The SSL conceptual model is thus appropriate for default analyses where site-specific geology may be unknown. Because the ECC site-specific geology and hydrogeology are known and are <u>not</u> consistent with the SSL/RISC model assumptions, an alternative site-specific model is needed to determine the potential impact of soil contamination on ground water.

Some of the simplifying assumptions presented in Exhibit 12 that are <u>not</u> applicable to the ECC Site SCPA are:

- Uniformly distributed contamination from the surface to the top of the aquifer; and,
- Unconfined, unconsolidated aquifer.

As stated above, the shallow aquifer in the ECC Site SCPA is confined by an overlying low permeability till and the ground water is under upward (artesian) pressure. Therefore, soil contamination in the till can be transported to the underlying sand and gravel unit

---

[8] Standard Guide for Risk-Based Corrective Action at Petroleum Release Sites, ASTM E 1739-95, November 1995.
[9] USEPA, Soil Screening Guidance: User's Guide, April 1996, pp. 28-29.
[10] Exhibit 12 of the SSL User's Guide is provided hereto as Appendix A.

only by molecular diffusion. As a result, the alternative model must incorporate this transport mechanism (molecular diffusion), rather than advection.

COMPARISON OF POST EXCAVATION DATA TO RISC STANDARDS

The lateral limits of the final excavation and confirmation sample locations are given in Figure 9. Excavation depths are depicted in cross sections in Figures 10 through 13. As stated previously, the confirmation samples were analyzed for VOCs and SVOCs. The analytical results for compounds detected above the reported quantitation limits (the Confirmation Data) are presented in Table 1. In this section, the Confirmation Data are compared to the provisions of RISC that apply to IDEM RCRA closure by removal or decontamination (historically referred to as "clean closure").

IDEM RCRA closure by removal or decontamination is defined in RISC[11] as:

> "Addressing the decontamination, treatment, or removal of the following: all hazardous waste, hazardous waste constituents, hazardous constituents, leachate, contaminated run-on and runoff, waste decomposition products, liners, and contaminated soils (including ground water) that pose a substantial present or potential threat to human health or the environment. The standard is achieved by demonstrating attainment with one of the following closure levels:
> - estimated quantitation levels (EQLs) for organic constituents,
> - the mean plus one standard deviation of background for non-organics, or
> - default or non-default residential levels."

Closure by removal or decontamination results in remediation of the RCRA unit in a manner such that no further regulatory control under RCRA Subtitle C is necessary to protect human health and the environment. "Closure by removal or decontamination can be achieved in two ways: 1) clean closure, or 2) risk-based closure. Clean closure levels are established as background levels or EQLs for the constituents set forth in 40 CFR

[11] RISC User's Guide, February 15, 2001, p. 2-3.

261, Appendix VII. Risk-based residential closure is based on default or non-default risk assessment that uses residential exposure assumptions."[12]

As a screening procedure, the maximum detected concentrations of VOCs and SVOCs were compared to RISC default closure Residential Risk-Based Screening Levels (RBSLs) in Table 2.[13] For all of the SVOCs, and for 11 of the 25 of the VOCs, the maximum detected value is below the default Residential levels. Therefore, these compounds can be eliminated from further consideration. For the remaining 14 compounds, the 95% upper confidence limits of the mean (the "95% UCL") are compared in Table 3 to their respective Residential default closure level[14]. The default RBSLs for both the direct and the migration to ground water pathways are shown.

The 95% UCL for the compounds were determined using the "Box-Cox Transformation Method". The USEPA document *Supplemental Guidance to RAGS: Calculating the Concentration Term* states "In most cases, it is reasonable to assume that Superfund soil sampling data are lognormally distributed. Because transformation is a necessary step in calculating the UCL [the upper confidence limit] of the arithmetic mean for a lognormal distribution, the data should be transformed by using the natural logarithm function (i.e., calculate ln(x), where x is the value from the data set). However, in cases where there is a question about the distribution of the data set, a statistical test should be used to identify the best distributional assumption for the data set."[15] In this case, the data are not normally distributed and there is a question about the distribution of the data. Therefore, it is appropriate to use a statistical test to identify the best distributional assumption for the data set. According to Sokal and Rohlf[16], "Rather than simply trying various transformations to find out which one works best, Box and Cox (1964) developed a procedure for estimating the best transformation to normality within the family of power

[12] RISC User's Guide, February 15, 2001, p. 2-24.

[13] RISC states "If COC concentrations for surface and subsurface soils are less than the closure levels, a nature and extent determination is generally not required." (RISC Technical Guide, February 15, 2001, p. 4-1). For closure RISC states "The upper confidence limit (UCL) of the mean of COC concentrations in a representative random sample of the source area must be less than the land use-specific closure levels." (RISC Technical Guide, February 15, 2001, p. 6-6).

[14] For the calculation of the 95% UCL, the non-detects for the VOCs are assigned the quantity of one-half of the detection limit.

[15] USEPA, 1992. *Supplemental Guidance to RAGS: Calculating the Concentration Term.* NTIS PE92-963373.

transformations." A detailed description of the Box-Cox Transformation including the governing equations and the data transformations for the 14 VOC compounds are presented in Appendix B.

RISC considers the following exposure pathways in the calculation of direct contact closure levels:

- Direct contact with skin (dermal absorption route);
- Inhalation of COC on soil particulates and dust (ingestion and inhalation routes);
- Volatilization to ambient air (inhalation route);
- Soil consumption (ingestion and dermal absorption routes); and,
- COC migration from soil to ground water, which could result in ground water ingestion, inhalation of volatile substances in ground water, and dermal absorption (such as showering or washing).

The migration to ground water pathway uses either the Maximum Contaminant Level (MCL), if available, as the target ground water concentration, or a risk-based level that considers ingestion, inhalation, and dermal contact.

As shown in Table 3, the 95% UCLs for four of the VOCs exceed their respective residential default closure levels for the migration to ground water pathway. These compounds are carried over for comparison with land use specific closure levels.

MIGRATION TO GROUND WATER NON-DEFAULT ANALYSIS

As discussed in the Risk-Based Site Assessment Models section above, the SSL/RISC conceptual model for calculating site-specific remediation objectives for the migration to ground water pathway is not appropriate for this site. Therefore, a non-default assessment has been conducted[17]. The processes modeled in the non-default assessment for

[16] Sokal, Robert R. and F. James Rohlf, 1995. *Biometry, Third Edition*, W.H. Freeman and Company, New York.

[17] The conduct of a non-default analysis using site-specific parameters and default equations is consistent with the fundamental difference between the SPCA and the SSL/RISC conceptual model. RISC states: "In some cases, the nondefault approach may be more desirable than a default approach because the nondefault approach may be more accurate on a site-specific basis." RISC Technical Guide, dated February 15, 2001, p. 7-2.

migration of soil contamination to the confined sand and gravel unit considers molecular diffusion as the transport mechanism through the saturated till to the underlying aquifer. Biological decay is also included in the model. The site-specific model also incorporates several assumptions that are used in the SSL/RISC model, such as: infinite source (i.e., constant concentration over time); steady state concentration distribution; instantaneous and linear equilibrium soil/water partitioning; receptor well at the downgradient edge of the source and screened within the plume; and, no contaminant attenuation in the aquifer. In addition, the site-specific model applies a minimum separation of three feet of till between the confirmation samples and the underlying subsurface water, based on site-specific data.[18] The equations for the non-default transport model and the derivation of the dilution factor for indirect contact are provided in Appendix D. The 95% UCLs of the mean for the four remaining VOCs are compared with their respective clean closure levels in Table 4. For all compounds, the 95% UCL is less than the calculated non-default closure level.

CONCLUSION

A comparison of the ECC Site SCPA exit sampling results to the provisions of RISC that apply to IDEM RCRA clean closure demonstrates that clean closure has been achieved at the ECC Site SCPA. The residual contamination in the ECC Site SCPA, therefore, constitutes IDEM RCRA clean closure because it meets the RISC requirements for a residential property without reliance upon exposure prevention remedies, i.e., activity restrictions or engineering controls.

[18] This is based upon soil borings advanced at the site, the logs for which are provided as Appendix C. Figures 4 through 7 depict geological cross sections based on these boring logs.

Table 1
Excavation Confirmation Soil Data
ECC Southern Concrete Pad

Location:	S01	S02	S03	S04	S05	S06	S07	S08	S09	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
Date Collected:	06/25/98	06/25/98	06/25/98	06/25/98	06/25/98	06/25/98	06/27/98	06/27/98	06/27/98	06/29/98	06/29/98	06/29/98	07/09/98	07/09/98	07/09/98	07/09/98	07/09/98	07/09/98	07/09/98	07/09/98	07/15/98	07/15/98	07/15/98	07/15/98	07/29/98	07/29/98	07/29/98	07/29/98	07/29/98	07/29/98
Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOCs																														
Acetone		0.12								0.027	0.043	0.029																	1.9	
Benzene																									0.006					
Bromodichloromethane															0.56	0.42	0.48													
Chloroethane																									0.14	0.19	0.028	0.032		
Chloroform	0.68		0.7												0.48														0.32	
1,1-Dichloroethane			1.1		6.7			1.4	18				0.019	1.4	11	2.1	9.6			0.007					0.2		0.005	0.088	0.59	
1,2-Dichloroethane																									0.016				0.32	
1,1-Dichloroethene					0.79										5.7	0.91	1.4								0.019				0.052	
cis-1,2-Dichloroethene	6.1		14	1.8	6.8	1.4							0.058	21	40	6.3	11		0.01	0.01					1		0.022	0.008	2.2	
trans-1,2-Dichloroethene		0.022													0.86	0.83	0.43								0.1	0.022				
1,2-Dichloroethene (Total)	6.2	0.022	14	1.8	6.9	1.4							0.058	21	44	7.4	12		0.01	0.01					1	0.024	0.024	0.008	2.2	
Ethylbenzene	1.4	0.026			0.51									0.34	6.6		2.6								0.062	0.007			0.37	
Methyl ethyl ketone	2.7	0.028	2.5	2.6	3.1	2.6		2.9	1.9					2.7	3.1	2.9	3.1					2.5							1	
Methyl isobutyl ketone					1																							0.007	0.28	
Methylene chloride															0.72		1.7					3.8			0.075		0.015		3.7	
Tetrachloroethene					2.7										110	3.4	27				0.006						0.007	0.01	3.1	
Toluene	0.73	0.01			24									2.7	19	1.8	8.5		0.011	0.007	0.007				0.79	0.016			0.25	
1,1,1-Trichloroethane	3.1		2.6		43				34				0.016	0.53	580	70	NR		0.008	0.078					0.019		0.031	0.006	2.6	
1,1,2-Trichloroethane																													0.098	
Trichloroethene					170	2		0.83					0.008		53	42	63			0.012							0.042	0.007	6.8	
Trichlorofluoromethane														6.4	11	39	3.3										0.005		0.08	
Vinyl chloride																									0.07		0.043			
m,p-Xylenes	3.1	0.04			1.1									0.71	23	0.76	9.1								0.17	0.009			0.92	
o-Xylene(s)	2	0.026												0.71	7	0.76	2.8								0.08	0.005			0.3	
Xylenes (total)	5.1	0.066			1.1									1.4	32	1.5	12								0.25	0.014			1.2	
SVOCs																														
bis(2-Ethylhexyl)phthalate		0.400						1				NA			0.65		3.4			NA									0.532	
Butylbenzylphthalate												NA			1.3	0.5				NA										
m,p-Cresols												NA								NA					0.417					
1,2-Dichlorobenzene												NA			6.5		5.8			NA									4.162	
Diethylphthalate					6.0							NA								NA					0.577					
Dimethyl phthalate					2.6							NA								NA										
Isophorone					0.58							NA								NA										
Naphthalene												NA			0.42					NA										
Phenol												NA								NA									1.108	

Note:
Blank Cell = Compound not detected above the method detection limit.
NA = Not analyzed due to insufficient sample volume.
NR = Not Reported

Table 2
Comparison of Maximum Concentration to
RISC Residential Default Closure
ECC Southern Concrete Pad

	RISC Residential Default Closure Levels mg/kg	Maximum Detected Soil Concentration mg/kg
VOCs		
Trichloroethene	0.057	170
Tetrachloroethene	0.058	110
1,1,1-Trichloroethane	1.9	580
Methylene chloride	0.023	3.8
cis-1,2-Dichloroethene	0.4	40
1,1-Dichloroethene	0.058	5.7
1,2-Dichloroethane	0.024	0.32
Vinyl chloride	0.013	0.07
1,1,2-Trichloroethane	0.03	0.098
1,1-Dichloroethane	5.6	18
Toluene	12	24
trans-1,2-Dichloroethene	0.68	0.86
Chloroform	0.59	0.7
Methyl isobutyl ketone	0.99	1
Bromodichloromethane	0.63	0.56
Acetone	3.1	1.9
Chloroethane	0.32	0.19
Ethylbenzene	13	6.6
Methyl ethyl ketone	12	3.1
Benzene	0.034	0.006
Xylenes (total)	190	32
1,2-Dichloroethene (Total)	--	44
Trichlorofluoromethane	--	39
m,p-Xylenes	--	23
o-Xylene(s)	--	7
SVOCs		
Naphthalene	0.7	0.42
1,2-Dichlorobenzene	17	6.5
Isophorone	5.3	0.58
Diethylphthalate	450	6
bis(2-Ethylhexyl)phthalate	300	3.4
Phenol	110	1.108
Dimethyl phthalate	1400	2.6
Butylbenzylphthalate	930	1.3
m,p-Cresols	--	0.417

Notes:
1) Residential Default Closure Levels are from RISC Technical Guide, Appendix A, Table 1, February 15, 2001.
2) Maximum concentrations that exceed the RISC Residential Default Closure levels are shaded. Compounds are sorted in the order of the ratio of the Maximum detected concentration to the RISC default level.
-- means no default closure level in the RISC Technical Guide.
RISC closure levels are given for the following compounds: cis 1,2-DCE = 0.4 mg/kg; trans 1,2-DCE = 0.68 mg/kg; total xylenes = 190 mg/kg; m-cresol = 11 mg/kg; and p-cresol = 1.1 mg/kg.

Table 3
Comparison of the 95% UCL of the Mean Soil Concentrations to the RISC Residential Default Closure Levels
ECC Southern Concrete Pad

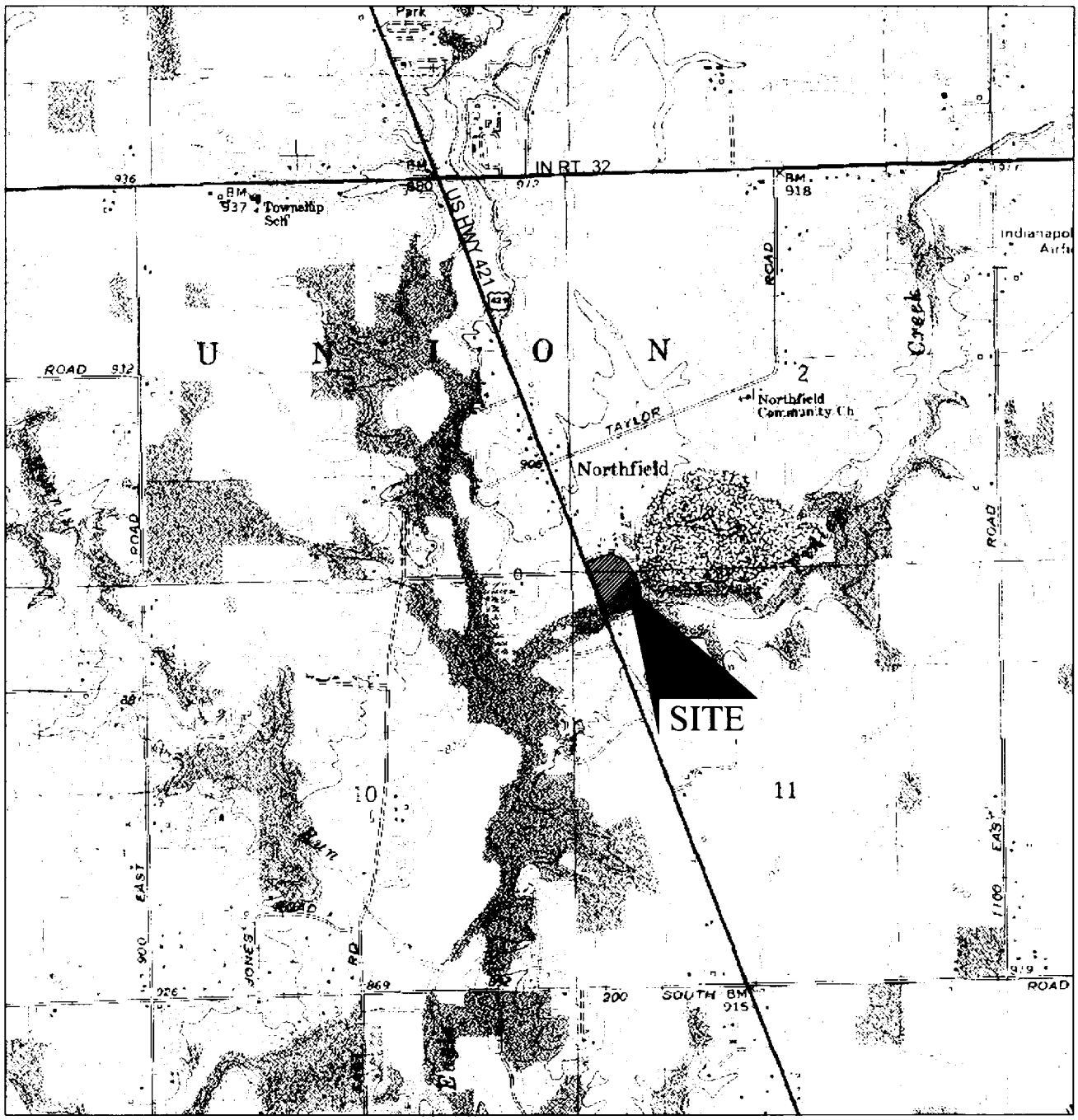
Compound	RISC Residential Default Closure		95% UCL of Mean
	Direct Contact mg/kg	Migration to GW mg/kg	mg/kg
Vinyl chloride	0.28	0.013	0.03
Trichloroethene	45	0.057	0.09
Methylene chloride	120	0.023	0.03
1,2-Dichloroethane	3.7	0.024	0.03
1,1,2-Trichloroethane	9.4	0.03	0.02
Tetrachloroethene	48	0.058	0.03
cis-1,2-Dichloroethene	110	0.4	0.15
1,1-Dichloroethene	0.67	0.058	0.02
trans-1,2-Dichloroethene	180	0.68	0.04
Chloroform	0.91	0.59	0.02
Methyl isobutyl ketone	1000	0.99	0.03
1,1,1-Trichloroethane	1800	1.9	0.05
1,1-Dichloroethane	1300	5.6	0.09
Toluene	1700	12	0.08

Notes:
95% UCLs that exceed the RISC Residential Default Closure levels are shaded.
The compounds are sorted in descending order of the ratio of the 95% UCL of the mean to the Migration to GW value.
See Appendix B for calculation of the 95%UCL of the Mean

Table 4
Comparison of the 95% UCL of the Mean to Non-Default Concentrations
ECC Southern Concrete Pad

Compound	Calculated Non-Default mg/kg	95% UCL of the Mean mg/kg
Trichloroethene	19.53	0.09
1,2 -Dichloroethane	159.31	0.03
Vinyl chloride	697.14	0.03
Methylene chloride	10,573,274 [C_{sat}]	0.03

Notes:
1) C_{sat} = Soil Saturation Limit. If the calculated value is greater than Csat, Csat is the non-default clean up value.
2) The compounds are sorted in the order of the ratio of the 95% UCL of the mean to the Calculated Non-Default value.



SCALE 1:24000

1 1/2 0 1 MILE

2000 0 2000 4000 6000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 10-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

SOURCE: U.S.G.S. 7.5 minute series (topographic)
Indiana - Boone Co. 1969

N

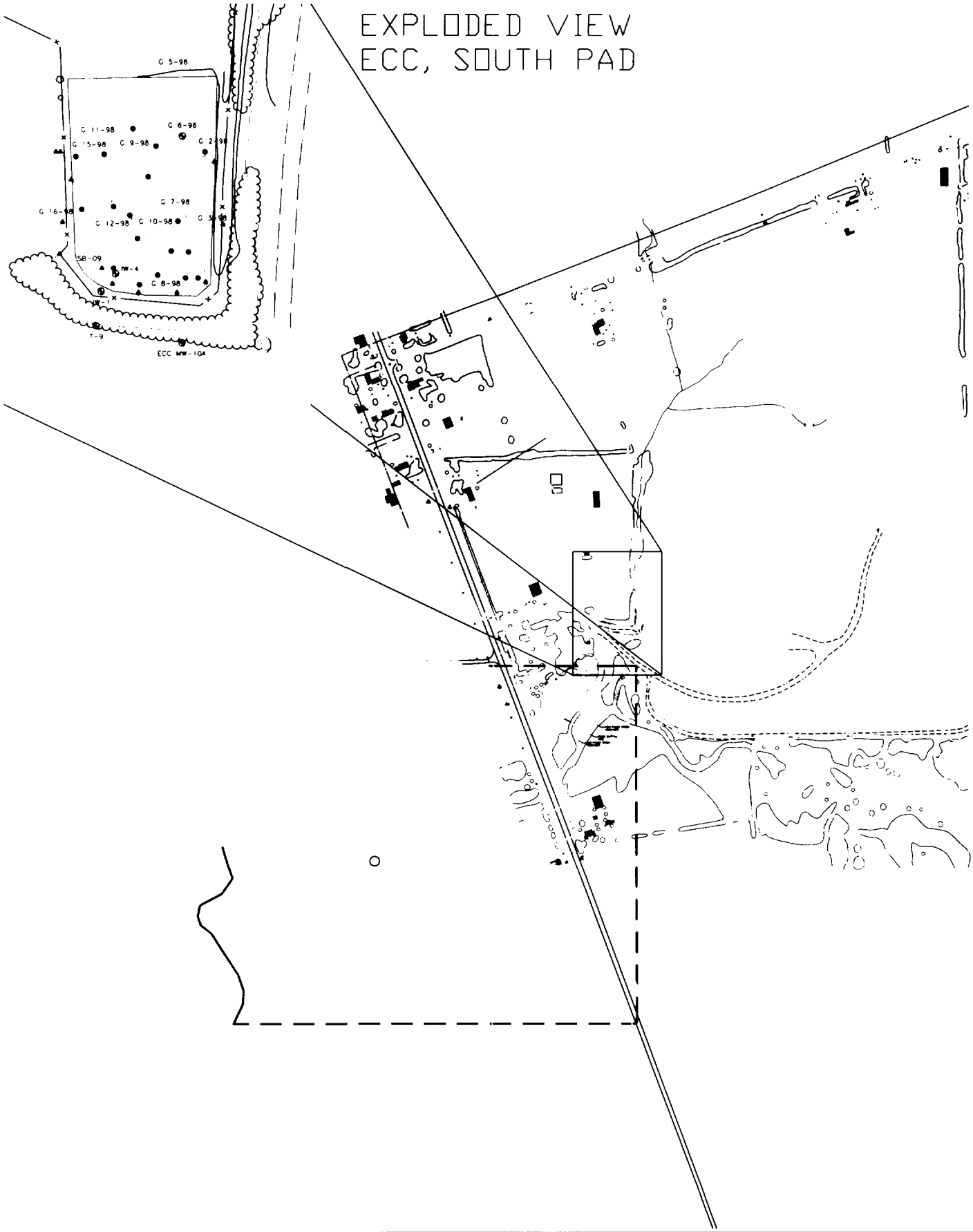
ENVIRON
740 Waukegan Road, Suite 401, Deerfield, IL 60015

General Location Map
ECC
Zionsville, Indiana

Figure 1

Drafter: BJM | Date: 8/10/00 | Contract Number: 216799 | Approved: | Revised:

:\Client Project Files\ECC\South Pad Closure\SCP Closure May 2001\Fig1



CPF\ECC\South Pad Closure\SCP Closure May 2001\FIG2

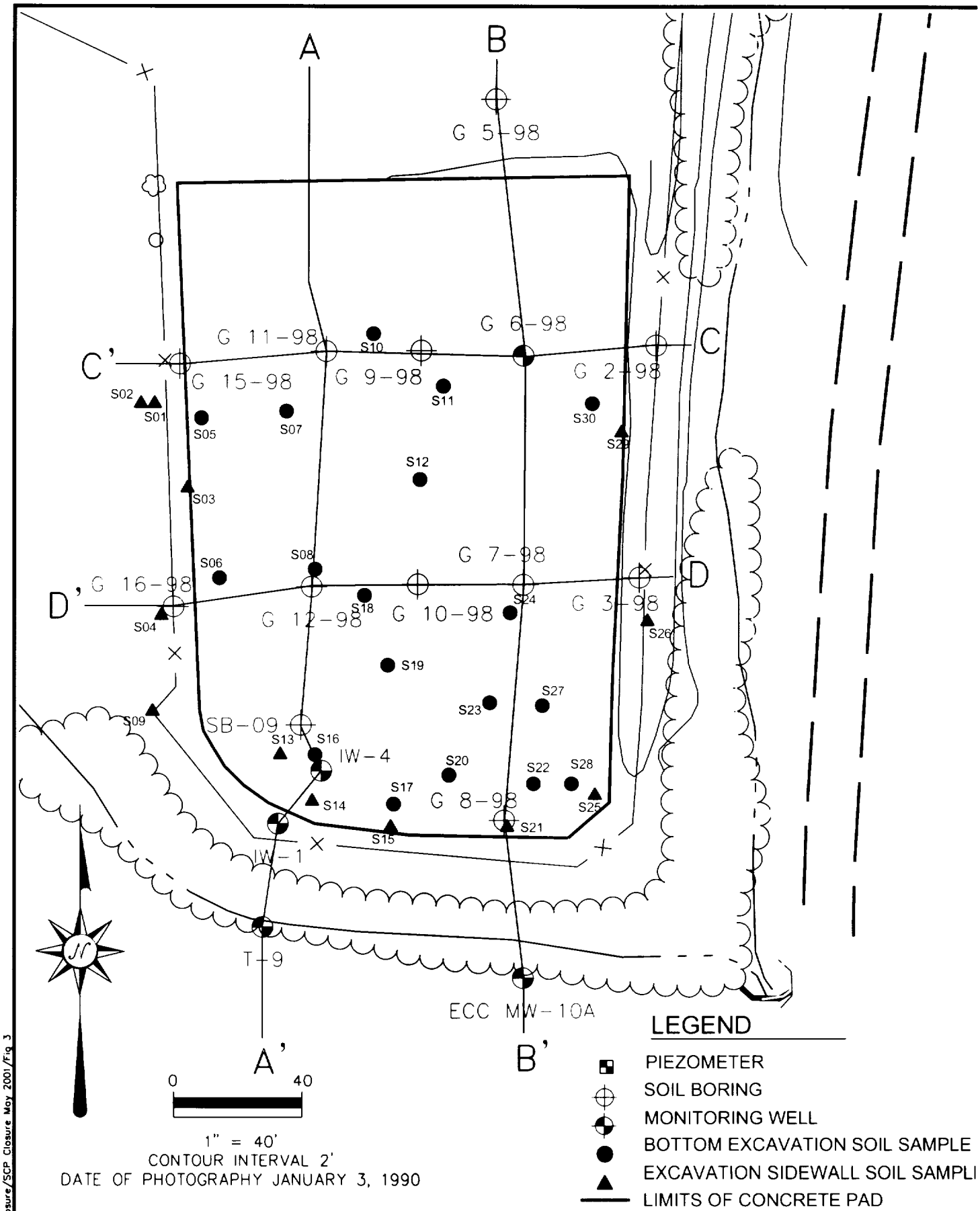
ENVIRON

740 Waukegan Road, Suite 401, Deerfield, Il 60015

SOUTHERN CONCRETE PAD AREA
ECC SITE
ZIONSVILLE, IN

Figure 2

Drafter:	GTH	Date:	08/10/00	Contract Number:	21-6585C	Approved:	Revised:



cpl/ECC/SouthPadClosure/SCP Closure May 2001/Fig 3

ENVIRON

740 Waukegan Road, Suite 401, Deerfield, IL 60015

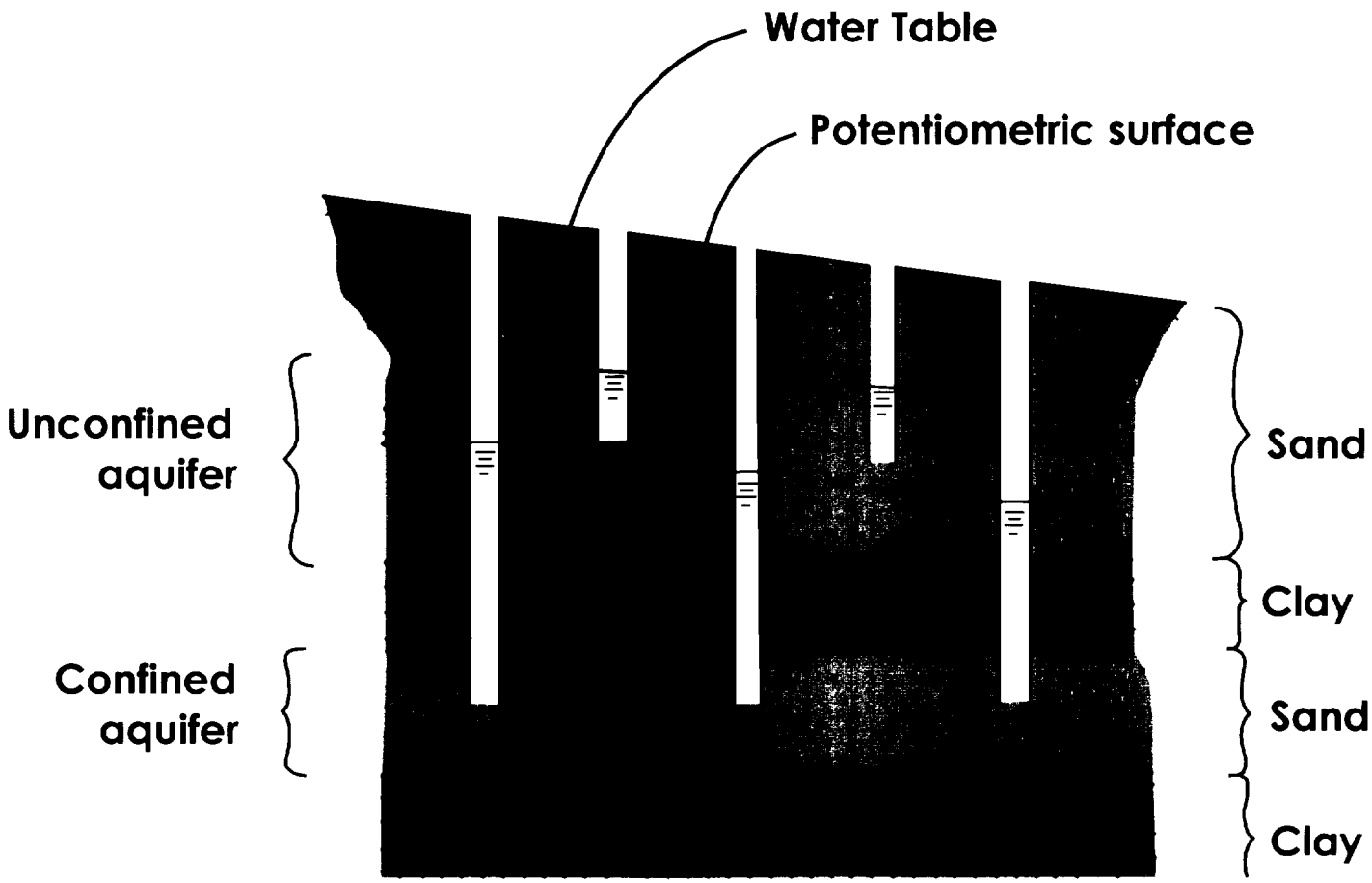
SAMPLING BASE MAP
SOUTHERN CONCRETE PAD AREA
ECC SITE

Figure 3

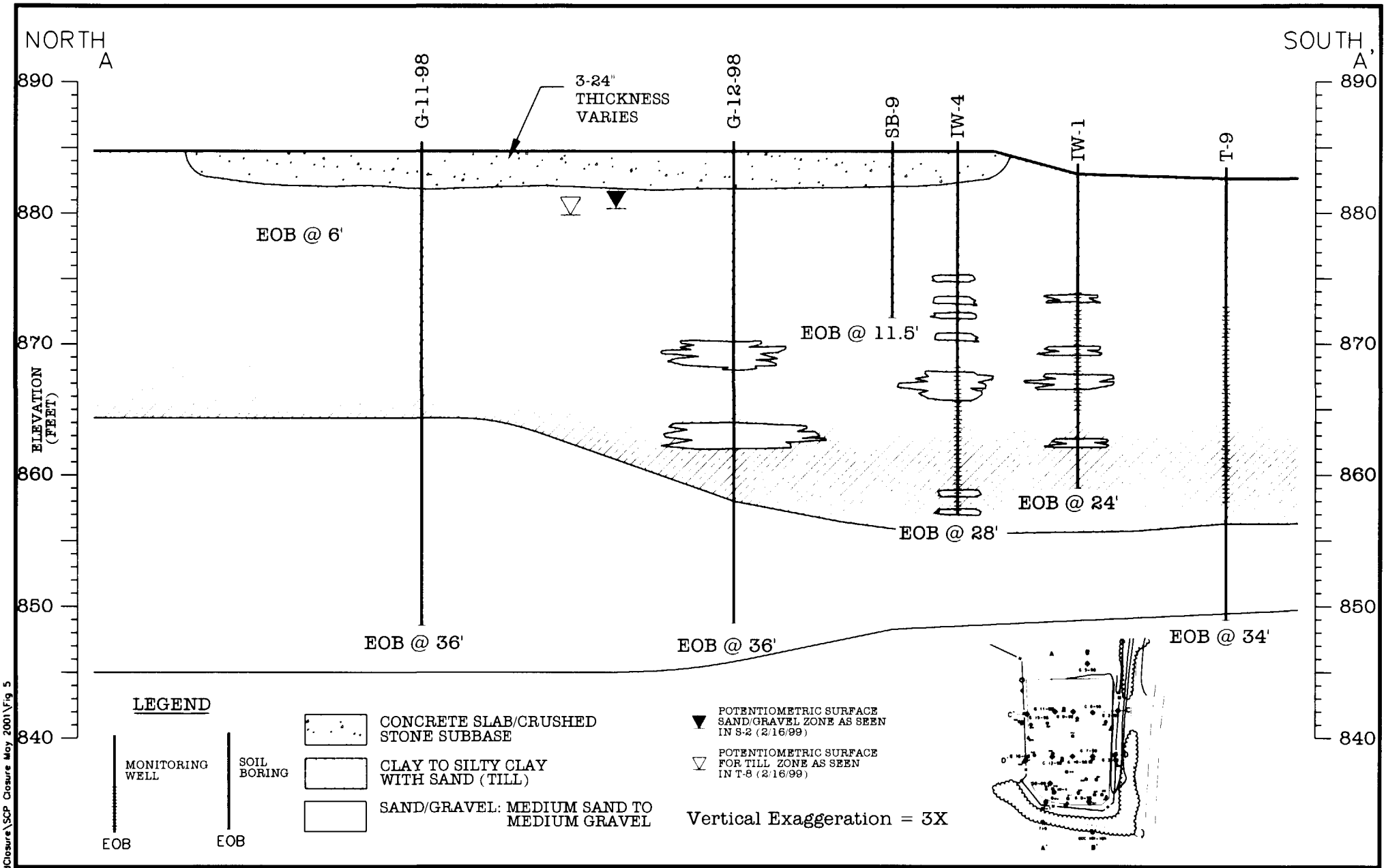
Drafter: GTH | Date: 5/08/01 | Contract Number: 21-6585C | Approved: REH | Revised:

Figure 4

Confined and Unconfined Aquifers



* Adapted from R. Allen Freeze and John A. Cherry, Groundwater, (New Jersey: Prentice Hall, 1979) p. 48.



ENVIRON

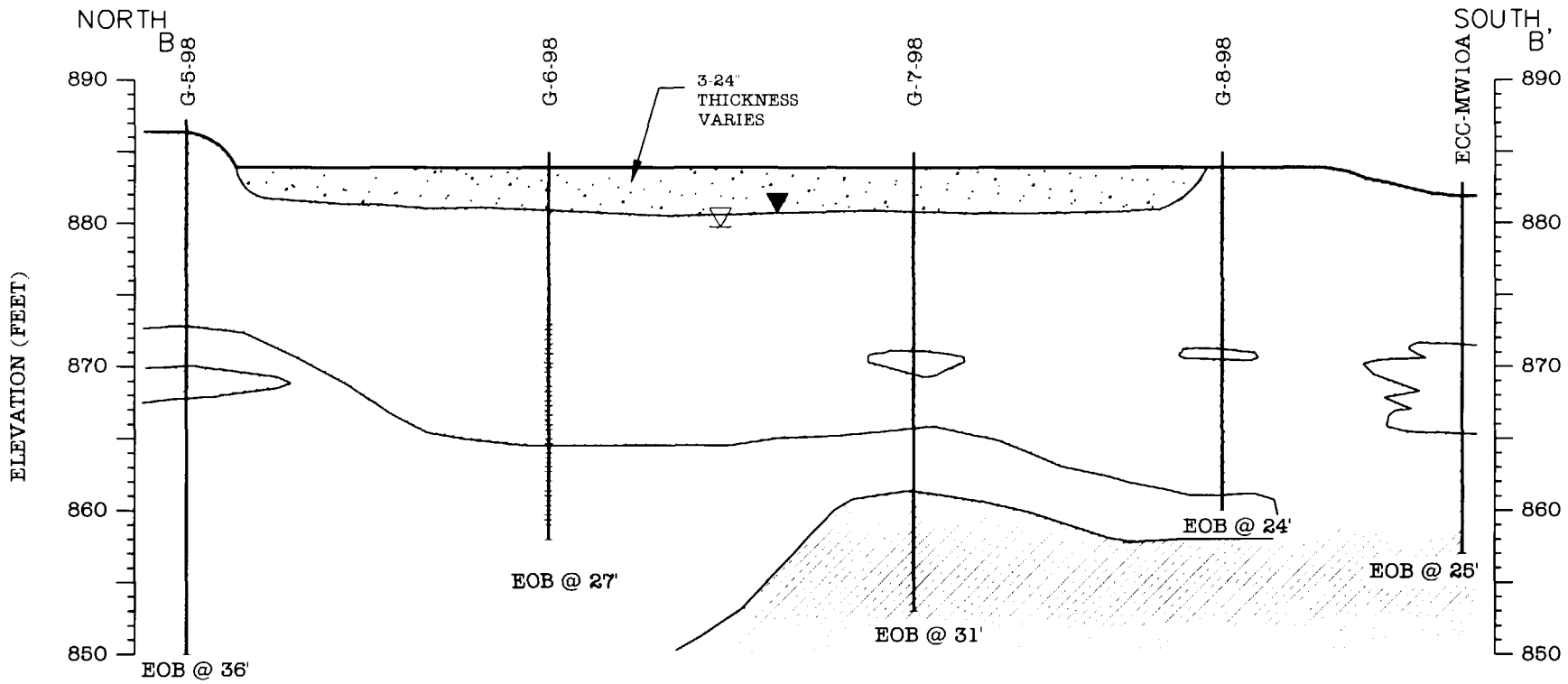
740 Waukegan Road, Suite 401, Deerfield, IL 60015

CROSS SECTION A-A'
NORTH TO SOUTH ON WESTERN END
ECC SITE SCPA

Figure 5

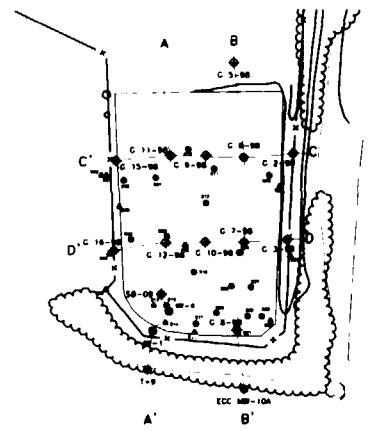
Drafter: GTH	Date: 5/08/01	Contract Number: 21-6585C	Approved: REH	Revised:

cpt:\ECC\SouthPadClosure\SCP Closure May 2001\Fig 5



EXCAVATION: ELEVATION 874.550

CROSS SECTION B-B'



LEGEND

MONITORING WELL — EOB

SOIL BORING — EOB

CONCRETE SLAB/CRUSHED STONE SUBBASE

CLAY TO SILTY CLAY WITH SAND (TILL)

SAND/GRAVEL: MEDIUM SAND GRAVEL

POTENTIOMETRIC SURFACE SAND/GRAVEL ZONE AS SEEN IN S-2 (2/16/99)

POTENTIOMETRIC SURFACE FOR TILL ZONE AS SEEN IN T-8 (2/16/99)

Vertical Exaggeration 3X

ENVIRON

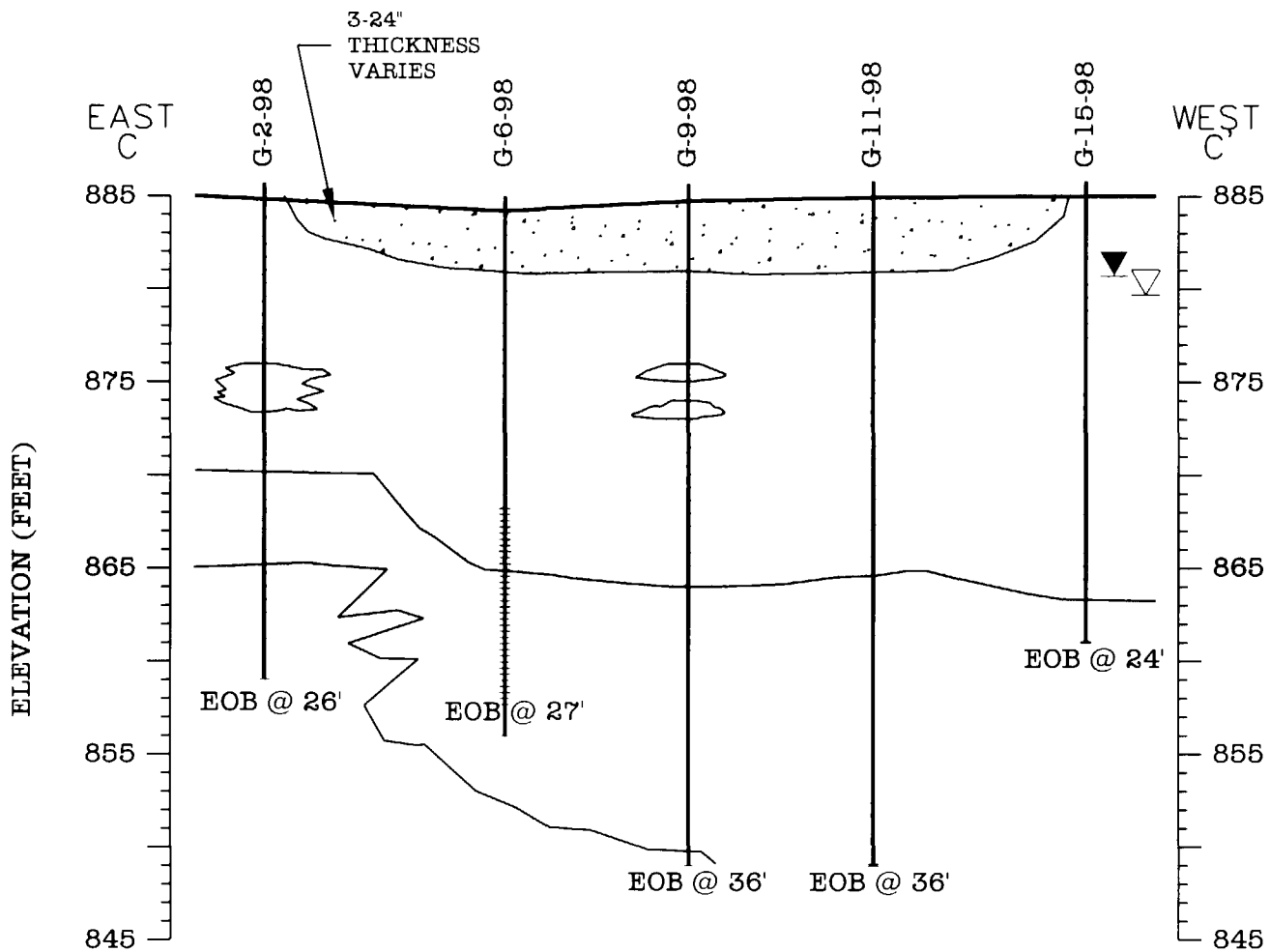
740 Waukegan Road, Suite 401, Deerfield, IL 60015

CROSS SECTION B-B'
NORTH TO SOUTH ON EASTERN END
ECC SITE SCPA

Figure 6

Drafter: GTH | Date: 5/08/01 | Contract Number: 21-6585C | Approved: REH | Revised:

CPF/ECC\SouthPodClosure/SCP Closure May 2001/Fig 6

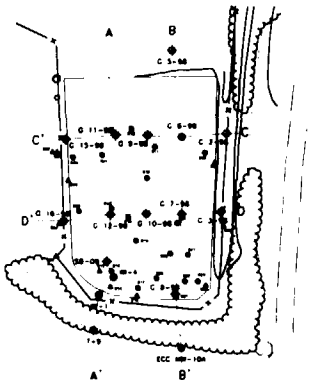


CROSS SECTION C-C'

Vertical Exaggeration = 3X

LEGEND

- CONCRETE SLAB/CRUSHED STONE SUBBASE
- CLAY TO SILTY CLAY WITH SAND (TILL)
- SAND/GRAVEL: MEDIUM SAND T MEDIUM GRAVEL
- MONITORING WELL — EOB
- SOIL BORING — EOB
- POTENTIOMETRIC SURFACE SAND/GRAVEL ZONE AS SEEN IN S-2 (2/16/99)
- POTENTIOMETRIC SURFACE FOR TILL ZONE AS SEEN IN T-8 (2/16/99)



ENVIRON

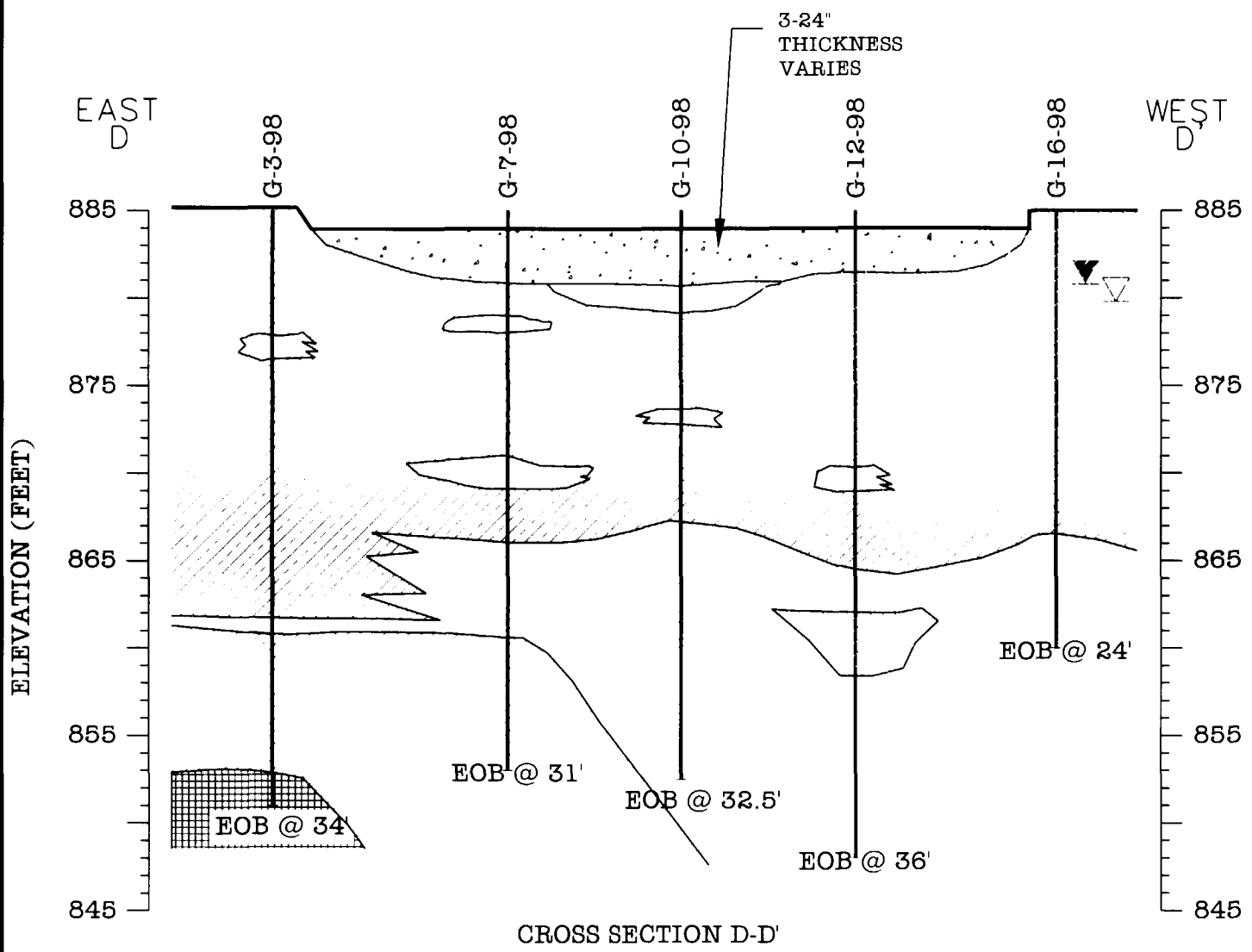
740 Waukegan Road, Suite 401, Deerfield, IL 60015

CROSS SECTION C-C'
EAST TO WEST ON NORTHERN END
ECC SITE SCPA

Figure 7

Drafter: GTH | Date: 5/08/01 | Contract Number: 21-6585C | Approved: REH | Revised:

CPF\ECC\SouthPodClosure\SCP Closure May 2001\Fig 7

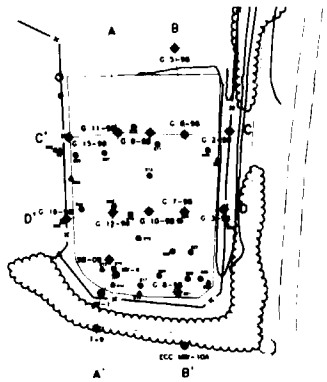


CROSS SECTION D-D'

Vertical Exaggeration 3X

LEGEND

- CONCRETE SLAB/CRUSHED STONE SUBBASE
- CLAY TO SILTY CLAY WITH SAND (TILL)
- SAND/GRAVEL: MEDIUM SA TO MEDIUM GRAVEL
- SILT (ML)
- SOIL BORING
- EOB
- POTENTIOMETRIC SURFACE SAND/GRAVEL ZONE AS SEE IN S-2 (2/16/99)
- POTENTIOMETRIC SURFACE FOR TILL ZONE AS SEEN IN T-8 (2/16/99)



ENVIRON

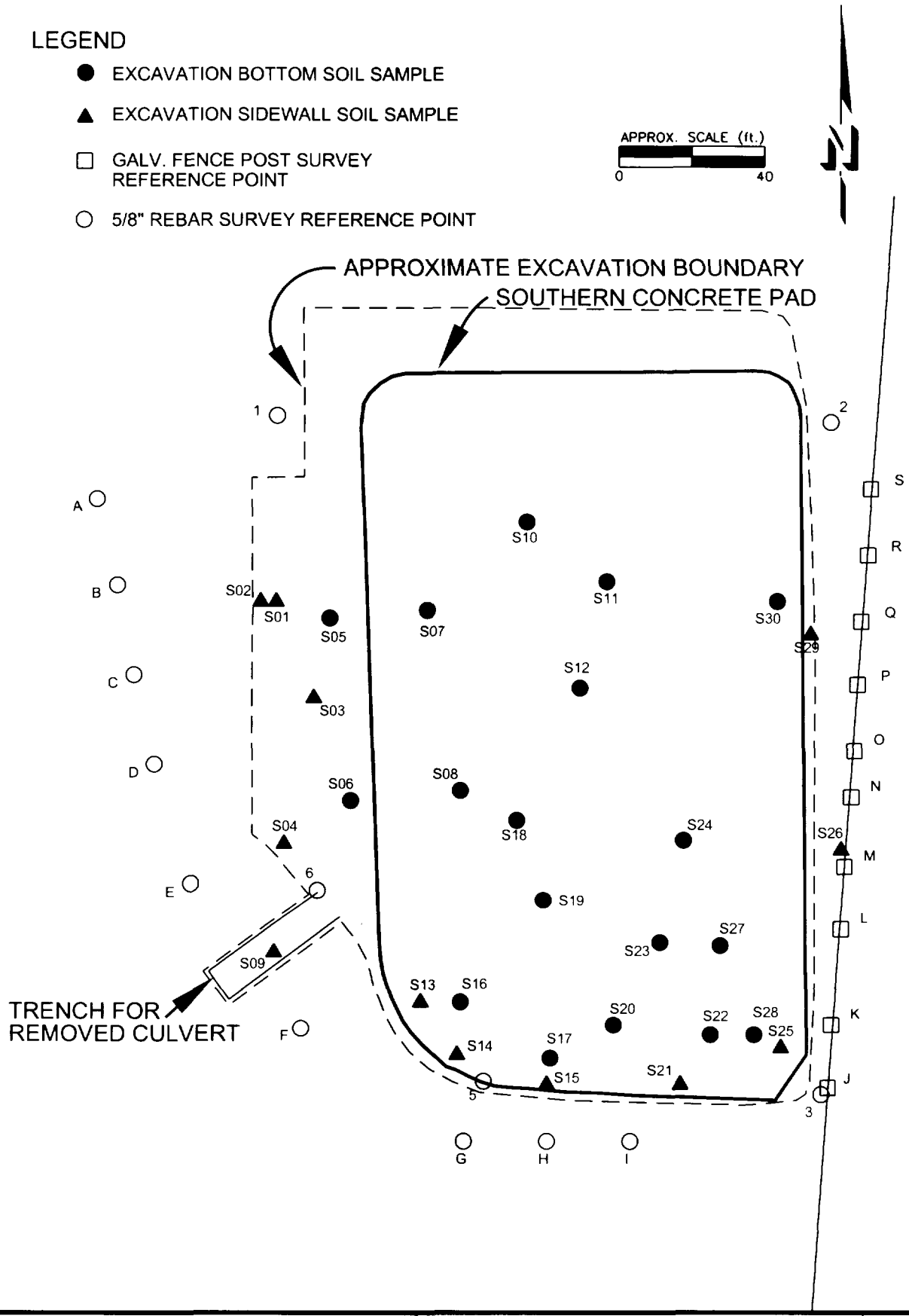
740 Waukegan Road, Suite 401, Deerfield, IL 60015

CROSS SECTION D-D'
EAST TO WEST ON SOUTHERN END
ECC SITE SCPA

Figure 8

Drafter: GTH | Date: 5/08/01 | Contract Number: 21-6585C | Approved: REH | Revised:

CP:\ECC\SouthPadClosure\SCP Closure May 2001\Fig 8



ENVIRON

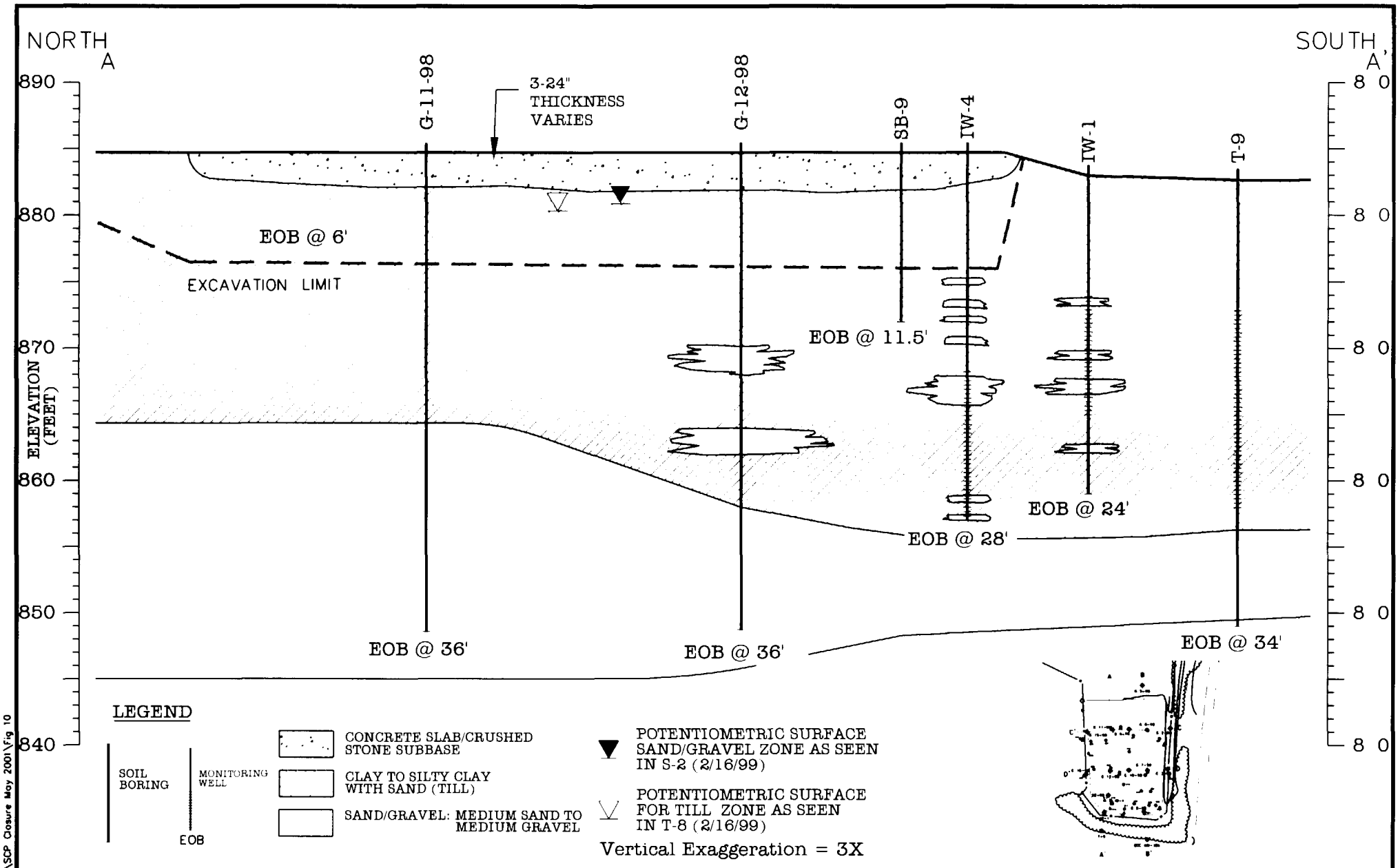
740 Waukegan Road, Suite 401, Deerfield, IL 60015

SOIL SAMPLING LOCATIONS
ECC SITE SCPA

Figure 9

Drafter: JBP | Date: 5/08/01 | Contract Number: 21-6585C | Approved: REH | Revised:

P:\CPF\ECC\SouthPadClosure\SCP Closure May 2001\Fig 9



ENVIRON

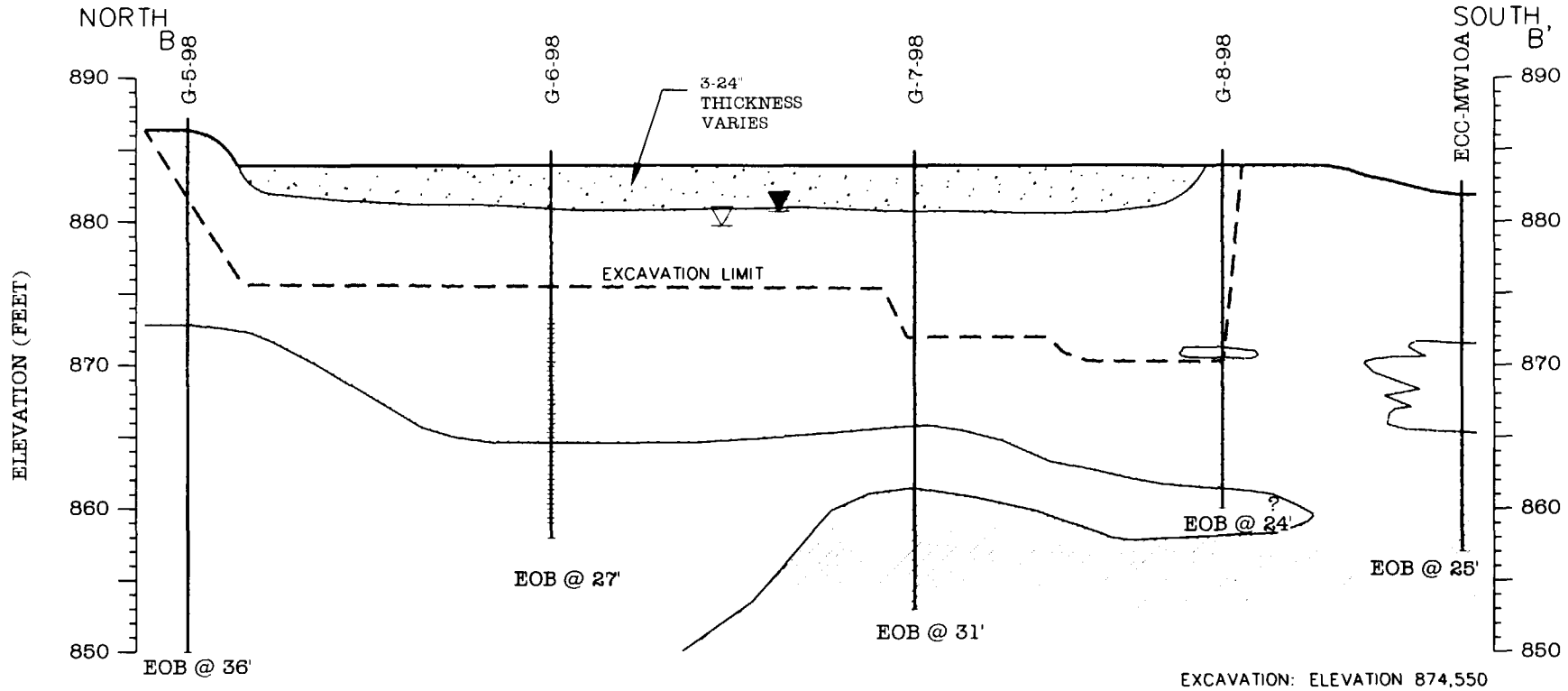
740 Waukegan Road, Suite 401, Deerfield, IL 60015

CROSS SECTION A-A'
NORTH TO SOUTH ON WESTERN END
ECC SITE SCPA

Figure 10

Drafter: GTH | Date: 5/08/01 | Contract Number: 21-6585C | Approved: REH | Revised:

CPF\SouthPadClosure\SCP Closure May 2001\Fig 10



CROSS SECTION B-B'

LEGEND

MONITORING WELL — EOB

SOIL BORING — EOB

CONCRETE SLAB/CRUSHED STONE SUBBASE

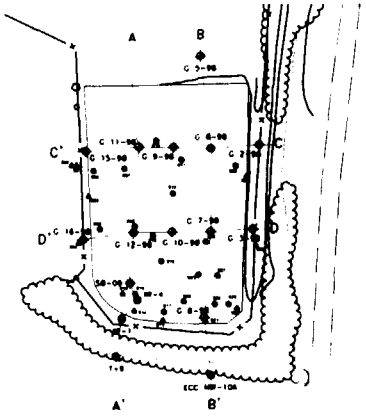
CLAY TO SILTY CLAY WITH SAND (TILL)

SAND/GRAVEL: MEDIUM SAND TO MEDIUM GRAVEL

POTENTIOMETRIC SURFACE SAND/GRAVEL ZONE AS SEEN IN S-2 (2/16/99)

POTENTIOMETRIC SURFACE FOR TILL ZONE AS SEEN IN T-8 (2/16/99)

Vertical Exaggeration 3X



ENVIRON

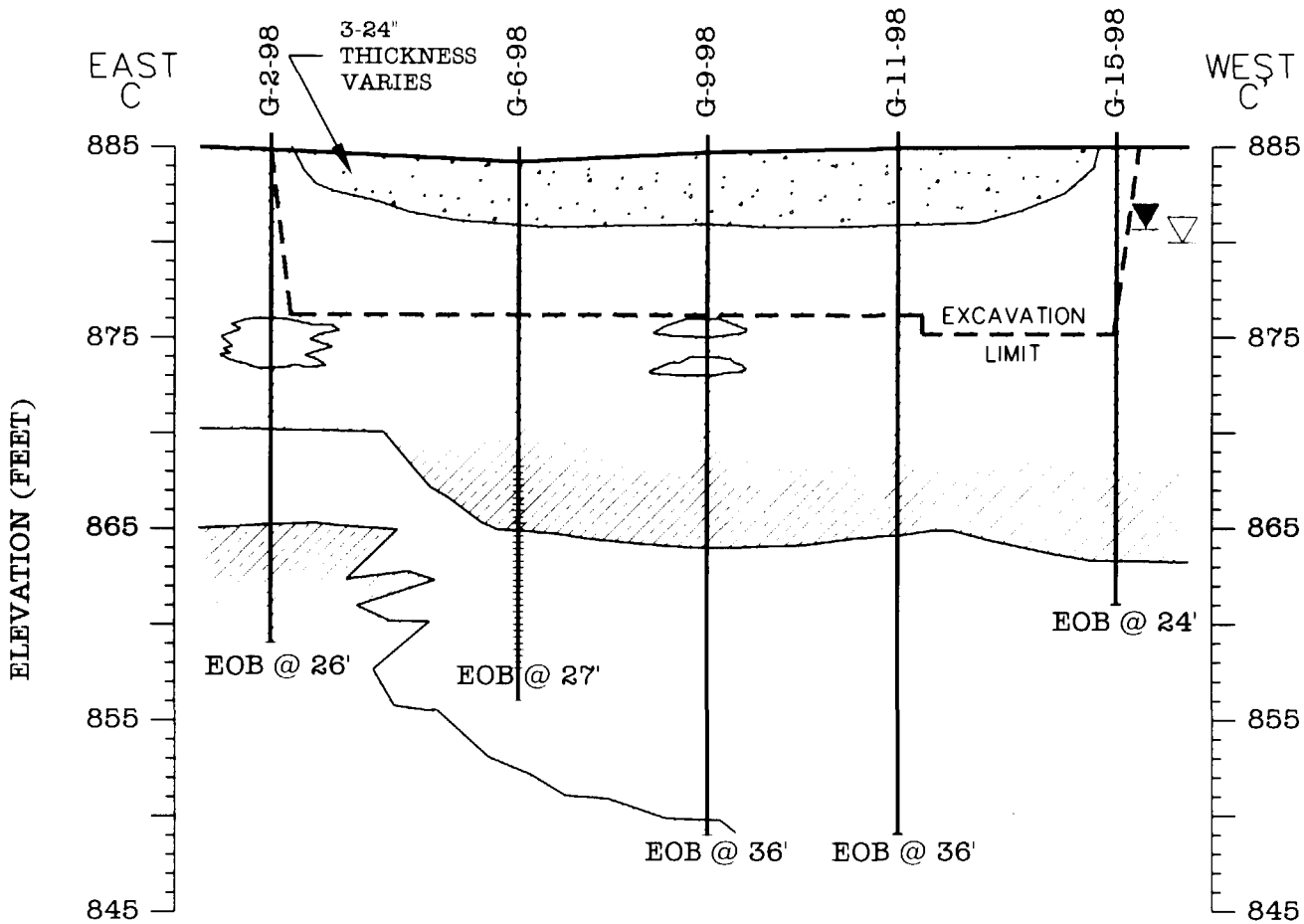
740 Waukegan Road, Suite 401, Deerfield, IL 60015

CROSS SECTION B-B'
NORTH TO SOUTH ON EASTERN END
ECC SITE SCPA

Figure 11

Drafter: GTH | Date: 5/08/01 | Contract Number: 21-6585C | Approved: REH | Revised:

CPF/ECC/SouthPodClosure/SCP Closure May 2001/Fig 11



CROSS SECTION C-C'

Vertical Exaggeration = 3X

LEGEND

CONCRETE SLAB/CRUSHED STONE SUBBASE

CLAY TO SILTY CLAY WITH SAND (TILL)

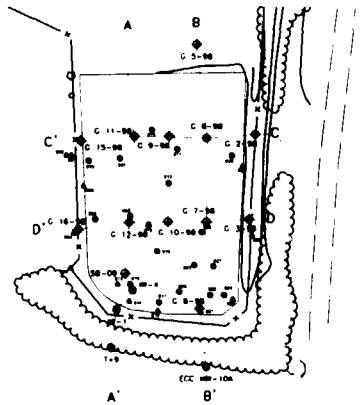
SAND/GRAVEL: MEDIUM SANDT MEDIUM GRAVEL

MONITORING WELL — EOB

SOIL BORING — EOB

POTENTIOMETRIC SURFACE SAND/GRAVEL ZONE AS SEEN IN S-2 (2/16/99)

POTENTIOMETRIC SURFACE FOR TILL ZONE AS SEEN IN T-8 (2/16/99)



ENVIRON

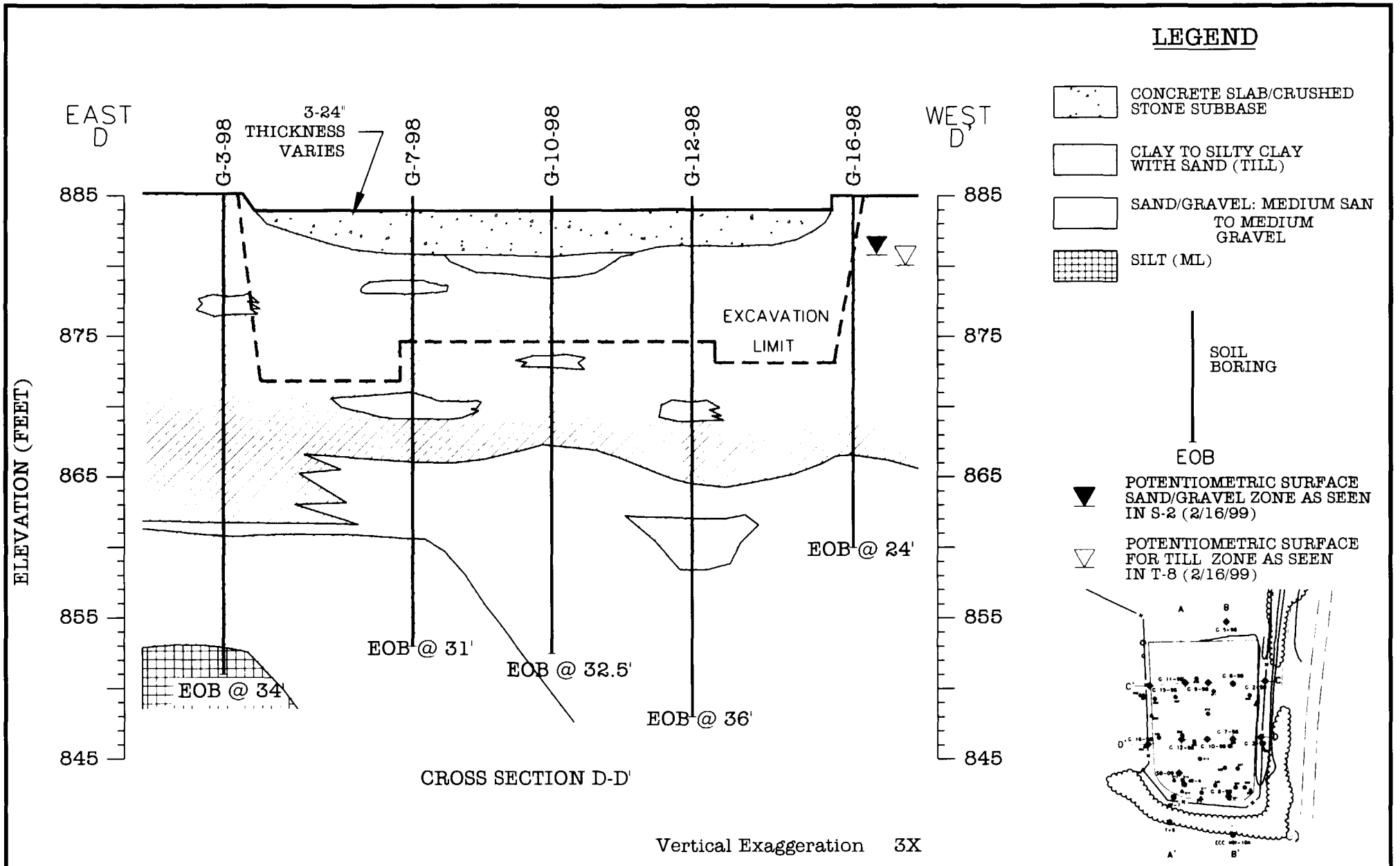
740 Waukegan Road, Suite 401, Deerfield, IL 60015

CROSS SECTION C-C'
EAST TO WEST ON NOTHERN END
ECC SITE SCPA

Figure 12

Drafter: GTH | Date: 5/08/01 | Contract Number: 21-6585C | Approved: REH | Revised:

cpl/ecc/southpadclosure/SCP Closure May 2001\Fig 12



ENVIRON

650 Dundee Road, Suite 150, Northbrook, IL 60062

CROSS SECTION D-D'
EAST TO WEST SOUTHERN END OF PAD
ECC SOUTH PAD AREA
ZIONSVILLE, IN

Figure 13

Drafter: APR | Date: 08/10/2000 | Contract Number: 21-6585C | Approved: REH | Revised:

Appendix A

Exhibit 12 of the Soil Screening Guidance: User's Guide[1]

Simplifying Assumptions for the SSL Migration to Ground Water Pathway

- Infinite source (i.e., steady-state concentrations are maintained over the exposure period)
- Uniformly distributed contamination from the surface to the top of the aquifer
- No contaminant attenuation (i.e., adsorption, biodegradation, chemical degradation) in soil
- Instantaneous and linear equilibrium soil/water portioning
- Unconfined, unconsolidated aquifer with homogeneous and isotropic hydrologic properties
- Receptor well at the downgradient edge of the source and screened within the plume
- No contaminant attenuation in the aquifer
- No NAPLs present (if NAPLs are present, the SSLs do no apply)

[1] USEPA, July 1996, *Soil Screening Guidance: User's Guide*, Second Edition, Office of Solid Waste and Emergency Response, Washington, DC 20460, Publication 9355.4-23.

Appendix B

Box-Cox Transformations

Box and Cox (1964) developed a procedure for estimating the best transformation to normality within the family of power transformations:[1]

$$Y' = (Y^{\lambda} - 1)/\lambda \qquad (\text{for } \lambda \neq 0) \qquad \text{B-1}$$

$$Y' = \ln Y \qquad (\text{for } \lambda = 0) \qquad \text{B-2}$$

Setting $\lambda = 1$ gives a simple linear transformation. Setting $\lambda = ½$ is equivalent to the square root transformation, $\lambda = 0$ is the lognormal transformation, and $\lambda = -1$ is the reciprocal transformation.

The value, λ, which maximizes the "log-likelihood function", yields the best transformation to normality within the family of power transformations. The log-likelihood function is presented below:

$$L = -\frac{\upsilon}{2}\ln s_T^2 + (\lambda - 1)\frac{\upsilon}{n}\Sigma \ln Y \qquad \text{B-3}$$

where s_T^2 is the variance of the transformed Y values (based on ν degrees of freedom), n is the number of samples, and ν is equal to (n-1). L is maximized by an iterative procedure. λ is varied to maximize L.

[1] Box, G. E. P. and D. R. Cox, 1964. *An Analysis of Transformations.* J. R. Stat. Soc., Ser. B. **26**:211-243. As referenced in Sokal, R. R. and F. J. Rohlf, 1995. *Biometry, 3rd Edition.* W.H. Freeman and Company, New York.

The sample data for the 14 volatile organic compounds (VOCs) are presented in Tables B1 – B14. When L is maximized for a given sample set, the 95% UCL of the mean for the transformed data is calculated using the following equation[2]:

$$95\%\ \text{UCL} = \bar{x} + \frac{ts}{\sqrt{n}} \qquad \text{B-4}$$

where $\bar{x}$ is the mean of the sample set, t is the appropriate value for the Students "t" test, and s is the standard deviation of the sample values. The 95% UCL of the mean of the transformed data is then back-transformed. The untransformed 95% UCL value is compared to the appropriate default or non-default closure level.

[2] Equation 6-3, *RISC Technical Guide*, February 15, 2001.

Table B-1. Sample Data for Trichloroethene

	Conc. mg/kg	Normal Distribution	-9.00	-8.00	-7.00	-6.00	-5.00	-4.00	λ -3.00	-2.00	-1.00	-0.50	**-0.10**	**0.00**	0.50	1.00
S01	0.25	37.3%	-3E+04	-8E+03	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-3E+00	-2E+00	-1E+00	-1E+00	-1E+00	-8E-01
S02	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
S03	0.25	37.3%	-3E+04	-8E+03	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-3E+00	-2E+00	-1E+00	-1E+00	-1E+00	-8E-01
S04	0.25	37.3%	-3E+04	-8E+03	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-3E+00	-2E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	170	100.0%	1E-01	1E-01	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	1E+00	2E+00	4E+00	5E+00	2E+01	2E+02
S06	2	39.2%	1E-01	1E-01	1E-01	2E-01	2E-01	2E-01	3E-01	4E-01	5E-01	6E-01	7E-01	7E-01	8E-01	1E+00
S07	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
S08	0.83	37.9%	-5E-01	-4E-01	-4E-01	-3E-01	-3E-01	-3E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01
S09	0.25	37.3%	-3E+04	-8E+03	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-3E+00	-2E+00	-1E+00	-1E+00	-1E+00	-8E-01
S10	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
S11	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
S12	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
S13	0.008	37.0%	-8E+17	-7E+15	-7E+13	-6E+11	-6E+09	-6E+07	-7E+05	-8E+03	-1E+02	-2E+01	-6E+00	-5E+00	-2E+00	-1E+00
S14	0.145	37.2%	-4E+06	-6E+05	-1E+05	-2E+04	-3E+03	-6E+02	-1E+02	-2E+01	-6E+00	-3E+00	-2E+00	-2E+00	-1E+00	-9E-01
S15	53	89.0%	1E-01	1E-01	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	1E+00	2E+00	3E+00	4E+00	1E+01	5E+01
S16	42	81.6%	1E-01	1E-01	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	1E+00	2E+00	3E+00	4E+00	1E+01	4E+01
S17	63	93.5%	1E-01	1E-01	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	1E+00	2E+00	3E+00	4E+00	1E+01	6E+01
S18	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
S19	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
S20	0.012	37.0%	-2E+16	-3E+14	-4E+12	-6E+10	-8E+08	-1E+07	-2E+05	-3E+03	-8E+01	-2E+01	-6E+00	-4E+00	-2E+00	-1E+00
S21	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
S22	0.125	37.1%	-1E+07	-2E+06	-3E+05	-4E+04	-7E+03	-1E+03	-2E+02	-3E+01	-7E+00	-4E+00	-2E+00	-2E+00	-1E+00	-9E-01
S23	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
S24	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
S25	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
S26	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
S27	0.042	37.1%	-3E+11	-1E+10	-6E+08	-3E+07	-2E+06	-8E+04	-4E+03	-3E+02	-2E+01	-8E+00	-4E+00	-3E+00	-2E+00	-1E+00
S28	0.007	37.0%	-3E+18	-2E+16	-2E+14	-1E+12	-1E+10	-1E+08	-1E+06	-1E+04	-1E+02	-2E+01	-6E+00	-5E+00	-2E+00	-1E+00
S29	6.8	44.7%	1E-01	1E-01	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	9E-01	1E+00	2E+00	2E+00	3E+00	6E+00
S30	0.0025	37.0%	-3E+22	-8E+19	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-4E+02	-4E+01	-8E+00	-6E+00	-2E+00	-1E+00
														-8.5E+01		
Arrithmetic Mean	11.30		-1.3E+22	-3.5E+19	-1E+17	-3E+14	-8.9E+11	-2.8E+09	-9305132	-35394.9	-185.927	-18.8852	-4.09855	-2.84724	0.902759	10.30005
Arithmetic Standard Deviation	34.07		1.5E+22	4.1E+19	1.2E+17	3.4E+14	1E+12	3.2E+09	1.1E+07	39737.2	192.575	17.9516	4.41933	3.686955	6.167841	34.07015
Arithmetic Variance	1160.78		2.2E+44	1.7E+39	1.4E+34	1.2E+29	1.1E+24	1E+19	1.1E+14	1.6E+09	37085.2	322.259	19.5305	13.59363	38.04227	1160.775
Count	30															
Degrees of Freedom	29															
		Box-Cox Parameter	-654.5	-566.7	-479.4	-392.7	-306.8	-222.0	-139.1	-59.4	12.6	40.1	47.7	44.73	-11.5	-102.3

Confidence	95%
Student's t value	1.699

Transformed Confidence = 1.37

Transformed UCL = -2.73

Back-transformed UCL = 0.09

Table B-2. Sample Data for Tetrachloroethene

	Conc. mg/kg	Normal Distribution	λ -5.00	-4.00	-3.00	-2.00	-1.50	-1.00	-0.75	-0.50	**-0.25**	-0.10	**0.00**	0.10	0.50	1.00
S01	0.25	40.9%	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S02	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S03	0.25	40.9%	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S04	0.25	40.9%	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	2.7	45.6%	2E-01	2E-01	3E-01	4E-01	5E-01	6E-01	7E-01	8E-01	9E-01	9E-01	1E+00	1E+00	1E+00	2E+00
S06	0.25	40.9%	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S07	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S08	0.25	40.9%	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S09	0.25	40.9%	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S10	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S13	0.003	40.5%	-8E+11	-3E+09	-1E+07	-6E+04	-4E+03	-3E+02	-1E+02	-3E+01	-1E+01	-8E+00	-6E+00	-4E+00	-2E+00	-1E+00
S14	0.145	40.7%	-3E+03	-6E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S15	110	100.0%	2E-01	2E-01	3E-01	5E-01	7E-01	1E+00	1E+00	2E+00	3E+00	4E+00	5E+00	6E+00	2E+01	1E+02
S16	3.4	47.0%	2E-01	2E-01	3E-01	5E-01	6E-01	7E-01	8E-01	9E-01	1E+00	1E+00	1E+00	1E+00	2E+00	2E+00
S17	27	86.0%	2E-01	2E-01	3E-01	5E-01	7E-01	1E+00	1E+00	2E+00	2E+00	3E+00	3E+00	4E+00	8E+00	3E+01
S18	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S19	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S20	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S21	0.006	40.5%	-3E+10	-2E+08	-2E+06	-1E+04	-1E+03	-2E+02	-6E+01	-2E+01	-1E+01	-7E+00	-5E+00	-4E+00	-2E+00	-1E+00
S22	0.125	40.7%	-7E+03	-1E+03	-2E+02	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S23	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S24	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S25	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S26	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S27	0.007	40.5%	-1E+10	-1E+08	-1E+06	-1E+04	-1E+03	-1E+02	-5E+01	-2E+01	-1E+01	-6E+00	-5E+00	-4E+00	-2E+00	-1E+00
S28	0.01	40.5%	-2E+09	-2E+07	-3E+05	-5E+03	-7E+02	-1E+02	-4E+01	-2E+01	-9E+00	-6E+00	-5E+00	-4E+00	-2E+00	-1E+00
S29	3.1	46.4%	2E-01	2E-01	3E-01	4E-01	5E-01	7E-01	8E-01	9E-01	1E+00	1E+00	1E+00	1E+00	2E+00	2E+00
S30	0.0025	40.5%	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
													-9.9E+01			
Arrithmetic Mean	4.93428		-9.2E+11	-2.9E+09	-9750926	-37491.2	-2555.65	-198.426	-60.3332	-20.1721	-7.65712	-4.57137	-3.31216	-2.41861	-0.29118	3.93428
Arithmetic Standard Deviation	20.4496		1E+12	3.2E+09	1.1E+07	39145.8	2586.4	190.858	55.8392	17.7949	6.55123	4.06415	3.214248	2.78608	4.17097	20.4496
Arithmetic Variance	418.188		1E+24	1E+19	1.1E+14	1.5E+09	6689462	36426.9	3118.02	316.66	42.9186	16.5173	10.33139	7.76225	17.397	418.188
Count	30															
Degrees of Freedom	29															
		Box-Cox Parameter	-225.5	-154.2	-84.7	-18.5	12.2	39.8	51.4	60.6	65.6	65.0	62.19	56.7	6.6	-87.5
Confidence	95%															
Student's t value	1.699							Transformed Confidence =			2.03					
								Transformed UCL =			-5.62					
								Back-transformed UCL =			0.03	**mg/kg**				

Table B-3. Sample Data for 1,1,1-Trichloroethane

	Conc. mg/kg	Normal Distribution	-7	-6	-5	-4	λ -3.00	-2.00	-1.50	-1.00	-0.75	-0.50	**-0.25**	-0.01	**0.00**	0.10	0.50	1.00
S01	3.1	41.8%	1E-01	2E-01	2E-01	2E-01	3E-01	4E-01	5E-01	7E-01	8E-01	9E-01	1E+00	1E+00	1E+00	1E+00	2E+00	2E+00
S02	0.0025	40.7%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-6E+00	-6E+00	-5E+00	-2E+00	-1E+00
S03	2.6	41.6%	1E-01	2E-01	2E-01	2E-01	3E-01	4E-01	5E-01	6E-01	7E-01	8E-01	8E-01	1E+00	1E+00	1E+00	1E+00	2E+00
S04	0.25	40.8%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	43	56.5%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	7E-01	1E+00	1E+00	2E+00	2E+00	4E+00	4E+00	5E+00	1E+01	4E+01
S06	0.25	40.8%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S07	0.0025	40.7%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-6E+00	-6E+00	-5E+00	-2E+00	-1E+00
S08	0.25	40.8%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S09	34	53.2%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	7E-01	1E+00	1E+00	2E+00	2E+00	3E+00	4E+00	4E+00	1E+01	3E+01
S10	0.0025	40.7%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-6E+00	-6E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	40.7%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-6E+00	-6E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	40.7%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-6E+00	-6E+00	-5E+00	-2E+00	-1E+00
S13	0.016	40.7%	-5E+11	-1E+10	-2E+08	-4E+06	-8E+04	-2E+03	-3E+02	-6E+01	-3E+01	-1E+01	-7E+00	-4E+00	-4E+00	-3E+00	-2E+00	-1E+00
S14	0.53	40.9%	-1E+01	-7E+00	-5E+00	-3E+00	-2E+00	-1E+00	-1E+00	-9E-01	-8E-01	-7E-01	-7E-01	-6E-01	-6E-01	-6E-01	-5E-01	-5E-01
S15	580	100.0%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	7E-01	1E+00	1E+00	2E+00	3E+00	6E+00	6E+00	9E+00	5E+01	6E+02
S16	70	66.0%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	7E-01	1E+00	1E+00	2E+00	3E+00	4E+00	4E+00	5E+00	1E+01	7E+01
S17	NR																	
S18	0.0025	40.7%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-6E+00	-6E+00	-5E+00	-2E+00	-1E+00
S19	0.008	40.7%	-7E+13	-6E+11	-6E+09	-6E+07	-7E+05	-8E+03	-9E+02	-1E+02	-5E+01	-2E+01	-9E+00	-5E+00	-5E+00	-4E+00	-2E+00	-1E+00
S20	0.078	40.7%	-8E+06	-7E+05	-7E+04	-7E+03	-7E+02	-8E+01	-3E+01	-1E+01	-8E+00	-5E+00	-4E+00	-3E+00	-3E+00	-2E+00	-1E+00	-9E-01
S21	0.0025	40.7%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-6E+00	-6E+00	-5E+00	-2E+00	-1E+00
S22	0.125	40.7%	-3E+05	-4E+04	-7E+03	-1E+03	-2E+02	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S23	0.0025	40.7%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-6E+00	-6E+00	-5E+00	-2E+00	-1E+00
S24	0.0025	40.7%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-6E+00	-6E+00	-5E+00	-2E+00	-1E+00
S25	0.019	40.7%	-2E+11	-4E+09	-8E+07	-2E+06	-5E+04	-1E+03	-3E+02	-5E+01	-2E+01	-1E+01	-7E+00	-4E+00	-4E+00	-3E+00	-2E+00	-1E+00
S26	0.0025	40.7%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-6E+00	-6E+00	-5E+00	-2E+00	-1E+00
S27	0.031	40.7%	-5E+09	-2E+08	-7E+06	-3E+05	-1E+04	-5E+02	-1E+02	-3E+01	-2E+01	-9E+00	-6E+00	-4E+00	-3E+00	-3E+00	-2E+00	-1E+00
S28	0.006	40.7%	-5E+14	-4E+12	-3E+10	-2E+08	-2E+06	-1E+04	-1E+03	-2E+02	-6E+01	-2E+01	-1E+01	-5E+00	-5E+00	-4E+00	-2E+00	-1E+00
S29	2.6	41.6%	1E-01	2E-01	2E-01	2E-01	3E-01	4E-01	5E-01	6E-01	7E-01	8E-01	8E-01	1E+00	1E+00	1E+00	1E+00	2E+00
S30	0.0025	40.7%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-6E+00	-6E+00	-5E+00	-2E+00	-1E+00
															-7.6E+01			
Arrithmetic Mean	25.41		-8.9E+16	-2.6E+14	-7.8E+11	-2.4E+09	-8172518	-31230.5	-2130.46	-167.101	-51.3635	-17.3797	-6.57794	-2.72132	-2.61743	-1.70513	1.71324	24.41
Arithmetic Standard Deviation	107.837		1.2E+17	3.4E+14	1E+12	3.2E+09	1E+07	38901.9	2565.53	188.217	54.862	17.5337	6.68476	3.80161	3.759673	3.60532	9.53884	107.837
Variance	11628.7		1.3E+34	1.1E+29	1E+24	9.9E+18	1.1E+14	1.5E+09	6581940	35425.8	3009.84	307.43	44.686	14.4523	14.13514	12.9983	90.9895	11628.7
Count	29																	
Degrees of Freedom	28																	
		Box-Cox Parameter	-513.8	-423.6	-334.2	-246.0	-159.5	-76.1	-36.6	-0.1	16.1	29.7	38.4	36.6	36.21	30.1	-26.5	-131.1
Confidence	95%																	
Student's t value	1.699																	

Transformed Confidence = 2.11

Transformed UCL = -4.47

Back-transformed UCL = 0.05 **mg/kg**

Table B-4. Sample Data for Methylene Chloride

	Conc mg/kg	Normal Distribution	-7.00	-6.00	-5.00	-4.00	-3.00	-2.00	-1.50	-1.00	-0.75	-0.50	-0.25	**-0.10**	**0.00**	0.10	0.50	1.00
							λ											
S01	0.25	43.7%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S02	0.0025	33.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S03	0.25	43.7%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S04	0.25	43.7%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	0.25	43.7%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S06	0.25	43.7%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S07	0.0025	33.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S08	0.25	43.7%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S09	0.25	43.7%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S10	0.0025	33.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	33.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	33.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S13	0.006	34.1%	-5E+14	-4E+12	-3E+10	-2E+08	-2E+06	-1E+04	-1E+03	-2E+02	-6E+01	-2E+01	-1E+01	-7E+00	-5E+00	-4E+00	-2E+00	-1E+00
S14	0.145	39.5%	-1E+05	-2E+04	-3E+03	-6E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S15	0.72	62.8%	-1E+00	-1E+00	-8E-01	-7E-01	-6E-01	-5E-01	-4E-01	-4E-01	-4E-01	-4E-01	-3E-01	-3E-01	-3E-01	-3E-01	-3E-01	-3E-01
S16	0.15	39.7%	-8E+04	-1E+04	-3E+03	-5E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S17	1.7	91.0%	1E-01	2E-01	2E-01	2E-01	3E-01	3E-01	4E-01	4E-01	4E-01	5E-01	5E-01	5E-01	5E-01	5E-01	6E-01	7E-01
S18	0.0025	33.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S19	0.0025	33.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S20	0.005	34.0%	-2E+15	-1E+13	-6E+10	-4E+08	-3E+06	-2E+04	-2E+03	-2E+02	-7E+01	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-2E+00	-1E+00
S21	0.005	34.0%	-2E+15	-1E+13	-6E+10	-4E+08	-3E+06	-2E+04	-2E+03	-2E+02	-7E+01	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-2E+00	-1E+00
S22	3.8	100.0%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	6E-01	7E-01	8E-01	1E+00	1E+00	1E+00	1E+00	1E+00	2E+00	3E+00
S23	0.005	34.0%	-2E+15	-1E+13	-6E+10	-4E+08	-3E+06	-2E+04	-2E+03	-2E+02	-7E+01	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-2E+00	-1E+00
S24	0.005	34.0%	-2E+15	-1E+13	-6E+10	-4E+08	-3E+06	-2E+04	-2E+03	-2E+02	-7E+01	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-2E+00	-1E+00
S25	0.075	36.7%	-1E+07	-9E+05	-8E+04	-8E+03	-8E+02	-9E+01	-3E+01	-1E+01	-8E+00	-5E+00	-4E+00	-3E+00	-3E+00	-2E+00	-1E+00	-9E-01
S26	0.0025	33.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S27	0.015	34.4%	-8E+11	-1E+10	-3E+08	-5E+06	-1E+05	-2E+03	-4E+02	-7E+01	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-1E+00
S28	0.0025	33.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S29	3.7	100.0%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	6E-01	7E-01	8E-01	1E+00	1E+00	1E+00	1E+00	1E+00	2E+00	3E+00
S30	0.0025	33.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
															-1.0E+02			
Arithmetic Mean	0.404		-7.8E+16	-2.3E+14	-6.9E+11	-2.2E+09	-7521437	-29876.3	-2091.6	-168.691	-52.6556	-18.2321	-7.28675	-4.56089	-3.45669	-2.69125	-1.23	-0.59647
Arithmetic Standard Deviation	0.967		1.1E+17	3.3E+14	9.8E+11	3E+09	9973735	36680.9	2417.82	178.958	52.502	16.6949	5.97114	3.48859	2.546051	1.9363	1.02784	0.9674
Variance	0.936		1.3E+34	1.1E+29	9.5E+23	9.2E+18	9.9E+13	1.3E+09	5845859	32025.9	2756.46	278.718	35.6545	12.1703	6.482377	3.74927	1.05645	0.93587
Count	30																	
Degrees of Freedom	29																	
		Box-Cox Parameter	-336.5	-267.4	-199.1	-131.9	-66.4	-4.1	24.7	50.1	60.6	68.7	73.48	74.03	73.14	71.1	49.3	1.0

Confidence	95%	Transformed Confidence =	1.85
Student's t value	1.699		
		Transformed UCL =	-5.43
		Back-transformed UCL =	0.03 **mg/kg**

Table B-5. Sample Data for cis 1,2-Dichloroethene

	Conc. mg/kg	Normal Distribution	λ -7.00	-6.00	-5.00	-4.00	-3.00	-2.00	-1.50	-1.00	-0.75	-0.50	-0.25	**-0.10**	**0.00**	0.01	0.05	0.07	0.10	0.50	1.00
S01	6.1	61.0%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	6E-01	8E-01	1E+00	1E+00	1E+00	2E+00	2E+00	2E+00	2E+00	2E+00	2E+00	3E+00	5E+00
S02	0.0025	32.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S03	14	88.7%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	7E-01	9E-01	1E+00	1E+00	2E+00	2E+00	3E+00	3E+00	3E+00	3E+00	3E+00	5E+00	1E+01
S04	1.8	40.9%	1E-01	2E-01	2E-01	2E-01	3E-01	3E-01	4E-01	4E-01	5E-01	5E-01	5E-01	6E-01	6E-01	6E-01	6E-01	6E-01	6E-01	7E-01	8E-01
S05	6.8	64.1%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	6E-01	9E-01	1E+00	1E+00	2E+00	2E+00	2E+00	2E+00	2E+00	2E+00	2E+00	3E+00	6E+00
S06	1.4	39.1%	1E-01	1E-01	2E-01	2E-01	2E-01	2E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	4E-01	4E-01
S07	0.0025	32.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S08	0.25	34.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S09	0.25	34.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S10	0.0025	32.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	32.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	32.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S13	0.058	33.1%	-6E+07	-4E+06	-3E+05	-2E+04	-2E+03	-1E+02	-5E+01	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-3E+00	-3E+00	-3E+00	-3E+00	-2E+00	-2E+00	-9E-01
S14	21	97.9%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	7E-01	1E+00	1E+00	2E+00	2E+00	3E+00	3E+00	3E+00	3E+00	3E+00	4E+00	7E+00	2E+01
S15	40	100.0%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	7E-01	1E+00	1E+00	2E+00	2E+00	3E+00	4E+00	4E+00	4E+00	4E+00	4E+00	1E+01	4E+01
S16	6.3	61.9%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	6E-01	8E-01	1E+00	1E+00	1E+00	2E+00	2E+00	2E+00	2E+00	2E+00	2E+00	3E+00	5E+00
S17	11	80.5%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	6E-01	9E-01	1E+00	1E+00	2E+00	2E+00	2E+00	2E+00	3E+00	3E+00	3E+00	5E+00	1E+01
S18	0.0025	32.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S19	0.01	32.9%	-1E+13	-2E+11	-2E+09	-2E+07	-3E+05	-5E+03	-7E+02	-1E+02	-4E+01	-2E+01	-9E+00	-6E+00	-5E+00	-5E+00	-4E+00	-4E+00	-4E+00	-2E+00	-1E+00
S20	0.01	32.9%	-1E+13	-2E+11	-2E+09	-2E+07	-3E+05	-5E+03	-7E+02	-1E+02	-4E+01	-2E+01	-9E+00	-6E+00	-5E+00	-5E+00	-4E+00	-4E+00	-4E+00	-2E+00	-1E+00
S21	0.0025	32.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S22	0.125	33.4%	-3E+05	-4E+04	-7E+03	-1E+03	-2E+02	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S23	0.0025	32.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S24	0.0025	32.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S25	1	37.3%	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00
S26	0.0025	32.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S27	0.022	33.0%	-6E+10	-1E+09	-4E+07	-1E+06	-3E+04	-1E+03	-2E+02	-4E+01	-2E+01	-1E+01	-6E+00	-5E+00	-4E+00	-4E+00	-3E+00	-3E+00	-3E+00	-2E+00	-1E+00
S28	0.008	32.9%	-7E+13	-6E+11	-6E+09	-6E+07	-7E+05	-8E+03	-9E+02	-1E+02	-5E+01	-2E+01	-9E+00	-6E+00	-5E+00	-5E+00	-4E+00	-4E+00	-4E+00	-2E+00	-1E+00
S29	2.2	42.7%	1E-01	2E-01	2E-01	2E-01	3E-01	4E-01	5E-01	5E-01	6E-01	7E-01	7E-01	8E-01	8E-01	8E-01	8E-01	8E-01	8E-01	1E+00	1E+00
S30	0.0025	32.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
															-7.2E+01						
Arithmetic Mean	3.745		-8.6E+16	-2.5E+14	-7.5E+11	-2.4E+09	-7867253	-29967.6	-2039.71	-159.237	-48.6697	-16.2866	-6.05701	-3.48308	-2.41373	-2.32543	-1.99896	-1.85011	-1.64243	0.20954	2.74535
Arithmetic Standard Deviation	8.452		1.1E+17	3.3E+14	1E+12	3.1E+09	1E+07	38760.8	2558.26	188.259	55.1552	17.8078	6.83422	4.40143	3.54121	3.47794	3.25872	3.16777	3.05235	3.23227	8.45168
Variance	71.431		1.3E+34	1.1E+29	1E+24	9.8E+18	1.1E+14	1.5E+09	6544706	35441.5	3042.09	317.119	46.7065	19.3726	12.54017	12.096	10.6193	10.0348	9.31685	10.4476	71.4309
Count	30																				
Degrees of Freedom	29																				
		Box-Cox Parameter	-579.2	-479.9	-381.4	-284.1	-188.6	-96.4	-52.6	-11.9	6.2	21.5	31.76	34.02	33.33	33.15	32.2	31.7	30.6	1.0	-61.9

Confidence	95%	**Transformed Confidence =**	1.37
Student's t value	1.699		
		Transformed UCL =	-2.12
		Back-transformed UCL =	0.15 mg/kg

Table B-6. Sample Data for 1,1-Dichloroethene

	Conc. mg/kg	Normal Distribution	-7.00	-6.00	-5.00	-4.00	λ -3.00	-2.00	-1.50	-1.00	-0.75	-0.50	**-0.25**	-0.10	**0.00**	0.10	0.50	1.00
S01	0.25	46.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S02	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S03	0.25	46.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S04	0.25	46.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	0.79	65.9%	-6E-01	-5E-01	-4E-01	-4E-01	-3E-01	-3E-01	-3E-01	-3E-01	-3E-01	-3E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01
S06	0.25	46.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S07	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S08	0.25	46.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S09	0.25	46.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S10	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S13	0.003	36.9%	-7E+16	-2E+14	-8E+11	-3E+09	-1E+07	-6E+04	-4E+03	-3E+02	-1E+02	-3E+01	-1E+01	-8E+00	-6E+00	-4E+00	-2E+00	-1E+00
S14	0.145	42.1%	-1E+05	-2E+04	-3E+03	-6E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S15	5.7	100.0%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	6E-01	8E-01	1E+00	1E+00	1E+00	2E+00	2E+00	2E+00	3E+00	5E+00
S16	0.91	70.0%	-1E-01	-1E-01	-1E-01	-1E-01	-1E-01	-1E-01	-1E-01	-1E-01	-1E-01	-1E-01	-1E-01	-9E-02	-9E-02	-9E-02	-9E-02	-9E-02
S17	1.4	83.8%	1E-01	1E-01	2E-01	2E-01	2E-01	2E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	4E-01	4E-01
S18	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S19	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S20	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S21	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S22	0.125	41.4%	-3E+05	-4E+04	-7E+03	-1E+03	-2E+02	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S23	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S24	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S25	0.019	37.5%	-2E+11	-4E+09	-8E+07	-2E+06	-5E+04	-1E+03	-3E+02	-5E+01	-2E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-1E+00
S26	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S27	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S28	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S29	0.052	38.7%	-1E+08	-8E+06	-5E+05	-3E+04	-2E+03	-2E+02	-6E+01	-2E+01	-1E+01	-7E+00	-4E+00	-3E+00	-3E+00	-3E+00	-2E+00	-9E-01
S30	0.0025	36.9%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
															-1.1E+02			
Arithmetic Mean	0.356		-1.2E+17	-3.5E+14	-1.1E+12	-3.3E+09	-1.1E+07	-41907.2	-2813.64	-213.912	-64.3411	-21.386	-8.21082	-5.03445	-3.77274	-2.91099	-1.3121	-0.64395
Arithmetic Standard Deviation	1.059		1.2E+17	3.4E+14	1E+12	3.2E+09	1.1E+07	40000.3	2662.55	197.297	57.4609	17.9869	6.26844	3.58649	2.576036	1.92654	0.99186	1.05885
Variance	1.121		1.4E+34	1.2E+29	1E+24	1E+19	1.1E+14	1.6E+09	7089166	38926	3301.76	323.527	39.2933	12.8629	6.635962	3.71157	0.98379	1.12117
Count	30																	
Degrees of Freedom	29																	
		Box-Cox Parameter	-264.6	-204.6	-145.5	-87.6	-31.6	20.9	44.8	65.6	74.0	80.3	83.5	83.3	81.97	79.5	54.9	-1.7

Confidence	95%	Transformed Confidence =	1.94
Student's t value	1.699		
		Transformed UCL =	-6.27
		Back-transformed UCL =	0.02 mg/kg

Table B-7. Sample Data for 1,2-Dichloroethane

	Conc. mg/kg	Normal Distribution	-7.00	-6.00	-5.00	-4.00	λ -3.00	-2.00	-1.50	-1.00	-0.75	-0.50	-0.25	**-0.10**	**0.00**	0.10	0.50	1.00
S01	0.25	91.4%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S02	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S03	0.25	91.4%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S04	0.25	91.4%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	0.25	91.4%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S06	0.25	91.4%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S07	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S08	0.25	91.4%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S09	0.25	91.4%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S10	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S13	0.003	21.0%	-7E+16	-2E+14	-8E+11	-3E+09	-1E+07	-6E+04	-4E+03	-3E+02	-1E+02	-3E+01	-1E+01	-8E+00	-6E+00	-4E+00	-2E+00	-1E+00
S14	0.145	67.1%	-1E+05	-2E+04	-3E+03	-6E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S15	0.145	67.1%	-1E+05	-2E+04	-3E+03	-6E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S16	0.15	68.7%	-8E+04	-1E+04	-3E+03	-5E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S17	0.15	68.7%	-8E+04	-1E+04	-3E+03	-5E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S18	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S19	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S20	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S21	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S22	0.125	60.5%	-3E+05	-4E+04	-7E+03	-1E+03	-2E+02	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S23	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S24	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S25	0.016	24.4%	-5E+11	-1E+10	-2E+08	-4E+06	-8E+04	-2E+03	-3E+02	-6E+01	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-1E+00
S26	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S27	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S28	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S29	0.32	97.6%	-4E+02	-2E+02	-6E+01	-2E+01	-1E+01	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-9E-01	-7E-01
S30	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
															-1.2E+02			
Arithmetic Mean	0.095		-1.2E+17	-3.5E+14	-1.1E+12	-3.3E+09	-1.1E+07	-41922.6	-2815.66	-214.403	-64.6932	-21.6784	-8.47097	-5.2816	-4.01318	-3.14616	-1.54089	-0.90528
Arithmetic Standard Deviation	0.114		1.2E+17	3.4E+14	1E+12	3.2E+09	1.1E+07	39984.4	2660.61	196.823	57.0907	17.6444	5.92207	3.22426	2.196173	1.52237	0.41699	0.11353
Variance	0.013		1.4E+34	1.2E+29	1E+24	1E+19	1.1E+14	1.6E+09	7078833	38739.2	3259.35	311.324	35.071	10.3958	4.823178	2.31762	0.17388	0.01289
Count	30																	
Degrees of Freedom	29																	
		Box-Cox Parameter	-208.8	-155.8	-103.7	-52.8	-3.7	41.9	62.3	79.6	86.4	91.3	93.90	94.07	93.57	92.6	83.6	63.1

Confidence	95%	Transformed Confidence =	1.00
Student's t value	1.699		
		Transformed UCL =	-4.28
		Back-transformed UCL =	0.028 **mg/kg**

Table B-8. Sample Data for Vinyl Chloride

	Conc. mg/kg	Normal Distribution	-7.00	-6.00	-5.00	-4.00	-3.00	-2.00	-1.50	-1.00	-0.75	-0.50	-0.25	**-0.10**	**0.00**	0.01	0.05	0.07	0.10	0.50	1.00
							λ														
S01	0.25	81.5%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S02	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S03	0.25	81.5%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S04	0.25	81.5%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	0.25	81.5%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S06	0.25	81.5%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S07	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S08	0.25	81.5%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S09	0.5	99.6%	-2E+01	-1E+01	-6E+00	-4E+00	-2E+00	-2E+00	-1E+00	-1E+00	-9E-01	-8E-01	-8E-01	-7E-01	-7E-01	-7E-01	-7E-01	-7E-01	-7E-01	-6E-01	-5E-01
S10	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S13	0.003	20.9%	-7E+16	-2E+14	-8E+11	-3E+09	-1E+07	-6E+04	-4E+03	-3E+02	-1E+02	-3E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-4E+00	-2E+00	-1E+00
S14	0.29	87.9%	-8E+02	-3E+02	-1E+02	-4E+01	-1E+01	-5E+00	-4E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-9E-01	-7E-01
S15	0.29	87.9%	-8E+02	-3E+02	-1E+02	-4E+01	-1E+01	-5E+00	-4E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-9E-01	-7E-01
S16	0.295	88.6%	-7E+02	-3E+02	-9E+01	-3E+01	-1E+01	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-9E-01	-7E-01
S17	0.305	89.9%	-6E+02	-2E+02	-8E+01	-3E+01	-1E+01	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-9E-01	-7E-01
S18	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S19	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S20	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S21	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S22	0.25	81.5%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S23	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S24	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S25	0.07	36.5%	-2E+07	-1E+06	-1E+05	-1E+04	-1E+03	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-4E+00	-3E+00	-3E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S26	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S27	0.043	29.7%	-5E+08	-3E+07	-1E+06	-7E+04	-4E+03	-3E+02	-7E+01	-2E+01	-1E+01	-8E+00	-5E+00	-4E+00	-3E+00	-3E+00	-3E+00	-3E+00	-3E+00	-2E+00	-1E+00
S28	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S29	0.025	25.6%	-2E+10	-7E+08	-2E+07	-6E+05	-2E+04	-8E+02	-2E+02	-4E+01	-2E+01	-1E+01	-6E+00	-4E+00	-4E+00	-4E+00	-3E+00	-3E+00	-3E+00	-2E+00	-1E+00
S30	0.0025	20.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
															-1.1E+02						
Arithmetic Mean	0.120		-1.1E+17	-3.3E+14	-9.8E+11	-3.1E+09	-1E+07	-39226.5	-2634.64	-200.815	-60.6902	-20.3976	-8.00725	-5.00942	-3.81552	-3.71954	-3.36962	-3.21308	-2.9985	-1.48238	-0.8798
Arithmetic Standard Deviation	0.145		1.2E+17	3.4E+14	1E+12	3.2E+09	1.1E+07	40053.6	2667.65	197.549	57.3606	17.7804	6.01779	3.30866	2.274646	2.19339	1.90018	1.77076	1.59538	0.46926	0.14501
Variance	0.021		1.4E+34	1.2E+29	1E+24	1E+19	1.1E+14	1.6E+09	7116334	39025.6	3290.24	316.144	36.2138	10.9472	5.174016	4.81095	3.61069	3.1356	2.54524	0.2202	0.02103
Count	30																				
Degrees of Freedom	29																				
		Box-Cox Parameter	-254.6	-195.9	-138.1	-81.4	-26.7	24.6	47.8	68.0	76.2	82.5	86.27	87.02	86.82	86.77	86.5	86.3	86.0	77.3	56.0

Confidence	95%
Student's t value	1.699

Transformed Confidence = 1.03

Transformed UCL = -3.98

Back-transformed UCL = 0.03 **mg/kg**

Table B-9. Sample Data for 1,1,2-Trichloroethane

	Conc. mg/kg	Normal Distribution	-7.00	-6.00	-5.00	-4.00	λ -3.00	-2.00	-1.50	-1.00	-0.75	-0.50	-0.25	-0.10	0.00	0.01	0.05	0.07	0.10	0.50	1.00
S01	0.25	93.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S02	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S03	0.25	93.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S04	0.25	93.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	0.25	93.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S06	0.25	93.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S07	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S08	0.25	93.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S09	0.25	93.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S10	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S13	0.003	21.4%	-7E+16	-2E+14	-8E+11	-3E+09	-1E+07	-6E+04	-4E+03	-3E+02	-1E+02	-3E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-4E+00	-2E+00	-1E+00
S14	0.145	70.9%	-1E+05	-2E+04	-3E+03	-6E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S15	0.145	70.9%	-1E+05	-2E+04	-3E+03	-6E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S16	0.15	72.5%	-8E+04	-1E+04	-3E+03	-5E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S17	0.15	72.5%	-8E+04	-1E+04	-3E+03	-5E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S18	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S19	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S20	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S21	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S22	0.125	64.1%	-3E+05	-4E+04	-7E+03	-1E+03	-2E+02	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S23	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S24	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S25	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S26	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S27	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S28	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S29	0.098	54.2%	-2E+06	-2E+05	-2E+04	-3E+03	-4E+02	-5E+01	-2E+01	-9E+00	-6E+00	-4E+00	-3E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S30	0.0025	21.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
Arithmetic Mean	0.087		-1.3E+17	-3.7E+14	-1.1E+12	-3.5E+09	-1.2E+07	-44525.8	-2983.06	-225.889	-67.8298	-22.5798	-8.75339	-5.43134	-1.2E+02 -4.1145	-4.00888	-3.62411	-3.45217	-3.2167	-1.56283	-0.91313
Arithmetic Standard Deviation	0.106		1.2E+17	3.4E+14	1E+12	3.2E+09	1.1E+07	39831	2655.47	197.154	57.293	17.7159	5.9297	3.21548	2.181915	2.10084	1.80861	1.67979	1.50547	0.40217	0.10562
Variance	0.011		1.4E+34	1.2E+29	1E+24	1E+19	1.1E+14	1.6E+09	7051545	38869.6	3282.49	313.852	35.1613	10.3393	4.760755	4.41354	3.27105	2.82171	2.26643	0.16174	0.01116
Count	30																				
Degrees of Freedom	29																				
		Box-Cox Parameter	-185.2	-135.1	-86.0	-38.0	8.1	50.8	69.7	85.4	91.4	95.6	97.53	97.38	96.69	96.60	96.2	95.9	95.5	86.1	65.2

Confidence	95%	**Transformed Confidence =**	**1.84**
Student's t value	1.699		
		Transformed UCL =	**-6.91**
		Back-transformed UCL =	**0.02 mg/kg**

Table B-10. Sample Data for 1,1-Dichloroethane

	Conc. mg/kg	Normal Distribution	λ -7.00	-6.00	-5.00	-4.00	-3.00	-2.00	-1.50	-1.00	-0.75	-0.50	-0.25	-0.10	0.00	0.01	0.05	0.07	0.10	0.50	1.00
S01	0.25	35.7%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S02	0.0025	33.5%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S03	1.1	43.6%	7E-02	7E-02	8E-02	8E-02	8E-02	9E-02	9E-02	9E-02	9E-02	9E-02	9E-02	9E-02	1E-01	1E-01	1E-01	1E-01	1E-01	1E-01	1E-01
S04	0.25	35.7%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	6.7	88.3%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	6E-01	9E-01	1E+00	1E+00	2E+00	2E+00	2E+00	2E+00	2E+00	2E+00	2E+00	3E+00	6E+00
S06	0.25	35.7%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S07	0.0025	33.5%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S08	1.4	46.4%	1E-01	1E-01	2E-01	2E-01	2E-01	2E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	4E-01	4E-01
S09	18	100.0%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	7E-01	9E-01	1E+00	2E+00	2E+00	3E+00	3E+00	3E+00	3E+00	3E+00	3E+00	6E+00	2E+01
S10	0.0025	33.5%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	33.5%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	33.5%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S13	0.019	33.6%	-2E+11	-4E+09	-8E+07	-2E+06	-5E+04	-1E+03	-3E+02	-5E+01	-2E+01	-1E+01	-7E+00	-5E+00	-4E+00	-4E+00	-4E+00	-3E+00	-3E+00	-2E+00	-1E+00
S14	1.4	46.4%	1E-01	1E-01	2E-01	2E-01	2E-01	2E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	3E-01	4E-01	4E-01
S15	11	98.7%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	6E-01	9E-01	1E+00	1E+00	2E+00	2E+00	2E+00	2E+00	3E+00	3E+00	3E+00	5E+00	1E+01
S16	2.1	53.2%	1E-01	2E-01	2E-01	2E-01	3E-01	4E-01	4E-01	5E-01	6E-01	6E-01	7E-01	7E-01	7E-01	7E-01	8E-01	8E-01	8E-01	9E-01	1E+00
S17	9.6	97.1%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	6E-01	9E-01	1E+00	1E+00	2E+00	2E+00	2E+00	2E+00	2E+00	2E+00	3E+00	4E+00	9E+00
S18	0.0025	33.5%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S19	0.0025	33.5%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S20	0.007	33.5%	-2E+14	-1E+12	-1E+10	-1E+08	-1E+06	-1E+04	-1E+03	-1E+02	-5E+01	-2E+01	-1E+01	-6E+00	-5E+00	-5E+00	-4E+00	-4E+00	-4E+00	-2E+00	-1E+00
S21	0.0025	33.5%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S22	0.125	34.6%	-3E+05	-4E+04	-7E+03	-1E+03	-2E+02	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S23	0.0025	33.5%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S24	0.0025	33.5%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S25	0.2	35.2%	-1E+04	-3E+03	-6E+02	-2E+02	-4E+01	-1E+01	-7E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-8E-01
S26	0.0025	33.5%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
S27	0.005	33.5%	-2E+15	-1E+13	-6E+10	-4E+08	-3E+06	-2E+04	-2E+03	-2E+02	-7E+01	-3E+01	-1E+01	-7E+00	-5E+00	-5E+00	-5E+00	-4E+00	-4E+00	-2E+00	-1E+00
S28	0.088	34.2%	-3E+06	-4E+05	-4E+04	-4E+03	-5E+02	-6E+01	-2E+01	-1E+01	-7E+00	-5E+00	-3E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S29	0.59	38.8%	-6E+00	-4E+00	-3E+00	-2E+00	-1E+00	-9E-01	-8E-01	-7E-01	-6E-01	-6E-01	-6E-01	-5E-01	-5E-01	-5E-01	-5E-01	-5E-01	-5E-01	-5E-01	-4E-01
S30	0.0025	33.5%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-6E+00	-5E+00	-5E+00	-5E+00	-2E+00	-1E+00
Arithmetic Mean	1.770		-9.4E+16	-2.7E+14	-8.2E+11	-2.6E+09	-8656261	-33057	-2244.19	-173.559	-52.6835	-17.5778	-6.64584	-3.95612	-8.6E+01 -2.86548	-2.77679	-2.45144	-2.30467	-2.10192	-0.50879	0.77047
Arithmetic Standard Deviation	4.145		1.2E+17	3.4E+14	1E+12	3.2E+09	1.1E+07	39182.2	2593.55	192.024	56.3407	18.0501	6.69187	4.12635	3.191208	3.12057	2.87161	2.76549	2.62667	2.2418	4.1446
Variance	17.178		1.4E+34	1.2E+29	1E+24	1E+19	1.1E+14	1.5E+09	6726515	36873.4	3174.27	325.806	44.7811	17.0267	10.18381	9.73794	8.24613	7.64791	6.89941	5.02567	17.1777
Count	30																				
Degrees of Freedom	29																				
		Box-Cox Parameter	-474.8	-388.6	-303.2	-219.0	-136.6	-57.4	-20.2	13.7	28.5	40.7	48.75	50.30	49.45	49.27	48.4	47.8	46.8	18.1	-41.2

Confidence	95%	**Transformed Confidence =**	1.28
Student's t value	1.699		
		Transformed UCL =	-2.68
		Back-transformed UCL =	0.09 mg/kg

Table B-11. Sample Data for Toluene

	Conc. mg/kg	Normal Distribution	-7	-6	-5	-4	λ -3.00	-2.00	-1.50	-1.00	-0.75	-0.50	**-0.25**	-0.10	**0.00**	0.10	0.50	1.00
S01	0.73	41.2%	-1E+00	-9E-01	-8E-01	-6E-01	-5E-01	-4E-01	-4E-01	-4E-01	-4E-01	-3E-01	-3E-01	-3E-01	-3E-01	-3E-01	-3E-01	-3E-01
S02	0.01	36.3%	-1E+13	-2E+11	-2E+09	-2E+07	-3E+05	-5E+03	-7E+02	-1E+02	-4E+01	-2E+01	-9E+00	-6E+00	-5E+00	-4E+00	-2E+00	-1E+00
S03	0.25	37.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S04	0.25	37.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	24	100.0%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	7E-01	1E+00	1E+00	2E+00	2E+00	3E+00	3E+00	4E+00	8E+00	2E+01
S06	0.25	37.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S07	0.0025	36.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S08	0.25	37.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S09	0.25	37.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S10	0.0025	36.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	36.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	36.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S13	0.003	36.2%	-7E+16	-2E+14	-8E+11	-3E+09	-1E+07	-6E+04	-4E+03	-3E+02	-1E+02	-3E+01	-1E+01	-8E+00	-6E+00	-4E+00	-2E+00	-1E+00
S14	2.7	55.2%	1E-01	2E-01	2E-01	2E-01	3E-01	4E-01	5E-01	6E-01	7E-01	8E-01	9E-01	9E-01	1E+00	1E+00	1E+00	2E+00
S15	19	99.9%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	7E-01	9E-01	1E+00	2E+00	2E+00	3E+00	3E+00	3E+00	7E+00	2E+01
S16	1.8	48.8%	1E-01	2E-01	2E-01	2E-01	3E-01	3E-01	4E-01	4E-01	5E-01	5E-01	5E-01	6E-01	6E-01	6E-01	7E-01	8E-01
S17	8.5	87.9%	1E-01	2E-01	2E-01	2E-01	3E-01	5E-01	6E-01	9E-01	1E+00	1E+00	2E+00	2E+00	2E+00	2E+00	4E+00	8E+00
S18	0.0025	36.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S19	0.011	36.3%	-7E+12	-9E+10	-1E+09	-2E+07	-3E+05	-4E+03	-6E+02	-9E+01	-4E+01	-2E+01	-8E+00	-6E+00	-5E+00	-4E+00	-2E+00	-1E+00
S20	0.007	36.2%	-2E+14	-1E+12	-1E+10	-1E+08	-1E+06	-1E+04	-1E+03	-1E+02	-5E+01	-2E+01	-1E+01	-6E+00	-5E+00	-4E+00	-2E+00	-1E+00
S21	0.007	36.2%	-2E+14	-1E+12	-1E+10	-1E+08	-1E+06	-1E+04	-1E+03	-1E+02	-5E+01	-2E+01	-1E+01	-6E+00	-5E+00	-4E+00	-2E+00	-1E+00
S22	0.125	37.0%	-3E+05	-4E+04	-7E+03	-1E+03	-2E+02	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S23	0.0025	36.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S24	0.0025	36.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S25	0.79	41.6%	-6E-01	-5E-01	-4E-01	-4E-01	-3E-01	-3E-01	-3E-01	-3E-01	-3E-01	-3E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01
S26	0.016	36.3%	-5E+11	-1E+10	-2E+08	-4E+06	-8E+04	-2E+03	-3E+02	-6E+01	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-1E+00
S27	0.0025	36.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S28	0.0025	36.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S29	0.25	37.9%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S30	0.0025	36.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
															-9.0E+01			
Arithmetic Mean	1.974		-8E+16	-2E+14	-7E+11	-2E+09	-8E+06	-29571	-2042.4	-162.61	-50.404	-17.257	-6.7253	-4.0842	-3.00006	-2.2332	-0.5794	0.97413
Arithmetic Standard Deviation	5.584		1.1E+17	3.2E+14	9.7E+11	3E+09	1E+07	37649.6	2485.59	183.005	53.5435	17.1281	6.35373	3.93052	3.058563	2.54895	2.46602	5.5845
Variance	31.187		1.2E+34	1.1E+29	9.5E+23	9.2E+18	1E+14	1.4E+09	6178137	33491	2866.9	293.373	40.3699	15.449	9.354806	6.49717	6.08125	31.1866
Count	30																	
Degrees of Freedom	29																	
		Box-Cox Parameter	-442.3	-360.0	-278.5	-198.2	-119.8	-44.5	-9.2	22.9	36.8	48.1	55.13	56.01	54.58	51.2	17.3	-49.9

Confidence	95%	Transformed Confidence =	1.22
Student's t value	1.699		
		Transformed UCL =	-2.86
		Back-transformed UCL =	0.08 **mg/kg**

Table B-12. Sample Data for Trans 1,2-Dichloroethene

	Conc. mg/kg	Normal Distribution	-7	-6	-5	-4	λ -3.00	-2.00	-1.50	-1.00	-0.75	-0.50	-0.25	**-0.10**	**0.00**	0.10	0.50	1.00
S01	0.25	68.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S02	0.022	29.3%	-6E+10	-1E+09	-4E+07	-1E+06	-3E+04	-1E+03	-2E+02	-4E+01	-2E+01	-1E+01	-6E+00	-5E+00	-4E+00	-3E+00	-2E+00	-1E+00
S03	0.25	68.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S04	0.25	68.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	0.25	68.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S06	0.25	68.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S07	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S08	0.25	68.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S09	0.25	68.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S10	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S13	0.003	26.4%	-7E+16	-2E+14	-8E+11	-3E+09	-1E+07	-6E+04	-4E+03	-3E+02	-1E+02	-3E+01	-1E+01	-8E+00	-6E+00	-4E+00	-2E+00	-1E+00
S14	0.145	50.0%	-1E+05	-2E+04	-3E+03	-6E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S15	0.86	99.9%	-3E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-1E-01	-1E-01	-1E-01
S16	0.83	99.9%	-4E-01	-3E-01	-3E-01	-3E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01	-2E-01
S17	0.43	89.7%	-5E+01	-3E+01	-1E+01	-7E+00	-4E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-9E-01	-9E-01	-8E-01	-8E-01	-7E-01	-6E-01
S18	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S19	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S20	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S21	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S22	0.125	46.5%	-3E+05	-4E+04	-7E+03	-1E+03	-2E+02	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S23	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S24	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S25	0.1	42.1%	-1E+06	-2E+05	-2E+04	-2E+03	-3E+02	-5E+01	-2E+01	-9E+00	-6E+00	-4E+00	-3E+00	-3E+00	-2E+00	-2E+00	-1E+00	-9E-01
S26	0.022	29.3%	-6E+10	-1E+09	-4E+07	-1E+06	-3E+04	-1E+03	-2E+02	-4E+01	-2E+01	-1E+01	-6E+00	-5E+00	-4E+00	-3E+00	-2E+00	-1E+00
S27	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S28	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S29	0.025	29.7%	-2E+10	-7E+08	-2E+07	-6E+05	-2E+04	-8E+02	-2E+02	-4E+01	-2E+01	-1E+01	-6E+00	-4E+00	-4E+00	-3E+00	-2E+00	-1E+00
S30	0.0025	26.4%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
															-1.1E+02			
Arithmetic Mean	0.145		-1E+17	-3E+14	-9E+11	-3E+09	-1E+07	-36619	-2467.9	-189.73	-57.79	-19.626	-7.7893	-4.8989	-3.74062	-2.9442	-1.453	-0.8552
Arithmetic Standard Deviation	0.225		1.2E+17	3.4E+14	1E+12	3.2E+09	1.1E+07	39852.9	2649.23	195.277	56.5136	17.4764	5.93214	3.28733	2.281615	1.62301	0.5383	0.22515
Variance	0.051		1.4E+34	1.2E+29	1E+24	1E+19	1.1E+14	1.6E+09	7018440	38133.2	3193.79	305.426	35.1903	10.8066	5.205766	2.63415	0.28977	0.05069
Count	30																	
Degrees of Freedom	29																	
		Box-Cox Parameter	-271.8	-211.0	-151.0	-92.2	-35.3	18.2	42.6	64.0	72.8	79.8	83.97	84.81	84.56	83.6	72.2	43.2

Confidence	95%	Transformed Confidence =	1.02
Student's t value	1.699		
		Transformed UCL =	-3.88
		Back-transformed UCL =	0.04 **mg/kg**

Table B-13. Sample Data for Chloroform

	Conc. mg/kg	Normal Distribution	-7	-6	-5	-4	λ -3.00	-2.00	-1.50	-1.00	-0.75	-0.50	**-0.25**	-0.10	**0.00**	0.10	0.50	1.00
S01	0.68	99.7%	-2E+00	-2E+00	-1E+00	-9E-01	-7E-01	-6E-01	-5E-01	-5E-01	-4E-01	-4E-01	-4E-01	-4E-01	-4E-01	-4E-01	-4E-01	-3E-01
S02	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S03	0.7	99.8%	-2E+00	-1E+00	-1E+00	-8E-01	-6E-01	-5E-01	-5E-01	-4E-01	-4E-01	-4E-01	-4E-01	-4E-01	-4E-01	-4E-01	-3E-01	-3E-01
S04	0.25	72.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	0.25	72.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S06	0.25	72.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S07	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S08	0.25	72.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S09	0.25	72.0%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S10	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S13	0.003	25.3%	-7E+16	-2E+14	-8E+11	-3E+09	-1E+07	-6E+04	-4E+03	-3E+02	-1E+02	-3E+01	-1E+01	-8E+00	-6E+00	-4E+00	-2E+00	-1E+00
S14	0.145	52.1%	-1E+05	-2E+04	-3E+03	-6E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S15	0.48	96.0%	-2E+01	-1E+01	-8E+00	-4E+00	-3E+00	-2E+00	-1E+00	-1E+00	-1E+00	-9E-01	-8E-01	-8E-01	-7E-01	-7E-01	-6E-01	-5E-01
S16	0.15	53.1%	-8E+04	-1E+04	-3E+03	-5E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S17	0.15	53.1%	-8E+04	-1E+04	-3E+03	-5E+02	-1E+02	-2E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S18	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S19	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S20	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S21	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S22	0.125	48.0%	-3E+05	-4E+04	-7E+03	-1E+03	-2E+02	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-9E-01
S23	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S24	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S25	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S26	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S27	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S28	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S29	0.32	82.5%	-4E+02	-2E+02	-6E+01	-2E+01	-1E+01	-4E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-9E-01	-7E-01
S30	0.0025	25.2%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
															-1.2E+02			
Arithmetic Mean	0.135		-1.3E+17	-3.7E+14	-1.1E+12	-3.5E+09	-1.2E+07	-44523	-2981.84	-225.322	-67.4344	-22.2997	-8.55195	-5.26487	-3.96748	-3.08655	-1.4811	-0.86523
Arithmetic Standard Deviation	0.198		1.2E+17	3.4E+14	1E+12	3.2E+09	1.1E+07	39834.2	2656.88	197.812	57.7542	18.0464	6.17385	3.42296	2.369737	1.67674	0.52831	0.1978
Variance	0.039		1.4E+34	1.2E+29	1E+24	1E+19	1.1E+14	1.6E+09	7059023	39129.5	3335.55	325.671	38.1165	11.7167	5.615653	2.81147	0.27911	0.03912
Count	30																	
Degrees of Freedom	29																	
		Box-Cox Parameter	-219.3	-165.0	-111.5	-59.3	-8.9	38.0	59.0	76.8	83.7	88.7	91.03	90.88	90.04	88.6	76.0	47.0

Confidence	95%	Transformed Confidence =	1.92
Student's t value	1.699		
		Transformed UCL =	**-6.64**
		Back-transformed UCL =	**0.02 mg/kg**

Table B-14. Sample Data for Methy Isobutyl Ketone

	Conc. mg/kg	Normal Distribution	-7	-6	-5	-4	λ -3.00	-2.00	-1.50	-1.00	-0.75	-0.50	-0.25	**-0.10**	**0.00**	0.10	0.50	1.00
S01	0.25	67.6%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S02	0.0025	24.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S03	0.25	67.6%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S04	0.25	67.6%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S05	1	100.0%	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00	0E+00
S06	0.25	67.6%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S07	0.0025	24.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S08	0.25	67.6%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S09	0.5	94.6%	-2E+01	-1E+01	-6E+00	-4E+00	-2E+00	-2E+00	-1E+00	-1E+00	-9E-01	-8E-01	-8E-01	-7E-01	-7E-01	-7E-01	-6E-01	-5E-01
S10	0.0025	24.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S11	0.0025	24.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S12	0.0025	24.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S13	0.006	25.3%	-5E+14	-4E+12	-3E+10	-2E+08	-2E+06	-1E+04	-1E+03	-2E+02	-6E+01	-2E+01	-1E+01	-7E+00	-5E+00	-4E+00	-2E+00	-1E+00
S14	0.29	74.0%	-8E+02	-3E+02	-1E+02	-4E+01	-1E+01	-5E+00	-4E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-9E-01	-7E-01
S15	0.29	74.0%	-8E+02	-3E+02	-1E+02	-4E+01	-1E+01	-5E+00	-4E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-9E-01	-7E-01
S16	0.29	74.0%	-8E+02	-3E+02	-1E+02	-4E+01	-1E+01	-5E+00	-4E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-9E-01	-7E-01
S17	0.305	76.1%	-6E+02	-2E+02	-8E+01	-3E+01	-1E+01	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-9E-01	-7E-01
S18	0.0025	24.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S19	0.0025	24.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S20	0.005	25.2%	-2E+15	-1E+13	-6E+10	-4E+08	-3E+06	-2E+04	-2E+03	-2E+02	-7E+01	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-2E+00	-1E+00
S21	0.005	25.2%	-2E+15	-1E+13	-6E+10	-4E+08	-3E+06	-2E+04	-2E+03	-2E+02	-7E+01	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-2E+00	-1E+00
S22	0.25	67.6%	-2E+03	-7E+02	-2E+02	-6E+01	-2E+01	-8E+00	-5E+00	-3E+00	-2E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-8E-01
S23	0.005	25.2%	-2E+15	-1E+13	-6E+10	-4E+08	-3E+06	-2E+04	-2E+03	-2E+02	-7E+01	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-2E+00	-1E+00
S24	0.005	25.2%	-2E+15	-1E+13	-6E+10	-4E+08	-3E+06	-2E+04	-2E+03	-2E+02	-7E+01	-3E+01	-1E+01	-7E+00	-5E+00	-4E+00	-2E+00	-1E+00
S25	0.0025	24.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S26	0.0025	24.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S27	0.0025	24.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
S28	0.007	25.4%	-2E+14	-1E+12	-1E+10	-1E+08	-1E+06	-1E+04	-1E+03	-1E+02	-5E+01	-2E+01	-1E+01	-6E+00	-5E+00	-4E+00	-2E+00	-1E+00
S29	0.28	72.4%	-1E+03	-3E+02	-1E+02	-4E+01	-1E+01	-6E+00	-4E+00	-3E+00	-2E+00	-2E+00	-1E+00	-1E+00	-1E+00	-1E+00	-9E-01	-7E-01
S30	0.0025	24.8%	-2E+17	-7E+14	-2E+12	-6E+09	-2E+07	-8E+04	-5E+03	-4E+02	-1E+02	-4E+01	-1E+01	-8E+00	-6E+00	-5E+00	-2E+00	-1E+00
															-1.1E+02			
Arithmetic Mean	0.151		-8.6E+16	-2.5E+14	-7.6E+11	-2.4E+09	-8261618	-32805.3	-2293.92	-184.124	-57.1817	-19.6744	-7.83588	-4.91744	-3.74541	-2.93972	-1.44013	-0.84948
Arithmetic Standard Deviation	0.217		1.1E+17	3.3E+14	1E+12	3.1E+09	1E+07	37143.9	2438.98	180.059	52.7999	16.7347	5.86992	3.31547	2.324925	1.66566	0.54641	0.2173
Variance	0.047		1.3E+34	1.1E+29	9.9E+23	9.6E+18	1E+14	1.4E+09	5948635	32421.4	2787.83	280.05	34.4559	10.9924	5.405277	2.77444	0.29856	0.04722
Count	30																	
Degrees of Freedom	29																	
		Box-Cox Parameter	-270.2	-209.5	-149.5	-90.6	-33.4	20.7	45.4	66.6	75.1	81.2	84.45	84.72	84.15	83.0	71.8	44.3

Confidence	95%	Transformed Confidence =	1.82
Student's t value	1.699		
		Transformed UCL =	-6.02
		Back-transformed UCL =	0.03 **mg/kg**

Appendix C

Soil Boring Logs

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 885.1 Completion Depth 26.0 ft bgs

Quadrangle Rossiton Sec. ____ T. ____ R. ____

UTM (or State Plane) Coord. N.(X) 921737.8 E.(Y) 725841.9

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-2-98 Monitor Well No. MW-G2

Site Location US 421, Zionsville, Indiana

Auger Depth 24 ft bgs Rotary Depth ft bgs

Date: Start 1/29/98 Finish 2/4/98

Water Level: During Drilling ▽ 8.0 ft bgs At Completion ▽ ft bgs

PERSONNEL

Geologist - S. Conway
Driller - Dave Bills
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
884.1	LEAN CLAY FILL with Sand medium stiff to stiff, brown, roots near surface (CL FILL)	1	64		6	.75 B	NA	15	7.3	
883.1		2	65		12	1.75 P	4 3 3 4	-	0004	
882.1		3								
881.1		4	66		16	1.5	4 4 4 5	15	127	
880.1		5								
879.1	SANDY CLAY stiff, dark gray (CL)	6	150		20	1.4 B	2 3 4 5	21	10	
878.1	Sand lens with pebbles at 7.3 feet.	7								12" Steel Casing installed to 7 feet.
877.1	CLAY soft to medium stiff, gray, trace sand and gravel (CL)	8	151		2	0.5 P	ST	25		
876.1	POORLY GRADED SAND coarse grained, loose, gray (SP)	9								
875.1		10	152		4	NP	NA	-	NA	
874.1		11								Bottom of Excavation at 874.9 +/-
873.1	LEAN CLAY stiff, gray, trace sand, little gravel (CL)	12	153		14	1.0 E	3 5 5 7	9	0	
872.1	UW = 147 pcf	13								
871.1	POORLY GRADED SAND medium to coarse grained, loose, gray, trace gravel (SP)	14	154		14	NP	1 2 3 6	-	0	
870.1		15								
869.1		16	155		10	NP	1 3 5 5	-	0	
868.1		17								
867.1	POORLY GRADED SAND with Gravel medium to coarse grained, medium dense, gray (SP)	18	156		18	NP	4 6 8 7	-	0	Cc = 0.96
866.1	Gravel lens at 19.8 feet	19								Cu = 7.5

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone Boring No. G-2-98 Monitor Well No. MW-G2

Project Name Enviro-Chem Superfund Site Site Location US 421, Zionsville, Indiana

Surface Elevation 885.1 Completion Depth 26.0 ft bgs Auger Depth 24 ft bgs Rotary Depth ft bgs

Quadrangle Rosston Sec. T. R. Date: Start 1/29/98 Finish 2/4/98

UTM (or State Plane) Coord. N.(X) 921737.6 E.(Y) 725941.9 Water Level: During Drilling ▽ 8.0 ft bgs At Completion ▽ ft bgs

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)
	LEAN CLAY with Sand hard, gray, trace gravel (CL)			157		14	6.8 B	3 8 12 21	-	0
864.1			21							
863.1			22	158		14	4.5+ P	8 10 13 14	-	0
862.1	Sand lens at 23.6 feet.		23							
861.1			24	159		18	-	7 13 14 16	-	0
860.1			25							
859.1	Boring terminated at 26 feet and tremmie grouted with cement-bentonite grout.		26							

PERSONNEL

Geologist - S. Conway
Driller - Dave Ellis
Helper - Justin
Helper -

REMARKS

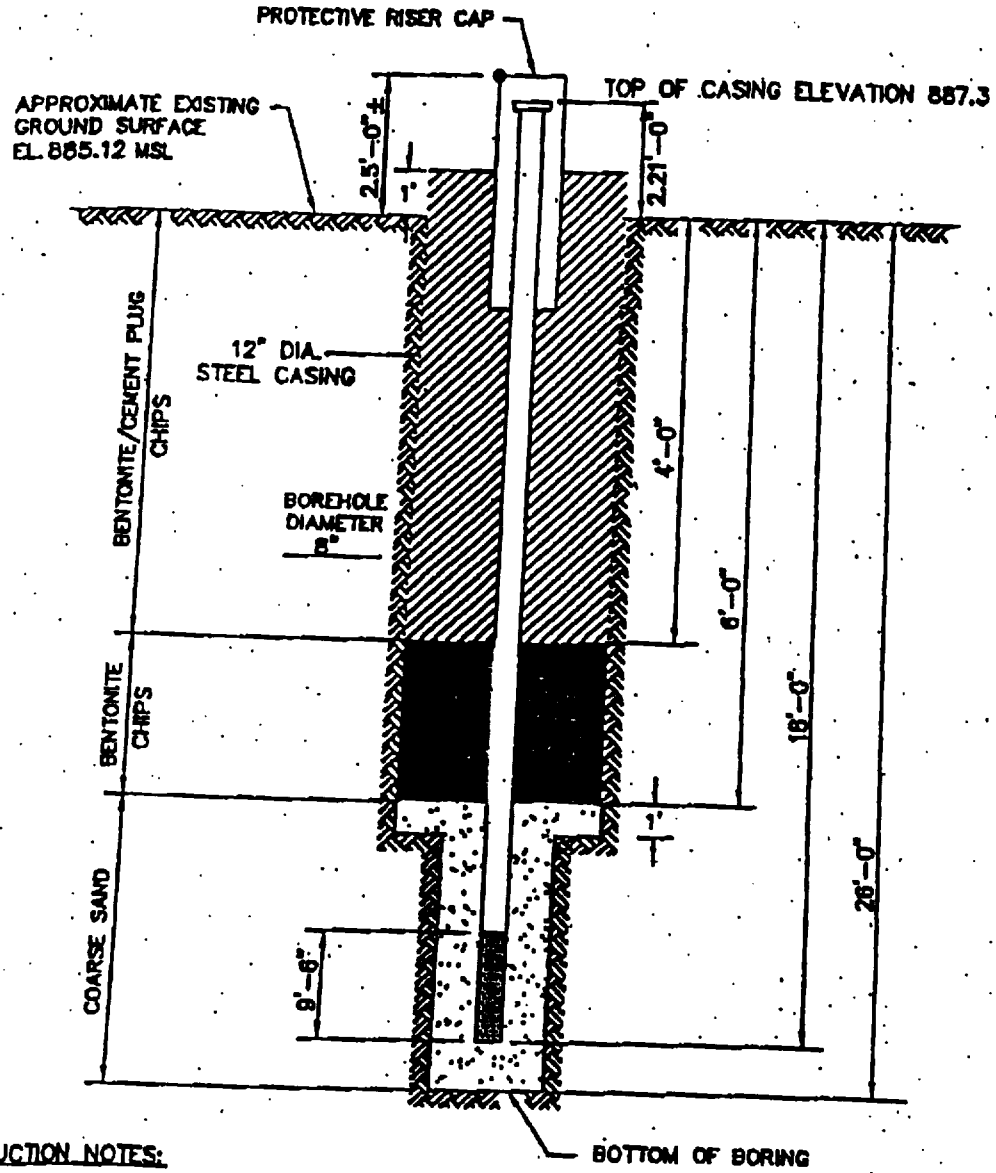
PROJECT TITLE ENVIRO-CHEM WELL NO. G-2 BORING NO. G-2-98

LOCATION ZIONSVILLE, IN DATE STARTED 1-29-98 COMPLETED 1-29-98

DRILLING CONTRACTOR PHILIP ENVIRONMENTAL DRILLER DAVE ELLIS

RIG No. CME-75 METHOD HSA FLUIDS NONE GEOLOGIST STEVE CONWAY, HANDEX

COMMENTS N 921,799.89, E 725,948.40



WELL CONSTRUCTION NOTES:

1. TYPE RISER ABOVE W.T. 2"ø PVC
2. TYPE RISER BELOW W.T. 2"ø PVC
3. TYPE OF SCREEN 0.010" CONT. SLOT PVC
3. TYPE OF PROTECTIVE CASING STEEL
4. ELEVATION OF WATER 878.13 FT MSL
5. WATER LEVEL READING ON 9.0 FT BELOW TOC FEB 24, 1998

RISER STACK MONITORING WELL INSTALLATION DIAGRAM

Versar INC.

NOT TO SCALE

L:\3709001\...\3709001H

versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone Boring No. G-3-98 Monitor Well No.

Project Name Enviro-Chem Superfund Site Site Location US 421, Zionsville, Indiana

Surface Elevation 885.2 Completion Depth 34.0 ft bgs Auger Depth 32 ft bgs Rotary Depth ft bgs

Quadrangle Rosston Sec. T. R. Date: Start 1/23/98 Finish 1/26/98

UTM (or State Plane) Coord. N.(X) 921664.5 E.(Y) 725941.5 Water Level: During Drilling ▽ 9.0 ft bgs At Completion ▽ ft bgs

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

PERSONNEL

Geologist - C. O'Neil
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
884.2	LEAN CLAY With Sand stiff to very stiff, brown to brown and gray mottled, trace gravel and brick fragments (CL-FILL)		1	10	X	4	1.0 P	1 2 2 1	21	0	
883.2			2	11	X	9	1.5 P	2 3 2 4	18	0	
882.2	UW=131 pcf SG=2.72		3								
881.2			4	12	X	12	2.0 P	1 4 3 5	21	2.7	
880.2			5								
879.2			6	13	X	20	1.9 B	2 2 2 3	21	26	
878.2	SANDY SILT stiff, gray, trace organics (ML) UW=129 pcf SG=2.64		7								12" Steel Casing installed to 7 feet.
877.2	POORLY GRADED SAND loose, fine to medium grained, brown (SP)		8	14	X	16	NP	1 2 2 4	18	-	
876.2			9								
875.2	LEAN CLAY very stiff to hard, brown and gray mottled (CL) UW=138 pcf SG=2.74		10	15	X	20	4.1 B	4 10 11 12	13	20.6	
874.2	Grades with isolated sand streaks and lenses.		11								Bottom of Excavation at 874.1+/-
873.2	SANDY CLAY/CLAYEY SAND very stiff, gray, trace gravel (CL/SC)		12	16	X	20	2.2 S	4 6 9 9	9	8.3	
872.2	Sand lense at 13.5 feet		13								
871.2	LEAN CLAY with Sand very stiff to hard, gray, trace gravel (CL)		14	17	X	20	5.3 B	5 8 11 11	9	19	
870.2	Sand lens at 15.5 feet		15								
869.2	UW=150 pcf		16	18	X	16	4.5+ P		-	18	
868.2			17								
867.2			18	19	X	10	2.9 B	4 6 6 9	11	1.8	
866.2	UW=144 pcf		19								

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Boring No. G-3-98 Monitor Well No.

Project Name Enviro-Chem Superfund Site

Site Location US 421, Zionsville, Indiana

Surface Elevation 886.2 Completion Depth 34.0 ft bgs

Auger Depth 32 ft bgs Rotary Depth ft bgs

Quadrangle Rosston Sec. T. R.

Date: Start 1/23/98 Finish 1/26/98

UTM (or State Plane) Coord. N.(X) 921664.5 E.(Y) 725941.5

Water Level: During Drilling ▽ 9.0 ft bgs At Completion ▽ ft bgs

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

PERSONNEL

Geologist - C. O'Neil
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS
	LEAN CLAY with Sand very stiff to hard, gray, trace gravel (CL)
864.2	
863.2	Sand lens at 22 feet
862.2	
861.2	POORLY GRADED SAND medium to coarse graded, medium dense gray (SP)
860.2	LEAN CLAY with Sand very stiff to hard, gray (CL)
859.2	
858.2	
857.2	
856.2	
855.2	Grades to LEAN CLAY
854.2	
853.2	SILT hard, gray, with interbedded clay streaks (ML)
852.2	
851.2	Boring terminated at 34 feet and tremmie grouted with cement-bentonite grout.

Graphic Log

Depth (feet bgs): 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34

SAMPLES

Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)
20	X	18	3.8 B	7 9 12 16	13	8.3
21	X	20	4.5 B	10 14 11 16		0.8
22	X	20	4.4 B	10 15 20 24	11	1.3
23	X	17	7.02 S	17 18 23 34	11	1.3
24	X	22	10.5 S	10 21 25 47	10	2.4
25	X	12	4.5+ P	20 50 50/4"	12	6.1
26	X	12	4.7 S	47 43 50 50/3.5	7	-

REMARKS

versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 886.6 Completion Depth 36.0 ft bgs

Quadrangle Roseton Sec. ____ T. ____ R. ____

UTM (or State Plane) Coord. N.(X) 921819.7 E.(Y) 725914.5

Latitude 39° 57' ____" Longitude 86° 16' ____"

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-5-98 Monitor Well No. ____

Site Location US 421, Zionsville, Indiana

Auger Depth 32 ft bgs Rotary Depth ____ ft bgs

Date: Start 1/31/98 Finish 2/5/98

Water Level:
During Drilling ▽14.0 ft bgs At Completion ▽ ____ ft bgs

PERSONNEL

Geologist - Steve Conwe
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
886.6	SANDY CLAY FILL very stiff to hard, brown to brown and gray mottled, trace gravel, brick and ash (CL-FILL)		1	76	X	9	2.0 P	3 2 2 3	13	0	
884.6			2	77	X	17	3.0 P	3 5 9 11	14	0	
883.6			3								
882.6			4	78	X	22	4.5	4 8 10 10	11	3.4	
881.6			5								
880.6			6	110	X	24	1.6 S	8 7 8 7	11	205	
879.6	CLAY very stiff, brown and gray mottled (CL)		7								12" Steel Casing installed to 7 feet.
878.6	Sand lens at 8.5 feet. UW = 144.2 pcf SG = 2.80		8	111	■	24	3.2	ST	11	NA	
877.6			9								
876.6			10	112	X	16	3.1 S	4 5 7 8	11	0.6	Bottom of Excavation at 875.8 +/-
875.6			11								
874.6	SAND CLAY very stiff, gray (CL)		12	113	X	19	3.5 P	5 5 5 7	10	0.6	
873.6	Fine GRAVEL lenses at 13.1 and 14 feet.		13								
872.6	SILTY SAND loose, gray, trace gravel (SM)		▽14	114	X	16	NP	4 4 4 3	16	0.0	
871.6	Gravel layer at 15.5 feet.		15								
870.6			16	115	X	12	2.5 P	4 4 7 13	8	0.0	
869.6	SANDY CLAY medium stiff, gray (CL) Sand lens at 17.3 feet		17								
868.6	POORLY GRADED SAND loose to medium dense, medium to coarse grained, gray, trace gravel (SP)		18	116	X	15	NP	1 3 5 7	10	1.3	
867.6			19								

VERSAR INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone Boring No. G-5-98 Monitor Well No.

Project Name Enviro-Chem Superfund Site Site Location US 421, Zionsville, Indiana

Surface Elevation 886.6 Completion Depth 36.0 ft bgs Auger Depth 32 ft bgs Rotary Depth ft bgs

Quadrangle Rosston Sec. T. R. Date: Start 1/31/98 Finish 2/5/98

UTM (or State Plane) Coord. N.(X) 921818.7 E.(Y) 725914.5 Water Level: During Drilling ▽14.0 ft bgs At Completion ▽ ft bgs

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

PERSONNEL

Geologist - Steve Conway
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
885.6	POORLY GRADED SAND medium to coarse grained, medium dense, gray, trace gravel (SP)		21	117	X	12	NP	3 5 7 7	15	0.0	
884.6			22	118	X	13	NP	3 5 8 9		0.0	
883.6			23								
882.6			24	119	X	15	NP	3 7 11 11		0.0	
881.6			25								
880.6			26	120	X	16	NP	6 7 8 13		0.0	
879.6			27								
878.6			28	121	X	13	NP	3 6 9 10		0.0	
877.6			29								
876.6			30	122	X	16	NP	7 9 7 12		0.0	
875.6			31								
874.6			32	123	X	15	NP	6 8 9 13		0.0	
873.6			33								
872.6			34	124	X	24	NP	4 3 6 9		0.0	
871.6			35								
870.6	Boring terminated at 36 feet and tremmie grouted with cement-bentonite grout.		36								

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 883.9 Completion Depth 27.0 ft bgs

Quadrangle Roseton Sec. ____ T. ____ R. ____

UTM (or State Plane) Coord. N.00 921433.4 E.(Y) 725907.8

Latitude 39° 57' ____" Longitude 86° 16' ____"

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-6-98 Monitor Well No. MW-6

Site Location US 421, Zionsville, Indiana

Auger Depth 25 ft bgs Rotary Depth ____ ft bgs

Date: Start 1/29/98 Finish 2/4/98

Water Level: During Drilling ▽ 4.0 ft bgs At Completion ▽ ____ ft bg

PERSONNE

Geologist - Steve Conw
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
883.9	7" CONCRETE above limestone subbase.	1	67	X	6	-	- 4 2 2	15	-	
881.9	SILTY CLAY FILL gray and brown, trace sand and gravel (CL-ML FILL)	2								
880.9	LEAN CLAY with Sand stiff to very stiff, brown to brown and gray mottled, trace gravel (CL)	3	68	X	16	-	5 7 9 12	1.1	175	
879.9		4								
878.9	Sand lenses at 4.9 and 5.6 feet	5	69	X	20	2.4 S	5 6 7 9	12	-	
877.9		6								
876.9		7	160	X	15	2.6 S	3 4 5 7	13	11.0	12" Steel Casing instal to 7 feet.
875.9		8								Bottom of Excavation a 875.2 +/-
874.9	LEAN CLAY very stiff, gray, trace sand and gravel (CL)	9	161	X	18	3.0 S	4 6 8 8	9	1.0	
873.9		10								
872.9		11	162	■	24	1.8	ST	11	NA	
871.9	UW = 143.7 pcf SG = 2.67	12								
870.9	Grades with interbedded SAND lenses.	13	163	X	18	1.7	NP	12	0.0	
869.9		14								
868.9	Sand lens at 15.3 feet.	15	164	X	16	1.3	2 3 4 5	12	0.0	
867.9		16								
866.9		17	165	X	18	1.3	1 3 2 6	-	0.0	
865.9		18								
864.9	POORLY GRADED SAND medium to coarse grained, medium dense, gray, trace gravel	19	166	X	14	NP	3 6	-	0.0	

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 883.9 Completion Depth 27.0 ft bgs

Quadrangle Rosston Sec. ____ T. ____ R. ____

UTM (or State Plane) Coord. N.(X) 921433.4 E.(Y) 725907.8

Latitude 39° 57' ____ ° Longitude 86° 16' ____ °

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-6-98 Monitor Well No. MW-G6

Site Location US 421, Zionsville, Indiana

Auger Depth 25 ft bgs Rotary Depth ____ ft bgs

Date: Start 1/28/98 Finish 2/4/98

Water Level: During Drilling ▽ 4.0 ft bgs At Completion ▽ ____ ft bgs

PERSONNEL

Geologist - Steve Conway
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
	POORLY GRADED SAND medium to coarse grained, medium dense, gray, trace gravel (SP)				X			8 8			
862.9			21	167	X	17	NP	3 6 7 14	-	0.0	
861.9			22								
860.9			23	168	X	14	NP	7 8 11 14	-	0.0	
859.9			24								
858.9			25	169	X	13	NP	6 11 13 18	-	0.0	
857.9			26								
856.9	Boring terminated at 27 feet and tremmie grouted with cement-bentonite grout.		27								

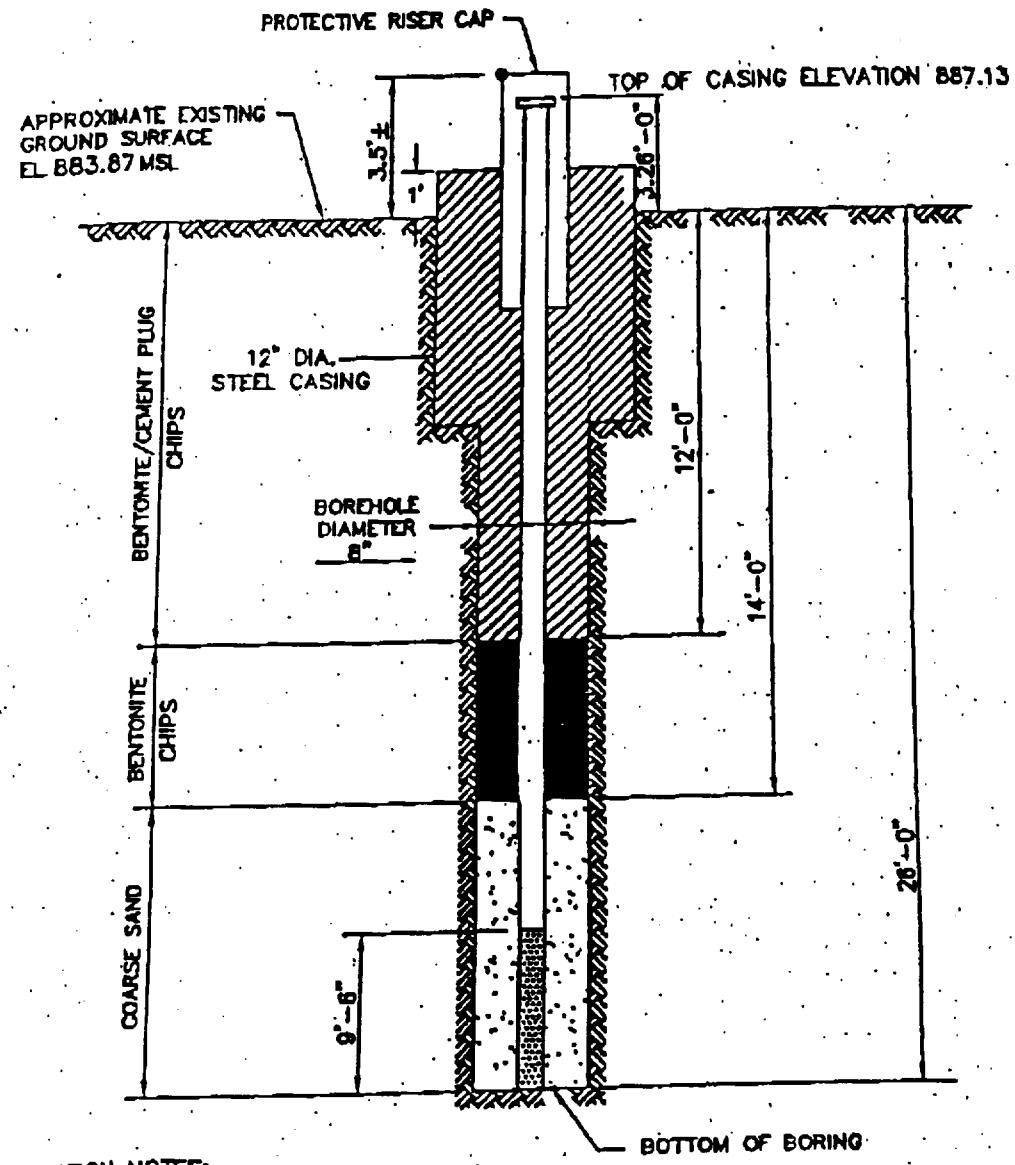
PROJECT TITLE ENVIRO-CHEM WELL NO. G-6 BORING NO. G-6-98

LOCATION ZIONSVILLE, IN DATE STARTED 1-29-98 COMPLETED 1-29-98

DRILLING CONTRACTOR PHILIP ENVIRONMENTAL DRILLER DAVE ELLIS

RIG No. CME-75 METHOD HSA FLUIDS NONE GEOLOGIST STEVE CONWAY, HANDEX

COMMENTS N 921,733.40, E 725,907.76



WELL CONSTRUCTION NOTES:

1. TYPE RISER ABOVE W.T. 2"ø PVC
2. TYPE RISER BELOW W.T. 2"ø PVC
3. TYPE OF SCREEN 0.010" CONT. SLOT PVC
3. TYPE OF PROTECTIVE CASING STEEL
4. ELEVATION OF WATER 878.35 FT MSL
5. WATER LEVEL READING ON 8.95' FT BELOW TOC FEB 24, 1998

RISER STACK MONITORING WELL INSTALLATION DIAGRAM

Versar INC.

L:\3709001\....\3709001G

NOT TO SCALE

VERSAR INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone Boring No. G-7-98 Monitor Well No.

Project Name Enviro-Chem Superfund Site Site Location US 421, Zionsville, Indiana

Surface Elevation 883.8 Completion Depth 31.0 ft bgs Auger Depth 29 ft bgs Rotary Depth ft bgs

Quadrangle Rosston Sec. T. R. Date: Start 1/30/98 Finish 2/3/98

UTM (or State Plane) Coord. N.(X) 921668.8 E.(Y) 725903.5 Water Level: During Drilling ▽18.0 ft bgs At Completion ▽ ft bgs

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

PERSONNEL

Geologist - Steve Conway
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
	10" CONCRETE floor slab over crushed limestone subbase.									
882.8		1	70	X	4	NA	- 3 7 9	-	185	
881.8		2								
880.8	LEAN CLAY FILL very stiff, brown, trace gravel (CL)	3	71	X	18	2.4 B	5 6 7 8	16	81	
879.8	SAND FILL medium to coarse grained, medium dense, brown (SP-FILL)	4								
878.8	LEAN CLAY with Sand very stiff, gray, trace gravel (CL)	5	72	X	18	2.1 S	3 7 7 11	14	162	
877.8	Orange staining at 5.0 feet	6								
876.8		7	138	X	18	3.3 B	6 5 6 8	11	78	12" Steel Casing installed to 7 feet.
875.8		8								
874.8	UW = 143.7 pcf SG = 2.69	9	139	■	24	4.0	51	11	NA	Bottom of Excavation at 874.2 +/-
873.8		10								
872.8		11	140	X	20	2.5	3 4 4 6	9	1.3	
871.8		12								
870.8	POORLY GRADED SAND fine grained, loose, gray (SP)	13	141	X	17	NP	4 4 4 7	10	1.3	
869.8		14								
868.8	LEAN CLAY with interbedded sand lenses, very stiff to hard, gray (CL)	15	142	X	15	NA	2 4 8 6	10	0.0	
867.8		16								
866.8		17	143	X	15	4.5 P	4 7 8 8	12	0.0	
865.8		▽18								
864.8	POORLY GRADED SAND medium to coarse grained, medium dense, gray, trace gravel (SP)	19	144	X	12	NP	4 5	11	0.0	

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 883.8 Completion Depth 31.0 ft bgs

Quadrangle Rosston Sec. ____ T. ____ R. ____

UTM (or State Plane) Coord. N.(X) 921668.8 E.(Y) 725903.5

Latitude 39° 57' ____" Longitude 86° 16' ____"

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-7-98 Monitor Well No. ____

Site Location US 421, Zionsville, Indiana

Auger Depth 29 ft bgs Rotary Depth ____ ft bgs

Date: Start 1/30/98 Finish 2/3/98

Water Level: During Drilling ▽18.0 ft bgs At Completion ▽ ____ ft bgs

PERSONNEL

Geologist - Steve Conway
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Op (ppm)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)
	POORLY GRADED SAND medium to coarse grained, medium dense, gray, trace gravel (CL)							8 5		
862.8			21	145		13	NP	10 12 12 9	11	0.0
861.8			22							
860.8	LEAN CLAY with Sand hard, gray, trace gravel (CL)		23	146		14	7.7 B	6 10 11 15	9	0.0
859.8			24							
858.8			25	147		17	7.3 B	5 11 16 19		0.0
857.8			26							
856.8			27	148		18	10 S	15 16 18 22		0.0
855.8			28							
854.8	Sand lenses at 29 and 29.5 feet.		29	149		18	5.9	9 13 20 28		0.0
853.8			30							
852.8	Boring terminated at 31 feet and trammie grouted with cement-bentonite grout.		31							

SAMPLES

REMARKS

VERSAR INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone Boring No. G-8-98 Monitor Well No. ____

Project Name Enviro-Chem Superfund Site Site Location US 421, Zionsville, Indiana

Surface Elevation 884.6 Completion Depth 24.0 ft bgs Auger Depth 22 ft bgs Rotary Depth ft bgs

Quadrangle Rosston Sec. ____ T. ____ R. ____ Date: Start 1/30/98 Finish 2/5/98

UTM (or State Plane) Coord. N.(X) 921598.6 E.(Y) 725895.7 Water Level: During Drilling ▽21.0 ft bgs At Completion ▽ 1.0 ft bgs

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

PERSONNEL

Geologist - Steve Conway
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
883.6	LEAN CLAY FILL with Sand soft to medium stiff, brown, trace roots and gravel (CL-FILL)	1	73		14	.4 B	1 1 2 1	16	0.0	
882.6		2	74		9	.33 B	1 1 1 2	20	0.9	
881.6	Gravel lens at 3.6 feet	3								
880.6	CLAYEY SAND FILL very stiff, brown (SC-FILL)	4	75		16	3.1 B	2 7 8 7	12	3.0	
879.6		5								
878.6	LEAN CLAY with Sand hard, brown and gray mottled, trace gravel (CL)	6	210		21	4.5 P	6 6 8 12	13	17.7	
877.6		7								12" Steel Casing installed to 7 feet.
876.6	UW=144.3 pcf SG=2.766	8	211		24	3.0	ST	13	NA	
875.6	Grades with Gravel.	9								
874.6		10	212		21	3.0 P	5 5 7 7	11	4.5	Bottom of Excavation at 873.8+/-
873.6		11								
872.6	Gravel lens at 12.4 feet	12	213		21	3.0 P	3 5 6 7	11	3.5	
871.6		13								
870.6	LEAN CLAY stiff to very stiff, gray, trace sand and gravel (CL)	14	214		20	2.0 P	3 4 5 8	9	1.5	
869.6		15								
868.6		16	215		21	1.75 P	3 4 4 5	11	1.5	
867.6		17								
866.6		18	216		21	1.5 P	1 3 3 6	11	1.5	
865.6		19								

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 884.6 Completion Depth 24.0 ft bgs

Quadrangle Rosston Sec. ____ T. ____ R. ____

UTM for State Plane Coord. N.(X) 921598.6 E.(Y) 725895.7

Latitude 39° 57' ____" Longitude 86° 16' ____"

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-8-98 Monitor Well No. ____

Site Location US 421, Zionsville, Indiana

Auger Depth 22 ft bgs Rotary Depth ____ ft bgs

Date: Start 1/30/98 Finish 2/5/98

Water Level: During Drilling ▽21.0 ft bgs At Completion ▽ 1.0 ft bgs

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)
863.6	LEAN CLAY stiff to very stiff, gray, trace sand and gravel (CL)		▽21	217		22	1.0 P	4 3 12 12	11	1.5
862.6	POORLY GRADED SAND medium grained, dense, gray (SP)		22 23	218		18	NP	6 12 19 21	9	0.5
861.6			24							
860.6	Boring terminated at 24 feet and tremmie grouted with cement-bentonite grout.									

PERSONNEL

Geologist - Steve Conway
Driller - Dave Ellis
Helper - Justin
Helper -

REMARKS

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone Boring No. G-9-98 Monitor Well No.

Project Name Enviro-Chem Superfund Site Site Location US 421, Zionsville, Indiana

Surface Elevation 884.4 Completion Depth 36.0 ft bgs Auger Depth 34 ft bgs Rotary Depth ft bgs

Quadrangle Rossiton Sec. T. R. Date: Start 1/22/98 Finish 1/26/98

UTM (or State Plane) Coord. N.(X) 921739.4 E.(Y) 725876.6 Water Level: During Drilling ▽ 8.0 ft bgs At Completion ▽ ft bgs

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

PERSONNEL

Geologist - C. O'Neil
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
883.4	13" Concrete slab over 12" Crushed limestone subbase floor	1	7	X	4	NA	- - 7 12		343	
882.4	LEAN CLAY very stiff to hard, gray (CL) UW = 146 pcf	2–3	8	X	15	4.5 P	6 7 8 9	11	284	
881.4										
880.4	Sand lens at 4.5 feet	4–5	9	X	15	2.5 P	2 6 5 6	11	280	
879.4	Grades with CLAYEY SILT									
878.4		6–7	27	X	17	4.1 B	4 6 8 7	11		12" Steel Casing installed to 7 feet.
877.4										
876.4	POORLY GRADED SAND medium grained, loose, gray, saturated (SP)	8	28	X	17	2.5 P NP	2 3 4 4	12		
875.4	LEAN CLAY to SANDY LEAN CLAY gray, trace gravel (CL)	9								Bottom off Excavation at 875.6 +/-
874.4	POORLY GRADED SAND medium grained, loose, gray, saturated (SP)	10	29	X	19	NP 2.0 B	3 3 4 5	11		
873.4	LEAN CLAY to SANDY LEAN CLAY gray, trace gravel (CL) UW = 148 pcf	11–12	30	X	18	1.4 B	2 4 4 6	11		
872.4										
871.4		13–14	31	X	22	1.3 B	2 4 6 6	11		
870.4										
869.4	UW = 143 pcf	15–16	32	X	16	2.2 B	3 6 7 9	11		
868.4										
867.4		17–18	33	X	13	3.25 P	8 11 10 10	9		
866.4	SAND lens at 18 feet									
865.4	UW = 140 pcf	19								

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3708.001 County Boone Boring No. G-9-98 Monitor Well No.

Project Name Enviro-Chem Superfund Site Site Location US 421, Zionsville, Indiana

Surface Elevation 884.4 Completion Depth 36.0 ft bgs Auger Depth 34 ft bgs Rotary Depth ft bgs

Quadrangle Rosston Sec. T. R. Date: Start 1/22/98 Finish 1/26/98

UTM (or State Plane) Coord. N.(X) 921738.4 E.(Y) 725876.6 Water Level: During Drilling ▽ 6.0 ft bgs At Completion ▽ ft bgs

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

PERSONNEL

Geologist - C. O'Neil
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Op (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
863.4	POORLY GRADED SAND medium to coarse grained, loose to medium dense, gray, trace gravel (SP)		21	34	X	14	NP	4 4 4 7			
862.4			22	35	X	12	NP	4 8 9 10			
861.4			23								
860.4	Cc = 0.49 Cu = 7.8		24	36	X	14	NP	6 8 10 10			Grain Size Analysis
859.4			25								
858.4			26	37	X	13	NP	6 8 10 11			
857.4			27								
856.4			28	38	X	13	NP	4 6 10 10			
855.4			29								
854.4			30	39	X	14	NP	8 12 12 16			
853.4			31								
852.4			32	40	X	17	NP	3 9 18 21			
851.4			33								
850.4			34	41	X	19	NP	7 11 13 14	18		
849.4	SILT medium dense, gray, trace gravel (SM)		35								
848.4	Boring terminated at 36 feet and trammie grouted with cement-bentonite grout.		36								

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 883.8 Completion Depth 32.5 ft bgs

Quadrangle Rosston Sec. ____ T. ____ R. ____

UTM (or State Plane) Coord. N,(X) 921668.0 E,(Y) 725875.2

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-10-98 Monitor Well No. ____

Site Location US 421, Zionsville, Indiana

Auger Depth 31 ft bgs Rotary Depth Justin ft bgs

Date: Start 1/28/98 Finish 2/3/98

Water Level:
During Drilling ▽16.0 ft bgs At Completion ▼ 0.1 ft bg

PERSONNEL

Geologist - Steve Conway
Driller - Dave Ellis
Helper -
Helper -

Elevation	DESCRIPTION OF MATERIALS
882.8	13" CONCRETE over limestone subbase.
881.8	
880.8	CLAYEY SAND FILL brown, trace brick and gravel (SC)
879.8	
878.8	LEAN CLAY medium stiff, brown, black and gray (CL)
877.8	Grades to brown.
876.8	
875.8	
874.8	SANDY CLAY dark brown (CL) UW=133.1 pcf SG=2.75
873.8	
872.8	SAND medium to coarse grained, medium dense, trace clay (SP)
871.8	LEAN CLAY with Sand very stiff, gray (CL)
870.8	
869.8	
868.8	
867.8	
866.8	POORLY GRADED SAND medium to coarse grained, gray (SP)
865.8	
864.8	

Graphic Log

Depth (feet bgs): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, ▽16, 17, 18, 19

SAMPLES

Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
61	X	6	NP	- - 8 11	13	121	
62	X	15	1.0 B	5 4 3 5	17	139	
63	X	22	.7 B	1 3 2 2	21	63	
126	X	20	5.8 B	5 6 8 10	12	34	12" Steel Casing installed to 7 feet.
126	■	16	.85	ST	9	NA	Bottom of Excavation at 874.8 +/-
127	X	12	NP	3 6 7 5	10	6.0	
128	X	13	3.3 B	4 5 6 6	11	2.0	
129	X	17	3.0 B	2 4 5 6	10	5.0	
130	X	4	NP	- - 2 2	-	0	
131	X	15	NP	2 5	-	0	

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone Boring No. G-10-98 Monitor Well No.

Project Name Enviro-Chem Superfund Site Site Location US 421, Zionsville, Indiana

Surface Elevation 883.8 Completion Depth 32.5 ft bgs Auger Depth 31 ft bgs Rotary Depth Justin ft bgs

Quadrangle Rosston Sec. T. R. Date: Start 1/28/98 Finish 2/3/98

UTM (or State Plane) Coord. N.(X) 921668.0 E.(Y) 725875.2 Water Level: During Drilling ▽16.0 ft bgs At Completion ▼ 0.1 ft bgs

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

PERSONNEL

Geologist - Steve Conway
Driller - Dave Ellis
Helper -
Helper -

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qa (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
	POORLY GRADED SAND medium to coarse grained, gray (SP)				X			5 4			
882.8			21	132	X	13	NP	3 5 5 8	-	0	
881.8			22		X						
880.8			23	133	X	16	NP	6 8 10 9	-	0	
879.8			24		X						
878.8			25	134	X	7	NP	5 8 7 9	-	0	
877.8			26		X						
876.8			27	135	X	12	NP	8 13 13 19	-	0	
875.8			28		X						
874.8			29	136	X	14	NP	8 20 13 18	-	0	
873.8			30		X						
872.8	SILTY SAND to FINE SAND medium dense, gray (SM/SP)		31		X		NP	-	-	-	
871.8			32		X						
	Boring terminated at 32.5 feet and tremmie grouted with cement-bentonite grout.										Sampler refusal at 32.5 feet.

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone Boring No. G-11-98 Monitor Well No.

Project Name Enviro-Chem Superfund Site Site Location US 421, Zionsville, Indiana

Surface Elevation 884.6 Completion Depth 36.0 ft bgs Auger Depth 34 ft bgs Rotary Depth ft bgs

Quadrangle Rossiton Sec. T. R. Date: Start 1/22/98 Finish 1/27/98

UTM (or State Plane) Coord. N.(X) 921739.6 E.(Y) 725846.6 Water Level: During Drilling ▽20.0 ft bgs At Completion ▽ ft bgs

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

PERSONNEL

Geologist - Steve Conway
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Dp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
883.6	10" Concrete floor slab over 14" Crushed limestone subbase		1	4	X	6	NA	- - 4 11	21	000+	
882.6	LEAN CLAY FILL with Sand very stiff, brown and gray mottled (CL-FILL)		2	5	X	10	3.6 P	4 5 6 9	12	31.9	
881.6			3								
880.6	LEAN CLAY stiff to very stiff, gray, trace sand and gravel (CL)		4	6	X	17	2.0 P	3 4 6 9	10	24.6	
879.6			5								
878.6			6	42	X	13	1.7 B	4 3 2 5	11	74.8	Steel Casing installed to 7 feet.
877.6			7								
876.6			8	43	X	23	2.9 B	3 5 7 2	11	5.0	Bottom of Excavation at 876.6+/-
875.6			9								
874.6	UW=145.1 pcf SG=2.70		10	44	■	17	2.8 B	ST	12	NA	
873.6			11								
872.6			12	45	X	24	1.9 P	2 3 5 6	11	3.4	
871.6			13								
870.6			14	46	X	24	1.9 B	1 3 5 8	11	3.4	
869.6			15								
868.6			16	47	X	23	1.5 B	2 2 3 4	11	2.9	
867.6	Sand lens at 17.5 feet		17								
866.6	LEAN CLAY with Sand to SANDY CLAY stiff, gray (CL)		18	48	X	20	1.4 B	1 2 4 5	13	2.9	
865.6			19								

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 884.6 Completion Depth 36.0 ft bgs

Quadrangle Rosston Sec. ____ T. ____ R. ____

UTM (or State Plane) Coord. N.(X) 921739.6 E.(Y) 725846.6

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-11-98 Monitor Well No. ____

Site Location US 421, Zionsville, Indiana

Auger Depth 34 ft bgs Rotary Depth ft bgs

Date: Start 1/22/98 Finish 1/27/98

Water Level: During Drilling ▽20.0 ft bgs At Completion ▽ ft bgs

PERSONNEL

Geologist - Steve Conway
Driller - Dave Ellis
Helper - Justin
Helper -

DESCRIPTION OF MATERIALS

Elevation	Description
	POORLY GRADED SAND medium to coarse grained, medium dense, gray, trace gravel (SP)
863.6	
862.6	
861.6	
860.6	
859.6	
858.6	Cc = 9.0 Cu = 8.0
857.6	
856.6	
855.6	
854.6	
853.6	
852.6	Grades to dense
851.6	
850.6	
849.6	
848.6	Boring terminated at 36 feet and tremmie grouted cement-bentonite grout.

SAMPLES

Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Cu (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	Remarks
21	49	X	6	NP	1/ 18*	-	3.9	
22–23	50	X	12	NP	3 6 6 8	-	6.0	
24–25	51	X	15	NP	3 5 7 7	-	8.2	
26–27	52	X	13	NP	4 8 9 14	-	10.3	Grain Size Analysis
28–29	53	X	15	NP	6 10 15 20	-	2.9	
30–31	54	X	14	NP	8 11 16 18	-	2.9	
32–33	55	X	18	NP	7 13 20 36	-	1.8	
34–35	56	X	14	NP	6 14 21 24	-	3.4	

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 884.0 Completion Depth 36.0 ft bgs

Quadrangle Roseton Sec. ____ T. ____ R. ____

UTM (or State Plane) Coord. N.(X) 921671.0 E.(Y) 725842.4

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-12-98 Monitor Well No. ____

Site Location US 421, Zionsville, Indiana

Auger Depth 34 ft bgs Rotary Depth ft bgs

Date: Start 1/28/98 Finish 2/1/98

Water Level: During Drilling ▽20.0 ft bgs At Completion ▽ ft bgs

PERSONNEL

Geologist - C. O'Neil
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS
883.0	7" CONCRETE over limestone FILL subbase.
882.0	LEAN CLAY FILL with Sand stiff to very stiff, brown and gray, trace gravel and brick fragments (CL-FILL)
881.0	
880.0	
879.0	
878.0	LEAN CLAY stiff to very stiff, gray, trace sand and gravel (CL)
877.0	
876.0	
875.0	
874.0	
873.0	
872.0	
871.0	
870.0	SILTY SAND to fine SAND medium dense, gray (SM/SP)
869.0	
868.0	LEAN CLAY with Sand very stiff, gray (CL)
867.0	
866.0	
865.0	

Graphic Log

Depth (feet bgs): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19

SAMPLES

Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
57	X	15	5.0 P	8 27 18	13	4000	
58	X	20	3.7 B	6 5 6 6	10	912	
59	X	0	-	-	-	-	
60	X	24	1.2 B	3 3 5 7	9	0.8	12" Steel Casing installed to 7 feet.
62	X	17	3.0 B	1 3 5 5	10	1.1	Bottom of Excavation at 875.1 +/-
63	X	18	2.8 B	4 5 6 9	11	0.5	
64	X	18	1.7 B	2 4 6 10	11	0	
65	X	14	NP	6 8 10 8	13	0	
66	X	18	3.1 B	6 4 4 6	10	0	
67	X	17	3.3 B	2 4 4 6	10	0	

Field Boring Log

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 884.0 Completion Depth 36.0 ft bgs

Quadrangle Rosston Sec. ____ T. ____ R. ____

UTM (or State Plane) Coord. N.(X) 921671.0 E.(Y) 725842.4

Latitude 39° 57' ____" Longitude 86° 16' ____"

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-12-98 Monitor Well No. ____

Site Location US 421, Zionsville, Indiana

Auger Depth 34 ft bgs Rotary Depth ____ ft bgs

Date: Start 1/28/98 Finish 2/1/98

Water Level: During Drilling ▽20.0 ft bgs At Completion ▼ ____ ft bgs

PERSONNEL

Geologist - C. O'Neil
Driller - Dave Ellis
Helper - Justin
Helper -

DESCRIPTION OF MATERIALS

Elevation	Description
863.0	SAND medium to coarse grained, loose to medium dense, gray (SP)
862.0	LEAN CLAY stiff, gray, trace sand (CL)
861.0	
860.0	
859.0	
858.0	SAND medium to coarse grained, loose to medium dense, gray (SP)
857.0	
856.0	
855.0	
854.0	
853.0	
852.0	
851.0	
850.0	
849.0	
848.0	Boring terminated at 36 feet and tremmie grouted with cement-bentonite grout.

Graphic Log

Depth (feet bgs): 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

SAMPLES

Sample No.	Sample Type	Sample Recovery (inches)	Cp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)
88	X	18	NP	1 2 5 4	17	0
89	X	12	1.2 B	2 2 4 6	14	0
90	X	13	0.8 B	1 2 3 4		0
91	X	12	NP	4 6 9 9		0
92	X	20	NP	2 8 11 14		0
93	X	21	NP	6 12 14 19		0
94	X	15	NP	4 9 9 16		0
95	X	13	NP	7 9 13 15		0

REMARKS

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 884.6 Completion Depth 24.0 ft bgs

Quadrangle Rosston Sec. ____ T. ____ R. ____

UTM (or State Plane) Coord. N.(X) 921739.9 E.(Y) 725802.2

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-15-98 Monitor Well No. ____

Site Location US 421, Zionsville, Indiana

Auger Depth 22 ft bgs Rotary Depth ft bgs

Date: Start 2/11/98 Finish 2/13/98

Water Level: During Drilling ▽21.5 ft bgs At Completion ▽ ft bgs

PERSONNEL

Geologist - Steve Conway
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
883.6	LEAN CLAY with Sand hard, brown, trace gravel (CL)		1	229		24	4.5+ P	2 4 5 9	11	173	
882.6			2	230		24	4.5 P	4 6 7 9	12	342	
881.6			3								
880.6			4	231		24	4.5 P	4 7 10 6	11	50	
879.6			5								
878.6	LEAN CLAY with Sand gray, trace gravel (CL)		6	247		17	3.0	4 4 5 6	11		12" Steel Casing installed to 7 feet.
877.6			7								
876.6			8	248		19	2.1	3 4 5 5	11		
875.6			9								
874.6	SANDY SILTY CLAY gray, trace gravel (CL-ML) UW=144.8 pcf SG=2.73		10	249		24	1.2	ST	12	NP	LL=17, PI=5 50% Sand 29% Silt 21% Clay
873.6			11								
872.6	Sand lenses at 11.5 and 11.8 feet		12	250		20	1.3	4 4 4 5	11		
871.6	Sand lens at 13.5 feet.		13								
870.6			14	251		21	1.7	1 2 4 5	11		
869.6	Sand lens at 15.9 feet.		15								
868.6			16	252		19	1.7	2 3 3 4			
867.6			17								
866.6	SANDY CLAY stiff, gray, trace gravel (CL-SC)		18	253		24	1.7	1 1 2 2			
865.6	Sand lens at 19.5 feet.		19								

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 884.6 Completion Depth 24.0 ft bgs

Quadrangle Rosston Sec. ____ T. ____ R. ____

UTM (or State Plane) Coord. N.(X) 921739.9 E.(Y) 725802.2

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-15-98 Monitor Well No. ____

Site Location US 421, Zionsville, Indiana

Auger Depth 22 ft bgs Rotary Depth ____ ft bgs

Date: Start 2/11/98 Finish 2/13/98

Water Level: During Drilling ▽21.5 ft bgs At Completion ▼ ____ ft bgs

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)
	SANDY CLAY stiff, gray, trace gravel (CL-SC)		21	264	X	21	1.2	1 1 2 3		
863.6			▽							
	CLAYEY SAND loose, gray, trace gravel (SC)		22	265	X	22	NP	W O H		
862.6			23							
861.6			24							
860.6	Boring terminated at 24 feet and tremmie grouted with cement-bentonite grout.									

SAMPLES

PERSONNEL

Geologist - Steve Conway
Driller - Dave Ellis
Helper - Justin
Helper -

REMARKS

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone Boring No. G-16-98 Monitor Well No.

Project Name Enviro-Chem Superfund Site Site Location US 421, Zionsville, Indiana

Surface Elevation 884.8 Completion Depth 24.0 ft bgs Auger Depth 22 ft bgs Rotary Depth ft bgs

Quadrangle Rosston Sec. T. R. Date: Start 2/10/98 Finish 2/13/98

UTM (or State Plane) Coord. N.(X) 921672.8 E.(Y) 725803.5 Water Level: During Drilling ▽18.0 ft bgs At Completion ▽ ft bgs

Latitude 39° 57' " Longitude 86° 16' "

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

PERSONNEL

Geologist - Chris White
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
883.8	Crushed Limestone FILL subbase	1	225	X	15	2.25 P	16 9 5 4	12	0.0	
882.8	LEAN CLAY with Sand stiff, brown to brown and gray, trace gravel and organics (CL FILL)	2	226	X	14	1.65	4 2 4 4	17	134	
881.8		3								
880.8		4	227	X	17	1.0 P	2 1 3 3	17	1500	
879.8		5								
878.8		6	228	X	18	NP	2 2 3 4	20	7.0	
877.8	CLAYEY SAND FILL loose, brown and gray, saturated (SC-FILL)	7								12" Steel Casing installed to 7 feet.
876.8	SANDY SILTY CLAY with Sand medium stiff to stiff, brown and gray mottled, trace sand and gravel (CL-ML) UW=139.9 pcf SG=2.63 Sand lenses at 8.5 and 9.5 feet.	8	256	■	24	0.9	ST	12	NA	LL=20, PI=5 47% Sand 31% Silt 20% Clay
875.8		9								
874.8	LEAN CLAY with Sand very stiff, gray, trace gravel (CL)	10	257	X	17	2.9	4 3 5 7	11	3.3	
873.8		11								
872.8		12	258	X	15	2.3	2 3 4 6	12	1.4	
871.8	Sand lens at 13.5 feet.	13								
870.8		14	259	X	19	2.1	3 4 4 6	11	1.4	
869.8		15								
868.8	SANDY CLAY stiff to very stiff, trace gravel (CL-SC)	16	260	X	16	2.5	3 3 4 6	11	4.3	
867.8		17								
866.8	POORLY GRADED SAND fine to medium grained (SP)	▽18	261	X	21	NP	2 2 3 3	11	1.4	
865.8		19								

Versar INC. ENVIRONMENTAL RISK MANAGEMENT

Field Boring Log

Project No. 3709.001 County Boone

Project Name Enviro-Chem Superfund Site

Surface Elevation 884.8 Completion Depth 24.0 ft bgs

Quadrangle Rosston Sec. ____ T. ____ R. ____

UTM (or State Plane) Coord. N.(X) 921672.8 E.(Y) 725803.5

Latitude 39° 57' ____" Longitude 86° 16' ____"

Boring Location Southern Concrete Pad Excavation Area

Drilling Equipment and Method CME-75

Boring No. G-16-98 Monitor Well No. ____

Site Location US 421, Zionsville, Indiana

Auger Depth 22 ft bgs Rotary Depth ____ ft bgs

Date: Start 2/10/98 Finish 2/13/98

Water Level: During Drilling ▽18.0 ft bgs At Completion ▽ ____ ft bgs

PERSONNEL

Geologist - Chris White
Driller - Dave Ellis
Helper - Justin
Helper -

Elevation	DESCRIPTION OF MATERIALS	Graphic Log	Depth (feet bgs)	Sample No.	Sample Type	Sample Recovery (inches)	Qp (tsf)	N Value (blows/6")	Moisture Content (%)	PID Reading (ppm)	REMARKS
	POORLY GRADED SAND fine to medium grained, gray, trace gravel (SP)			252	X	19	NP	2 3 5 8		0.4	
863.8			21								
862.8			22	253	X	24	NP	1 4 5 10	-	2.4	
861.8			23								
860.8	Boring terminated at 24 feet and tremmie grouted with cement-bentonite grout.		24								

DRILL LOG

PROJECT ENVIRO-CHEM		OWNER ———	SKETCH MAP
LOCATION ZIONSVILLE, IN		W.O. NUMBER 2495-1010	ND - NOT DETECTED
BORING NUMBER IW-1	TOTAL DEPTH 22.0'	DIAMETER 8.0'	VPPM - VAPOR PARTS PER MILLION
SURFACE ELEV. —	WAT LEV: INIT - -	24-HRS —	SS - SPLIT SPOON
SCREEN: DIA 4"	LENGTH 5'	SLOT SIZE .020	F - FINE M - MEDIUM
CASING: DIA 4"	LENGTH 11'	TYPE PVC	C - COARSE
DRILLING COMPANY TOP FLIGHT		DRITILLING METHOD HSA	
DRILLER NICK	LOG BY VFB	DATE DRILLED 3-12-98	NOTES

Depth (feet)	Graphic Log	Well Construction	Sample Number	Blow Count/ RQD/ % REC.	PID READINGS (VPPM)	DESCRIPTION / SOIL CLASSIFICATION((COLOR, TEXTURE, STRUCTURES, MOISTURE, OVA READINGS)
1						0.610' GREY AND BROWN CLAY,
2						LITTLE SILT, TRACE FINE
3					80	TO COARSE SAND, WET,
4						DISTURBED, ODOR PRESENT
5						
6			SS-18	8-15	54	6.0-9.8 GREY CLAY, SOME SILT, TRACE
7				17-32		F-M SAND, TRACE F-M
8			SS-19	9-10	12.5	GRAVEL (WELL ROUNDED), DAMP,
9				13-22		MOTTLED, SLIGHT ODOR
10			SS-20	5-5	20.4	9.8-10.0 BROWN F-M GRAVEL, SATURATED,
11				7-12		SLIGHT ODOR (CHLORINATED SOLVENT)
12			SS-21	3-5	3.0	10.0-12.0 GREY CLAY, SOME SILT,
13				12-23		MOIST, NO ODOR
14			SS-22	6-8	114.7	12.0-12.2 BROWN FINE TO MEDIUM
15				11-12	ND	SAND AND GRAVEL, SATURATED,
16			SS-23	3-4	ND	ODOR (CHLORINATED SOLVENT)
17				7-10		12.2-14.0 GREY CLAY, LITTLE SILT,
18			SS-24	4-5	ND	DAMP, NO ODOR
19				7-9		14.0-14.8 BROWN COARSE SAND, STRONG ODOR
20			SS-25	4-6	ND	(CHLORINATED SOLVENT)
21				9-9		14.8-19.5 GREY CLAY, LITTLE SILT,
22						DAMP, NO ODOR
						19.5-19.6 BROWN FINE SAND, SATURATED, NO ODOR
						19.6-22.0 GREY CLAY, TRACE SILT, DAMP, NO ODOR

DRILL LOG

PROJECT ENVIRO-CHEM		OWNER ———	SKETCH MAP
LOCATION ZIONSVILLE, IN		W.O. NUMBER 2495-1010	ND - NOT DETECTED
BORING NUMBER IW -4	TOTAL DEPTH 28.00'	DIAMETER 8"	VPPM - VAPOR PARTS PER MILLION
SURFACE ELEV. ---	WAT LEV: INIT --	24-HRS ---	SS - SPLIT SPOON
SCREEN: DIA 4"	LENGTH 10'	SLOT SIZE .020	F - FINE M - MEDIUM
CASING: DIA 4"	LENGTH 17'	TYPE PVC	C - COARSE
DRILLING COMPANY TOP FLIGHT		DRILLING METHOD HSA	
DRILLER NICK	LOG BY VFB	DATE DRILLED 3/16/98	NOTES

Depth (feet)	Graphic Log	Well Construction	Sample Number	Blow Count/ ROD/ % REC.	PID READINGS (VPPM)	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES, MOISTURE, OVA READINGS)
						0 - 7.0 GREY BROWN CLAY, LITTLE
1		—				TO TRACE SILT, TRACE FINE
2					110	TO COARSE SAND, WET,
3						DISTURBED, ODOR PRESENT
4						
5			SS-43	8-11	6	7.0 - 10.0 GREY CLAY, SOME SILT,
6				12-12		TRACE FINE SAND, TRACE
7			SS-44	10-11		M-C GRAVEL, DAMP, NO ODOR
8				14-16		
9			SS-45	6-7	41	10.0 - 10.2 BROWN M-C SAND, SATURATED.,
10				8-14		NO ODOR
11			SS-46	11-12	11	10.2 - 11.8 GREY CLAY, SOME SILT,
12				12-15		TRACE F-C SAND, DAMP, NO ODOR
13			SS-47	6-8	34	11.8 - 12.4 BROWN MEDIUM SAND, SATURATED,
14				12-14		NO ODOR
15			SS-48	5-4	15	12.4 - 13.8 GREY CLAY, SOME SILT, TRACE FINE
16				12-12		SAND, DAMP, NO ODOR
17			SS-49	10-11	15.7	13.8-14.4 BROWN MEDIUM SAND, SATURATED,
18				12-18		SLIGHT ODOR
19			SS-50	9-10	3.5	14.4 - 15.2 GREY AND BROWN CLAY AND
20				10-11		SILT, TRACE F-C SAND/GRAVEL, DAMP
21			SS-51	3-4	13	15.2-15.6 BROWN MEDIUM SAND, SATURATED,
22				7-12		NO ODOR
23						

DRILL LOG - IW 4 (continued)

PROJECT ENVIRO-CHEM	OWNER ———		SKETCH MAP
LOCATION ZIONSVILLE, IN	W.O. NUMBER 2495-1010		ND - NOT DETECTED
BORING NUMBER IW -4	TOTAL DEPTH 28.00'	DIAMETER 8"	VPPM - VAPOR PARTS PER MILLION
SURFACE ELEV. —	WAT LEV: INIT --	24-HRS —	SS - SPLIT SPOON
SCREEN: DIA 4"	LENGTH 10'	SLOT SIZE .020	F - FINE M - MEDIUM
CASING: DIA 4"	LENGTH 17'	TYPE PVC	C - COARSE
DRILLING COMPANY TOP FLIGHT	DRILLING METHOD HSA		
DRILLER NICK	LOG BY VFB	DATE DRILLED 3/16/98	NOTES

Depth (feet)	Graphic Log	Well Construction	Sample Number	Blow Count/ RQD/ % REC.	PID READINGS (VPPM)	DESCRIPTION / SOIL CLASSIFICATION((COLOR, TEXTURE, STRUCTURES, MOISTURE, OVA READINGS)	
24			SS-52	3-6	3	15.6 - 17.8	GREY CLAY AND SILT,
25				10-10			TRACE F-C SAND/GRAVEL, DAMP,
26			SS-53	6-13	1		NO ODOR
27				15-21		17.8 - 21.0	BROWN POORLY SORTED
28							SAND, SATURATED, ODOR
							PRESENT
						21.0 - 25.0	GREY CLAY, LITTLE SILT,
							DAMP, SLIGHT ODOR
						25.0 - 25.3	BROWN SAND, SATURATED,
							NO ODOR
						25.3 - 27.0	GREY CLAY, LITTLE SILT,
							NO ODOR, DAMP
						27.0 - 27.3	BROWN SAND, SATURATED,
							NO ODOR
						27.3 - 28.0	GREY CLAY, LITTLE SILT,
							DAMP, NO ODOR

CH2M HILL

PROJECT NUMBER	BORING NUMBER	SHEET 1 OF 1
	SB-09	

SOIL BORING LOG

PROJECT ECC LOCATION ≈ 25'N + 25'E of SW corner of Pa

ELEVATION DRILLING CONTRACTOR ATEC

DRILLING METHOD AND EQUIPMENT HOLLOW STEM AUGER

WATER LEVEL AND DATE START [illegible] FINISH LOGGER BJB

ELEVATION	DEPTH BELOW SURFACE	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
						0 - 0.7' Conc. Pad		HNu bkgd 2-25 pp
	1	X	SB-09-01	9"	9-21-16	0-2" Pea Gravel 2-9" Coarse Gravel Fill		HNu upto 250 pp
	2							
	3	X	SB-09-02 (CUP)	13"	15-12-10	reddish brown silty clay w/gravel Firm, moist.		HNu upto 40 ppm
	4	X	SB-09-03	16"	15-12-10	same as above. bottom 6" softer and appears to have more clay		HNu readings betw 90 + 20 ppm
	5							
	6	X	SB-09-04 (CUP)	18"	2-2-3	same as bottom of above. lower portion grades to gray brown with reddish mottles wet		HNu upto 20 ppm
	7	X	SB-09-05	18"	4-7-11	med. brown silty clay w/gravel moist soft. reddish brown mottling		HNu upto 9 ppm
	8							
	9	X	SB-09-06	18"	6-8-12	same as above. Lower 10" is equally gray brown and reddish brown varyed.		HNu upto 5 ppm
	10	X	SB-09-07	13"	2-8-9	0-8 same as above 8-12" gray brown silty clay w/gravel no mottling. (seem act.).		HNu upto 20 pp
	11							
	12							

REV 11/82

CH2M HILL

PROJECT NUMBER	BORING NUMBER	SHEET
W65230.C3	ECC-10A	1 OF 1

SOIL BORING LOG

LOCATION South of Fence Along Road

PROJECT ECC RI

ELEVATION [illegible] Ground Surface

DRILLING CONTRACTOR ATEC

DRILLING METHOD AND EQUIPMENT Mobil B-61 Drill Rig, 4" I.D. HSAs

START 11/2/84 FINISH 11/2/84 LOGGER J.H. Johnson

WATER LEVEL AND DATE

ELEVATION	DEPTH BELOW SURFACE	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)	SYMBOLIC LOG	COMMENTS (DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION)
								HNu reading background (~0.5ppm)
	2							
	4							
	6							
	8					Silty Clay, Dark Gray, some sand and fine gravel, Silty Sand, Bottom 4" of Sample, moist to wet ~10.5'		
	10	X	SS-1	12"	4-10-16			
	12					Sand, Light Brown, Fine, Some Silt, wet ~16.5'		
	14	X	SS-2	4"	22-47-50/3"			Rod Chatter, possible cobbles and coarse gravel at 15 ft.
	16							
	18					Silty Clay, Dark Gray, some sand and fine gravel, moist		
	20		SS-3	9"	8-13-14			
	22					Silty Clay and Clayey Silt, Gray, mod. moist, some sand and gravel. Bottom of Boring @ ~25.0'		
	24	X	SS-4	14"	11-26-38			
	26							

ENVIRON

650 Dundee Road, Suite 150
Northbrook, Illinois 60062

GEOLOGIC DRILL LOG

BOREHOLE NO.: **T-9**
TOTAL DEPTH: **34.0'**

PROJECT INFORMATION

PROJECT:	ECC: Monitoring Wells
SITE LOCATION:	Zionsville, IN
JOB NO.:	21-6585B
LOGGED BY:	Scott Hayter
PROJECT MANAGER:	Ron Hutchens
DATES DRILLED:	5-5-98

DRILLING INFORMATION

DRILLING CO.:	EDAC
DRILLER:	Dan Dreyer
RIG TYPE:	Gus Peck GP-1300
METHOD OF DRILLING:	hollow-stem auger
SAMPLING METHODS:	split spoon
HAMMER WT./DROP	140 lb., 30 in.

NOTES:

SS INTERVAL (ft)	SS RECOVERY (ft)	BLOW COUNTS	PID (ppm)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
0-10		no sampling		0				SILT; field observation
				-5				
				-10		MH		SILT: Gray-brown silt with a little clay, a little sand, and a trace of gravel. Dry.
10-12	0.5	1, 2, 3, 6	<1					
12-14	0	4, 5, 5, 8	<1				14.0	SILTY CLAY: Dark gray-brown silty clay with a trace of fine gravel and few sand. Moist.
14-16	1.5	3, 4, 6, 8	<1	-15				
16-18	1.5	1, 1, 3, 4	<1					
18-20	1.5	1, 1, 3, 4	<1	-20		CL		
20-22	1.1	1, 1, 2, 2	<1					
22-24	1.8	1, 1, 2, 4	<1					
24-26	1.4	1, 1, 3, 4	<1	-25				
26-28	2.0	1, 1, 1, 4	<1				26.7	SAND: Medium to coarse sand with a trace of fine gravel. Dry.
28-30	1.3	1, 1, 1, 4	<1	-30		SW		
30-32	2.0	2, 2, 4, 8	<1					
32-34	2.0	5, 13, 48, 48	<1			MH	33.2	SILT: Dark brown silt with a trace of clay and a trace of fine gravel. Dry.

ENVIRON

650 Dundee Road, Suite 150
Northbrook, Ilinois 60062

WELL CONSTRUCTION LOG

MONITORING WELL NO. T-9

TOTAL DEPTH: 25.5'

PROJECT INFORMATION

PROJECT:	ECC: Monitoring Wells
SITE LOCATION:	Zionsville, IN
JOB NO.:	21-6585B
LOGGED BY:	Scott Hayter
DATE(S) DRILLED:	5-11-98

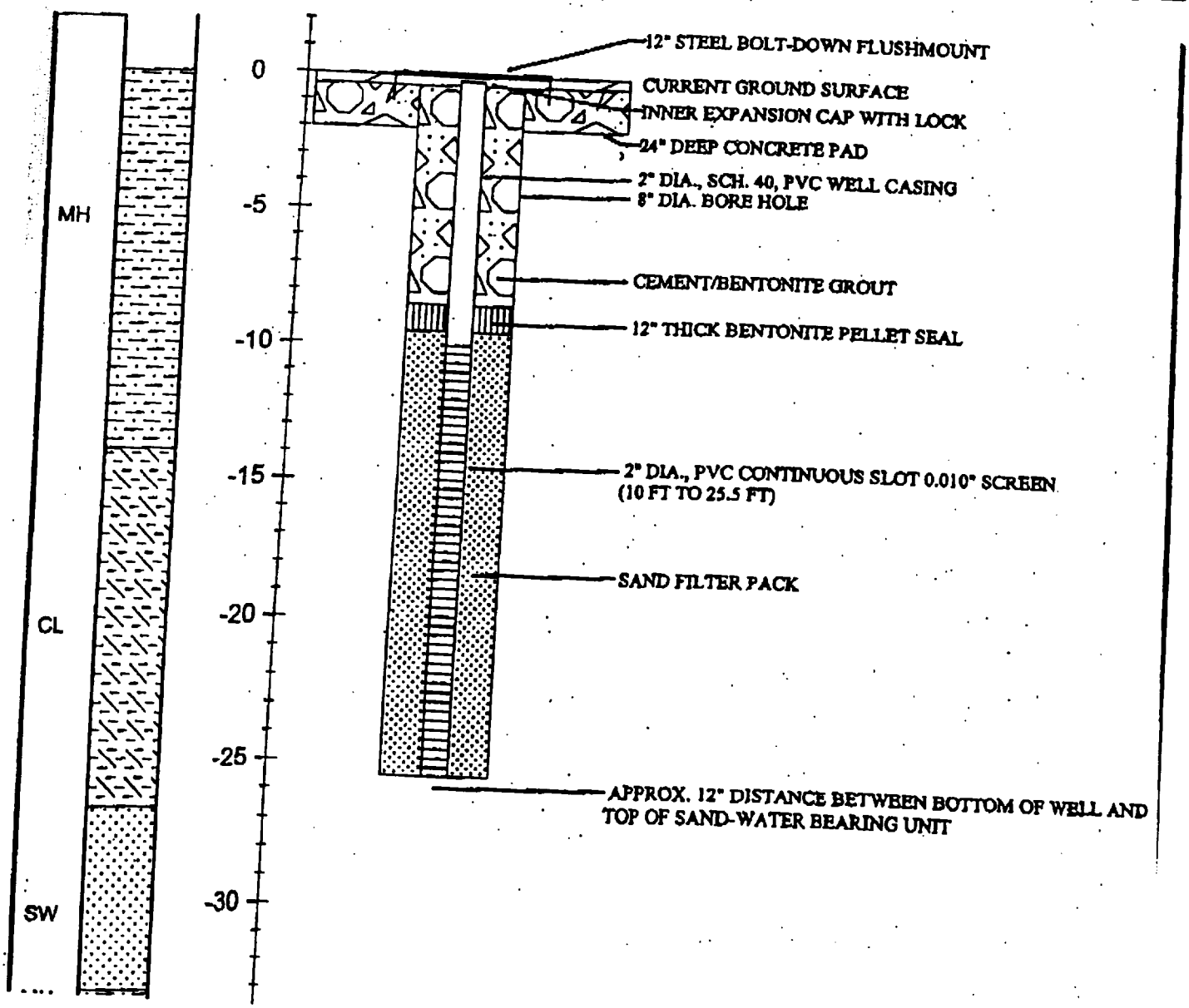
DRILLING INFORMATION

DRILLING CO.:	EDAC
DRILLER:	Dan Dreyer
RIG TYPE:	Gus Peck GP-1300
METHOD OF DRILLING:	hollow-stem auger
BORE HOLE DIAMETER:	California split spoon

T.O.C. ELEVATION: 882.08

SURVEY COORDINATES: 921571.18N 725827.61E

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Appendix D

Molecular Diffusion and Decay Transport Model Equations

The following equation describes the change in contaminant concentration over time based on molecular diffusion and decay.

$$\frac{\partial C}{\partial t} = D_{eff}\frac{\partial^2 C}{\partial x^2} - \lambda C \qquad \text{D-1}$$

$$D_{eff} = D_w \theta_t \qquad \text{D-2}$$

where C is contaminant concentration, t denotes time, D_{eff} is the effective diffusion coefficient, x is the vertical distance between the contamination and the ground water, λ is the decay constant, D_w is the chemical-specific diffusivity in water, and θ_t is the total porosity. At steady state (i.e., when the diffusive flux no longer changes with time), the solution to the equation is[1]

$$C = C_o \exp\left(-x\left(\lambda / D_{eff}\right)^{1/2}\right) \qquad \text{D-3}$$

where C_o is the source concentration. The diffusive flux (mass per time per area), J, into the ground water is, by definition,

$$J = -D_{eff}\left.\frac{dC}{dx}\right|_{\text{till/water interface}} \qquad \text{D-4}$$

[1] Equation was solved by analogy to the heat conduction equation solution presented in *Conduction of Heat in Solids*, H.S. Carslaw and J.C. Jaeger, Oxford Science Publications, 1959, p. 135.

The expression $\left.\frac{dC}{dx}\right|_{\text{till/water interface}}$ is the contaminant concentration gradient evaluated at the till/water interface. The rate of mass transfer (mass per time, or M) can then be calculated by multiplying the flux by the area of contamination [length parallel to ground water flow (L) times width perpendicular to ground water flow (W)].

$$M = J \cdot L \cdot W \qquad \text{D-5}$$

The contaminant concentration in the underlying ground water resulting from the mixture of the contaminant flux in the ground water can be calculated by dividing the rate of mass transfer by the volumetric flow rate of ground water. The volumetric flow rate of ground water (Q) is represented by the following expression.

$$Q = K \cdot i \cdot W \cdot d_{mix} \qquad \text{D-6}$$

where K is the hydraulic conductivity, i is the hydraulic gradient, and d_{mix} is the depth of the mixing zone. The resulting ground water concentration is therefore

$$C_{gw} = \frac{M}{Q} = -\frac{LD_{eff}\left.\frac{dC}{dx}\right|_{\text{till/water interface}}}{K \cdot i \cdot d_{mix}}. \qquad \text{D-7}$$

An analytical expression for $\frac{dC}{dx}$ can be obtained by taking the derivative of Equation D-3.

$$\frac{dC}{dx} = -C_o\left(\lambda/D_{eff}\right)^{1/2} \exp\left(-\left(\lambda/D_{eff}\right)^{1/2} x\right) \qquad \text{D-8}$$

Evaluating this expression at the till/water interface (d_{till}), substituting the resulting expression and rearranging for $\frac{C_o}{C}$, which is the effective dilution attenuation factor for diffusion transport (DAF_{dif}), we get

$$DAF_{dif} = \frac{C_o}{C} = \frac{K \cdot i \cdot d_{mix}}{LD_{eff}\left(\lambda / D_{eff}\right)^{1/2} \exp\left(-\left(\lambda / D_{eff}\right)^{1/2} d_{till}\right)} \qquad \text{D-9}$$

Note that the C_o in the above expressions refers to the water concentration in equilibrium with the soil concentration, so we must incorporate the equilibrium leaching equation[2] in order to calculate the IDEM RCRA clean closure level for soil (CL). The resulting expression is

$$CL = C_W \text{ x } DAF_{dif}\left[K_d + \frac{\theta_W + \theta_a H'}{\rho_b}\right] \qquad \text{D-10}$$

where C_W is the closure level for ground water, K_d is the product of the chemical-specific organic carbon partitioning coefficient, K_{oc}, and the fraction of organic carbon, f_{oc}. The chemical-specific input parameters (K_{oc}, H', D_w, and λ) used in the non-default calculations are given in Table D-1, along with their respective sources. The site-specific physical parameters (f_{oc}, ρ_b, θ_t, θ_a, θ_w, d_{till}, L, K, i, and d_{mix}) used, along with the rationale for their selection, are given in Table D-2.

[2] RISC Technical Guide, February 15, 2001, Equation 7-1, p. 7-5.

Table D-1
Input Parameters – Chemical Specific
ECC Southern Concrete Pad

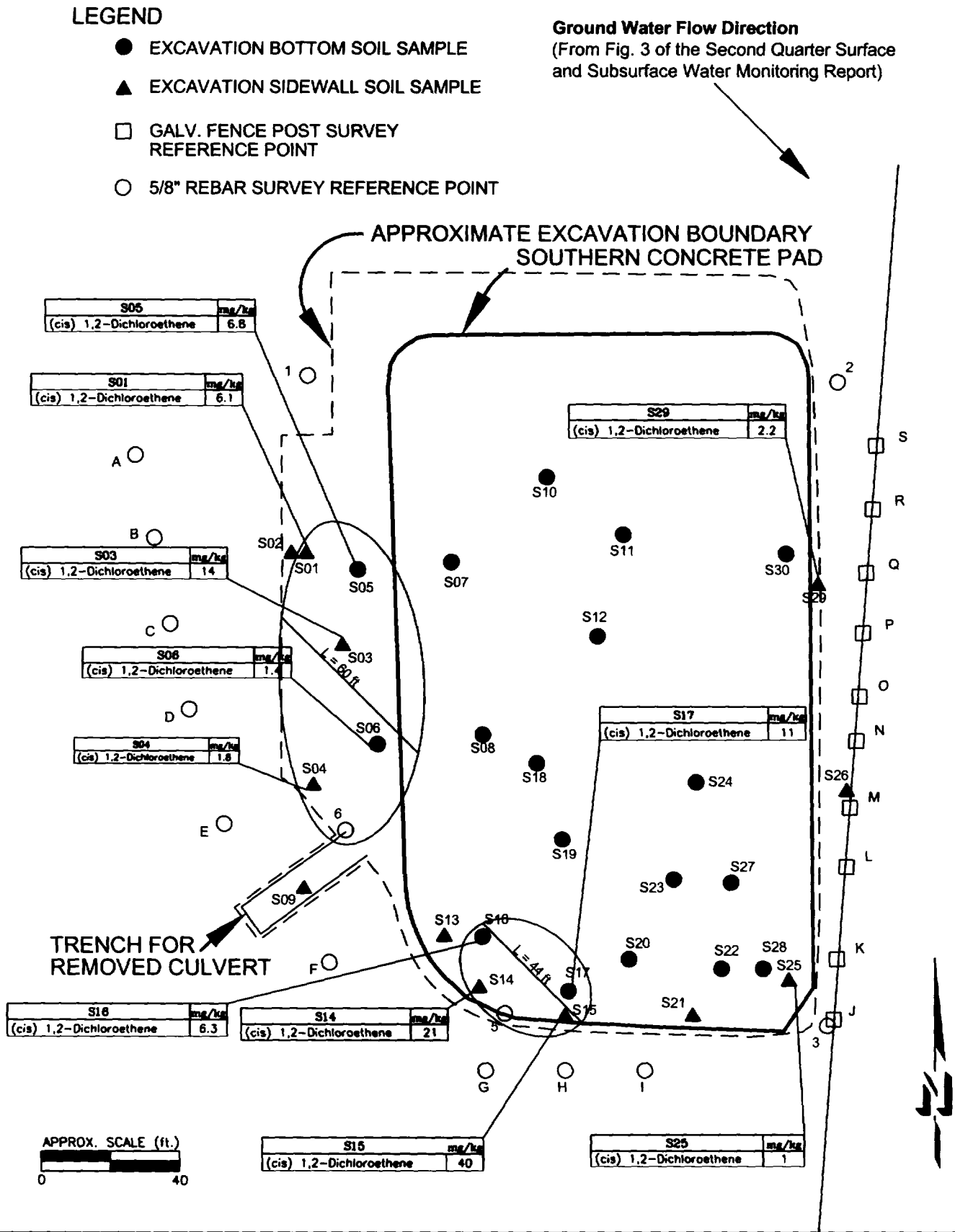
Parameters	Units	VC	TCE	MC	1,2 DCA	Source
Target Level for Ground Water (C_w)	mg/L	0.002	0.005	0.005	0.0050	RISC
K_{oc}	L/kg	18.6	166	11.7	17.4	RISC
H'	unitless	1.11	0.422	0.0898	0.0401	RISC
Dw	cm^2/s	1.23E-06	9.10E-06	1.17E-05	9.90E-06	RISC
λ	day^{-1}	2.40E-04	4.20E-04	1.20E-02	1.90E-03	TACO

Notes:
RISC: RISC Technical Guide, February 15, 2001
TACO: Illinois EPA Tiered Approach to Corrective Action Objectives, Final, July 1997. Amended effective January 6, 2001.
PCE: Tetrachloroethylene
1,1 DCA: 1,1 - Dichloroethane
1,2 DCA: 1,2 - Dichloroethane
1,1 DCE: 1,1 - Dichloroethylene
cis 1,2 DCE: (cis) 1-2 Dichloroethylene
MC: Methylene Chloride
1,1,1 TCA: 1,1,1 - Trichloroethane
1,1,2 TCA: 1,1,2 - Trichloroethane
TCE: Trichloroethylene
VC: Vinyl Chloride

Table D-2

Input Parameters – Site Specific
ECC Southern Concrete Pad

Parameters	Units	Values	Source
f_{oc} - fraction organic carbon	D	0.00964	Total organic carbon data presented in the ERM Technical Memorandum Soil Organic Carbon (January 25, 1996). The average of the f_{oc} measurements from the intervals between 4 and 10 feet, excluding B103, B105, and B115 (the obviously impacted borings) was selected.
P_b - soil density	kg/L	1.5	RISC Technical Guide, February 15, 2001, p. A.1 - 35.
θ_t - total porosity	L/L	0.21	Versar soil test data from table dated 2/28/98. The average of all reported measurements was selected.
θ_a – air filled porosity	L/L	0.08	Versar soil test data from table dated 2/28/98. The average of all reported measurements was selected.
θ_w – water filled porosity	L/L	0.13	Versar soil test data from table dated 2/28/98. The average of all reported measurements was selected.
d_{till} – depth of till	feet	3	Versar Geotechnical Survey Report, dated 4/8/98.
L – length of source area parallel to ground water flow	feet	60	Largest source length for all compounds. The source dimensions were based on area of soil in excess of default screening levels for each compound - See Figure D-1.
K – hydraulic conductivity	cm/s	0.005	The lesser of the geomean of the November –December slug test results (0.009 from Table H-1 of the Third Site Field Investigation Data Report) and the geomean of the historic hydraulic conductivity test results (0.005 cm/s from Table 2-1 of the 1988 CH2M Hill Tech Memo) was selected.
i – hydraulic gradient	feet/feet	0.004	Based on August 9, 1999 water level observations as reported in the 3/16/00 letter report to Michael McAteer of the USEPA.
d_{mix} – depth of ground water mixing zone	cm	200	ASTM 1939-95 RBCA Standard default.



ENVIRON

740 Waukegan Road, Suite 401, Deerfield, IL 60015

LENGTH OF LARGEST SOURCE AREA PARALLEL TO GROUND WATER FLOW ECC SITE

Figure D-1

Drafter: JBP | Date: 08/10/00 | Contract Number: 21-6585C | Approved: REH | Revised:

P:\Client Project Files\ECC\SouthPadClosure\SOP Closure Final\C-1