Remedial Investigation Report

Anniston PCB

Operable Unit 3

May 2010

[2 of 2]

APPENDIX A

Refraction Seismic Survey Line Graphs

F:\PROJ\TF525\RPT\CPT-RPT.W51

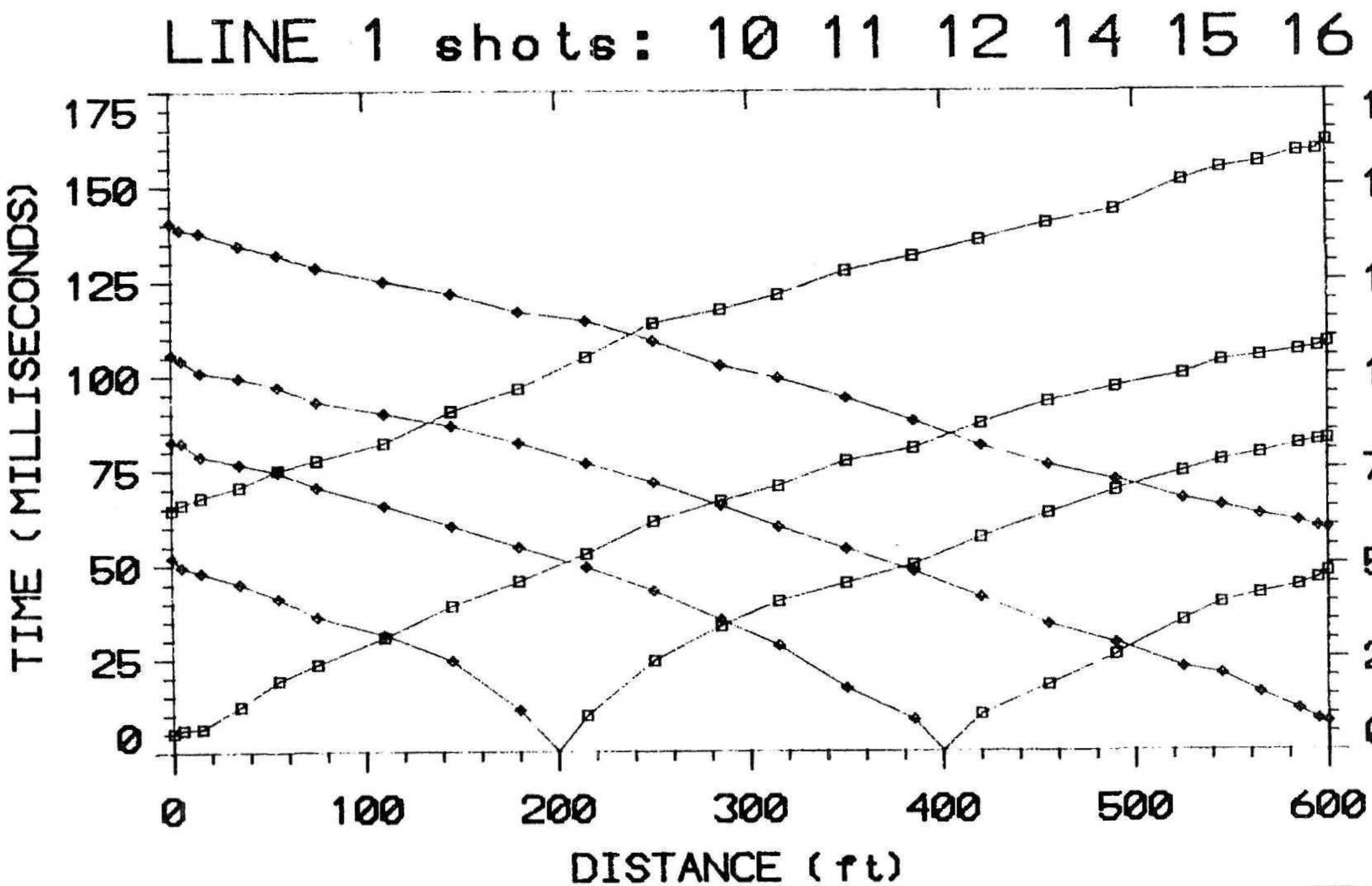


FIGURE 1

GEOPHYSICAL SURVEY	
TIME VS DISTANCE	
FOR:	MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY:	GERAGHTY & MILLER, INC GEOPHYSICAL GROUP

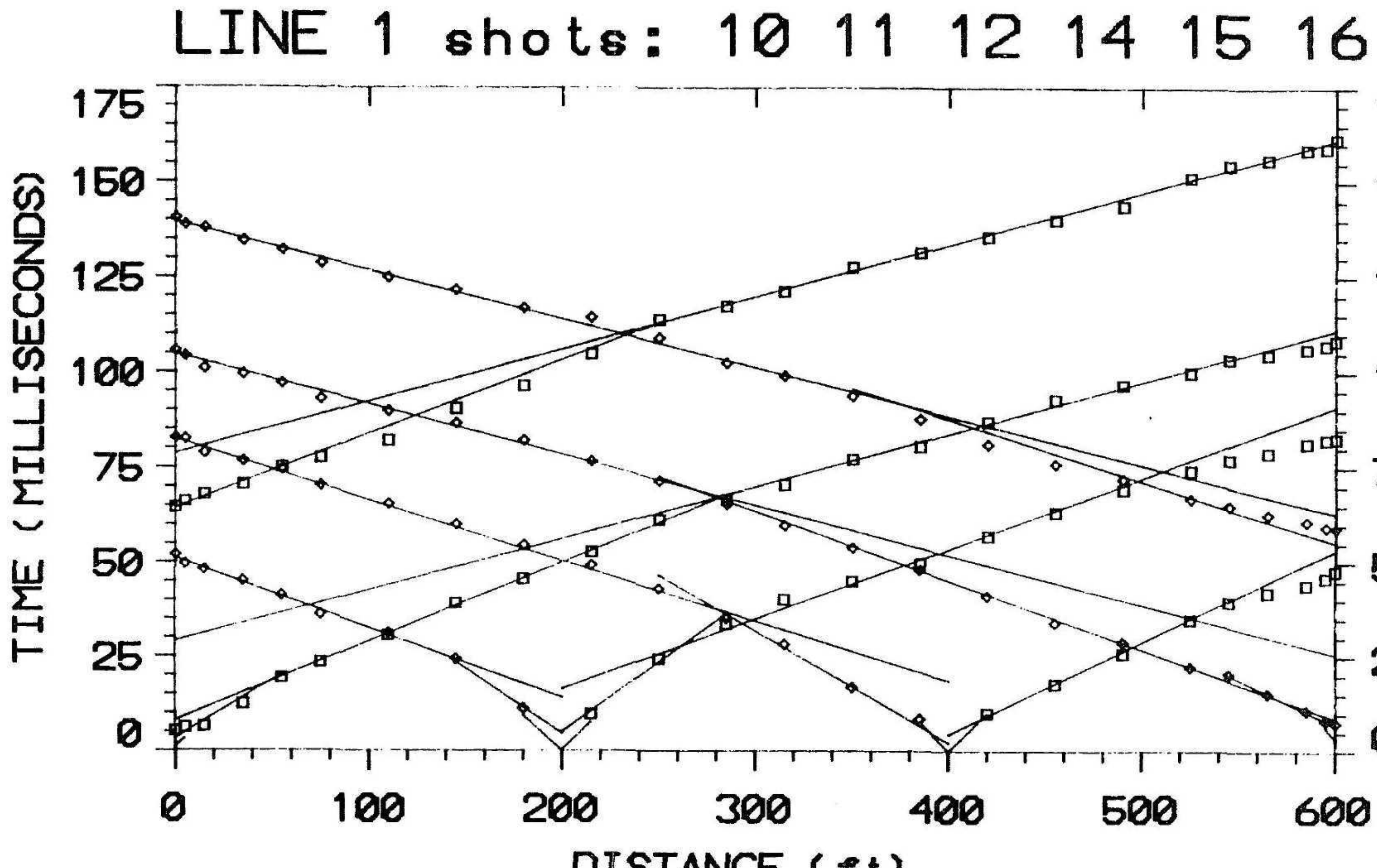


FIGURE 1B

GEOPHYSICAL SURVEY

REFRACTOR ASSIGNMENTS

FOR: MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

BY: GERAGHTY & MILLER, INC.
GEOPHYSICAL GROUP

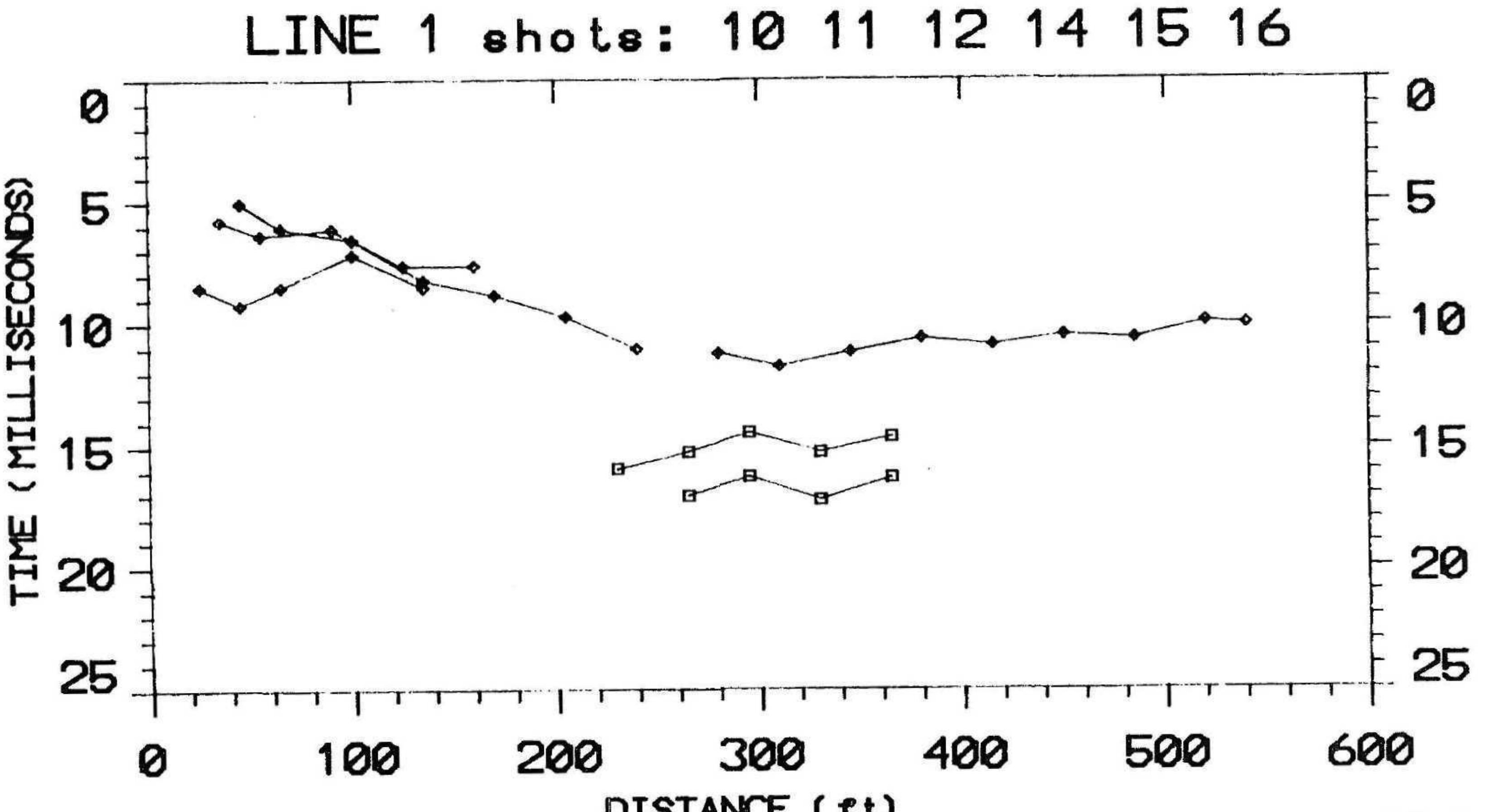


FIGURE 10

GEOPHYSICAL SURVEY
TIME DEPTH VS DISTANCE
FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY: GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP

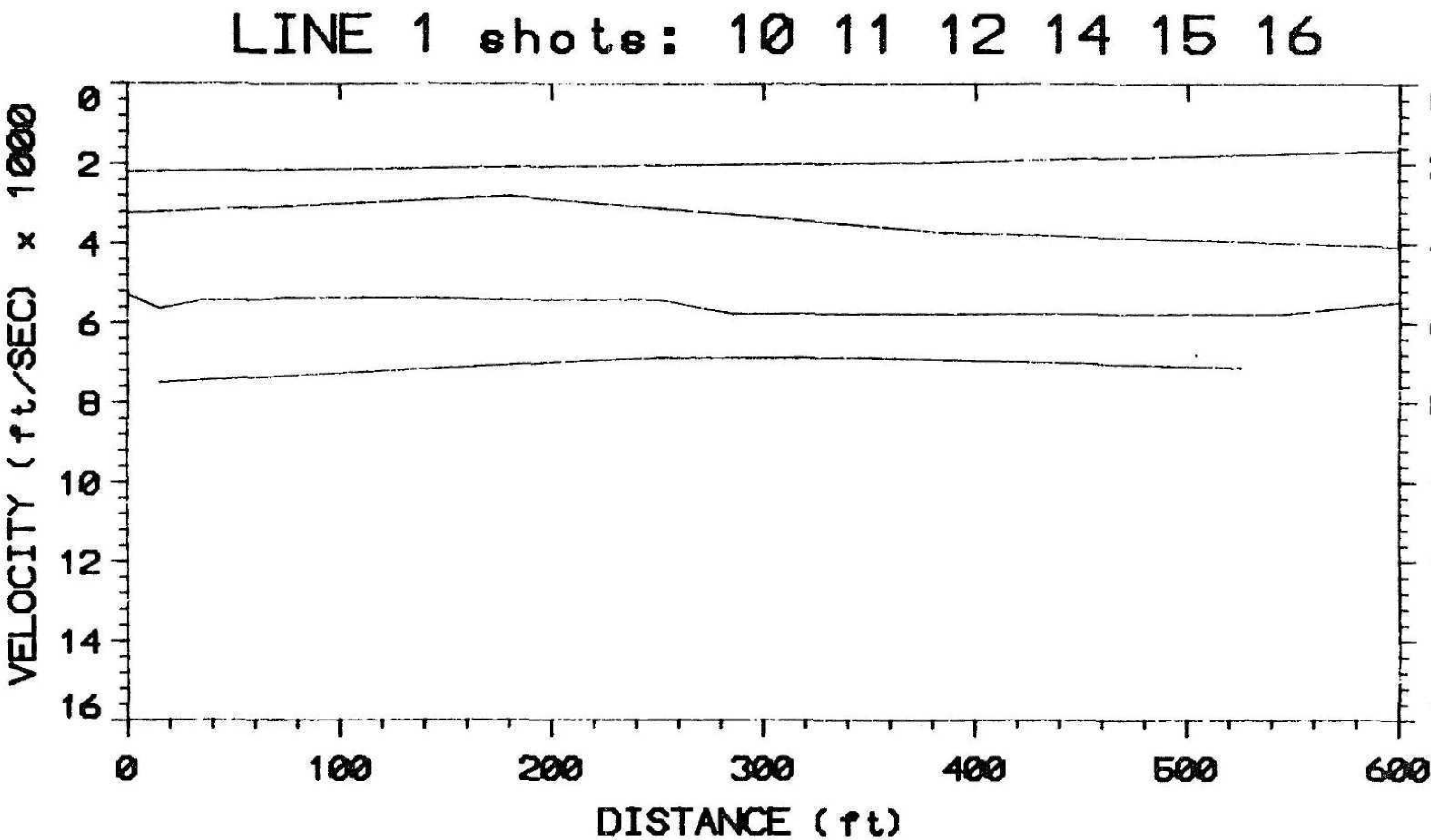


FIGURE 1D

GEOPHYSICAL SURVEY
VELOCITY VS DISTANCE
FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY: GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP

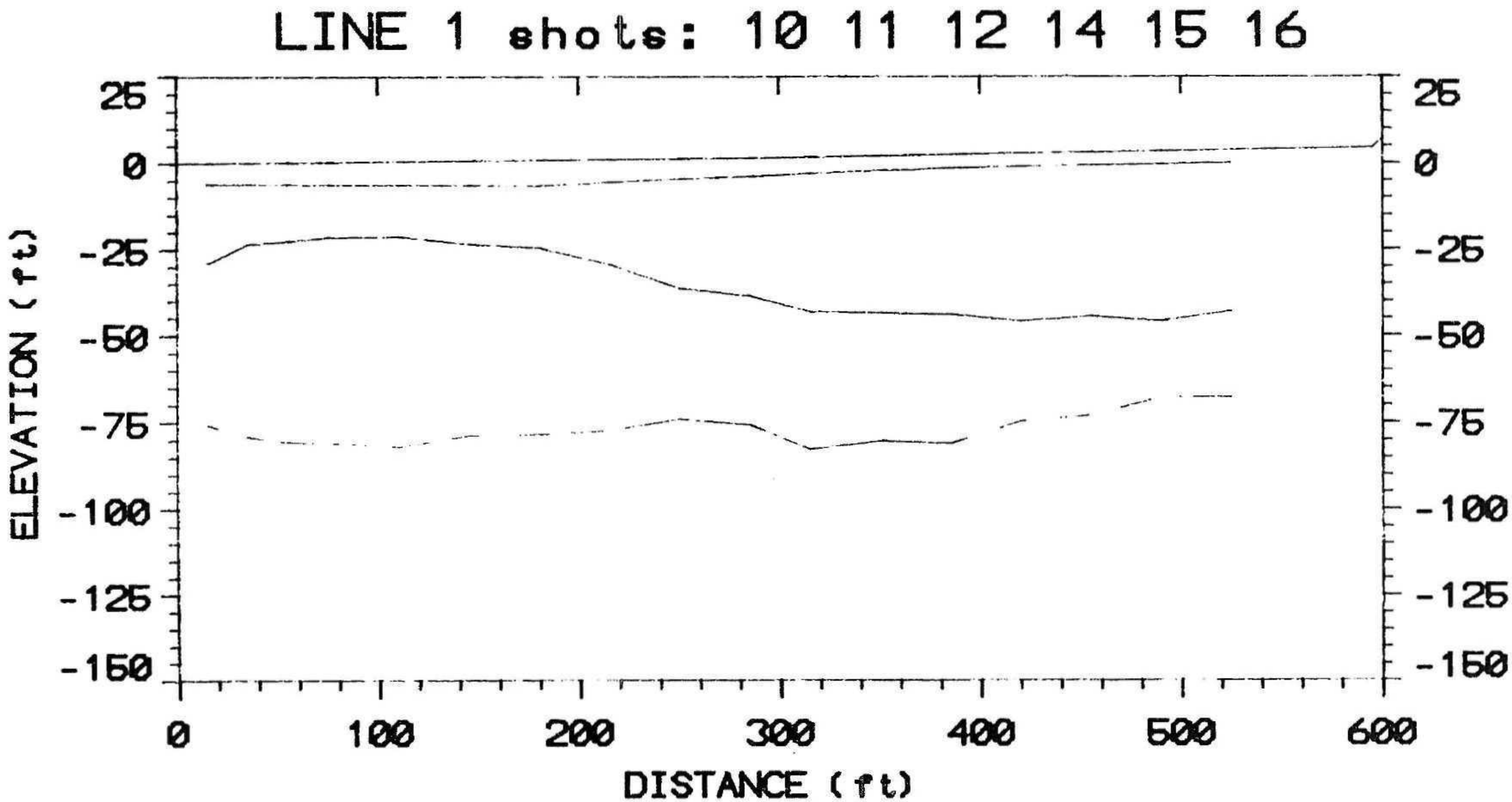


FIGURE 1E

GEOPHYSICAL SURVEY

DEPTH VS DISTANCE

FOR: MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

BY: GERAGHTY & MILLER, INC.
GEOPHYSICAL GROUP

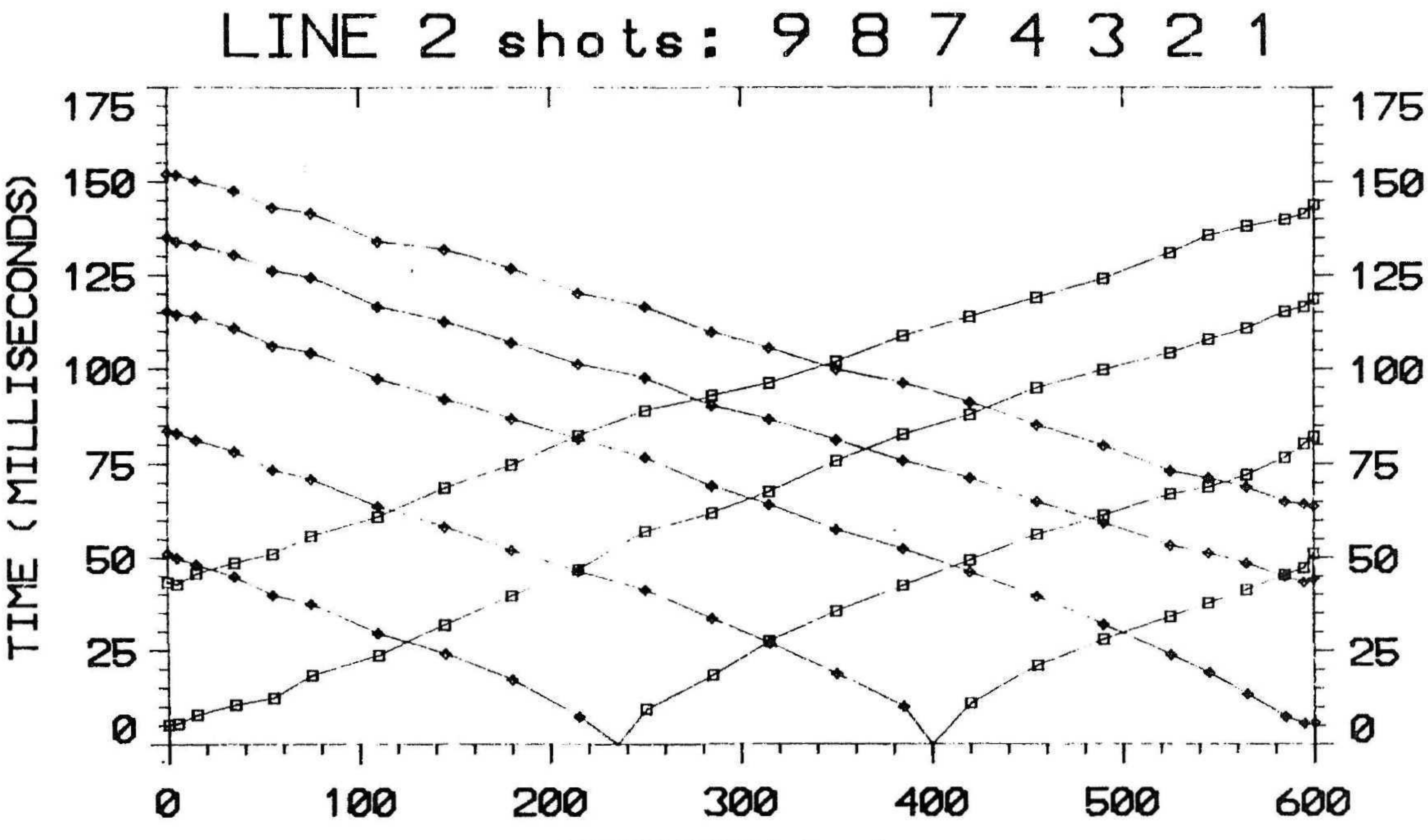
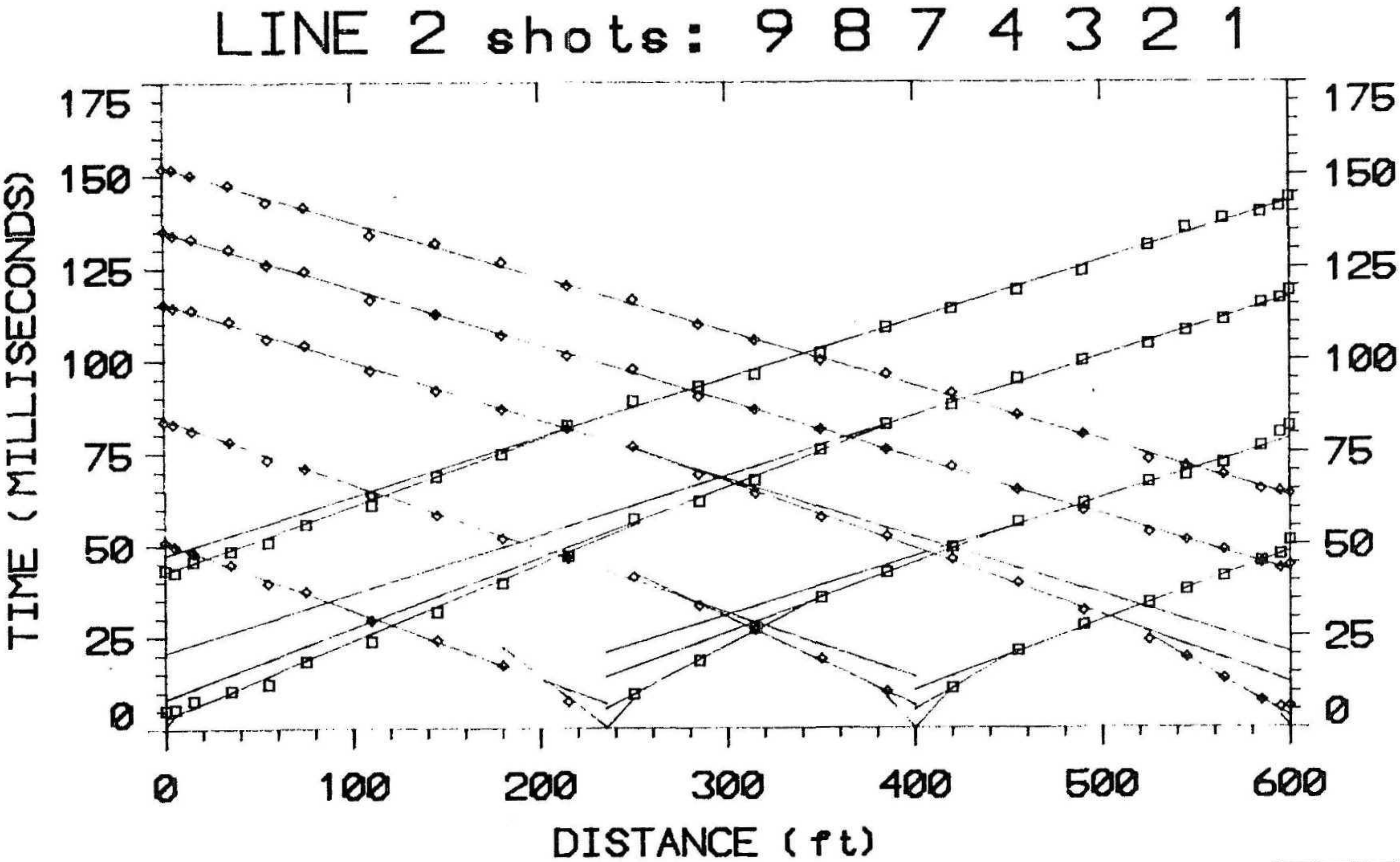


FIGURE 2A

GEOPHYSICAL SURVEY
TIME VS DISTANCE
FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY: GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP



FIGURE

GEOPHYSICAL SURVEY

REFRACTOR ASSIGNMENTS

FOR: MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

BY: GERAGHTY & MILLER, IN[illegible]
GEOPHYSICAL GROUP

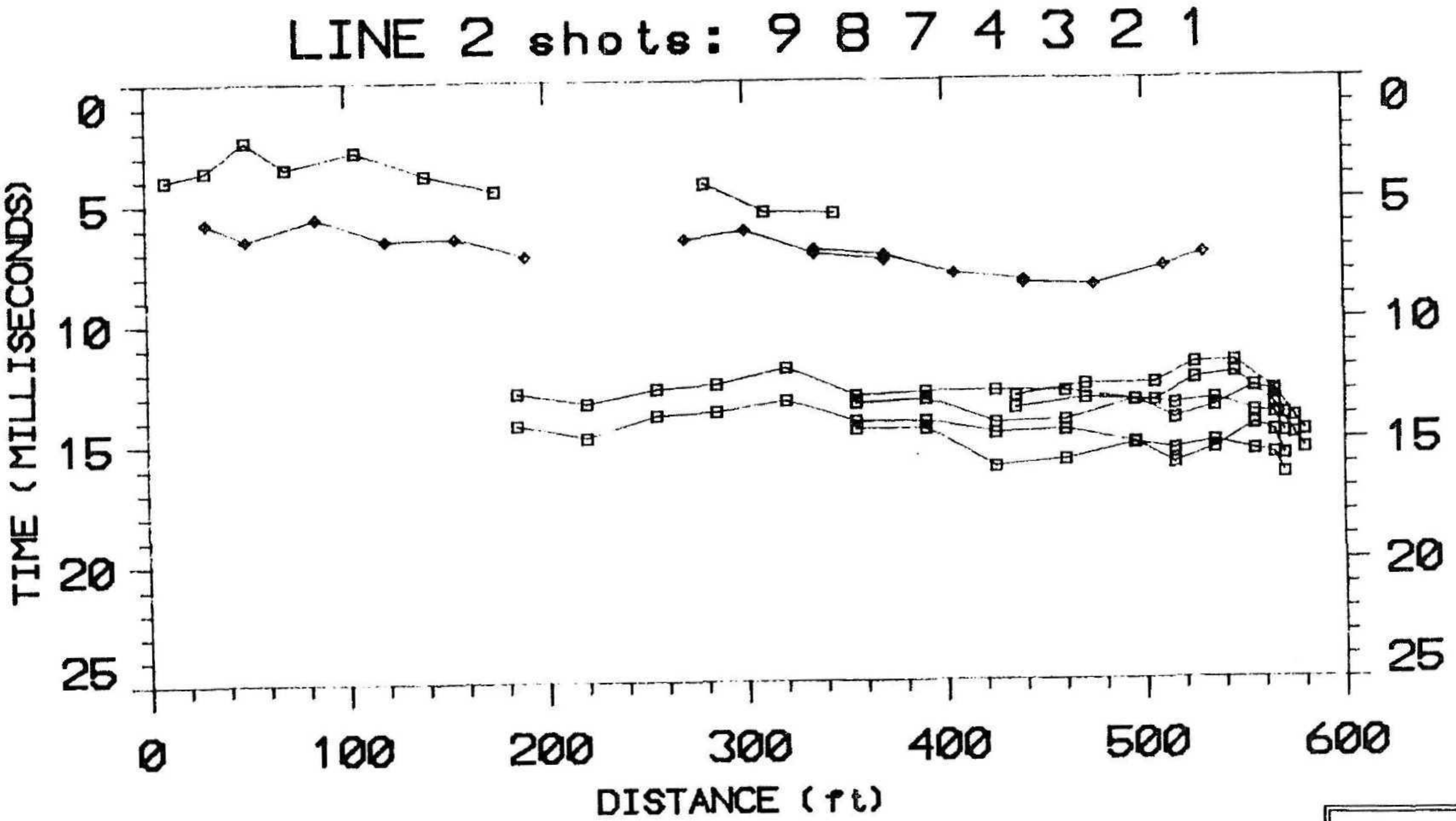


FIGURE 2C

GEOPHYSICAL SURVEY

TIME DEPTH VS DISTANCE

FOR: MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

BY: GERAGHTY & MILLER, INC.
GEOPHYSICAL GROUP

LINE 2 shots: 9 8 7 4 3 2 1

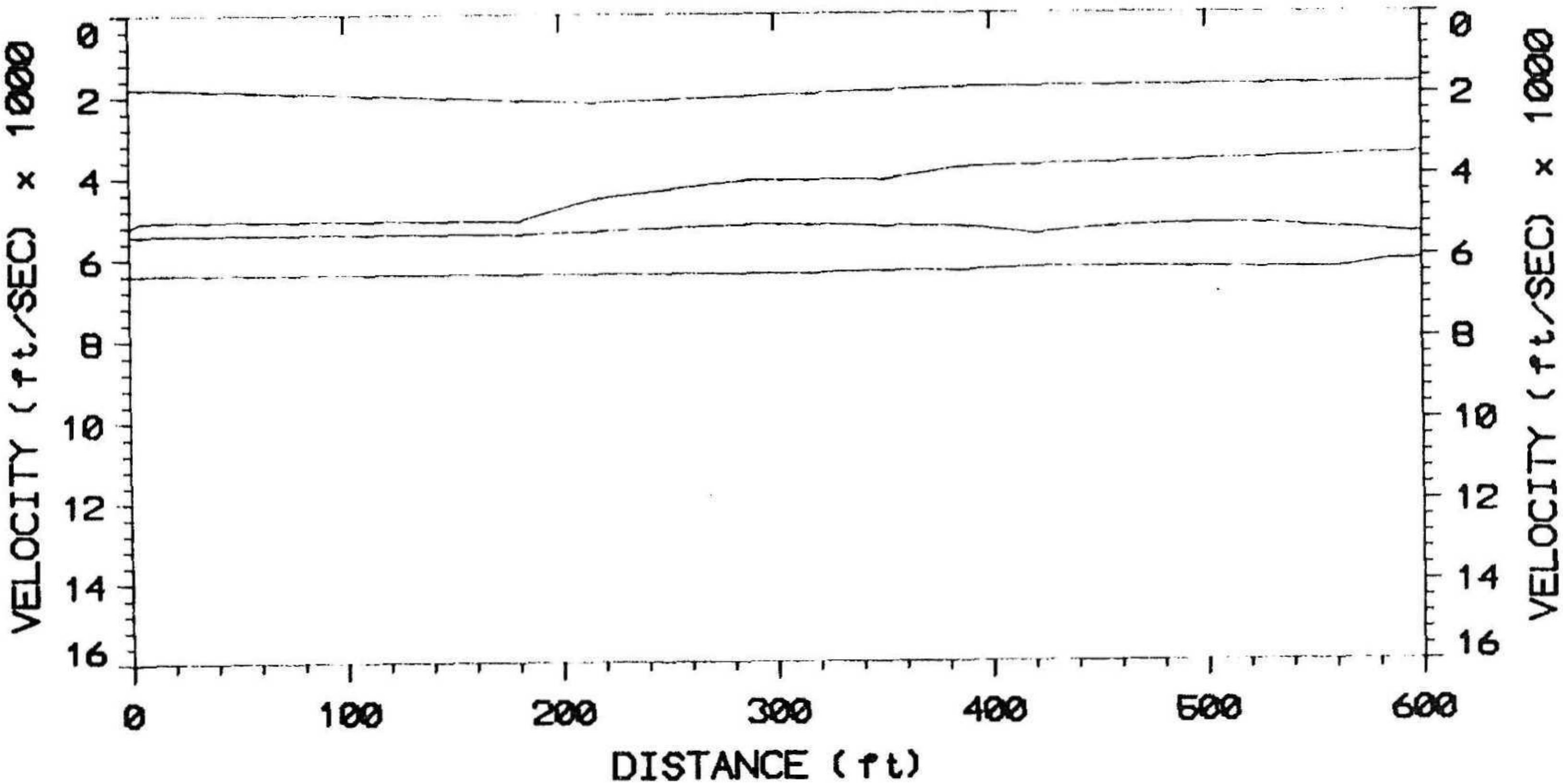


FIGURE 2

GEOPHYSICAL SURVEY

VELOCITY VS DISTANCE

FOR: MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

BY: GERAGHTY & MILLER, INC.
GEOPHYSICAL GROUP

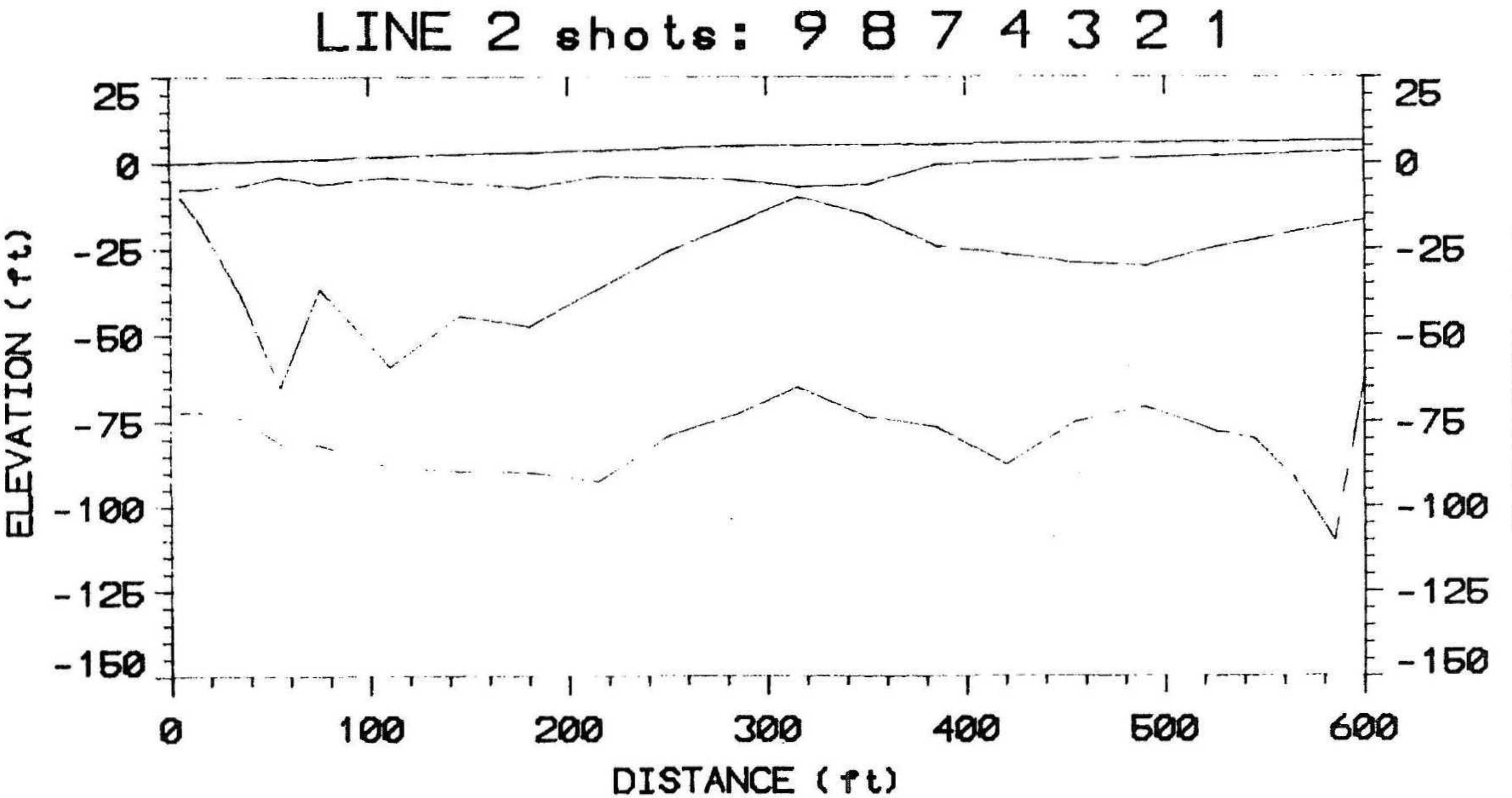


FIGURE 2E

GEOPHYSICAL SURVEY

DEPTH VS DISTANCE

FOR: MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

BY: GERAGHTY & MILLER, INC.
GEOPHYSICAL GROUP

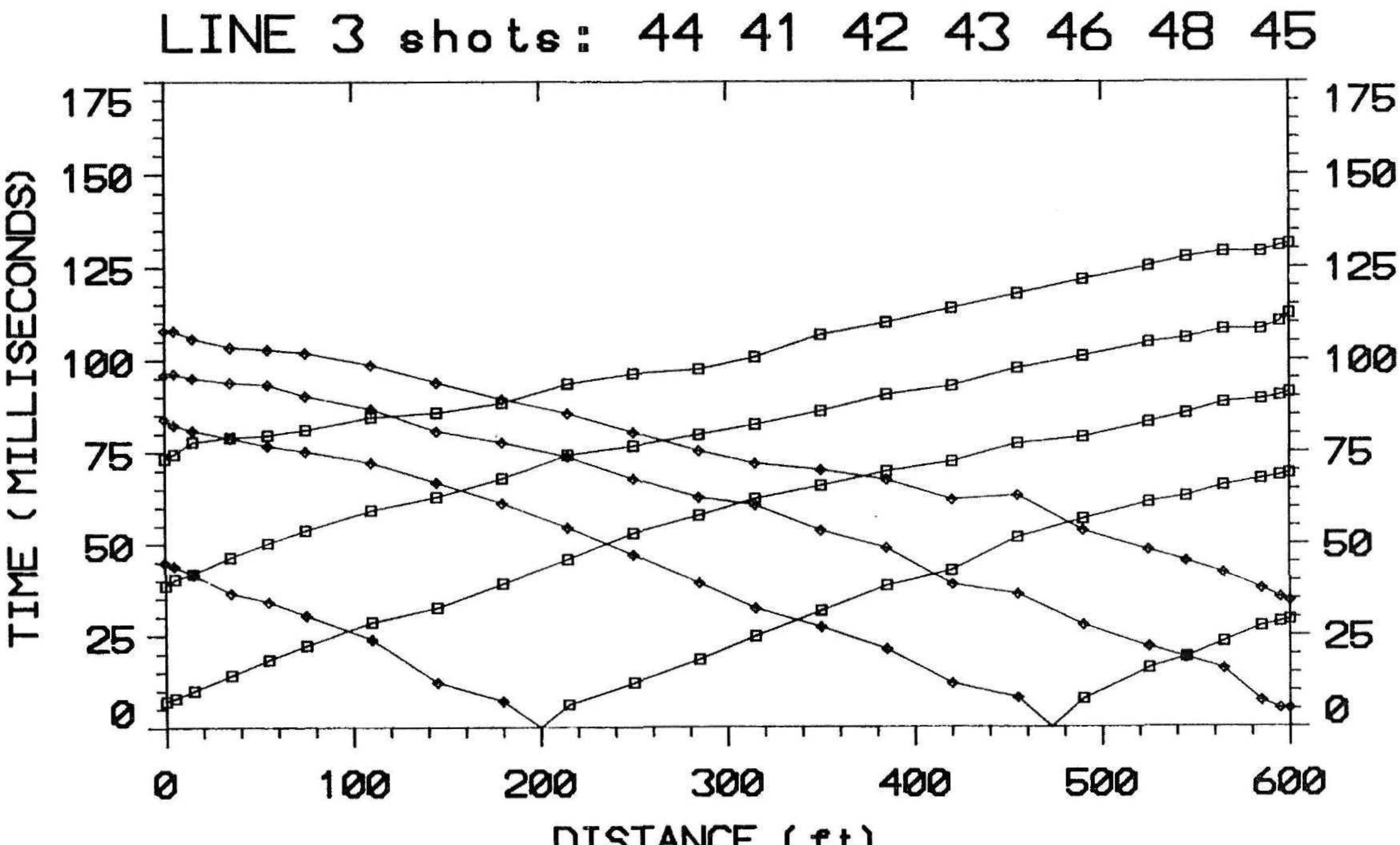


FIGURE 3A

GEOPHYSICAL SURVEY
TIME VS DISTANCE
FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY: GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP

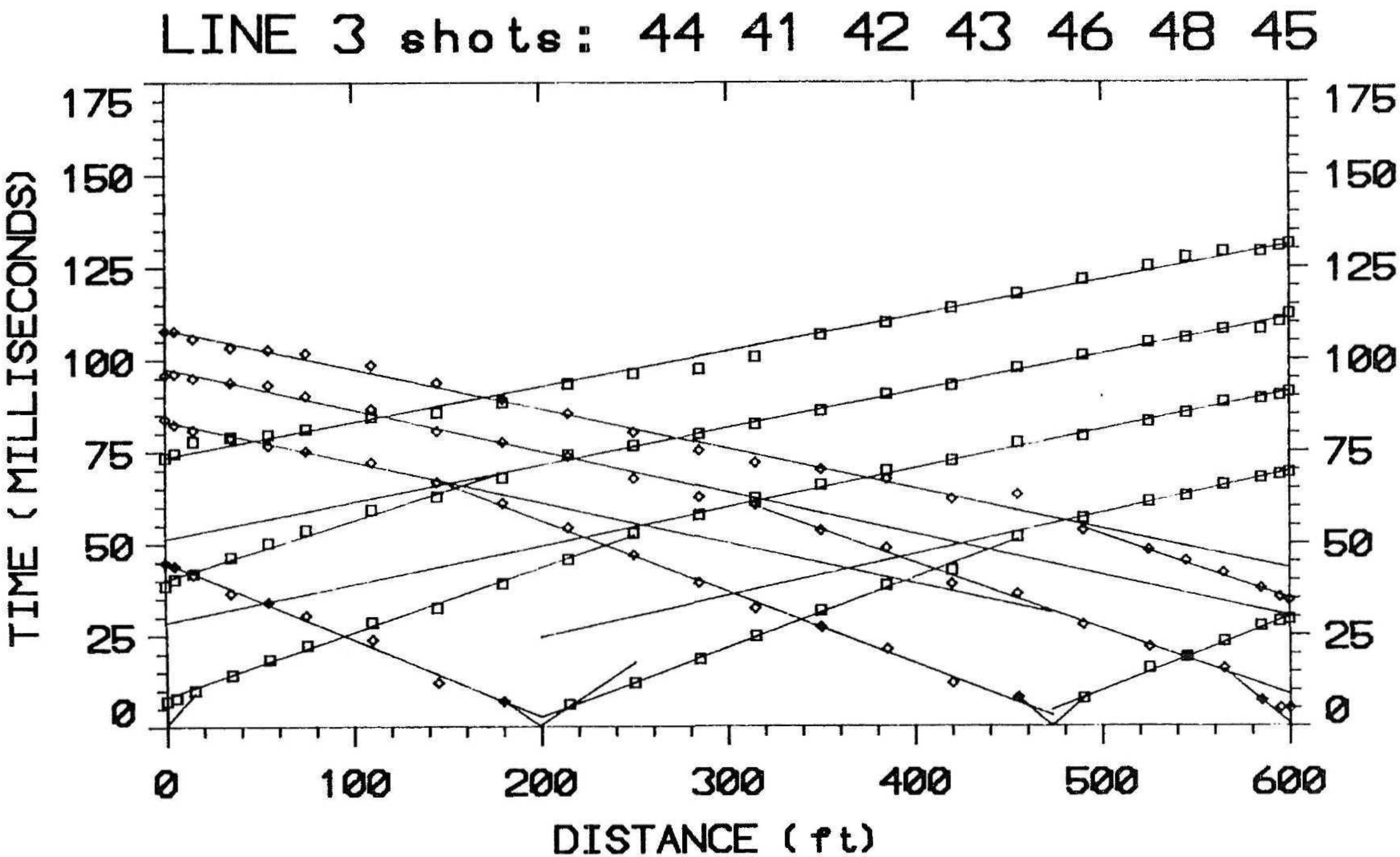


FIGURE 3B

GEOPHYSICAL SURVEY

REFRACTOR ASSIGNMENTS

FOR: MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

BY: GERAGHTY & MILLER, INC.
GEOPHYSICAL GROUP

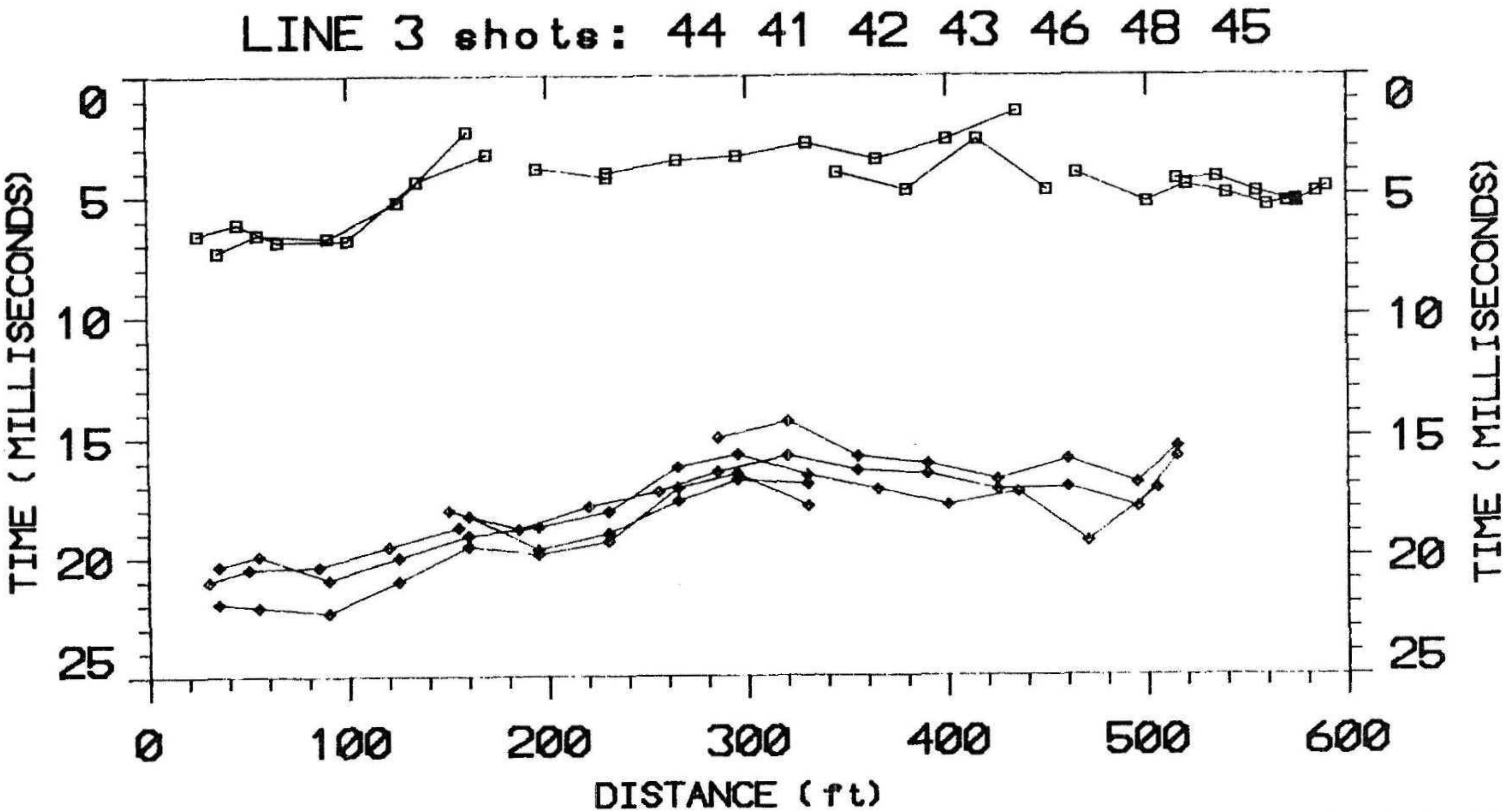


FIGURE 3

GEOPHYSICAL SURVEY
TIME DEPTH VS DISTANCE
FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY: GERAGHTY & MILLER, INC GEOPHYSICAL GROUP

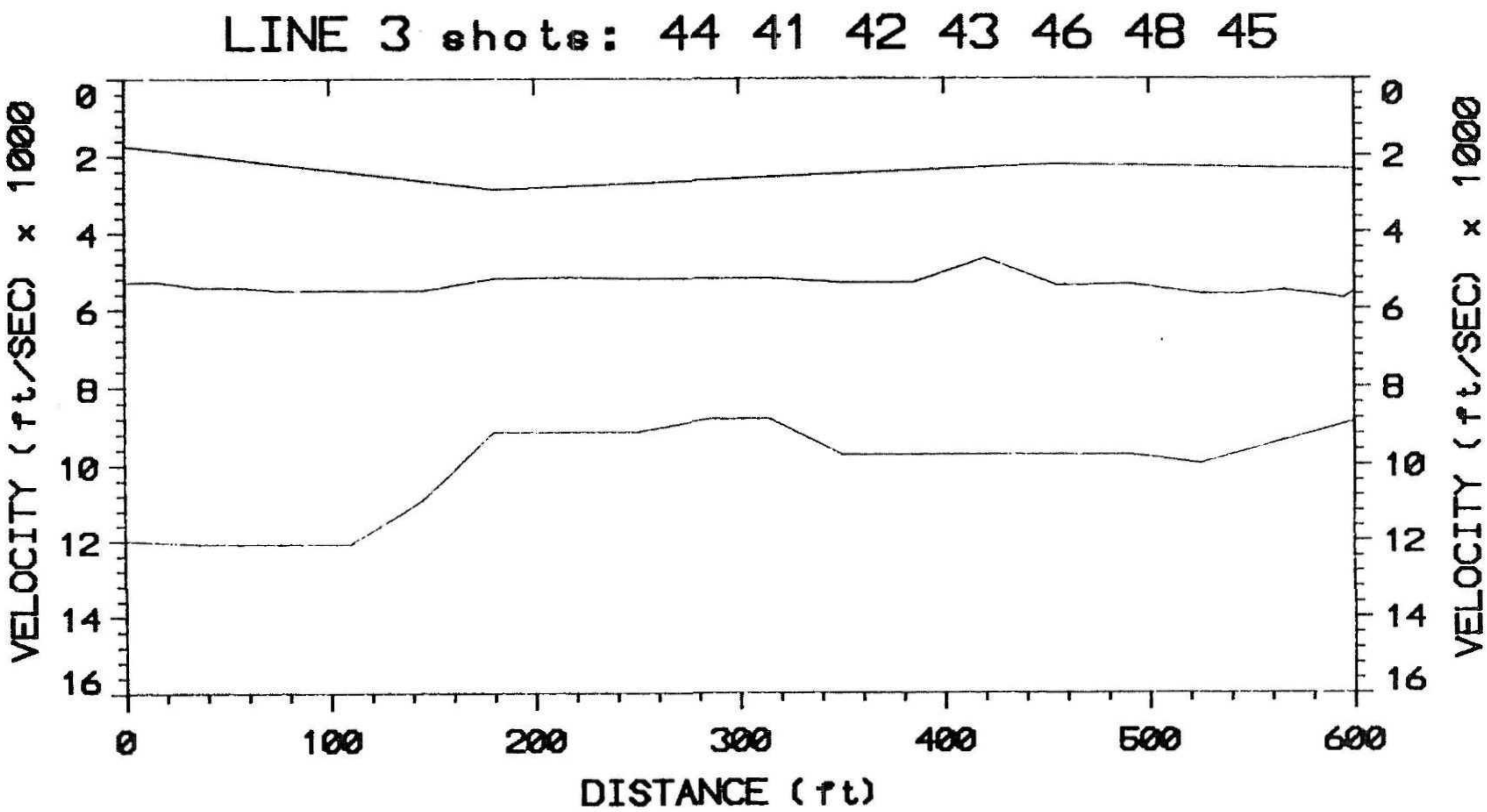


FIGURE 3D

GEOPHYSICAL SURVEY

VELOCITY VS DISTANCE

FOR: MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

BY: GERAGHTY & MILLER, INC.
GEOPHYSICAL GROUP

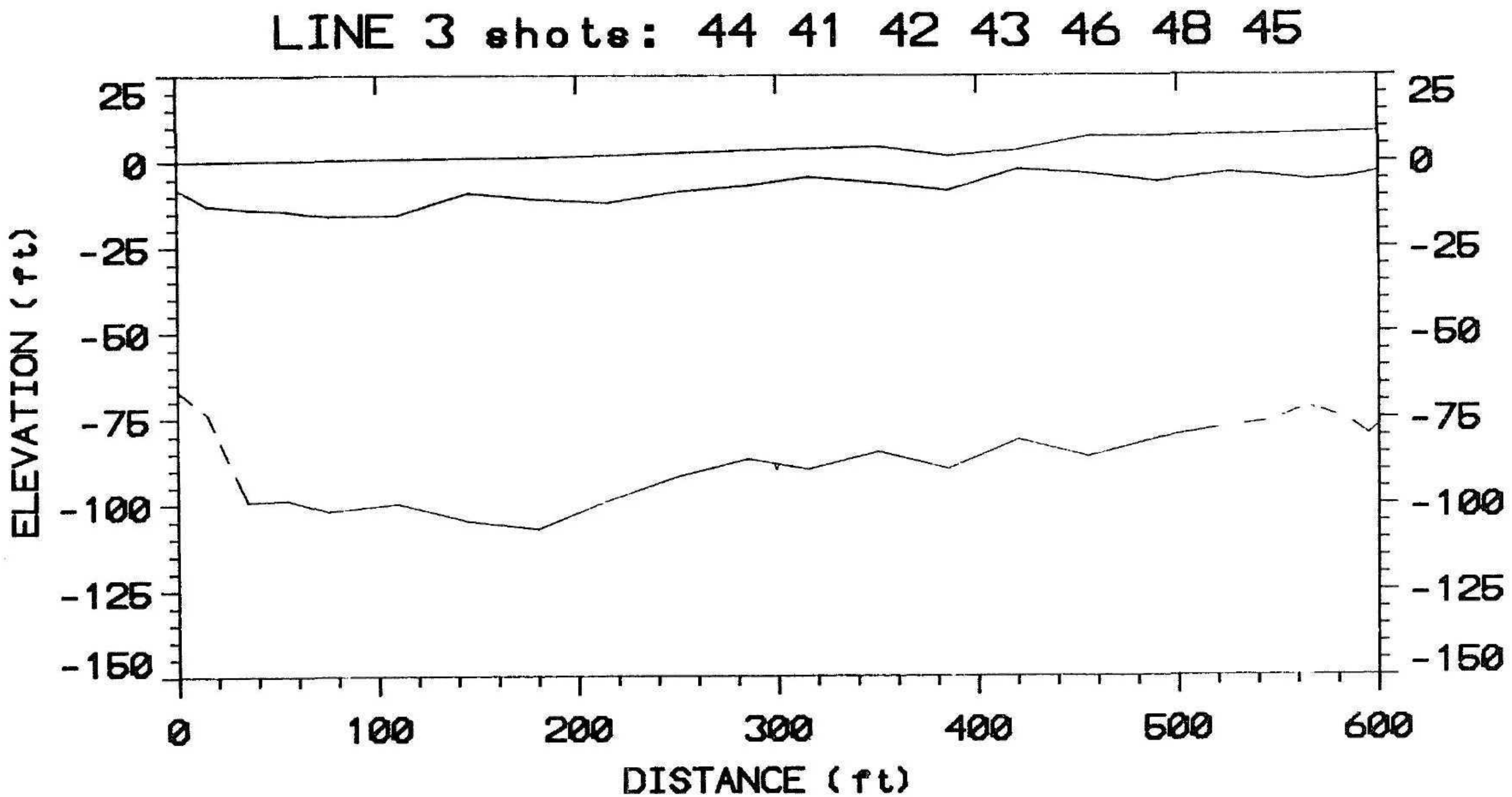


FIGURE 3E

GEOPHYSICAL SURVEY	
DEPTH VS DISTANCE	
FOR:	MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY:	GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP

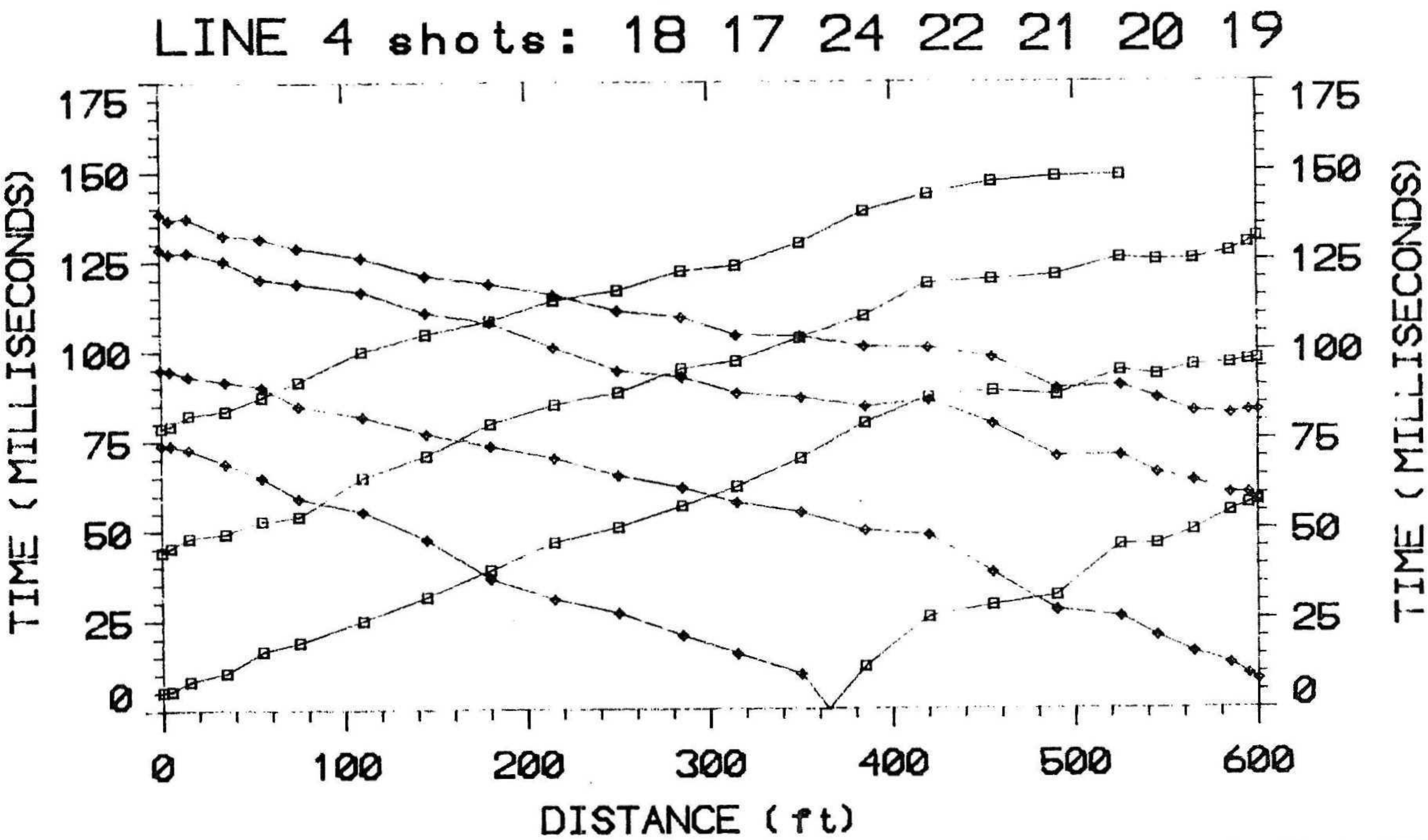


FIGURE 4A

GEOPHYSICAL SURVEY
TIME VS DISTANCE
FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY: GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP

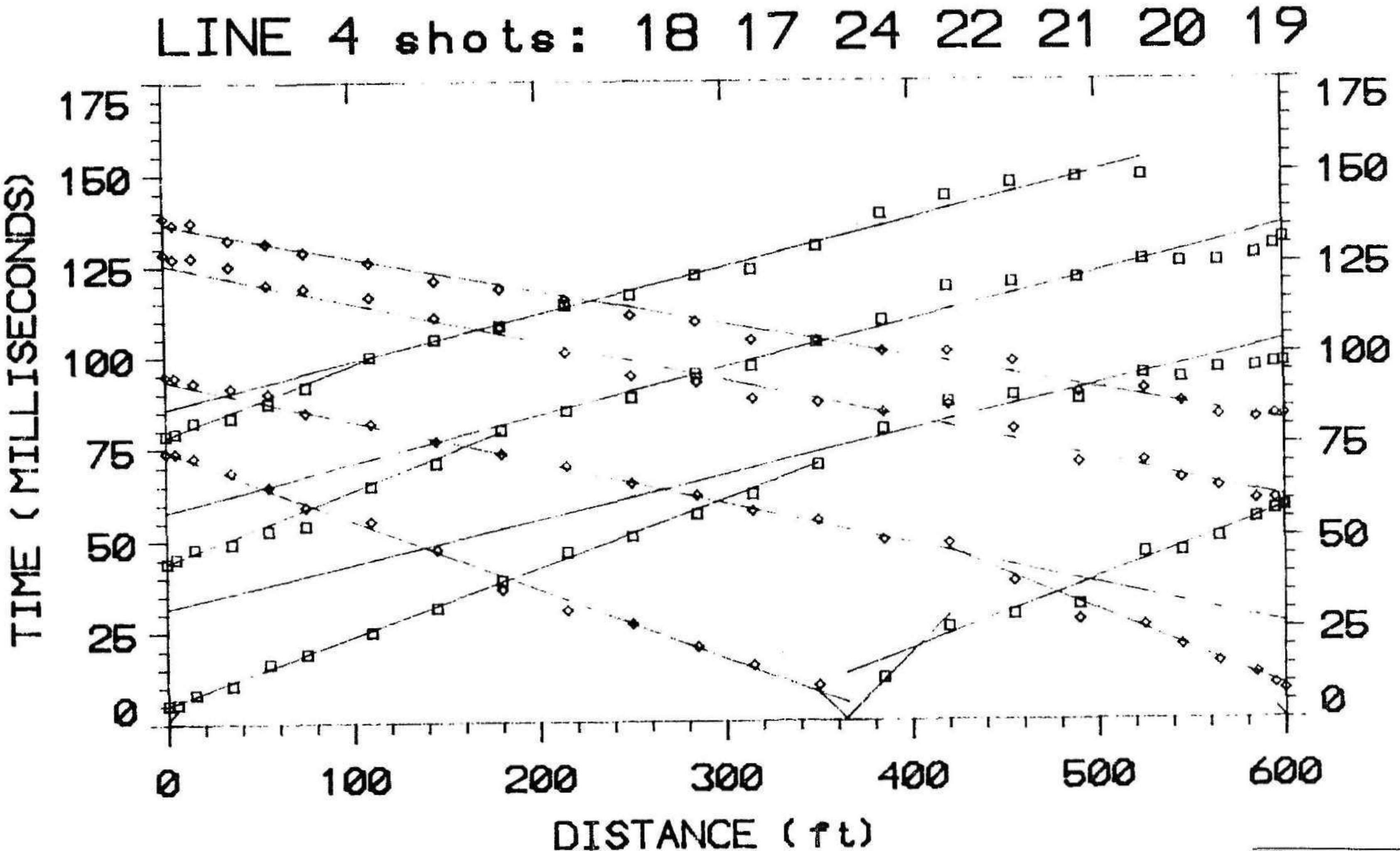


FIGURE 4B

GEOPHYSICAL SURVEY

REFRACTOR ASSIGNMENTS

FOR: MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

BY: GERAGHTY & MILLER, INC.
GEOPHYSICAL GROUP

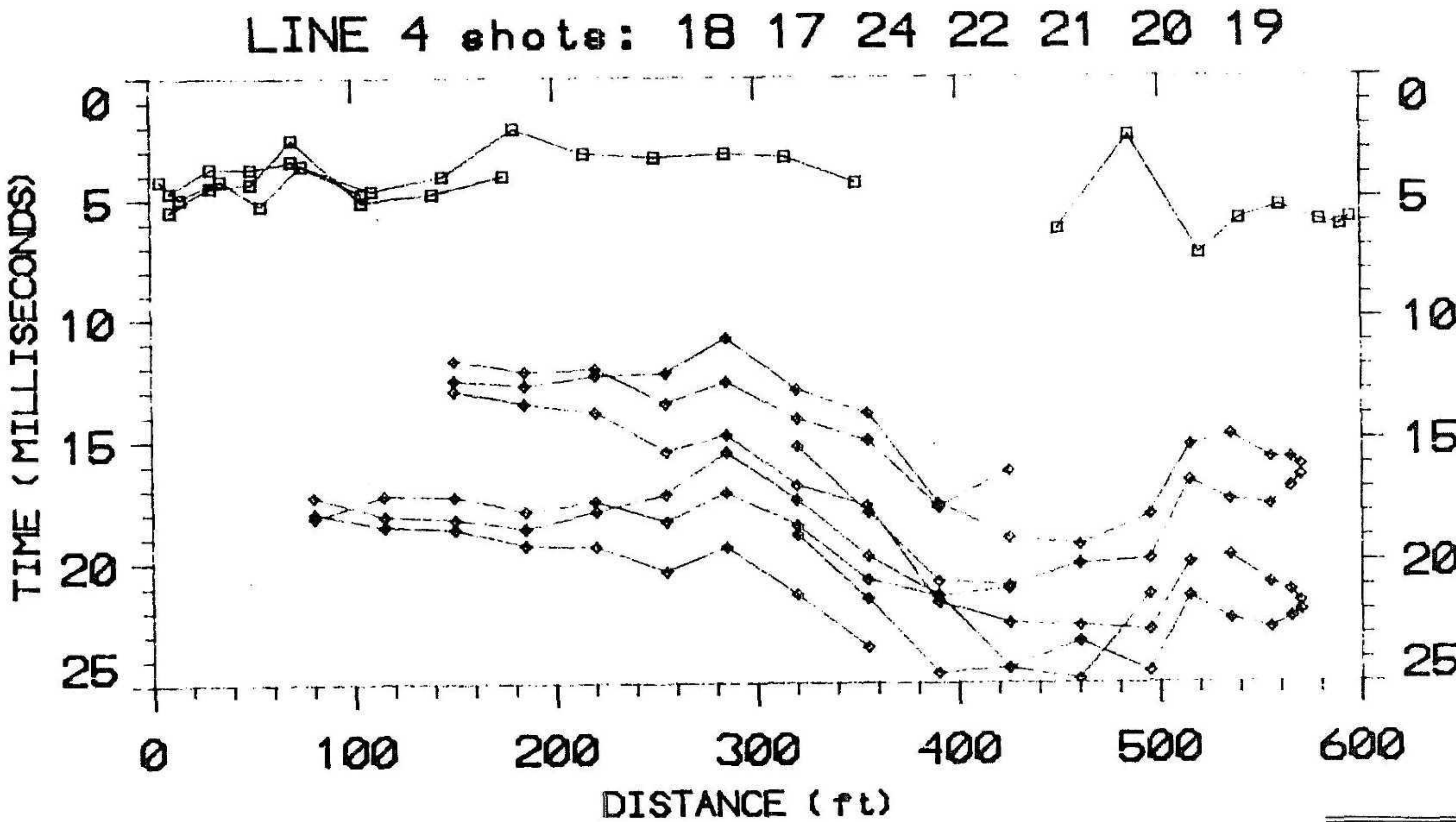


FIGURE 40

GEOPHYSICAL SURVEY	
TIME DEPTH VS DISTANCE	
FOR:	MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY:	GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP

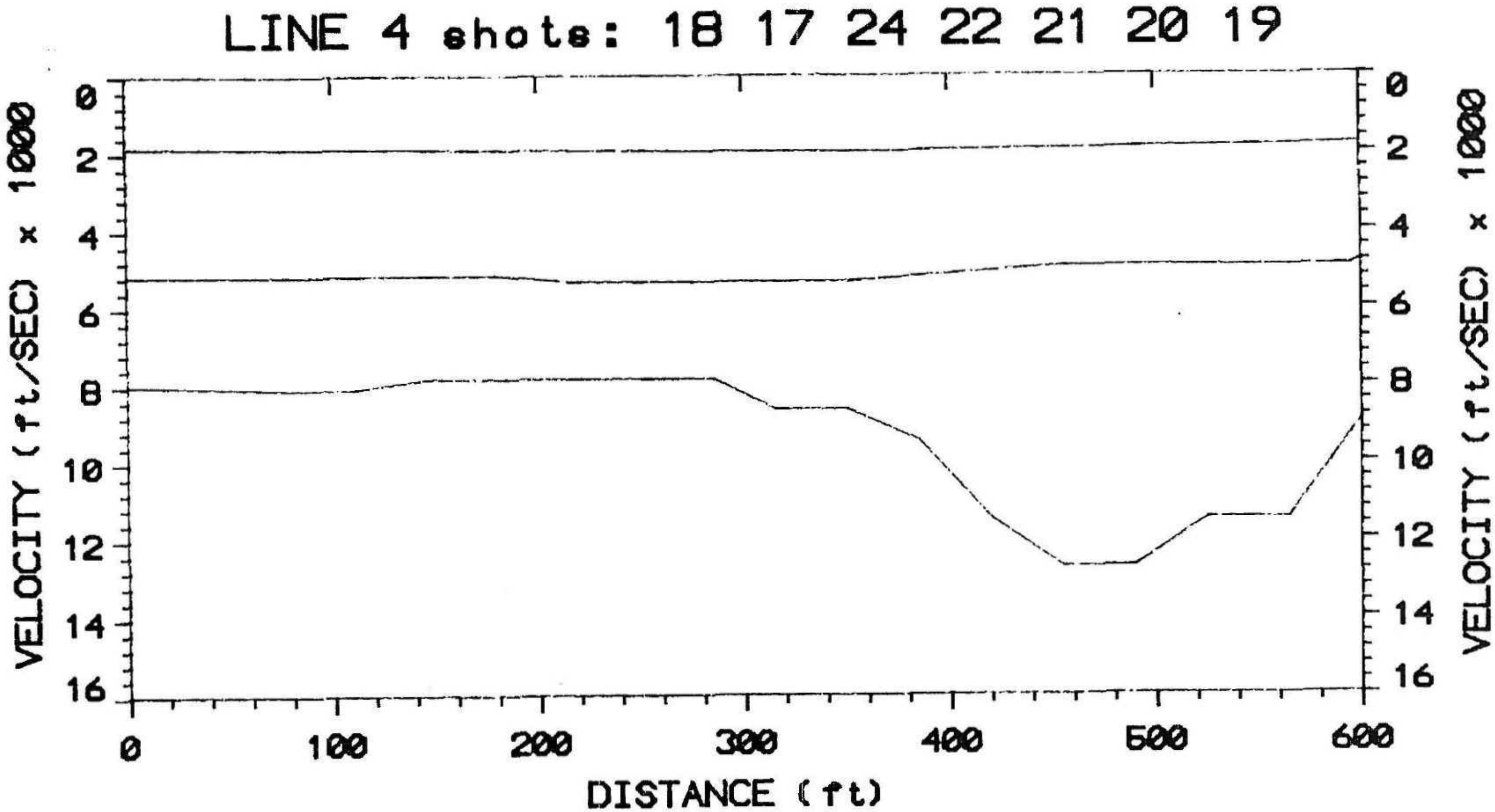
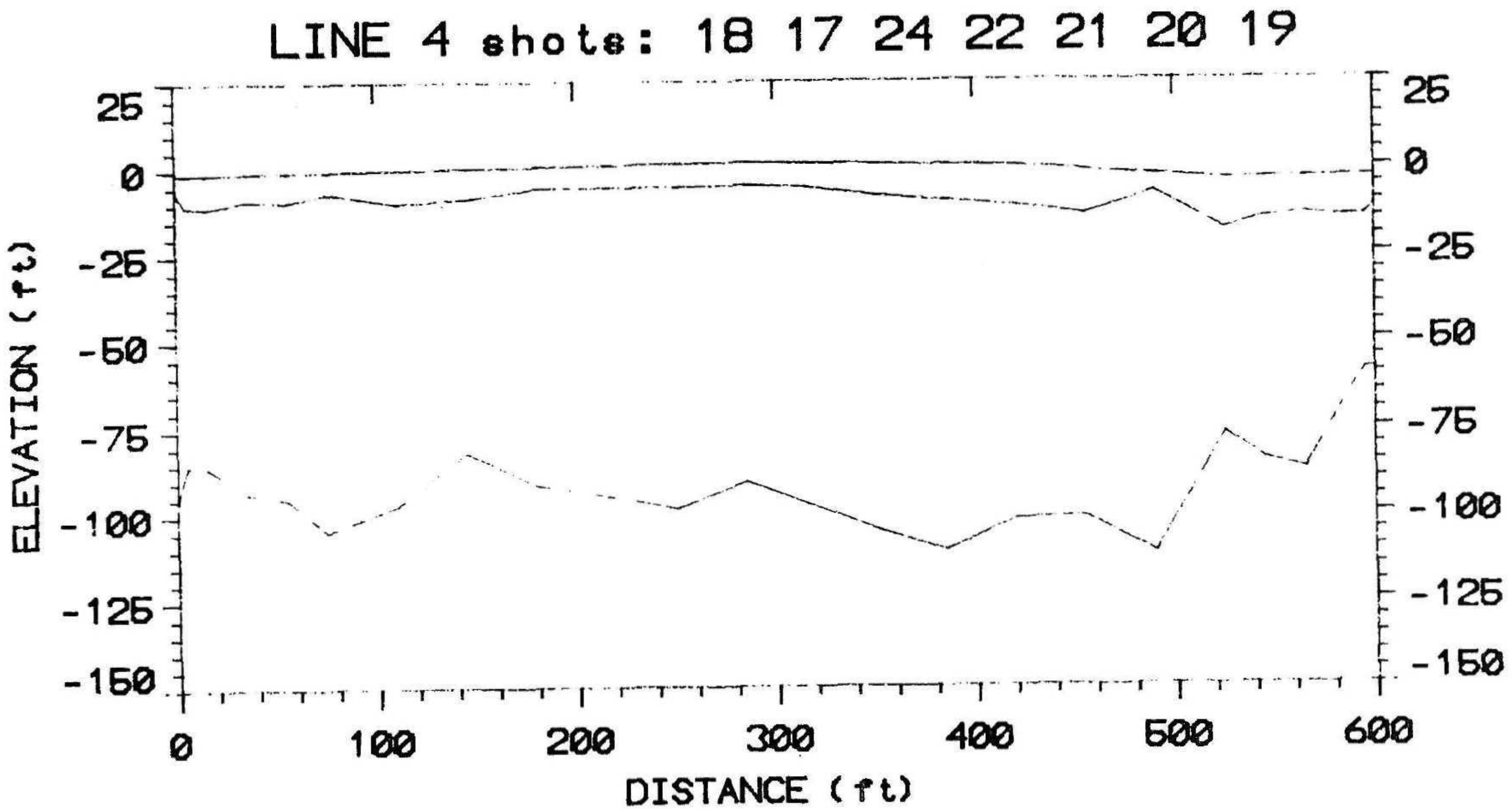


FIGURE 4D

GEOPHYSICAL SURVEY
VELOCITY VS DISTANCE
FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY: GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP



FIGURE

GEOPHYSICAL SURVEY	
DEPTH VS DISTANCE	
FOR:	MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY:	GERAGHTY & MILLER, IN GEOPHYSICAL GROUP

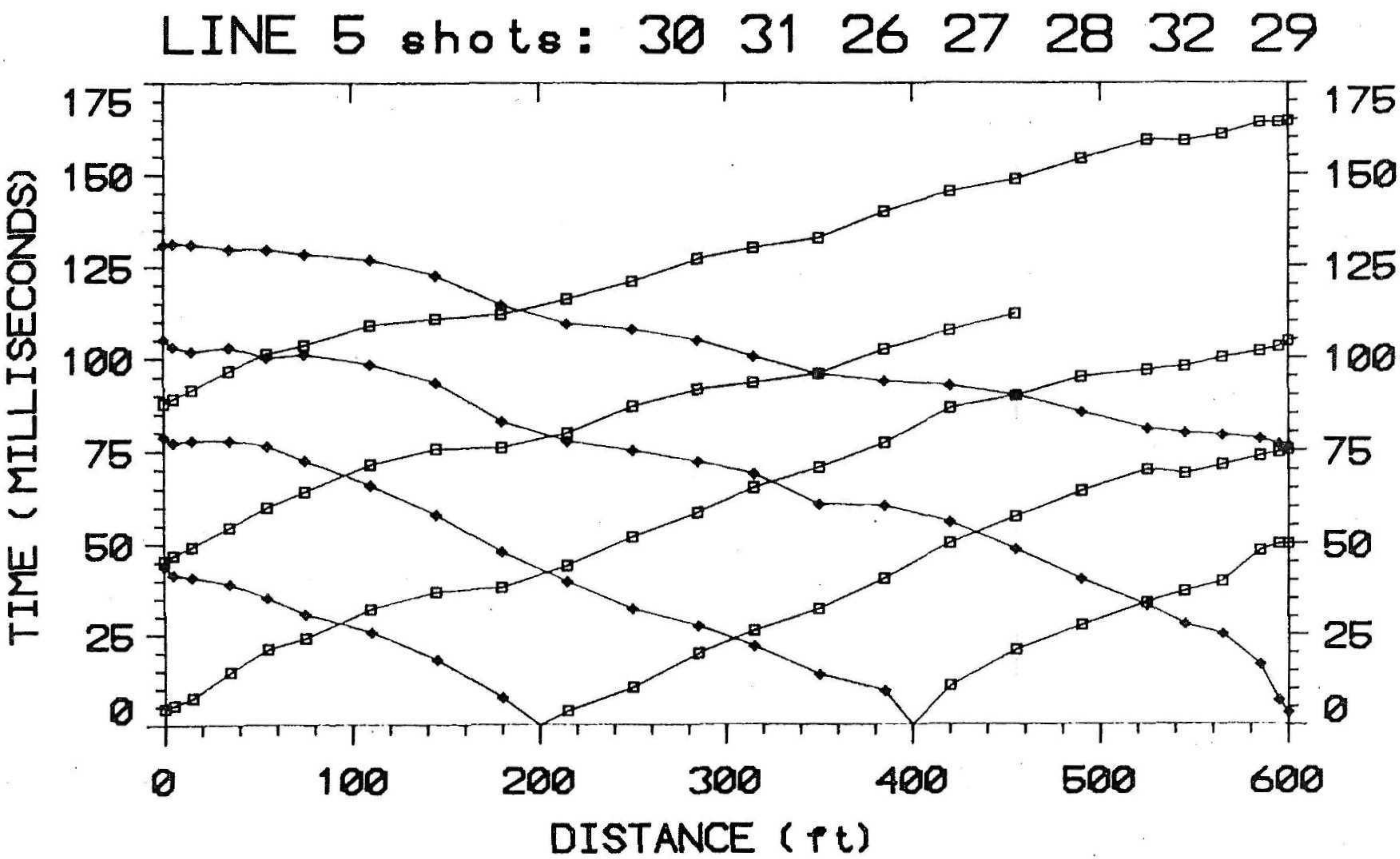


FIGURE 5A

GEOPHYSICAL SURVEY

TIME VS DISTANCE

FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA

BY: GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP

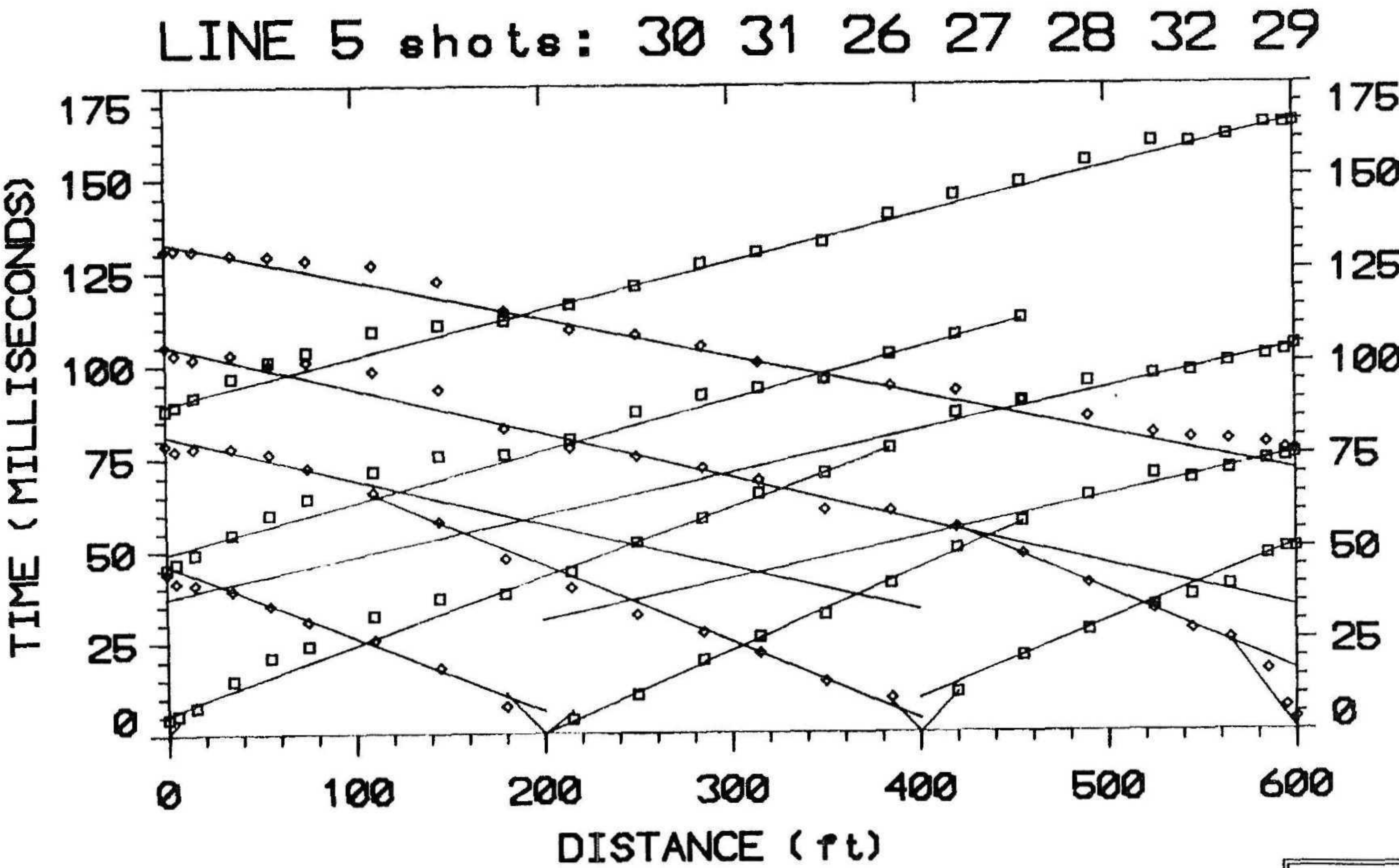


FIGURE 5

GEOPHYSICAL SURVEY	
REFRACTOR ASSIGNMENTS	
FOR:	MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY:	GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP

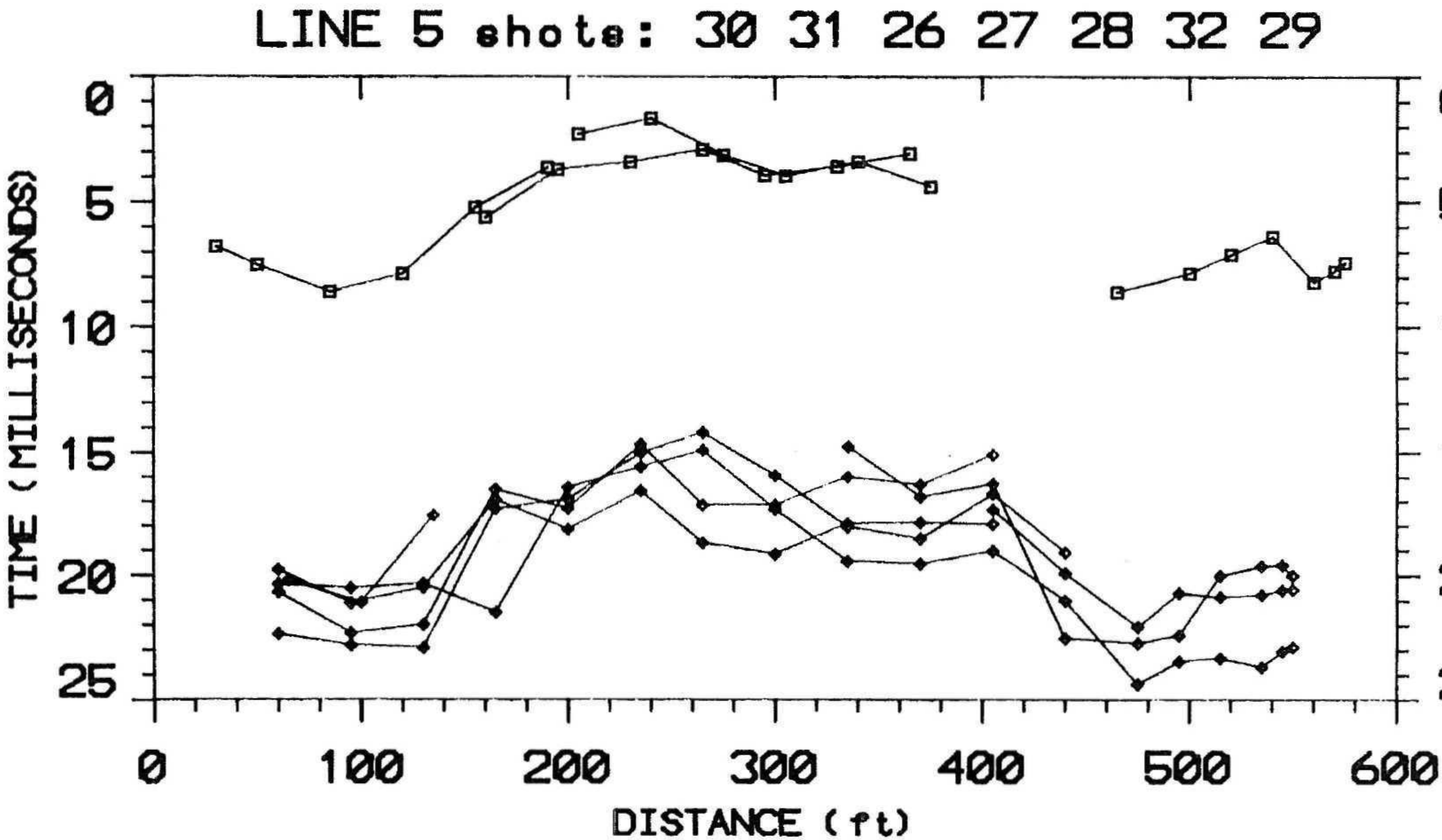


FIGURE 5C

GEOPHYSICAL SURVEY
TIME DEPTH VS DISTANCE
FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY: GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP

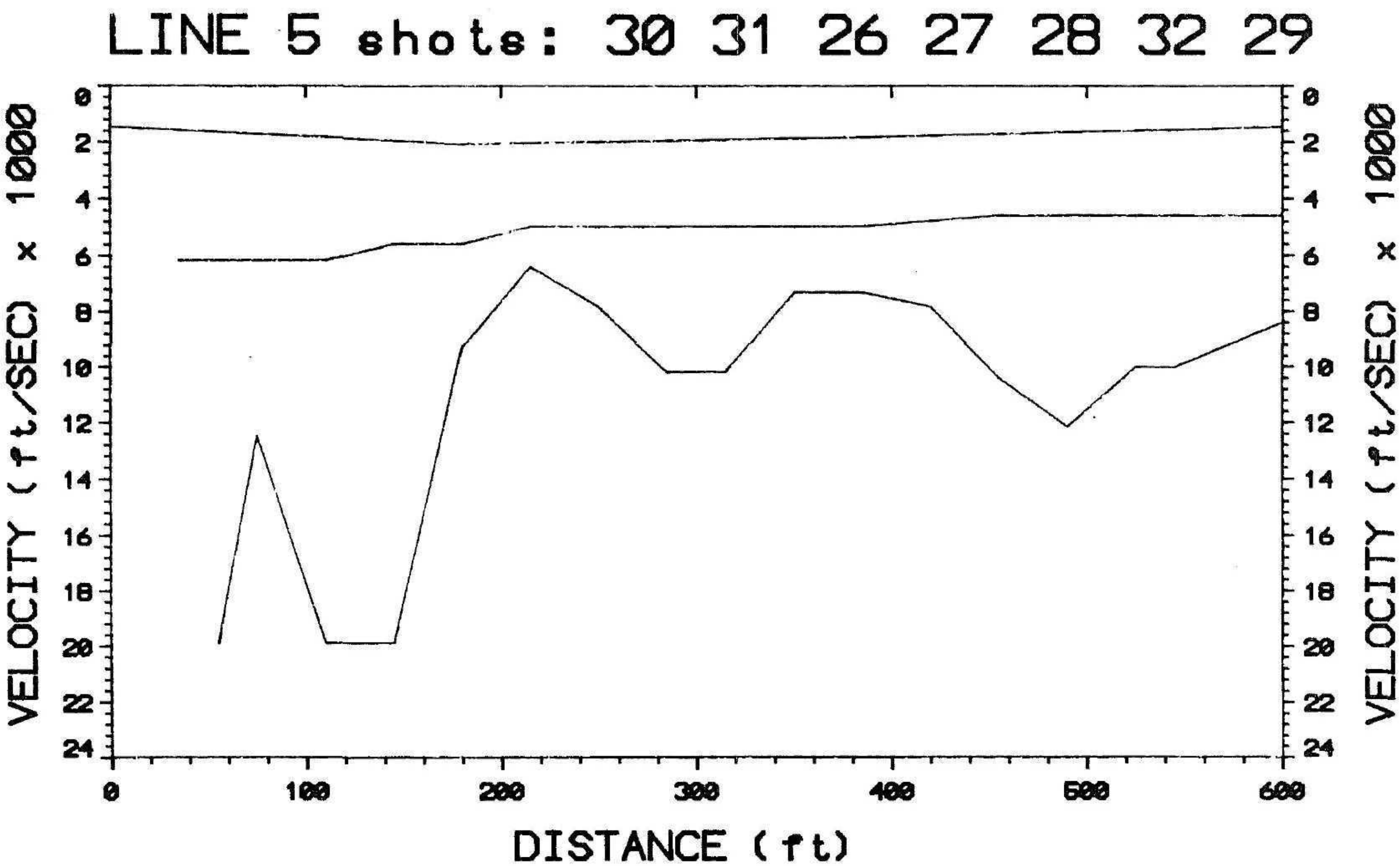


FIGURE 5D

GEOPHYSICAL SURVEY
VELOCITY VS DISTANCE
FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY: GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP

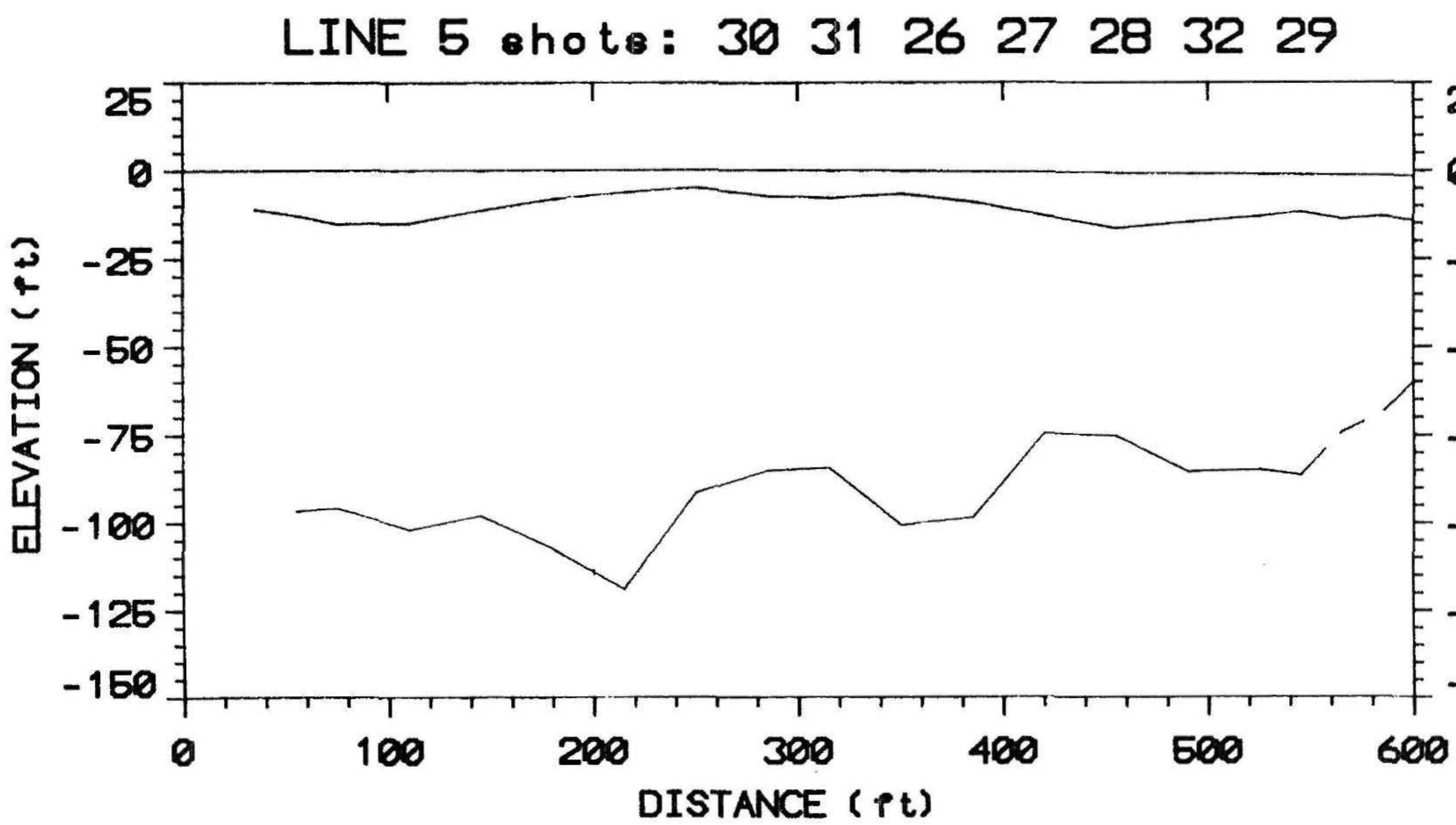


FIGURE 5E

GEOPHYSICAL SURVEY	
DEPTH VS DISTANCE	
FOR:	MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY:	GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP

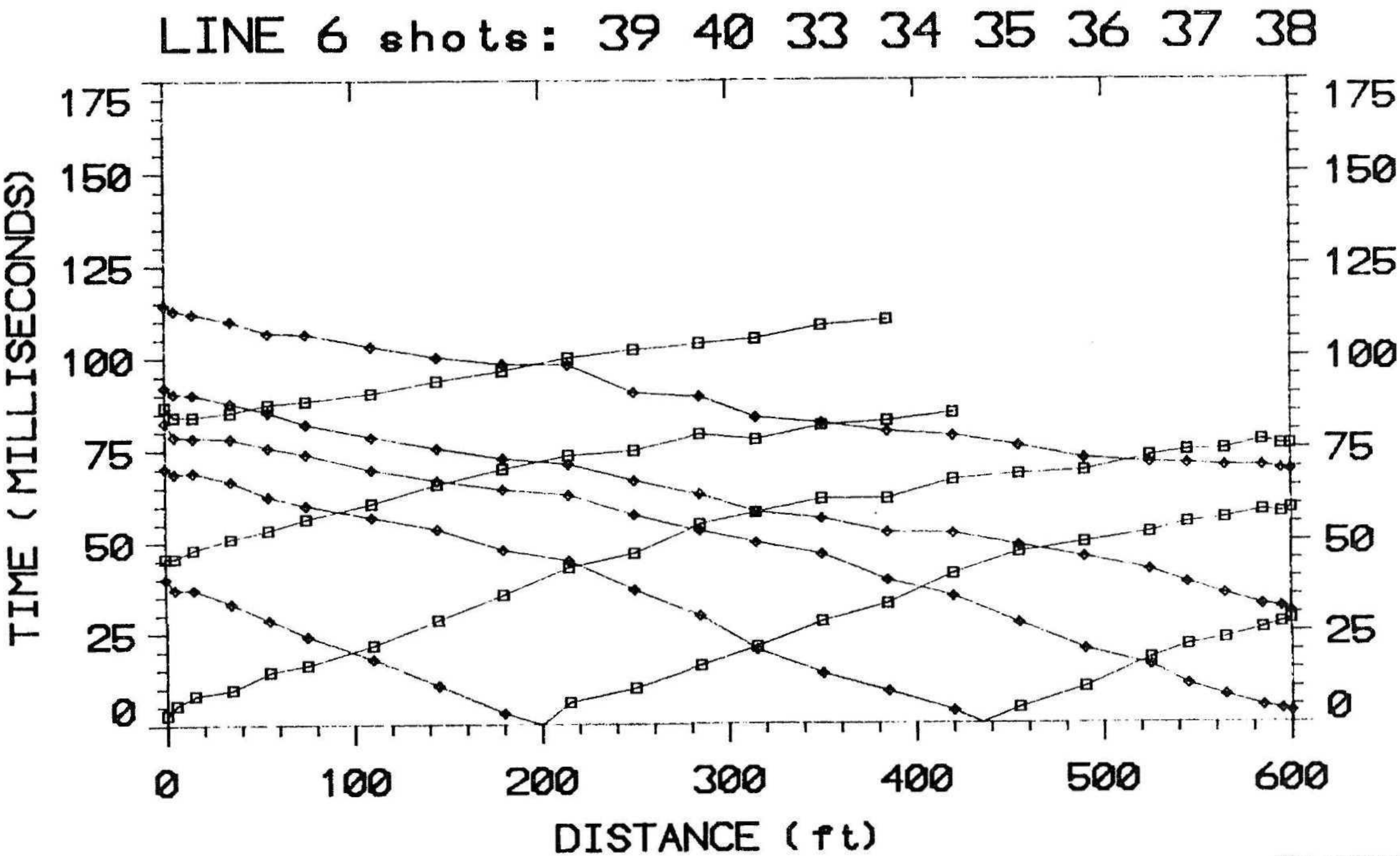
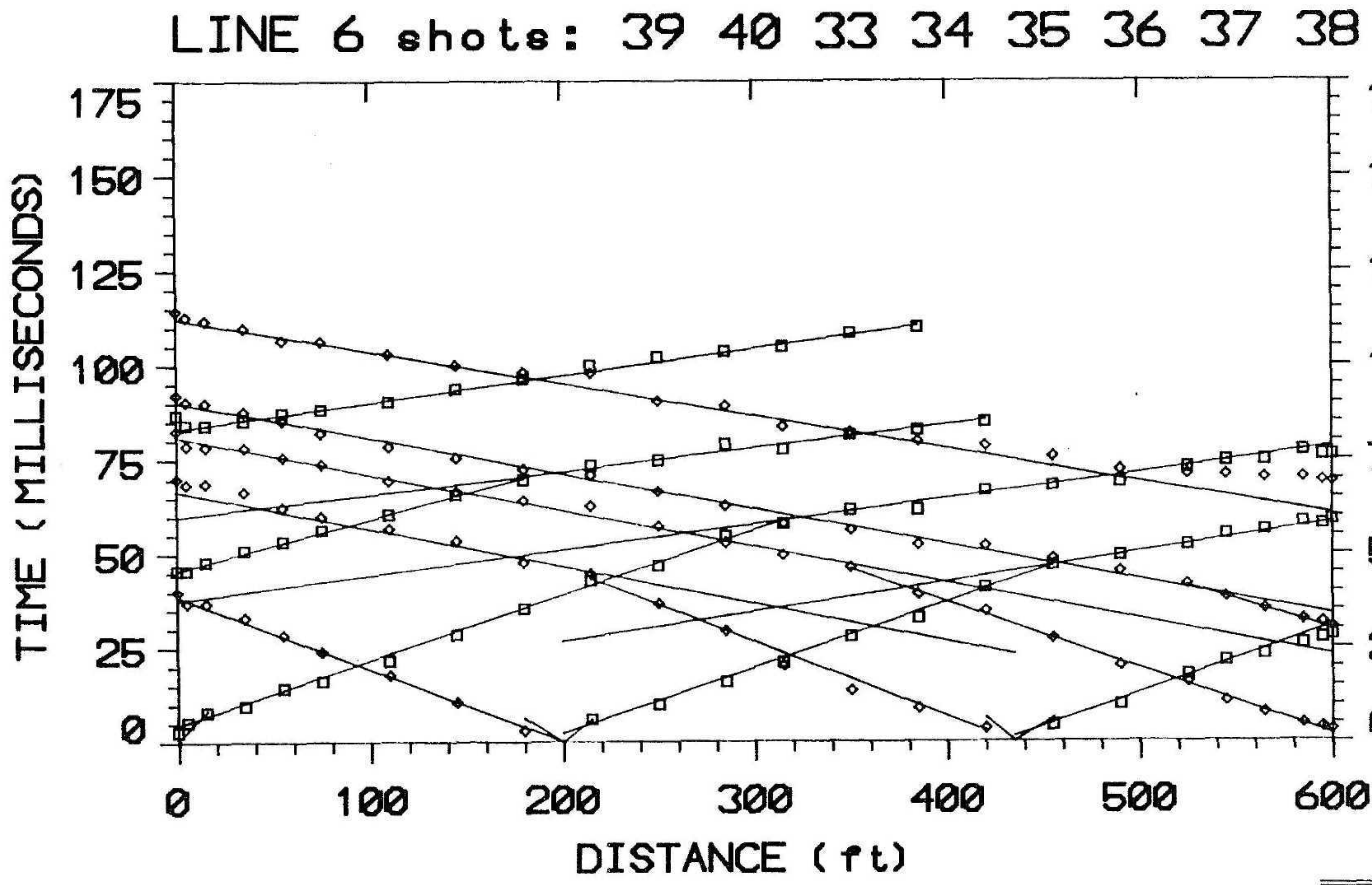


FIGURE 6

GEOPHYSICAL SURVEY
TIME VS DISTANCE
FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY: GERAGHTY & MILLER, INC GEOPHYSICAL GROUP



FIGURE

GEOPHYSICAL SURVEY

REFRACTOR ASSIGNMENTS

FOR: MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

BY: GERAGHTY & MILLER, IN
GEOPHYSICAL GROUP

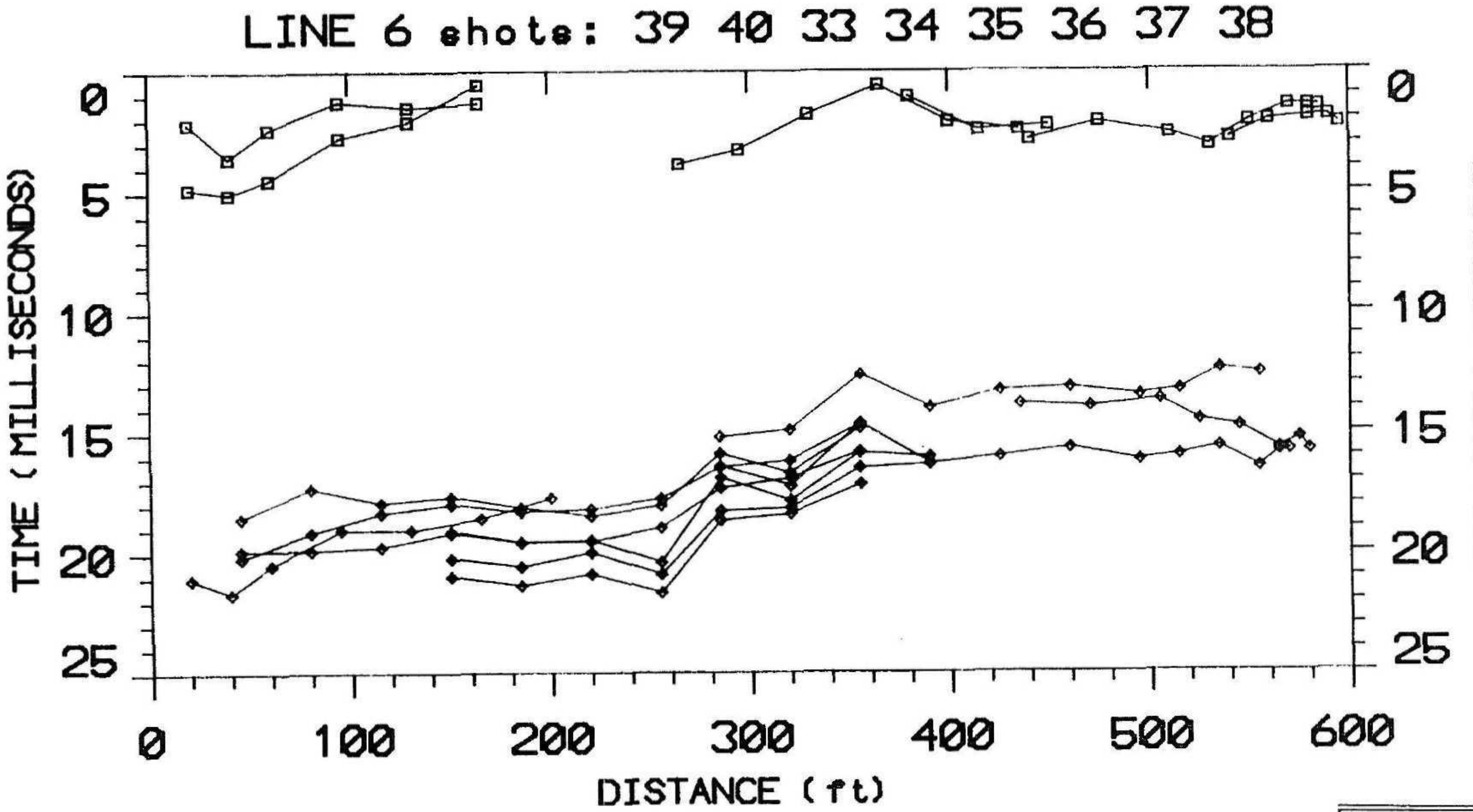


FIGURE 6

GEOPHYSICAL SURVEY
TIME DEPTH VS DISTANCE
FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY: GERAGHTY & MILLER, INC GEOPHYSICAL GROUP

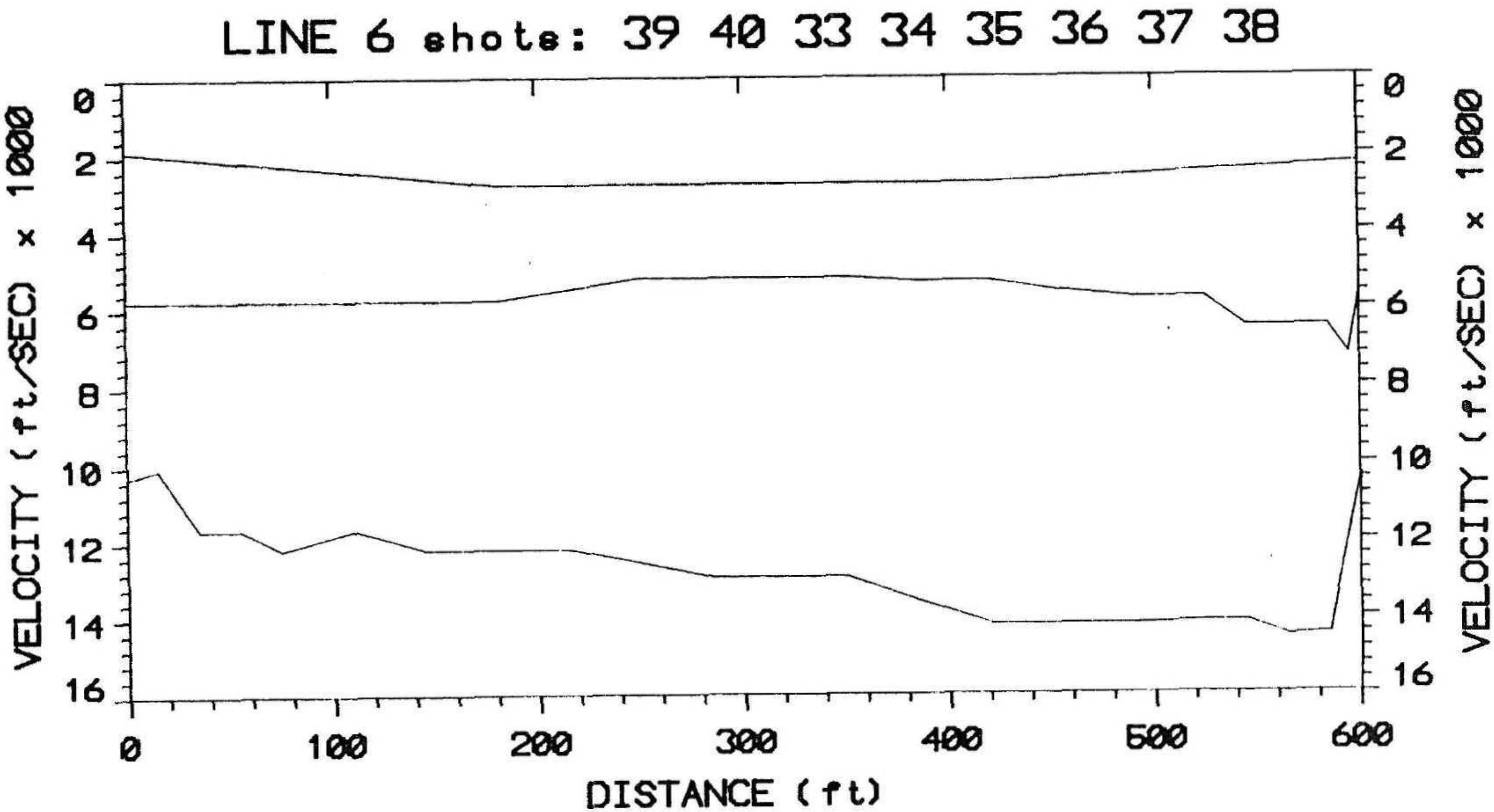


FIGURE 6

GEOPHYSICAL SURVEY
VELOCITY VS DISTANCE
FOR: MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY: GERAGHTY & MILLER, INC. GEOPHYSICAL GROUP

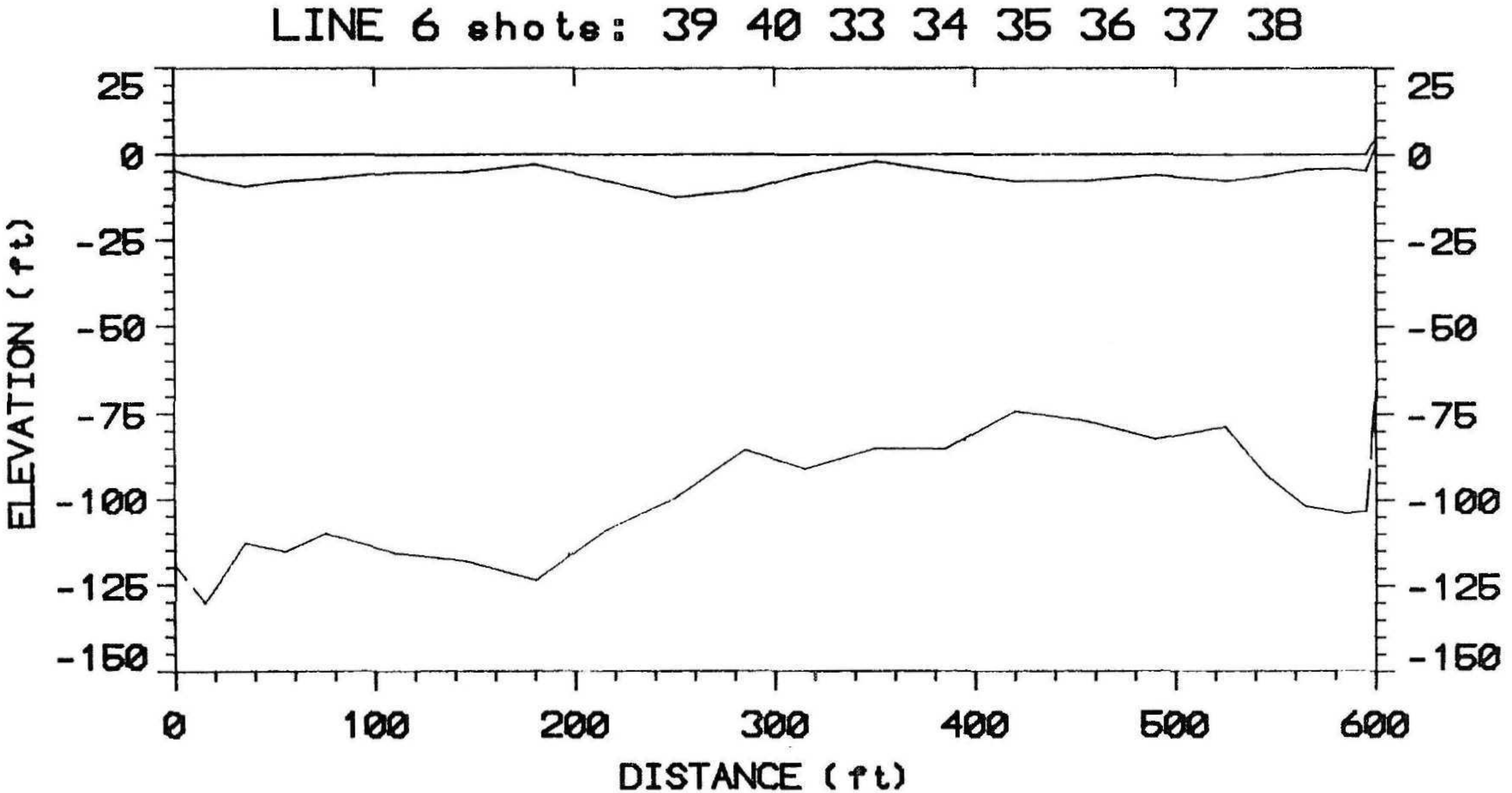


FIGURE 6

GEOPHYSICAL SURVEY	
DEPTH VS DISTANCE	
FOR:	MONSANTO CHEMICAL COMPANY ANNISTON, ALABAMA
BY:	GERAGHTY & MILLER, INC GEOPHYSICAL GROUP

APPENDIX B

CPT Sounding Charts

F:\PROJ\TF525\RPT\CPT-RPT.W51

FUGRO

FUGRO GEOSCIENCES, INC.

6105 Rookin
Houston, Texas 77074
Tel: (713) 778-5580
Fax: (713) 778-5501

May 11, 1992
Report Number 0301-2114

Geraghty & Miller
14497 North Dale Mabry
Suite 115
Tampa, Florida 33618

Attention: Mr. Ken Miklos

CONE PENETROMETER TESTING
AND RELATED SERVICES
MONSANTO FACILITY
ANNISTON, ALABAMA

Dear Ken:

Please find enclosed herewith the final results of the cone penetrometer tests conducted at the above referenced location.

For your information, the soil stratigraphy was identified using Campanella and Robertson's Simplified Soil Behavior Chart. Please note that because of the empirical nature of the soil behavior chart, the soil identification should be verified locally.

Fugro Geosciences appreciates the opportunity to be of service to your organization. If you should have any questions, or if we can be of further assistance, please do not hesitate to contact us. We look forward to working with you in the future.

Very truly yours,
FUGRO GEOSCIENCES, INC.

Jeffery L. Ness

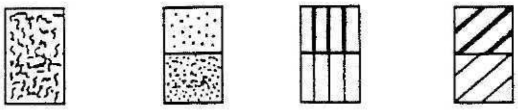
Jeffery L. Ness
CPT Supervisor

JLN/kjs

Key To Soil Classification and Symbols

SOIL TYPE
(Shown in Symbol Column)

Sand Silt Clay



Fill Sandy Silty Clayey

Predominant Type Shown Heavy

SAMPLE TYPE
(Shown in Samples Column)

Undisturbed Rock Core Split Spoon No Recovery

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (Major portion Retained on No. 200 Sieve)
Includes (1) clean gravels and sand described as fine, medium or course, depending on distribution of grain sizes (2) silty or clayey gravels and sands and (3) fine grained low plasticity soils (PI < 10) such as sandy silts. Condition is rated according to relative density, as determined by lab tests or estimated from resistance to sampler penetration.

Descriptive Term	Penetration Resistance*	Relative Density
Loose	0 - 10	0 to 40%
Medium Dense	10 - 30	40 to 70%
Dense	30 - 50	70 to 90%
Very Dense	Over 50	90 to 100%

* Blows/Foot, 140# Hammer, 30" Drop

FINE GRAINED SOILS (Major Portion Passing No. 200 Sieve)
Includes (1) inorganic and organic silts and clays, (2) sandy, gravelly or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings or by unconfined compression tests for soils with PI $\geq$ 10.

Descriptive Term	Cohesive Shear Strength Tons/Square Foot
Very Soft	Less Than 0.125
Soft	0.125 to 0.25
Firm	0.25 to 0.50
Stiff	0.50 to 1.00
Very Stiff	1.00 to 2.00
Hard	2.00 and Higher

Note: Slickensided and fissured clay may have lower unconfined compressive strengths than shown above because of planes of weakness or shrinkage cracks; consistency ratings of such soils are based on hand penetrometer readings.

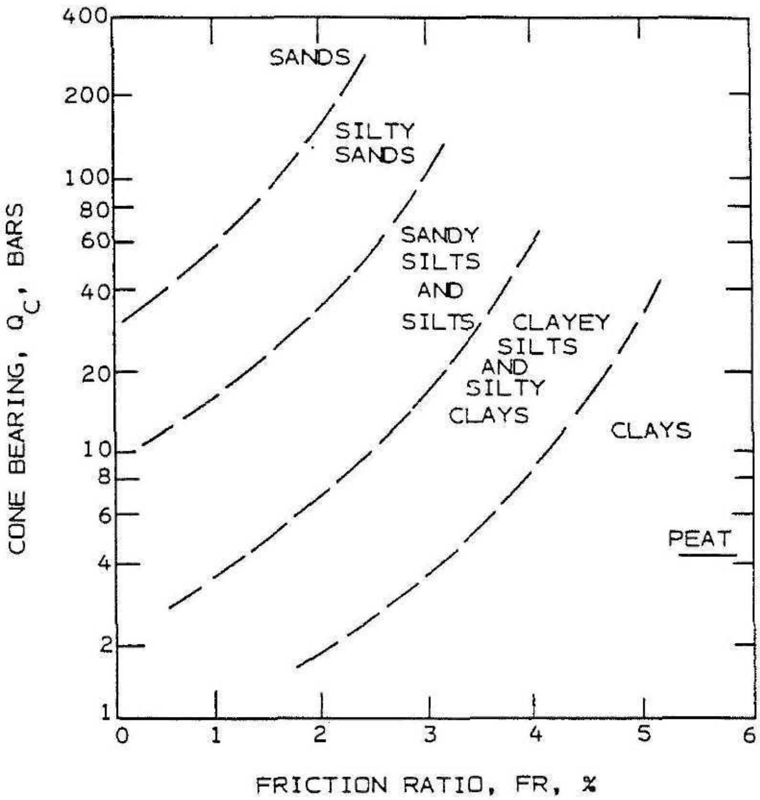
TERMS CHARACTERIZING SOIL STRUCTURE

Parting:	paper thin in size
Seam:	1/8" to 3" thick
Layer:	greater than 3"
Fissured:	containing shrinkage cracks, frequently filled with fine sand or silt, usually more or less vertical
Sensitive:	pertaining to cohesive soils that are subject to appreciable loss of strength when remolded
Interbedded:	composed of alternate layers of different soil types
Laminated:	composed of thin layers of varying color and texture
Calcareous:	containing appreciable quantities of calcium carbonate
Well Graded:	having wide range in grain sizes and substantial amounts of all intermediate particle sizes
Poorly Graded:	predominantly of one grain size, or having a range of sizes with some intermediate size missing
Flocculated:	pertaining to cohesive soils that exhibit a loose knit or flakey structure
Slickensided:	having inclined planes of weakness that are slick and glossy in appearance.

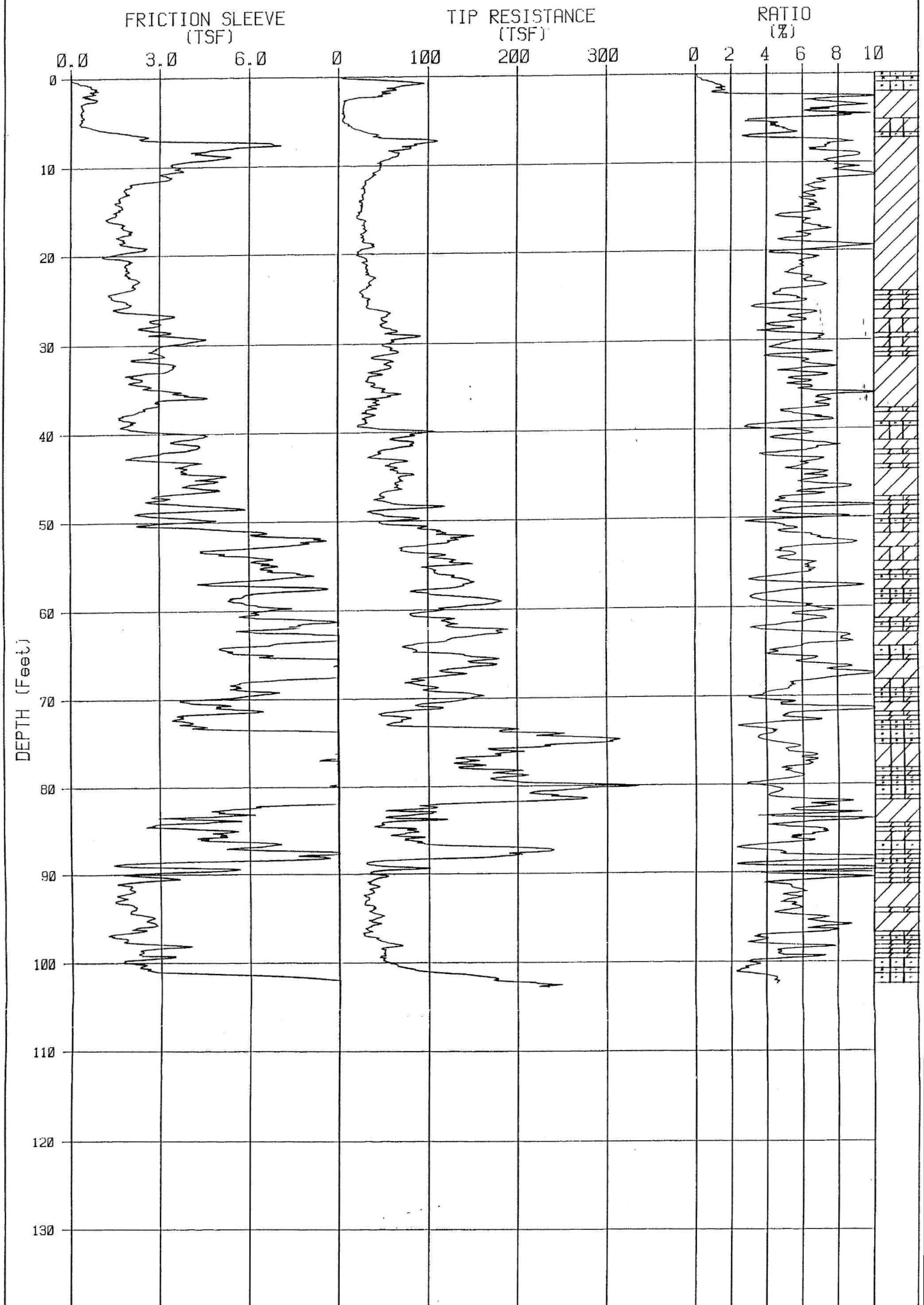
Degree of Slickensided Development

Slightly Slickensided:	slickensides present at intervals of 1' to 2', soil does not easily break along these plates
Moderately Slickensided:	slickensides spaced at intervals of 1' to 2', soil breaks easily along these planes
Extremely Slickensided:	continuous and interconnected slickensides spaced at intervals of 4" to 12', soil breaks along the slickensides into pieces 3" to 6" in size
Intensely Slickensided:	slickensides spaced at intervals of less than 4", continuous in all directions; soil breaks down along planes into nodules 1/4" to 2" in size.

1 BAR = 100KPA = 1.02 KG/CM^2

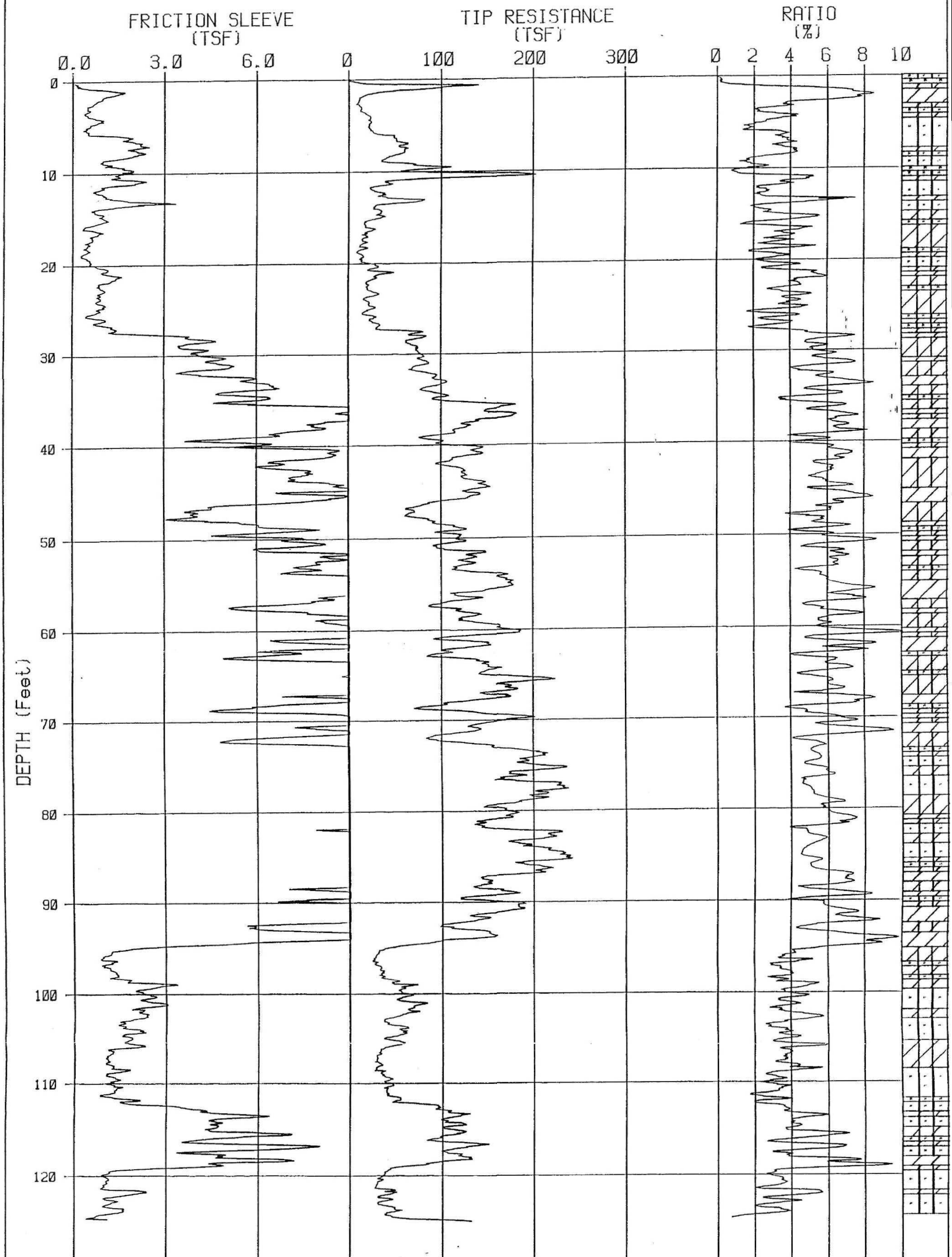


CAMPANELLA AND ROBERTSON CLASSIFICATION CHART



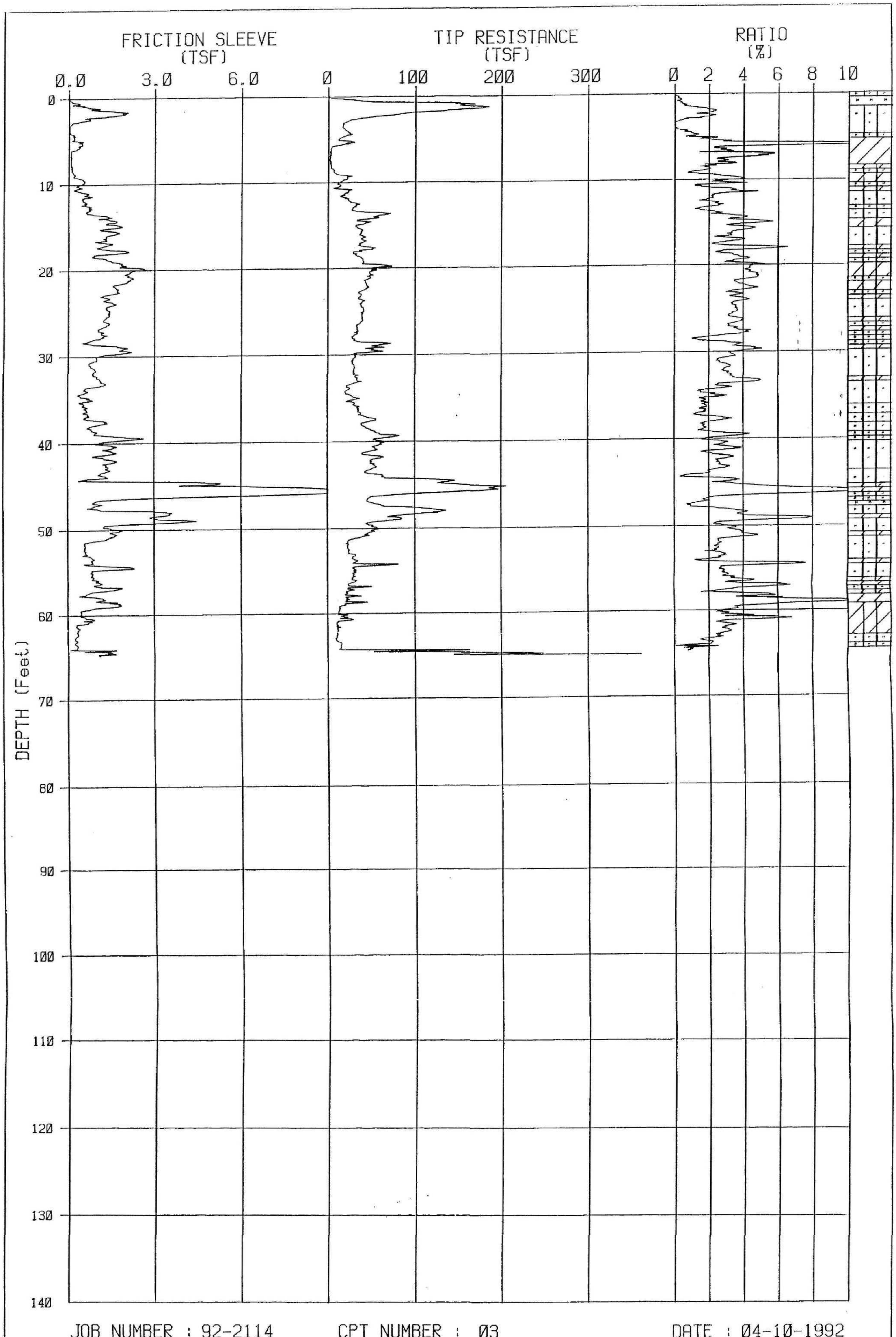
JOB NUMBER : 92-2114　　CPT NUMBER : 01　　DATE : 04-09-1992

ELEVATION : 0.00　　CONE NUMBER: F7.5CKEV173



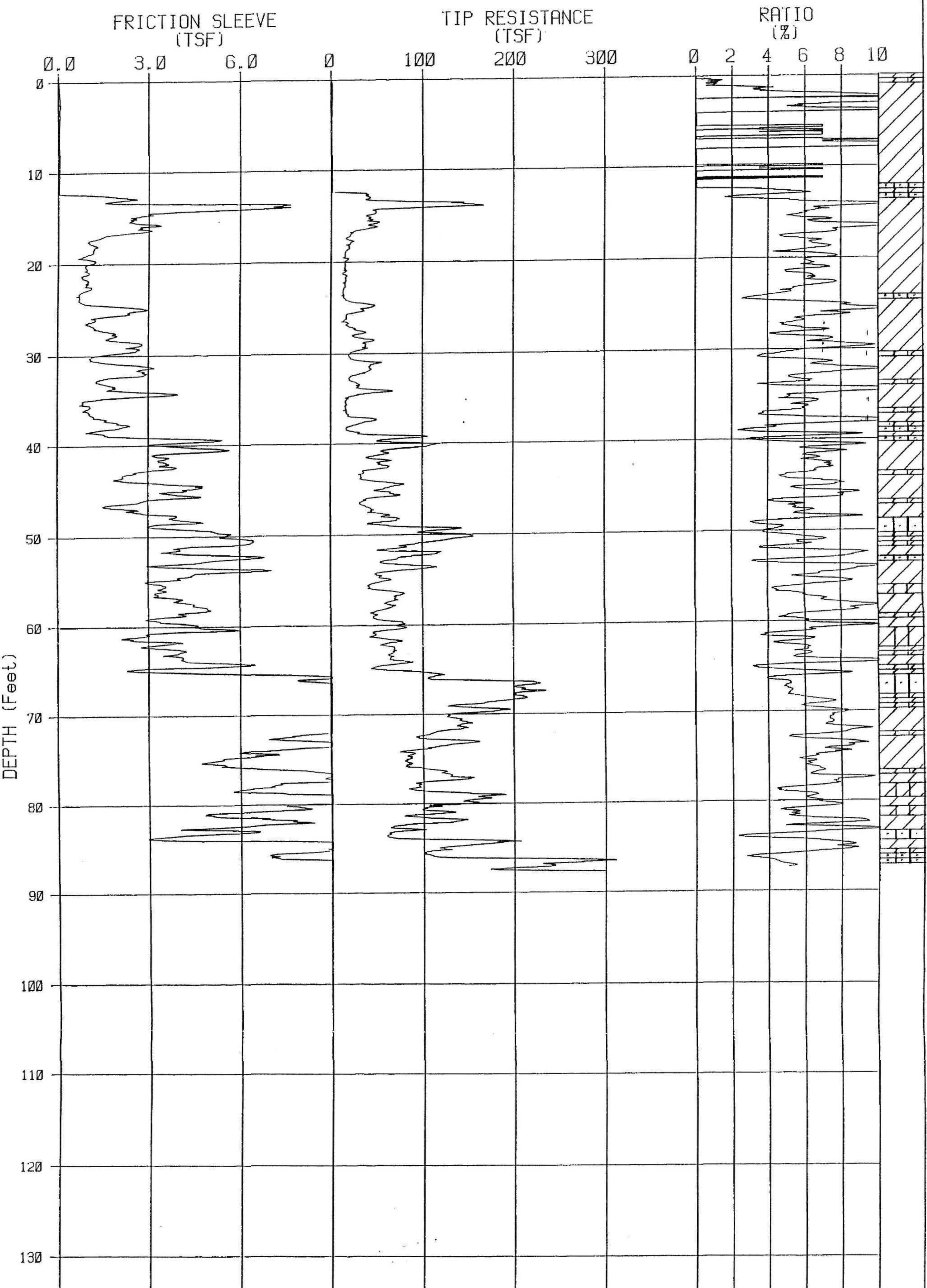
JOB NUMBER : 92-2114 CPT NUMBER : 02 DATE : 04-10-1992

ELEVATION : 0.00 CONE NUMBER: F7.5CKEV173



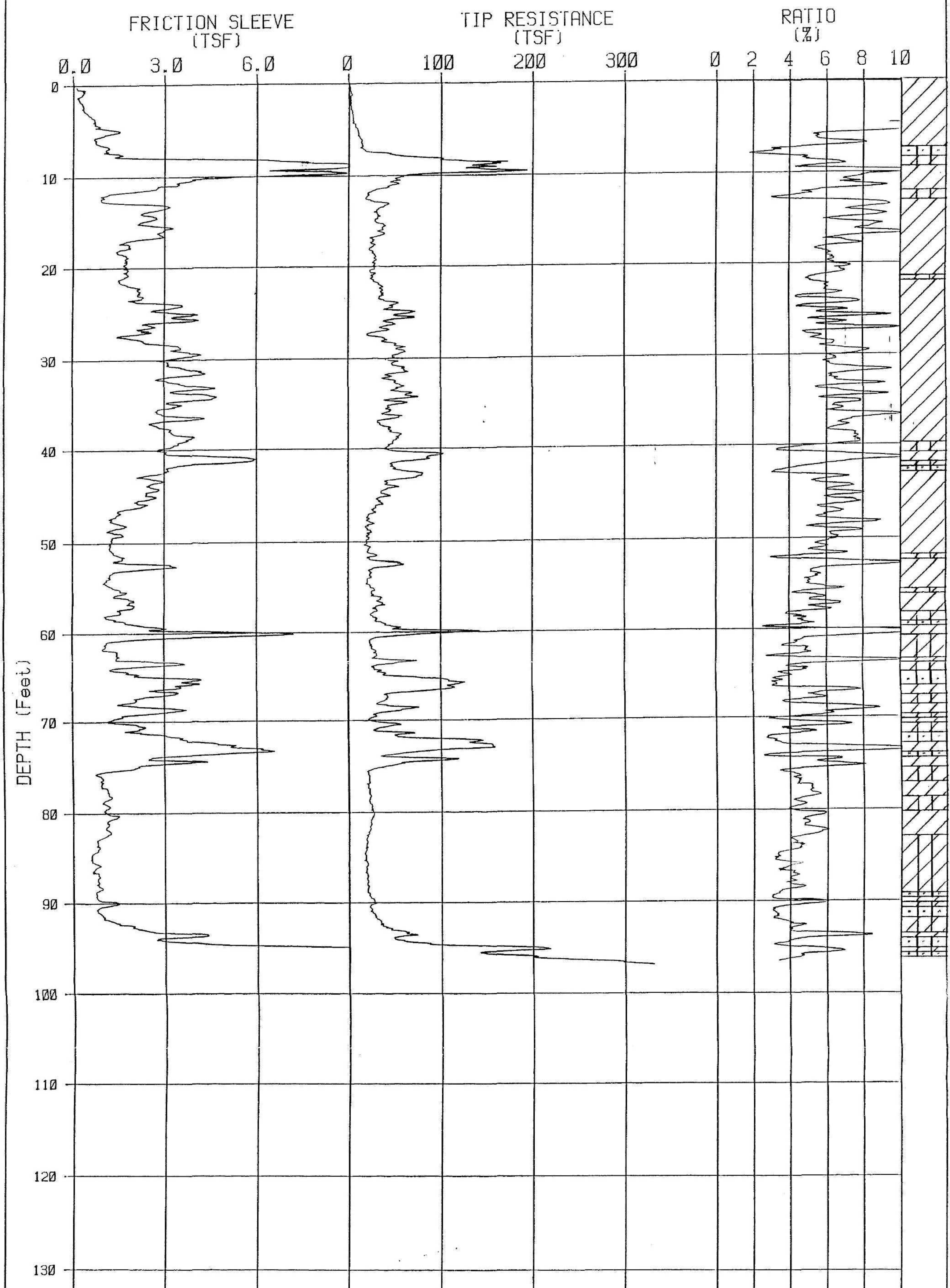
JOB NUMBER : 92-2114   CPT NUMBER : 03   DATE : 04-10-1992

ELEVATION : 0.00   CONE NUMBER: F7.5CKEV173



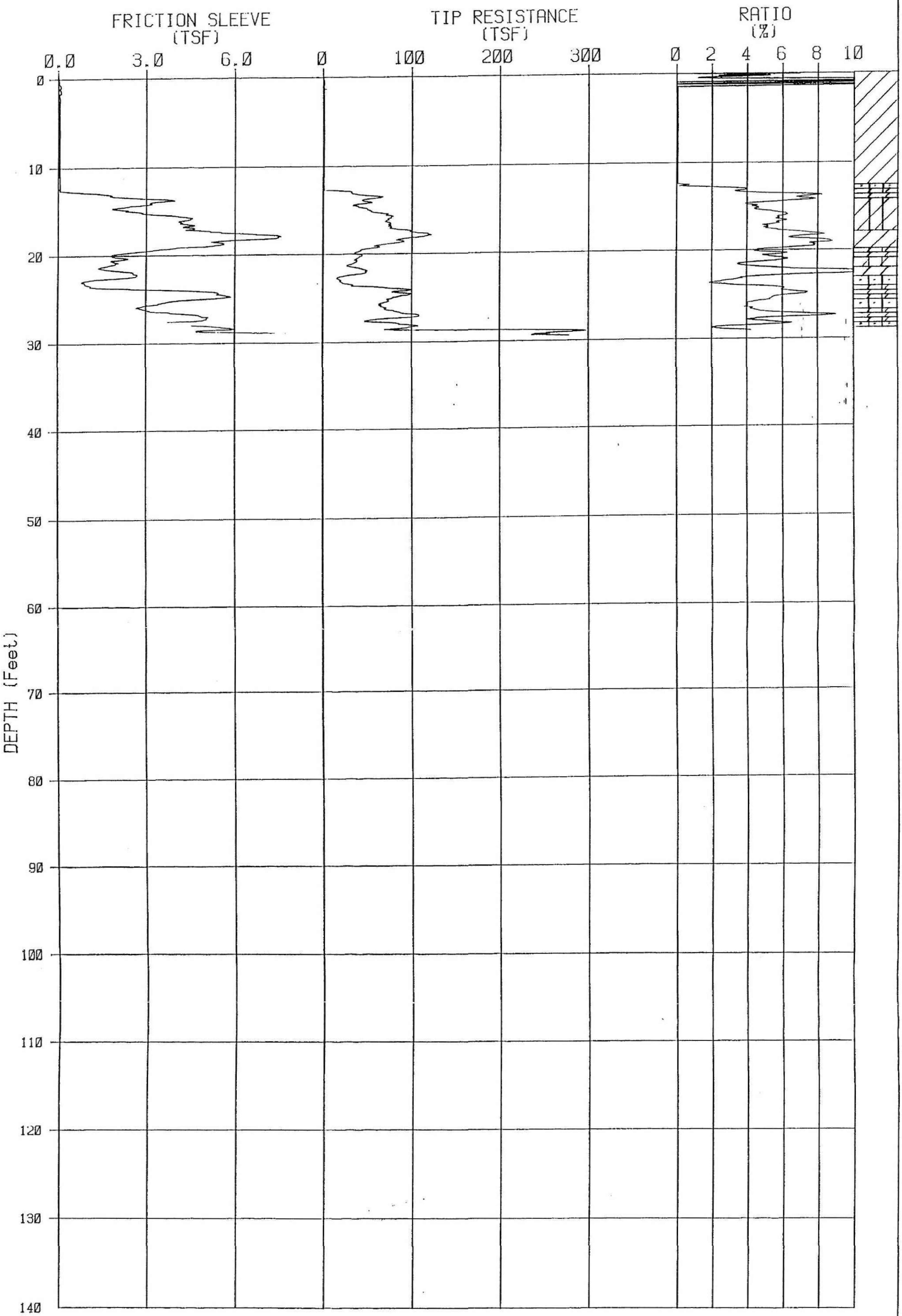
JOB NUMBER : 92-2114 CPT NUMBER : 04 DATE : 04-09-1992

ELEVATION : 0.00 CONE NUMBER: F7.5CKEV173



JOB NUMBER : 92-2114 CPT NUMBER : 05 DATE : 04-14-1992

ELEVATION : 0.00 CONE NUMBER: F7.5CKEV173



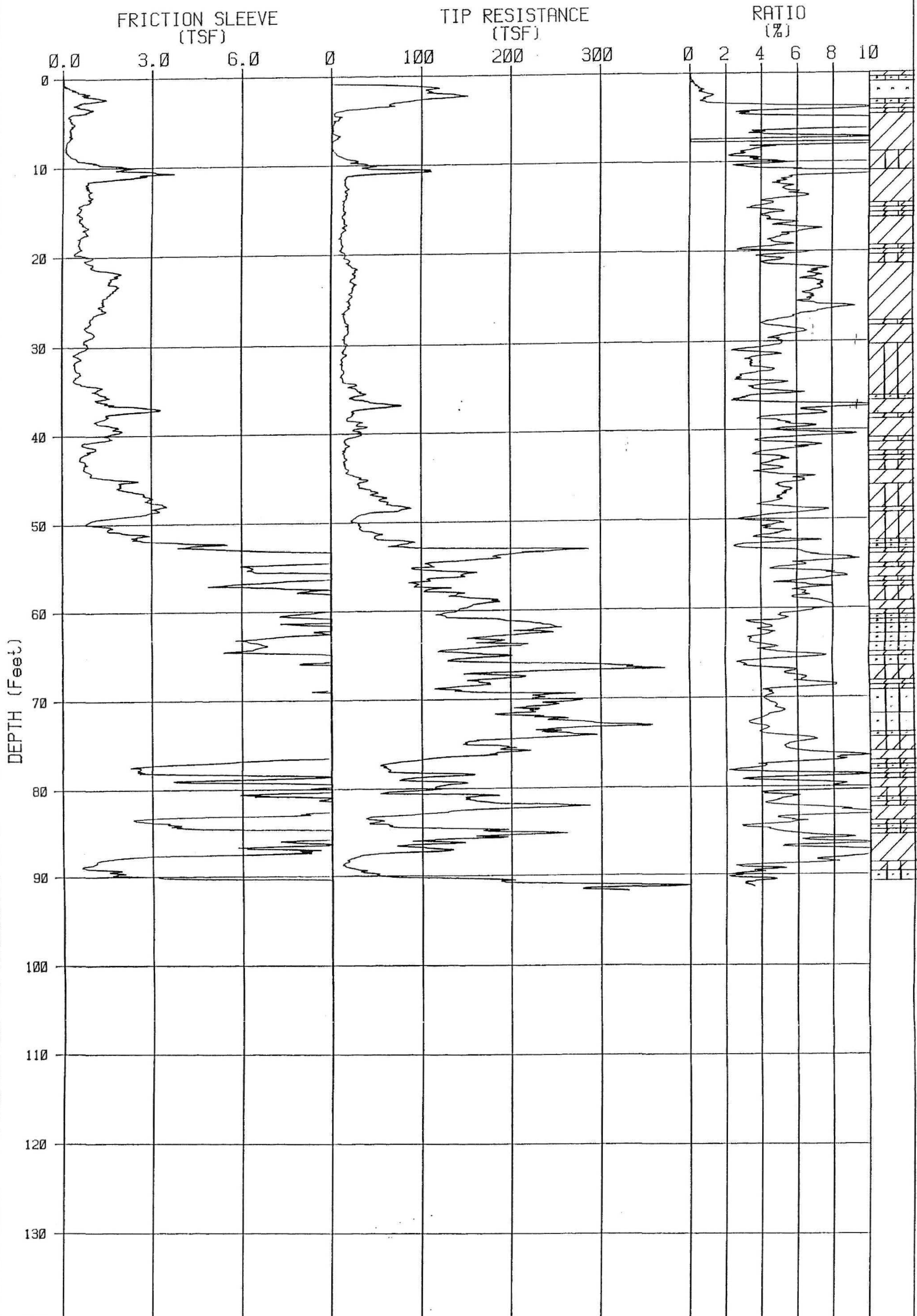
JOB NUMBER : 92-2114

ELEVATION : 0.00

CPT NUMBER : 06

CONE NUMBER: F7.5CKEV173

DATE : 04-12-1992



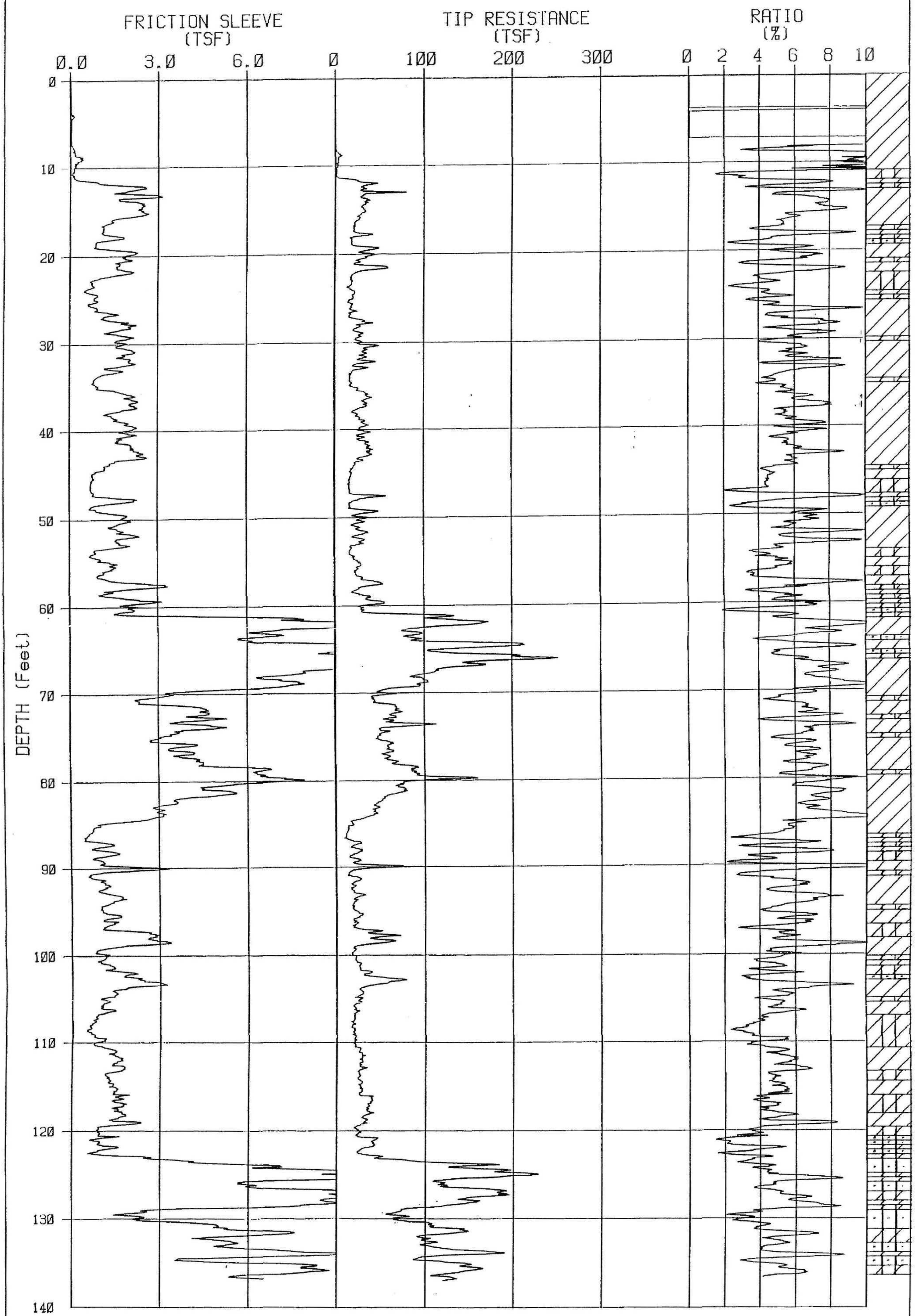
JOB NUMBER : 92-2114

ELEVATION : 0.00

CPT NUMBER : 07

CONE NUMBER: F7.5CKEV173

DATE : 04-13-1992



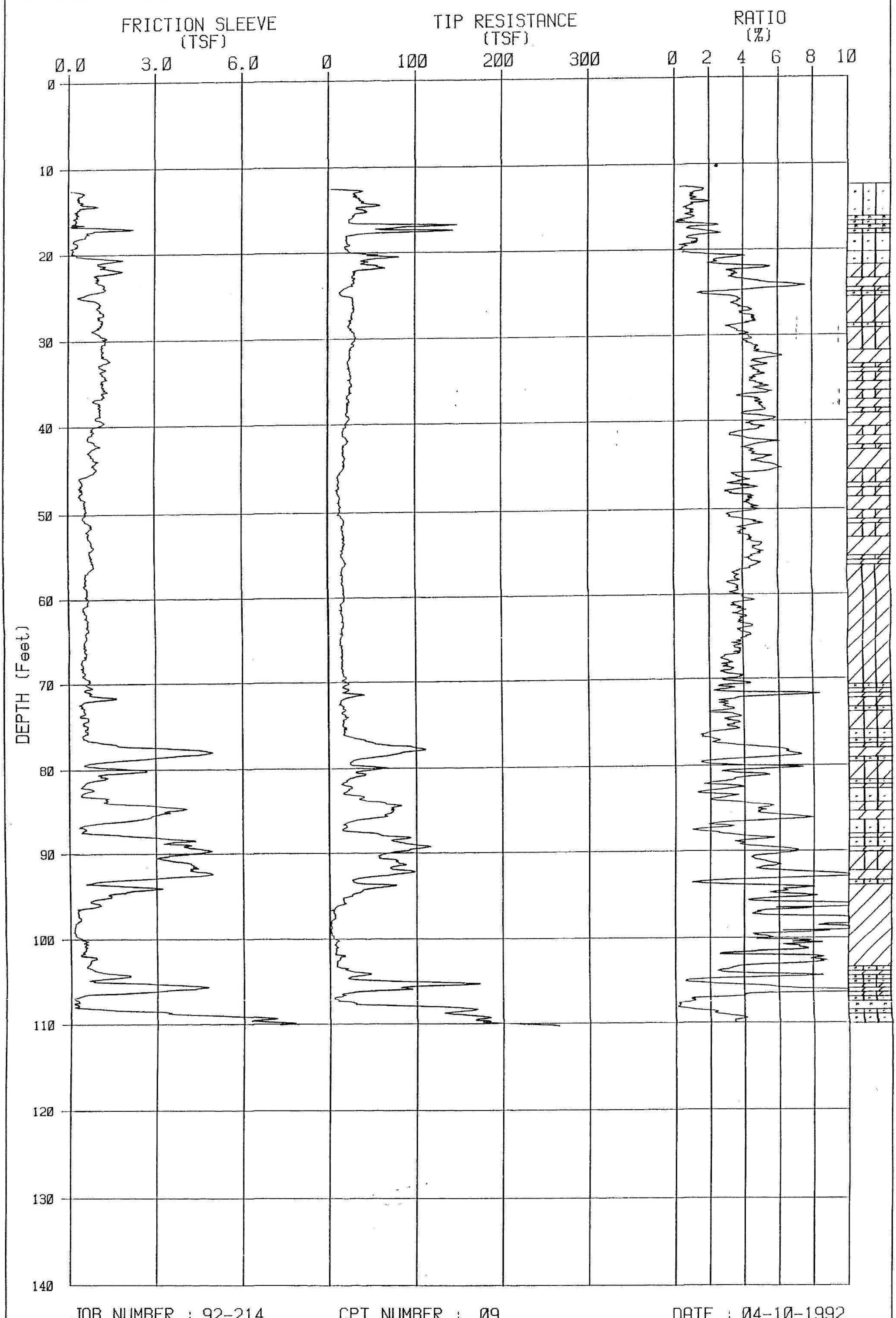
JOB NUMBER : 92-2114

ELEVATION : 0.00

CPT NUMBER : 08

CONE NUMBER: F7.5CKEV173

DATE : 04-12-1992



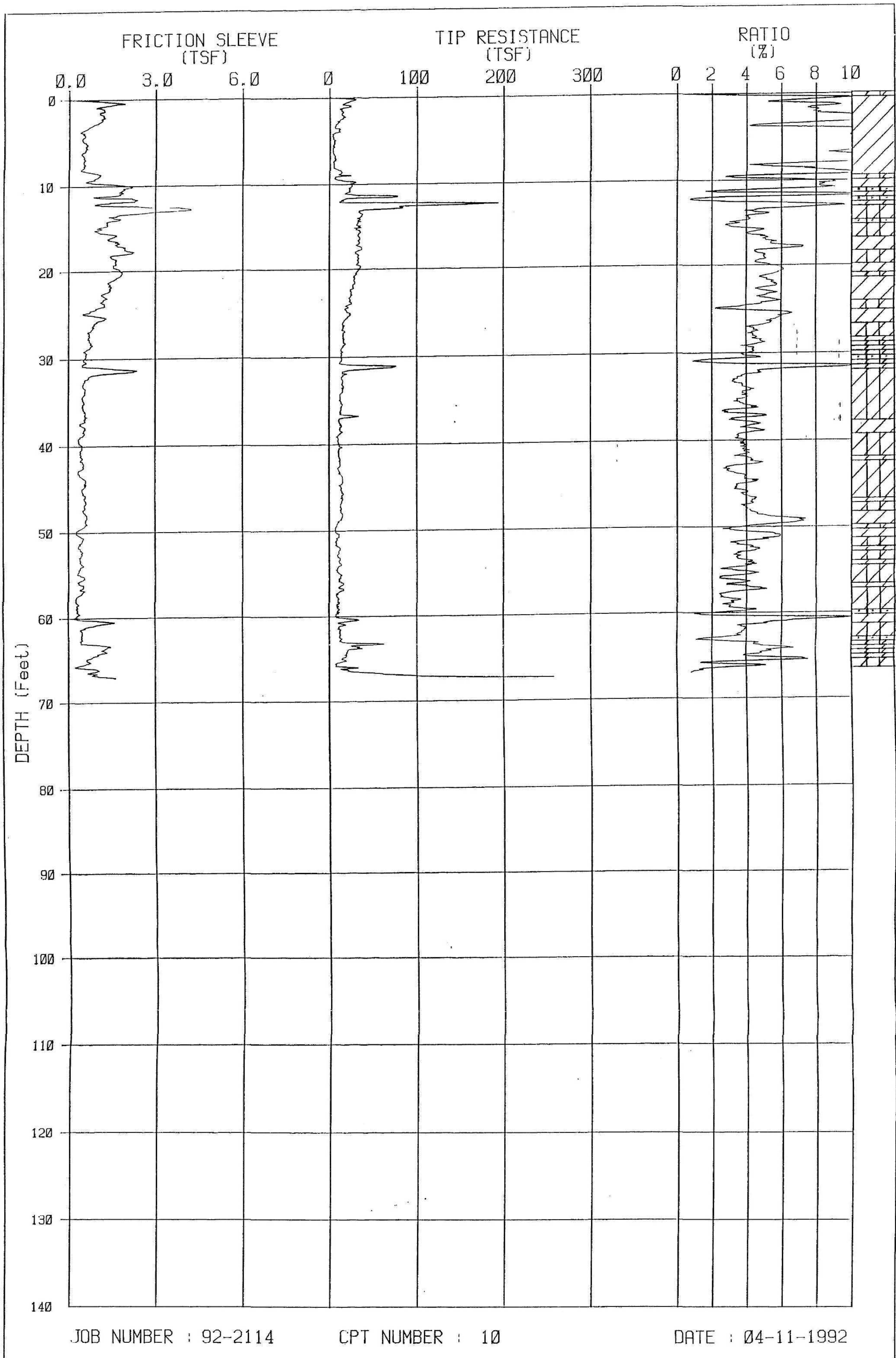
JOB NUMBER : 92-214

ELEVATION : 0.00

CPT NUMBER : 09

CONE NUMBER: F7.5CKEV173

DATE : 04-10-1992



JOB NUMBER : 92-2114

CPT NUMBER : 10

DATE : 04-11-1992

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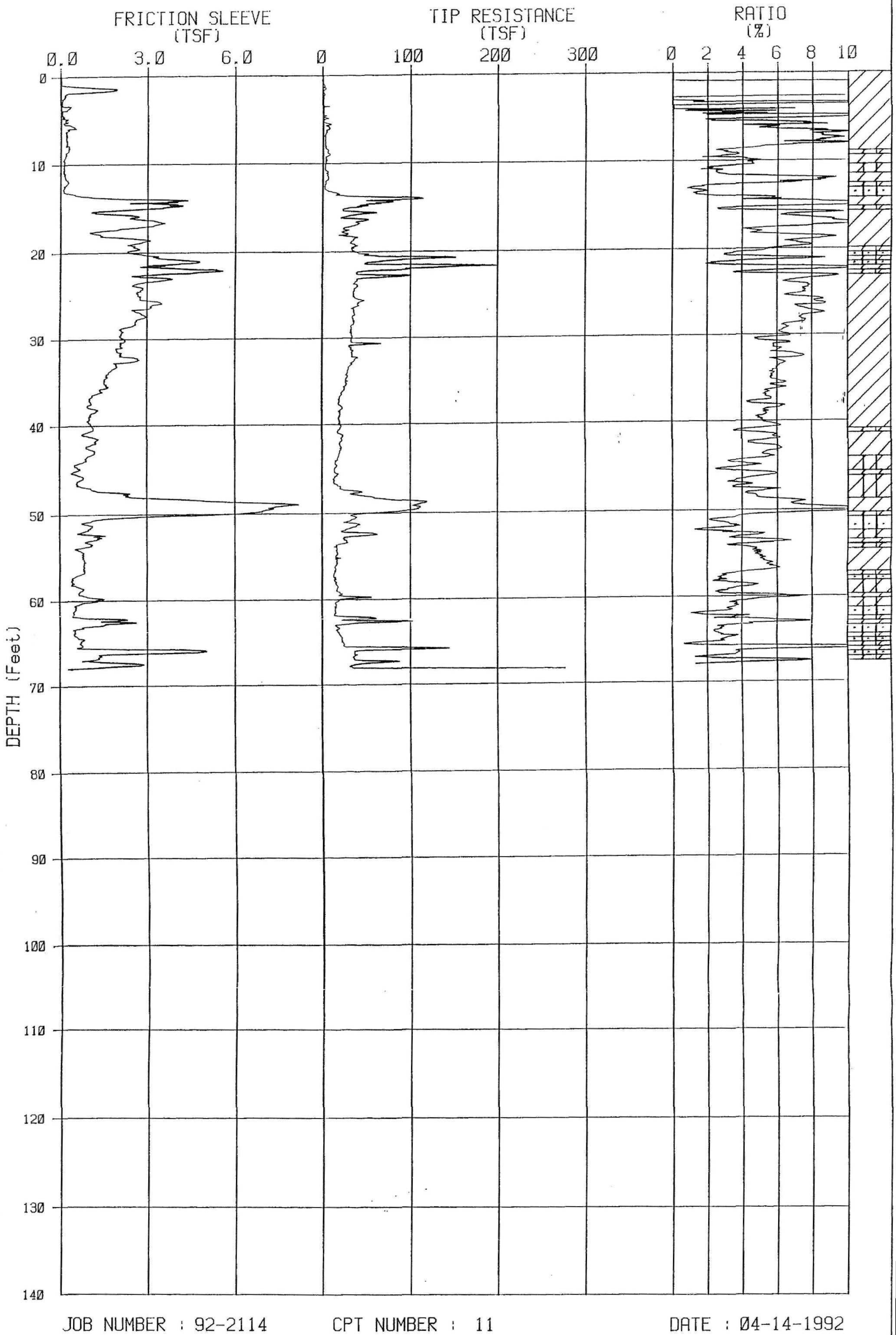

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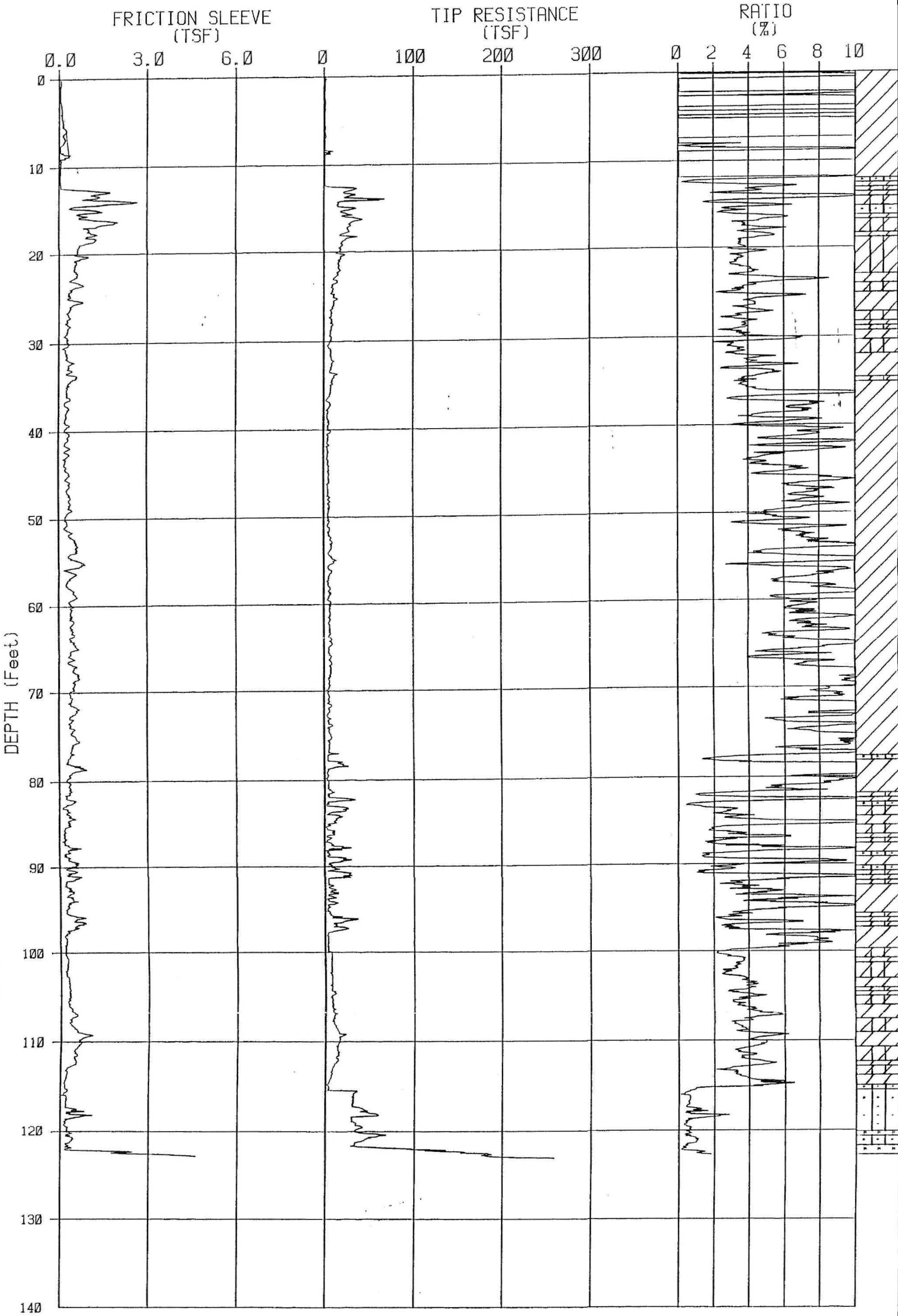

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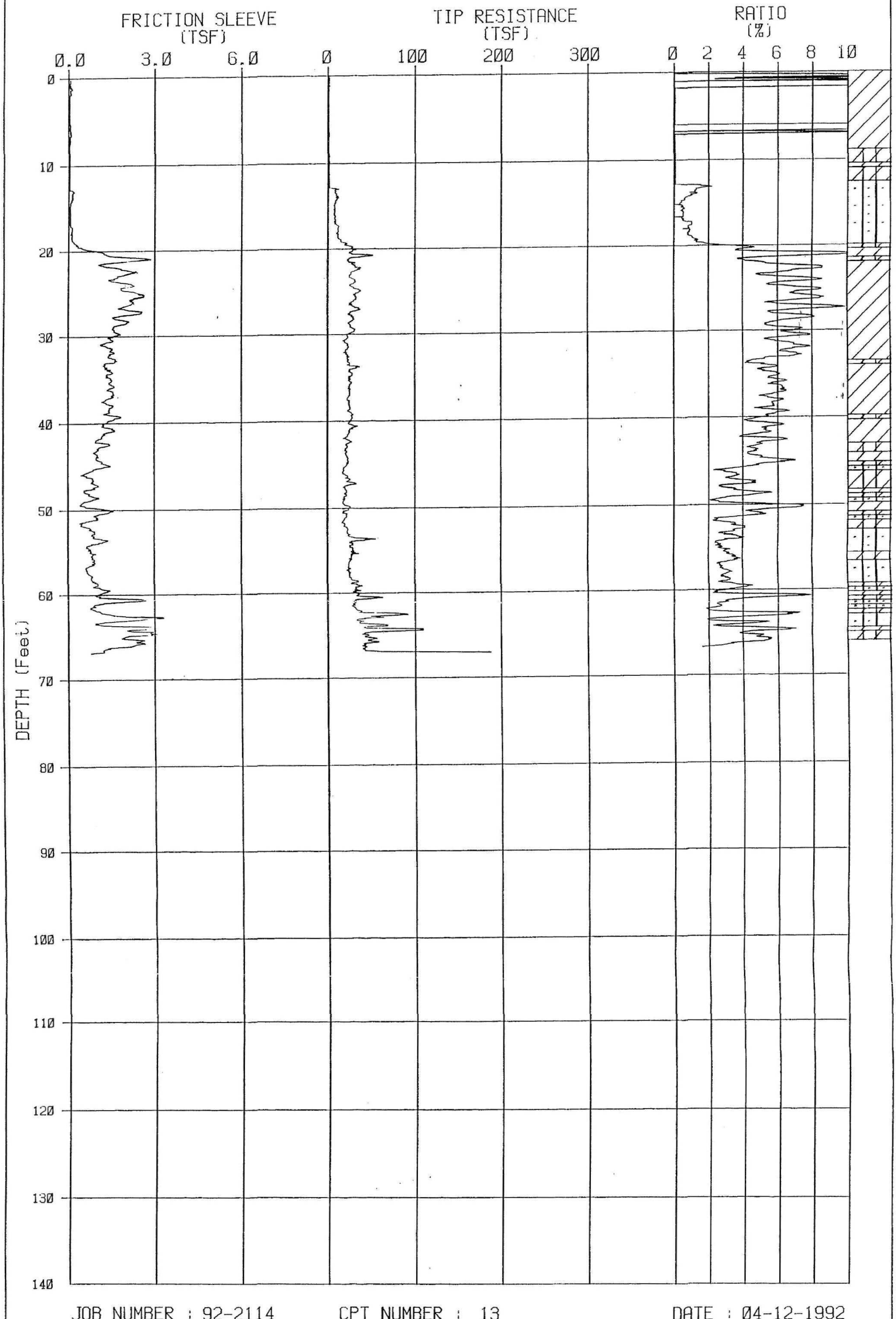

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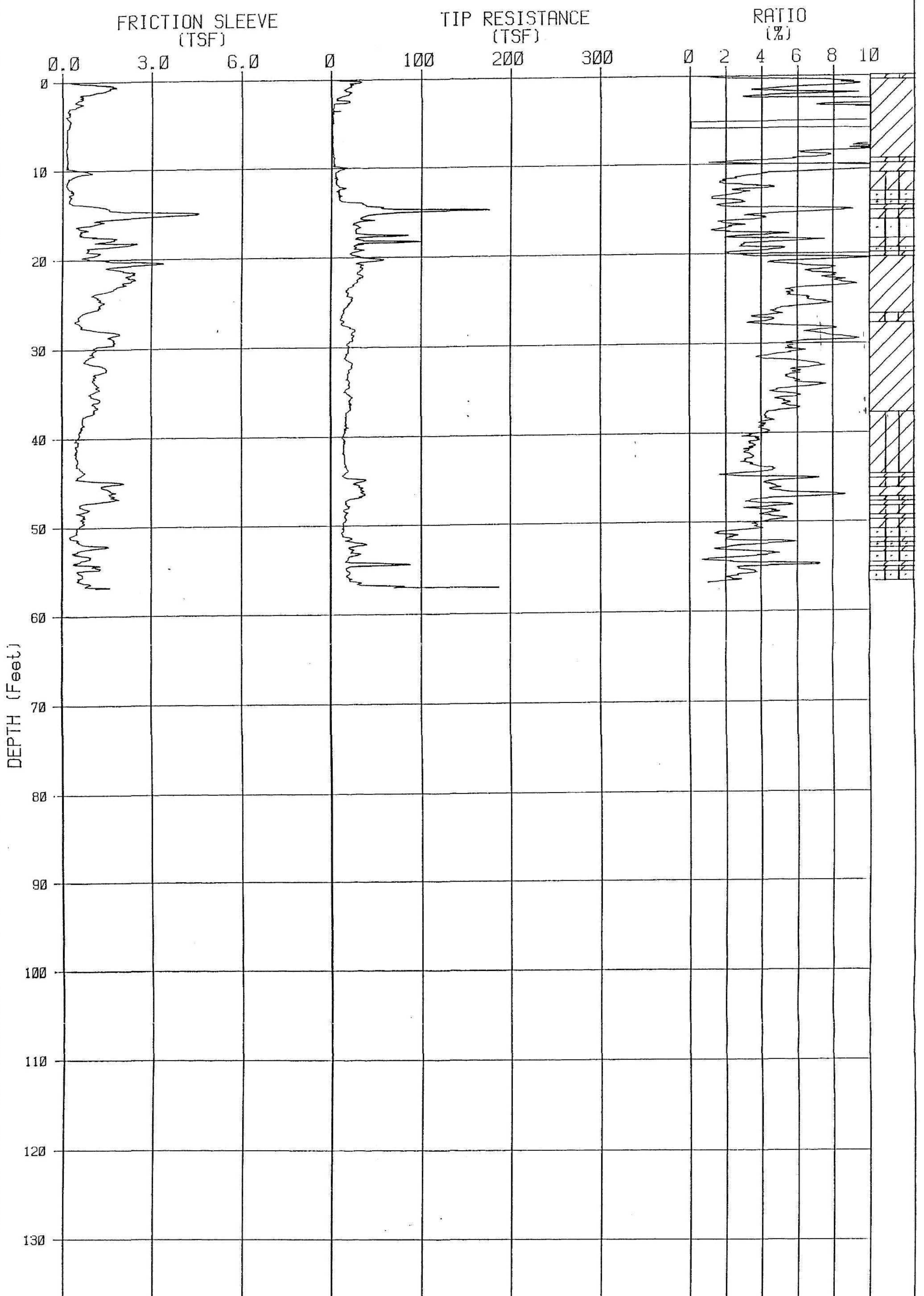

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DATE : 04-12-1992

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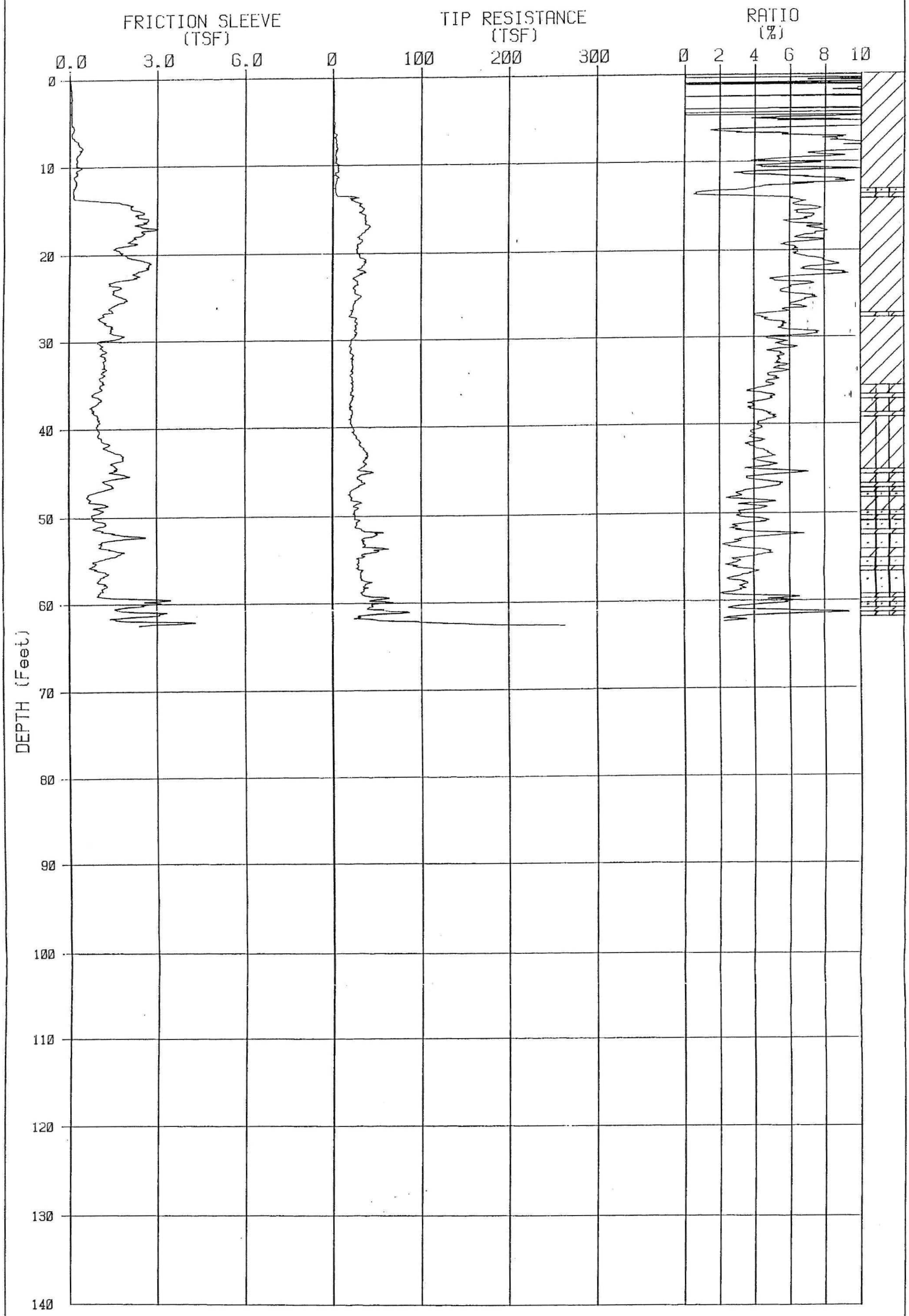

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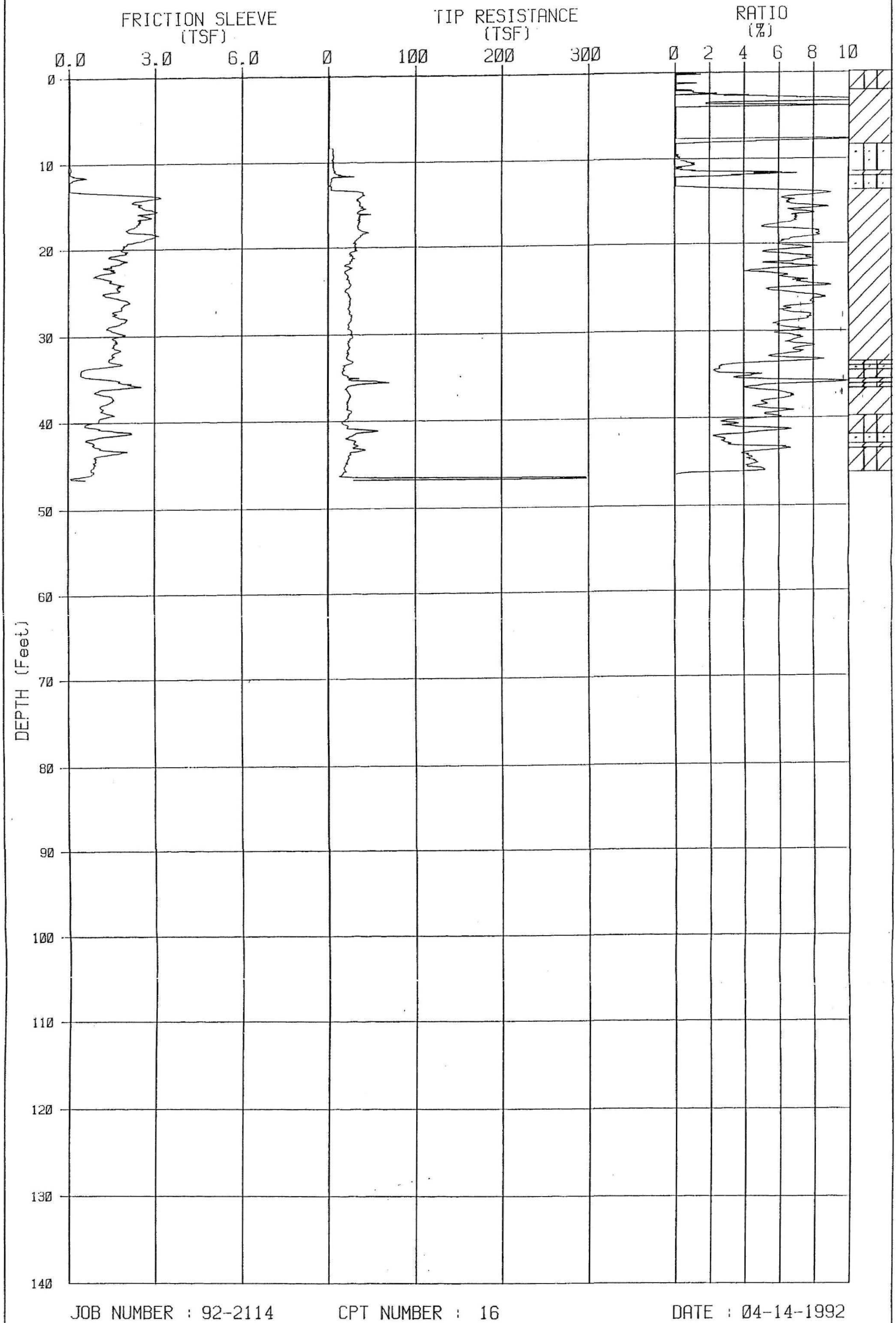

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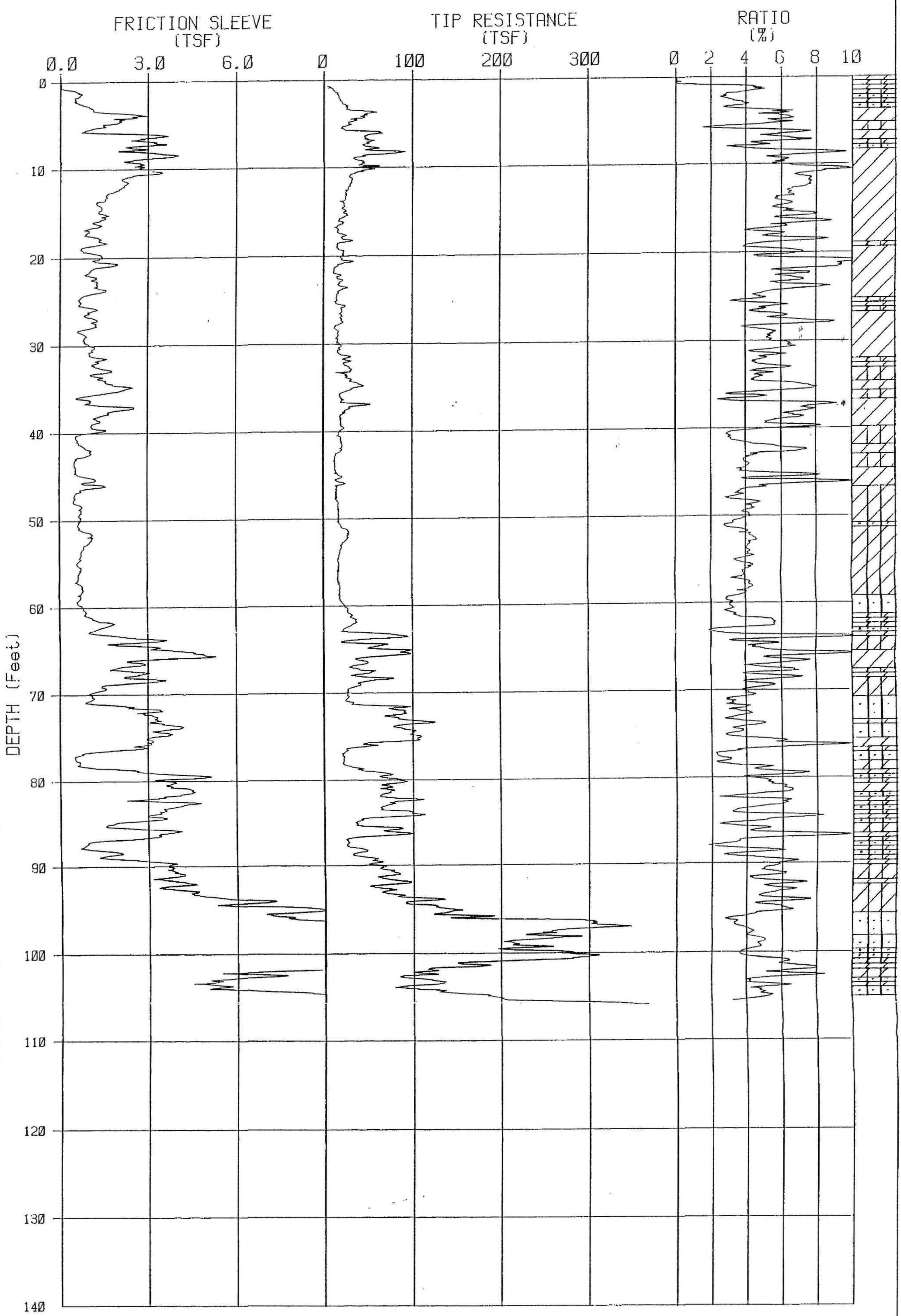

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ELEVATION : 0.00   CONE NUMBER: F7.5CKEV173

PHASE II:
INSTALLATION OF SHALLOW BEDROCK AND DEEP OVERBURDEN PIEZOMETERS IN THE VICINITY OF WASTE MANAGEMENT AREA II (WMA-II)

MONSANTO CHEMICAL COMPANY
Anniston, Alabama

January 1993

Prepared for

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January 14, 1993

Geraghty & Miller, Inc. is submitting this report to Monsanto Chemical Company at the Anniston, Alabama facility. The report was prepared in conformance with Geraghty & Miller's strict Quality assurance/quality control procedures to ensure that the report meets industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Respectfully submitted,

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Senior Scientist/Project Manager

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Vice President/Project Officer

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1.0 INTRODUCTION

A 1991 investigation of the bedrock aquifer in the vicinity of Waste Management Area II [WMA-II, (Figure 1)] at the Monsanto, Anniston facility, detected constituents of concern [parathion and paranitrophenol (PNP)] at the residuum/bedrock interface in a single interface well (DW-1) installed in the vicinity of WMA-II (Geraghty & Miller, 1991). Additional phased bedrock investigations were designed to delineate the bedrock surface and the direction of ground-water flow in the bedrock and to evaluate ground-water quality within the study area. The investigation rationale was based on the hypothesis that the constituents of concern would collect and migrate horizontally along the bedrock surface as a preferred migration pathway.

The first phase of the bedrock investigation included two separate geophysical studies to delineate the bedrock surface. The first geophysical study was a refraction seismic survey conducted by Geraghty & Miller personnel in March, 1992. The refraction seismic survey was used as a first-effort approach to define the top of bedrock within the area of study. The bedrock surface identified in the refraction seismic survey was used as a basis for the second geophysical study that consisted of a Cone Penetrometer Test (CPT) program conducted by Geraghty & Miller personnel in April 1992. The CPT program was conducted to verify the findings of the seismic survey and to further define the bedrock interface within the study area.

Phase II of the bedrock investigation included installation of shallow bedrock aquifer piezometers, deep borings, and a deep overburden piezometer. These monitoring points were integrated with the findings of the Phase I geophysical investigations (bedrock interface) and used to evaluate the ground-water quality in the shallow bedrock aquifer. This report summarizes the findings of the previous investigations (1991 OLBSI/WMA-II Saturated Zone/Shallow Bedrock Investigation and Phase I Geophysical Investigations) and discusses the procedures and findings of the recent Phase II shallow bedrock and deep overburden drilling program.

1.1 SITE BACKGROUND

The Anniston Plant (Facility) is located in Calhoun County, in northeastern Alabama, near the town of Anniston. The Facility is located approximately one mile west of downtown Anniston along Highway 202 and covers an area of roughly 10 acres. The Phase II study area was expanded around WMA-II and encompasses the area of the former parathion production unit (since removed) and the Facility's open field located adjacent to and north of the Southern Railroad tracks that mark the northern boundary of the Facility's plant site (Figure 2).

WMA-II, as listed in the Facility's RCRA permit, is a former lined surface impoundment that received acidic wastewater from the parathion intermediates operation from 1979 to 1987. This surface impoundment was taken out of service in 1987 and was closed as per an approved RCRA Closure Plan. Ground-water monitoring was implemented in 1986 as part of RCRA permitting activities.

1.2 POTENTIAL SOURCE EVALUATION

Review of the potential known sources for parathion and PNP indicated that they are confined to the northwest portion of the Facility where the parathion production unit, two associated surface impoundments (WMA-II and the Old Limestone Bed Surface Impoundment [OLBSI]), and a former lagoon were located.

The parathion production unit was taken out of service in 1986 and was dismantled in 1987. The buildings and pipelines were removed and the area was regraded with natural clay material and topped with limestone gravel. The potential sources of parathion and PNP within this area were removed during dismantlement operations.

WMA-II was a RCRA-regulated surface impoundment that was closed according to the Closure Plan included in the Facility approved RCRA permit. Clean closure was not attempted; however, the contents of the impoundment and the liner were removed and three feet of the clay base was excavated. The area was backfilled with natural clay materials and a RCRA-approved cap was installed that consisted of a drainage layer overlain by a geotextile fabric, and finally a top soil layer seeded with three grass types. This cap is designed to minimize leaching of residual source materials to the underlying unconsolidated zone.

The OLBSI was not regulated by RCRA; however, this unit is listed as a solid waste management unit on the Facility RCRA permit. The OLBSI was an asphalt-lined surface impoundment that received acidic wastewater from the parathion intermediates operation from approximately 1962 to 1980. In 1985 the impoundment was taken out of service and the asphalt liner and liquids from the impoundment were removed. The clay base was excavated approximately four to five feet below the base of the asphalt liner. Clean closure, while attempted, was not demonstrated and the excavated impoundment was backfilled with a clay with permeabilities less than or equal to the base subsoils. An asphalt cap was re-installed over the backfilled clay to provide additional protection from infiltration and to minimize the leaching of residual source materials into the underlying unconsolidated zone.

A former lagoon lined with a treated tar-paper like material, was located in the same vicinity as the WMA-II surface impoundment. The lagoon was installed in 1964 and was used until 1965. Although the lagoon was taken out of service in 1965, it was not closed until 1976. During this interim period (1965 to 1976), the lagoon collected storm-water runoff and was used intermittently as a storage lagoon for solids from the wastewater treatment operation. In 1976 when the lagoon was closed, the solids/sludges and the liner material were removed and the lagoon was backfilled with natural clays.

In summary, constituents of concern detected at DW-1 and MW-20A could have come from any of the processes that were associated with parathion manufacturing. All of these processes are incorporated within the study area as shown in the figures of this report. For the purposes of this study, the entire former parathion production area has been designated as the source.

1.3 GEOLOGIC SETTING

The Monsanto Anniston facility is located in the Valley and Ridge physiographic province. The topography of the area is characterized by northeastward trending valleys paralleled by ridges and mountains. Geologic formations in the region have been extensively folded into northeastward-trending synclines and anticlines complicated by thrust faults that have a general northeastward-trending strike and a southeastward dip.

The area is underlain by sedimentary and slightly metamorphosed sedimentary rocks ranging in age from Cambrian to Ordovician. Fluvial deposits and residuum overlie these rocks in some areas. The ridges are composed of sandstone units that are more resistant to chemical and mechanical weathering. The valleys are composed of the less resistant carbonate units that are more susceptible to weathering, especially in the humid climate of northeastern Alabama.

The carbonate rocks in the area are deeply weathered and a mantle of residuum (in situ decomposed rock) has developed on the outcrops (Scott, et al, 1987). The lower Cambrian Shady Dolomite and the overlying residuum lie beneath the Monsanto facility.

Regionally, the Shady Dolomite consists of 500 to 1,000 feet of sandy dolostone and dolomitic limestone (Scott, et al, 1987).

1.4 PREVIOUS INVESTIGATIONS

1.4.1 1991 OLBSI Interceptor Well Effectiveness Study

The detection of constituents in the existing observation wells necessitated an evaluation of the effectiveness of the OLBSI interceptor well system. The objective of the program was to install piezometers midway between the existing interceptor wells to evaluate their radius of influence by measuring the potentiometric head at various distances from each interceptor well. The investigation included the installation of eleven deep (installed to approximately 52 feet bls) and four shallow (installed to approximately 30-35 feet bls) piezometers in April, 1991. These piezometers, the interceptor wells, and the observation wells are installed wholly within the residuum above the limestone/dolostone bedrock. Although this zone is saturated, it is not capable of "yield[ing] economically significant quantities of ground water" and thereby is not classified as an aquifer (Glossary of Geology). Water level measurements in the piezometers demonstrated that a cone of depression has been induced by the interceptor well system, indicating that ground water migrating through this area is effectively being captured (Geraghty & Miller, 1991).

1.4.2 WMA-II Saturated Zone/Shallow Bedrock Investigation

An investigation of the ground-water quality in the uppermost saturated zone within the residuum and the residuum/bedrock interface was completed in October 1991 in the vicinity of WMA-II (Geraghty & Miller, 1991). The objective of this field investigation was to determine the vertical extent of contamination as indicated by the presence of the characteristic odor associated with the decomposition of organothiophosphate compounds.

The presence or absence of this odor in the soil samples was used as a gross indicator of constituent contamination within the saturated zone and at the bedrock interface. The uppermost saturated zone was characterized in this manner during the installation of three down-gradient RCRA monitoring wells in 1986. The monitoring well boreholes (MW-20, MW-15 and MW-16) were extended from the ground surface to a zone that did not exhibit the characteristic odor associated with the constituents of concern.

Due to intermittent detections of constituents of concern in one of the down-gradient monitoring wells (MW-20A, which replaced MW-20), Monsanto began additional evaluations that included the installation of a second shallow overburden monitoring well (MW-20B) adjacent to existing monitoring well MW-20A (Figure 1). An interface monitoring well (DW-1) was installed in the vicinity of WMA-II in response to comments made by ADEM regarding vertical delineation of constituents at WMA II. The comments were generated after a preliminary review of Monsanto's early RCRA permit modification application.

A comparison of the lithologic logs from these boreholes (MW-20, MW-20B, and DW-1) suggest that the sandy silty clay lenses encountered at different elevations in each borehole are discontinuous. In addition to the apparent discontinuous lenses within residuum, the presence of organothiophosphates (as indicated by the characteristic odor) also was intermittent in these boreholes. The odor was present during the drilling activities associated with the installation of MW-20B and DW-1, but was not noted during earlier drilling activities associated with MW-20 and its replacement, MW-20A. A lithologic log and well construction log for DW-1 and MW-20B are included in appendices A and B, respectively.

Ground-water samples obtained from DW-1 during the shallow bedrock investigation indicated the presence of parathion and PNP at the base of the residuum at the bedrock interface. Initially, high concentrations of constituents were detected in the ground water;

however, the concentrations rapidly declined with continued purging. This phenomenon was interpreted to be the result of a localized area of impact at the interface; therefore, delineation of the interface boundary (bedrock surface) was necessary. Once the bedrock surface was mapped, topographic lows, could be targeted for investigation for constituent impacts.

1.4.3 1992 Phase I: Geophysical Investigations

Geophysical techniques were selected to aide in delineating the residuum/bedrock interface (bedrock surface) across the entire suspected source area as well as potential downgradient plant site property boundaries. These bedrock surface investigations included two different geophysical exploration methods. The working hypothesis was that the constituents of concern would migrate horizontally along the bedrock/residuum interface as a preferred migration pathway. The Phase I geophysical investigations included a refraction seismic survey conducted by Geraghty & Miller personnel in March, 1992 (Figures 3 and 4) and a CPT program conducted by Geraghty & Miller personnel in April, 1992 (Figures 5 and 6).

The seismic refraction survey indicated the two different seismic signatures across the study area. It was noted that the refractors interpreted to be bedrock has a lower velocity in the area north of the railroad tracks. The mapped bedrock surface (based on seismic interpretation) indicated the presence of a large elliptical-shaped topographic low in the vicinity of the OLBSI and WMA-II and two smaller lows in the field north of the railroad tracks.

The follow-up CPT program was designed to verify the findings of the refraction seismic (inferred bedrock surface) so that monitoring well placement could be optimized. The CPT generally confirmed the presence of resistance in all areas by refusal of the advancement of the CPT rods during sounding of the borehole. For the purposes of the CPT program, refusal of the CPT rods was inferred to represent the top of the bedrock within the area of study. The mapped bedrock surface (based on CPT interpretation) indicated the presence of a large topographic low transecting the study area, extending from the WMA-II area east-northeastward across the railroad tracks.

A composite interpretation of the findings of the Phase I geophysical investigations indicated the presence of an apparent bedrock low transecting the property in a south-west to north-east direction (Figure 7). The findings of combined Phase I geophysical study are discussed in a Geraghty & Miller, Inc. report entitled "Phase I: Geophysical Bedrock Investigation In The Vicinity Of The Former Parathion Production Unit".

Based on the findings of the Phase I refraction seismic survey and CPT program, additional soil borings and piezometers were installed in optimal locations as part of a Phase II shallow bedrock aquifer investigation performed to evaluate the ground-water quality and the ground-water flow direction in the shallow bedrock aquifer within the area of study. This report documents the operations and findings of the field work associated with the above-stated objectives.

2.0 STUDY AREA INVESTIGATION METHODOLOGIES

2.1 SOIL SAMPLING AND BOREHOLE INSTALLATION

A total of nine boreholes were installed during a drilling program conducted by Geraghty & Miller personnel during the months spanning July through November, 1992. All boreholes were drilled by Miller Drilling Company (Miller) using a drilling rig capable of performing the air rotary and percussion method of drilling. Five of the boreholes were converted to shallow bedrock piezometers (SBP-1 through SBP-5), one of the boreholes was converted to a deep overburden piezometer (DOP-1) and the remaining three boreholes (DOB-1, DOB-2 and DOB-3) were abandoned (Figure 8).

Overburden and bedrock samples were collected from various intervals during drilling of each borehole. The lithologic characteristics of each borehole were described in the field by a Geraghty & Miller hydrogeologist and were used to prepare lithologic logs (Appendix A).

2.2 SHALLOW BEDROCK PIEZOMETER SPECIFICATIONS

Five shallow bedrock piezometers were installed to investigate the horizontal extent of constituents of concern within the shallow bedrock aquifer. For the purposes of the shallow bedrock investigation, the first competent limestone encountered during the drilling of the borehole was considered the top of the bedrock. The shallow bedrock aquifer is defined as the first water producing zone encountered below the top of competent bedrock. Each piezometer was installed at least 10 feet into the shallow bedrock aquifer, generally no deeper than 25 feet into the limestone.

The five shallow bedrock piezometers (indicated as SBP-1, SBP-2, SBP-5, SBP-7 and SBP-9 in the field logs and subsequently changed to SBP-1 through SBP-5, respectively) were installed by drilling a nominal 10-inch diameter borehole approximately four feet into the bedrock using the air rotary method of drilling. Upon reaching the top of the competent bedrock, a 6-inch diameter black steel surface casing was installed into the borehole and the annular space between the borehole wall and surface casing was pressure grouted to land surface using a tremie pipe. The grout was allowed to set up overnight for curing. The surface casing was used to prevent downward contamination into potentially unaffected strata. A 10-inch diameter surface casing was used during installation of bedrock piezometers SBP-1 and SBP-5 to help keep the borehole annulus open during installation of the 6-inch diameter surface casing. An attempt was made to remove the 10-inch diameter casing at SBP-1; however, the drilling rig was unable to remove the casing and it was left in place.

Upon allowing the grout to set up in the 6-inch diameter surface casing, a nominal 6-inch diameter borehole was advanced inside the surface casing down to the next water bearing zone using the percussion hammer method of drilling. Air was used to lift out all drilling debris from the borehole and also to aid in developing the borehole prior to the installation of the piezometer.

After removing the drilling stem from the borehole, a 2-inch diameter piezometer was installed inside the borehole. Each piezometer was constructed using new, 2-inch diameter, flush threaded, Schedule 40 PVC attached to new, 2-inch diameter, 0.010-inch factory slotted, Schedule 40 PVC screen. The piezometer casings rise to approximately 2.5 feet above land surface and are finished with a slip or threaded PVC cap. A sediment sump, consisting of a minimum 2-foot length of new, 2-inch diameter, schedule 40 PVC casing was installed at the base of the screened section of each piezometer. The bottom of the sediment sump was sealed using a threaded PVC cap.

A sand pack consisting of a uniformly-graded, clean 6/20 silica sand was installed inside the annulus between the piezometer and the borehole wall using a tremie pipe. The sand pack was installed from the total depth of the borehole to a minimum of five feet above the top of the piezometer screen. A minimum 3.5 foot seal of 1/2-inch bentonite pellets was installed on top of the sand pack to prevent grout from entering the sand pack during later grouting activities. The remainder of the annular space between the piezometer and borehole wall/surface casing was grouted to land surface using a Portland Type I cement with a three percent bentonite mix. Where used, the 10-inch diameter temporary surface casing was sectionally removed during grouting of the annular space. An eight-inch square, lockable steel protective casing was installed over the piezometer to protect the piezometer from vehicular traffic and unauthorized entry. The protective steel casing was grouted in place and is level at approximately three feet above land surface. The piezometer construction logs are provided in Appendix B. Construction details for each piezometer are listed in Table 1.

During the drilling and installation of these shallow bedrock piezometers, the characteristic odor of the constituents of concern was not detected. The drill cuttings for each piezometer were stockpiled on impervious plastic sheeting and because there was no evidence of the presence of constituents of concern, these cuttings were removed for proper disposal. Upon the completion of each piezometer, the piezometer was developed using a submersible pump and/or teflon bailer until the development water was relatively sediment free. Measuring point elevations (top of casing) at each piezometer were surveyed relative to mean sea level. The results of the survey are presented in Table 2.

Ground-water samples were obtained from each of the bedrock piezometers and analyzed for the presence of parathion and PNP. Results of the analyses are discussed in Section 3.3 and are presented in Table 3.

2.3 DEEP OVERBURDEN PIEZOMETER

North of the railroad tracks a deep overburden piezometer was installed at a total depth of 300 feet bls at location DOP-1. This piezometer was installed in place of a proposed shallow bedrock piezometer that was located hydraulically downgradient from the source area and in a bedrock low, as documented by the geophysical investigations. Because bedrock was not encountered at the expected depth based on the geophysical investigations, the top of the bedrock was expected at a depth of approximately 120 feet bls, the borehole was advanced to a depth of 300 feet bls in an attempt to tag the bedrock surface. The piezometer was therefore installed to evaluate the presence of constituents of concern within the deeper residuum located hydraulically down-gradient from the source (as defined in Section 1.2 of this report).

The deep overburden piezometer (indicated as SBP-6 in the field logs and subsequently changed to DOP-1) was installed by Miller using the air rotary method of drilling (Figure 8). The piezometer was constructed by drilling a 14 1/2-inch diameter borehole to a total depth of 40 feet below land surface (bls). A 10-inch diameter black steel casing was installed inside the borehole annulus and grouted in place using a neat cement grout. The casing was installed to prevent loose formation from entering the borehole during subsequent drilling activities. Upon allowing the grout to set, the borehole was advanced to a total depth of 300 feet bls using a nominal 8 1/4-inch diameter bit. Upon reaching the total depth of the borehole, a 6-inch diameter, black steel, temporary surface casing was installed inside the borehole to a total depth of 300 feet bls. The 6-inch diameter temporary surface casing was installed to protect the borehole from collapse during piezometer installation activities. The deep overburden piezometer was installed inside the surface casing to the total depth of the borehole. The temporary surface casing was sectionally removed during piezometer completion activities. The deep overburden piezometer was constructed using a 265-foot section of new, 2-inch diameter, flush threaded, Schedule 40 PVC casing attached to a 25-foot section of new, 2-inch diameter, 0.010-inch factory slotted, Schedule 40 PVC well screen. The piezometer casing rises to approximately 2.5 feet above land surface and is finished with a threaded PVC cap. A sediment sump, constructed using a 10-foot length of new, 2-inch diameter, schedule 40 PVC casing, was installed at the base of the screened section of the piezometer. The bottom of the sediment sump was sealed using a threaded PVC cap.

A sand pack consisting of a uniformly-graded, clean 20/40 silica sand was gravity installed inside the annulus between the piezometer and the borehole wall (the tremie method of installing the sand pack was attempted, but the sand would not flow completely out of the tremie pipe during installation activities). The sand pack was installed from the bottom of the borehole to ten feet above the top of the screen. A five foot seal of bentonite slurry was installed on top of the sand pack to prevent grout from entering the sand pack during subsequent grouting activities. The remainder of the annular space between the piezometer and borehole wall/surface casing was grouted to land surface using a Portland Type I cement with a three percent bentonite mix.

During the drilling and installation of this deep overburden piezometer, the characteristic odor of the constituents of concern was not detected. The drill cuttings were stockpiled on impervious plastic sheeting and because there was no evidence of the presence of constituents of concern, these cuttings were removed for proper disposal.

An eight-inch square, lockable steel protective casing was installed over the piezometer to protect the piezometer from vehicular traffic and unauthorized entry. The protective steel casing was grouted in place and is level at approximately three feet above land surface. The lithologic log for DOP-1 is presented in Appendix A. The piezometer construction log is provided in Appendix B.

A ground-water sample was obtained from DOP-1 and analyzed for the presence of parathion and PNP. Results of the analyses are discussed in Section 3.3 and are presented in Table 3.

2.4 DEEP OVERBURDEN BOREHOLES

Three deep overburden boreholes (indicated as SBP-3, SBP-4 and SBP-8 in the field logs and subsequently changed to DOB-1, DOB-2 and DOB-3, respectively [Figure 8]) were drilled in an attempt to located the bedrock interface and the location of the dramatic change in bedrock depth within the area of study north of the railroad tracks. These boreholes were located in proposed shallow bedrock piezometer locations; however, the bedrock was not encountered at the expected depths based on the geophysical investigations. The boreholes were advanced to depths at least twice as deep as the expected depth of bedrock and later abandoned when competent bedrock was not encountered. Lithology differences in the deeper residuum, i.e. the presence of platy shale materials, account for the misinterpretations regarding the bedrock surface in the geophysical investigations.

The characteristic odor associated with the presence of organothiophosphate compounds was not noted during drilling of these deep overburden boreholes. Water-bearing zones producing quantities of water greater than 2-3 gallons per minute (amount of water the drill rig uses to lift out the drill cuttings during drilling activities) were not encountered during drilling of the boreholes. The following describes the drilling activities conducted at each borehole location.

- Deep Overburden Borehole DOB-1: This borehole location, north of the deep overburden piezometer, was selected in an attempt to determine the extent of the apparent discontinuity at depth in relation to the depth of the bedrock surface. Bedrock was not encountered and the characteristic odor associated with the constituents of concern were not detected.

A nominal 10-inch diameter borehole was drilled using the air rotary method of drilling at DOB-1. The borehole was advanced to a total depth of 250 feet bls. The borehole was abandoned by lowering a tremie pipe down to 120 feet bls (depth where formation collapse occurred) and pressure grouting Portland Type I cement down inside the borehole annulus from the total depth of the tremie pipe to land surface.

- Deep Overburden Borehole DOB-2: This borehole location, north of SBP-3, was selected to delineate the inferred deepest section of the bedrock "low". This location also represents a potential downgradient position relative to ground-water movement at the facility northeast property boundary. Bedrock was not encountered, nor was the characteristic odor of the constituents of concern.

A nominal 10-inch diameter borehole was drilled using the air rotary method of drilling at DOB-2. Upon reaching a total depth of 540 feet bls, the drill stem was removed from the borehole and an attempt was made to install a 10-inch diameter, black steel temporary surface casing to the total depth of the borehole. The surface casing was necessary because the compressed air used to lift out the formation cuttings was fracturing the formation at depth rather than lifting the cuttings out of the borehole. The surface casing was installed to 53 feet bls before abandoning the borehole due to the depth of the borehole and because consolidated bedrock had not been encountered. An attempt to remove the surface casing was not successful and the casing was left in place during abandonment of the borehole. The borehole was abandoned by lowering a tremie pipe inside the surface casing down to 120 feet bls (depth where formation collapse occurred) and pressure grouting portland Type I neat cement from the total depth of the tremie pipe to land surface.The outside of the surface casing was also pressure grouted from approximately 40 feet bls (depth where annulus collapse occurred) to land surface using the tremie pipe.

- Deep Overburden Borehole DOB-3: This borehole, west-southwest of DOP-1, was selected to delineate the extent of the apparent discontinuity at depth in relation to the bedrock surface. This location also represents a potential downgradient position relative to ground-water movement at the facility southwest property boundary. Bedrock was not encountered, nor was the characteristic odor of the constituents of concern.

  A nominal 14-inch diameter borehole was drilled to 40 feet bls using the air rotary method of drilling at DOB-3. A 10-inch diameter steel surface casing was installed inside the borehole. The annulus between the surface casing and borehole wall was filled with neat cement grout and allowed to set up. The surface casing was installed to prevent loose formation from entering the borehole during later drilling activities. After allowing the surface casing and grout to set up, the borehole was advanced inside the casing to a total depth of 250 feet bls. The borehole was abandoned by lowering a tremie pipe down to 180 feet bls and pressure grouting Portland Type I cement down inside the borehole annulus from the total depth of the borehole to land surface.

Drill cuttings from each of the boreholes were kept separated and stockpiled on impervious plastic sheeting and because there was no evidence of the presence of constituents of concern, these cuttings were removed for proper disposal.

Although appreciable quantities of water were not encountered during drilling of the deep boreholes, ground water did enter the boreholes from saturated lenses contained within the residuum. A water sample was obtained from each borehole prior to abandonment as a gross indicator (the boreholes were not developed prior to obtaining the water samples and the samples represent ground water across the depth of the borehole) for the presence or absence of constituents of concern within the residuum. Results of the ground-water analyses are discussed in Section 3.3 and are presented in Table 3.

3.0 FINDINGS

3.1 SITE GEOLOGY

Across the site, both north and south of the railroad tracks, the upper part of the residuum is similar; fine-to-coarse grained sandy clay. Generally, this sandy clay overlies a dense clay with localized lenses of very fine to fine-grained sand and tight, silty clay. However, the site-specific geologic materials in the deeper residuum vary based on samples collected during this investigation. The residuum found north and south of the railroad tracks consist of silty clays and fine to coarse-grained sandy clays in the upper 67 to 125 feet. The residuum below this zone consists of lenses of chert and laminated (platy) weathered shale. This laminated zone extended up to 540 feet below land surface. The lithology differences encountered within the residuum and the large difference in apparent thickness of the residual material suggests the presence of a geologic discontinuity within the study area.

Ground water moves preferentially through the sandy clay areas located within the residuum. The migration pathway of constituents vertically through the residuum is not known precisely due to the discontinuous sandy clay zones; however, it is believed that the more permeable lenses are the migratory pathways through this zone.

Competent bedrock was encountered below the unconsolidated materials located south of the geologic discontinuity at depths ranging from 82 to 129.5 feet bls. The bedrock surface within the study area consists of a zone of highly weathered bedrock material ranging from a few feet to over ten feet in thickness. Below the weathered bedrock zone lies competent bedrock consisting of gray sandy dolomitic limestone. A top of competent bedrock elevation map is provided as Figure 9. Competent bedrock was not encountered north of the identified geologic discontinuity. The residuum extended as deep as 540 feet bls in one location.

A stratigraphic cross-section location map is provided as Figure 10. Stratigraphic cross-sections are presented in Figures 11, 12 and 13.

3.2 WATER LEVEL MEASUREMENTS

A water-level measuring point (north side, top of PVC casing) was established for each newly installed piezometer and referenced to mean sea level. Depth to water measurements were obtained on December 1st and 2nd, 1992 using an electronic interface probe and converted to water-table elevations (Table 2). Based on the water-table elevations, the ground water in the shallow bedrock aquifer appears to flow northwest across the plant site to the geologic discontinuity and then flows laterally due to the presence of less permeable clays to the north. Water table elevation maps, indicating the ground-water flow direction for the shallow bedrock aquifer have been compiled and are shown as Figures 14 and 15.

3.3 GROUND-WATER SAMPLING

Ground-water samples were obtained from deep overburden boreholes DOB-1, DOB-2 and DOB-3, bedrock piezometers SBP-1 through SBP-5, and deep overburden piezometer DOP-1 and analyzed for parathion and PNP using the Monsanto Anniston plant laboratory. Field logs indicate that the characteristic odor of the constituents of concern was not detected in any of the ground-water samples collected. The analyses from each sample location confirm the field observations and indicate that concentrations of parathion and PNP are below the laboratory practical quantitation limit for each constituent.

Ground-water samples were also obtained from interface well DW-1 and analyzed for total parathion and PNP. A ground-water sample obtained from DW-1 prior to purging the well indicated a total parathion concentration of 225.7 parts per million (ppm) and a PNP concentration of 4.0 ppm. A ground-water sample taken from DW-1 after purging the well indicated a total parathion concentration of 1.5 ppm and a PNP concentration of 1.1 ppm. Impacted ground-water from the suspected source area (as defined in Section 1.2) appears to be confined at the base of the residuum as evidenced by the initial high concentrations and the rapid declines in constituent concentrations upon purging of the well. Results of the analyses are presented in Table 3.

4.0 CONCLUSIONS

The lithologic information obtained during the drilling program supplements the findings of the earlier geophysical studies and indicates bedrock at much greater depths north of the railroad tracks. The geophysical seismic investigation indicated a difference in seismic signatures north and south of the railroad tracks. Although the refractors were of different velocities both were interpreted as competent bedrock. The cone penetrometer program also confirmed the presence of resistant refractive materials. These materials, when encountered, were dense enough to cause CPT rod refusal and were also interpreted as competent bedrock north and south of the railroad tracks.

The drilling program confirmed the presence of competent bedrock south of the railroad tracks, however, to the north the interpreted bedrock was not encountered. Residuum present at the "interpreted" depth consisted of chert and/or remnant platy shale lenses. These lenses of chert and/or platy shale were the refractors seen in the earlier seismic refraction study and, although the lenses were only 4-6 inches thick, would have been competent enough to cause refusal of the CPT rods. The deep overburden boreholes were drilled to depths ranging from 250 to 540 feet bls not encountering bedrock nor detecting organothiophosphate odors, and were subsequently abandoned.

Water quality analyses and field observations during drilling indicate that no migration of constituents of concern have occurred north of the railroad tracks in the deeper residuum. This suggests that geologic discontinuity provides a barrier to ground-water flow and constituent migration northward. Constituents of concern were not observed in the residuum above the newly-installed bedrock wells south of the railroad tracks. Nor were constituents of concern found in the water quality analyses from these wells, suggesting that the shallow bedrock aquifer has not been impacted in those locations lateral to DW-1. Consequently, constituents of concern present in the ground water at the bedrock/residuum interface at DW-1 appear to be confined to a localized area.

TABLES

Table 1

Shallow Bedrock Piezometer, Deep Overburden Piezometer and Deep Overburden Soil Boring Construction Details
Monsanto Chemical Company
Anniston, Alabama

Piezometer/ Soil Boring ID	Total Depth (feet bls)	Screened Interval (feet bls)	Depth to Competent Bedrock (feet bls)	Sand Pack Thickness (feet)
SBP-1	157	137 to 152	129.5	24
SBP-2	140	123 to 138	110	22
SBP-3	102	90 to 100	82	17
SBP-4	147.5	130 to 145	107	24.5
SBP-5	140	128 to 138	105	17
DOP-6	300	265 to 290	NE	45
DOB-1	250	NA	NE	NA
DOB-2	540	NA	NE	NA
DOB-3	250	NA	NE	NA

Feet bls = Feet below land surface

NE = Not Encountered

NA = Not Applicable

user\kenm\monsanto\tbl\table1.w51

Table 2

Shallow Bedrock Piezometer Water Table Elevations
Monsanto Chemical Company
Anniston, Alabama

Piezometer ID	Top of Casing Elevation (feet MSL)	12-1-92		12/2/92	
		Depth to Water (feet bls)	Water Table Elevation (feet MSL)	Depth to Water (feet bls)	Water Table Elevation (feet MSL)
SBP-1	759.45	80.26	679.19	80.14	679.31
SBP-2	751.45	72.70	678.75	72.64	678.81
SBP-3	743.28	66.80	676.48	66.72	676.56
SBP-4	760.63	81.64	678.99	81.58	679.05
SBP-5	755.56	78.96	676.60	78.86	676.70
BR-5	768.10	82.64 [1/]	680.85 [1/]		

[1/] 09/02/92 measurement

Feet MSL = Feet Above Mean Sea Level
Feet bls = Feet below land surface

KENM\MONSANTO\TBL\TABLE2.W51

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Table 3

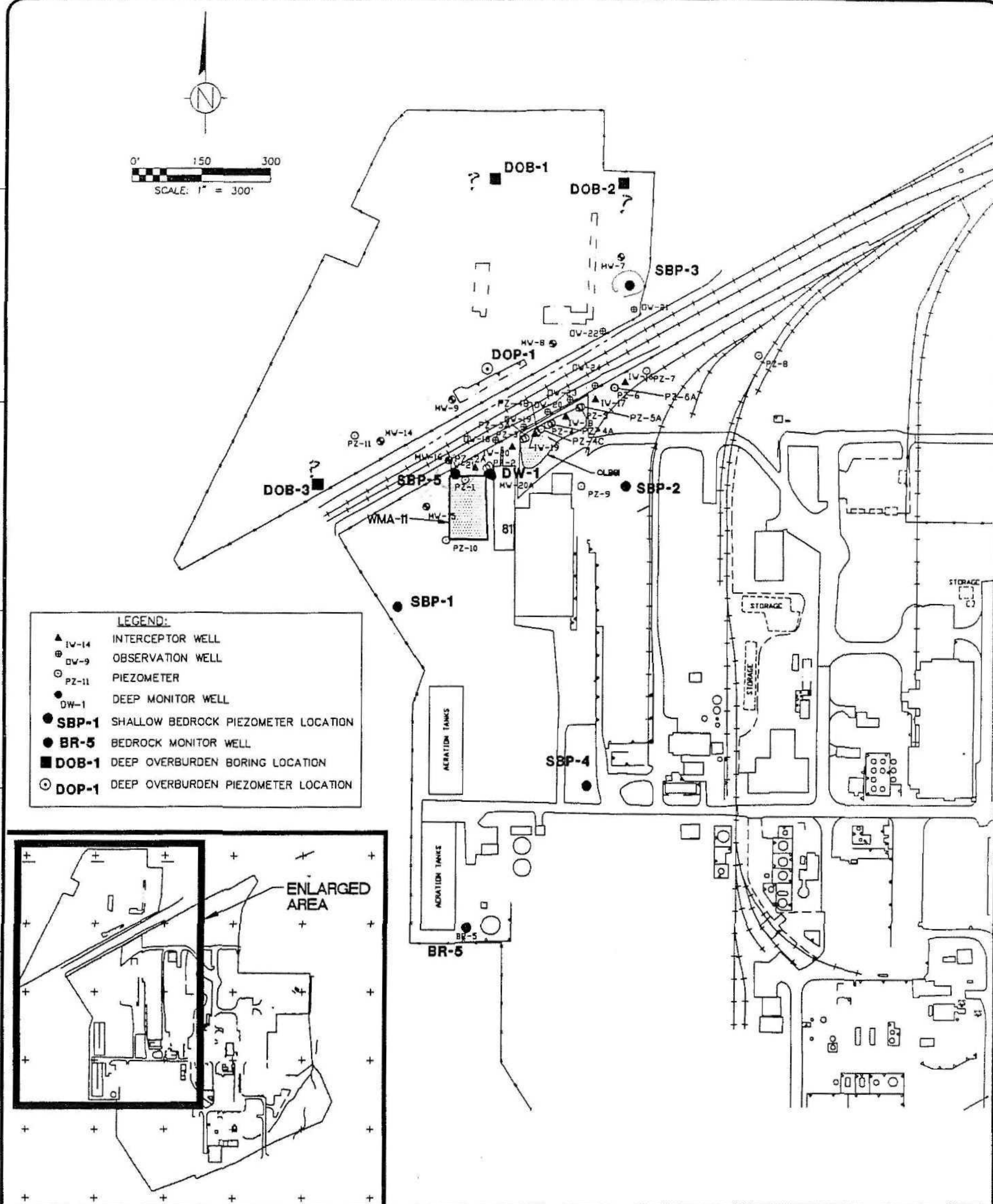
Ground-Water Analyses for PNP and Parathion
Monsanto Chemical Company
Anniston, Alabama

Piezometer ID	Date Analyzed	PNP (ppm)	Methyl Parathion (ppm)	Ethyl Parathion (ppm)	Total Parathion (ppm)
DOP-1	8/19/92	BQL	BQL	BQL	BQL
DW-1 [1/]	8/19/92	4.0	4.2	221.5	225.7
DW-1 [2/]	8/21/92	1.2	0.1	1.3	1.5
DOP-2	9/03/92	BQL	BQL	BQL	BQL
SBP-3	9/03/92	BQL	BQL	BQL	BQL
SBP-1	9/11/92	BQL	BQL	BQL	BQL
SBP-2	9/11/92	BQL	BQL	BQL	BQL
SBP-3	9/18/92	BQL	BQL	BQL	BQL
SBP-4	9/24/92	BQL	BQL	BQL	BQL
DOP-1	11/09/92	BQL	BQL	BQL	BQL
SBP-5	11/09/92	BQL	BQL	BQL	BQL

[1/] Water sample obtained prior to purging well
[2/] Water sample obtained after purging well
ppm = parts per million
BQL = Below Practical Quantitation Limits
PNP PQL = 0.004 ppm
Total Parathion PQL = 0.0011 ppm

FIGURES

DRAFTER: BJH | APPROVED: PP | CHECKED: KM | DRAWING: X | FILE NO.: MONTBR-5.DWG | PRJCT NO.: TF52517 | DWG DATE: 12/7/92

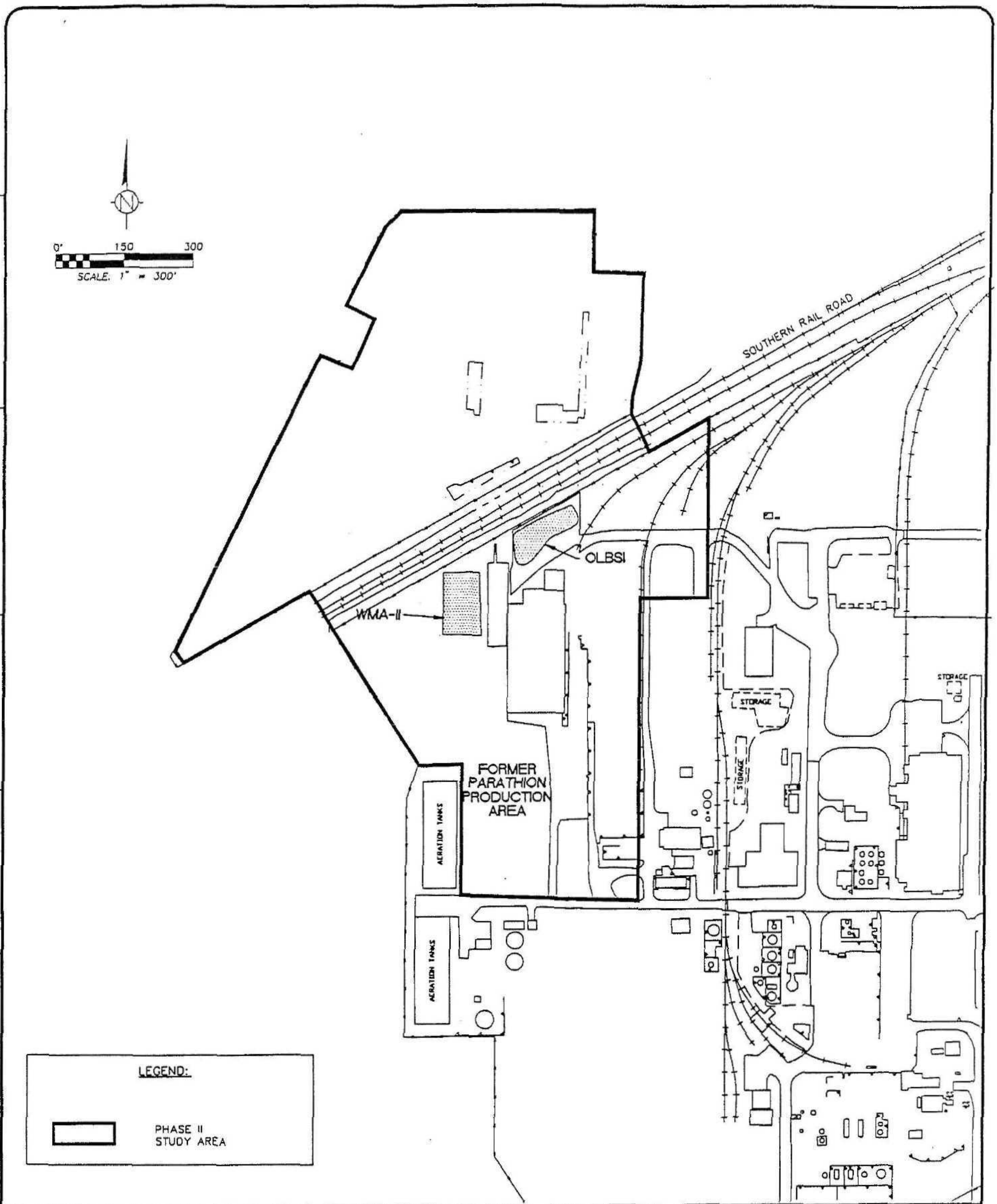


GERAGHTY & MILLER, INC.
Environmental Services

SITE PLAN

MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 1



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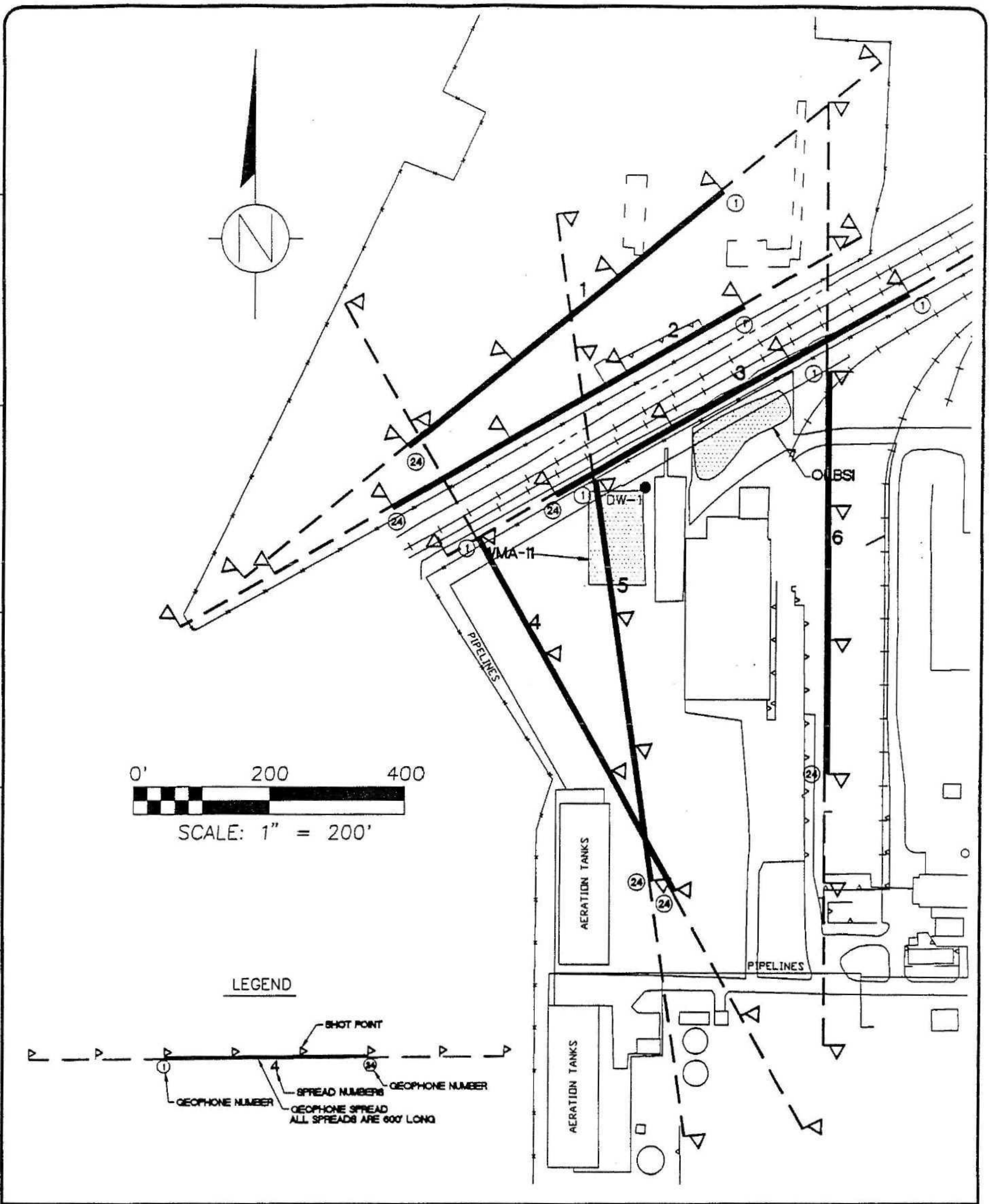
GERAGHTY & MILLER, INC.
Environmental Services

PHASE II STUDY AREA

MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 2



DWG DATE: 5-22-92 | PRJCT NO.: TF52517 | FILE NO.: MONTB6-A | DRAWING: MONSANTO | CHECKED: KM | APPROVED: LLH | DRAFTER: AWG

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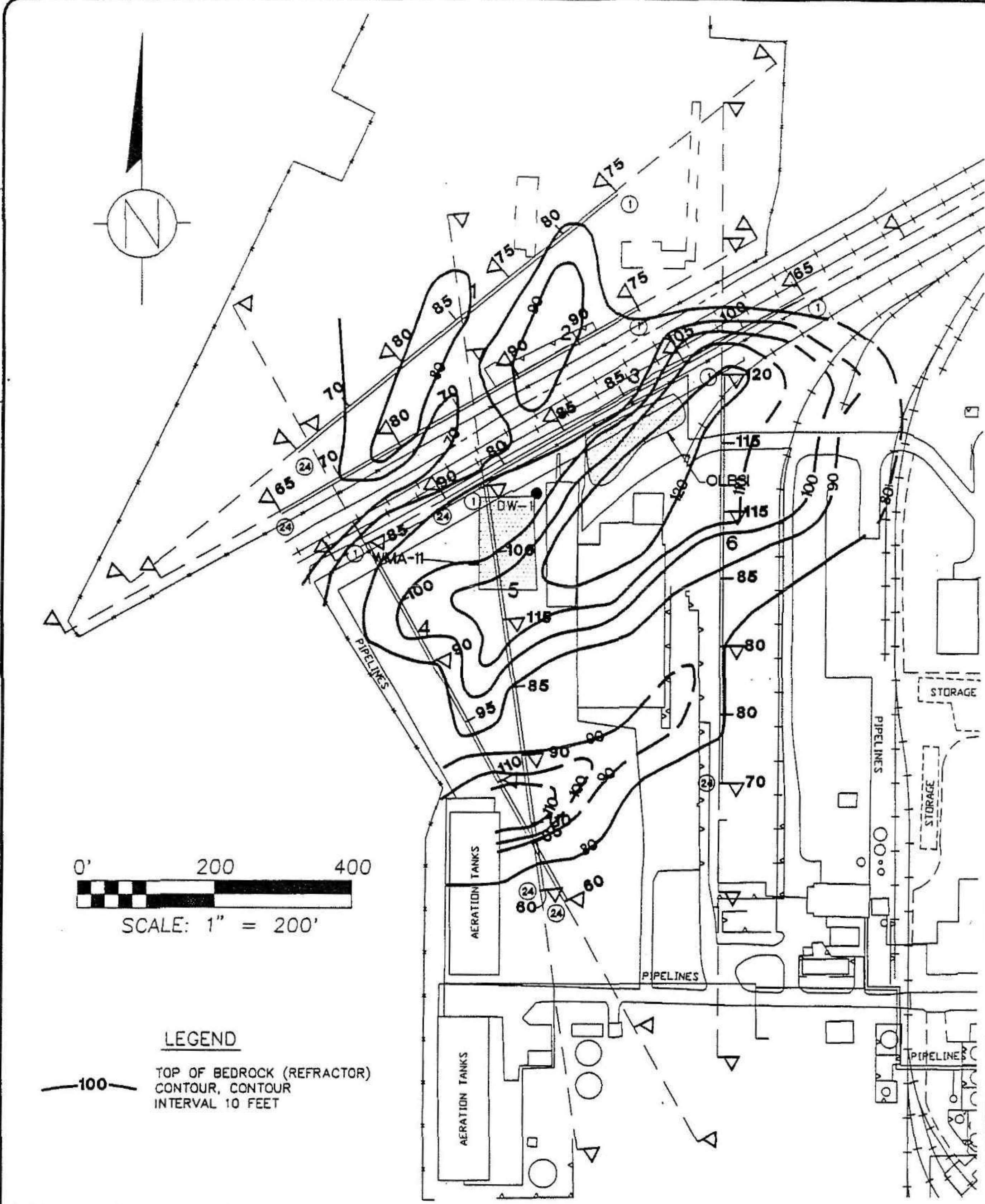
Environmental Services

REFRACTION SEISMIC SURVEY MAP

MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 3

DRAFTER: AWG | APPROVED: LLH | CHECKED: KM | DRAWING: MONSANTO | FILE NO.: MONTB6-A | PRJCT NO.: TF52517 | DWG DATE: 5-22-92



GERAGHTY & MILLER, INC.
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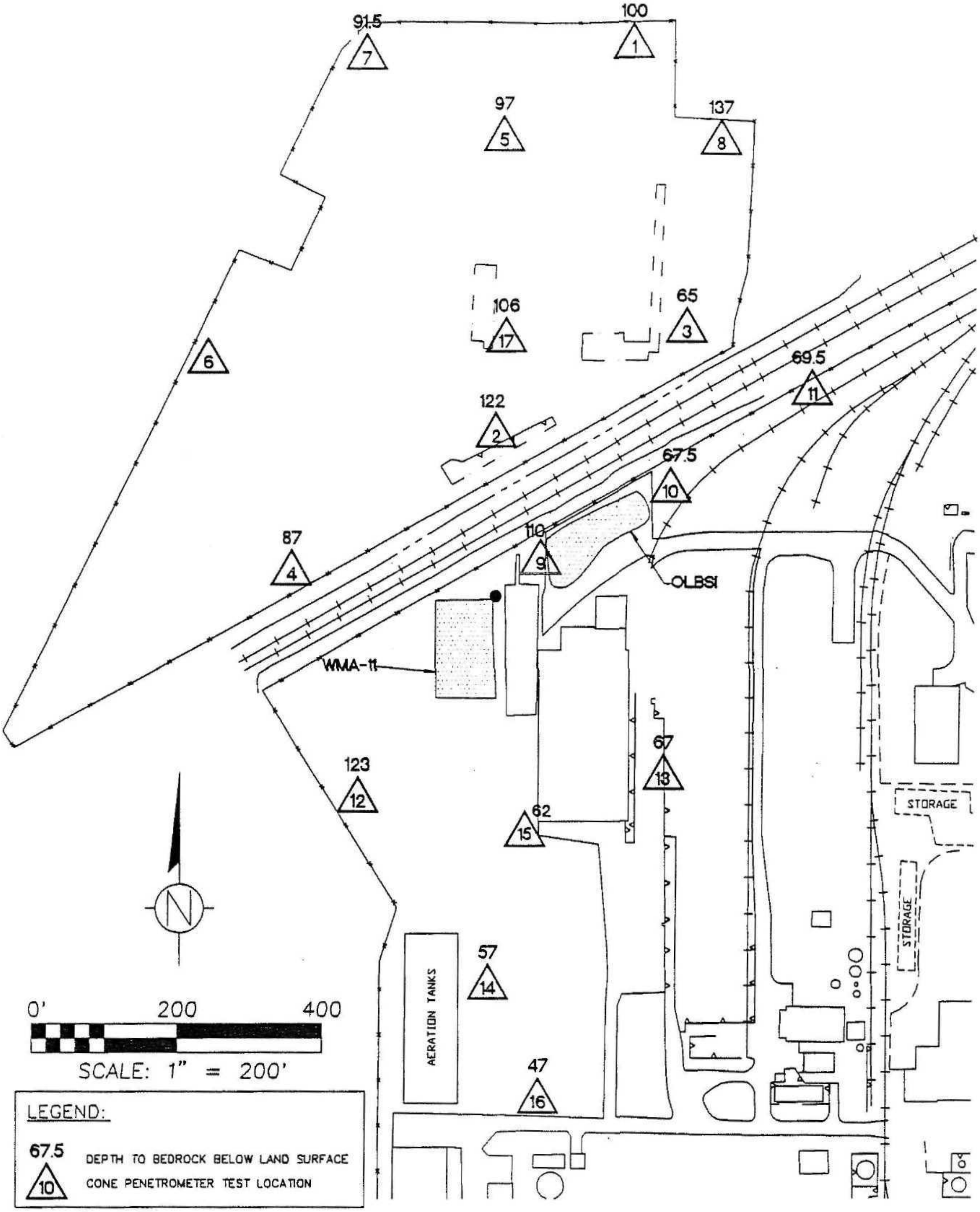
INFERRED TOP BEDROCK CONTOUR MAP
REFRACTION SEISMIC SURVEY
MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE
4



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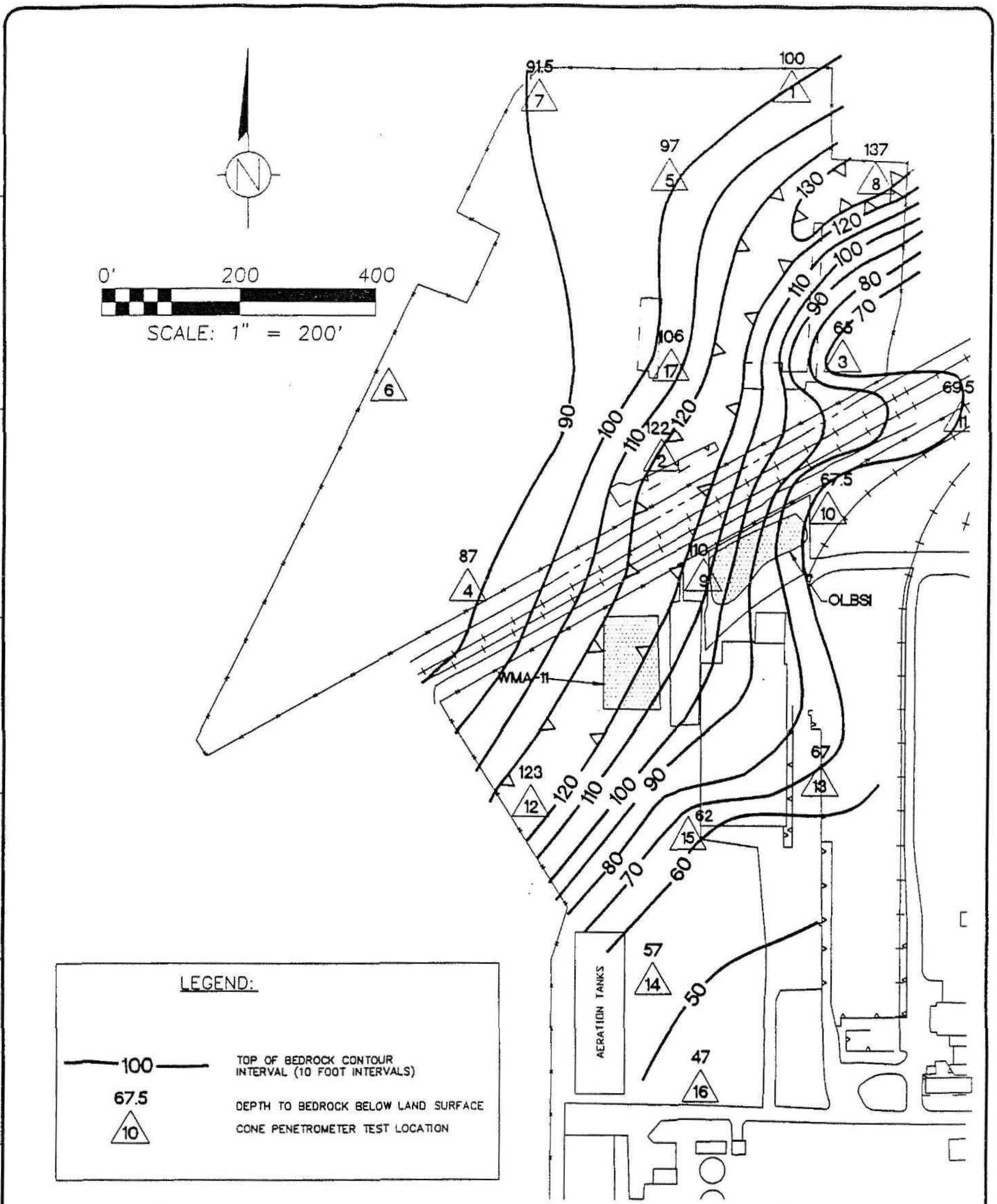
GERAGHTY & MILLER, INC.
Environmental Services

CPT LOCATION MAP

MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 5

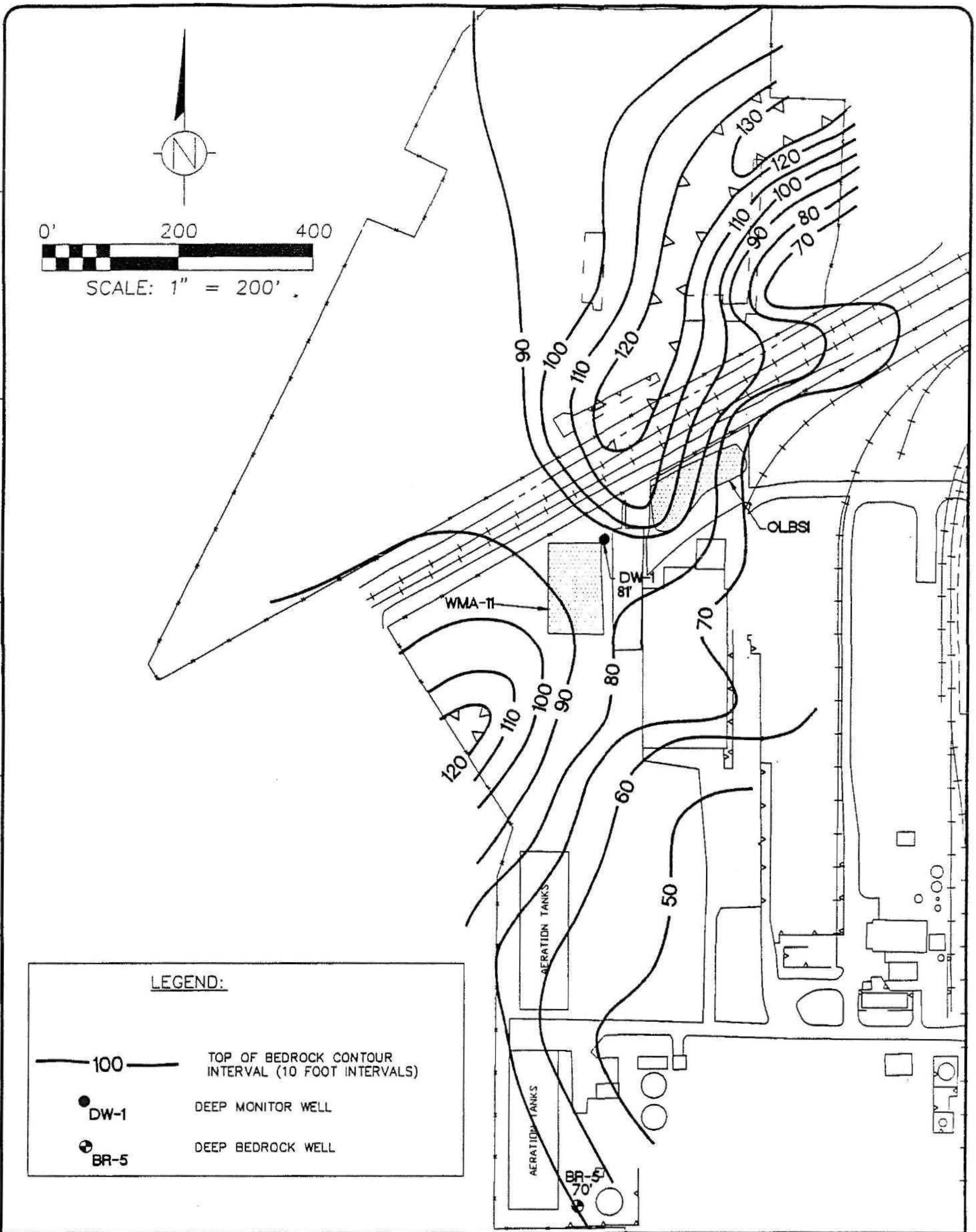


GERAGHTY & MILLER, INC.
Environmental Services

INFERRED TOP OF BEDROCK CONTOUR MAP
CPT PROGRAM
MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE
6

DWG DATE: 5-22-92 | PRJCT NO.: TF52517 | FILE NO.: MONTB2-B | DRAWING: MONSANTO | CHECKED: KM | APPROVED: LLH | DRAFTER: AWG

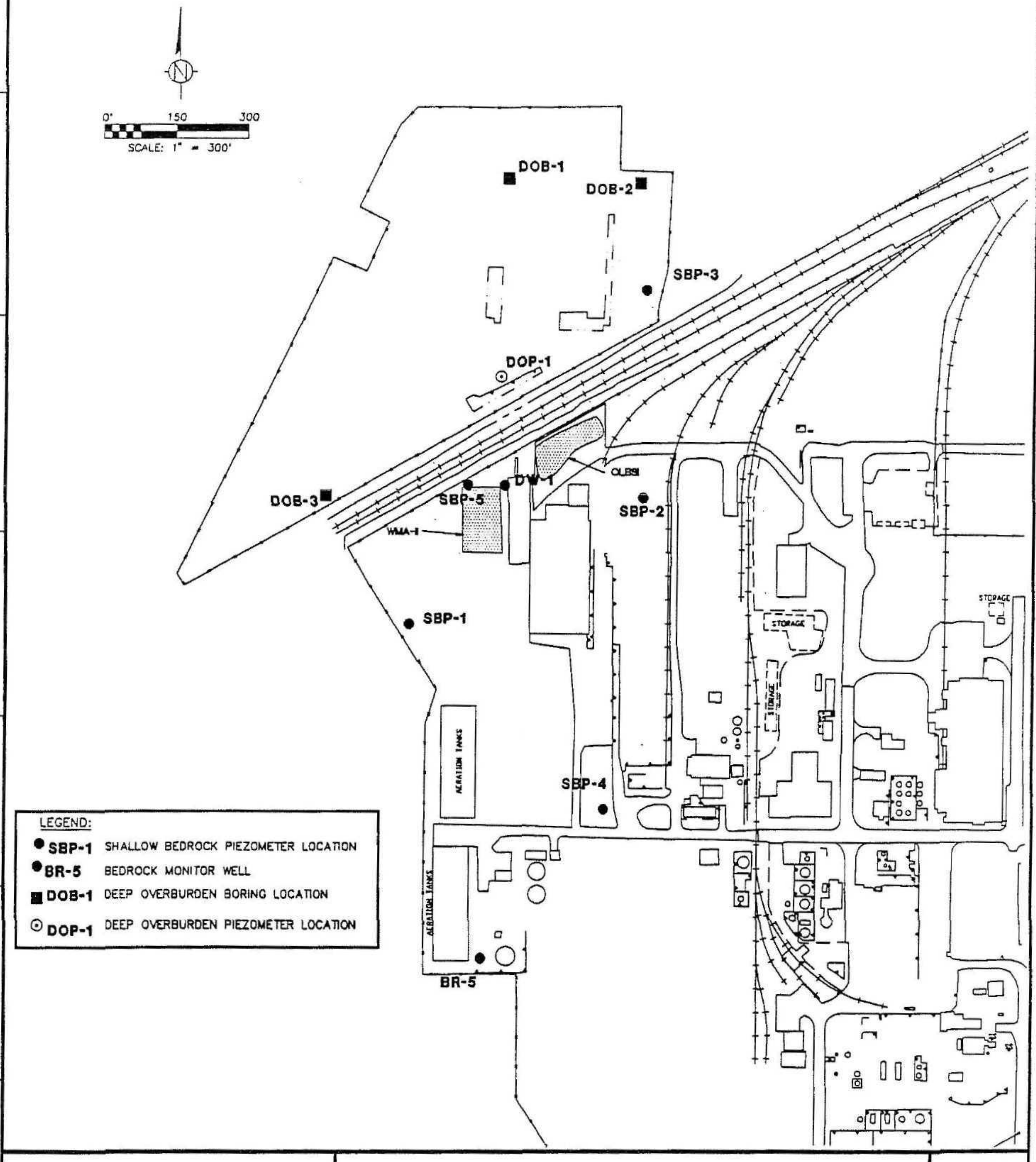


GERAGHTY & MILLER, INC.
Environmental Services

COMPOSITE TOP OF BEDROCK

MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 7

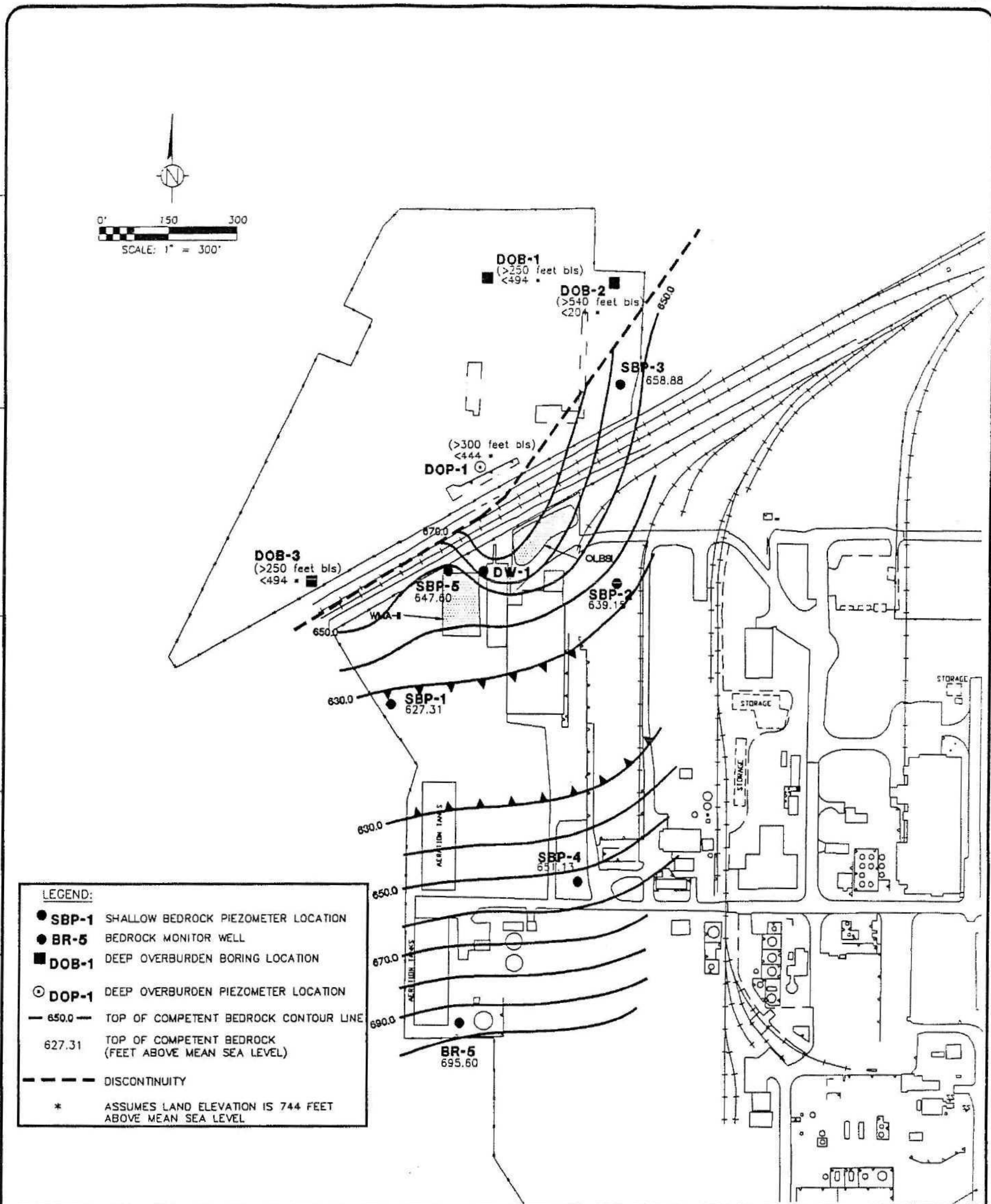


DRAFTER: BJH | APPROVED: PP | CHECKED: KM | DRAWING: X | FILE NO.:MONSAN-A | PRJCT NO.: TF525.18 | DWG DATE: 12/21/92

GERAGHTY & MILLER, INC.
Environmental Services

PHASE II BEDROCK, DEEP OVERBURDEN PIEZOMETER AND BORING LOCATIONS
MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 8



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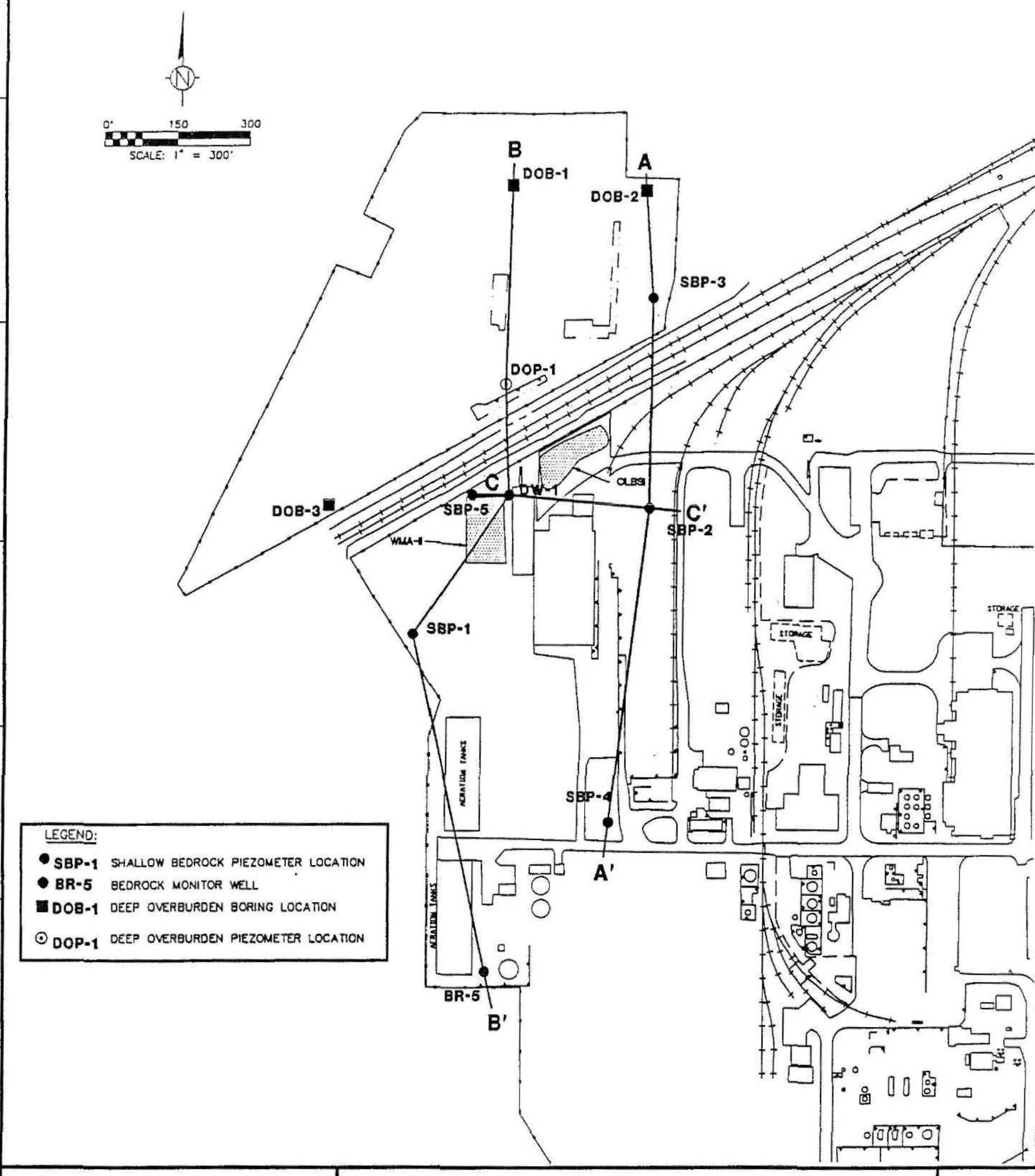
Environmental Services

TOP OF COMPETENT BEDROCK

MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 9

DWG DATE: 12/21/92 | PRJCT NO.: TF525.18 | FILE NO.:MONSAN-A | DRAWING: X | CHECKED: KM | APPROVED: PP | DRAFTER: BJH



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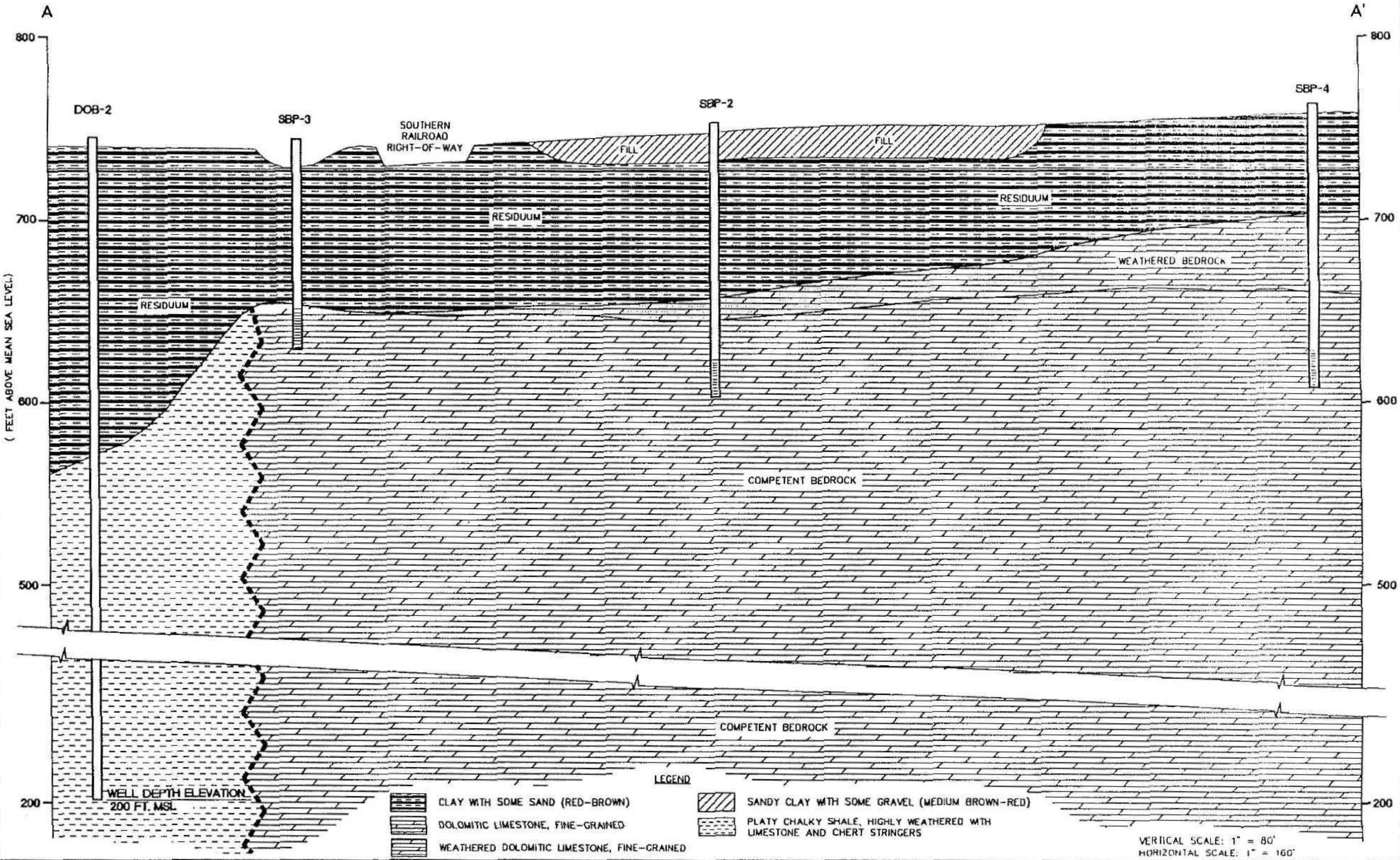
Environmental Services

STRATIGRAPHIC CROSS-SECTION LOCATION MAP

MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 10

DWG DATE: 1/6/93	PRJCT NO.: TF52518	FILE NO.: MONSANCS.DWG	DRAWING: X	CHECKED: X	APPROVED: X	DRAFTER: BJH



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Environmental Services

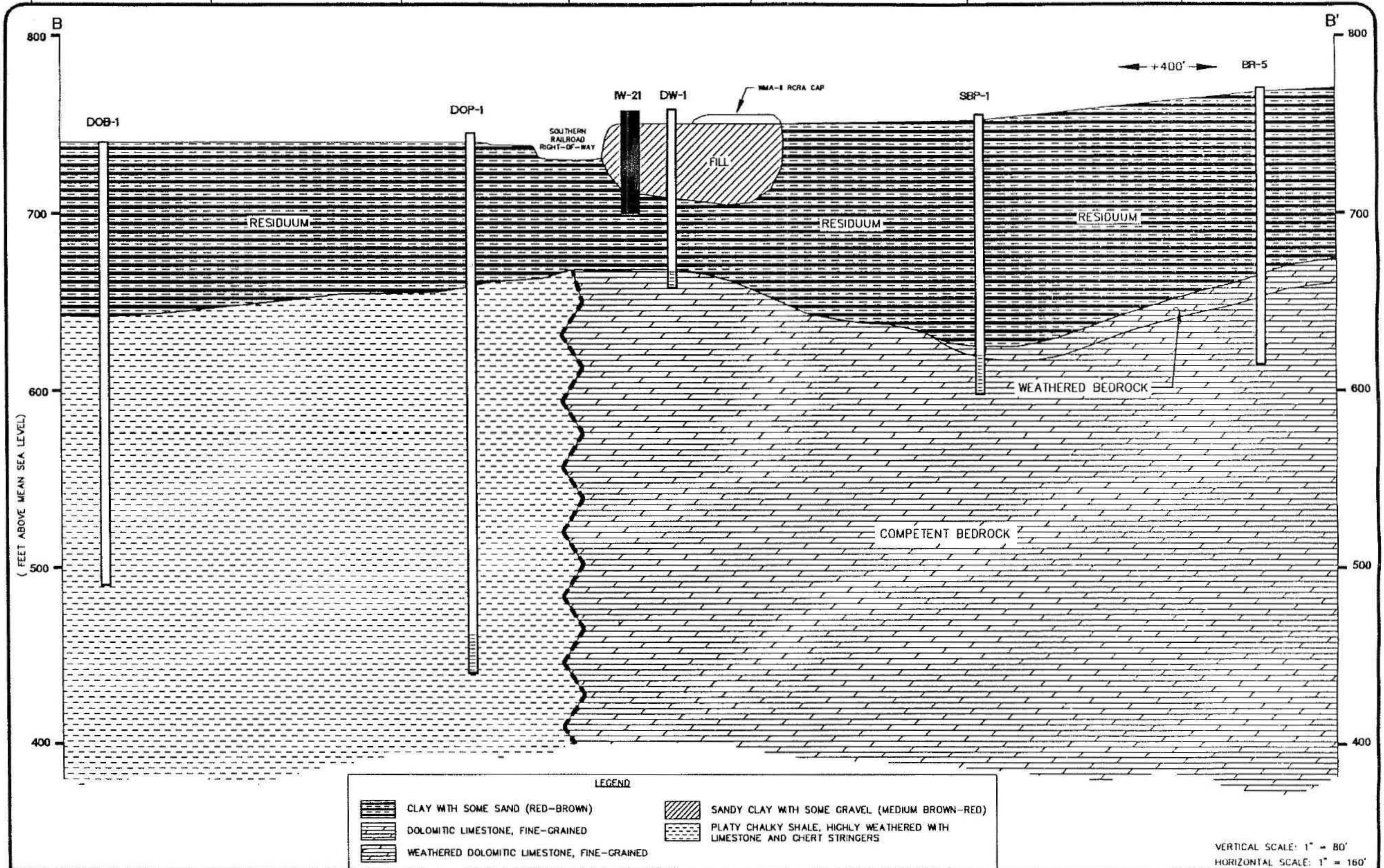
STRATIGRAPHIC CROSS-SECTION A-A'

MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 11

GERAGHTY & MILLER, INC.

DWG DATE: 1/13/93 | PRJCT NO.: TF52518 | FILE NO.:MONSACR2.DWG | DRAWING: X | CHECKED: X | APPROVED: X | DRAFTER: BJH



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Environmental Services

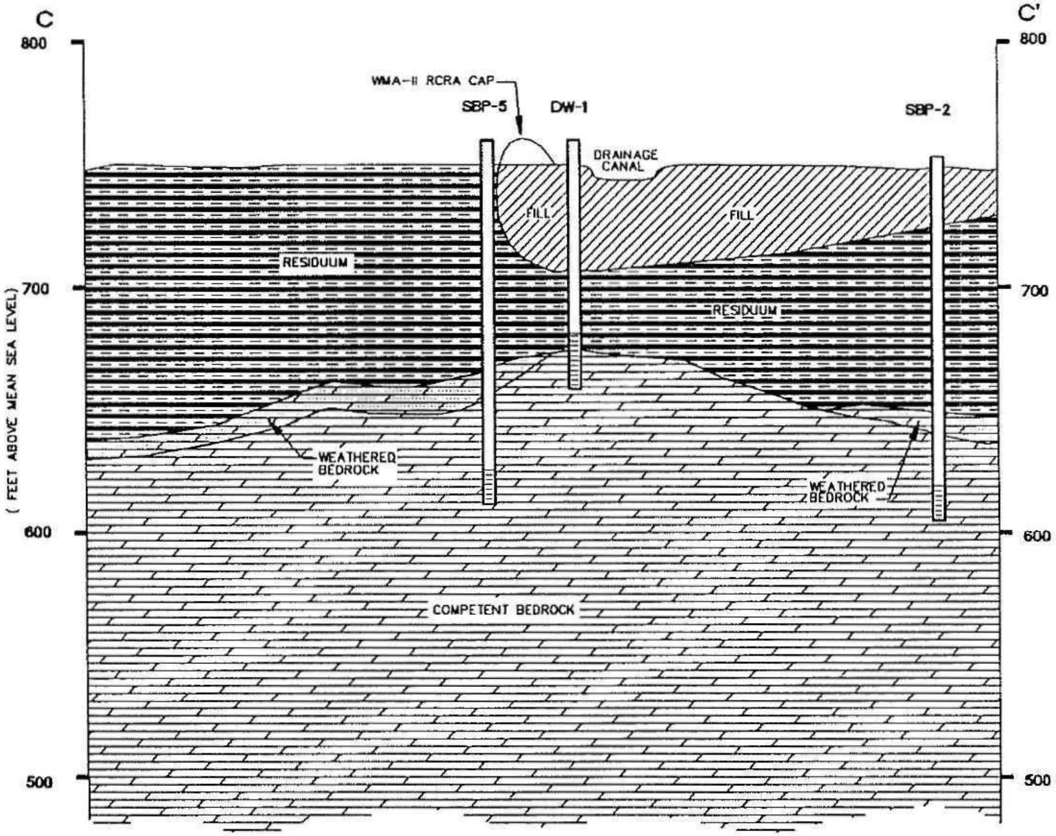
STRATIGRAPHIC CROSS-SECTION B-B'

MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 12

GERAGHTY & MILLER, INC.

DWG DATE: 1/6/93	PRJCT NO.: TF52518	FILE NO.: MONSACR3.DWG	DRAWING: X	CHECKED: X	APPROVED: X	DRAFTER: BJH



LEGEND

- CLAY WITH SOME SAND (RED-BROWN)
- DOLOMITIC LIMESTONE, FINE-GRAINED
- WEATHERED DOLOMITIC LIMESTONE, FINE-GRAINED
- SANDY CLAY WITH SOME GRAVEL (MEDIUM BROWN-RED)

VERTICAL SCALE: 1" = 80'
HORIZONTAL SCALE: 1" = 160'

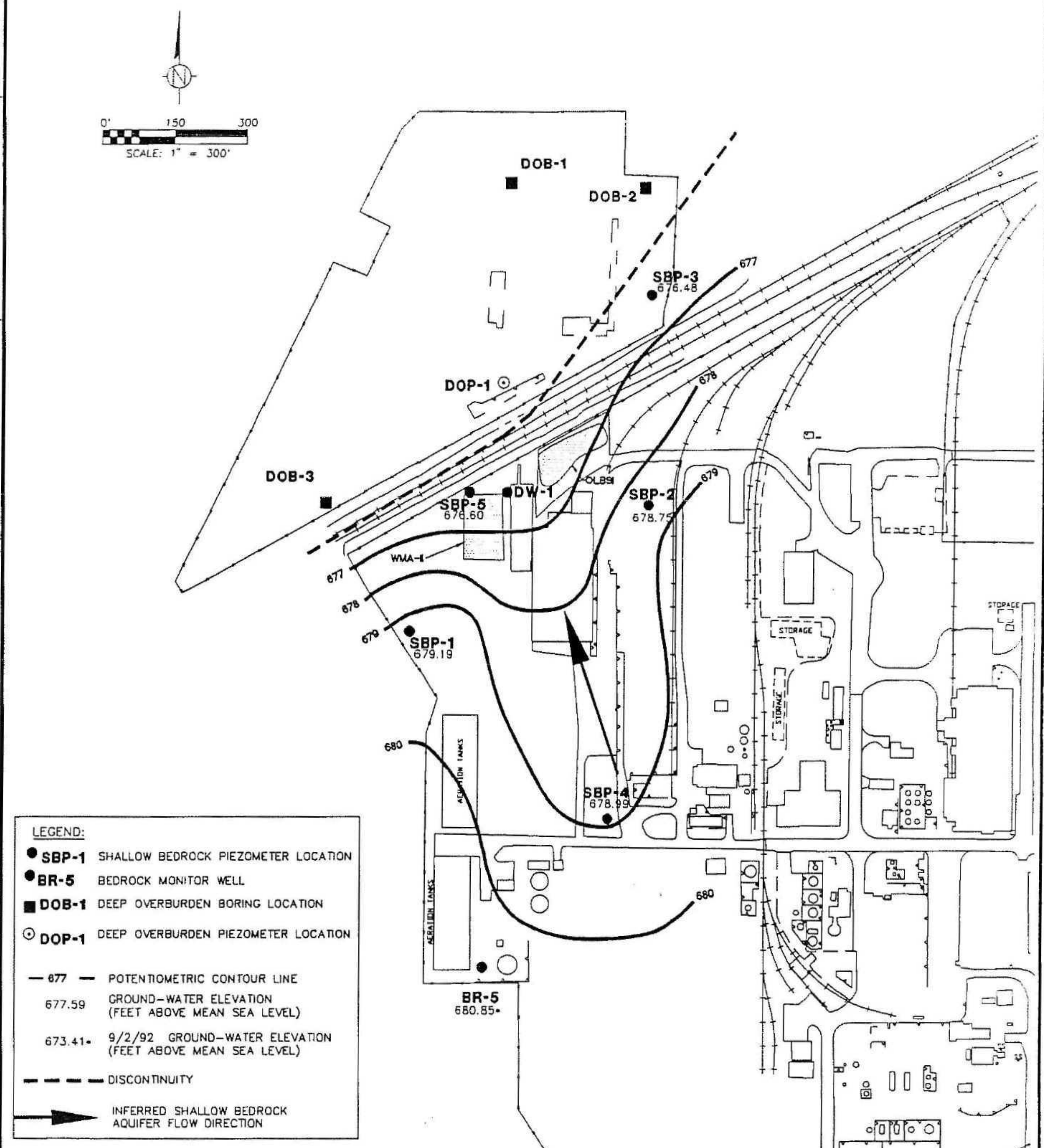
GERAGHTY & MILLER, INC.
Environmental Services

STRATIGRAPHIC CROSS-SECTION C-C'

MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 13

GERAGHTY & MILLER, INC.

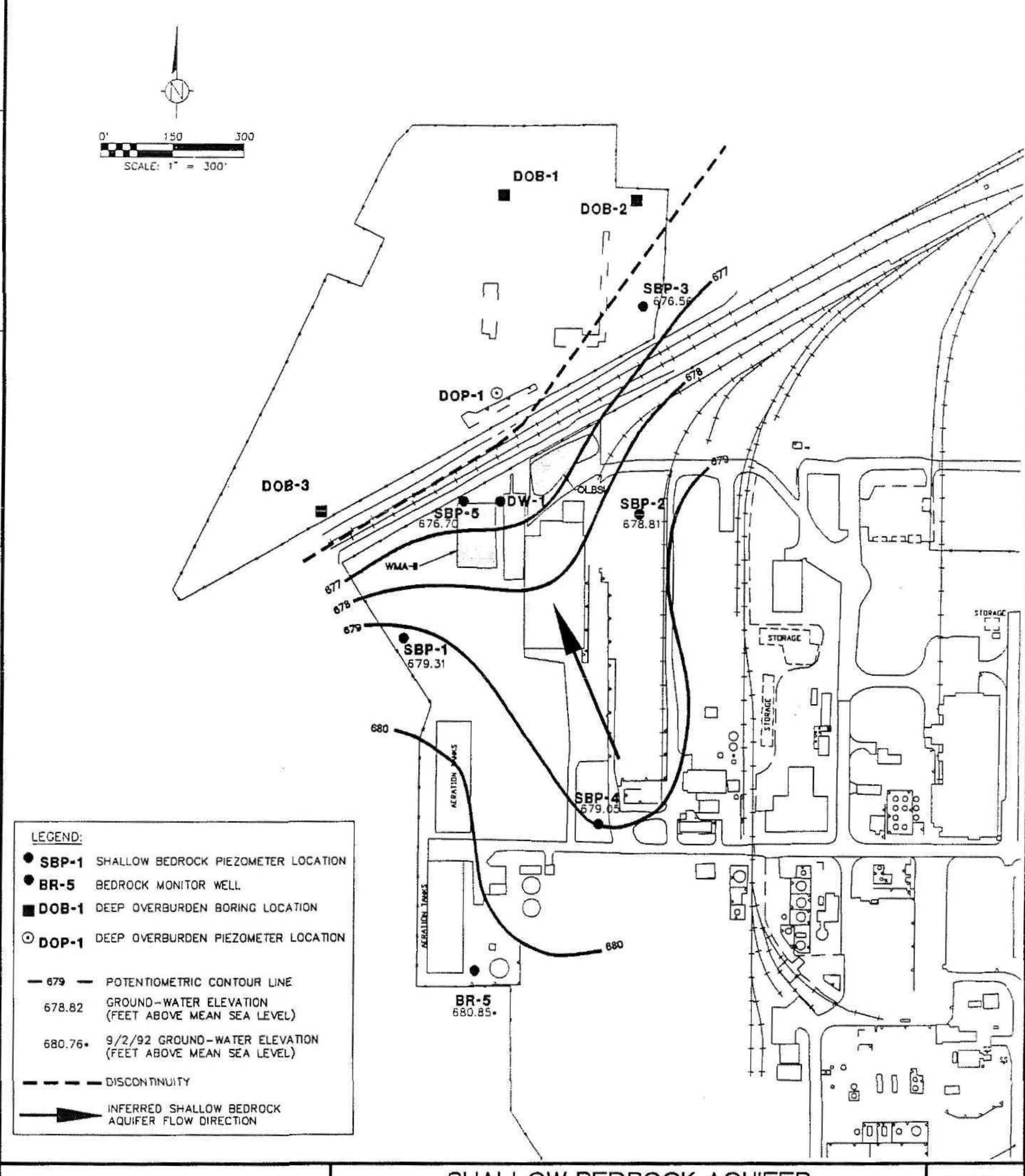


GERAGHTY & MILLER, INC.
Environmental Services

SHALLOW BEDROCK AQUIFER
POTENTIOMETRIC SURFACE
DECEMBER 1, 1992
MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 14

DWG DATE: 1/14/93 | PRJCT NO.: TF525.18 | FILE NO.:MONSAN-A | DRAWING: X | CHECKED: KM | APPROVED: PP | DRAFTER: BJH



DWG DATE: 1/14/93 | PRJCT NO.: TF525.18 | FILE NO.: MONSAN-A | DRAWING: X | CHECKED: KM | APPROVED: PP | DRAFTER: BJH

GERAGHTY & MILLER, INC.
Environmental Services

SHALLOW BEDROCK AQUIFER
POTENTIOMETRIC SURFACE
DECEMBER 2, 1992
MONSANTO CHEMICAL COMPANY
ANNISTON, ALABAMA

FIGURE 15

APPENDIX A

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION
OF MONITOR WELL MW-20B

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Sandy clay. Brown clay contains less than 5% quartz sand. Sand is very fine-grained and is well rounded. Contains pebble and cobble-size chert and limestone fragments. Fragments are subrounded. Visible indication of water at 7 ft bls . .	0 - 8	8
Sandy clay. Brown. Contains approximately 10% quartz sand. Sand grains are very fine-grained and well rounded. Chert and limestone fragments are present but not as abundant	8 - 12	4
Clay. Orange, brown, and red clay. Subrounded chert and limestone fragments present	12 - 16	4
Sandy clay. Brown clay with less than 5% quartz sand. Sand grains are very fine-grained and well rounded. Contains pebble and cobble-size chert and limestone fragments which are subrounded. At 24 ft bls strong contamination odor detected.	16 - 24	8

Geologist: Joseph Mizerany
Date Drilled: May 1991

TF525\LITHLOG\PIEZPZ-2.W51

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION
OF MONITOR WELL DW-1

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Sandy clay. Moderate brown with some dark yellowish orange at top. Small sandstone and dolomite pebbles present. Some limestone gravel as well as coarse-grained sandstone fragments. Slight odor detected at 23 feet with minor amounts of black staining. Dense clay lenses at 24.5 and 29.5 feet.	0 - 34	34
Clay. Mottled colors. Various shades of brown, red, yellow, orange, yellow-green. Clay is dense, dry, and brittle. Black staining evident from 48 feet with slight detectable odor. Small sandy clay lens at 36 feet	34 - 78	44
Clay. Moderate brown. Dry. Contains 5-10% small sandstone and shale clasts. Thin lenses of soft weathered shale present. Detectable odor observed.	78 - 80	2
Bedrock. Light grey competent limestone.	81 - 96	15

Geologist: Chris Bona
Date Drilled: September 1991

TF525\LITHLOG\PIEZPZ-2.W51

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION
OF SHALLOW BEDROCK PIEZOMETER SBP-1

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Clay. Moderate reddish brown. Plastic. Sandy. Fine grained. Silty. Moist, becoming wet at 25' bls.	0 - 125	125
Weathered dolomitic limestone. Fractured	125 - 129.5	4.5
Limestone. Dolomitic. Medium dark gray. Very competent	129.5 - 157	27.5

TF525\LITHLOG\PIEZSBP-1.W51

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION
OF SHALLOW BEDROCK PIEZOMETER SBP-2

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Sandy clay. Grayish brown. Silty. Some gravel Moist becoming wet at 15' bls	0 - 27	27
Clay. Moderate red brown. Firm. Sandy. Medium to fine grained. Silty. Some pebbles. Moist. Increased water content at 55' bls	27 - 100	73
Clay. Sandy. Weathered dolomitic limestone fragments	100 - 110	10
Dolomitic limestone. Medium dark gray. Fairly competent to very competent.	110 - 140	30

TF525\LITHLOG\PIEZSBP-2.W51

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION OF SHALLOW BEDROCK PIEZOMETER SBP-3

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Clay with slag deposits. Fine to course grained. Dry. Compact	0 - 8	8
Clay with Slag deposits. Moderate reddish brown. Fine grained. Moist. Compact..	8 - 12	4
Clay. Moderate reddish brown with some gray mottling. Silty. Sandy. Fine grained. Moist. Compact.	12 - 68.5	56.5
Clay. Moderate reddish brown with some gray mottling. Silty. Sandy. Fine grained. Moist. Compact. Sandstone, Quartz and Chert fragments.	68.5 - 82	13.5
Limestone. Dark gray. Competent.	82 - 102	20

TF525\LITHLOG\PIEZSBP3.51

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION OF SHALLOW BEDROCK PIEZOMETER SBP-4

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Clay. Moderate reddish brown to dark reddish brown Trace sand. Some organics. Damp	0 - 15	15
Clay. Moderate reddish orange to moderate yellowish brown. Silty. Sandy. Sandstone fragments	15 - 60	45
Silt. Moderate yellowish brown. Cemented. Chalky.	60 - 67	7
Dolomitic limestone. Weathered to fairly competent	67 - 107	40
Dolomitic limestone. Grayish black to light brownish grey Very competent	107 - 147.5	40.5

TF525\LITHLOG\SBP-4.W51

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION OF SHALLOW BEDROCK PIEZOMETER SBP-5

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Clay. Moderate reddish orange. Sandy. Fine grained Silty. Moist, becoming wet at 25' bls.	0 - 97	97
Dolomitic limestone. Medium gray, very competent	97 - 98.5	1.5
Dolomitic limestone, fractured	98.5 - 105	6.5
Dolomitic limestone. Medium gray, fairly competent, with some fracturing	105 - 140	35

TF525\LITHLOG\PIEZSBP-5.W51

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION
OF DEEP OVERBURDEN PIEZOMETER DOP-1

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Clay with slag deposits. Moderate reddish brown. Sandy. Dry..	0 - 4	4
Clay. Moderate reddish brown. Sandy. Fine grained. Quartz fragments. Silty. Moist becoming wet at 40' bls	4 - 40	36
Clay. Pale red. Sandy. Fine grained. Silty	40 - 52	12
Clay. Pale red to moderate reddish brown. Sandy. Fine grained. Platy. Silty. Weathered shale	52 - 300	248

TF525\LITHLOG\DOP-1.W51

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION
OF DEEP OVERBURDEN BORING DOB-1

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Sand. Dark brown. Silty. Trace organics. Slag Deposits. Dry .	0 - 4	4
Clay. Light brown to grayish red. Silty. Soft. Damp.	4 - 100	96
Clay. Grayish red. Silty. Soft. Damp. Sandstone Fragments and trace chert.	100 - 174	74
Clay. Blackish red. Plastic. Platy. Silty. Weathered shale. Dense. Damp	174 - 250	76

TF525\LITHLOG\DOB-1.W51

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION
OF DEEP OVERBURDEN BORING DOB-2

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Slightly clayey sand. Slag deposits. Silty. Some organics	0 - 4.5	4.5
Clay. Light brown. Silty. Soft.	4.5 - 18	13.5
Clay. Dark yellowish orange. Silty. Soft	18 - 128	110
Clay. Dark yellowish orange. Silty. Soft. Sandstone fragments.	128 - 193	65
Clay. Dark yellowish orange. Silty. Soft. Sandstone fragments. Chert fragments.	193 - 250	57
Clay. Dark yellowish orange. Silty. Soft.	250 - 283	33
Clay. Dark yellowish orange. Silty. Soft. Sandstone and Chert fragments	283 - 290	7
Clay. Dark yellowish orange. Silty. Soft.	290 - 300	10
Clay. Dark yellowish orange to grayish red. Silty. Platy and chalky. Sandstone and Chert fragments	300 - 398	98
Clay. Grayish red. Silty. Trace sandstone and Chert.	398 - 475	77
Clay. Grayish red to pale red with laminations of moderate reddish brown. Silty.	475 - 515	40
Clay. Pale red with moderate reddish brown laminations. Some sand. Sandstone fragments. Quartz.	515 - 540	25

TF525\LITHLOG\BHSBP-4.51

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION
OF DEEP OVERBURDEN BORING DOB-3

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Clay. Dark yellowish orange. Sandy. Fine grained. Silty. Compact. Becoming softer with depth	0 - 135	135
Clay. Dark yellowish orange. Slightly sandy. Silty. Compact. Platy with alternating hard and soft layers, changing color to brown gray with depth.	135 - 250	115

TF525\LITHLOG\DOB-3

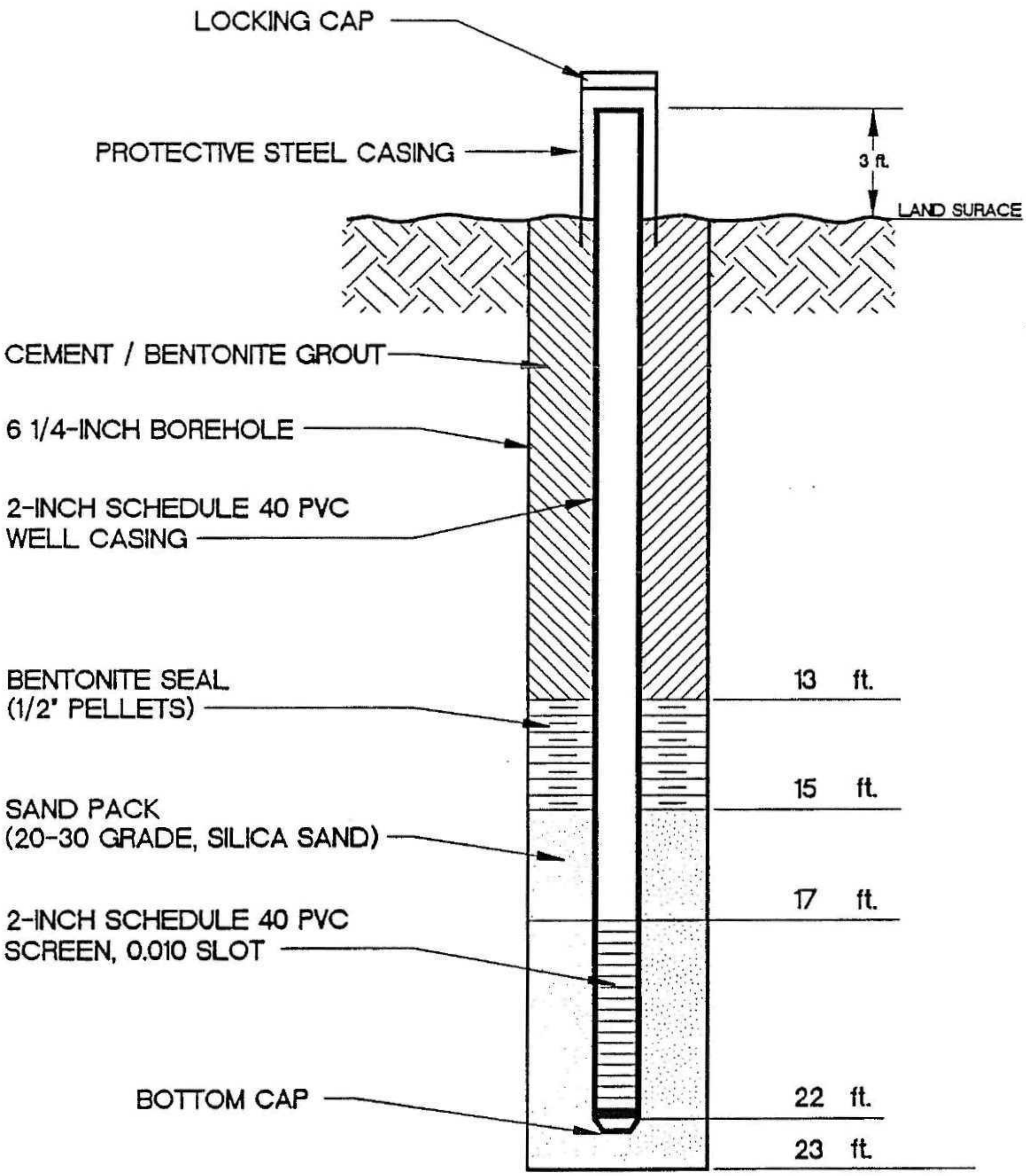
APPENDIX B

GERAGHTY & MILLER, INC.
Environmental Services

WELL CONSTRUCTION DIAGRAM

WELL NO.	MW-20B	PROJECT	TF52509

LOCATION	FACILITY	SURFACE ELEVATION	MEASURING POINT ELEVATION
Anniston, Alabama	Monsanto		
GEOLOGIST	DRILLING CONTRACTOR	DRILLING METHOD	DRILLER
Joe Mizerany	Graves Service Co. Inc.	Hollow Stem Auger	Ron Flanigan
DEVELOPMENT METHOD	GALLONS EVACUATED	DATE WELL COMPLETED	STATIC DEPTH TO WATER FEET BELOW M.P. 8.56
Teflon Bailer	~10	5-06-91	DATE: 5-06-91



NOT TO SCALE

ALL MEASUREMENTS IN ft. BELOW LAND SURFACE

DRAFTER: JVP | APPROVED: 0000 | CHECKED: 0000 | DRAWING: MONSANO9 | FILE NO.: MONSANTO | PRJCT NO.: TF525.09 | DWG DATE: 10-01-91

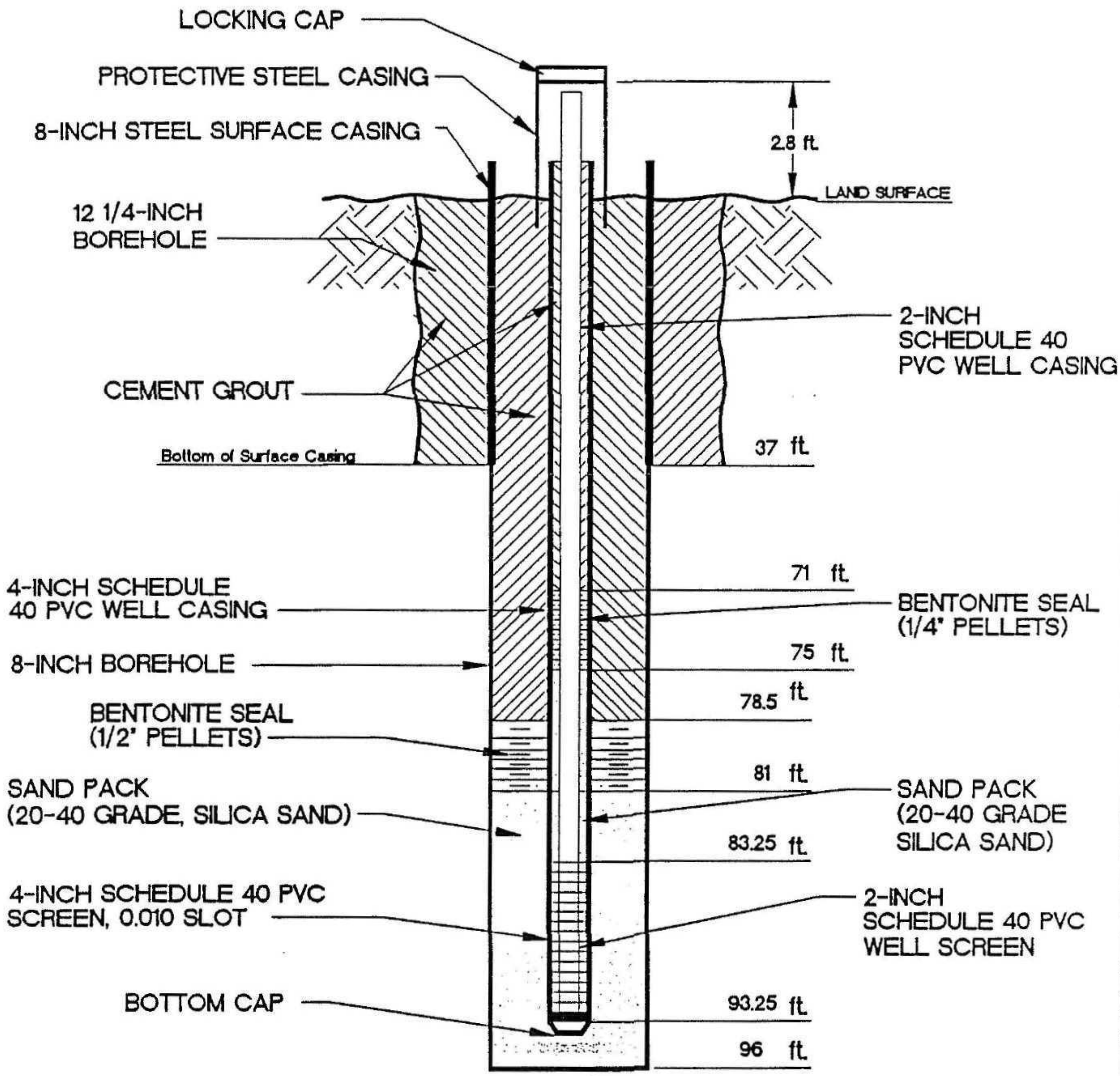
GERAGHTY & MILLER, INC.
Environmental Services

PIEZOMETER CONSTRUCTION DIAGRAM

WELL NO. DW-1

PROJECT TF52509

LOCATION	FACILITY	SURFACE ELEVATION	MEASURING POINT ELEVATION
Anniston, Alabama	Monsanto		
GEOLOGIST	DRILLING CONTRACTOR	DRILLING METHOD	DRILLER
Chris Bona	Graves Service Co. Inc.	Hollow Stem Auger	Dwight Pruit
DEVELOPMENT METHOD	GALLONS EVACUATED	DATE WELL COMPLETED	STATIC DEPTH TO WATER FEET BELOW M.P. 78.88
Air From Drill Rig	~150	9-09-91	DATE: 9-16-91



NOT TO SCALE

ALL MEASUREMENTS IN ft. BELOW LAND SURFACE

DRAFTER: DAN T./JVP | APPROVED: 0000 | CHECKED: 0000 | DRAWING: MONSAN08 | FILE NO.: MONSANTO | PRJCT NO.: TF525.09 | DWG DATE: 10-02-91

WELL CONSTRUCTION LOG

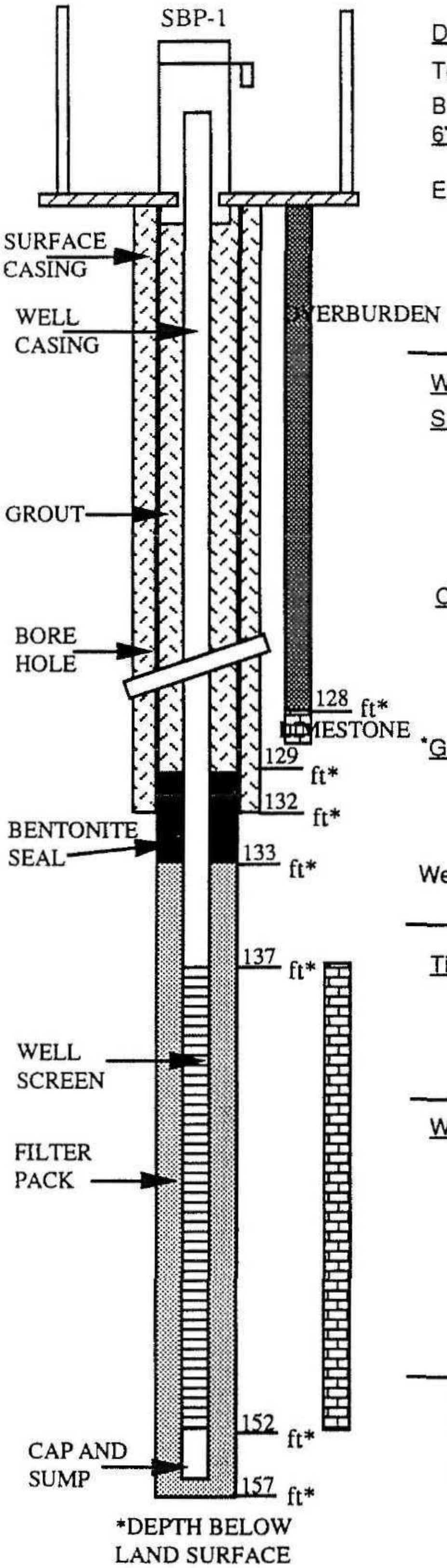
Project Name: Monsanto

Well: SBP-1

Location: Anniston, Alabama

Client: Monsanto Chemical

Prepared By: Ken Miklos



Drilling Summary

Total Depth bls: 157'

Borehole Diameter(s): 10" 0' to 40' bls
6" 40' to 157' bls

Drilling Contractor: Miller Drilling

Drillers: Kevin Mitchell

Drilling Method: Air Rotary/Percussion Hammer

Drilling Fluid (Amount/Type): Water

Elevations (Surveyed)/Datum:

Land Surface 756.81

Top of Well Casing 759.45 feet MSL

Depth to Water: static 82.68 from TOC

Well Design

Surface Casing: Material Steel

Diameter 6"
Length 132'
Setting 0' - 132' bls

Screen: Material Schedule 40 PVC

Diameter 2"
Slot 0.01"
Setting 137' - 152' bls

Casing: Material Schedule 40 PVC

Diameter 2"
Length 137'
Setting 2.5' als - 137' bls (plus 5' sump)

Filter Pack: Material Silica Sand (6/20)

Setting 133' - 157' bls

*Grout: Type Portland Type I w/ 3% bentonite

Setting 0' - 129' bls

Seals: Type Bentonite Pellets

Setting 129' - 133' bls

Well Protection: 3' steel protective casing with lockable cover.

Time Log:	Started	Completed
Drilling:	7-28-92	8-4-92
Installation:	8-4-92	8-4-92
Development:	9-8-92	9-10-92

Well Development:

Method/Equipment: Teflon Bailer / Submersible Pump

Static DTW 82.68

Water Removed During Development approx. 138.5 gallons

pH: 7.69 Conductivity: 400 (umhos/cm)

Temp oC: 20

Remarks: A 10" diameter steel surface casing was installed to 40' bls to hold back formation during drilling of the borehole. Efforts to remove the casing were not successful.

WELL CONSTRUCTION LOG

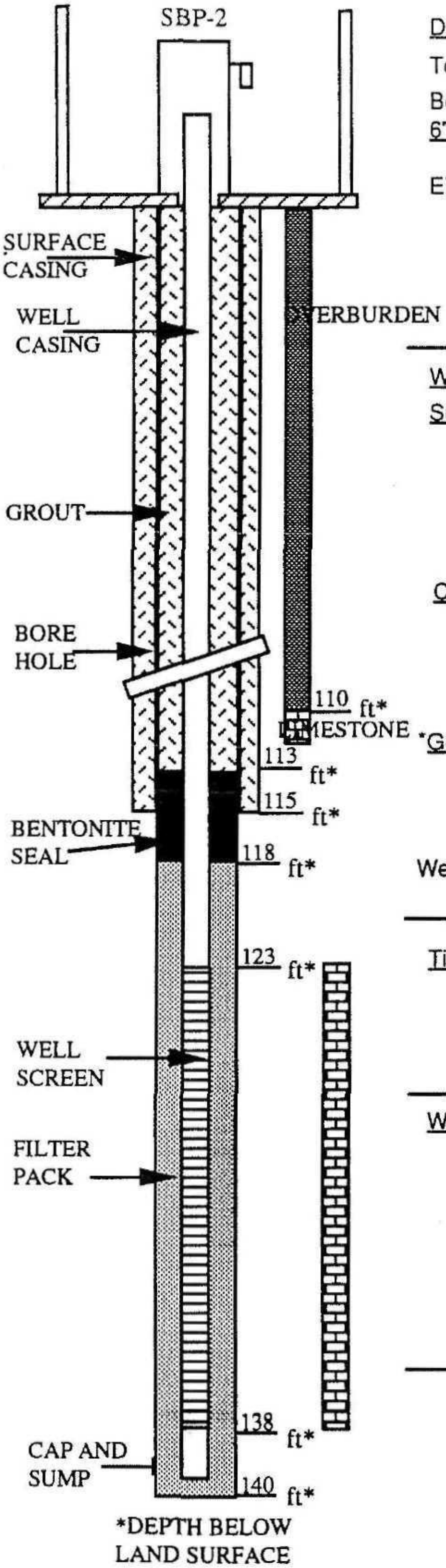
Project Name: Monsanto

Well: SBP-2

Location: Anniston, Alabama

Client: Monsanto Chemical

Prepared By: Ken Miklos



Drilling Summary

Total Depth bls: 140'

Borehole Diameter(s): 10" 0' to 20' bls
6" 20' to 140' bls

Drilling Contractor: Miller Drilling

Drillers: Kevin Mitchell

Drilling Method: Air Rotary/Percussion Hammer

Drilling Fluid (Amount/Type): Water

Elevations (Surveyed)/Datum:

Land Surface 749.15

Top of Well Casing 751.45 feet MSL

Depth to Water: static 74.69' from TOC

Well Design

Surface Casing: Material Steel

Diameter 6"
Length 115'
Setting 0' - 115' bls

Screen: Material Schedule 40 PVC

Diameter 2"
Slot 0.01"
Setting 123' - 138' bls

Casing: Material Schedule 40 PVC

Diameter 2"
Length 123'
Setting 2.3' als - 123' bls (2' sump)

Filter Pack: Material Silica Sand (6/20)

Setting 118' - 140' bls

*Grout: Type Portland Type I w/ 3% bentonite

Setting 0' - 113' bls

Seals: Type Bentonite Pellets

Setting 113 - 118' bls

Well Protection: 3' steel protective casing with lockable cover.

Time Log:

	Started	Completed
Drilling:	7-21-92	7-25-92
Installation:	7-25-92	7-25-92
Development:	9-9-92	9-10-92

Well Development:

Method/Equipment: Teflon Bailer / Submersible Pump

Static DTW 74.69

Water Removed During Development approx. 402.5 gallons

pH: 8.11 Conductivity: 610 (umhos/cm)

Temp oC: 20

Remarks:

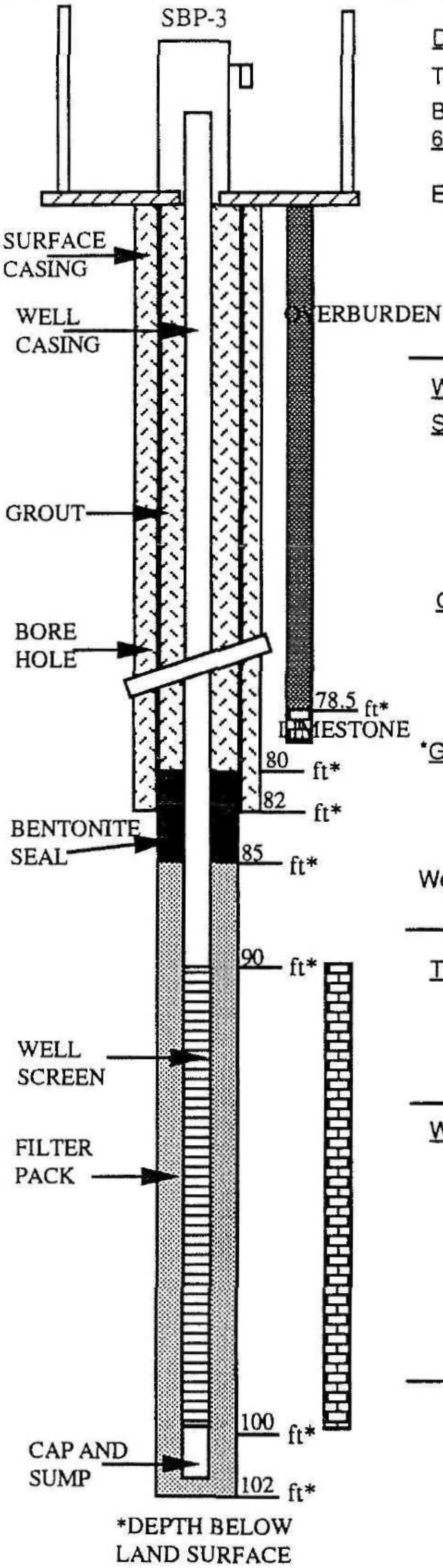
GERAGHTY & MILLER, INC.

WELL CONSTRUCTION LOG

Project Name: Monsanto | Well: SBP-3

Location: Anniston, Alabama

Client: Monsanto Chemical | Prepared By: Ken Miklos



Drilling Summary

Total Depth bls: 102'

Borehole Diameter(s): 10" 0' to 82' bls
6" 82' to 102' bls

Drilling Contractor: Miller Drilling

Drillers: Kevin Mitchell

Drilling Method: Air Rotary/Percussion Hammer

Drilling Fluid (Amount/Type): Water

Elevations (Surveyed)/Datum:

Land Surface ________

Top of Well Casing 743.28 feet MSL

Depth to Water: static 67.84 from TOC

Well Design

Surface Casing: Material Steel
Diameter 6"
Length 82'
Setting 0' - 82' bls

Screen: Material Schedule 40 PVC
Diameter 2"
Slot 0.01"
Setting 90' - 100' bls

Casing: Material Schedule 40 PVC
Diameter 2"
Length 90'
Setting 2.3' als - 90' bls (2' sump)

Filter Pack: Material Silica Sand (6/20)
Setting 85' - 102' bls

*Grout: Type Portland Type I w/ 3% bentonite
Setting 0' - 80' bls

Seals: Type Bentonite Pellets
Setting 80' - 85' bls

Well Protection: 3' steel protective casing with lockable cover.

Time Log:	Started	Completed
Drilling:	7-31-92	8-26-92
Installation:	8-26-92	8-26-92
Development:	9-11-92	9-11-92

Well Development:

Method/Equipment: Submersible Pump

Static DTW 67.84

Water Removed During Development approx. 116 gallons

pH: 7.82 Conductivity: 260 (umhos/cm)

Temp oC: 19.5

Remarks: ________

GERAGHTY & MILLER, INC.

WELL CONSTRUCTION LOG

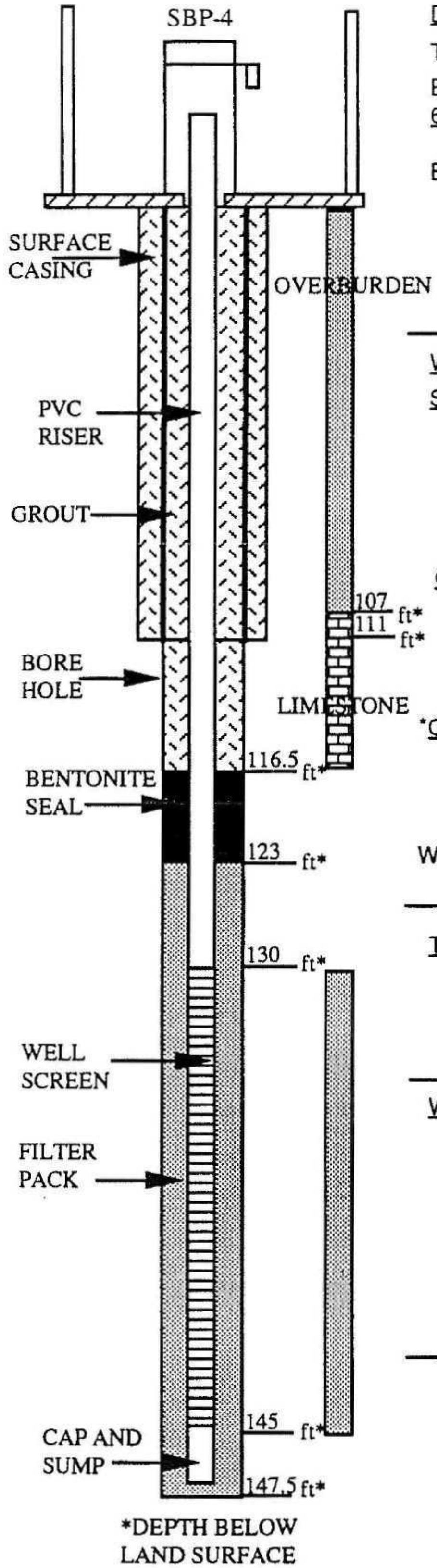
Project Name: Monsanto

Well: SBP-4

Location: Anniston, Alabama

Client: Monsanto Chemical

Prepared By: Ken Miklos



Drilling Summary

Total Depth bls: 147.5'

Drilling Contractor: Miller Drilling

Borehole Diameter(s): 10" 0' to 111' bls
6" 111' to 147.5' bls

Drillers: Kevin Mitchell

Drilling Method: Air Rotary/Percussion Hammer

Drilling Fluid (Amount/Type): Water

Elevations (Surveyed)/Datum:
- Land Surface ________
- Top of Well Casing 760.63'
- Depth to Water: static 83.45 from TOC

Well Design

Surface Casing: Material Steel
- Diameter 6"
- Length 111'
- Setting 0' - 111' bls

Screen: Material Schedule 40 PVC
- Diameter 2"
- Slot 0.01"
- Setting 130' - 145' bls

Casing: Material Schedule 40 PVC
- Diameter 2"
- Length 130'
- Setting 2.3' als - 130' bls (2.5' sump)

Filter Pack: Material Silica Sand (6/20)
- Setting 123' - 147.5' bls

*Grout: Type Portland Type I w/ 3% bentonite
- Setting 0' - 116.5' bls

Seals: Type Bentonite Pellets
- Setting 116.5' - 123' bls

Well Protection: 3' steel protective casing with lockable cover.

Time Log:

	Started	Completed
Drilling:	9-10-92	9-19-92
Installation:	9-19-92	9-19-92
Development:	9-22-92	9-22-92

Well Development:

Method/Equipment: Submersible Pump

Static DTW 83.45

Water Removed During Development: approx. 115 gallons

pH: 9.5 Conductivity: 290 (umhos/cm)

Temp oC: 21

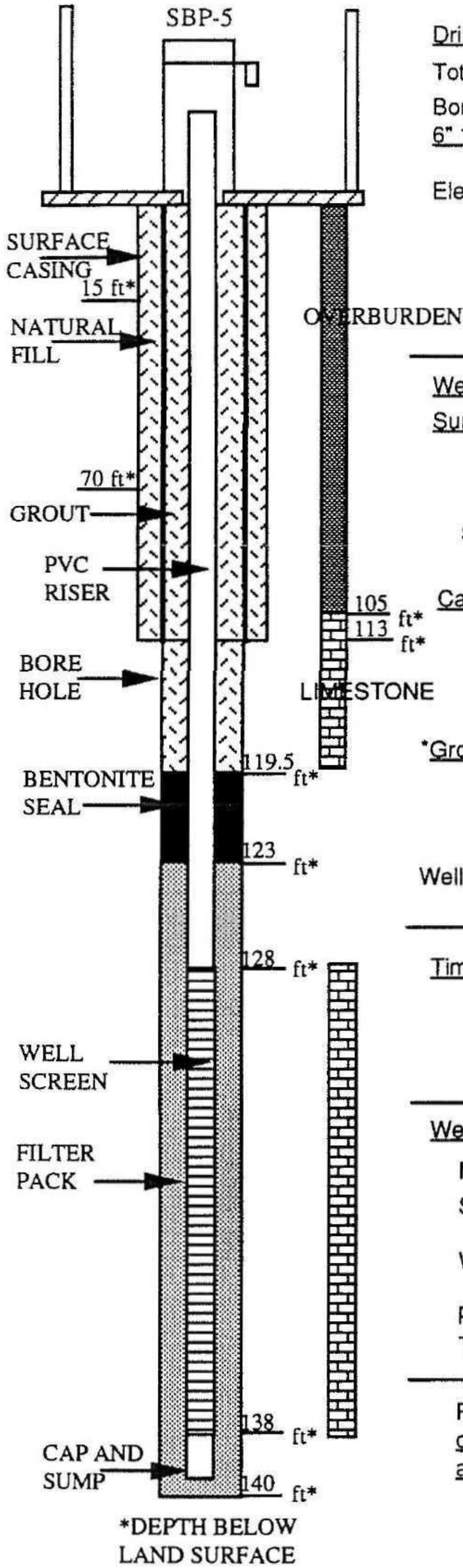
Remarks: ________

WELL CONSTRUCTION LOG

Project Name: Monsanto　　　Well: SBP-5

Location: Anniston, Alabama

Client: Monsanto Chemical　　　Prepared By: Ken Miklos



Drilling Summary

Total Depth bls: 140'

Borehole Diameter(s): 17.5" 0' to 113'
6" 113' to 140'

Drilling Contractor: Miller Drilling

Drillers: Kevin Mitchell

Drilling Method: Air Rotary with water wash

Drilling Fluid (Amount/Type): Water

Elevations (Surveyed)/Datum:

Land Surface 752.60

Top of Well Casing 755.56

Depth to Water: static 82.33

Well Design

Surface Casing: Material Steel

Diameter 6"
Length 113'
Setting 0' - 113' bls

Screen: Material Schedule 40 PVC

Diameter 2"
Slot 0.01"
Setting 128' - 138' bls

Casing: Material Schedule 40 PVC

Diameter 2"
Length 128'
Setting 2' als - 128' bls (2' sump)

Filter Pack: Material Silica Sand (6/20)

Setting 123' - 140' bls

*Grout: Type Portland Type I w/ 3% bentonite

Setting 0' - 119.5' bls

Seals: Type Bentonite Pellets

Setting 119.5' - 123' bls

Well Protection: 3' steel protective casing with lockable cover.

Time Log:	Started	Completed
Drilling:	11/4/92	11/7/92
Installation:	11/7/92	11/7/92
Development:	11/7/92	11/9/92

Well Development:

Method/Equipment: Air Lift and Bailer

Static DTW 82.33

Water Removed During Development: approx. 300 gallons

pH: 6.72　Conductivity: 280 (umhos/cm)

Temp oC: 18

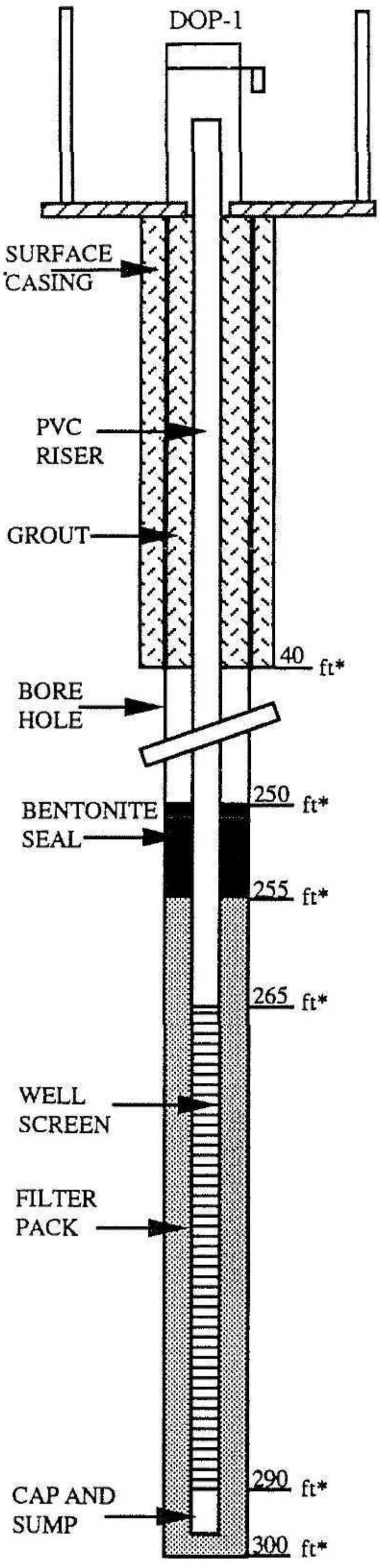
Remarks: A 10" steel surface casing was installed to 113' bls to hold back formation during drilling of the borehole. During the removal of the casing, the formation collapsed around the 6" diameter casing from 15' to approx. 70' bls.

WELL CONSTRUCTION LOG

Project Name: Monsanto　　Well: DOP-1

Location: Anniston, Alabama

Client: Monsanto Chemical　　Prepared By: Jason Kirkpatrick



*DEPTH BELOW LAND SURFACE

Drilling Summary

Total Depth bls: 300'

Borehole Diameter(s): 14.5" 0' to 40' bls 8.25" 40' to 300' bls

Drilling Contractor: Miller Drilling

Drillers: Kevin Mitchell

Drilling Method: Air Rotary

Drilling Fluid (Amount/Type): Water

Elevations (Surveyed)/Datum:

Land Surface 743.78

Top of Well Casing 746.38

Depth to Water: static 66.90' bls

Well Design

Surface Casing: Material Steel

Diameter 10"
Length 40'
Setting 0' - 40' bls

Screen: Material Schedule 40 PVC

Diameter 2"
Slot 0.01"
Setting 265' - 290' bls

Casing: Material Schedule 40 PVC

Diameter 2"
Length 265'
Setting 2.3' als - 265' bls (plus 10' sump)

Filter Pack: Material Silica Sand (6/20)

Setting 255' - 300' bls

*Grout: Type Portland Type I w/ 3% bentonite

Setting 0' - 250' bls

Seals: Type Bentonite Slurry

Setting 250' - 255' bls

Well Protection: 3' steel protective casing with lockable cover.

Time Log:	Started	Completed
Drilling:	10-15-92	10-22-92
Installation:	10-19-92	10-22-92
Development:	10-24-92	10-24-92

Well Development:

Method/Equipment: Air Lift

Static DTW 72' bls

Water Removed During Development: approx. 50 gallons

pH: NA*　Conductivity: NA (umhos/cm)　* Not Analyzed

Temp oC: NA

Remarks: A 10" diameter steel surface casing was installed to 40' bls to hold back formation during drilling of the borehole.

APPENDIX C

Boring Logs and Monitoring Well Construction Logs
(provided in electronic format on CD)

GERAGHTY & MILLER, INC.
Environmental Services

SAMPLE/CORE LOG

Boring/Well BR-1 Project/No. ______ Page 1 of ____

Site Location ______ Drilling Started ______ Drilling Completed ______

Total Depth Drilled ______ feet Hole Diameter ______ inches Type of Sample/ Coring Device ______

Length and Diameter of Coring Device ______ Sampling Interval ______ feet

Land-Surface Elev. ______ feet ☐ Surveyed ☐ Estimated Datum ______

Drilling Fluid Used ______ Drilling Method ______

Drilling Contractor ______ Driller ______ Helper ______

Prepared By J. Connors Hammer Weight ______ Hammer Drop ______ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	5			clay, dry, med. brown
5	10			clay (as above); sandstone, medium to fine gr.
				weathered to white to pale yellow orange
10	15			clay, damp, med. red brown mixed with dark
				yellow orange clay; sandstone (as above)
15	20			As above
20	25			clay, damp, med. brown
25	30			As above
30	35			clay damp, med. brown mottled with dk. yellow
				orange
35	40			As above
40	45			As above
45	50			Clay, grayish red to med. brown mottled with
				dk. yellow orange clay
50	55			As above
55	60			As above
60	65			As above
65	70			As above with semilithified grayish purple
				inclusions
70	75			As above

GERAGHTY & MILLER, INC.
Environmental Services

SAMPLE/CORE LOG

Boring/Well BR-1 Project/No. ______ Page 2 of ______

Site Location ______ Drilling Started ______ Drilling Completed ______

Total Depth Drilled ______ feet Hole Diameter ______ inches Type of Sample/ Coring Device ______

Length and Diameter of Coring Device ______ Sampling Interval ______ feet

Land-Surface Elev. ______ feet ☐ Surveyed ☐ Estimated Datum ______

Drilling Fluid Used ______ Drilling Method ______

Drilling Contractor ______ Driller ______ Helper ______

Prepared By J. Connor Hammer Weight ______ Hammer Drop ______ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
75	80			As above
80	85			As above (no inclusion)
85	90			As above
90	94			As above
94	100			as above
100	106			As above
106	110			Clay (as above) with dolomite chips, v. lt.
				gray
110	114			As above
114	160			Dolomite, v. lt. gray to olive gray, soft
				argilleceous; dolomite, yellowish gray, soft,
				argilleceous; dk. gray
160	169			As above with minor amounts of chert p. yellow
				brown to dark yel. brown
169	219			Dolomite, hard - med. dark to olive gray
219	235			Pale to dark yellow brown, w/dolomite (above)
235	240			Driller believes sand is lithofied but breaks
				up before comes to surface. SAnd, coarse to fine gr.
				quartz, SS, cgr qtz. grayish orange - chert
				dolomite

GERAGHTY & MILLER, INC.
Environmental Services

SAMPLE/CORE LOG

Boring/Well BR-1 Project/No. ______ Page 3 of ______

Site Location ______ Drilling Started ______ Drilling Completed ______

Total Depth Drilled ______ feet Hole Diameter ______ inches Type of Sample/ Coring Device ______

Length and Diameter of Coring Device ______ Sampling Interval ______ feet

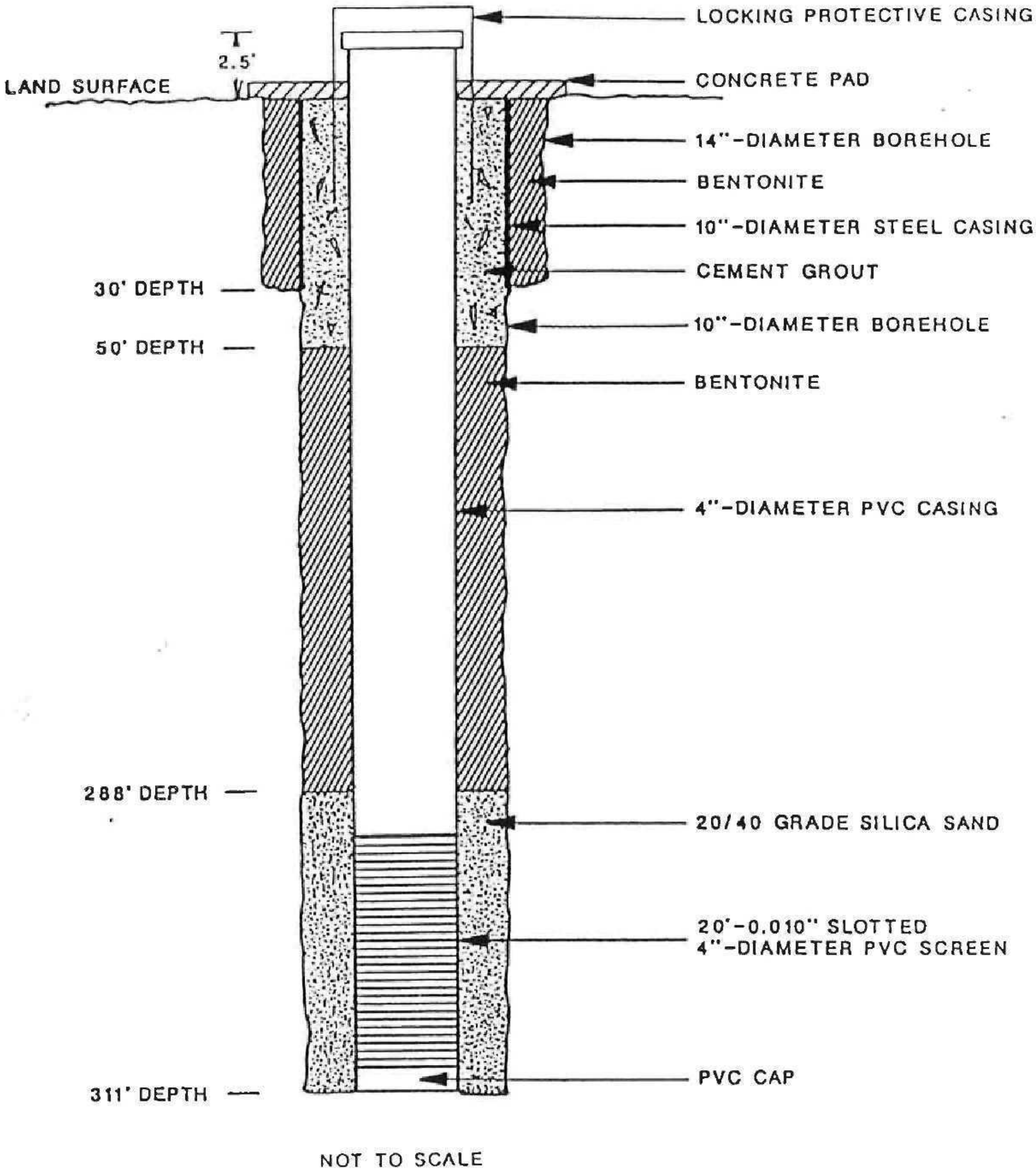
Land-Surface Elev. ______ feet ☐ Surveyed ☐ Estimated Datum ______

Drilling Fluid Used ______ Drilling Method ______

Drilling Contractor ______ Driller ______ Helper ______

Prepared By ______ Hammer Weight ______ Hammer Drop ______ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
240	269			SAnd, c-fg, quartz, white, grayish orange,
				pale yellow brown grains
269	319			sand, as above; sandstone, ortho quartzite grayish
				orange to pale pink; quartz, white to pale pink



Construction Diagram of
Monitor Well BR-1.

CLIENT NAME:

Monsanto Chemical Company

GERAGHTY & MILLER, INC.
Environmental Services

SAMPLE/CORE LOG

Boring/Well BR-2 Project/No. ______ Page ____ of ____

Site Location ______ Drilling Started ______ Drilling Completed ______

Total Depth Drilled ______ feet Hole Diameter ______ inches Type of Sample/Coring Device ______

Length and Diameter of Coring Device ______ Sampling Interval ______ feet

Land-Surface Elev. ______ feet ☐ Surveyed ☐ Estimated Datum ______

Drilling Fluid Used ______ Drilling Method ______

Drilling Contractor ______ Driller ______ Helper ______

Prepared By Connors 9/29/87 Hammer Weight ______ Hammer Drop ______ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	5			Clay, sandy, dry med brown with small (1" across) to large (3' across)
				sandstone boulders
5	10			as above
10	14			as above
14	21			clay, as above;smaller ss & cherty - easier
				drilling
21	25			clay, brownish gray, dry; shale or mudstone
				chips, brownish grey
25	38			As above
38	85			Shale, grayish purple clay? as above
85	105			Shale as above; clay, grayish orange; shale, pale
				olive
105	133			Lt. gray clay, (+ shale)?
133	138			Clay, brown
138	145			?
145	150			Shale, med dark gray, mod. hard; shale, pale olive
				(as above); shale, med redish brown
150	165			shale, med. reddish brown, soft to hard;
				pale olive (as above)
				161-183 making water

GERAGHTY & MILLER, INC.
Environmental Services

SAMPLE/CORE LOG

Boring/Well BR-2 Project/No. ________ Page ____ of ____

Site Location ________ Drilling Started ________ Drilling Completed ________

Total Depth Drilled ____ feet Hole Diameter ____ inches Type of Sample/ Coring Device ________

Length and Diameter of Coring Device ________ Sampling Interval ____ feet

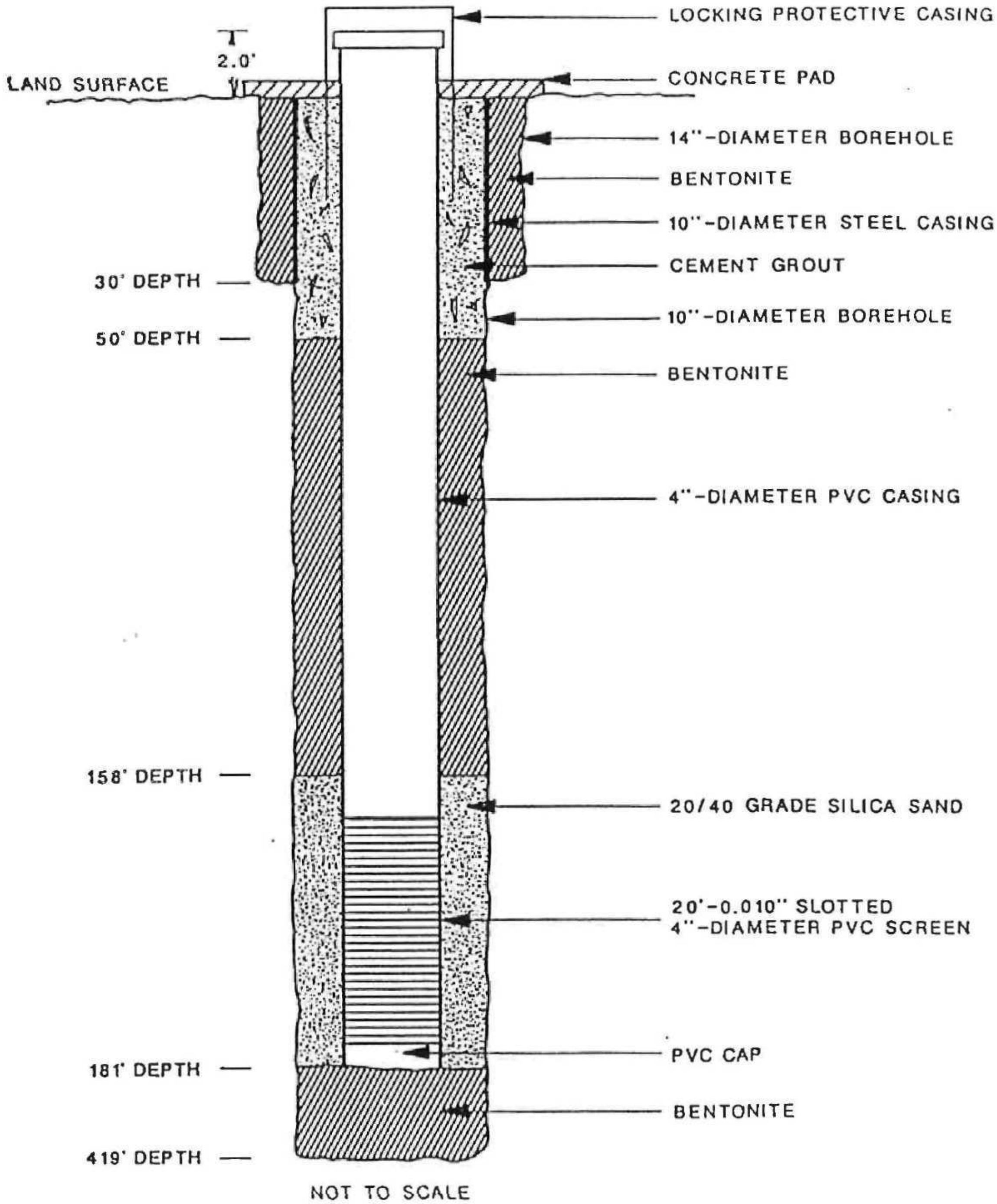
Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ________

Drilling Fluid Used ________ Drilling Method ________

Drilling Contractor ________ Driller ________ Helper ________

Prepared By ________ Hammer Weight ____ Hammer Drop ____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
165	169.5			shale, pale olive; med reddish brown; and med.
				dk. gray/ as above.
169.5	183			As above; lost circ - believe to be as fractured
				zone above
183	265			Dolomatic LS; cuttings still have shale, as
				above. possibly from higher up. LS is pinkish
				gray to v. Lt. gray, hard.
265	370			Dolomatic L.S. med dk. gray, hard; dol. LS.
				pinkish gray to v. lt. gray hard; shale med.
				reddish brown (as above.)
370	420			As above, except 50/50 dark and lt. dolomitic
				LS.



Construction Diagram of Monitor Well BR-2.

CLIENT NAME:

Monsanto Chemical Company

GERAGHTY & MILLER, INC.
Environmental Services

SAMPLE/CORE LOG

Boring/Well BR-3 (Project/No. ____ Page ____ of ____

Site Location ____ Drilling Started ____ Drilling Completed ____

Total Depth Drilled ____ feet Hole Diameter ____ inches Type of Sample/Coring Device ____

Length and Diameter of Coring Device ____ Sampling Interval ____ feet

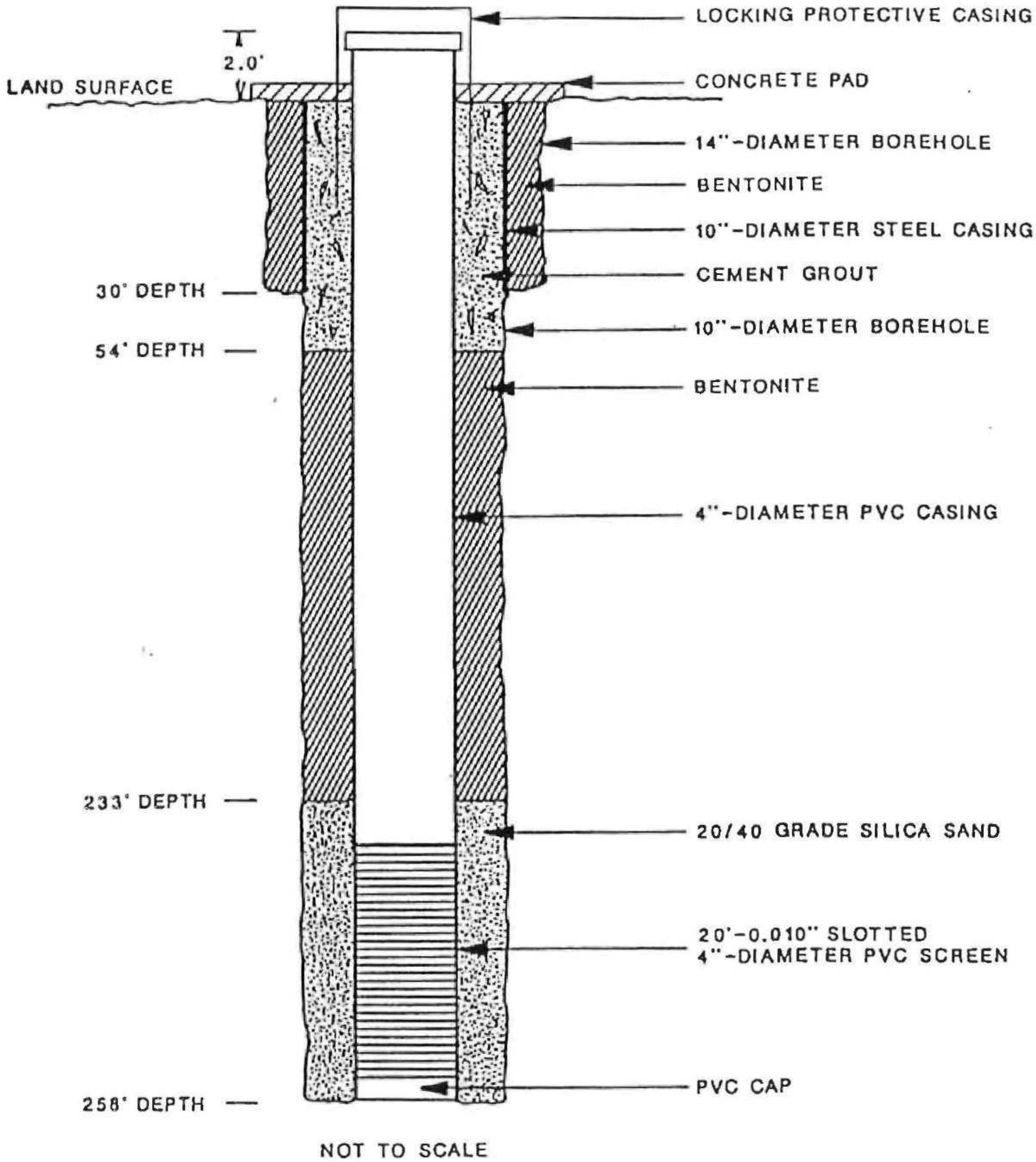
Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used ____ Drilling Method ____

Drilling Contractor ____ Driller ____ Helper ____

Prepared By Connors Hammer Weight ____ Hammer Drop ____ inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	12			Clay, dry, pinkish red; SS rocks (pinkish
				gray to gray); routed in upper 1'.
12	70			as above, except no roots or rocks.
70	97			Clay, lt. gray to lt. brown
97	109			Clay (as above)IBw/Dolostone, v. lt gray to
				lt. olive gray & med. dk. gray;
109	120			Dolostone, v. lt. gray to lt. olive gray &
				Med. dark gray; minor amount chert, brown
120	145			Predominantly med. dk. gray dolostone, other
				wise as above.
145	160			Predominantly v. lt. gray to lt. olive gray
				no chert
160	190			95% v. lt. gray to lt. olive gray; 5% dol.
				med. gray
190	210			Dol. med gray to med. dk gray
210	235			90% Dol. v. lt. olive gray; 10% med. gray
235	242			90% dol. v. lt. gray to v. lt. olive gray;
				10% med. gray
242	265			Dol. (as above) IB/w/clay lt. gray with pinkish
				mottling. water between 242 and 265



Construction Diagram of Monitor Well BR-3.

CLIENT NAME:

Monsanto Chemical Company

LITHOLOGIC LOG FOR BORING BR-4

Description	Depth (ft)	Thickness (ft)
Clay, dry, reddish-brown; sandstone boulders, quartz, coarse- to medium-grained, pale orange	0.0 - 16.0	16.0
Clay, dry, reddish-brown	16.0 - 25.0	9.0
Clay, sandy, wet, reddish-brown	25.0 - 101.0	76.0
Clay, reddish-brown; dolomitic limestone, hard, light gray	101.0 - 119.0	18.0
Dolomitic limestone, vuggy, pinkish-gray to light gray	119.0 - 140.0	21.0
Dolomitic limestone, hard, vuggy, light gray to dark gray	140.0 - 142.0	2.0
Dolomitic limestone, hard, light gray to dark gray; shale, reddish-brown	142.0 - 160.0	18.0
Dolomitic limestone, hard, light gray to dark gray; dolomitic limestone, pale orangish-gray	160.0 - 215.0	55.0
Dolomitic limestone, hard, dark gray to light olive-gray; dolomitic limestone, pale orange	215.0 - 240.0	25.0
Dolomitic limestone, hard, dark gray to light olive-gray	240.0 - 267.0	27.0

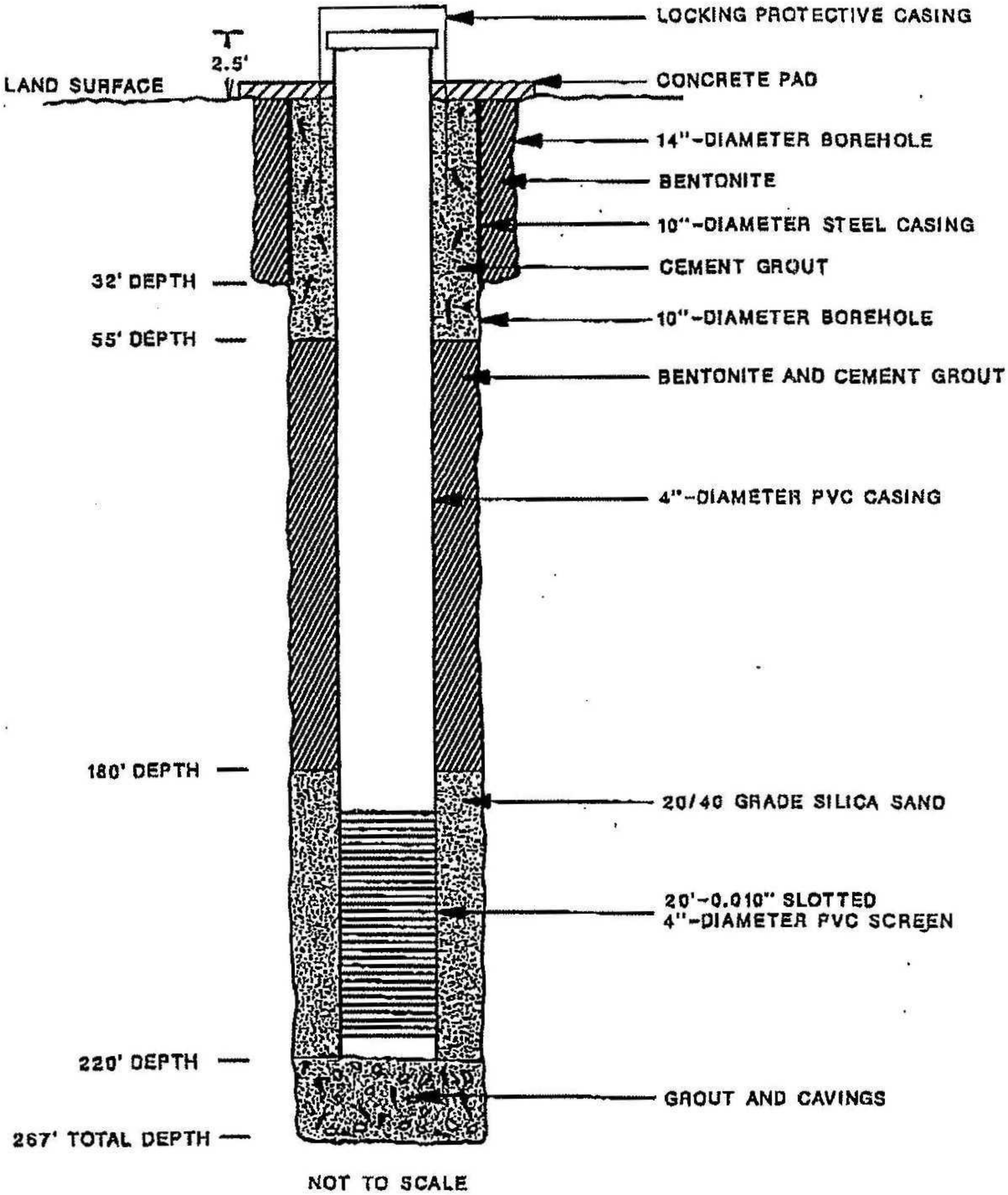


Figure B-1.

Construction Details of Bedrock Monitor Well BR-4.

CLIENT NAME:

Monsanto Chemical Company

LITHOLOGIC LOG FOR BORING BR-5

Description	Depth (ft)	Thickness (ft)
Clay, dry, dark reddish-brown; gravel, gray (upper 6")............................	0.0 - 70.0	70.0
Dolomitic limestone, soft, pinkish-gray; dolomitic limestone, hard, very light gray	70.0 - 95.0	25.0
Dolomitic limestone, pale olive-gray to pinkish-gray; mudstone, yellowish-brown...	95.0 - 110.0	15.0
Dolomitic limestone, pale olive-gray to dark gray.................................	110.0 - 135.0	25.0
Dolomitic limestone, dark gray to light pinkish-gray..............................	135.0 - 140.0	5.0
Dolomitic limestone, very dark gray.......	140.0 - 155.0	15.0
Dolomitic limestone, vuggy, very dark gray to light pinkish-gray....................	155.0 - 175.0	20.0
Dolomitic limestone, gray to light pinkish-gray..............................	175.0 - 180.0	5.0
Dolomitic limestone, gray to dark gray....	180.0 - 200.0	20.0

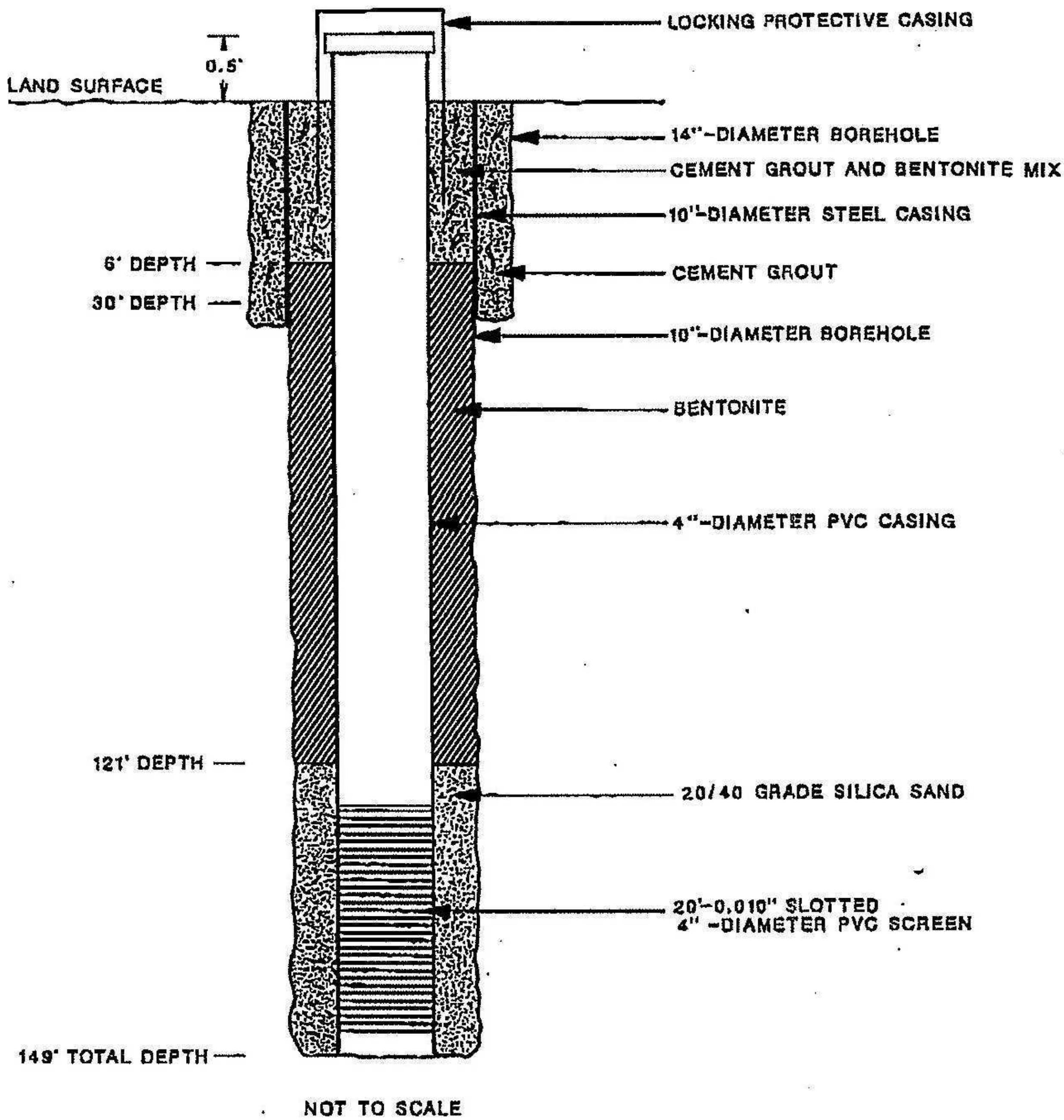


Figure B-2.

Construction Details of Becrock Well BR-5.

CLIENT NAME:

Monsanto Chemical Company

Lithologic Log of Interceptor Well I-1.

Description	Depth (ft)	Thickness (ft)
Clay, sandy, silty, orange; pebble to boulder sandstone and quartzite.	0 - 13	13
Clay, damp, silty, stiff, purple and white.	13 - 26	13

Lithologic Log of Interceptor Well I-2.

Description	Depth (ft)	Thickness (ft)
Clay, sandy, silty, orange; pebble to boulder sandstone and quartzite.	0 - 11	11
Clay, silty, soft, wet, purple and white.	11 - 20	9
Clay, silty, stiff, damp, purple and white.	20 - 27	7

Lithologic Log of Interceptor Well I-3.

Description	Depth (ft)	Thickness (ft)
Clay, sandy, silty, orange; pebble to boulder sandstone and quartzite.	0 - 11	11
Clay, silty, soft, wet, orange, white and purple.	11 - 23	12
Clay, slightly silty, stiff, damp, purple and white.	23 - 25	2

Lithologic Log of Interceptor Well I-4.

Note: Cuttings were too wet; not able to log.

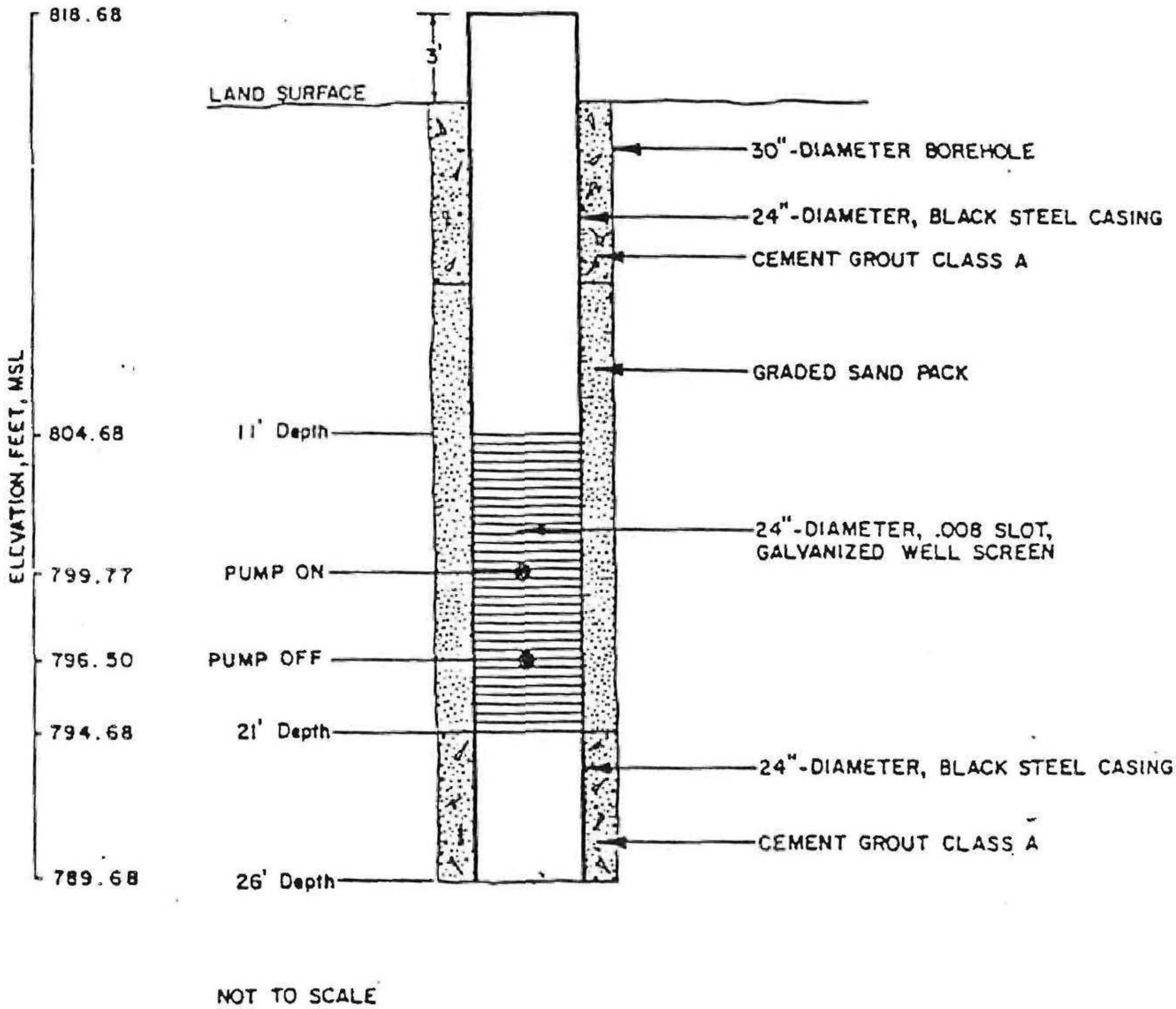
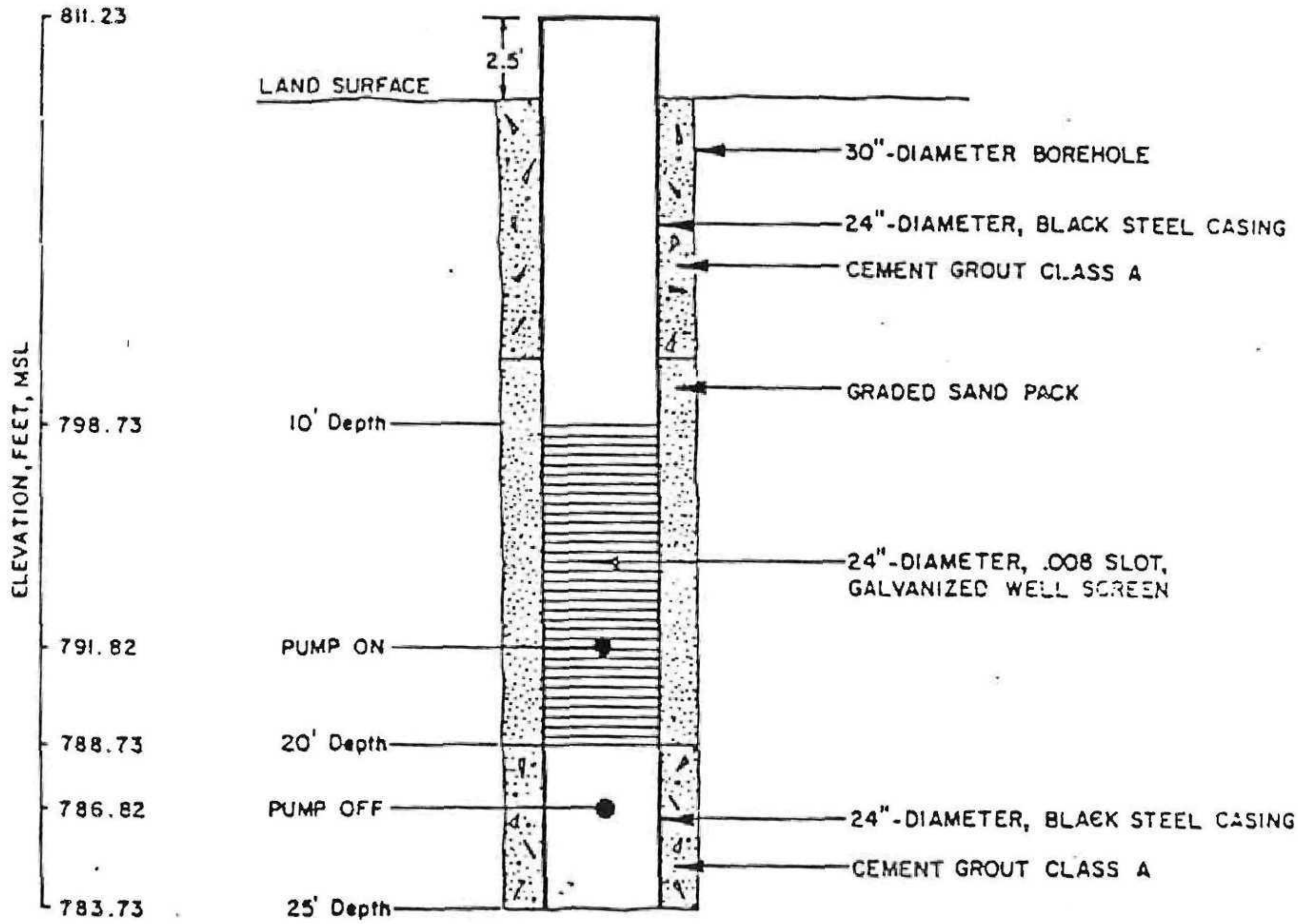


Figure 14 Schematic Diagrams Showing the Construction Details and Pump Settings for Recovery Well I-1.



NOT TO SCALE

Figure 15 Schematic Diagram Showing the Construction Details and Pump Settings for Recovery Well I-2

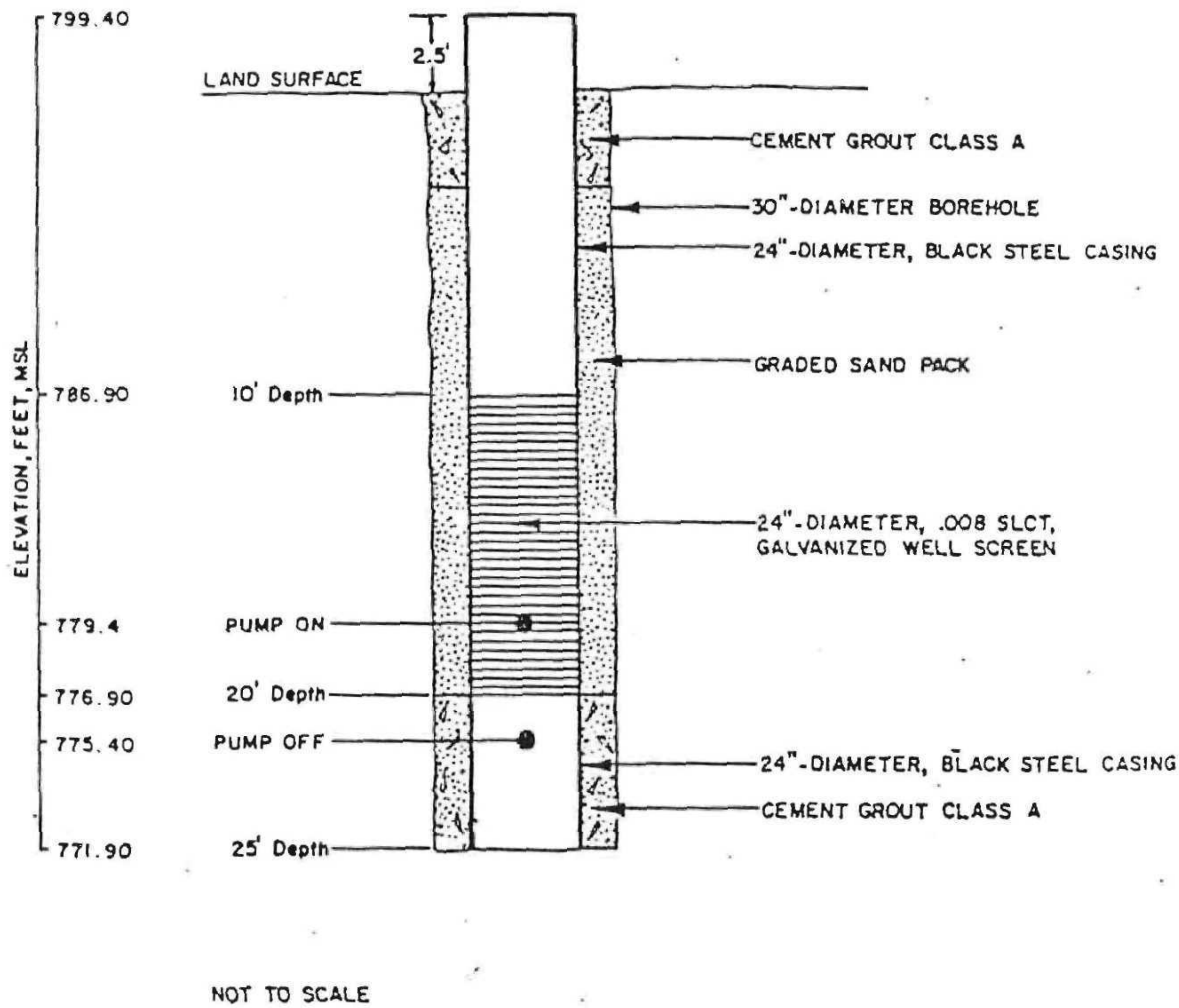


Figure 16 Schematic Diagram Showing the Construction Details and Pump Settings for Recovery Well I-3.

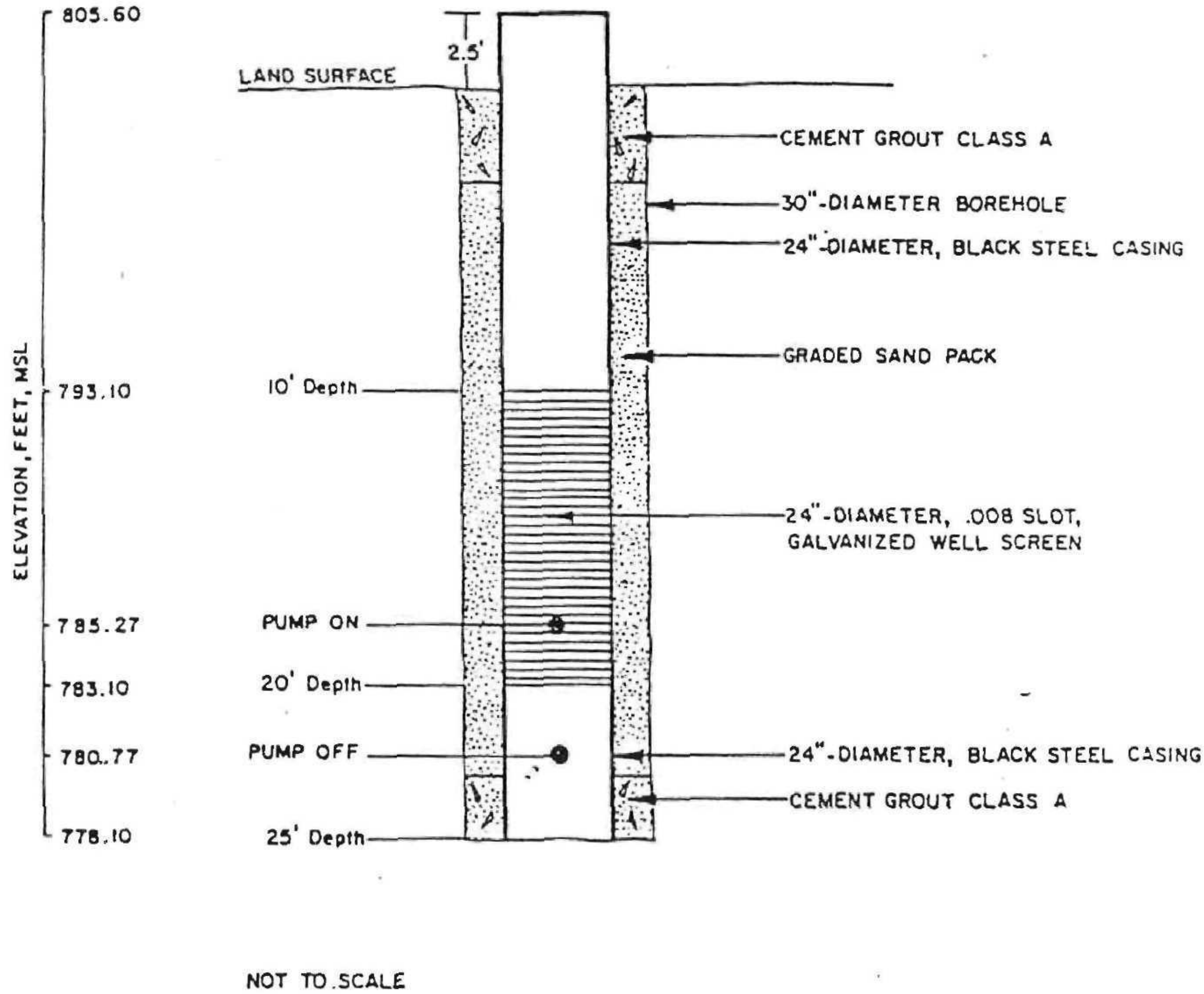


Figure 17 Schematic Diagram Showing the Construction Details and Pump Settings for Recovery Well I-4.

Lithologic Log of Interceptor Well I-5.

Description	Depth (ft)	Thickness (ft)
Clay, silty, red, purple and white.	0 - 10	10
Silt, slightly sandy, loose, dry, yellow.	10 - 38	28
Clay, silty, damp, red, purple, white, and orange.	38 - 68	30

Note: Water appears to be at approximately 43 ft.

Lithologic Log of Interceptor Well I-6.

Clay, silty, red, white, and purple.	0 - 10	10
Clay, silty, damp, red, white, and purple.	10 - 35	25
Possibly a sandy silt layer, very wet.	35 - 37	2
Clay, silty, red, white, and orange.	37 - 68	31

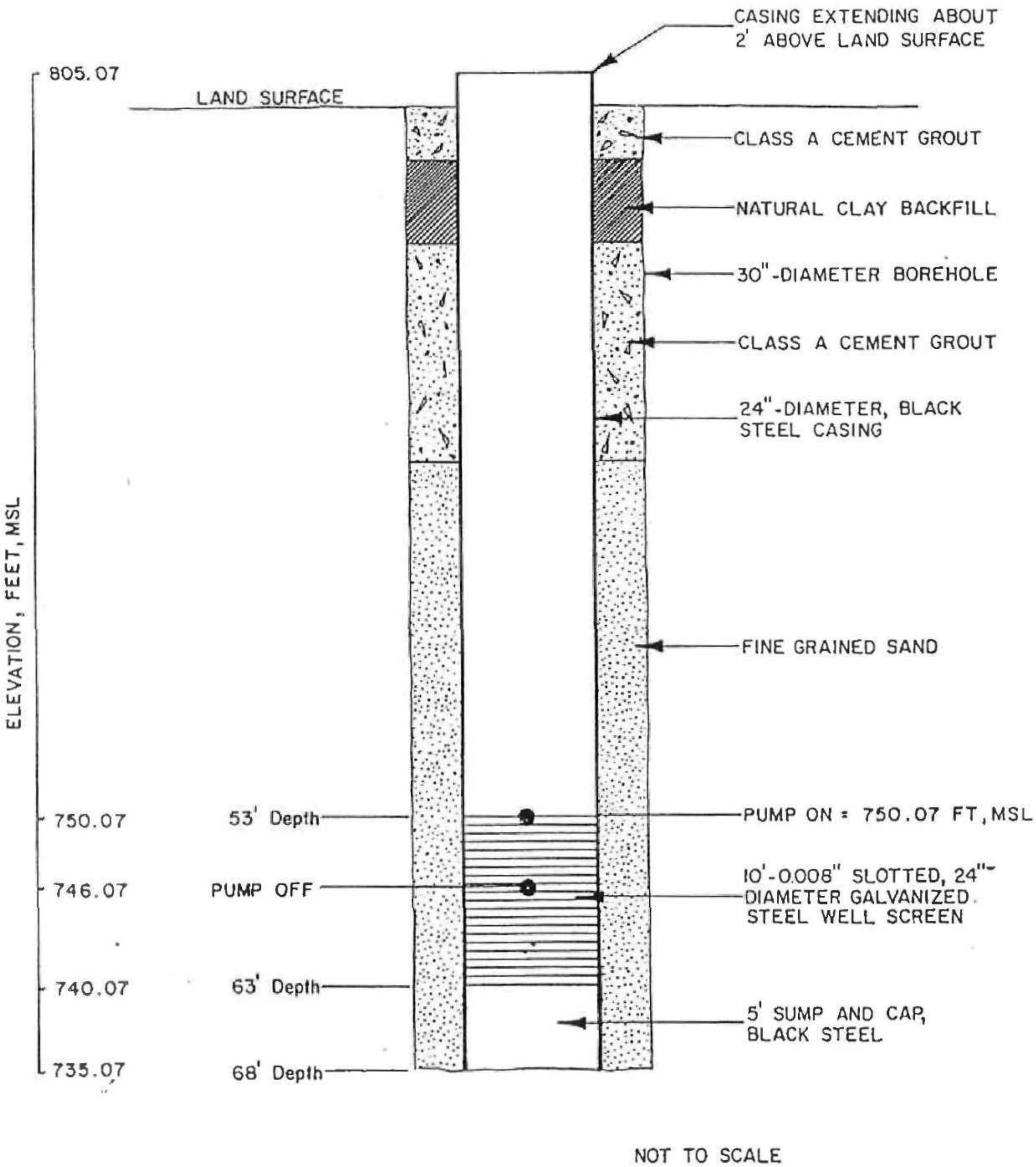


Figure B-1. Schematic diagram showing the construction details and pump settings for recovery well I-5.

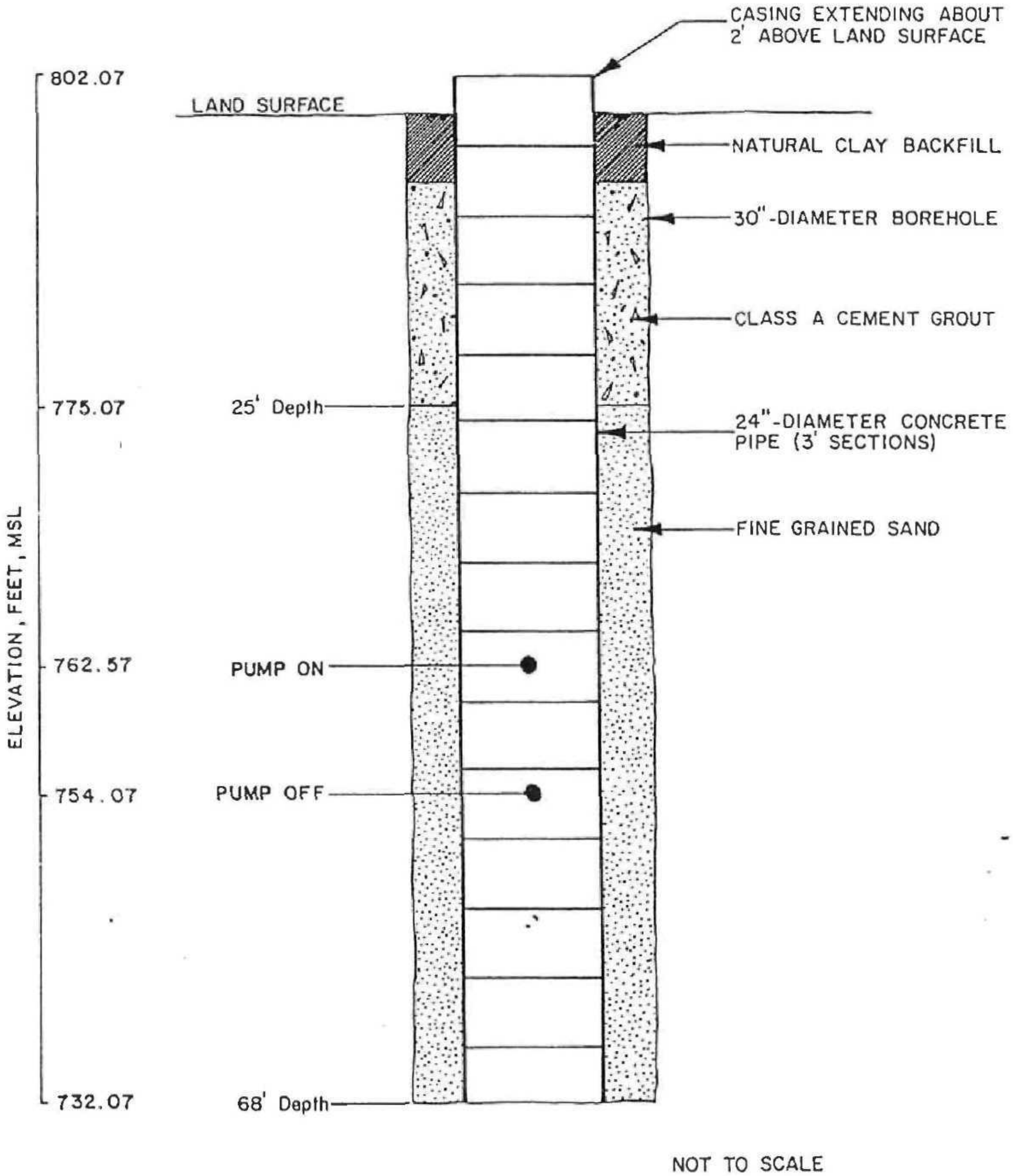


Figure B-2. Schematic diagram showing the construction details and pump settings for recovery well I-6.

LITHOLOGIC LOG FOR INTERCEPTOR WELL IW-7

Description	Depth (ft)	Thickness (ft)
Sand, quartz, fine-grained, silty, brown..	0.0 - 1.5	1.5
Clay, sandy, mottled yellowish-brown and reddish-brown; sandstone boulders, quartz, coarse- to fine-grained, yellowish-brown to gray..................................	1.5 - 6.0	4.5
Clay, mottled yellowish-brown and reddish-brown..................................	6.0 - 15.0	9.0
Clay, mottled yellowish brown and gray....	15.0 - 18.0	3.0
Clay, mottled yellowish-brown, grayish-brown, and purple.........................	18.0 - 24.0	6.0
Clay, mottled, purple and reddish-brown; clay, mottled yellowish-brown and gray....	24.0 - 32.0	8.0
Clay, mottled purple, reddish-brown, gray, and yellowish-brown......................	32.0 - 40.0	8.0

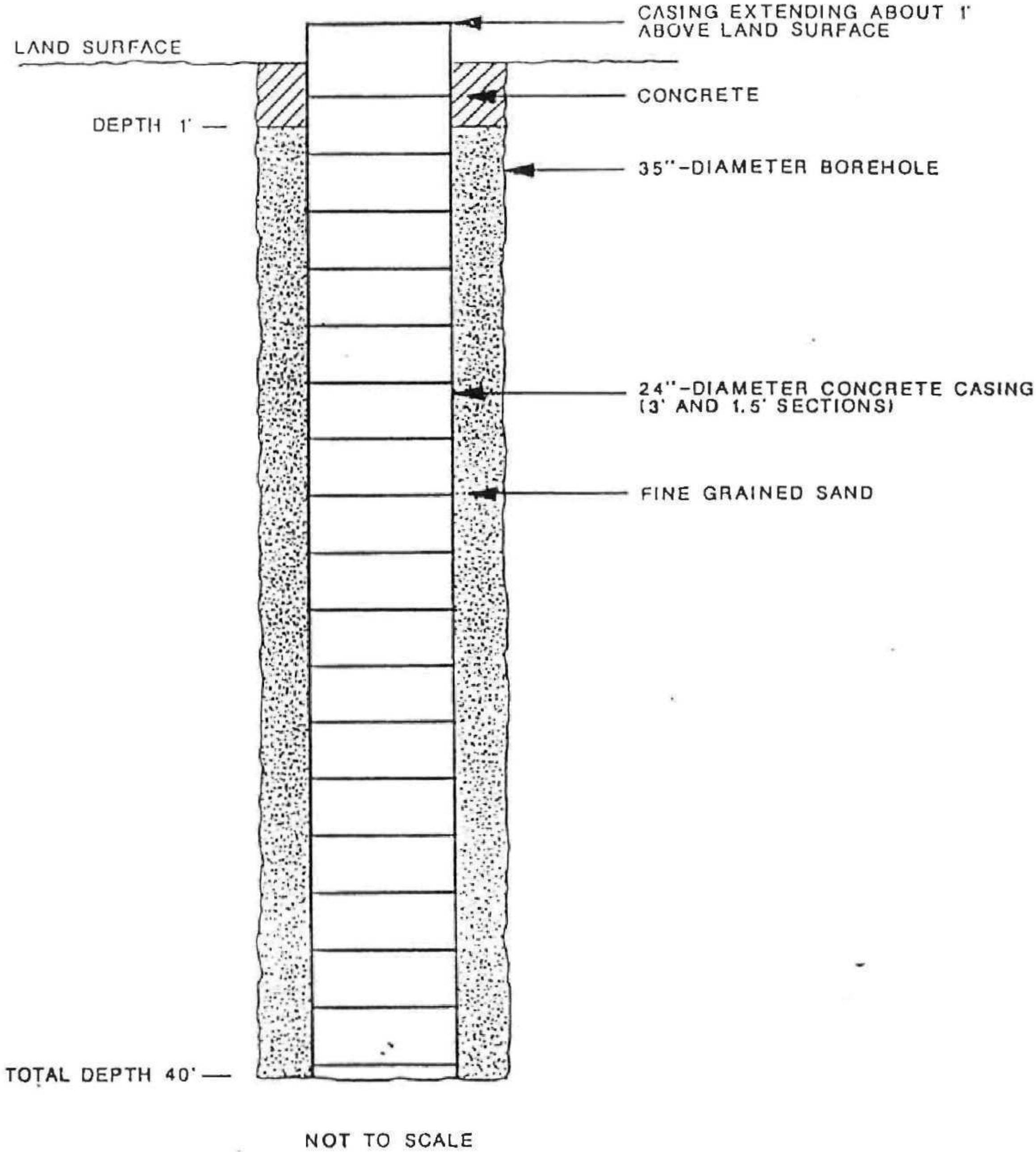


Figure B-1.

Construction Diagram of Interceptor Well No. IW-7.

CLIENT NAME:

Monsanto Chemical Company
Anniston, Alabama

LITHOLOGIC LOG FOR INTERCEPTOR WELL IW-8

Description	Depth (ft)	Thickness (ft)
Sand, quartz, silty, rooted, brown; sandstone boulders, quartz, coarse- to fine-grained, gray to yellowish-brown..........	0.0 - 2.0	2.0
Sand, quartz, medium- to fine-grained, brown; clay, reddish-brown; sandstone boulders, quartz, coarse- to fine-grained, gray to yellowish-brown..................	2.0 - 7.0	5.0
Clay, sandy, mottled brown and yellowish-brown; sandstone boulders (as above)......	7.0 - 10.0	3.0
Clay, mottled reddish-brown and yellowish-brown....................................	10.0 - 20.0	10.0
Clay, mottled reddish-brown, yellowish-brown, brown, and purple..................	20.0 - 36.0	16.0
lay, light yellowish-brown...............	36.0 - 39.5	3.5

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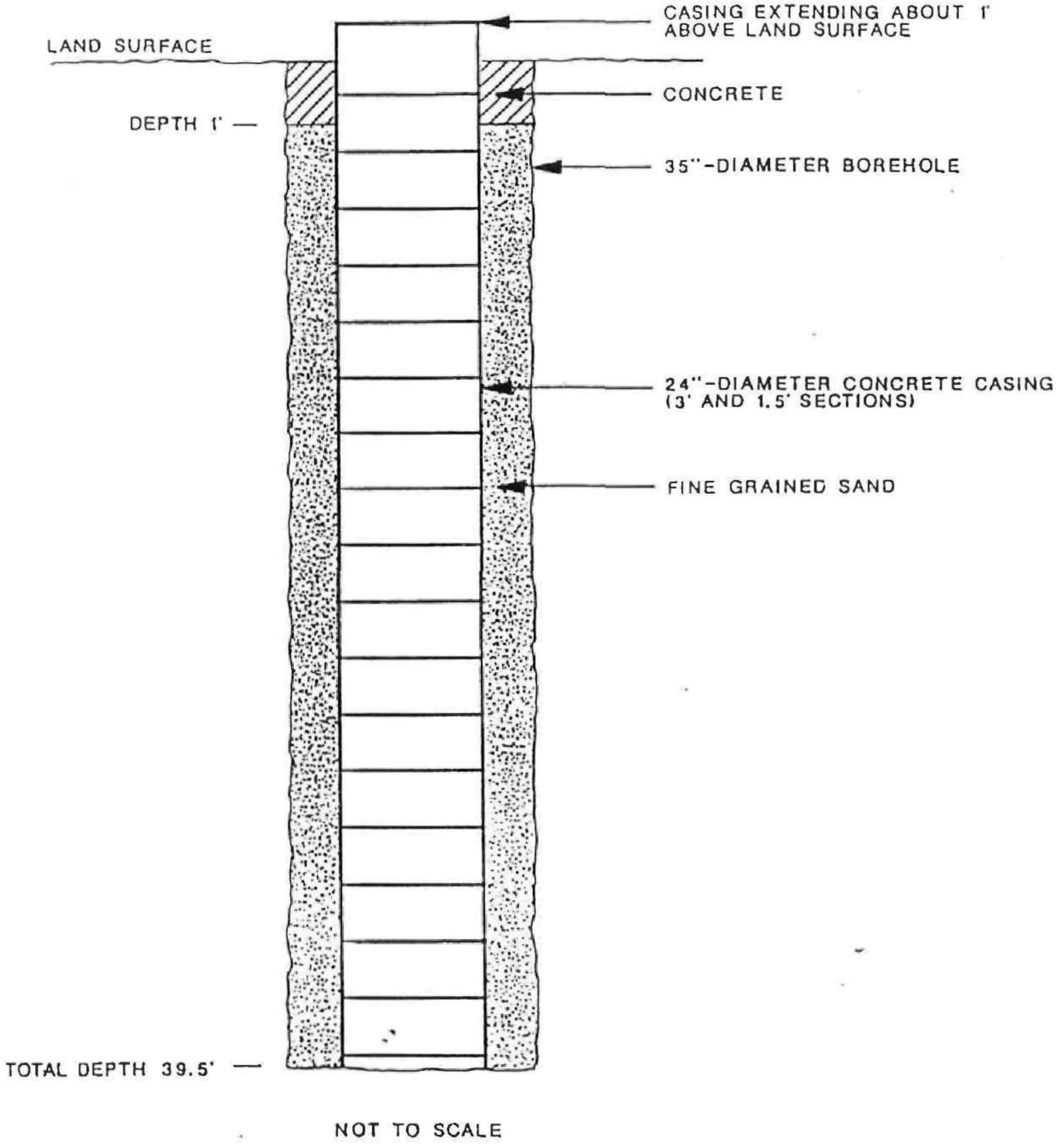


Figure B-2.

Construction Diagram of Interceptor Well No. IW-8.

CLIENT NAME:

Monsanto Chemical Company
Anniston, Alabama

LITHOLOGIC LOG FOR INTERCEPTOR WELL IW-9

Description	Depth (ft)	Thickness (ft)
Sand, quartz, medium- to fine-grained, silty, rooted near surface, brown.........	0.0 - 2.0	2.0
Sand, quartz, medium- to fine-grained, silty, light grayish brown................	3.0 - 4.0	1.0
Clay, sandy, reddish-brown................	4.0 - 19.0	15.0
Clay, mottled light yellowish-brown and gray.................................	19.0 - 30.0	11.0
Clay, mottled light yellowish-brown, gray, and pink................................	30.0 - 36.0	6.0
Clay, mottled light yellowish-brown, gray, and brown................................	36.0 - 41.0	5.0
Clay, mottled white, very light gray, pink, and yellowish-brown......................	41.0 - 50.0	9.0

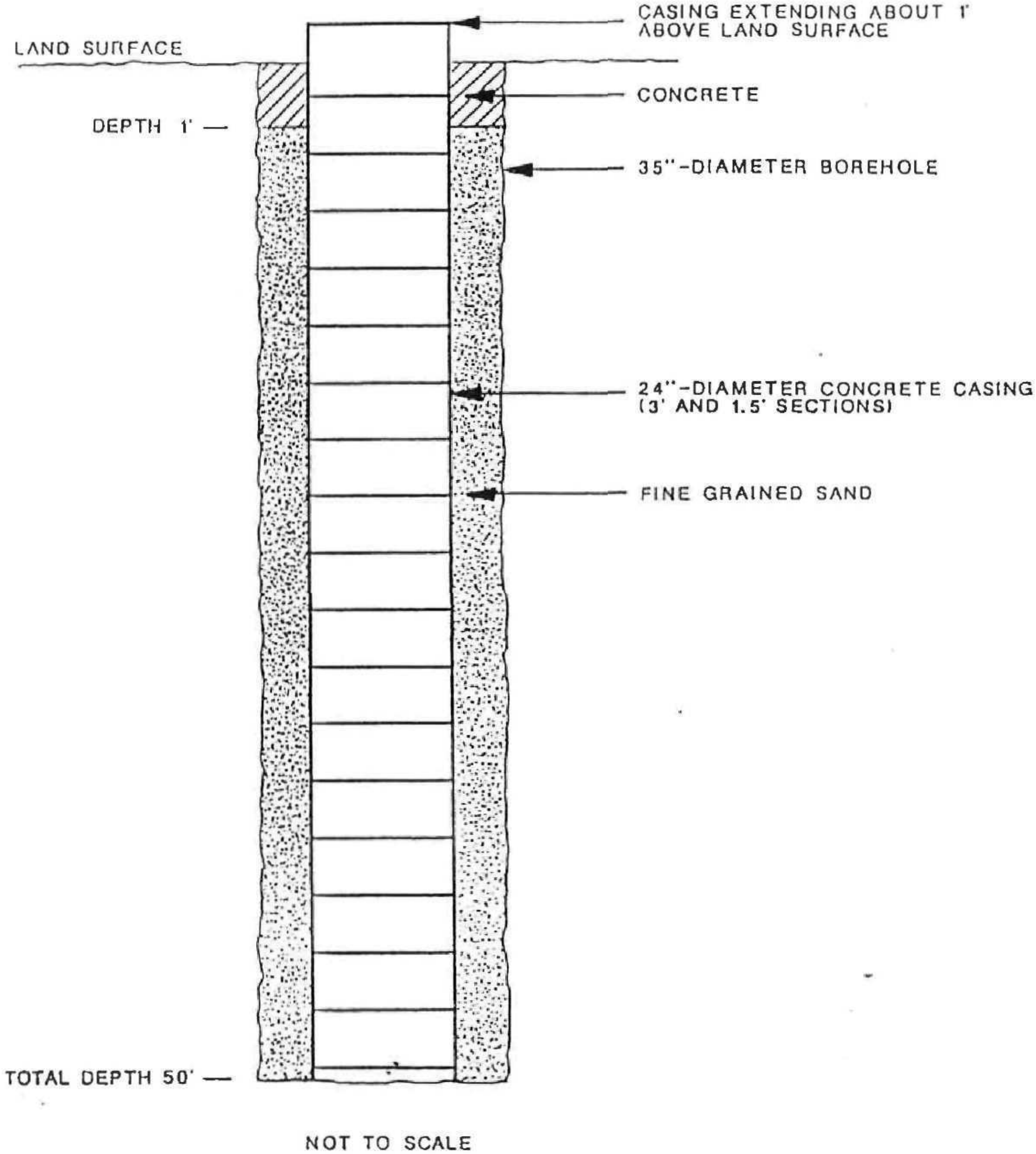


Figure B-3.

Construction Diagram of Interceptor Well No. IW-9.

CLIENT NAME:

Monsanto Chemical Company
Anniston, Alabama

LITHOLOGIC LOG FOR INTERCEPTOR WELL IW-10

Description	Depth (ft)	Thickness (ft)
Sand, quartz, medium- to fine-grained, silty, rooted, brown......................	0.0 - 1.0	1.0
Clay, sandy, dark reddish-brown; sandstone boulders, quartz, coarse- to medium-grained, gray to yellowish-brown..........	1.0 - 10.0	9.0
Clay, mottled dark reddish-brown and purple................................	10.0 - 24.0	14.0
Clay, mottled dark reddish-brown and purple; clay light yellowish-brown and light gray.............................	24.0 - 52.0	28.0
Clay, mottled yellowish-brown and purple..	52.0 - 68.0	16.0

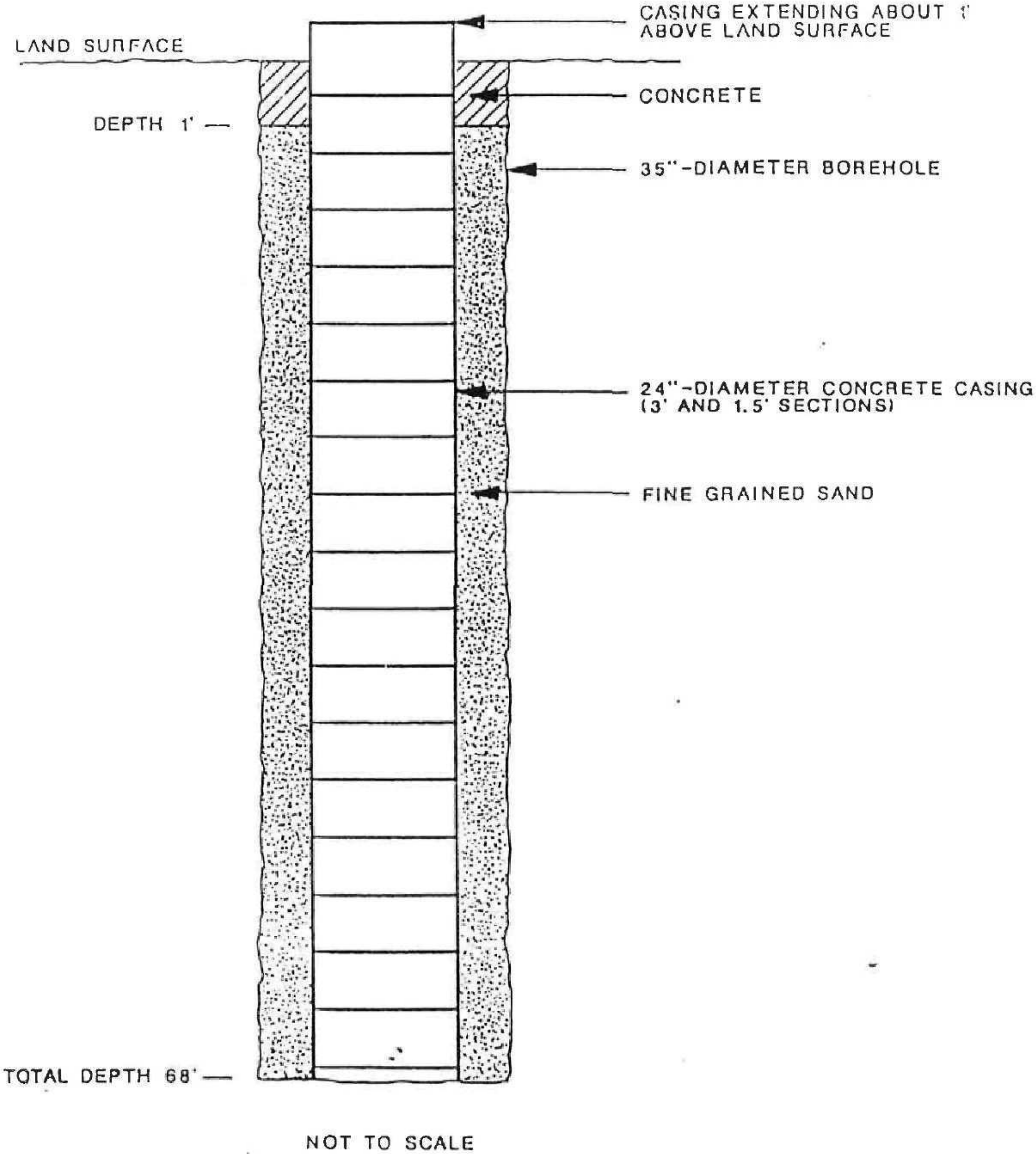


Figure B-4.

Construction Diagram of Interceptor Well No. IW-10.

CLIENT NAME:

Monsanto Chemical Company
Anniston, Alabama

LITHOLOGIC LOG FOR INTERCEPTOR WELL IW-11

Description	Depth (ft)	Thickness (ft)
Clay, rooted, reddish-brown...............	0.0 - 1.0	1.0
Clay, mottled purple, yellowish-brown, and reddish-brown...........................	1.0 - 48.0	47.0
Clay, mottled yellowish-brown and light grayish-green...........................	48.0 - 58.0	10.0
Clay, light gray.........................	58.0 - 60.0	2.0
Clay, mottled purple and yellowish-brown..	60.0 - 68.0	8.0

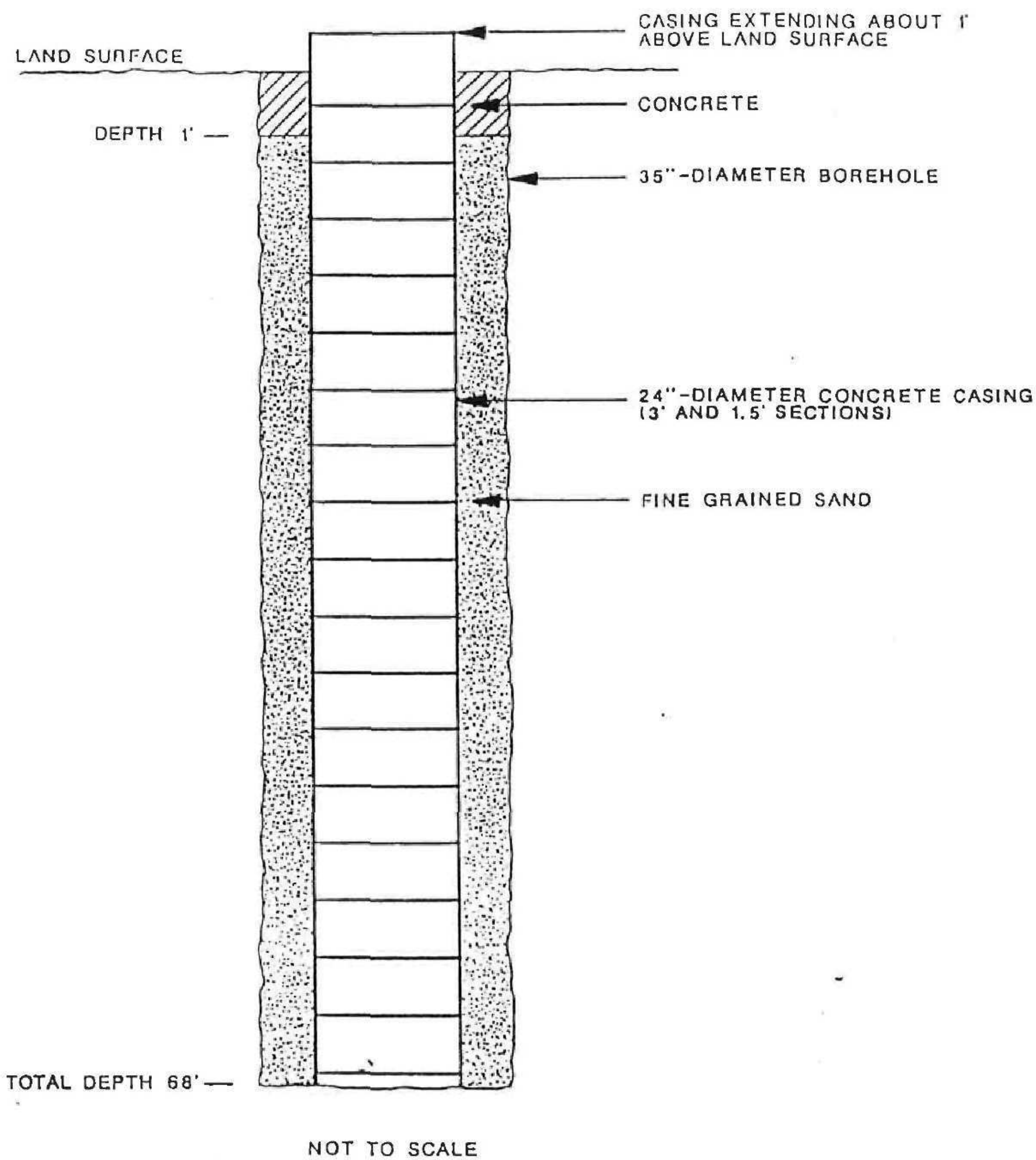


Figure B-5.

Construction Diagram of Interceptor Well No. IW-11.

CLIENT NAME:

Monsanto Chemical Company
Anniston, Alabama

LITHOLOGIC LOG FOR INTERCEPTOR WELL IW-12

Description	Depth (ft)	Thickness (ft)
Sand, quartz, fine-grained, silty, rooted, brown..................................	0.0 - 1.0	1.0
Sand, quartz, fine-grained, silty, organic debris, dark gray........................	1.0 - 2.0	1.0
Clay, sandy, reddish-brown to dark brown..	2.0 - 9.0	7.0
Clay, mottled light yellowish-brown and gray...................................	9.0 - 28.0	19.0
Clay, mottled gray, dark yellowish-brown and pinkish-gray.........................	28.0 - 51.0	23.0

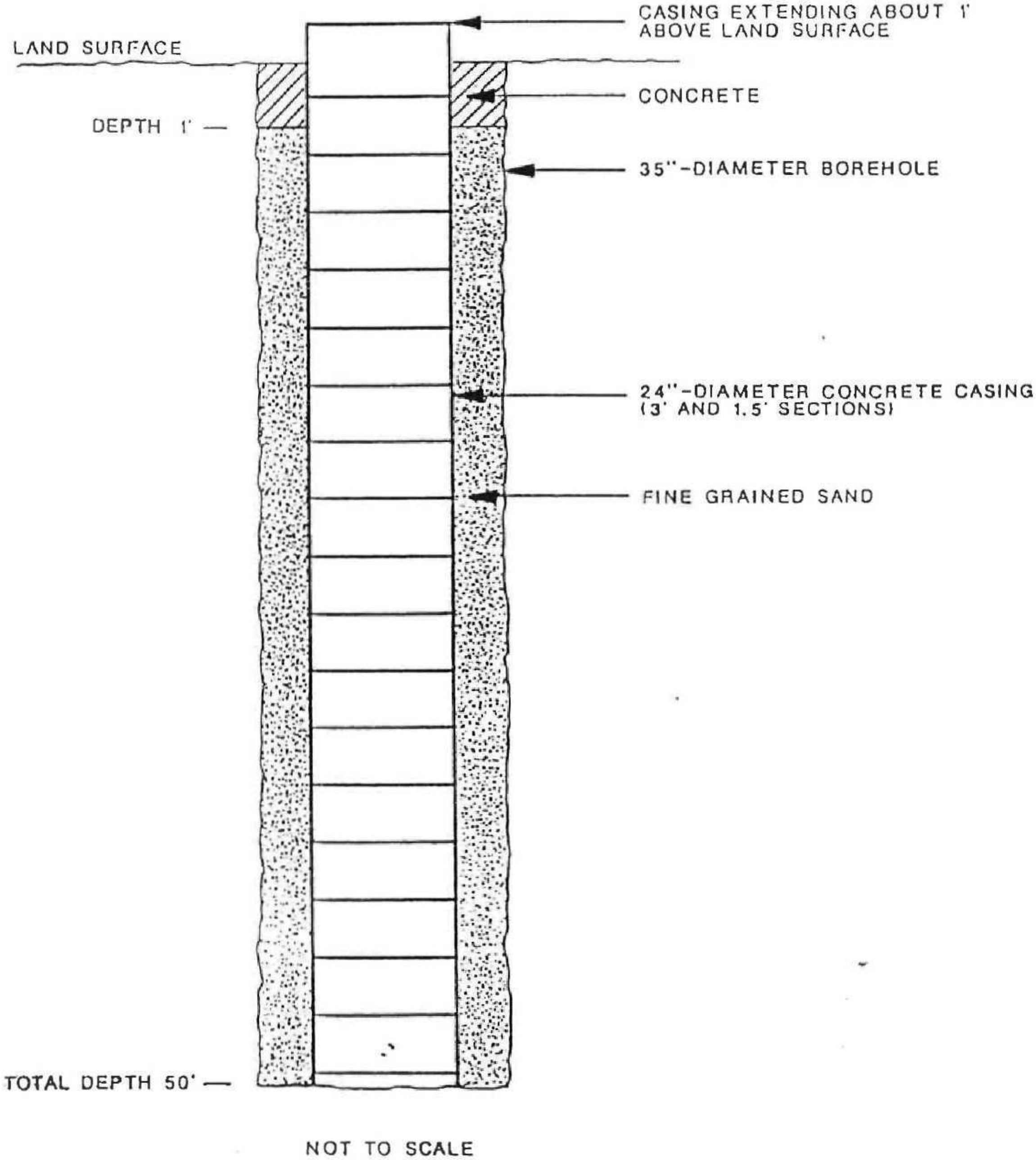


Figure B-6.

Construction Diagram of
Interceptor Well No. IW-12.

CLIENT NAME:

Monsanto Chemical Company
Anniston, Alabama

LITHOLOGIC LOG FOR INTERCEPTOR WELL IW-13

Description	Depth (ft)	Thickness (ft)
Sand, quartz, fine-grained, silty, rooted, dark brown to dark gray..................	0.0 - 1.0	1.0
Sand, quartz, fine- to very fine-grained, silty, light brown........................	1.0 - 18.0	17.0
Clay, sandy, damp, mottled light gray to yellowish-brown...........................	18.0 - 45.0	27.0
Clay, as above; clay, dense reddish-brown.	45.0 - 50.0	5.0

549/14

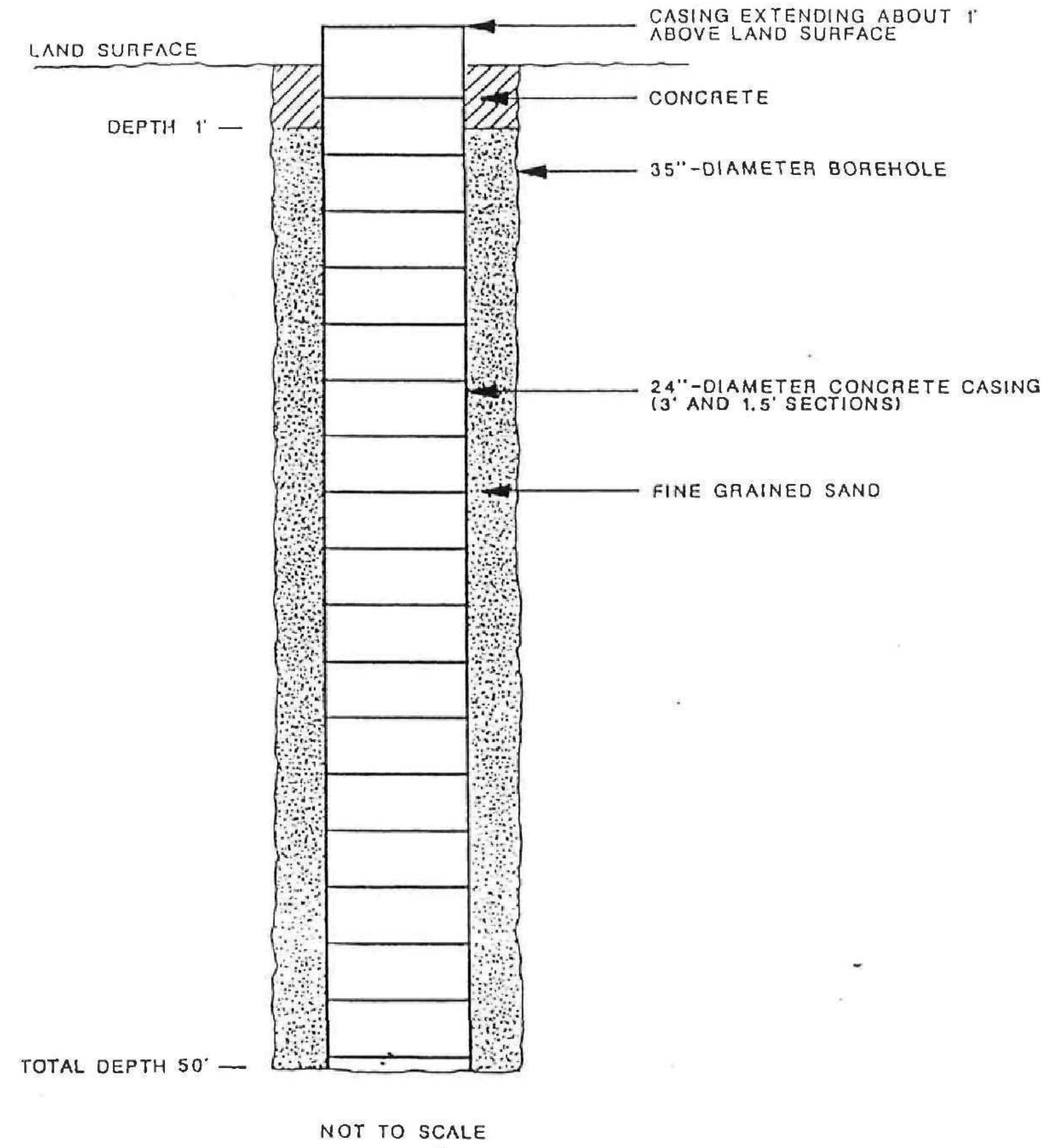


Figure B-7.

Construction Diagram of Interceptor Well No. IW-13.

CLIENT NAME:

Monsanto Chemical Company
Anniston, Alabama

LITHOLOGIC LOG FOR INTERCEPTOR WELL IW-14

Description	Depth (ft)	Thickness (ft)
Sand, quartz, fine-grained, silty, rooted, brown....................................	0.0 - 2.0	2.0
Sand, quartz, clayey, brown...............	2.0 - 9.0	7.0
Clay, dry, purple.........................	9.0 - 24.0	15.0
Clay, dry, mottled purple and yellowish-brown....................................	24.0 - 46.0	22.0

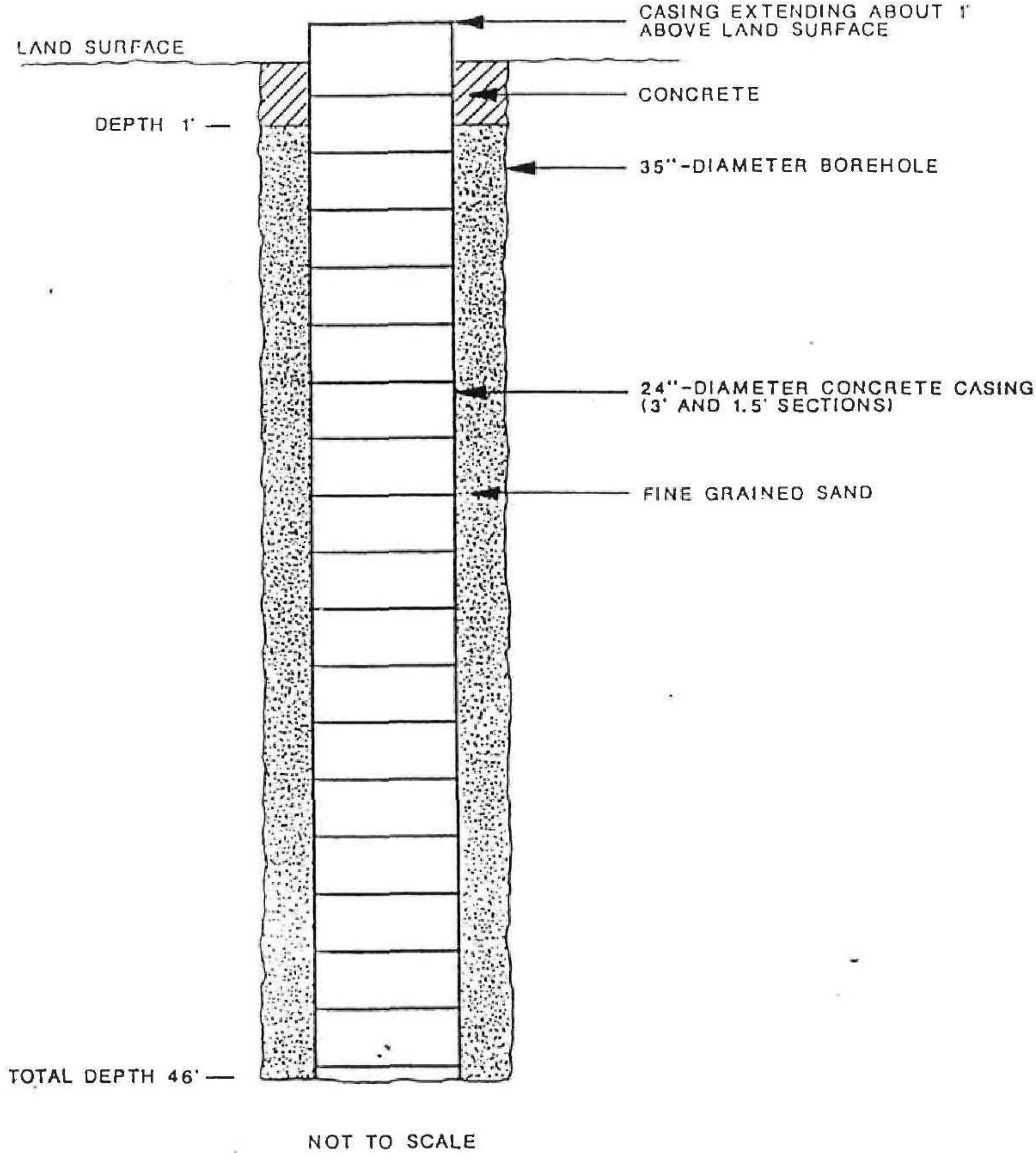


Figure B-8.

Construction Diagram of Interceptor Well No. IW-14.

CLIENT NAME:

Monsanto Chemical Company
Anniston, Alabama

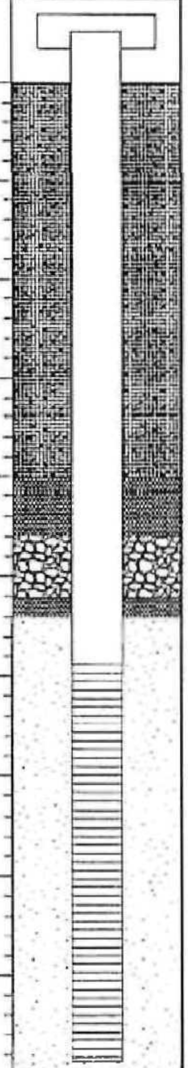
Golder Associates

Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, Georgia 30341
Telephone: 770-496-1893
Fax: 770-934-9476

Client: Solutia Inc		Job No.: 943-3680.RFI	Boring/Well: IW-14A
Project: Solutia/Supplemental RFI/CS/AL		Well Construction Data	(ft bgs)
Date Started: 2/5/03	Date Completed: 2/5/03	Screen: 0.006 inch slotted	From: 29.4 - To: 49.4
Logged By: KMT	Checked By: KH	Pack: 20/40 silica sand	From: 27 - To: 50
Drilling Co.: TDS	Driller: D. Campbell	Seal: pellets/pure gold bent. gr	From: 20 - To: 27
Method: 6.25" ID HSA	Equipment: CME-55-ATV	Grout: Portland Type II	From: 2 - To: 20
Boring Depth: 50.0	Ground Surface Elevation: 748.0	Inner Casing: 4 inch diameter S40 PVC	
GW Level: 27.0	Time/Date: 2/6/03	Outer Casing/Stick Up: N/A	

Depth (ft bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	PD (ppm)	Description	Elevation (ft msl)
0							Very stiff to stiff, moist to damp, red brown to red orange brown SILTY CLAY, some to little fine to coarse sand, trace to some fine to coarse Gravel (chert and quartz) (FILL)	748.00
5	1	DO	10-11-17	28	1.3/1.5	0		743
10	2	DO	9-6-6	12	1.5/1.5	0		738
15	3	DO	4-10-12	22	0.0/1.5	0	Loose to compact, dry to damp, red brown fine to coarse SAND, and CLAYEY SILT (FILL)	733
20	4	DO	6-10-13	23	0.4/1.5	0		728
25	5	DO	4-6-9	15	1.5/1.5	0	Very stiff to firm, moist, brown to yellowish orange brown SILTY CLAY, trace to little fine to coarse Sand, trace fine Gravel (black opaques and quartz) (RESIDUUM)	723
30	6	DO	4-6-6	12	1.0/1.5	0		718
35	7	DO	4-5-7	12	1.5/1.5	0	Very stiff to firm, moist to wet, finely mottled pink red brown, yellow brown, purple, white and black SILTY CLAY, little to some fine to coarse Sand (lenses), little fine Gravel (sandstone/lithified medium sand), trace black stains (RESIDUUM)	713
40	8	DO	4-6-8	14	1.5/1.5	0		708
45	9	DO	3-5-6	11	1.5/1.5	0		703
50	10	DO	3-2-3	5	1.5/1.5	0		698

Well Construction



LITHOLOGIC LOG FOR INTERCEPTOR WELL IW-15

Description	Depth (ft)	Thickness (ft)
Sand, quartz, very fine-grained, silty, brown; sandstone boulders, quartz, coarse- to medium-grained, gray....................	0.0 - 1.0	1.0
Sand, quartz, coarse- to fine-grained, silty, yellowish-brown....................	1.0 - 1.5	0.5
Sand, quartz, silty, brown; sandstone boulders (as above)......................	1.5 - 4.5	3.0
Sand, quartz, very fine-grained, clayey, mottled brown to brownish-yellow; sandstone boulders (as above)............	4.5 - 10.0	5.5
Clay, slightly damp, mottled yellowish-brown to gray............................	10.0 - 20.0	10.0
Clay, slightly damp, mottled purplish-brown and yellowish-brown.................	20.0 - 30.0	10.0
.ay, damp, mottled yellowish-brown to gray....................................	30.0 - 48.0	18.0

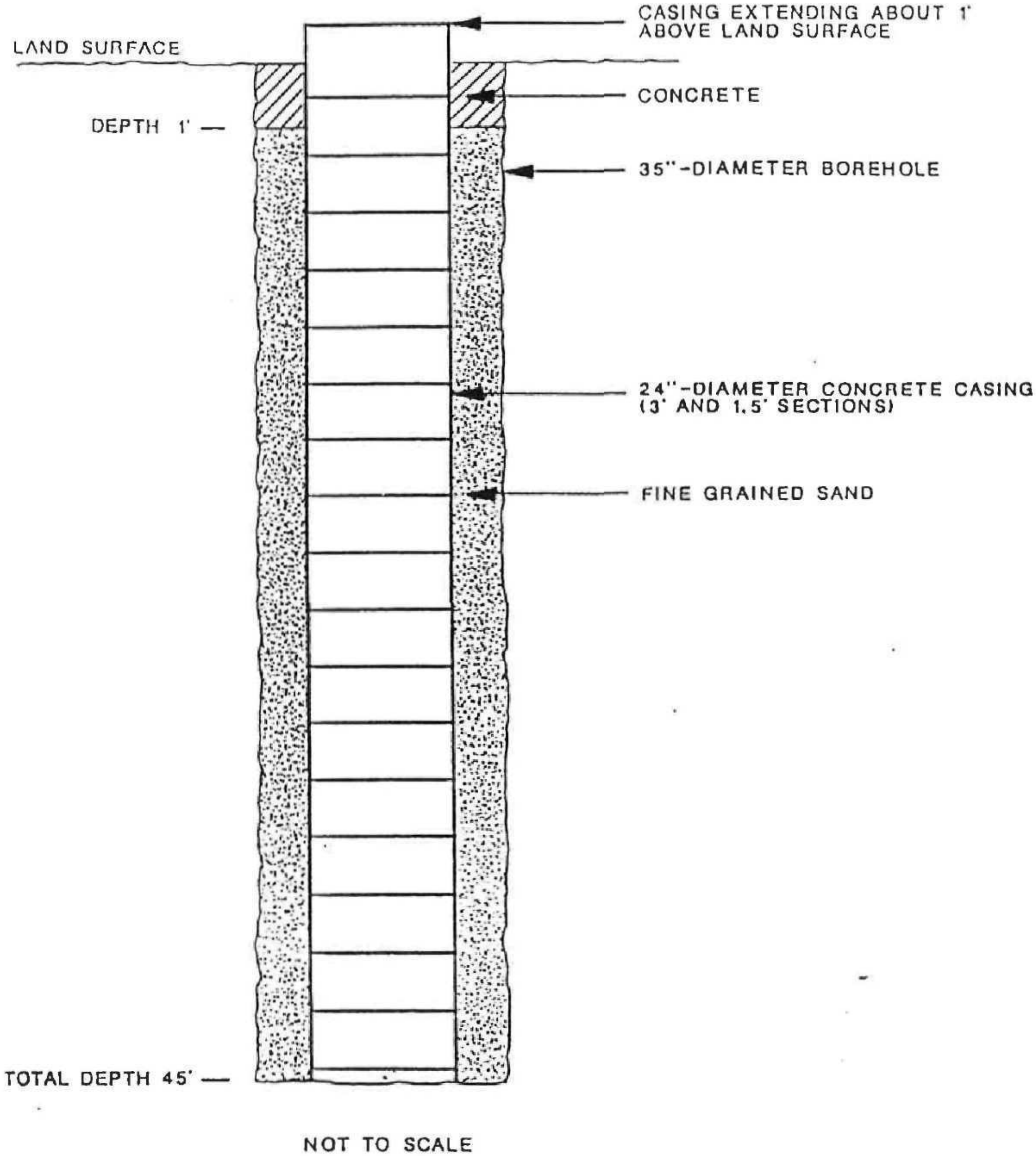


Figure B-9.

Construction Diagram of Interceptor Well No. IW-15.

CLIENT NAME:

Monsanto Chemical Company
Anniston, Alabama

GERAGHTY & MILLER, INC.
Ground-Water Consultants

SAMPLE/CORE LOG

Boring/Well IW-16 thru 21 Project/No. LA0308MA01 Page 1 of 1

Site Location Anniston Plant, Monsanto Drilling Started 10-26-88 Drilling Completed 11-1-88

Total Depth Drilled 50 feet Hole Diameter 35 inches Type of Sample/Coring Device Auger Rig

Length and Diameter of Coring Device 3 feet Sampling Interval N/A feet

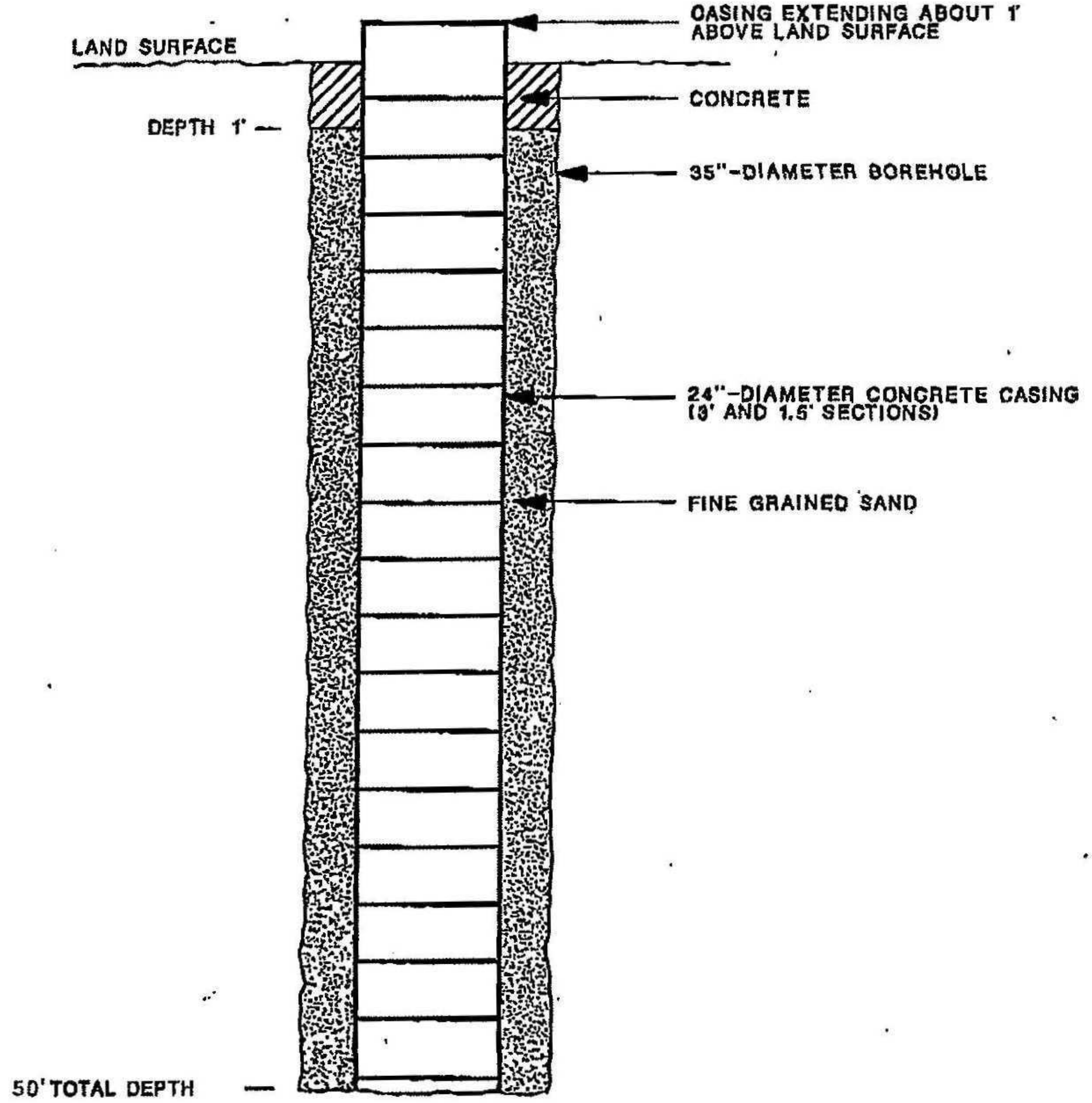
Land-Surface Elev. 750 feet ☐ Surveyed ☒ Estimated Datum MSL

Drilling Fluid Used N/A Drilling Method Auger Bucket

Drilling Contractor Helms Well Drilling Driller Jack Helper Various

Prepared By James Connors Hammer Weight N/A Hammer Drop N/A inches

	Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
IW-16	0	10			clay, yellow-brown to light gray (motteled); some l.s.
					grains.
	10	50			clay, reddish brown, damp.
IW-17	0	9			clay, brownto yellow brown, l.s. grains (as above);
					clay, reddish brown to yellow brown to light gray.
	9	50			clay, reddish brown to purple-gray, damp.
IW-18	0	50			clay, reddish brown, yellow brown, light gray and
					purple gray; very damp below 6 ft bls, strong odor in
					upper part of boring.
IW-19	0	15			clay, reddish to yellow brown, damp, odor; some l.s.
					fragments (as above).
IW-20	0	12			clay, yellow brown, very strong odor.
	12	50			clay, brown to reddish brown.
					ANN 1111093
IW-21	0	14			clay, reddish brown, sandy.
	14	50			clay, reddish brown, light gray, yellow brown.



NOT TO SCALE

Figure 2
Schematic Diagram of Interceptor Wells IW-16 through IW-21

CLIENT NAME:
Monsanto Chemical Company
Anniston, Alabama

Golder Associates

Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, Georgia 30341
Telephone: 770-496-1893
Fax: 770-934-9476

Client: Solutia Inc		Job No.: 943-3680.RFI	Boring/Well: IW-22
Project: Solutia/Supplemental RFI/CS/AL		Well Construction Data	(ft bgs)
Date Started: 2/7/03	Date Completed: 2/7/03	Screen: 0.006 inch slotted	From: 14.9 - To: 39.9
Logged By: KMT	Checked By: KH	Pack: 20/40 silica sand	From: 12.7 - To: 40
Drilling Co.: TDS	Driller: D. Campbell	Seal: pure gold bent. grout	From: 9 - To: 12.7
Method: 6.25" ID HSA	Equipment: CME-55-ATV	Grout: Portland Type II	From: 1 - To: 9
Boring Depth: 40.0	Ground Surface Elevation:	Inner Casing: 4 inch diameter S40 PVC	
GW Level:	Time/Date:	Outer Casing/Stick Up: N/A	

Depth (ft bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	P.D. (ppm)	Lithology	Description	Elevation (ft msl)	Well Construction
0								Very stiff, Red Brown SILTY CLAY, and wood fragments, fine Gravel (FILL)		
5	1	DO	3-1-7	8	0.6/1.5	0				
10	2	DO	1-WH-WH	WH	0.0/1.5	0				
15	3	DO	2-4-5	9	1.5/1.5	0		Firm to very stiff, moist to very moist, mottled orange brown, yellow brown and gray CLAY, trace fine Sand (RESIDUUM)		
20	4	DO	4-8-10	18	1.5/1.6	0				
25	5	DO	4-8-12	20	1.5/1.5	0				
30	6	DO	3-4-7	11	1.5/1.5	0				
35	7	DO	1-2-3	5	1.5/1.5	0				
40	0	DO	2-3-4	7	1.5/1.5	0				

Golder Associates

Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, Georgia 30341
Telephone: 770-496-1893
Fax: 770-934-9476

Client: Solutia Inc		Job No.: 943-3680 RFI	Boring/Well: IW-23
Project: Solutia/Supplemental RFI/CS/AL		Well Construction Data	(ft bgs)
Date Started: 1/31/03	Date Completed: 1/31/03	Screen: 0.006 inch slotted	From: 25 - To: 50
Logged By: KMT	Checked By: KH	Pack: 20/40 silica sand	From: 15 - To: 50.6
Drilling Co.: TDS	Driller: D. Campbell	Seal: bentonite pellets	From: 12 - To: 15
Method: 6.25" ID HSA	Equipment: CME-55-ATV	Grout: Portland Type II	From: 1 - To: 12
Boring Depth: 50.0	Ground Surface Elevation:	Inner Casing: 4 inch diameter S40 PVC	
GW Level:	Time/Date:	Outer Casing/Stick Up: N/A	

Depth (ft bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	PID (ppm)	Lithology	Description	Elevation (ft msl)	Well Construction
0								Stiff to very stiff, moist to damp, orange brown, yellow brown and red brown SILTY CLAY, little to some fine to coarse Sand, trace black stains (FILL)		
5	1	DO	1-2-2	4	0.8/1.5	0				
10	2	DO	3-4-5	9	1.5/1.5	0				
								Very stiff to hard, moist to damp, mottled orangeish red brown, yellow brown and brown CLAY, trace fine to coarse Sand (RESIDUUM)		
15	3	DO	4-7-11	18	1.5/1.5	NF				
20	4	DO	2-5-8	13	0.4/1.5	NF				
25	5	DO	3-5-8	13	1.5/1.5	NF				
30	6	DO	1-5-8	13	1.5/1.5	NF				
35	7	DO	2-4-7	11	1.5/1.5	NF				
40	8	DO	3-5-7	12	1.5/1.5	NF				
45										
50										

Golder Associates

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Fax: 770-934-9476

Client: Solutia Inc		Job No.: 943-3680.RFI	Boring/Well: IW-24
Project: Solutia/Supplemental RFI/CS/AL		Well Construction Data	(ft bgs)
Date Started: 1/30/03	Date Completed: 1/30/03	Screen: 0.006 inch slotted	From: 15 - To: 40
Logged By: KMT	Checked By: KH	Pack: 20/40 silica sand	From: 12.5 - To: 40
Drilling Co.: TDS	Driller: D. Campbell	Seal: bentonite pellets	From: 9.5 - To: 12.5
Method: 8.25" ID HSA	Equipment: CME-55-ATV	Grout: Portland Type II	From: 1 - To: 9.5
Boring Depth: 40.5	Ground Surface Elevation:	Inner Casing: 4 inch diameter S40 PVC	
GW Level: 6.0	Time/Date: 1/31/03	Outer Casing/Stick Up: N/A	

Depth (ft bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	PID (ppm)
5	1	DO	1-1-1	2	1.3 / 1.5	0
10	2	DO	WH-5-8	13	1.5 / 1.5	.3
15	3	DO	4-7-9	16	1.5 / 1.5	14-50
20	4	DO	3-5-8	13	1.5 / 1.5	9-37
25	5	DO	4-5-7	12	1.5 / 1.5	50
30	6	DO	2-4-5	9	1.5 / 1.5	50-100
35	7	DO	1-2-1	3	1.5 / 1.5	50-100
40	8	DO	2-4-5	9	1.5 / 1.5	50-100

Description

Firm, moist red brown and brown SILTY CLAY, trace to little fine to coarse Sand, trace fine Gravel (FILL)

Very soft, wet, dark yellowish gray, fine to coarse SAND, some Clayey Silt (FILL)

Very stiff to stiff, moist, mottled yellow brown and orange brown CLAY, little to some Silt, little to trace fine to coarse Sand, trace fine chert Gravel (weathered), trace purple and white clasts of clay with depth. (RESIDUUM)

Elevation (ft msl) | Well Construction

Golder Associates

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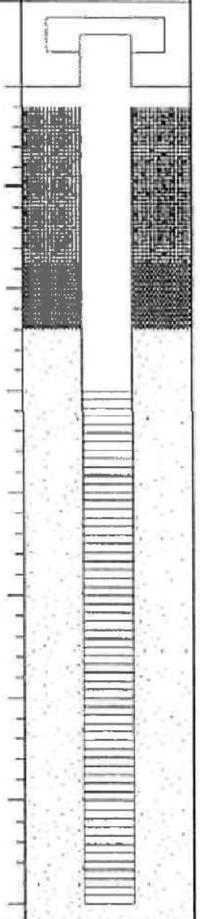
Client: Solutia Inc		Job No.: 943-3680.RFI	Boring/Well: IW-25
Project: Solutia/Supplemental RFI/CS/AL		Well Construction Data	(ft bgs)
Date Started: 2/3/03	Date Completed: 2/3/03	Screen: 0.006 inch slotted	From: 15 - To: 40
Logged By: KH	Checked By: KH	Pack: 20/40 silica sand	From: 12 - To: 41
Drilling Co.: TDS	Driller: D. Campbell	Seal: bentonite pellets	From: 8.7 - To: 12
Method: 6.25" ID HSA	Equipment: CME-55-ATV	Grout: Portland Type II	From: 1 - To: 8.7
Boring Depth: 41.0	Ground Surface Elevation:	Inner Casing: 4 inch diameter S40 PVC	
GW Level:	Time/Date:	Outer Casing/Stick Up: N/A	

Depth (ft bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	PID (ppm)	Lithology	Description	Elevation (ft msl)	Well Construction
0								Soft, moist, reddish brown and gray SILTY CLAY, little Sand, trace to little Gravel (FILL)		
5	1	DO	3-4-5	9	0.5/1.5	0				
10	2	DO	1-1-2	3	0.8/1.5	0		Very soft, wet, mottled red brown and tan SILTY CLAY, some to little Sand (FILL)		
15	3	DO	2-2-4	6	1.5/1.5	0		Firm to very stiff, wet to moist, reddish brown and tan SILTY CLAY, trace fine to coarse Sand, little fine to coarse Gravel (RESIDUUM)		
20	4	DO	2-5-8	13	1.5/1.5	0				
25	5	DO	2-6-10	16	1.5/1.5	0				
30	6	DO	3-5-8	13	1.5/1.5	0		Stiff to soft, moist to very moist, mottled red brown, tan and white SILTY CLAY, trace to little fine to coarse Sand, trace Gravel (RESIDUUM)		
35	7	DO	5-6-7	13	1.5/1.5	0				
40	8	DO	5-5-8	13	1.5/1.5	0				



LITHOLOGIC LOG AND PHYSICAL DESCRIPTION OF DEEP OVERBURDEN PIEZOMETER DOP-1

Monsanto Chemical Company
Anniston, Alabama

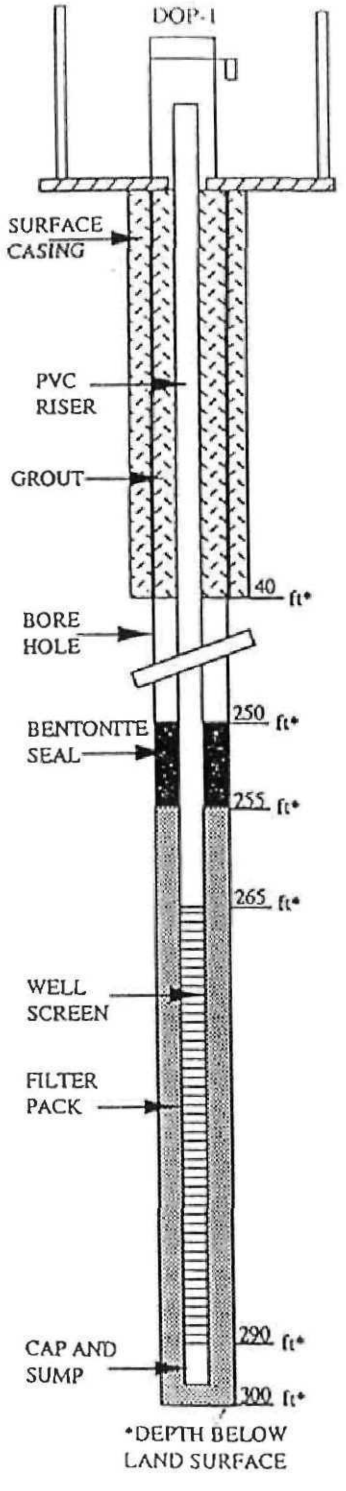
Description	Depth (ft)	Thickness (ft)
Clay with slag deposits. Moderate reddish brown. Sandy. Dry..	0 - 4	4
Clay. Moderate reddish brown. Sandy. Fine grained. Quartz fragments. Silty. Moist becoming wet at 40' bls	4 - 40	36
Clay. Pale red. Sandy. Fine grained. Silty	40 - 52	12
Clay. Pale red to moderate reddish brown. Sandy. Fine grained. Platy. Silty. Weathered shale	52 - 300	248

WELL CONSTRUCTION LOG

Project Name: Monsanto	Well DOP-1

Location Anniston, Alabama

Client: Monsanto Chemical	Prepared By Jason Kirkpatrick



Drilling Summary

Total Depth bls: 300'

Borehole Diameter(s): 14.5" 0' to 40' bls
8.25" 40' to 300' bls

Drilling Contractor: Miller Drilling
Drillers: Kevin Mitchell
Drilling Method: Air Rotary
Drilling Fluid (Amount/Type): Water

Elevations (Surveyed)/Datum:
Land Surface 743.78
Top of Well Casing 746.38
Depth to Water: static 66.90' bls

Well Design

Surface Casing: Material Steel
Diameter 10"
Length 40'
Setting 0' - 40' bls

Screen: Material Schedule 40 PVC
Diameter 2"
Slot 0.01"
Setting 265' - 290' bls

Casing: Material Schedule 40 PVC
Diameter 2"
Length 265'
Setting 2.3' als - 265' bls (plus 10' sump)

Filter Pack: Material Silica Sand (6/20)
Setting 255' - 300' bls

*Grout: Type Portland Type I w/ 3% bentonite
Setting 0' - 250' bls

Seals: Type Bentonite Slurry
Setting 250' - 255' bls

Well Protection: 3' steel protective casing with lockable cover.

Time Log:	Started	Completed
Drilling:	10-15-92	10-22-92
Installation:	10-19-92	10-22-92
Development:	10-24-92	10-24-92

Well Development:

Method/Equipment: Air Lift
Static DTW 72' bls

Water Removed During Development: approx. 50 gallons

pH: NA* Conductivity: NA (umhos/cm) * Not Analyzed
Temp oC: NA

Remarks: A 10" diameter steel surface casing was installed to 40' bls to hold back formation during drilling of the borehole.

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION OF MONITOR WELL DW-1

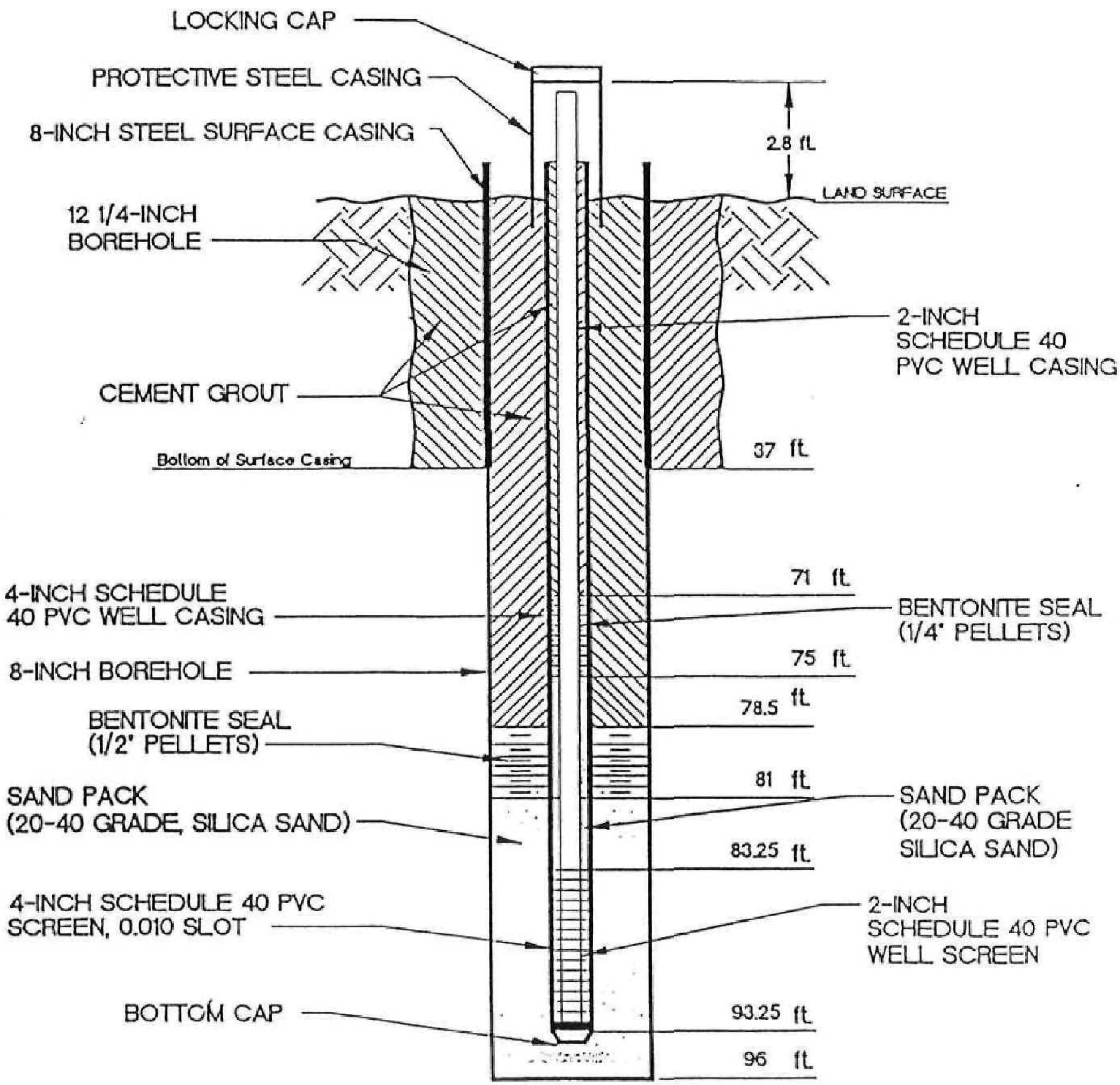
Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Sandy clay. Moderate brown with some dark yellowish orange at top. Small sandstone and dolomite pebbles present. Some limestone gravel as well as coarse-grained sandstone fragments. Slight odor detected at 23 feet with minor amounts of black staining. Dense clay lenses at 24.5 and 29.5 feet.	0 - 34	34
Clay. Mottled colors. Various shades of brown, red, yellow, orange, yellow-green. Clay is dense, dry, and brittle. Black staining evident from 48 feet with slight detectable odor. Small sandy clay lens at 36 feet	34 - 78	44
Clay. Moderate brown. Dry. Contains 5-10% small sandstone and shale clasts. Thin lenses of soft weathered shale present. Detectable odor observed.	78 - 80	2
Bedrock. Light grey competent limestone.	81 - 96	15

Geologist: Chris Bona
Date Drilled: September 1991

GERAGHTY & MILLER, INC. Environmental Services	PIEZOMETER CONSTRUCTION DIAGRAM	DW-1 PROJECT TF52509

LOCATION	FACILITY	SURFACE ELEVATION	MEASURING POINT ELEVATION
Anniston, Alabama	Monsanto		
GEOLOGIST	DRILLING CONTRACTOR	DRILLING METHOD	DRILLER
Chris Bona	Graves Service Co. Inc.	Hollow Stem Auger	Dwight Pruit
DEVELOPMENT METHOD	GALLONS EVACUATED	DATE WELL COMPLETED	STATIC DEPTH TO WATER FEET BELOW M.P. 78.88 DATE: 9-16-91
Air From Drill Rig	~150	9-09-91	



NOT TO SCALE

ALL MEASUREMENTS IN ft. BELOW LAND SURFACE

DAN 1./JVP | APPROVED: 0000 | CHECKED: 0000 | MONSANO8 | FILE NO.: MONSANTO | PRJCT NO.: TF525.09 | DWG DATE: 10-02-91

SA-06

Figure B-25. Lithologic Log of Cased Boring P-22-C.

Description	Depth (ft)	Thickness (ft)
Clay, silty, loose, reddish-brown; trace of fine-grained sand....................................	0 - 2	2
Clay, slightly sandy, fine-grained, stiff, crumbly; pebble-size sandstone; chert fragments............	2 - 16	14
Clay, stiff, moist, slightly pliable, orange to tan; trace of fine-grained sand....................	16 - 24	8

ANN 1117971

SA-22

Figure B-25. Lithologic Log of Cased Boring P-22-C.

Description	Depth (ft)	Thickness (ft)
Clay, silty, loose, reddish-brown; trace of fine-grained sand....................................	0 - 2	2
Clay, slightly sandy, fine-grained, stiff, crumbly; pebble-size sandstone; chert fragments............	2 - 16	14
Clay, stiff, moist, slightly pliable, orange to tan; trace of fine-grained sand....................	16 - 24	8

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SA-64

LITHOLOGIC LOG OF BORING B-64

Description	Depth (ft)	Thickness (ft)
Sand, clayey, dark brown; bricks and concrete	0 - 8	8
Clay, very sandy, fine to coarse grained, tannish-orange	8 - 16	8
Clay, silty, sandy, purple and orange, vertically laminated	16 - 17	1
Clay, slightly sandy, slightly silty, very light gray, reddish-orange and tannish-orange, waxy, massive	17 - 20	3
Clay, slightly sandy, orange and light orange, vertically laminated	20 - 25	5

Golder Associates

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Client: Solutia Inc	Boring/Well: AB-1
Project: Solutia/Supplemental RFI/CS/AL	Job No.: 943-3680.RFI
Date Started: 1/20/03	Date Completed: 1/22/03
Logged By: KTYRRELL	Checked By:
Drilling Co.: Richard Simmons Drilling Inc.	Driller: M. Armstrong
Method: 4.25" ID HSA/ Air Rotary	Equipment: GUS PESH 1000
Boring Depth: 109.5	Ground Surface Elevation:
GW Level:	Time/Date:

Depth (ft bgs)	Sample	Sample Number	PID (ppm)	Lithology	Description	Elevation (ft msl)
0			0		Stiff, moist, orange brown SILTY CLAY (FILL)	
					Firm to stiff, moist, brown and black, fine to coarse SAND, and SILTY CLAY, fine to coarse Gravel (FILL)	
5			0		Firm to very stiff, moist, mottled, brown and yellow brown, SILTY CLAY, little fine Gravel (quartz), some to little fine to medium Sand (FILL)	
10			0			
15			0		Very stiff, dry to damp, red brown CLAY, some fine to coarse Sand, trace fine to coarse Gravel (FILL)	
20			0		Very stiff to hard, dry to damp, yellow brown and orange red brown CLAY, trace fine Gravel (RESIDUUM)	
25			0			
30			0			
35			0		Very stiff to hard, dry, purple-gray CLAY with trace red stains (RESIDUUM)	
40			0			
45			0		Weathered Shale lens (1.6 feet thick), when sampled becomes: Dense, dry, tan, SLITY CLAY with fine to coarse SAND-sized fragements of shale (RESIDUUM)	
					Very stiff, moist, gray, pink and red brown to yellow brown to purple and pinkish red brown SILTY CLAY, trace fine to coarse Sand, trace fine Gravel, trace black manganese stains (RESIDUUM)	
50			0			
55						

Continued Next Page

Golder Associates

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Client: Solutia Inc	Boring/Well: AB-1
Project: Solutia/Supplemental RFI/CS/AL	Job No.: 943-3680.RFI

Depth (ft bgs)	Sample	Sample Number	PID (ppm)	Lithology	Description	Elevation (ft msl)
			0			
60			0			
65			0		Very stiff, to firm, very moist to moist, yellow brown to brown, SILTY CLAY, trace little fine to coarse Sand, trace to little fine to coarse chert Gravel (white and gray, weathered), abundant Gravel 70 - 70.4 ft bgs (RESIDUUM)	
70			0			
75			0		Very stiff, moist, mottled dark brownand yellow brown CLAY (RESIDUUM)	
80			0		Very stiff, moist, dark brown and yellow brown CLAY, trace to little fine to coarse Sand, trace to little fine chert Gravel (white), purple, white, and brown clasts of clay (RESIDUUM) (CL)	
					Very stiff, moist, dark brown CLAY, some fine to coarse chert Gravel, trace to little fine to coarse Sand (RESIDUUM)	
85			0		Very stiff, moist, dark brown to red brown, CLAY, finely mottled with purple and yellow, trace to little fine to coarse Sand, trace to little fine to coarse chert Gravel (RESIDUUM)	
					Very stiff, moist, dark brown CLAYEY fine to coarse chert GRAVEL (RESIDUUM)	
90			0		Very stiff, moist, dark brown CLAY, finely mottled with yellow, red brown, and white Clay, little fine to coarse chert Gravel (White), little fine to coarse Sand (RESIDUUM)	
95			0			
100			0		Weathered Shale, when sampled becomes: Dense/Hard, wet to very moist, olive yellow gray SILTY CLAY, fine to coarse Sand and fine to coarse Gravel (shale), black manganese stains along laminations (RESIDUUM)	
105					Very stiff, moist, pinky red brown CLAY (RESIDUUM)	
					Weathered Shale, when sampled becomes: Loose, wet, olive gray, fine to coarse SAND, fine to coarse GRAVEL	
					spoon refusal at 102 ft ldd, ASSUMED TO BE SHALE	
					AUGER REFUSAL AT 103 ft ldd, Changed to Air Rotary drilling	
					SHALE and LIMESTONE, when sampled becomes: White/Tan, fine to coarse shale and limestone SAND	
					LIMESTONE, when sampled becomes: White, fine to coarse limestone SAND	

LITHOLOGIC LOG FOR BORING CB-85

Description	Depth (ft)	Thickness (ft)
Clay, silty, dark brown; gravel, gray (upper 6")	0.0 - 2.0	2.0
Clay, silty, dark brown	2.0 - 2.5	0.5
Clay, sandy, dry, dark reddish-brown	2.5 - 4.0	1.5
Clay, silty, dark brown	4.0 - 4.5	0.5
Clay, sandy, dry, mottled yellow and reddish-brown	4.5 - 6.25	1.75
Clay, silty, dark brown	6.25- 9.5	3.25
Clay, sandy, dry, mottled light yellow and reddish-brown	9.5 - 11.5	2.0
Sand, very fine-grained, clayey, light yellow	11.5 - 12.0	0.5
Clay, sandy, damp, gummy, mottled light yellow and reddish-brown	12.0 - 13.0	1.0
Clay, light gray	13.0 - 15.0	2.0
Clay, sandy, wet, mottled light yellow and reddish-brown; dolomite gravel, gray	15.0 - 24.0	9.0
Clay, mottled light yellow and reddish-brown; gravel, gray	24.0 - 35.5	11.5
Clay, as above; dolomite gravel, gray; clay, dark gray	35.5 - 40.0	4.5

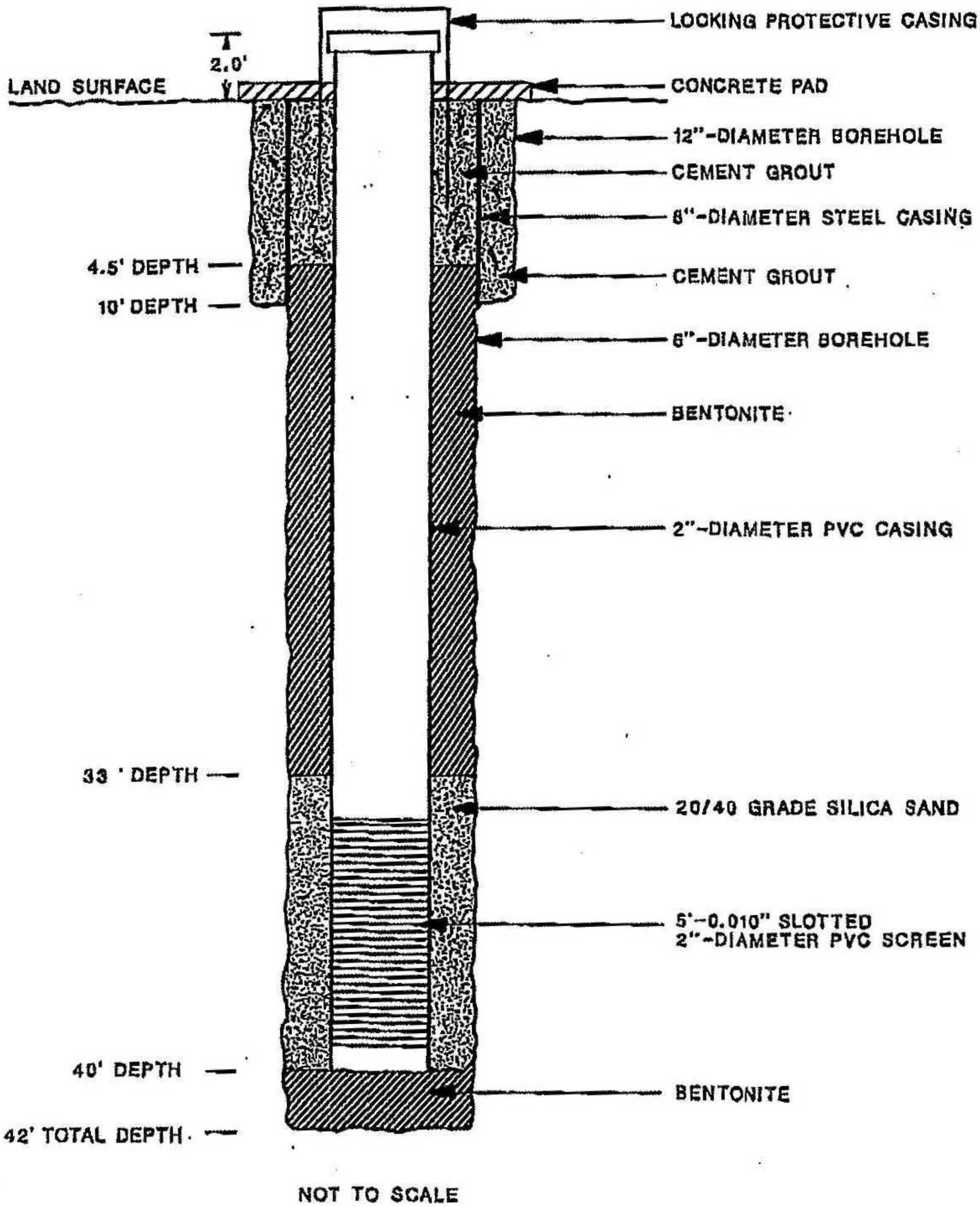

Figure B-3.

Construction Details of Cased Boring CB-85.

CLIENT NAME:

Monsanto Chemical Company

mw-01

Figure B-34. Lithologic Log of Monitor Well P-32-W.

Description	Depth (ft)	Thickness (ft)
Clay, sandy, fine-grained, reddish-orange; pebble sandstone....................................	0 - 12	12
Clay, slightly sandy, very fine-grained, stiff, orange to tan....................................	12 - 15	3
Clay, very stiff, dry, crumbly, trace of very fine grained sand....................................	12 - 20	8
Clay, slightly silty, stiff, tight, reddish-brown with multicolored layers..........................	20 - 38	18
Clay, slightly silty, stiff, moist, slightly pliable, reddish-brown with multicolored layers....	38 - 44.5	6.5
Clay, slightly silty, stiff, dry, crumbly, white to orange....................................	44.5- 48	3.5
Clay, moderately silty, stiff, moist, crumbly reddish-brown; very fine-grained, sand located in stringers....................................	48 - 60	12

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MW-01

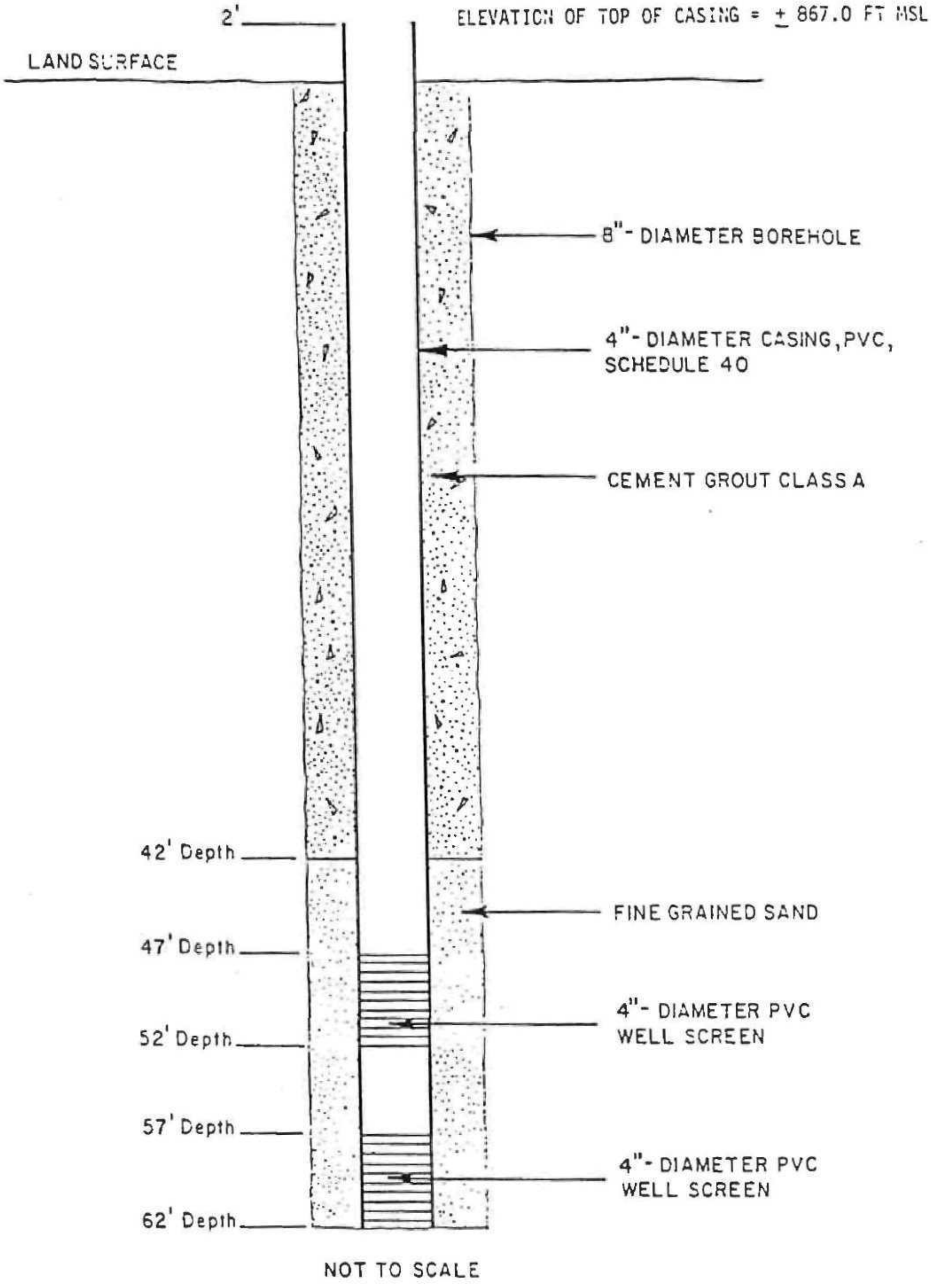


Figure A-6. Schematic Diagram Showing the Well-Construction Details of P-32-W.

LITHOLOGIC LOG OF BORING B-60 (MONITOR WELL MW-1a)

Description	Depth (ft)	Thickness (ft)
Sand, clayey, some cobbles, orangish-brown	0 - 3	3
Sand, clayey, cobbles and boulders, orange	3 - 12	9
Clay, silty, slightly sandy, trace pebbles, tannish-orange, firm	12 - 17	5
Clay, silty, orangish-red, stiff, crumbly	17 - 30	13
Clay, silty, orangish-red, purple, and buff, stiff, crumbly; iron chert fragments	30 - 39	9
Clay, silty, brownish-orange, crumbly, iron chert fragments	39 - 45	6
Clay, silty, sandy, brownish-orange, iron chert cobbles and pebbles	45 - 49	4
Clay, pebble-rich, sandy, silty, red	49 - 50	1
Clay, silty, trace sand, brownish-orange	50 - 60	10

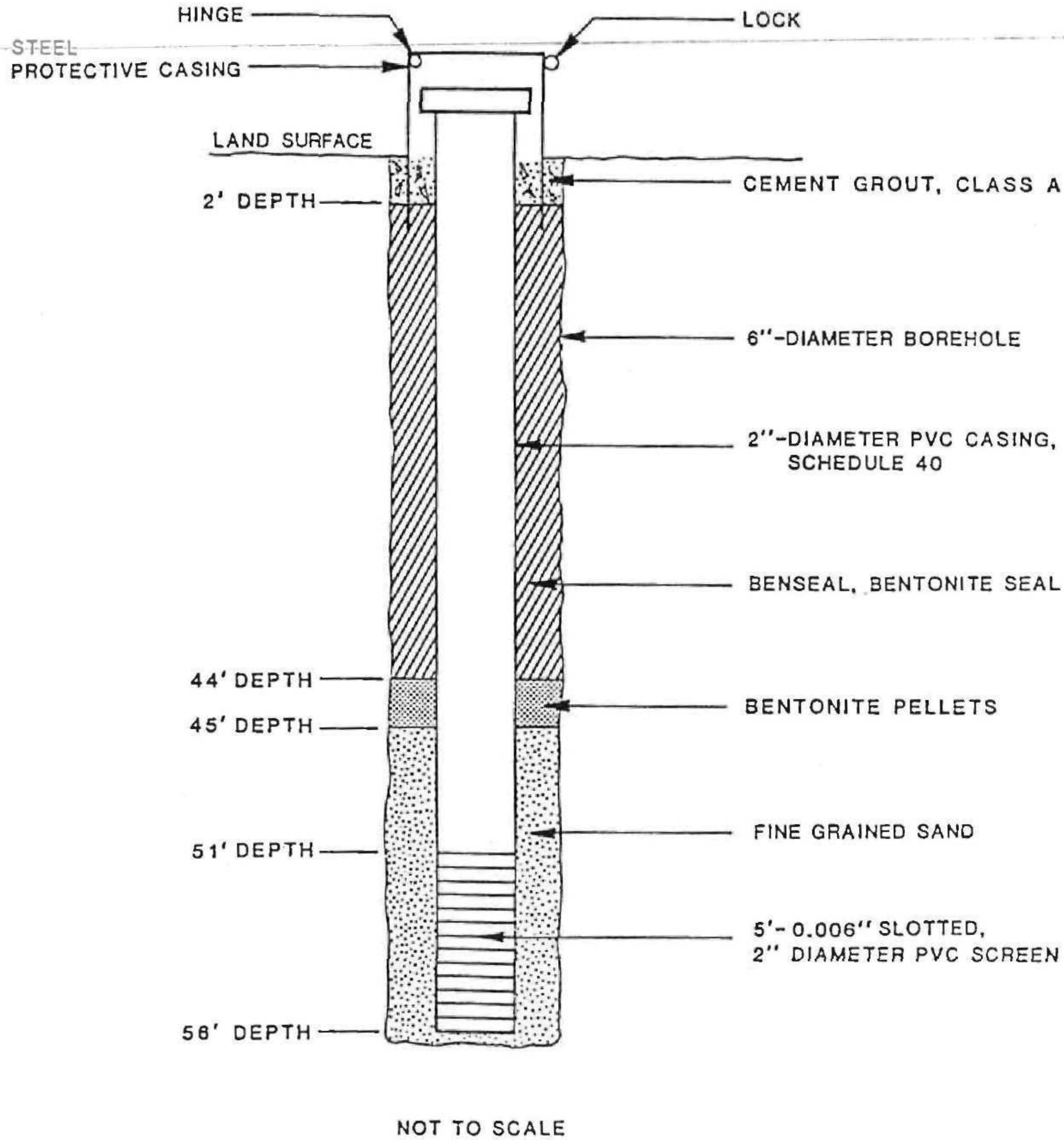
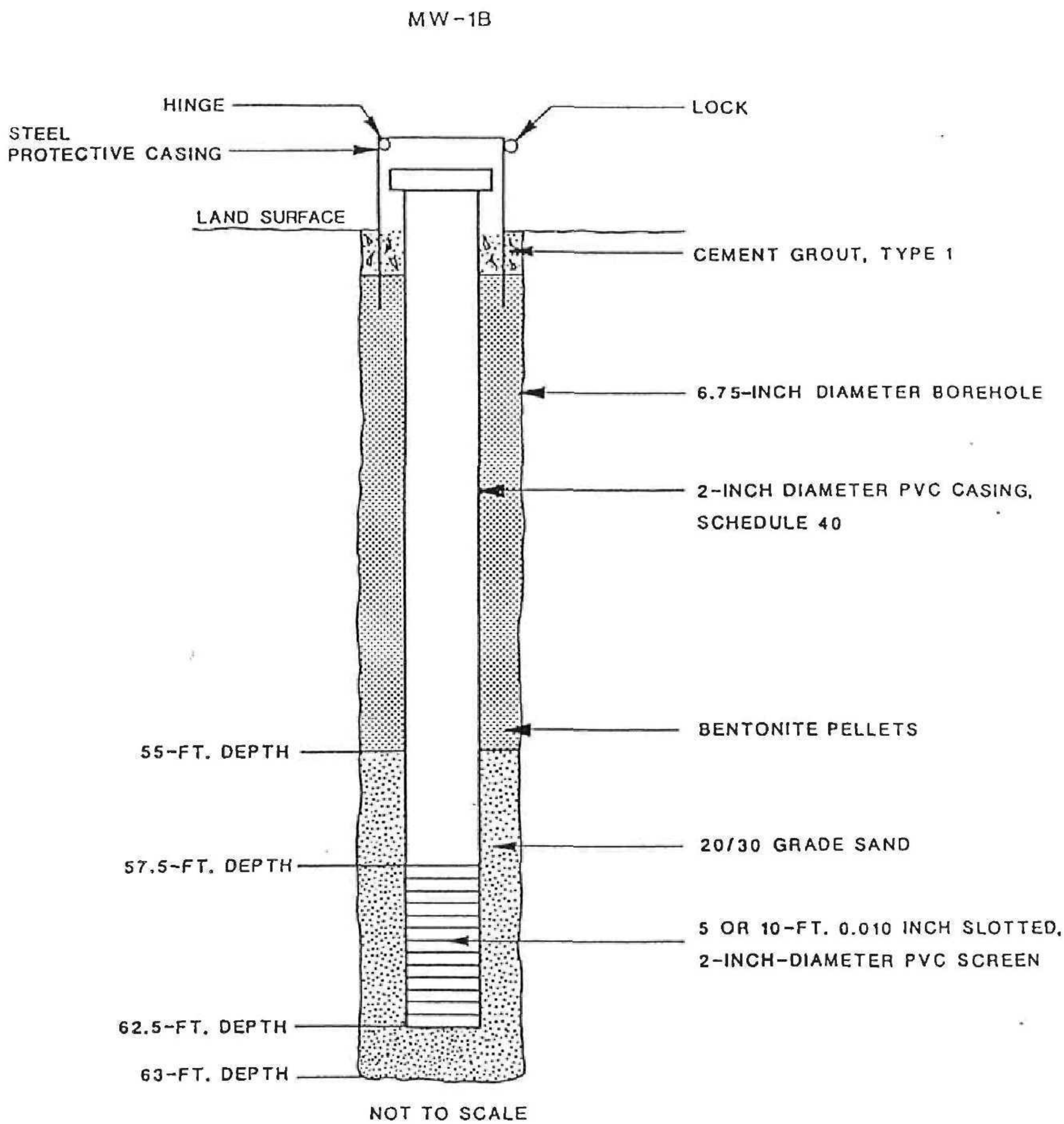


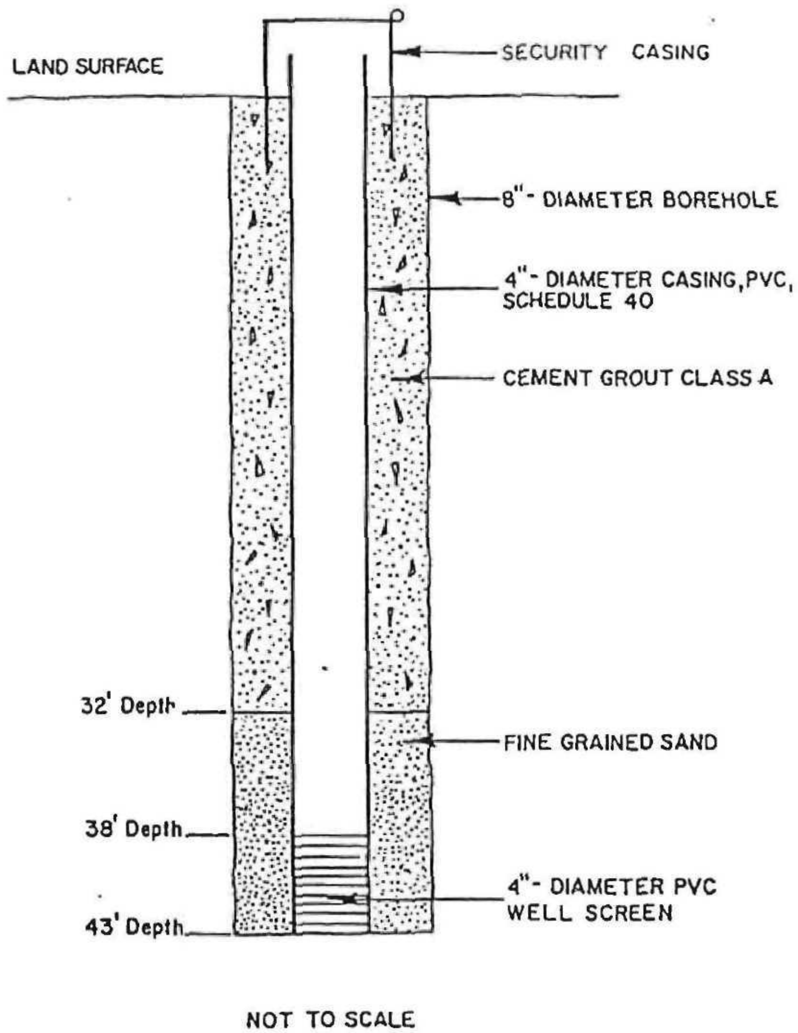
Figure A-1. Schematic Diagram Showing the Construction Details of Monitor Well MW-1a.

LITHOLOGIC LOG OF BORING B-67 (MW-1B)

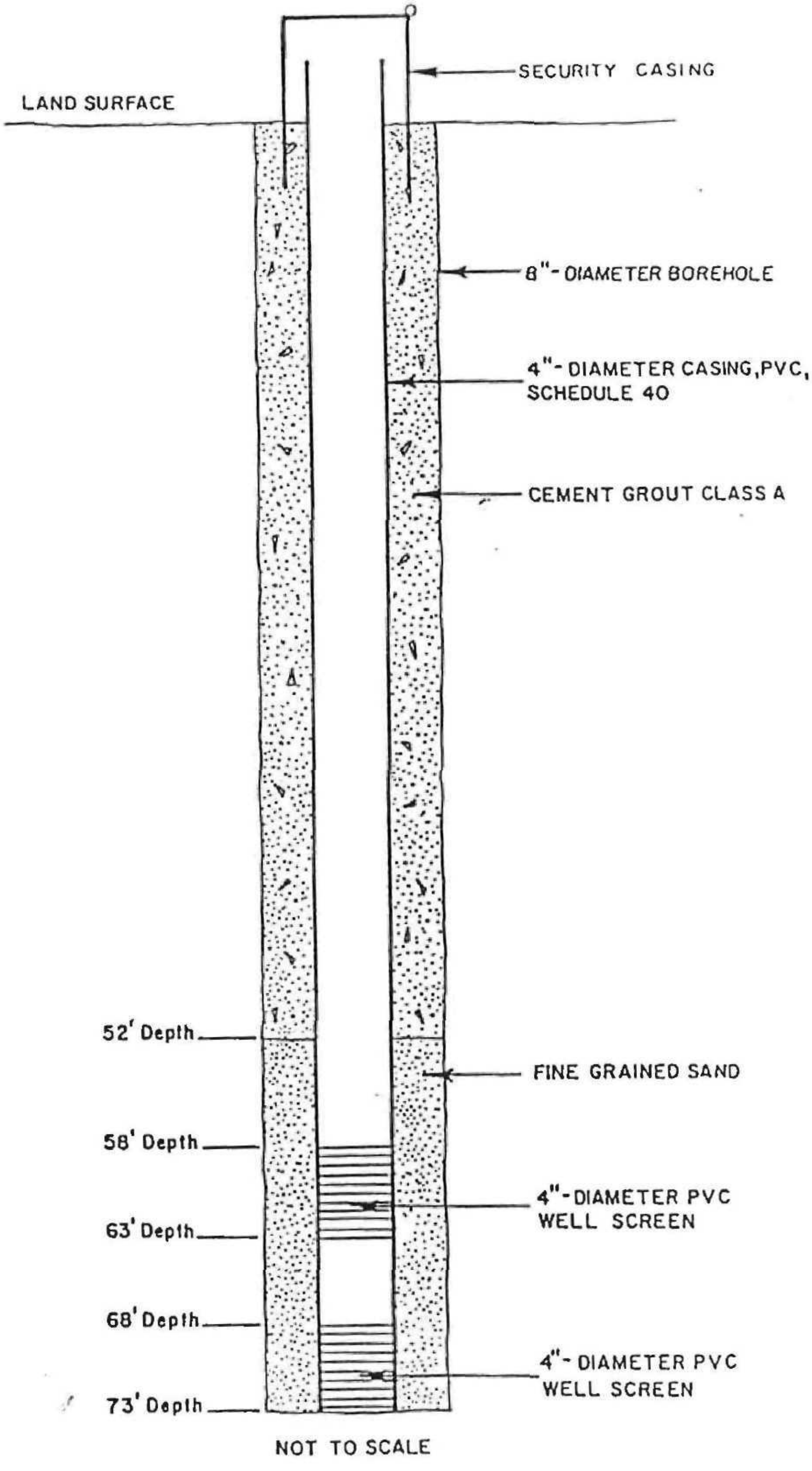
Description	Depth (ft)	Thickness (ft)
Silt, tan; minor amounts of very fine to fine sand; minor amounts of clay; chert; minor organics...........................	0 - 2	2
Clay, white, orange, red, crimson, tan minor amounts of silt and fine-grained sand....................................	2 - 10	8
Clay, red, orange, purple, mottled.......	10 - 15	5
Clay, white, red, orange, yellow, crimson mottled.................................	15 - 59	44
Clay, yellow; minor amounts of silt; minor amounts of fine to coarse-grained sand; trace chert........................	59 - 60	1
Clay, red, orange, white, mottled........	60 - 62.5	2.5
Chert, white.............................	62.5 - 63	0.5



SCHEMATIC DIAGRAM SHOWING THE CONSTRUCTION DETAILS OF MONITOR WELL MW-1B.



Schematic Diagram Showing the Well-Construction Details of Monitor Well MW-2.

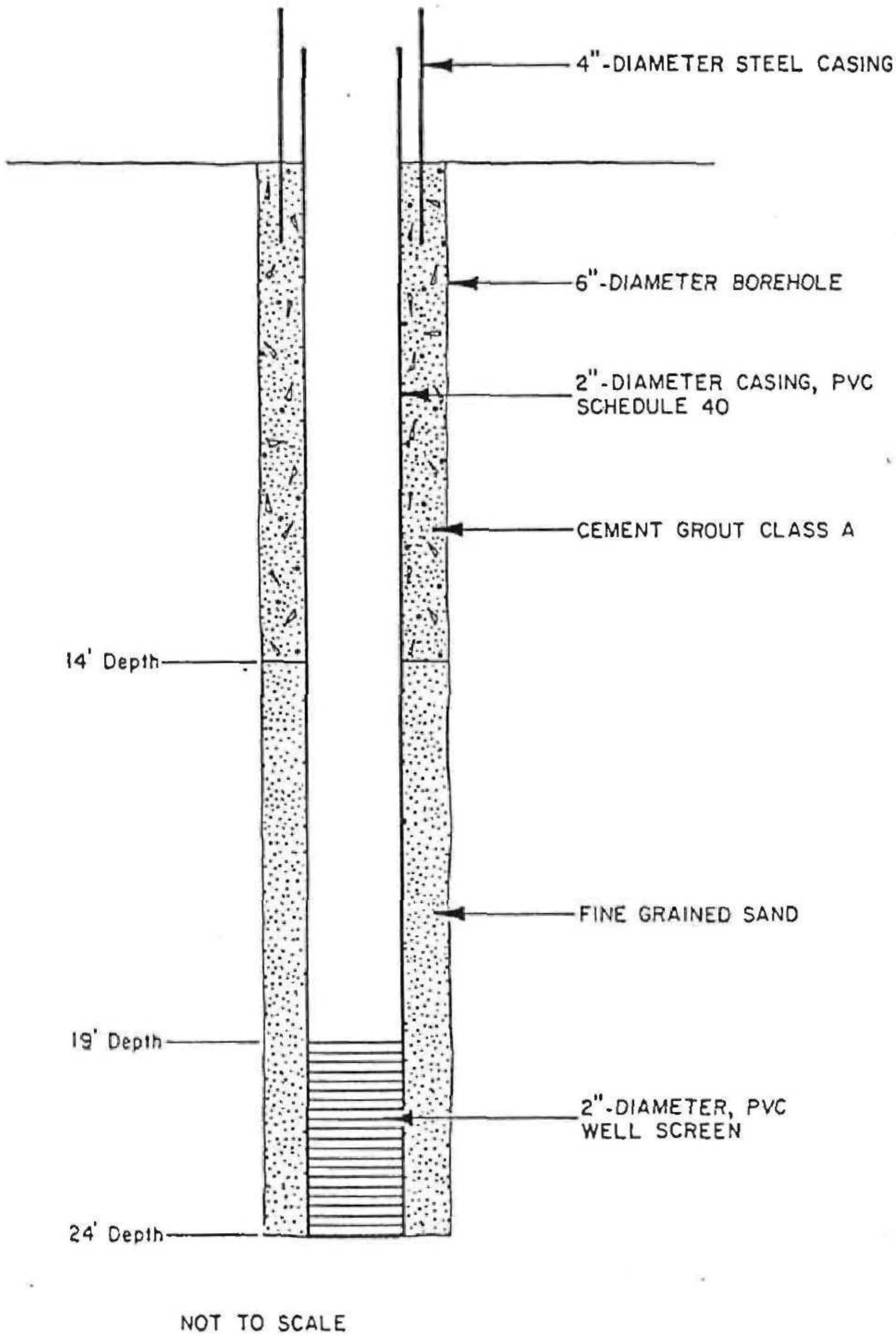


Schematic Diagram Showing the Well-Construction Details of Monitor Well MW-3.

MW-7

LITHOLOGIC LOG OF BORING B-4

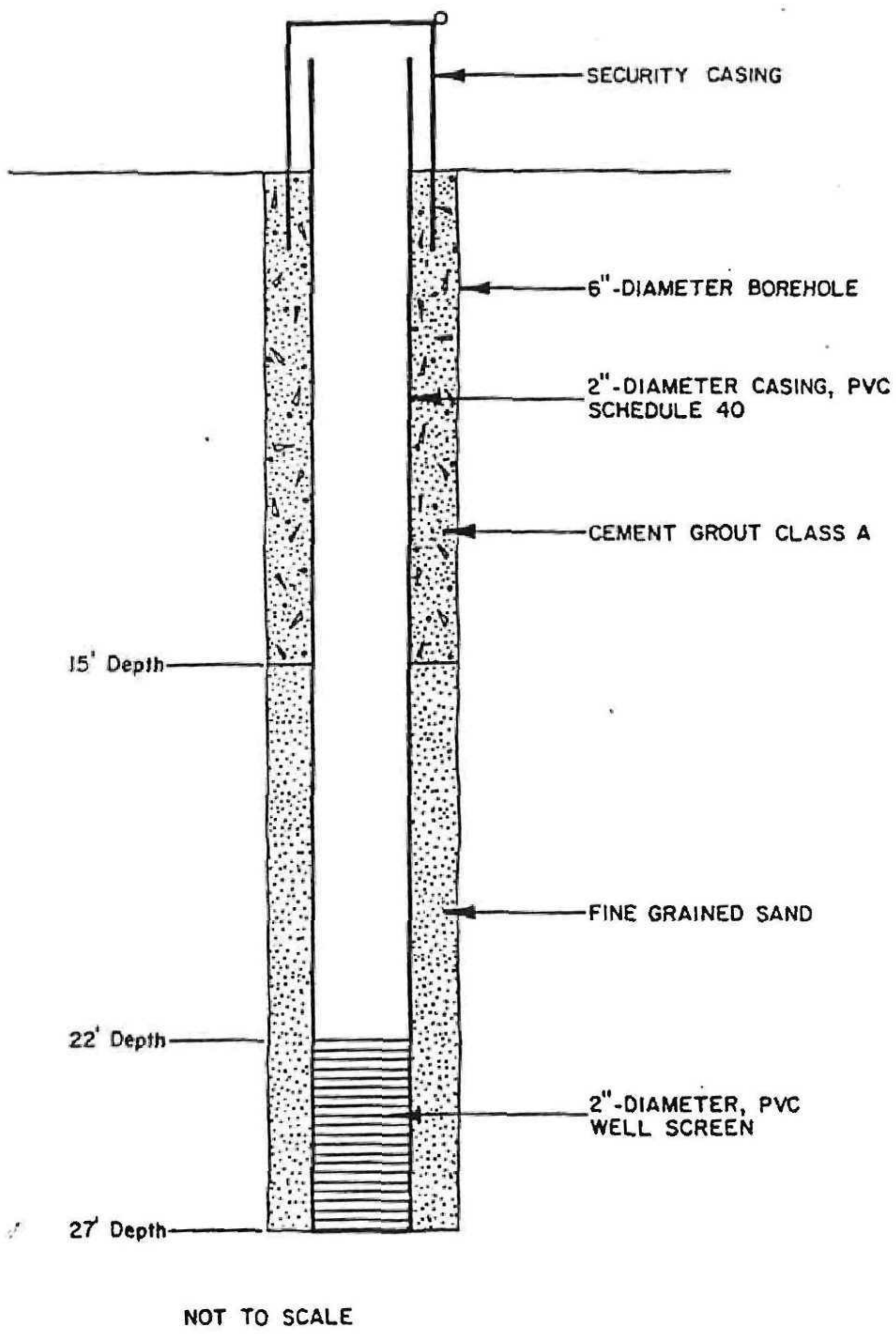
Description	Depth (ft)	Thickness (ft)
Silt, sandy, soft, damp, black............	0 - 5.5	5.5
Clay, slightly sandy, very soft, damp, brown....................................	5.5 - 8.0	2.5
Clay, slightly sandy, firm, damp, tan; gravel throughout samples.................	8.0 - 10.5	2.5
Clay, slightly silty, stiff, damp, tan to reddish-brown; trace of very fine-grained sand.................................	10.5 - 15.5	5.0
Clay, slightly silty, slightly sandy, very stiff, damp, tan; gravel throughout samples..............................	15.5 - 20.5	5.0
Clay, slightly silty, very stiff, damp, tan; trace of medium-grained, sand........	20.5 - 23.0	2.5
Clay, very stiff, damp, tan...............	23.0 - 25.0	2.0



Construction details of monitor well MW-7.

Lithologic Log of Boring B-45 (Monitor Well MW-8)

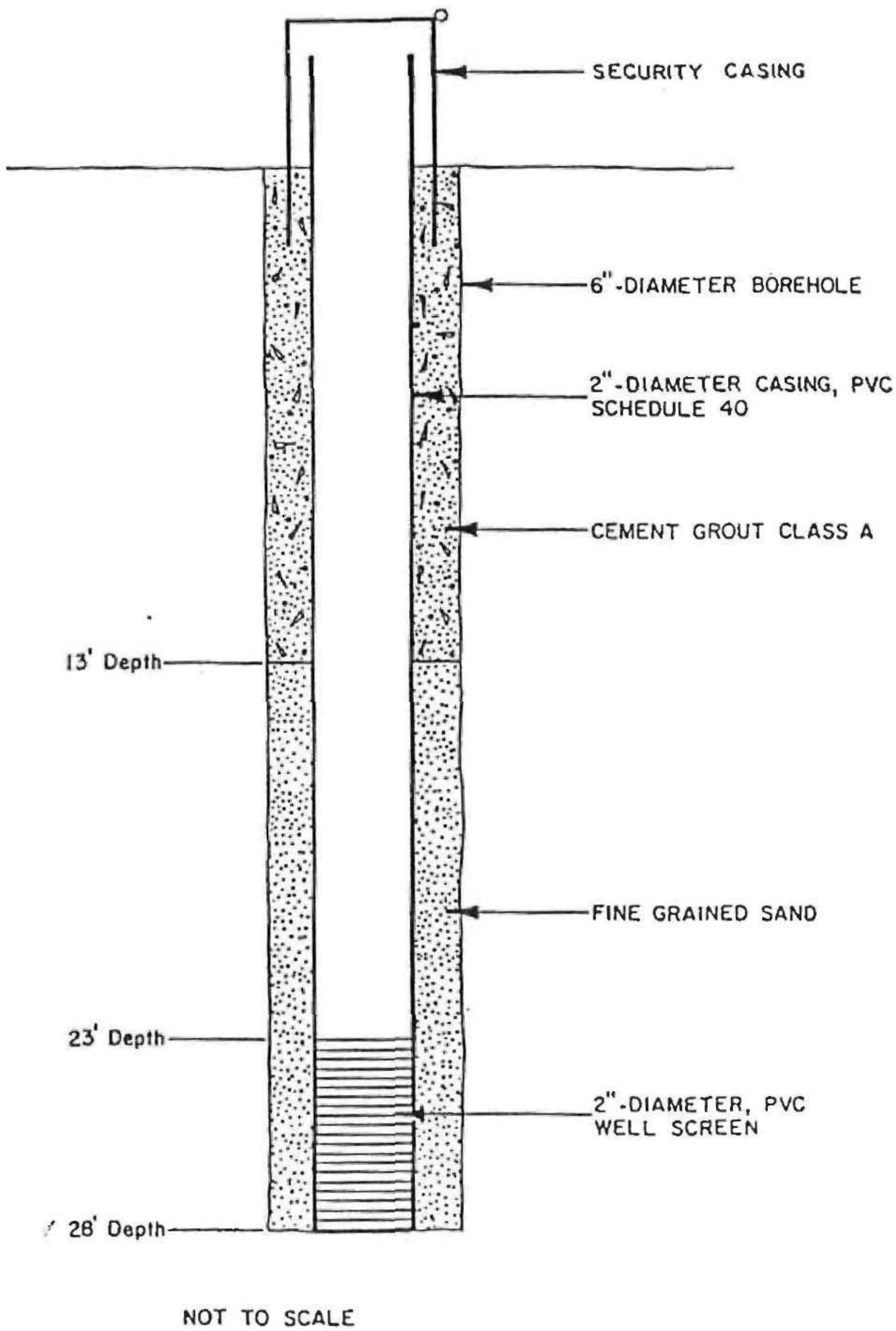
Description	Depth (ft)	Thickness (ft)
Clay, slightly sandy, soft to stiff, damp, reddish-brown to brown....................	1.0 - 5.5	4.5
Clay, silty, slightly sandy to sandy, stiff to very stiff, damp, reddish-brown and orange................................	5.5 - 18.0	12.5
Clay, stiff, damp, tan and brown..........	18.0 - 20.5	2.5
Clay, sandy, stiff, wet, orange and brown; 3-inch lense of clayey, medium-grained sand....................................	20.5 - 23.0	2.5
Clay, slightly silty, slightly sandy, stiff, damp, orange and tan; gravel throughout samples........................	23.0 - 30.0	7.0



Schematic Diagram Showing the Well-Construction Details of Monitor Well MW-8.

Lithologic Log of Boring B-44 (Monitor Well MW-9)

Description	Depth (ft)	Thickness (ft)
Clay, silty, slightly sandy, very soft to firm, damp, reddish-brown.................	1.0 - 5.5	4.5
Clay, slightly sandy, very stiff, damp, orange and gray..........................	5.5 - 8.0	2.5
Clay, slightly silty, stiff to very stiff, damp, reddish-brown......................	8.0 - 13.0	5.0
Clay, very sandy, stiff, wet, reddish-brown..................................	13.0 - 15.5	2.5
Clay, sandy, very stiff, damp, reddish-brown; gravel throughout samples..........	15.5 - 17.0	1.5
Clay, stiff to very stiff, damp, orange, white, gray, and lavender.................	17.0 - 23.0	6.0
Clay, silty, sandy, soft, wet, brown......	23.0 - 27.0	4.0
Clay, stiff, damp, orange, gray, and red..	27.0 - 28.0	1.0
Sand, fine to coarse-grained, very clayey, loose, wet, brown........................	28.0 - 30.5	2.5
Clay, slightly silty, stiff to very stiff, damp, white, orange, gray, brown, and lavender..................................	30.5 - 40.0	9.5



Schematic Diagram Showing the Well-Construction Details of Monitor Well MW-9.

LITHOLOGIC LOG OF BORING B-65 (MONITOR WELL MW-11)

Description	Depth (ft)	Thickness (ft)
Clay, very sandy, orangish-brown to orangish-red, occassional cobbles of sandstone..................................	0 - 4	4
Clay, sandy, light orange, cobbles, orangish-red............................	4 - 10	6
Clay, very sandy, orange, trace sandstone cobbles................................	10 - 17	7
Clay, sandy, orange, gravelly............	17 - 20	3
Clay, sandy, reddish-orange and light orange..................................	20 - 21	1
Clay, sandy, reddish-orange and light orange..................................	21 - 29	8
Clay, sandy, orange, trace black sand.....	29 - 30	1

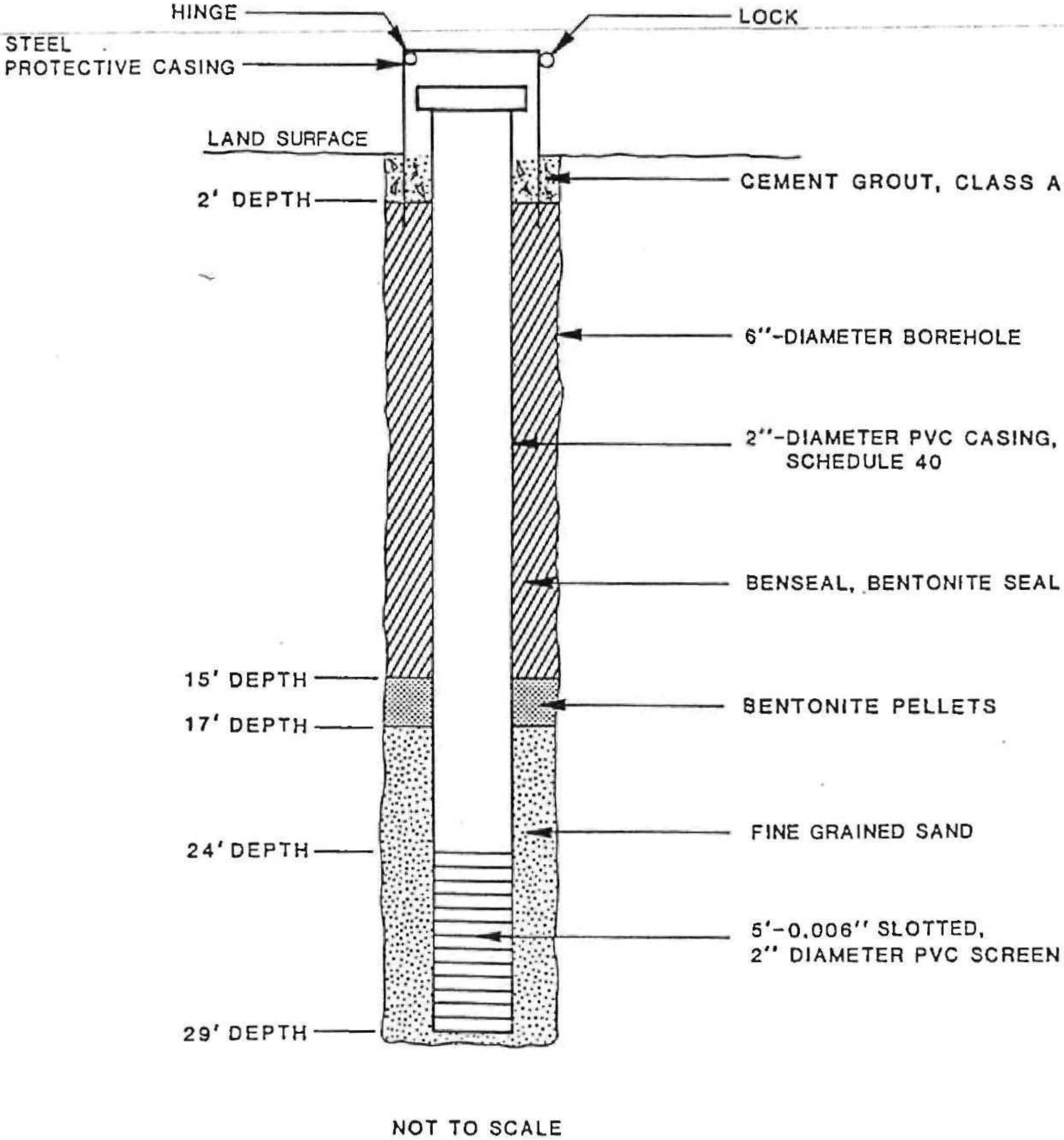
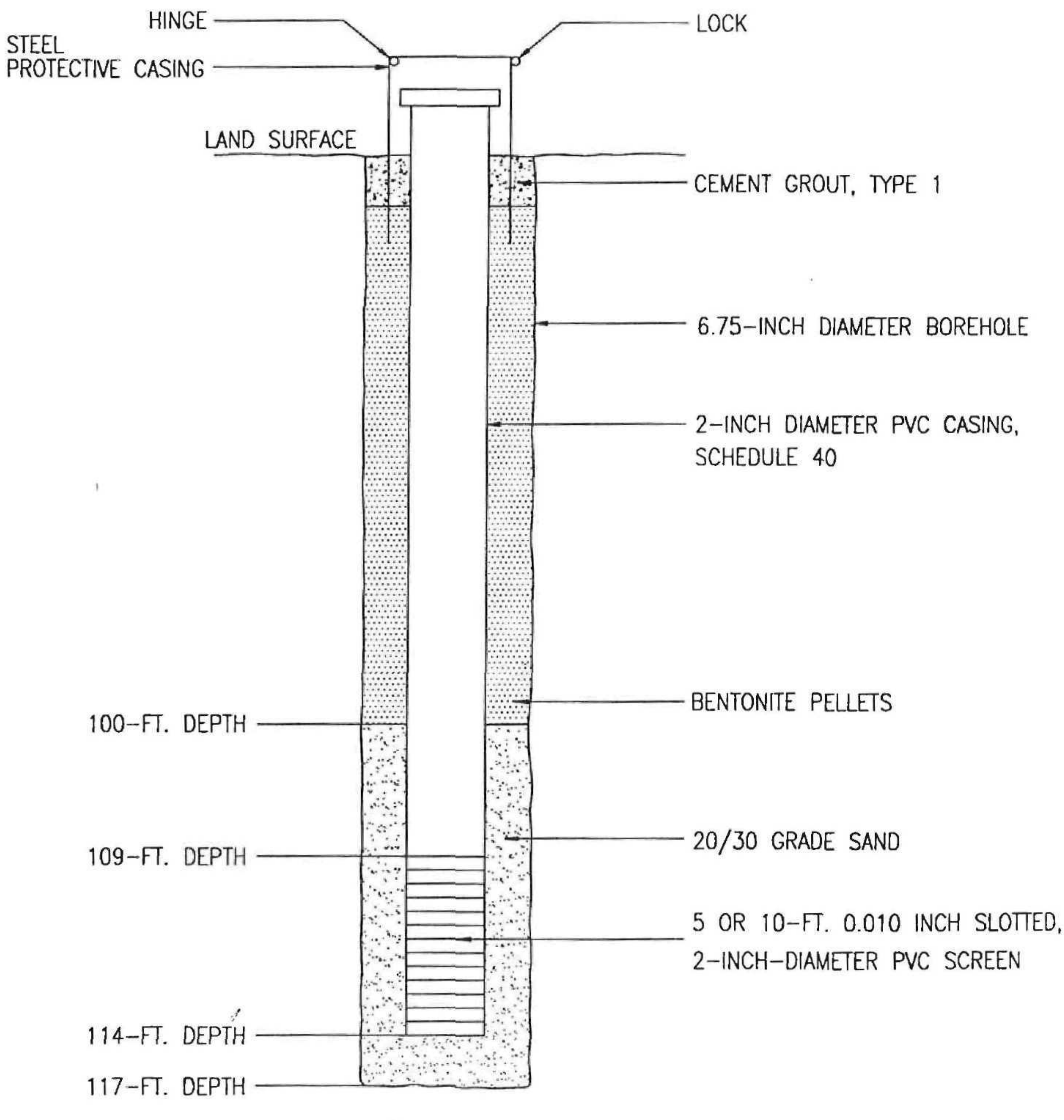


Figure A-2. Schematic Diagram Showing the Construction Details of Monitor Well MW-11.

LITHOLOGIC LOG OF BORING B-68 (MW-11A)

Description	Depth (ft)	Thickness (ft)
Sand, very fine grained, silty; some clay, red-brown, organics................	0 - 3	3
Sandstone, fine to medium-grained, white.	3 - 3.5	0.5
Clay, red; some silt and very fine sand; sandstone, fine to medium-grained, white, friable.................................	3.5 - 12	8.5
Clay, red-orange; some silt and very fine-grained sand........................	12 - 14	2
Clay, red-orange; minor silt.............	14 - 18	4
Clay, red-orange; some silt and fine to medium-grained sand; trace chert.........	18 - 27	9
Clay, red-orange; moderate amounts of fine-grained sand; trace chert...........	27 - 28	1
Clay, red-orange.........................	28 - 37	9
Clay, red-orange; some chert.............	37 - 54	17
Chert....................................	54 - 55	1
Chert, soft with clay....................	55 - 64.5	9.5
Chert, varying in hardness...............	64.5 - 95.0	5.5
Chert, with clay.........................	95 - 99	4
Limestone, gray..........................	99 - 122.5	23.5

MW-11A



NOT TO SCALE

LITHOLOGIC LOG OF BORING B-61 (MONITOR WELL MW-12)

Description	Depth (ft)	Thickness (ft)
Clay, sandy, orangish-red	0 - 6	6
Sand, clayey, reddish-orange, trace sandstone cobbles and pebbles	6 - 8	2
Clay, sandy, orangish-red, trace pebbles	8 - 10	2
Clay, sandy, fine to coarse grained, reddish-orange and tan, firm	10 - 16	6
Clay, sandy, silty, tan to reddish-orange, crumbly	16 - 19	3
Clay, slightly silty, slightly sandy, tan to reddish-orange, waxy	19 - 24	5
Clay, slightly sandy, slightly silty, tan to reddish-orange, waxy	24 - 30	6

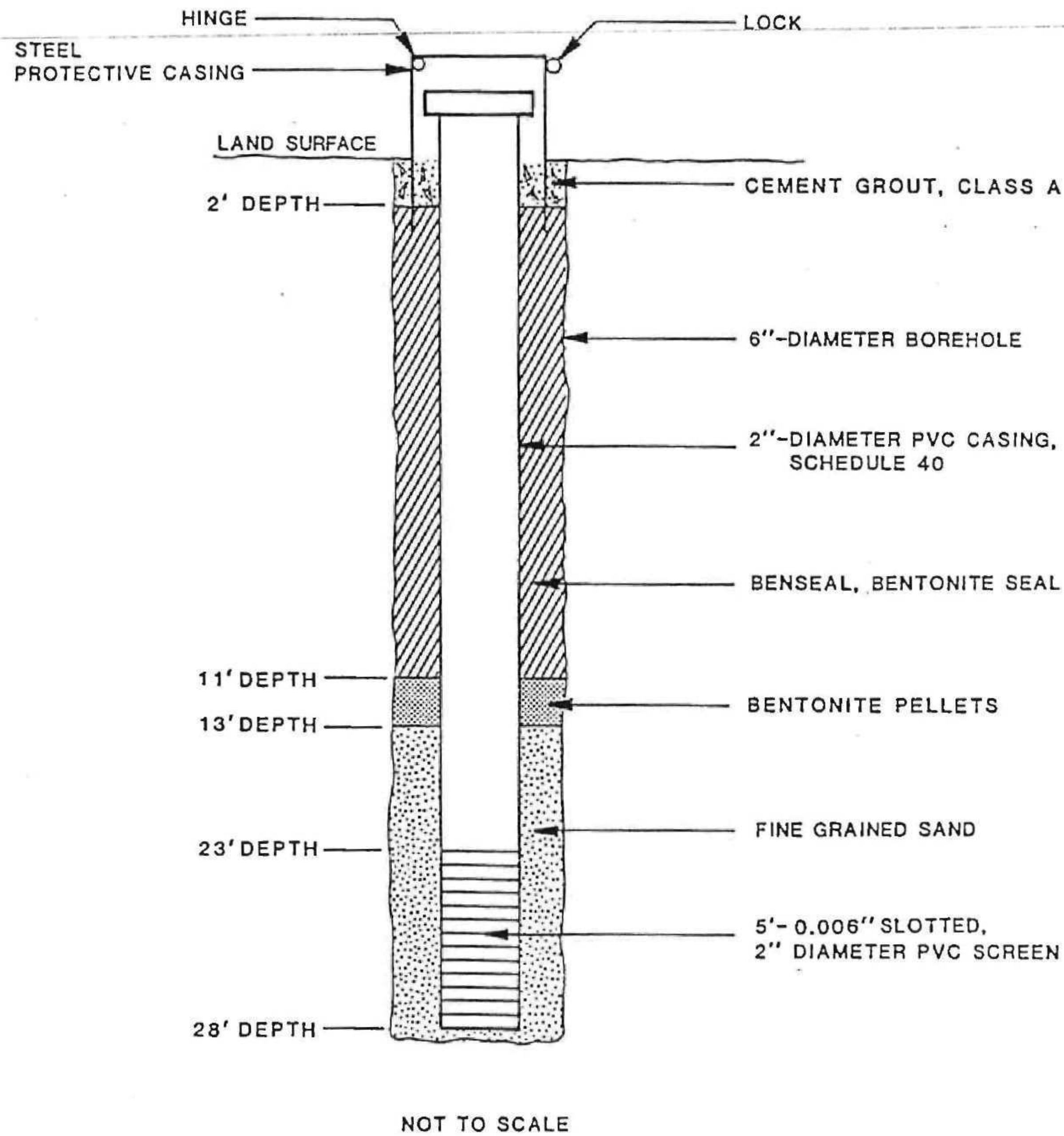
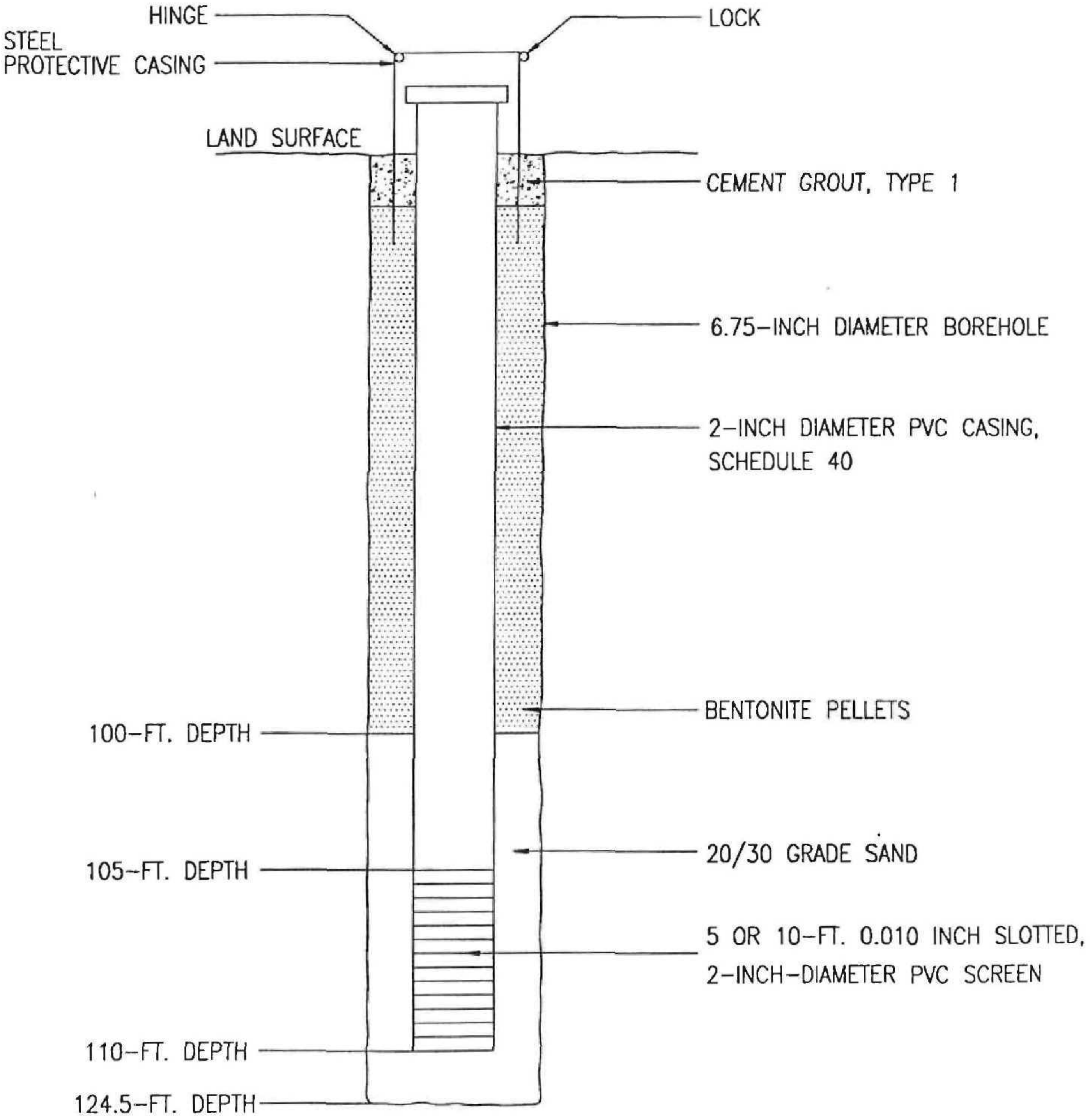


Figure A-3. Schematic Diagram Showing the Construction Details of Monitor Well MW-12.

LITHOLOGIC LOG OF BORING B-69 (MW-12A)

Description	Depth (ft)	Thickness (ft)
Clay, red-brown; silty; organics	0 - 3	3
Clay, red-orange, silty, some fine-grained sand; some sandstone, fine to medium-grained, white, friable	3 - 9	6
Clay, orange, yellow; silty; some fine-grained sand	9 - 16	7
Clay, orange, yellow, white, mottled	16 - 18	2
Clay, orange, yellow, white (chalky), mottled; chert	18 - 47	29
Chert; some clay, orange, mottled	47 - 48	1
Clay, orange; chert	48 - 54	6
Chert	54 - 55	1
Chert with clay	55 - 76	21
Chert, hard, with clay	76 - 80	4
Chert; limestone, gray, interbedded	80 - 94	14
Limestone, gray	94 - 107	13
Limestone, gray, soft	107 - 117	10
Limestone, gray, hard	117 - 124.5	7.5

MW-12A



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LITHOLOGIC LOG OF BORING B-62 (MONITOR WELL MW-13)

Description	Depth (ft)	Thickness (ft)
Clay, sandy, orangish-brown to orange.....	0 - 4	4
Clay, sandy, sandstone cobbles and pebbles, orangish-brown to orange.........	4 - 12	8
Clay, sandy, slightly silty, trace cobbles and pebbles, orange, firm.................	12 - 15	3
Clay, slightly silty, trace sand, occassional cobble or pebble or chert fragments, orange to buff, waxy; black material in thin streaks..................	15 - 20	5
Clay, silt, sand, pebbles and cobbles or chert and sandstone, orangish-tan.........	20 - 30	10

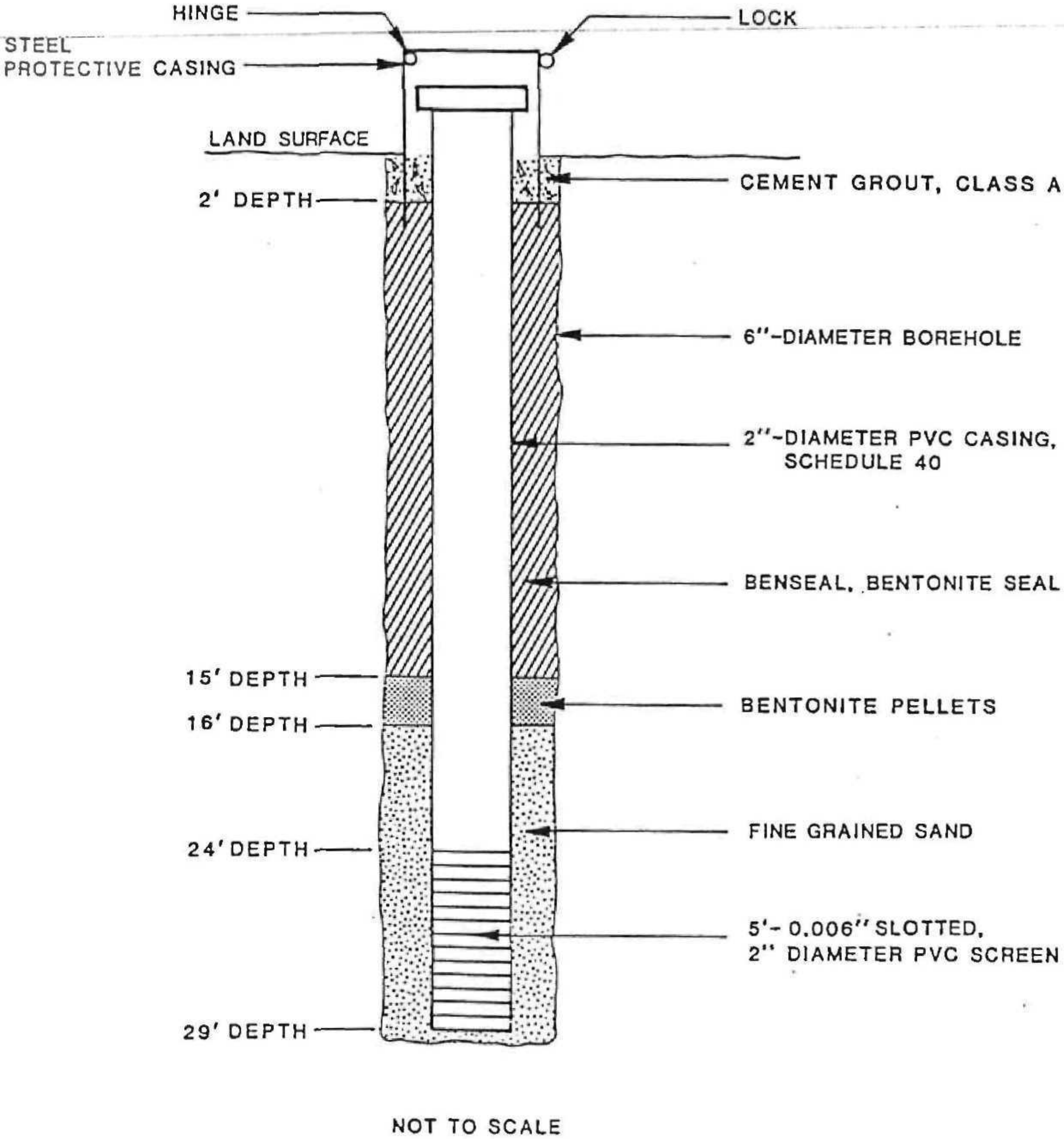
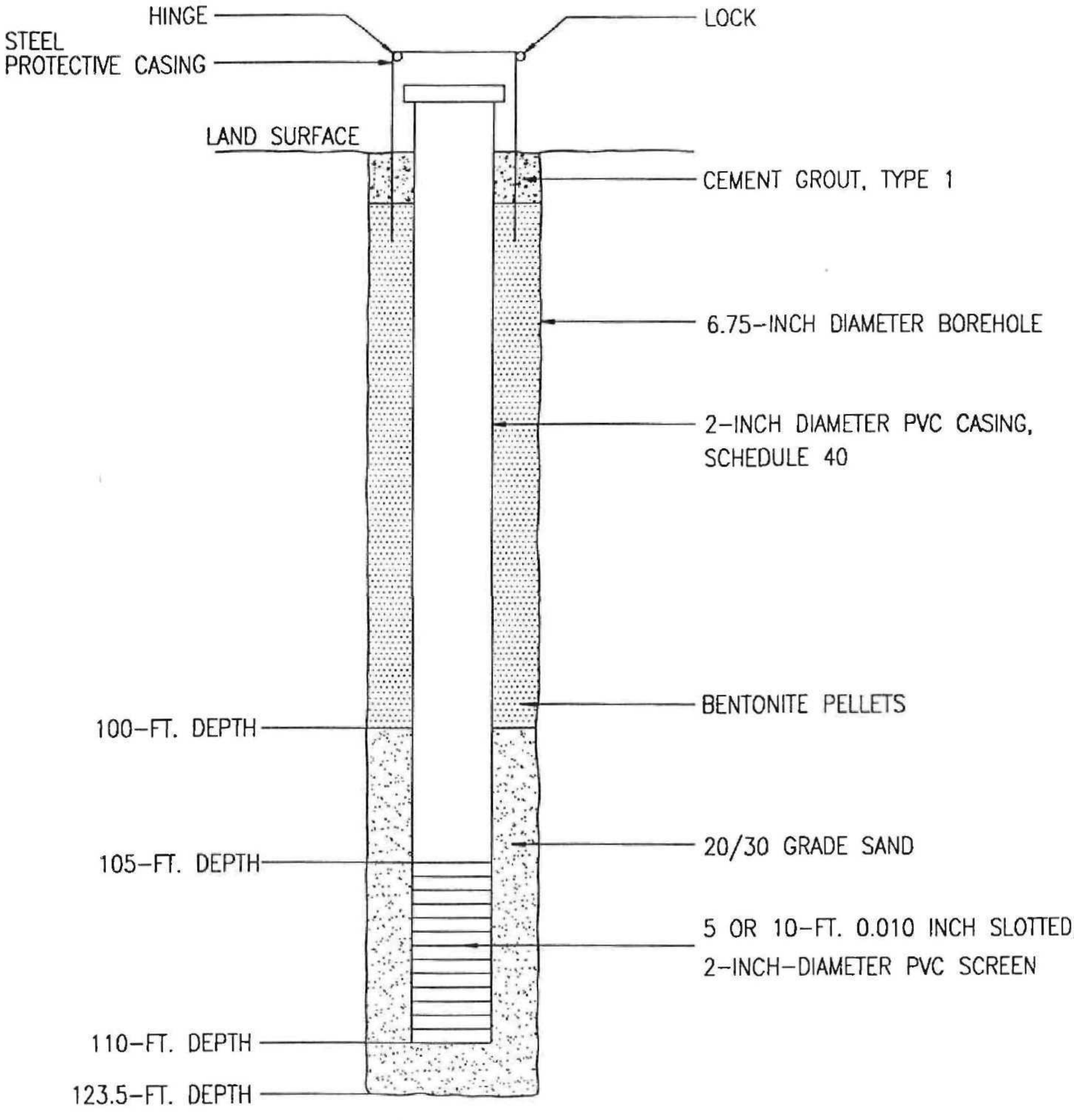


Figure A-4. Schematic Diagram Showing the Construction Details of Monitor Well MW-13.

LITHOLOGIC LOG OF BORING B-70 (MW-13A)

Description	Depth (ft)	Thickness (ft)
Sand, very fine to medium-grained, red; minor silt; minor organics; chert........	0 - 10	10
Clay, orange, mottled; minor silt........	10 - 14	4
Clay, orange, mottled; chert; inclusions of fine to medium-grained sand, yellow....	14 - 17	3
Sandstone; fine to medium-grained white to light gray, friable...................	17 - 17.5	0.5
Clay, orange and white; some fine-grained sand; some rock.........................	17.5 - 19	1.5
Clay, red-orange, mottled; cherts; some medium-grained sand.................	19 - 29	10
Clay, orange, mottled....................	29 - 53	24
Chert....................................	53 - 54	1
Chert, with clay.........................	54 - 67.5	12.5
Limestone, hard, gray....................	67.5 - 70	2.5
Limestone, gray..........................	70 - 72	2
Limestone, gray; chert, interbedded......	72 - 81.5	9.5
Limestone, gray; chert and clay interbedded..............................	81.5 - 106.5	25
Limestone, gray; chert, interbedded......	106.5 - 123.5	17

MW-13A



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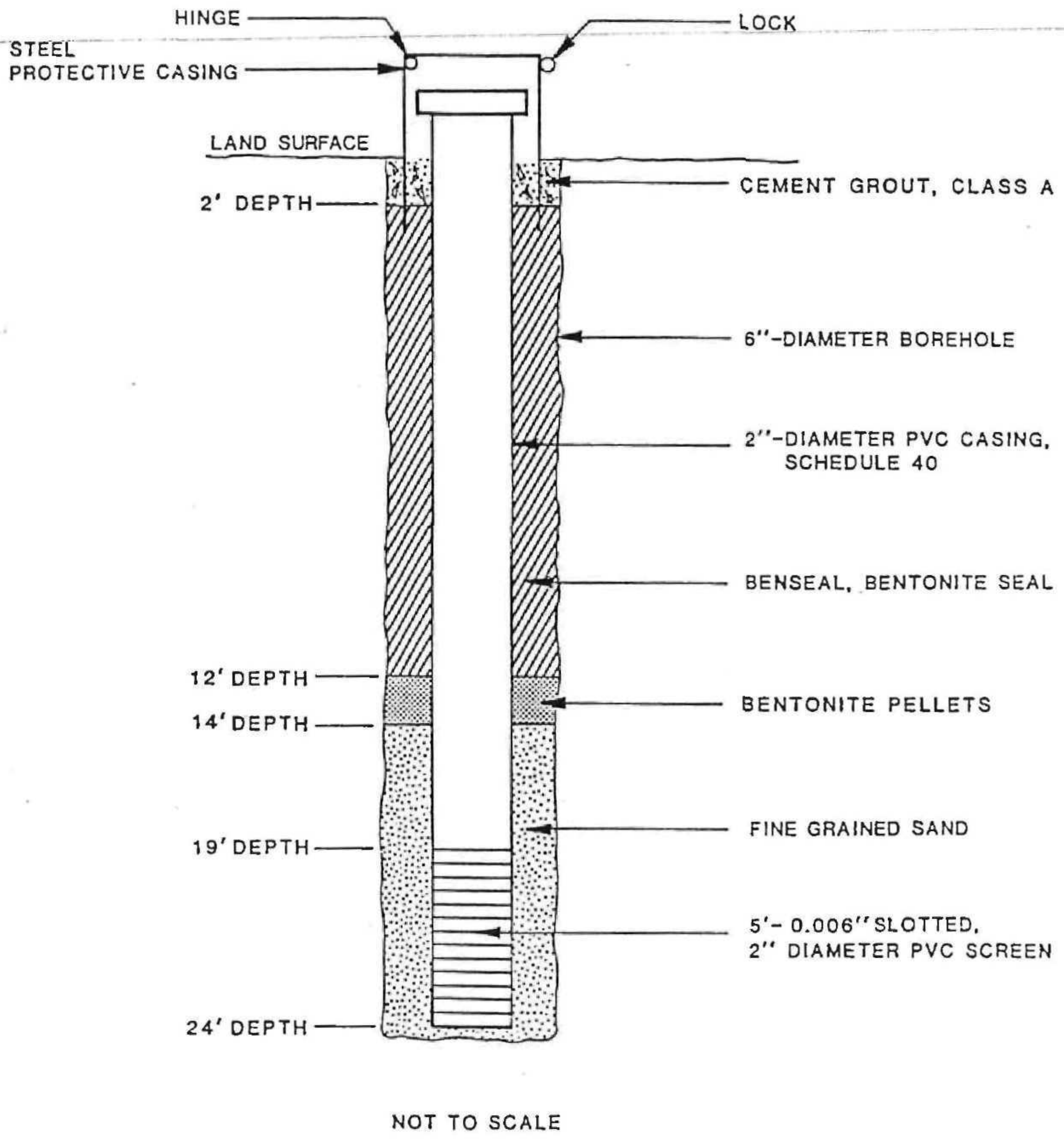

Figure A-5. Schematic Diagram Showing the Construction Details of Monitor Well MW-14.

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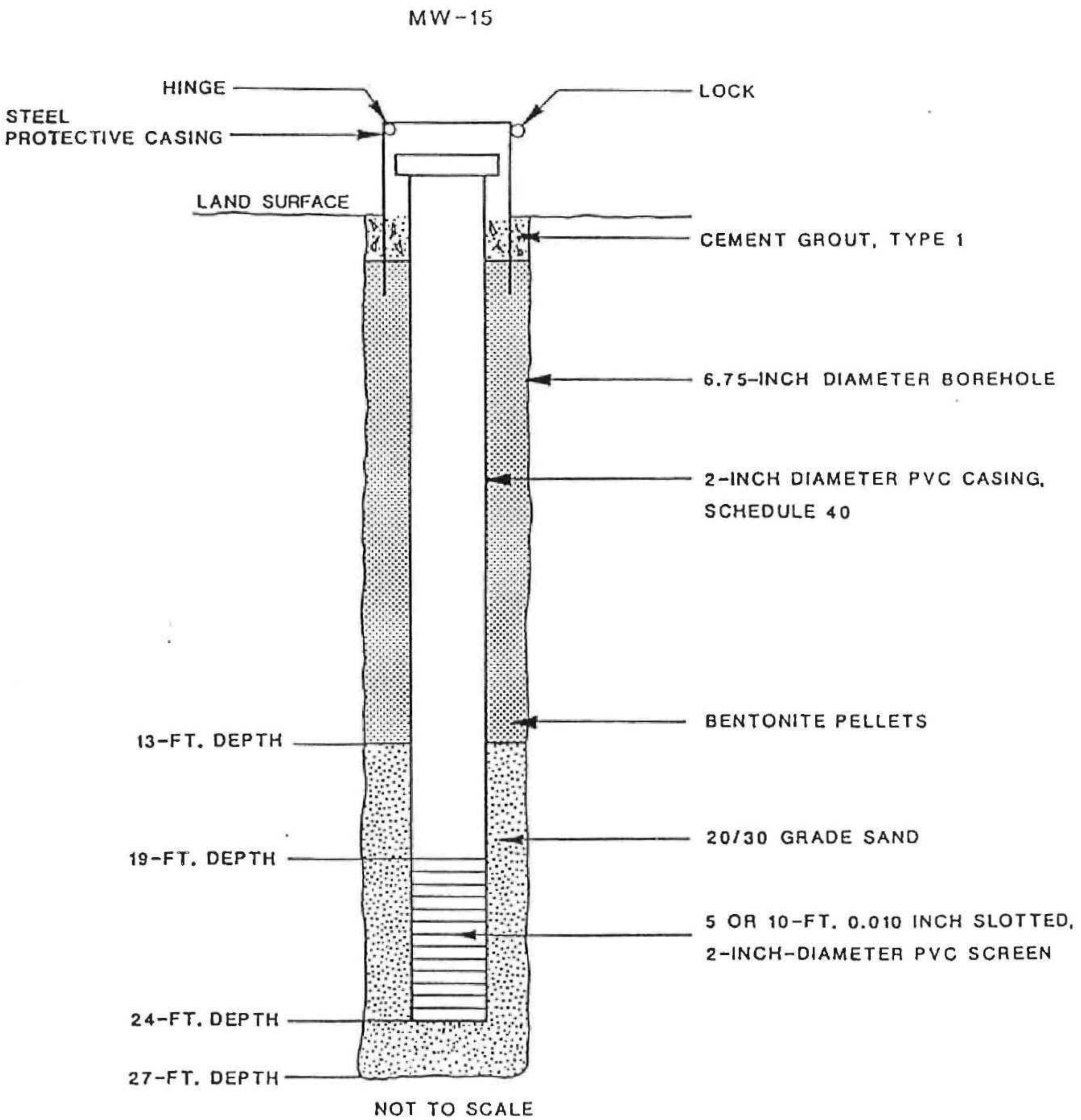
LITHOLOGIC LOG OF BORING B-63 (MONITOR WELL MW-14)

Description	Depth (ft)	Thickness (ft)
Clay, silty, slightly sandy, dark orange...	0 - 4	4
Clay, very sandy, slightly silty, orange...	4 - 11	7
Clay, sandy, dark orange, chert and sandstone pebbles..............................	11 - 12	1
Clay, silty, sandy, orange, firm...........	12 - 15	3
Clay, very sandy, silty, orange	15 - 19	4
Clay, very sandy, silty, dark orange.......	19 - 21	3
Clay, silty, slightly sandy, gray, orange, and buff, horizontally laminated, firm.....	21 - 25	4

LITHOLOGIC LOG OF BORING B-71 (MW-15)

Description	Depth (ft)	Thickness (ft)
Fill and gravel	0 - 4	4
Chert; sand, fine to medium-grained, orange, tan	4 - 5	1
Clay, some sand, fine to medium-grained, orange; chert	5 - 11.5	6.5
Clay, orange; some sand, fine to medium-grained	11.5 - 13	1.5
Sand, fine to medium-grained, brown; some clay	13 - 16	3
Clay, orange; some sand, fine-grained, orange	16 - 17	1
Sand, fine to coarse-grained, red-orange; some clay; chert	17 - 18	1
Clay, orange; some sand, fine to medium-grained, orange; chert	18 - 19	1
Sand, fine to medium-grained, orange	19 - 23	4
Clay, orange with black silt; some fine to medium-grained sand; trace chert	23 - 27	4
Clay, orange with black silt; minor amounts of fine to medium-grained sand	27 - 39	12

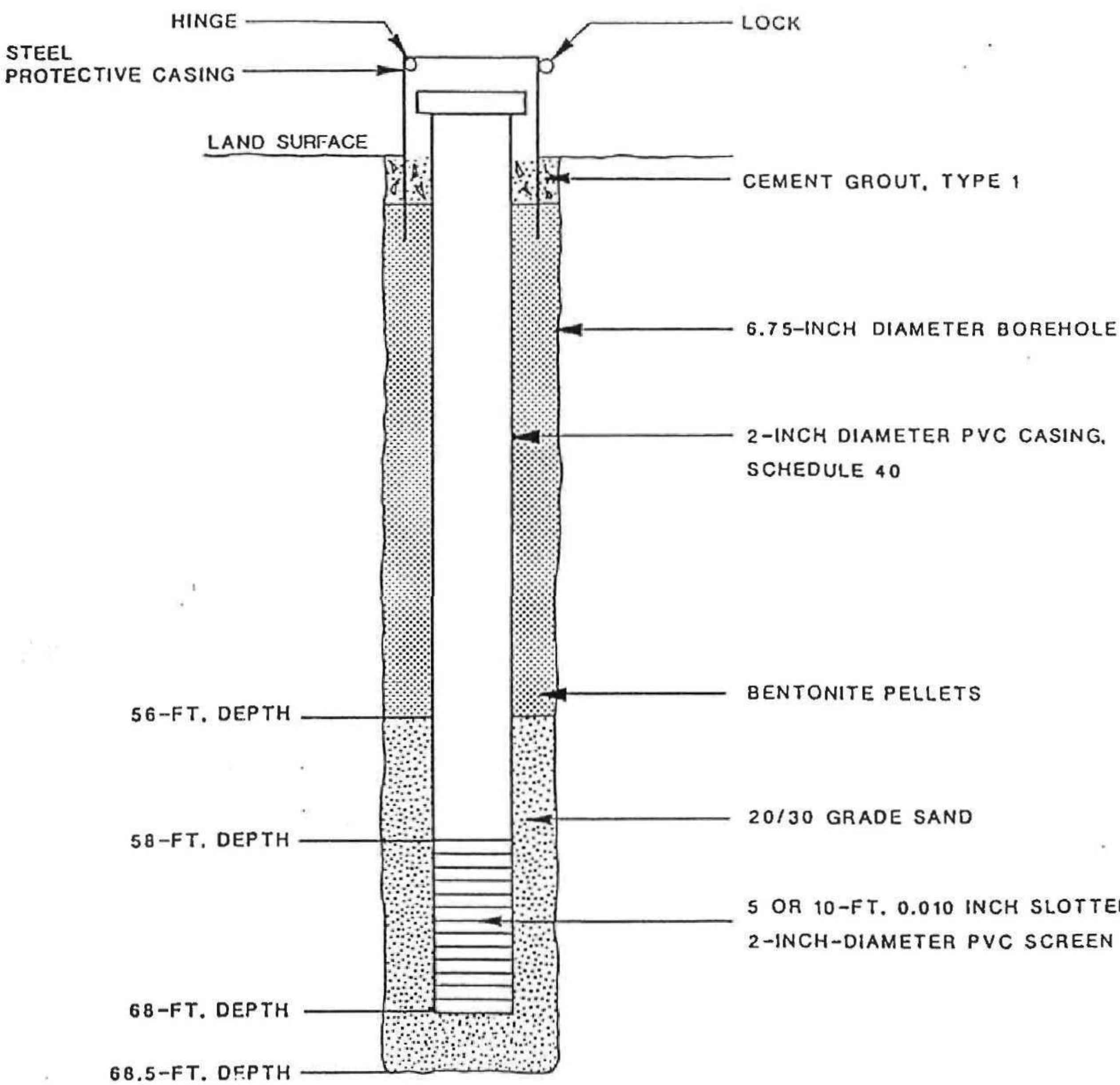


SCHEMATIC DIAGRAM SHOWING THE CONSTRUCTION DETAILS OF MONITOR WELL MW-15.

LITHOLOGIC LOG OF BORING B-74 (MW-16)

Description	Depth (ft)	Thickness (ft)
Fill and gravel..........................	0 - 2	2
Clay, red-orange, soft; some sand, fine to medium-grained; chert..................	2 - 9	7
Sand, fine to coarse grained; chert; minor amounts of silt and clay...........	9 - 12	3
Clay, red-orange, soft; some sand, fine to medium-grained, chert.................	12 - 21	9
Clay, red-orange, mottled; trace chert...	21 - 68	47

MW-16



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SC MATIC DIAGRAM SHOWING THE CONSTRUCTION DETAILS OF MONITOR WELL MW-16.

LITHOLOGIC LOGS FOR MONITOR WELL MW-20A

Description	Depth (ft)	Thickness (ft)
Fill material (clay, sandy, reddish-brown; concrete and dolomite fragments)..........	0.0 - 2.0	2.0
No recovery...............................	5.0 - 7.0	2.0
Fill material (as above)..................	8.0 - 9.0	1.0
Clay, silty, mottled gray, reddish-brown, and light orange.........................	9.0 - 10.0	1.0
No recovery...............................	13.0 - 15.0	2.0
Clay, sandy, mottled reddish-brown and light brown; sandstone fragments, course-to fine-grained, gray (fresh) to reddish-brown (weathered), with black organic inclusions......................	18.0 - 20.0	2.0
Clay (as above); sandstone (as above).....	23.0 - 25.0	2.0

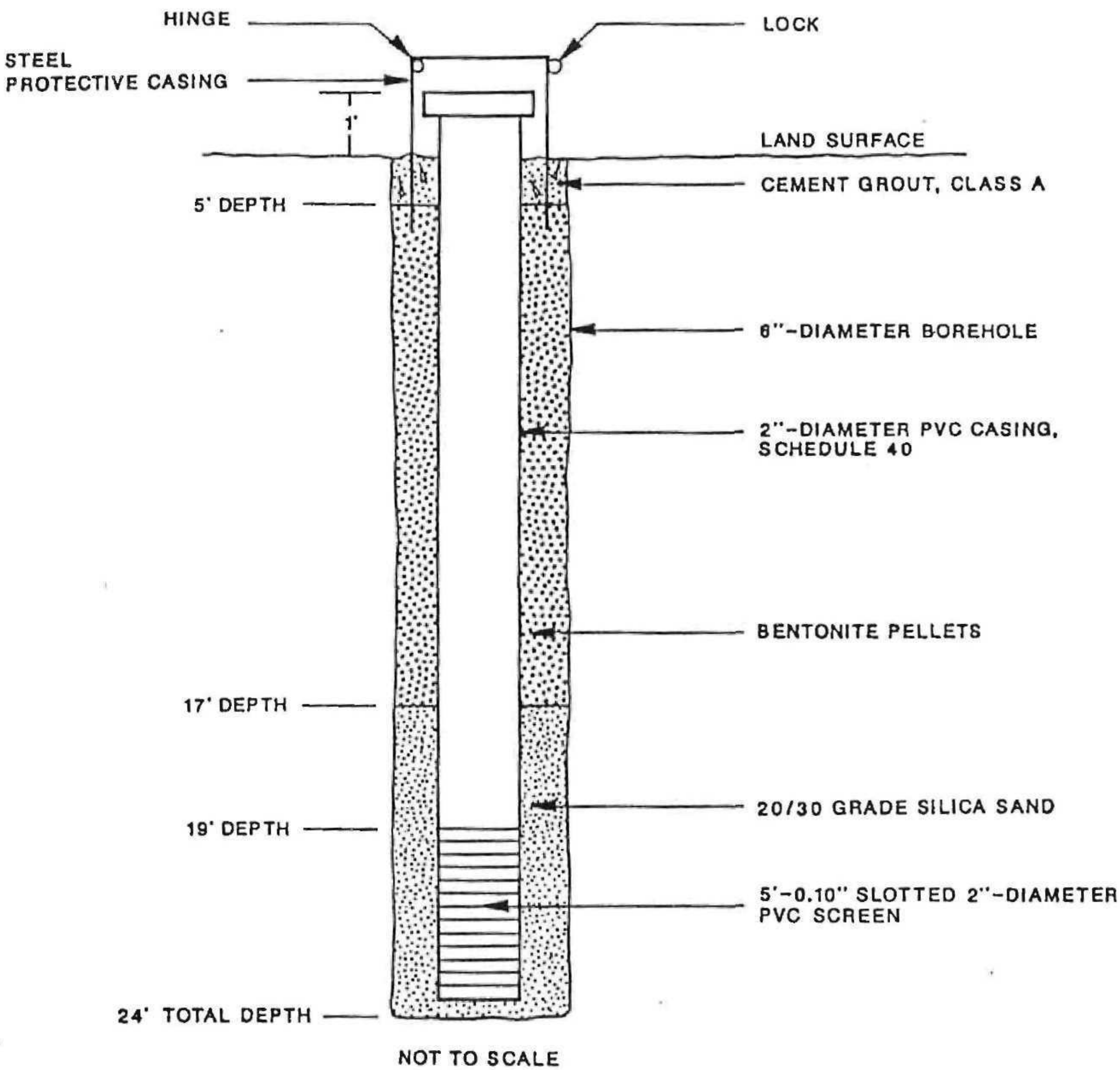


Table B-1.

Well Construction Diagram of Monitor Well MW-20A.

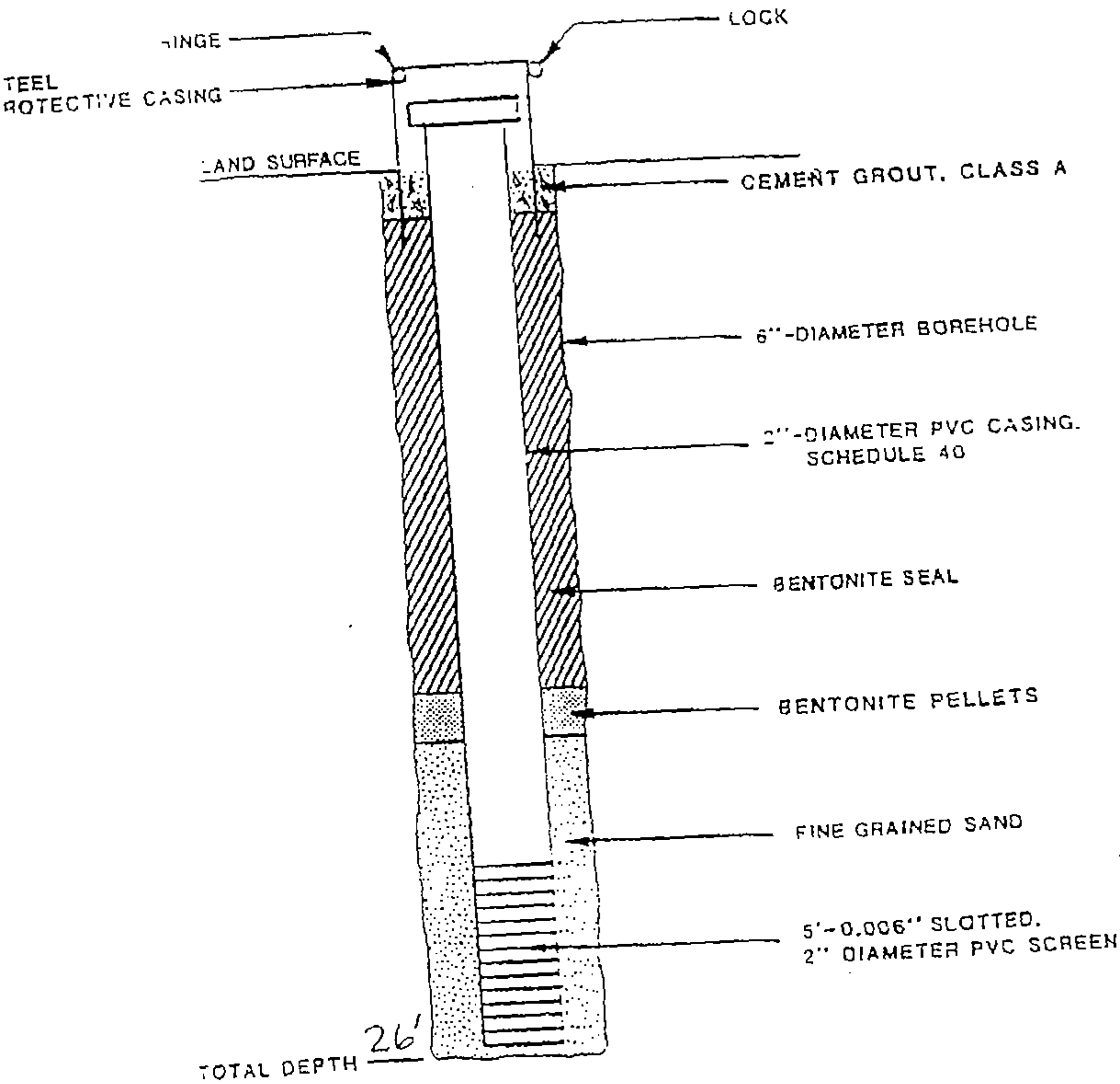
CLIENT NAME:

Monsanto Chemical Company

(OW-1) (B-19, P-10)

Figure B-20. Lithologic Log of Cased Boring P-18-C.

Description	Depth (ft)	Thickness (ft)
Sand, fine to medium-grained, clayey, loose; interlayered with gravel; trace of organics.......... ..	0 - 4	4
Sandstone, well indurated, poorly sorted, white to yellow; soft slightly sandy clay..................	4 - 6	2
Sand, fine to medium-grained, clayey, loose, interlayered with gravel and rock fragments.............	6 - 9	3
Clay, sandy, fine to medium-grained, dense; rock fragments....................................	9 - 14	5
Clay, very sandy, fine-grained, dense, reddish-orange..	14 - 15	1
Sand, fine-grained, compact, reddish-orange; soft clay...	15 - 15.5	0.5
Clay, dense, crumbly, white to orange; tract of silt...	15.5 - 19	3.5
Clay, sandy, fine-grained, reddish-orange; trace of silt and rock fragments...........................	19 - 23	4
Sand, fine-grained, loose, very wet; silt; trace of clay and rock fragments..........................	23 - 25	2
Clay, slightly silty, dense, crumbly, orange to purple..	25 - 26	1



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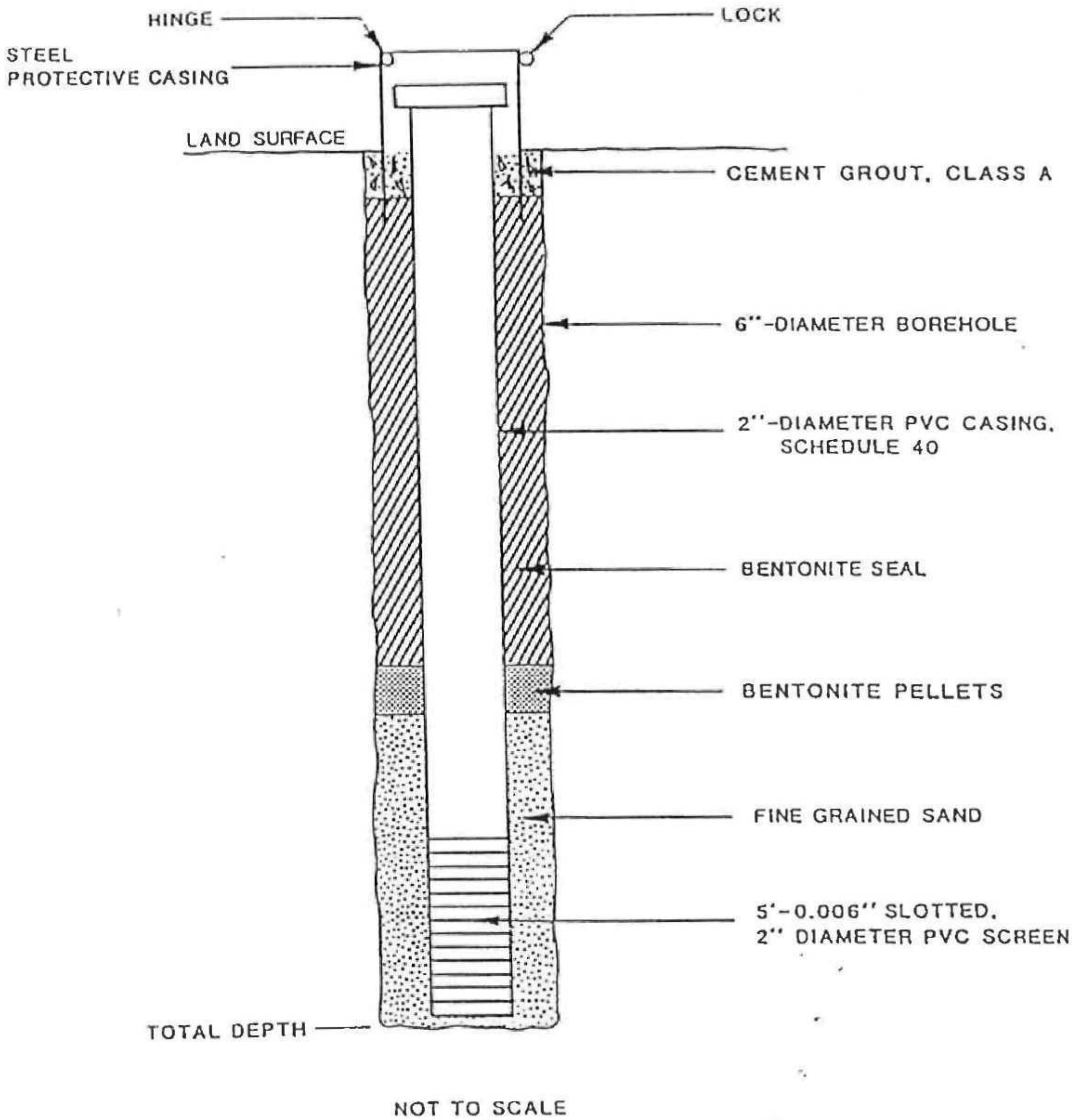
Construction Diagram for Observation Well OW-1

Lithologic Log of Observation Well OW-2 (P58)

Description	Depth (ft)	Thickness (ft)
Sand, clayey, silty, cobbles, gravel and occassional boulders, orangish-brown to orange	0 - 5	5
Clay, silty, sandy, gravel, cobbles, and boulders, reddish-orange to orange	5 - 15	10
Clay, slightly silty, light maroon, light gray and orange, vertically laminated, waxy	15 - 21	6
Clay, slightly sandy, slightly silty, maroon and orange, vertically laminated, thin sandy lenses	21 - 25	4
Clay, slightly sandy, slightly silty, maroon and orange, vertically laminated, very sandy lenses	25 - 34	9
Clay, medium gray, massive	34 - 35	1

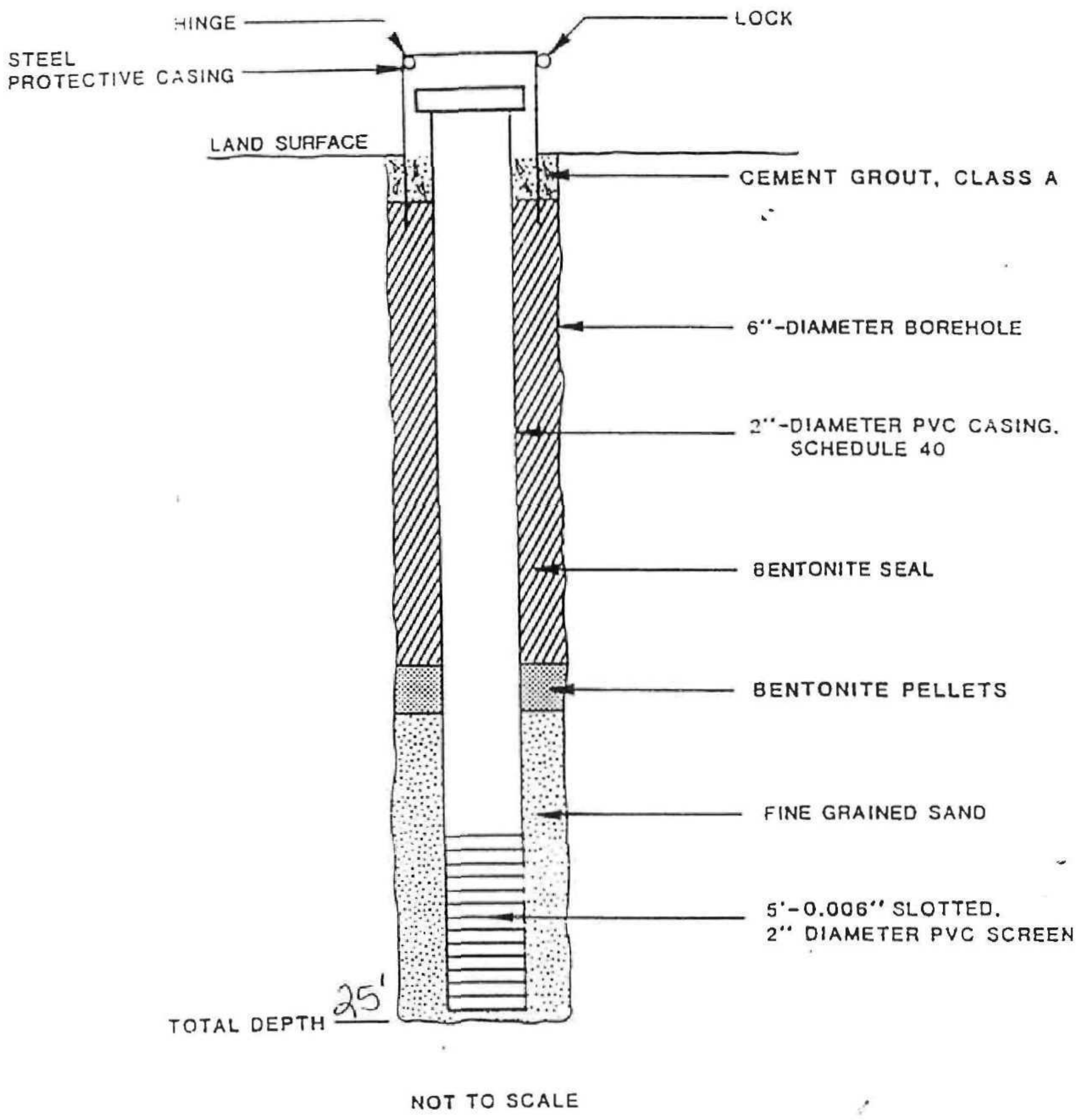


Construction diagram of Observation Well OW-2.

OW-3

LITHOLOGIC LOG OF BORING B-57 (OBSERVATION WELL P-57)

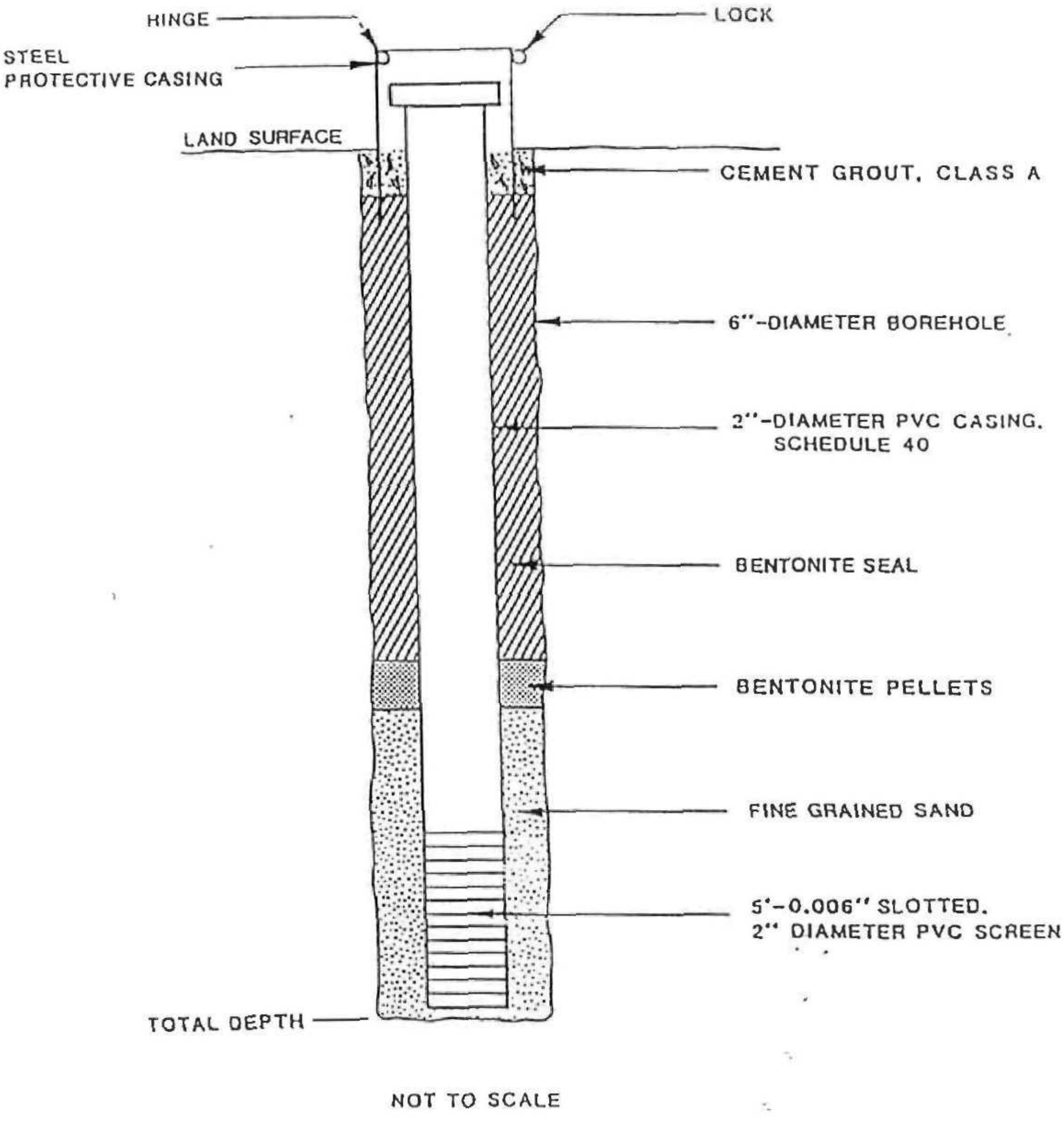
Description	Depth (ft)	Thickness (ft)
Sand, clayey, gravelly, cobbles, orangish-brown to orange..........................	0 - 5	5
Clay, sandy, gravelly, cobbles and boulders, brownish-orange.................	5 - 10	5
Clay, silty, sandy, gravelly, cobbles and occassional boulders; orange, reddish-orange, and light gray....................	10 - 14	4
Clay, silty, slightly sandy, light gray and reddish-orange to orange.............	14 - 19	5
Clay, silty, light gray and reddish-orange to orange................................	19 - 25	6



Construction diagram of Observation Well OW-3.

Lithologic Log of Observation Well OW-4 (P56)

Description	Depth (ft)	Thickness (ft)
Sand, gravelly, clayey, orangish-brown....	0 - 3	3
Boulders, cobbles, and pebbles in sandy clay matrix, orange........................	3 - 11	8
Clay, sandy, silty, gray, reddish-orange, and orange, firm..........................	11 - 15	4
Clay, silty, sandy, orange to reddish-orange....................................	15 - 21	6
Clay, silty, slightly sandy, gray, reddish-orange, and orange, firm..........	21 - 30	9

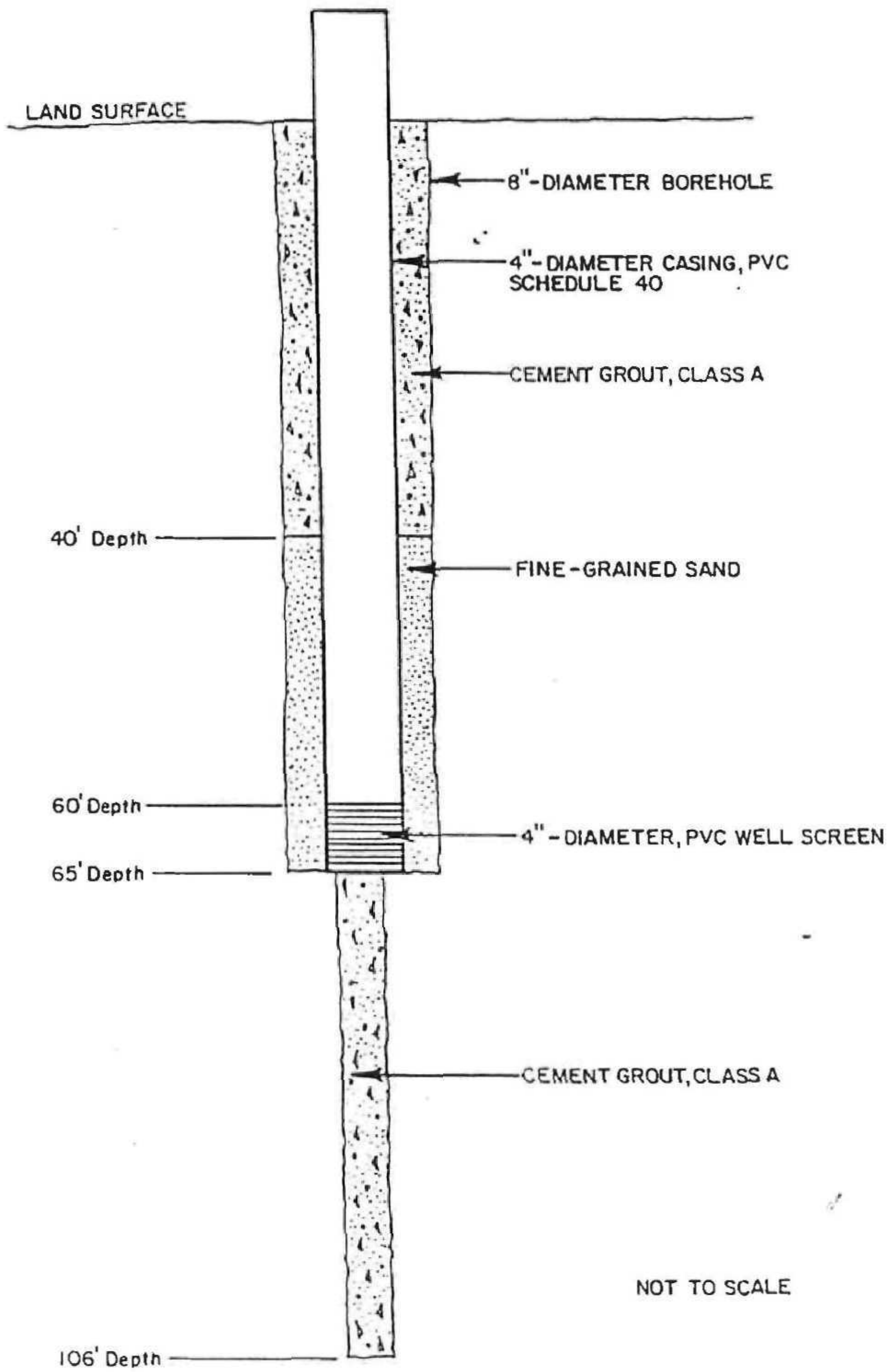


Construction diagram of Observation Well OW-4.

OW-5

Lithologic Log of Boring B-35 (Monitor Well MW-5)

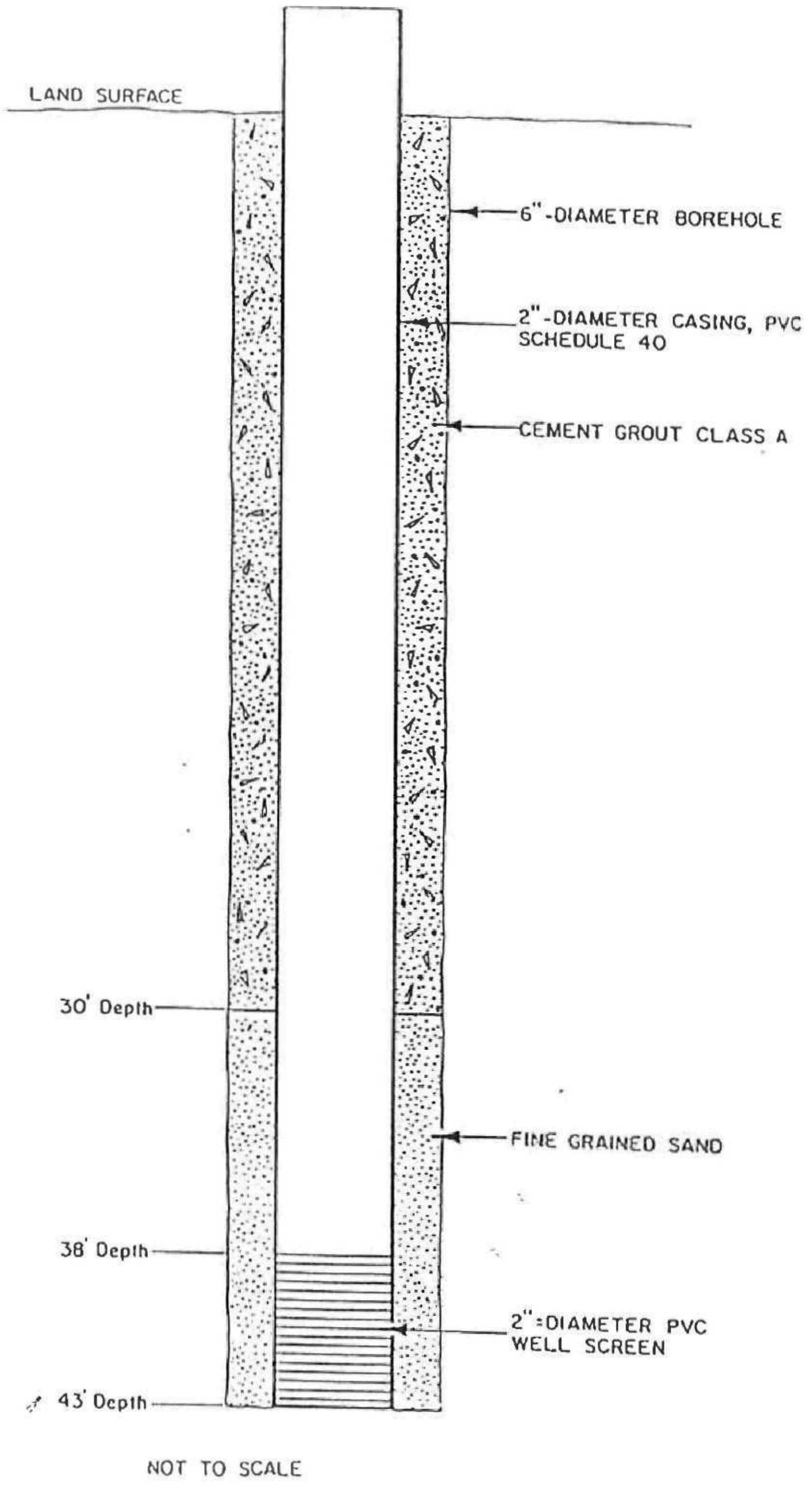
Description	Depth (ft)	Thickness (ft)
Clay, silty, slightly sandy, very hard, brown; sandstone fragments throughout samples	0 - 8	8
Clay, silty, very hard, damp, gray and reddish-brown	8 - 32	24
Clay, silty, very hard, damp, gray, olive-green, orange, and reddish-brown	32 - 42	10
Clay, silty, very hard, damp, gray and reddish-brown	42 - 49.5	7.5
No recovery	49.5 - 51.0	1.5
Clay, silty, hard, damp, reddish-brown	51 - 55.5	4.5
Clay, sandy, hard, moist, pliable, orange, gray, and reddish-brown	55.5 - 58.0	2.5
Clay, silty, very hard, damp, purple and reddish-brown	58 - 68	10
Clay, very silty, hard, damp, purple, reddish-brown, orange, and gray	68 - 79.5	11.5
No recovery	79.5 - 81.0	1.5
Clay, very silty, slightly sandy, damp, yellow; several small (1") lenses of medium to coarse-grained sand	81 - 93	12
Silt, clayey, slightly sandy, wet, very soft, damp, brown and yellow	93 - 98	5
Clay, silty, hard, damp, friable, reddish-brown, purple, and gray	98 - 103	5
Clay, silty, stiff, moist, pasty, orange and red	103 - 106	3



Construction diagram of Observation Well OW-5.

Lithologic Log of Observation Well OW-6 (MW-4)

Description	Depth (ft)	Thickness (ft)
Clay, silty, slightly sandy, very stiff, damp, orange	0 - 7	7
Clay, silty, very stiff to hard, damp, orange and white	7 - 17	10
Clay, slightly silty, stiff, damp, pliable, purple; stringers of orange silt	17 - 20.5	3.5
Clay, silty, stiff, damp, friable, purple to reddish-brown; stringers of orange silt	20.5 - 23	2.5
Clay, silty, stiff, moist, friable, purple; stringers of orange silt	23 - 28	5
Clay, silty, stiff, moist, pliable, purple to reddish-brown; stringers of yellow silt	28 - 30.5	2.5
Silt, clayey, hard, moist, friable, yellow and purple to reddish-brown	30.5 - 33	2.5
Clay, very silty, very stiff, moist, purple to reddish-brown, yellow, and white	33 - 34	1
Gravel, wet, white and yellow	34 - 34.5	0.5
Clay, very silty, very stiff to hard, moist, purple to reddish-brown, yellow and white	34.5 - 38	3.5
Clay, very silty, very stiff, moist, purple to reddish-brown and yellow	38 - 39.5	1.5
Sand, medium to coarse-grained, silty, very wet, yellow; gravel	39.5 - 40.5	1
Clay, very silty, hard, moist, purple to reddish-brown, yellow, and white; trace of sand	40.5 - 43	2.5
Clay, very silty, hard, moist, gray to blue-green; yellow silt stringers	43 - 45	2



Construction diagram of Observation Well OW-6.

Lithologic Log of Observation Well OW-7 (P59)

Description	Depth (ft)	Thickness (ft)
Sand, clayey, orangish-brown..............	0 - 3	3
Clay, sandy, reddish-orange to orange, trace gravel.............................	3 - 5	2
Clay, very sandy, slightly silty, orange, occassional cobble and gravel............	5 - 10	5
Clay, sandy, orange; trace gravel.........	10 - 14	4
Clay, very silty, pale purple to maroon, friable................................	14 - 22	8
Silt, clayey, pale purple to gray.........	22 - 28	6
Silt, sandy, slightly clayey, pale purple and light orange..................	28 - 31	3
Clay, very silty, pale purple to maroon, friable................................	31 - 33	2
Clay, very silty, pale purple and light greenish-gray; trace sand.................	33 - 37	4
Silt, clayey, sandy, purple, platey, shale-like...............................	37 - 42	5
Clay, silty, sandy, orange, purple and gray, laminated, firm....................	42 - 43	1

Lithologic Log of Observation Well OW-8 (P47)

Description	Depth (ft)	Thickness (ft)
Sand, slightly clayey, orangish-brown to orange	0 - 3	3
Clay, sandy, cobbly, orange	3 - 7	4
Clay, sandy, reddish-orange, trace cobble	7 - 15	8
Clay, sandy, reddish-orange to buff, damp, trace gravel; cobbles at 17'	15 - 20	5
Clay, sandy, reddish-orange, very sandy 22-23'	20 - 30	10
Clay, sandy, reddish-orange, pebble fragments and some gravel	30 - 40	10

Lithologic Log of Observation Well OW-9 (C-1)

Description	Depth (ft)	Thickness (ft)
Clay, silty, stiff, damp, light brown; trace of fine-grained sand................	1 - 2.5	1.5
Clay, silty, very stiff, light brown; trace of fine-grained sand................	3.5 - 5	1.5
Clay, very stiff, reddish-orange; carbonaceous material......................	6 - 7.5	1.5
Clay, slightly silty, very stiff, reddish-brown; fine-grained sandstone.............	8.5 - 10	1.5
Clay, slightly silty, very stiff, reddish-brown; fine-grained sandstone, hematite fragments................................	11 - 12.5	1.5
Clay, slightly silty, very stiff, reddish-orange; fine-grained sandstone; pebble hematite.................................	13.5 - 15	1.5
Clay, silty, very stiff, reddish-orange; fine-grained sandstone fragments..........	16 - 17.5	1.5
Clay, silty, very stiff, reddish-orange, fine-grained sandstone fragments..........	18.5 - 20	1.5
Clay, very stiff, light orange............	21 - 22.5	1.5
Clay, stiff, light orange.................	23.5 - 25	1.5
Clay, slightly silty, very stiff, pliable, reddish-brown; pebble sandstone, pebble henatite................................	26 - 27.5	1.5
Clay, stiff, pliable, reddish-brown; carbonaceous material.....................	28.5 - 30	1.5
Clay, slightly silty, stiff, pliable, reddish-brown; carbonaceous material......	31 - 32.5	1.5
Clay, slightly silty, stiff, pliable, reddish-brown; carbonaceous material; trace of fine-grained sand................	33.5 - 35	1.5
Clay, very stiff, pliable, brown..........	36 - 37.5	1.5
Clay, very stiff, pliable, brown..........	38.5 - 40	1.5

Lithologic Log of Observation Well OW-10 (C-2)

Description	Depth (ft)	Thickness (ft)
Clay, soft, reddish-brown..................	1 - 2.5	1.5
Clay, silty, firm, pasty, light brown; rock fragments..........................	3.5 - 5	1.5
Clay, silty, sandy, very stiff, reddish-brown; fine-grained sandstone.............	6 - 7.5	1.5
Clay, silty, stiff, reddish-brown; trace of fine-grained sand......................	8.5 - 10	1.5
Clay, silty, stiff, soft, reddish-brown; pebble sandstone and hematite............	11 - 12.5	1.5
Clay, silty, very stiff, soft, reddish-brown; pebble sandstone; trace of sand....	13.5 - 15	1.5
Clay, slightly silty, very stiff, reddish-orange; trace of coarse-grained sand......	16 - 17.5	1.5
Clay, slightly silty, very stiff, reddish-orange; trace of coarse-grained sand......	18.5 - 20	1.5
Clay, silty, very stiff, reddish-orange...	21 - 22.5	1.5
Clay, slightly silty, very stiff, reddish-orange.................................	23.5 - 25	1.5
Clay, slightly silty, very stiff, reddish-orange.................................	26 - 27.5	1.5
Clay, slightly silty, very stiff, reddish-orange; carbonaceous material............	28.5 - 30	1.5
Clay, very stiff, moist, pliable, reddish-orange.................................	31 - 32.5	1.5
Clay, very stiff, reddish-brown; carbonaceous material.....................	33.5 - 35	1.5
Clay, very stiff, reddish-brown; carbonaceous material.....................	36 - 37.5	1.5
Clay, slightly silty, very stiff, reddish-brown; carbonaceous material.............	38.5 - 40	1.5

OW-11 (B-24, P-24)

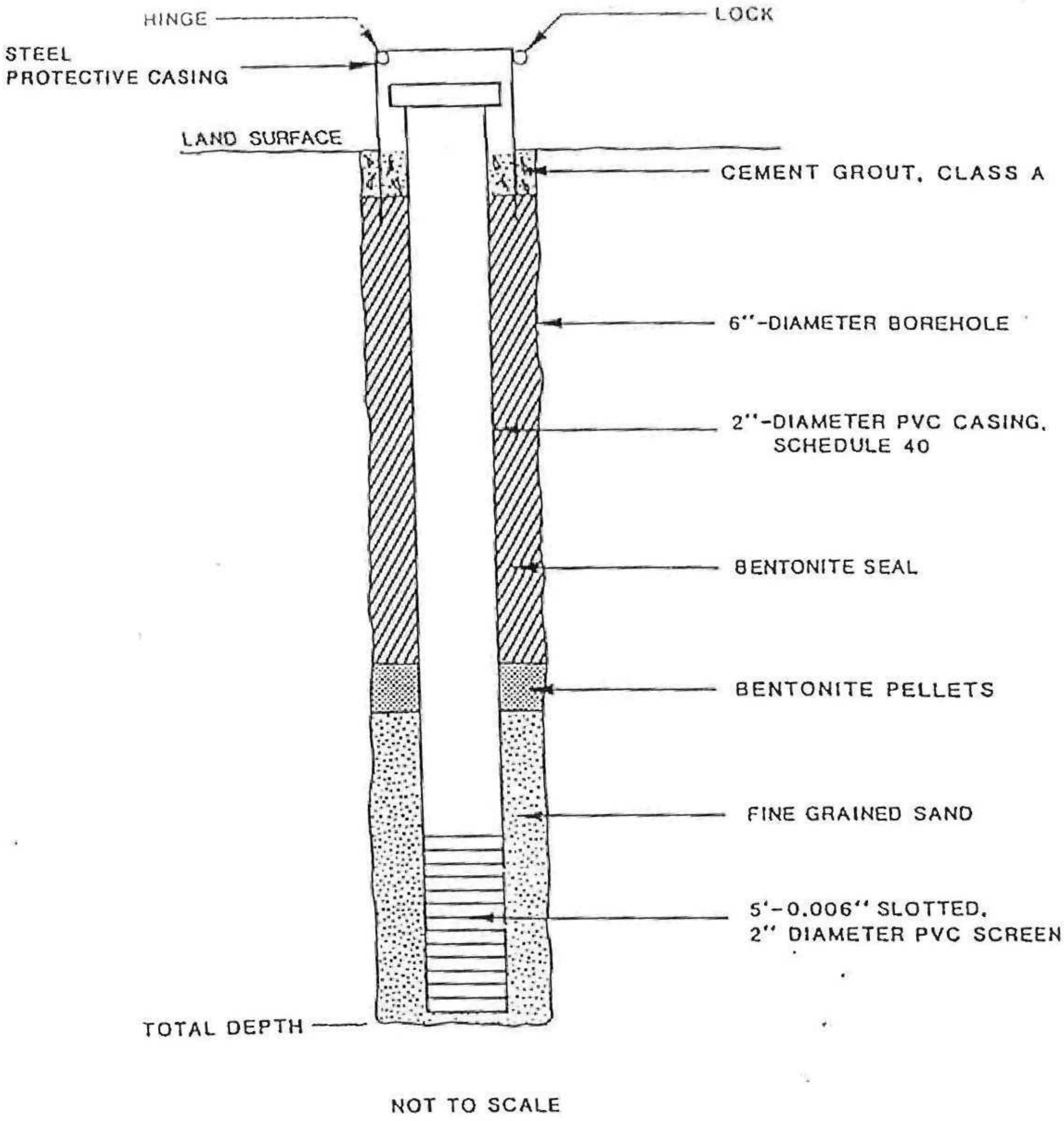
Figure B-26. Lithologic Log of Cased Boring P-23-C.

Description	Depth (ft)	Thickness (ft)
Sand, very clayey, fine-grained, loose; brown; trace of organics..................................	0 - 5	5
Clay, sandy, fine to medium-grained, loose, reddish-brown....................................	5 - 9	4
Clay, silty, pliable, wet, reddish-orange to tan..	9 - 10	1
Clay, slightly sandy, fine to medium-grained, reddish orange..................................	10 - 12	2
Clay, very sandy, fine to medium grained, soft, very wet, olive green; silt......................	12 - 13	1
Clay, dense, stiff, tight, orange to reddish-brown..	13 - 14	1

OW-12 (B-25, P-25)

Figure B-27. Lithologic Log of Cased Boring P-24-C.

Description	Depth (ft)	Thickness (ft)
Sand, very clayey, very fine-grained, loose; sandstone fragments..................................	0 - 5	5
Clay, very sandy, fine-grained, loose, reddish-orange; sandstone fragments; several small lenses of loosely consolitated, medium-grained sandstone.	5 - 15	10
Clay, dense, soft, pliable, reddish-brown; trace of fine to medium-grained sand....................	15 - 18	3
Clay, dense, very stiff, tight, reddish-orange; trace of medium-grained sand....................	18 - 22.5	4.5
Clay, dense, very stiff, tight, white to orange; trace of silt..................................	22.5- 24.5	2
Clay, slightly silty, dense, soft, pliable, white to orange; 2" lense of very wet, silty, very fine-grained sand just below 25 ft..........	24.5- 27.5	3
Clay, soft, pliable, purple; trace of silt located in stringers............................	27.5- 29	1.5
Clay, slightly sandy, fine to medium-grained; dense, stiff, dry, purple with multicolored layers; 3" orange silt lense just above 30 ft....	29 - 32	3
Sandy silt, very fine to fine-grained, very wet, orange..	32 - 33.5	1.5
Clay, dense, very stiff, tight, purple...........	33.5- 34.5	1



Schematic diagram of Observation Wells OW-7, OW-8 , OW-9 through OW-12.

OW-13

Figure B-15. Lithologic Log of Boring P-13-B.

Description	Depth (ft)	Thickness (ft)
Sand, clayey, fine-grained; pebbles and cobble size sandstone (fill material)........................	0 - 6	6
Clay, sandy, fine-grained, loose, reddish-brown; pebbles....................................	6 - 9	3
Clay, dense, stiff, reddish-brown; trace of fine-grained sand..................................	9 - 19	10
Clay, dense, soft, pliable, reddish-brown.........	19 - 29	10
Clay, silty, very dense, crumbly, reddish-brown...	27 - 34	5
Clay, dense, soft, pliable, reddish-brown.........	34 - 40	6
Clay, silty, dense, soft, crumbly, reddish-brown, with multi-colored layers........................	40 - 44	4
Clay, silty, soft, very wet, reddish-brown........	44 - 45	1
Clay, dense, very stiff, reddish-brown; trace of fine-coarse-grained sand........................	45 - 49	4
Clay, silty, soft, very wet, reddish-brown........	49 - 50	1
Clay, dense, very stiff, dry, reddish-brown.......	50 - 51	1

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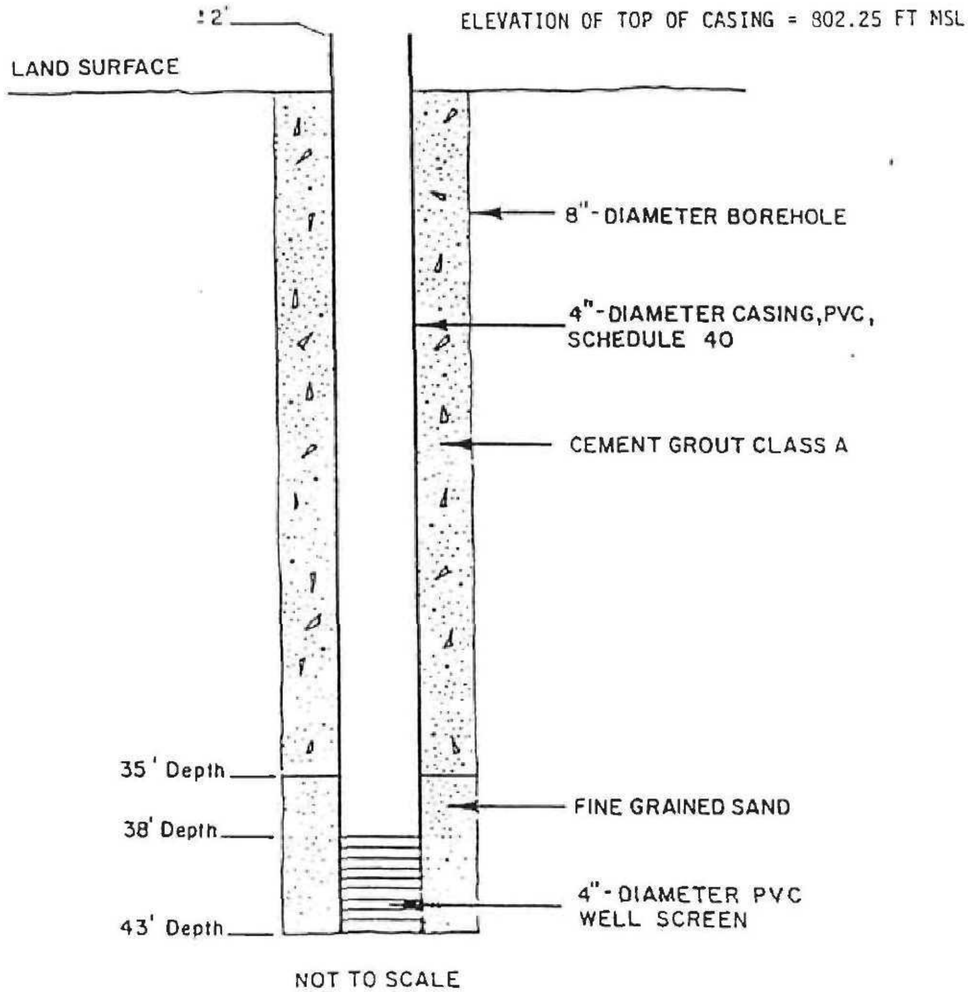
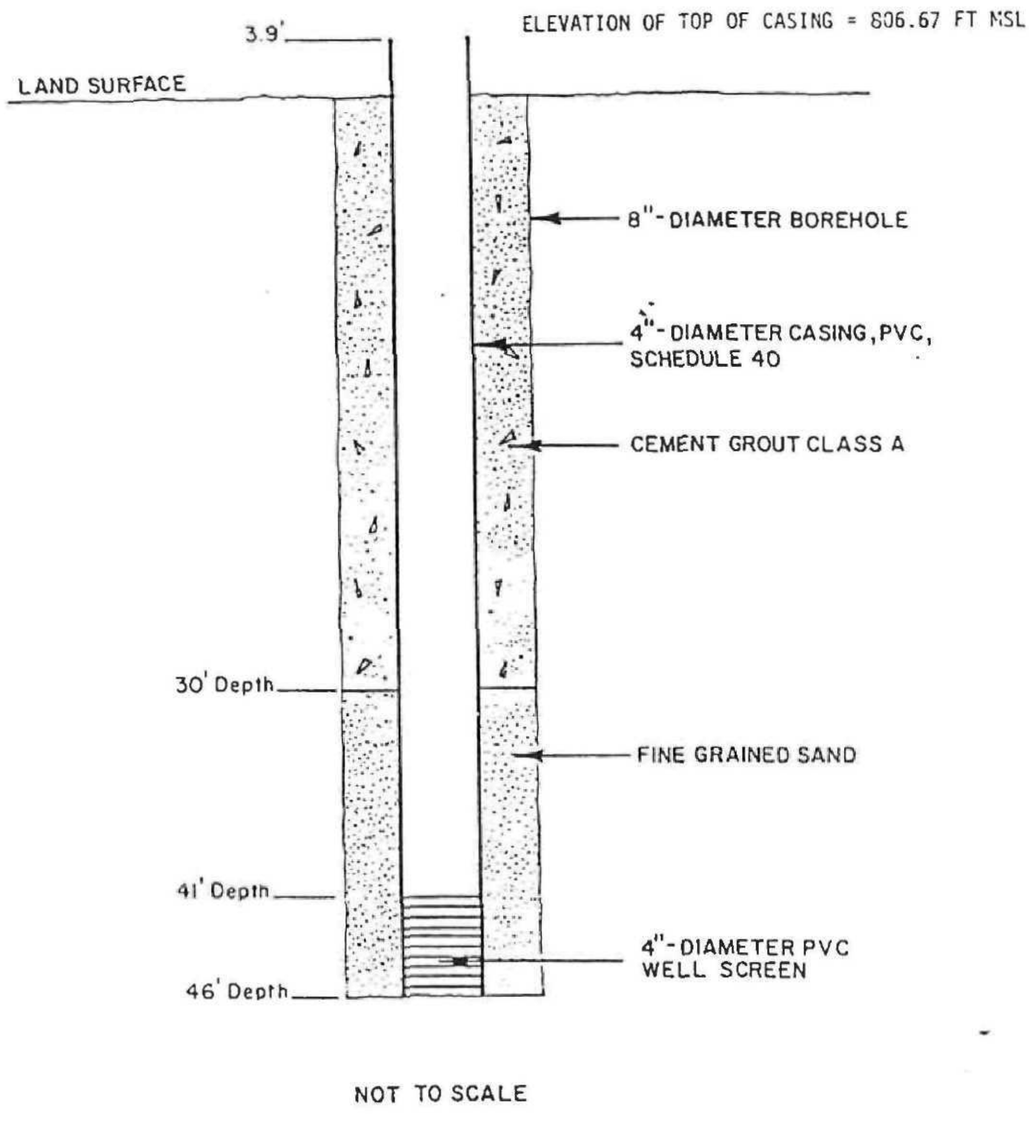


Construction diagram of Observation Well OW-13.

OW-14 (B-15, P-15)

Figure B-16. Lithologic Log of Monitor Well P-14-W.

Description	Depth (ft)	Thickness (ft)
Sand, clayey, fine-grained, silty, loose, reddish-brown	0 - 2	6
Clay, silty, firm, reddish-brown	2 - 5	3
Clay, silty, firm, white to gray	5 - 6	1
Clay, slightly silty, dense, crumbly reddish-brown with multicolored layers	6 - 15	9
Clay, silty, dense, pliable, yellowish brown	15 - 18	3
Clay, silty, soft, crumbly, orange	18 - 21	3
Clay, slightly silty, dense, soft, crumbly reddish-brown	21 - 24.5	3.5
Clay, silty, soft, interlayered with gravel	24.5- 29	4.5
Clay, slightly silty, dense, soft, white to orange; small gravel lense in clay matrix at 35.5'	29 - 40	11
Clay, sandy, fine-grained, soft, crumbly, brown to black; silt	40 - 41	1
Clay, very silty, very soft, trace of gravel	41 - 45	4
Clay, dense, stiff, pliable, white to red	45 - 46	1



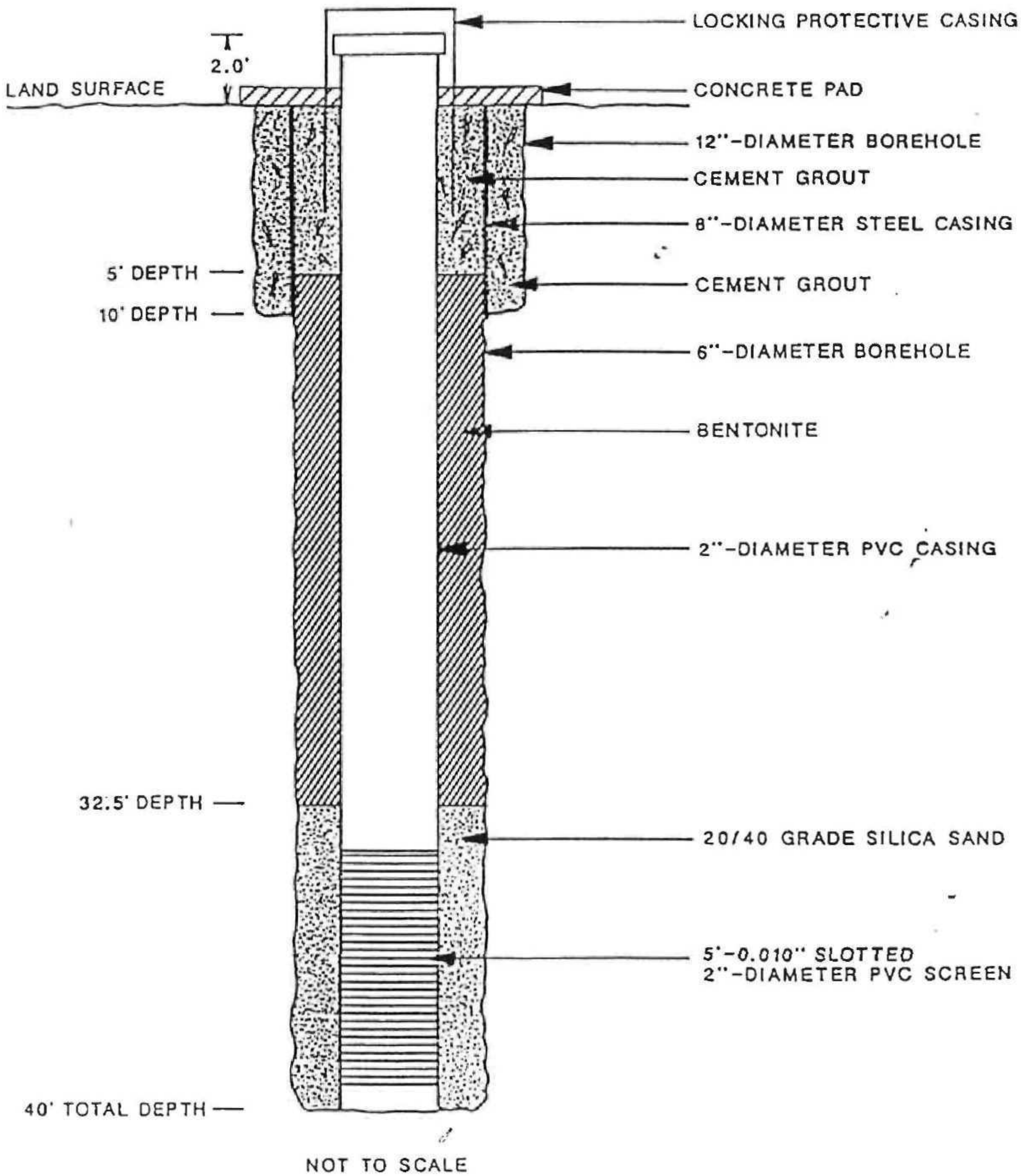
Construction diagram of Observation Well OW-14.

LITHOLOGIC LOG FOR BORING CB-86 (OW-15)

Description	Depth (ft)	Thickness (ft)
Sand, quartz, very fine-grained, silty, dark brown	0.0 - 0.5	0.5
Clay, dry, sandy, dark brown	0.5 - 2.0	1.5
No recovery	2.0 - 7.0	5.0
Clay, dry, mottled dark reddish-orange, light yellowish-brown, and dark gray	7.0 - 8.0	1.0
Clay, sandy, dark brown to tan	8.0 - 9.0	1.0
Clay, damp, tan	9.0 - 9.5	0.5
Clay, damp, mottled light gray, yellowish-brown, and dark gray	9.5 - 10.0	0.5
No recovery	10.0 - 12.0	2.0
Clay, wet, yellowish-brown	12.0 - 14.0	2.0
Clay, wet, mottled yellow, dark brown, dark gray and light gray; clay, very dry, reddish-orange	14.0 - 28.0	14.0
Clay, damp, soft, mottled dark grayish-brown, light gray and yellowish brown	28.0 - 29.5	1.5
Clay, stiff, dry, mottled light gray, yellowish-brown, and purplish-red	29.5 - 30.0	0.5
Clay, damp, mottled yellowish-brown and grayish-brown	30.0 - 33.0	3.0
Clay, stiff, mottled yellowish-brown and reddish-brown	33.0 - 34.0	1.0

Lithologic Log (Continued).

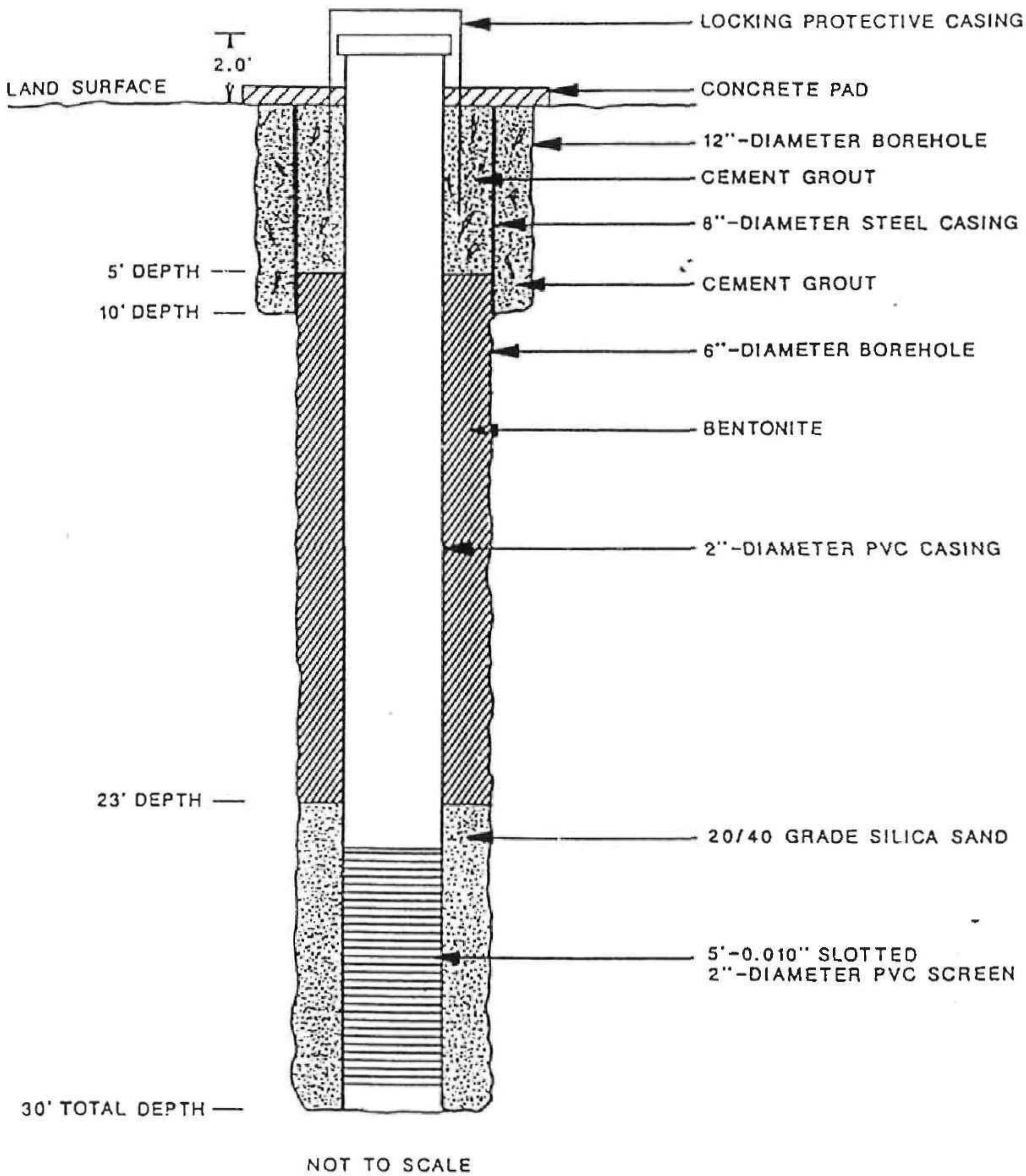
Description	Depth (ft)	Thickness (ft)
Clay, wet, loose, grayish brown...........	34.0 - 35.0	1.0
Clay, sandy, mottled light gray, purple, and yellowish-brown......................	35.0 - 36.0	1.0
Clay, wet, loose, grayish-brown...........	36.0 - 37.0	1.0
Clay, sandy, mottled light gray purple, and yellowish-brown......................	37.0 - 38.0	1.0
Clay, mottled, orangish-brown, light gray, and yellowish-brown......................	38.0 - 40.0	2.0



Construction diagram of Observation Well OW-15.

LITHOLOGIC LOG FOR BORING CB-87 (OW-16)

Description	Depth (ft)	Thickness (ft)
Clay, very sandy, reddish-brown; sandstone, fine- to medium-grained, pale orange-gray	0.0 - 12.0	12.0
Clay, silty, dry, mottled reddish-brown, light gray, and yellow	12.0 - 14.0	2.0
Clay, sandy, dry, reddish-brown; sandstone, fine- to medium-grained, pale orangish-gray	14.0 - 16.0	2.0
Clay, sandy, wet, reddish-brown	16.0 - 18.0	2.0
Clay, purple; shale, purple	18.0 - 22.0	4.0
Clay, mottled purple and light gray; shale (as above)	22.0 - 23.5	1.5
Clay, sandy, reddish-orange; sandstone, fine- to medium-grained, pale orange-gray	23.5 - 26.0	2.5
Clay, silty, very wet, brown; clay inclusions, light gray	26.0 - 29.0	3.0
Clay, mottled light bluish-gray and yellowish-brown	29.0 - 30.0	1.0
Clay, very wet, yellowish-brown	30.0 - 32.0	2.0
Clay, dry, yellowish-brown	32.0 - 34.0	2.0
Clay, mottled light bluish-gray, reddish-brown, and purple	34.0 - 38.0	4.0
Clay, mottled light bluish-gray and reddish-brown	38.0 - 40.0	2.0

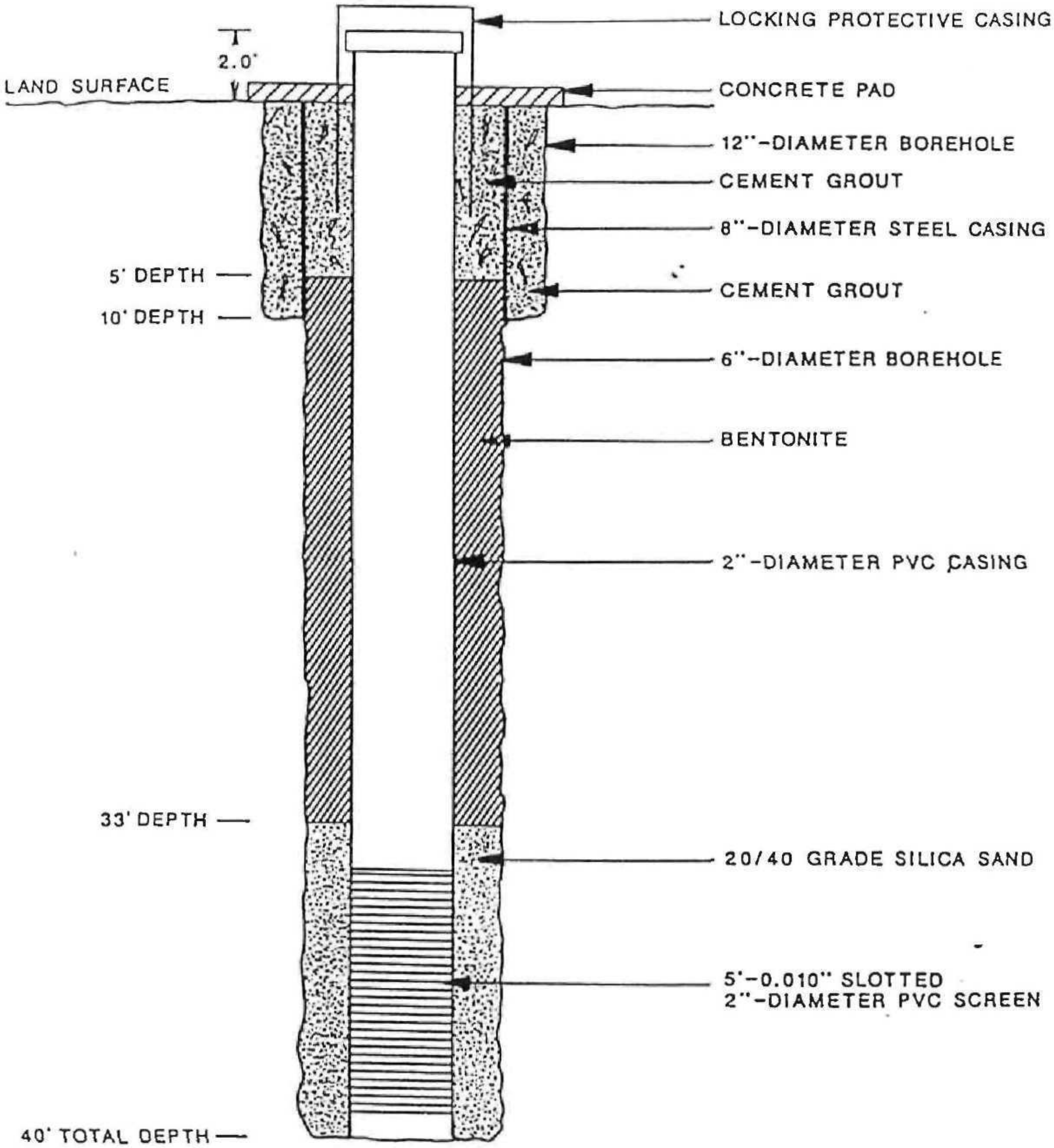


Construction diagram of Observation Well OW-16.

W-17

LITHOLOGIC LOG FOR BORING CB-88

Description	Depth (ft)	Thickness (ft)
Clay, sandy, dry, cohesive, reddish-brown.	0.0 - 7.0	7.0
Clay, dry, cohesive, purplish-red; clay, sandy, orangish-yellow....................	7.0 - 20.0	13.0
Clay, mottled yellowish-brown and light gray..................................	20.0 - 22.0	2.0
Clay, sandy, mottled yellowish-brown and light gray............................	22.0 - 28.0	6.0
Clay, dark purplish-red...................	28.0 - 34.0	6.0
Clay, sandy, mottled yellowish-brown and light gray............................	34.0 - 40.0	6.0

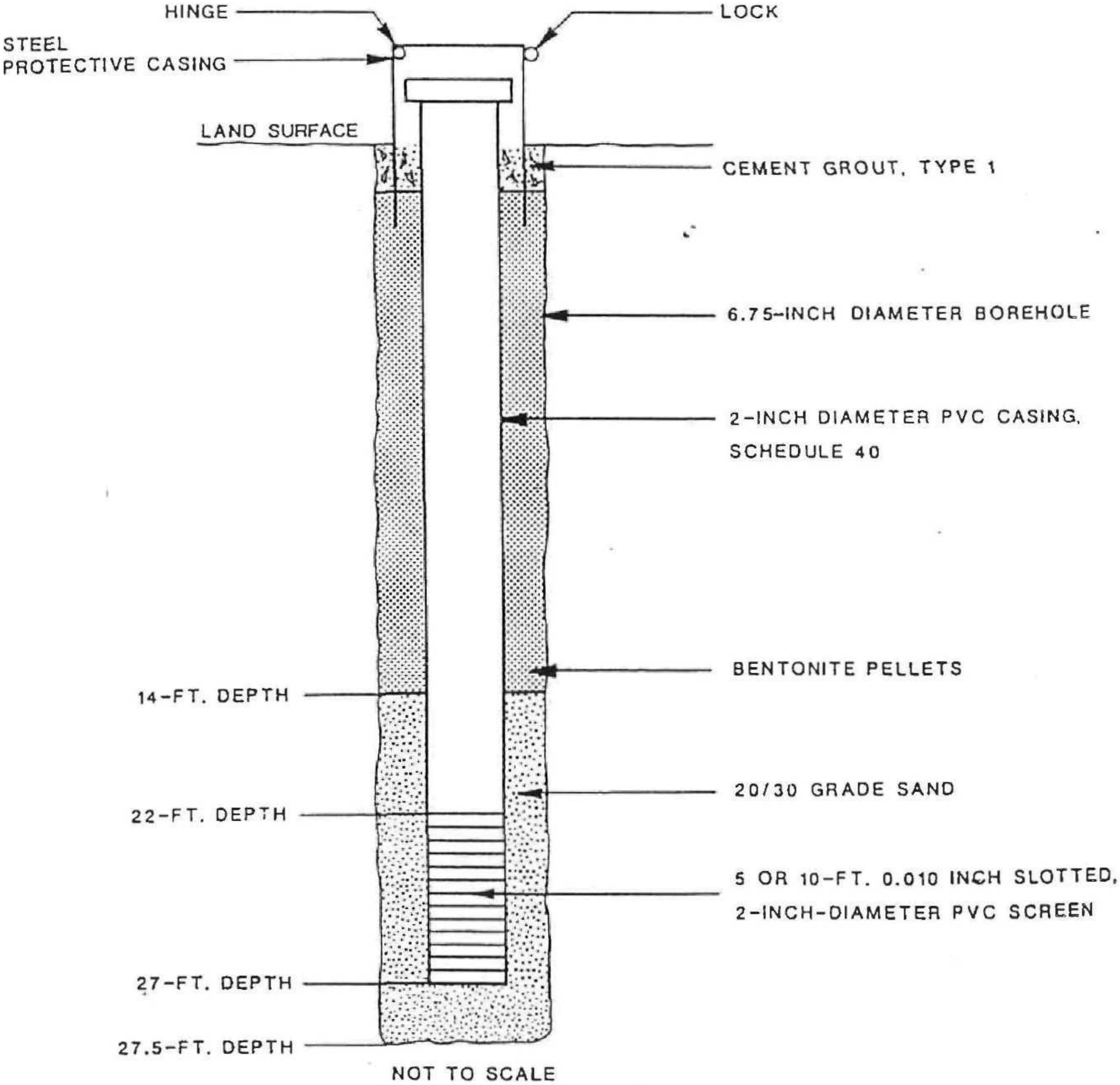


Construction diagram of Observation Well OW-17.

OW-18

LITHOLOGIC LOG OF BORING B-75 (MW-17)

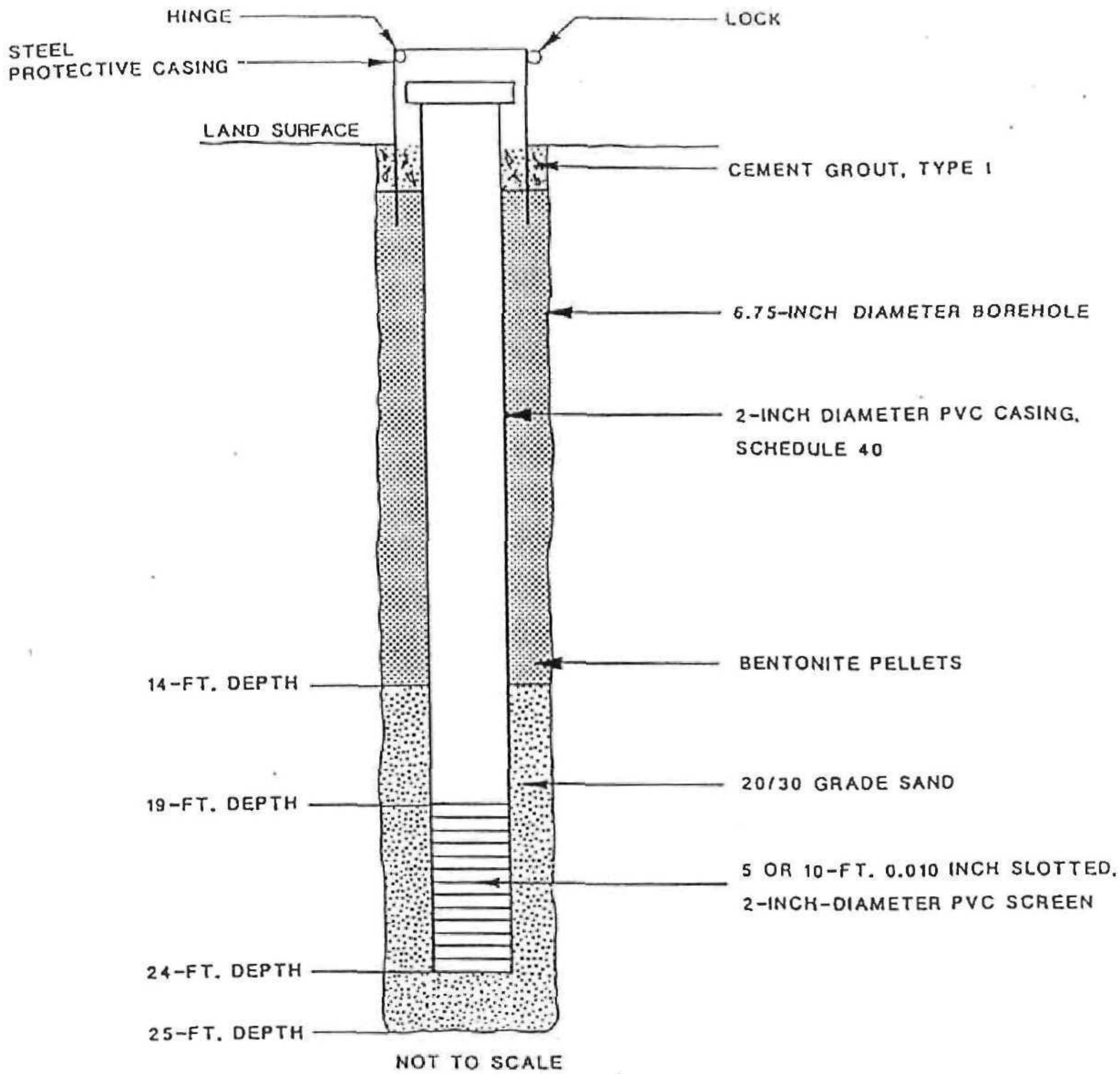
Description	Depth (ft)	Thickness (ft)
Gravel, rock, clay, fill	0 - 3	3
Clay, orange-red; some sand, fine to medium-grained, trace chert	3 - 10	7
Sand, fine to coarse-grained, red-orange; moderate amounts of clay	10 - 15	5
Rock gravel; sand, fine to coarse-grained; some clay	15 - 17.5	2.5
Clay, orange; some fine to medium-grained sand	17.5 - 22	4.5
Sand, fine to coarse-grained, silty, orange	22 - 24	2
Clay, orange, mottled; chert	24 - 27.5	3.5



Construction diagram of Observation Well OW-18.

LITHOLOGIC LOG OF BORING B-76 (MW-18) (OW-19)

)es ‹ption	Depth (ft)	Thickness (ft)
:lay, red..............................	0 - 2.5	2.5
:lay, red-orange, mottled.................	2.5 - 10	7.5
;and, fine to medium-grained; minor clay.	10 - 12.5	2.5
:lay, red-orange, mottled.................	12.5 - 20	7.5
:hert; sand, medium to coarse............	20 - 23	3
:lay, orange-red, mottled; chert.........	23 - 32.5	9.5



Construction diagram of Observation Well OW-19.

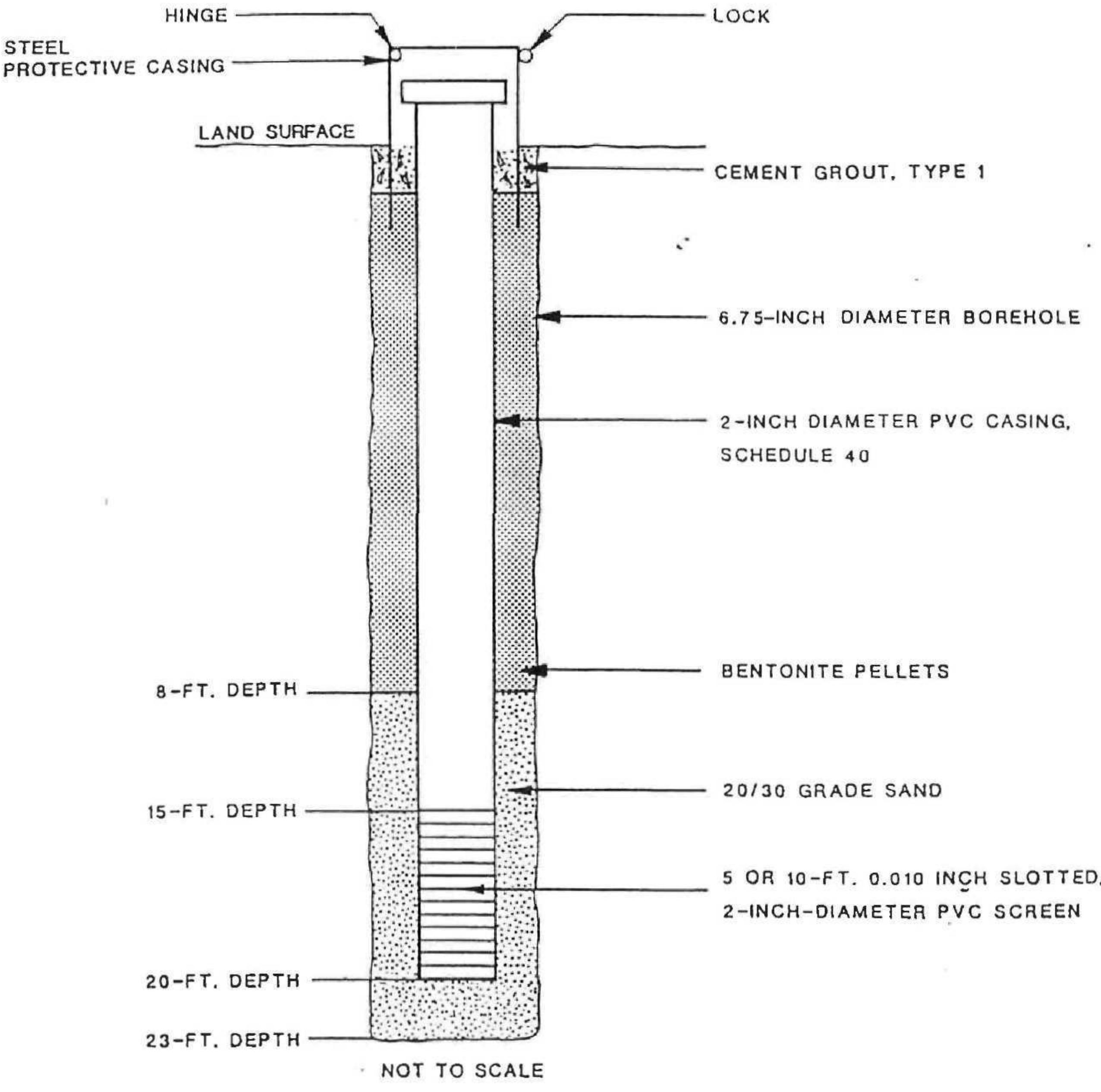
GERAGHTY & MILLER, INC.

CB-78 OW-20

TD doesn't match constr. log

LITHOLOGIC LOG OF BORING B-78 (MW-19)

Description	Depth (ft)	Thickness (ft)
Fill and gravel...........................	0 - 2.5	2.5
Clay, orange, soft........................	2.5 - 8	5.5
Sand, fine to medium-grained, orange.....	8 - 9	1
Clay, orange..............................	9 - 10	1
Sand, fine to medium-grained, orange.....	10 - 12	2
Clay, red and white, soft to mottled; some sand, fine to coarse-grained; chert.	12 - 19.5	7.5
Clay, orange, white, mottled.............	19.5 - 32.5	13.0



Construction diagram of Observation Well OW-20.

GERAGHTY & MILLER, INC.
Environmental Services

SUBJECT: Monsanto – Surface impoundment	BY:	DATE:	PAGE
PROJECT: 0 5 10	CHKD:	DATE:	SHEET 1
Vert. Scale: 1" = 10'			
CLIENT/PROJECT: NO:	REV:	DATE:	

CB-80
OW-21
741.82 (TOC)

rd, bn-blk f-gr minor gravel

rd/org, white, mottled f-gr.

CB-81
OW-22
743.40 (TOC)

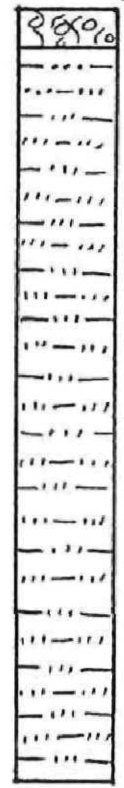
blk, f-gr

rd, org, wh mottled f-cs gr.

← slag

rd, org, white mottled f-cs gr.

CB-83
OW-23
744.68 (TOC)



rd/org mottled f-cs gr

CB-84
OW-24
743.68 (TOC)

rd/org mottled f-cs gr

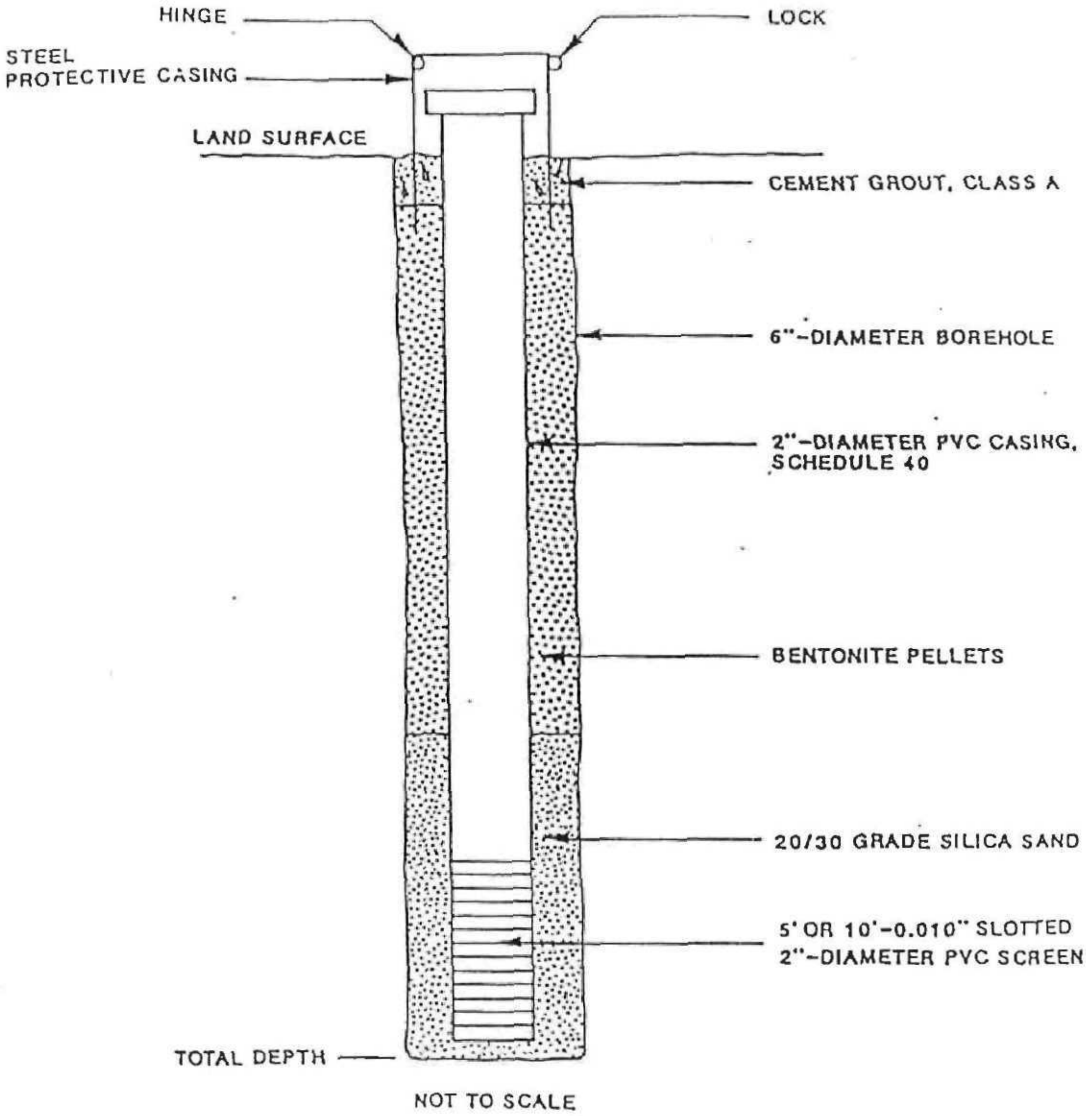
G&M Form 30 6-89 Southprint 89-1294

LITHOLOGIC LOG FOR BORING NUMBER B-81 (OW-22)

Description	Depth (ft)	Thickness (ft)
Sand, fine-grained, black..................	0 - 5.0	5.0
Clay, red, orange, white, mottled; sand fine to coarse grained (few streaks <0.5', from 5-15'); slag at 10'...........	5.0 - 40.0	35.0

LITHOLOGIC LOG FOR BORING NUMBER B-84

Description	Depth (ft)	Thickness (ft)
Road gravel, fill.........................	0 - 2.0	2.0
Clay, red orange, mottled; sand, fine to coarse grained (few streaks <0.5', from 11-13' and 23-25') minor gravel...........	2.0 - 40.0	38.0



Construction diagram of Observation Well OW-21 through OW-24.

Golder Associates

Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, Georgia 30341
Telephone: 770-496-1893
Fax: 770-934-9476

Client: Solutia Inc		Job No.: 943-3680.RFI	Boring/Well: OW-21A
Project: Solutia/Supplemental RFI/CS/AL		Well Construction Data	(ft bgs)
Date Started: 1/16/03	Date Completed: 1/29/03	Screen: 0.006 inch slotted	From: 25 - To: 35
Logged By: KMT	Checked By: KH	Pack: 20/40 silica sand	From: 23 - To: 36
Drilling Co.: TDS	Driller: D. Campbell	Seal: bentonite pellets	From: 19.9 - To: 23
Method: 6.25" ID /3.25" ID HSA	Equipment: CME-55-ATV	Grout: Portland Type II	From: 0 - To: 19.9
Boring Depth: 35.0	Ground Surface Elevation: 741.9	Inner Casing: 2 inch diameter S40 PVC	
GW Level: 9.0	Time/Date: 1/31/03	Outer Casing/Stick Up: 8 inch diameter Stainless Steel set to 17' bgs	

Depth (ft bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	PID (ppm)	Lithology	Description	Elevation (ft msl)	Well Construction
0								Very stiff, damp to dry, orange brown SILTY CLAY, trace roots, trace black stains (FILL)	741.90	
	1	DO	3-3-3-3	6	0.6/2.0	0				
	2	DO	2-2-1-1	3	0.7/2.0	0				
								Loose/soft, damp, black and brown fine to coarse SAND and CLAYEY SILT, trace fine to coarse Gravel (FILL, possible foundry material)		
5	3	DO	1-2-2-1	4	0.7/2.0	0			737	
	4	DO	1-1-2-1	3	1.9/2.0	0				
								Soft to stiff, wet to moist, yellow orange brown SILTY CLAY, trace to little fine Sand, trace mottling with red brown (RESIDUUM)		
	5	DO	1-0-1-1	1	1.3/2.0	0				
10									732	

Continued Next Page

Golder Associates

Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, Georgia 30341
Telephone: 770-496-1893
Fax: 770-934-9476

Client: Solutia Inc	Job No.: 943-3680.RFI	Boring/Well: OW-21A
Project: Solutia/Supplemental RFI/CS/AL		

Depth (ft bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	PID (ppm)	Lithology	Description	Elevation (ft msl)	Well Construction
	6	DO	WH-1-2-1	3	1.3/2.0	0				
	7	DO	1-3-4-3	7	2.0/2.0	0				
15	8	DO	2-4-4-5	8	2.0/2.0	0		Stiff to very stiff, moist to very moist, yellow brown to dark yellow brown CLAY, trace fine to coarse Sand (lenses), trace to little fine to coarse chert Gravel, relict laminations from parent rock (RESIDUUM)	727	
	9	DO	2-8-8-11	14	2.0/2.0	0				
20									722	
	10	DO	2-6-8-12	14	2.0/2.0	0				
	11	DO	3-5-8-14	13	2.0/2.0	0				

Continued Next Page

Golder Associates
Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, Georgia 30341
Telephone: 770-496-1893
Fax: 770-934-9476

Client: Solutia Inc | Job No.: 943-3680.RFI | Boring/Well: OW-21A

Project: Solutia/Supplemental RFI/CS/AL

Depth (ft bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	PID (ppm)	Lithology	Description	Elevation (ft msl)	Well Construction
	11	DO	3-5-8-14	13	2.0/2.0	0				
25	12	DO	3-6-9-12	15	2.0/2.0	0			717	
	13	DO	3-5-7-11	12	2.0/2.0	0				
	14	DO	3-6-8-11	14	2.0/2.0	0				
30									712	
	15	DO	2-4-7-8	11	2.0/2.0	0				
	16	DO	6-6-8-8	14	1.8/2.0	0				
35									707	

OW-25

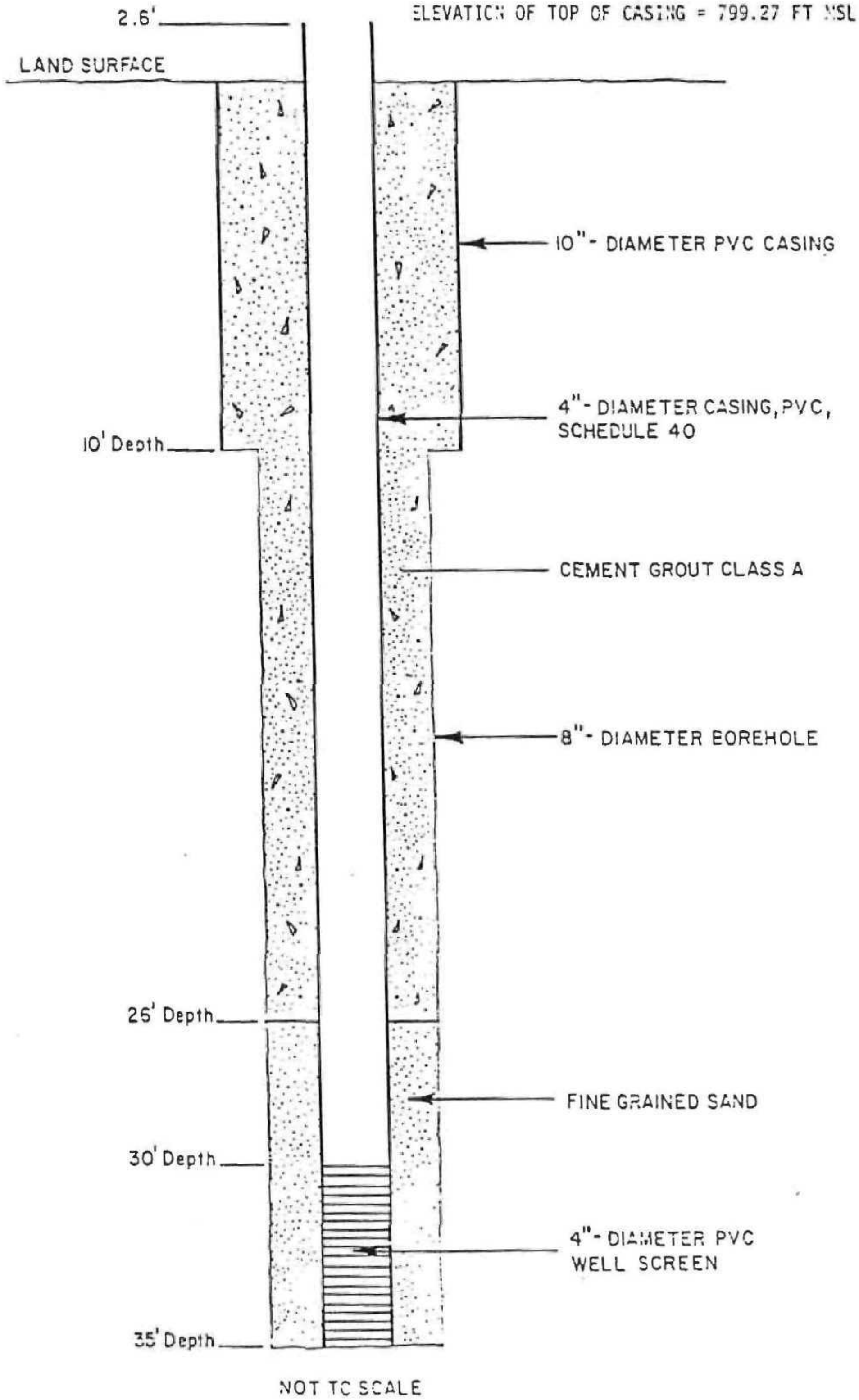


Figure A-4. Schematic Diagram Showing the Well-Construction Details of P-16-W.

PROJECT: SOLUTIA

PROJECT LOCATION: ALABAMA

PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-1S

BORING DATE: 6/2/98

BORING LOCATION:

SHEET: 1 OF 1

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 In	N	REC/ATT	NOTE
0	HSA 4 1/4, 12 1/4	Gravel fill			0.00						
		Soft to stiff, moist to wet, red-orange-brown, SILTY CLAY, little to and fine-coarse (weathered residuum)	CL		2.00	1	SS	2,4,4,4	8	1.75/2	
5						2	SS	2,1,2,3	3	1.75/2	
						3	SS	4,11,14,17	25	2.0/2.0	
		Below 8' Fine chert gravel				4	SS	4,11,14,17	25	1.0/2.0	
10		Soft, moist to wet, red-white-tan, mottled, SILTY CLAY AND CLAYEY F-C SAND, (weathered residuum)	CL-SC		10.00	5	SS	2,5,7,9	12	2.0/2.0	
						6	SS	5,7,6,11	13	2.0/2.0	
15		Firm to stiff, damp, orange-tan-brown-gray, mottled, SILTY CLAY, trace coarse-fine sand and fine gravel, occasional thin silty sand filled fractures (weathered residuum)	CL		15.00	7	CME	-	NA	3.5/4.0	
20						8	SH	-	NA	2.0/2.0	
		Stiff to very stiff, damp to wet, tan-brown with purple mottling, SILTY CLAY AND CLAYEY GRAVEL (weathered residuum)	CL-GC		22.00	9	CME	-	NA	3.0/3.0	
25		Stiff, damp to moist, tan-brown, trace white-gray marbling, SILTY CLAY, trace to little coarse-fine sand and coarse-fine gravel, thin wet, silt filled fractures present (weathered residuum)	CL		25.00	10	CME	-	NA	5.0/5.0	
30						11	SH	-	NA	1.5/2.0	
						12	CME	-	NA	3.0/3.0	
35		Boring completed @ 35' BGS			35.00						
40											

DRILL RIG: CME-75

DRILLING CONTRACTOR: EEI

DRILLER: E. FULLER

Golder Associates

LOGGED: CDH/MNH

CHECKED: SFR

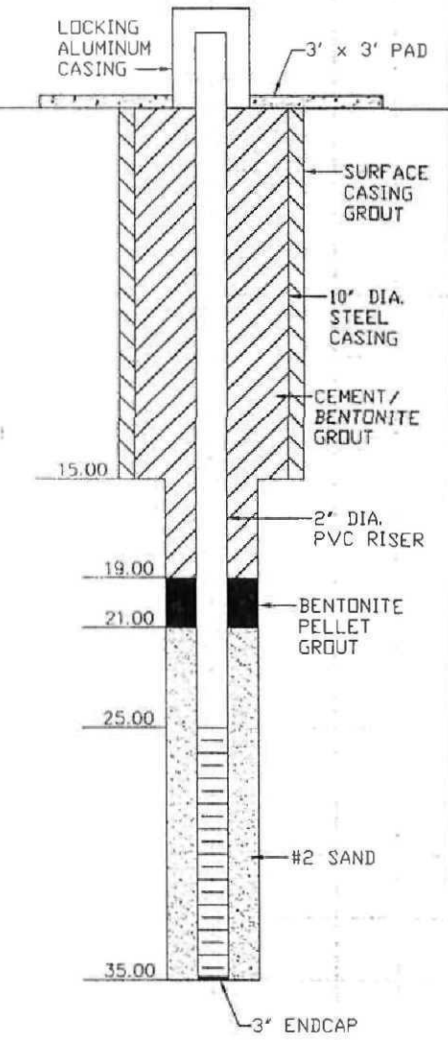
DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. DWR-1S SHEET 1 of 1
GA INSP. CDH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 736.60 WATER DEPTH 13.64
WEATHER SUNNY DRILLING COMPANY EEI TOC ELEV. 738.89 DATE/TIME 8-11-98
TEMP. 85 DRILL RIG CME-75 DRILLER E. FULLER STARTED 7:40/5-22-98 (TIME / DATE) COMPLETED 10:00/6-2-98 (TIME / DATE)
LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 30 l.f. WELL SCREEN 2 in. dia. 10 l.f. BENTONITE SEAL PELLETS
CASING TYPE PVC SREEN TYPE PVC INSTALLATION METHOD POURED
JOINT TYPE FLUSH SLOT SIZE 0.008 FILTER PACK QTY. 10 BAGS
GROUT QUANTITY 6.5 BAGS CENTRALIZERS N/A FILTER PACK TYPE GRADE 2 SILICA SAND
GROUT TYPE CEMENT/BENTONITE DRILLING MUD TYPE N/A INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
	GROUND SURFACE		Installed and grouted 10" dia. steel surface casing to 15' BGS with 12 1/4" dia. augers. Resumed boring with 4 1/4" dia. augers to 35' BGS. Installed 10' of 2" dia., 0.008 slot PVC screen and 30' of 2" dia. PVC riser to 35' BGS. Tremmied 10 bags of sand to ~21' BGS. (Installed extra 2' of sand pack to intersect saturated zone @ 22' - 24' BGS). Poured (1) 5 gal. bucket of bentonite pellets to ~19' BGS. Grouted remainder of open annulus with 95%-5% cement bentonite grout mixture. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish.
0.0	REFER TO RECORD OF BOREHOLE DWR-1S FOR LITHOLOGIC DISCRIPTION		
5.0			
10.0			
15.0			
20.0			
25.0			**WELL DEVELOPMENT NOTES**
30.0			Pumped and surged over 3 week period until turbidity improved. Minimum of 6 well volumes removed.
35.0			
40.0			
45.0			
50.0			

PROJECT: SOLUTIA

PROJECT LOCATION: ALABAMA

PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-1D

BORING DATE: 6/9/98

BORING LOCATION:

DATUM: FT-MSL

BORING METHOD: HSA 4 1/4, 12 1/4

SOIL PROFILE

DESCRIPTION	USCS	ELEV / DEPTH
Gravel fill		0.00
Soft to stiff, damp to moist, orange-brown to red brown, SILTY CLAY, trace to little fine sand, trace fine gravel (weathered residuum) 3' - 4' Dark staining	CL	1.00
Loose, moist to very moist, white-orange-tan, mottled CLAYEY F-C SAND, seams of silty sands	SC-SM	10.00
Soft to firm, moist to wet, purple-gray-white-brown, mottled, SILTY CLAY, *little to some silt and sand seams,* trace quartzite gravel	CL	14.00
Firm, damp to moist, purple-white-tan, mottled, SILTY CLAY, little to some silt and sand seams, trace coarse-fine gravel (weathered residuum)	CL	16.00
Soft to stiff, damp to moist, red-brown-orange, SILTY CLAY, little coarse-fine sand and gravel 29' Tan-brown, trace to little coarse-fine sand, and fine gravel Slickensides	CL	26.00

SAMPLES

NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT
1	SS	2,3,4,4	7	0.5/2.0
2	SS	1,1,2,4	3	1.5/2.0
3	SS	6,5,12,19	17	2.0/2.0
4	SS	6,12,13,13	25	2.0/2.0
5	SS	3,6,7,7	13	1.5/2.0
6	SS	7,8,11,12	19	2.0/2.0
7	SS	3,2,4,4	6	2.0/2.0
8	SS	5,6,8,11	14	1.0/2.0
9	SS	2,3,4,5	7	1.5/2.0
10	SH	-	NA	0.5/2.0
11	SS	4,5,7,8	12	1.5/2.0
12	SS	3,6,8,8	14	2.0/2.0
13	SS	3,6,7,14	13	1.75/2
14	SS	7,10,15,21	25	2.0/2.0
15	SS	3,4,9,12	13	1.0/2.0
16	SS	2,10,13,45	23	2.0/2.0
17	CME	-	NA	3.0/4.0

NOTE

DRILL RIG: CME-75

DRILLING CONTRACTOR: EEI

DRILLER: E. FULLER

Golder Associates

LOGGED: CDH/MNH

CHECKED: SFR

DATE: 10/7/98

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-1D

BORING DATE: 6/9/98
BORING LOCATION:

SHEET: 2 OF
DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
40	HSA 4 1/4, 12 1/4	See previous page	CL			18	SH	-	NA	0/0	
						19	CME	-	NA	3.0/3.0	
45						20	SH	-	NA	0/0	
						21	CME	-	NA	3.0/3.0	
50						22	SH	-	NA	1.0/2.0	
		Stiff to very stiff, moist, red-brown-tan, trace white-gray, SILTY CLAY, trace to little coarse-fine sand and fine gravel, silt in places (weathered residuum) Below 55' shale fragments common	CL-ML		52.00	23	CME	-	NA	3.0/3.0	
55						24	CME	-	NA	5.0/5.0	
60						25	SH	-	NA	1.0/2.0	
		Stiff to very stiff, damp to very moist, red-brown-tan and black, SILTY CLAY AND CLAYEY F GRAVEL, trace to some coarse-fine sand (weathered residuum)	CL-GC		62.00	26	SS	47,23,19,22	42	2.0/2.0	
						27	SS	11/16	27	1.0/1.0	
65		Boring completed @ 65' BGS			65.00						
70											
75											
80											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH/MNH
CHECKED: SFR
DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. OWR-1D SHEET 1 of 1

GA INSP. CDH/MNH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 737.59 WATER DEPTH 57.78

WEATHER SUNNY DRILLING COMPANY EEI TOC ELEV. 739.59 DATE/TIME 8-11-98

TEMP. 95 DRILL RIG CME-75 DRILLER E. FULLER STARTED 13:50/6-1-98 (TIME / DATE) COMPLETED 09:00/6-9-98 (TIME / DATE)

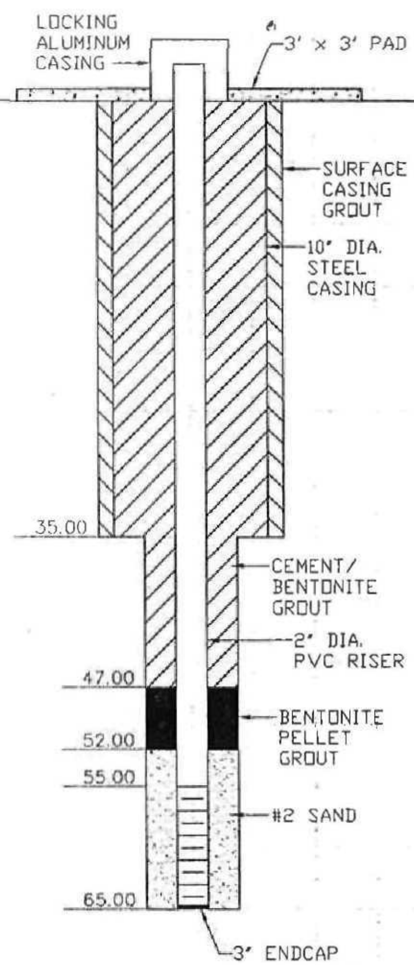
LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 60 l.f.	WELL SCREEN 2 in. dia. 10 l.f.	BENTONITE SEAL PELLETS
CASING TYPE PVC	SREEN TYPE PVC	INSTALLATION METHOD POURED
JOINT TYPE FLUSH	SLOT SIZE 0.008	FILTER PACK QTY. 9 BAGS
GROUT QUANTITY 12 BAGS	CENTRALIZERS N/A	FILTER PACK TYPE GRADE 2 SILICA SAND
GROUT TYPE CEMENT/BENTONITE	DRILLING MUD TYPE N/A	INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE OWR-1D FOR LITHOLOGIC DISCRIPTION
10.0	
20.0	
30.0	
40.0	
50.0	
60.0	
70.0	
80.0	
90.0	
100.0	

WELL SKETCH



INSTALLATION NOTES

Installed and grouted 10" dia. steel surface casing to 35' BGS with 12 1/4" dia. augers. Resumed boring with 4 1/4" dia. augers to 65' BGS. Installed 10' of 2" dia., 0.008 slot PVC screen and 60' of 2" dia. PVC riser to 65' BGS. Tremmied 9 bags of sand to ~52' BGS. Poured (2) 5 gal. buckets of bentonite pellets to ~47' BGS. Grouted remainder of open annulus with 95%-5% cement bentonite grout mixture. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish.

WELL DEVELOPMENT NOTES

Well made very little water and recovered slowly. Surged and pumped as recovery allowed over 3 week period. Minimum of 6 well volumes removed.

PROJECT: SOLUTIA

PROJECT LOCATION: ALABAMA

PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-2S

BORING DATE: 6/16/98

BORING LOCATION:

SHEET: 1 OF 1

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4, 12 1/4	(FILL) Soft, moist, light brown-red-orange, SILTY CLAY, some fine-coarse sand and gravel	CL		0.00						See OWR-2D for full sample descriptions
		Soft, wet, light brown-orange-red, CLAYEY SAND AND SILT, fine-coarse sand, little to trace gravel (weathered residuum)	CL-MH		18.00	1	SH	-	NA	1.8/2.0	
		Soft, moist to wet, red-brown-orange, SILTY CLAY, intermittent layers of clayey sand and sand infilling of fractures, trace gravel (weathered residuum)	CL		26.00	2	SH	-	NA	2.0/2.0	
35		Boring completed @ 35' BGS			35.00						

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

DRILL RIG: CME-75

DRILLING CONTRACTOR: EEI

DRILLER: E. FULLER

Golder Associates

LOGGED: CDH

CHECKED: SFR

DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

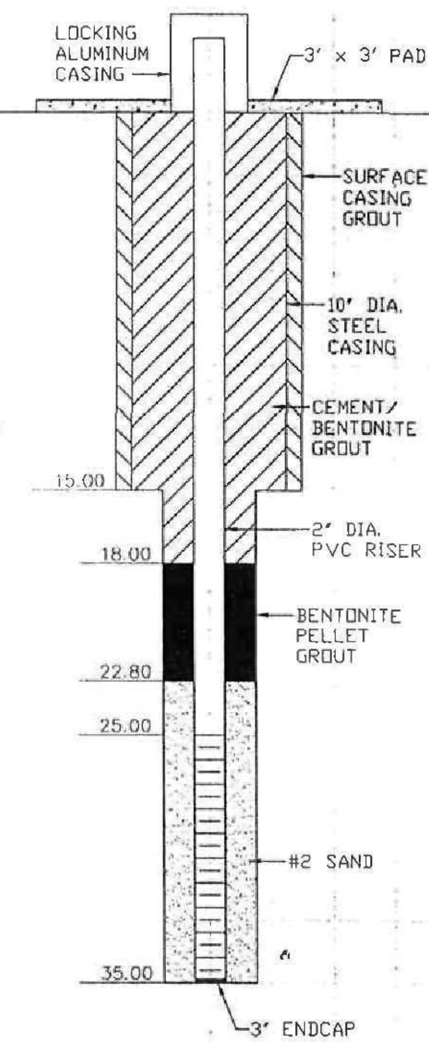
JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. OWR-2S SHEET 1 of 1
GA INSP. CDH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 754.90 WATER DEPTH 10.47
WEATHER SUNNY DRILLING COMPANY EEI TOC ELEV. 757.46 DATE/TIME 8-11-98
TEMP. 92 DRILL RIG CME-75 DRILLER E. FULLER STARTED 15:30/6-11-98 (TIME / DATE) COMPLETED 17:00/6-16-98 (TIME / DATE)
LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 30 l.f. WELL SCREEN 2 in. dia. 10 l.f. BENTONITE SEAL PELLETS
CASING TYPE PVC SREEN TYPE PVC INSTALLATION METHOD POURED
JOINT TYPE FLUSH SLOT SIZE 0.008 FILTER PACK QTY. 7.5 BAGS
GROUT QUANTITY 7 BAGS CENTRALIZERS N/A FILTER PACK TYPE GRADE 2 SILICA SAND
GROUT TYPE CEMENT/BENTONITE DRILLING MUD TYPE N/A INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE OWR-2S FOR LITHOLOGIC DISCRIPTION
5.0	
10.0	
15.0	
20.0	
25.0	
30.0	
35.0	
40.0	
45.0	
50.0	

WELL SKETCH



INSTALLATION NOTES

Installed and grouted 10" dia. steel surface casing to 15' BGS with 12 1/4" dia. augers. Resumed boring with 4 1/4" dia. augers to 35' BGS. Installed 10' of 2" dia., 0.008 slot PVC screen and 30' of 2" dia. PVC riser to 35' BGS. Tremmied 7.5 bags of sand to ~22.8' BGS. Poured (2) 5 gal. buckets of bentonite pellets to ~18' BGS. Grouted remainder of open annulus with 95%-5% cement bentonite grout mixture. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved. Minimum of 6 well volumes removed.

PROJECT: SOLUTIA

PROJECT LOCATION: ALABAMA

PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-2D

BORING DATE: 6/23/98

BORING LOCATION:

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4, 12 1/4	(FILL) Soft, moist, light brown-medium brown, SILTY CLAY, some fine-coarse sand and gravels	CL		0.00						
						1	SS	2,1,2,3	3	1.0/2.0	
5		(Saturated)				2	SS	1,1,1,1	2	1.0/2.0	
						3	SS	1,1,3,6	4	1.0/2.0	
						4	SS	1,4,1,2	5	1.0/2.0	
10		Dark staining @ approx. 10' BGS				5	SS	(1for12)1,1	2	0.5/2.0	
						6	ss	1,1,3,2	4	1.0/2.0	
15						7	ss	5,13,6,8	19	2.0/2.0	
						8	SS	8,5,4,6	9	2.0/2.0	
		Soft, wet, light brown-orange-red, CLAYEY SAND; SILT, fine-coarse sand, little to trace gravels (weathered residuum)	CL-MH		18.00	9	SS	2,3,2,4	5	1.8/2.0	
20						10	SS	2,3,5,6	8	2.0/2.0	
						11	SS	1,2,3,4	5	1.5/2.0	
25						12	SS	1,1,3,3	4	1.0/2.0	
		Soft, moist-wet, red-brown-orange, SILTY CLAY, intermittent layers of clayey sand and infilling of fractures, trace gravels (weathered residuum)	CL		26.00	13	SS	1,2,3,4	5	2.0/2.0	
						14	SS	(1for12)2,2	2	2.0/2.0	
30						15	SS	1,2,2,2	4	2.0/2.0	
						16	SS	1,1,1,1	2	2.0/2.0	
35											
						17	CME	-	NA	3.5/5.0	
40											

DRILL RIG: CME-75

DRILLING CONTRACTOR: EEI

DRILLER: E. FULLER

Golder Associates

LOGGED: CDH

CHECKED: SFR

DATE: 10/7/98

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-2D

BORING DATE: 6/23/98
BORING LOCATION:

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 In	N	REC/ATT	NOTE
40	HSA 4 1/4, 12 1/4	See previous page	CL			-	SH	-	NA	0.0/0.0	
						18	CME	-	NA	3.0/3.0	
45						19	SH	-	NA	1.8/2.0	
						20	CME	-	NA	3.0/3.0	
50						21	CME	-	NA	4.0/5.0	
55	Air Rotary	Air rotary, intermittent rock and soil mix. Cuttings indicate reworked quartzite and cherty limestone fragments intermixed with soil type as described previous			55.00						
60											Hard drilling @ approx. 58' BGS - auger refusal @ 59' BGS left augers in hole and will return next week with air rotary equipment.
65											
70											Resumed drilling 6/23/98 @ 8:00 Intermittent rock and max. 6" soil layers to approx. 69' BGS, cuttings show quartzite (reworked) and limestone, continued with air rotary to 75' BGS, soft drilling indicates soil, washed hole to blow up cuttings, lost all water (void zone?), tremors felt @ ground surface while blowing air
75	HSA 4 1/4, 12 1/4	Soft, wet to moist, light brown-red-orange, SILTY CLAY, trace to little fine-coarse sand, trace to little gravels, including chert, intermittent thin (2" max.) sand (fine-medium) layers (weathered residuum)	CL		74.00	22	SS	1,2,2,1	4	0.5/2.0	
80											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-2D

BORING DATE: 6/23/98
BORING LOCATION:

SHEET: 3 OF 3
DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
80	HSA 4 1/4, 12 1/4	See previous page				23	SH	-	NA	2.0/2.0	
85						24	SS	2,2,3,5	5	1.5/2.0	
90						25	SS	2,3,5,7	8	2.0/2.0	
95		Same as above, no sandy zones	CL			26	SS	5,7,9,11	16	1.8/2.0	
100						27	SH	-	NA	2.0/2.0	
						28	SS	8,8,3,3	11	2.0/2.0	
105											
						29	SS	10,50/3	50/3	1.5/2.0	
110		Boring completed @ 110' BGS			110.00						
115											
120											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

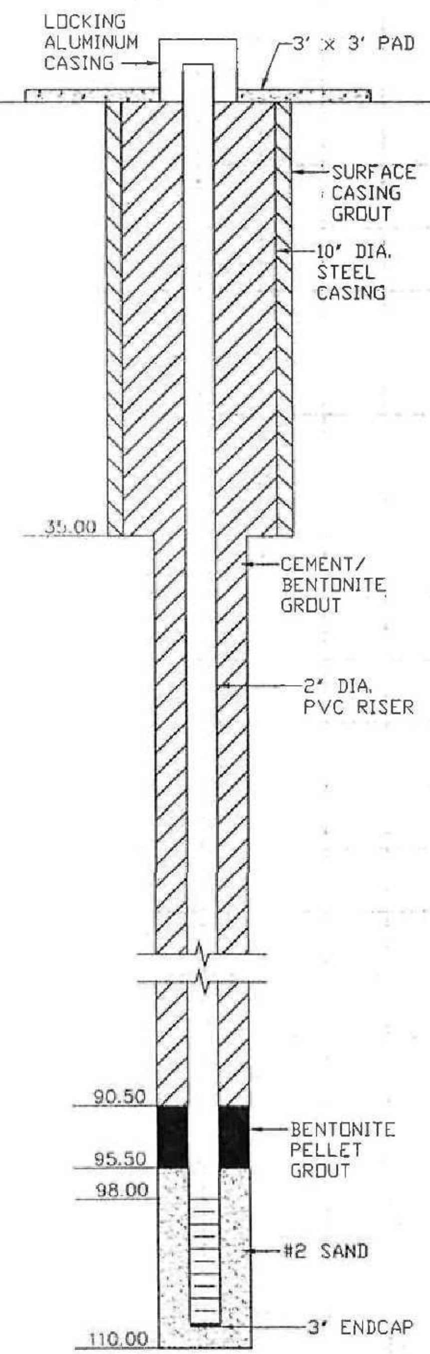
JOB NO. 983-3223	PROJECT SOLUTIA/RFI/AL	WELL NO. OWR-2D	SHEET 1 of 1
GA INSP. CDH	DRILLING METHOD HSA (4 1/4, 12 1/4)	GROUND ELEV. 754.70	WATER DEPTH 62.31
WEATHER SUNNY	DRILLING COMPANY EEI	TOC ELEV. 756.99	DATE/TIME 8-11-98
TEMP. 95	DRILL RIG CME-75 DRILLER E. FULLER	STARTED 16:00/6-10-98 (TIME / DATE)	COMPLETED 16:00/6-23-98 (TIME / DATE)
LOCATION / COORDINATES N/A			

MATERIALS INVENTORY

WELL CASING 2 in. dia. 100 l.f.	WELL SCREEN 2 in. dia. 10 l.f.	BENTONITE SEAL PELLETS
CASING TYPE PVC	SREEN TYPE PVC	INSTALLATION METHOD POURED
JOINT TYPE FLUSH	SLOT SIZE 0.008	FILTER PACK QTY. 16 BAGS
GROUT QUANTITY 47 BAGS	CENTRALIZERS N/A	FILTER PACK TYPE GRADE 2 SILICA SAND
GROUT TYPE CEMENT/BENTONITE	DRILLING MUD TYPE N/A	INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE OWR-2D FOR LITHOLOGIC DISCRIPTION
10.0	
20.0	
30.0	
40.0	
50.0	
60.0	
90.0	
100.0	
110.0	

WELL SKETCH



INSTALLATION NOTES

Installed and grouted 10" dia. steel surface casing to 35' BGS with 12 1/4" dia. augers. Resumed boring with 4 1/4" dia. augers to 59' BGS. Met refusal and tooled out to air rotary and advanced to ~75' BGS (Intermittent rock and soil in this zone). Readvanced 4 1/4" dia. augers ro ~110' BGS (refusal). Installed 10' of 2" dia. 0.008 slot PVC screen and 100' of 2" dia. PVC riser to ~108' BGS. Tremmied 16 bags grade 2 sand to ~95.5' BGS (lost some in fracture zone and used extra to fill bottom of boring). Poured (3) 5 gal. buckets bentonite pellets to ~90.5' BGS. Grouted remainder of annulus with 95%-5% cement bentonite mix. Installed locking aluminum protective casing, 3' x 3' pad and bumper posts for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved. Minimum of 6 well volumes removed.

PROJECT: SOLUTIA

PROJECT LOCATION: ALABAMA

PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-3S

BORING DATE: 6/9/98

BORING LOCATION:

SHEET: 1 OF 1

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4, 12 1/4	Gravel fill			0.00						
		Firm, damp to moist, red-brown, SILTY CLAY, some to and fine gravel (FILL)	CL		1.00	1	SS	3,9,8,4	17	0.5/2.0	
5		Soft to firm, damp to moist, reddish brown and gray, mottled, SILTY CLAY, trace to and coarse-fine sand and fine gravel (weathered residuum)			3.00	2	SS	2,3,3,5	6	2.0/2.0	
						3	SS	1,1,1,2	2	1.0/2.0	
		7' - 7.5' Wet, Fe nodules Below 8' damp to moist				4	SS	3,4,3,3	7		
10		10' - 25' Occasional weathered sandstone fragments				5	SS	3,7,8,10	15	2.0/2.0	
						6	SS	9,10,10,11	20	2.0/2.0	
			CL			7	SS	17,13,20,14	33	2.0/2.0	
15		17' - 20' Trace cobbles									
						8	CME	-	NA		
20						9	SH	-	NA	2.0/2.0	
						10	CME	-	NA	3.0/3.0	
25		Stiff, damp, red-brown-tan and black, trace purple, mottled SILTY CLAY, trace coarse-fine sand and gravel, occasional cobble sized shale fragments			25.00	11	CME	-	NA	5.0/5.0	
30			CL			12	SH	-	NA	0.5/2.0	
		Below 32' damp to moist, trace to some coarse-fine sand and gravel				13	CME	-	NA	3.0/3.0	
35		Boring completed @ 35' BGS			35.00						
40											

DRILL RIG: CME-75

DRILLING CONTRACTOR: EEI

DRILLER: E. FULLER

Golder Associates

LOGGED: MNH

CHECKED: SFR

DATE: 10/7/98

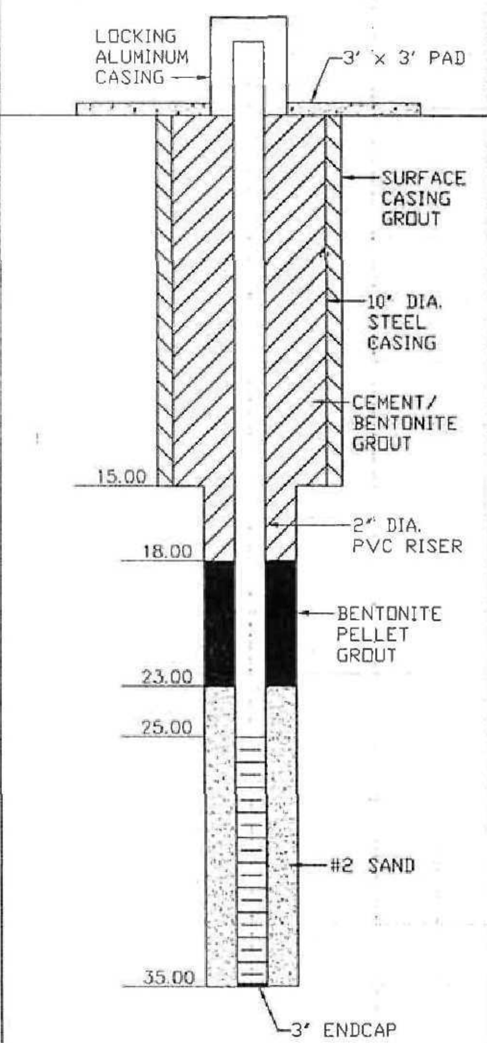
MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. DWR-3S SHEET 1 of 1
GA INSP. CDH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 758.30 WATER DEPTH 10.85
WEATHER SUNNY DRILLING COMPANY EEI TOC ELEV. 760.48 DATE/TIME 8-11-98
TEMP. 95 DRILL RIG CME-75 DRILLER E. FULLER STARTED 14:10/6-3-98 (TIME / DATE) COMPLETED 18:00/6-9-98 (TIME / DATE)
LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 30 l.f. WELL SCREEN 2 in. dia. 10 l.f. BENTONITE SEAL PELLETS
CASING TYPE PVC SREEN TYPE PVC INSTALLATION METHOD POURED
JOINT TYPE FLUSH SLOT SIZE 0.008 FILTER PACK QTY. 8 BAGS
GROUT QUANTITY 7 BAGS CENTRALIZERS N/A FILTER PACK TYPE GRADE 2 SILICA SAND
GROUT TYPE CEMENT/BENTONITE DRILLING MUD TYPE N/A INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION	WELL SKETCH
	GROUND SURFACE	
0.0	REFER TO RECORD OF BOREHOLE DWR-3S FOR LITHOLOGIC DISCRIPTION	
5.0		
10.0		
15.0		
20.0		
25.0		
30.0		
35.0		
40.0		
45.0		
50.0		



INSTALLATION NOTES

Installed and grouted 10" dia. steel surface casing to 15' BGS with 12 1/4" dia. augers. Resumed boring with 4 1/4" dia. augers to 35' BGS. Installed 10' of 2" dia., 0.008 slot PVC screen and 27' of 2" dia. PVC riser to 35' BGS. Tremmied 8 bags of sand to ~23' BGS. Poured (2) 5 gal. buckets of bentonite pellets to ~18' BGS. Grouted remainder of open annulus with 95%-5% cement bentonite grout mixture. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved. Minimum of 6 well volumes removed.

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-3D

BORING DATE: 6/10/98
BORING LOCATION:

SHEET: 1 OF 2
DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 In	N	REC/ATT	NOTE
0	HSA 4 1/4, 12 1/4	Gravel fill			0.00						
		Firm, damp to moist, red-brown, SILTY CLAY, some to and coarse-fine gravel (FILL)	CL		1.00						
5		Soft to firm, damp to moist, reddish brown and gray, mottled, SILTY CLAY, trace to and coarse-fine sand and gravel (weathered residuum)	CL		3.00						
10											
						1	SS	3,6,7,10	13		
15		15' - 20' Very soft, wet in places				2	SS	2,3,4,7	7	.25/2.0	
						3	SS	2,6,6,6	12	0.0/0.0	
20						4	SH	-	NA	1.0/2.0	
						5	SS	3,5,7,10	12	1.0/2.0	
		23' - 29' Sandstone gravels, clay filled fractures				6	SS	3,5,7,10	12	2.0/2.0	
25						7	SS	3,4,4,6	8	2.0/2.0	
						8	SS	3,3,7,9	10	1.0/2.0	
30		30.5' - 31' Dark staining, red-brown				9	SS	3,3,3,5	6	1.0/2.0	
		31' - 33' Interbedded with soft, wet, yellow brown silt and clayey silt				10	SS	2,2,2,4	4	1.5/2.0	
		33' - 35' Soft, purple, mottled				11	SS	2,2,1,2	3	1.0/2.0	
35		35' Sandstone gravels 35' - 41' Stiff, laminated with silt filled micro-fractures									
						12	CME	-	NA	3.5/4.0	
40											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH/MNH
CHECKED: SFR
DATE: 10/7/98

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-3D

BORING DATE: 6/10/98
BORING LOCATION:

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	ELEV / DEPTH	SAMPLES NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
40	HSA 4 1/4, 12 1/4		CL		13	SH	-	NA	0/0	
		Stiff, damp to very moist, medium brown and red-brown, mottled, SILTY CLAY AND SILT, trace to some coarse-fine sand and fine gravel (weathered residuum)	CL-ML	41.00	14	CME	-	NA	3.0/3.0	
45		Firm to very stiff, moist, medium brown, SILTY CLAY, little coarse-fine sand and fine gravel, sand and gravel composed of chert and shale fragments (weathered residuum)	CL	45.00	15	SH	-	NA	1.5/2.0	
					16	SS	11,5,5,7	10	2.0/2.0	
50					17	SS	8,9	17	1.0/1.0	
					18	CME	-	NA	4.5/5.0	
55		55' - 58' Grades to highly plastic silty clay			19	CME	-	NA	5.0/5.0	
60		Dense, damp to moist, light brown and tan, SILTY SAND AND SANDY SILT, thin (<1 cm) silty clay lenses interbedded	SM-ML	58.00	20	SH	-	NA	1.0/2.0	
					21	CME	-	NA	3.0/3.0	
65		Boring completed @ 65' BGS		65.00						
70										
75										
80										

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH/MNH
CHECKED: SFR
DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. OWR-3D SHEET 1 of 1

GA INSP. CDH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 757.50 WATER DEPTH DRY

WEATHER P. CLOUDY DRILLING COMPANY EEI TOC ELEV. 759.76 DATE/TIME 8-11-98

TEMP. 95 DRILL RIG CME-75 DRILLER E. FULLER STARTED 17:00/6-3-98 (TIME / DATE) COMPLETED 12:00/6-10-98 (TIME / DATE)

LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 60 l.f. WELL SCREEN 2 in. dia. 10 l.f. BENTONITE SEAL PELLETS

CASING TYPE PVC SREEN TYPE PVC INSTALLATION METHOD POURED

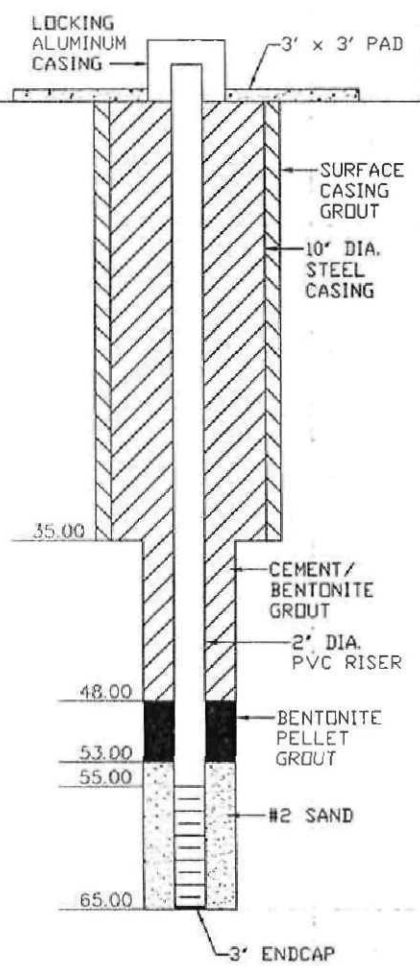
JOINT TYPE FLUSH SLOT SIZE 0.008 FILTER PACK QTY. 8 BAGS

GROUT QUANTITY 9 BAGS CENTRALIZERS N/A FILTER PACK TYPE GRADE 2 SILICA SAND

GROUT TYPE CEMENT/BENTONITE DRILLING MUD TYPE N/A INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE OWR-3D FOR LITHOLOGIC DISCRIPTION
10.0	
20.0	
30.0	
40.0	
50.0	
60.0	
70.0	
80.0	
90.0	
100.0	

WELL SKETCH



INSTALLATION NOTES

Installed and grouted 10" dia. steel surface casing to 35' BGS with 12 1/4" dia. augers. Resumed boring with 4 1/4" dia. augers to 65' BGS. Installed 10' of 2" dia. PVC, 0.008 slot screen and 60' of 2" dia. PVC riser to ~65' BGS. Tremmied 8 bags grade 2 silica sand to ~53' BGS. Poured (2) 5. gal. buckets of bentonite pellets to ~48' BGS. Grouted remainder of open annulus with 95%-5% bentonite mix. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish.

WELL DEVELOPMENT NOTES

Dry

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-4D

BORING DATE: 5/27/98
BORING LOCATION:

SHEET: 1 OF 3
DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4, 12 1/4	Fill and concrete, no sample taken until 3' BGS			0.00						
		Soft, moist, dark brown, CLAYEY SILT, fine-medium sand, little gravels (topsoil)	MH		3.00	1	DO	1,1,2,3	3	2.0/2.0	
5						2	DO	1,2,1,3	3	2.0/2.0	
		Soft to firm, light brown-tan-red, SILTY CLAY, little to some fine-medium sand (weathered residuum)	CL		7.00	3	DO	1,3,5,5	8	2.0/2.0	
10						4	DO	4,5,5,12	10	2.0/2.0	
						5	DO	10,11,13,17	24	1.0/2.0	
						6	DO	8,11,13,15	24	1.75/2	
15						7	DO	5,7,9,10	16	1.5/2.0	
						8	DO	4,5,7,7	12	1.75/2	
20						9	SH	-	NA		
		Firm to stiff, damp to moist, light brown-red-orange, SILTY CLAY, little to some fine-coarse sand, trace to little fine-medium chert gravels, black (Mn) staining	CL		21.00	10	DO	3,4,3,8	7	2.0/2.0	
						11	DO	3,4,5,7	9	1.75/2	
25						12	DO	2,1,5,7	6	2.0/2.0	
						13	DO	3,5,7,11	12	2.0/2.0	
30						14	DO	2,3,8,11	11	1.75/2	
						15	DO	8,11,12,13	23	1.75/2	
						16	DO	14,14,8,13	22	2.0/2.0	
35						17	CME	-	NA	4.5/5.0	
40											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-4D

BORING DATE: 5/27/98
BORING LOCATION:

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
40	HSA 4 1/4, 12 1/4	See previous page	CL			18	SH	-	NA	2.0/2.0	
						19	CME	-	NA	3.0/5.0	
45						20	CME	-	NA	5.0/5.0	
50						21	CME		NA	5.0/5.0	
55		Soft, moist to wet, yellow-tan, CLAYEY SILT, trace fine-medium sand, slickensided fractures with Mn and Fe staining (weathered residuum)	MH		54.00	22	CME	-	NA	5.0/5.0	
60						23	SH	-	NA	2.0/2.0	
						24	CME	-	NA	3.0/3.0	
65		Soft to firm, moist, brown-med. brown, SILTY CLAY, some highly weathered rock zones, trace fine-medium sand (weathered residuum)	CL		67.00	25	CME	-	NA	5.0/5.0	
70						26	CME		NA	5.0/5.0	
75						27	CME	-	NA	5.0/5.0	
80											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

PROJECT: SOLUTIA

PROJECT LOCATION: ALABAMA

PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-4D

BORING DATE: 5/27/98

BORING LOCATION:

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE				SAMPLES					NOTE
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 In	N	REC/ATT	
80	HSA 4 1/4, 12 1/4		CL			28	SH	-	NA	2.0/2.0	
		Boring completed @ 80' BGS, pushed shelby additional 2' to 82' BGS			82.00						
85											
90											
95											
100											
105											
110											
115											
120											

DRILL RIG: CME-75

DRILLING CONTRACTOR: EEI

DRILLER: E. FULLER

Golder Associates

LOGGED: CDH

CHECKED: SFR

DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

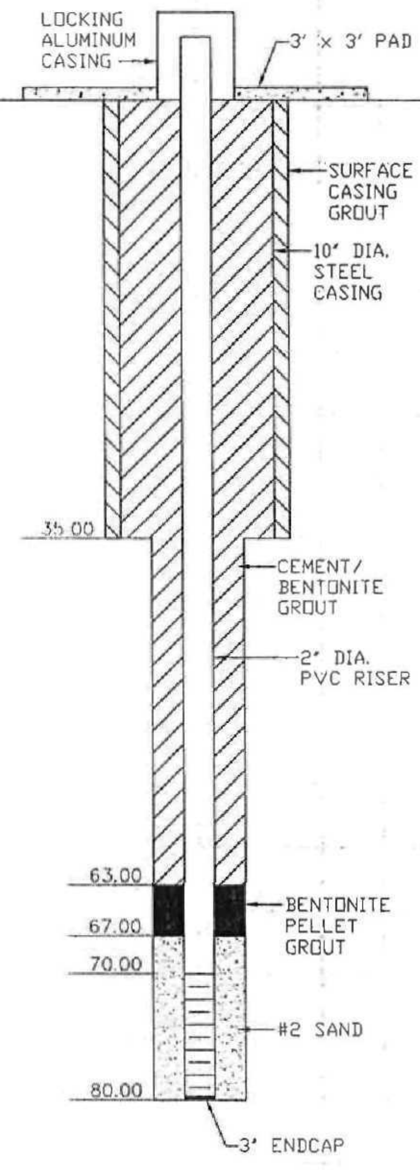
JOB NO. 983-3223	PROJECT SOLUTIA/RFI/AL	WELL NO. OWR-4D	SHEET 1 of 1
GA INSP. CDH	DRILLING METHOD HSA (4 1/4, 12 1/4)	GROUND ELEV. 741.90	WATER DEPTH 67.33
WEATHER SUNNY	DRILLING COMPANY EEI	TOC ELEV. 746.03	DATE/TIME 8-11-98
TEMP. 95	DRILL RIG CME-75 DRILLER E. FULLER	STARTED 15:10/5-20-98 (TIME / DATE)	COMPLETED 15:30/5/27/98 (TIME / DATE)
LOCATION / COORDINATES N/A			

MATERIALS INVENTORY

WELL CASING 2 in. dia. 80 l.f.	WELL SCREEN 2 in. dia. 10 l.f.	BENTONITE SEAL PELLETS
CASING TYPE PVC	SREEN TYPE PVC	INSTALLATION METHOD POURED
JOINT TYPE FLUSH	SLOT SIZE 0.008	FILTER PACK QTY. 10 BAGS
GROUT QUANTITY 10.5 BAGS	CENTRALIZERS N/A	FILTER PACK TYPE GRADE 2 SILICA SAND
GROUT TYPE CEMENT/BENTONITE	DRILLING MUD TYPE N/A	INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE OWR-4D FOR LITHOLOGIC DISCRIPTION
10.0	
20.0	
30.0	
40.0	
50.0	
60.0	
70.0	
80.0	
90.0	
100.0	

WELL SKETCH



INSTALLATION NOTES

Installed and grouted 10' dia. steel surface casing to 35' BGS with 12 1/4' dia. augers. Resumed boring with 4 1/4' dia. augers to 80' BGS. Installed 10' of 2' dia. PVC, 0.008 slot screen and 80' of 2' dia. PVC riser to ~80' BGS. Tremmied 10 bags grade 2 silica sand to ~67' BGS. Poured (1) 5. gal. buckets of bentonite pellets to ~63' BGS. Grouted remainder of open annulus with 95%-5% bentonite mix. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish. Stick-up ~5' AGS to acconodate future grade.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved. Minimum of 6 well volumes removed.

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-5D

BORING DATE: 6/5/98
BORING LOCATION:

DATUM: FT-MSL

SOIL PROFILE

BORING METHOD: HSA 4 1/4, 12 1/4

ELEV / DEPTH	DESCRIPTION	USCS	GRAPHIC LOG
0.00	Soft, damp to moist, reddish brown, SILTY CLAY, trace to some fine-coarse sand and gravel (weathered residuum) Below 2' chemical odor present 4' - 10' occasional sandstone fragments	CL	
12.00	Firm to very stiff, damp to moist, purplish red, white-yellow-tan, mottled, SILTY CLAY, trace to some fine-coarse sand and gravel, few slickensides (weathered residuum) 22' - 57' Few microfractures filled with silty sand and silt	CL	

SAMPLES

NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT
1	SS	1,3,2,1	5	0.5/2.0
2	SS	1,2,3,2	5	2.0/2.0
3	SS	6,19,23,13	42	1.3/2.0
4	SS	11,14,21,19	35	1.0/2.0
5	SS	11,7,9,10	16	2.0/2.0
6	SS	9,8,10,15	18	2.0/2.0
7	SS	5,4,8,9	12	1.5/2.0
8	SS	4,5,7,10	12	2.0/2.0
9	SS	4,6,8,10	14	1.0/2.0
	SH	-	NA	0/0
10	SH	-	NA	1.0/2.0
11	SS	6,6,14,17	20	2.0/2.0
12	SS	4,6,5,6	11	2.0/2.0
13	SS	2,4,6,7	10	2.0/2.0
14	SS	5,8,8,8	16	1.0/2.0
15	SS	6,10,12,15	22	2.0/2.0
16	SS	1,1,1,2	2	2.0/2.0
17	SH	-	NA	
18	CME	-	NA	5.0/5.0

DEPTH SCALE FEET: 0, 5, 10, 15, 20, 25, 30, 35, 40

NOTE

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH/MNH
CHECKED: SFR
DATE: 10/7/98

RECORD OF BOREHOLE OWR-5D

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
40	HSA 4 1/4, 12 1/4		CL			18	CME	-	NA	5.0/5.0	
45		46' - 57' Vertical microfractures filled with silty fine sand, fractures increasing with depth				19	CME	-	NA	5.0/5.0	
50						20	CME	-	NA	4.0/5.0	
55		52' - 57' Very stiff				21	CME	-	NA	4.5/5.0	
		Very stiff, damp to moist, purple, red-brown, tan, marbled, SILTY CLAY AND CLAYEY SILT, trace to little coarse-fine sand and fine gravel, thin vertical fractures filled with fine sand (weathered residuum)	CL-ML		57.00	22	SS	11,13,23,37	36	1.0/2.0	
60						23	SS	8,16,23,30	39	1.5/2.0	
						24	SS	8,16,34,40	50	1.5/2.0	
						25	SS	7,22,23,22	45	1.5/2.0	
65		Boring completed @ 65' BGS			65.00						
70											
75											
80											

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223	PROJECT SOLUTIA/RFI/AL	WELL NO. OWR-5D	SHEET 1 of 1
GA INSP. CDH	DRILLING METHOD HSA (4 1/4, 12 1/4)	GROUND ELEV. 802.40	WATER DEPTH 48.84
WEATHER SUNNY	DRILLING COMPANY EEI	TOC ELEV. 804.93	DATE/TIME 8-11-98
TEMP. 95	DRILL RIG CME-75 DRILLER E. FULLER	STARTED 11:00/5-18-98 (TIME / DATE)	COMPLETED 16:00/6-5-98 (TIME / DATE)

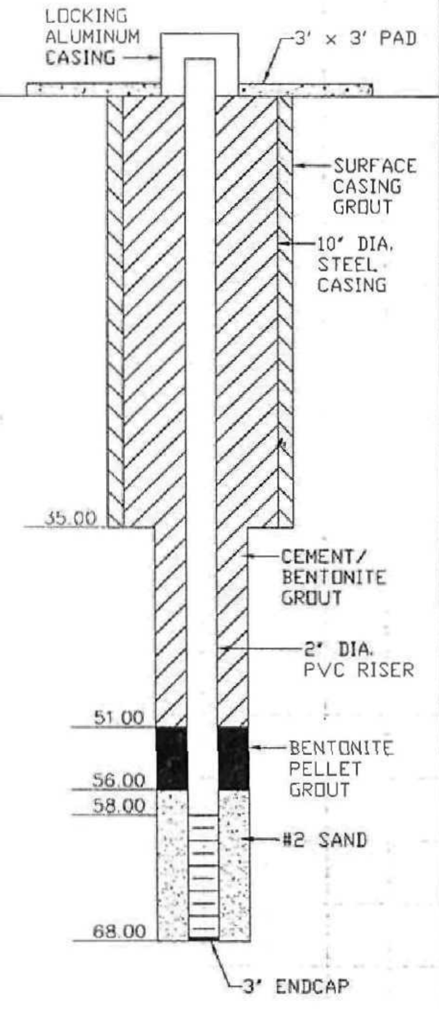
LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 60 l.f.	WELL SCREEN 2 in. dia. 10 l.f.	BENTONITE SEAL PELLETS
CASING TYPE PVC	SREEN TYPE PVC	INSTALLATION METHOD POURED
JOINT TYPE FLUSH	SLOT SIZE 0.008	FILTER PACK QTY. 9 BAGS
GROUT QUANTITY 12 BAGS	CENTRALIZERS N/A	FILTER PACK TYPE GRADE 2 SILICA SAND
GROUT TYPE CEMENT/BENTONITE	DRILLING MUD TYPE N/A	INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE OWR-5D FOR LITHOLOGIC DISCRIPTION
10.0	
20.0	
30.0	
40.0	
50.0	
60.0	
70.0	
80.0	
90.0	
100.0	

WELL SKETCH



INSTALLATION NOTES

Installed and grouted 10" dia. steel surface casing to 35' BGS with 12 1/4" dia. augers. Resumed boring with 4 1/4" dia. augers to 68' BGS. Installed 10' of 2" dia. PVC, 0.008 slot screen and 60' of 2" dia. PVC riser to ~68' BGS. Tremmied 9 bags grade 2 silica sand to ~56' BGS. Poured (2) 5. gal. buckets of bentonite pellets to ~51' BGS. Grouted remainder of open annulus with 95%-5% bentonite' mix. Installed locking aluminum protective casing and 3' x 3' concrete pad for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved. Minimum of 6 well volumes removed.

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-6D

BORING DATE: 6/3/98
BORING LOCATION:

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV DEPTH	SAMPLES NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4, 12 1/4	(FILL) Soft, dry, light brown to dark brown, CLAYEY SILT, little fine-coarse sand, trace fine-coarse gravel	ML		0.00						
						1	SS	1,2,1,2	3	1.0/2.0	
5		Soft to firm, dry to moist, light brown and reddish brown and tan, mottled, SILTY CLAY, little to some fine-coarse sand and fine-coarse gravel, weathered sandstone gravel (weathered residuum)	CL		4.00	2	SS	1,2,5,4	7	1.0/2.0	
						3	SS	7,9,12,14	21	2.0/2.0	
						4	SS	5,12,12,9	24	1.0/2.0	
10						5	SS	2,5,2,4	7	1.0/2.0	
						6	SS	3,5,5,4	10	1.0/2.0	
15		14' - 18' same as above except soft, wet				7	SS	4,5,3,3	8	2.0/2.0	
						8	SS	3,3,4,5	7	0.5/2.0	
		Stiff, damp to very moist, red-brown-tan, mottled, SILTY CLAY, trace to some fine-coarse sand and gravels, weathered sandstone common (weathered residuum)	CL		18.00	9	SS	5,7,11,12	18	2.0/2.0	
20						10	SH	-	NA		
						11	SS	4,7,7,10	14	1.75/2	
25						12	SS	3,4,7,7	11	1.75/2	
						13	SS	7,9,10,9	19	1.0/2.0	
						14	SS	4,4,8,10	12	0.5/2.0	
30						15	SS	5,7,7,9	14	2.0/2.0	
						16	SS	7,9,6,6	15	2.0/2.0	
35											34' - 65' BGS sample recovery poor. Samples remolded by wood fragments during drilling. Soft, wet conditions likely due to remolding. Intact, undisturbed samples indicate stiff, moist silty clay
						17	CME	-	NA		
40											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH/MNH
CHECKED: SFR
DATE: 10/7/98

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-6D

BORING DATE: 6/3/98
BORING LOCATION:

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
40	HSA 4 1/4, 12 1/4	See previous page	CL			18	SH	-	NA		
						19	CME	-	NA	1.0/5.0	
45						20	SH	-	NA		
						21	SS	4,4,6,8	10	0.2/2.0	
						22	CME	-	NA	0.5/3.0	
50						23	CME	-	NA	1.0/5.0	
55						24	CME	-	NA		
60						25	SH	-	NA	0.8/2.0	
						26	SS	2,3,3,4	6	1.5/2.0	
						27	SS	4,3,4,4	7	1.5/2.0	
65		Boring completed @ 65' BGS			65.00						
70											
75											
80											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH/MNH
CHECKED: SFR
DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. OWR-6D SHEET 1 of 1

GA INSP. CDH/MNH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 734.50 WATER DEPTH 52.16

WEATHER SUNNY DRILLING COMPANY EEI TOC ELEV. 736.79 DATE/TIME 8-11-98

TEMP. 95 DRILL RIG CME-75 DRILLER E. FULLER STARTED 10:5-/5-19-98 (TIME / DATE) COMPLETED 16:00/6-3-98 (TIME / DATE)

LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 70 l.f. WELL SCREEN 2 in. dia. 10 l.f. BENTONITE SEAL PELLETS

CASING TYPE PVC SREEN TYPE PVC INSTALLATION METHOD POURED

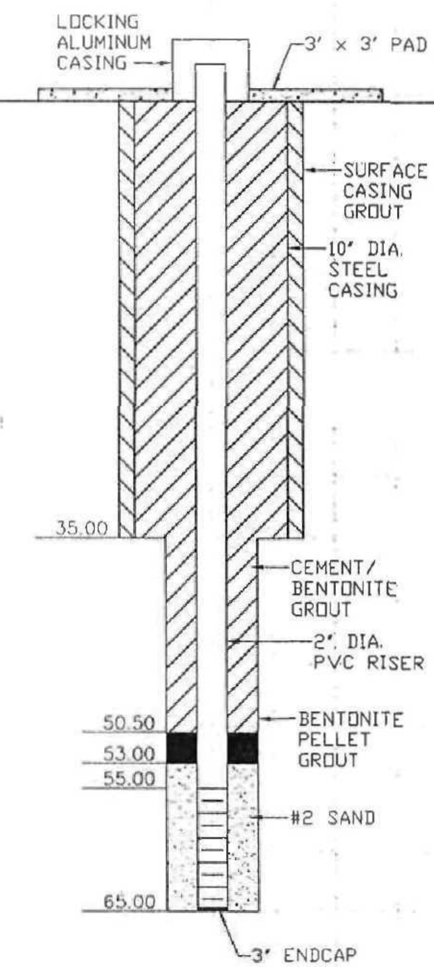
JOINT TYPE FLUSH SLOT SIZE 0.008 FILTER PACK QTY. 9 BAGS

GROUT QUANTITY 12 BAGS CENTRALIZERS N/A FILTER PACK TYPE GRADE 2 SILICA SAND

GROUT TYPE CEMENT/BENTONITE DRILLING MUD TYPE N/A INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE OWR-6D FOR LITHOLOGIC DISCRIPTION
10.0	
20.0	
30.0	
40.0	
50.0	
60.0	
70.0	
80.0	
90.0	
100.0	

WELL SKETCH



INSTALLATION NOTES

Installed and grouted 10" dia. steel surface casing to 35' BGS with 12 1/4" dia. augers. Resumed boring with 4 1/4" dia. augers to 65' BGS. Installed 10' of 2" dia., 0.008 slot PVC screen and 60' of 2" dia. PVC riser to 65' BGS. Tremmied 9 bags of sand to ~53' BGS. Poured (1) 5 gal. buckets of bentonite pellets to ~50.5' BGS. Grouted remainder of open annulus with 95%-5% cement bentonite grout mixture. Installed locking aluminum protective casing and 3' x 3' concrete pad for surface finish.

WELL DEVELOPMENT NOTES

Well made very little water and recovered slowly. Surged and pumped as recovery allowed over 3 week period. Minimum of 6 well volumes removed.

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-7D

BORING DATE: 5/28/98
BORING LOCATION:

SHEET: 1 OF 2
DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 In	N	REC/ATT	NOTE
0	HSA 4 1/4, 12 1/4	(FILL) Soft, red-brown, SILTY CLAY, little to some fine-medium gravel	CL		0.00						
						1	DO	2,3,8,11	11	1.0/2.0	
5						2	DO	2,10,9,14	19	2.0/2.0	
						3	DO	10,30,29,10	59	2.0/2.0	
		Soft to firm, moist, red-brown-orange, SILTY CLAY, little to some fine-coarse sand, little to trace gravels, intermittent sand zones (weathered residuum)	CL		7.00	4	DO	2,10,12,5	22	2.0/2.0	
10						5	DO	3,8,5,8	13	1.0/2.0	
		Clayey sand zone				6	DO	4,5,8,7	13	1.0/2.0	
15						7	DO	2,3,11,16	14	2.0/2.0	
						8	DO	11,15,13,13	28	2.0/2.0	
						9	DO	5,8,9,9	17	1.0/2.0	
20						10	DO	3,4,4,6	8	1.0/2.0	
						11	DO	3,5,4,5	9	1.0/2.0	
25		Gravelly zone	CL		24.00						
						12	SH	-	NA	1.5/2.0	
30		Soft to firm, moist to wet, red-brown-orange, SILTY CLAY, little fine-coarse sand, trace gravels (chert) to nodules, slickenslided silt/sand filled fractures (weathered residuum)	CL		30.00	13	DO	10,10,3,3	13	1.0/2.0	
						14	DO	3,7,10,11	17	1.0/2.0	
35						15	DO	9,11	20	1.0/1.0	
						16	CME	-	NA	4.0/5.0	
40											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-7D

BORING DATE: 5/28/98
BORING LOCATION:

SHEET: 2 OF 2
DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 In	N	REC/ATT	NOTE
40	HSA 4 1/4, 12 1/4	See previous page				17	SH	-	NA	1.5/2.0	
						18	CME	-	NA	3.0/3.0	
45						19	CME	-	NA	4.0/5.0	
50		Clayey sand zone	CL			20	CME	-	NA	4.0/5.0	
55						21	CME	-	NA	4.0/5.0	
60						22	SH	-	NA	1.7/2.0	
						23	CME	-	NA	3.0/3.0	
65		Boring completed @ 65' BGS			65.00						
70											
75											
80											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. DWR-7D SHEET 1 of 1

GA INSP. CDH/MNH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 772.10 WATER DEPTH 60.83

WEATHER SUNNY DRILLING COMPANY EEI TOC ELEV. 774.49 DATE/TIME 8-11-98

TEMP. 90 DRILL RIG CME-75 DRILLER E. FULLER STARTED 14:30/5-13-98 (TIME / DATE) COMPLETED 15:30/5-28-98 (TIME / DATE)

LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 60 l.f. WELL SCREEN 2 in. dia. 10 l.f. BENTONITE SEAL PELLETS

CASING TYPE PVC SREEN TYPE PVC INSTALLATION METHOD POURED

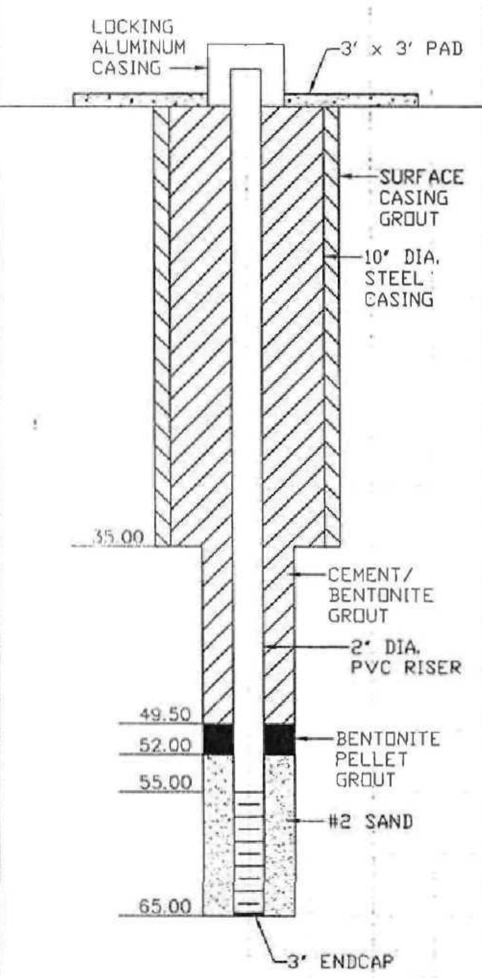
JOINT TYPE FLUSH SLOT SIZE 0.008 FILTER PACK QTY. 9 BAGS

GROUT QUANTITY 10 BAGS CENTRALIZERS N/A FILTER PACK TYPE GRADE 2 SILICA SAND

GROUT TYPE CEMENT/BENTONITE DRILLING MUD TYPE N/A INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE DWR-7D FOR LITHOLOGIC DISCRIPTION
10.0	
20.0	
30.0	
40.0	
50.0	
60.0	
70.0	
80.0	
90.0	
100.0	

WELL SKETCH



INSTALLATION NOTES

Installed and grouted 10" dia. steel surface casing to 35' BGS with 12 1/4" dia. augers. Resumed boring with 4 1/4" dia. augers to 65' BGS. Installed 10' of 2" dia., 0.008 slot PVC screen and 60' of 2" dia. PVC riser to 65' BGS. Tremmied 9 bags of sand to ~52' BGS. Poured (1) 5 gal. buckets of bentonite pellets to ~49.5' BGS. Grouted remainder of open annulus with 95%-5% cement bentonite grout mixture. Installed locking aluminum protective casing, 3' x 3' and concrete pad for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved. Minimum of 6 well volumes removed.

PROJECT: SOLUTIA

PROJECT LOCATION: ALABAMA

PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-8S

BORING DATE: 6/12/98

BORING LOCATION:

SHEET: 1 OF 1

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4, 12 1/4	Gravel fill			0.00						
		Soft, dry to damp, light brown-orange brown, CLAYEY SILT, some to and fine-medium sand and fine gravel, fractured	ML		2.00	1	SS	3,6,5,9	11	0.0/2.0	
5						2	SS	5,5,4,7	9	2.0/2.0	
		Soft, light brown to orange brown, moist to very moist, SILTY CLAY, some to and fine-coarse sand and fine gravel 8.5' - 9' Roof shingle-like material 9' - 10' Clayey silt	CL		6.00	3	SS	4,4,3,3	7	.75/2.0	
						4	SS	2,7,2,2	9	1.5/2.0	
10		Soft, moist to wet, light brown-orange brown, SILTY CLAY, trace to and fine-coarse sand, little fine gravel	CL		10.00	5	SS	1,1,2,4	3	2.0/2.0	
						6	SS	4,2,4,2	6	2.0/2.0	
15						7	SS	2,2,2,2	4	2.0/2.0	
		Compact to firm, wet, red-brown, SANDY SILT AND SILTY FINE SAND	ML-SM		18.00						
		Firm, damp to moist, red-brown-tan-balck, mottled, SILTY CLAY, trace to some coarse-fine sand and fine gravel, chert gravel present and Fe nodules	CL		18.50	8	SS	5,9,4,10	13	1.5/2.0	
20						9	SH	-	NA	2.0/2.0	
						10	CME	-	NA		
25						11	CME	-	NA	3.0/3.0	
		28' - 32' Silty sand and sandy silt thin (< 1 cm) seams present, wet in seams				12	SS	4,6,7,13	13	1.5/2.0	
30						13	SH	-	NA	1.5/2.0	
		32' - 35' No seams				14	SS	5,6,8,11	14	2.0/2.0	
						15	SS	7,8	15	1.0/1.0	
35		Boring completed @ 35' BGS			35.00						
40											

DRILL RIG: CME-75

DRILLING CONTRACTOR: EEI

DRILLER: E. FULLER

Golder Associates

LOGGED: MNH

CHECKED: SFR

DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. OWR-8S SHEET 1 of 1

GA INSP. CDH/MNH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 752.90 WATER DEPTH 13.76

WEATHER SUNNY DRILLING COMPANY EEI TOC ELEV. 755.17 DATE/TIME 8-11-98

TEMP. 95 DRILL RIG CME-75 DRILLER E. FULLER STARTED 12:00/6-8-98 (TIME / DATE) COMPLETED 16:00/6-12-98 (TIME / DATE)

LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 30 l.f. WELL SCREEN 2 in. dia. 10 l.f. BENTONITE SEAL PELLETS

CASING TYPE PVC SREEN TYPE PVC INSTALLATION METHOD POURED

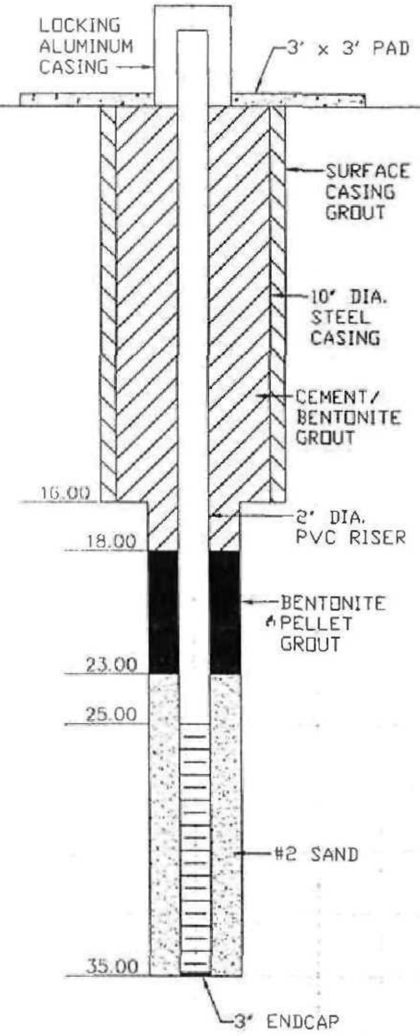
JOINT TYPE FLUSH SLOT SIZE 0.008 FILTER PACK QTY. 8 BAGS

GROUT QUANTITY 7 BAGS CENTRALIZERS N/A FILTER PACK TYPE GRADE 2 SILICA SAND

GROUT TYPE CEMENT/BENTONITE DRILLING MUD TYPE N/A INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE OWR-8S FOR LITHOLOGIC DISCRIPTION
5.0	
10.0	
15.0	
20.0	
25.0	
30.0	
35.0	
40.0	
45.0	
50.0	

WELL SKETCH



INSTALLATION NOTES

Installed and grouted 10" dia. steel surface casing to 16' BGS with 12 1/4" dia. augers. Resumed boring with 4 1/4" dia. augers to 35' BGS. Installed 10' of 2" dia., 0.008 slot PVC screen and 30' of 2" dia. PVC riser to 35' BGS. Tremmied 8 bags of sand to ~23' BGS. Poured (2) 5 gal. buckets of bentonite pellets to ~18' BGS. Grouted remainder of open annulus with 95%-5% cement bentonite grout mixture. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved. Minimum of 6 well volumes removed.

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-9S

BORING DATE: 6/21/98
BORING LOCATION:

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4, 12 1/4	Firm, damp to moist, light brown, orange, reddish brown, SILTY CLAY, little to some fine-coarse sand and gravel, (meta-sandstone) and (chert), fe, Mn nodules, some slickensided fractures with clay or silty sand infilling	CL		0.00	1	SS	3,4,8,9	12	2.0/2.0	
						2	SS	2,4,7,8	11	2.0/2.0	
5						3	SS	14,15,16,19	31	1.75/2	
						4	SS	3,5,8,11	13	2.0/2.0	
10						5	SS	3,6,8,11	14	2.0/2.0	
						6	SS	10,9,8,13	17	1.0/2.0	
15						7	CME	-	NA	5.0/5.0	
20						8	SH	-	NA	1.2/2.0	
		24' - 27' Cobble/gravel zone				9	CME	-	NA	3.0/3.0	
25						10	CME	-	NA	5.0/5.0	
30						11	CME	-	NA	5.0/5.0	
35		35' - 37' Highly weathered chert and meta-sandstone				12	CME	-	NA	5.0/5.0	
40											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE OWR-9S

BORING DATE: 6/21/98
BORING LOCATION:

SHEET: 2 OF
DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
40	HSA 4 1/4, 12 1/4	See previous page	CL			13	SH	-	NA	1.8/2.0	
						14	CME	-	NA	3.0/3.0	
45											
						15	CME	-	NA	5.0/5.0	
50		Boring completed @ 50' BGS			50.00						
55											
60											
65											
70											
75											
80											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. DWR-9S SHEET 1 of 1

GA INSP. CDH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 750.70 WATER DEPTH 37.67

WEATHER SUNNY DRILLING COMPANY EEI TOC ELEV. 753.09 DATE/TIME 8-11-98

TEMP. 90 DRILL RIG CME-75 DRILLER E. FULLER STARTED 15:00/5-21-98 (TIME / DATE) COMPLETED 11:00/6-21-98 (TIME / DATE)

LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 50 l.f. WELL SCREEN 2 in. dia. 10 l.f. BENTONITE SEAL PELLETS

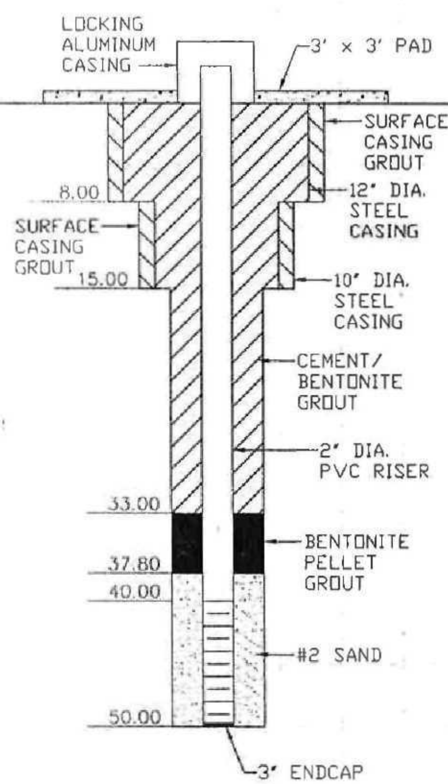
CASING TYPE PVC SREEN TYPE PVC INSTALLATION METHOD POURED

JOINT TYPE FLUSH SLOT SIZE 0.008 FILTER PACK QTY. 8 BAGS

GROUT QUANTITY 7 BAGS CENTRALIZERS N/A FILTER PACK TYPE GRADE 2 SILICA SAND

GROUT TYPE CEMENT/BENTONITE DRILLING MUD TYPE N/A INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
	GROUND SURFACE		
0.0	REFER TO RECORD OF BOREHOLE DWR-9S FOR LITHOLOGIC DISCRIPTION		
10.0			
20.0			
30.0			
40.0			
50.0			
60.0			
70.0			
80.0			
90.0			
100.0			



INSTALLATION NOTES

Installed and grouted 12" dia. steel surface casing to ~8" BGS. Allowed to cure, then instaslled 10" dia. steel casing to ~15' BGS. Resumed boring with 4 1/4" dia. augers to 50' BGS. Installed 10' of 2" dia., 0.008 slot PVC screen and 50' of 2" dia. PVC riser to 50' BGS. Tremmied 8 bags of sand to ~37.8' BGS. Poured (2) 5 gal. buckets of bentonite pellets to ~33' BGS. Grouted remainder of open annulus with 95%-5% cement bentonite grout mixture. Installed locking aluminum protective casing and 3' x 3' concrete pad for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved. Minimum of 6 well volumes removed.

Golder Associates

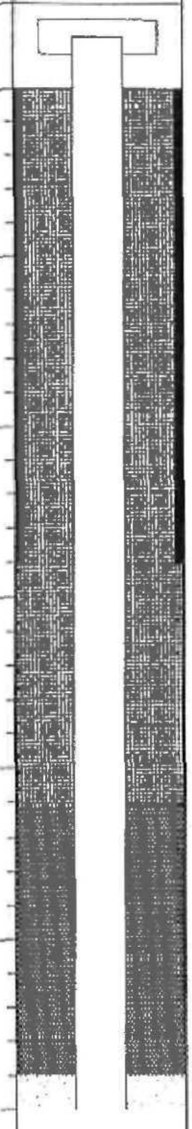
Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, Georgia 30341
Telephone: 770-496-1893
Fax: 770-934-9476

Client: Solutia Inc		Job No.: 943-3680.RFI	Boring/Well: OWR-10
Project: Solutia/Supplemental RFI/CS/AL		Well Construction Data	(ft bgs)
Date Started: 1/17/03	Date Completed: 1/23/03	Screen: 0.006 inch slotted	From: 39.2 - To: 49.2
Logged By: KT/KH	Checked By: KH	Pack: 20/40 silica sand	From: 29 - To: 51
Drilling Co.: TDS	Driller: D. Campbell	Seal: bentonite pellets	From: 21 - To: 29
Method: 6.25" ID/ 3.25" ID HSA	Equipment: CME-55-ATV	Grout: Portland Type II	From: 0 - To: 21
Boring Depth: 56.0	Ground Surface Elevation:	Inner Casing: 2 Inch diameter S40 PVC	
GW Level: ▼ 18.5	Time/Date: 1/27/03	Outer Casing/Stick Up: 8 inch diameter Stainless Steel set to 14' bgs	

Depth (ft bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	P.D. (ppm)	Description
0							
	1	DO	2-2-2-2	4	1.3/2.0	0	Stiff, moist to damp, orange brown SILTY CLAY, trace fine Sand (FILL)
	2	DO	1-2-2-3	4	1.1/2.0	0	
5	3	DO	3-2-3-4	5	1.7/2.0	0	Stiff to very stiff, damp to dry, mottled red brown and black SILTY CLAY, some fine to coarse Sand, trace fine Gravel (cemented fine-medium sand)(FILL)
	4	DO	10-17-16-15	33	1.7/2.0	0	
	5	DO	3-9-13-14	22	0.8/2.0	0	
10	6	DO	4-12-21-20	33	1.8/2.0	0	Very stiff to hard, dry red brown SILTY CLAY (FILL)
	7	DO	4-8-13-19	21	2.0/2.0	0	Very stiff to hard, dry, red brown SILTY CLAY, some fine to coarse Sand (lenses), trace coarse Gravel (sandstone/cemented medium sand) (RESIDUUM?)
15							
	8	DO	4-7-7-9	14	0.0/2.0	0	Stiff to soft, moist, mottled red brown, tan and black SILTY CLAY, little to trace fine to coarse Sand, trace Gravel (RESIDUUM?)
	9	DO	4-7-9-11	16	2.0/2.0	0	
20	10	DO	4-5-6-8	11	2.0/2.0	0	
	11	DO	3-6-8-10	14	2.0/2.0	0	
25	12	DO	1-4-6-8	10	2.0/2.0	0	
	13	DO	1-2-5-7	7	1.5/2.0	0	Firm to stiff, moist, mottled red brown, tan and black SILTY CLAY, trace fine to coarse Sand, trace Gravel (RESIDUUM)
	14	DO	2-4-6-8	10	2.0/2.0	0	
30							

Elevation (ft msl)

Well Construction



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PID/SPT BMW LOGS 2-20.GPJ NKCHC LSBMW.GDT 3/18/03

Golder Associates
Golder Associates Inc.
3730 Chamblee Tucker Road
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Fax: 770-934-9476

Client: Solutia Inc	Job No.: 943-3680.RFI	Boring/Well: OWR-10
Project: Solutia/Supplemental RFI/CS/AL		

Depth (ft bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	PID (ppm)	Lithology	Description	Elevation (ft msl)	Well Construction
	15	DO	2-5-6-8	11	2.0/2.0	0				
	16	DO	2-3-5-6	8	2.0/2.0	0				
35	17	DO	3-4-5-6	9	2.0/2.0	0				
	18	DO	3-7-5-6	12	2.0/2.0	0				
	19	DO	3-4-6-7	10	2.0/2.0	0				
40	20	DO	2-4-5-5	9	2.0/2.0	0				
	21	DO	3-4-7-7	11	2.0/2.0	0				
45	22	DO	2-3-4-9	7	2.0/2.0	0				
	23	DO	5-6-8-8	14	2.0/2.0	0				
	24	DO	1-3-3-5	6	2.0/2.0	0				
50	25	DO	4-4-5-6	9	2.0/2.0	0				
	26	DO	7-8-9-9	17	2.0/2.0	0				
55	27	DO	5-6-7-6	13	2.0/2.0	0				

Golder Associates

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3730 Chamblee Tucker Road
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Client: Solutia Inc		Job No.: 943-3680.RFI	Boring/Well: OWR-11
Project: Solutia/Supplemental RFI/CS/AL		Well Construction Data	(ft bgs)
Date Started: 1/14/03	Date Completed: 1/20/03	Screen: 0.006 inch slotted	From: 25 - To: 35
Logged By: KT/KH	Checked By: KH	Pack: 20/40 silica sand	From: 23.1 - To: 36
Drilling Co.: TDS	Driller: D. Campbell	Seal: bentonite pellets	From: 20 - To: 23.1
Method: 6.25" ID/ 3.25" ID HSA	Equipment: CME-55-ATV	Grout: Portland Type II	From: 0 - To: 20
Boring Depth: 36.0	Ground Surface Elevation:	Inner Casing: 2 inch diameter S40 PVC	
GW Level: 7.0	Time/Date: 1/27/03	Outer Casing/Stick Up: 8 inch diameter Stainless Steel set to 17' bgs	

Depth (ft bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	FID (ppm)	Lithology	Description	Elevation (ft msl)	Well Construction
0	1	DO	2-2-3-2	5	1.5/2.0	0		Stiff to very stiff, moist to damp, orange brown SILTY CLAY, trace fine Gravel (FILL)		
	2	DO	2-3-3-5	6	1.7/2.0	0				
5	3	DO	1-3-3-4	6	1.8/2.0	0				
	4	DO	1-2-5-8	7	1.7/2.0	0		Very stiff to very soft, mosit to wet to dry, yellow orange brown SILTY CLAY, trace to little fine to coarse Sand, trace to little fine Gravel (sandstone/cemented medium sand) (FILL)		
	5	DO	5-8-11-11	19	0.8/2.0	0				
10	6	DO	5-7-7-8	14	0.0/2.0	0				
	7	DO	5-7-8-8	15	1.4/2.0	0		Very stiff, dry to damp, mottled red brown and yellow brown SILTY CLAY, trace to little fine to coarse Sand, little fine to coarse Gravel (sandstone) (FILL)		
15	8	DO	2-4-7-7	11	1.5/2.0	0		Very stiff, moist, mottled, red brown, black, tan SILTY CLAY, trace fine to coarse chert Gravel (RESIDUUM)		
	9	DO	5-8-10-14	18	1.9/2.0	0				
20	10	DO	3-6-9-10	15	1.6/2.0	0				
	11	DO	1-2-3-5	5	1.9/2.0	0		Very soft, moist, red brown fine to coarse SAND, some to and SILTY CLAY (RESIDUUM)		
25	12	DO	2-5-6-10	11	1.5/2.0	0		Stiff to firm, moist to wet, mottled red brown, black, and tan SILTY CLAY, trace chert Gravel (RESIDUUM)		
	13	DO	5-6-8-9	14	1.7/2.0	0				
	14	DO	3-4-4-7	8	1.3/2.0	0				
30	15	DO	2-3-5-8	8	1.6/2.0	0				
	16	DO	1-5-6-6	11	1.7/2.0	0				
35	17	DO	3-4-5-7	9	1.6/2.0	0				

Golder Associates

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3730 Chamblee Tucker Road
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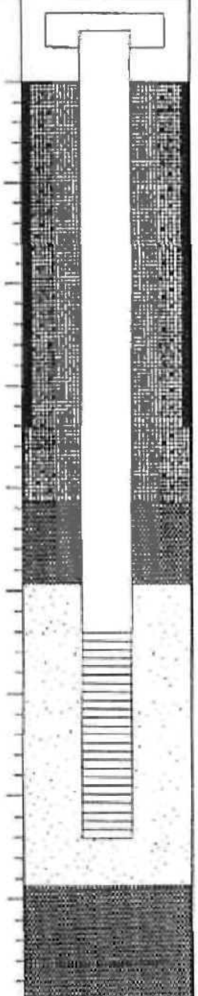
Client: Solutia Inc		Job No.: 943-3680.RFI	Boring/Well: OWR-12
Project: Solutia/Supplemental RFI/CS/AL		Well Construction Data	(ft bgs)
Date Started: 1/14/03	Date Completed: 1/20/03	Screen: 0.006 inch slotted	From: 27 - To: 37
Logged By: KT/KH	Checked By: KH	Pack: 20/40 silica sand	From: 24.7 - To: 39.3
Drilling Co.: TDS	Driller: D. Campbell	Seal: bentonite pellets	From: 20.7 - To: 24.7
Method: 6.25" ID/ 3.25" ID HSA	Equipment: CME-55-ATV	Grout: Portland Type II	From: 0 - To: 20.7
Boring Depth: 45.0	Ground Surface Elevation:	Inner Casing: 2 inch diameter S40 PVC	
GW Level: 12.9	Time/Date: 1/27/03	Outer Casing/Stick Up: 8 inch diameter Stainless Steel set to 17' bgs	

Depth (f. bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	PID (ppm)	Lithology	Description	Elevation (ft msl)
0	1	DO	3-2-3-3	5	1.4/2.0	0		Firm, moist, orange brown to dark brown SILTY CLAY, trace to little fine to coarse Sand, trace fine Gravel (FILL)	
	2	DO	2-2-2-2	4	1.5/2.0	0			
5	3	DO	2-3-2-4	5	1.3/2.0	0			
	4	DO	2-2-2-4	4	0.6/2.0	0			
	5	DO	2-4-6-7	10	0.6/2.0	0		Firm to very stiff, moist, brown CLAY, trace fine to coarse Sand, black staining (FILL)	
10	6	DO	2-4-3-5	7	2.0/2.0	0			
	7	DO	1-4-6-3	10		0		Loose, moist to wet, black fine to coarse SAND and fine GRAVEL, and very stiff, moist red brown SILTY CLAY (FILL) ▼	
15	8	DO	6-50/4	50/4	1.0/2.0	0		Very stiff to hard, dry to damp, red brown SILTY CLAY, little fine Sand (RESIDUUM?)	
					0.5/2.0				
	9	DO	6-9-8-8	17	1.7/2.0	0		Stiff to very stiff, moist, mottled, red brown and tan SILTY CLAY, trace fine to coarse Sand, trace Gravel (RESIDUUM)	
20	10	DO	3-11-15-10	26	2.0/2.0	0			
	11	DO	5-7-9-11	16	2.0/2.0	0		Very stiff to firm, moist, mottled red brown and tan CLAYEY SILT, trace fine to coarse Sand. Clay lens 24.5 to 24.8 ft. bgs (RESIDUUM)	
25	12	DO	4-6-8-9	14	2.0/2.0	0			
	13	DO	2-5-6-6	11	2.0/2.0	0		Stiff to soft, moist to very moist, mottled, red brown, tan and black SILTY CLAY, trace to little fine to coarse Sand, trace Gravel (RESIDUUM)	
	14	DO	2-4-6-7	10	2.0/2.0	0			
30	15	DO	1-3-5-7	8	2.0/2.0	0			
	16	DO	3-5-7-6	12	2.0/2.0	0			
35	17	DO	5-6-10-10	16	2.0/2.0	0			
	18	DO	1-3-7-8	10	2.0/2.0	0		Firm, moist to very moist, mottled red brown, black and tan SILTY CLAY, little to some fine to coarse Sand, trace Gravel (RESIDUUM)	
	19	DO	4-6-8-10	14	2.0/2.0	0			
40									
	20	DO	5-6-10-8	16	2.0/2.0	0			
	21	DO	4-6-9-9	15	2.0/2.0	0			
45					2.0/2.0				

Well Construction



Golder Associates

Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, Georgia 30341
Telephone: 770-496-1893
Fax: 770-934-9476

Client: Solutia Inc		Job No.: 943-3680.RFI	Boring/Well: OWR-13
Project: Solutia/Supplemental RFI/CS/AL		Well Construction Data	(ft bgs)
Date Started: 1/14/03	Date Completed: 1/23/03	Screen: 0.006 inch slotted	From: 26 - To: 36
Logged By: KT/KH	Checked By: KH	Pack: 20/40 silica sand	From: 23.8 - To: 37
Drilling Co.: TDS	Driller: D. Campbell	Seal: bentonite pellets	From: 19.8 - To: 23.8
Method: 6.25" ID/ 3.25" ID HSA	Equipment: CME-55-ATV	Grout: Portland Type II	From: 0 - To: 19.8
Boring Depth: 36.0	Ground Surface Elevation:	Inner Casing: 2 inch diameter S40 PVC	
GW Level: ▼ 13.0	Time/Date: 1/27/03	Outer Casing/Stick Up: 8 inch diameter Stainless Steel set to 17' bgs	

Depth (ft bgs)	Sample Number	Type	Blows Per 6-inches	N-Value	Rec/Att	PID (ppm)	Lithology	Description	Elevation (ft msl)	Well Construction
0	1	DO	2-3-3-3	6	1.5/2.0	0		Stiff to firm, moist, orange brown SILTY CLAY, trace fine Gravel (FILL)		
	2	DO	1-3-2-4	5	1.1/2.0	0		Very loose, wet, black fine to coarse SAND, fine Gravel (FILL)		
5	3	DO	1-2-2-1	4	0.9/2.0	0		Very loose, moist to wet, black fine to coarse SAND, little Silt, trace fine Gravel (FILL, possible foundry material)		
	4	DO	1-1-1-2	2	2.0/2.0	0				
	5	DO	1-WH-WH-1	WH	0.4/2.0	0				
10	6	DO	WH-WH-WH-1	WH	2.0/2.0	0		Very soft to soft, wet orange brown to red brown fine SAND and SILT, trace Clay, trace medium to coarse Sand, trace fine Gravel (FILL)		
	7	DO	WH-WH-1-2	1	2.0/2.0	0			▼	
15	8	DO	3-3-4-6	7	2.0/2.0	0		Stiff to soft, moist to wet, mottled red brown and tan SILTY CLAY, trace fine to coarse Sand, trace Gravel (RESIDUUM)		
	9	DO	2-4-5-7	9	1.7/2.0	0				
20	10	DO	5-5-9-9	14	1.8/2.0	0				
	11	DO	2-4-4-6	8	2.0/2.0	0				
25	12	DO	3-4-6-6	10	2.0/2.0	0				
	13	DO	1-3-5-8	8	1.8/2.0	0				
	14	DO	2-4-6-13	10	1.9/2.0	0				
30	15	DO	2-5-5-7	10	1.6/2.0	0		Soft to firm, wet to very moist, mottled reddish brown and tan SILTY CLAY, some to little Sand (lenses), trace chert Gravel (RESIDUUM)		
	16	DO	1-2-3-4	5	1.2/2.0	0				
35	17	DO	2-3-4-3	7	1.0/2.0	0				

Golder Associates

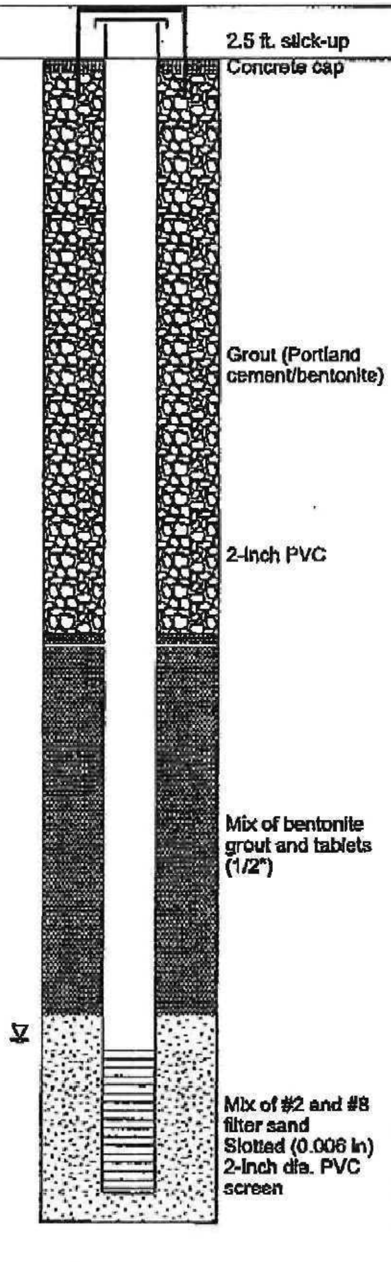
OWR-14D

PAGE 1 OF 1

PROJECT NUMBER	943-3680.RFI	DATE STARTED	Jun 6, 05
PROJECT NAME	Solutia	BOREHOLE DIAMETER	6
LOCATION	Anniston, AL	CASING TYPE/DIAMETER	PVC / 2 in.
DRILLING METHOD	3.25" HSA	SCREEN TYPE/SLOT	Slotted / 0.006
SAMPLING METHOD		FILTER PACK TYPE /QUANTITY	No. 2 and No. 8 sand / 1450 lbs.
GROUND ELEVATION		GROUT TYPE/QUANTITY	Portland cement & bentonite powder / 588 lbs.
TOP OF CASING	—	DEPTH TO WATER	68.30
LOGGED BY	JWC	GROUND WATER ELEVATION	
REMARKS			

Depth	LITHOLOGIC DESCRIPTION
	Ground Surface
	Soft, dry to damp, reddish brown SILT, trace clay, trace (f) sand
5	
	Firm, damp, brownish red CLAYEY SILT
10	Rec'd
	SAA, brownish red and orange mottled
15	
20	
	Firm, damp, reddish brown and orange mottled SILTY CLAY
25	SAA, reddish brown, gray, and orange mottled
	Firm, damp, reddish brown and orange mottled SILTY CLAY, trace limestone fragments
30	
35	Rec'd
	SAA, soft, moist
40	
45	Soft, wet, brown SILTY CLAY, trace coarse sand, trace limestone fragments
	Soft, wet, reddish brown CLAYEY SILT, trace to some gravel
50	Soft to firm, moist, brown and light brown mottled SILTY CLAY, trace (m-c) sand
55	
60	
65	
70	
75	Limestone gravel @ 75' to 76' bgs
80	
	Bottom of borehole at 81.0 feet.

WELL DIAGRAM



INSTALLATION NOTES

06-14-05:
14:05-Installed well screen and casing
14:15-Poured #8 filter sand @ 81' to 67.5' bgs (150 lbs)
16:20-Poured (3/8") bentonite pellets (20 lbs)
16:30-Bentonite bridged @ 10' bgs due to limited space between casing and auger
-Attempted to free-up bentonite by moving auger up/down but lost 10.5' of sand filter to void/fissure (sand @ 81'-78' bgs)

06-15-05:
07:20-Removed screen/casing
07:30-Augered back down to 81' bgs
08:30-Installed screen/casing
08:40-Poured #8 sand (650 lbs)
15:00-Poured #2 sand (400 lbs)

06-16-05:
07:30-Poured #2 sand @ 81' to 67.5' bgs (250 lbs)
09:30-Tremmied bentonite grout (50 lbs)
10:00-Casing pulled up to 79' bgs while removing auger (sand @ 66.5' bgs)
10:10-Poured 50 lbs bentonite tablets
10:15-Tremmied bentonite grout (50 lbs)

06-20-05:
10:00-Tremmied grout @ 40' to 0' bgs (588 lbs)

DEVELOPMENT NOTES

RECORD OF BOREHOLE OWR-14D

PROJECT: Solutia
PROJECT NUMBER: 943-3680.RFI
LOCATION: Anniston, AL

DRILLING METHOD: 3.25" HSA
DRILLING DATE: June 6, 2005
DRILL RIG: CME-75

DATUM:
COORDS: Not Surveyed

GS ELEVATION:
TOC ELEVATION:

DEPTH (ft)	BORING METHOD	SOIL PROFILE DESCRIPTION	ELEV. / DEPTH (ft)	SAMPLE NUMBER	TYPE	BLOWS per 6 in (140 lb hammer, 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft / WATER CONTENT (PERCENT)	NOTES WATER LEVELS
0	3.25" HSA	0.0 - 6.4 Soft, dry to damp, reddish brown SILT, trace clay, trace (f) sand	0.0							
				1	DO		3	19/24		
5				2	DO		3	2/24		
		6.4 - 12.0 Firm, damp, brownish red CLAYEY SILT	6.4	3	DO		7	24/24		
				4	DO		15	22/24		
10				5	DO		18	24/24		
		12.0 - 22.1 SAA, brownish red and orange mottled	12.0	6	DO		16	22/24		
15				7	DO		16	22/24		
				8	DO		13	24/24		
				9	DO		13	16/24		
20				10	DO		19	22/24		
		22.1 - 24.0 Firm, damp, reddish brown and orange mottled SILTY CLAY	22.1	11	DO		10	24/24		
25		24.0 - 27.8 SAA, reddish brown, gray, and orange mottled	24.0	12	DO		11	24/24		
				13	DO		10	24/24		
		27.8 - 38.0 Firm, damp, reddish brown and orange mottled SILTY CLAY, trace limestone fragments	27.8	14	DO		14	12/24		
30				15	DO		6	10/24		
				16	DO		14	17/24		
35				17	DO		9	12/24		
				18	DO		6	3/24		
		38.0 - 44.0 SAA, soft, moist	38.0	19	DO		9	20/24		
40										

Log continued on next page

1 in to 5 ft
DRILLING CONTRACTOR: Technical Drilling Services
DRILLER: C. Lee

LOGGED: JWC
CHECKED:

Golder Associates

RECORD OF BOREHOLE OWR-14D

PROJECT: Solutia
PROJECT NUMBER: 943-3680.RFI
LOCATION: Anniston, AL

DRILLING METHOD: 3.25" HSA
DRILLING DATE: June 6, 2005
DRILL RIG: CME-75

DATUM:
COORDS: Not Surveyed

GS ELEVATION:
TOC ELEVATION:

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
40	3.25" HSA	38.0 - 44.0 SAA, soft, moist *(Continued)*		20	DO		10	24/24	
				21	DO		6	24/24	
45		44.0 - 47.0 Soft, wet, brown SILTY CLAY, trace coarse sand, trace limestone fragments	44.0	22	DO		8	20/24	
				23	DO		6	22/24	
		47.0 - 48.7 Soft, wet, reddish brown CLAYEY SILT, trace to some gravel	47.0						
		48.7 - 81.0 Soft to firm, moist, brown and light brown mottled SILTY CLAY, trace (m-c) sand	48.7	24	DO		4	22/24	
50				25	DO		4	21/24	
				26	DO		8	24/24	
55				27	DO		12	22/24	
				28	DO		11	24/24	
				29	DO		11	22/24	
60				30	DO		8	24/24	
				31	DO		5	21/24	
65				32	DO		6	24/24	
				33	DO		5	0/24	
				34	DO		5	6/24	∇ 68.30
70				35	DO		5	24/24	
				36	DO		7	24/24	
75		75.0 - 76.0 Limestone gravel @ 75' to 76' bgs		37	DO		21	23/24	
				38	DO		39	13/24	
				39	DO		0	0/24	
80		Log continued on next page							

PENETRATION RESISTANCE BLOWS / ft ■ (20, 40, 60, 80); WATER CONTENT (PERCENT) W_p — W — W_l (20, 40, 60, 80)

1 in to 5 ft
DRILLING CONTRACTOR: Technical Drilling Services
DRILLER: C. Lee

LOGGED: JWC
CHECKED:

Golder Associates

RECORD OF BOREHOLE OWR-14D

PROJECT: Solutia
PROJECT NUMBER: 943-3680.RFI
LOCATION: Anniston, AL

DRILLING METHOD: 3.25" HSA
DRILLING DATE: June 6, 2005
DRILL RIG: CME-75

DATUM:
COORDS: Not Surveyed

GS ELEVATION:
TOC ELEVATION:

DEPTH (ft)	BORING METHOD / TEST	SOIL PROFILE DESCRIPTION		GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (20 40 60 80) / WATER CONTENT (PERCENT) W_p — W — W_l (20 40 60 80)	NOTES WATER LEVELS
80						40	DO		0	18/24	■	
		Boring terminated at 81 ft. BGS										
85												
90												
95												
100												
105												
110												
115												
120												

1 in to 5 ft
DRILLING CONTRACTOR: Technical Drilling Services
DRILLER: C. Lee

LOGGED: JWC
CHECKED:

Golder Associates

OW R-15D

RECORD OF BOREHOLE OW-15D

PROJECT: Solutia
PROJECT NUMBER: 943-3680.RFI
LOCATION: Anniston, AL

DRILLING METHOD: 3.25" HSA
DRILLING DATE: June 13, 2005
DRILL RIG: CME-75

DATUM:
COORDS: Not Surveyed

SHEET 1 of 2
GS ELEVATION:
TOC ELEVATION:

DEPTH (ft)	BORING METHOD	DESCRIPTION	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer, 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft (20 40 60 80) / WATER CONTENT (PERCENT) W_p W W_l (20 40 60 80)	NOTES WATER LEVELS
0	3.25" HSA	0.0 - 9.0 Soft, damp to moist, reddish brown CLAYEY SILT, trace gravel, trace (f) sand		0.0	1	TO			19/48		
5					2	TO			30/60		
10		9.0 - 14.0 Firm, moist, brown and reddish brown mottled (f-c) SANDY SILT, trace clay, trace gravel		9.0	3	TO			15/60		
15		14.0 - 26.0 Firm, damp, purple, brownish orange, and gray mottled SILT, trace clay, trace (f) sand			4	TO			45/60		∇ 16.91
20					5	TO			35/60		
25		26.0 - 26.5 Firm, damp, gray and orange brown (f) SILTY SAND		26.0 / 26.5	6	TO			45/60		
		26.5 - 29.0 Firm, damp, purple, brown, and gray (alternating layers) SILT, with 1/2" sand lenses		29.0							
30		29.0 - 43.1 V. stiff, dry to damp, purple, brown, and gray mottled SILT, trace clay			7	TO			35/60		
35					8	TO			34/60		
40		Log continued on next page			9	TO					

1 in to 5 ft
DRILLING CONTRACTOR: Technical Drilling Services
DRILLER: C. Lee

LOGGED: JWC
CHECKED:

Golder Associates

OWR-15D

RECORD OF BOREHOLE OW-15D

PROJECT: Solutia
PROJECT NUMBER: 943-3680.RFI
LOCATION: Anniston, AL

DRILLING METHOD: 3.25" HSA
DRILLING DATE: June 13, 2005
DRILL RIG: CME-75

DATUM:
COORDS: Not Surveyed

GS ELEVATION:
TOC ELEVATION:

DEPTH (ft)	BORING METHOD	DESCRIPTION	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft / WATER CONTENT (PERCENT)	NOTES WATER LEVELS
40	3.25" HSA	29.0 - 43.1 V. stiff, dry to damp, purple, brown, and gray mottled SILT, trace clay *(Continued)*		9	TO			60/60		
		43.1 - 45.0 Firm, damp, orange brown and gray mottled SILTY SAND	43.1	10	TO			12/12		
45		45.0 - 52.5 Soft, moist, reddish brown and gray mottled CLAYEY SILT, trace (f) sand		11	TO			20/48		
50				12	TO			60/60		
		52.5 - 53.2 Firm, damp, light brown SANDY SILT	52.5							
		53.2 - 56.3 Soft, moist, reddish brown and gray mottled CLAYEY SILT, trace (f) sand	53.2							
55		56.3 - 58.0 Compact, moist, yellowish brown SILTY SAND	56.3	13	TO			60/60		
		58.0 - 59.0 Firm, moist, brownish yellow and light gray mottled SANDY SILT	58.0							
		59.0 - 61.0 Loose, wet, yellow to yellow brown SILTY SAND	59.0							
60		61.0 - 64.0 Firm, damp to moist, brownish yellow and light gray CLAYEY SILT, trace (f) sand	61.0	14	TO			36/60		
		Boring terminated at 64 ft. BGS								
65										
70										
75										
80										

1 in to 5 ft
DRILLING CONTRACTOR: Technical Drilling Services
DRILLER: C. Lee

LOGGED: JWC
CHECKED:

Golder Associates

OW2-15D

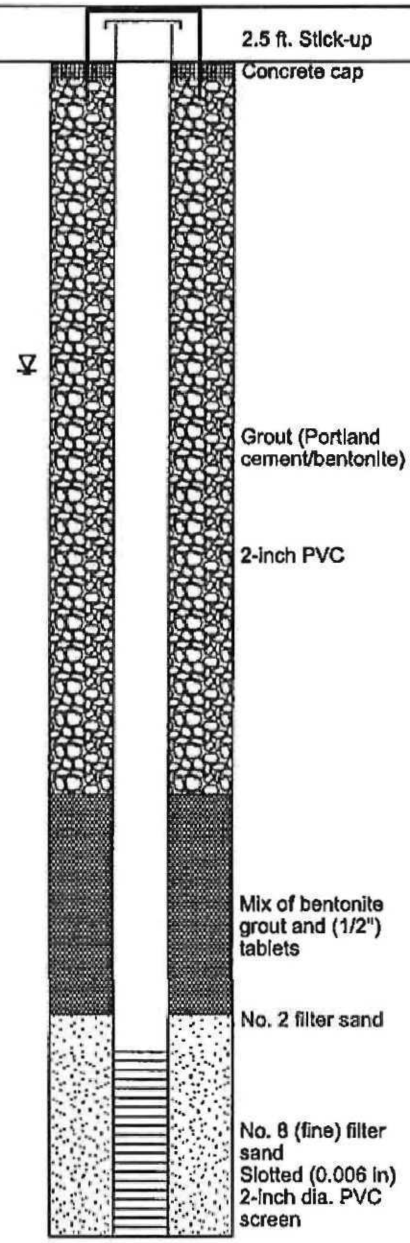
Golder Associates

OW-15D

PROJECT NUMBER	943-3680.RFI	**DATE STARTED**	Jun 13, 05
PROJECT NAME	Solutia	**BOREHOLE DIAMETER**	6
LOCATION	Anniston, AL	**CASING TYPE/DIAMETER**	PVC / 2 in.
DRILLING METHOD	3.25" HSA	**SCREEN TYPE/SLOT**	Slotted / 0.006
SAMPLING METHOD		**FILTER PACK TYPE /QUANTITY**	No. 8 sand / 425 lbs.
GROUND ELEVATION		**GROUT TYPE/QUANTITY**	Portland cement & bentonite powder / 420 lbs.
TOP OF CASING	---	**DEPTH TO WATER**	16.91
LOGGED BY	JWC	**GROUND WATER ELEVATION**	
REMARKS			

Depth	LITHOLOGIC DESCRIPTION
	Ground Surface
0	Soft, damp to moist, reddish brown CLAYEY SILT, trace gravel, trace (f) sand
9	Firm, moist, brown and reddish brown mottled (f-c) SANDY SILT, trace clay, trace gravel
14	Firm, damp, purple, brownish orange, and gray mottled SILT, trace clay, trace (f) sand
26.5	Firm, damp, gray and orange brown (f) SILTY SAND
28.5	Firm, damp, purple, brown, and gray (alternating layers) SILT, with 1/2" sand lenses
31	V. stiff, dry to damp, purple, brown, and gray mottled SILT, trace clay
43.5	Firm, damp, orange brown and gray mottled SILTY SAND
45.5	Soft, moist, reddish brown and gray mottled CLAYEY SILT, trace (f) sand
52.5	Firm, damp, light brown SANDY SILT
53.5	Soft, moist, reddish brown and gray mottled CLAYEY SILT, trace (f) sand
56	Compact, moist, yellowish brown SILTY SAND
58	Firm, moist, brownish yellow and light gray mottled SANDY SILT
60	Loose, wet, yellow to yellow brown SILTY SAND
62	Firm, damp to moist, brownish yellow and light gray CLAYEY SILT, trace (f) sand
64	Bottom of borehole at 64.0 feet.

WELL DIAGRAM



INSTALLATION NOTES

06-21-05:

09:30-Installed well screen and casing

09:35-Poured #8 sand @ 64' to 52.5' bgs (350 lbs)

12:10-Poured #2 sand @ 52.5' to 52' bgs (75 lbs)

12:50-Tremmied bentonite grout (50 lbs)

13:00-Poured 50 lbs of 1/2" bentonite tablets

13:05-Bentonite @ 52' to 40' bgs

06-22-05:

07:15-Tremmied grout @ 40' to 0' bgs (420 lbs)

DEVELOPMENT NOTES

Geraghty & Miller, Inc.

Lithologic Log of Boring B-8 (Piezometer P-8)

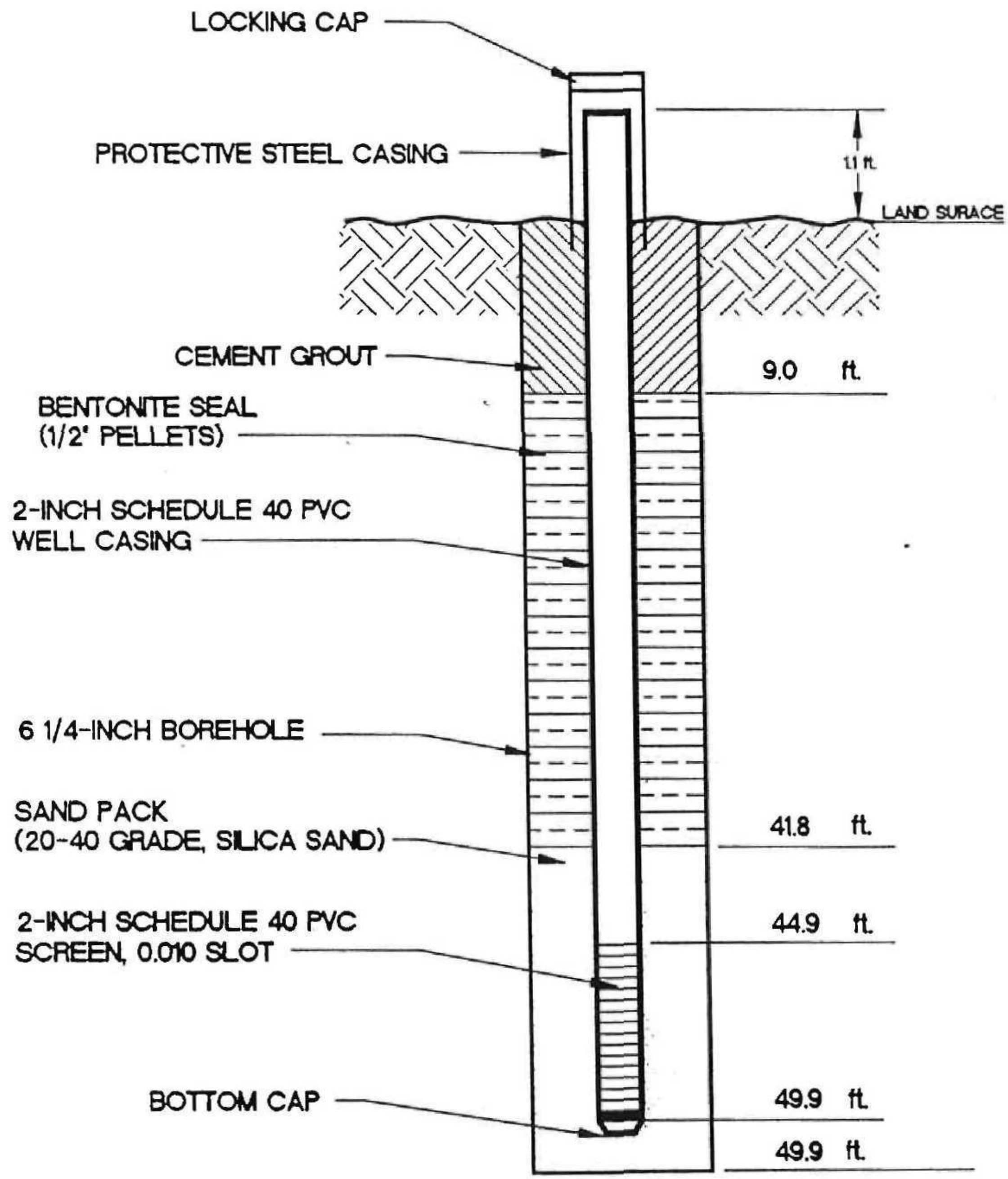
(P-8-C)

Description	Depth (ft)	Thickness (ft)
Sand, quartz, fine to coarse-grained, brown; interlayered with pebble to cobble sandstone...	0 - 8	8
Clay, silty, firm, dry, brown; trace of pebble sandstone..............................	8 - 10	2
Clay, silty, firm, wet, brown with gray streaks; trace of slate lenses.........................	10 - 14	4
Clay, silty, firm, reddish brown; white and red streaks throughout sample......................	14 - 18	4
Clay, silty, crumbly, brown; red waxy clay stringers..................................	18 - 22	4
Clay, silty, firm, red and brown...............	22 - 24	2
Clay, waxy, firm, brown with red sandy lenses..	24 - 26	2

GERAGHTY & MILLER, INC.
Environmental Services

PIEZOMETER CONSTRUCTION DIAGRAM

WELL NO. PZ - 8	PROJECT TF52509		
LOCATION Anniston, Alabama	FACILITY Monsanto	SURFACE ELEVATION 751.98	MEASURING POINT ELEVATION 753.04
GEOLOGIST Jason Kirkpatrick	DRILLING CONTRACTOR Graves Service Co. Inc.	DRILLING METHOD Hollow Stem Auger	DRILLER Ron Flanigan
DEVELOPMENT METHOD N / A	GALLONS EVACUATED 0	DATE WELL COMPLETED 4-18-91	STATIC DEPTH TO WATER FEET BELOW M.P. 41.85 DATE: 4-20-91



NOT TO SCALE

ALL MEASUREMENTS IN ft. BELOW LAND SURFACE

DRAFTER: JVP | APPROVED: 0000 | CHECKED: 0000 | DRAWING: MONSAN17 | FILE NO.: MONSANTO | PRJCT NO.: TF525.09 | DWG DATE: 10-02-91

Geraghty & Miller, Inc.

Lithologic Log of Boring B-9 (Piezometer P-9)

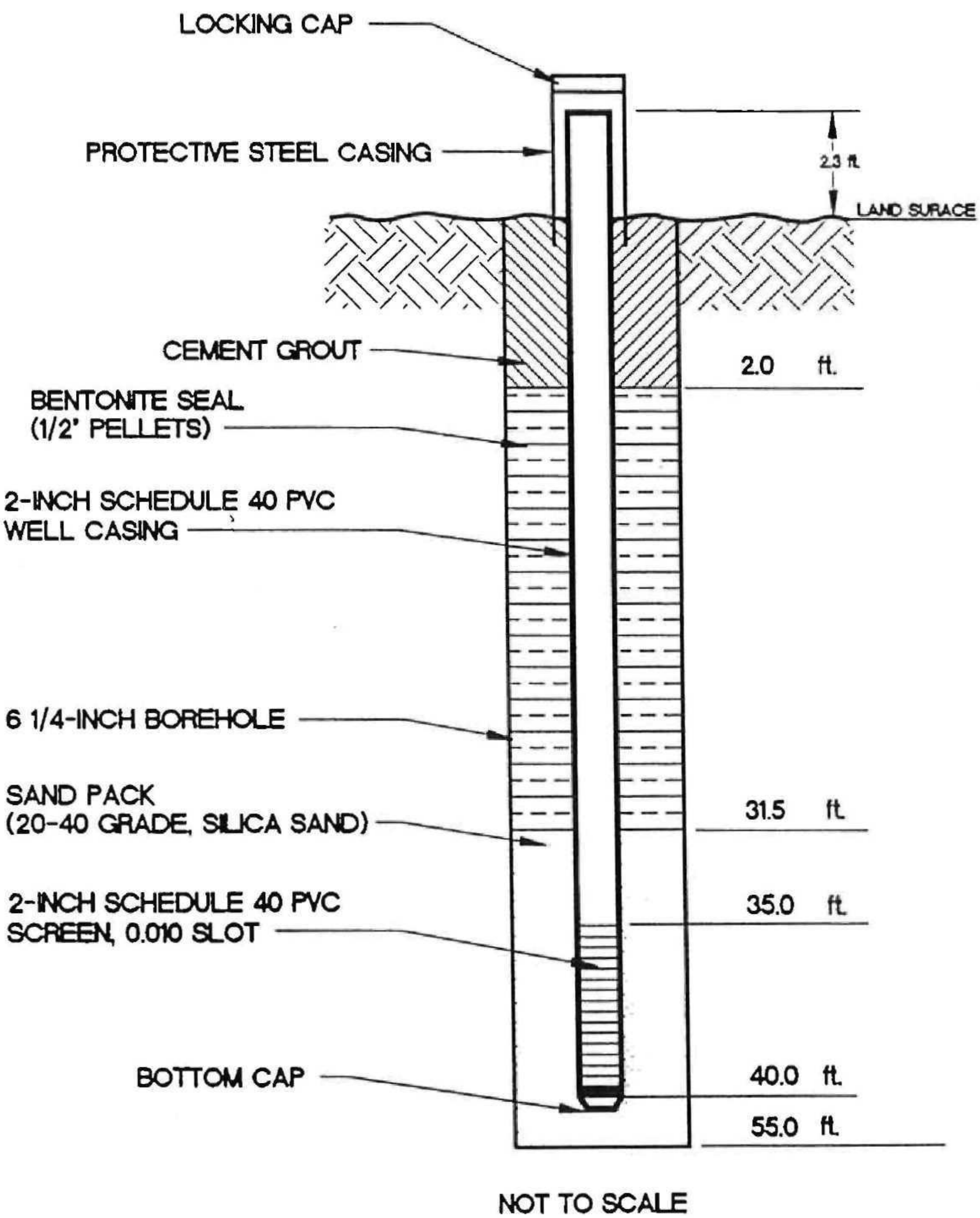
(P-8-C1)

Description	Depth (ft)	Thickness (ft)
Sand, clayey, fine to coarse-grained, brown....	0 - 5	5
Clay, sandy, coarse to pebble, brown; interlayered with brown sandstone..................	5 - 9	4
Clay, silty, firm, wet, brown; interlayered with pebble gravel..........................	9 - 19	10
Clay, silty, firm, damp, brown with reddish stains; interlayered with a white chalky substance..................................	19 - 21	2
No returns................................	21 - 23	2
Clay, sandy, medium to coarse-grained, wet brown....................................	23 - 25	2
Clay, waxy, firm, brown; red streaks running through sample..............................	25 - 27	2
Clay, waxy, firm, tan to brown.................	27 - 29	2
Clay, waxy, firm, tan; silty lenses present....	29 - 31	2
Clay, waxy, firm, damp, tan to gray; interlayered with black slate-like pebbles.........	31 - 33	2
Clay, silty, crumbly, gray; reddish medium-grained sand lenses..........................	33 - 34.5	1.5
No returns................................	34.5 - 35	.5
Clay, waxy, firm, gray; red sandy lenses through bottom half of sample.................	35 - 37	2
Clay, sandy, coarse to pebble, tan to gray.....	37 - 39	2
Clay, silty, firm, wet, brown with reddish streaks....................................	39 - 41	2

GERAGHTY & MILLER, INC.
Environmental Services

PIEZOMETER CONSTRUCTION DIAGRAM

WELL NO. PZ - 9	PROJECT TF52509		
LOCATION: Anniston, Alabama	FACILITY: Monsanto	SURFACE ELEVATION: 747.31	MEASURING POINT ELEVATION: 749.60
GEOLOGIST: Jason Kirkpatrick	DRILLING CONTRACTOR: Graves Service Co. Inc.	DRILLING METHOD: Hollow Stem Auger	DRILLER: Ron Flanigan
DEVELOPMENT METHOD: N / A	GALLONS EVACUATED: 0	DATE WELL COMPLETED: 4-19-91	STATIC DEPTH TO WATER FEET BELOW M.P.: - DATE: 4-20-91



NOT TO SCALE

ALL MEASUREMENTS IN ft. BELOW LAND SURFACE

DRAFTER JVP | APPROVED: 0000 | CHECKED: 0000 | DRAWING: MONSANI8 | FILE NO.: MONSANTO | PRJCT NO.: TF525.09 | DWG DATE: 10-02-91

Geraghty & Miller, Inc.

Lithologic Log of Boring B-10 (Piezometer P-10)

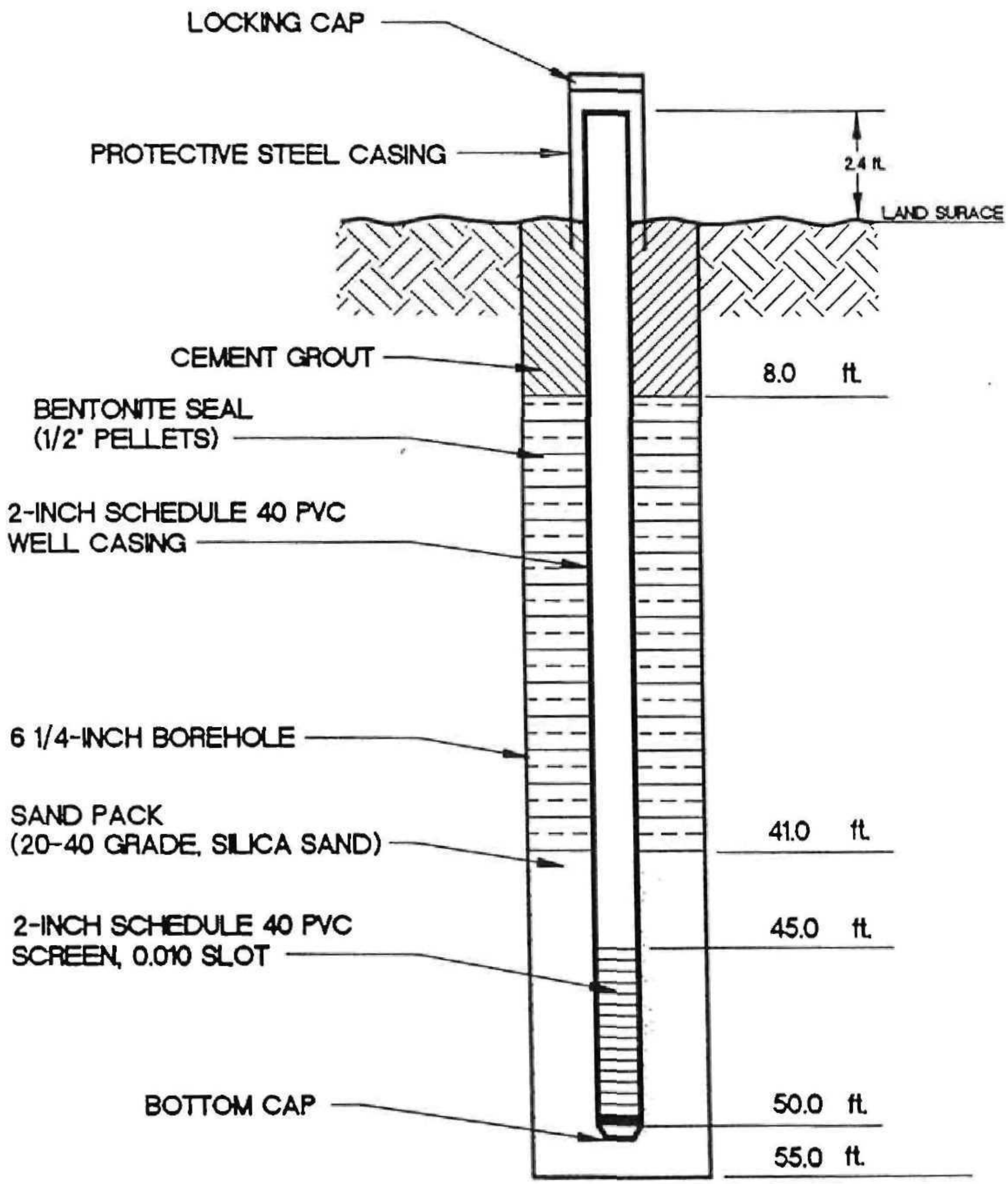
(P-9-C)

Description	Depth (ft)	Thickness (ft)
Clay, sandy, medium to coarse-grained, brown; interlayered with white to gray sandstone pebbles	0 - 5	5
Clay, very sandy, fine to coarse-grained, reddish brown; interlayered with white and red sandstone	5 - 10	5
Clay, silty, firm, reddish brown; slate lenses throughout sample	10 - 12	2
Clay, silty, damp, deep red	12 - 15	3
Clay, silty, firm, red; streaks of brown sand throughout sample; trace of a white chalky substance	15 - 20	5
Clay, silty, firm, red; streaks of brown sand	20 - 25	5
Clay, silty, firm, red; two-inch sand stringers throughout sample	25 - 27	2
Clay, silty, firm, red	27 - 30	3
Sand, clayey, fine to medium-grained, brown and red	30 - 32	2
No returns	32 - 35	3
Sand, clayey, fine to medium-grained, brown	35 - 36	1
Clay, silty, firm, red; brown fine to medium-grained sand stringers	36 - 37	1
No returns	37 - 40	3
Clay, silty, firm, reddish brown	40 - 42	2

GERAGHTY & MILLER, INC.
Environmental Services

PIEZOMETER CONSTRUCTION DIAGRAM

WELL NO. PZ - 10	PROJECT TF52509		
LOCATION: Anniston, Alabama	FACILITY: Monsanto	SURFACE ELEVATION: 752.65	MEASURING POINT ELEVATION: 755.03
GEOLOGIST: Jason Kirkpatrick	DRILLING CONTRACTOR: Graves Service Co. Inc.	DRILLING METHOD: Hollow Stem Auger	DRILLER: Ron Flanigan
DEVELOPMENT METHOD: N / A	GALLONS EVACUATED: 0	DATE WELL COMPLETED: 4-19-91	STATIC DEPTH TO WATER FEET BELOW M.P. 19.62; DATE: 4-20-91



NOT TO SCALE

ALL MEASUREMENTS IN ft. BELOW LAND SURFACE

DRAFTER: JVP | APPROVED: 0000 | CHECKED: 0000 | DRAWING: MONSAN19 | FILE NO.: MONSANTO | PRJCT NO.: TF525.09 | DWG DATE: 10-02-91

Geraghty & Miller, Inc.

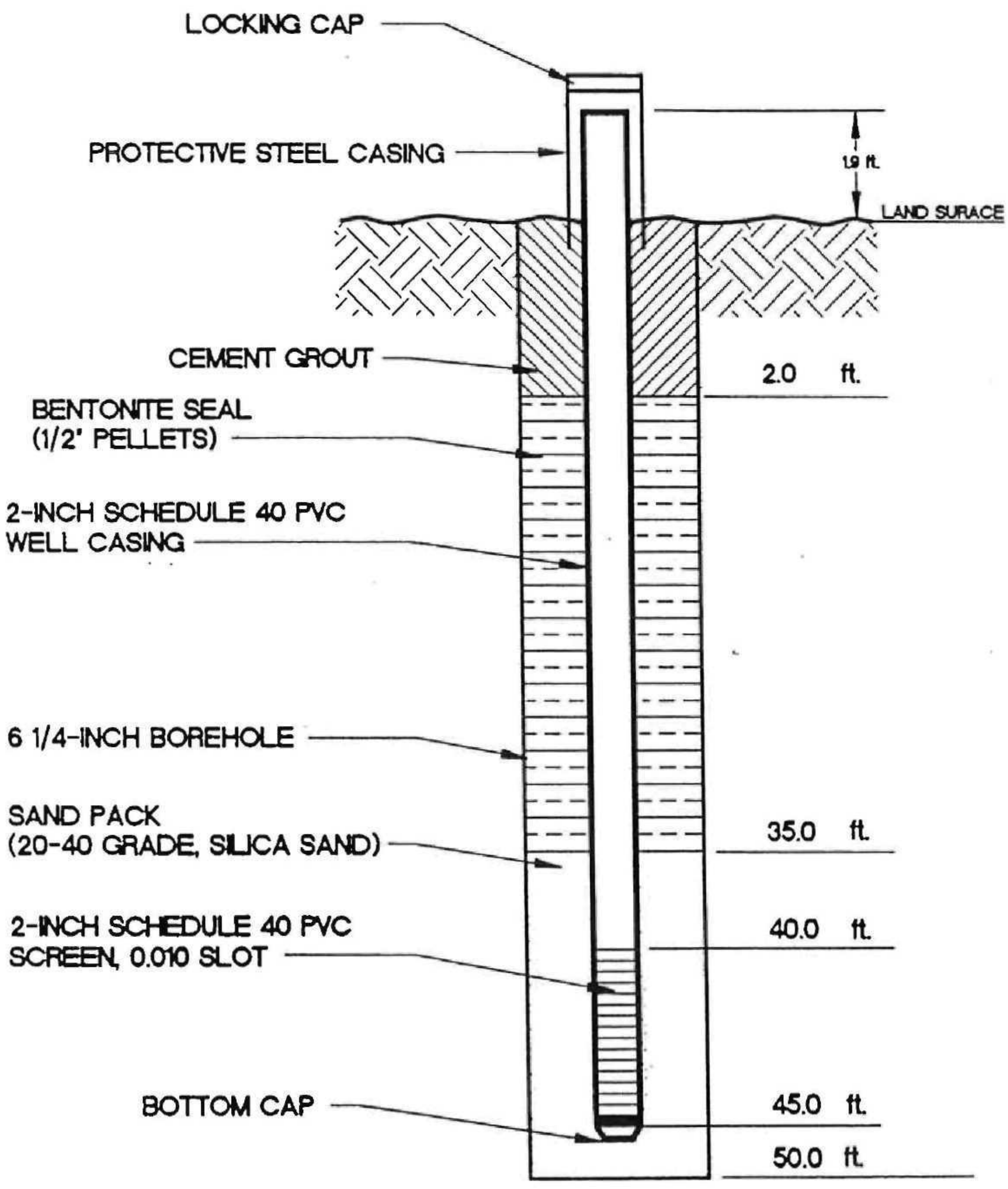
Lithologic Log of Boring B-11 (Piezometer P-11)

Description	Depth (ft)	Thickness (ft)
Clay, sandy, medium to coarse-grained, brown; interlayered with sandstone pebbles............	0 - 10	10
Clay, sandy, medium to coarse-grained, tan to reddish brown, interlayered with sandstone.....	10 - 15	5
Clay, sandy, medium to coarse-grained, reddish brown; interlayered with pebble quarts.........	15 - 17	2
Clay, sandy, medium to coarse-grained, reddish brown; interlayered with pebble to cobble sandstone..................................	17 - 20	3
Clay, sandy, medium to coarse-grained, brown; pebble sandstone throughout..................	20 - 22	2
No returns..................................	22 - 25	3
Clay, silty, pasty, brown; speckled with a white pasty substance..........................	25 - 30	5
Clay, silty, pasty, tight, red; stringers of a white pasty substance throughout sample......	30 - 34	4

GERAGHTY & MILLER, INC.
Environmental Services

PIEZOMETER CONSTRUCTION DIAGRAM

WELL NO.	PZ - 11	PROJECT	TF52509
LOCATION: Anniston, Alabama	FACILITY: Monsanto	SURFACE ELEVATION: 747.93	MEASURING POINT ELEVATION: 749.86
GEOLOGIST: Jason Kirkpatrick	DRILLING CONTRACTOR: Graves Service Co. Inc.	DRILLING METHOD: Hollow Stem Auger	DRILLER: Ron Flanigan
DEVELOPMENT METHOD: N / A	GALLONS EVACUATED: 0	DATE WELL COMPLETED: 4-20-91	STATIC DEPTH TO WATER FEET BELOW M.P.: 8.45; DATE: 4-20-91



NOT TO SCALE

ALL MEASUREMENTS IN ft. BELOW LAND SURFACE

DRAFTER: JVP | APPROVED: 0000 | CHECKED: 0000 | DRAWING: MONSAN20 | FILE NO.: MONSANTO | PRJCT NO.: TF525.09 | DWG DATE: 10-02-91

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE PZR-1

BORING DATE: 6/18/98
BORING LOCATION:

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4	Firm, damp, tan-brown, SILTY CLAY, some fine-coarse sand and gravel (FILL)	CL		0.00						
5						1	SS	5,11,4,9	15	1.0/2.0	
10						2	SS	6,5,4,5	9	2.0/2.0	
15						3	SS	5,8,9,15	17	1.5/2.0	
		Soft to firm, purple-red-brown, mottled, SILTY CLAY, fine-coarse sand, infilling of slickensided fractures (weathered residuum)	CL		18.00	4	SS				
20											
25						5	SS	4,7,8,12	15	2.0/2.0	
30						6	SS	6,11,14,16	25	1.0/2.0	
35						7	SS	10,12,11,12	23	2.0/2.0	
40						8	SH	-	NA	1.0/2.0	

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE PZR-1

BORING DATE: 6/18/98
BORING LOCATION:

SHEET: 2 OF
DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
40	HSA 4 1/4	See previous page	CL			8	SH	-	NA	1.0/2.0	
45						9	SS	7,10,15,15	25	2.0/2.0	
		Becomes saturated @ approx. 48' BGS									
50						10	SS	6,4,5,3	9	1.0/2.0	
55						11	SS	1,2,3,4	5	2.0/2.0	
60		Boring completed @ 60' BGS			60.00						
65											
70											
75											
80											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. PZR-1 SHEET 1 of 1

GA INSP. CDH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 804.40 WATER DEPTH 50.94

WEATHER SUNNY DRILLING COMPANY EEI TOC ELEV. 806.91 DATE/TIME 8-11-98

TEMP. 96 DRILL RIG CME-75 DRILLER E. FULLER STARTED 14:30/6-18-98 (TIME / DATE) COMPLETED 17:00/6-18-98 (TIME / DATE)

LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 50 l.f. WELL SCREEN 2 in. dia. 10 l.f. BENTONITE SEAL PELLETS

CASING TYPE PVC SREEN TYPE PVC INSTALLATION METHOD POURED

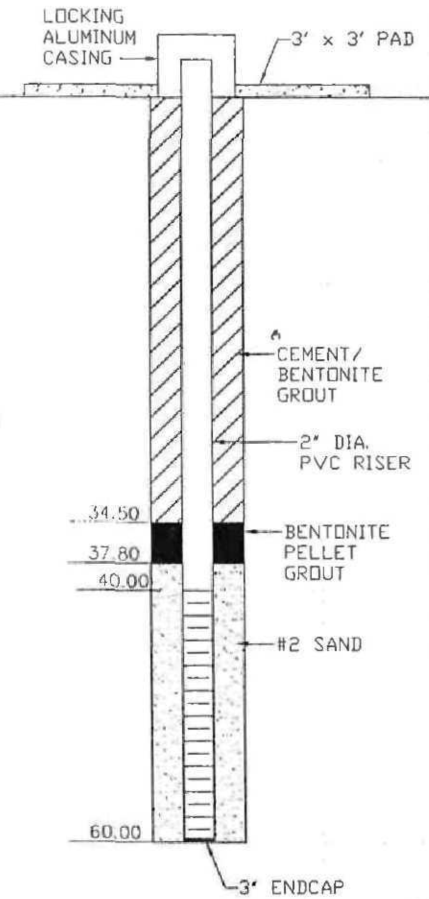
JOINT TYPE FLUSH SLOT SIZE 0.008 FILTER PACK QTY. 14 1/2 BAGS

GROUT QUANTITY 10 BAGS CENTRALIZERS N/A FILTER PACK TYPE GRADE 2 SILICA SAND

GROUT TYPE CEMENT/BENTONITE DRILLING MUD TYPE N/A INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE PZR-1 FOR LITHOLOGIC DISCRIPTION
10.0	
20.0	
30.0	
40.0	
50.0	
60.0	
70.0	
80.0	
90.0	
100.0	

WELL SKETCH



INSTALLATION NOTES

Advanced 4 1/4" dia. augers to ~60' BGS. Installed 20' of 2" dia., 0.008 slot PVC screen and 50' of 2" dia. PVC riser to 60' BGS. Tremmied 14 1/2 bags of sand to ~37.8' BGS. Poured (1) 5 gal. buckets of bentonite pellets to ~34.5' BGS. Grouted remainder of open annulus with 95%-5% cement bentonite grout mixture. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved.

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE PZR-2

BORING DATE: 6/16/98
BORING LOCATION:

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4	Firm, damp, red-brown-tan-black, mottled, SILTY CLAY, some coarse-fine sand and gravel, trace cobbles (FILL)	CL		0.00						
5						1	SS	5,4,5,4	9	1.0/2.0	
10		Below 10' red-brown				2	SS	10,7,9,9	16	2.0/2.0	
15		15' Trace asphalt and bituminous concrete				3	SS	10,5,9,10	14	1.5/2.0	
		Firm, damp to moist, purple with white-gray marbling, SILTY CLAY, trace coarse-fine sand (weathered residuum)	CL		18.00						
20						4	SH	-	NA	1.0/2.0	
						5	SS	7,9,5,9	14	2.0/2.0	
25						6	SS	4,4,7,11	11	2.0/2.0	
30						7	SS	10,8,6,11	14	2.0/2.0	
35						8	SS	6,9,12,19	21	2.0/2.0	
40											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: MNH
CHECKED: SFR
DATE: 10/7/98

PROJECT: SOLUTIA

PROJECT LOCATION: ALABAMA

PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE PZR-2

BORING DATE: 6/16/98

BORING LOCATION:

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
40	HSA 4 1/4		CL			9	SH	-	NA	2.0/2.0	
		Firm, damp to moist, purple with white-gray marbling, SILTY CLAY, trace coarse-fine sand, occasional thin (1cm), medium brown silt filled seams (weathered residuum)			41.00	10	SS	4,7,5,6	12	1.5/2.0	
45						11	SS	4,7,8,9	15	2.0/2.0	
50		Below 50' trace to little sandy silt in thin seams	CL			12	SS	9,11,10,10	21	2.0/2.0	
55						13	SS	7,9,13,16	22	2.0/2.0	
						14	SH	-	NA	1.0/2.0	
60		Boring completed @ 60' BGS			60.00						
65											
70											
75											
80											

DRILL RIG: CME-75

DRILLING CONTRACTOR: EEI

DRILLER: E. FULLER

Golder Associates

LOGGED: MNH

CHECKED: SFR

DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223	PROJECT SOLUTIA/RFI/AL	WELL NO. PZR-2	SHEET 1 of 1
GA INSP. CDH	DRILLING METHOD HSA (4 1/4, 12 1/4)	GROUND ELEV. 803.50	WATER DEPTH 50.72
WEATHER SUNNY	DRILLING COMPANY EEI	TOC ELEV. 805.86	DATE/TIME 8-11-98
TEMP. 96	DRILL RIG CME-75 DRILLER E. FULLER	STARTED 12:00/6-16-98 (TIME / DATE)	COMPLETED 19:00/6-16-98 (TIME / DATE)

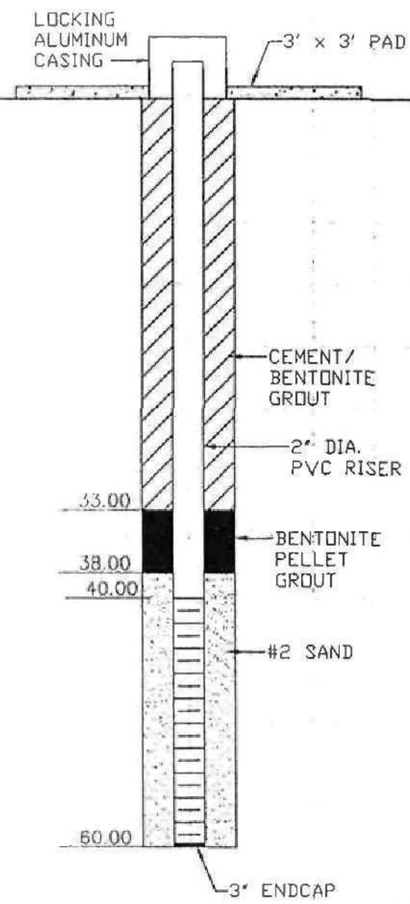
LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 45 l.f.	WELL SCREEN 2 in. dia. 20 l.f.	BENTONITE SEAL PELLETS
CASING TYPE PVC	SREEN TYPE PVC	INSTALLATION METHOD POURED
JOINT TYPE FLUSH	SLOT SIZE 0.008	FILTER PACK QTY. 14 BAGS
GROUT QUANTITY 8.5 BAGS	CENTRALIZERS N/A	FILTER PACK TYPE GRADE 2 SILICA SAND
GROUT TYPE CEMENT/BENTONITE	DRILLING MUD TYPE N/A	INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE PZR-2 FOR LITHOLOGIC DISCRIPTION
10.0	
20.0	
30.0	
40.0	
50.0	
60.0	
70.0	
80.0	
90.0	
100.0	

WELL SKETCH



INSTALLATION NOTES

Advanced 4 1/4" dia. augers to ~60' BGS. Installed 20' of 2" dia., 0.008 slot PVC screen and 45' of 2" dia. PVC riser to 60' BGS. Tremmied 14 bags of sand to ~38' BGS. Poured (2) 5 gal. buckets of bentonite pellets to ~33' BGS. Grouted remainder of open annulus with 95%-5% cement bentonite grout mixture. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved.

PROJECT: SOLUTIA

PROJECT LOCATION: ALABAMA

PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE PZR-3

BORING DATE: 6/10/98

BORING LOCATION:

SHEET: 1 OF 2

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4	FILL			0.00						
		Soft, damp, light brown, CLAYEY SILT, little fine-coarse gravel (FILL)			3.00	1	CME	-	NA	1.0/2.0	
5		Soft, moist, red-orange-brown, SILTY CLAY, little fine-coarse sand, some to and fine gravel (FILL)	CL		5.00						
10						2	SS	6,16,16,20	32	1.0/2.0	
						3	SS	30,14,10,13	24	1.5/2.0	
15						4	SS	5,8,10,15	18	2.0/2.0	
		Firm, moist, red-brown-purple, mottled, SILTY CLAY, trace coarse-fine sand, sandy silt infilling along fracture planes (weathered residuum)	CL		16.00	5	SS	10,21,19,25	40	2.0/2.0	
						6	SS	8,8,12,17	20	2.0/2.0	
20						7	SH	-	NA	1.3/2.0	
						8	CME	-	NA	3.0/3.0	
25						9	CME	-	NA	5.0/5.0	
30						10	CME	-	NA	5.0/5.0	
35						11	CME	-	NA	5.0/5.0	
40											

DRILL RIG: CME-75

DRILLING CONTRACTOR: EEI

DRILLER: E. FULLER

Golder Associates

LOGGED: CDH

CHECKED: SFR

DATE: 10/7/98

PROJECT: SOLUTIA

PROJECT LOCATION: ALABAMA

PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE PZR-3

BORING DATE: 6/10/98

BORING LOCATION:

SHEET: 2 OF 2

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
40	HSA 4 1/4		CL			12	SH	-	NA	1.5/2.0	
		Same as above, but soft and saturated (weathered residuum)	CL		42.00	13	CME	-	NA	3.0/3.0	
45						14	CME	-	NA	5.0/5.0	
50		Same as above, but firm and moist (not saturated) (weathered residuum)	CL		50.00	15	CME	-	NA	5.0/5.0	
55						16	SH	-	NA	2.0/2.0	
60		Boring completed @ 60' BGS			60.00						
65											
70											
75											
80											

DRILL RIG: CME-75

DRILLING CONTRACTOR: EEI

DRILLER: E. FULLER

Golder Associates

LOGGED: CDH

CHECKED: SFR

DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. PZR-3 SHEET 1 of 1

GA INSP. CDH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 802.40 WATER DEPTH 45.06

WEATHER SUNNY DRILLING COMPANY EEI TOC ELEV. 805.05 DATE/TIME 8-11-98

TEMP. 96 DRILL RIG CME-75 DRILLER E. FULLER STARTED 10:30/6-9-98 (TIME / DATE) COMPLETED 12:15/6-10-98 (TIME / DATE)

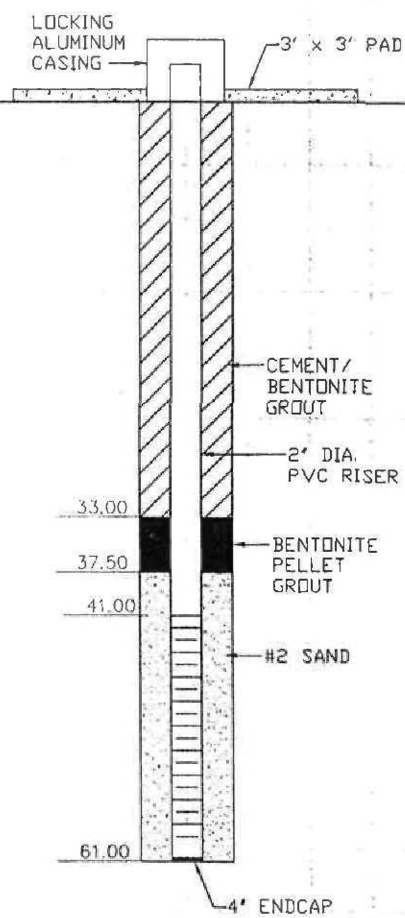
LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 50 l.f.	WELL SCREEN 2 in. dia. 20 l.f.	BENTONITE SEAL PELLETS
CASING TYPE PVC	SREEN TYPE PVC	INSTALLATION METHOD POURED
JOINT TYPE FLUSH	SLOT SIZE 0.008	FILTER PACK QTY. 15 BAGS
GROUT QUANTITY 10 BAGS	CENTRALIZERS N/A	FILTER PACK TYPE GRADE 2 SILICA SAND
GROUT TYPE CEMENT/BENTONITE	DRILLING MUD TYPE N/A	INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE PZR-3 FOR LITHOLOGIC DISCRIPTION
10.0	
20.0	
30.0	
40.0	
50.0	
60.0	
70.0	
80.0	
90.0	
100.0	

WELL SKETCH



INSTALLATION NOTES

Advanced 4 1/4" dia. augers to ~61' BGS. Installed 20' of 2" dia., 0.008 slot PVC screen and 50' of 2" dia. PVC riser to 61' BGS. Tremmied 15 bags of sand to ~37.5' BGS. Poured (2) 5 gal. buckets of bentonite pellets to ~33' BGS. Grouted remainder of open annulus with 95%-5% cement bentonite grout mixture. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved.

PROJECT: SOLUTIA

PROJECT LOCATION: ALABAMA

PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE PZR-4

BORING DATE: 6/15/98

BORING LOCATION:

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4	Soft to firm, damp, red-brown-medium brown, SILTY CLAY, trace to and coarse-fine sand and gravel (FILL)	CL		0.00						
5						1	SS	4,3,5,8	8	0.5/2.0	
10		Trace cobbles, trace organics				2	SS	10,6,12,18	18	2.0/2.0	
15		Below 15' moist, occasional sandstone and quartzite fragments				3	SS	7,4,9,10	13	2.0/2.0	
		Stiff, damp to moist, light brown-red brown-tan, mottled, SILTY CLAY, trace coarse-fine sand and fine gravel (weathered residuum)	CL		18.00						
20						4	SH	-	NA	1.0/2.0	
						5	SS	15,17,18,23	35	2.0/2.0	
25						6	SS	5,6,7,12	13	0/0	
						7	SS	13,18,18,23	36	2.0/2.0	
30						8	SS	6,14,16,16	30	2.0/2.0	
35		Firm, moist to very moist, purple and light medium brown, trace white-gray, mottled, SILTY CLAY AND SILT, trace coarse-fine sand, very thin (<1cm) silt filled fractures, chemical odor (weathered residuum)	CL-ML		35.00	9	SS	3,4,4,9	8	2.0/2.0	
40											

DRILL RIG: CME-75

DRILLING CONTRACTOR: EEI

DRILLER: E. FULLER

Golder Associates

LOGGED: MNH

CHECKED: SFR

DATE: 10/7/98

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE PZR-4

BORING DATE: 6/15/98
BORING LOCATION:

SHEET: 2 OF 2
DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
40	HSA 4 1/4					10	SH	-	NA	2.0/2.0	
		Below 42' purple with white-gray marbling				11	SS	5,5,6,10	11	2.0/2.0	
45			CL-ML			12	SS	2,4,4,6	8	1.0/2.0	
		Below 49' soft, moist to wet									
50		Firm, moist to very moist, light brown and tan with white-gray marbling, SILTY CLAY AND CLAYEY SILT, trace fine sand, thin silt filled vertical fractures present (weathered residuum)			50.00	13	SS	3,4,4,5	8	2.0/2.0	
55			CL-ML			14	SS	3,4,6,7	10	2.0/2.0	
						15	SH	-	NA	2.0/2.0	
60		Boring completed @ 60' BGS			60.00						
65											
70											
75											
80											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: MNH
CHECKED: SFR
DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

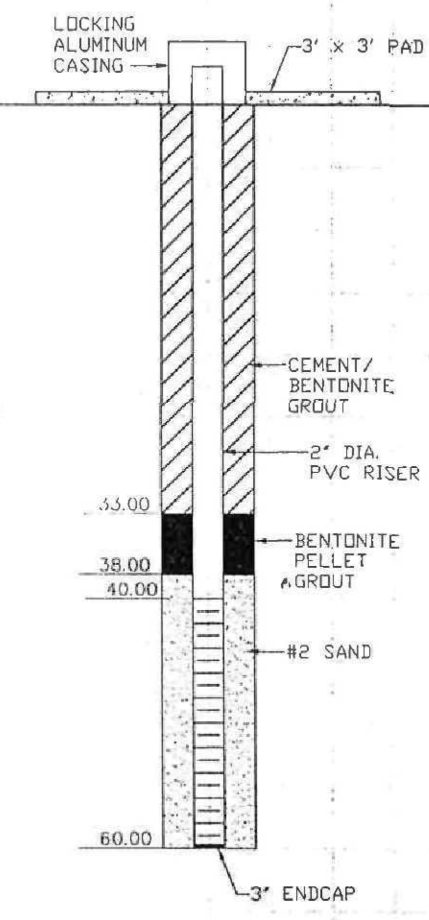
JOB NO. 983-3223	PROJECT SOLUTIA/RFI/AL	WELL NO. PZR-4	SHEET 1 of 1
GA INSP. CDH	DRILLING METHOD HSA (4 1/4, 12 1/4)	GROUND ELEV. 801.50	WATER DEPTH 44.00
WEATHER SUNNY	DRILLING COMPANY EEI	TOC ELEV. 803.94	DATE/TIME 8-11-98
TEMP. 96	DRILL RIG CME-75 DRILLER E. FULLER	STARTED 10:00/6-15-98 (TIME / DATE)	COMPLETED 8:00/6-17-98 (TIME / DATE)
LOCATION / COORDINATES N/A			

MATERIALS INVENTORY

WELL CASING 2 in. dia. 45 l.f.	WELL SCREEN 2 in. dia. 20 l.f.	BENTONITE SEAL PELLETS
CASING TYPE PVC	SREEN TYPE PVC	INSTALLATION METHOD POURED
JOINT TYPE FLUSH	SLOT SIZE 0.008	FILTER PACK QTY. 14 BAGS
GROUT QUANTITY 9.5 BAGS	CENTRALIZERS N/A	FILTER PACK TYPE GRADE 2 SILICA SAND
GROUT TYPE CEMENT/BENTONITE	DRILLING MUD TYPE N/A	INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE PZR-4 FOR LITHOLOGIC DISCRIPTION
10.0	
20.0	
30.0	
40.0	
50.0	
60.0	
70.0	
80.0	
90.0	
100.0	

WELL SKETCH



INSTALLATION NOTES

Advanced 4 1/4" dia. augers to ~601' BGS. Installed 20' of 2" dia., 0.008 slot PVC screen and 45' of 2" dia. PVC riser to 60' BGS. Tremmied 14 bags of sand to ~38' BGS. Poured (2) 5 gal. buckets of bentonite pellets to ~33' BGS. Grouted remainder of open annulus with 95%-5% cement bentonite grout mixture. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved.

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE PZR-5

BORING DATE: 6/17/98
BORING LOCATION:

SHEET: 1 OF 2
DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4	Soft, damp, medium-dark brown, CLAYEY SILT, some fine-coarse sand and gravel	CL		0.00						
5						1	SS	5,12,4,5	16	2.0/2.0	
		Soft, damp, purple-white-gray, mottled, SILTY CLAY, sand infilled fractures, trace gravel (weathered residuum)	CL		6.00	2	SS	5,6,9,10	15	0.5/2.0	
						3	SS	4,4,6,2	10	2.0/2.0	
10						4	SS	3,6,5,11	11	2.0/2.0	
		Firm, dry to damp, purple-white-gray, mottled, SILTY CLAY, some fine-medium sand, infilling of slickensided fractures, intermittent saturation (weathered residuum)	CL		12.00	5	SS	39,33,34,50	67	0.5/2.0	
15						6	SS	6,9,18,20	27	2.0/2.0	
						7	SS	12,20,24,22	44	2.0/2.0	
						8	SS	12,43,44,30	87	0.5/2.0	
20						9	SH	-	NA	1.0/2.0	
						10	SS	18,23,29,23	52	2.0/2.0	
25						11	SS	6,6,9,12	15	2.0/2.0	
						12	SS	6,8,14,14	22	2.0/2.0	
						13	SS	4,5,6,9	11	2.0/2.0	
30						14	SS	9,12,10,15	22	1.5/2.0	
						15	SS	20,26,38,36	66	1.0/2.0	
35						16	SS	12,22,29,42	51	1.6/2.0	
		Same as above, but saturated				17	SS	12,26,22,38	48	2.0/2.0	
		Same as above, but damp				18	SS	18,18,23,20	41	2.0/2.0	
40											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE PZR-5

BORING DATE: 6/17/98
BORING LOCATION:

SHEET: 2 OF 2
DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
40	HSA 4 1/4	See previous page	CL			19	SH	-	NA	1.0/2.0	
						20	SS	17,26,25,29	51	1.5/2.0	
45		Boring completed @ 45' BGS			45.00						
50											
55											
60											
65											
70											
75											
80											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. PZR-5 SHEET 1 of 1

GA INSP. CDH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 753.30 WATER DEPTH 22.44

WEATHER SUNNY DRILLING COMPANY EEI TOC ELEV. 755.73 DATE/TIME 8-11-98

TEMP. 95 DRILL RIG CME-75 DRILLER E. FULLER STARTED 15:00/6-17-98 (TIME / DATE) COMPLETED 17:00/6-17-98 (TIME / DATE)

LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING 2 in. dia. 30 l.f. WELL SCREEN 2 in. dia. 20 l.f. BENTONITE SEAL PELLETS

CASING TYPE PVC SREEN TYPE PVC INSTALLATION METHOD POURED

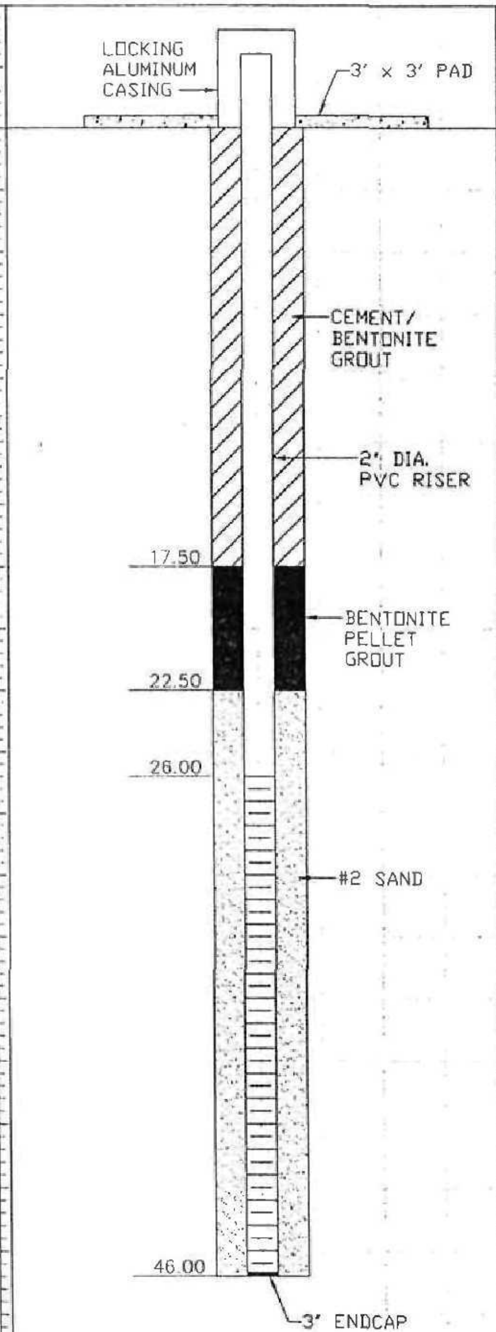
JOINT TYPE FLUSH SLOT SIZE 0.008 FILTER PACK QTY. 14 BAGS

GROUT QUANTITY N/A CENTRALIZERS N/A FILTER PACK TYPE GRADE 2 SILICA SAND

GROUT TYPE N/A DRILLING MUD TYPE N/A INSTALLATION METHOD TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE PZR-5 FOR LITHOLOGIC DISCRIPTION
5.0	
10.0	
15.0	
20.0	
25.0	
30.0	
35.0	
40.0	
45.0	
50.0	

WELL SKETCH



INSTALLATION NOTES

Augered with 4 1/4" dia. augers to ~46' BGS. Installed 20' of 2" dia. PVC, 0.008 slot screen and and 30' of 2" dia. PVC riser to ~46' BGS. Tremmied 14 bags of sand to ~22.5' BGS. Poured (2) 5 gal. buckets of bentonite pellets to ~17.5' BGS. Grouted remaining annulus with cement bentonite grout mixture. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved.

PROJECT: SOLUTIA

PROJECT LOCATION: ALABAMA

PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE PZR-6

BORING DATE: 6/18/98

BORING LOCATION:

SHEET: 1 OF 2

DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
0	HSA 4 1/4	Soft, dry, medium dark brown, CLAYEY SILT, trace fine-medium sand, little fine gravel			0.00	1	SS	3,11,9,5	20	1.0/2.0	
5		Firm, dry, purple-gray-white, mottled, SILTY CLAY, little fine-medium sand, infilling of fractures (weathered residuum)	CL		5.00	2	SS	8,11,14,18	25	2.0/2.0	
10						3	SS	5,5,7,12	25	1.0/2.0	
15						4	SS	6,7,7,12	14	2.0/2.0	
20						5	SH	-	NA	1.2/2.0	
		(Saturated)									
25						6	SS	7,11,9,13	20	2.0/2.0	
		Moist to wet, yellow, CLAYEY SAND			26.00	7	SS	18,18,18,18	36	1.0/2.0	
		Firm, damp to moist, purple-white-gray, mottled SILTY CLAY, fine-medium sand, infilling of fractures (weathered residuum)	CL		28.00						
30						8	SS	9,19,21,23	40	1.0/2.0	
						9	SS	32,17,50/4	50/4	1.5/2.0	
		33' - 35' Wet				10	SS	21,17,18,50/3	50/3	1.5/2.0	
35						11	SS	7,9,12,12	23	2.0/2.0	
		37' - 37.5' Wet				12	SS	13,39,45,50/2	50/2	1.0/2.0	
40						13	SH	-	NA		

DRILL RIG: CME-75

DRILLING CONTRACTOR: EEI

DRILLER: E. FULLER

Golder Associates

LOGGED: CDH

CHECKED: SFR

DATE: 10/7/98

PROJECT: SOLUTIA
PROJECT LOCATION: ALABAMA
PROJECT NUMBER: 983-3223

RECORD OF BOREHOLE PZR-6

BORING DATE: 6/18/98
BORING LOCATION:

SHEET: 2 OF 2
DATUM: FT-MSL

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	NOTE
40	HSA 4 1/4		CL			13	SH	-	NA		
						14	SS	18,17,25,30	42	2.0/2.0	
45		Boring completed @ 45' BGS			45.00						
50											
55											
60											
65											
70											
75											
80											

DRILL RIG: CME-75
DRILLING CONTRACTOR: EEI
DRILLER: E. FULLER

Golder Associates

LOGGED: CDH
CHECKED: SFR
DATE: 10/7/98

MONITORING WELL INSTALLATION LOG

JOB NO. 983-3223 PROJECT SOLUTIA/RFI/AL WELL NO. PZR-6 SHEET 1 of 1

GA INSP. CDH DRILLING METHOD HSA (4 1/4, 12 1/4) GROUND ELEV. 754.90 WATER DEPTH 28.98

WEATHER SUNNY DRILLING COMPANY EEI TOC ELEV. 757.09 DATE/TIME 8-11-98

TEMP. 95 DRILL RIG CME-75 DRILLER E. FULLER STARTED 8:00/6-18-98 (TIME / DATE) COMPLETED 11:00/6-18-98 (TIME / DATE)

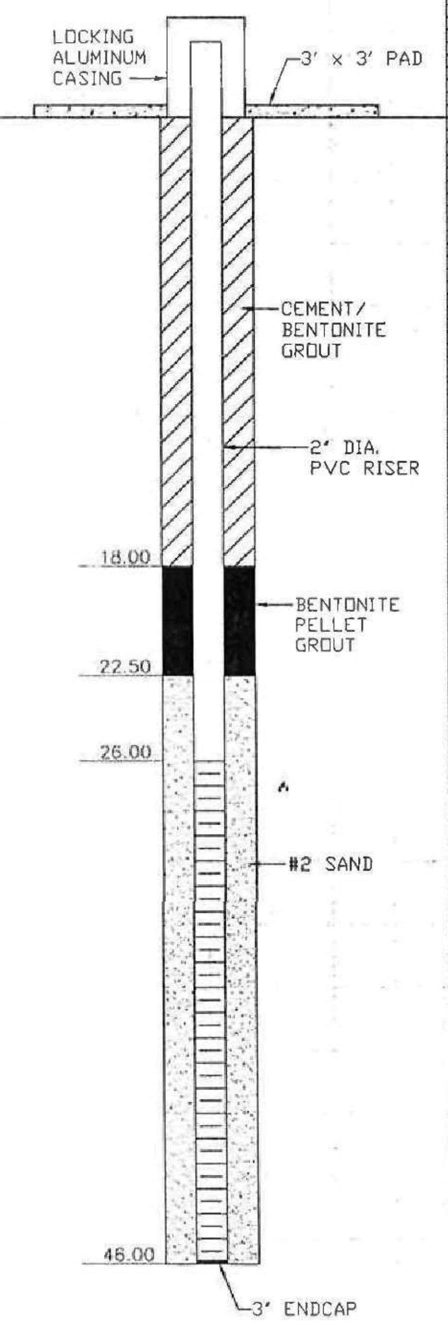
LOCATION / COORDINATES N/A

MATERIALS INVENTORY

WELL CASING	2 in. dia. 30 l.f.	WELL SCREEN	2 in. dia. 20 l.f.	BENTONITE SEAL	PELLETS
CASING TYPE	PVC	SREEN TYPE	PVC	INSTALLATION METHOD	POURED
JOINT TYPE	FLUSH	SLOT SIZE	0.008	FILTER PACK QTY.	14 BAGS
GROUT QUANTITY	3.5 BAGS	CENTRALIZERS	N/A	FILTER PACK TYPE	GRADE 2 SILICA SAND
GROUT TYPE	N/A	DRILLING MUD TYPE	N/A	INSTALLATION METHOD	TREMMIED

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	REFER TO RECORD OF BOREHOLE PZR-6 FOR LITHOLOGIC DISCRIPTION
5.0	
10.0	
15.0	
20.0	
25.0	
30.0	
35.0	
40.0	
45.0	
50.0	

WELL SKETCH



INSTALLATION NOTES

Augered with 4 1/4" dia. augers to ~46' BGS. Installed 20' of 2" dia. PVC, 0.008 slot screen and and 30' of 2" dia. PVC riser to ~46' BGS. Tremmied 14 bags of sand to ~22.5' BGS. Poured (2) 5 gal. buckets of bentonite pellets to ~18' BGS. Grouted remaining annulus with cement bentonite grout mixture. Installed locking aluminum protective casing, 3' x 3' concrete pad and bumper posts for surface finish.

WELL DEVELOPMENT NOTES

Pumped and surged over 3 week period until turbidity improved.

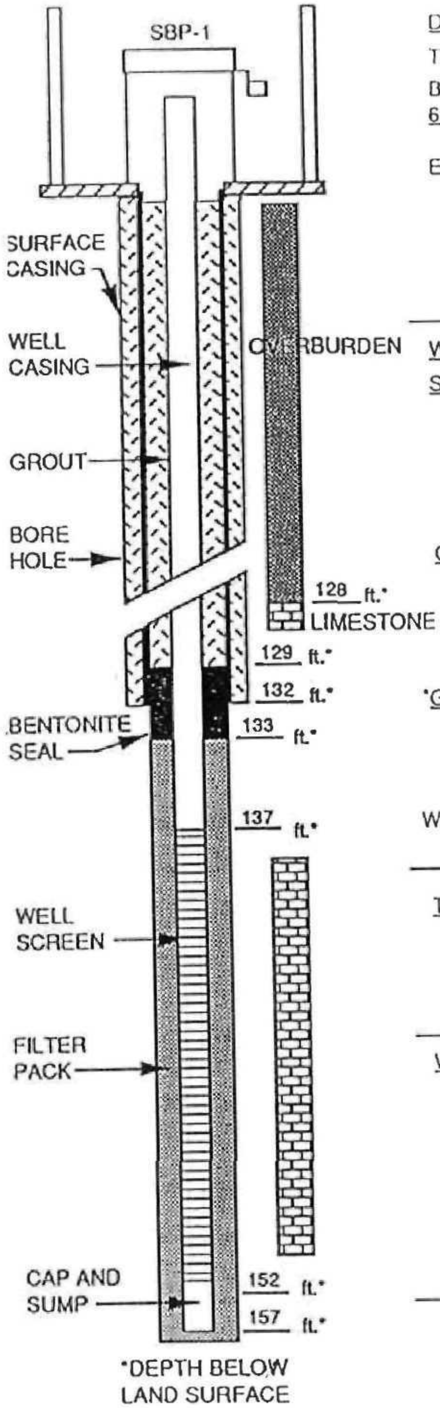
LITHOLOGIC LOG AND PHYSICAL DESCRIPTION
OF SHALLOW BEDROCK PIEZOMETER SBP-1

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Clay. Moderate reddish brown. Plastic. Sandy. Fine grained. Silty. Moist, becoming wet at 25' bls.	0 - 125	125
Weathered dolomitic limestone. Fractured	125 - 129.5	4.5
Limestone. Dolomitic. Medium dark gray. Very competent	129.5 - 157	27.5

WELL CONSTRUCTION LOG

Project Name: Monsanto
Well: SBP-1
Location: Anniston, Alabama
Client: Monsanto Chemical
Prepared By: Ken Miklos



Drilling Summary

Total Depth bls: 157'

Borehole Diameter(s): 10" 0' to 40' bls
6" 40' to 157' bls

Elevations (Surveyed)/Datum:

Land Surface ______

Top of Well Casing 2.5' als

Depth to Water: static 82.68 from TOC

Drilling Contractor: Miller Drilling

Drillers: Kevin Mitchell

Drilling Method: Air Rotary/Percussion Hammer

Drilling Fluid (Amount/Type): Water

Well Design

Surface Casing: Material Steel

Diameter 6"
Length 132'
Setting 0' - 132' bls

Screen: Material Schedule 40 PVC

Diameter 2"
Slot 0.01"
Setting 137' - 152' bls

Casing: Material Schedule 40 PVC

Diameter 2"
Length 144.5'
Setting 2.5' als - 137' bls (plus 5' sump)

Filter Pack: Material Silica Sand (6-20)

Setting 133' - 157' bls

*Grout: Type Portland Type I w/ 5% bentonite

Setting 0' - 129' bls

Seals: Type Bentonite Pellets

Setting 129' - 133' bls

Well Protection: 3' steel protective casing with lockable cover.

Time Log:	Started	Completed
Drilling:	7-28-92	8-4-92
Installation:	8-4-92	8-4-92
Development:	9-8-92	9-10-92

Well Development:

Method/Equipment: Teflon Bailer / Submersible Pump

Static DTW 82.68

Water Removed During Development 138.5 gallons

pH: 7.69 Conductivity: 400 (umhos/cm)

Temp oC: 20

Remarks: A 10" steel surface casing was installed to 40' bls to hold back formation during drilling of the borehole. Efforts to remove the casing were not successful.

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION
OF SHALLOW BEDROCK PIEZOMETER SBP-2

Monsanto Chemical Company
Anniston, Alabama

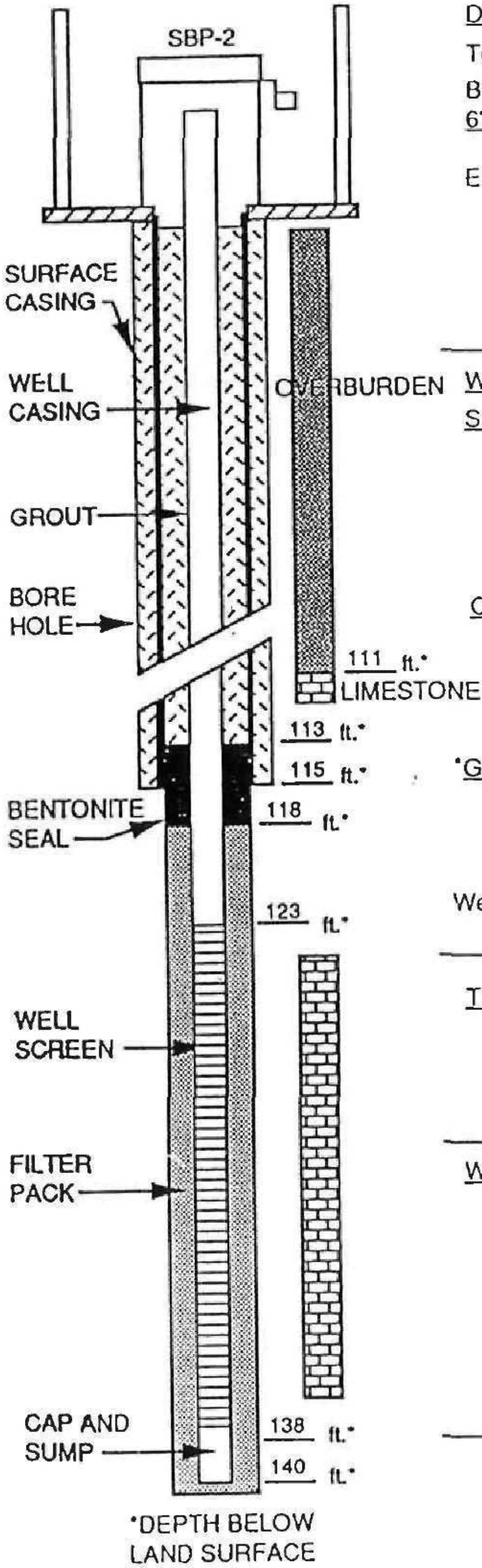
Description	Depth (ft)	Thickness (ft)
Sandy clay. Grayish brown. Silty. Some gravel Moist becoming wet at 15' bls	0 - 27	27
Clay. Moderate red brown. Firm. Sandy. Medium to fine grained. Silty. Some pebbles. Moist. Increased water content at 55' bls	27 - 100	73
Clay. Sandy. Weathered dolomitic limestone fragments	100 - 110	10
Dolomitic limestone. Medium dark gray. Fairly competent to very competent.	110 - 140	30

WELL CONSTRUCTION LOG

Project Name: Monsanto Well: SBP-2

Location: Anniston, Alabama

Client: Monsanto Chemical Prepared By: Ken Miklos



Drilling Summary

Total Depth bls: 140'

Borehole Diameter(s): 10" 0' to 20' bls
6" 20' to 140' bls

Drilling Contractor: Miller Drilling

Drillers: Kevin Mitchell

Drilling Method: Air Rotary/Percussion Hammer

Drilling Fluid (Amount/Type): Water

Elevations (Surveyed)/Datum:

Land Surface ______

Top of Well Casing 2.3' als

Depth to Water: static 74.69' from TOC

Well Design

Surface Casing: Material Steel

Diameter 6"
Length 115'
Setting 0' - 115' bls

Screen: Material Schedule 40 PVC

Diameter 2"
Slot 0.01"
Setting 123' - 138' bls

Casing: Material Schedule 40 PVC

Diameter 2"
Length 127.3'
Setting 2.3' als - 123' bls (2' sump)

Filter Pack: Material Silica Sand (6-20)

Setting 113' - 140' bls

*Grout: Type Portland Type I w/ 5% bentonite
Setting 0' - 113' bls

Seals: Type Bentonite Pellets
Setting 113 - 118' bls

Well Protection: 3' steel protective casing with lockable cover.

Time Log:	Started	Completed
Drilling:	7-21-92	7-25-92
Installation:	7-25-92	7-25-92
Development:	9-9-92	9-10-92

Well Development:

Method/Equipment: Teflon Bailer / Submersible Pump

Static DTW 74.69

Water Removed During Development 402.5 gallons

pH: 8.11 Conductivity: 610 (umhos/cm)

Temp oC: 20

Remarks: ______

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION
OF SHALLOW BEDROCK PIEZOMETER SBP-3

Monsanto Chemical Company
Anniston, Alabama

Description	Depth (ft)	Thickness (ft)
Clay with slag deposits. Fine to course grained. Dry. Compact	0 - 8	8
Clay with Slag deposits. Moderate reddish brown. Fine grained. Moist. Compact..	8 - 12	4
Clay. Moderate reddish brown with some gray mottling. Silty. Sandy. Fine grained. Moist. Compact.	12 - 68.5	56.5
Clay. Moderate reddish brown with some gray mottling. Silty. Sandy. Fine grained. Moist. Compact. Sandstone, Quartz and Chert fragments.	68.5 - 82	13.5
Limestone. Dark gray. Competent.	82 - 102	20

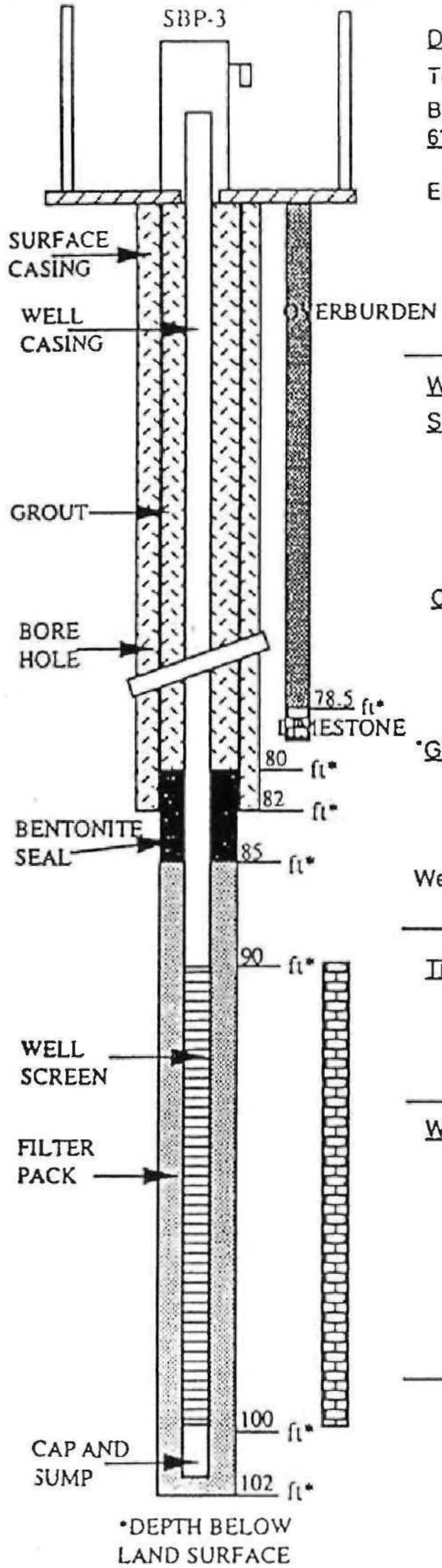
TF525\LITHLOG\PIEZSBP3.51

WELL CONSTRUCTION LOG

Project Name: Monsanto | Well: SBP-3

Location: Anniston, Alabama

Client: Monsanto Chemical | Prepared By: Ken Miklos



*DEPTH BELOW LAND SURFACE

Drilling Summary

Total Depth bls: 102'

Borehole Diameter(s): 10" 0' to 82' bls
6" 82' to 102' bls

Drilling Contractor: Miller Drilling

Drillers: Kevin Mitchell

Drilling Method: Air Rotary/Percussion Hammer

Drilling Fluid (Amount/Type): Water

Elevations (Surveyed)/Datum:

Land Surface ________

Top of Well Casing 743.28 feet MSL

Depth to Water: static 67.84 from TOC

Well Design

Surface Casing: Material Steel

Diameter 6"
Length 82'
Setting 0' - 82' bls

Screen: Material Schedule 40 PVC

Diameter 2"
Slot 0.01"
Setting 90' - 100' bls

Casing: Material Schedule 40 PVC

Diameter 2"
Length 90'
Setting 2.3' als - 90' bls (2' sump)

Filter Pack: Material Silica Sand (6/20)

Setting 85' - 102' bls

Grout: Type Portland Type I w/ 3% bentonite

Setting 0' - 80' bls

Seals: Type Bentonite Pellets

Setting 80' - 85' bls

Well Protection: 3' steel protective casing with lockable cover.

Time Log:	Started	Completed
Drilling:	7-31-92	8-26-92
Installation:	8-26-92	8-26-92
Development:	9-11-92	9-11-92

Well Development:

Method/Equipment: Submersible Pump

Static DTW 67.84

Water Removed During Development approx. 116 gallons

pH: 7.82 Conductivity: 260 (umhos/cm)

Temp oC: 19.5

Remarks: ________

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION OF SHALLOW BEDROCK PIEZOMETER SBP-4

Monsanto Chemical Company
Anniston, Alabama

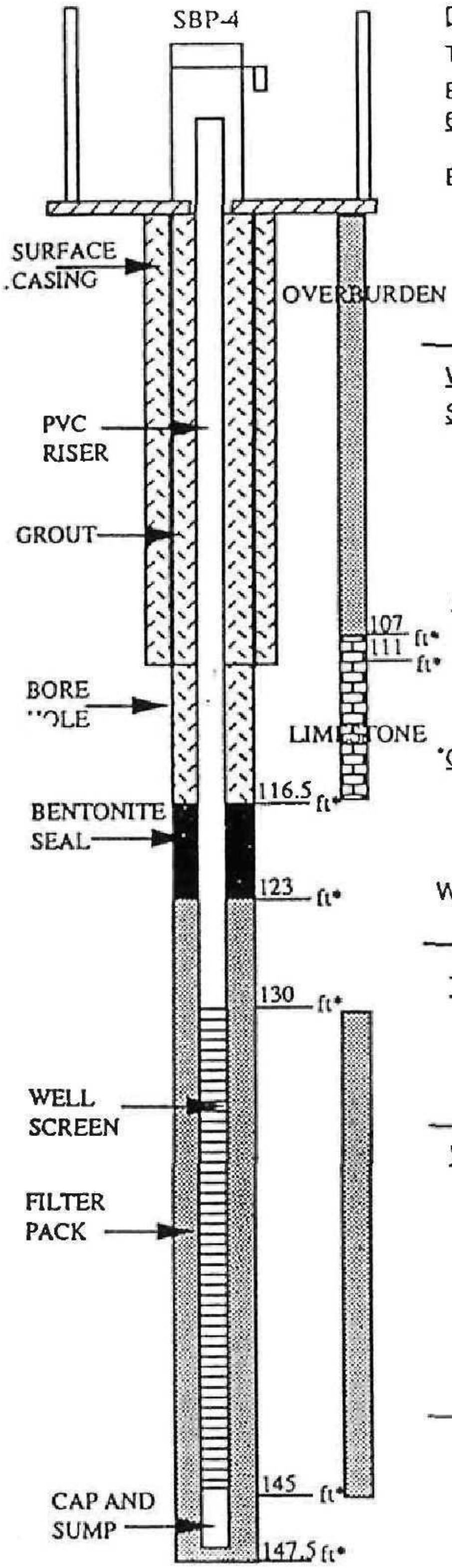
Description	Depth (ft)	Thickness (ft)
Clay. Moderate reddish brown to dark reddish brown Trace sand. Some organics. Damp	0 - 15	15
Clay. Moderate reddish orange to moderate yellowish brown. Silty. Sandy. Sandstone fragments	15 - 60	45
Silt. Moderate yellowish brown. Cemented. Chalky.	60 - 67	7
Dolomitic limestone. Weathered to fairly competent	67 - 107	40
Dolomitic limestone. Grayish black to light brownish grey Very competent	107 - 147.5	40.5

WELL CONSTRUCTION LOG

Project Name: Monsanto Well: SBP-4

Location: Anniston, Alabama

Client: Monsanto Chemical Prepared By: Ken Miklos



*DEPTH BELOW LAND SURFACE

Drilling Summary

Total Depth bls: 147.5'

Borehole Diameter(s): 10" 0' to 111' bls
6" 111' to 147.5' bls

Drilling Contractor: Miller Drilling

Drillers: Kevin Mitchell

Drilling Method: Air Rotary/Percussion Hammer

Drilling Fluid (Amount/Type): Water

Elevations (Surveyed)/Datum:

Land Surface ______

Top of Well Casing 760.63'

Depth to Water: static 83.45 from TOC

Well Design

Surface Casing: Material Steel
Diameter 6"
Length 111'
Setting 0' - 111' bls

Screen: Material Schedule 40 PVC
Diameter 2"
Slot 0.01"
Setting 130' - 145' bls

Casing: Material Schedule 40 PVC
Diameter 2"
Length 130'
Setting 2.3' als - 130' bls (2.5' sump)

Filter Pack: Material Silica Sand (6/20)
Setting 123' - 147.5' bls

*Grout: Type Portland Type I w/ 3% bentonite
Setting 0' - 116.5' bls

Seals: Type Bentonite Pellets
Setting 116.5' - 123' bls

Well Protection: 3' steel protective casing with lockable cover.

Time Log:	Started	Completed
Drilling:	9-10-92	9-19-92
Installation:	9-19-92	9-19-92
Development:	9-22-92	9-22-92

Well Development:

Method/Equipment: Submersible Pump

Static DTW 83.45

Water Removed During Development: approx. 115 gallons

pH: 9.5 Conductivity: 290 (umhos/cm)

Temp oC: 21

Remarks: ______

LITHOLOGIC LOG AND PHYSICAL DESCRIPTION
OF SHALLOW BEDROCK PIEZOMETER SBP-5

Monsanto Chemical Company
Anniston, Alabama

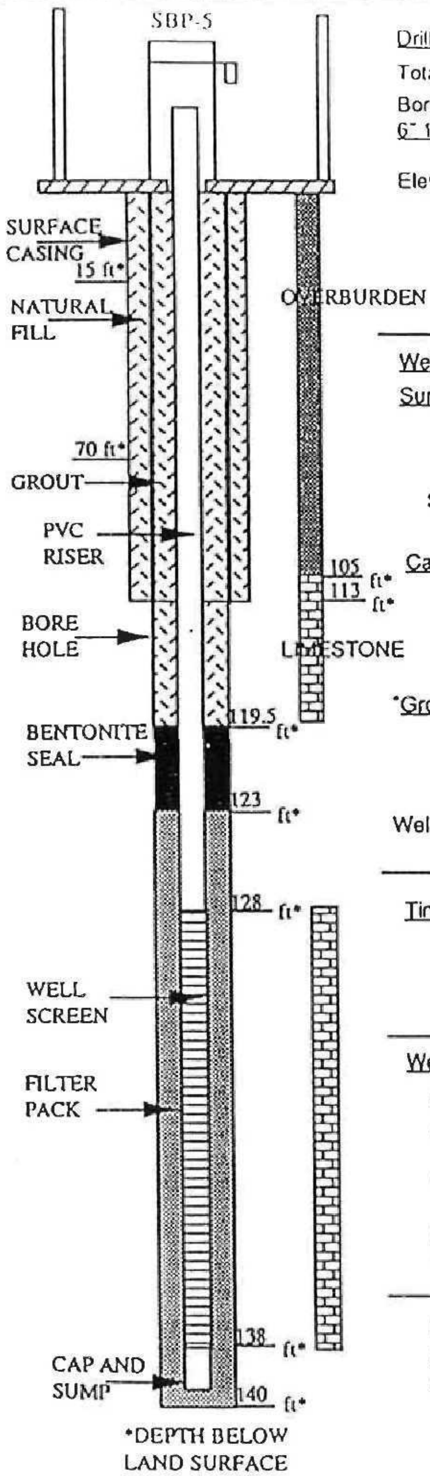
Description	Depth (ft)	Thickness (ft)
Clay. Moderate reddish orange. Sandy. Fine grained Silty. Moist, becoming wet at 25' bls.	0 - 97	97
Dolomitic limestone. Medium gray, very competent	97 - 98.5	1.5
Dolomitic limestone, fractured	98.5 - 105	6.5
Dolomitic limestone. Medium gray, fairly competent, with some fracturing	105 - 140	35

WELL CONSTRUCTION LOG

Project Name: Monsanto — Well: SBP 5

Location: Anniston, Alabama

Client: Monsanto Chemical — Prepared By: Ken Miklos



Drilling Summary

Total Depth bls: 140'

Borehole Diameter(s): 17.5" 0' to 113'
6" 113' to 140'

Drilling Contractor: Miller Drilling
Drillers: Kevin Mitchell
Drilling Method: Air Rotary with water wash
Drilling Fluid (Amount/Type): Water

Elevations (Surveyed)/Datum:
Land Surface 752.60
Top of Well Casing 755.56
Depth to Water: static 82.33

Well Design

Surface Casing: Material Steel
Diameter 6"
Length 113'
Setting 0' - 113' bls

Screen: Material Schedule 40 PVC
Diameter 2"
Slot 0.01"
Setting 128' - 138' bls

Casing: Material Schedule 40 PVC
Diameter 2"
Length 128'
Setting 2' als - 128' bls (2' sump)

Filter Pack: Material Silica Sand (6/20)
Setting 123' - 140' bls

*Grout: Type Portland Type I w/ 3% bentonite
Setting 0' - 119.5' bls

Seals: Type Bentonite Pellets
Setting 119.5' - 123' bls

Well Protection: 3' steel protective casing with lockable cover.

Time Log:	Started	Completed
Drilling:	11/4/92	11/7/92
Installation:	11/7/92	11/7/92
Development:	11/7/92	11/9/92

Well Development:

Method/Equipment: Air Lift and Bailer
Static DTW 82.33

Water Removed During Development: approx. 300 gallons

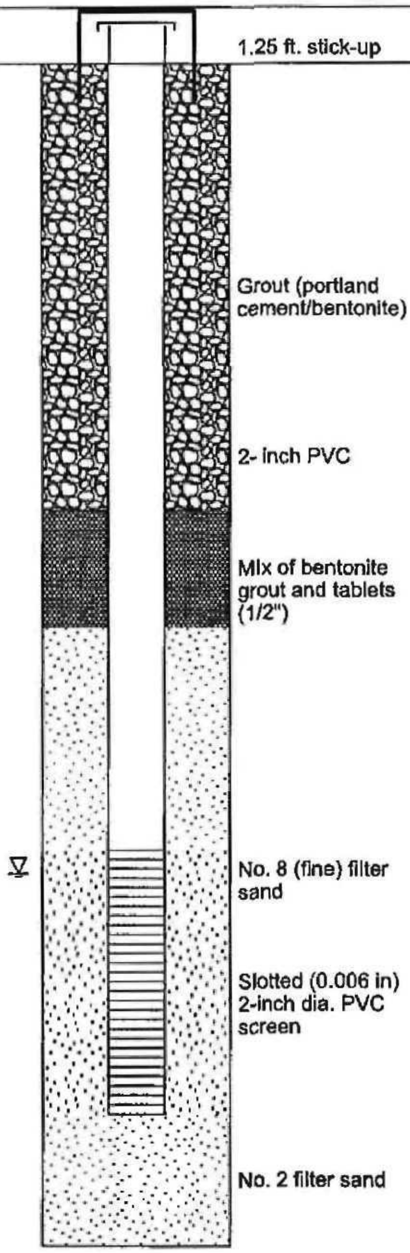
pH: 6.72 Conductivity: 280 (umhos/cm)
Temp oC: 18

Remarks: A 10" steel surface casing was installed to 113' bls to hold back formation during drilling of the borehole. During the removal of the casing, the formation collapsed around the 6" diameter casing from 15' to approx. 70' bls.

Golder Associates

PROJECT NUMBER	943-3680.RFI	**DATE STARTED**	Jun 8, 05
PROJECT NAME	Solutia	**BOREHOLE DIAMETER**	6
LOCATION	Anniston, AL	**CASING TYPE/DIAMETER**	PVC / 2 in.
DRILLING METHOD	3.25" HSA	**SCREEN TYPE/SLOT**	Slotted / 0.006
SAMPLING METHOD	Split spoon @ 24"	**FILTER PACK TYPE /QUANTITY**	No. 8 sand / 500 lbs.
GROUND ELEVATION		**GROUT TYPE/QUANTITY**	Portland cement & bentonite powder / 294 lbs.
TOP OF CASING	--	**DEPTH TO WATER**	30.9
LOGGED BY	JWC	**GROUND WATER ELEVATION**	
REMARKS			

Depth	LITHOLOGIC DESCRIPTION	WELL DIAGRAM	INSTALLATION NOTES
	Ground Surface	1.25 ft. stick-up	
0–7	Soft to firm, damp, reddish brown, gray, and orange mottled CLAYEY SILT	Grout (portland cement/bentonite)	06-16-05: 17:10-Backfilled boring @ 45' to 40' bgs (#2 sand-100lbs) 17:25-Installed well screen/casing 17:30-Poured #8 (fine) sand @ 40' to 25' bgs (400 lbs)
7–10	Firm, damp, brownish red, orange, and gray mottled SILTY CLAY	2- inch PVC	06-17-05: 07:15-Poured #8 sand @25' to 21.5' bgs (100 lbs) 08:30-Tremmied bentonite grout (50 lbs) 08:40-Poured 50 lbs of bentonite tablets (1/2")
10–45	Stiff, damp, reddish brown and orange mottled CLAYEY SILT, trace gravel @ 11.1-11.2 ft BGS, trace (f-m) sand	Mix of bentonite grout and tablets (1/2") No. 8 (fine) filter sand Slotted (0.006 in) 2-inch dia. PVC screen No. 2 filter sand	06-20-05: 11:20-Bentonite @ 21' to 17' bgs 11:30-Tremmied grout @ 17' to 0' bgs (294 lbs)
45	Bottom of borehole at 45.0 feet.		



DEVELOPMENT NOTES

RECORD OF BOREHOLE T-1

PROJECT: Solutia
PROJECT NUMBER: 943-3680.RFI
LOCATION: Anniston, AL

DRILLING METHOD: 3.25" HSA
DRILLING DATE: June 8, 2005
DRILL RIG: CME-75

DATUM:
COORDS: Not Surveyed

GS ELEVATION:
TOC ELEVATION:

BORING METHOD: 3.25" HSA

DEPTH (ft)	SOIL PROFILE DESCRIPTION	ELEV. DEPTH (ft)
0	0.0 - 7.0 Soft to firm, damp, reddish brown, gray, and orange mottled CLAYEY SILT	0.0
7	7.0 - 10.3 Firm, damp, brownish red, orange, and gray mottled SILTY CLAY	7.0
10.3	10.3 - 45.0 Stiff, damp, reddish brown and orange mottled CLAYEY SILT, trace gravel @ 11.1-11.2 ft BGS, trace (f-m) sand	10.3

NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT
1	DO		4	6/24
2	DO		17	18/24
3	DO		14	24/24
4	DO		10	24/24
5	DO		11	23/24
6	DO		39	14/24
7	DO		14	13/24
8	DO		14	18/24
9	DO		14	22/24
10	DO		12	24/24
11	DO		7	23/24
12	DO		13	24/24
13	DO		10	22/24
14	DO		8	22/24
15	DO		9	23/24
16	DO		11	20/24
17	DO		10	21/24
18	DO		12	20/24
19	DO		9	18/24
20	DO		7	23/24

PENETRATION RESISTANCE BLOWS / ft ■ (20 40 60 80)
WATER CONTENT (PERCENT) W_p — W — W_l (20 40 60 80)

NOTES WATER LEVELS: ▽ 30.9

Log continued on next page

1 in to 5 ft
DRILLING CONTRACTOR: Technical Drilling Services
DRILLER: C. Lee

LOGGED: JWC
CHECKED:

Golder Associates

RECORD OF BOREHOLE T-1

PROJECT: Solutia
PROJECT NUMBER: 943-3680.RFI
LOCATION: Anniston, AL

DRILLING METHOD: 3.25" HSA
DRILLING DATE: June 8, 2005
DRILL RIG: CME-75

DATUM:
COORDS: Not Surveyed

GS ELEVATION:
TOC ELEVATION:

DEPTH (ft)	BORING METHOD	DESCRIPTION (SOIL PROFILE)	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (20 40 60 80) / WATER CONTENT (PERCENT) W_p W W_l (20 40 60 80)	NOTES WATER LEVELS
40	3.25" HSA	10.3 - 45.0 Stiff, damp, reddish brown and orange mottled CLAYEY SILT, trace gravel @ 11.1-11.2 ft BGS, trace (f-m) sand *(Continued)*			21	DO		5	17/24	■	
					22	DO		6	20/24	■	
					23	DO		6	18/24	■	
45		Boring terminated at 45 ft. BGS									
50											
55											
60											
65											
70											
75											
80											

1 in to 5 ft
DRILLING CONTRACTOR: Technical Drilling Services
DRILLER: C. Lee

LOGGED: JWC
CHECKED:

Golder Associates

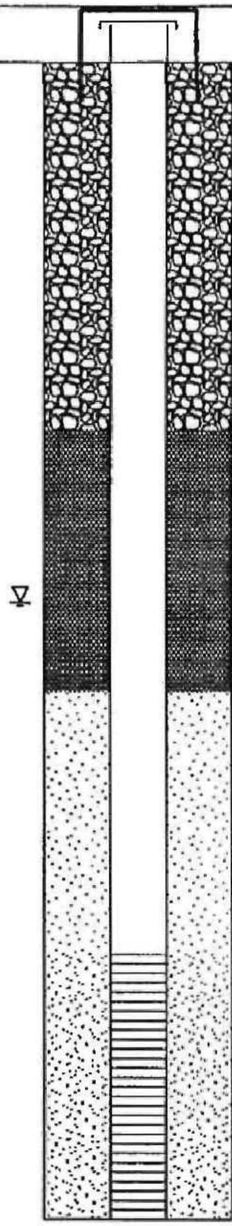
Golder Associates

PROJECT NUMBER 943-3680.RFI
PROJECT NAME Solutia
LOCATION Anniston, AL
DRILLING METHOD 3.25" HSA
SAMPLING METHOD Split spoon @ 24" / 5 ft. CME
GROUND ELEVATION
TOP OF CASING ----
LOGGED BY JWC
REMARKS

DATE STARTED Jun 8, 05
BOREHOLE DIAMETER 6
CASING TYPE/DIAMETER PVC / 2 in.
SCREEN TYPE/SLOT Slotted / 0.006
FILTER PACK TYPE /QUANTITY No. 8 sand / 325 lbs
GROUT TYPE/QUANTITY Portland cement & bentonite powder / 297 lbs.
DEPTH TO WATER 20.61
GROUND WATER ELEVATION

Depth	LITHOLOGIC DESCRIPTION
	Ground Surface
0	Soft to firm, damp, brown to reddish brown CLAYEY SILT
5	
10	SAA, trace fine sand (10'-19.5' bgs)
15	
20	Stiff, damp, reddish brown and light brown mottled SILTY CLAY
25	
30	
32	Firm, damp, reddish brown and tan mottled CLAYEY SILT
35	
40	
45	Bottom of borehole at 44.0 feet.

WELL DIAGRAM



INSTALLATION NOTES

06-20-05:

12:40-Installed well screen and casing

12:45-Poured #8 sand @ 44' to 29.5' bgs (275 lbs)

13:35-Poured #2 sand @ 29.5' to 24' bgs (50 lbs)

14:15-Tremmied bentonite grout (50 lbs)

14:30-Poured 50 lbs of 1/2" bentonite tablets

06-22-05:

07:30-Bentonite @ 24' to 14' bgs

07:35-Tremmied grout @ 14' to 0' bgs (297 lbs)

DEVELOPMENT NOTES

RECORD OF BOREHOLE T-2

PROJECT: Solutia
PROJECT NUMBER: 943-3680.RFI
LOCATION: Anniston, AL

DRILLING METHOD: 3.25" HSA
DRILLING DATE: June 8, 2005
DRILL RIG: CME-75

DATUM:
COORDS: Not Surveyed

SHEET 1 of 2
GS ELEVATION:
TOC ELEVATION:

DEPTH (ft)	BORING METHOD	SOIL PROFILE DESCRIPTION	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ / WATER CONTENT (PERCENT)	NOTES WATER LEVELS
0	3.25" HSA	0.0 - 19.5 Soft to firm, damp, brown to reddish brown CLAYEY SILT		0.0	1	DO		2	20/24		
					2	DO		12	23/24		
5					3	DO		16	22/24		
					4	DO		15	24/24		
					5	DO		11	24/24		
10		10.0 - 19.5 SAA, trace fine sand (10'-19.5' bgs)		10.0	6	TO			48/48		
15					7	TO			45/60		
20		19.5 - 31.7 Stiff, damp, reddish brown and light brown mottled SILTY CLAY		19.5	8	TO			60/60		∇ 20.61
25					9	TO			60/60		
30		31.7 - 44.0 Firm, damp, reddish brown and tan mottled CLAYEY SILT		31.7	10	TO			60/60		
35					11	TO			58/60		
40					12	TO					

Log continued on next page

1 in to 5 ft
DRILLING CONTRACTOR: Technical Drilling Services
DRILLER: C. Lee

LOGGED: JWC
CHECKED:

Golder Associates

RECORD OF BOREHOLE T-2

PROJECT: Solutia
PROJECT NUMBER: 943-3680.RFI
LOCATION: Anniston, AL

DRILLING METHOD: 3.25" HSA
DRILLING DATE: June 8, 2005
DRILL RIG: CME-75

DATUM:
COORDS: Not Surveyed

GS ELEVATION:
TOC ELEVATION:

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft / WATER CONTENT (PERCENT)	NOTES WATER LEVELS
40	3.25" HSA	31.7 - 44.0 Firm, damp, reddish brown and tan mottled CLAYEY SILT *(Continued)*			12	TO			56/60		
		Boring terminated at 44 ft. BGS									
45											
50											
55											
60											
65											
70											
75											
80											

1 in to 5 ft
DRILLING CONTRACTOR: Technical Drilling Services
DRILLER: C. Lee

LOGGED: JWC
CHECKED:

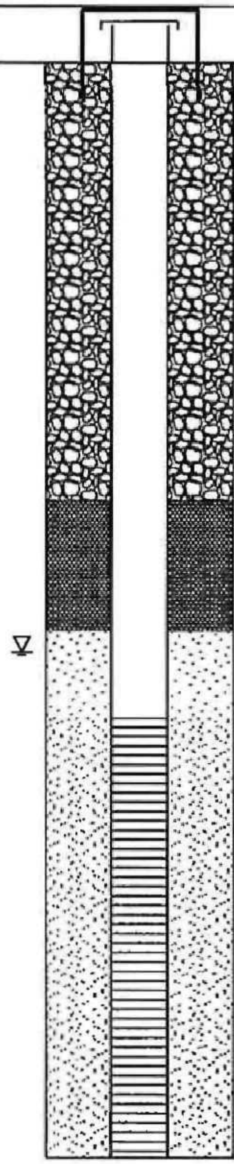
Golder Associates

Golder Associates

PROJECT NUMBER	943-3680.RFI	DATE STARTED	Jun 8, 05
PROJECT NAME	Solutia	BOREHOLE DIAMETER	6
LOCATION	Anniston, AL	CASING TYPE/DIAMETER	PVC / 2 in.
DRILLING METHOD	3.25" HSA	SCREEN TYPE/SLOT	Slotted / 0.006
SAMPLING METHOD	Split spoon @ 24"	FILTER PACK TYPE /QUANTITY	No. 8 sand / 225 lbs
GROUND ELEVATION		GROUT TYPE/QUANTITY	Portland cement & bentonite powder / 245 lbs.
TOP OF CASING	----	DEPTH TO WATER	13.5
LOGGED BY	JWC	GROUND WATER ELEVATION	
REMARKS			

Depth	LITHOLOGIC DESCRIPTION	INSTALLATION NOTES
	Ground Surface	
0	Soft, moist, brown CLAYEY SILT, trace (f) sand	06-17-05:
		13:45-Installed well screen and casing
		13:50-Poured #8 sand (50 lbs)
		14:20-Well screen/casing pulled out while removing auger -Completely removed screen/casing
5		14:25-Augered boring in order to remove loose material
	SAA, Damp, gray, orange, and reddish brown mottled	14:50-Installed screen/casing (2nd attempt)
		14:55-Poured #8 sand (175 lbs)
		16:30-Sand @ 25' to 13' bgs
10	Firm, moist, reddish brown SILT, trace (f) sand w/ alternating layers of white silt	16:35-Poured 50 lbs of 1/2" bentonite tablets @ 13' to 10' bgs
		06-20-05:
		11:00-Tremmied grout @10' to 0' bgs (245 lbs)
	Trace clay @ 13.3'-13.8' bgs	
15		
	SAA, wet, trace to some (f) sand, trace gravel	DEVELOPMENT NOTES
	Soft to firm, wet, brown SANDY SILT/SILTY SAND	
20	Firm, moist, brown, light gray, and orange mottled CLAYEY SILT	
25	Bottom of borehole at 25.0 feet.	

WELL DIAGRAM



RECORD OF BOREHOLE T-3

PROJECT: Solutia
PROJECT NUMBER: 943-3680.RFI
LOCATION: Anniston, AL

DRILLING METHOD: 3.25" HSA
DRILLING DATE: June 8, 2005
DRILL RIG: CME-75

DATUM:
COORDS: Not Surveyed

GS ELEVATION:
TOC ELEVATION:

DEPTH (ft)	BORING METHOD	SOIL PROFILE DESCRIPTION	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	NOTES WATER LEVELS
0	3.25" HSA	0.0 - 6.3 Soft, moist, brown CLAYEY SILT, trace (f) sand	0.0	1	DO		1	17/24	
				2	DO		4	15/24	
5				3	DO		9	23/24	
		6.3 - 9.5 SAA, Damp, gray, orange, and reddish brown mottled	6.3	4	DO		7	24/24	
				5	DO		13	24/24	
10		9.5 - 16.0 Firm, moist, reddish brown SILT, trace (f) sand w/ alternating layers of white silt	9.5	6	DO		18	16/24	
		13.3 - 13.8 Trace clay @ 13.3'-13.8' bgs		7	DO		11	21/24	∇ 13.5
15				8	DO		17	19/24	
		16.0 - 18.3 SAA, wet, trace to some (f) sand, trace gravel		9	DO		19	16/24	
		18.3 - 19.0 Soft to firm, wet, brown SANDY SILT/SILTY SAND	18.3	10	DO		16	19/24	
20		19.0 - 25.0 Firm, moist, brown, light gray, and orange mottled CLAYEY SILT	19.0	11	DO		13	14/24	
				12	DO		15	22/24	
25		Boring terminated at 25 ft. BGS		13	DO		7	24/24	
30									
35									
40									

PENETRATION RESISTANCE BLOWS / ft ■ 20 40 60 80
WATER CONTENT (PERCENT) W_p W W_l 20 40 60 80

1 in to 5 ft
DRILLING CONTRACTOR: Technical Drilling Services
DRILLER: C. Lee

LOGGED: JWC
CHECKED:

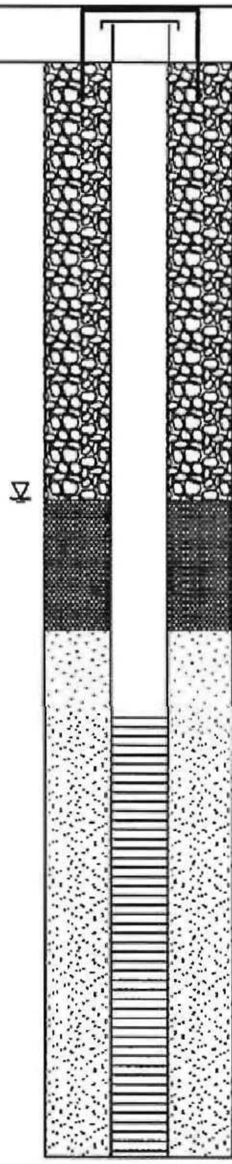
Golder Associates

Golder Associates

PROJECT NUMBER	943-3680.RFI	DATE STARTED	Jun 9, 05
PROJECT NAME	Solutia	BOREHOLE DIAMETER	6
LOCATION	Anniston, AL	CASING TYPE/DIAMETER	PVC / 2 in.
DRILLING METHOD	3.25" HSA	SCREEN TYPE/SLOT	Slotted / 0.006
SAMPLING METHOD	Split spoon @ 24" / 5 ft. CME	FILTER PACK TYPE /QUANTITY	No. 8 sand / 200 lbs.
GROUND ELEVATION		GROUT TYPE/QUANTITY	Portland cement & bentonite powder / 262 lbs.
TOP OF CASING	---	DEPTH TO WATER	10.00
LOGGED BY	JWC	GROUND WATER ELEVATION	
REMARKS			

Depth	LITHOLOGIC DESCRIPTION
	Ground Surface
0	Soft, damp, brown CLAYEY SILT, trace (f) sand
	Loose, damp, dark gray SILTY SAND, trace organics (roots)
5	Damp, soft, dark gray to black SANDY SILT
	Soft, damp, brownish orange CLAYEY SILT, trace fine sand Wet sample, trace gravel @ 6.6'-7.9' bgs
10	Moist, soft, reddish brown and light brown mottled CLAYEY SILT, trace (f) sand, trace gravel, trace organics (roots) Wet to very wet, some to little gravel @ 14'-14.5' bgs
15	
20	
25	Bottom of borehole at 25.0 feet.

WELL DIAGRAM



INSTALLATION NOTES

06-21-05:

15:55-Installed well screen and casing

16:00-Poured #8 sand @ 25' to 17' bgs (150 lbs)

06-22-05:

10:55-Poured #8 sand @ 17' to 13' bgs (50 lbs)

11:45-Poured 50 lbs of 1/2" bentonite tablets @ 13' to 10' bgs

06-23-05:

07:30-Tremmied grout @ 10' to 0' bgs (262 lbs)

DEVELOPMENT NOTES

RECORD OF BOREHOLE T-4

PROJECT: Solutia
PROJECT NUMBER: 943-3680.RFI
LOCATION: Anniston, AL

DRILLING METHOD: 3.25" HSA
DRILLING DATE: June 9, 2005
DRILL RIG: CME-75

DATUM:
COORDS: Not Surveyed

SHEET 1 of 1
GS ELEVATION:
TOC ELEVATION:

DEPTH (ft)	BORING METHOD	DESCRIPTION	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer, 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft / WATER CONTENT (PERCENT)	NOTES WATER LEVELS
0	3.25" HSA	0.0 - 2.1 Soft, damp, brown CLAYEY SILT, trace (f) sand		0.0	1	DO		1	14/24		
		2.1 - 4.8 Loose, damp, dark gray SILTY SAND, trace organics (roots)		2.1	2	DO		7	17/24		
5		4.8 - 6.0 Damp, soft, dark gray to black SANDY SILT		4.8	3	DO		7	18/24		
		6.0 - 10.0 Soft, damp, brownish orange CLAYEY SILT, trace fine sand; 6.6 - 7.9 Wet sample, trace gravel @ 6.6'-7.9' bgs		6.0	4	DO		1	23/24		
					5	DO		2	20/24		
10		10.0 - 25.0 Moist, soft, reddish brown and light brown mottled CLAYEY SILT, trace (f) sand, trace gravel, trace organics (roots); 14.0 - 14.5 Wet to very wet, some to little gravel @ 14'-14.5' bgs		10.0	6	TO			14/48		∇ 10.00
15					7	TO			42/60		
20					8	TO			60/60		
					9	TO			12/12		
25		Boring terminated at 25 ft. BGS									
30											
35											
40											

1 in to 5 ft
DRILLING CONTRACTOR: Technical Drilling Services
DRILLER: C. Lee

LOGGED: JWC
CHECKED:

Golder Associates

RECORD OF MONITORING WELL T-05

PROJECT: Solutia
PROJECT NUMBER: 943-3680-RFI .01D
DRILLED DEPTH: 145.0 ft
AZIMUTH: N/A
LOCATION: Anniston, AL

DRILL METHOD: Rotosonic
DRILL RIG: Gas-PECK- GP24-300RS
DATE STARTED: 10/23/06
DATE COMPLETED: 10/30/06
WEATHER: clear

DATUM: NA
COORDS: N: 1,146,124.4 E: 650,076.5
GS ELEVATION: 765.1 ft
TOC ELEVATION: 767.2 ft
TEMPERATURE: 50F

INCLINATION: -90
DEPTH W.L.: 97.3 ft
ELEVATION W.L.: 669.9 ft
DATE W.L.: 10/29/06
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	NOTES	WELL CONSTRUCTION DETAILS
0	765	0.0 - 55.0 no lithology recorded				2.25' stick up~		**WELL CASING** Interval: 0-118 feet Material: Schedule 40 PVC Diameter: 2 inches Joint Type: Flush Interior Thread **WELL SCREEN** Interval: 118 -128 feet Material: Schedule 40 PVC Diameter: 2 inches Slot Size: 0.010 inch End Cap: 6 inch sump **FILTER PACK** Interval: 116 - 130 feet Type: 20-30 standard sand Quantity: 6 bags (50 lbs each) **FILTER PACK SEAL** Interval: 111-116 feet Type: Bentonite seal pellets Quantity: 1.5 bags (50 lbs each) **ANNULUS SEAL** Interval: 0-111 feet Type: Portland Type 1 grout Quantity: 7 bags (94 lbs each) + 1/2 bag (50 lbs each) bentonite powder
5	760							
10	755							
15	750							
20	745							
25	740							
30	735							
35	730							
40	725							
45	720							
50		Log continued on next page						

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Boart Longyear
DRILLER: Ken

GA INSPECTOR: R.P.
CHECKED BY:
DATE: 11/9/06

Golder Associates

WELL DEVELOPMENT SOLUTIA BORINGS AND WELLS.GPJ GOLDER NJ-PA.GDT 1/22/07

RECORD OF MONITORING WELL T-05

PROJECT: Solutia
PROJECT NUMBER: 943-3680-RFI .01D
DRILLED DEPTH: 145.0 ft
AZIMUTH: N/A
LOCATION: Anniston, AL

DRILL METHOD: Rotosonic
DRILL RIG: Gas-PECK- GP24-300RS
DATE STARTED: 10/23/06
DATE COMPLETED: 10/30/06
WEATHER: clear

DATUM: NA
COORDS: N: 1,146,124.4 E: 650,076.5
GS ELEVATION: 765.1 ft
TOC ELEVATION: 767.2 ft
TEMPERATURE: 50F

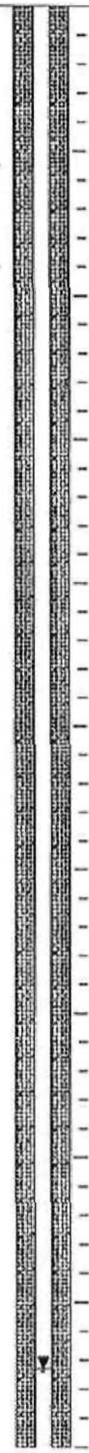
INCLINATION: -90
DEPTH W.L.: 97.3 ft
ELEVATION W.L.: 669.9 ft
DATE W.L.: 10/29/06
TIME W.L.:

SOIL PROFILE

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	ELEV. / DEPTH (ft)
50	715	0.0 - 55.0 no lithology recorded*(Continued)*		
55	710	55.0 - 60.0 wet, soft brown silty CLAY (dolostone residuum)		710.1 / 55.0
60	705	60.0 - 61.0 hard grey fresh DOLOSTONE with trace chert		705.1 / 60.0
		61.0 - 65.0 wet, soft brown silty CLAY, little to some gravel (fine to course dolostone fragments)		704.1 / 61.0
65	700	65.0 - 66.0 hard slightly weathered DOLOSTONE		700.1 / 65.0
		66.0 - 70.0 dry, loose SILT, some consolidated clay/ silt and little to some coarse gravel (dolostone residuum)		699.1 / 66.0
70	695	70.0 - 75.0 dry, highly weathered DOLOSTONE fragments in a silt to silty clay, some fine sand, residual soil matrix		695.1 / 70.0
75	690	75.0 - 91.0 very dry, grey highly weathered DOLOSTONE in a gravelly residual soil matrix		690.1 / 75.0
80	685			
85	680			
90	675			
		91.0 - 94.0 soft CLAY (dolostone residuum)		674.1 / 91.0
		94.0 - 95.0 fresh to slightly weathered DOLOSTONE		671.1 / 94.0
95	670	95.0 - 97.0 SILT (dolostone residuum)		670.1 / 95.0
		97.0 - 99.0 fresh to slightly weathered DOLOSTONE		668.1 / 97.0
		99.0 - 100.0		666.1 / 99.0
100				665.1

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



Portland Type 1 grout

well casing

NOTES

consolidated silt nodules, some clay (approx. 84-85 ft)

consolidated hard clay nodules (approx. 88-89 ft)

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0-118 feet
Material: Schedule 40 PVC
Diameter: 2 inches
Joint Type: Flush Interior Thread

WELL SCREEN
Interval: 118 -128 feet
Material: Schedule 40 PVC
Diameter: 2 inches
Slot Size: 0.010 inch
End Cap: 6 inch sump

FILTER PACK
Interval: 116 - 130 feet
Type: 20-30 standard sand
Quantity: 6 bags (50 lbs each)

FILTER PACK SEAL
Interval: 111-116 feet
Type: Bentonite seal pellets
Quantity: 1.5 bags (50 lbs each)

ANNULUS SEAL
Interval: 0-111 feet
Type: Portland Type 1 grout
Quantity: 7 bags (94 lbs each) + 1/2 bag (50 lbs each) bentonite powder

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Boart Longyear
DRILLER: Ken

GA INSPECTOR: R.P.
CHECKED BY:
DATE: 11/9/06

Golder Associates

RECORD OF MONITORING WELL T-05

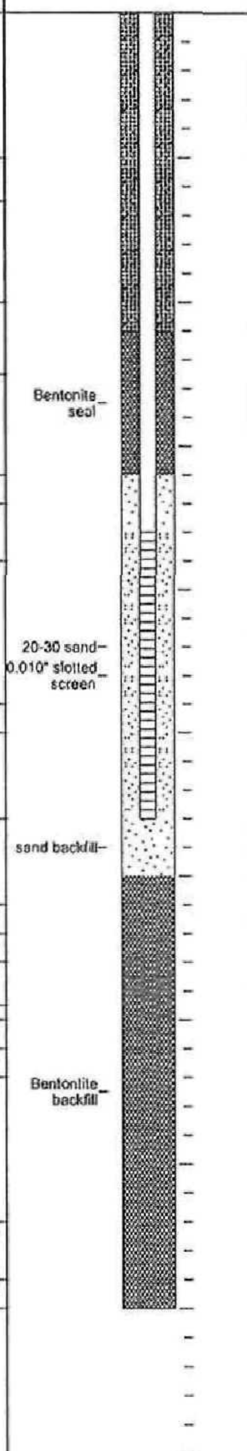
SHEET 3 of 3

PROJECT: Solutia	DRILL METHOD: Rotosonic	DATUM: NA	INCLINATION: -90
PROJECT NUMBER: 943-3680-RFI .01D	DRILL RIG: Gas-PECK- GP24-300RS	COORDS: N: 1,146,124.4 E: 650,076.5	DEPTH W.L.: 97.3 ft
DRILLED DEPTH: 145.0 ft	DATE STARTED: 10/23/06	GS ELEVATION: 765.1 ft	ELEVATION W.L.: 669.9 ft
AZIMUTH: N/A	DATE COMPLETED: 10/30/06	TOC ELEVATION: 767.2 ft	DATE W.L.: 10/29/06
LOCATION: Anniston, AL	WEATHER: clear	TEMPERATURE: 50F	TIME W.L.:

SOIL PROFILE

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NOTES
100	665	SILT			100.0	
		100.0 - 105.0 moderately weathered to highly weathered DOLOSTONE with some consolidated SILT (dolostone residuum) at 104' bgs				
105	660	105.0 - 105.5 hard grey to light red MUDSTONE and SILTSTONE (dolostone residuum)			660.1 / 105.0	non-reactive to HCl
		106.5 - 110.0 loose brown SILT (dolostone residuum)			658.6 / 106.5	high carbonate content (reactive to HCl)
110	655	110.0 - 112.5 hard SILT (dolostone residuum)			655.1 / 110.0	no carbonate content
		112.5 - 116.0 loose SILT and fine SAND (dolostone residuum)			652.6 / 112.5	high carbonate content
115	650	116.0 - 117.0 hard MUDSTONE or SILTSTONE (dolostone residuum)			649.1 / 116.0 / 648.1 / 117.0	no carbonate
		117.0 - 119.0 wet, very soft SILT (dolostone residuum)				
120	645	119.0 - 124.0 dry, loose brown SILT with some fine sand (dolostone residuum)			646.1 / 119.0	
125	640	124.0 - 125.0 MUDSTONE with carbonate or possible chert (dolostone residuum)			641.1 / 124.0 / 640.1 / 125.0	high carbonate (chert, non-reactive to HCl)
		125.0 - 128.0 wet brown SILT with some gravel (dolostone residuum)				
130	635	128.0 - 131.0 dry brown to grey SILT with little gravel (dolostone residuum)			637.1 / 128.0	
		131.0 - 132.0 very hard grey fresh to slightly weathered DOLOSTONE			634.1 / 131.0 / 633.1	slightly reactive to HCl
		132.0 - 133.0 dry brown SILT with little gravel (dolostone residuum)			132.0 / 632.1 / 133.0	slightly reactive to HCl
135	630	133.0 - 134.5 dry, very hard grey fresh to slightly weathered DOLOSTONE			630.6	
		134.5 - 135.0 dry brown SILT and grey fresh to slightly weathered DOLOSTONE			135.0 / 629.1	
		135.0 - 136.0 wet grey clean fresh to slightly weathered DOLOSTONE			136.0 / 628.1	
140	625	136.0 - 137.0 moist SILT (dolostone residuum) with some dolostone			137.0	
		137.0 - 142.0 dry grey fresh to slightly weathered DOLOSTONE with some silt			623.1 / 142.0	
145	620	142.0 - 144.0 dry SILT (dolostone residuum) with some dolostone			621.1 / 144.0 / 620.1	Boring completed at 145.0 ft
		144.0 - 145.0 moist/ wet SILT (dolostone residuum) with some dolostone				
150		Boring completed at 145.0 ft				

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0-118 feet
Material: Schedule 40 PVC
Diameter: 2 inches
Joint Type: Flush Interior Thread

WELL SCREEN
Interval: 118 -128 feet
Material: Schedule 40 PVC
Diameter: 2 inches
Slot Size: 0.010 inch
End Cap: 6 inch sump

FILTER PACK
Interval: 116 - 130 feet
Type: 20-30 standard sand
Quantity: 6 bags (50 lbs each)

FILTER PACK SEAL
Interval: 111-116 feet
Type: Bentonite seal pellets
Quantity: 1.5 bags (50 lbs each)

ANNULUS SEAL
Interval: 0-111 feet
Type: Portland Type 1 grout
Quantity: 7 bags (94 lbs each) + 1/2 bag (50 lbs each) bentonite powder

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Boart Longyear
DRILLER: Ken

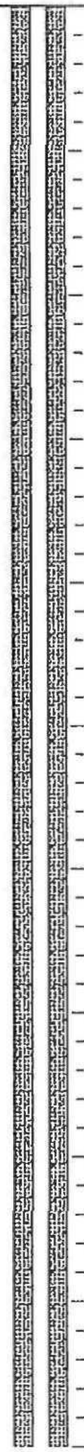
GA INSPECTOR: R.P.
CHECKED BY:
DATE: 11/9/06

Golder Associates

WELL DEVELOPMENT SOLUTIA BORINGS AND WELLS.GPJ GOLDER NJ-PA.GDT 1/22/07

RECORD OF MONITORING WELL T-06

PROJECT: Solutia	DRILL METHOD: Rotosonic	DATUM: NA	INCLINATION: -90
PROJECT NUMBER: 943-3680-RFI .01D	DRILL RIG: Gas-PECK- GP24-300RS	COORDS: N: 1,146,301.2 E: 649,902.8	DEPTH W.L.: 89.1 ft
DRILLED DEPTH: 150.0 ft	DATE STARTED: 10/24/06	GS ELEVATION: 760.1 ft	ELEVATION W.L.: 670.9 ft
AZIMUTH: N/A	DATE COMPLETED: 10/30/06	TOC ELEVATION: 760.0 ft	DATE W.L.: 10/30/06
LOCATION: Anniston, AL	WEATHER: cloudy	TEMPERATURE: 44F	TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	NOTES	WELL CONSTRUCTION DETAILS
0	760	0.0 - 55.0 no lithology recorded						**WELL CASING** Interval: 0 -115 feet Material: Schedule 40 PVC Diameter: 2 inches Joint Type: Flush Interior Thread **WELL SCREEN** Interval: 115-125 feet Material: Schedule 40 PVC Diameter: 2 inches Slot Size: 0.010 inch End Cap: 6 inch sump **FILTER PACK** Interval: 112-130 feet Type: 20-30 standard sand Quantity: 5.5 bags (50 lbs each) **FILTER PACK SEAL** Interval: 108-112 feet Type: 3/8" Bentonite seal pellets Quantity: 1 bag (50 lbs each) **ANNULUS SEAL** Interval: 0-108 feet Type: Portland Type 1 grout Quantity: 8 bags (94 lbs each) + 1/3 bag (50 lbs each) Bentonite powder
5	755							
10	750							
15	745							
20	740							
25	735							
30	730							
35	725							
40	720							
45	715							
50		Log continued on next page						

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Boart Longyear
DRILLER: Ken

GA INSPECTOR: R.P.
CHECKED BY:
DATE: 11/9/06

Golder Associates

RECORD OF MONITORING WELL T-06

PROJECT: Solutia
PROJECT NUMBER: 943-3680-RFI .01D
DRILLED DEPTH: 150.0 ft
AZIMUTH: N/A
LOCATION: Anniston, AL

DRILL METHOD: Rotosonic
DRILL RIG: Gas-PECK- GP24-300RS
DATE STARTED: 10/24/06
DATE COMPLETED: 10/30/06
WEATHER: cloudy

DATUM: NA
COORDS: N: 1,146,301.2 E: 649,902.8
GS ELEVATION: 760.1 ft
TOC ELEVATION: 760.0 ft
TEMPERATURE: 44F

INCLINATION: -90
DEPTH W.L.: 89.1 ft
ELEVATION W.L.: 670.9 ft
DATE W.L.: 10/30/06
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	NOTES	WELL CONSTRUCTION DETAILS
50	710	0.0 - 55.0 no lithology recorded(Continued)				Portland Type 2 grout		**WELL CASING** Interval: 0 -115 feet Material: Schedule 40 PVC Diameter: 2 inches Joint Type: Flush Interior Thread
55	705	55.0 - 56.0 soft brown CLAY			705.1 55.0			**WELL SCREEN** Interval: 115-125 feet Material: Schedule 40 PVC Diameter: 2 inches Slot Size: 0.010 inch End Cap: 6 inch sump
		56.0 - 60.0 red brown soft, moist, silty CLAY residuum with local layers of deeply weathered dolostone			704.1 56.0	well casing	reacts to HCl	**FILTER PACK** Interval: 112-130 feet Type: 20-30 standard sand Quantity: 5.5 bags (50 lbs each)
60	700	60.0 - 61.0 soft brown CLAY lense			700.1 60.0			
		61.0 - 65.0 light gray, slightly weathered to moderately weathered medium crystalline DOLOSTONE with dark brown CLAY layers at 65' bgs that are completely weathered			699.1 61.0			**FILTER PACK SEAL** Interval: 108-112 feet Type: 3/8" Bentonite seal pellets Quantity: 1 bag (50 lbs each)
65	695	65.0 - 82.0 red-brown, very soft moist, silty CLAY with trace to little gravel (comprise of variably weathered dolostone fragments). Residual soil is locally interlayered with moderately to highly weathered dolostone.			695.1 65.0			**ANNULUS SEAL** Interval: 0-108 feet Type: Portland Type 1 grout Quantity: 8 bags (94 lbs each) + 1/3 bag (50 lbs each) Bentonite powder
70	690							
75	685							
80	680							
		82.0 - 85.0 dry SILT (dolostone residuum) with some highly weathered dolostone fragments and fine sand			678.1 82.0			
85	675	85.0 - 89.0 moist brown SILT and fine SAND with some clay (dolostone residuum) and highly weathered dolostone			675.1 85.0			
		89.0 - 90.0 dry brown SILT and fine sand (dolostone residuum), some highly weathered dolostone, trace clay			671.1 89.0			
90	670	90.0 - 95.0 very moist brown SILT and fine sand (dolostone residuum) with some highly weathered dolostone and trace to little clay			670.1 90.0		dolostone reacts to HCl	
95	665	95.0 - 102.0 soft wet brown SILT with some fine sand (dolostone residuum) and highly weathered dolostone; iron nodule at 97' bgs			665.1 95.0			
100								

Log continued on next page

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Boart Longyear
DRILLER: Ken

GA INSPECTOR: R.P.
CHECKED BY:
DATE: 11/9/06

Golder Associates

RECORD OF MONITORING WELL T-06

PROJECT: Solutia
PROJECT NUMBER: 943-3680-RFI .01D
DRILLED DEPTH: 150.0 ft
AZIMUTH: N/A
LOCATION: Anniston, AL

DRILL METHOD: Rotosonic
DRILL RIG: Gas-PECK- GP24-300RS
DATE STARTED: 10/24/06
DATE COMPLETED: 10/30/06
WEATHER: cloudy

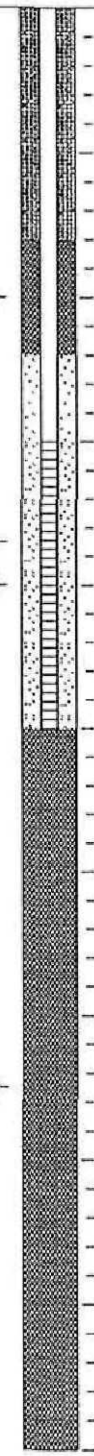
DATUM: NA
COORDS: N: 1,146,301.2 E: 649,902.8
GS ELEVATION: 760.1 ft
TOC ELEVATION: 760.0 ft
TEMPERATURE: 44F

INCLINATION: -90
DEPTH W.L.: 89.1 ft
ELEVATION W.L.: 670.9 ft
DATE W.L.: 10/30/06
TIME W.L.:

SOIL PROFILE

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NOTES
100	660					
		102.0 - 105.0 dry hard brown SILT (dolostone residuum) with trace moderately weathered dolostone			658.1 / 102.0	
105	655	105.0 - 108.0 slightly wet homogeneous brown fine SAND (dolostone residuum) 104-109 subverticle fracture, highly weathered to coursly weathered			655.1 / 105.0	5' of subvertical fractures
		108.0 - 111.0 light brown to grey SILT with trace fresh to moderally weathered dolostone layers			652.1 / 108.0	
110	650	111.0 - 114.0 dry light brown to grey SILT (dolostone residuum) trace to little fresh to moderatly weathered dolostone layers			649.1 / 111.0	
		114.0 - 115.0 dry hard grey highly weathered DOLOSTONE			646.1 / 114.0	
115	645	115.0 - 120.0 very hard grey fresh to slightly weathered DOLOTONE			645.1 / 115.0	dolostone slightly reacts with HCl
120	640	120.0 - 124.0 wet, very soft brown CLAY (dolostone residuum) with some dolomite gravel (moderatly weathered dolostone fragments)			640.1 / 120.0	
		124.0 - 125.0 DOLOSTONE with some silt and little clay			636.1 / 124.0	
125	635	125.0 - 126.5 moist brown fine SAND (dolostone residuum) with trace to little slighly to moderally weathered dolostone and little clay			635.1 / 125.0	
		126.5 - 131.5 wet brown SILT (dolostone residuum) and slightly weathered to highly weathered DOLOSTONE			633.6 / 126.5	
130	630	131.5 - 132.5 dry, brown to grey fine SAND (no dolostone)			628.6 / 131.5	
		132.5 - 135.0 saturated (maybe from drilling water) SILT and DOLOSTONE with trace fine sand			627.6 / 132.5	
135	625	135.0 - 140.0 light brown moderally to deeply weathered DOLOSTONE and SILT (dolostone residuum)			625.1 / 135.0	
140	620	140.0 - 142.0 wet, very soft light brown SILT (dolostone residuum)			620.1 / 140.0	
		142.0 - 144.5 slightly moist light brown moderally to highly weathered DOLOSTONE and SILT (dolostone residuum)			618.1 / 142.0	
145	615	144.5 - 150.0 very dry grey moderally to highly weathered DOLOSTONE			615.6 / 144.5	
150		Boring completed at 150.0 ft			610.1	Boring completed at 150.0 ft

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



Bentonite seal
20-30 sand
0.010" slotted screen
Bentonite backfill

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0 -115 feet
Material: Schedule 40 PVC
Diameter: 2 inches
Joint Type: Flush Interior Thread

WELL SCREEN
Interval: 115-125 feet
Material: Schedule 40 PVC
Diameter: 2 inches
Slot Size: 0.010 inch
End Cap: 6 inch sump

FILTER PACK
Interval: 112-130 feet
Type: 20-30 standard sand
Quantity: 5.5 bags (50 lbs each)

FILTER PACK SEAL
Interval: 108-112 feet
Type: 3/8" Bentonite seal pellets
Quantity: 1 bag (50 lbs each)

ANNULUS SEAL
Interval: 0-108 feet
Type: Portland Type 1 grout
Quantity: 8 bags (94 lbs each) + 1/3 bag (50 lbs each) Bentonite powder

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Boart Longyear
DRILLER: Ken

GA INSPECTOR: R.P.
CHECKED BY:
DATE: 11/9/06

Golder Associates

& MILLER, INC.
Environmental Services

SAMPLE/CORE LOG

Boring/Well HEL-1 Project/No. TF0525.020 Page 1 of 1

Site Location Monsanto, Anniston Drilling Started 4/12/94 Drilling Completed 4/12/94

Total Depth Drilled 32 feet Hole Diameter 8 1/4 inches Type of Sample/Coring Device split spoon

Length and Diameter of Coring Device 2' x 2" Sampling Interval every 5' feet

Land-Surface Elev. ______ feet ☐ Surveyed ☐ Estimated Datum ______

Drilling Fluid Used none Drilling Method Hollow stem

Drilling Contractor Miller Drilling Driller Todd Helper Mike

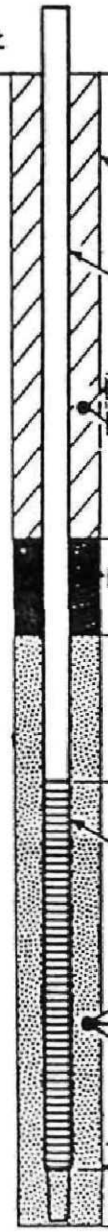
Prepared By Ken Mikula Hammer Weight n/a Hammer Drop n/a inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (~~feet~~) "	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	4			Surface rubble, mixture of clayey
				sand + rock, some organics
4	6	20"		Fill material - clayey sand,
				brownish orange, silty, some
				organics; damp
~~8~~ 9	11	24"		Clay, slightly sandy, some silt, mottled
				brownish orange + tan, cohesive;
				damp - moist
14	16	24"		see above - pebble zone ~1" thick
				at 15' bls - dry + sandy.
19	21	24"		Clay, sandy, some silt, mottled
				brownish orange + tan, some
				lenses of sand but appears to
				be dry; overall a damp sample.
24	26	20"		same as above - bottom 1' of spoon
				is moist to wet. Poss. water @ 25' bls
29	31	22"		same as above - moist - wet
				STOP at 32' bls

G&M Form 03 6 86 Southpoint 89 1257

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG



~2.5 ft

LAND SURFACE

nomead

8.25 inch diameter drilled hole

Well casing, 2 inch diameter, PVC Sch. 40

☐ Backfill
☒ Grout 3% bentonite
signal mountain portland Type I

15 ft*

Bentonite ☐ slurry ☒ pellets

17 ft* medium Pure Gold chips

19 ft*

Well Screen. 2 inch diameter PVC, 10 slot

☐ Gravel Pack
☒ Sand Pack 20/30 silica Atlanta Sand + supply co
☐ Formation Collapse

29.0 ft*

31.5 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Monsanto Well WEL-1

Town/City Anniston

County ______ State AL

Permit No. ______

Land-Surface Elevation and Datum ______ feet ☐ surveyed ☐ estimated

Installation Dates(s) 4/12/94

Drilling Method Hollow stem auger

Drilling Contractor Miller Drilling Co.

Drilling Fluid None

Development Techniques(s) and Date(s)
Bailer 4/14/94

Fluid Loss During Drilling none gallons

Water Removed During Development ~28 gallons

Static Depth to Water 6.22 feet below M.P.

Pumping Depth to Water 6.5 - 8.5 (Bailer) feet below M.P.

Pumping Duration ~2 hours

Yield ______ gpm Date ______

Specific Capacity ______ gpm/ft

Well Purpose Monitor well

Remarks 8 50 lb bags of sand used. No problems

Prepared by Ken Mapin

1/86

GERAGHTY & MILLER, INC.
Environmental Services

SAMPLE/CORE LOG

Boring/Well WEL-2 Project/No. TF0525.020 Page 1 of 1

Site Location Monsanto, Anniston Drilling Started 4/12/99 Drilling Completed 4/12/99

Total Depth Drilled 32 feet Hole Diameter 8.25 inches Type of Sample/Coring Device split spoon

Length and Diameter of Coring Device 2'x2" Sampling Interval every 5 feet

Land-Surface Elev.____ feet ☐ Surveyed ☐ Estimated Datum____

Drilling Fluid Used none Drilling Method Hollow-stem auger

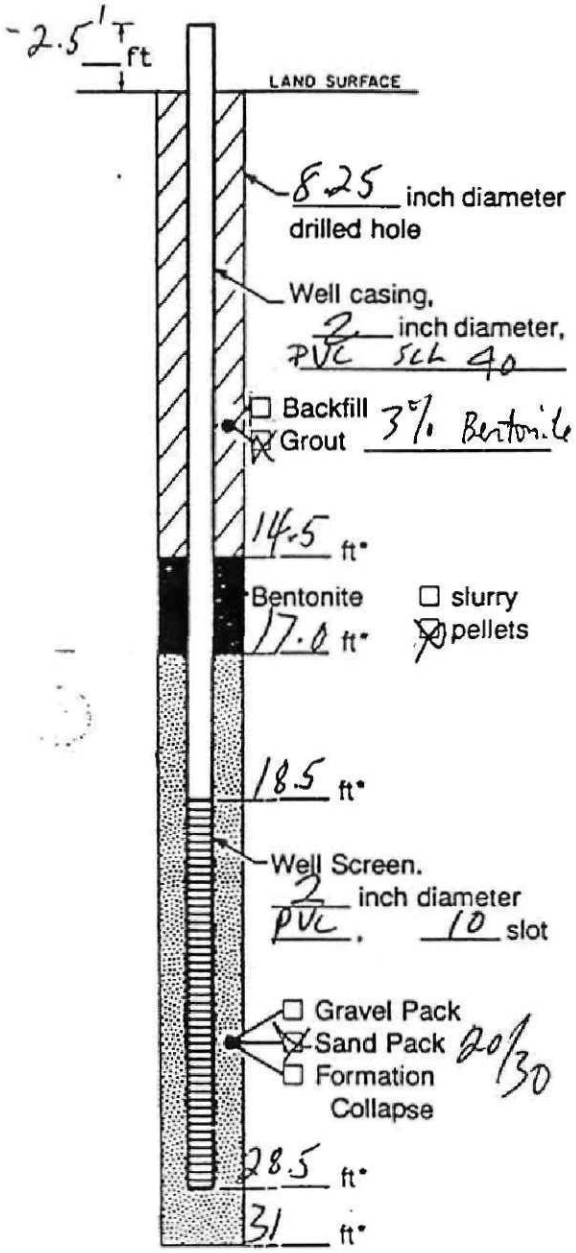
Drilling Contractor Miller Drilling Driller Todd Helper mike

Prepared By Ken Mitchell Hammer Weight n/a Hammer Drop n/a inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet) "	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	4'			fill material - rocks + sandy
				clay - some silt; damp
4	6	6"		fill material - clay, sandy w/
				some silt, dark brownish orange,
				some pebble chips; damp
9	11	—		NO sample - cuttings are
				clay, sandy w/ some silt, dark
				brownish-orange; damp to moist
14	16	24"		Clay, slightly sandy, some silt,
				brownish orange w/ dark brown to
				black thin lenses (organics?), very
				compact; damp
19	21	24"		same as above
24	26	24"		same as above - slightly more
				moist
29	31	24"		same as above - damp to moist
				Stop at 32' bls

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG



Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Monsanto. Well WFL-2

Town/City Anniston

County ______ State AL

Permit No. ______

Land-Surface Elevation and Datum ______ feet ☐ surveyed ☐ estimated

Installation Dates(s) 4/12/94

Drilling Method Hollow stem auger

Drilling Contractor Miller Drilling Co

Drilling Fluid None

Development Techniques(s) and Date(s) Bailer 4/14/94

Fluid Loss During Drilling — gallons

Water Removed During Development ~30 gallons

Static Depth to Water 6.84 feet below M.P.

Pumping Depth to Water 7-9 (Bailer) feet below M.P.

Pumping Duration 2 hours

Yield ______ gpm Date ______

Specific Capacity ______ gpm/ft

Well Purpose Monitor

Remarks 8.5 bags (50lb) of sand used
No problem

Prepared by Ken Mitch

1/86.

GERAGHTY & MILLER, INC.
Environmental Services

SAMPLE/CORE LOG

Boring/Well WEL-3 Project/No. TF0525.020 Page 1 of 1

Site Location Monsanto Drilling Started 4/13/94 Drilling Completed 4/13/94

Total Depth Drilled 32 feet Hole Diameter 8.25 inches Type of Sample/ Coring Device split spoon

Length and Diameter of Coring Device 2' x 2" Sampling Interval every 5 feet

Land-Surface Elev. ______ feet ☐ Surveyed ☐ Estimated Datum ______

Drilling Fluid Used None Drilling Method Hollow stem auger

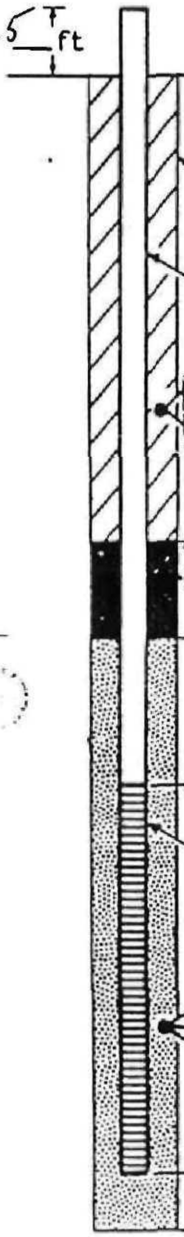
Drilling Contractor Miller Drilling Co. Driller Todd Helper Mike

Prepared By Ken Mitchell Hammer Weight n/a Hammer Drop n/a inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (~~feet~~ ")	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	4			Fill material, sandy clay, reddish-orange, pebbles + rock fragments, some organics; damp
4	6	24		same to 5' bls - then clay, slightly sandy (F.G.), some silt, reddish brown w/ tan mottling, compact + firm; damp
9	11	24		Clay, trace sand, F.G., silty, mottled reddish brown + tan, chert fragments (weathered), compact; damp.
14	16	18		Same as above but with more chert fragments. Chert lense at ~15.5' bls - no water evident
19	21	20		same as above
24	26	24		same as above
29	31	24		same as above
				Stop @ 32' bls

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG



~2.5 ft

LAND SURFACE

8.25 inch diameter drilled hole

Well casing, 2 inch diameter, PVC Sch 40

☐ Backfill
☑ Grout 3% bentonite

15 ft*

Bentonite ☐ slurry ☑ pellets

17.0 ft*

19.5 ft*

Well Screen. 2 inch diameter PVC, 10 slot

☐ Gravel Pack
☒ Sand Pack 20/30
☐ Formation Collapse

29.5 ft*

32 ft*

Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Monsanto Well WEL-3

Town/City Anniston

County ______ State AL

Permit No. ______

Land-Surface Elevation and Datum ______ feet ☐ surveyed ☐ estimated

Installation Dates(s) 4/13/94

Drilling Method Hollow stem auger

Drilling Contractor Miller Drilling Co.

Drilling Fluid None

Development Techniques(s) and Date(s) Bail 4/14/94

Fluid Loss During Drilling ~ none gallons

Water Removed During Development ~27 gallons

Static Depth to Water 7.67 feet below M.P.

Pumping Depth to Water 8-10 (Bailer) feet below M.P.

Pumping Duration ______ hours

Yield ______ gpm Date ______

Specific Capacity ______ gpm/ft

Well Purpose Monitor

Remarks 8 50 lb bags of sand used. No problems

Prepared by [signature]

GERAGHTY & MILLER, INC.
Environmental Services

SAMPLE/CORE LOG

Boring/Well WEL-4 Project/No. TF0525-020 Page 1 of 1

Site Location Monsanto, Anniston Drilling Started 4/13/94 Drilling Completed 4/14/94

Total Depth Drilled 47 feet Hole Diameter 8.25 inches Type of Sample/ Coring Device Split spoon

Length and Diameter of Coring Device 2' x 2" Sampling Interval every 5 feet

Land-Surface Elev. ______ feet ☐ Surveyed ☐ Estimated Datum ______

Drilling Fluid Used None Drilling Method Hollow stem auger

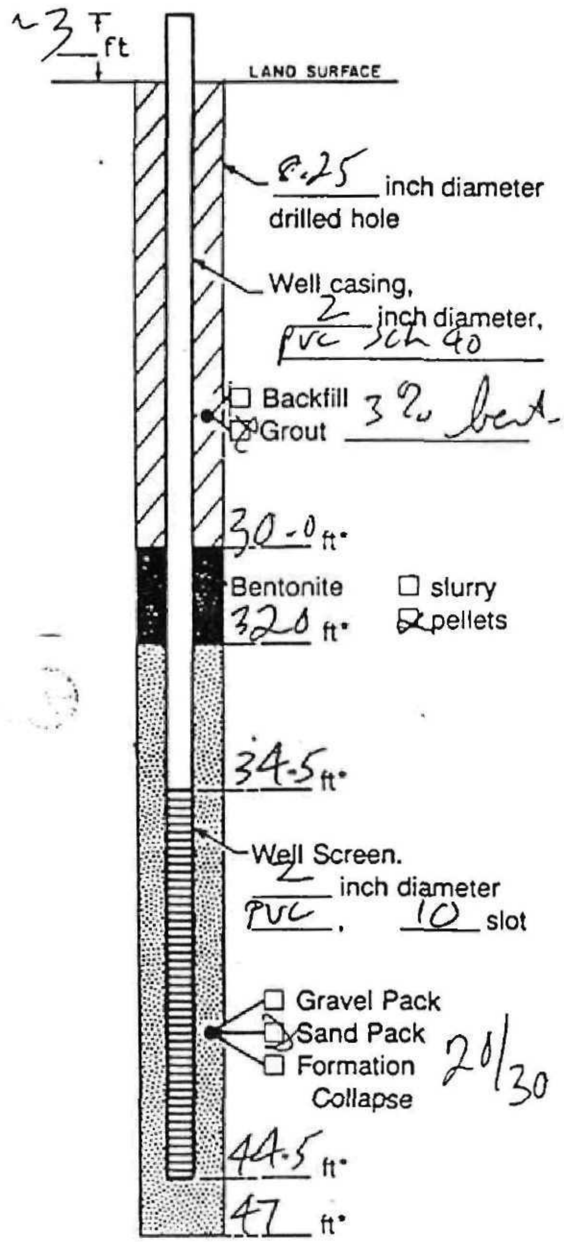
Drilling Contractor Miller Drilling Co. Driller Todd Helper Nike

Prepared By Ken Mehl Hammer Weight n/a Hammer Drop n/a inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery ~~(feet)~~ "	Time/Hydraulic Pressure or Blows per 6 inches	Sample/Core Description
0	4			Fill natural - Clay, sandy, silty,
				dark reddish brown; damp
4	6	24		Same to ~4.5' bls then clay, sandy,
				F.G., silty, reddish brown + tan
				mottling; small rock fragments; damp
9	11	24		Same as above - Hard lense @ 11' bls (chert)
14	16	24		Same as above - chert lense ~2"
				thick at 15.5' bls, dry, somewhat
				more pebbles in sample
19	21	14		Same as above
24	26	24		Same as above
~~3~~29	31	24		Same as above
34	36	24		Same as above
39	41	24		Same as above, darker; wet at
				bottom of spoon.
4/14/94				
41	47			Same as above; wet

GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION LOG



Measuring Point is Top of Well Casing Unless Otherwise Noted.

*Depth Below Land Surface

Project Monsanto. Well WEL-4

Town/City Anniston

County ______ State AL.

Permit No. ______

Land-Surface Elevation and Datum ______ feet ☐ surveyed ☐ estimated

Installation Dates(s) 4/14/94

Drilling Method Hollow-stem auger

Drilling Contractor Miller Drilling Co.

Drilling Fluid none

Development Techniques(s) and Date(s)
Bailer 4/15/94
Bailed dry.

Fluid Loss During Drilling none gallons

Water Removed During Development ~15 gallons

Static Depth to Water 41 feet below M.P.

Pumping Depth to Water 41-47 (went dry) feet below M.P.

Pumping Duration ~2.5 hours

Yield ______ gpm Date 4/15/94

Specific Capacity ______ gpm/ft

Well Purpose Monitor well

Remarks Did not find water till ~45' bls. Bailed dry, little or no sediment after completion of development.

Prepared by Ken Mitchell

1/86.

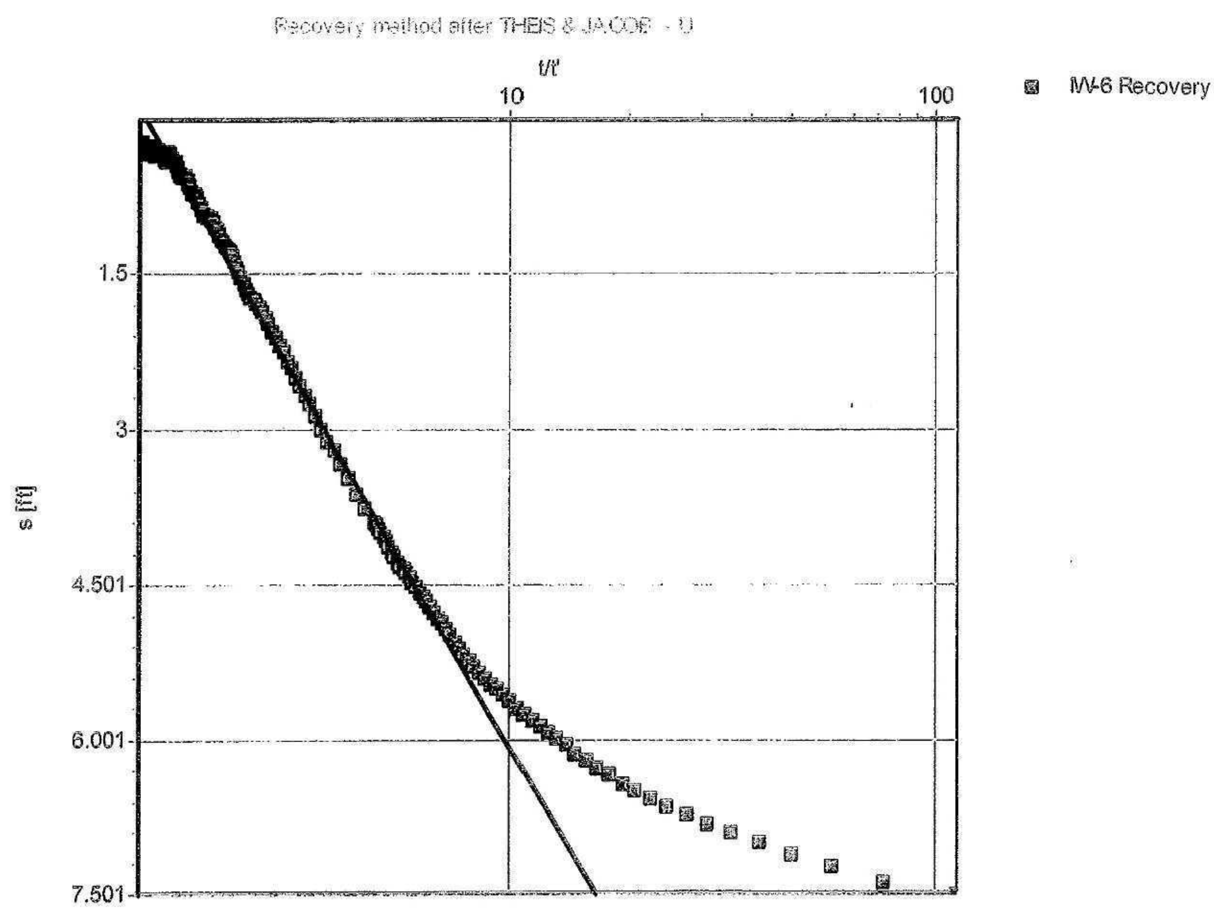
APPENDIX D

Aquifer Performance Test Results
(provided in electronic format on CD)

Golder Associates	Golder Associates Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341 Phone: (770) 496-1893	**Pumping test analysis** No: Project: Solutia/IW-6/IW-6 Recovery and uncorrect Client:

Location:	Pumping test: IW-6	Pumping well: Well name

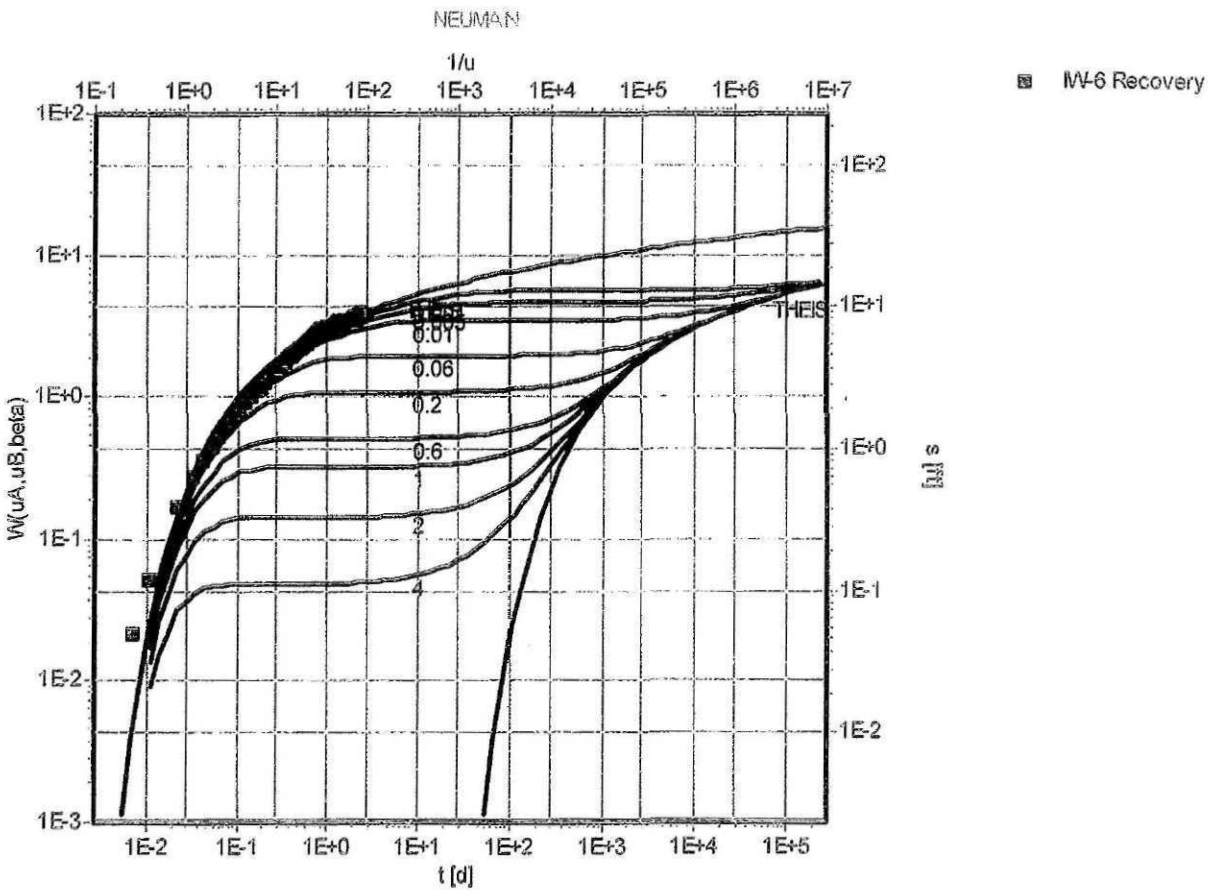
Test performed by:	Evaluated by: CDH
Test date: 6/1/01	Evaluation date: 6/1/01
Analysis method: THEIS Recovery	Aquifer thickness: 25 [ft] Discharge rate: 0.09218107 [U.S. gal/min]



Transmissivity: 4.66×10^-1 [ft²/d]

Conductivity: 1.86×10^-2 [ft/d]

Golder Associates Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341 Phone: (770) 496-1893	Pumping test analysis	
	No:	
	Project: Solutia/IW-6/IW-6 Recovery and uncorrect	
	Client:	
Location:	Pumping test: IW-6	Pumping well: Well name
Test performed by:	Evaluated by: CDH	
Test date: 6/1/01	Evaluation date: 6/1/01	
Analysis method: NEUMAN	Aquifer thickness: 25 [ft]	
	Discharge rate: 0.09218107 [U.S. gal/min]	



Transmissivity: 6.09×10^-1 [ft²/d]

Conductivity: 2.44×10^-2 [ft/d]

Storativity: 6.58×10^-2

Specific yield: 6.58×10^+2

Golder Associates

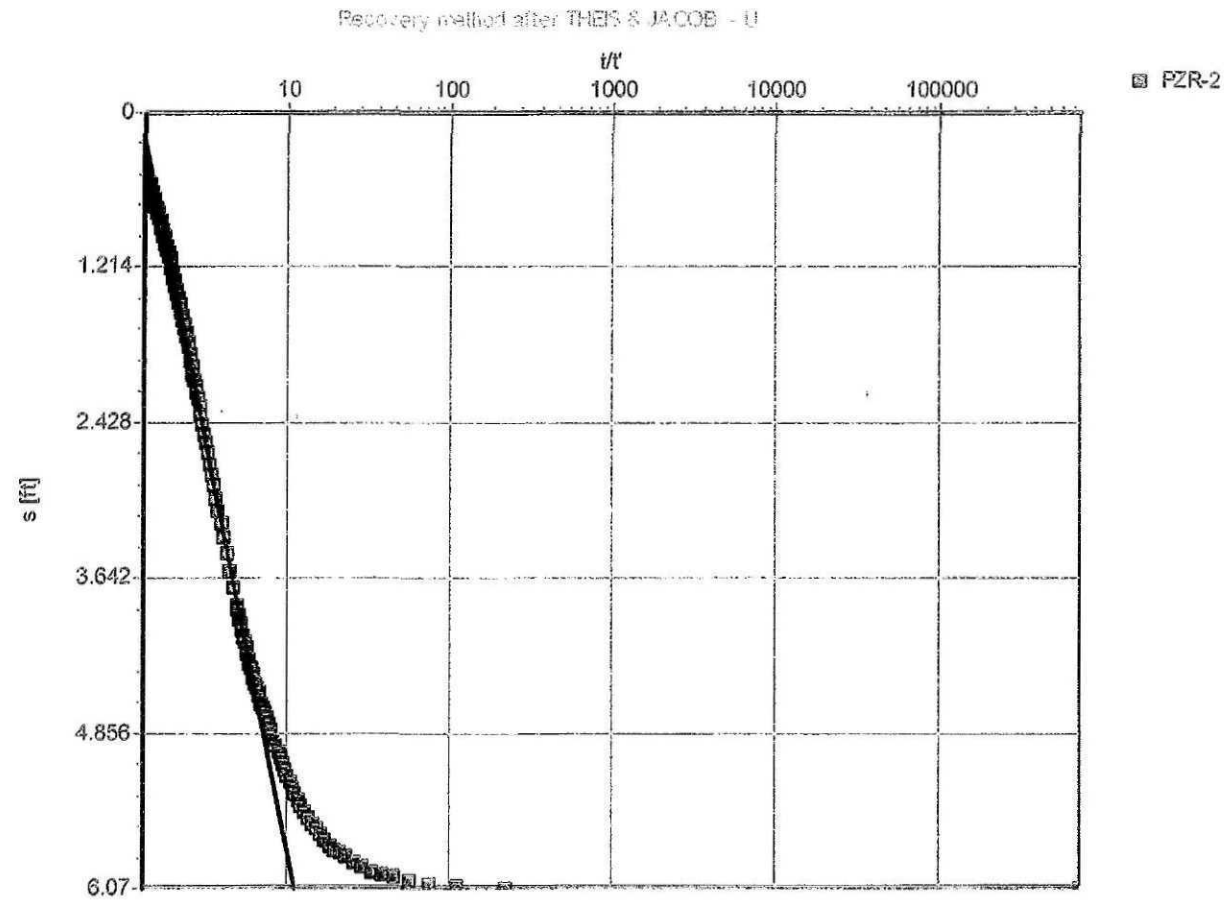
Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, GA 30341
Phone: (770) 496-1893

Pumping test analysis

No: 9433680043
Project: IW6/PZR2
Client: Solutia

Location: Anniston AL	Pumping test: IW-6	Pumping well: Well name

Test performed by:		Evaluated by:	CDH
Test date:	6/3/01	Evaluation date:	6/3/01
Analysis method:	THEIS Recovery	Aquifer thickness:	25 [ft]
		Discharge rate:	0.093004115 [U.S. gal/min]



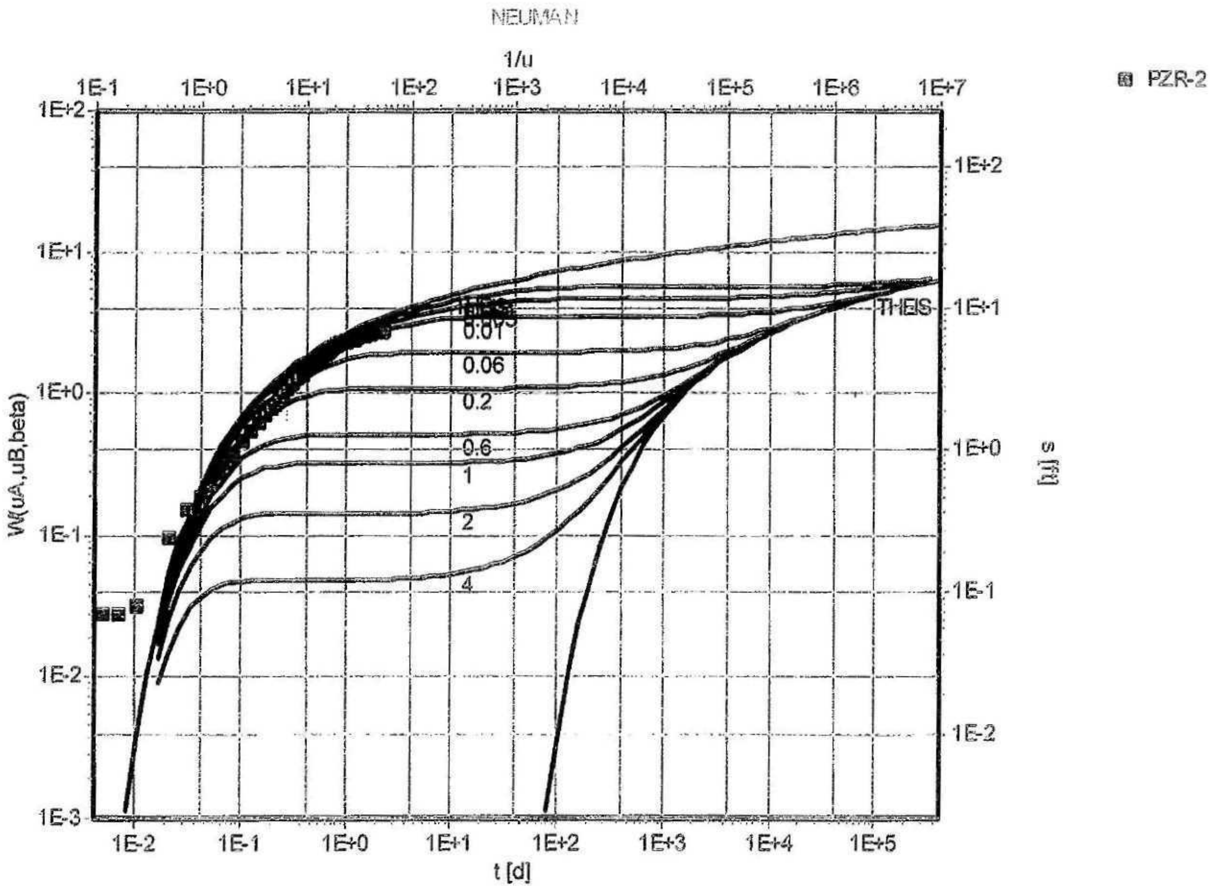
Transmissivity: 5.24×10^{-1} [ft²/d]

Conductivity: 2.09×10^{-2} [ft/d]

Golder Associates Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341 Phone: (770) 496-1893	Pumping test analysis No: 9433680043 Project: IW6/PZR2 Client: Solutia

Location: Anniston AL	Pumping test: IW-6	Pumping well: Well name

Test performed by: Test date: 6/3/01	Evaluated by: CDH Evaluation date: 6/3/01
Analysis method: NEUMAN	Aquifer thickness: 25 [ft] Discharge rate: 0.093004115 [U.S. gal/min]

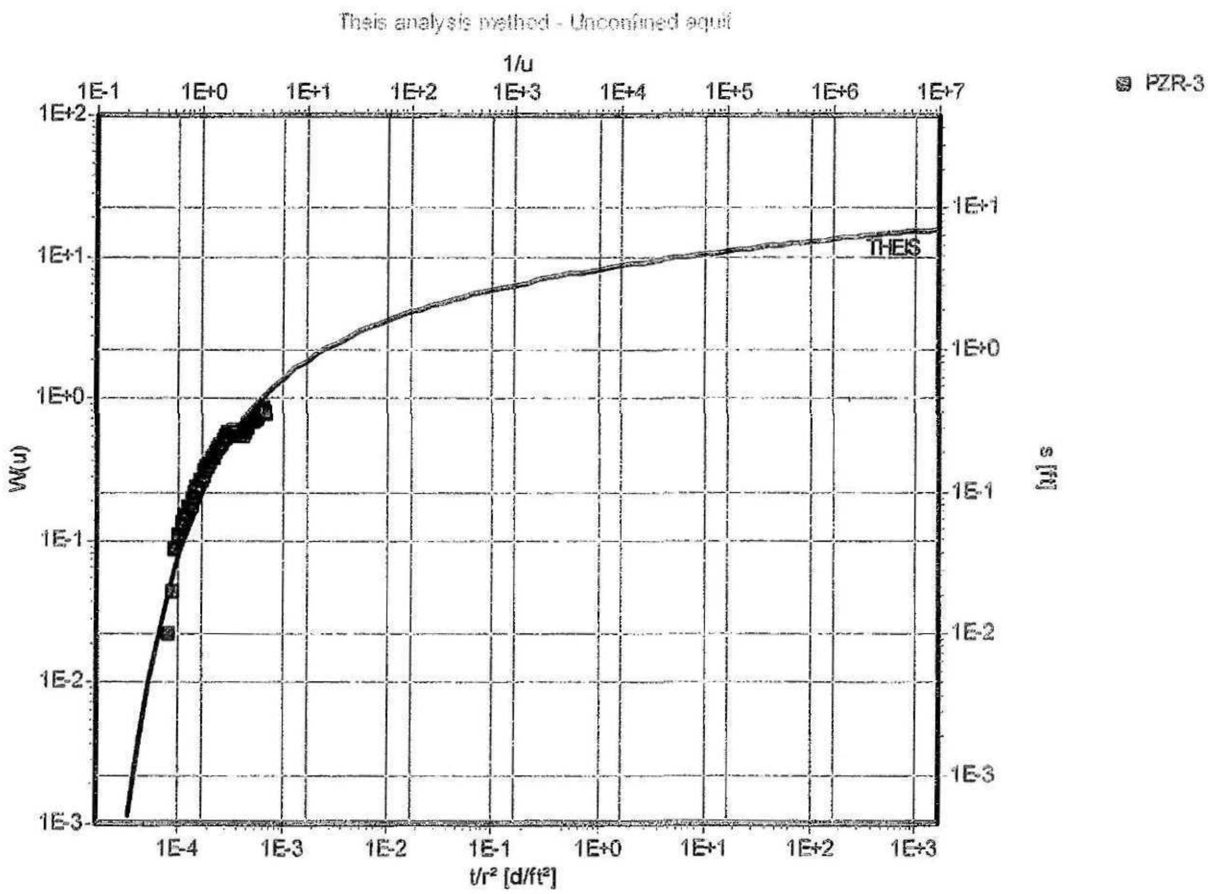


Transmissivity:	5.66×10^-1 [ft²/d]
Conductivity:	2.27×10^-2 [ft/d]
Storativity:	9.85×10^-4
Specific yield:	9.85×10^+0

Golder Associates	Golder Associates Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341 Phone: (770) 496-1893	**Pumping test analysis** No: 9433680 Project: IW-6PZR-3 Client: Solutia

Location: Anniston AL	Pumping test: IW-6	Pumping well: IW-6

Test performed by: GOLDER	Evaluated by: CDH
Test date: 7/19/01	Evaluation date: 7/19/01
Analysis method: THEIS	Aquifer thickness: 25 [ft]
	Discharge rate: 0.4 [U.S. gal/min]



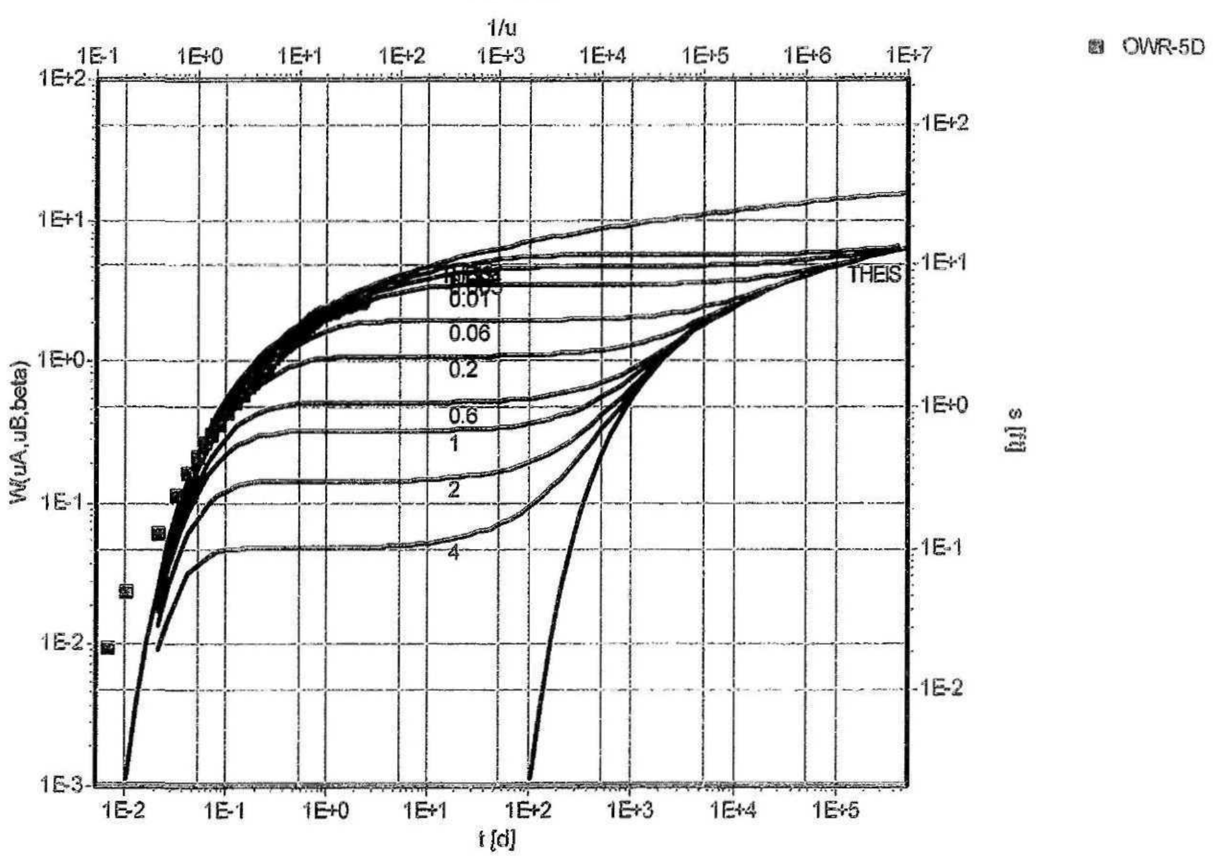
Transmissivity: 1.35×10^+1 [ft²/d]

Conductivity: 5.39×10^-1 [ft/d]

Golder Associates Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341 Phone: (770) 496-1893	Pumping test analysis No: 9433680043 Project: IW6/OWR5D Recovery Client: Solutia

Location: Anniston AL	Pumping test: IW-6	Pumping well: Well name

Test performed by:	Evaluated by: CDH
Test date: 6/3/01	Evaluation date: 6/3/01
Analysis method: NEUMAN	Aquifer thickness: 25 [ft]
	Discharge rate: 0.093004115 [U.S. gal/min]



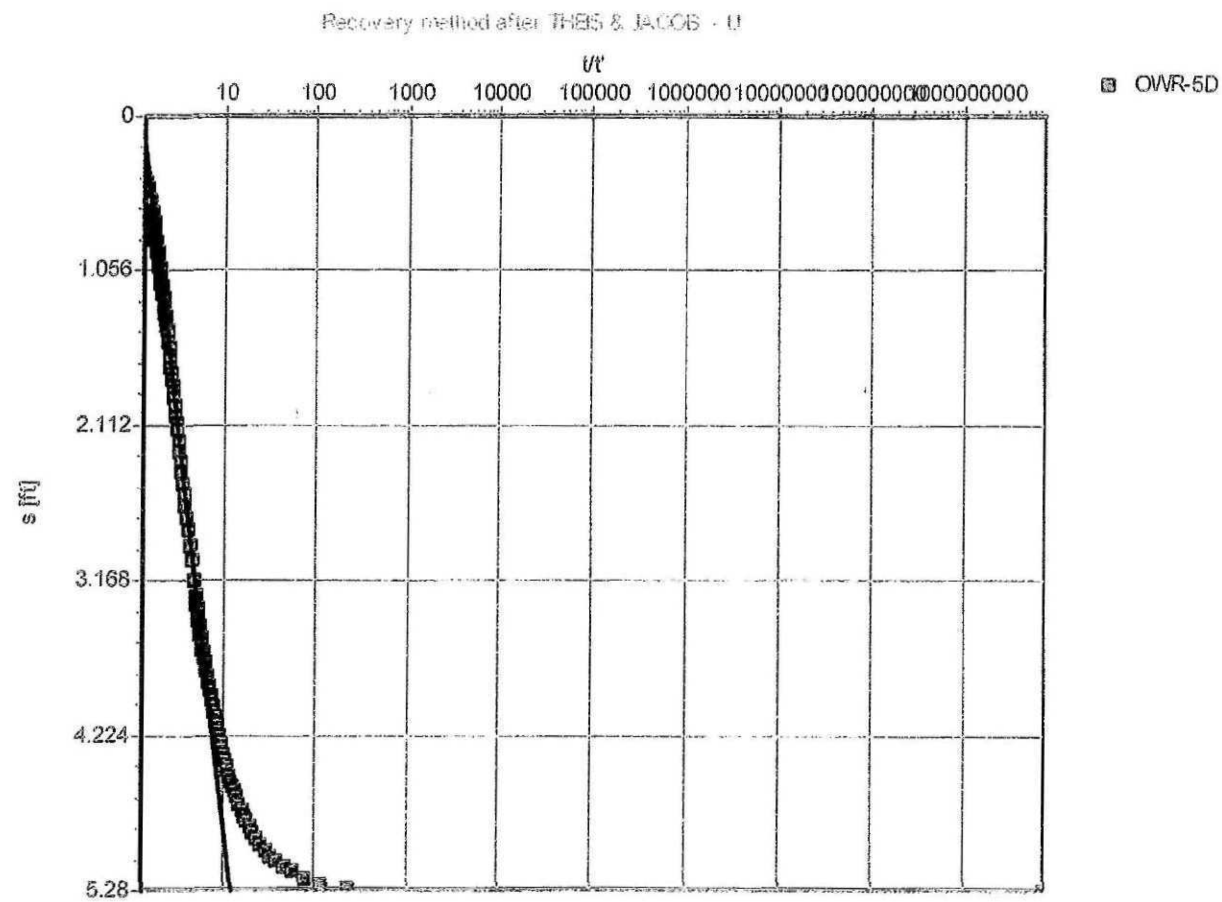
Transmissivity:	6.76×10^-1 [ft²/d]
Conductivity:	2.70×10^-2 [ft/d]
Storativity:	1.70×10^-4
Specific yield:	1.70×10^+0

Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, GA 30341
Phone: (770) 496-1893

Pumping test analysis	
No:	9433680043
Project:	IW6/OWR5D Recovery
Client:	Solutia

Location: Anniston AL	Pumping test: IW-6	Pumping well: Well name

Test performed by:		Evaluated by:	CDH
Test date:	6/3/01	Evaluation date:	6/3/01
Analysis method:	THEIS Recovery	Aquifer thickness:	25 [ft]
		Discharge rate:	0.093004115 [U.S. gal/min]



Transmissivity: 6.25×10^-1 [ft²/d]

Conductivity: 2.50×10^-2 [ft/d]

Golder Associates

Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, GA 30341
Phone: (770) 496-1893

Pumping test analysis

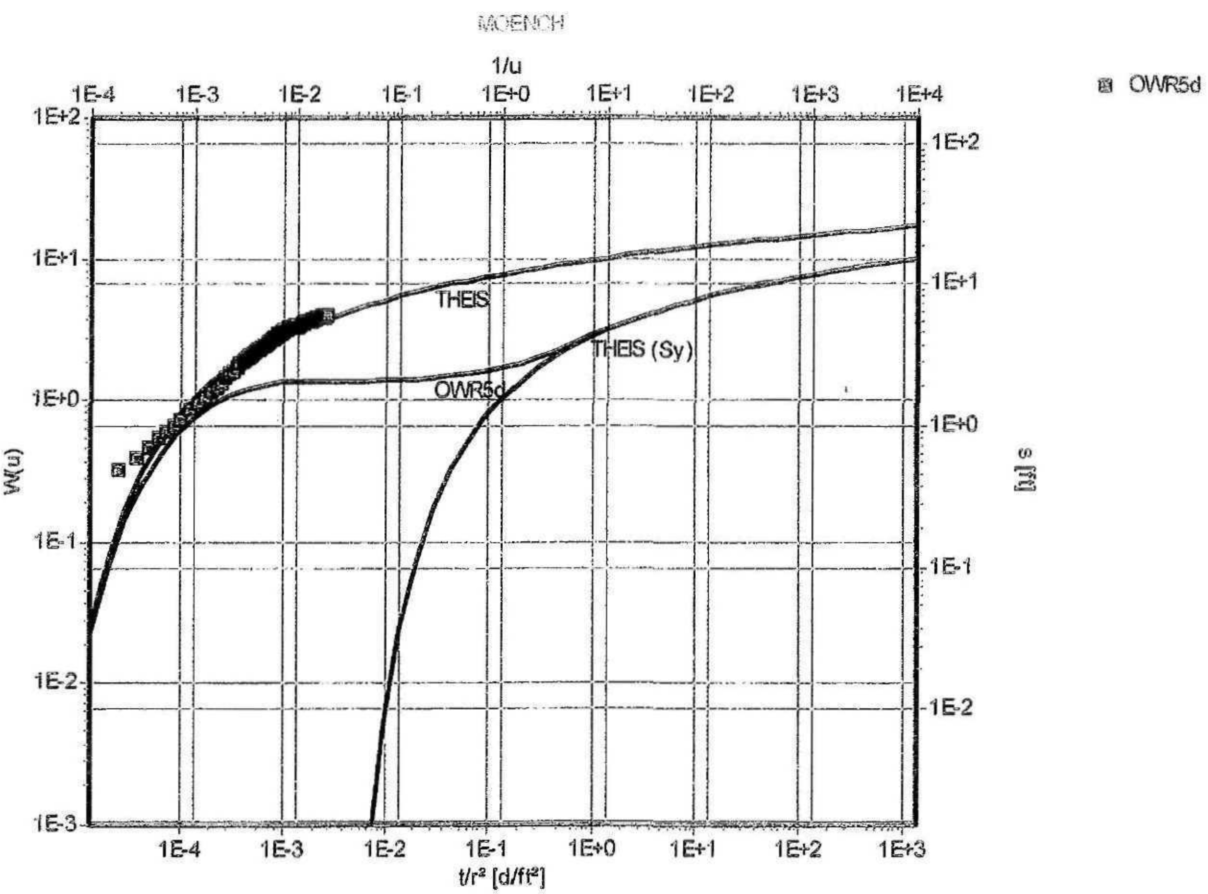
No: 9433680

Project: IW6-OWR5DMOENCH

Client: Solutia

Location: Anniston AL	Pumping test: IW-6	Pumping well: IW-6

Test performed by: Golder	Evaluated by: CDH
Test date: 7/18/01	Evaluation date: 7/18/01
Analysis method: MOENCH	Aquifer thickness: 25 [ft]
	Discharge rate: 0.4 [U.S. gal/min]

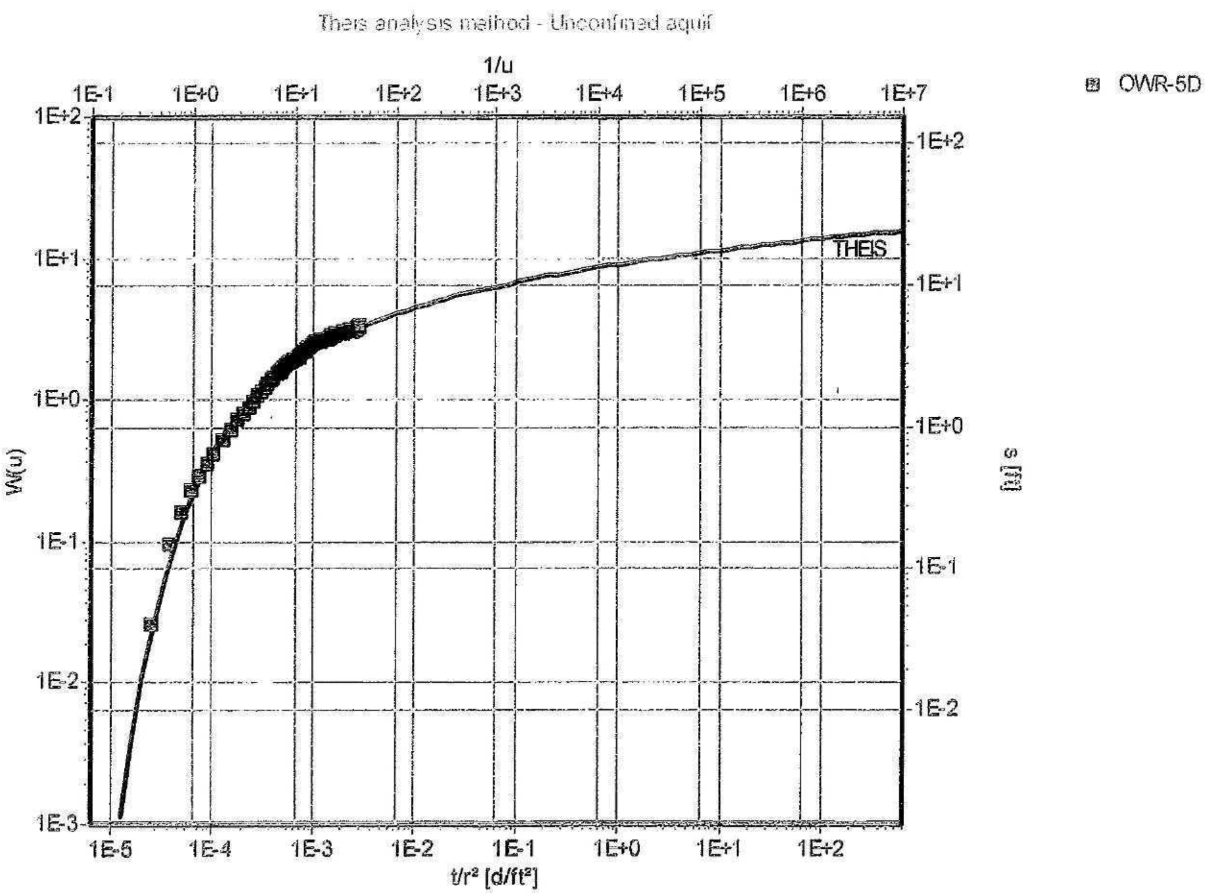


Transmissivity:	4.05×10^+0 [ft²/d]
Conductivity:	1.62×10^-1 [ft/d]
Storativity:	5.59×10^-1
Conductivity vertical:	1.62×10^-2 [ft/d]

Golder Associates Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341 Phone: (770) 496-1893	**Pumping test analysis**
	No: 9433680043
	Project: Solutia/IW-6 and OWR5D
	Client: Solutia

Location: Anniston AL	Pumping test: IW-6	Pumping well: IW-6

Test performed by:	Evaluated by: CDH
Test date: 5/31/01	Evaluation date: 5/31/01
Analysis method: THEIS	Aquifer thickness: 25 [ft]
	Discharge rate: 0.4 [U.S. gal/min]



Transmissivity: 3.95×10^+0 [ft²/d]

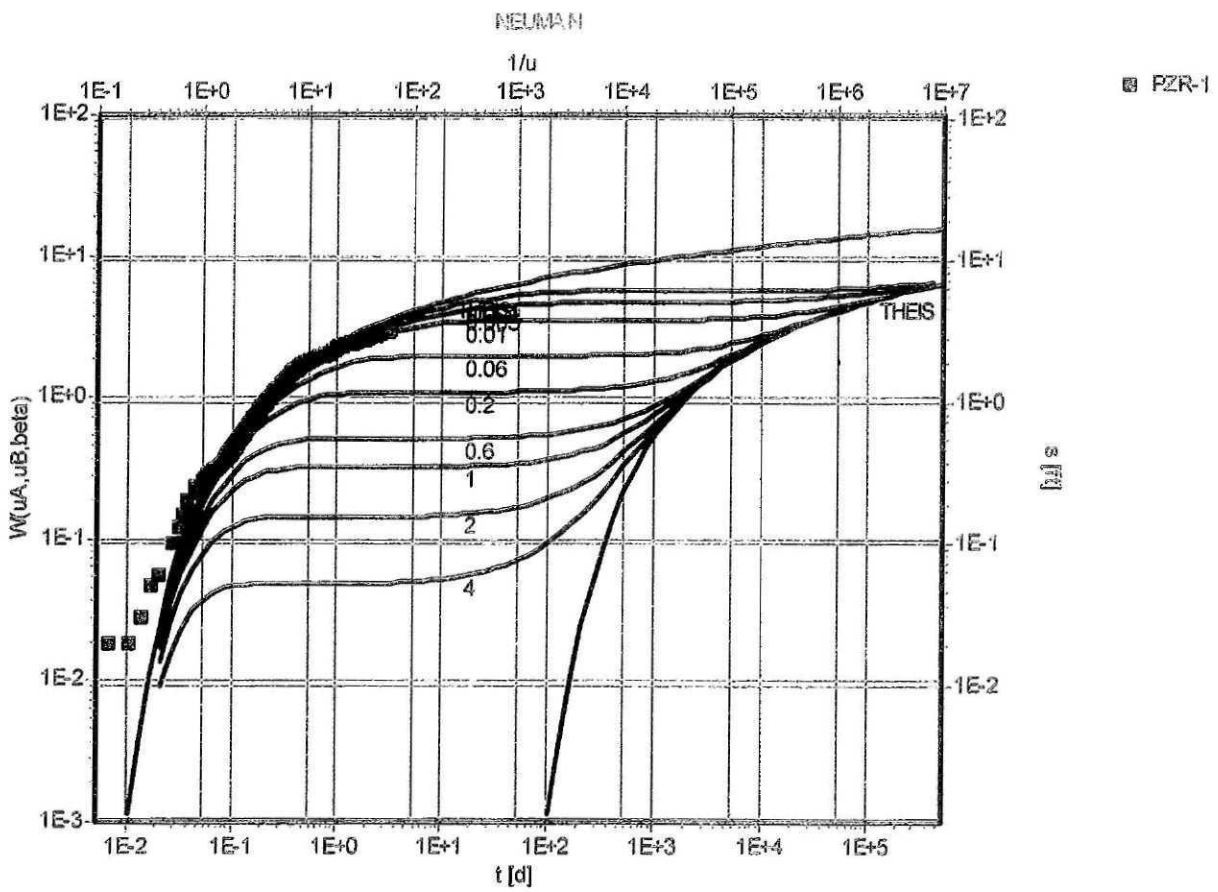
Conductivity: 1.58×10^-1 [ft/d]

Corrected using Jacob (1944)

Golder Associates Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341 Phone: (770) 496-1893	**Pumping test analysis**
	No: 9433680
	Project: IW-11/PZR-1
	Client: Solutia

Location: Anniston AL	Pumping test: IW-11	Pumping well: IW-11

Test performed by:		Evaluated by:	CDH
Test date:	7/19/01	Evaluation date:	7/19/01
Analysis method:	NEUMAN	Aquifer thickness:	25 [ft]
		Discharge rate:	0.4 [U.S. gal/min]

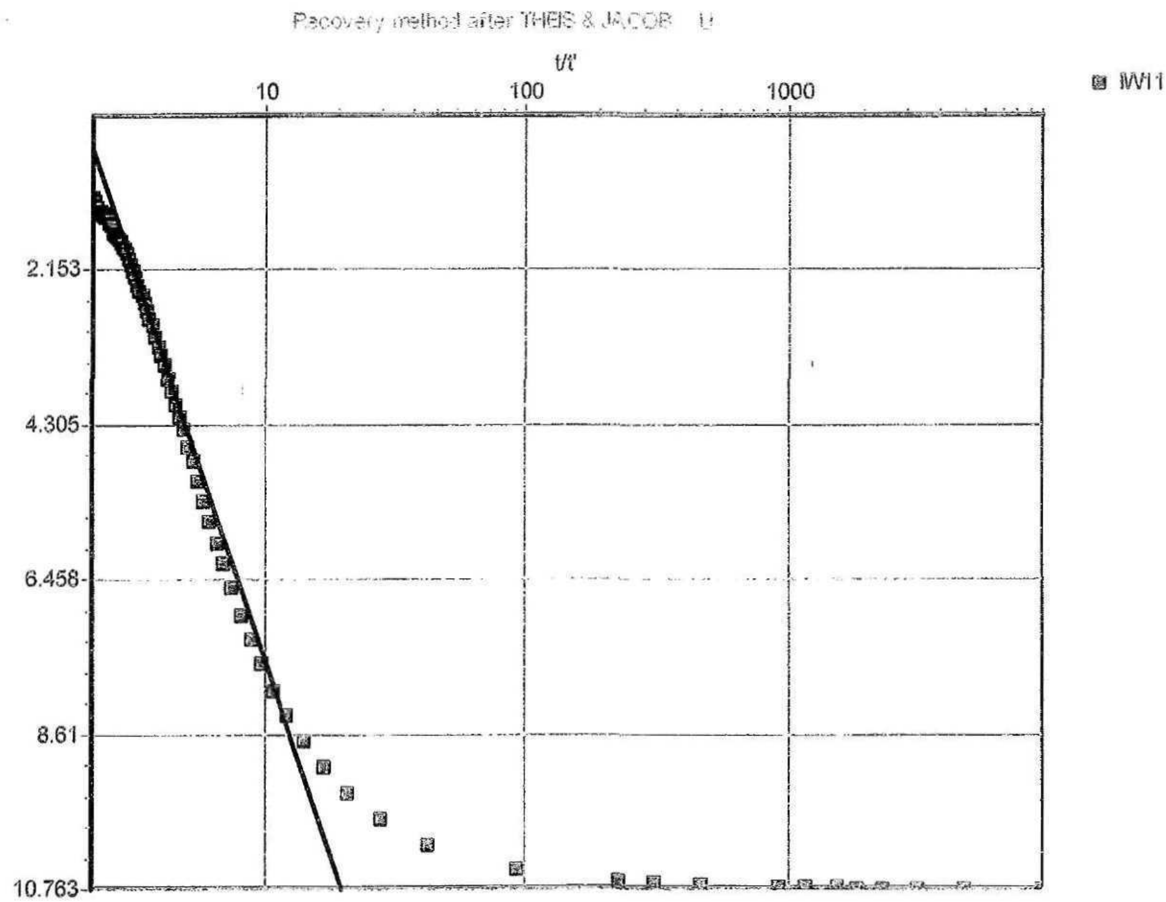


Transmissivity:	5.67×10^+0 [ft²/d]
Conductivity:	2.27×10^-1 [ft/d]
Storativity:	2.13×10^-2
Specific yield:	2.13×10^+2

Golder Associates Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341 Phone: (770) 496-1893	**Pumping test analysis** No: 9433680043 Project: Solutia IW-11/IW-11 Client: Solutia

Location: Anniston AL	Pumping test: IW-11 Recovery	Pumping well: Iw-

Test performed by:	Evaluated by: CDH
Test date: 5/31/01	Evaluation date: 5/31/01
Analysis method: THEIS Recovery	Aquifer thickness: 25 [ft] Discharge rate: 0.21455387 [U.S. gal/min]



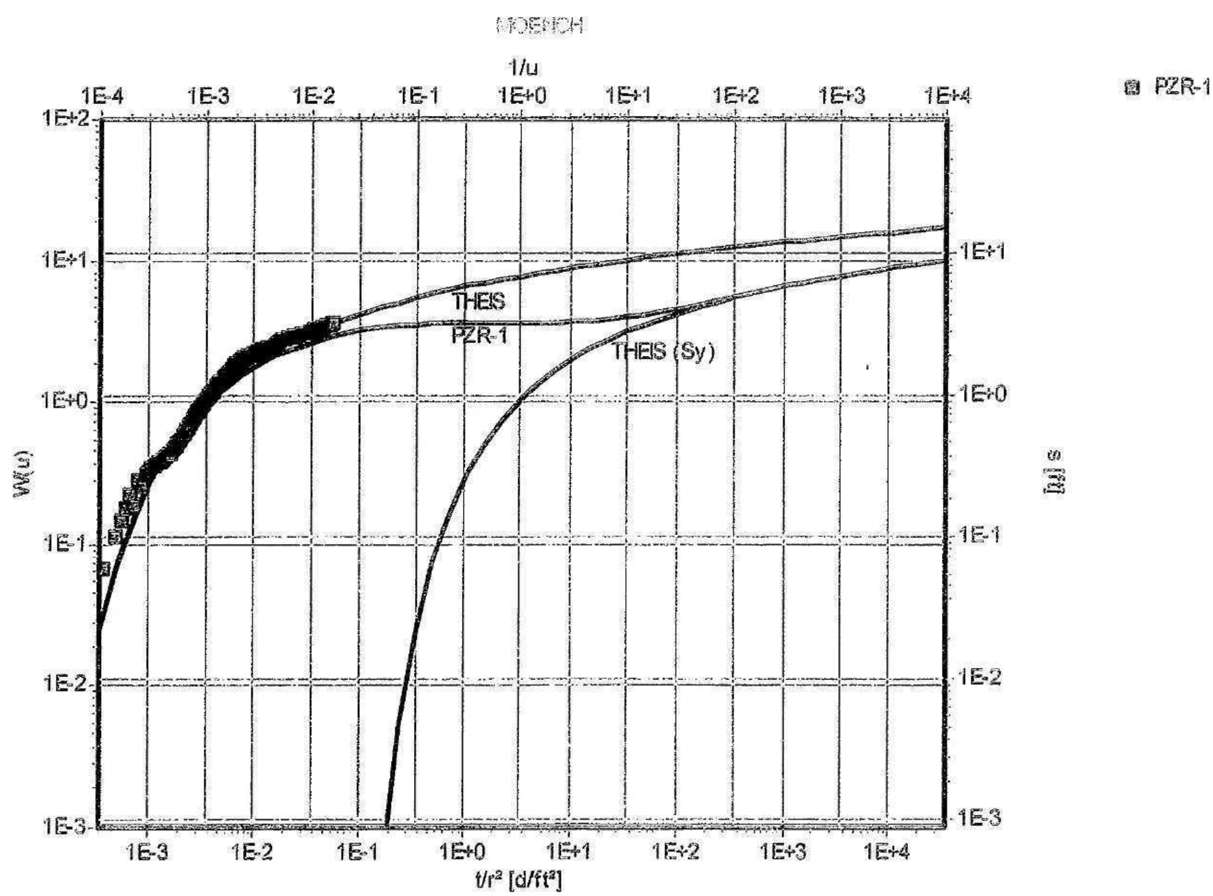
Transmissivity: 7.04×10^-1 [ft³/d]

Conductivity: 2.82×10^-2 [ft/d]

Golder Associates Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341 Phone: (770) 496-1893	Pumping test analysis No: 9433680 Project: IW-11PZR-1Moench Client: Solutia

Location: Anniston AL	Pumping test: IW-11	Pumping well: IW-11

Test performed by:	Evaluated by: CDH
Test date: 7/18/01	Evaluation date: 7/18/01
Analysis method: MOENCH	Aquifer thickness: 25 [ft]
	Discharge rate: 0.4 [U.S. gal/min]



Transmissivity: 6.88×10^+0 [ft²/d]

Conductivity: 2.75×10^-1 [ft/d]

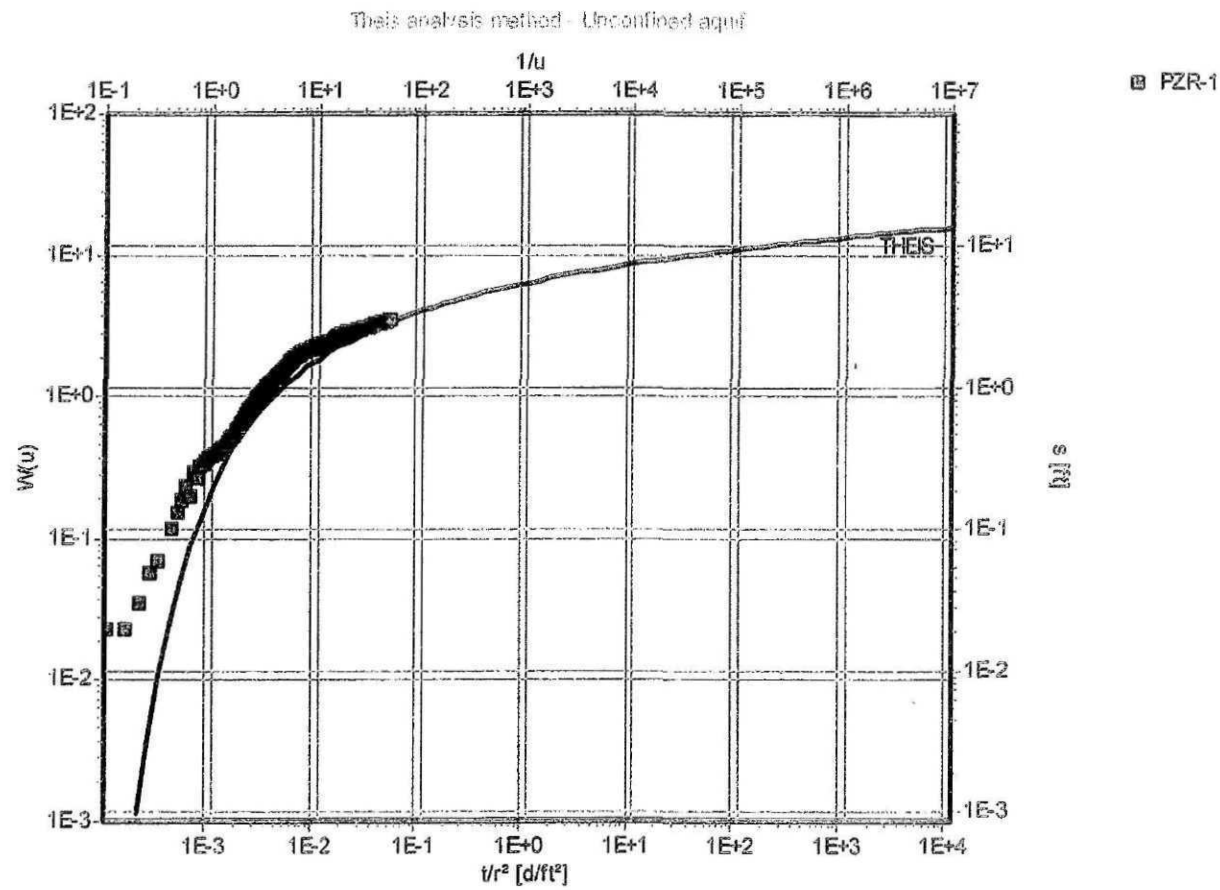
Storativity: 2.38×10^+1

Conductivity vertical: 2.75×10^-2 [ft/d]

Golder Associates	Golder Associates Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341 Phone: (770) 496-1893	Pumping test analysis No: 9433680 Project: IW-11/PZR-1 Client: Solutia

Location: Anniston AL	Pumping test: IW-11	Pumping well: IW-11

Test performed by:	Evaluated by: CDH
Test date: 7/19/01	Evaluation date: 7/19/01
Analysis method: THEIS	Aquifer thickness: 25 [ft]
	Discharge rate: 0.4 [U.S. gal/min]

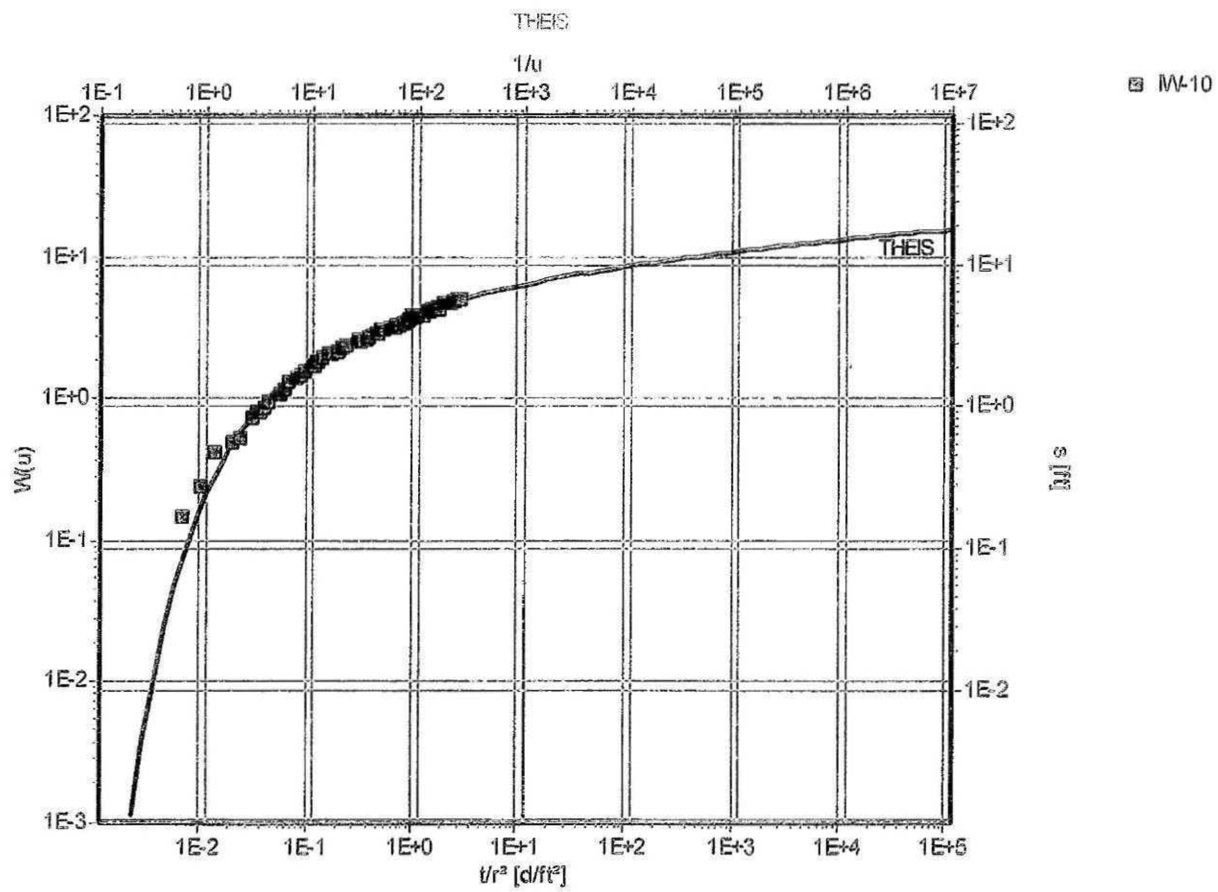


Transmissivity: 7.11×10^+0 [ft²/d]

Conductivity: 2.84×10^-1 [ft/d]

Golder Associates Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341 Phone: (770) 496-1893	**Pumping test analysis**	
	No:	9433680043
	Project:	Solutia IW10 original theis
	Client:	Solutia

Location:	Pumping test: IW-10	Pumping well: Inline
Test performed by:	Evaluated by:	CDH
Test date: 5/31/01	Evaluation date:	6/3/01
Analysis method: THEIS	Aquifer thickness:	25 [ft]
	Discharge rate:	0.4 [U.S. gal/min]

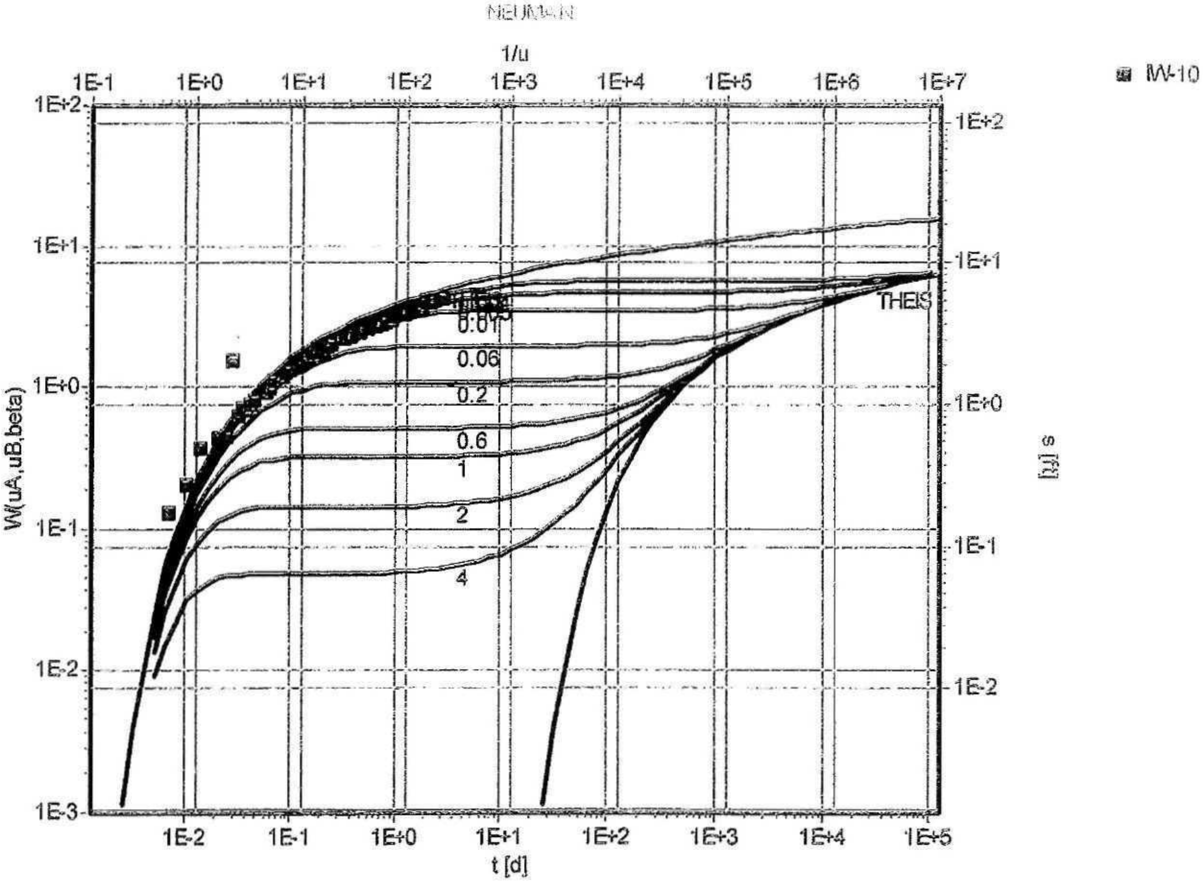


Transmissivity:	5.36×10^+0 [ft²/d]
Conductivity:	2.14×10^-1 [ft/d]
Storativity:	2.53×10^-1

Golder Associates	Golder Associates Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341 Phone: (770) 496-1893	**Pumping test analysis** No: 9433680043 Project: Solutia IW-10- IW-10 Client: Solutia

Location: Anniston AL	Pumping test: IW-10	Pumping well: IW-10

Test performed by: Test date: 5/31/01	Evaluated by: CDH Evaluation date: 5/31/01
Analysis method: NEUMAN	Aquifer thickness: 25 [ft] Discharge rate: 0.14305093 [U.S. gal/min]



Transmissivity:	1.65×10^+0 [ft²/d]
Conductivity:	6.58×10^-2 [ft/d]
Storativity:	8.55×10^-2
Specific yield:	8.55×10^+2

Golder Associates

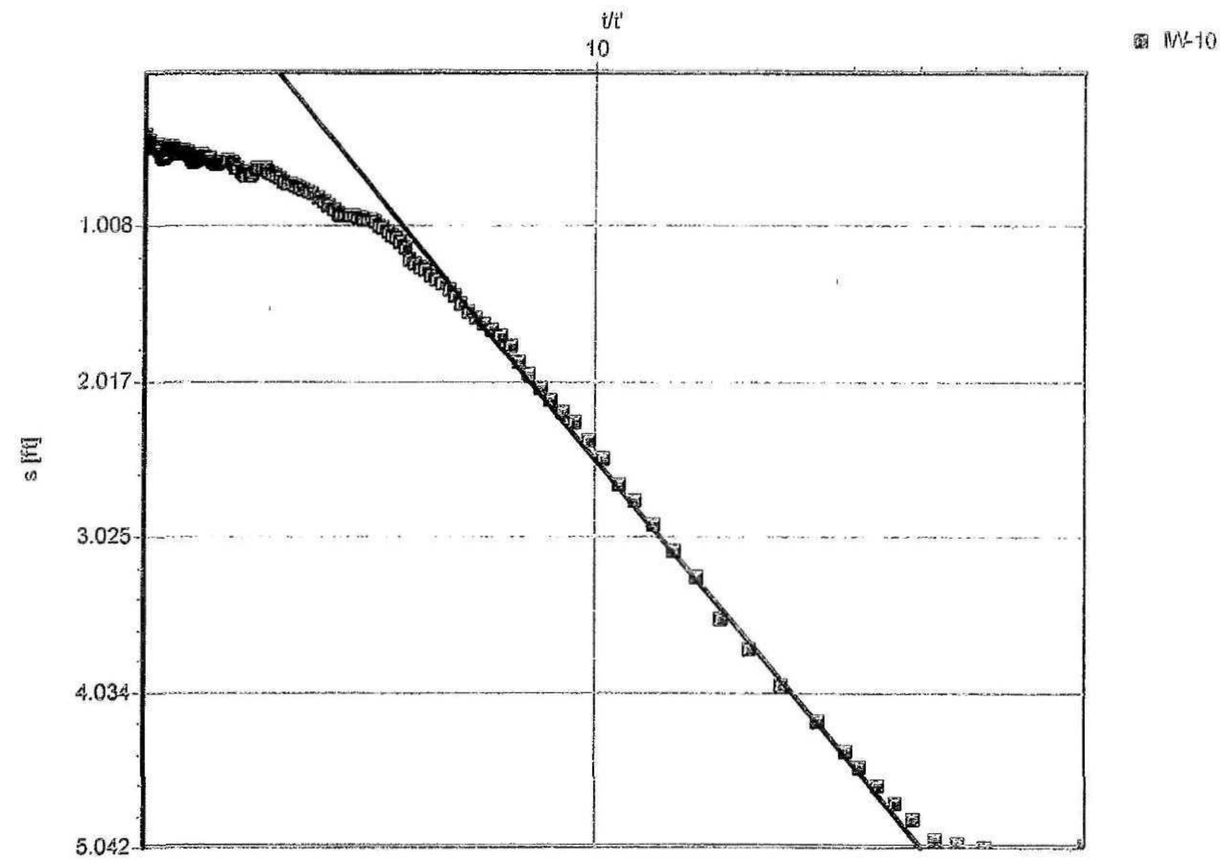
Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, GA 30341
Phone: (770) 496-1893

Pumping test analysis

No:	9433680043
Project:	Solutia IW-10- IW-10
Client:	Solutia

Location: Anniston AL	Pumping test: IW-10	Pumping well: IW-10

Test performed by:		Evaluated by:	CDH
Test date:	5/31/01	Evaluation date:	5/31/01
Analysis method:	THEIS Recovery	Aquifer thickness:	25 [ft]
		Discharge rate:	0.14305093 [U.S. gal/min]



Transmissivity:	1.14×10^+0 [ft²/d]
Conductivity:	4.57×10^-2 [ft/d]

Golder Associates

Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, GA 30341
Phone: (770) 496-1893

Pumping test analysis

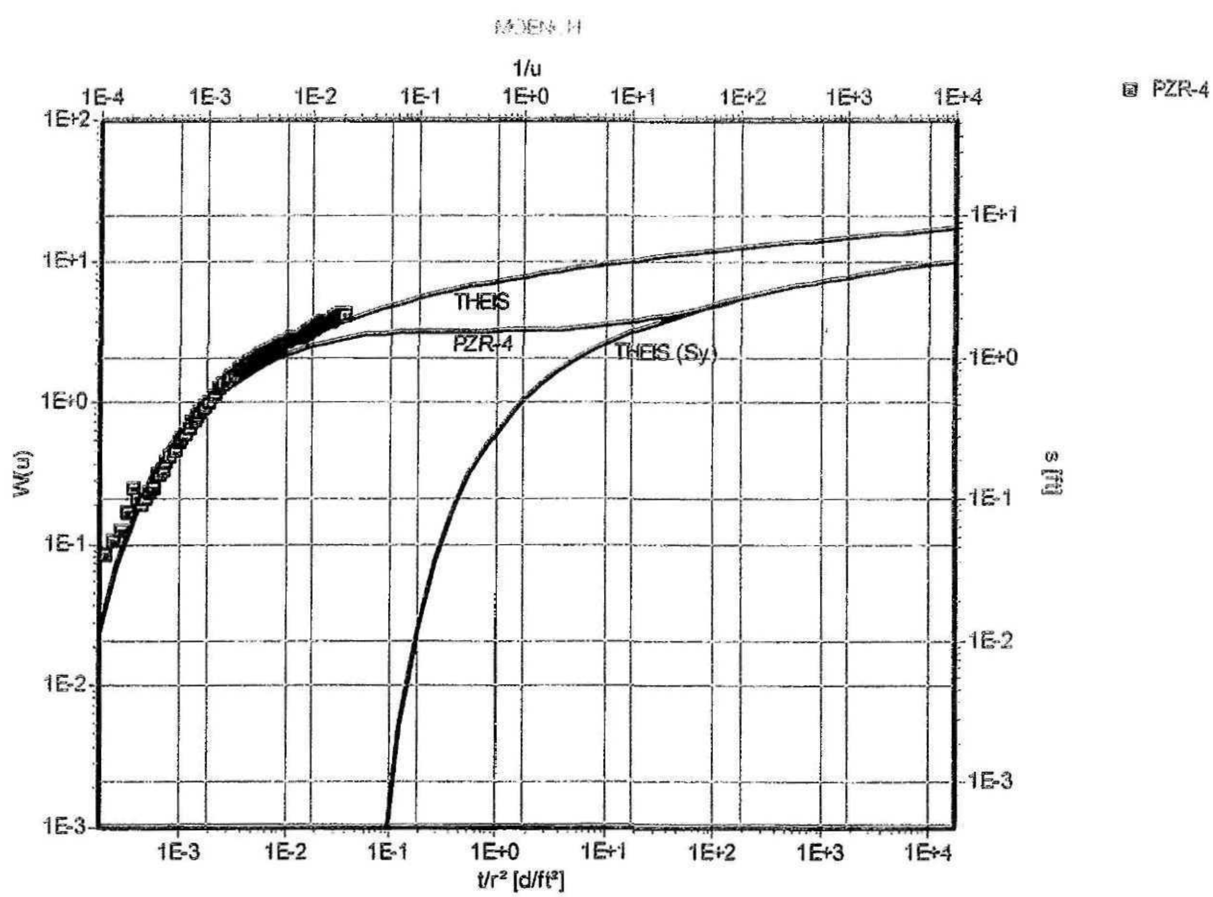
No: 9433680

Project: IW-10PZR-4 Moench

Client: Solutia

Location: Anniston	Pumping test: IW-10	Pumping well: IW-10

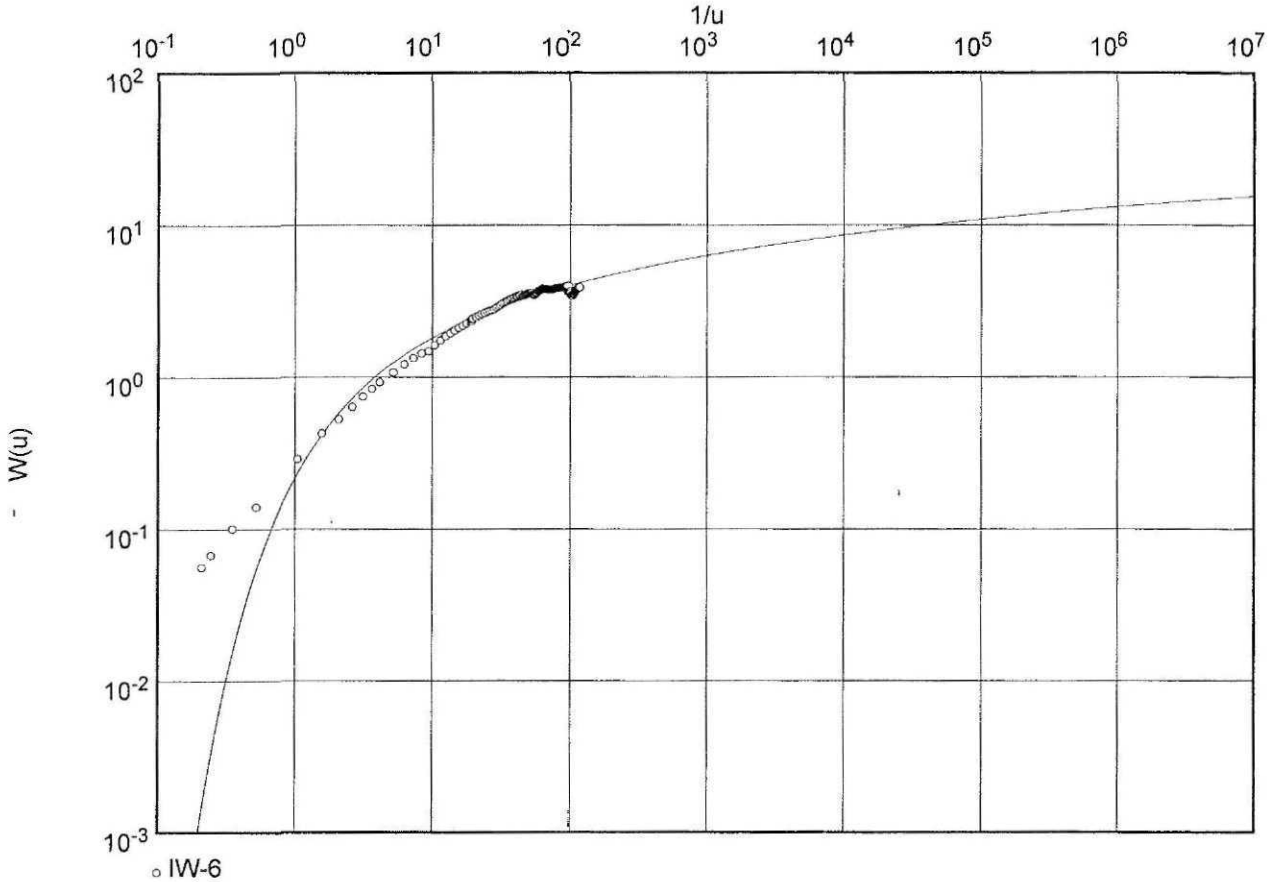
Test performed by:	Golder	Evaluated by:	CDH
Test date:	7/18/01	Evaluation date:	7/19/01
Analysis method:	MOENCH	Aquifer thickness:	25 [ft]
		Discharge rate:	0.4 [U.S. gal/min]



Transmissivity:	1.28×10^+1 [ft²/d]
Conductivity:	5.12×10^-1 [ft/d]
Storativity:	2.28×10^+1
Conductivity vertical:	5.12×10^-2 [ft/d]

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-26-98 | Page 1 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 9-9-98
IW-6	
Discharge 0.40 U.S.gal/min	



Transmissivity [ft²/d]: 3.44×10^{0}

Hydraulic conductivity [ft/d]: 1.37×10^{-1}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-26-98 | Page 3 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 9-9-98
IW-6	IW-6
Discharge 0.40 U.S.gal/min	Distance from the pumping well 1.00 ft

Static water level: 36.67 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.00417	36.77	0.10	0.10
3	0.00486	36.79	0.12	0.12
4	0.00694	36.85	0.18	0.18
5	0.01042	36.92	0.25	0.25
6	0.02083	37.19	0.52	0.51
7	0.03125	37.44	0.77	0.76
8	0.04167	37.63	0.96	0.94
9	0.05208	37.83	1.16	1.13
10	0.06250	38.03	1.36	1.32
11	0.07292	38.21	1.54	1.49
12	0.08333	38.38	1.71	1.65
13	0.10417	38.67	2.00	1.92
14	0.12500	38.93	2.26	2.16
15	0.14583	39.16	2.49	2.37
16	0.16667	39.36	2.69	2.55
17	0.18750	39.46	2.79	2.63
18	0.20833	39.75	3.08	2.89
19	0.22917	40.00	3.33	3.11
20	0.25000	40.23	3.56	3.31
21	0.27083	40.42	3.75	3.47
22	0.29167	40.60	3.93	3.62
23	0.31250	40.77	4.10	3.76
24	0.33333	40.92	4.25	3.89
25	0.35417	41.07	4.40	4.01
26	0.37500	41.23	4.56	4.14
27	0.38507	41.24	4.57	4.15
28	0.38519	41.25	4.58	4.16
29	0.38530	41.25	4.58	4.16
30	0.38542	41.25	4.58	4.16
31	0.38611	41.24	4.57	4.15
32	0.38681	41.40	4.73	4.28
33	0.38750	41.40	4.73	4.28
34	0.39583	41.46	4.79	4.33
35	0.41667	41.58	4.91	4.43
36	0.43750	41.70	5.03	4.52
37	0.45833	41.84	5.17	4.64
38	0.47917	41.95	5.28	4.72
39	0.50000	42.04	5.37	4.79
40	0.52083	42.11	5.44	4.85
41	0.54167	42.18	5.51	4.90
42	0.56250	42.27	5.60	4.97
43	0.58333	42.42	5.75	5.09
44	0.60417	42.57	5.90	5.20
45	0.62500	42.69	6.02	5.30
46	0.64583	42.87	6.20	5.43
47	0.66667	42.99	6.32	5.52
48	0.68750	43.09	6.42	5.60
49	0.70833	43.19	6.52	5.67
50	0.72917	43.29	6.62	5.74

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, GA 30341
ph.(770)496-1893

Pumping test analysis
Theis analysis method
Unconfined aquifer

Project: Solutia/RFI/AL

Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 9-9-98
IW-6	IW-6
Discharge 0.40 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 36.67 ft below datum	

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	0.75000	43.41	6.74	5.83
52	0.77083	43.48	6.81	5.88
53	0.79167	43.59	6.92	5.96
54	0.81250	43.69	7.02	6.03
55	0.83333	43.76	7.09	6.08
56	0.85417	43.84	7.17	6.14
57	0.87500	43.88	7.21	6.17
58	0.89583	43.96	7.29	6.23
59	0.91667	43.79	7.12	6.11
60	0.93750	43.89	7.22	6.18
61	0.95833	43.95	7.28	6.22
62	0.97917	44.03	7.36	6.28
63	1.00000	44.05	7.38	6.29
64	1.02083	44.10	7.43	6.33
65	1.04167	44.13	7.46	6.35
66	1.06250	44.15	7.48	6.36
67	1.08333	43.97	7.30	6.23
68	1.10417	43.86	7.19	6.16
69	1.12500	43.93	7.26	6.21
70	1.14583	44.07	7.40	6.30
71	1.16667	44.22	7.55	6.41
72	1.18750	44.37	7.70	6.51
73	1.20833	44.47	7.80	6.58
74	1.22917	44.55	7.88	6.64
75	1.25000	44.65	7.98	6.71
76	1.27083	44.78	8.11	6.79
77	1.29167	44.75	8.08	6.77
78	1.31250	44.73	8.06	6.76
79	1.33333	44.71	8.04	6.75
80	1.35417	44.71	8.04	6.75
81	1.37500	44.69	8.02	6.73
82	1.39583	44.66	7.99	6.71
83	1.41667	44.66	7.99	6.71
84	1.43750	44.64	7.97	6.70
85	1.45833	44.62	7.95	6.69
86	1.47917	44.64	7.97	6.70
87	1.50000	44.69	8.02	6.73
88	1.52083	44.74	8.07	6.77
89	1.54167	44.78	8.11	6.79
90	1.56250	44.80	8.13	6.81
91	1.58333	44.83	8.16	6.83
92	1.60417	44.84	8.17	6.84
93	1.62500	44.85	8.18	6.84
94	1.64583	44.87	8.20	6.86
95	1.66667	44.88	8.21	6.86
96	1.68750	44.89	8.22	6.87
97	1.70833	44.90	8.23	6.88
98	1.72917	44.91	8.24	6.88
99	1.75000	44.93	8.26	6.90
100	1.77083	44.94	8.27	6.90

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-26-98	Page 5
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 9-9-98
IW-6	IW-6
Discharge 0.40 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 36.67 ft below datum	

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
101	1.79167	44.95	8.28	6.91
102	1.81250	44.96	8.29	6.92
103	1.83333	44.99	8.32	6.94
104	1.85417	45.08	8.41	7.00
105	1.87500	45.13	8.46	7.03
106	1.89583	45.22	8.55	7.09
107	1.91667	45.22	8.55	7.09
108	1.93750	45.22	8.55	7.09
109	1.95660	44.19	7.52	6.39
110	1.95694	44.17	7.50	6.38
111	1.95729	44.22	7.55	6.41
112	1.97917	44.33	7.66	6.49
113	2.00000	44.12	7.45	6.34
114	2.02083	43.81	7.14	6.12
115	2.04167	43.80	7.13	6.11
116	2.06250	43.77	7.10	6.09
117	2.08333	43.97	7.30	6.23
118	2.10417	44.05	7.38	6.29
119	2.12500	44.09	7.42	6.32
120	2.14583	44.24	7.57	6.42
121	2.16667	44.41	7.74	6.54
122	2.18750	44.54	7.87	6.63
123	2.20833	44.64	7.97	6.70
124	2.22917	44.72	8.05	6.75
125	2.25000	44.80	8.13	6.81
126	2.27083	44.82	8.15	6.82
127	2.29167	44.89	8.22	6.87
128	2.31250	44.92	8.25	6.89
129	2.33333	44.97	8.30	6.92

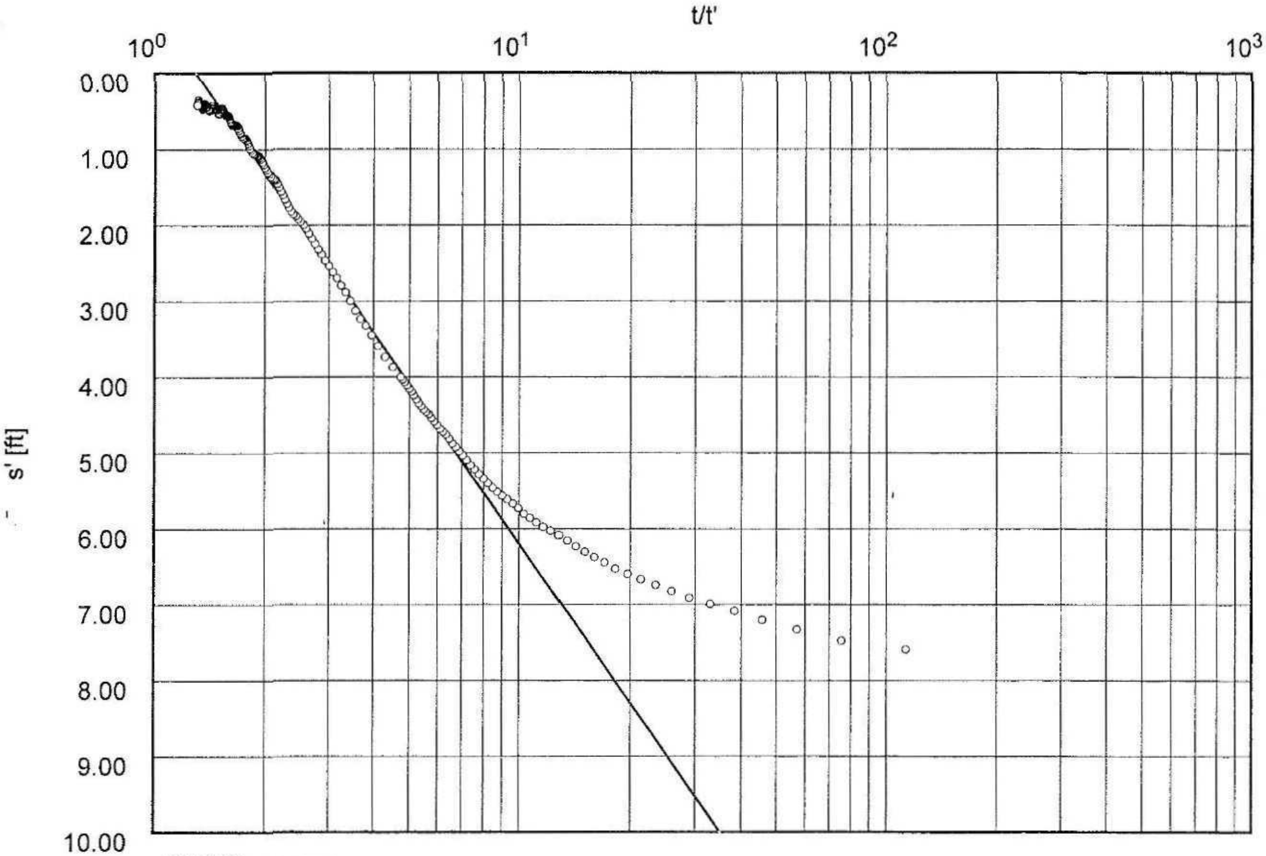
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-26-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 9-9-98
IW-6	Inline Flow Meter
Discharge 0.40 U.S.gal/min	

	Pumping test duration [d]	Discharge [U.S.gal/min]		
1	0.00000	0.40		
2	2.43056	0.40		

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98 | Page 1 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
IW-6	
Discharge 0.09 U.S.gal/min	
	Pumping test duration: 2.33333 d



○ IW-6 Recovery

Transmissivity [ft²/d]: 4.65×10^{-1}

Hydraulic conductivity [ft/d]: 1.86×10^{-2}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98 | Page 2 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
IW-6	IW-6 Recovery
Discharge 0.09 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 36.66 ft below datum	Pumping test duration: 2.33333 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
1	0.02083	45.99	9.33	7.59
2	0.03125	45.81	9.15	7.48
3	0.04167	45.58	8.92	7.33
4	0.05208	45.38	8.72	7.20
5	0.06250	45.20	8.54	7.08
6	0.07292	45.06	8.40	6.99
7	0.08333	44.94	8.28	6.91
8	0.09375	44.81	8.15	6.82
9	0.10417	44.69	8.03	6.74
10	0.11458	44.58	7.92	6.67
11	0.12500	44.48	7.82	6.60
12	0.13542	44.38	7.72	6.53
13	0.14583	44.26	7.60	6.44
14	0.15625	44.16	7.50	6.37
15	0.16667	44.06	7.40	6.30
16	0.17708	43.96	7.30	6.23
17	0.18750	43.85	7.19	6.16
18	0.19792	43.75	7.09	6.08
19	0.20833	43.67	7.01	6.03
20	0.21875	43.60	6.94	5.98
21	0.22917	43.52	6.86	5.92
22	0.23958	43.44	6.78	5.86
23	0.25000	43.36	6.70	5.80
24	0.26042	43.26	6.60	5.73
25	0.27083	43.18	6.52	5.67
26	0.28125	43.10	6.44	5.61
27	0.29167	43.04	6.38	5.57
28	0.30208	42.97	6.31	5.51
29	0.31250	42.90	6.24	5.46
30	0.32292	42.82	6.16	5.40
31	0.33333	42.74	6.08	5.34
32	0.34375	42.66	6.00	5.28
33	0.35417	42.58	5.92	5.22
34	0.36458	42.51	5.85	5.17
35	0.37500	42.42	5.76	5.10
36	0.38542	42.34	5.68	5.03
37	0.39583	42.27	5.61	4.98
38	0.40625	42.20	5.54	4.93
39	0.41667	42.14	5.48	4.88
40	0.42708	42.06	5.40	4.82
41	0.43750	41.99	5.33	4.76
42	0.44792	41.94	5.28	4.72
43	0.45833	41.89	5.23	4.68
44	0.46875	41.83	5.17	4.64
45	0.47917	41.77	5.11	4.59
46	0.48958	41.71	5.05	4.54
47	0.50000	41.65	4.99	4.49
48	0.51042	41.61	4.95	4.46
49	0.52083	41.57	4.91	4.43
50	0.53125	41.52	4.86	4.39

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 3 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
IW-6	IW-6 Recovery
Discharge 0.09 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 36.66 ft below datum	Pumping test duration: 2.33333 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
51	0.54167	41.47	4.81	4.35
52	0.55208	41.41	4.75	4.30
53	0.56250	41.34	4.68	4.24
54	0.57292	41.28	4.62	4.19
55	0.58333	41.23	4.57	4.15
56	0.59375	41.18	4.52	4.11
57	0.60417	41.13	4.47	4.07
58	0.61458	41.09	4.43	4.04
59	0.62500	41.05	4.39	4.00
60	0.66667	40.89	4.23	3.87
61	0.70833	40.73	4.07	3.74
62	0.75000	40.56	3.90	3.60
63	0.79167	40.39	3.73	3.45
64	0.83333	40.24	3.58	3.32
65	0.87500	40.14	3.48	3.24
66	0.91667	40.01	3.35	3.13
67	0.95833	39.86	3.20	3.00
68	1.00000	39.73	3.07	2.88
69	1.04167	39.63	2.97	2.79
70	1.08333	39.52	2.86	2.70
71	1.12500	39.43	2.77	2.62
72	1.16667	39.34	2.68	2.54
73	1.20833	39.26	2.60	2.46
74	1.25000	39.17	2.51	2.38
75	1.29167	39.10	2.44	2.32
76	1.33333	39.02	2.36	2.25
77	1.37500	38.94	2.28	2.18
78	1.41667	38.87	2.21	2.11
79	1.45833	38.79	2.13	2.04
80	1.50000	38.74	2.08	1.99
81	1.54167	38.70	2.04	1.96
82	1.58333	38.66	2.00	1.92
83	1.62500	38.62	1.96	1.88
84	1.66667	38.59	1.93	1.86
85	1.70833	38.55	1.89	1.82
86	1.75000	38.50	1.84	1.77
87	1.79167	38.44	1.78	1.72
88	1.83333	38.38	1.72	1.66
89	1.87500	38.32	1.66	1.60
90	1.91667	38.27	1.61	1.56
91	1.95833	38.21	1.55	1.50
92	2.00000	38.16	1.50	1.45
93	2.04167	38.11	1.45	1.41
94	2.08333	38.10	1.44	1.40
95	2.12500	38.08	1.42	1.38
96	2.16667	38.06	1.40	1.36
97	2.20833	38.02	1.36	1.32
98	2.25000	38.00	1.34	1.30
99	2.29167	37.96	1.30	1.27
100	2.33333	37.93	1.27	1.24

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 4
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
IW-6	IW-6 Recovery
Discharge 0.09 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 36.66 ft below datum	Pumping test duration: 2.33333 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
101	2.37500	37.89	1.23	1.20
102	2.41667	37.86	1.20	1.17
103	2.45833	37.81	1.15	1.12
104	2.50000	37.79	1.13	1.10
105	2.54167	37.77	1.11	1.09
106	2.58333	37.76	1.10	1.08
107	2.62500	37.76	1.10	1.08
108	2.66667	37.75	1.09	1.07
109	2.70833	37.75	1.09	1.07
110	2.75000	37.74	1.08	1.06
111	2.79167	37.72	1.06	1.04
112	2.83333	37.69	1.03	1.01
113	2.87500	37.67	1.01	0.99
114	2.91667	37.63	0.97	0.95
115	2.95833	37.60	0.94	0.92
116	3.00000	37.57	0.91	0.89
117	3.04167	37.55	0.89	0.87
118	3.08333	37.53	0.87	0.85
119	3.12500	37.53	0.87	0.85
120	3.16667	37.52	0.86	0.85
121	3.20833	37.52	0.86	0.85
122	3.25000	37.50	0.84	0.83
123	3.29167	37.47	0.81	0.80
124	3.33333	37.45	0.79	0.78
125	3.37500	37.42	0.76	0.75
126	3.41667	37.39	0.73	0.72
127	3.45833	37.36	0.70	0.69
128	3.50000	37.35	0.69	0.68
129	3.54167	37.35	0.69	0.68
130	3.58333	37.35	0.69	0.68
131	3.62500	37.35	0.69	0.68
132	3.64792	37.36	0.70	0.69
133	3.64861	37.34	0.68	0.67
134	3.64931	37.35	0.69	0.68
135	3.65000	37.35	0.69	0.68
136	3.65278	37.35	0.69	0.68
137	3.65625	37.34	0.68	0.67
138	3.65972	37.35	0.69	0.68
139	3.66319	37.34	0.68	0.67
140	3.66667	37.35	0.69	0.68
141	3.67014	37.35	0.69	0.68
142	3.67361	37.35	0.69	0.68
143	3.67708	37.35	0.69	0.68
144	3.68056	37.34	0.68	0.67
145	3.68403	37.34	0.68	0.67
146	3.68750	37.35	0.69	0.68
147	3.69097	37.35	0.69	0.68
148	3.69444	37.34	0.68	0.67
149	3.69792	37.35	0.69	0.68
150	3.70139	37.35	0.69	0.68

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 5
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
IW-6	IW-6 Recovery
Discharge 0.09 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 36.66 ft below datum	Pumping test duration: 2.33333 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
151	3.70486	37.34	0.68	0.67
152	3.70833	37.35	0.69	0.68
153	3.71181	37.34	0.68	0.67
154	3.71528	37.35	0.69	0.68
155	3.72222	37.35	0.69	0.68
156	3.72917	37.35	0.69	0.68
157	3.73611	37.35	0.69	0.68
158	3.74306	37.35	0.69	0.68
159	3.75000	37.35	0.69	0.68
160	3.75694	37.34	0.68	0.67
161	3.76389	37.34	0.68	0.67
162	3.77083	37.35	0.69	0.68
163	3.77778	37.35	0.69	0.68
164	3.78472	37.34	0.68	0.67
165	3.79167	37.34	0.68	0.67
166	3.79861	37.34	0.68	0.67
167	3.81250	37.33	0.67	0.66
168	3.83333	37.32	0.66	0.65
169	3.85417	37.31	0.65	0.64
170	3.87500	37.30	0.64	0.63
171	3.89583	37.28	0.62	0.61
172	3.91667	37.28	0.62	0.61
173	3.93750	37.26	0.60	0.59
174	3.95833	37.24	0.58	0.57
175	3.97917	37.24	0.58	0.57
176	4.00000	37.23	0.57	0.56
177	4.02083	37.22	0.56	0.55
178	4.04167	37.22	0.56	0.55
179	4.06250	37.22	0.56	0.55
180	4.08333	37.22	0.56	0.55
181	4.10417	37.22	0.56	0.55
182	4.12500	37.21	0.55	0.54
183	4.14583	37.22	0.56	0.55
184	4.16667	37.22	0.56	0.55
185	4.18750	37.22	0.56	0.55
186	4.20833	37.21	0.55	0.54
187	4.22917	37.21	0.55	0.54
188	4.25000	37.20	0.54	0.53
189	4.27083	37.20	0.54	0.53
190	4.29167	37.19	0.53	0.52
191	4.31250	37.18	0.52	0.51
192	4.33333	37.18	0.52	0.51
193	4.35417	37.17	0.51	0.50
194	4.37500	37.16	0.50	0.49
195	4.39583	37.15	0.49	0.49
196	4.41667	37.14	0.48	0.48
197	4.43750	37.14	0.48	0.48
198	4.45833	37.13	0.47	0.47
199	4.47917	37.13	0.47	0.47
200	4.50000	37.12	0.46	0.46

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98 | Page 6 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
IW-6	IW-6 Recovery
Discharge 0.09 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 36.66 ft below datum	Pumping test duration: 2.33333 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
201	4.54167	37.13	0.47	0.47
202	4.58333	37.15	0.49	0.49
203	4.62500	37.16	0.50	0.49
204	4.66667	37.18	0.52	0.51
205	4.70833	37.20	0.54	0.53
206	4.75000	37.21	0.55	0.54
207	4.79167	37.20	0.54	0.53
208	4.83333	37.19	0.53	0.52
209	4.87500	37.17	0.51	0.50
210	4.91667	37.15	0.49	0.49
211	4.95833	37.14	0.48	0.48
212	5.00000	37.13	0.47	0.47
213	5.04167	37.13	0.47	0.47
214	5.08333	37.13	0.47	0.47
215	5.12500	37.13	0.47	0.47
216	5.16667	37.14	0.48	0.48
217	5.20833	37.14	0.48	0.48
218	5.25000	37.14	0.48	0.48
219	5.29167	37.13	0.47	0.47
220	5.33333	37.12	0.46	0.46
221	5.37500	37.10	0.44	0.44
222	5.41667	37.09	0.43	0.43
223	5.45833	37.09	0.43	0.43
224	5.50000	37.09	0.43	0.43
225	5.54167	37.09	0.43	0.43
226	5.58333	37.11	0.45	0.45
227	5.62500	37.12	0.46	0.46
228	5.66667	37.14	0.48	0.48
229	5.70833	37.15	0.49	0.49
230	5.75000	37.16	0.50	0.49
231	5.79167	37.16	0.50	0.49
232	5.83333	37.15	0.49	0.49
233	5.87500	37.14	0.48	0.48
234	5.91667	37.13	0.47	0.47
235	5.95833	37.11	0.45	0.45
236	6.00000	37.09	0.43	0.43
237	6.04167	37.09	0.43	0.43
238	6.08333	37.10	0.44	0.44
239	6.12500	37.10	0.44	0.44
240	6.16667	37.10	0.44	0.44
241	6.20833	37.11	0.45	0.45
242	6.25000	37.11	0.45	0.45
243	6.29167	37.10	0.44	0.44
244	6.33333	37.08	0.42	0.42
245	6.37500	37.07	0.41	0.41
246	6.41667	37.06	0.40	0.40
247	6.45833	37.06	0.40	0.40
248	6.50000	37.06	0.40	0.40
249	6.54167	37.07	0.41	0.41
250	6.58333	37.08	0.42	0.42

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 7
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
IW-6	IW-6 Recovery
Discharge 0.09 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 36.66 ft below datum	Pumping test duration: 2.33333 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
251	6.62500	37.09	0.43	0.43
252	6.64583	37.10	0.44	0.44
253	6.65278	37.10	0.44	0.44
254	6.65972	37.11	0.45	0.45
255	6.66667	37.11	0.45	0.45
256	6.67361	37.12	0.46	0.46
257	6.68056	37.12	0.46	0.46
258	6.68750	37.11	0.45	0.45
259	6.69444	37.13	0.47	0.47
260	6.70833	37.13	0.47	0.47
261	6.72917	37.14	0.48	0.48
262	6.75000	37.14	0.48	0.48
263	6.77083	37.14	0.48	0.48
264	6.79167	37.13	0.47	0.47
265	6.81250	37.12	0.46	0.46
266	6.83333	37.12	0.46	0.46
267	6.85417	37.11	0.45	0.45
268	6.87500	37.11	0.45	0.45
269	6.89583	37.10	0.44	0.44
270	6.91667	37.09	0.43	0.43
271	6.93750	37.08	0.42	0.42
272	6.95833	37.08	0.42	0.42
273	6.97917	37.08	0.42	0.42
274	7.00000	37.07	0.41	0.41
275	7.02083	37.06	0.40	0.40
276	7.04167	37.06	0.40	0.40
277	7.06250	37.06	0.40	0.40
278	7.08333	37.06	0.40	0.40
279	7.10417	37.07	0.41	0.41
280	7.12500	37.08	0.42	0.42
281	7.14583	37.08	0.42	0.42
282	7.16667	37.08	0.42	0.42
283	7.18750	37.08	0.42	0.42
284	7.20833	37.08	0.42	0.42
285	7.22917	37.09	0.43	0.43
286	7.25000	37.09	0.43	0.43
287	7.27083	37.09	0.43	0.43
288	7.29167	37.08	0.42	0.42
289	7.31250	37.07	0.41	0.41
290	7.33333	37.06	0.40	0.40
291	7.35417	37.06	0.40	0.40
292	7.37500	37.05	0.39	0.39
293	7.39583	37.04	0.38	0.38
294	7.41667	37.04	0.38	0.38
295	7.43750	37.03	0.37	0.37
296	7.45833	37.03	0.37	0.37
297	7.47917	37.03	0.37	0.37
298	7.50000	37.01	0.35	0.35
299	7.52083	37.01	0.35	0.35
300	7.54167	37.01	0.35	0.35

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98 | Page 8 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
IW-6	IW-6 Recovery
Discharge 0.09 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 36.66 ft below datum	Pumping test duration: 2.33333 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
301	7.56250	37.01	0.35	0.35
302	7.58333	37.02	0.36	0.36
303	7.60417	37.02	0.36	0.36
304	7.62500	37.02	0.36	0.36
305	7.64583	37.04	0.38	0.38
306	7.66667	37.05	0.39	0.39
307	7.68750	37.06	0.40	0.40
308	7.70833	37.08	0.42	0.42
309	7.72917	37.09	0.43	0.43
310	7.75000	37.09	0.43	0.43
311	7.77083	37.09	0.43	0.43
312	7.79167	37.08	0.42	0.42

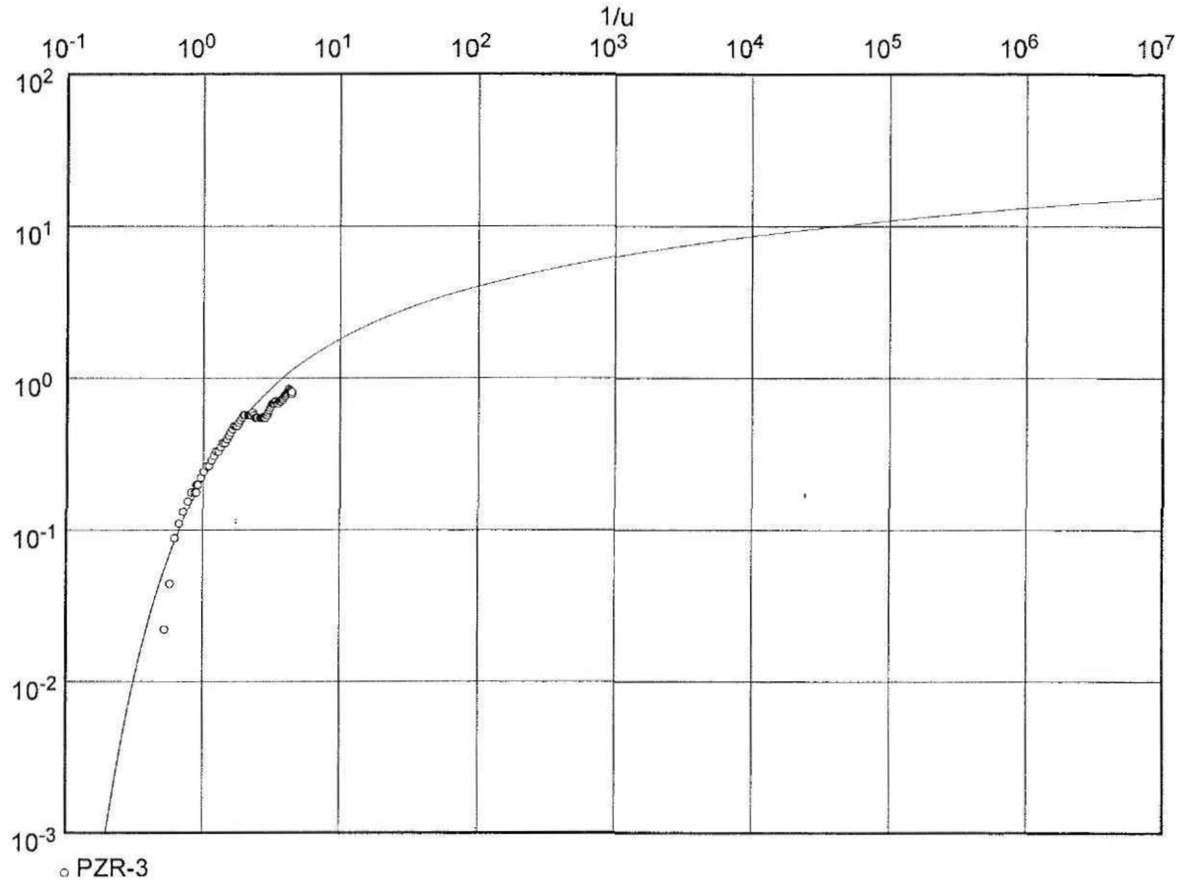
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 9
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
IW-6	
Discharge 0.09 U.S.gal/min	
	Pumping test duration: 2.33333 d

	Pumping test duration [d]	Discharge [U.S.gal/min]		
1	0.00000	0.40		
2	2.33333	0.40		
3	2.33403	0.00		
4	10.12500	0.00		

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 1 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-3	
Discharge 0.40 U.S.gal/min	



Transmissivity [ft²/d]: 1.34×10^{1}

Hydraulic conductivity [ft/d]: 5.39×10^{-1}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-3	PZR-3
Discharge 0.40 U.S.gal/min	Distance from the pumping well 54.25 ft
Static water level: 45.47 ft below datum	

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.00486	45.46	-0.01	-0.01
3	0.00694	45.45	-0.02	-0.02
4	0.01042	45.46	-0.01	-0.01
5	0.02083	45.45	-0.02	-0.02
6	0.03125	45.46	-0.01	-0.01
7	0.04167	45.45	-0.02	-0.02
8	0.05208	45.45	-0.02	-0.02
9	0.06250	45.45	-0.02	-0.02
10	0.07292	45.44	-0.03	-0.03
11	0.08333	45.44	-0.03	-0.03
12	0.10417	45.43	-0.04	-0.04
13	0.12500	45.45	-0.02	-0.02
14	0.14583	45.45	-0.02	-0.02
15	0.16667	45.45	-0.02	-0.02
16	0.18750	45.46	-0.01	-0.01
17	0.20833	45.47	0.00	0.00
18	0.22917	45.48	0.01	0.01
19	0.25000	45.49	0.02	0.02
20	0.27083	45.51	0.04	0.04
21	0.29167	45.52	0.05	0.05
22	0.31250	45.53	0.06	0.06
23	0.33333	45.54	0.07	0.07
24	0.35417	45.55	0.08	0.08
25	0.37500	45.55	0.08	0.08
26	0.38507	45.55	0.08	0.08
27	0.38519	45.56	0.09	0.09
28	0.38530	45.55	0.08	0.08
29	0.38542	45.56	0.09	0.09
30	0.38611	45.55	0.08	0.08
31	0.38681	45.56	0.09	0.09
32	0.38750	45.56	0.09	0.09
33	0.39583	45.56	0.09	0.09
34	0.41667	45.57	0.10	0.10
35	0.43750	45.58	0.11	0.11
36	0.45833	45.59	0.12	0.12
37	0.47917	45.59	0.12	0.12
38	0.50000	45.60	0.13	0.13
39	0.52083	45.61	0.14	0.14
40	0.54167	45.62	0.15	0.15
41	0.56250	45.62	0.15	0.15
42	0.58333	45.63	0.16	0.16
43	0.60417	45.64	0.17	0.17
44	0.62500	45.64	0.17	0.17
45	0.64583	45.65	0.18	0.18
46	0.66667	45.66	0.19	0.19
47	0.68750	45.67	0.20	0.20
48	0.70833	45.68	0.21	0.21
49	0.72917	45.69	0.22	0.22
50	0.75000	45.69	0.22	0.22

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 3 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-3	PZR-3
Discharge 0.40 U.S.gal/min	Distance from the pumping well 54.25 ft

Static water level: 45.47 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	0.77083	45.69	0.22	0.22
52	0.79167	45.70	0.23	0.23
53	0.81250	45.71	0.24	0.24
54	0.83333	45.72	0.25	0.25
55	0.85417	45.73	0.26	0.26
56	0.87500	45.73	0.26	0.26
57	0.91667	45.73	0.26	0.26
58	0.93750	45.73	0.26	0.26
59	0.95833	45.73	0.26	0.26
60	0.97917	45.73	0.26	0.26
61	1.00000	45.74	0.27	0.27
62	1.02083	45.73	0.26	0.26
63	1.04167	45.72	0.25	0.25
64	1.06250	45.72	0.25	0.25
65	1.08333	45.72	0.25	0.25
66	1.12500	45.72	0.25	0.25
67	1.14583	45.72	0.25	0.25
68	1.16667	45.72	0.25	0.25
69	1.18750	45.72	0.25	0.25
70	1.20833	45.72	0.25	0.25
71	1.22917	45.72	0.25	0.25
72	1.25000	45.73	0.26	0.26
73	1.27083	45.73	0.26	0.26
74	1.29167	45.74	0.27	0.27
75	1.31250	45.75	0.28	0.28
76	1.33333	45.76	0.29	0.29
77	1.35417	45.77	0.30	0.30
78	1.37500	45.78	0.31	0.31
79	1.39583	45.78	0.31	0.31
80	1.41667	45.78	0.31	0.31
81	1.43750	45.78	0.31	0.31
82	1.45833	45.79	0.32	0.32
83	1.47917	45.79	0.32	0.32
84	1.50000	45.78	0.31	0.31
85	1.52083	45.79	0.32	0.32
86	1.54167	45.78	0.31	0.31
87	1.56250	45.79	0.32	0.32
88	1.58333	45.79	0.32	0.32
89	1.60417	45.79	0.32	0.32
90	1.62500	45.80	0.33	0.33
91	1.64583	45.80	0.33	0.33
92	1.66667	45.80	0.33	0.33
93	1.68750	45.81	0.34	0.34
94	1.70833	45.82	0.35	0.35
95	1.72917	45.82	0.35	0.35
96	1.75000	45.82	0.35	0.35
97	1.77083	45.83	0.36	0.36
98	1.79167	45.83	0.36	0.36
99	1.81250	45.84	0.37	0.37
100	1.83333	45.85	0.38	0.38

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, GA 30341
ph.(770)496-1893

Pumping test analysis
Theis analysis method
Unconfined aquifer

Project: Solutia/RFI/AL

Evaluated by: CDH

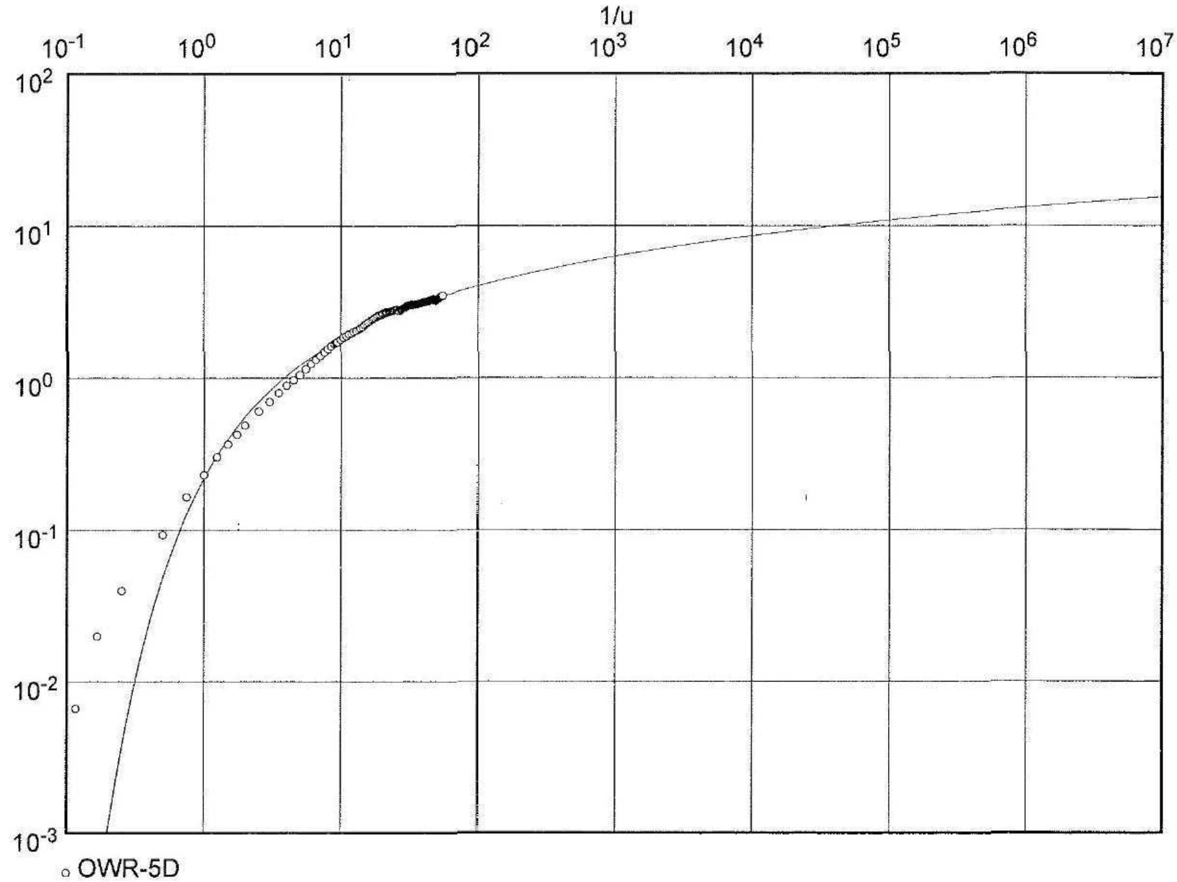
Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-3	PZR-3
Discharge 0.40 U.S.gal/min	Distance from the pumping well 54.25 ft

Static water level: 45.47 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
101	1.85417	45.86	0.39	0.39
102	1.87500	45.85	0.38	0.38
103	1.89583	45.85	0.38	0.38
104	1.91667	45.84	0.37	0.37
105	1.93750	45.84	0.37	0.37
106	1.95660	45.84	0.37	0.37
107	1.95694	45.83	0.36	0.36
108	1.95729	45.84	0.37	0.37

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98 | Page 1 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	
Discharge 0.40 U.S.gal/min	



Transmissivity [ft²/d]: 4.04×10^{0}

Hydraulic conductivity [ft/d]: 1.61×10^{-1}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98 | Page 2 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	OWR-5D
Discharge 0.40 U.S.gal/min	Distance from the pumping well 28.75 ft

Static water level: 44.85 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.00417	44.86	0.01	0.01
3	0.00486	44.86	0.01	0.01
4	0.00694	44.88	0.03	0.03
5	0.01042	44.91	0.06	0.06
6	0.02083	44.99	0.14	0.14
7	0.03125	45.10	0.25	0.25
8	0.04167	45.20	0.35	0.35
9	0.05208	45.31	0.46	0.46
10	0.06250	45.41	0.56	0.55
11	0.07292	45.50	0.65	0.64
12	0.08333	45.60	0.75	0.74
13	0.10417	45.78	0.93	0.91
14	0.12500	45.93	1.08	1.06
15	0.14583	46.09	1.24	1.21
16	0.16667	46.24	1.39	1.35
17	0.18750	46.36	1.51	1.46
18	0.20833	46.49	1.64	1.59
19	0.22917	46.65	1.80	1.74
20	0.25000	46.80	1.95	1.87
21	0.27083	46.94	2.09	2.00
22	0.29167	47.07	2.22	2.12
23	0.31250	47.20	2.35	2.24
24	0.33333	47.32	2.47	2.35
25	0.35417	47.43	2.58	2.45
26	0.37500	47.53	2.68	2.54
27	0.38507	47.57	2.72	2.57
28	0.38519	47.57	2.72	2.57
29	0.38530	47.58	2.73	2.58
30	0.38542	47.57	2.72	2.57
31	0.38611	47.58	2.73	2.58
32	0.38681	47.58	2.73	2.58
33	0.38750	47.58	2.73	2.58
34	0.39583	47.62	2.77	2.62
35	0.41667	47.72	2.87	2.71
36	0.43750	47.82	2.97	2.79
37	0.45833	47.90	3.05	2.86
38	0.47917	47.99	3.14	2.94
39	0.50000	48.05	3.20	3.00
40	0.52083	48.12	3.27	3.06
41	0.54167	48.18	3.33	3.11
42	0.56250	48.25	3.40	3.17
43	0.58333	48.32	3.47	3.23
44	0.60417	48.40	3.55	3.30
45	0.62500	48.50	3.65	3.38
46	0.64583	48.58	3.73	3.45
47	0.66667	48.67	3.82	3.53
48	0.68750	48.75	3.90	3.60
49	0.70833	48.84	3.99	3.67
50	0.72917	48.90	4.05	3.72

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 3 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	OWR-5D
Discharge 0.40 U.S.gal/min	Distance from the pumping well 28.75 ft

Static water level: 44.85 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	0.75000	48.97	4.12	3.78
52	0.77083	49.04	4.19	3.84
53	0.79167	49.11	4.26	3.90
54	0.81250	49.16	4.31	3.94
55	0.83333	49.22	4.37	3.99
56	0.85417	49.28	4.43	4.04
57	0.87500	49.34	4.49	4.09
58	0.89583	49.38	4.53	4.12
59	0.91667	49.36	4.51	4.10
60	0.93750	49.38	4.53	4.12
61	0.95833	49.43	4.58	4.16
62	0.97917	49.44	4.59	4.17
63	1.00000	49.47	4.62	4.19
64	1.02083	49.50	4.65	4.22
65	1.04167	49.53	4.68	4.24
66	1.06250	49.57	4.72	4.27
67	1.08333	49.54	4.69	4.25
68	1.10417	49.50	4.65	4.22
69	1.12500	49.48	4.63	4.20
70	1.14583	49.55	4.70	4.26
71	1.16667	49.61	4.76	4.31
72	1.18750	49.66	4.81	4.35
73	1.20833	49.71	4.86	4.39
74	1.22917	49.76	4.91	4.43
75	1.25000	49.81	4.96	4.47
76	1.27083	49.87	5.02	4.52
77	1.29167	49.91	5.06	4.55
78	1.31250	49.93	5.08	4.56
79	1.33333	49.95	5.10	4.58
80	1.35417	49.97	5.12	4.60
81	1.37500	49.98	5.13	4.60
82	1.39583	49.99	5.14	4.61
83	1.41667	49.99	5.14	4.61
84	1.43750	49.99	5.14	4.61
85	1.45833	49.99	5.14	4.61
86	1.47917	50.00	5.15	4.62
87	1.50000	50.01	5.16	4.63
88	1.52083	50.04	5.19	4.65
89	1.54167	50.06	5.21	4.67
90	1.56250	50.08	5.23	4.68
91	1.58333	50.11	5.26	4.71
92	1.60417	50.13	5.28	4.72
93	1.62500	50.15	5.30	4.74
94	1.64583	50.16	5.31	4.75
95	1.66667	50.18	5.33	4.76
96	1.68750	50.21	5.36	4.79
97	1.70833	50.22	5.37	4.79
98	1.72917	50.24	5.39	4.81
99	1.75000	50.26	5.41	4.82
100	1.77083	50.27	5.42	4.83

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 4
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	OWR-5D
Discharge 0.40 U.S.gal/min	Distance from the pumping well 28.75 ft

Static water level: 44.85 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
101	1.79167	50.29	5.44	4.85
102	1.81250	50.30	5.45	4.86
103	1.83333	50.33	5.48	4.88
104	1.85417	50.34	5.49	4.89
105	1.87500	50.37	5.52	4.91
106	1.89583	50.40	5.55	4.93
107	1.91667	50.43	5.58	4.96
108	1.93750	50.45	5.60	4.97
109	1.95660	50.49	5.64	5.00
110	1.95694	50.48	5.63	5.00
111	1.95729	50.48	5.63	5.00
112	1.95833	50.48	5.63	5.00
113	1.97917	50.51	5.66	5.02
114	2.00000	50.51	5.66	5.02
115	2.02083	50.41	5.56	4.94
116	2.04167	50.37	5.52	4.91
117	2.06250	50.32	5.47	4.87
118	2.08333	50.37	5.52	4.91
119	2.10417	50.41	5.56	4.94
120	2.12500	50.44	5.59	4.97
121	2.14583	50.48	5.63	5.00
122	2.16667	50.52	5.67	5.03
123	2.18750	50.57	5.72	5.07
124	2.20833	50.62	5.77	5.10
125	2.22917	50.66	5.81	5.13
126	2.25000	50.71	5.86	5.17
127	2.27083	50.75	5.90	5.20
128	2.29167	50.79	5.94	5.23
129	2.31250	50.81	5.96	5.25
130	2.33333	50.84	5.99	5.27
131	2.35417	50.86	6.01	5.29

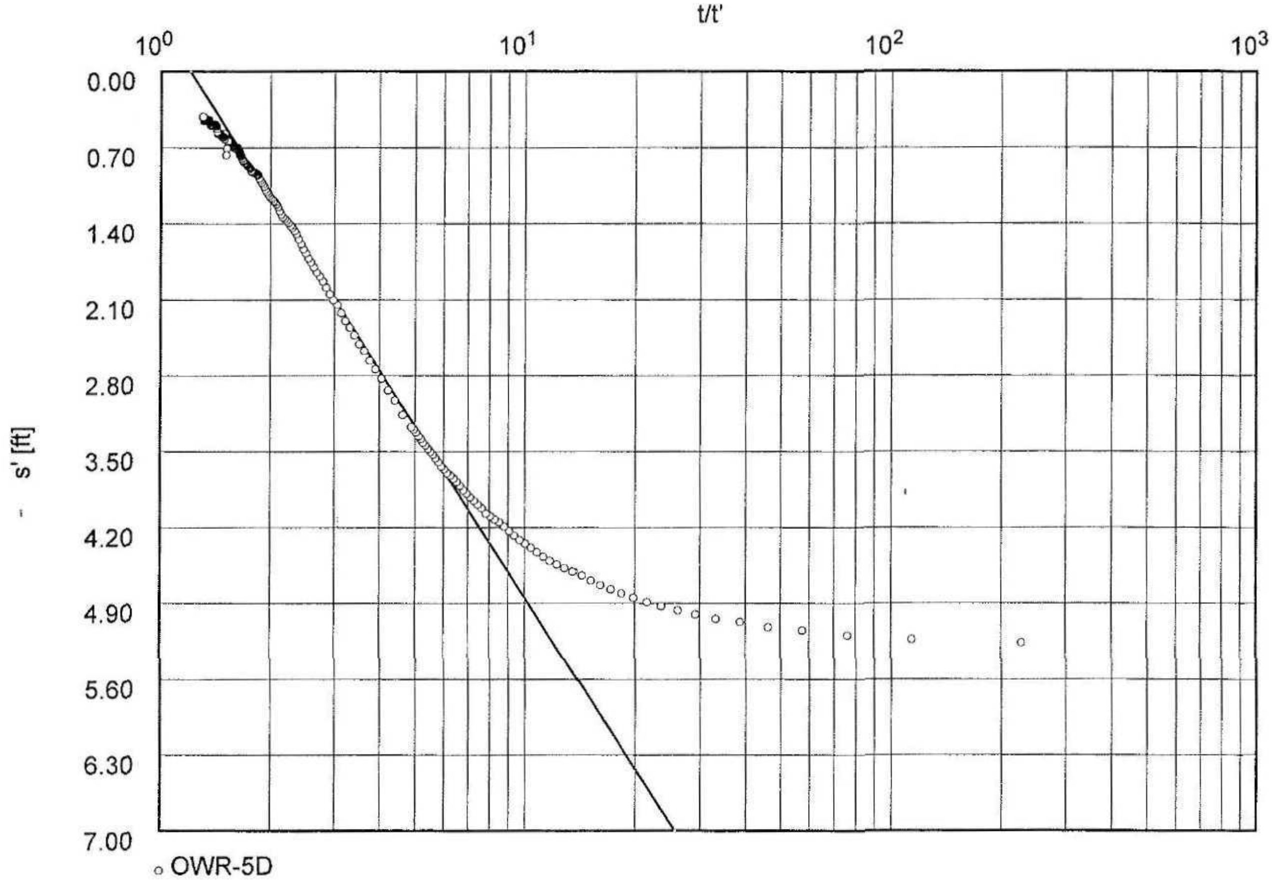
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 5
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	Inline Flow Meter
Discharge 0.40 U.S.gal/min	

	Pumping test duration [d]	Discharge [U.S.gal/min]		
1	0.00000	0.40		
2	2.43056	0.40		

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98 Page 1 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	
Discharge 0.09 U.S.gal/min	
	Pumping test duration: 2.35417 d



Transmissivity [ft²/d]: 6.22×10^{-1}

Hydraulic conductivity [ft/d]: 2.48×10^{-2}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	
Discharge 0.09 U.S.gal/min	
	Pumping test duration: 2.35417 d

	Pumping test duration [d]	Discharge [U.S.gal/min]		
1	0.00000	0.40		
2	2.35417	0.40		
3	2.35486	0.00		
4	10.12500	0.00		

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 3
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	OWR-5D
Discharge 0.09 U.S.gal/min	Distance from the pumping well 28.75 ft
Static water level: 44.86 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
1	0.01042	50.84	5.98	5.26
2	0.02083	50.80	5.94	5.23
3	0.03125	50.75	5.89	5.20
4	0.04167	50.69	5.83	5.15
5	0.05208	50.65	5.79	5.12
6	0.06250	50.59	5.73	5.07
7	0.07292	50.55	5.69	5.04
8	0.08333	50.50	5.64	5.00
9	0.09375	50.45	5.59	4.97
10	0.10417	50.40	5.54	4.93
11	0.11458	50.35	5.49	4.89
12	0.12500	50.30	5.44	4.85
13	0.13542	50.25	5.39	4.81
14	0.14583	50.20	5.34	4.77
15	0.15625	50.15	5.29	4.73
16	0.16667	50.10	5.24	4.69
17	0.17708	50.04	5.18	4.64
18	0.18750	49.99	5.13	4.60
19	0.19792	49.95	5.09	4.57
20	0.20833	49.91	5.05	4.54
21	0.21875	49.87	5.01	4.51
22	0.22917	49.82	4.96	4.47
23	0.23958	49.77	4.91	4.43
24	0.25000	49.72	4.86	4.39
25	0.26042	49.67	4.81	4.35
26	0.27083	49.63	4.77	4.31
27	0.28125	49.58	4.72	4.27
28	0.29167	49.53	4.67	4.23
29	0.30208	49.48	4.62	4.19
30	0.31250	49.43	4.57	4.15
31	0.32292	49.40	4.54	4.13
32	0.33333	49.36	4.50	4.10
33	0.34375	49.33	4.47	4.07
34	0.35417	49.27	4.41	4.02
35	0.36458	49.23	4.37	3.99
36	0.37500	49.19	4.33	3.96
37	0.38542	49.15	4.29	3.92
38	0.39583	49.11	4.25	3.89
39	0.40625	49.07	4.21	3.86
40	0.41667	49.02	4.16	3.81
41	0.42708	48.98	4.12	3.78
42	0.43750	48.94	4.08	3.75
43	0.44792	48.91	4.05	3.72
44	0.45833	48.88	4.02	3.70
45	0.46875	48.84	3.98	3.66
46	0.47917	48.81	3.95	3.64
47	0.48958	48.76	3.90	3.60
48	0.50000	48.72	3.86	3.56
49	0.51042	48.68	3.82	3.53
50	0.52083	48.65	3.79	3.50

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 4
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	OWR-5D
Discharge 0.09 U.S.gal/min	Distance from the pumping well 28.75 ft
Static water level: 44.86 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
51	0.53125	48.62	3.76	3.48
52	0.54167	48.58	3.72	3.44
53	0.55208	48.55	3.69	3.42
54	0.56250	48.51	3.65	3.38
55	0.57292	48.48	3.62	3.36
56	0.58333	48.44	3.58	3.32
57	0.59375	48.41	3.55	3.30
58	0.60417	48.38	3.52	3.27
59	0.64583	48.25	3.39	3.16
60	0.68750	48.10	3.24	3.03
61	0.72917	47.99	3.13	2.93
62	0.77083	47.87	3.01	2.83
63	0.81250	47.77	2.91	2.74
64	0.85417	47.68	2.82	2.66
65	0.89583	47.58	2.72	2.57
66	0.93750	47.51	2.65	2.51
67	0.97917	47.42	2.56	2.43
68	1.02083	47.34	2.48	2.36
69	1.06250	47.27	2.41	2.29
70	1.10417	47.19	2.33	2.22
71	1.14583	47.11	2.25	2.15
72	1.18750	47.06	2.20	2.10
73	1.22917	47.00	2.14	2.05
74	1.27083	46.93	2.07	1.98
75	1.31250	46.87	2.01	1.93
76	1.35417	46.82	1.96	1.88
77	1.39583	46.78	1.92	1.85
78	1.43750	46.73	1.87	1.80
79	1.47917	46.68	1.82	1.75
80	1.52083	46.64	1.78	1.72
81	1.56250	46.59	1.73	1.67
82	1.60417	46.55	1.69	1.63
83	1.64583	46.50	1.64	1.59
84	1.68750	46.45	1.59	1.54
85	1.72917	46.40	1.54	1.49
86	1.77083	46.37	1.51	1.46
87	1.81250	46.34	1.48	1.44
88	1.85417	46.32	1.46	1.42
89	1.89583	46.29	1.43	1.39
90	1.93750	46.27	1.41	1.37
91	1.97917	46.25	1.39	1.35
92	2.02083	46.24	1.38	1.34
93	2.06250	46.21	1.35	1.31
94	2.10417	46.18	1.32	1.29
95	2.14583	46.14	1.28	1.25
96	2.18750	46.11	1.25	1.22
97	2.22917	46.09	1.23	1.20
98	2.27083	46.08	1.22	1.19
99	2.31250	46.06	1.20	1.17
100	2.35417	46.05	1.19	1.16

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 5
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	OWR-5D
Discharge 0.09 U.S.gal/min	Distance from the pumping well 28.75 ft
Static water level: 44.86 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
101	2.39583	46.03	1.17	1.14
102	2.43750	46.01	1.15	1.12
103	2.47917	45.99	1.13	1.10
104	2.52083	45.97	1.11	1.09
105	2.56250	45.94	1.08	1.06
106	2.60417	45.92	1.06	1.04
107	2.64583	45.90	1.04	1.02
108	2.68750	45.88	1.02	1.00
109	2.72917	45.86	1.00	0.98
110	2.77083	45.83	0.97	0.95
111	2.81250	45.82	0.96	0.94
112	2.85417	45.82	0.96	0.94
113	2.89583	45.81	0.95	0.93
114	2.93750	45.81	0.95	0.93
115	2.97917	45.80	0.94	0.92
116	3.02083	45.80	0.94	0.92
117	3.06250	45.79	0.93	0.91
118	3.10417	45.77	0.91	0.89
119	3.14583	45.76	0.90	0.88
120	3.18750	45.75	0.89	0.87
121	3.22917	45.74	0.88	0.86
122	3.27083	45.73	0.87	0.85
123	3.31250	45.72	0.86	0.85
124	3.35417	45.71	0.85	0.84
125	3.39583	45.71	0.85	0.84
126	3.43750	45.70	0.84	0.83
127	3.47917	45.69	0.83	0.82
128	3.52083	45.67	0.81	0.80
129	3.56250	45.65	0.79	0.78
130	3.60417	45.64	0.78	0.77
131	3.62708	45.64	0.78	0.77
132	3.62778	45.64	0.78	0.77
133	3.62847	45.63	0.77	0.76
134	3.62917	45.63	0.77	0.76
135	3.63194	45.64	0.78	0.77
136	3.63542	45.63	0.77	0.76
137	3.63889	45.62	0.76	0.75
138	3.64236	45.62	0.76	0.75
139	3.64583	45.63	0.77	0.76
140	3.64931	45.62	0.76	0.75
141	3.65278	45.62	0.76	0.75
142	3.65625	45.62	0.76	0.75
143	3.65972	45.62	0.76	0.75
144	3.66319	45.61	0.75	0.74
145	3.66667	45.61	0.75	0.74
146	3.67014	45.62	0.76	0.75
147	3.67361	45.61	0.75	0.74
148	3.67708	45.62	0.76	0.75
149	3.68056	45.62	0.76	0.75
150	3.68403	45.61	0.75	0.74

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 6
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	OWR-5D
Discharge 0.09 U.S.gal/min	Distance from the pumping well 28.75 ft
Static water level: 44.86 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
151	3.68750	45.61	0.75	0.74
152	3.69097	45.60	0.74	0.73
153	3.69444	45.60	0.74	0.73
154	3.70139	45.61	0.75	0.74
155	3.70833	45.60	0.74	0.73
156	3.71528	45.60	0.74	0.73
157	3.72222	45.59	0.73	0.72
158	3.72917	45.59	0.73	0.72
159	3.73611	45.59	0.73	0.72
160	3.74306	45.60	0.74	0.73
161	3.75000	45.59	0.73	0.72
162	3.75694	45.58	0.72	0.71
163	3.76389	45.58	0.72	0.71
164	3.77083	45.57	0.71	0.70
165	3.77778	45.58	0.72	0.71
166	3.79167	45.58	0.72	0.71
167	3.81250	45.58	0.72	0.71
168	3.83333	45.58	0.72	0.71
169	3.85417	45.58	0.72	0.71
170	3.87500	45.58	0.72	0.71
171	3.89583	45.57	0.71	0.70
172	3.91667	45.57	0.71	0.70
173	3.93750	45.57	0.71	0.70
174	3.95833	45.57	0.71	0.70
175	3.97917	45.57	0.71	0.70
176	4.00000	45.57	0.71	0.70
177	4.02083	45.57	0.71	0.70
178	4.04167	45.56	0.70	0.69
179	4.06250	45.56	0.70	0.69
180	4.08333	45.56	0.70	0.69
181	4.10417	45.55	0.69	0.68
182	4.12500	45.55	0.69	0.68
183	4.14583	45.54	0.68	0.67
184	4.16667	45.54	0.68	0.67
185	4.18750	45.53	0.67	0.66
186	4.20833	45.53	0.67	0.66
187	4.22917	45.53	0.67	0.66
188	4.25000	45.53	0.67	0.66
189	4.27083	45.52	0.66	0.65
190	4.29167	45.52	0.66	0.65
191	4.31250	45.52	0.66	0.65
192	4.33333	45.52	0.66	0.65
193	4.35417	45.52	0.66	0.65
194	4.37500	45.52	0.66	0.65
195	4.39583	45.52	0.66	0.65
196	4.41667	45.52	0.66	0.65
197	4.43750	45.52	0.66	0.65
198	4.45833	45.52	0.66	0.65
199	4.47917	45.51	0.65	0.64
200	4.52083	45.57	0.71	0.70

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 7 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	OWR-5D
Discharge 0.09 U.S.gal/min	Distance from the pumping well 28.75 ft
Static water level: 44.86 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
201	4.56250	45.58	0.72	0.71
202	4.60417	45.64	0.78	0.77
203	4.64583	45.46	0.60	0.59
204	4.68750	45.45	0.59	0.58
205	4.72917	45.44	0.58	0.57
206	4.77083	45.49	0.63	0.62
207	4.81250	45.47	0.61	0.60
208	4.85417	45.47	0.61	0.60
209	4.89583	45.47	0.61	0.60
210	4.93750	45.47	0.61	0.60
211	4.97917	45.47	0.61	0.60
212	5.02083	45.47	0.61	0.60
213	5.06250	45.46	0.60	0.59
214	5.10417	45.46	0.60	0.59
215	5.14583	45.45	0.59	0.58
216	5.18750	45.44	0.58	0.57
217	5.22917	45.44	0.58	0.57
218	5.27083	45.44	0.58	0.57
219	5.31250	45.44	0.58	0.57
220	5.35417	45.44	0.58	0.57
221	5.39583	45.44	0.58	0.57
222	5.43750	45.44	0.58	0.57
223	5.47917	45.44	0.58	0.57
224	5.52083	45.43	0.57	0.56
225	5.56250	45.42	0.56	0.55
226	5.60417	45.39	0.53	0.52
227	5.64583	45.37	0.51	0.50
228	5.68750	45.36	0.50	0.49
229	5.72917	45.36	0.50	0.49
230	5.77083	45.35	0.49	0.49
231	5.81250	45.35	0.49	0.49
232	5.85417	45.35	0.49	0.49
233	5.89583	45.35	0.49	0.49
234	5.93750	45.36	0.50	0.49
235	5.97917	45.36	0.50	0.49
236	6.02083	45.36	0.50	0.49
237	6.06250	45.36	0.50	0.49
238	6.10417	45.36	0.50	0.49
239	6.14583	45.35	0.49	0.49
240	6.18750	45.35	0.49	0.49
241	6.22917	45.35	0.49	0.49
242	6.27083	45.35	0.49	0.49
243	6.31250	45.35	0.49	0.49
244	6.35417	45.36	0.50	0.49
245	6.39583	45.36	0.50	0.49
246	6.43750	45.36	0.50	0.49
247	6.47917	45.35	0.49	0.49
248	6.52083	45.35	0.49	0.49
249	6.56250	45.35	0.49	0.49
250	6.60417	45.34	0.48	0.48

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 8
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	OWR-5D
Discharge 0.09 U.S.gal/min	Distance from the pumping well 28.75 ft
Static water level: 44.86 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
251	6.62500	45.33	0.47	0.47
252	6.63194	45.33	0.47	0.47
253	6.63889	45.33	0.47	0.47
254	6.64583	45.32	0.46	0.46
255	6.65278	45.33	0.47	0.47
256	6.65972	45.33	0.47	0.47
257	6.66667	45.32	0.46	0.46
258	6.67361	45.32	0.46	0.46
259	6.68750	45.32	0.46	0.46
260	6.70833	45.31	0.45	0.45
261	6.72917	45.31	0.45	0.45
262	6.75000	45.31	0.45	0.45
263	6.77083	45.31	0.45	0.45
264	6.79167	45.31	0.45	0.45
265	6.81250	45.31	0.45	0.45
266	6.83333	45.31	0.45	0.45
267	6.85417	45.31	0.45	0.45
268	6.87500	45.31	0.45	0.45
269	6.89583	45.31	0.45	0.45
270	6.91667	45.32	0.46	0.46
271	6.93750	45.32	0.46	0.46
272	6.95833	45.32	0.46	0.46
273	6.97917	45.32	0.46	0.46
274	7.00000	45.32	0.46	0.46
275	7.02083	45.32	0.46	0.46
276	7.04167	45.32	0.46	0.46
277	7.06250	45.32	0.46	0.46
278	7.08333	45.32	0.46	0.46
279	7.10417	45.32	0.46	0.46
280	7.12500	45.31	0.45	0.45
281	7.14583	45.31	0.45	0.45
282	7.16667	45.31	0.45	0.45
283	7.18750	45.31	0.45	0.45
284	7.20833	45.31	0.45	0.45
285	7.22917	45.30	0.44	0.44
286	7.25000	45.30	0.44	0.44
287	7.27083	45.30	0.44	0.44
288	7.29167	45.31	0.45	0.45
289	7.31250	45.31	0.45	0.45
290	7.33333	45.31	0.45	0.45
291	7.35417	45.31	0.45	0.45
292	7.37500	45.31	0.45	0.45
293	7.39583	45.31	0.45	0.45
294	7.41667	45.32	0.46	0.46
295	7.43750	45.32	0.46	0.46
296	7.45833	45.32	0.46	0.46
297	7.47917	45.32	0.46	0.46
298	7.50000	45.32	0.46	0.46
299	7.52083	45.32	0.46	0.46
300	7.54167	45.32	0.46	0.46

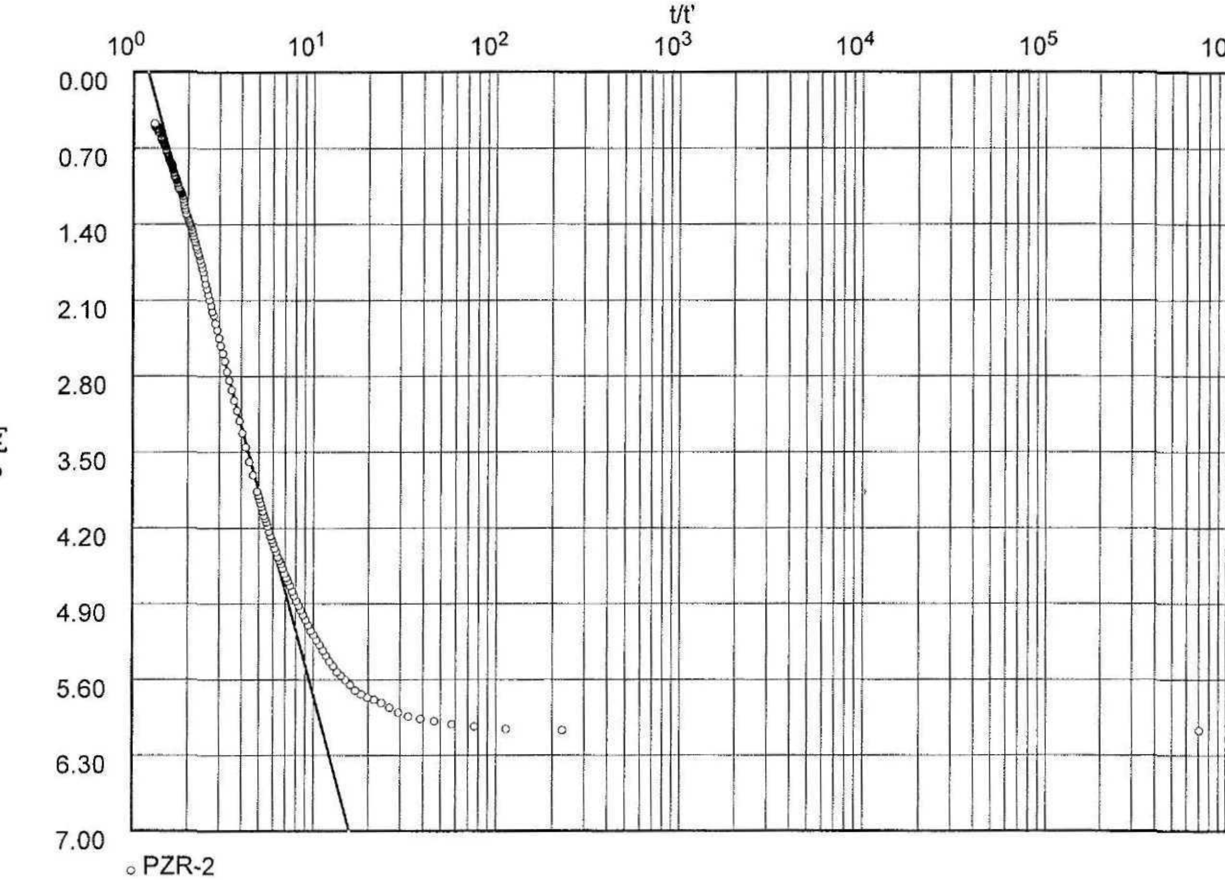
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 9
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
OWR-5D	OWR-5D
Discharge 0.09 U.S.gal/min	Distance from the pumping well 28.75 ft
Static water level: 44.86 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
301	7.56250	45.32	0.46	0.46
302	7.58333	45.32	0.46	0.46
303	7.60417	45.31	0.45	0.45
304	7.62500	45.31	0.45	0.45
305	7.64583	45.30	0.44	0.44
306	7.66667	45.30	0.44	0.44
307	7.68750	45.29	0.43	0.43
308	7.70833	45.28	0.42	0.42
309	7.72917	45.28	0.42	0.42
310	7.75000	45.28	0.42	0.42
311	7.77083	45.28	0.42	0.42

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98 | Page 1 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	
Discharge 0.09 U.S.gal/min	
	Pumping test duration: 2.35417 d



Transmissivity [ft²/d]: 5.23×10^{-1}

Hydraulic conductivity [ft/d]: 2.09×10^{-2}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	PZR-2
Discharge 0.09 U.S.gal/min	Distance from the pumping well 9.75 ft
Static water level: 45.93 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
1	0.00000	53.00	7.07	6.07
2	0.01041	53.00	7.07	6.07
3	0.02083	52.98	7.05	6.06
4	0.03125	52.95	7.02	6.03
5	0.04166	52.92	6.99	6.01
6	0.05208	52.88	6.95	5.98
7	0.06250	52.85	6.92	5.96
8	0.07291	52.82	6.89	5.94
9	0.08333	52.77	6.84	5.90
10	0.09375	52.71	6.78	5.86
11	0.10416	52.65	6.72	5.82
12	0.11458	52.61	6.68	5.79
13	0.12500	52.58	6.65	5.77
14	0.13541	52.54	6.61	5.74
15	0.14583	52.49	6.56	5.70
16	0.15625	52.42	6.49	5.65
17	0.16666	52.36	6.43	5.60
18	0.17708	52.31	6.38	5.57
19	0.18750	52.26	6.33	5.53
20	0.19791	52.19	6.26	5.48
21	0.20833	52.13	6.20	5.43
22	0.21875	52.06	6.13	5.38
23	0.22916	52.00	6.07	5.33
24	0.23958	51.93	6.00	5.28
25	0.25000	51.87	5.94	5.23
26	0.26041	51.81	5.88	5.19
27	0.27083	51.76	5.83	5.15
28	0.28125	51.69	5.76	5.10
29	0.29166	51.63	5.70	5.05
30	0.30208	51.57	5.64	5.00
31	0.31250	51.51	5.58	4.96
32	0.32291	51.46	5.53	4.92
33	0.33333	51.40	5.47	4.87
34	0.34375	51.34	5.41	4.82
35	0.35416	51.29	5.36	4.79
36	0.36458	51.22	5.29	4.73
37	0.37500	51.17	5.24	4.69
38	0.38541	51.13	5.20	4.66
39	0.39583	51.08	5.15	4.62
40	0.40625	51.02	5.09	4.57
41	0.41666	50.97	5.04	4.53
42	0.42708	50.93	5.00	4.50
43	0.43750	50.89	4.96	4.47
44	0.44791	50.83	4.90	4.42
45	0.45833	50.79	4.86	4.39
46	0.46875	50.73	4.80	4.34
47	0.47916	50.69	4.76	4.31
48	0.48958	50.65	4.72	4.27
49	0.50000	50.60	4.67	4.23
50	0.51041	50.54	4.61	4.18

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 3
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	PZR-2
Discharge 0.09 U.S.gal/min	Distance from the pumping well 9.75 ft
Static water level: 45.93 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
51	0.52083	50.49	4.56	4.14
52	0.53125	50.45	4.52	4.11
53	0.54166	50.42	4.49	4.09
54	0.55208	50.37	4.44	4.05
55	0.56250	50.32	4.39	4.00
56	0.57291	50.28	4.35	3.97
57	0.58333	50.23	4.30	3.93
58	0.59375	50.19	4.26	3.90
59	0.60416	50.15	4.22	3.86
60	0.64583	49.97	4.04	3.71
61	0.68750	49.82	3.89	3.59
62	0.72916	49.66	3.73	3.45
63	0.77083	49.51	3.58	3.32
64	0.81250	49.38	3.45	3.21
65	0.85416	49.27	3.34	3.12
66	0.89583	49.16	3.23	3.02
67	0.93750	49.05	3.12	2.93
68	0.97916	48.95	3.02	2.84
69	1.02083	48.86	2.93	2.76
70	1.06250	48.75	2.82	2.66
71	1.10416	48.67	2.74	2.59
72	1.14583	48.59	2.66	2.52
73	1.18750	48.51	2.58	2.45
74	1.22916	48.43	2.50	2.38
75	1.27083	48.36	2.43	2.31
76	1.31250	48.28	2.35	2.24
77	1.35416	48.24	2.31	2.20
78	1.39583	48.18	2.25	2.15
79	1.43750	48.12	2.19	2.09
80	1.47916	48.07	2.14	2.05
81	1.52083	48.01	2.08	1.99
82	1.56250	47.96	2.03	1.95
83	1.60416	47.90	1.97	1.89
84	1.64583	47.84	1.91	1.84
85	1.68750	47.80	1.87	1.80
86	1.72916	47.76	1.83	1.76
87	1.77083	47.72	1.79	1.73
88	1.81250	47.68	1.75	1.69
89	1.85416	47.66	1.73	1.67
90	1.89583	47.62	1.69	1.63
91	1.93750	47.59	1.66	1.60
92	1.97916	47.55	1.62	1.57
93	2.02083	47.52	1.59	1.54
94	2.06250	47.49	1.56	1.51
95	2.10416	47.46	1.53	1.48
96	2.14583	47.43	1.50	1.45
97	2.18750	47.40	1.47	1.43
98	2.22916	47.38	1.45	1.41
99	2.27083	47.36	1.43	1.39
100	2.31250	47.34	1.41	1.37

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 4
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	PZR-2
Discharge 0.09 U.S.gal/min	Distance from the pumping well 9.75 ft
Static water level: 45.93 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
101	2.35416	47.32	1.39	1.35
102	2.39583	47.30	1.37	1.33
103	2.43750	47.28	1.35	1.31
104	2.47916	47.27	1.34	1.30
105	2.52083	47.24	1.31	1.28
106	2.56250	47.22	1.29	1.26
107	2.60416	47.19	1.26	1.23
108	2.64583	47.16	1.23	1.20
109	2.68750	47.13	1.20	1.17
110	2.72916	47.10	1.17	1.14
111	2.77083	47.08	1.15	1.12
112	2.81250	47.07	1.14	1.11
113	2.85416	47.06	1.13	1.10
114	2.89583	47.05	1.12	1.09
115	2.93750	47.04	1.11	1.09
116	2.97916	47.04	1.11	1.09
117	3.02083	47.03	1.10	1.08
118	3.06250	47.02	1.09	1.07
119	3.10416	47.00	1.07	1.05
120	3.14583	46.98	1.05	1.03
121	3.18750	46.97	1.04	1.02
122	3.22916	46.95	1.02	1.00
123	3.27083	46.94	1.01	0.99
124	3.31250	46.93	1.00	0.98
125	3.35416	46.92	0.99	0.97
126	3.39583	46.91	0.98	0.96
127	3.43750	46.91	0.98	0.96
128	3.47916	46.90	0.97	0.95
129	3.52083	46.88	0.95	0.93
130	3.56250	46.87	0.94	0.92
131	3.60416	46.85	0.92	0.90
132	3.62708	46.84	0.91	0.89
133	3.62777	46.84	0.91	0.89
134	3.62847	46.84	0.91	0.89
135	3.62916	46.84	0.91	0.89
136	3.63194	46.84	0.91	0.89
137	3.63541	46.84	0.91	0.89
138	3.63889	46.84	0.91	0.89
139	3.64236	46.84	0.91	0.89
140	3.64583	46.83	0.90	0.88
141	3.64930	46.84	0.91	0.89
142	3.65277	46.84	0.91	0.89
143	3.65625	46.84	0.91	0.89
144	3.65972	46.83	0.90	0.88
145	3.66319	46.83	0.90	0.88
146	3.66666	46.83	0.90	0.88
147	3.67014	46.83	0.90	0.88
148	3.67361	46.83	0.90	0.88
149	3.67708	46.83	0.90	0.88
150	3.68055	46.82	0.89	0.87

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 5
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	PZR-2
Discharge 0.09 U.S.gal/min	Distance from the pumping well 9.75 ft
Static water level: 45.93 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
151	3.68402	46.82	0.89	0.87
152	3.68750	46.82	0.89	0.87
153	3.69097	46.82	0.89	0.87
154	3.69444	46.82	0.89	0.87
155	3.70139	46.82	0.89	0.87
156	3.70833	46.81	0.88	0.86
157	3.71527	46.81	0.88	0.86
158	3.72222	46.81	0.88	0.86
159	3.72916	46.80	0.87	0.85
160	3.73611	46.81	0.88	0.86
161	3.74305	46.81	0.88	0.86
162	3.75000	46.80	0.87	0.85
163	3.75694	46.80	0.87	0.85
164	3.76389	46.80	0.87	0.85
165	3.77083	46.79	0.86	0.85
166	3.77777	46.79	0.86	0.85
167	3.79166	46.80	0.87	0.85
168	3.81250	46.79	0.86	0.85
169	3.83333	46.79	0.86	0.85
170	3.85416	46.79	0.86	0.85
171	3.87500	46.78	0.85	0.84
172	3.89583	46.78	0.85	0.84
173	3.91666	46.78	0.85	0.84
174	3.93750	46.78	0.85	0.84
175	3.95833	46.77	0.84	0.83
176	3.97916	46.77	0.84	0.83
177	4.00000	46.77	0.84	0.83
178	4.02083	46.76	0.83	0.82
179	4.04166	46.76	0.83	0.82
180	4.06250	46.75	0.82	0.81
181	4.08333	46.75	0.82	0.81
182	4.10416	46.75	0.82	0.81
183	4.12500	46.74	0.81	0.80
184	4.14583	46.73	0.80	0.79
185	4.16666	46.73	0.80	0.79
186	4.18750	46.72	0.79	0.78
187	4.20833	46.72	0.79	0.78
188	4.22916	46.72	0.79	0.78
189	4.25000	46.71	0.78	0.77
190	4.27083	46.71	0.78	0.77
191	4.29166	46.71	0.78	0.77
192	4.31250	46.70	0.77	0.76
193	4.33333	46.70	0.77	0.76
194	4.35416	46.70	0.77	0.76
195	4.37500	46.70	0.77	0.76
196	4.39583	46.70	0.77	0.76
197	4.41666	46.70	0.77	0.76
198	4.43750	46.69	0.76	0.75
199	4.45833	46.69	0.76	0.75
200	4.47916	46.69	0.76	0.75

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 6
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	PZR-2
Discharge 0.09 U.S.gal/min	Distance from the pumping well 9.75 ft
Static water level: 45.93 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
201	4.52083	46.68	0.75	0.74
202	4.56250	46.67	0.74	0.73
203	4.60416	46.66	0.73	0.72
204	4.64583	46.65	0.72	0.71
205	4.68750	46.63	0.70	0.69
206	4.72916	46.63	0.70	0.69
207	4.77083	46.62	0.69	0.68
208	4.81250	46.62	0.69	0.68
209	4.85416	46.61	0.68	0.67
210	4.89583	46.61	0.68	0.67
211	4.93750	46.61	0.68	0.67
212	4.97916	46.61	0.68	0.67
213	5.02083	46.61	0.68	0.67
214	5.06250	46.60	0.67	0.66
215	5.10416	46.60	0.67	0.66
216	5.14583	46.59	0.66	0.65
217	5.18750	46.58	0.65	0.64
218	5.22916	46.58	0.65	0.64
219	5.27083	46.57	0.64	0.63
220	5.31250	46.57	0.64	0.63
221	5.35416	46.57	0.64	0.63
222	5.39583	46.57	0.64	0.63
223	5.43750	46.57	0.64	0.63
224	5.47916	46.57	0.64	0.63
225	5.52083	46.56	0.63	0.62
226	5.56250	46.55	0.62	0.61
227	5.60416	46.54	0.61	0.60
228	5.64583	46.53	0.60	0.59
229	5.68750	46.51	0.58	0.57
230	5.72916	46.51	0.58	0.57
231	5.77083	46.50	0.57	0.56
232	5.81250	46.50	0.57	0.56
233	5.85416	46.50	0.57	0.56
234	5.89583	46.50	0.57	0.56
235	5.93750	46.50	0.57	0.56
236	5.97916	46.50	0.57	0.56
237	6.02083	46.50	0.57	0.56
238	6.06250	46.49	0.56	0.55
239	6.10416	46.49	0.56	0.55
240	6.14583	46.49	0.56	0.55
241	6.18750	46.48	0.55	0.54
242	6.22916	46.48	0.55	0.54
243	6.27083	46.48	0.55	0.54
244	6.31250	46.48	0.55	0.54
245	6.35416	46.49	0.56	0.55
246	6.39583	46.49	0.56	0.55
247	6.43750	46.49	0.56	0.55
248	6.47916	46.49	0.56	0.55
249	6.52083	46.48	0.55	0.54
250	6.56250	46.47	0.54	0.53

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 7 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	PZR-2
Discharge 0.09 U.S.gal/min	Distance from the pumping well 9.75 ft
Static water level: 45.93 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
251	6.60416	46.47	0.54	0.53
252	6.62500	46.46	0.53	0.52
253	6.63194	46.46	0.53	0.52
254	6.63889	46.46	0.53	0.52
255	6.64583	46.46	0.53	0.52
256	6.65277	46.46	0.53	0.52
257	6.65972	46.45	0.52	0.51
258	6.66666	46.45	0.52	0.51
259	6.67361	46.45	0.52	0.51
260	6.68750	46.44	0.51	0.50
261	6.70833	46.44	0.51	0.50
262	6.72916	46.44	0.51	0.50
263	6.75000	46.44	0.51	0.50
264	6.77083	46.44	0.51	0.50
265	6.79166	46.44	0.51	0.50
266	6.81250	46.44	0.51	0.50
267	6.83333	46.44	0.51	0.50
268	6.85416	46.44	0.51	0.50
269	6.87500	46.44	0.51	0.50
270	6.89583	46.44	0.51	0.50
271	6.91666	46.44	0.51	0.50
272	6.93750	46.44	0.51	0.50
273	6.95833	46.44	0.51	0.50
274	6.97916	46.44	0.51	0.50
275	7.00000	46.45	0.52	0.51
276	7.02083	46.45	0.52	0.51
277	7.04166	46.45	0.52	0.51
278	7.06250	46.45	0.52	0.51
279	7.08333	46.44	0.51	0.50
280	7.10416	46.44	0.51	0.50
281	7.12500	46.44	0.51	0.50
282	7.14583	46.44	0.51	0.50
283	7.16666	46.44	0.51	0.50
284	7.18750	46.44	0.51	0.50
285	7.20833	46.43	0.50	0.49
286	7.22916	46.43	0.50	0.49
287	7.25000	46.43	0.50	0.49
288	7.27083	46.43	0.50	0.49
289	7.29166	46.44	0.51	0.50
290	7.31250	46.44	0.51	0.50
291	7.33333	46.44	0.51	0.50
292	7.35416	46.44	0.51	0.50
293	7.37500	46.44	0.51	0.50
294	7.39583	46.44	0.51	0.50
295	7.41666	46.44	0.51	0.50
296	7.43750	46.44	0.51	0.50
297	7.45833	46.44	0.51	0.50
298	7.47916	46.44	0.51	0.50
299	7.50000	46.44	0.51	0.50
300	7.52083	46.44	0.51	0.50

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 8
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	PZR-2
Discharge 0.09 U.S.gal/min	Distance from the pumping well 9.75 ft
Static water level: 45.93 ft below datum	Pumping test duration: 2.35417 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
301	7.54166	46.44	0.51	0.50
302	7.56250	46.44	0.51	0.50
303	7.58333	46.44	0.51	0.50
304	7.60416	46.44	0.51	0.50
305	7.62500	46.43	0.50	0.49
306	7.64583	46.43	0.50	0.49
307	7.66666	46.42	0.49	0.49
308	7.68750	46.42	0.49	0.49
309	7.70833	46.41	0.48	0.48
310	7.72916	46.41	0.48	0.48
311	7.75000	46.41	0.48	0.48
312	7.77083	46.41	0.48	0.48

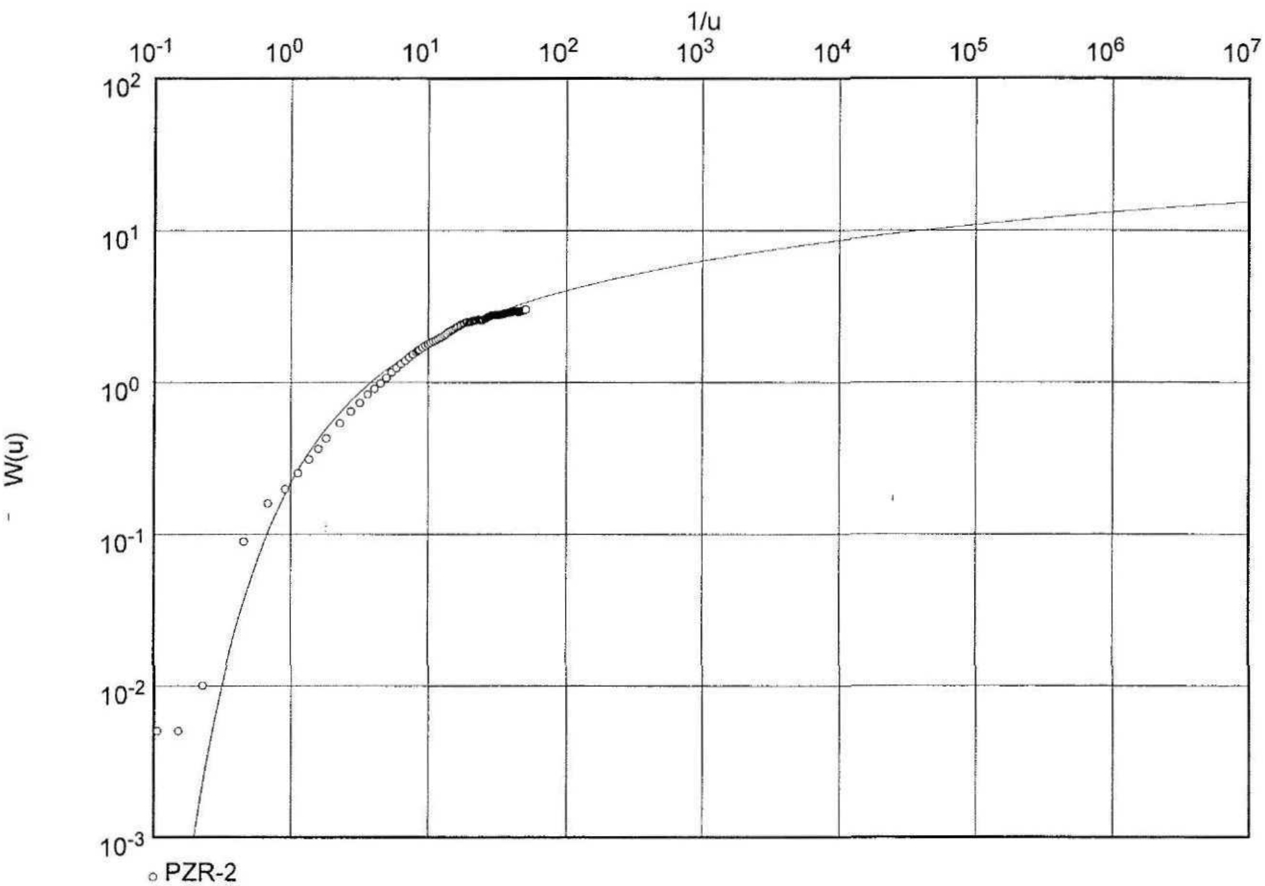
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-03-98	Page 9
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	
Discharge 0.09 U.S.gal/min	
	Pumping test duration: 2.35417 d

	Pumping test duration [d]	Discharge [U.S.gal/min]		
1	0.00000	0.40		
2	2.35417	0.40		
3	2.35486	0.00		
4	10.12500	0.00		

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-26-98 | Page 1 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	
Discharge 0.40 U.S.gal/min	



Transmissivity [ft²/d]: 3.07×10^{0}

Hydraulic conductivity [ft/d]: 1.22×10^{-1}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-26-98 | Page 2 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	PZR-2
Discharge 0.40 U.S.gal/min	Distance from the pumping well 9.66 ft

Static water level: 45.99 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.00417	46.00	0.01	0.01
3	0.00486	46.00	0.01	0.01
4	0.00694	46.00	0.01	0.01
5	0.01042	46.01	0.02	0.02
6	0.02083	46.17	0.18	0.18
7	0.03125	46.31	0.32	0.32
8	0.04167	46.39	0.40	0.40
9	0.05208	46.50	0.51	0.50
10	0.06250	46.62	0.63	0.62
11	0.07292	46.73	0.74	0.73
12	0.08333	46.86	0.87	0.85
13	0.10417	47.09	1.10	1.08
14	0.12500	47.31	1.32	1.29
15	0.14583	47.50	1.51	1.46
16	0.16667	47.71	1.72	1.66
17	0.18750	47.88	1.89	1.82
18	0.20833	48.04	2.05	1.97
19	0.22917	48.23	2.24	2.14
20	0.25000	48.44	2.45	2.33
21	0.27083	48.62	2.63	2.49
22	0.29167	48.79	2.80	2.64
23	0.31250	48.95	2.96	2.78
24	0.33333	49.11	3.12	2.93
25	0.35417	49.26	3.27	3.06
26	0.37500	49.38	3.39	3.16
27	0.38507	49.46	3.47	3.23
28	0.38519	49.46	3.47	3.23
29	0.38530	49.46	3.47	3.23
30	0.38542	49.46	3.47	3.23
31	0.38611	49.46	3.47	3.23
32	0.38681	49.47	3.48	3.24
33	0.38750	49.47	3.48	3.24
34	0.39583	49.52	3.53	3.28
35	0.41667	49.65	3.66	3.39
36	0.43750	49.76	3.77	3.49
37	0.45833	49.87	3.88	3.58
38	0.47917	49.95	3.96	3.65
39	0.50000	50.04	4.05	3.72
40	0.52083	50.13	4.14	3.80
41	0.54167	50.22	4.23	3.87
42	0.56250	50.29	4.30	3.93
43	0.58333	50.37	4.38	4.00
44	0.60417	50.47	4.48	4.08
45	0.62500	50.59	4.60	4.18
46	0.64583	50.71	4.72	4.27
47	0.66667	50.81	4.82	4.36
48	0.68750	50.91	4.92	4.44
49	0.70833	50.99	5.00	4.50
50	0.72917	51.10	5.11	4.59

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-26-98	Page 3
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	PZR-2
Discharge 0.40 U.S.gal/min	Distance from the pumping well 9.66 ft

Static water level: 45.99 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	0.75000	51.17	5.18	4.64
52	0.77083	51.23	5.24	4.69
53	0.79167	51.31	5.32	4.75
54	0.81250	51.40	5.41	4.82
55	0.83333	51.47	5.48	4.88
56	0.85417	51.53	5.54	4.93
57	0.87500	51.58	5.59	4.97
58	0.89583	51.64	5.65	5.01
59	0.91667	51.63	5.64	5.00
60	0.93750	51.66	5.67	5.03
61	0.95833	51.68	5.69	5.04
62	0.97917	51.73	5.74	5.08
63	1.00000	51.76	5.77	5.10
64	1.02083	51.79	5.80	5.13
65	1.04167	51.82	5.83	5.15
66	1.06250	51.86	5.87	5.18
67	1.08333	51.84	5.85	5.17
68	1.10417	51.78	5.79	5.12
69	1.12500	51.77	5.78	5.11
70	1.14583	51.83	5.84	5.16
71	1.16667	51.89	5.90	5.20
72	1.18750	51.94	5.95	5.24
73	1.20833	52.00	6.01	5.29
74	1.22917	52.06	6.07	5.33
75	1.25000	52.11	6.12	5.37
76	1.27083	52.19	6.20	5.43
77	1.29167	52.25	6.26	5.48
78	1.31250	52.29	6.30	5.51
79	1.33333	52.31	6.32	5.52
80	1.35417	52.33	6.34	5.54
81	1.37500	52.33	6.34	5.54
82	1.39583	52.34	6.35	5.54
83	1.41667	52.34	6.35	5.54
84	1.43750	52.34	6.35	5.54
85	1.45833	52.34	6.35	5.54
86	1.47917	52.34	6.35	5.54
87	1.50000	52.35	6.36	5.55
88	1.52083	52.37	6.38	5.57
89	1.54167	52.38	6.39	5.57
90	1.56250	52.40	6.41	5.59
91	1.58333	52.43	6.44	5.61
92	1.60417	52.46	6.47	5.63
93	1.62500	52.49	6.50	5.65
94	1.64583	52.51	6.52	5.67
95	1.66667	52.53	6.54	5.68
96	1.68750	52.55	6.56	5.70
97	1.70833	52.56	6.57	5.71
98	1.72917	52.58	6.59	5.72
99	1.75000	52.59	6.60	5.73
100	1.77083	52.61	6.62	5.74

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-26-98	Page 4
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	PZR-2
Discharge 0.40 U.S.gal/min	Distance from the pumping well 9.66 ft
Static water level: 45.99 ft below datum	

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
101	1.79167	52.62	6.63	5.75
102	1.81250	52.65	6.66	5.77
103	1.83333	52.67	6.68	5.79
104	1.85417	52.69	6.70	5.80
105	1.87500	52.71	6.72	5.82
106	1.89583	52.74	6.75	5.84
107	1.91667	52.77	6.78	5.86
108	1.93750	52.78	6.79	5.87
109	1.95660	52.79	6.80	5.88
110	1.95694	52.79	6.80	5.88
111	1.95729	52.79	6.80	5.88
112	1.95833	52.79	6.80	5.88
113	1.97917	52.80	6.81	5.88
114	2.00000	52.80	6.81	5.88
115	2.02083	52.75	6.76	5.85
116	2.04167	52.71	6.72	5.82
117	2.06250	52.65	6.66	5.77
118	2.08333	52.68	6.69	5.79
119	2.10417	52.71	6.72	5.82
120	2.12500	52.73	6.74	5.83
121	2.14583	52.74	6.75	5.84
122	2.16667	52.76	6.77	5.85
123	2.18750	52.79	6.80	5.88
124	2.20833	52.83	6.84	5.90
125	2.22917	52.86	6.87	5.93
126	2.25000	52.90	6.91	5.96
127	2.27083	52.92	6.93	5.97
128	2.29167	52.95	6.96	5.99
129	2.31250	52.96	6.97	6.00
130	2.33333	52.98	6.99	6.01
131	2.35417	53.00	7.01	6.03

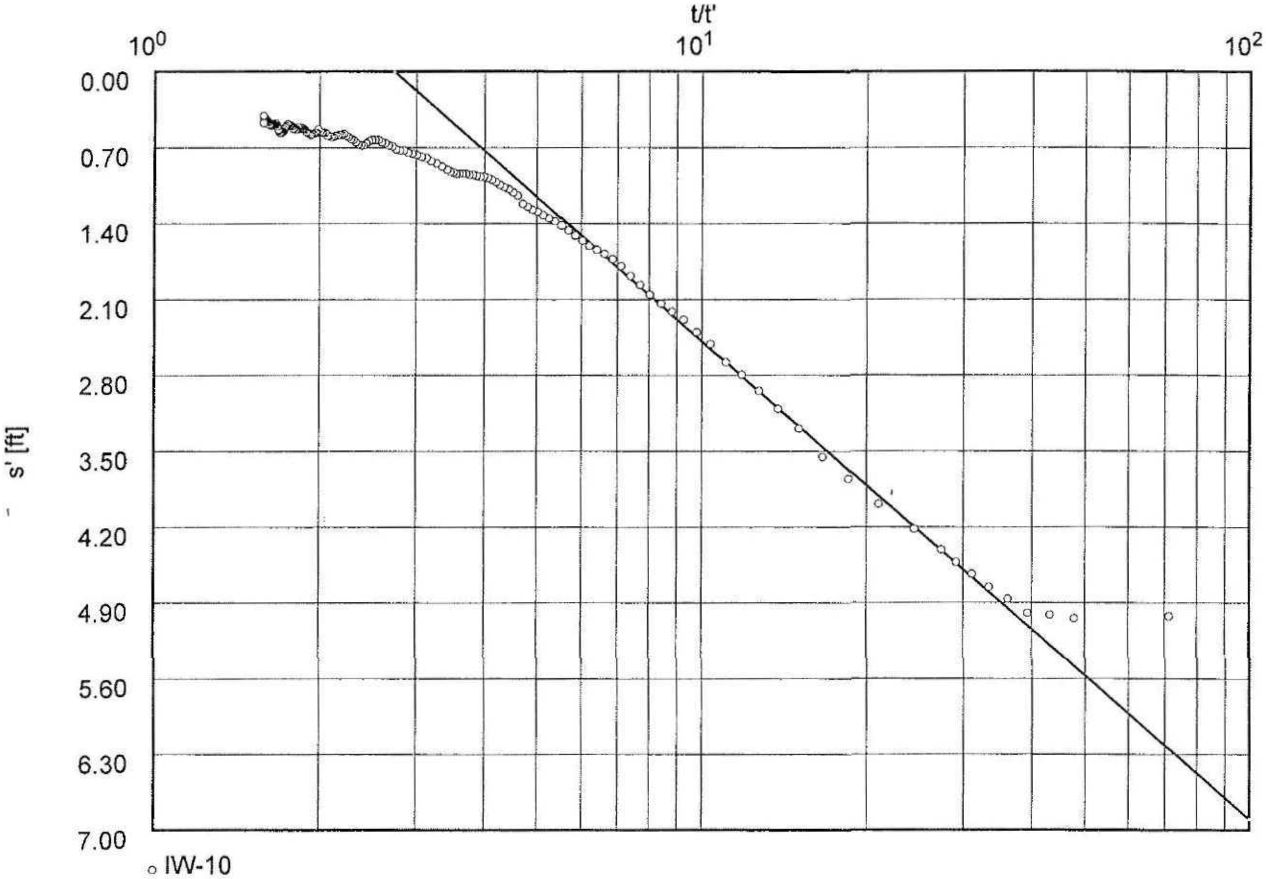
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-26-98	Page 5
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-6	Test conducted on: 09-09-98
PZR-2	measured with inline flow meter
Discharge 0.40 U.S.gal/min	

	Pumping test duration [d]	Discharge [U.S.gal/min]		
1	0.00000	0.40		
2	2.36111	0.40		

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-04-98 | Page 1 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-10 Recovery	Test conducted on: 09-15-98
IW-10	
Discharge 0.14 U.S.gal/min	
	Pumping test duration: 2.93056 d



Transmissivity [ft²/d]: 1.14×10^0

Hydraulic conductivity [ft/d]: 4.56×10^{-2}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-04-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-10 Recovery	Test conducted on: 09-15-98
IW-10	IW-10
Discharge 0.14 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 42.64 ft below datum	Pumping test duration: 2.93056 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
1	0.04167	48.31	5.67	5.03
2	0.06250	48.33	5.69	5.04
3	0.06944	48.29	5.65	5.01
4	0.07639	48.27	5.63	5.00
5	0.08333	48.10	5.46	4.86
6	0.09028	47.96	5.32	4.75
7	0.09722	47.81	5.17	4.64
8	0.10417	47.67	5.03	4.52
9	0.11111	47.53	4.89	4.41
10	0.12500	47.29	4.65	4.22
11	0.14583	47.01	4.37	3.99
12	0.16667	46.73	4.09	3.76
13	0.18750	46.49	3.85	3.55
14	0.20833	46.18	3.54	3.29
15	0.22917	45.97	3.33	3.11
16	0.25000	45.78	3.14	2.94
17	0.27083	45.61	2.97	2.79
18	0.29167	45.48	2.84	2.68
19	0.31250	45.29	2.65	2.51
20	0.33333	45.17	2.53	2.40
21	0.35417	45.04	2.40	2.28
22	0.37500	44.96	2.32	2.21
23	0.39583	44.88	2.24	2.14
24	0.41667	44.79	2.15	2.06
25	0.43750	44.69	2.05	1.97
26	0.45833	44.60	1.96	1.88
27	0.47917	44.50	1.86	1.79
28	0.50000	44.43	1.79	1.73
29	0.52083	44.38	1.74	1.68
30	0.54167	44.34	1.70	1.64
31	0.56250	44.30	1.66	1.60
32	0.58333	44.25	1.61	1.56
33	0.60417	44.20	1.56	1.51
34	0.62500	44.15	1.51	1.46
35	0.64583	44.10	1.46	1.42
36	0.66667	44.06	1.42	1.38
37	0.68750	44.03	1.39	1.35
38	0.70833	44.00	1.36	1.32
39	0.72917	43.97	1.33	1.29
40	0.75000	43.95	1.31	1.28
41	0.77083	43.92	1.28	1.25
42	0.79167	43.89	1.25	1.22
43	0.81250	43.81	1.17	1.14
44	0.83333	43.78	1.14	1.11
45	0.85417	43.75	1.11	1.09
46	0.87500	43.73	1.09	1.07
47	0.89583	43.71	1.07	1.05
48	0.91667	43.68	1.04	1.02
49	0.93750	43.66	1.02	1.00
50	0.95833	43.64	1.00	0.98

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-04-98	Page 3
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-10 Recovery	Test conducted on: 09-15-98
IW-10	IW-10
Discharge 0.14 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 42.64 ft below datum	Pumping test duration: 2.93056 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
51	0.97917	43.63	0.99	0.97
52	1.00000	43.63	0.99	0.97
53	1.02083	43.62	0.98	0.96
54	1.04167	43.61	0.97	0.95
55	1.06250	43.61	0.97	0.95
56	1.08333	43.60	0.96	0.94
57	1.10417	43.60	0.96	0.94
58	1.12500	43.60	0.96	0.94
59	1.14583	43.60	0.96	0.94
60	1.16667	43.59	0.95	0.93
61	1.18750	43.58	0.94	0.92
62	1.20833	43.56	0.92	0.90
63	1.25000	43.53	0.89	0.87
64	1.29167	43.50	0.86	0.85
65	1.33333	43.48	0.84	0.83
66	1.37500	43.45	0.81	0.80
67	1.41667	43.44	0.80	0.79
68	1.45833	43.42	0.78	0.77
69	1.50000	43.41	0.77	0.76
70	1.54167	43.40	0.76	0.75
71	1.58333	43.38	0.74	0.73
72	1.62500	43.38	0.74	0.73
73	1.66667	43.37	0.73	0.72
74	1.70833	43.34	0.70	0.69
75	1.75000	43.33	0.69	0.68
76	1.79167	43.31	0.67	0.66
77	1.83333	43.30	0.66	0.65
78	1.87500	43.28	0.64	0.63
79	1.91667	43.28	0.64	0.63
80	1.95833	43.28	0.64	0.63
81	2.00000	43.29	0.65	0.64
82	2.04167	43.31	0.67	0.66
83	2.08333	43.33	0.69	0.68
84	2.12500	43.33	0.69	0.68
85	2.16667	43.32	0.68	0.67
86	2.20833	43.30	0.66	0.65
87	2.25000	43.28	0.64	0.63
88	2.29167	43.27	0.63	0.62
89	2.33333	43.25	0.61	0.60
90	2.37500	43.24	0.60	0.59
91	2.41667	43.22	0.58	0.57
92	2.45833	43.23	0.59	0.58
93	2.50000	43.23	0.59	0.58
94	2.54167	43.24	0.60	0.59
95	2.58333	43.24	0.60	0.59
96	2.62500	43.25	0.61	0.60
97	2.66667	43.25	0.61	0.60
98	2.70833	43.24	0.60	0.59
99	2.75000	43.24	0.60	0.59
100	2.79167	43.21	0.57	0.56

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-04-98	Page 4 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-10 Recovery	Test conducted on: 09-15-98
IW-10	IW-10
Discharge 0.14 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 42.64 ft below datum	Pumping test duration: 2.93056 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
101	2.83333	43.21	0.57	0.56
102	2.87500	43.21	0.57	0.56
103	2.91667	43.20	0.56	0.55
104	2.95833	43.18	0.54	0.53
105	3.00000	43.21	0.57	0.56
106	3.04167	43.21	0.57	0.56
107	3.08333	43.22	0.58	0.57
108	3.12500	43.22	0.58	0.57
109	3.16667	43.23	0.59	0.58
110	3.20833	43.22	0.58	0.57
111	3.25000	43.21	0.57	0.56
112	3.29167	43.20	0.56	0.55
113	3.33333	43.18	0.54	0.53
114	3.37500	43.17	0.53	0.52
115	3.41667	43.17	0.53	0.52
116	3.45833	43.16	0.52	0.51
117	3.50000	43.17	0.53	0.52
118	3.54167	43.16	0.52	0.51
119	3.58333	43.18	0.54	0.53
120	3.62500	43.18	0.54	0.53
121	3.66667	43.17	0.53	0.52
122	3.70833	43.17	0.53	0.52
123	3.75000	43.15	0.51	0.50
124	3.79167	43.14	0.50	0.49
125	3.83333	43.14	0.50	0.49
126	3.87500	43.13	0.49	0.49
127	3.91667	43.13	0.49	0.49
128	3.95833	43.15	0.51	0.50
129	4.00000	43.16	0.52	0.51
130	4.04167	43.18	0.54	0.53
131	4.08333	43.20	0.56	0.55
132	4.12500	43.20	0.56	0.55
133	4.16667	43.21	0.57	0.56
134	4.20833	43.21	0.57	0.56
135	4.25000	43.19	0.55	0.54
136	4.29167	43.18	0.54	0.53
137	4.33333	43.15	0.51	0.50
138	4.37500	43.13	0.49	0.49
139	4.41667	43.12	0.48	0.48
140	4.45833	43.13	0.49	0.49
141	4.50000	43.13	0.49	0.49
142	4.54167	43.13	0.49	0.49
143	4.58333	43.14	0.50	0.49
144	4.62500	43.14	0.50	0.49
145	4.66667	43.14	0.50	0.49
146	4.70833	43.13	0.49	0.49
147	4.75000	43.11	0.47	0.47
148	4.79167	43.10	0.46	0.46
149	4.83333	43.09	0.45	0.45
150	4.87500	43.09	0.45	0.45

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-04-98	Page 5 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-10 Recovery	Test conducted on: 09-15-98
IW-10	IW-10
Discharge 0.14 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 42.64 ft below datum	Pumping test duration: 2.93056 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
151	4.91667	43.09	0.45	0.45
152	4.95833	43.09	0.45	0.45
153	5.00000	43.10	0.46	0.46
154	5.03316	43.09	0.45	0.45
155	5.03328	43.11	0.47	0.47
156	5.03339	43.11	0.47	0.47
157	5.03351	43.12	0.48	0.48
158	5.03363	43.11	0.47	0.47
159	5.03374	43.12	0.48	0.48
160	5.03385	43.05	0.41	0.41
161	5.03397	43.11	0.47	0.47
162	5.03408	43.11	0.47	0.47
163	5.03420	43.11	0.47	0.47
164	5.03432	43.12	0.48	0.48
165	5.03443	43.12	0.48	0.48
166	5.03455	43.11	0.47	0.47
167	5.03467	43.12	0.48	0.48
168	5.03478	43.11	0.47	0.47
169	5.03490	43.12	0.48	0.48
170	5.03501	43.09	0.45	0.45
171	5.03513	43.12	0.48	0.48
172	5.03524	43.12	0.48	0.48
173	5.03536	43.12	0.48	0.48
174	5.03547	43.05	0.41	0.41
175	5.03559	43.12	0.48	0.48

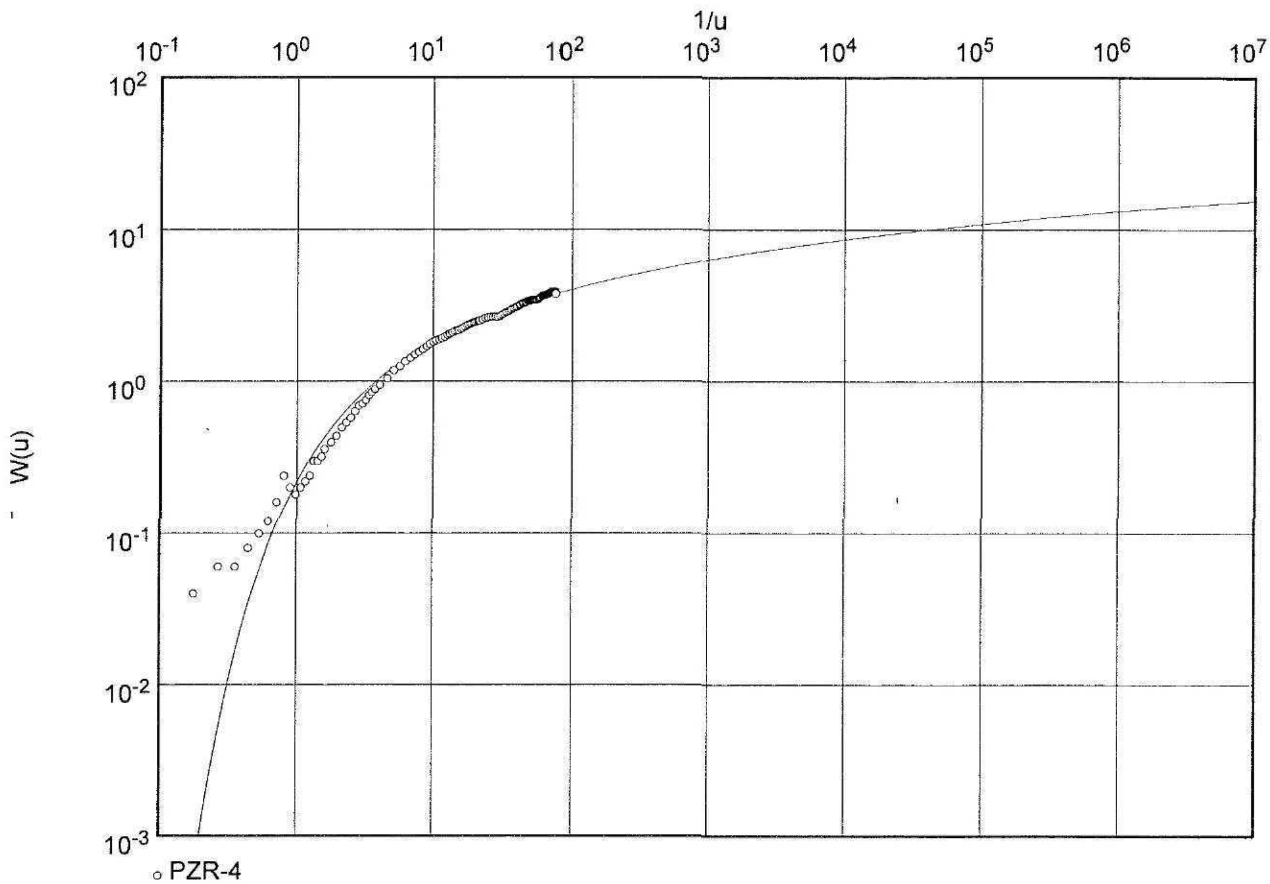
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-04-98	Page 6
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-10 Recovery	Test conducted on: 09-15-98
IW-10	IW-10 discharge
Discharge 0.14 U.S.gal/min	
	Pumping test duration: 2.93056 d

	Pumping test duration [d]	Discharge [U.S.gal/min]		
1	0.00000	0.40		
2	2.93056	0.40		
3	2.93125	0.00		
4	8.19444	0.00		

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98 | Page 1 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-10	Test conducted on: 09-15-98
PZR-4	
Discharge 0.40 U.S.gal/min	



Transmissivity [ft²/d]: 1.21×10^{1}

Hydraulic conductivity [ft/d]: 4.87×10^{-1}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-10	Test conducted on: 09-15-98
PZR-4	PZR-4
Discharge 0.40 U.S.gal/min	Distance from the pumping well 9.25 ft

Static water level: 44.66 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.00347	44.67	0.01	0.01
3	0.00694	44.68	0.02	0.02
4	0.01042	44.69	0.03	0.03
5	0.01389	44.69	0.03	0.03
6	0.01736	44.70	0.04	0.04
7	0.02083	44.71	0.05	0.05
8	0.02431	44.72	0.06	0.06
9	0.02778	44.74	0.08	0.08
10	0.03125	44.78	0.12	0.12
11	0.03472	44.76	0.10	0.10
12	0.03819	44.75	0.09	0.09
13	0.04167	44.76	0.10	0.10
14	0.04514	44.77	0.11	0.11
15	0.04861	44.78	0.12	0.12
16	0.05208	44.81	0.15	0.15
17	0.05556	44.81	0.15	0.15
18	0.05903	44.82	0.16	0.16
19	0.06250	44.84	0.18	0.18
20	0.06944	44.86	0.20	0.20
21	0.07639	44.88	0.22	0.22
22	0.08333	44.91	0.25	0.25
23	0.09028	44.93	0.27	0.27
24	0.09722	44.95	0.29	0.29
25	0.10417	44.98	0.32	0.32
26	0.11111	45.01	0.35	0.35
27	0.11806	45.02	0.36	0.36
28	0.12500	45.04	0.38	0.38
29	0.13194	45.07	0.41	0.41
30	0.13889	45.09	0.43	0.43
31	0.14583	45.11	0.45	0.45
32	0.15972	45.14	0.48	0.48
33	0.18056	45.19	0.53	0.52
34	0.20139	45.26	0.60	0.59
35	0.22222	45.30	0.64	0.63
36	0.24306	45.35	0.69	0.68
37	0.26389	45.39	0.73	0.72
38	0.28472	45.43	0.77	0.76
39	0.30556	45.46	0.80	0.79
40	0.32639	45.49	0.83	0.82
41	0.34722	45.53	0.87	0.85
42	0.36806	45.56	0.90	0.88
43	0.38889	45.59	0.93	0.91
44	0.40972	45.61	0.95	0.93
45	0.43056	45.63	0.97	0.95
46	0.45139	45.65	0.99	0.97
47	0.47222	45.67	1.01	0.99
48	0.49306	45.70	1.04	1.02
49	0.51389	45.72	1.06	1.04
50	0.53472	45.74	1.08	1.06

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 3
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-10	Test conducted on: 09-15-98
PZR-4	PZR-4
Discharge 0.40 U.S.gal/min	Distance from the pumping well 9.25 ft

Static water level: 44.66 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	0.55556	45.76	1.10	1.08
52	0.57639	45.77	1.11	1.09
53	0.59722	45.78	1.12	1.09
54	0.61806	45.80	1.14	1.11
55	0.63889	45.82	1.16	1.13
56	0.65972	45.84	1.18	1.15
57	0.68056	45.86	1.20	1.17
58	0.70139	45.88	1.22	1.19
59	0.72222	45.89	1.23	1.20
60	0.74306	45.91	1.25	1.22
61	0.76389	45.92	1.26	1.23
62	0.78472	45.93	1.27	1.24
63	0.80556	45.94	1.28	1.25
64	0.82639	45.95	1.29	1.26
65	0.84722	45.96	1.30	1.27
66	0.88889	45.98	1.32	1.29
67	0.93056	46.01	1.35	1.31
68	0.97222	46.02	1.36	1.32
69	1.01389	46.03	1.37	1.33
70	1.05556	46.03	1.37	1.33
71	1.09722	46.03	1.37	1.33
72	1.13889	46.03	1.37	1.33
73	1.18056	46.05	1.39	1.35
74	1.22222	46.08	1.42	1.38
75	1.26389	46.10	1.44	1.40
76	1.30556	46.13	1.47	1.43
77	1.34722	46.15	1.49	1.45
78	1.38889	46.17	1.51	1.46
79	1.43056	46.20	1.54	1.49
80	1.47222	46.22	1.56	1.51
81	1.51389	46.24	1.58	1.53
82	1.55556	46.26	1.60	1.55
83	1.59722	46.28	1.62	1.57
84	1.63889	46.30	1.64	1.59
85	1.68056	46.33	1.67	1.61
86	1.72222	46.35	1.69	1.63
87	1.76389	46.37	1.71	1.65
88	1.80556	46.38	1.72	1.66
89	1.84722	46.40	1.74	1.68
90	1.88889	46.42	1.76	1.70
91	1.93056	46.43	1.77	1.71
92	1.97222	46.44	1.78	1.72
93	2.01389	46.44	1.78	1.72
94	2.05556	46.44	1.78	1.72
95	2.09722	46.44	1.78	1.72
96	2.13889	46.44	1.78	1.72
97	2.18056	46.45	1.79	1.73
98	2.22222	46.46	1.80	1.74
99	2.26389	46.48	1.82	1.75
100	2.30556	46.50	1.84	1.77

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 4
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-10	Test conducted on: 09-15-98
PZR-4	PZR-4
Discharge 0.40 U.S.gal/min	Distance from the pumping well 9.25 ft
Static water level: 44.66 ft below datum	

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
101	2.34722	46.53	1.87	1.80
102	2.38889	46.56	1.90	1.83
103	2.43056	46.57	1.91	1.84
104	2.47222	46.58	1.92	1.85
105	2.51389	46.59	1.93	1.86
106	2.55556	46.60	1.94	1.86
107	2.59722	46.60	1.94	1.86
108	2.63889	46.62	1.96	1.88
109	2.68056	46.64	1.98	1.90
110	2.72222	46.66	2.00	1.92
111	2.76389	46.68	2.02	1.94
112	2.80556	46.69	2.03	1.95
113	2.84722	46.70	2.04	1.96
114	2.88889	46.70	2.04	1.96
115	2.93056	46.70	2.04	1.96
116	2.97222	46.70	2.04	1.96
117	2.99306	46.69	2.03	1.95
118	3.00000	46.70	2.04	1.96
119	3.00694	46.68	2.02	1.94
120	3.01389	46.68	2.02	1.94
121	3.02083	46.66	2.00	1.92
122	3.02778	46.63	1.97	1.89

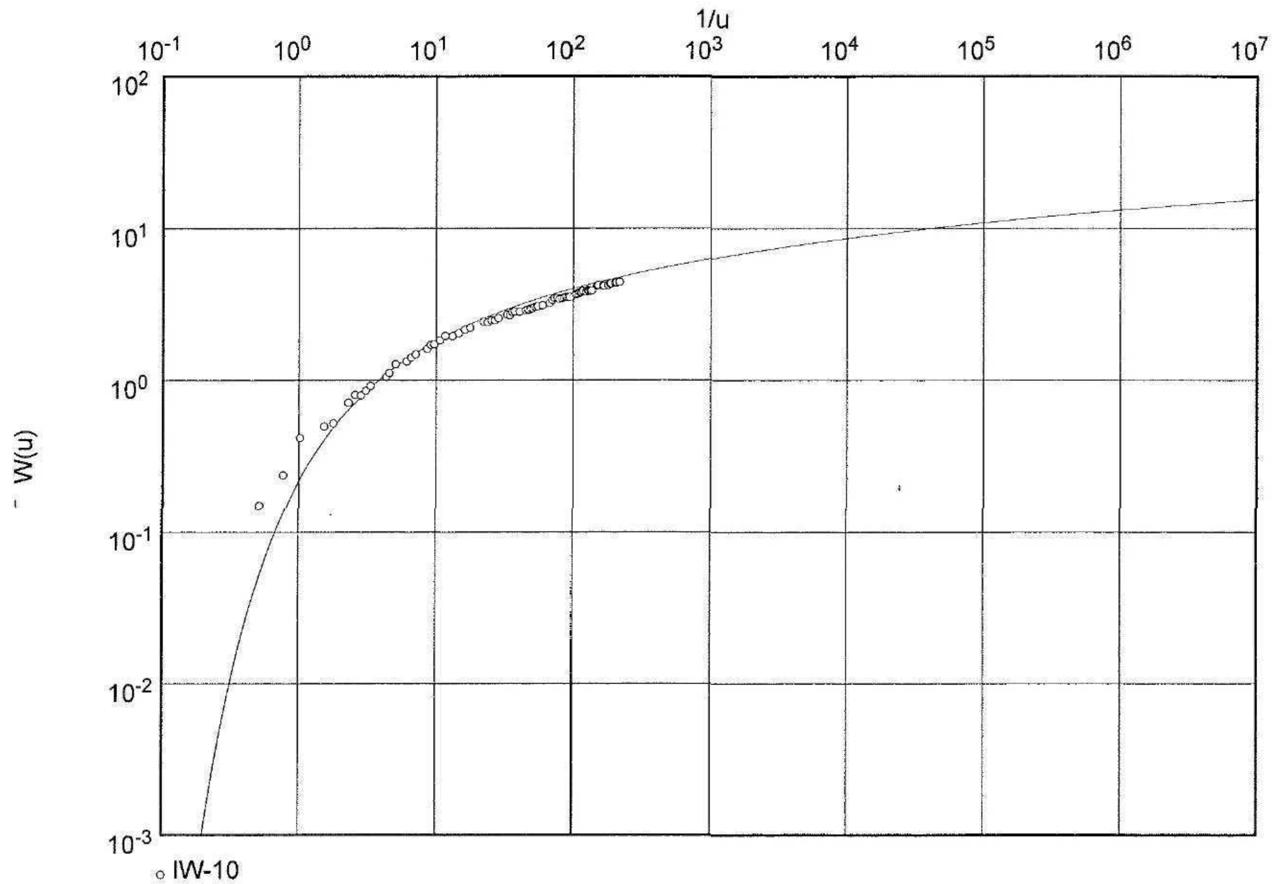
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 5
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-10	Test conducted on: 09-15-98
PZR-4	Inline Flow Meter
Discharge 0.40 U.S.gal/min	

	Pumping test duration [d]	Discharge [U.S.gal/min]		
1	0.00000	0.40		
2	2.91667	0.40		

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 1
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-10	Test conducted on: 09-15-98
IW-10	
Discharge 0.40 U.S.gal/min	



Transmissivity [ft²/d]: 5.38×10^{0}

Hydraulic conductivity [ft/d]: 2.15×10^{-1}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-10	Test conducted on: 09-15-98
IW-10	IW-10
Discharge 0.40 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 42.64 ft below datum	

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.00347	42.63	-0.01	-0.01
3	0.00694	42.81	0.17	0.17
4	0.01042	42.91	0.27	0.27
5	0.01389	43.12	0.48	0.48
6	0.02083	43.21	0.57	0.56
7	0.02431	43.24	0.60	0.59
8	0.03125	43.46	0.82	0.81
9	0.03472	43.57	0.93	0.91
10	0.03819	43.56	0.92	0.90
11	0.04167	43.63	0.99	0.97
12	0.04514	43.71	1.07	1.05
13	0.05903	43.87	1.23	1.20
14	0.06250	43.94	1.30	1.27
15	0.06944	44.14	1.50	1.45
16	0.08333	44.21	1.57	1.52
17	0.09028	44.30	1.66	1.60
18	0.09722	44.39	1.75	1.69
19	0.11806	44.55	1.91	1.84
20	0.12500	44.68	2.04	1.96
21	0.13194	44.70	2.06	1.98
22	0.14583	44.82	2.18	2.08
23	0.15972	44.99	2.35	2.24
24	0.18056	44.98	2.34	2.23
25	0.20139	45.08	2.44	2.32
26	0.22222	45.22	2.58	2.45
27	0.24306	45.30	2.66	2.52
28	0.30556	45.58	2.94	2.77
29	0.32639	45.55	2.91	2.74
30	0.34722	45.65	3.01	2.83
31	0.36806	45.64	3.00	2.82
32	0.38889	45.75	3.11	2.92
33	0.45139	45.93	3.29	3.07
34	0.47222	45.90	3.26	3.05
35	0.49306	46.08	3.44	3.20
36	0.51389	46.11	3.47	3.23
37	0.55556	46.10	3.46	3.22
38	0.61806	46.19	3.55	3.30
39	0.63889	46.23	3.59	3.33
40	0.65972	46.20	3.56	3.31
41	0.68056	46.28	3.64	3.38
42	0.70139	46.30	3.66	3.39
43	0.72222	46.38	3.74	3.46
44	0.74306	46.37	3.73	3.45
45	0.76389	46.41	3.77	3.49
46	0.82639	46.47	3.83	3.54
47	0.93056	46.63	3.99	3.67
48	0.97222	46.81	4.17	3.82
49	1.01389	46.96	4.32	3.95
50	1.05556	46.97	4.33	3.96

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 3
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-10	Test conducted on: 09-15-98
IW-10	IW-10
Discharge 0.40 U.S.gal/min	Distance from the pumping well 1.00 ft

Static water level: 42.64 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	1.09722	46.92	4.28	3.91
52	1.13889	46.96	4.32	3.95
53	1.18056	47.00	4.36	3.98
54	1.22222	47.04	4.40	4.01
55	1.26389	47.02	4.38	4.00
56	1.30556	47.05	4.41	4.02
57	1.43056	47.26	4.62	4.19
58	1.47222	47.33	4.69	4.25
59	1.51389	47.41	4.77	4.31
60	1.55556	47.41	4.77	4.31
61	1.59722	47.53	4.89	4.41
62	1.68056	47.47	4.83	4.36
63	1.72222	47.59	4.95	4.46
64	1.76389	47.49	4.85	4.38
65	1.80556	47.56	4.92	4.44
66	1.84722	47.55	4.91	4.43
67	2.01389	47.98	5.34	4.77
68	2.05556	48.03	5.39	4.81
69	2.22222	47.97	5.33	4.76
70	2.26389	47.98	5.34	4.77
71	2.43056	48.03	5.39	4.81
72	2.51389	48.14	5.50	4.89
73	2.55556	48.22	5.58	4.96
74	2.72222	48.25	5.61	4.98
75	2.80556	48.28	5.64	5.00
76	2.93056	48.34	5.70	5.05

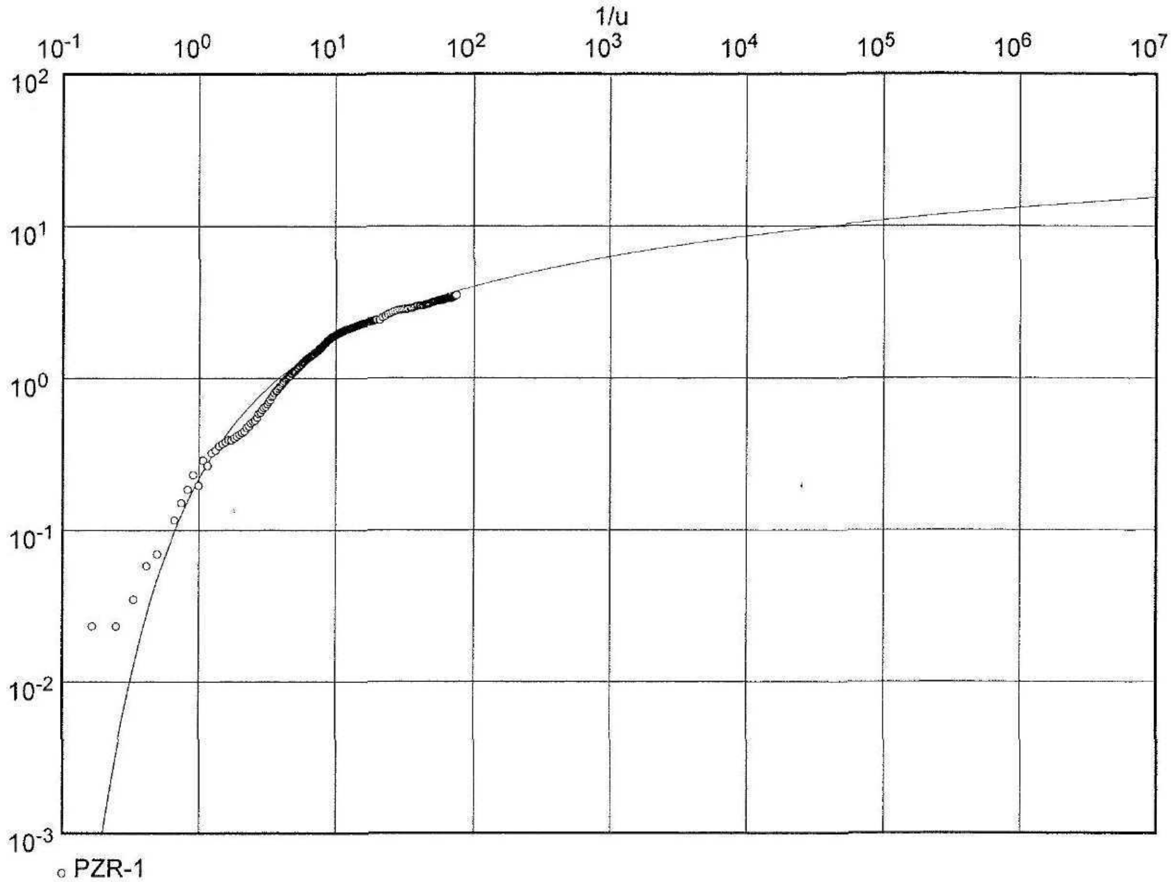
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 4
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-10	Test conducted on: 09-15-98
IW-10	Inline Flow Meter
Discharge 0.40 U.S.gal/min	

	Pumping test duration [d]	Discharge [U.S.gal/min]		
1	0.00000	0.40		
2	2.84722	0.40		

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 1
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
PZR-1	
Discharge 0.40 U.S.gal/min	



Transmissivity [ft²/d]: 7.11×10^{0}

Hydraulic conductivity [ft/d]: 2.84×10^{-1}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
PZR-1	PZR-1
Discharge 0.40 U.S.gal/min	Distance from the pumping well 7.50 ft

Static water level: 47.25 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.00012	47.25	0.00	0.00
3	0.00023	47.25	0.00	0.00
4	0.00035	47.25	0.00	0.00
5	0.00047	47.25	0.00	0.00
6	0.00058	47.25	0.00	0.00
7	0.00069	47.22	-0.03	-0.03
8	0.00081	47.25	0.00	0.00
9	0.00104	47.25	0.00	0.00
10	0.00116	47.25	0.00	0.00
11	0.00127	47.25	0.00	0.00
12	0.00139	47.25	0.00	0.00
13	0.00162	47.22	-0.03	-0.03
14	0.00174	47.25	0.00	0.00
15	0.00185	47.25	0.00	0.00
16	0.00197	47.25	0.00	0.00
17	0.00208	47.25	0.00	0.00
18	0.00220	47.25	0.00	0.00
19	0.00231	47.25	0.00	0.00
20	0.00243	47.25	0.00	0.00
21	0.00255	47.25	0.00	0.00
22	0.00266	47.25	0.00	0.00
23	0.00278	47.25	0.00	0.00
24	0.00290	47.25	0.00	0.00
25	0.00301	47.25	0.00	0.00
26	0.00347	47.26	0.01	0.01
27	0.00417	47.26	0.01	0.01
28	0.00486	47.24	-0.01	-0.01
29	0.00694	47.27	0.02	0.02
30	0.01042	47.27	0.02	0.02
31	0.01389	47.28	0.03	0.03
32	0.01736	47.30	0.05	0.05
33	0.02083	47.31	0.06	0.06
34	0.02778	47.35	0.10	0.10
35	0.03125	47.38	0.13	0.13
36	0.03472	47.41	0.16	0.16
37	0.03819	47.45	0.20	0.20
38	0.04167	47.42	0.17	0.17
39	0.04514	47.50	0.25	0.25
40	0.04861	47.48	0.23	0.23
41	0.05208	47.53	0.28	0.28
42	0.05556	47.54	0.29	0.29
43	0.05903	47.56	0.31	0.31
44	0.06250	47.57	0.32	0.32
45	0.06597	47.58	0.33	0.33
46	0.06944	47.59	0.34	0.34
47	0.07292	47.59	0.34	0.34
48	0.07639	47.60	0.35	0.35
49	0.07986	47.61	0.36	0.36
50	0.08333	47.62	0.37	0.37

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 3
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
PZR-1	PZR-1
Discharge 0.40 U.S.gal/min	Distance from the pumping well 7.50 ft

Static water level: 47.25 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	0.08681	47.63	0.38	0.38
52	0.09028	47.64	0.39	0.39
53	0.09375	47.66	0.41	0.41
54	0.09722	47.67	0.42	0.42
55	0.10069	47.69	0.44	0.44
56	0.10417	47.70	0.45	0.45
57	0.10764	47.71	0.46	0.46
58	0.11111	47.73	0.48	0.48
59	0.11458	47.76	0.51	0.50
60	0.11806	47.77	0.52	0.51
61	0.12153	47.79	0.54	0.53
62	0.12500	47.81	0.56	0.55
63	0.12847	47.82	0.57	0.56
64	0.13194	47.84	0.59	0.58
65	0.13542	47.86	0.61	0.60
66	0.13889	47.88	0.63	0.62
67	0.14236	47.91	0.66	0.65
68	0.14583	47.92	0.67	0.66
69	0.14931	47.95	0.70	0.69
70	0.15278	47.97	0.72	0.71
71	0.15625	47.98	0.73	0.72
72	0.15972	48.00	0.75	0.74
73	0.16319	48.02	0.77	0.76
74	0.16667	48.03	0.78	0.77
75	0.17014	48.05	0.80	0.79
76	0.17361	48.07	0.82	0.81
77	0.17708	48.09	0.84	0.83
78	0.18056	48.11	0.86	0.85
79	0.18403	48.13	0.88	0.86
80	0.18750	48.14	0.89	0.87
81	0.19097	48.16	0.91	0.89
82	0.19444	48.17	0.92	0.90
83	0.19792	48.19	0.94	0.92
84	0.20139	48.20	0.95	0.93
85	0.20486	48.22	0.97	0.95
86	0.20833	48.23	0.98	0.96
87	0.21181	48.24	0.99	0.97
88	0.21528	48.26	1.01	0.99
89	0.21875	48.28	1.03	1.01
90	0.22222	48.29	1.04	1.02
91	0.22569	48.31	1.06	1.04
92	0.22917	48.32	1.07	1.05
93	0.23264	48.34	1.09	1.07
94	0.23611	48.35	1.10	1.08
95	0.23958	48.37	1.12	1.09
96	0.24306	48.38	1.13	1.10
97	0.24653	48.40	1.15	1.12
98	0.25000	48.42	1.17	1.14
99	0.25347	48.43	1.18	1.15
100	0.25694	48.44	1.19	1.16

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 4
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
PZR-1	PZR-1
Discharge 0.40 U.S.gal/min	Distance from the pumping well 7.50 ft

Static water level: 47.25 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
101	0.26042	48.45	1.20	1.17
102	0.26389	48.46	1.21	1.18
103	0.26736	48.47	1.22	1.19
104	0.27083	48.48	1.23	1.20
105	0.27431	48.49	1.24	1.21
106	0.27778	48.50	1.25	1.22
107	0.28125	48.51	1.26	1.23
108	0.28472	48.52	1.27	1.24
109	0.28819	48.53	1.28	1.25
110	0.29167	48.54	1.29	1.26
111	0.29514	48.56	1.31	1.28
112	0.29861	48.57	1.32	1.29
113	0.30208	48.58	1.33	1.29
114	0.30556	48.59	1.34	1.30
115	0.30903	48.60	1.35	1.31
116	0.31250	48.62	1.37	1.33
117	0.31597	48.64	1.39	1.35
118	0.31944	48.65	1.40	1.36
119	0.32292	48.66	1.41	1.37
120	0.32639	48.68	1.43	1.39
121	0.32986	48.69	1.44	1.40
122	0.33333	48.71	1.46	1.42
123	0.33681	48.72	1.47	1.43
124	0.34028	48.73	1.48	1.44
125	0.34375	48.75	1.50	1.45
126	0.34722	48.76	1.51	1.46
127	0.35069	48.78	1.53	1.48
128	0.35417	48.79	1.54	1.49
129	0.35764	48.81	1.56	1.51
130	0.36111	48.82	1.57	1.52
131	0.36458	48.83	1.58	1.53
132	0.36806	48.85	1.60	1.55
133	0.37153	48.86	1.61	1.56
134	0.37500	48.88	1.63	1.58
135	0.37847	48.89	1.64	1.59
136	0.38194	48.90	1.65	1.60
137	0.38542	48.90	1.65	1.60
138	0.38889	48.91	1.66	1.60
139	0.39236	48.92	1.67	1.61
140	0.39583	48.93	1.68	1.62
141	0.39931	48.94	1.69	1.63
142	0.40278	48.94	1.69	1.63
143	0.40625	48.95	1.70	1.64
144	0.40972	48.96	1.71	1.65
145	0.41319	48.97	1.72	1.66
146	0.41667	48.98	1.73	1.67
147	0.42014	48.98	1.73	1.67
148	0.42361	48.99	1.74	1.68
149	0.42708	49.00	1.75	1.69
150	0.43056	49.01	1.76	1.70

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 5
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
PZR-1	PZR-1
Discharge 0.40 U.S.gal/min	Distance from the pumping well 7.50 ft

Static water level: 47.25 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
151	0.43403	49.01	1.76	1.70
152	0.43750	49.02	1.77	1.71
153	0.44097	49.03	1.78	1.72
154	0.44444	49.03	1.78	1.72
155	0.44792	49.04	1.79	1.73
156	0.45139	49.05	1.80	1.74
157	0.45486	49.06	1.81	1.74
158	0.45833	49.07	1.82	1.75
159	0.46181	49.07	1.82	1.75
160	0.46528	49.08	1.83	1.76
161	0.46875	49.08	1.83	1.76
162	0.47222	49.09	1.84	1.77
163	0.47569	49.09	1.84	1.77
164	0.47917	49.10	1.85	1.78
165	0.48264	49.10	1.85	1.78
166	0.48611	49.11	1.86	1.79
167	0.48958	49.11	1.86	1.79
168	0.49306	49.12	1.87	1.80
169	0.49653	49.12	1.87	1.80
170	0.50000	49.13	1.88	1.81
171	0.50347	49.13	1.88	1.81
172	0.50694	49.13	1.88	1.81
173	0.51042	49.14	1.89	1.82
174	0.51389	49.14	1.89	1.82
175	0.51736	49.14	1.89	1.82
176	0.52083	49.15	1.90	1.83
177	0.52431	49.15	1.90	1.83
178	0.52778	49.15	1.90	1.83
179	0.53125	49.16	1.91	1.84
180	0.53472	49.16	1.91	1.84
181	0.53819	49.17	1.92	1.85
182	0.54167	49.17	1.92	1.85
183	0.54514	49.18	1.93	1.86
184	0.54861	49.18	1.93	1.86
185	0.55208	49.19	1.94	1.86
186	0.55556	49.19	1.94	1.86
187	0.55903	49.20	1.95	1.87
188	0.56250	49.20	1.95	1.87
189	0.56597	49.21	1.96	1.88
190	0.56944	49.21	1.96	1.88
191	0.57292	49.22	1.97	1.89
192	0.57639	49.22	1.97	1.89
193	0.57986	49.22	1.97	1.89
194	0.58333	49.23	1.98	1.90
195	0.58681	49.23	1.98	1.90
196	0.59028	49.24	1.99	1.91
197	0.59375	49.24	1.99	1.91
198	0.59722	49.25	2.00	1.92
199	0.60069	49.25	2.00	1.92
200	0.60417	49.25	2.00	1.92

Golder Associates Inc.
3730 Chamblee Tucker Rd.
Atlanta, GA 30341
ph.(770)496-1893

Pumping test analysis
Theis analysis method
Unconfined aquifer

Date: 10-27-98 |

Project: Solutia/RFI/AL

Evaluated by: CDH

Pumping Test No. IW-11	Test conducted on: 09-23-98
PZR-1	PZR-1
Discharge 0.40 U.S.gal/min	Distance from the pumping well 7.50 ft

Static water level: 47.25 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
201	0.60764	49.26	2.01	1.93
202	0.61111	49.26	2.01	1.93
203	0.61458	49.26	2.01	1.93
204	0.61806	49.27	2.02	1.94
205	0.62153	49.27	2.02	1.94
206	0.62500	49.28	2.03	1.95
207	0.62847	49.28	2.03	1.95
208	0.63194	49.28	2.03	1.95
209	0.63542	49.29	2.04	1.96
210	0.63889	49.29	2.04	1.96
211	0.64236	49.30	2.05	1.97
212	0.64583	49.30	2.05	1.97
213	0.64931	49.30	2.05	1.97
214	0.65278	49.31	2.06	1.98
215	0.65625	49.31	2.06	1.98
216	0.65972	49.31	2.06	1.98
217	0.66319	49.31	2.06	1.98
218	0.66667	49.32	2.07	1.98
219	0.67014	49.32	2.07	1.98
220	0.67361	49.32	2.07	1.98
221	0.67708	49.32	2.07	1.98
222	0.68056	49.32	2.07	1.98
223	0.68403	49.33	2.08	1.99
224	0.68750	49.33	2.08	1.99
225	0.69097	49.33	2.08	1.99
226	0.69444	49.34	2.09	2.00
227	0.69792	49.34	2.09	2.00
228	0.70139	49.34	2.09	2.00
229	0.70486	49.34	2.09	2.00
230	0.70833	49.34	2.09	2.00
231	0.71181	49.35	2.10	2.01
232	0.71528	49.36	2.11	2.02
233	0.71875	49.36	2.11	2.02
234	0.72222	49.36	2.11	2.02
235	0.72569	49.36	2.11	2.02
236	0.72917	49.37	2.12	2.03
237	0.73264	49.37	2.12	2.03
238	0.73611	49.37	2.12	2.03
239	0.73958	49.37	2.12	2.03
240	0.74306	49.37	2.12	2.03
241	0.74653	49.38	2.13	2.04
242	0.75000	49.38	2.13	2.04
243	0.75347	49.38	2.13	2.04
244	0.75694	49.38	2.13	2.04
245	0.76042	49.38	2.13	2.04
246	0.76389	49.38	2.13	2.04
247	0.76736	49.39	2.14	2.05
248	0.77083	49.39	2.14	2.05
249	0.77431	49.39	2.14	2.05
250	0.77778	49.40	2.15	2.06

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 7
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
PZR-1	PZR-1
Discharge 0.40 U.S.gal/min	Distance from the pumping well 7.50 ft

Static water level: 47.25 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
251	0.78125	49.40	2.15	2.06
252	0.78472	49.40	2.15	2.06
253	0.78819	49.40	2.15	2.06
254	0.79167	49.41	2.16	2.07
255	0.79514	49.41	2.16	2.07
256	0.79861	49.41	2.16	2.07
257	0.80208	49.41	2.16	2.07
258	0.80556	49.41	2.16	2.07
259	0.80903	49.42	2.17	2.08
260	0.81250	49.42	2.17	2.08
261	0.81597	49.42	2.17	2.08
262	0.81944	49.42	2.17	2.08
263	0.82292	49.43	2.18	2.08
264	0.82639	49.43	2.18	2.08
265	0.82986	49.44	2.19	2.09
266	0.83333	49.43	2.18	2.08
267	0.87500	49.43	2.18	2.08
268	0.91667	49.52	2.27	2.17
269	0.95833	49.58	2.33	2.22
270	1.00000	49.64	2.39	2.28
271	1.04167	49.68	2.43	2.31
272	1.08333	49.72	2.47	2.35
273	1.12500	49.75	2.50	2.38
274	1.16667	49.78	2.53	2.40
275	1.20833	49.80	2.55	2.42
276	1.25000	49.82	2.57	2.44
277	1.29167	49.83	2.58	2.45
278	1.33333	49.84	2.59	2.46
279	1.37500	49.83	2.58	2.45
280	1.41667	49.85	2.60	2.46
281	1.45833	49.88	2.63	2.49
282	1.50000	49.89	2.64	2.50
283	1.54167	49.91	2.66	2.52
284	1.58333	49.94	2.69	2.55
285	1.62500	49.96	2.71	2.56
286	1.66667	49.98	2.73	2.58
287	1.70833	49.98	2.73	2.58
288	1.75000	49.99	2.74	2.59
289	1.79167	49.99	2.74	2.59
290	1.83333	50.00	2.75	2.60
291	1.87500	50.02	2.77	2.62
292	1.91667	50.03	2.78	2.63
293	1.95833	50.05	2.80	2.64
294	2.00000	50.07	2.82	2.66
295	2.04167	50.10	2.85	2.69
296	2.08333	50.13	2.88	2.71
297	2.12500	50.14	2.89	2.72
298	2.16667	50.16	2.91	2.74
299	2.20833	50.17	2.92	2.75
300	2.25000	50.19	2.94	2.77

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 8
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
PZR-1	PZR-1
Discharge 0.40 U.S.gal/min	Distance from the pumping well 7.50 ft

Static water level: 47.25 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
301	2.29167	50.19	2.94	2.77
302	2.33333	50.19	2.94	2.77
303	2.37500	50.20	2.95	2.78
304	2.41667	50.21	2.96	2.78
305	2.45833	50.22	2.97	2.79
306	2.50000	50.24	2.99	2.81
307	2.54167	50.26	3.01	2.83
308	2.58333	50.28	3.03	2.85
309	2.62500	50.30	3.05	2.86
310	2.66667	50.31	3.06	2.87
311	2.70833	50.32	3.07	2.88
312	2.75000	50.32	3.07	2.88
313	2.79167	50.32	3.07	2.88
314	2.83333	50.32	3.07	2.88
315	2.87500	50.34	3.09	2.90
316	2.91667	50.34	3.09	2.90
317	2.95833	50.36	3.11	2.92
318	3.00000	50.39	3.14	2.94
319	3.04167	50.42	3.17	2.97
320	3.08333	50.44	3.19	2.99
321	3.12500	50.47	3.22	3.01
322	3.16667	50.48	3.23	3.02
323	3.17292	50.48	3.23	3.02
324	3.17326	50.48	3.23	3.02
325	3.17361	50.49	3.24	3.03
326	3.17396	50.48	3.23	3.02

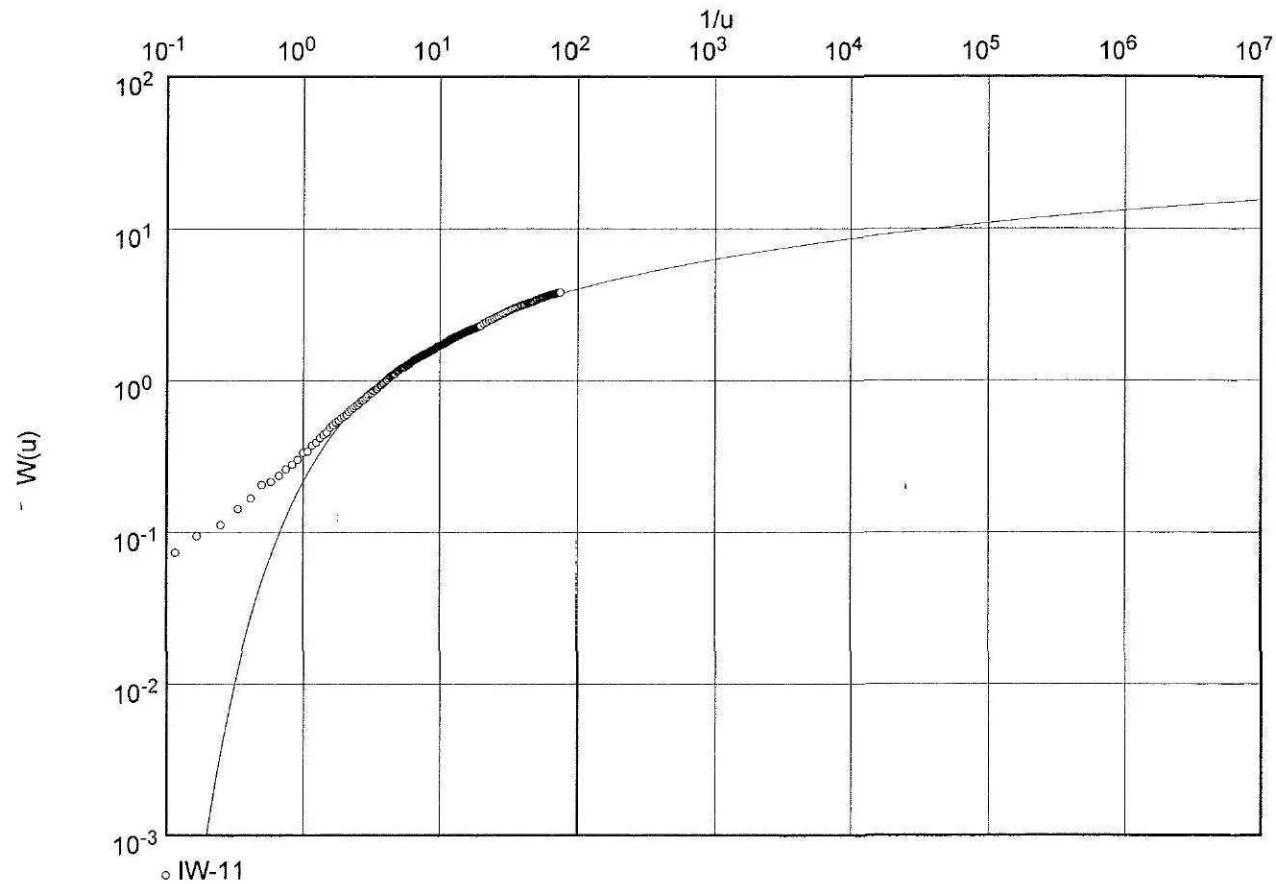
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 9
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
PZR-1	Inline Flow Meter
Discharge 0.40 U.S.gal/min	

	Pumping test duration [d]	Discharge [U.S.gal/min]		
1	0.00000	0.40		
2	3.00000	0.40		

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 1
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
IW-11	
Discharge 0.40 U.S.gal/min	



Transmissivity [ft²/d]: 2.15×10^{0}

Hydraulic conductivity [ft/d]: 8.62×10^{-2}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
IW-11	IW-11
Discharge 0.40 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 45.10 ft below datum	

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.00012	45.12	0.02	0.02
3	0.00023	45.07	-0.03	-0.03
4	0.00035	45.12	0.02	0.02
5	0.00047	45.12	0.02	0.02
6	0.00058	45.07	-0.03	-0.03
7	0.00069	45.21	0.11	0.11
8	0.00081	45.20	0.10	0.10
9	0.00092	45.23	0.13	0.13
10	0.00104	45.23	0.13	0.13
11	0.00116	45.24	0.14	0.14
12	0.00127	45.24	0.14	0.14
13	0.00139	45.22	0.12	0.12
14	0.00151	45.24	0.14	0.14
15	0.00162	45.21	0.11	0.11
16	0.00174	45.25	0.15	0.15
17	0.00185	45.26	0.16	0.16
18	0.00197	45.23	0.13	0.13
19	0.00208	45.27	0.17	0.17
20	0.00220	45.22	0.12	0.12
21	0.00231	45.25	0.15	0.15
22	0.00243	45.28	0.18	0.18
23	0.00255	45.24	0.14	0.14
24	0.00266	45.27	0.17	0.17
25	0.00278	45.26	0.16	0.16
26	0.00290	45.24	0.14	0.14
27	0.00301	45.26	0.16	0.16
28	0.00347	45.27	0.17	0.17
29	0.00417	45.30	0.20	0.20
30	0.00486	45.31	0.21	0.21
31	0.00694	45.37	0.27	0.27
32	0.01042	45.42	0.32	0.32
33	0.01389	45.51	0.41	0.41
34	0.01736	45.58	0.48	0.48
35	0.02083	45.69	0.59	0.58
36	0.02431	45.72	0.62	0.61
37	0.02778	45.78	0.68	0.67
38	0.03125	45.85	0.75	0.74
39	0.03472	45.91	0.81	0.80
40	0.03819	45.97	0.87	0.85
41	0.04167	46.07	0.97	0.95
42	0.04514	46.09	0.99	0.97
43	0.04861	46.19	1.09	1.07
44	0.05208	46.24	1.14	1.11
45	0.05556	46.32	1.22	1.19
46	0.05903	46.38	1.28	1.25
47	0.06250	46.43	1.33	1.29
48	0.06597	46.54	1.44	1.40
49	0.06944	46.59	1.49	1.45
50	0.07292	46.66	1.56	1.51

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 3
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
IW-11	IW-11
Discharge 0.40 U.S.gal/min	Distance from the pumping well 1.00 ft

Static water level: 45.10 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	0.07639	46.70	1.60	1.55
52	0.07986	46.77	1.67	1.61
53	0.08333	46.81	1.71	1.65
54	0.08681	46.86	1.76	1.70
55	0.09028	46.94	1.84	1.77
56	0.09375	47.00	1.90	1.83
57	0.09722	47.05	1.95	1.87
58	0.10069	47.11	2.01	1.93
59	0.10417	47.14	2.04	1.96
60	0.10764	47.22	2.12	2.03
61	0.11111	47.29	2.19	2.09
62	0.11458	47.31	2.21	2.11
63	0.11806	47.37	2.27	2.17
64	0.12153	47.43	2.33	2.22
65	0.12500	47.51	2.41	2.29
66	0.12847	47.55	2.45	2.33
67	0.13194	47.58	2.48	2.36
68	0.13542	47.66	2.56	2.43
69	0.13889	47.67	2.57	2.44
70	0.14236	47.74	2.64	2.50
71	0.14583	47.77	2.67	2.53
72	0.14931	47.83	2.73	2.58
73	0.15278	47.90	2.80	2.64
74	0.15625	47.93	2.83	2.67
75	0.15972	47.99	2.89	2.72
76	0.16319	48.02	2.92	2.75
77	0.16667	48.09	2.99	2.81
78	0.17014	48.15	3.05	2.86
79	0.17361	48.17	3.07	2.88
80	0.17708	48.26	3.16	2.96
81	0.18056	48.32	3.22	3.01
82	0.18403	48.38	3.28	3.06
83	0.18750	48.41	3.31	3.09
84	0.19097	48.44	3.34	3.12
85	0.19444	48.47	3.37	3.14
86	0.19792	48.50	3.40	3.17
87	0.20139	48.59	3.49	3.25
88	0.20486	48.64	3.54	3.29
89	0.20833	48.67	3.57	3.32
90	0.21181	48.70	3.60	3.34
91	0.21528	48.77	3.67	3.40
92	0.21875	48.80	3.70	3.43
93	0.22222	48.82	3.72	3.44
94	0.22569	48.84	3.74	3.46
95	0.22917	48.86	3.76	3.48
96	0.23264	48.89	3.79	3.50
97	0.23611	48.97	3.87	3.57
98	0.23958	49.00	3.90	3.60
99	0.24306	48.98	3.88	3.58
100	0.24653	49.04	3.94	3.63

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 4
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
IW-11	IW-11
Discharge 0.40 U.S.gal/min	Distance from the pumping well 1.00 ft

Static water level: 45.10 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
101	0.25000	49.07	3.97	3.65
102	0.25347	49.08	3.98	3.66
103	0.25694	49.16	4.06	3.73
104	0.26042	49.20	4.10	3.76
105	0.26389	49.25	4.15	3.81
106	0.26736	49.30	4.20	3.85
107	0.27083	49.34	4.24	3.88
108	0.27431	49.37	4.27	3.91
109	0.27778	49.39	4.29	3.92
110	0.28125	49.42	4.32	3.95
111	0.28472	49.43	4.33	3.96
112	0.28819	49.45	4.35	3.97
113	0.29167	49.53	4.43	4.04
114	0.29514	49.55	4.45	4.05
115	0.29861	49.58	4.48	4.08
116	0.30208	49.60	4.50	4.10
117	0.30556	49.62	4.52	4.11
118	0.30903	49.66	4.56	4.14
119	0.31250	49.68	4.58	4.16
120	0.31597	49.74	4.64	4.21
121	0.31944	49.74	4.64	4.21
122	0.32292	49.76	4.66	4.23
123	0.32639	49.81	4.71	4.27
124	0.32986	49.84	4.74	4.29
125	0.33333	49.86	4.76	4.31
126	0.33681	49.90	4.80	4.34
127	0.34028	49.92	4.82	4.36
128	0.34375	49.95	4.85	4.38
129	0.34722	49.96	4.86	4.39
130	0.35069	50.02	4.92	4.44
131	0.35417	50.03	4.93	4.44
132	0.35764	50.05	4.95	4.46
133	0.36111	50.07	4.97	4.48
134	0.36458	50.12	5.02	4.52
135	0.36806	50.14	5.04	4.53
136	0.37153	50.14	5.04	4.53
137	0.37500	50.18	5.08	4.56
138	0.37847	50.21	5.11	4.59
139	0.38194	50.23	5.13	4.60
140	0.38542	50.28	5.18	4.64
141	0.38889	50.30	5.20	4.66
142	0.39236	50.35	5.25	4.70
143	0.39583	50.37	5.27	4.71
144	0.39931	50.41	5.31	4.75
145	0.40278	50.43	5.33	4.76
146	0.40625	50.49	5.39	4.81
147	0.40972	50.50	5.40	4.82
148	0.41319	50.52	5.42	4.83
149	0.41667	50.51	5.41	4.82
150	0.42014	50.56	5.46	4.86

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 5
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
IW-11	IW-11
Discharge 0.40 U.S.gal/min	Distance from the pumping well 1.00 ft

Static water level: 45.10 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
151	0.42361	50.56	5.46	4.86
152	0.42708	50.58	5.48	4.88
153	0.43056	50.61	5.51	4.90
154	0.43403	50.60	5.50	4.89
155	0.43750	50.64	5.54	4.93
156	0.44097	50.67	5.57	4.95
157	0.44444	50.70	5.60	4.97
158	0.44792	50.70	5.60	4.97
159	0.45139	50.71	5.61	4.98
160	0.45486	50.76	5.66	5.02
161	0.45833	50.81	5.71	5.06
162	0.46181	50.82	5.72	5.07
163	0.46528	50.85	5.75	5.09
164	0.46875	50.86	5.76	5.10
165	0.47222	50.93	5.83	5.15
166	0.47569	50.93	5.83	5.15
167	0.47917	50.96	5.86	5.17
168	0.48264	51.01	5.91	5.21
169	0.48611	51.03	5.93	5.23
170	0.48958	51.03	5.93	5.23
171	0.49306	51.08	5.98	5.26
172	0.49653	51.14	6.04	5.31
173	0.50000	51.14	6.04	5.31
174	0.50347	51.11	6.01	5.29
175	0.50694	51.15	6.05	5.32
176	0.51042	51.20	6.10	5.36
177	0.51389	51.21	6.11	5.36
178	0.51736	51.26	6.16	5.40
179	0.52083	51.28	6.18	5.42
180	0.52431	51.28	6.18	5.42
181	0.52778	51.30	6.20	5.43
182	0.53125	51.36	6.26	5.48
183	0.53472	51.36	6.26	5.48
184	0.53819	51.39	6.29	5.50
185	0.54167	51.41	6.31	5.51
186	0.54514	51.44	6.34	5.54
187	0.54861	51.47	6.37	5.56
188	0.55208	51.50	6.40	5.58
189	0.55556	51.50	6.40	5.58
190	0.55903	51.49	6.39	5.57
191	0.56250	51.55	6.45	5.62
192	0.56597	51.57	6.47	5.63
193	0.56944	51.58	6.48	5.64
194	0.57292	51.58	6.48	5.64
195	0.57639	51.64	6.54	5.68
196	0.57986	51.61	6.51	5.66
197	0.58333	51.64	6.54	5.68
198	0.58681	51.66	6.56	5.70
199	0.59028	51.68	6.58	5.71
200	0.59375	51.72	6.62	5.74

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 6
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
IW-11	IW-11
Discharge 0.40 U.S.gal/min	Distance from the pumping well 1.00 ft

Static water level: 45.10 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
201	0.59722	51.76	6.66	5.77
202	0.60069	51.76	6.66	5.77
203	0.60417	51.77	6.67	5.78
204	0.60764	51.83	6.73	5.82
205	0.61111	51.84	6.74	5.83
206	0.61458	51.85	6.75	5.84
207	0.61806	51.85	6.75	5.84
208	0.62153	51.89	6.79	5.87
209	0.62500	51.92	6.82	5.89
210	0.62847	51.94	6.84	5.90
211	0.63194	51.95	6.85	5.91
212	0.63542	51.96	6.86	5.92
213	0.63889	51.96	6.86	5.92
214	0.64236	51.98	6.88	5.93
215	0.64583	51.99	6.89	5.94
216	0.64931	52.05	6.95	5.98
217	0.65278	52.08	6.98	6.01
218	0.65625	52.10	7.00	6.02
219	0.65972	52.10	7.00	6.02
220	0.66319	52.13	7.03	6.04
221	0.66667	52.08	6.98	6.01
222	0.67014	52.13	7.03	6.04
223	0.67361	52.14	7.04	6.05
224	0.67708	52.15	7.05	6.06
225	0.68056	52.23	7.13	6.11
226	0.68403	52.21	7.11	6.10
227	0.68750	52.26	7.16	6.13
228	0.69097	52.26	7.16	6.13
229	0.69444	52.27	7.17	6.14
230	0.69792	52.31	7.21	6.17
231	0.70139	52.29	7.19	6.16
232	0.70486	52.29	7.19	6.16
233	0.70833	52.35	7.25	6.20
234	0.71181	52.31	7.21	6.17
235	0.71528	52.34	7.24	6.19
236	0.71875	52.36	7.26	6.21
237	0.72222	52.37	7.27	6.21
238	0.72569	52.41	7.31	6.24
239	0.72917	52.40	7.30	6.23
240	0.73264	52.41	7.31	6.24
241	0.73611	52.43	7.33	6.26
242	0.73958	52.43	7.33	6.26
243	0.74306	52.45	7.35	6.27
244	0.74653	52.50	7.40	6.30
245	0.75000	52.50	7.40	6.30
246	0.75347	52.50	7.40	6.30
247	0.75694	52.52	7.42	6.32
248	0.76042	52.52	7.42	6.32
249	0.76389	52.53	7.43	6.33
250	0.76736	52.54	7.44	6.33

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 7
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
IW-11	IW-11
Discharge 0.40 U.S.gal/min	Distance from the pumping well 1.00 ft

Static water level: 45.10 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
251	0.77083	52.55	7.45	6.34
252	0.77431	52.56	7.46	6.35
253	0.77778	52.61	7.51	6.38
254	0.78125	52.62	7.52	6.39
255	0.78472	52.63	7.53	6.40
256	0.78819	52.63	7.53	6.40
257	0.79167	52.67	7.57	6.42
258	0.79514	52.69	7.59	6.44
259	0.79861	52.70	7.60	6.44
260	0.80208	52.71	7.61	6.45
261	0.80556	52.73	7.63	6.47
262	0.80903	52.72	7.62	6.46
263	0.81250	52.75	7.65	6.48
264	0.81597	52.73	7.63	6.47
265	0.81944	52.75	7.65	6.48
266	0.82292	52.76	7.66	6.49
267	0.82639	52.79	7.69	6.51
268	0.82986	52.81	7.71	6.52
269	0.83333	52.84	7.74	6.54
270	0.87500	53.17	8.07	6.77
271	0.91667	53.39	8.29	6.92
272	0.95833	53.63	8.53	7.07
273	1.00000	53.81	8.71	7.19
274	1.04167	54.03	8.93	7.34
275	1.08333	54.26	9.16	7.48
276	1.12500	54.44	9.34	7.60
277	1.16667	54.66	9.56	7.73
278	1.20833	54.85	9.75	7.85
279	1.25000	55.02	9.92	7.95
280	1.29167	55.27	10.17	8.10
281	1.33333	55.43	10.33	8.20
282	1.37500	55.59	10.49	8.29
283	1.41667	55.80	10.70	8.41
284	1.45833	55.95	10.85	8.50
285	1.50000	56.11	11.01	8.59
286	1.54167	56.29	11.19	8.69
287	1.58333	56.43	11.33	8.76
288	1.62500	56.64	11.54	8.88
289	1.66667	56.77	11.67	8.95
290	1.70833	56.87	11.77	9.00
291	1.75000	56.95	11.85	9.04
292	1.79167	57.09	11.99	9.11
293	1.83333	57.23	12.13	9.19
294	1.87500	57.34	12.24	9.24
295	1.91667	57.41	12.31	9.28
296	1.95833	57.56	12.46	9.35
297	2.00000	57.65	12.55	9.40
298	2.04167	57.83	12.73	9.49
299	2.08333	58.12	13.02	9.63
300	2.12500	58.23	13.13	9.68

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 8
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
IW-11	IW-11
Discharge 0.40 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 45.10 ft below datum	

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
301	2.16667	58.40	13.30	9.76
302	2.20833	58.58	13.48	9.85
303	2.25000	58.65	13.55	9.88
304	2.29167	58.74	13.64	9.92
305	2.33333	58.87	13.77	9.98
306	2.37500	59.00	13.90	10.04
307	2.41667	59.16	14.06	10.11
308	2.45833	59.29	14.19	10.16
309	2.50000	59.42	14.32	10.22
310	2.54167	59.55	14.45	10.27
311	2.58333	59.75	14.65	10.36
312	2.62500	59.88	14.78	10.41
313	2.66667	59.95	14.85	10.44
314	2.70833	60.08	14.98	10.49
315	2.75000	60.19	15.09	10.54
316	2.79167	60.25	15.15	10.56
317	2.83333	60.33	15.23	10.59
318	2.87500	60.41	15.31	10.62
319	2.91667	60.51	15.41	10.66
320	2.95833	60.60	15.50	10.70
321	3.00000	60.69	15.59	10.73
322	3.04167	60.77	15.67	10.76
323	3.08333	60.84	15.74	10.79
324	3.12500	60.89	15.79	10.80
325	3.16667	60.94	15.84	10.82
326	3.17292	60.95	15.85	10.83
327	3.17326	60.95	15.85	10.83
328	3.17361	60.99	15.89	10.84
329	3.17396	60.98	15.88	10.84

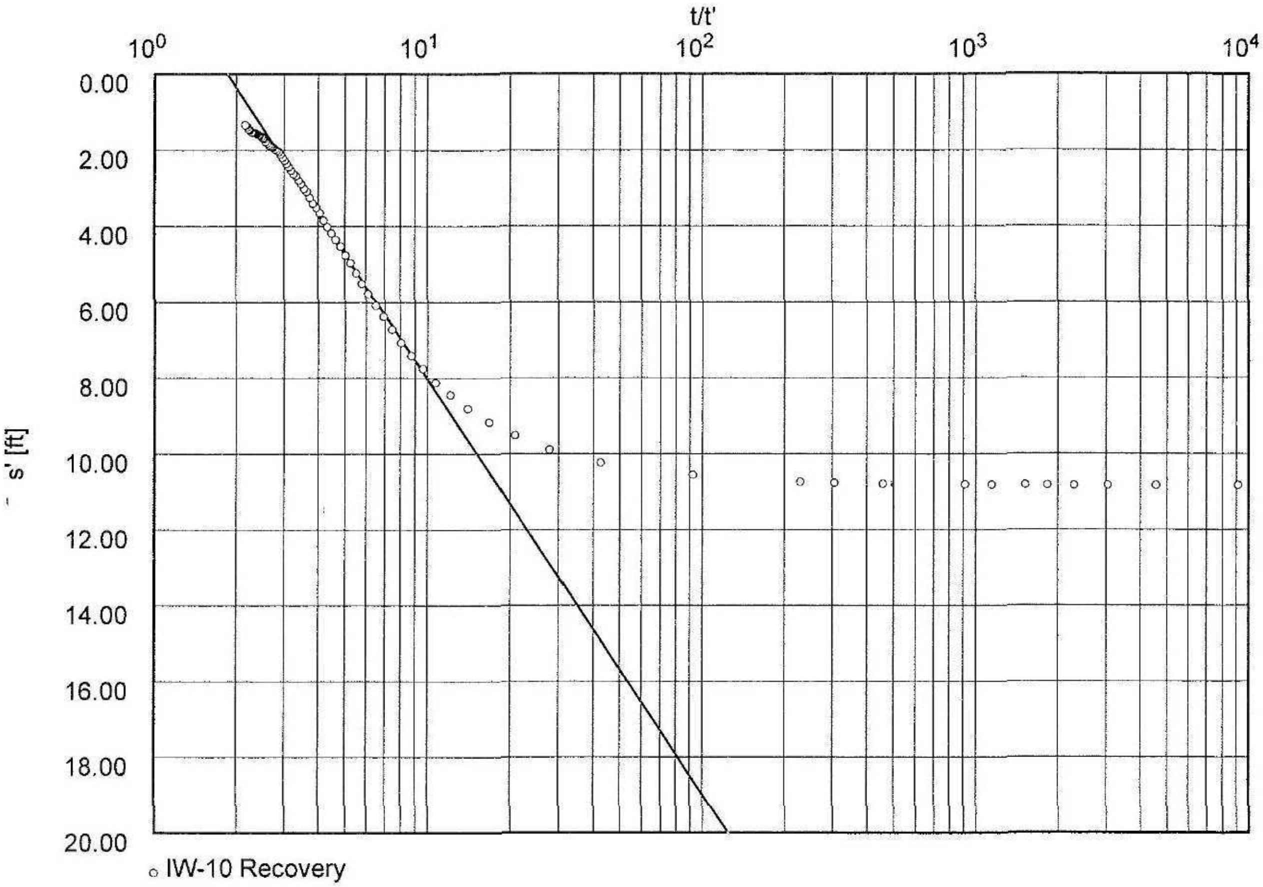
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-27-98	Page 9
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11	Test conducted on: 09-23-98
IW-11	Inline Flow Meter
Discharge 0.40 U.S.gal/min	

	Pumping test duration [d]	Discharge [U.S.gal/min]		
1	0.00000	0.40		
2	3.00000	0.40		

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-04-98 / Page 1 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-11 Recovery	Test conducted on: 09-23-98
IW-11	
Discharge 0.21 U.S.gal/min	
	Pumping test duration: 3.17361 d



Transmissivity [ft²/d]: 6.90×10^{-1}

Hydraulic conductivity [ft/d]: 2.76×10^{-2}

Aquifer thickness [ft]: 25.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-04-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11 Recovery	Test conducted on: 09-23-98
IW-11	IW-10 Recovery
Discharge 0.21 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 45.10 ft below datum	Pumping test duration: 3.17361 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
1	0.00035	60.98	15.88	10.84
2	0.00069	60.97	15.87	10.83
3	0.00104	60.97	15.87	10.83
4	0.00139	60.96	15.86	10.83
5	0.00174	60.95	15.85	10.83
6	0.00208	60.92	15.82	10.81
7	0.00278	60.92	15.82	10.81
8	0.00347	60.90	15.80	10.81
9	0.00694	60.85	15.75	10.79
10	0.01042	60.79	15.69	10.77
11	0.01389	60.72	15.62	10.74
12	0.03472	60.24	15.14	10.56
13	0.07639	59.45	14.35	10.23
14	0.11806	58.67	13.57	9.89
15	0.15972	57.88	12.78	9.51
16	0.20139	57.19	12.09	9.17
17	0.24306	56.50	11.40	8.80
18	0.28472	55.86	10.76	8.44
19	0.32639	55.31	10.21	8.13
20	0.36806	54.69	9.59	7.75
21	0.40972	54.14	9.04	7.41
22	0.45139	53.63	8.53	7.07
23	0.49306	53.09	7.99	6.71
24	0.53472	52.60	7.50	6.38
25	0.57639	52.19	7.09	6.08
26	0.61806	51.77	6.67	5.78
27	0.65972	51.41	6.31	5.51
28	0.70139	51.04	5.94	5.23
29	0.74306	50.69	5.59	4.97
30	0.78472	50.43	5.33	4.76
31	0.82639	50.14	5.04	4.53
32	0.86806	49.92	4.82	4.36
33	0.90972	49.71	4.61	4.18
34	0.95139	49.50	4.40	4.01
35	0.99306	49.30	4.20	3.85
36	1.03472	49.07	3.97	3.65
37	1.07639	48.90	3.80	3.51
38	1.11806	48.77	3.67	3.40
39	1.15972	48.59	3.49	3.25
40	1.20139	48.41	3.31	3.09
41	1.24306	48.32	3.22	3.01
42	1.28472	48.18	3.08	2.89
43	1.32639	48.07	2.97	2.79
44	1.36806	47.94	2.84	2.68
45	1.40972	47.88	2.78	2.63
46	1.45139	47.78	2.68	2.54
47	1.49306	47.67	2.57	2.44
48	1.53472	47.58	2.48	2.36
49	1.57639	47.49	2.39	2.28
50	1.61806	47.40	2.30	2.19

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-04-98	Page 3
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11 Recovery	Test conducted on: 09-23-98
IW-11	IW-10 Recovery
Discharge 0.21 U.S.gal/min	Distance from the pumping well 1.00 ft
Static water level: 45.10 ft below datum	Pumping test duration: 3.17361 d

	Time from end of pumping [d]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
51	1.65972	47.31	2.21	2.11
52	1.70139	47.24	2.14	2.05
53	1.74306	47.20	2.10	2.01
54	1.78472	47.16	2.06	1.98
55	1.82639	47.11	2.01	1.93
56	1.86806	47.09	1.99	1.91
57	1.90972	47.07	1.97	1.89
58	1.95139	47.04	1.94	1.86
59	1.99306	47.00	1.90	1.83
60	2.03472	46.95	1.85	1.78
61	2.07639	46.87	1.77	1.71
62	2.11806	46.84	1.74	1.68
63	2.15972	46.80	1.70	1.64
64	2.20139	46.77	1.67	1.61
65	2.24306	46.75	1.65	1.60
66	2.28472	46.73	1.63	1.58
67	2.32639	46.72	1.62	1.57
68	2.36806	46.70	1.60	1.55
69	2.40972	46.69	1.59	1.54
70	2.45139	46.68	1.58	1.53
71	2.49306	46.67	1.57	1.52
72	2.53472	46.62	1.52	1.47
73	2.57639	46.60	1.50	1.45
74	2.61806	46.59	1.49	1.45
75	2.65972	46.53	1.43	1.39
76	2.70139	46.49	1.39	1.35
77	2.74306	46.48	1.38	1.34

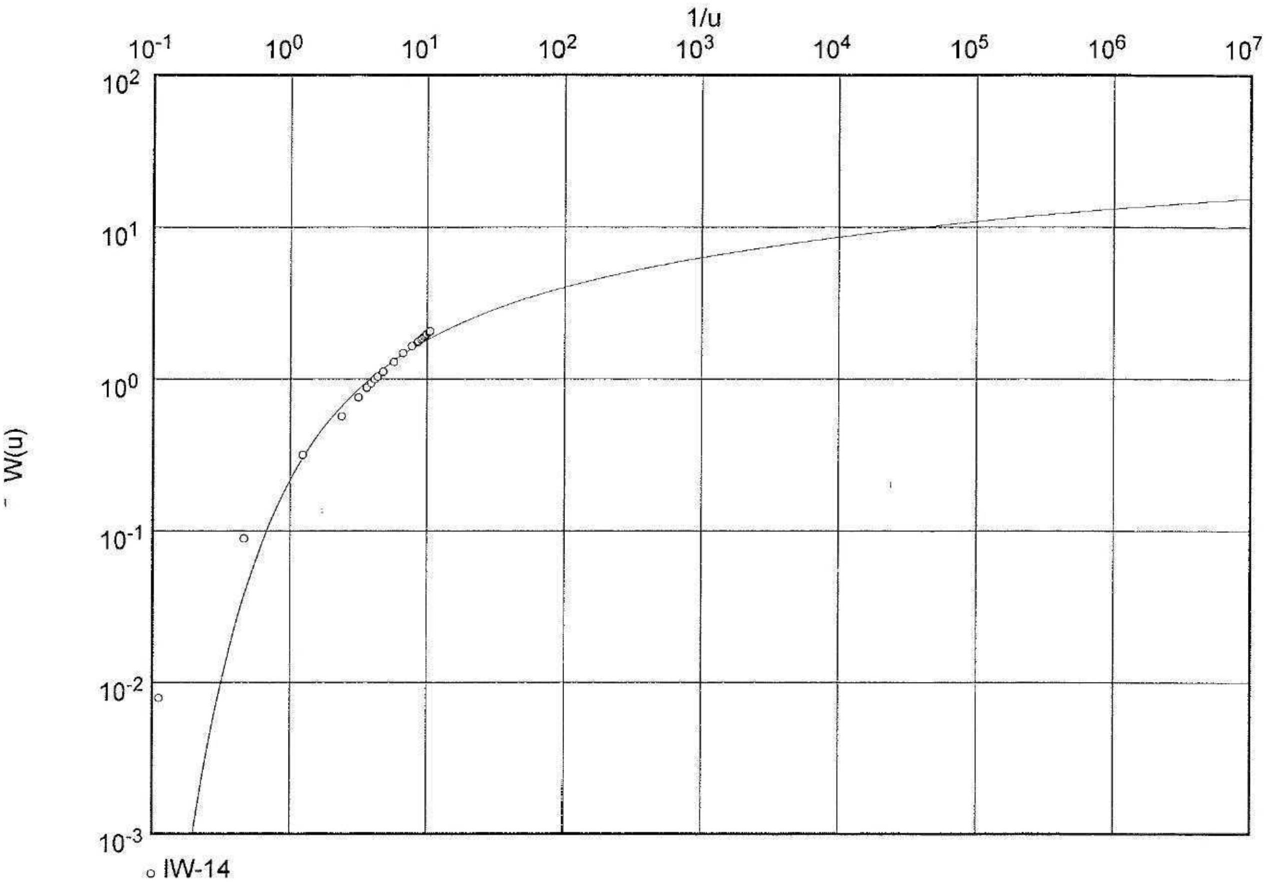
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 11-04-98	Page 4
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-11 Recovery	Test conducted on: 09-23-98
IW-11	Iw-10 discharge
Discharge 0.21 U.S.gal/min	
	Pumping test duration: 3.17361 d

	Pumping test duration [d]	Discharge [U.S.gal/min]		
1	0.00000	0.40		
2	3.17361	0.40		
3	3.17431	0.00		
4	5.91667	0.00		

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-29-98 / Page 1 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-14	Test conducted on: 10-12-98
IW-14	
Discharge 0.25 U.S.gal/min	



Transmissivity [ft²/d]: 5.03×10^{-1}

Hydraulic conductivity [ft/d]: 1.25×10^{-2}

Aquifer thickness [ft]: 40.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-29-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

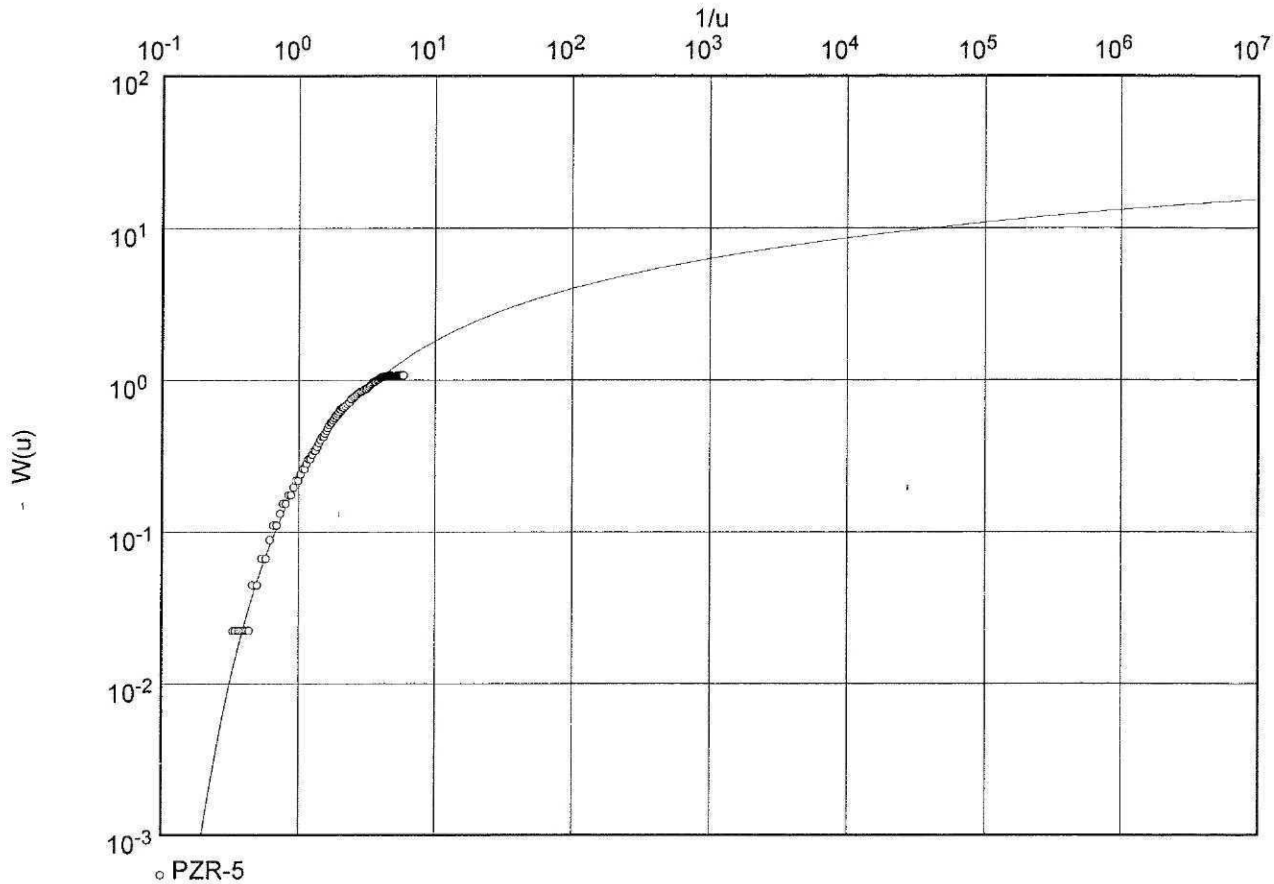
Pumping Test No. IW-14	Test conducted on: 10-12-98
IW-14	IW-14
Discharge 0.25 U.S.gal/min	Distance from the pumping well 1.00 ft

Static water level: 17.03 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.02292	17.09	0.06	0.06
3	0.09375	17.71	0.68	0.67
4	0.25278	19.51	2.48	2.40
5	0.48472	21.62	4.59	4.33
6	0.64236	23.28	6.25	5.76
7	0.73889	24.34	7.31	6.64
8	0.79722	24.94	7.91	7.13
9	0.84375	25.50	8.47	7.57
10	0.88542	25.91	8.88	7.89
11	0.97431	26.71	9.68	8.51
12	1.16667	28.54	11.51	9.85
13	1.36528	30.59	13.56	11.26
14	1.58125	32.57	15.54	12.52
15	1.72500	33.89	16.86	13.31
16	1.75417	34.21	17.18	13.49
17	1.83125	34.89	17.86	13.87
18	1.88681	35.48	18.45	14.19
19	1.93264	36.05	19.02	14.50
20	1.98889	36.68	19.65	14.82
21	2.02917	37.15	20.12	15.06
22	2.11042	37.98	20.95	15.46
23	2.14931	38.45	21.42	15.68
24	2.15764	38.57	21.54	15.74

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 1
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	
Discharge 0.25 U.S.gal/min	



Transmissivity [ft²/d]: 8.57×10^{-1}

Hydraulic conductivity [ft/d]: 4.28×10^{-2}

Aquifer thickness [ft]: 20.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft
Static water level: 16.70 ft below datum	

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.02222	16.70	0.00	0.00
3	0.02229	16.70	0.00	0.00
4	0.02236	16.70	0.00	0.00
5	0.02243	16.70	0.00	0.00
6	0.02250	16.60	-0.10	-0.10
7	0.02257	16.70	0.00	0.00
8	0.02264	16.60	-0.10	-0.10
9	0.02271	16.70	0.00	0.00
10	0.02278	16.70	0.00	0.00
11	0.02285	16.60	-0.10	-0.10
12	0.02292	16.70	0.00	0.00
13	0.02299	16.70	0.00	0.00
14	0.02306	16.60	-0.10	-0.10
15	0.02778	16.70	0.00	0.00
16	0.03472	16.60	-0.10	-0.10
17	0.04167	16.60	-0.10	-0.10
18	0.04861	16.60	-0.10	-0.10
19	0.05556	16.60	-0.10	-0.10
20	0.06250	16.70	0.00	0.00
21	0.06944	16.70	0.00	0.00
22	0.07639	16.70	0.00	0.00
23	0.08333	16.70	0.00	0.00
24	0.09028	16.70	0.00	0.00
25	0.09722	16.70	0.00	0.00
26	0.10417	16.70	0.00	0.00
27	0.11111	16.70	0.00	0.00
28	0.11806	16.70	0.00	0.00
29	0.12500	16.70	0.00	0.00
30	0.13194	16.70	0.00	0.00
31	0.13889	16.70	0.00	0.00
32	0.14583	16.70	0.00	0.00
33	0.15278	16.70	0.00	0.00
34	0.15972	16.70	0.00	0.00
35	0.16667	16.70	0.00	0.00
36	0.17361	16.70	0.00	0.00
37	0.18056	16.80	0.10	0.10
38	0.18750	16.80	0.10	0.10
39	0.19444	16.80	0.10	0.10
40	0.20139	16.80	0.10	0.10
41	0.20833	16.80	0.10	0.10
42	0.21528	16.80	0.10	0.10
43	0.22222	16.80	0.10	0.10
44	0.22917	16.80	0.10	0.10
45	0.23611	16.80	0.10	0.10
46	0.25000	16.90	0.20	0.20
47	0.27083	16.90	0.20	0.20
48	0.29167	17.00	0.30	0.30
49	0.31250	17.00	0.30	0.30
50	0.33333	17.10	0.40	0.40

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 3 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft

Static water level: 16.70 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	0.35417	17.20	0.50	0.49
52	0.37500	17.20	0.50	0.49
53	0.39583	17.30	0.60	0.59
54	0.41667	17.40	0.70	0.69
55	0.43750	17.40	0.70	0.69
56	0.45833	17.50	0.80	0.78
57	0.47917	17.50	0.80	0.78
58	0.50000	17.60	0.90	0.88
59	0.52083	17.70	1.00	0.98
60	0.54167	17.70	1.00	0.98
61	0.56250	17.80	1.10	1.07
62	0.58333	17.90	1.20	1.16
63	0.60417	17.90	1.20	1.16
64	0.62500	18.00	1.30	1.26
65	0.64583	18.10	1.40	1.35
66	0.66667	18.10	1.40	1.35
67	0.68750	18.20	1.50	1.44
68	0.70833	18.30	1.60	1.54
69	0.72917	18.30	1.60	1.54
70	0.75000	18.40	1.70	1.63
71	0.77083	18.50	1.80	1.72
72	0.79167	18.60	1.90	1.81
73	0.81250	18.70	2.00	1.90
74	0.83333	18.70	2.00	1.90
75	0.85417	18.80	2.10	1.99
76	0.87500	18.90	2.20	2.08
77	0.89583	19.00	2.30	2.17
78	0.91667	19.10	2.40	2.26
79	0.93750	19.20	2.50	2.34
80	0.95833	19.20	2.50	2.34
81	0.97917	19.30	2.60	2.43
82	1.00000	19.40	2.70	2.52
83	1.02083	19.50	2.80	2.60
84	1.04167	19.50	2.80	2.60
85	1.06250	19.60	2.90	2.69
86	1.08333	19.70	3.00	2.77
87	1.10417	19.80	3.10	2.86
88	1.12500	19.80	3.10	2.86
89	1.14583	19.90	3.20	2.94
90	1.15979	19.90	3.20	2.94
91	1.15986	19.90	3.20	2.94
92	1.15993	19.90	3.20	2.94
93	1.16000	19.90	3.20	2.94
94	1.16007	19.90	3.20	2.94
95	1.16014	19.90	3.20	2.94
96	1.16021	19.90	3.20	2.94
97	1.16028	19.90	3.20	2.94
98	1.16035	19.90	3.20	2.94
99	1.16042	19.90	3.20	2.94
100	1.16049	19.90	3.20	2.94

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 4
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft

Static water level: 16.70 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
101	1.16056	19.90	3.20	2.94
102	1.16063	19.90	3.20	2.94
103	1.16069	19.90	3.20	2.94
104	1.16076	19.90	3.20	2.94
105	1.16083	19.90	3.20	2.94
106	1.16090	19.90	3.20	2.94
107	1.16097	19.90	3.20	2.94
108	1.16104	19.90	3.20	2.94
109	1.16111	19.90	3.20	2.94
110	1.16118	19.90	3.20	2.94
111	1.16125	19.90	3.20	2.94
112	1.16132	19.90	3.20	2.94
113	1.16139	19.90	3.20	2.94
114	1.16146	19.90	3.20	2.94
115	1.16153	19.90	3.20	2.94
116	1.16160	19.90	3.20	2.94
117	1.16167	19.90	3.20	2.94
118	1.16174	19.90	3.20	2.94
119	1.16181	19.90	3.20	2.94
120	1.16187	19.90	3.20	2.94
121	1.16194	19.90	3.20	2.94
122	1.16201	19.90	3.20	2.94
123	1.16208	19.90	3.20	2.94
124	1.16215	19.90	3.20	2.94
125	1.16222	19.90	3.20	2.94
126	1.16229	19.90	3.20	2.94
127	1.16236	19.90	3.20	2.94
128	1.16243	19.90	3.20	2.94
129	1.16250	19.90	3.20	2.94
130	1.16257	19.90	3.20	2.94
131	1.16264	19.90	3.20	2.94
132	1.16271	19.90	3.20	2.94
133	1.16278	19.90	3.20	2.94
134	1.16285	19.90	3.20	2.94
135	1.16292	19.90	3.20	2.94
136	1.16299	19.90	3.20	2.94
137	1.16306	19.90	3.20	2.94
138	1.16312	19.90	3.20	2.94
139	1.16319	19.90	3.20	2.94
140	1.16326	19.90	3.20	2.94
141	1.16333	19.90	3.20	2.94
142	1.16340	19.90	3.20	2.94
143	1.16347	19.90	3.20	2.94
144	1.16354	19.90	3.20	2.94
145	1.16361	19.90	3.20	2.94
146	1.16368	19.90	3.20	2.94
147	1.16375	19.90	3.20	2.94
148	1.16382	19.90	3.20	2.94
149	1.16389	19.90	3.20	2.94
150	1.16396	19.90	3.20	2.94

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 5
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft

Static water level: 16.70 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
151	1.16403	19.90	3.20	2.94
152	1.16410	19.90	3.20	2.94
153	1.16417	19.90	3.20	2.94
154	1.16424	19.90	3.20	2.94
155	1.16431	19.90	3.20	2.94
156	1.16437	19.90	3.20	2.94
157	1.16444	19.90	3.20	2.94
158	1.16451	19.90	3.20	2.94
159	1.16458	19.90	3.20	2.94
160	1.16465	19.90	3.20	2.94
161	1.16472	19.90	3.20	2.94
162	1.16479	19.90	3.20	2.94
163	1.16486	19.90	3.20	2.94
164	1.16493	19.90	3.20	2.94
165	1.16500	19.90	3.20	2.94
166	1.16507	19.90	3.20	2.94
167	1.16514	19.90	3.20	2.94
168	1.16521	19.90	3.20	2.94
169	1.16528	19.90	3.20	2.94
170	1.16535	19.90	3.20	2.94
171	1.16542	19.90	3.20	2.94
172	1.16549	19.90	3.20	2.94
173	1.16556	19.90	3.20	2.94
174	1.16563	19.90	3.20	2.94
175	1.16569	19.90	3.20	2.94
176	1.16576	19.90	3.20	2.94
177	1.16583	19.90	3.20	2.94
178	1.16590	19.90	3.20	2.94
179	1.16597	19.90	3.20	2.94
180	1.16604	19.90	3.20	2.94
181	1.16611	19.90	3.20	2.94
182	1.16618	19.90	3.20	2.94
183	1.16625	19.90	3.20	2.94
184	1.16632	19.90	3.20	2.94
185	1.16639	19.90	3.20	2.94
186	1.16646	19.90	3.20	2.94
187	1.16653	19.90	3.20	2.94
188	1.16660	19.90	3.20	2.94
189	1.16667	19.90	3.20	2.94
190	1.16674	19.90	3.20	2.94
191	1.16681	19.90	3.20	2.94
192	1.16688	19.90	3.20	2.94
193	1.16694	19.90	3.20	2.94
194	1.16701	19.90	3.20	2.94
195	1.16708	19.90	3.20	2.94
196	1.16715	19.90	3.20	2.94
197	1.16722	19.90	3.20	2.94
198	1.16729	19.90	3.20	2.94
199	1.16736	19.90	3.20	2.94
200	1.16743	19.90	3.20	2.94

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 6
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft

Static water level: 16.70 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
201	1.16750	19.90	3.20	2.94
202	1.16757	19.90	3.20	2.94
203	1.16764	19.90	3.20	2.94
204	1.16771	19.90	3.20	2.94
205	1.16778	19.90	3.20	2.94
206	1.16785	19.90	3.20	2.94
207	1.16792	19.90	3.20	2.94
208	1.16799	19.90	3.20	2.94
209	1.16806	19.90	3.20	2.94
210	1.16813	19.90	3.20	2.94
211	1.16819	19.90	3.20	2.94
212	1.16826	19.90	3.20	2.94
213	1.16833	19.90	3.20	2.94
214	1.16840	19.90	3.20	2.94
215	1.16847	19.90	3.20	2.94
216	1.16854	19.90	3.20	2.94
217	1.16861	19.90	3.20	2.94
218	1.16868	19.90	3.20	2.94
219	1.16875	19.90	3.20	2.94
220	1.16882	19.90	3.20	2.94
221	1.16889	19.90	3.20	2.94
222	1.16896	19.90	3.20	2.94
223	1.16903	19.90	3.20	2.94
224	1.16910	19.90	3.20	2.94
225	1.16917	19.90	3.20	2.94
226	1.16924	19.90	3.20	2.94
227	1.16931	19.90	3.20	2.94
228	1.16938	19.90	3.20	2.94
229	1.16944	19.90	3.20	2.94
230	1.16951	19.90	3.20	2.94
231	1.20833	20.00	3.30	3.03
232	1.25000	20.10	3.40	3.11
233	1.29167	20.20	3.50	3.19
234	1.33333	20.40	3.70	3.36
235	1.37500	20.50	3.80	3.44
236	1.41667	20.60	3.90	3.52
237	1.45833	20.70	4.00	3.60
238	1.50000	20.80	4.10	3.68
239	1.54167	20.90	4.20	3.76
240	1.58333	20.90	4.20	3.76
241	1.62500	21.00	4.30	3.84
242	1.66667	21.10	4.40	3.92
243	1.70833	21.10	4.40	3.92
244	1.75000	21.20	4.50	3.99
245	1.79167	21.30	4.60	4.07
246	1.83333	21.40	4.70	4.15
247	1.87500	21.50	4.80	4.22
248	1.91667	21.60	4.90	4.30
249	1.95833	21.70	5.00	4.38
250	2.00000	21.70	5.00	4.38

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 7
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft

Static water level: 16.70 ft below datum

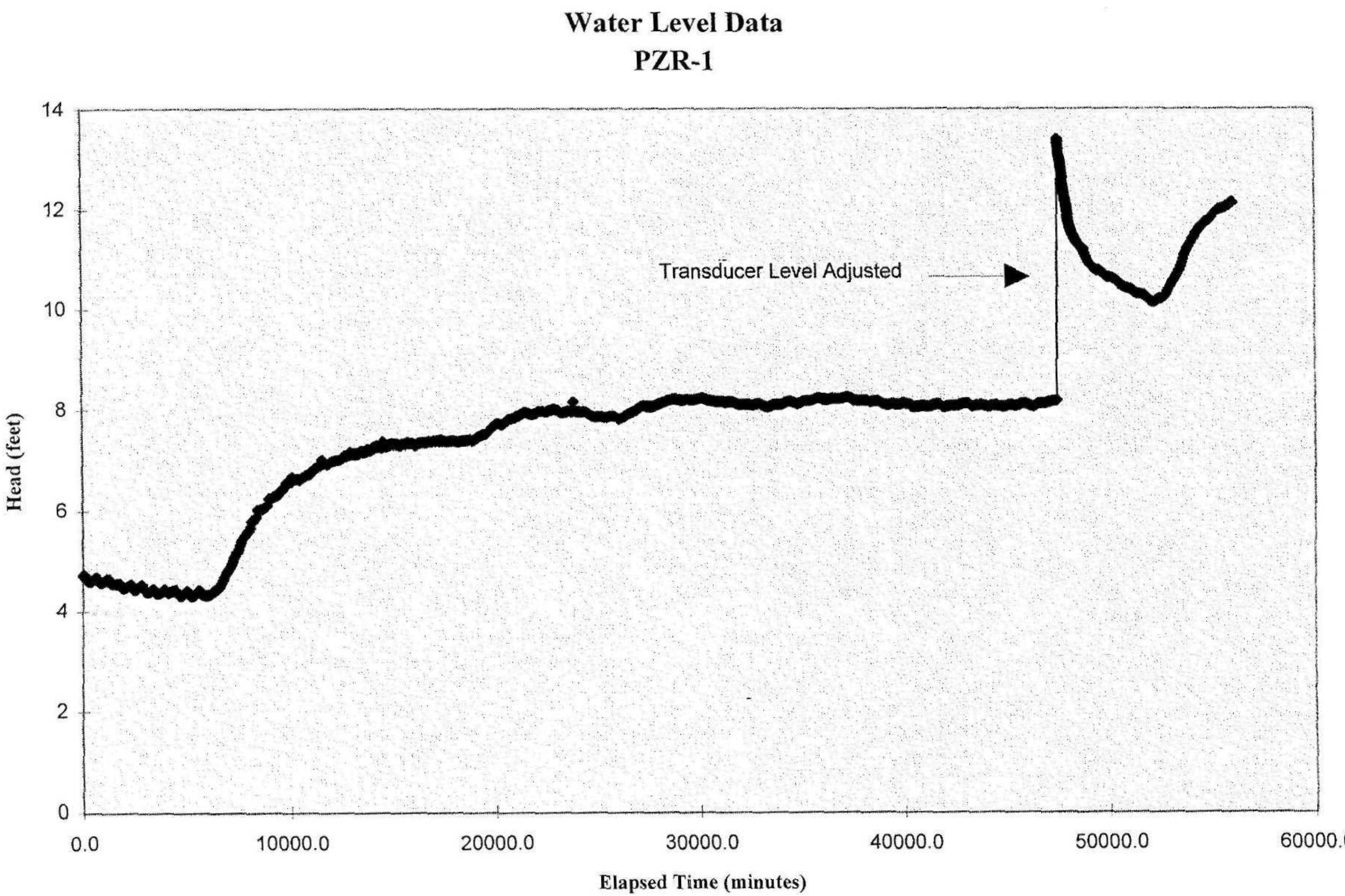
	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
251	2.04167	21.80	5.10	4.45
252	2.08333	21.90	5.20	4.52
253	2.11076	21.90	5.20	4.52
254	2.11083	21.90	5.20	4.52
255	2.11090	21.90	5.20	4.52
256	2.11097	21.90	5.20	4.52
257	2.11104	21.90	5.20	4.52
258	2.11111	21.90	5.20	4.52
259	2.11118	21.90	5.20	4.52
260	2.11125	21.90	5.20	4.52
261	2.11132	21.90	5.20	4.52
262	2.14521	22.00	5.30	4.60
263	2.14528	22.00	5.30	4.60
264	2.14535	22.00	5.30	4.60
265	2.14542	22.00	5.30	4.60
266	2.14549	22.00	5.30	4.60
267	2.14556	22.00	5.30	4.60
268	2.14562	22.00	5.30	4.60
269	2.14569	22.00	5.30	4.60
270	2.14583	22.00	5.30	4.60
271	2.16667	22.00	5.30	4.60
272	2.18750	22.00	5.30	4.60
273	2.20833	22.10	5.40	4.67
274	2.22917	22.10	5.40	4.67
275	2.25000	22.10	5.40	4.67
276	2.27083	22.10	5.40	4.67
277	2.29167	22.10	5.40	4.67
278	2.31250	22.20	5.50	4.74
279	2.33333	22.20	5.50	4.74
280	2.35417	22.20	5.50	4.74
281	2.37500	22.20	5.50	4.74
282	2.39583	22.20	5.50	4.74
283	2.41667	22.20	5.50	4.74
284	2.43750	22.20	5.50	4.74
285	2.45833	22.20	5.50	4.74
286	2.47917	22.20	5.50	4.74
287	2.50000	22.30	5.60	4.82
288	2.52083	22.30	5.60	4.82
289	2.54167	22.30	5.60	4.82
290	2.56250	22.30	5.60	4.82
291	2.58333	22.30	5.60	4.82
292	2.60417	22.30	5.60	4.82
293	2.62500	22.30	5.60	4.82
294	2.64583	22.20	5.50	4.74
295	2.66667	22.20	5.50	4.74
296	2.68750	22.20	5.50	4.74
297	2.70833	22.20	5.50	4.74
298	2.75000	22.20	5.50	4.74
299	2.79167	22.20	5.50	4.74
300	2.83333	22.20	5.50	4.74

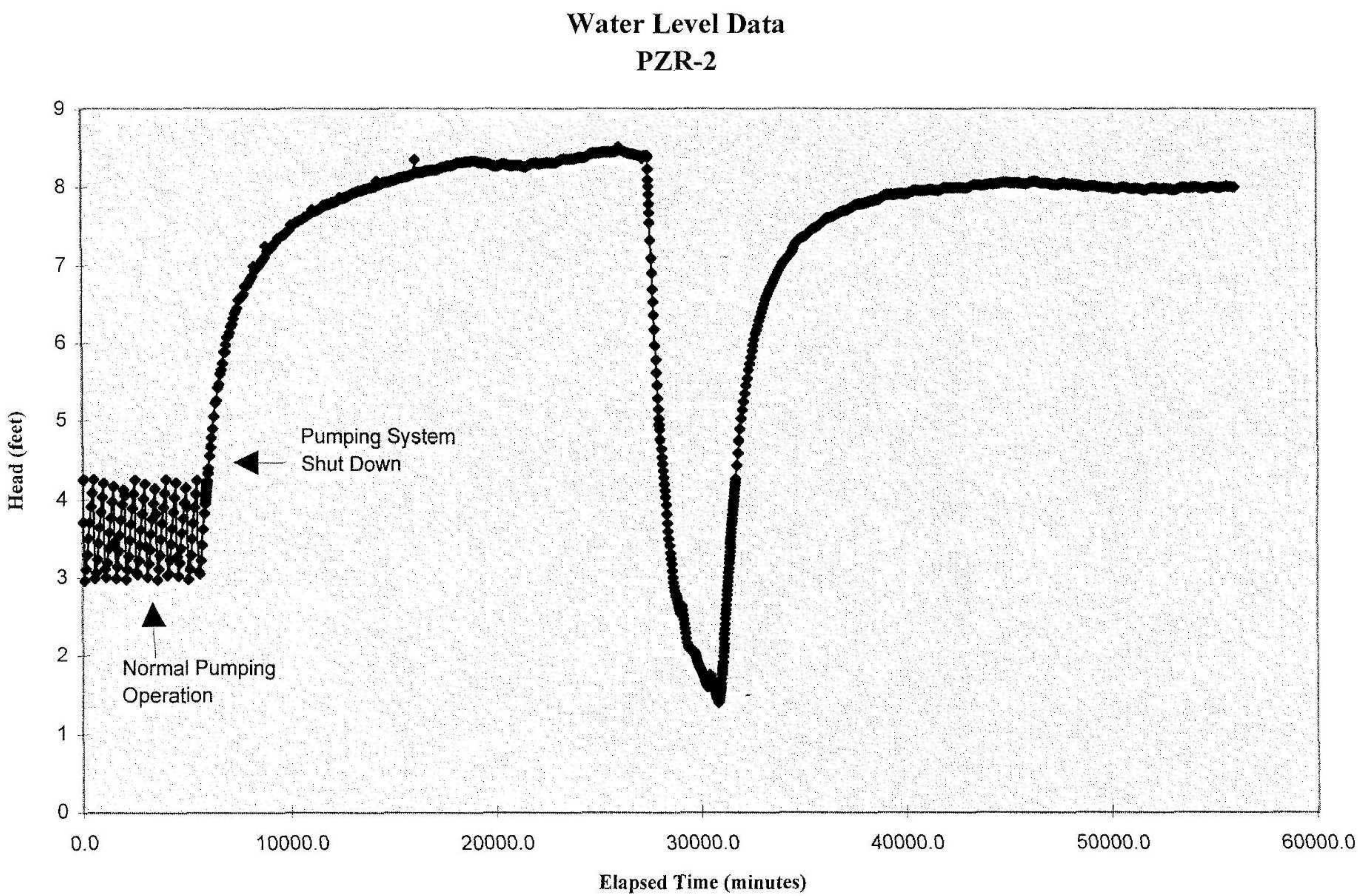
Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 8
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

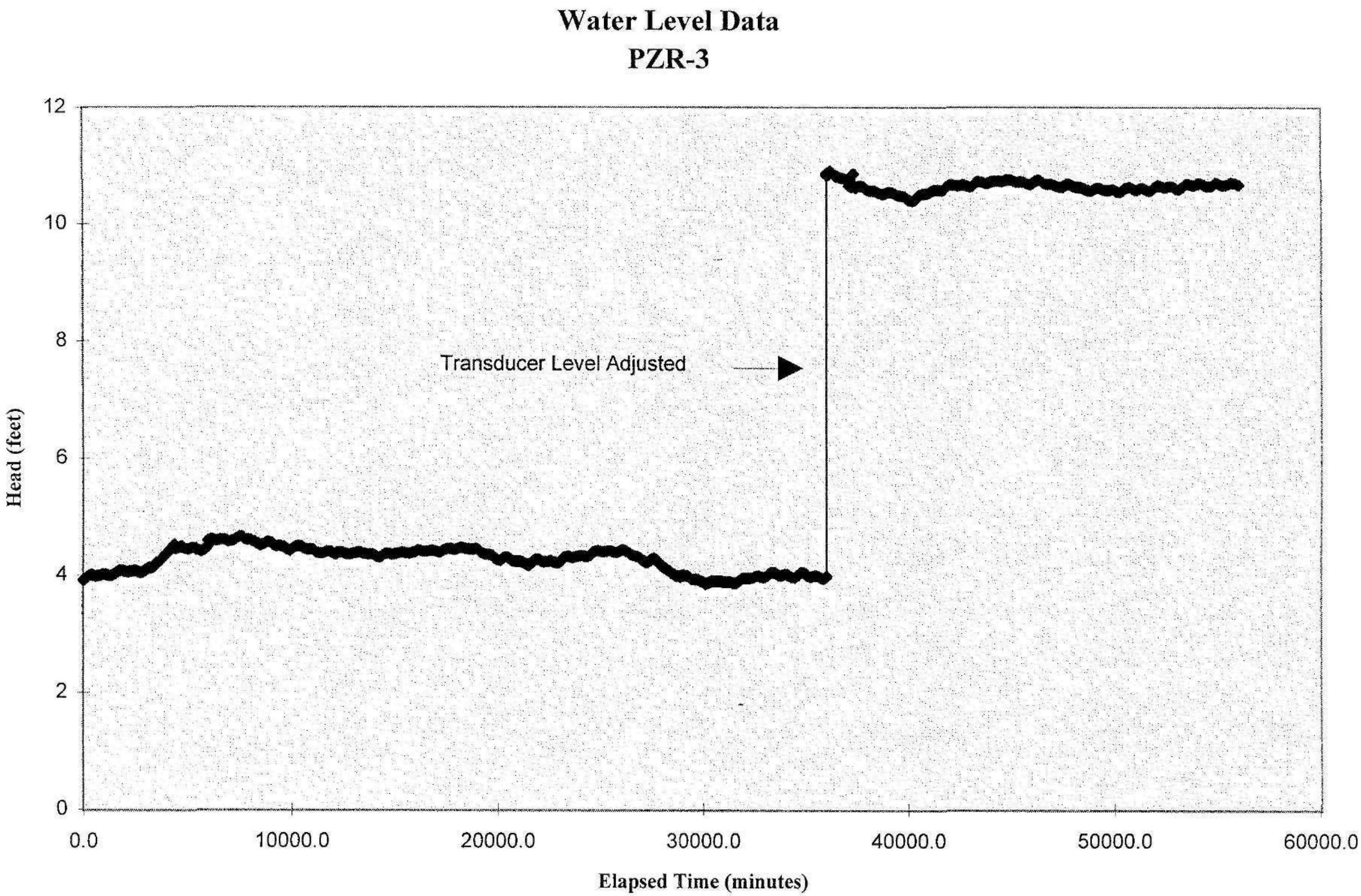
Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft

Static water level: 16.70 ft below datum

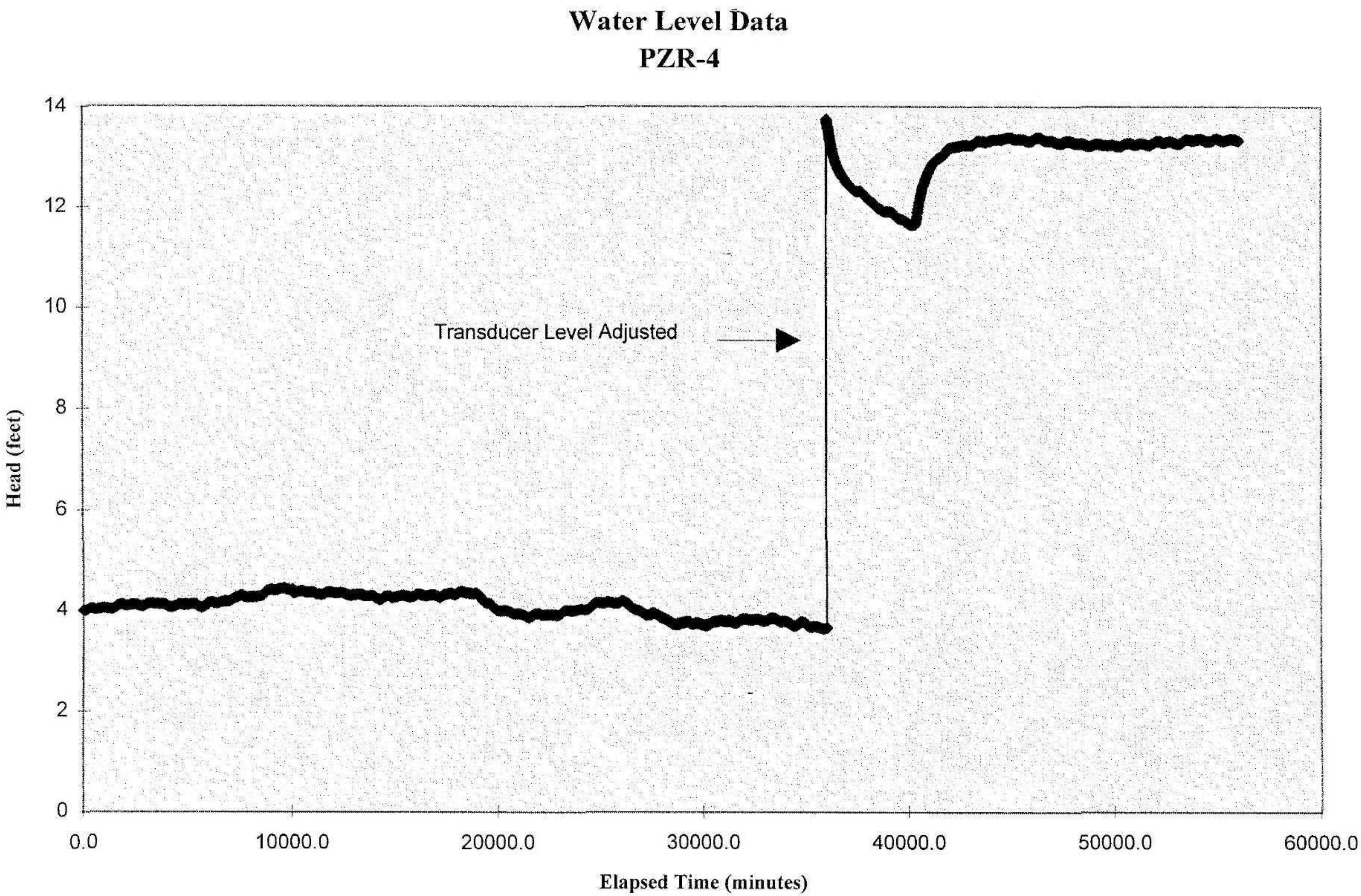
	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
301	2.87500	22.30	5.60	4.82
302	2.91667	22.30	5.60	4.82
303	2.95833	22.30	5.60	4.82
304	3.00000	22.30	5.60	4.82
305	3.04167	22.30	5.60	4.82
306	3.08333	22.30	5.60	4.82
307	3.12500	22.30	5.60	4.82
308	3.16667	22.30	5.60	4.82
309	3.20833	22.30	5.60	4.82

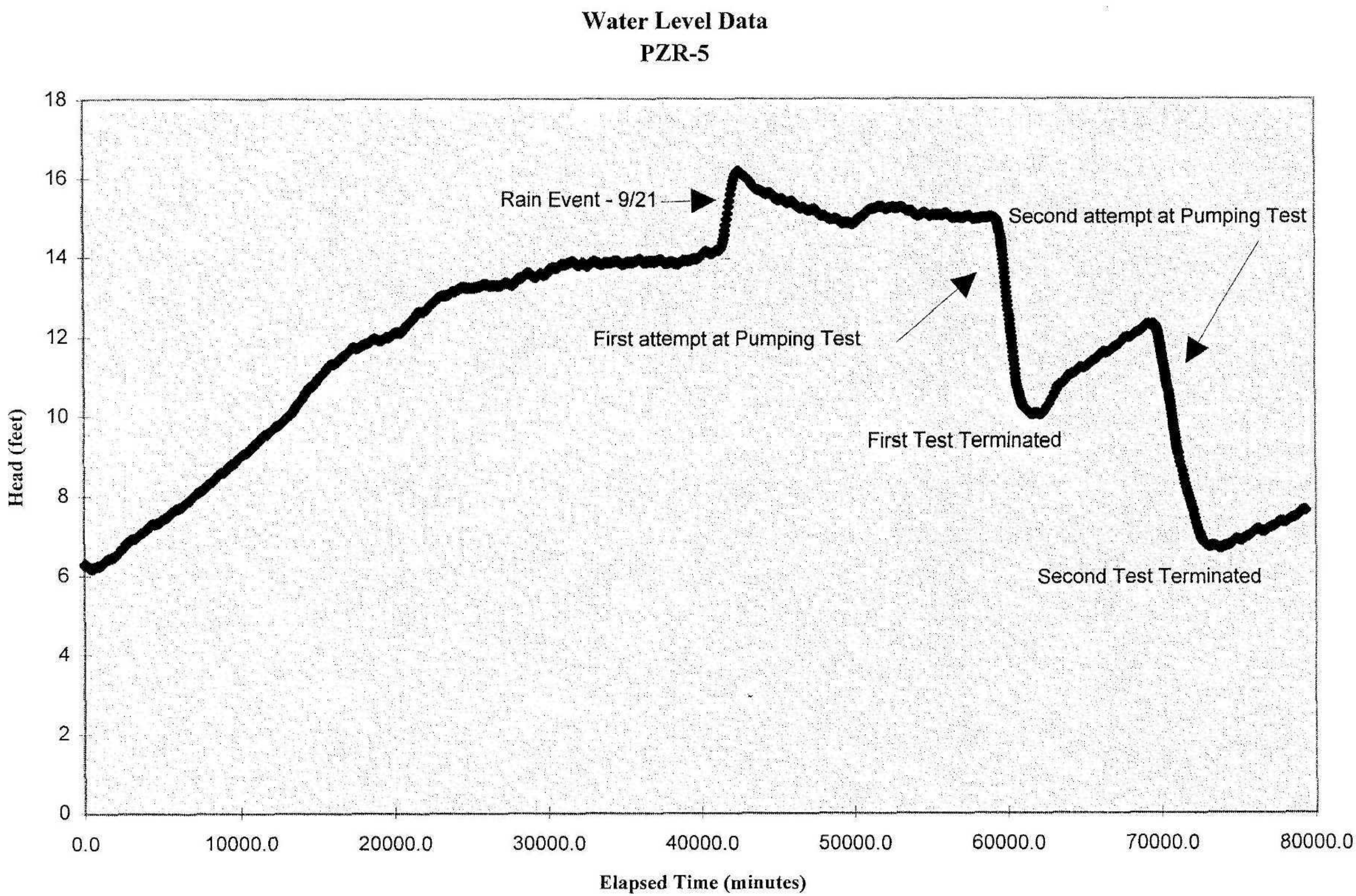

Water Level Data
PZR-1
Transducer Level Adjusted
Head (feet)
0
2
4
6
8
10
12
14
0.0
10000.0
20000.0
30000.0
40000.0
50000.0
60000.0
Elapsed Time (minutes)

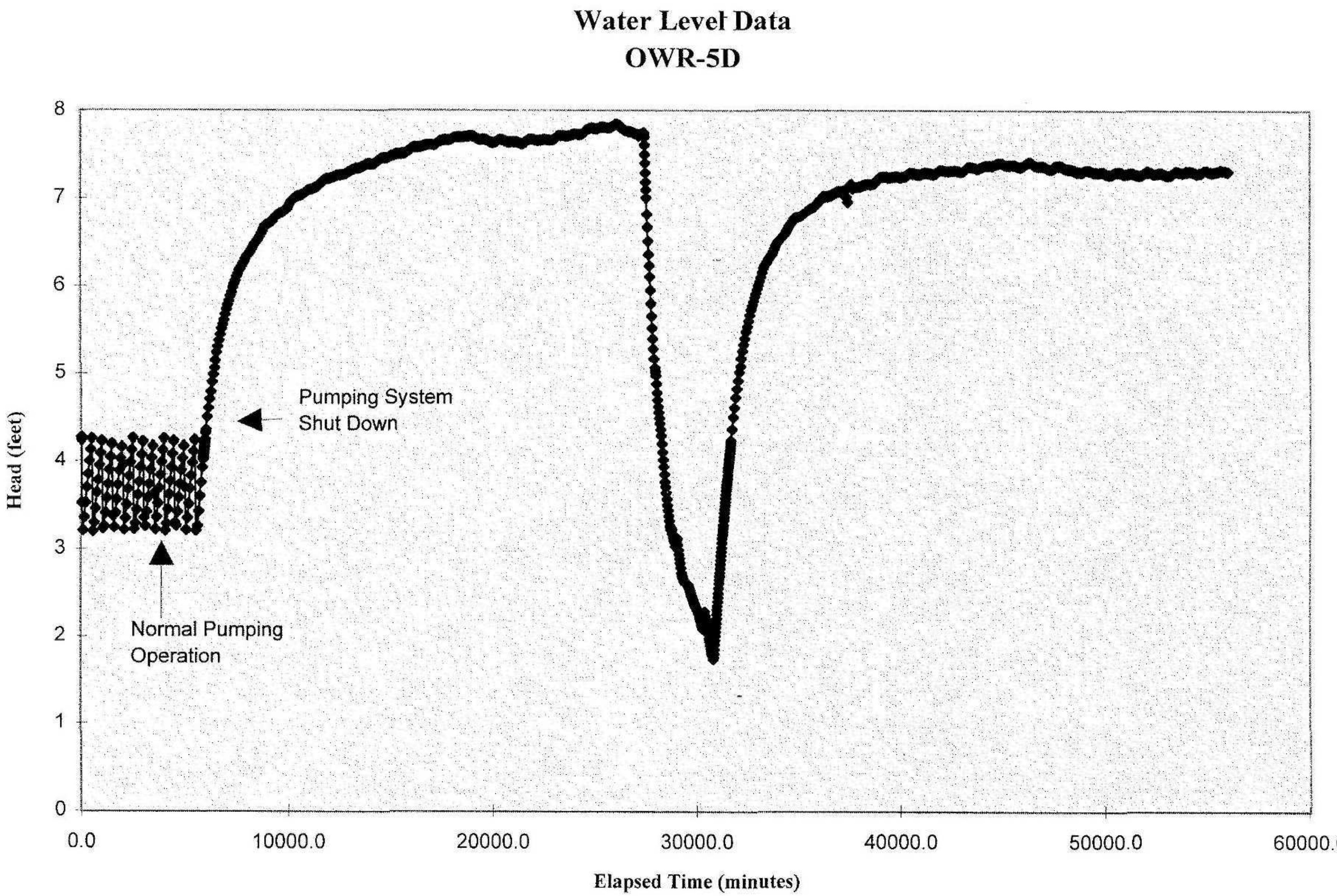

Water Level Data
PZR-2
Head (feet)
9
8
7
6
5
4
3
2
1
0
Pumping System
Shut Down
Normal Pumping
Operation
0.0
10000.0
20000.0
30000.0
40000.0
50000.0
60000.0
Elapsed Time (minutes)


Water Level Data
PZR-3
Head (feet)
12
10
8
6
4
2
0
Transducer Level Adjusted
0.0
10000.0
20000.0
30000.0
40000.0
50000.0
60000.0
Elapsed Time (minutes)

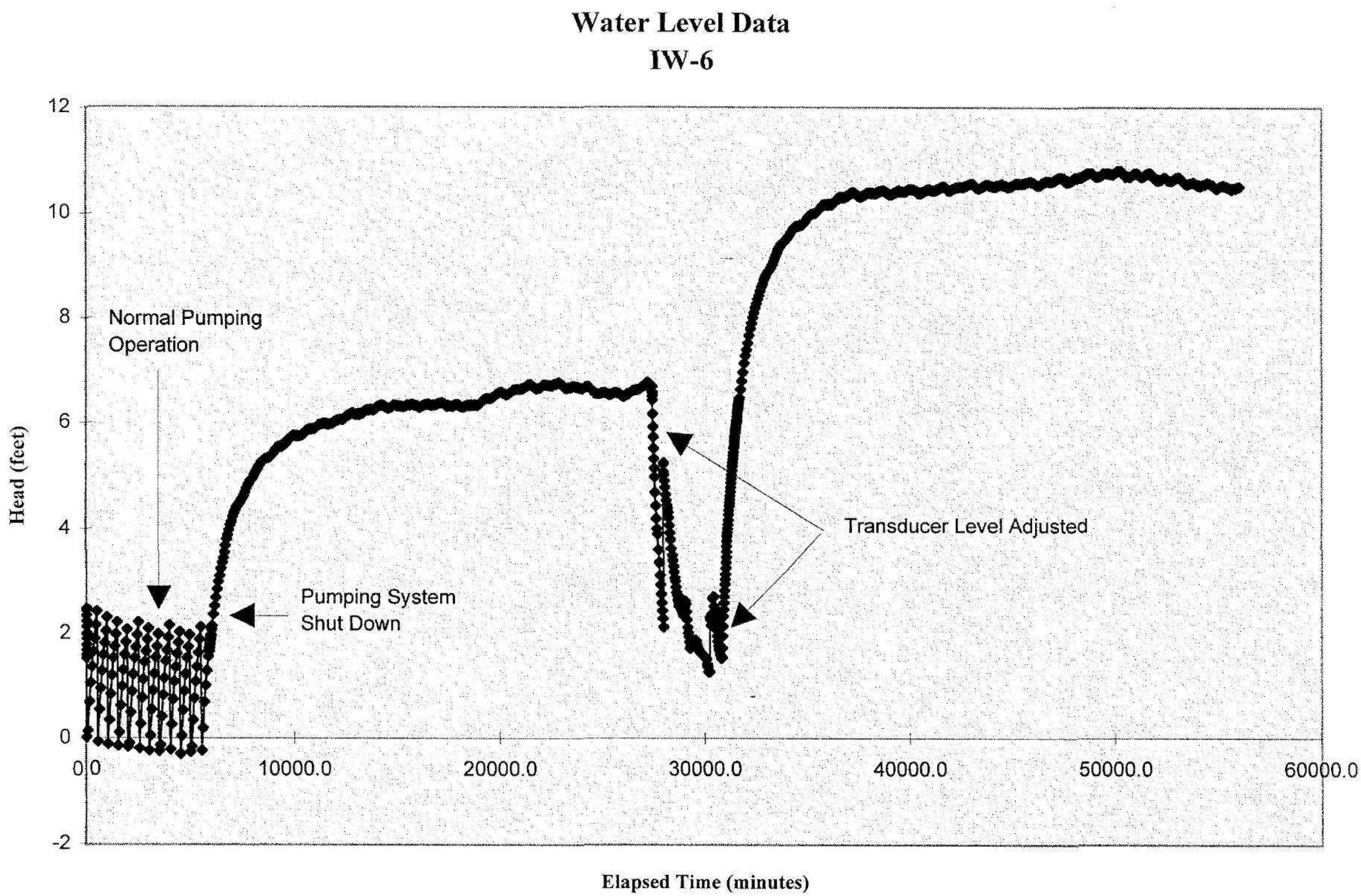
pzr-4

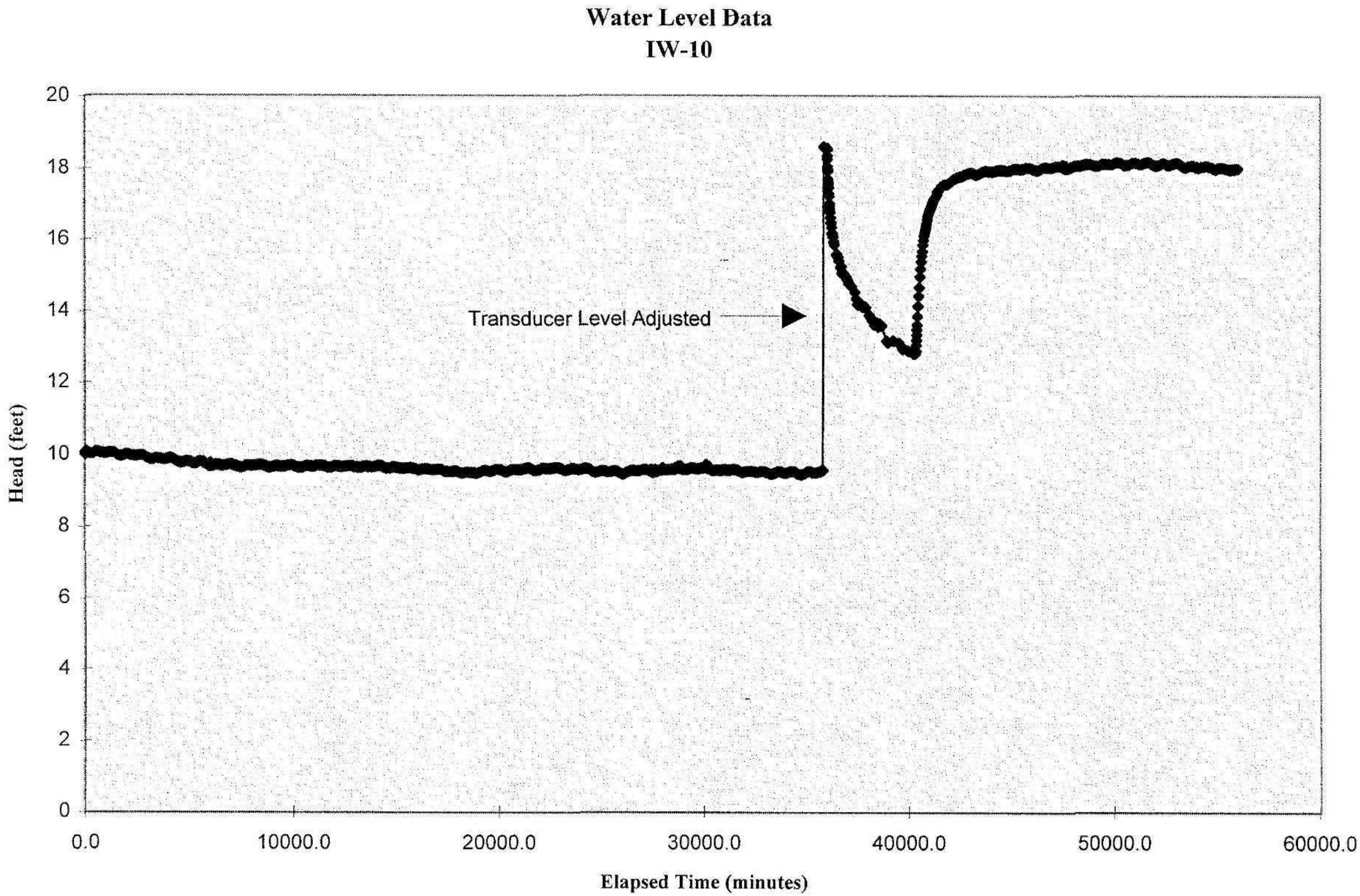

Water Level Data
PZR-4
Head (feet)
Elapsed Time (minutes)
Transducer Level Adjusted
0
2
4
6
8
10
12
14
0.0
10000.0
20000.0
30000.0
40000.0
50000.0
60000.0

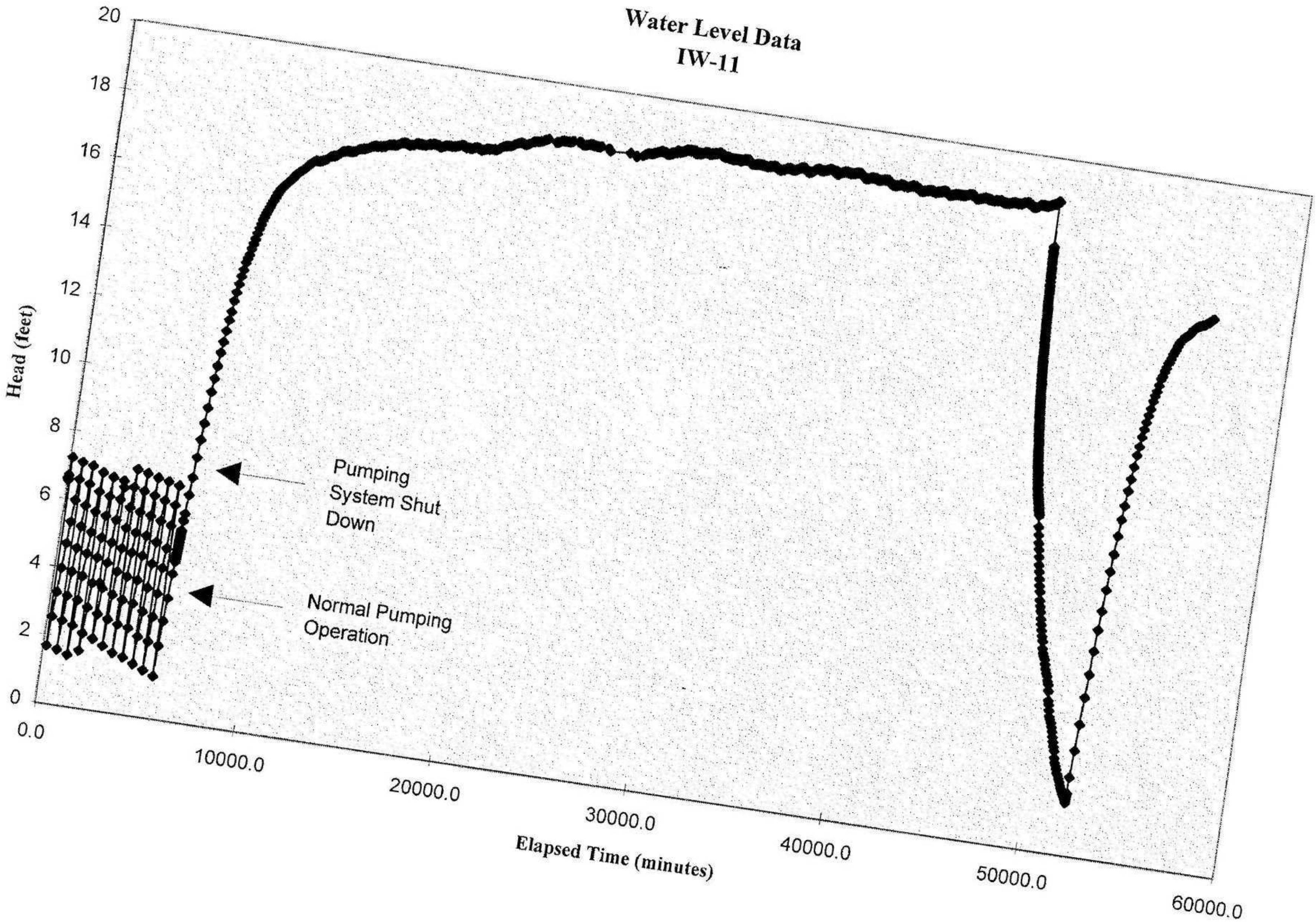

Water Level Data
PZR-5
Head (feet)
Elapsed Time (minutes)
18
16
14
12
10
8
6
4
2
0
0.0
10000.0
20000.0
30000.0
40000.0
50000.0
60000.0
70000.0
80000.0
Rain Event - 9/21
Second attempt at Pumping Test
First attempt at Pumping Test
First Test Terminated
Second Test Terminated



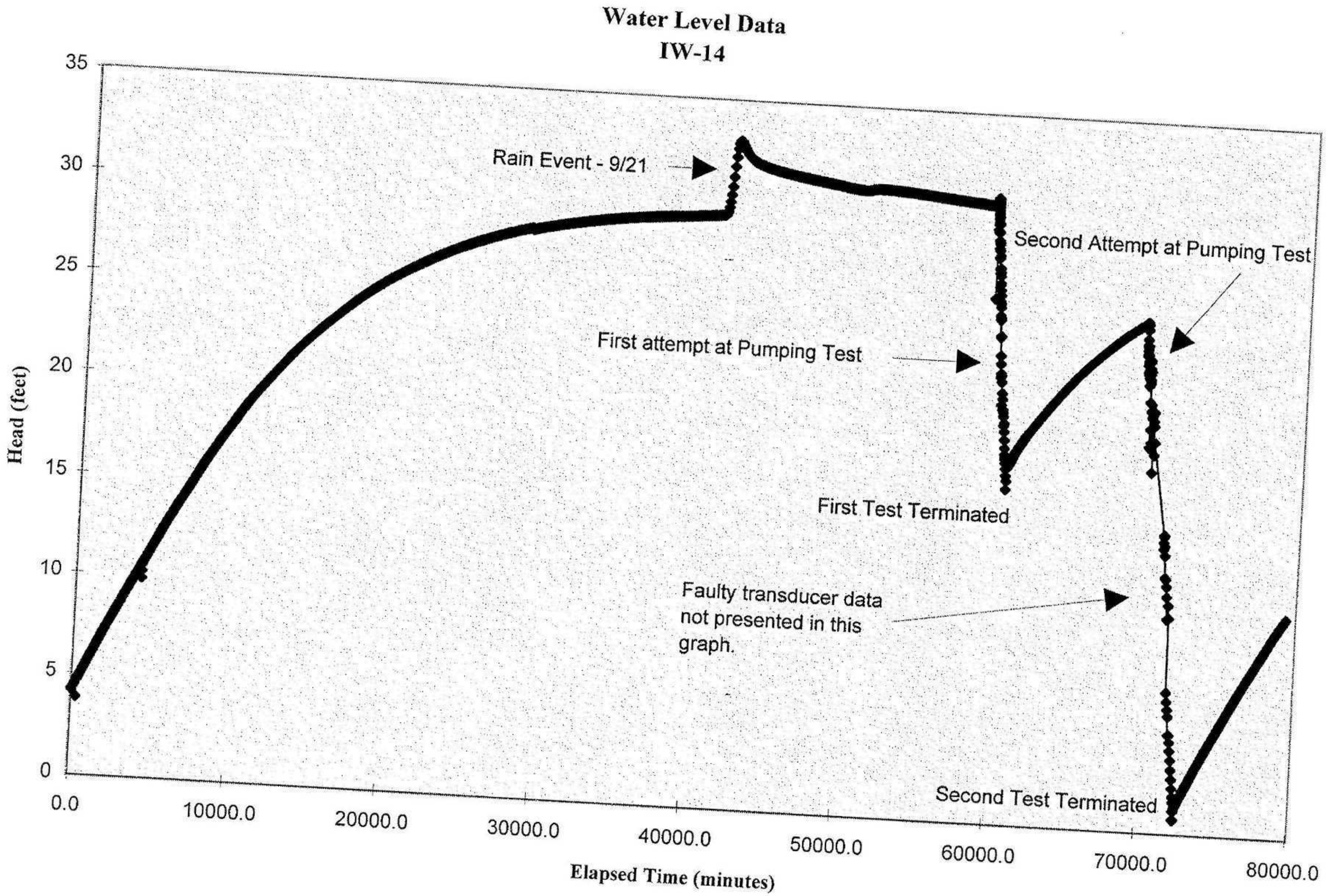
Water Level Data
OWR-5D
Head (feet)
8
7
6
5
4
3
2
1
0
0.0
10000.0
20000.0
30000.0
40000.0
50000.0
60000.0
Elapsed Time (minutes)
Pumping System Shut Down
Normal Pumping Operation


Water Level Data
IW-6
Head (feet)
12
10
8
6
4
2
0
-2
0.0
10000.0
20000.0
30000.0
40000.0
50000.0
60000.0
Elapsed Time (minutes)
Normal Pumping Operation
Pumping System Shut Down
Transducer Level Adjusted


Water Level Data
IW-10
Head (feet)
Elapsed Time (minutes)
Transducer Level Adjusted
0
2
4
6
8
10
12
14
16
18
20
0.0
10000.0
20000.0
30000.0
40000.0
50000.0
60000.0



Water Level Data
IW-11
Head (feet)
20
18
16
14
12
10
8
6
4
2
0
0.0
10000.0
20000.0
30000.0
40000.0
50000.0
60000.0
Elapsed Time (minutes)
Pumping System Shut Down
Normal Pumping Operation


Water Level Data
IW-14
Head (feet)
35
30
25
20
15
10
5
0
0.0
10000.0
20000.0
30000.0
40000.0
50000.0
60000.0
70000.0
80000.0
Elapsed Time (minutes)
Rain Event - 9/21
Second Attempt at Pumping Test
First attempt at Pumping Test
First Test Terminated
Faulty transducer data not presented in this graph.
Second Test Terminated

1996 Old Limestone Bed Surface Impoundment (OLBSI) Pumping Test Data

Golder Associates	SUBJECT Monsanto / Pump / AL		
	Job No. 943-3660 Ref. 029	Made by CDH Checked JMF Reviewed JMF	Date 12-10-96 Sheet 1 of 2

IW-16

Chow

$Q = 0.1\,gpm = 0.002228\ ft^3/sec$

$T = \frac{Q}{4\pi S_a}(W_u) = \frac{0.0022\ ft^3/sec\ (.048)}{(4)(\pi)(8ft)}$

$S_a = 8ft$

$\Delta S_a = 48ft$

$t_a = 240\ sec$

$= 1.05e^{-6}\ ft^2/sec$

$F(u) = \frac{S_a}{\Delta S_a} = 0.166$

$= 6.3e^{-5}\ ft^2/min$

$= .09072\ ft^2/day$

$u(a) = 2.0 \quad W(u) = .048$

$K = \frac{1.05e^{-6}\ ft^2/sec}{40ft} = 2.6e^{-8}\ ft/sec$

$7.92\ e^{-7}\ cm/sec$

Theis Recovery

$Q = 0.0022\ ft^3/sec$

$\Delta S' = 48ft$

$T = \frac{2.3Q}{4\pi \Delta S'} = \frac{0.005512}{603.19} = 8.49\,e^{-7}\ ft^2/sec$

$K = 2.12e^{-8}\ ft/sec$

$K = 6.47\ e^{-7}\ cm/sec$

Jacob

$T = \frac{2.3Q}{4\pi\ (h_0-h)} = \frac{.1925\ ft^3/day\ (2.3)}{4\pi\ 48\ ft} = 0.073\ ft^2/day$

$K = 0.0018\ ft/day$

$= 2.12\,e^{-8}\ ft/sec$

$= 6.47\,e^{-7}\ cm/sec$

Golder Associates

SUBJECT Mousanto/Pump/AC		
Job No. 943-3680.029	Made by CAH	Date 12-10-96
Ref.	Checked JMF	Sheet 2 of 2
	Reviewed JMF	

PZ 6A

Jacob Method

$$T = \frac{2.3Q}{4\pi(h_o - h)} = \frac{(19.25\ ft^3/day)(2.3)}{(4)(\pi)(1.7\ ft)} = \frac{44.275}{(4)\pi(1.7\ ft)} = 2.07\ ft^2/day$$

$K = 5.18\ e^{-2}\ ft/day$

$= 6.00\ e^{-7}\ ft/sec$

$= 1.82\ e^{-5}\ cm/sec$

PZ 4C drawdown

Jacob $T = \frac{2.3\ Q}{4\pi(h_o - h)} = \frac{2.3(7.7\ ft^3/day)}{4\pi\ (3.9)} = .36\ ft^2/day$

$K = .009\ ft/day$

$= 1e^{-7}\ ft/sec$

$= 3.18\ e^{-6}\ cm/sec$

DMW-1L DRAWDOWN

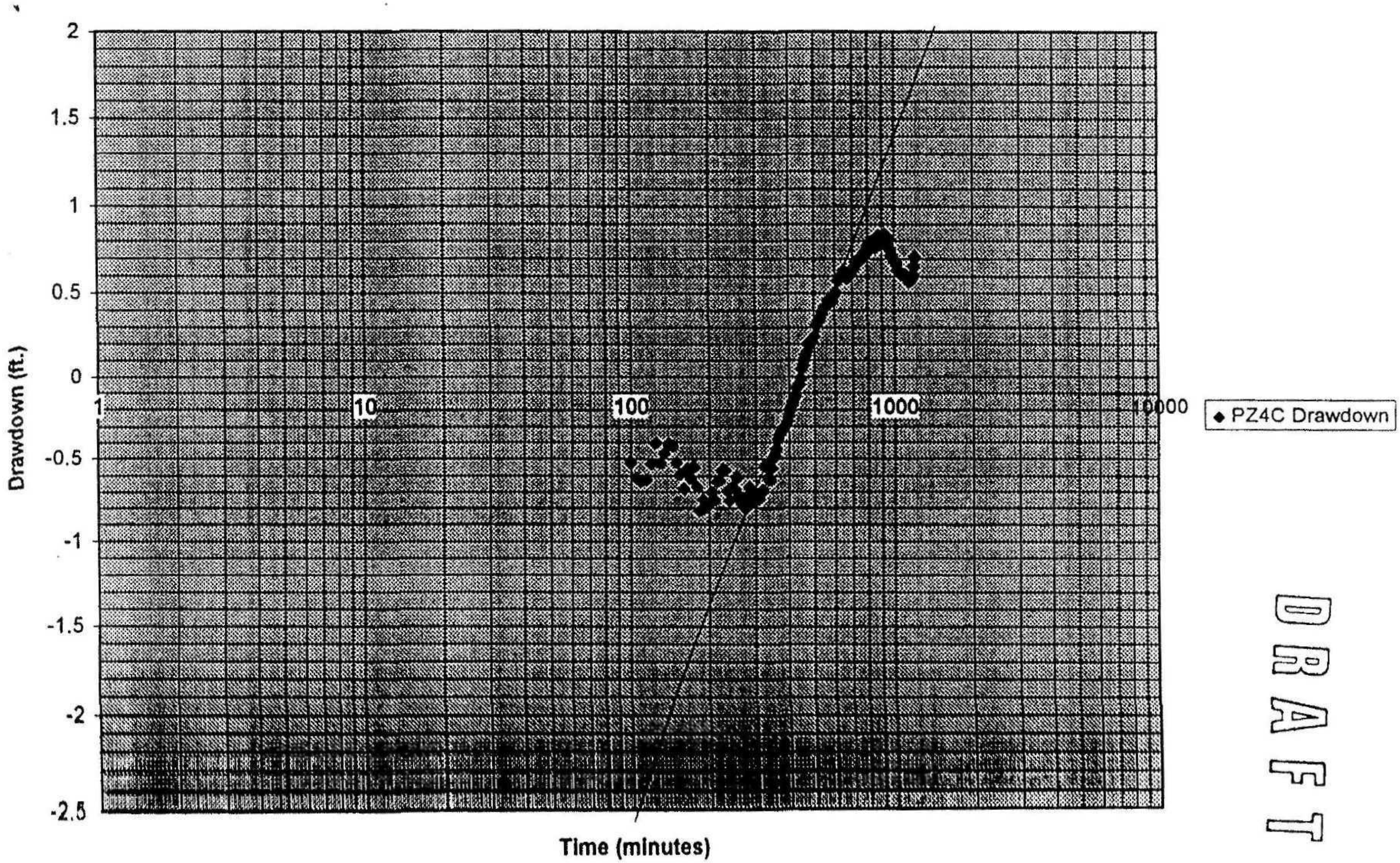
$$T = \frac{2.3\ Q}{4\pi(h_o - h)} = 2.3\ \frac{(7.7\ ft^3/day)}{4(\pi)(8.4)} = .1677\ ft^2/day$$

$K = .0042\ ft/day$

$= 4.8\ e^{-8}\ ft/sec$

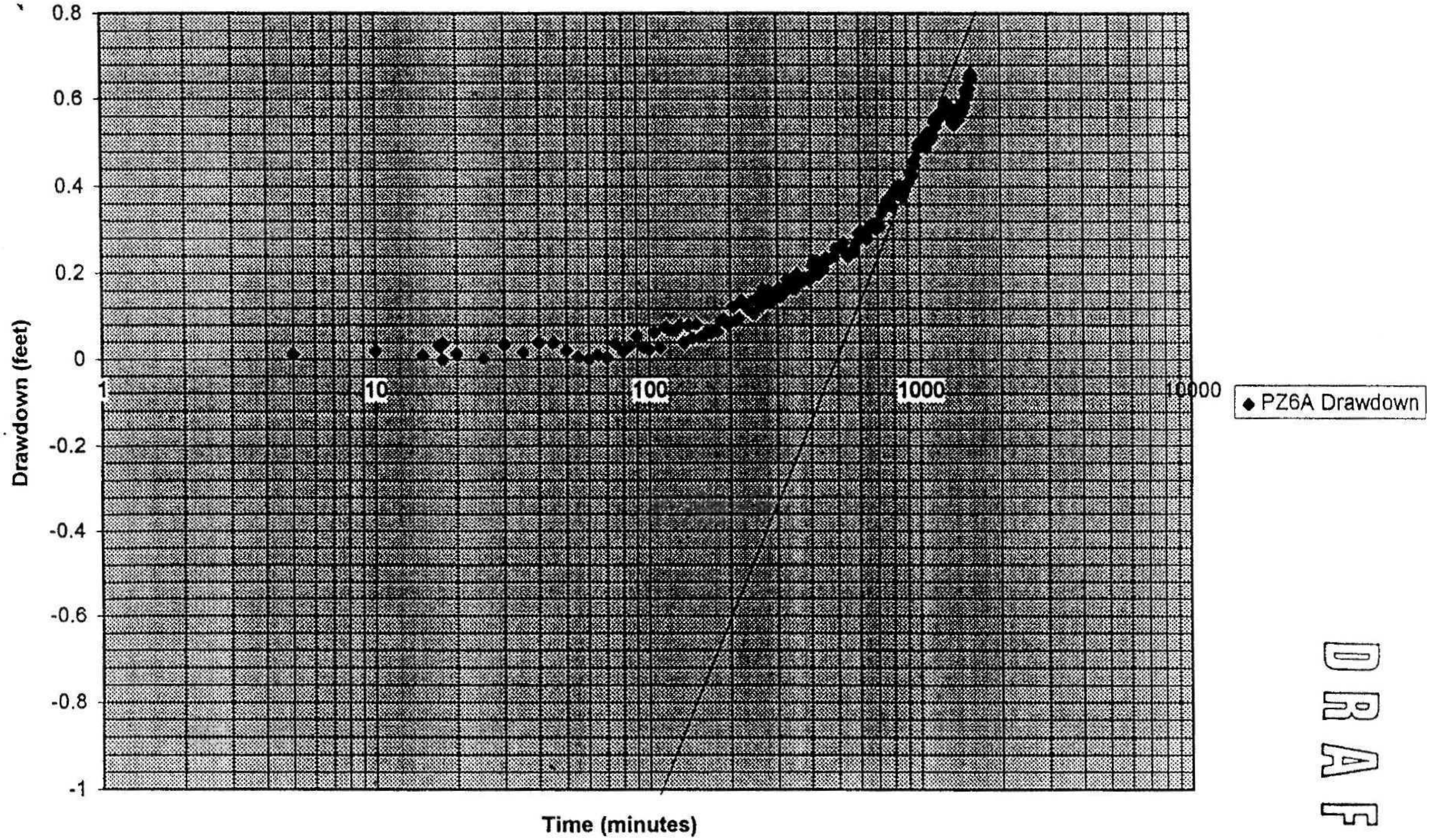
$= 1.47\ e^{-6}\ cm/sec$

PZ4C Drawdown



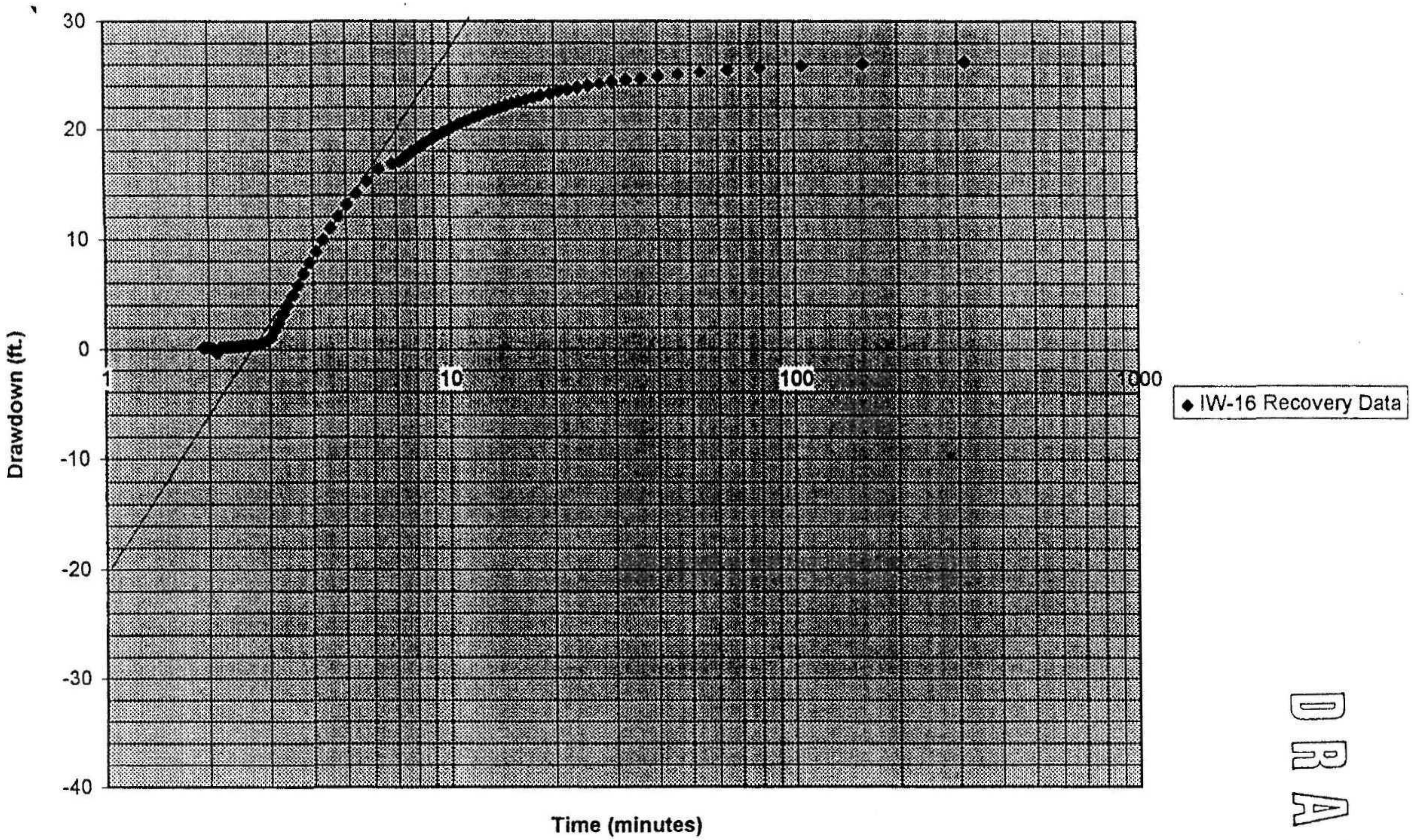
DRAFT

PZ6A Drawdown



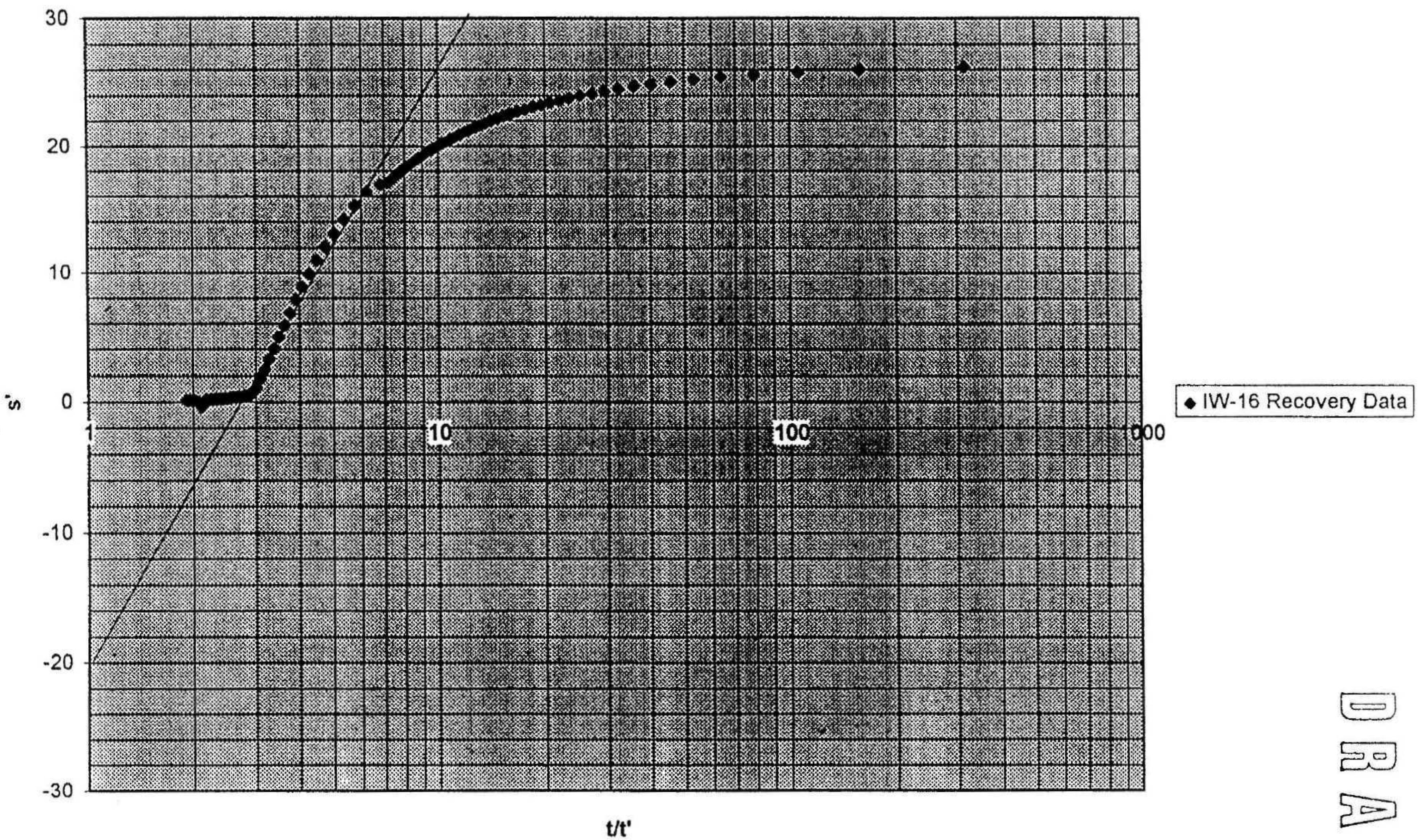
DRAFT

IW-16 Chow Analysis



DRAFT

Theis Recovery IW-16



DRAFT

Dec-96 943-3680

FALLING HEAD TEST
MONSANTO ANNISTON FACILITY
WELL PZ-7

	Units		
Static Water Depth	Feet	33.08	Feet Below TOC
Riser Diameter	Inches	2.00	
Sandpack Diameter	Inches	8.000	
Top of Sandpack Depth	Feet	44.00	Feet Below TOC
Bottom of Screen	Feet	50.00	Feet Below TOC

Minutes	Seconds	Elapsed Time (min)	Depth to Water (ft.)	Head	Head Ratio H/Ho		LOG HEAD RATIO
0	0	0	28.257808	4.82	1.000		0.000
120	0	120	28.600612	4.48	0.929		-0.032
240	0	240	28.882201	4.20	0.871		-0.060
360	0	360	29.137687	3.94	0.818	*	-0.087
480	0	480	29.374231	3.71	0.768		-0.114
600	0	600	29.578204	3.50	0.726		-0.139
720	0	720	29.736901	3.34	0.693		-0.159
840	0	840	29.857021	3.22	0.668		-0.175
960	0	960	29.969518	3.11	0.645		-0.190
1080	0	1080	30.143461	2.94	0.609		-0.215
1200	0	1200	30.289222	2.79	0.579		-0.238
1320	0	1320	30.393172	2.69	0.557		-0.254
1440	0	1440	30.498277	2.58	0.535		-0.271
1560	0	1560	30.535699	2.54	0.528		-0.278
1680	0	1680	30.646348	2.43	0.505		-0.297
1800	0	1800	30.764158	2.32	0.480		-0.319
1920	0	1920	30.853555	2.23	0.462		-0.336
2040	0	2040	30.924472	2.16	0.447		-0.350
2160	0	2160	30.975292	2.10	0.436		-0.360
2280	0	2280	31.030732	2.05	0.425		-0.372
2400	0	2400	31.119205	1.96	0.407		-0.391
2520	0	2520	31.246255	1.83	0.380		-0.420
2640	0	2640	31.351822	1.73	0.358		-0.446
2760	0	2760	31.398253	1.68	0.349		-0.457
2880	0	2880	31.448149	1.63	0.338		-0.471
3000	0	3000	31.488574	1.59	0.330		-0.481
3120	0	3120	31.543783	1.54	0.319		-0.497
3240	0	3240	31.618396	1.46	0.303		-0.518
3360	0	3360	31.673836	1.41	0.292		-0.535
3480	0	3480	31.747063	1.33	0.276		-0.558
3600	0	3600	31.770394	1.31	0.272		-0.566
3720	0	3720	31.7995	1.28	0.266		-0.576
3840	0	3840	31.839232	1.24	0.257		-0.590
3960	0	3960	31.943644	1.14	0.236	*	-0.628
4080	0	4080	32.033503	1.05	0.217		-0.66[illegible]
4200	0	4200	32.090098	0.99	0.205		-0.[illegible]
4320	0	4320	32.136298	0.94	0.196		[illegible]

Dec-96 943-3680

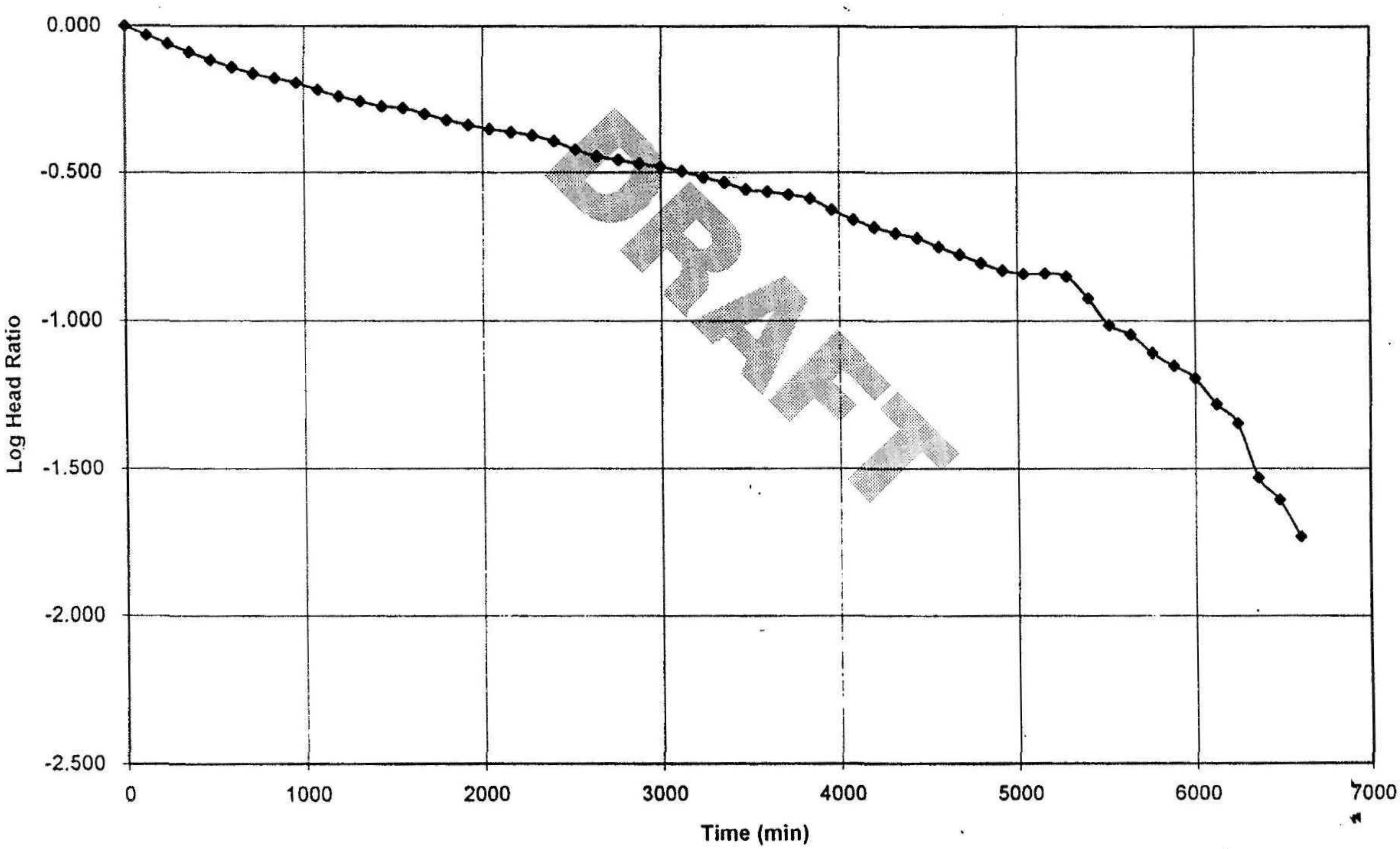
FALLING HEAD TEST
MONSANTO ANNISTON FACILITY
WELL PZ-7

	Units		
Static Water Depth	Feet	33.08	Feet Below TOC
Riser Diameter	Inches	2.00	
Sandpack Diameter	Inches	8.000	
Top of Sandpack Depth	Feet	44.00	Feet Below TOC
Bottom of Screen	Feet	50.00	Feet Below TOC

Minutes	Seconds	Elapsed Time (min)	Depth to Water (ft.)	Head	Head Ratio H/Ho		LOG HEAD RATIO
4440	0	4440	32.170255	0.91	0.189		-0.724
4560	0	4560	32.228236	0.85	0.177		-0.753
4680	0	4680	32.278746	0.80	0.167		-0.778
4800	0	4800	32.327797	0.75	0.156		-0.807
4920	0	4920	32.371918	0.71	0.147		-0.833
5040	0	5040	32.390629	0.69	0.143		-0.845
5160	0	5160	32.386933	0.69	0.144		-0.842
5280	0	5280	32.40472	0.68	0.140		-0.854
5400	0	5400	32.50867	0.57	0.118		-0.926
5520	0	5520	32.614699	0.47	0.096		-1.016
5640	0	5640	32.647963	0.43	0.090		-1.048
5760	0	5760	32.703865	0.38	0.078		-1.108
5880	0	5880	32.738515	0.34	0.071		-1.150
6000	0	6000	32.769931	0.31	0.064		-1.192
6120	0	6120	32.826757	0.25	0.053		-1.280
6240	0	6240	32.861638	0.22	0.045		-1.344
6360	0	6360	32.937637	0.14	0.030		-1.530
6480	0	6480	32.960275	0.12	0.025		-1.605
6600	0	6600	32.990305	0.09	0.019		-1.730
6720	0	6720	33.014098	0.07	0.014		-1.864
6840	0	6840	33.112042	-0.03	-0.007		-2.178
6960	0	6960	33.205135	-0.13	-0.026		-1.586
7080	0	7080	33.223153	-0.14	-0.030		-1.527
7200	0	7200	33.243019	-0.16	-0.034		-1.471
7320	0	7320	33.265888	-0.19	-0.039		-1.414
7440	0	7440	33.32872	-0.25	-0.052		-1.288
7560	0	7560	33.436597	-0.36	-0.074		-1.131
7680	0	7680	33.463393	-0.38	-0.080		-1.100

* INDICATES THE BEST FIT LINE PASSES THROUGH THESE POINTS
WHICH ARE USED TO CALCULATE HYDRAULIC CONDUCTIVITY
K = 2.9361E-07

PZ-7



0.000
-0.500
-1.000
-1.500
-2.000
-2.500
Log Head Ratio
0
1000
2000
3000
4000
5000
6000
7000
Time (min)
DRAFT

Dec-96 943-3680

FALLING HEAD TEST
MONSANTO ANNISTON FACILITY
WELL DMW-16

	Units		
Static Water Depth	Feet	33.08	Feet Below TOC
Riser Diameter	Inches	2.00	
Sandpack Diameter	Inches	8.000	
Top of Sandpack Depth	Feet	54.00	Feet Below TOC
Bottom of Screen	Feet	60.00	Feet Below TOC

Minutes	Seconds	Elapsed Time (min)	Depth to Water (ft.)	Head	Head Ratio H/Ho		Log Head Ratio
0	0	0	28.257808	4.82	1		0
120	0	120	28.600612	4.48	0.929		-0.032
240	0	240	28.882201	4.20	0.871		-0.060
360	0	360	29.137687	3.94	0.818	*	-0.087
480	0	480	29.374231	3.71	0.768		-0.114
600	0	600	29.578204	3.50	0.726		-0.139
720	0	720	29.736901	3.34	0.693		-0.159
840	0	840	29.857021	3.22	0.668		-0.175
960	0	960	29.969518	3.11	0.645		-0.190
1080	0	1080	30.143461	2.94	0.609		-0.215
1200	0	1200	30.289222	2.79	0.579		-0.238
1320	0	1320	30.393172	2.69	0.557		-0.254
1440	0	1440	30.498277	2.58	0.535		-0.271
1560	0	1560	30.535699	2.54	0.528		-0.278
1680	0	1680	30.646348	2.43	0.505		-0.297
1800	0	1800	30.764158	2.32	0.480		-0.319
1920	0	1920	30.853555	2.23	0.462		-0.336
2040	0	2040	30.924472	2.16	0.447		-0.350
2160	0	2160	30.975292	2.10	0.436		-0.360
2280	0	2280	31.030732	2.05	0.425		-0.372
2400	0	2400	31.119205	1.96	0.407		-0.391
2520	0	2520	31.246255	1.83	0.380		-0.420
2640	0	2640	31.351822	1.73	0.358		-0.446
2760	0	2760	31.398253	1.68	0.349		-0.457
2880	0	2880	31.448149	1.63	0.338		-0.471
3000	0	3000	31.488574	1.59	0.330		-0.481
3120	0	3120	31.543783	1.54	0.319		-0.497
3240	0	3240	31.618396	1.46	0.303		-0.518
3360	0	3360	31.673836	1.41	0.292		-0.535
3480	0	3480	31.747063	1.33	0.276		-0.558
3600	0	3600	31.770394	1.31	0.272		-0.566
3720	0	3720	31.7995	1.28	0.266		-0.576
3840	0	3840	31.839232	1.24	0.257		-0.590
3960	0	3960	31.943644	1.14	0.236		-0.628
4080	0	4080	32.033503	1.05	0.217		-0.664

Dec-96 943-3680

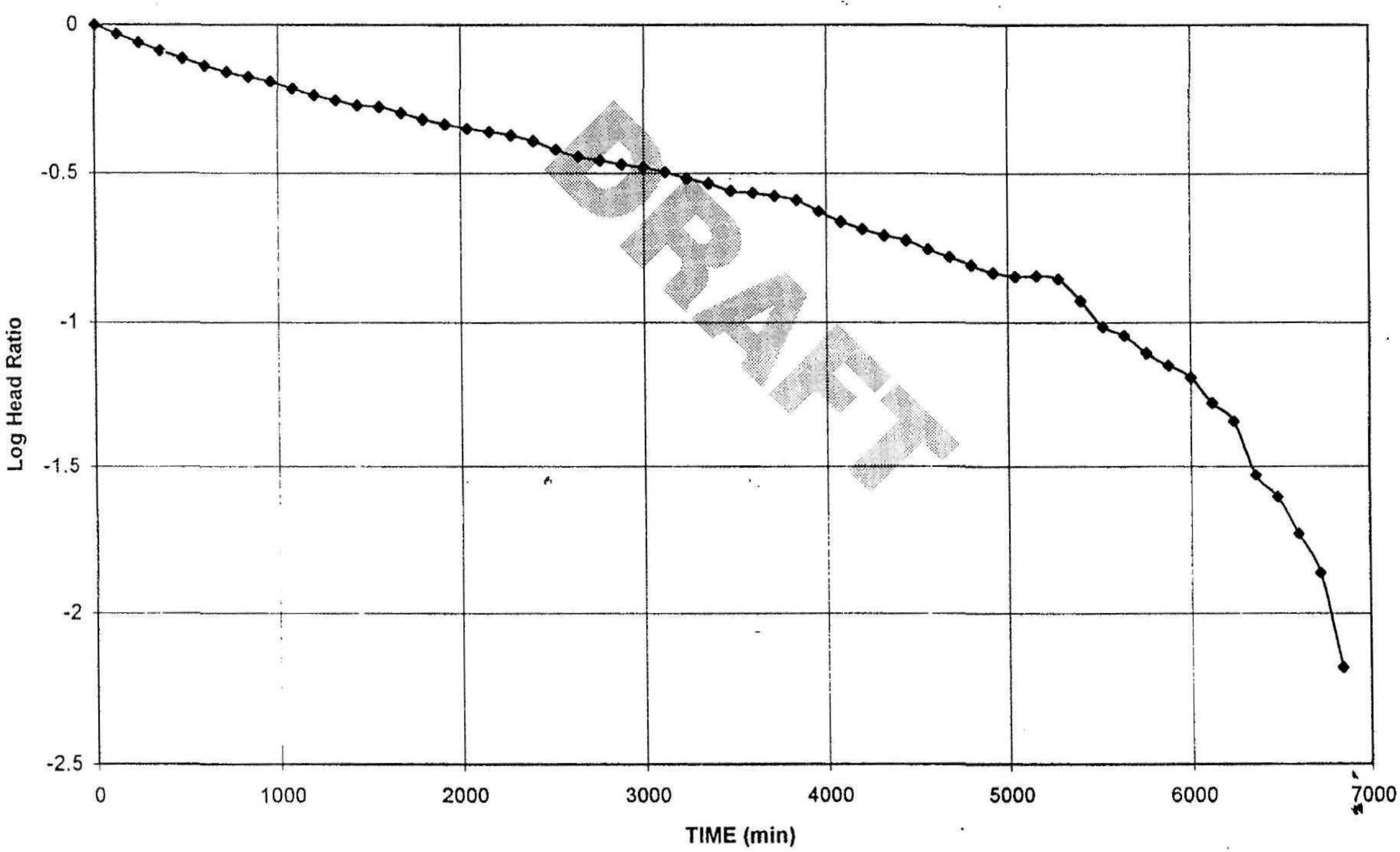
FALLING HEAD TEST
MONSANTO ANNISTON FACILITY
WELL DMW-16

	Units		
Static Water Depth	Feet	33.08	Feet Below TOC
Riser Diameter	Inches	2.00	
Sandpack Diameter	Inches	8.000	
Top of Sandpack Depth	Feet	54.00	Feet Below TOC
Bottom of Screen	Feet	60.00	Feet Below TOC

Minutes	Seconds	Elapsed Time (min)	Depth to Water (ft.)	Head	Head Ratio H/Ho		Log Head Ratio .
4200	0	4200	32.090098	0.99	0.205		-0.688
4320	0	4320	32.136298	0.94	0.196		-0.708
4440	0	4440	32.170255	0.91	0.189		-0.724
4560	0	4560	32.228236	0.85	0.177		-0.753
4680	0	4680	32.276746	0.80	0.167		-0.778
4800	0	4800	32.327797	0.75	0.156		-0.807
4920	0	4920	32.371918	0.71	0.147		-0.833
5040	0	5040	32.390629	0.69	0.143		-0.845
5160	0	5160	32.386933	0.69	0.144	*	-0.842
5280	0	5280	32.40472	0.68	0.140		-0.854
5400	0	5400	32.50867	0.57	0.118		-0.926
5520	0	5520	32.614699	0.47	0.096		-1.016
5640	0	5640	32.647963	0.43	0.090		-1.048
5760	0	5760	32.703865	0.38	0.078		-1.108
5880	0	5880	32.738515	0.34	0.071		-1.150
6000	0	6000	32.769931	0.31	0.064		-1.192
6120	0	6120	32.826757	0.25	0.053		-1.280
6240	0	6240	32.861638	0.22	0.045		-1.344
6360	0	6360	32.937637	0.14	0.030		-1.530
6480	0	6480	32.960275	0.12	0.025		-1.605
6600	0	6600	32.990305	0.09	0.019		-1.730
6720	0	6720	33.014098	0.07	0.014		-1.864
6840	0	6840	33.112042	-0.03	-0.007		-2.178
6960	0	6960	33.205135	-0.13	-0.026		-1.586
7080	0	7080	33.223153	-0.14	-0.030		-1.527
7200	0	7200	33.243019	-0.16	-0.034		-1.471
7320	0	7320	33.265888	-0.19	-0.039		-1.414
7440	0	7440	33.32872	-0.25	-0.052		-1.288
7560	0	7560	33.436597	-0.36	-0.074		-1.131
7680	0	7680	33.463393	-0.38	-0.080		-1.100

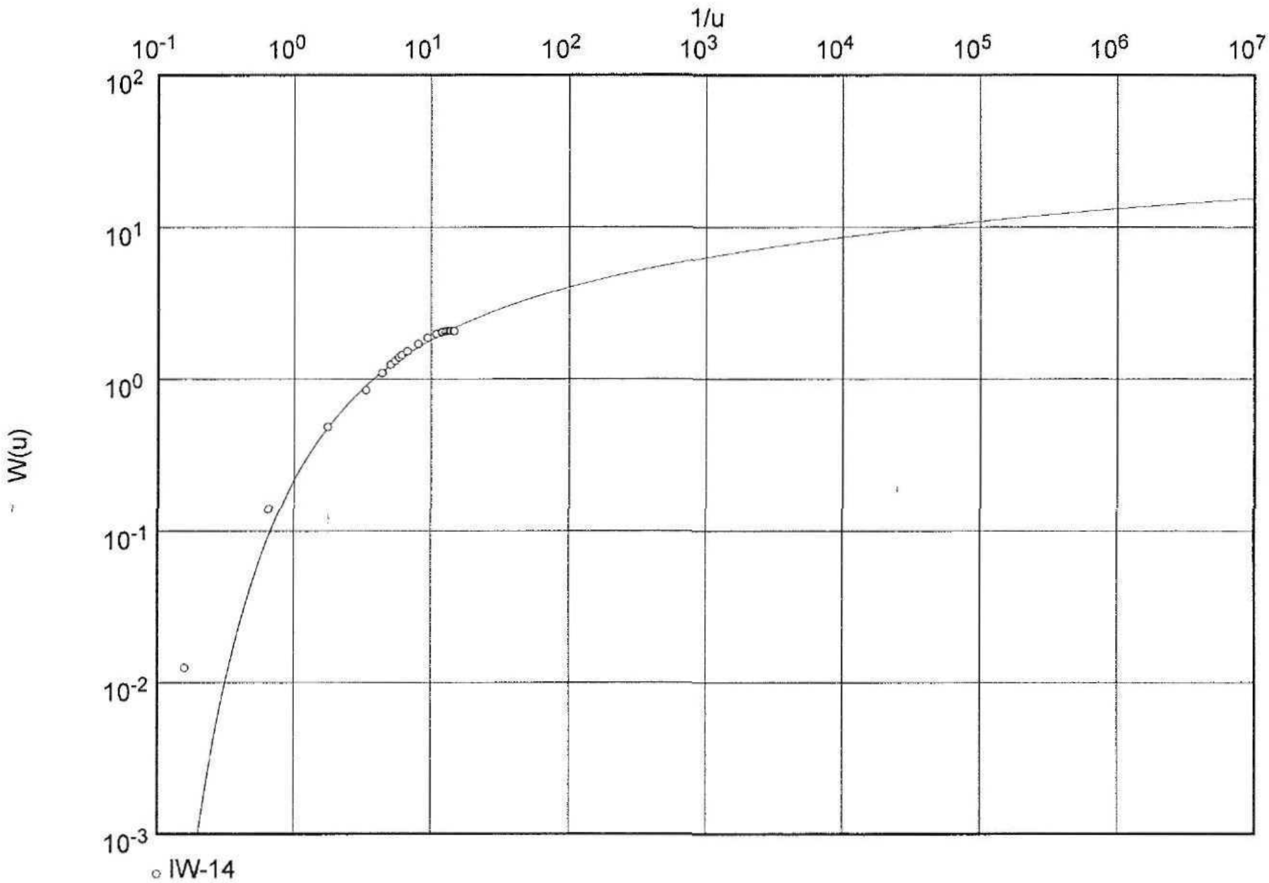
* INDICATES THE BEST FIT LINE PASSES THROUGH THESE POINTS
WHICH ARE USED TO CALCULATE HYDRAULIC CONDUCTIVITY
K = 3.0774E-07

WELL DMW-16


0
-0.5
-1
-1.5
-2
-2.5
Log Head Ratio
0
1000
2000
3000
4000
5000
6000
7000
TIME (min)
DRAFT

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-29-98 — Page 1 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-14	Test conducted on: 10-12-98
IW-14	
Discharge 0.25 U.S.gal/min	



Transmissivity [ft²/d]: 7.98×10^{-1}

Hydraulic conductivity [ft/d]: 3.99×10^{-2}

Aquifer thickness [ft]: 20.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-29-98	Page 2
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

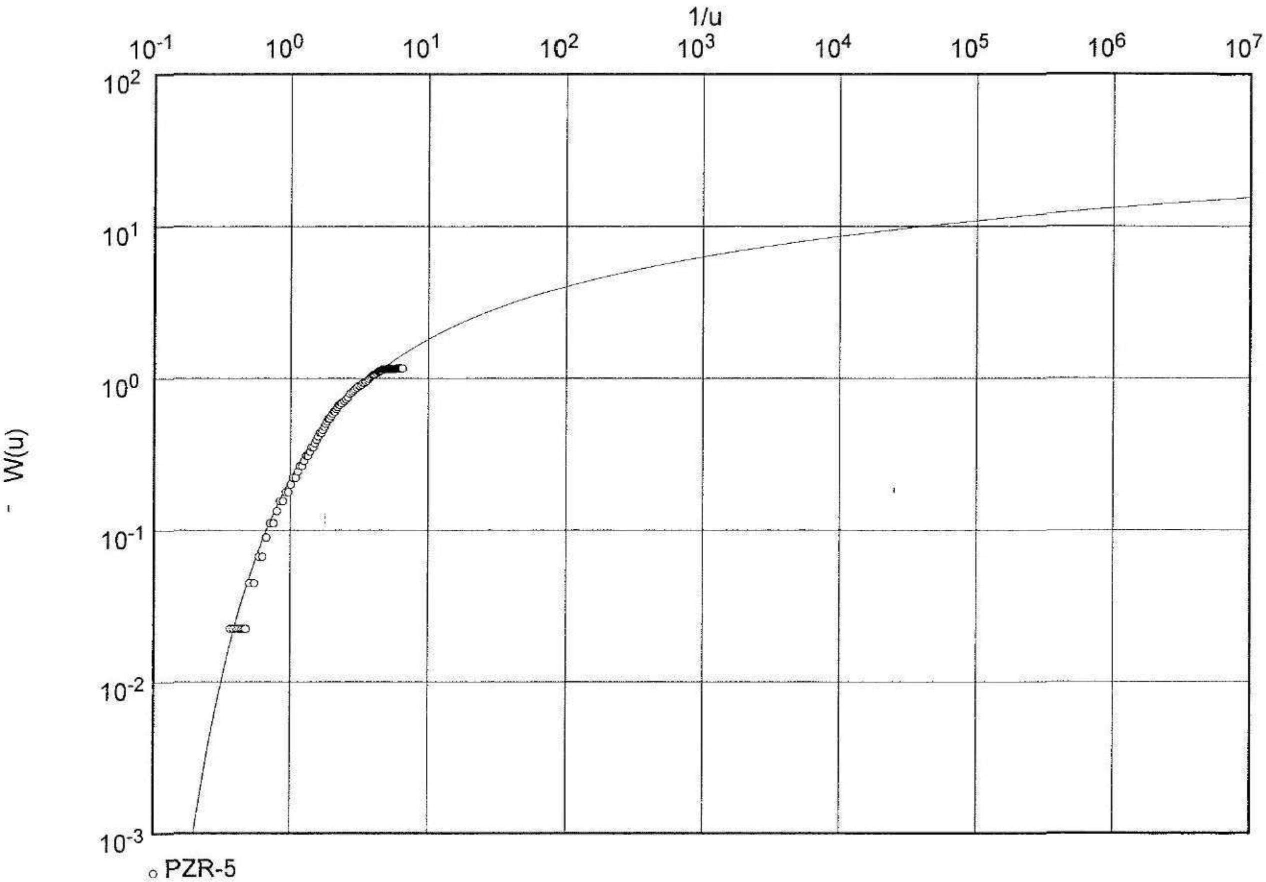
Pumping Test No. IW-14	Test conducted on: 10-12-98
IW-14	IW-14
Discharge 0.25 U.S.gal/min	Distance from the pumping well 1.00 ft

Static water level: 17.03 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.02292	17.09	0.06	0.06
3	0.09375	17.71	0.68	0.67
4	0.25278	19.51	2.48	2.33
5	0.48472	21.62	4.59	4.06
6	0.64236	23.28	6.25	5.27
7	0.73889	24.34	7.31	5.97
8	0.79722	24.94	7.91	6.35
9	0.84375	25.50	8.47	6.68
10	0.88542	25.91	8.88	6.91
11	0.97431	26.71	9.68	7.34
12	1.16667	28.54	11.51	8.20
13	1.36528	30.59	13.56	8.96
14	1.58125	32.57	15.54	9.50
15	1.72500	33.89	16.86	9.75
16	1.75417	34.21	17.18	9.80
17	1.83125	34.89	17.86	9.89
18	1.88681	35.48	18.45	9.94
19	1.93264	36.05	19.02	9.98
20	1.98889	36.68	19.65	10.00
21	2.02917	37.15	20.12	10.00
22	2.11042	37.98	20.95	9.98
23	2.14931	38.45	21.42	9.95
24	2.15764	38.57	21.54	9.94

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 1
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	
Discharge 0.25 U.S.gal/min	



Transmissivity [ft²/d]: 8.57×10^{-1}

Hydraulic conductivity [ft/d]: 2.14×10^{-2}

Aquifer thickness [ft]: 40.00

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98 / Page 2 Project: Solutia/RFI/AL Evaluated by: CDH

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft

Static water level: 16.70 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.02222	16.70	0.00	0.00
3	0.02229	16.70	0.00	0.00
4	0.02236	16.70	0.00	0.00
5	0.02243	16.70	0.00	0.00
6	0.02250	16.60	-0.10	-0.10
7	0.02257	16.70	0.00	0.00
8	0.02264	16.60	-0.10	-0.10
9	0.02271	16.70	0.00	0.00
10	0.02278	16.70	0.00	0.00
11	0.02285	16.60	-0.10	-0.10
12	0.02292	16.70	0.00	0.00
13	0.02299	16.70	0.00	0.00
14	0.02306	16.60	-0.10	-0.10
15	0.02778	16.70	0.00	0.00
16	0.03472	16.60	-0.10	-0.10
17	0.04167	16.60	-0.10	-0.10
18	0.04861	16.60	-0.10	-0.10
19	0.05556	16.60	-0.10	-0.10
20	0.06250	16.70	0.00	0.00
21	0.06944	16.70	0.00	0.00
22	0.07639	16.70	0.00	0.00
23	0.08333	16.70	0.00	0.00
24	0.09028	16.70	0.00	0.00
25	0.09722	16.70	0.00	0.00
26	0.10417	16.70	0.00	0.00
27	0.11111	16.70	0.00	0.00
28	0.11806	16.70	0.00	0.00
29	0.12500	16.70	0.00	0.00
30	0.13194	16.70	0.00	0.00
31	0.13889	16.70	0.00	0.00
32	0.14583	16.70	0.00	0.00
33	0.15278	16.70	0.00	0.00
34	0.15972	16.70	0.00	0.00
35	0.16667	16.70	0.00	0.00
36	0.17361	16.70	0.00	0.00
37	0.18056	16.80	0.10	0.10
38	0.18750	16.80	0.10	0.10
39	0.19444	16.80	0.10	0.10
40	0.20139	16.80	0.10	0.10
41	0.20833	16.80	0.10	0.10
42	0.21528	16.80	0.10	0.10
43	0.22222	16.80	0.10	0.10
44	0.22917	16.80	0.10	0.10
45	0.23611	16.80	0.10	0.10
46	0.25000	16.90	0.20	0.20
47	0.27083	16.90	0.20	0.20
48	0.29167	17.00	0.30	0.30
49	0.31250	17.00	0.30	0.30
50	0.33333	17.10	0.40	0.40

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 3
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft
Static water level: 16.70 ft below datum	

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	0.35417	17.20	0.50	0.50
52	0.37500	17.20	0.50	0.50
53	0.39583	17.30	0.60	0.60
54	0.41667	17.40	0.70	0.69
55	0.43750	17.40	0.70	0.69
56	0.45833	17.50	0.80	0.79
57	0.47917	17.50	0.80	0.79
58	0.50000	17.60	0.90	0.89
59	0.52083	17.70	1.00	0.99
60	0.54167	17.70	1.00	0.99
61	0.56250	17.80	1.10	1.08
62	0.58333	17.90	1.20	1.18
63	0.60417	17.90	1.20	1.18
64	0.62500	18.00	1.30	1.28
65	0.64583	18.10	1.40	1.38
66	0.66667	18.10	1.40	1.38
67	0.68750	18.20	1.50	1.47
68	0.70833	18.30	1.60	1.57
69	0.72917	18.30	1.60	1.57
70	0.75000	18.40	1.70	1.66
71	0.77083	18.50	1.80	1.76
72	0.79167	18.60	1.90	1.85
73	0.81250	18.70	2.00	1.95
74	0.83333	18.70	2.00	1.95
75	0.85417	18.80	2.10	2.04
76	0.87500	18.90	2.20	2.14
77	0.89583	19.00	2.30	2.23
78	0.91667	19.10	2.40	2.33
79	0.93750	19.20	2.50	2.42
80	0.95833	19.20	2.50	2.42
81	0.97917	19.30	2.60	2.52
82	1.00000	19.40	2.70	2.61
83	1.02083	19.50	2.80	2.70
84	1.04167	19.50	2.80	2.70
85	1.06250	19.60	2.90	2.79
86	1.08333	19.70	3.00	2.89
87	1.10417	19.80	3.10	2.98
88	1.12500	19.80	3.10	2.98
89	1.14583	19.90	3.20	3.07
90	1.15979	19.90	3.20	3.07
91	1.15986	19.90	3.20	3.07
92	1.15993	19.90	3.20	3.07
93	1.16000	19.90	3.20	3.07
94	1.16007	19.90	3.20	3.07
95	1.16014	19.90	3.20	3.07
96	1.16021	19.90	3.20	3.07
97	1.16028	19.90	3.20	3.07
98	1.16035	19.90	3.20	3.07
99	1.16042	19.90	3.20	3.07
100	1.16049	19.90	3.20	3.07

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 4
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft

Static water level: 16.70 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
101	1.16056	19.90	3.20	3.07
102	1.16063	19.90	3.20	3.07
103	1.16069	19.90	3.20	3.07
104	1.16076	19.90	3.20	3.07
105	1.16083	19.90	3.20	3.07
106	1.16090	19.90	3.20	3.07
107	1.16097	19.90	3.20	3.07
108	1.16104	19.90	3.20	3.07
109	1.16111	19.90	3.20	3.07
110	1.16118	19.90	3.20	3.07
111	1.16125	19.90	3.20	3.07
112	1.16132	19.90	3.20	3.07
113	1.16139	19.90	3.20	3.07
114	1.16146	19.90	3.20	3.07
115	1.16153	19.90	3.20	3.07
116	1.16160	19.90	3.20	3.07
117	1.16167	19.90	3.20	3.07
118	1.16174	19.90	3.20	3.07
119	1.16181	19.90	3.20	3.07
120	1.16187	19.90	3.20	3.07
121	1.16194	19.90	3.20	3.07
122	1.16201	19.90	3.20	3.07
123	1.16208	19.90	3.20	3.07
124	1.16215	19.90	3.20	3.07
125	1.16222	19.90	3.20	3.07
126	1.16229	19.90	3.20	3.07
127	1.16236	19.90	3.20	3.07
128	1.16243	19.90	3.20	3.07
129	1.16250	19.90	3.20	3.07
130	1.16257	19.90	3.20	3.07
131	1.16264	19.90	3.20	3.07
132	1.16271	19.90	3.20	3.07
133	1.16278	19.90	3.20	3.07
134	1.16285	19.90	3.20	3.07
135	1.16292	19.90	3.20	3.07
136	1.16299	19.90	3.20	3.07
137	1.16306	19.90	3.20	3.07
138	1.16312	19.90	3.20	3.07
139	1.16319	19.90	3.20	3.07
140	1.16326	19.90	3.20	3.07
141	1.16333	19.90	3.20	3.07
142	1.16340	19.90	3.20	3.07
143	1.16347	19.90	3.20	3.07
144	1.16354	19.90	3.20	3.07
145	1.16361	19.90	3.20	3.07
146	1.16368	19.90	3.20	3.07
147	1.16375	19.90	3.20	3.07
148	1.16382	19.90	3.20	3.07
149	1.16389	19.90	3.20	3.07
150	1.16396	19.90	3.20	3.07

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 5
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft

Static water level: 16.70 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
151	1.16403	19.90	3.20	3.07
152	1.16410	19.90	3.20	3.07
153	1.16417	19.90	3.20	3.07
154	1.16424	19.90	3.20	3.07
155	1.16431	19.90	3.20	3.07
156	1.16437	19.90	3.20	3.07
157	1.16444	19.90	3.20	3.07
158	1.16451	19.90	3.20	3.07
159	1.16458	19.90	3.20	3.07
160	1.16465	19.90	3.20	3.07
161	1.16472	19.90	3.20	3.07
162	1.16479	19.90	3.20	3.07
163	1.16486	19.90	3.20	3.07
164	1.16493	19.90	3.20	3.07
165	1.16500	19.90	3.20	3.07
166	1.16507	19.90	3.20	3.07
167	1.16514	19.90	3.20	3.07
168	1.16521	19.90	3.20	3.07
169	1.16528	19.90	3.20	3.07
170	1.16535	19.90	3.20	3.07
171	1.16542	19.90	3.20	3.07
172	1.16549	19.90	3.20	3.07
173	1.16556	19.90	3.20	3.07
174	1.16563	19.90	3.20	3.07
175	1.16569	19.90	3.20	3.07
176	1.16576	19.90	3.20	3.07
177	1.16583	19.90	3.20	3.07
178	1.16590	19.90	3.20	3.07
179	1.16597	19.90	3.20	3.07
180	1.16604	19.90	3.20	3.07
181	1.16611	19.90	3.20	3.07
182	1.16618	19.90	3.20	3.07
183	1.16625	19.90	3.20	3.07
184	1.16632	19.90	3.20	3.07
185	1.16639	19.90	3.20	3.07
186	1.16646	19.90	3.20	3.07
187	1.16653	19.90	3.20	3.07
188	1.16660	19.90	3.20	3.07
189	1.16667	19.90	3.20	3.07
190	1.16674	19.90	3.20	3.07
191	1.16681	19.90	3.20	3.07
192	1.16688	19.90	3.20	3.07
193	1.16694	19.90	3.20	3.07
194	1.16701	19.90	3.20	3.07
195	1.16708	19.90	3.20	3.07
196	1.16715	19.90	3.20	3.07
197	1.16722	19.90	3.20	3.07
198	1.16729	19.90	3.20	3.07
199	1.16736	19.90	3.20	3.07
200	1.16743	19.90	3.20	3.07

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 6
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft

Static water level: 16.70 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
201	1.16750	19.90	3.20	3.07
202	1.16757	19.90	3.20	3.07
203	1.16764	19.90	3.20	3.07
204	1.16771	19.90	3.20	3.07
205	1.16778	19.90	3.20	3.07
206	1.16785	19.90	3.20	3.07
207	1.16792	19.90	3.20	3.07
208	1.16799	19.90	3.20	3.07
209	1.16806	19.90	3.20	3.07
210	1.16813	19.90	3.20	3.07
211	1.16819	19.90	3.20	3.07
212	1.16826	19.90	3.20	3.07
213	1.16833	19.90	3.20	3.07
214	1.16840	19.90	3.20	3.07
215	1.16847	19.90	3.20	3.07
216	1.16854	19.90	3.20	3.07
217	1.16861	19.90	3.20	3.07
218	1.16868	19.90	3.20	3.07
219	1.16875	19.90	3.20	3.07
220	1.16882	19.90	3.20	3.07
221	1.16889	19.90	3.20	3.07
222	1.16896	19.90	3.20	3.07
223	1.16903	19.90	3.20	3.07
224	1.16910	19.90	3.20	3.07
225	1.16917	19.90	3.20	3.07
226	1.16924	19.90	3.20	3.07
227	1.16931	19.90	3.20	3.07
228	1.16938	19.90	3.20	3.07
229	1.16944	19.90	3.20	3.07
230	1.16951	19.90	3.20	3.07
231	1.20833	20.00	3.30	3.16
232	1.25000	20.10	3.40	3.26
233	1.29167	20.20	3.50	3.35
234	1.33333	20.40	3.70	3.53
235	1.37500	20.50	3.80	3.62
236	1.41667	20.60	3.90	3.71
237	1.45833	20.70	4.00	3.80
238	1.50000	20.80	4.10	3.89
239	1.54167	20.90	4.20	3.98
240	1.58333	20.90	4.20	3.98
241	1.62500	21.00	4.30	4.07
242	1.66667	21.10	4.40	4.16
243	1.70833	21.10	4.40	4.16
244	1.75000	21.20	4.50	4.25
245	1.79167	21.30	4.60	4.34
246	1.83333	21.40	4.70	4.42
247	1.87500	21.50	4.80	4.51
248	1.91667	21.60	4.90	4.60
249	1.95833	21.70	5.00	4.69
250	2.00000	21.70	5.00	4.69

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 7
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft

Static water level: 16.70 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
251	2.04167	21.80	5.10	4.77
252	2.08333	21.90	5.20	4.86
253	2.11076	21.90	5.20	4.86
254	2.11083	21.90	5.20	4.86
255	2.11090	21.90	5.20	4.86
256	2.11097	21.90	5.20	4.86
257	2.11104	21.90	5.20	4.86
258	2.11111	21.90	5.20	4.86
259	2.11118	21.90	5.20	4.86
260	2.11125	21.90	5.20	4.86
261	2.11132	21.90	5.20	4.86
262	2.14521	22.00	5.30	4.95
263	2.14528	22.00	5.30	4.95
264	2.14535	22.00	5.30	4.95
265	2.14542	22.00	5.30	4.95
266	2.14549	22.00	5.30	4.95
267	2.14556	22.00	5.30	4.95
268	2.14562	22.00	5.30	4.95
269	2.14569	22.00	5.30	4.95
270	2.14583	22.00	5.30	4.95
271	2.16667	22.00	5.30	4.95
272	2.18750	22.00	5.30	4.95
273	2.20833	22.10	5.40	5.04
274	2.22917	22.10	5.40	5.04
275	2.25000	22.10	5.40	5.04
276	2.27083	22.10	5.40	5.04
277	2.29167	22.10	5.40	5.04
278	2.31250	22.20	5.50	5.12
279	2.33333	22.20	5.50	5.12
280	2.35417	22.20	5.50	5.12
281	2.37500	22.20	5.50	5.12
282	2.39583	22.20	5.50	5.12
283	2.41667	22.20	5.50	5.12
284	2.43750	22.20	5.50	5.12
285	2.45833	22.20	5.50	5.12
286	2.47917	22.20	5.50	5.12
287	2.50000	22.30	5.60	5.21
288	2.52083	22.30	5.60	5.21
289	2.54167	22.30	5.60	5.21
290	2.56250	22.30	5.60	5.21
291	2.58333	22.30	5.60	5.21
292	2.60417	22.30	5.60	5.21
293	2.62500	22.30	5.60	5.21
294	2.64583	22.20	5.50	5.12
295	2.66667	22.20	5.50	5.12
296	2.68750	22.20	5.50	5.12
297	2.70833	22.20	5.50	5.12
298	2.75000	22.20	5.50	5.12
299	2.79167	22.20	5.50	5.12
300	2.83333	22.20	5.50	5.12

Golder Associates Inc. 3730 Chamblee Tucker Rd. Atlanta, GA 30341 ph.(770)496-1893	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 10-28-98	Page 8
		Project: Solutia/RFI/AL	
		Evaluated by: CDH	

Pumping Test No. IW-14	Test conducted on: 10-12-98
PZR-5	PZR-5
Discharge 0.25 U.S.gal/min	Distance from the pumping well 12.50 ft

Static water level: 16.70 ft below datum

	Pumping test duration [d]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
301	2.87500	22.30	5.60	5.21
302	2.91667	22.30	5.60	5.21
303	2.95833	22.30	5.60	5.21
304	3.00000	22.30	5.60	5.21
305	3.04167	22.30	5.60	5.21
306	3.08333	22.30	5.60	5.21
307	3.12500	22.30	5.60	5.21
308	3.16667	22.30	5.60	5.21
309	3.20833	22.30	5.60	5.21

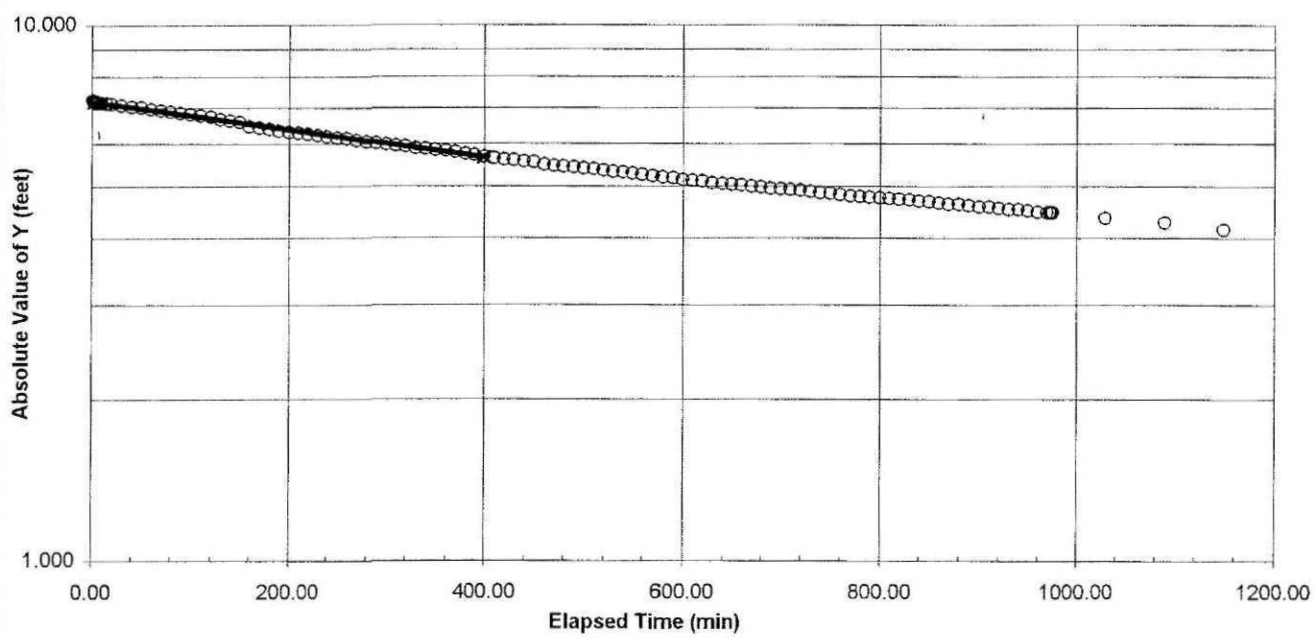
Slug Test Data Analysis

Well Location:	MW-1B	**Project No.:**	983-3223
Test Date:	8/20/98	**Project Name:**	Solutia/RFI/AL
Drilling Method:	HSA	**Testing By:**	DLH
Test Type:	Falling Head	**Analysis By:**	CDH

Well and Aquifer Characteristics			**Physical Analytical Parameters**	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**62.5** feet	L_w	Saturated Well Length:	21.58 feet
Depth to Top of Filter:	**55.5** feet	L_e	Effective Well Length:	7 feet
Depth to Static Water Level:	**40.92** feet			
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters						
A	2.14	L_e/r_w	21.21	y_0	Initial y of best fit line:	**7.166** feet
B	0.30	$\ln(R_e/r_w)$	2.32	y_t	Terminal y of best fit line:	**5.657** feet
C	0.00	Software Version:	1.00	dt	Time between y_0 and y_t:	397.33 min
				K	**Hydraulic Conductivity**	**3.48E-07 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

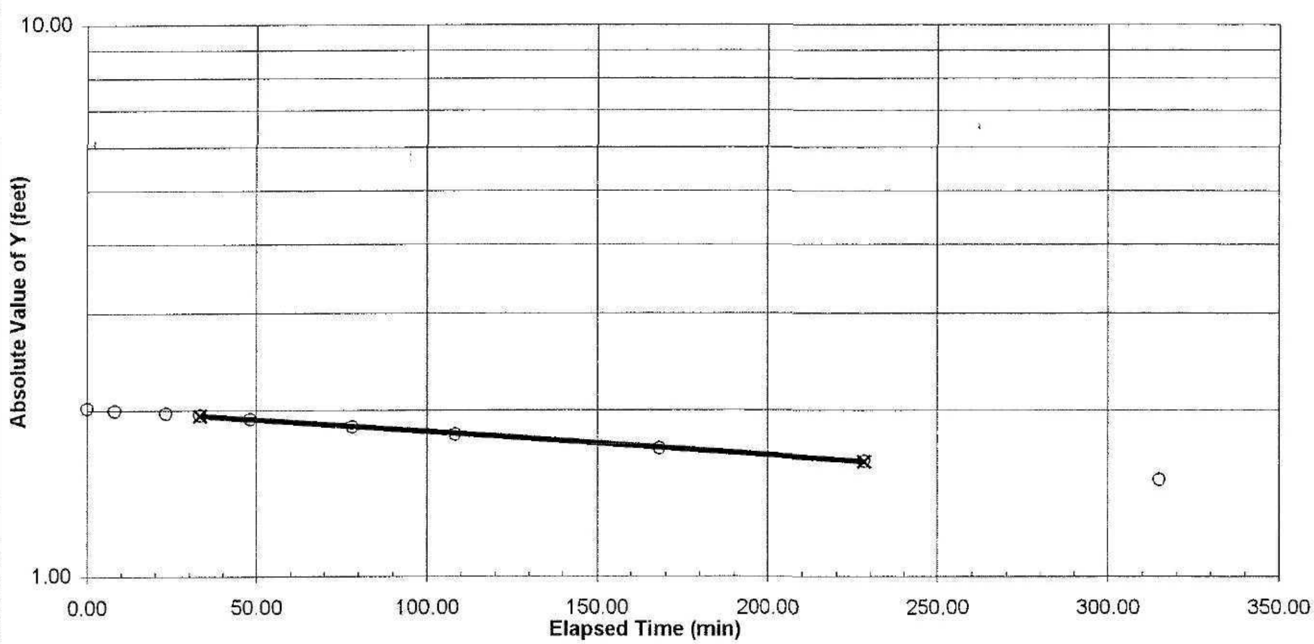
Slug Test Data Analysis

Well Location:	CB-85	**Project No.:**	933-3223
Test Date:	8/19/98	**Project Name:**	SOLUTIA/RFI/AL
Drilling Method:	HSA	**Testing By:**	MAC
Test Type:	Falling Head	**Analysis By:**	JSR

Well and Aquifer Characteristics			Physical Analytical Parameters	
Casing Diameter:	2 inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	8 inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	32 feet	L_w	Saturated Well Length:	21.49 feet
Depth to Top of Filter:	25 feet	L_e	Effective Well Length:	7 feet
Depth to Static Water Level:	10.51 feet			
Saturated Aquifer Thickness:	60 feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	30%	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters						
A	2.14	L_e/r_w	21.21	y_0	Initial y of best fit line:	**1.95** feet
B	0.30	$\ln(R_e/r_w)$	2.32	y_t	Terminal y of best fit line:	**1.61** feet
C	0.00	Software Version:	1.00	dt	Time between y_0 and y_t:	195.00 min
				K	**Hydraulic Conductivity**	**5.74E-07 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

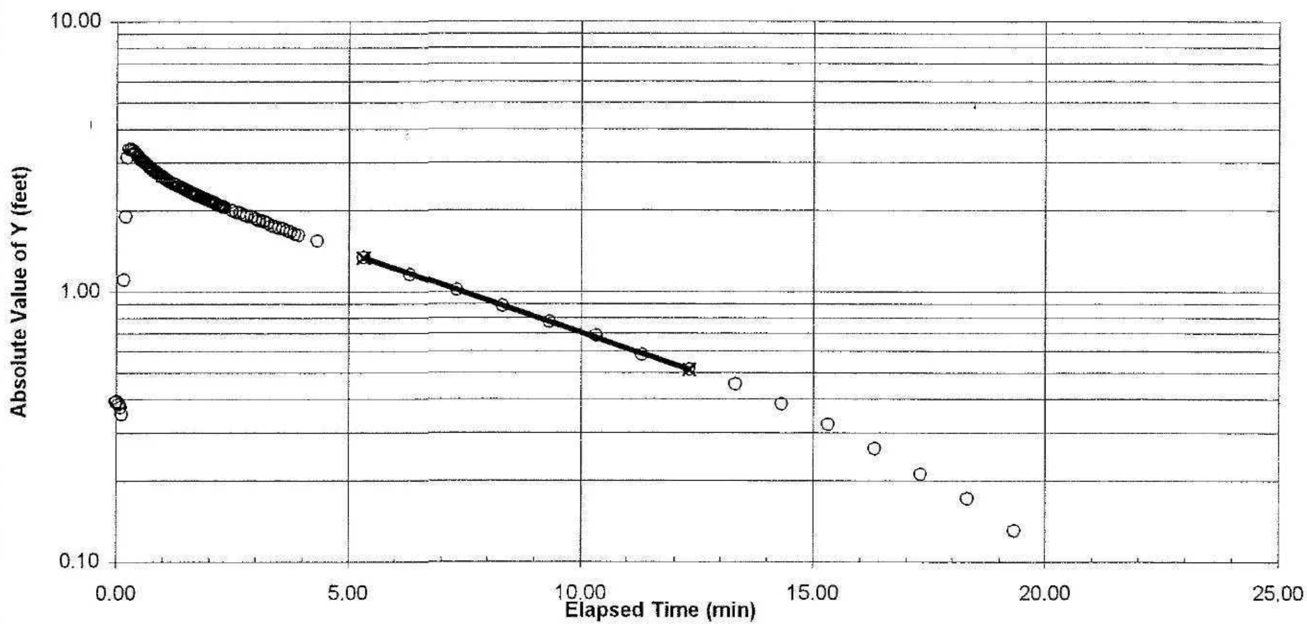
Slug Test Data Analysis

Well Location:	OW-7	Project No.:	983-3223
Test Date:	8/19/98	Project Name:	Solutia/RFI/AL
Drilling Method:	HSA	Testing By:	DLH
Test Type:	Falling Head	Analysis By:	CDH

Well and Aquifer Characteristics			Physical Analytical Parameters	
Casing Diameter:	2 inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	8 inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	47 feet	L_w	Saturated Well Length:	11.38 feet
Depth to Top of Filter:	40 feet	L_e	Effective Well Length:	7 feet
Depth to Static Water Level:	35.62 feet			
Saturated Aquifer Thickness:	60 feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	30%	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters						
A	2.14	L_e/r_w	21.21	y_0	Initial y of best fit line:	1.33 feet
B	0.30	$\ln(R_e/r_w)$	2.07	y_t	Terminal y of best fit line:	0.51 feet
				dt	Time between y_0 and y_t:	7.00 min
C	0.00	Software Version:	1.00	K	Hydraulic Conductivity	7.14E-05 cm/sec



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

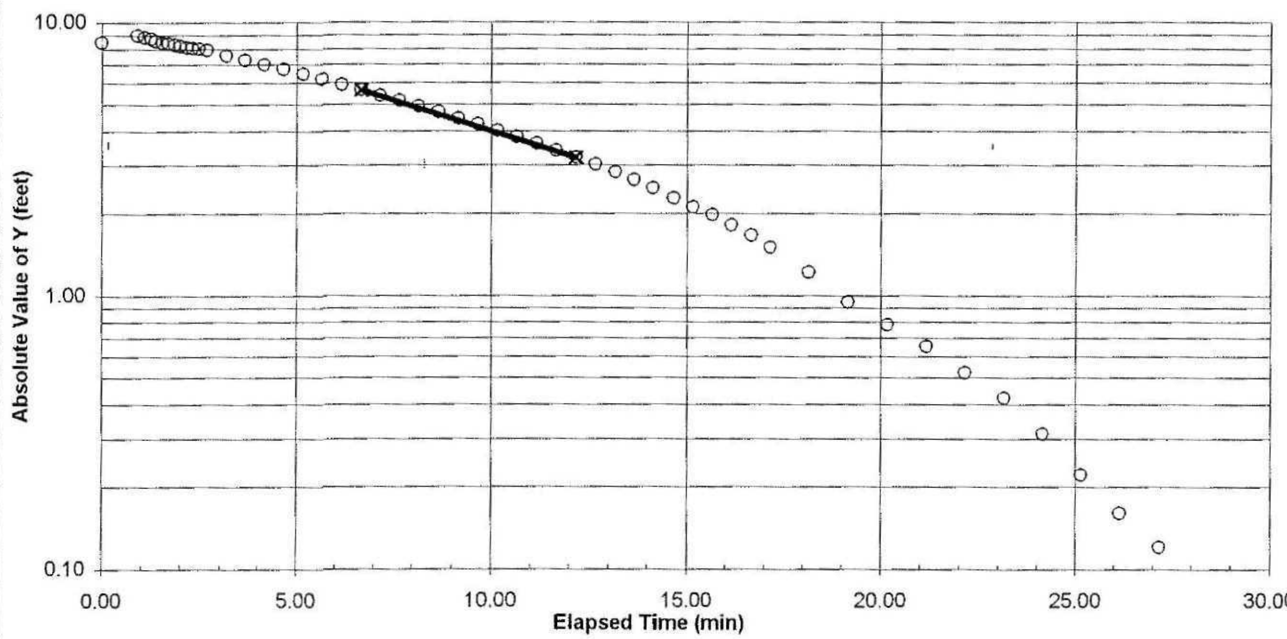
Slug Test Data Analysis

Well Location:	OW-8A	Project No.:	983-3223
Test Date:	8/21/98	Project Name:	Solutia/RFI/AL
Drilling Method:	HSA	Testing By:	DLH
Test Type:	Rising Head	Analysis By:	CDH

Well and Aquifer Characteristics			Physical Analytical Parameters	
Casing Diameter:	2 inches	r_c	Effective Casing Radius:	0.1937 feet
Borehole Diameter:	8 inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**25** feet	L_w	Saturated Well Length:	10.06 feet
Depth to Top of Filter:	**13** feet	L_e	Effective Well Length:	12 feet
Depth to Static Water Level:	**14.94** feet		Water Below Top of Filter	
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters						
A	2.65	L_e/r_w	36.36	y_0	Initial y of best fit line:	**5.63** feet
B	0.37	$\ln(R_e/r_w)$	2.24	y_t	Terminal y of best fit line:	**3.19** feet
				dt	Time between y_0 and y_t:	5.50 min
C	0.00	Software Version:	1.00	K	**Hydraulic Conductivity**	**1.84E-04** cm/sec



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

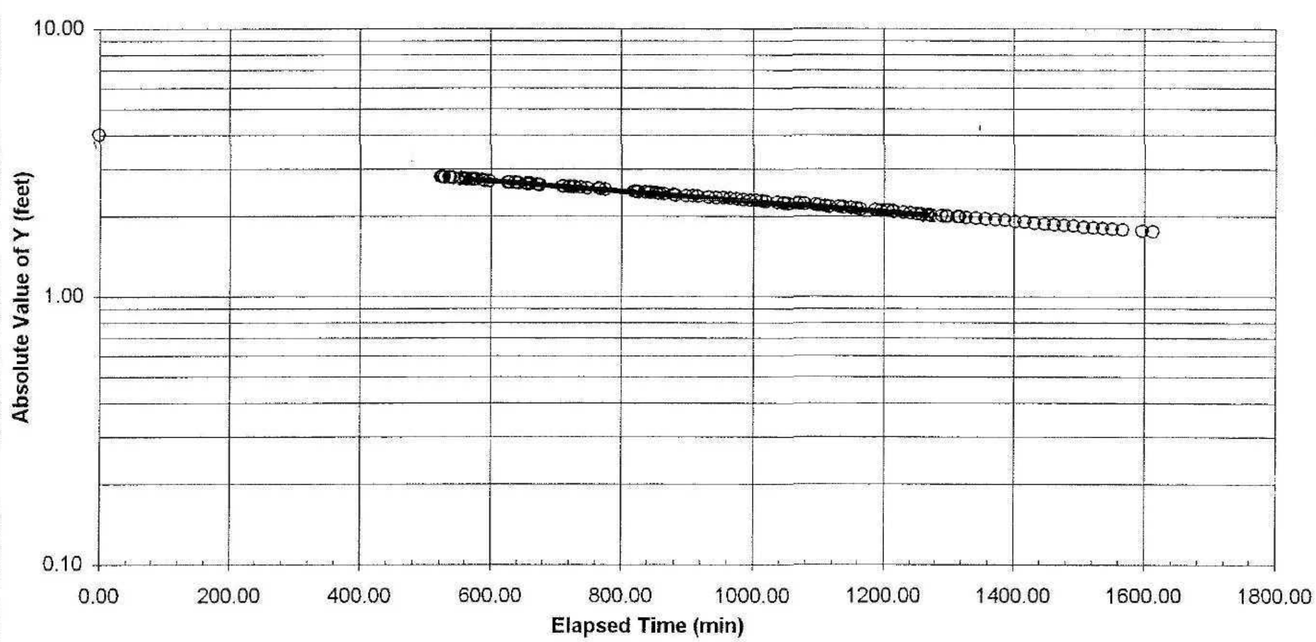
Slug Test Data Analysis

Well Location:	OW-10	Project No.:	933-3223
Test Date:	9/30/98	Project Name:	SOLUTIA/RFI/AL
Drilling Method:	HSA	Testing By:	MAC
Test Type:	Falling Head	Analysis By:	JSR

Well and Aquifer Characteristics			Physical Analytical Parameters	
Casing Diameter:	2 inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	8 inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	38 feet	L_w	Saturated Well Length:	15.07 feet
Depth to Top of Filter:	29 feet	L_e	Effective Well Length:	9 feet
Depth to Static Water Level:	22.93 feet			
Saturated Aquifer Thickness:	60 feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	30%	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters						
A	2.35	L_e/r_w	27.27	y_0	Initial y of best fit line:	**2.74** feet
B	0.32	$\ln(R_e/r_w)$	2.32	y_t	Terminal y of best fit line:	**2.01** feet
C	0.00	Software Version:	1.00	dt	Time between y_0 and y_t:	708.75 min
				K	**Hydraulic Conductivity**	**1.99E-07** cm/sec



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

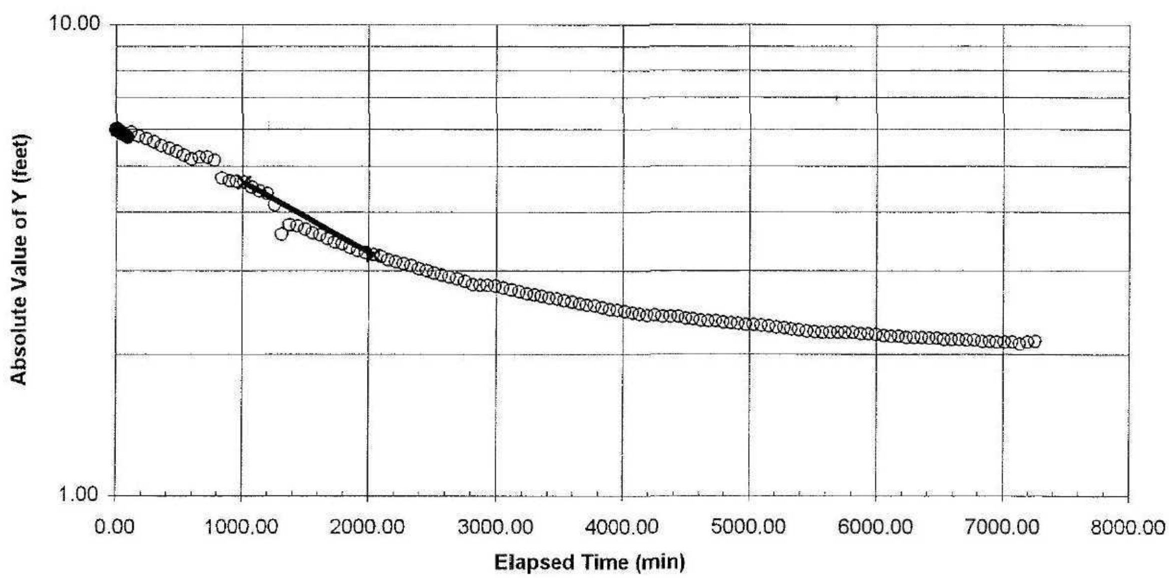
Slug Test Data Analysis

Well Location:	OW-15	Project No.:	983-3223
Test Date:	10/7/98	Project Name:	Solutia/RFI/AL
Drilling Method:	HSA	Testing By:	MAC
Test Type:	Falling Head	Analysis By:	CDH

Well and Aquifer Characteristics			Physical Analytical Parameters	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**40** feet	L_w	Saturated Well Length:	25.01 feet
Depth to Top of Filter:	**33** feet	L_e	Effective Well Length:	7 feet
Depth to Static Water Level:	**14.99** feet			
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters							
A	2.14	L_e/r_w	21.21	y_0	Initial y of best fit line:	**4.62** feet
B	0.30	$\ln(R_e/r_w)$	2.38	y_t	Terminal y of best fit line:	**3.24** feet
C	0.00	Software Version:	1.00	dt	Time between y_0 and y_t:	1020.00 min
				K	**Hydraulic Conductivity**	**2.08E-07 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

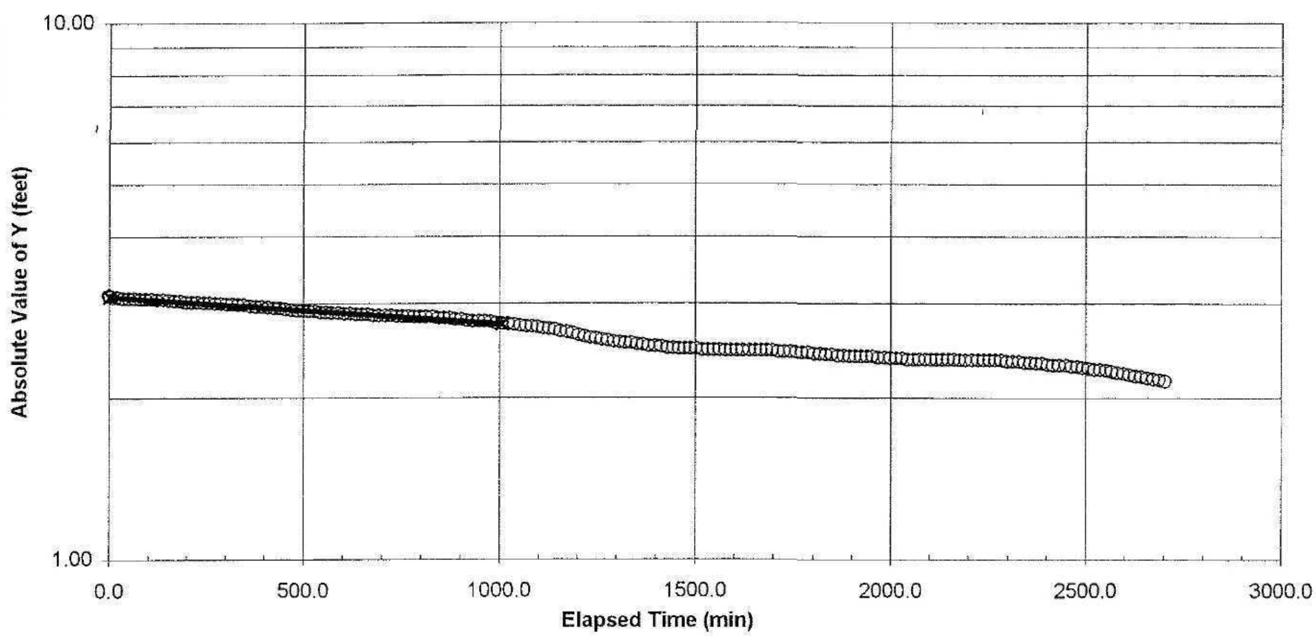
Slug Test Data Analysis

Well Location:	OWR-1D	Project No.:	933-3223
Test Date:	8/19/98	Project Name:	SOLUTIA/RFI/AL
Drilling Method:	HSA	Testing By:	CDH
Test Type:	Falling Head	Analysis By:	JSR

Well and Aquifer Characteristics			Physical Analytical Parameters	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**67** feet	L_w	Saturated Well Length:	18.11 feet
Depth to Top of Filter:	**55** feet	L_e	Effective Well Length:	12 feet
Depth to Static Water Level:	**48.89** feet			
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters					
A	2.65	L_e/r_w	36.36	y_0	Initial y of best fit line: **3.08** feet
B	0.37	$\ln(R_e/r_w)$	2.52	y_t	Terminal y of best fit line: **2.74** feet
C	0.00	Software Version:	1.00	dt	Time between y_0 and y_t: 1005.00 min
				K	**Hydraulic Conductivity** **4.31E-08** **cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

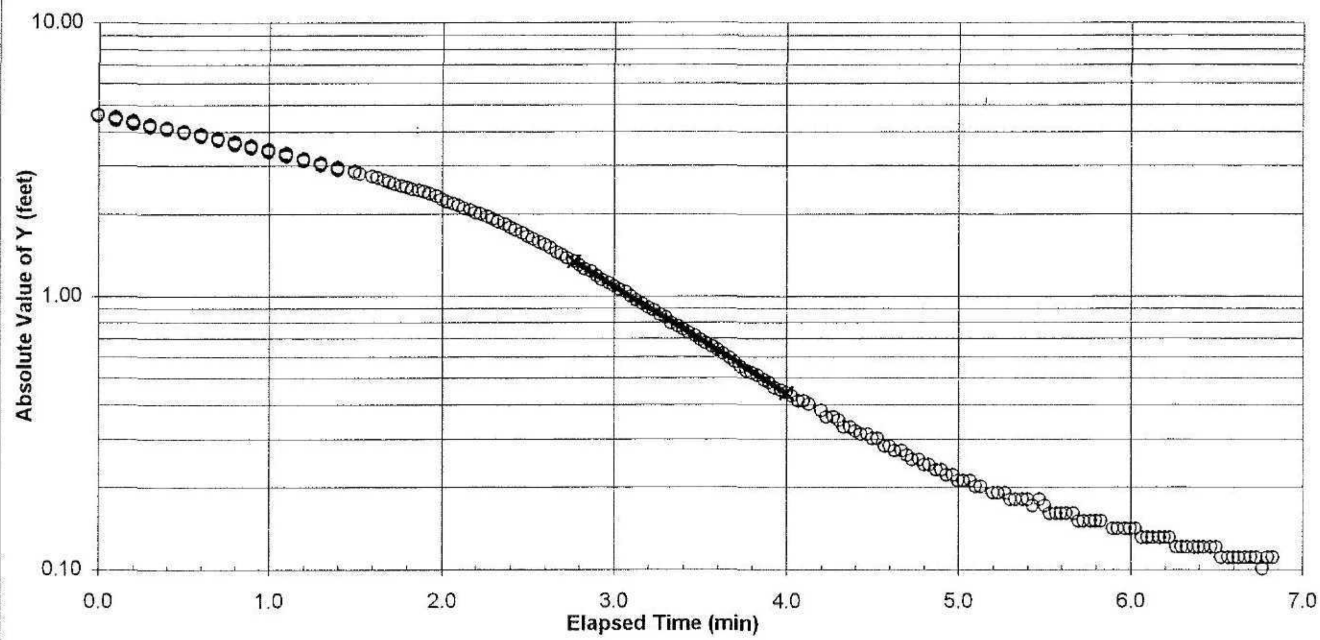
Slug Test Data Analysis

Well Location:	OWR-1S	Project No.:	933-3223
Test Date:	8/19/98	Project Name:	SOLUTIA/RFI/AL
Drilling Method:	HSA	*Testing By:*	CDH
Test Type:	Falling Head	Analysis By:	JSR

Well and Aquifer Characteristics			Physical Analytical Parameters	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**37** feet	L_w	Saturated Well Length:	20.38 feet
Depth to Top of Filter:	**25** feet	L_e	Effective Well Length:	12 feet
Depth to Static Water Level:	**16.62** feet			
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters						
				y_0	Initial y of best fit line:	**1.33** feet
A	2.65	L_e/r_w	36.36	y_t	Terminal y of best fit line:	**0.44** feet
B	0.37	$\ln(R_e/r_w)$	2.57	dt	Time between y_0 and y_t:	1.23 min
C	0.00	Software Version:	1.00	K	**Hydraulic Conductivity**	**3.39E-04 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

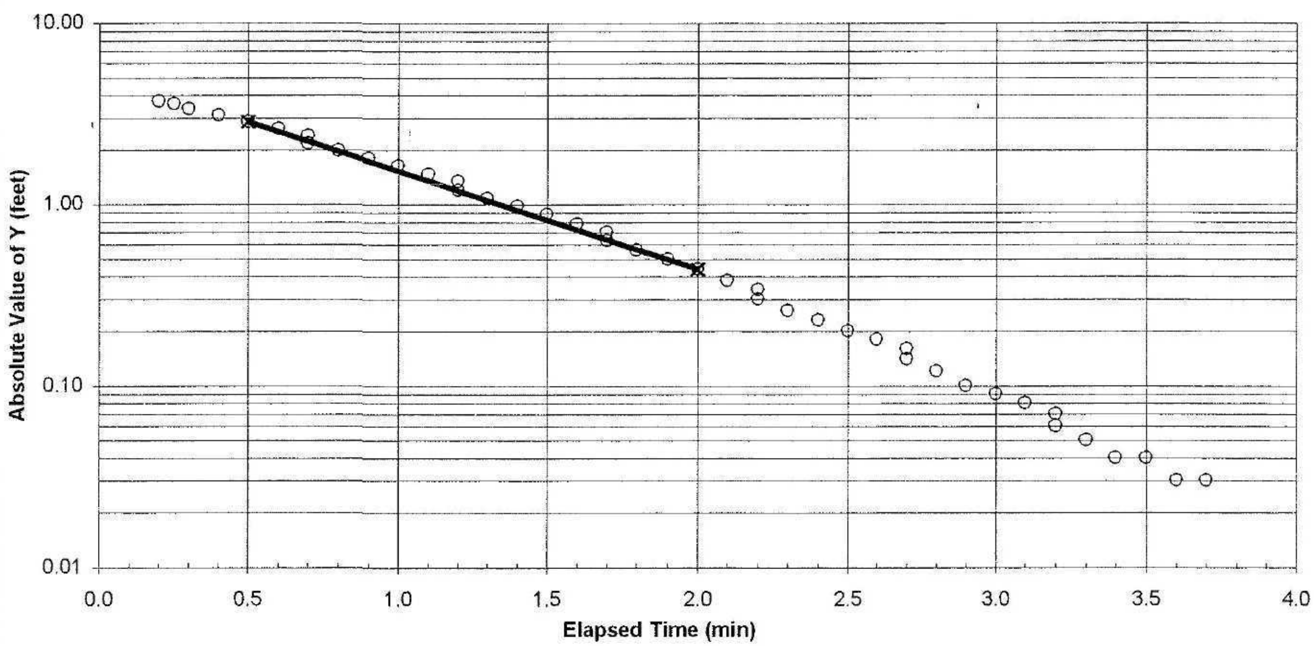
Slug Test Data Analysis

Well Location:	OWR-2D	Project No.:	933-3223
Test Date:	8/19/98	Project Name:	SOLUTIA/RFI/AL
Drilling Method:	HSA	Testing By:	CDH
Test Type:	Falling Head	Analysis By:	JSR

Well and Aquifer Characteristics			Physical Analytical Parameters	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**110** feet	L_w	Saturated Well Length:	27.6 feet
Depth to Top of Filter:	**98** feet	L_e	Effective Well Length:	12 feet
Depth to Static Water Level:	**82.4** feet			
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters							
A	2.65	L_e/r_w	36.36		y_0	Initial y of best fit line:	**2.85** feet
B	0.37	$\ln(R_e/r_w)$	2.72		y_t	Terminal y of best fit line:	**0.44** feet
C	0.00	Software Version:	1.00		dt	Time between y_0 and y_t:	1.50 min
					K	**Hydraulic Conductivity**	**4.98E-04** cm/sec



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

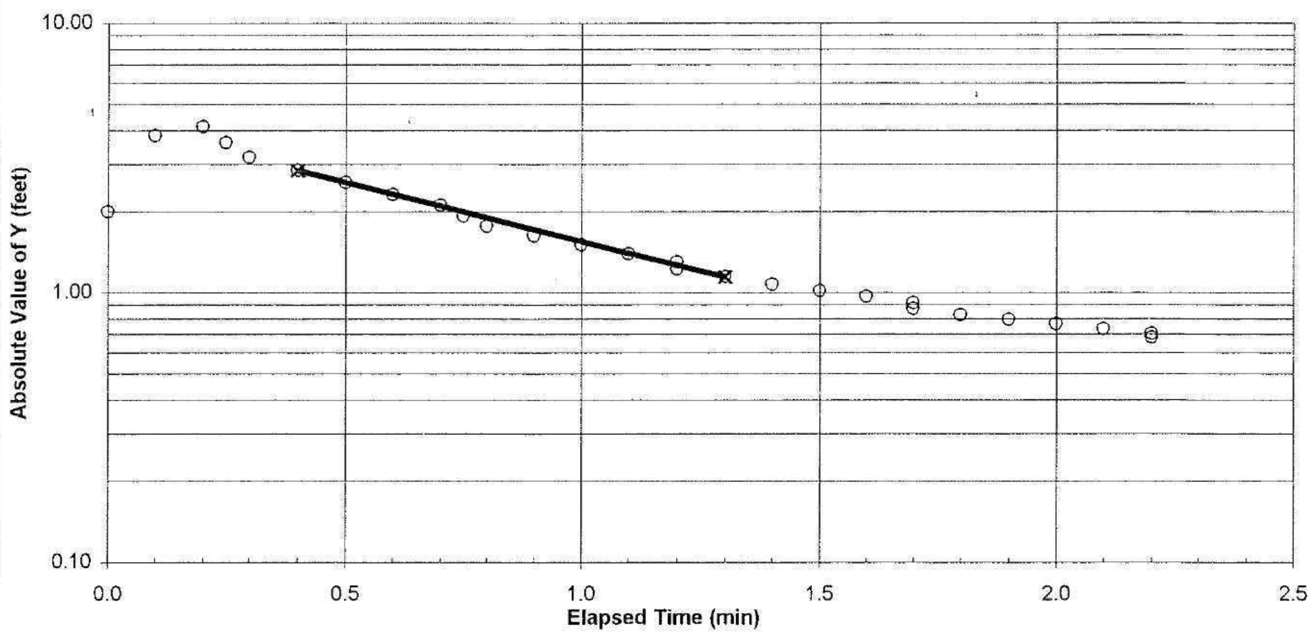
Slug Test Data Analysis

Well Location:	OWR-2S	**Project No.:**	933-3223
Test Date:	8/19/98	**Project Name:**	SOLUTIA/RFI/AL
Drilling Method:	HSA	**Testing By:**	CDH
Test Type:	Falling Head	**Analysis By:**	JSR

Well and Aquifer Characteristics			**Physical Analytical Parameters**	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well	**37** feet	L_w	Saturated Well Length:	24.26 feet
Depth to Top of Filter	**25** feet	L_e	Effective Well Length:	12 feet
Depth to Static Water Level	**12.74** feet			
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter	**30%**	n	Effective Porosity of Filter	30%

Aquifer Property Analysis

Method Parameters						
A	2.65	L_e/r_w	36.36	y_0	Initial y of best fit line:	**2.83** feet
B	0.37	$\ln(R_e/r_w)$	2.66	y_t	Terminal y of best fit line:	**1.14** feet
				dt	Time between y_0 and y_t:	0.90 min
C	0.00	Software Version:	1.00	K	**Hydraulic Conductivity**	**3.95E-04 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

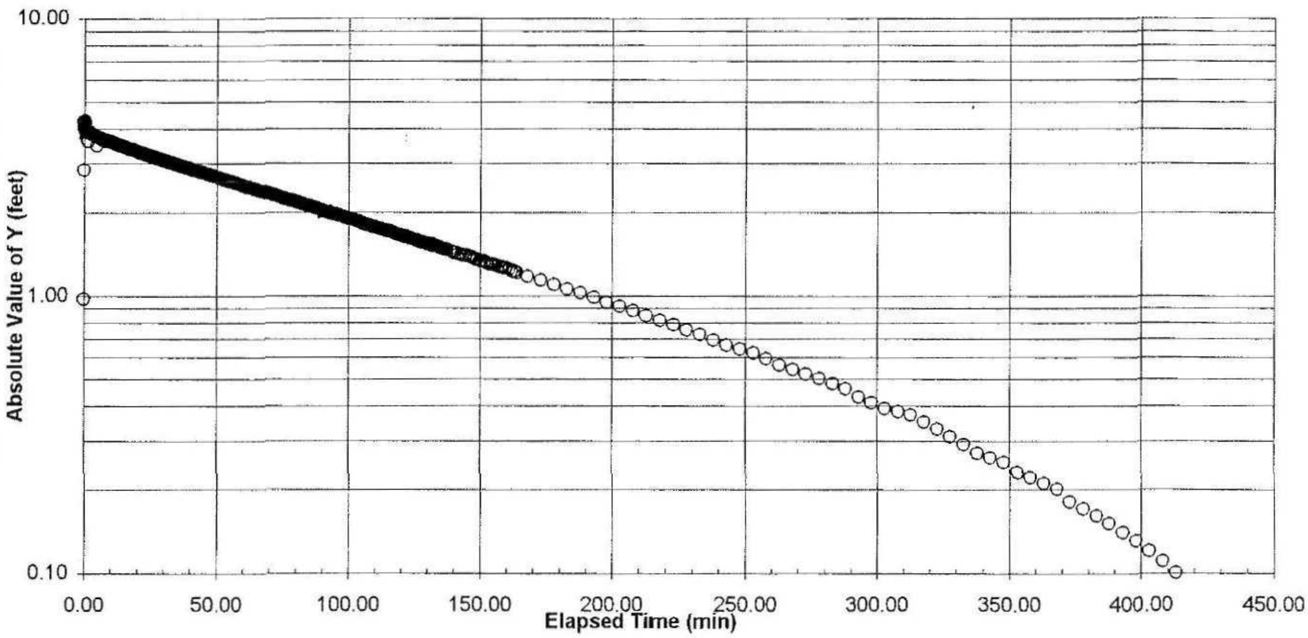
Slug Test Data Analysis

Well Location:	OWR-3S	**Project No.:**	933-3223
Test Date:	9/29/98	**Project Name:**	SOLUTIA/RFI/AL
Drilling Method:	HSA	**Testing By:**	MAC
Test Type:	Falling Head	**Analysis By:**	JSR

Well and Aquifer Characteristics			**Physical Analytical Parameters**	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**37** feet	L_w	Saturated Well Length:	25.14 feet
Depth to Top of Filter:	**25** feet	L_e	Effective Well Length:	12 feet
Depth to Static Water Level:	**11.86** feet			
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters							
A	2.65	L_e/r_w	36.36	y_0	Initial y of best fit line:	**3.90** feet
B	0.37	$\ln(R_e/r_w)$	2.67	y_t	Terminal y of best fit line:	**2.01** feet
C	0.00	Software Version:	1.00	dt	Time between y_0 and y_t:	90.37 min
				K	**Hydraulic Conductivity**	**2.88E-06 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

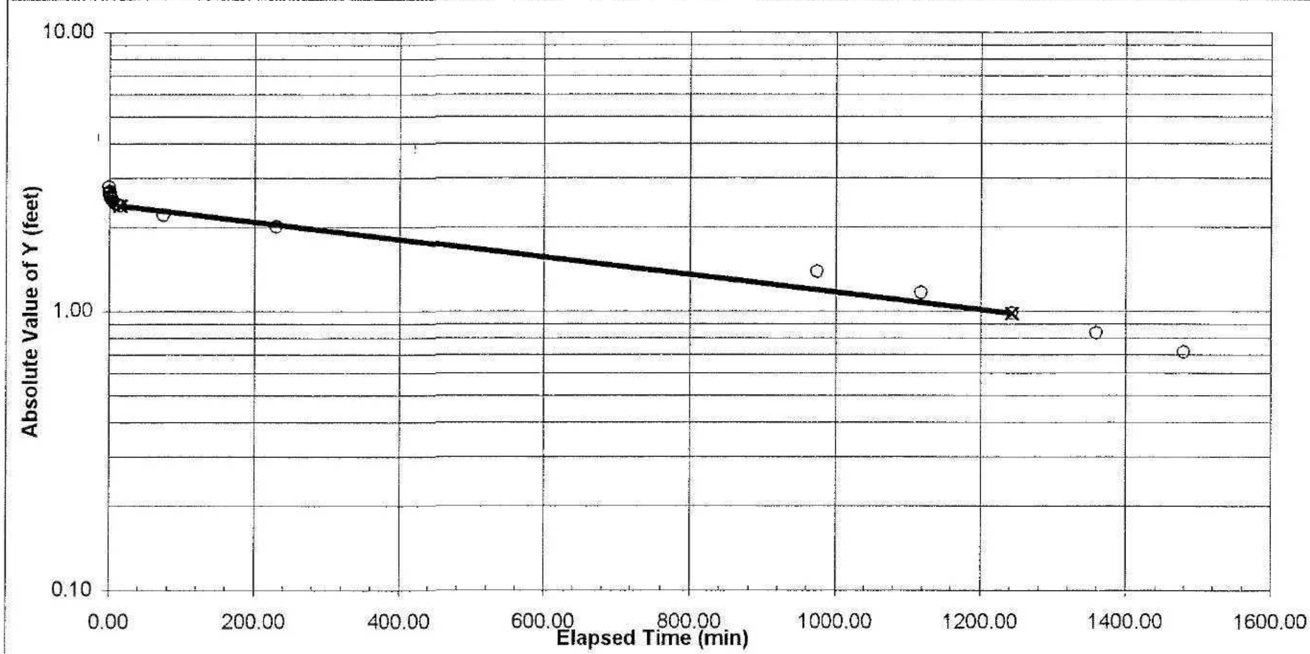
Slug Test Data Analysis

Well Location:	OWR-4D	Project No.:	983-3223
Test Date:	10/6/98	Project Name:	Solutia/RFI/AL
Drilling Method:	HSA	Testing By:	MAC
Test Type:	Rising Head	Analysis By:	JSR

Well and Aquifer Characteristics			Physical Analytical Parameters	
Casing Diameter:	2 inches	r_c	Effective Casing Radius:	0.1937 feet
Borehole Diameter:	8 inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**85** feet	L_w	Saturated Well Length:	11.73 feet
Depth to Top of Filter:	**73** feet	L_e	Effective Well Length:	12 feet
Depth to Static Water Level:	**73.27** feet		Water Below Top of Filter	
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters							
A	2.65	L_e/r_w	36.36		y_0	Initial y of best fit line:	**2.38** feet
B	0.37	$\ln(R_e/r_w)$	2.32		y_t	Terminal y of best fit line:	**0.98** feet
					dt	Time between y_0 and y_t:	1228.42 min
C	0.00	Software Version:	1.00		K	**Hydraulic Conductivity**	**1.33E-06 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

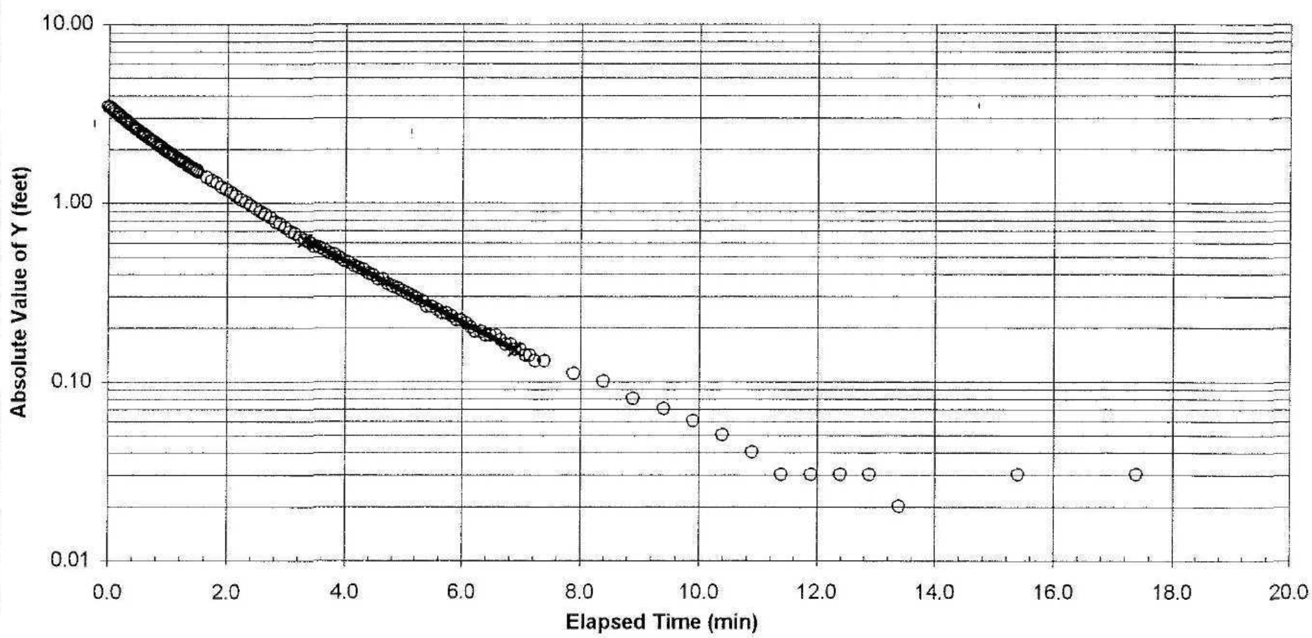
Slug Test Data Analysis

Well Location:	OWR-5D	**Project No.:**	933-3223
Test Date:	8/18/98	**Project Name:**	SOLUTIA/RFI/AL
Drilling Method:	HSA	**Testing By:**	CDH
Test Type:	Falling Head	**Analysis By:**	JSR

Well and Aquifer Characteristics			**Physical Analytical Parameters**	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**68** feet	L_w	Saturated Well Length:	19.67 feet
Depth to Top of Filter:	**56** feet	L_e	Effective Well Length:	12 feet
Depth to Static Water Level:	**48.33** feet			
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters						
A	2.65	L_e/r_w	36.36	y_0	Initial y of best fit line:	**0.62** feet
B	0.37	$\ln(R_e/r_w)$	2.56	y_t	Terminal y of best fit line:	**0.15** feet
C	0.00	Software Version:	1.00	dt	Time between y_0 and y_t:	3.58 min
				K	**Hydraulic Conductivity**	**1.49E-04 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

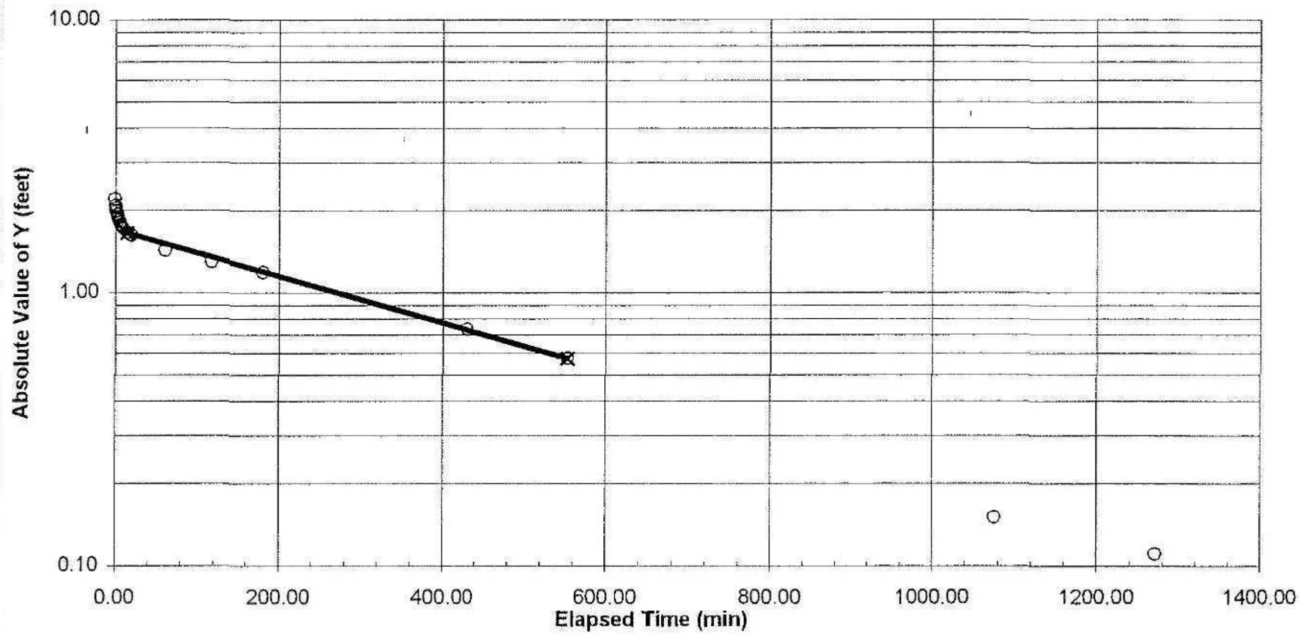
Slug Test Data Analysis

Well Location:	OWR-6D	**Project No.:**	983-3223
Test Date:	10/5/98	**Project Name:**	Solutia/RFI/AL
Drilling Method:	HSA	**Testing By:**	MAC
Test Type:	Rising Head	**Analysis By:**	JSR

Well and Aquifer Characteristics			**Physical Analytical Parameters**	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.1937 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**67** feet	L_w	Saturated Well Length:	8.13 feet
Depth to Top of Filter:	**55** feet	L_e	Effective Well Length:	12 feet
Depth to Static Water Level:	**58.87** feet		Water Below Top of Filter	
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters							
A	2.65	L_e/r_w	36.36		y_0	Initial y of best fit line:	**1.65** feet
B	0.37	$\ln(R_e/r_w)$	2.14		y_t	Terminal y of best fit line:	**0.57** feet
C	0.00	Software Version:	1.00		dt	Time between y_0 and y_t:	538.50 min
					K	**Hydraulic Conductivity**	**3.35E-06 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

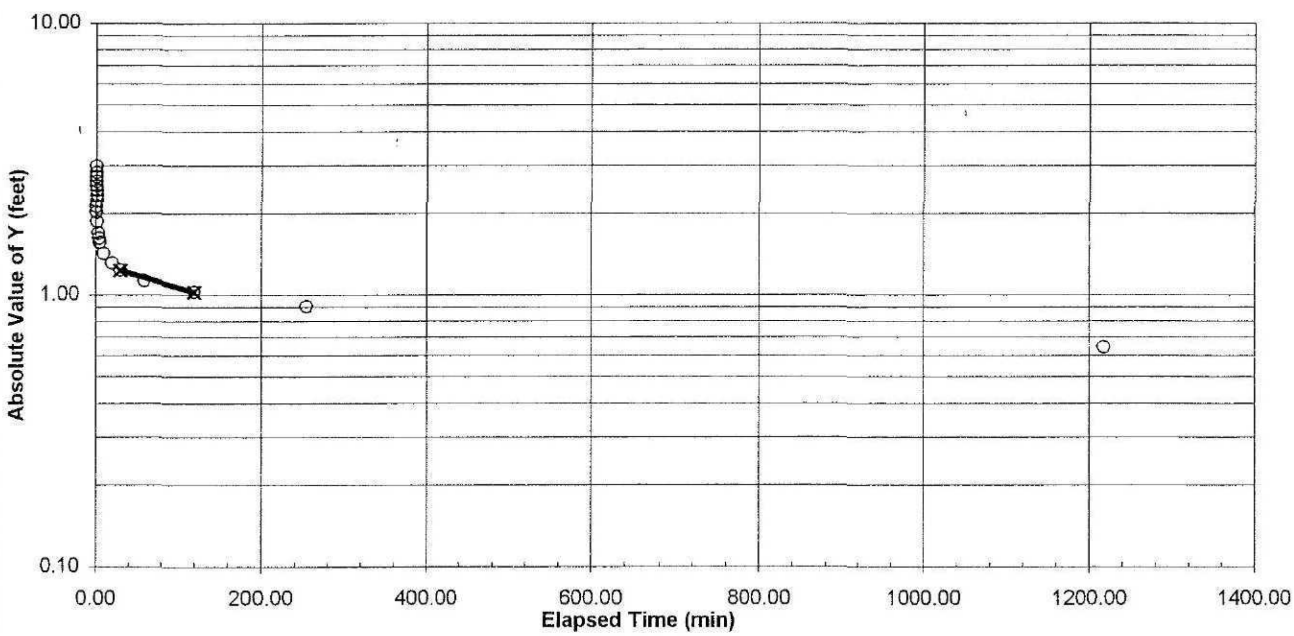
Slug Test Data Analysis

Well Location:	OWR-7D	**Project No.:**	983-3223
Test Date:	10/5/98	**Project Name:**	Solutia/RFI/AL
Drilling Method:	HSA	**Testing By:**	MAC
Test Type:	Rising Head	**Analysis By:**	JSR

Well and Aquifer Characteristics			Physical Analytical Parameters	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.1937 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**67** feet	L_w	Saturated Well Length:	4.01 feet
Depth to Top of Filter:	**55** feet	L_e	Effective Well Length:	12 feet
Depth to Static Water Level:	**62.99** feet		Water Below Top of Filter	
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters						
A	2.65	L_e/r_w	36.36	y_0	Initial y of best fit line:	**1.23** feet
B	0.37	$\ln(R_e/r_w)$	1.77	y_t	Terminal y of best fit line:	**1.02** feet
				dt	Time between y_0 and y_t:	90.00 min
C	0.00	Software Version:	1.00	K	**Hydraulic Conductivity**	**2.92E-06 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

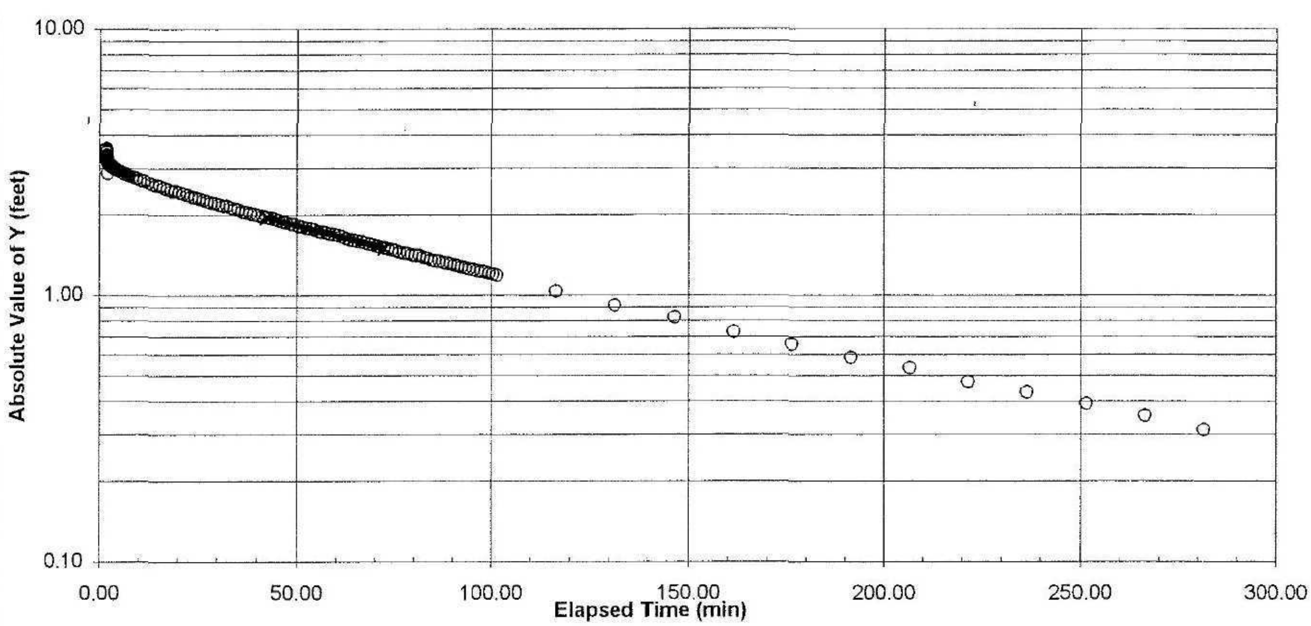
Slug Test Data Analysis

Well Location:	OWR-8S	**Project No.:**	983-3223
Test Date:	10/6/98	**Project Name:**	Solutia/RFI/AL
Drilling Method:	HSA	**Testing By:**	MAC
Test Type:	*Falling Head*	***Analysis By:***	CDH

Well and Aquifer Characteristics			**Physical Analytical Parameters**	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**37** feet	L_w	Saturated Well Length:	23.3 feet
Depth to Top of Filter:	**25** feet	L_e	Effective Well Length:	12 feet
Depth to Static Water Level:	**13.7** feet			
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters				y_0	Initial y of best fit line:	**1.95** feet
A	2.65	L_e/r_w	36.36	y_t	Terminal y of best fit line:	**1.50** feet
B	0.37	$\ln(R_e/r_w)$	2.64	dt	Time between y_0 and y_t:	30.00 min
C	0.00	Software Version:	1.00	K	**Hydraulic Conductivity**	**3.39E-06 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

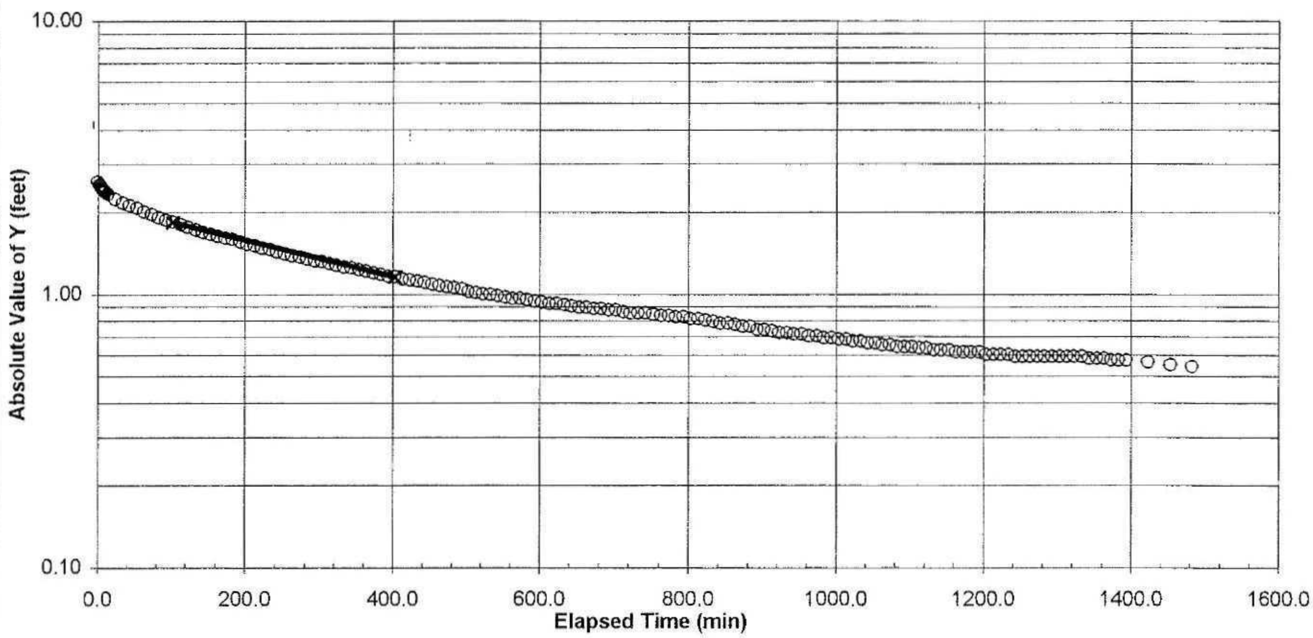
Slug Test Data Analysis

Well Location:	OWR-9S	Project No.:	933-3223
Test Date:	8/19/98	Project Name:	SOLUTIA/RFI/AL
Drilling Method:	HSA	Testing By:	CDH
Test Type:	Falling Head	Analysis By:	JSR

Well and Aquifer Characteristics			Physical Analytical Parameters	
Casing Diameter:	2 inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	8 inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	54.5 feet	L_w	Saturated Well Length:	16.89 feet
Depth to Top of Filter:	42 feet	L_e	Effective Well Length:	12.5 feet
Depth to Static Water Level:	37.61 feet			
Saturated Aquifer Thickness:	60 feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	30%	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters						
				y_0	Initial y of best fit line:	1.83 feet
A	2.71	L_e/r_w	37.88	y_t	Terminal y of best fit line:	1.15 feet
B	0.37	$\ln(R_e/r_w)$	2.51	dt	Time between y_0 and y_t:	300.00 min
C	0.00	Software Version:	1.00	K	Hydraulic Conductivity	5.48E-07 cm/sec



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

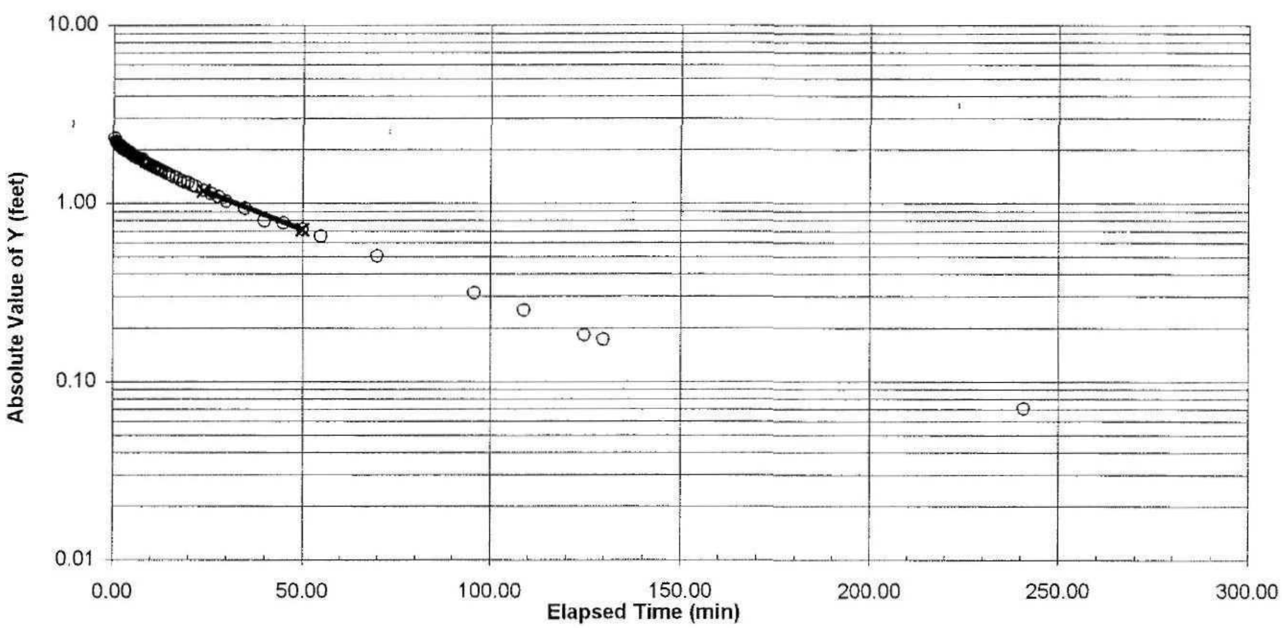
Slug Test Data Analysis

Well Location:	**PZR-1**	**Project No.:**	**983-3223**
Test Date:	**8/19/98**	**Project Name:**	**Solutia/RFI/AL**
Drilling Method:	**HSA**	**Testing By:**	**DLH**
Test Type:	Rising Head	**Analysis By:**	**JSR**

Well and Aquifer Characteristics			**Physical Analytical Parameters**	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.1937 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well	**60** feet	L_w	Saturated Well Length:	8.95 feet
Depth to Top of Filter	**38** feet	L_e	Effective Well Length:	22 feet
Depth to Static Water Level	**51.05** feet		Water Below Top of Filter	
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter	**30%**	n	Effective Porosity of Filter	30%

Aquifer Property Analysis

Method Parameters							
					y_0	Initial y of best fit line:	**1.17** feet
A	3.54	L_e/r_w	66.67		y_t	Terminal y of best fit line:	**0.71** feet
B	0.54	$\ln(R_e/r_w)$	2.34		dt	Time between y_0 and y_t:	26.00 min
C	0.00	Software Version:	1.00		K	**Hydraulic Conductivity**	**1.95E-05 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

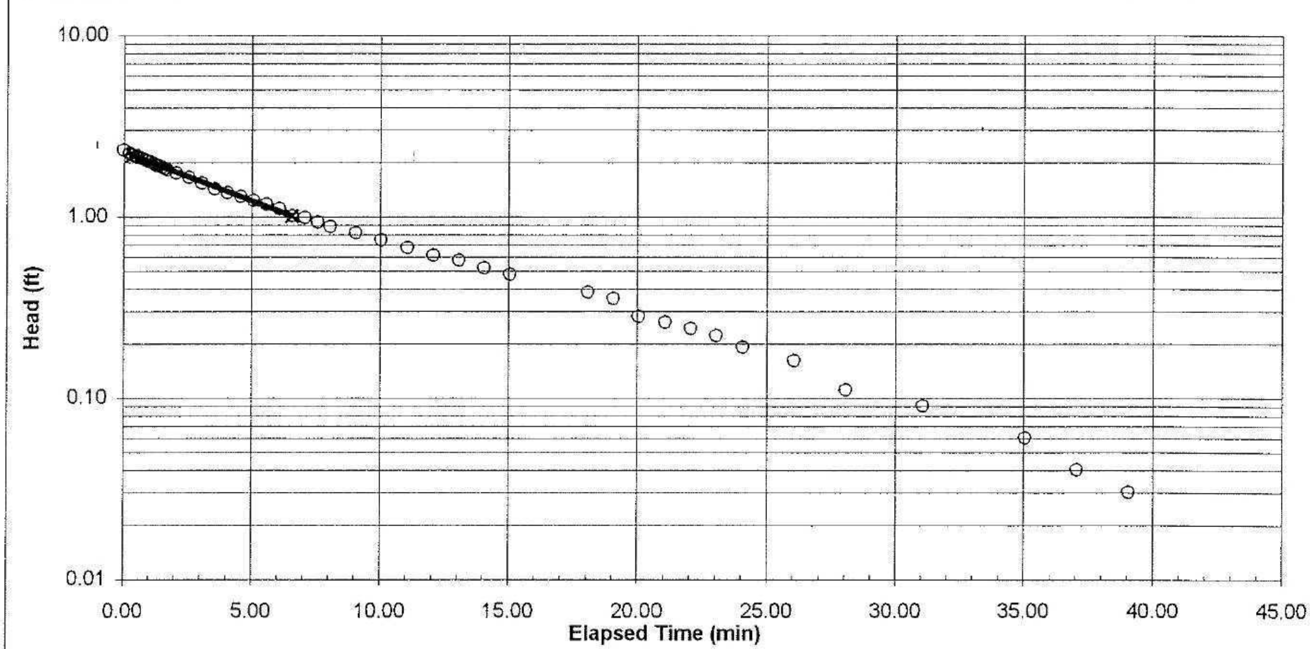
Slug Test Data Analysis

Well Location:	PZR-2	Project No.:	983-3223
Test Date:	8/20/98	Project Name:	Solutia/RFI/AL
Drilling Method:	HSA	Testing By:	DLH
Test Type:	Rising Head	Analysis By:	JSR

Well and Aquifer Characteristics			Physical Analytical Parameters	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.1937 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**62** feet	L_w	Saturated Well Length:	12.01 feet
Depth to Top of Filter:	**40** feet	L_e	Effective Well Length:	22 feet
Depth to Static Water Level:	**49.99** feet		Water Below Top of Filter	
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters							
A	3.54	L_e/r_w	66.67		y_0	Initial y of best fit line:	**2.18** feet
B	0.54	$\ln(R_e/r_w)$	2.50		y_t	Terminal y of best fit line:	**1.01** feet
C	0.00	Software Version:	1.00		dt	Time between y_0 and y_t:	6.22 min
					K	**Hydraulic Conductivity**	**1.34E-04 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

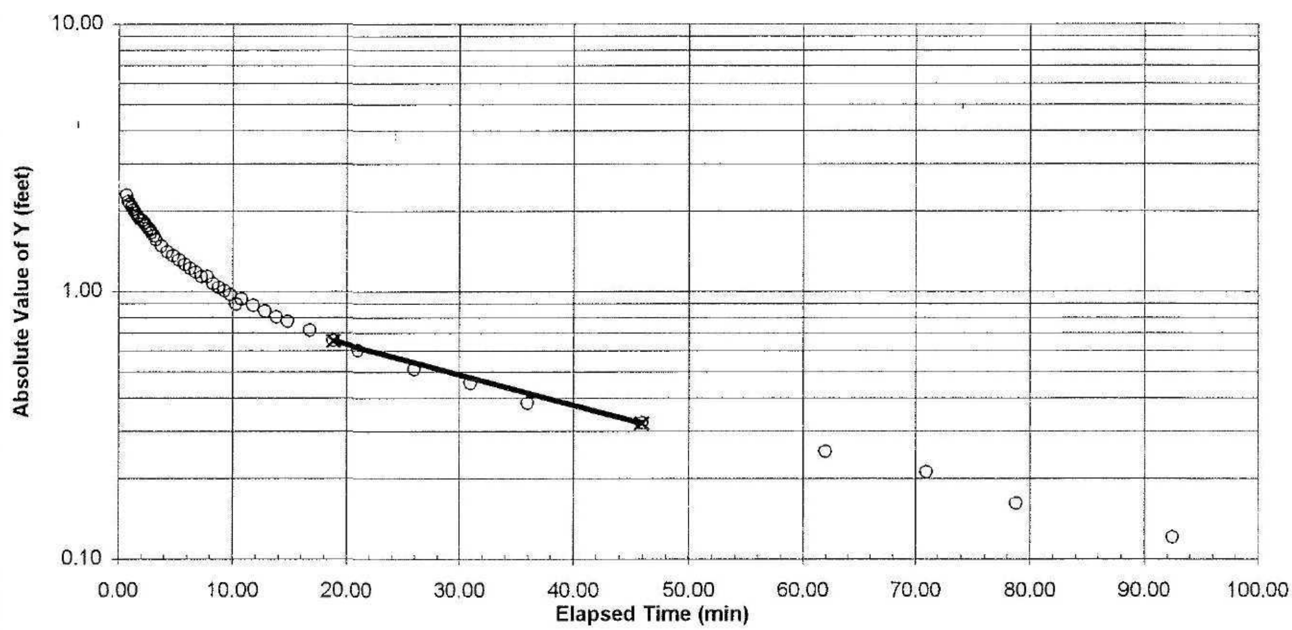
Slug Test Data Analysis

Well Location:	PZR-3	**Project No.:**	983-3223
Test Date:	8/20/98	**Project Name:**	Solutia/RFI/AL
Drilling Method:	HSA	**Testing By:**	DLH
Test Type:	Rising Head	**Analysis By:**	CDH

Well and Aquifer Characteristics			**Physical Analytical Parameters**	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.1937 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**62** feet	L_w	Saturated Well Length:	16.65 feet
Depth to Top of Filter:	**40** feet	L_e	Effective Well Length:	22 feet
Depth to Static Water Level:	**45.35** feet		Water Below Top of Filter	
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters							
A	3.54	L_e/r_w	66.67	y_0	Initial y of best fit line:	**0.65** feet
B	0.54	$\ln(R_e/r_w)$	2.68	y_t	Terminal y of best fit line:	**0.32** feet
C	0.00	Software Version:	1.00	dt	Time between y_0 and y_t:	27.17 min
				K	**Hydraulic Conductivity**	**3.03E-05 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

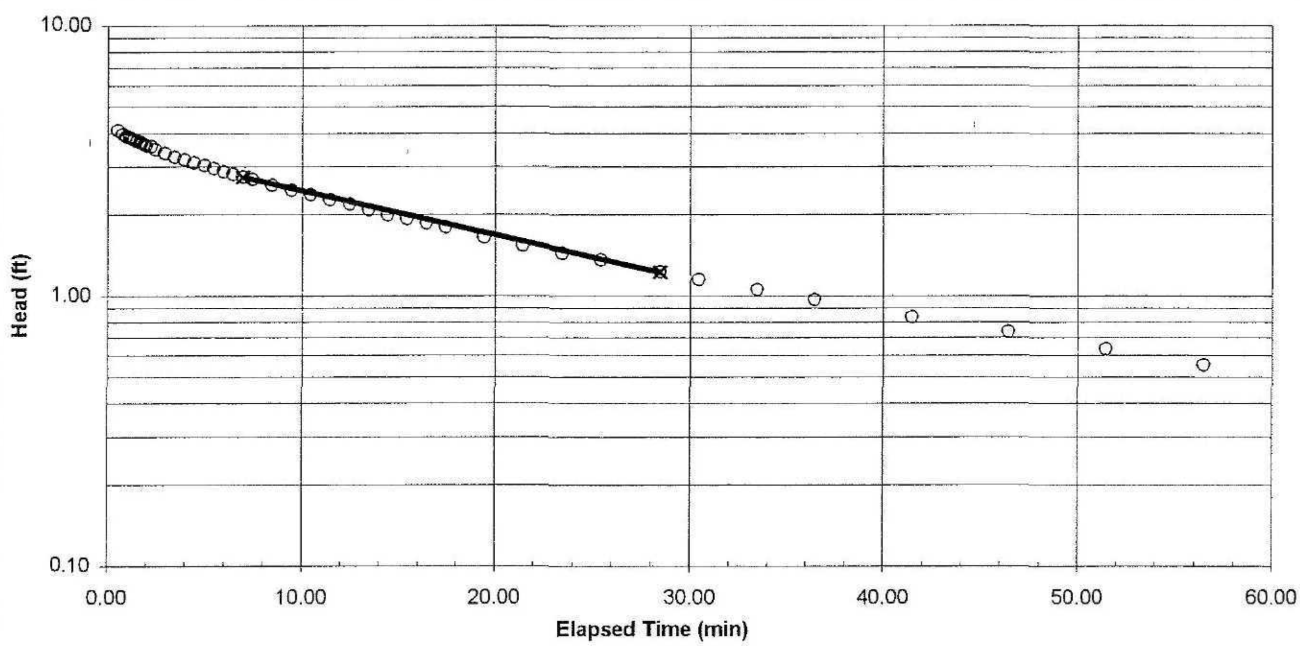
Slug Test Data Analysis

Well Location:	**PZR-4**	**Project No.:**	**983-3223**
Test Date:	**8/20/98**	**Project Name:**	**Solutia/RFI/AL**
Drilling Method:	**HSA**	**Testing By:**	**DLH**
Test Type:	Rising Head	**Analysis By:**	**JSR**

Well and Aquifer Characteristics			**Physical Analytical Parameters**	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.1937 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**62** feet	L_w	Saturated Well Length:	17.77 feet
Depth to Top of Filter:	**40** feet	L_e	Effective Well Length:	22 feet
Depth to Static Water Level:	**44.23** feet		Water Below Top of Filter	
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters				y_0	Initial y of best fit line:	**2.74** feet
A	3.54	L_e/r_w	66.67	y_t	Terminal y of best fit line:	**1.22** feet
B	0.54	$\ln(R_e/r_w)$	2.71	dt	Time between y_0 and y_t:	21.50 min
C	0.00	Software Version:	1.00	K	**Hydraulic Conductivity**	**4.42E-05 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

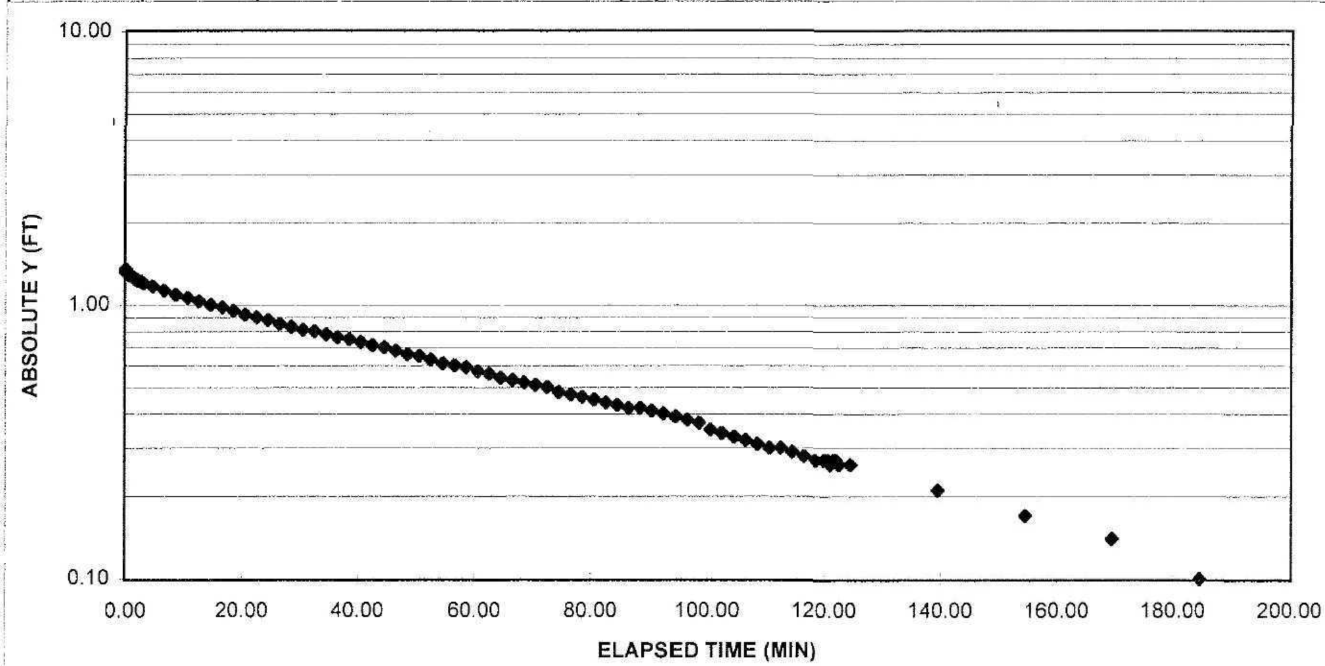
Slug Test Data Analysis

Well Location:	**PZR-5**	**Project No.:**	**983-3223**
Test Date:	**8/18/98**	**Project Name:**	**Solutia/RFI/AL**
Drilling Method:	**HSA**	**Testing By:**	**DLH**
Test Type:	Falling Head	**Analysis By:**	**JSR**

Well and Aquifer Characteristics			**Physical Analytical Parameters**	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**47** feet	L_w	Saturated Well Length:	27 feet
Depth to Top of Filter:	**25** feet	L_e	Effective Well Length:	22 feet
Depth to Static Water Level:	**20** feet			
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters							
A	3.54	L_e/r_w	66.67	y_0	Initial y of best fit line:	**0.85** feet	
B	0.54	$\ln(R_e/r_w)$	2.94	y_t	Terminal y of best fit line:	**0.71** feet	
C	0.00	Software Version:	1.00	dt	Time between y_0 and y_t:	16.00 min	
				K	**Hydraulic Conductivity**	**2.65E-06**	**cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

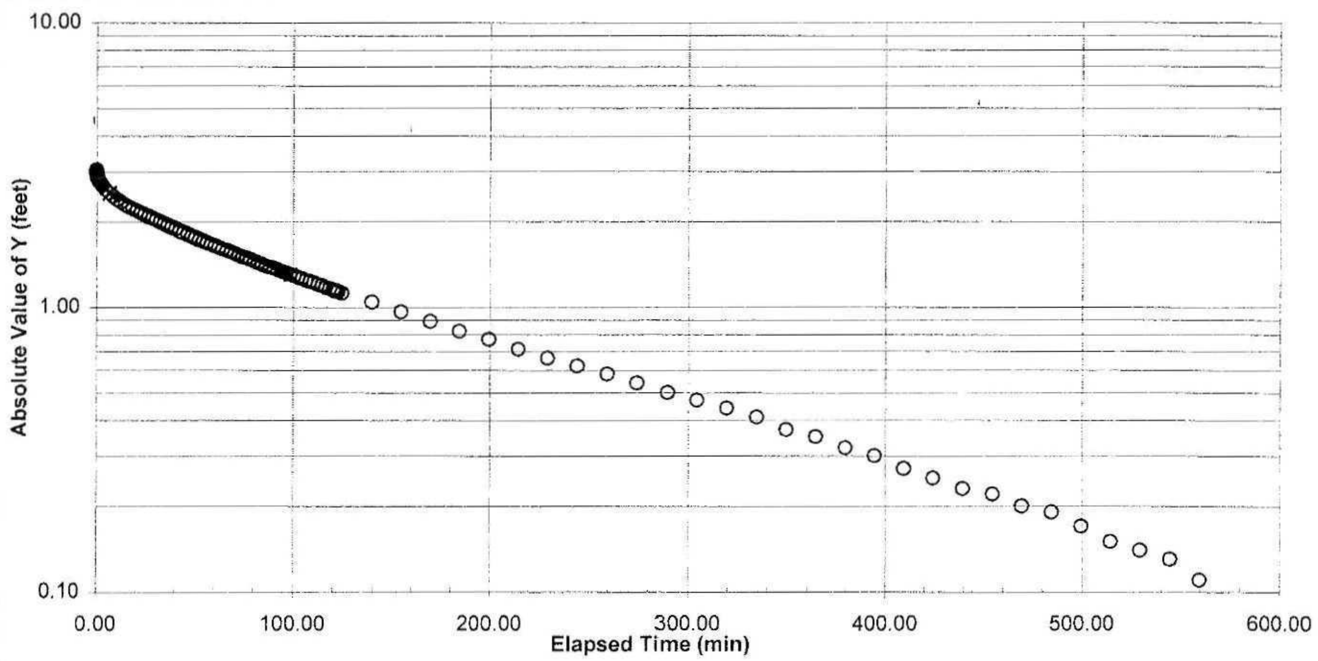
Slug Test Data Analysis

Well Location:	**PZR-6**	**Project No.:**	**983-3223**
Test Date:	**8/18/98**	**Project Name:**	**Solutia/RFI/AL**
Drilling Method:	**HSA**	**Testing By:**	**DLH**
Test Type:	Falling Head	**Analysis By:**	**JSR**

Well and Aquifer Characteristics			**Physical Analytical Parameters**	
Casing Diameter:	**2** inches	r_c	Effective Casing Radius:	0.0833 feet
Borehole Diameter:	**8** inches	r_w	Borehole Radius:	0.33 feet
Depth to Bottom of Well:	**47** feet	L_w	Saturated Well Length:	22.44 feet
Depth to Top of Filter:	**25** feet	L_e	Effective Well Length:	22 feet
Depth to Static Water Level:	**24.56** feet			
Saturated Aquifer Thickness:	**60** feet	H	Saturated Aquifer Thickness:	60 feet
Effective Porosity of Filter:	**30%**	n	Effective Porosity of Filter:	30%

Aquifer Property Analysis

Method Parameters				y_0	Initial y of best fit line:	**2.52** feet
A	3.54	L_e/r_w	66.67	y_t	Terminal y of best fit line:	**1.30** feet
B	0.54	$\ln(R_e/r_w)$	2.84	dt	Time between y_0 and y_t:	92.00 min
C	0.00	Software Version:	1.00	K	**Hydraulic Conductivity**	**1.64E-06 cm/sec**



Reference: Bouwer, Herman; 1989; "The Bouwer and Rice Slug Test -- An Update"; GROUNDWATER, Vol. 27, No. 3, pp. 304 - 309.

APPENDIX E

Groundwater Calculations

Golder Associates

SUBJECT Groundwater Flow Velocity Calculation		
Job No. 943-3680-043	Made by MAC	Date 6/30/08
Ref. Appendix B	Checked JAF Reviewed MMS	Sheet of

(1) - Groundwater Flow Velocity for Shallow Potentiometric Surface (April 2007)

- Horizontal Hydraulic Gradient

Well	GW Elevation
OWR-01~~S~~ S (JAF)	723.13 FT
OW-16A	765.83 FT

Distance along flow line = 2,250 FT

$$j = \frac{765.83 - 723.13 \text{ FT}}{2,250 \text{ FT}} = \frac{42.7}{2,250}$$

$$j = 1.90 \times 10^{-2} \text{ FT/FT}$$

Groundwater Flow Velocity

$v = Ki/n_e$ Assume $n_e = 0.02$

$$= \frac{(1.53 \times 10^{-2} \text{ ft/d})(1.90 \times 10^{-2} \text{ FT/FT})}{0.02}$$

$K = 1.53 \times 10^{-2}$ ft/d (RFI/CS, 2002)

$v = 0.0145$ FT/d $= 5.3$ FT/Year

(2) Groundwater Flow Velocity for Deep Residuum Potentiometric Surface (April 2007):

- Horizontal Hydraulic Gradient

Well	GW Elevation
OWR-4D	671.78
OWR-5D	~~748.33~~ (JAF) 749.33

Distance along flow line = 1825 FT

$$j = \frac{749.33 - 671.78}{1,825 \text{ FT}} = \frac{77.6}{1825}$$

$$j = 4.25 \times 10^{-2} \text{ FT/FT}$$

Golder Associates	SUBJECT Groundwater Flow Velocity Calculation		
	Job No. 943-3680.043	Made by MAC	Date 6/30/08
	Ref. APP B.	Checked JAF	Sheet of
		Reviewed MMS	

Groundwater Flow Velocity

$v = Ki/n_e$ Assume $n_e = 0.02$

$= \dfrac{(6.53 \times 10^{-3}\ ft/d)(4.25 \times 10^{-2}\ FT/FT)}{0.02}$ $K = 6.53 \times 10^{-3}\ ft/d$ (REI, 2002)

$= 0.014\ FT/d = 5.1\ FT/Year$

Golder Associates

SUBJECT Groundwater Flow Velocity Calculation		
Job No. 943-3680-043	Made by RAP	Date 6/27/07
Ref. Appendix B	Checked JAF	Sheet 1 of 2
	Reviewed MMS	

① Groundwater Flow Velocity for Shallow Potentiometric Surface (April 2007):

- Horizontal Hydraulic Gradient

Well (JAF)	GW Elevations
OWR-~~21S~~ 01S	723.13 FT
OW-16A	765.83 FT

Distance along flow line = 2,250 FT

$$j = \frac{765.83 - 723.13\ FT}{2{,}250\ FT}$$

$$= \frac{42.7}{2{,}250}$$

$$j = 1.90 \times 10^{-2}\ FT/FT$$ (JAF)

Groundwater Flow Velocity

Assume $n_e = 0.20$

$$v = K\,i/n_e$$

$K = 1.53 \times 10^{-2}$ ft/d. (RFI/CS, 2002)

$$= \frac{(1.53 \times 10^{-2}\ ft/d)\ (1.90 \times 10^{-2}\ FT/FT)}{0.2}$$

$$v = 0.00145\ FT/d = \underline{0.53\ FT/Year}$$

② Groundwater Flow Velocity for Deep Residuum Potentiometric Surface (April 2007):

- Horizontal Hydraulic Gradient

Well	GW Elevation
OWR-4D	671.78
OWR-5D	~~748.33~~ (JAF) 749.33

Distance along flow line = 1,825 FT

$$j = \frac{749.33 - 671.78}{1{,}825\ FT}$$

$$j = \frac{77.6}{1{,}825}$$

$$j = 4.25 \times 10^{-2}\ FT/FT$$

Golder Associates

SUBJECT Groundwater Flow Velocity Calculation		
Job No. 943-3680.043	Made by MAC	Date 6/27/07
Ref. APP. B	Checked JAF Reviewed MMS	Sheet 2 of 2

- Groundwater Flow Velocity

$v = Ki/n_e$

Assume $n_e = 0.20$

$K = 6.53 \times 10^{-3}$ ft/d (REI, 2002)

$= \dfrac{(6.53 \times 10^{-3} \text{ ft/d})(4.25 \times 10^{-2} \text{ FT/FT})}{0.2}$

$v = 0.0014$ FT/d $=$ 0.51 FT/Year

APPENDIX F

Groundwater CCL Calculations

Objective:

Since 4-nitrophenol and o,o,o-triethylphosphorothioate do not currently have Federal MCLs, or Region IX PRGs, calculate constituent concentration limits (CCLs) using methods defined in the, "*User's Guide and Background Technical Document for USEPA Region 9's Preliminary Remediation Goals Table*," herein referred to as the Region IX PRGs User's Guide.

Calculations:

There is limited toxicity information available for 4-nitrophenol and o,o,o-triethylphosphorothioate and therefore only non-cancer risks calculations associated with direct contact or oral ingestion are preformed. Although 4-nitrophenol does have the potential to volatize, there is insufficient toxicity information available to calculate inhalation risks for this chemical. o,o,o-triethylphosphorothioate[1] is not considered a volatile chemical since the Henry's Law constant is greater than 10^{-5} (atm-m^3/mol) and the molecular weight is less than 200 g/mole. Toxicity information associated with cancer risks is not available for 4-nitrophenol and o,o,o-triethylphosphorothioate.

The following equation was used for the calculation:

$$\mathbf{PRG}\left(\frac{\mu g}{L}\right) = \frac{\mathbf{THQ} \times \mathbf{BW_a} \times \mathbf{AT_n} \times \mathbf{1000}\left(\frac{\mu g}{L}\right)}{\mathbf{EF_r} \times \mathbf{ED_r} \times \left(\frac{\mathbf{IRW_a}}{\mathbf{RfD_o}}\right)}$$

The following input parameters were used:

	Assumptions	**Parameters**
THQ	Target Hazard Quotient (unitless)	1
BW_a	Body Weight (kg)	70
AT_n	Averaging Time –noncancer (days)	ED_r*365
ED_r	Exposure Duration, resident (year)	30
EF_r	Exposure Frequency, resident (day/year)	350
IRW_a	Drinking Water Ingestion, adult (m^3/day)	2
RfD_o	Reference Dose – oral (mg/kg/day)	3E-02 (4-nitrophenol) 2E-02(o,o,o-triethylphosphorothioate)

With the exception of the reference doses, all other parameters are consistent with the Region IX PRGs User's Guide. The reference doses were derived as part of the Solutia Anniston Site Sampling and Analysis QA/QC Plan (Solutia, 2007). The reference dose for 4-nitrophenol is based on dermal unbounded No Adverse Effects Level (NOAEL) in rats. Results are based on an unpublished oral Monsanto rat study which reported increased mortality as a result of acute pharmacological/toxicological effects exacerbated by repeated dosing. For o,o,o-triethylphosphorothioate, the reference dose is based on a surrogate value from dimethoate which

[1] The Henry Law constant for o,o,o-triethylphosphorothioate is 7.2E-03 and the molecular weight is 198.2 based on EPA's website: http://www.epa.gov/fedrgstr/EPA-AIR/1998/December/Day-09/a28472c.htm

resulted in NOAEL in humans at an intake of 0.04 mg/kg/day and an allowable daily intake of 0.02 mg/kg/day based on cholinesterase inhibition.

Results:

The following is a summary of the calculated CCLs:

Constituent	CCL (μg/L)
4-nitrophenol	1,095
o,o,o-triethylphosphorothioate	730

References:

USEPA. "*User's Guide and Background Technical Document for USEPA Region 9's Preliminary Remediation Goals Table*,"

Solutia, 2007. *Solutia Anniston Site, Sampling and Analysis QA/QC Plan, Revision 1*, March 2007.

APPENDIX G

Laboratory Reports

ANALYTICAL REPORT

Job Number: 680-15645-1

SDG Number: ANST07

Job Description: Anniston RCRA Spring GW Sampling Event

For:
Golder Associates Inc.
8933 Western Way
Building A,
Suite 12
Jacksonville, FL 32256

Attention: Mr. Rich W Poff

Terry Hornsby
Project Manager I
thornsby@stl-inc.com
04/28/2006

cc: E. Gayle Macolly

Project Manager: Terry Hornsby

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. All questions regarding this test report should be directed to the STL Project Manager who signed this test report.

Severn Trent Laboratories, Inc.
STL Savannah 5102 LaRoche Avenue, Savannah, GA 31404
Tel (912) 354-7858 Fax (912) 351-3673 www.stl-inc.com

METHOD SUMMARY

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography	STL-SAV	SW846 8081A_8082	
Continuous Liquid-Liquid Extraction	STL-SAV		SW846 3520C

LAB REFERENCES:

STL-SAV = STL-Savannah

METHOD REFERENCES:

SW846 - "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

Method	Analyst	Analyst ID
SW846 8081A_8082	Kellar, Joshua	JK

SAMPLE SUMMARY

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-15645-1	OWR-15D	Water	04/12/2006 1640	04/14/2006 0908
680-15645-2	OWR-15DF	Water	04/12/2006 1640	04/14/2006 0908
680-15645-3	OWR-16AF.EPA	Water	04/12/2006 1540	04/14/2006 0908
680-15645-4	SBP-03-EPA	Water	04/13/2006 1245	04/14/2006 0908
680-15645-5	OW-8AF-EPA	Water	04/13/2006 0825	04/14/2006 0908
680-15645-6	OW-21AF-EPA	Water	04/13/2006 0945	04/14/2006 0908

SAMPLE RESULTS

Analytical Data

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

Client Sample ID: OWR-15D

Lab Sample ID:	680-15645-1	Date Sampled:	04/12/2006 1640
Client Matrix:	Water	Date Received:	04/14/2006 0908

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method:	8081A_8082	Analysis Batch: 680-42499	Instrument ID:	GC SemiVolatiles - M
Preparation:	3520C	Prep Batch: 680-42082	Lab File ID:	md19037.d
Dilution:	1.0		Initial Weight/Volume:	1020 mL
Date Analyzed:	04/20/2006 0938		Final Weight/Volume:	10 mL
Date Prepared:	04/17/2006 1104		Injection Volume:	
			Column ID:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
PCB-1016	<0.98		0.11	0.98
PCB-1221	8.4	P	0.49	2.0
PCB-1232	<0.98		0.18	0.98
PCB-1242	<0.98		0.14	0.98
PCB-1248	<0.98		0.11	0.98
PCB-1254	<0.98		0.20	0.98
PCB-1260	<0.98		0.11	0.98

Surrogate	%Rec		Acceptance Limits
Tetrachloro-m-xylene	37		30 - 150
DCB Decachlorobiphenyl	19	*	30 - 150

Analytical Data

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

Client Sample ID: OWR-15DF

Lab Sample ID: 680-15645-2
Client Matrix: Water

Date Sampled: 04/12/2006 1640
Date Received: 04/14/2006 0908

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method:	8081A_8082	Analysis Batch: 680-42527	Instrument ID:	GC SemiVolatiles - M	
Preparation:	3520C	Prep Batch: 680-42082	Lab File ID:	md19043.d	
Dilution:	1.0		Initial Weight/Volume:	1040 mL	
Date Analyzed:	04/20/2006 1135		Final Weight/Volume:	10 mL	
Date Prepared:	04/17/2006 1104		Injection Volume:		
			Column ID:	PRIMARY	

Analyte	Result (ug/L)	Qualifier	MDL	RL
PCB-1016	<0.96		0.11	0.96
PCB-1221	<1.9		0.48	1.9
PCB-1232	<0.96		0.17	0.96
PCB-1242	<0.96		0.13	0.96
PCB-1248	<0.96		0.11	0.96
PCB-1254	<0.96		0.19	0.96
PCB-1260	<0.96		0.11	0.96

Surrogate	%Rec		Acceptance Limits
Tetrachloro-m-xylene	796	*	30 - 150
DCB Decachlorobiphenyl	38		30 - 150

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

Client Sample ID: OWR-16AF.EPA

Lab Sample ID:	680-15645-3	Date Sampled:	04/12/2006 1540
Client Matrix:	Water	Date Received:	04/14/2006 0908

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method:	8081A_8082	Analysis Batch: 680-42527	Instrument ID:	GC SemiVolatiles - M
Preparation:	3520C	Prep Batch: 680-42082	Lab File ID:	md19045.d
Dilution:	1.0		Initial Weight/Volume:	1050 mL
Date Analyzed:	04/20/2006 1214		Final Weight/Volume:	10 mL
Date Prepared:	04/17/2006 1104		Injection Volume:	
			Column ID:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
PCB-1016	<0.95		0.10	0.95
PCB-1221	<1.9		0.48	1.9
PCB-1232	<0.95		0.17	0.95
PCB-1242	<0.95		0.13	0.95
PCB-1248	<0.95		0.10	0.95
PCB-1254	<0.95		0.19	0.95
PCB-1260	<0.95		0.10	0.95

Surrogate	%Rec		Acceptance Limits
Tetrachloro-m-xylene	19	*	30 - 150
DCB Decachlorobiphenyl	44		30 - 150

Analytical Data

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

Client Sample ID: SBP-03-EPA

Lab Sample ID: 680-15645-4
Client Matrix: Water

Date Sampled: 04/13/2006 1245
Date Received: 04/14/2006 0908

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method:	8081A_8082	Analysis Batch: 680-42527	Instrument ID:	GC SemiVolatiles - M
Preparation:	3520C	Prep Batch: 680-42082	Lab File ID:	md19046.d
Dilution:	1.0		Initial Weight/Volume:	1040 mL
Date Analyzed:	04/20/2006 1233		Final Weight/Volume:	10 mL
Date Prepared:	04/17/2006 1104		Injection Volume:	
			Column ID:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
PCB-1016	<0.96		0.11	0.96
PCB-1221	<1.9		0.48	1.9
PCB-1232	<0.96		0.17	0.96
PCB-1242	<0.96		0.13	0.96
PCB-1248	<0.96		0.11	0.96
PCB-1254	<0.96		0.19	0.96
PCB-1260	<0.96		0.11	0.96

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	46	30 - 150
DCB Decachlorobiphenyl	42	30 - 150

Analytical Data

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

Client Sample ID: OW-8AF-EPA

Lab Sample ID: 680-15645-5
Client Matrix: Water

Date Sampled: 04/13/2006 0825
Date Received: 04/14/2006 0908

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3520C
Dilution: 1.0
Date Analyzed: 04/20/2006 1253
Date Prepared: 04/17/2006 1104

Analysis Batch: 680-42527
Prep Batch: 680-42082

Instrument ID: GC SemiVolatiles - M
Lab File ID: md19047.d
Initial Weight/Volume: 1040 mL
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
PCB-1016	<0.96		0.11	0.96
PCB-1221	<1.9		0.48	1.9
PCB-1232	<0.96		0.17	0.96
PCB-1242	<0.96		0.13	0.96
PCB-1248	<0.96		0.11	0.96
PCB-1254	<0.96		0.19	0.96
PCB-1260	<0.96		0.11	0.96

Surrogate	%Rec	Acceptance Limits
Tetrachloro-m-xylene	65	30 - 150
DCB Decachlorobiphenyl	74	30 - 150

Analytical Data

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

Client Sample ID: OW-21AF-EPA

Lab Sample ID:	680-15645-6	Date Sampled:	04/13/2006 0945
Client Matrix:	Water	Date Received:	04/14/2006 0908

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method:	8081A_8082	Analysis Batch: 680-42527	Instrument ID:	GC SemiVolatiles - M
Preparation:	3520C	Prep Batch: 680-42082	Lab File ID:	md19049.d
Dilution:	5.0		Initial Weight/Volume:	1060 mL
Date Analyzed:	04/20/2006 1331		Final Weight/Volume:	10 mL
Date Prepared:	04/17/2006 1104		Injection Volume:	
			Column ID:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
PCB-1016	<4.7		0.52	4.7
PCB-1221	<9.4		2.4	9.4
PCB-1232	<4.7		0.85	4.7
PCB-1242	<4.7		0.66	4.7
PCB-1248	<4.7		0.52	4.7
PCB-1254	<4.7		0.94	4.7
PCB-1260	<4.7		0.52	4.7

Surrogate	%Rec		Acceptance Limits
Tetrachloro-m-xylene	14200	*	30 - 150
DCB Decachlorobiphenyl	91		30 - 150

DATA REPORTING QUALIFIERS

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

Lab Section	Qualifier	Description
GC Semi VOA		
	*	LCS, LCSD, MS, MSD, MD, or Surrogate exceeds the control limits
	P	The lower of the two values is reported when the % difference between the results of two GC columns is greater than 40%

QUALITY CONTROL RESULTS

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

QC Association Summary

Lab Sample ID	Client Sample ID	Client Matrix	Method	Prep Batch
GC Semi VOA				
Prep Batch: 680-42082				
LCS 680-42082/22-A	Lab Control Spike	Water	3520C	
MB 680-42082/20-A	Method Blank	Water	3520C	
680-15645-1	OWR-15D	Water	3520C	
680-15645-2	OWR-15DF	Water	3520C	
680-15645-3	OWR-16AF.EPA	Water	3520C	
680-15645-4	SBP-03-EPA	Water	3520C	
680-15645-5	OW-8AF-EPA	Water	3520C	
680-15645-6	OW-21AF-EPA	Water	3520C	
Analysis Batch:680-42408				
LCS 680-42082/22-A	Lab Control Spike	Water	8081A_8082	680-42082
MB 680-42082/20-A	Method Blank	Water	8081A_8082	680-42082
Analysis Batch:680-42499				
680-15645-1	OWR-15D	Water	8081A_8082	680-42082
Analysis Batch:680-42527				
680-15645-2	OWR-15DF	Water	8081A_8082	680-42082
680-15645-3	OWR-16AF.EPA	Water	8081A_8082	680-42082
680-15645-4	SBP-03-EPA	Water	8081A_8082	680-42082
680-15645-5	OW-8AF-EPA	Water	8081A_8082	680-42082
680-15645-6	OW-21AF-EPA	Water	8081A_8082	680-42082

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

Surrogate Recovery Report

8081A 8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Client Matrix: Water

Lab Sample ID	Client Sample	(DCB 1) (%Rec)	(TCX 1) (%Rec)
LCS 680-42082/22-A		63	57
MB 680-42082/20-A		66	50
680-15645-1	OWR-15D	19 *	37
680-15645-2	OWR-15DF	38	796 *
680-15645-3	OWR-16AF.EPA	44	19 *
680-15645-4	SBP-03-EPA	42	46
680-15645-5	OW-8AF-EPA	74	65
680-15645-6	OW-21AF-EPA	91	14200 *

Surrogate		Acceptance Limits
(DCB 1)	DCB Decachlorobiphenyl	30 - 150
(TCX 1)	Tetrachloro-m-xylene	30 - 150

Client: Golder Associates Inc.

Job Number: 680-15645-1
Sdg Number: ANST07

Method Blank - Batch: 680-42082

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID: MB 680-42082/20-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 04/19/2006 1824
Date Prepared: 04/17/2006 1104

Analysis Batch: 680-42408
Prep Batch: 680-42082
Units: ug/L

Instrument ID: GC SemiVolatiles - M
Lab File ID: md19011.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	Result	Qual	MDL	RL
PCB-1016	<1.0		0.11	1.0
PCB-1221	<2.0		0.50	2.0
PCB-1232	<1.0		0.18	1.0
PCB-1242	<1.0		0.14	1.0
PCB-1248	<1.0		0.11	1.0
PCB-1254	<1.0		0.20	1.0
PCB-1260	<1.0		0.11	1.0

Surrogate	% Rec	Acceptance Limits
Tetrachloro-m-xylene	50	30 - 150
DCB Decachlorobiphenyl	66	30 - 150

Laboratory Control Sample - Batch: 680-42082

Method: 8081A_8082
Preparation: 3520C

Lab Sample ID: LCS 680-42082/22-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 04/19/2006 1903
Date Prepared: 04/17/2006 1104

Analysis Batch: 680-42408
Prep Batch: 680-42082
Units: ug/L

Instrument ID: GC SemiVolatiles - M
Lab File ID: md19013.d
Initial Weight/Volume: 1000 mL
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	*Spike Amount*	*Result*	*% Rec.*	*Limit*	*Qual*
PCB-1016	10.0	7.88	79	43 - 114	
PCB-1260	10.0	9.25	93	52 - 121	

Surrogate	% Rec	Acceptance Limits
Tetrachloro-m-xylene	57	30 - 150
DCB Decachlorobiphenyl	63	30 - 150

Calculations are performed before rounding to avoid round-off errors in calculated results.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE: Solutia GW Program	PROJECT NO.: 943-3680-RFI	PROJECT LOCATION (STATE): AL
STL (LAB) PROJECT MANAGER: Terry Hornsby	P.O. NUMBER:	CONTRACT NO.:
CLIENT (SITE) PM: Rich Poff	CLIENT PHONE: 904-614-3887	CLIENT FAX:
CLIENT NAME: Solutia	CLIENT E-MAIL: rpoff@golder.com	
CLIENT ADDRESS: 5933 Western Way, Suite 12, Jacksonville FL 32256		
COMPANY CONTRACTING THIS WORK (if applicable): Golder Associates		

PAGE 1 OF 1

STANDARD REPORT DELIVERY ✓
DATE DUE
EXPEDITED REPORT DELIVERY (SURCHARGE)
DATE DUE
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT,...)

REQUIRED ANALYSIS: PCB
PRESERVATIVE: ICE

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G)	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID	NUMBER OF CONTAINERS SUBMITTED (PCB)	REMARKS
4/12/06	1640	OWR-15D		X				2	unfiltered
4/12/06	1640	OWR-15DF		X				2	filtered
4/12/06	1540	OWR-16AF.EPA		X				2	filtered
4/13/06	1245	SBP-03-EPA		X				2	unfiltered
4/13/06	825	OW-8AF-EPA		X				2	filtered
4/13/06	945	OW-21AF-EPA		X				2	filtered

TEMP.: 0.5, 1.9

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			[signature]	4/13/06	15:25			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
EMPTY CONTAINERS								

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
Brian Hubbard	4-14-06	0908	YES ○ NO ○		680-15645	

STL8240-680 (12/02)

APPENDIX H

Data Validation Summaries
(provided in electronic format on CD)

APPENDIX H

LABORATORY RESULT'S DATA VALIDATION SUMMARY

1. Groundwater Data Validation Results

The groundwater laboratory results associated with the RFI sampling event were validated to determine the following:

- if proper chain-of-custody was maintained;
- if proper methods were used;
- if holding times were met;
- if proper detection limits were achieved;
- if method blanks, field blanks, and/or trip blanks indicated any contamination;
- if relative percent differences (RPDs) between a sample and it's duplicate were within control limits;
- if surrogate recoveries were within method established control limits; and
- if any matrix interference was evident; and
- and if laboratory control samples (LCS), LCS duplicate recoveries and RPDs were within control limits.

The data validation was done according to USEPA SW846 (SW846) methodologies and USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review (February 1994).

Chain-of custody forms and holding times were examined and determined to be acceptable. Surrogate recoveries were within the established method control limits. Anomalies were not present in the PCB chromatographs. No target analytes were reported in any method blanks or trip blanks.

A field blank was taken to ensure target analytes were not introduced to samples in the field. A rinsate (field blank) sample was taken using the decontaminated equipment from OWR-7D. The rinsate blanks had target analytes reported: suspended solids (6.0 mg/L), standard plate count (10 CFU/mL), nitrate (2.7 mg/L), and total dissolved solids (12 mg/L). The groundwater sample results for these parameters were qualified as estimated (J) for results from all RFI wells except OW-6A and OWR-5D. that were less than 10 times the concentration found in the rinsate. Wells OW-6A and OWR-5D were sampled separately for the above mentioned parameters after the RFI sampling event to obtain more data for natural attenuation study.

The matrix spike (MS) and matrix spike duplicate (MSD) analysis are performed to verify the affect the sample matrix has on the precision and accuracy of the method and to verify the laboratories precision and accuracy in recovery of the target analyte during analysis. Additional groundwater samples from OWR-2S were submitted to the laboratory to be used for MS and MSD analysis. Nitrate, manganese, total Kjeldahl nitrogen (TKN) MS and MSD recoveries were outside method control limits. MS/MSD were reported for each sample batch by the laboratory in addition to the OWR-2S MS/MSD. These MS/MSD analyses were performed using laboratory supplied samples. Several of these MS/MSD recoveries were outside of control limits but they do not represent the sample matrices from the site and were not considered during validation. The MS/MSD evaluation cannot be used alone to validate data. It has to be used in conjunction with another data validation criteria discrepancy to qualify data. None of the sample data is qualified based on the MS/MSD deficiency alone.

Duplicate sample analysis verifies the laboratory and field precision at the time of analysis. The relative percent difference between the sample and it's duplicate should be within a control limit of 20%. Duplicate filtered and unfiltered samples were taken at OWR-2D to represent samples from the deeper residuum wells and at OWR-8S to represent samples from the upper residuum wells. The OWR-2D and duplicate RPDs for the standard plate count (32%), suspended solids (40%), and TKN (27%) were outside the control limit. The deep residuum groundwater samples were qualified as estimated due to these results. The filtered OWR-8S and it's duplicate's RPDs for lead (50%) and manganese (24%) were outside the control limits. The filtered groundwater samples from shallow residuum wells were qualified as estimated due to these results. The unfiltered WEL-4 and it's duplicate's RPD for barium (144%) was outside the control limits. The unfiltered WEL-1, WEL-2, WEL-3 and WEL-4 samples were qualified as estimated due to these results. The duplicate sample results are presented in Table H-1.

Savannah Laboratories (Savannah) noted that the OWR-2D duplicate and OW-10 samples' TOX analysis were repeated and demonstrated that the secondary activated carbon column consistently exceeded 10% of the two-column total TOX amount. According to Savannah, this is caused by weakly adsorbed organohalide components of the sample. Thus, the reported TOX concentration of this sample is likely to be biased low. The TOX result for the OWR-2D duplicate and OW-10 sample was qualified as estimated (J).

2. Soil Data Validation Results

The soil laboratory results associated with the RFI sampling event were validated to determine the following:

- if proper chain-of-custody was maintained;
- if proper methods were used;
- if holding times were met;
- if proper detection limits were achieved;
- if method blanks, field blanks, and/or trip blanks indicated any contamination;
- if relative percent differences (RPDs) between a sample and it's duplicate were within control limits; and
- if surrogate recoveries were within method established control limits; and
- if any matrix interference was evident; and
- and if laboratory control samples (LCS), LCS duplicate recoveries and RPDs were within control limits.

The data validation was done according to USEPA SW846 (SW846) methodologies and USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Inorganic Data Review (February 1994).

Chain-of custody forms and holding times were examined and determined to be acceptable. Surrogate recoveries and MS/MSD recoveries were within the established method control limits. No target analytes were reported in any rinsate (field) blanks, method blanks or trip blanks.

A method blank was analyzed for each soil sample batch by the laboratory. The method blank analysis ensures contaminants were not introduced to the samples by the laboratories handling procedures. A method blank had a detection of aroclor 1248 (95 ug/kg). The samples associated with this method blank are SSR-18, SSR-19, SSR-20, and SSR-21. The aroclor 1248 results results that were less than 10 times the concentration found in the method blank for these samples were qualified as estimated.

Duplicate sample analysis verifies the laboratory and field precision at the time of analysis. According the the CLP protocal, soil duplicate results are expected to have a greater variance than water. Thus, only the sample and it's duplicate are qualified when the RPD is outside of control limits of 20%. The SSR-10 and duplicate (DUPE2) RPDs for aroclor 1242 (27%), aroclor 1254 (33%), arsenic (28%), beryllium (223%), chromium (21%), cobalt (69%), lead (64%), manganese (47%), mercury (149%) and nickel (42%) were outside of control limits. The SSR-10 and duplicate results for these parameters were qualified as estimated. The SSR-15 and duplicate (DUPE1) RPDs for aroclor 1242 (< 100%), aroclor 1232 (< 100%), aroclor 1254 (< 100%), aroclor 1260 (< 100%), barium (25%), mercury (<100%) and nickle (25%) were outside control limits. The SSR-18 and duplicate (DUPE4) RPDs for aroclor 1248 (<100%), aroclor 1260 (<100%), arsenic (54%), barium (58%), chromium (62%), cobalt (26%), lead (26%), manganese (31%), mercury (40%) and vanadium (43%) were outside of control limits. The SSR-18 and duplicate results for these parameters were qualified as estimated. The duplicate sample results are presented in Table H-2.

Savannah noted that the methyl paration result in SSR-18 and SSR-21, aroclor 1248 result in SSR-18 and SSR-21, and ethyl parathion result in SSR-21 and was identifided using the retention time. Two dissimilar GC columns confirmed the presence of the target analyte in the sample, the percent difference between the columns was greater than 40%. Thus, these results were qualified as estimated.

3. Surface Water Data Validation Results

The surface water laboratory results associated with the RFI/CS were validated to determine the following:

- if proper chain-of-custody was maintained;
- if proper methods were used;
- if holding times were met;
- if proper detection limits were achieved;
- if method blanks indicated any contamination;
- if any matrix interference was noted by the laboratory; and
- and if laboratory control samples (LCS), LCS duplicate recoveries and RPDs were within control limits.

The data validation was done according to USEPA SW846 (SW846) methodologies and USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Inorganic Data Review (February 1994).

Chain-of custody forms and holding times were examined and determined to be acceptable. LCS and LCS duplicate recoveries were within the established method control limits. The LCS RPDs were within control limits. No target analytes were reported in any method blanks.

Savannah qualified the o,o,o-triethyl phosphorothioate results for DSN004 and DSN005. This was due to anomalies the laboratory detected during the analyses.

TABLE H-1
Groundwater Sampling QA/QC Results

Parameter	Units	OWR-02D	OWR-02D-Q	OWR-02D-F	OWR-02D-Q-F	OWR-08S	OWR-08S-Q	OWR-08S-F	OWR-08S-Q-F	WEL-04	WEL-04-Q	WEL-04-F	WEL-04-Q-F
Inorganic Indicators													
Alkalinity (to pH 4.5) as CaCO3	mg/L	120	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron, Ferrous (2+)	mg/L	< 0.10	< 0.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nitrate-N	mg/L	1.7 J	1.8 J	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Phenolics, Total Recoverables	mg/L	< 0.050	< 0.050	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Phosphorus, Total	mg/L	< 0.044	< 0.044	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Standard Plate Count	CFU/mL	720 J	520 J	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sulfate as SO4	mg/L	< 5.0	< 5.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sulfide	mg/L	< 0.10	< 0.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Dissolved Solids	mg/L	180 J	170 J	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Kjeldahl Nitrogen-N	mg/L	0.71 J	0.54 J	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Organic Carbon	mg/L	< 1.0	< 1.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Organic Halogen	mg/L	0.032	0.028 J	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Suspended Solids	mg/L	6.0 J	9.0 J	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Metals													
Arsenic	mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Barium	mg/L	0.029	0.034	0.017	0.016	0.24	0.24	0.19	0.23	0.074 J	0.01	0.012	0.011
Beryllium	mg/L	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
Cadmium	mg/L	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Chromium	mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.012	< 0.010	< 0.010	< 0.010
Cobalt	mg/L	< 0.010	< 0.010	< 0.010	< 0.010	0.029	0.030	0.024	0.028	0.012	< 0.010	< 0.010	< 0.010
Lead	mg/L	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.0060	0.027 J	0.045 J	0.016	< 0.0050	< 0.0050	< 0.0050
Manganese	mg/L	0.13	0.14	0.013	0.012 J	1.4	1.5	1.1 J	1.4 J	1.1	0.053	0.058	0.055
Mercury	mg/L	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	0.00033 J	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Nickel	mg/L	< 0.0040	< 0.0040	< 0.0040	< 0.0040	0.010	0.011	0.0091	0.010	0.025	< 0.0040	< 0.0040	< 0.0040
Vanadium	mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.027	< 0.010	< 0.010	< 0.010
Organophosphorus Pesticides													
Methyl parathion	µg/L	< 0.50	< 0.50	N/A	N/A	9.6	9.7	N/A	N/A	< 0.50	< 0.50	N/A	N/A
Parathion	µg/L	< 1.0	< 1.0	N/A	N/A	560	730	N/A	N/A	< 1.0	< 1.0	N/A	N/A
Tetraethyldithiopyrophosphate (Sulfotepp)	µg/L	< 0.50	< 0.50	N/A	N/A	1.8	1.9	N/A	N/A	< 0.50	< 0.50	N/A	N/A

N/A = Not Analyzed
Q = Field Duplicate
F = Filtered
J = Estimated Value

TABLE H-1
Groundwater Sampling QA/QC Results

Parameter	Units	OWR-02D	OWR-02D-Q	OWR-02D-F	OWR-02D-Q-F	OWR-08S	OWR-08S-Q	OWR-08S-F	OWR-08S-Q-F	WEL-04	WEL-04-Q	WEL-04-F	WEL-04-Q-F
PCBs													
Aroclor 1016	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	< 1.0	< 1.0	< 1.0	< 1.0
Aroclor 1221	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	< 1.0	< 1.0	< 1.0	< 1.0
Aroclor 1232	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	< 1.0	< 1.0	< 1.0	< 1.0
Aroclor 1242	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	< 1.0	< 1.0	< 1.0	< 1.0
Aroclor 1248	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	< 1.0	< 1.0	< 1.0	< 1.0
Aroclor 1254	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	< 1.0	< 1.0	< 1.0	< 1.0
Aroclor 1260	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	< 1.0	< 1.0	< 1.0	< 1.0
Total PCBs	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	< 1.0	< 1.0	< 1.0	< 1.0
SVOCs													
1,2-Dichlorobenzene	µg/L	< 10	< 10	N/A	N/A	< 40	< 40	N/A	N/A	< 10	< 10	N/A	N/A
1,4-Dichlorobenzene	µg/L	< 10	< 10	N/A	N/A	< 40	< 40	N/A	N/A	< 10	< 10	N/A	N/A
2,4,5-Trichlorophenol	µg/L	< 10	< 10	N/A	N/A	< 40	< 40	N/A	N/A	< 10	< 10	N/A	N/A
2,4,6-Trichlorophenol	µg/L	< 10	< 10	N/A	N/A	< 40	< 40	N/A	N/A	< 10	< 10	N/A	N/A
2,4-Dichlorophenol	µg/L	< 10	< 10	N/A	N/A	< 40	< 40	N/A	N/A	< 10	< 10	N/A	N/A
4-Nitrophenol	µg/L	< 50	< 50	N/A	N/A	390	340	N/A	N/A	< 50	< 50	N/A	N/A
o,o,o-Triethylphosphorothioate	µg/L	< 10	< 10	N/A	N/A	330	330	N/A	N/A	< 10	< 10	N/A	N/A
Pentachlorophenol	µg/L	< 1.0	< 1.0	N/A	N/A	1.2	< 1.0	N/A	N/A	< 1.0	< 1.0	N/A	N/A
Phenol	µg/L	< 10	< 10	N/A	N/A	< 40	< 40	N/A	N/A	< 10	< 10	N/A	N/A
VOCs													
1,1,2,2-Tetrachloroethane	µg/L	< 5.0	< 5.0	N/A	N/A	< 5.0	< 5.0	N/A	N/A	< 5.0	< 5.0	N/A	N/A
Chlorobenzene	µg/L	< 5.0	< 5.0	N/A	N/A	< 5.0	< 5.0	N/A	N/A	< 5.0	< 5.0	N/A	N/A
Isopropylbenzene	µg/L	< 5.0	< 5.0	N/A	N/A	< 5.0	< 5.0	N/A	N/A	< 5.0	< 5.0	N/A	N/A
Methylene chloride	µg/L	< 5.0	< 5.0	N/A	N/A	36	36	N/A	N/A	< 5.0	< 5.0	N/A	N/A

N/A = Not Analyzed
Q = Field Duplicate
F = Filtered
J = Estimated Value

TABLE H-2
Soil Sampling QA/QC Results

Parameter	Units	SSR-10	SSR-10-Q	SSR-15	SSR-15-Q	SSR-18	SSR-18-Q	SSR-22	SSR-22-Q
Inorganic Indicators									
Cation Exchange Capacity	meq/100g	15	17	N/A	N/A	N/A	N/A	N/A	N/A
Organic Carbon (Walkley-Black)	mg/kg	130	140	N/A	N/A	N/A	N/A	N/A	N/A
Petroleum Hydrocarbons	mg/kg	N/A	N/A	N/A	N/A	N/A	N/A	< 11	12
Sulfide, Acid Volatile	mg/kg	< 1.3	< 1.4	N/A	N/A	N/A	N/A	N/A	N/A
Total Organic Carbon	mg/kg	< 100	200	N/A	N/A	N/A	N/A	N/A	N/A
Metals									
Arsenic	mg/kg	6.8 J	9 J	7.2	8.2	33 J	19 J	N/A	N/A
Barium	mg/kg	25	21	36 J	28 J	55 J	30 J	N/A	N/A
Beryllium	mg/kg	1.5 J	1.9 J	0.62	< 0.53	< 0.51	< 0.52	N/A	N/A
Cadmium	mg/kg	< 0.59	< 0.61	< 0.55	< 0.53	< 0.51	< 0.52	N/A	N/A
Chromium	mg/kg	17 J	21 J	40	37	10 J	19 J	N/A	N/A
Cobalt	mg/kg	22 J	45 J	4.3	4	4.3 J	3.3 J	N/A	N/A
Lead	mg/kg	39 J	20 J	42	40	110 J	85 J	N/A	N/A
Manganese	mg/kg	680 J	1,100 J	100	120	370 J	270 J	N/A	N/A
Mercury	mg/kg	0.076 J	0.011 J	3.3 J	1.1 J	0.42 J	0.28 J	N/A	N/A
Nickel	mg/kg	17 J	26 J	8.6 J	6.7 J	11	13	N/A	N/A
Vanadium	mg/kg	55	67	52	47	15 J	9.7 J	N/A	N/A
Organophosphorus Pesticides									
Methyl parathion	mg/kg	< 0.022	< 0.023	< 0.020	< 0.020	0.10 J	0.10 J	N/A	N/A
Parathion	mg/kg	< 0.043	< 0.044	< 0.040	< 0.038	< 0.037	< 0.037	N/A	N/A
Tetraethyldithiopyrophosphate (Sulfotepp)	mg/kg	< 0.022	< 0.023	< 0.020	< 0.020	< 0.019	< 0.019	N/A	N/A

N/A = Not Analyzed
Q = Duplicate
J = Estimated Value

TABLE H-2
Soil Sampling QA/QC Results

Parameter	Units	SSR-10	SSR-10-Q	SSR-15	SSR-15-Q	SSR-18	SSR-18-Q	SSR-22	SSR-22-Q
PCBs									
Aroclor 1016	mg/kg	< 0.043	< 0.045	< 4	< 39	< 930	< 3,800	N/A	N/A
Aroclor 1221	mg/kg	< 0.043	< 0.045	< 4	< 39	< 930	< 3,800	N/A	N/A
Aroclor 1232	mg/kg	< 0.043	< 0.045	< 4 J	720	< 930	< 3,800	N/A	N/A
Aroclor 1242	mg/kg	0.059 J	0.045 J	46 J	< 39	< 930	< 3,800	N/A	N/A
Aroclor 1248	mg/kg	< 0.043	< 0.045	< 4	< 39	16,000 J	9,800 J	N/A	N/A
Aroclor 1254	mg/kg	0.028 J	0.02 J	12 J	97	< 930	< 3,800	N/A	N/A
Aroclor 1260	mg/kg	< 0.043	< 0.045	7.0 J	44	620 J	< 3,800 J	N/A	N/A
Total PCBs	mg/kg	0.087 J	0.065	65 J	860	17,000 J	9,800 J	N/A	N/A
SVOCs									
1,2-Dichlorobenzene	mg/kg	< 0.43	< 0.44	< 0.39	< 0.39	< 37	< 38	N/A	N/A
1,4-Dichlorobenzene	mg/kg	< 0.43	< 0.44	< 0.39	< 0.39	< 37	< 38	N/A	N/A
2,4,5-Trichlorophenol	mg/kg	< 0.43	< 0.44	< 0.39	< 0.39	< 37	< 38	N/A	N/A
2,4,6-Trichlorophenol	mg/kg	< 0.43	< 0.44	< 0.39	< 0.39	< 37	< 38	N/A	N/A
2,4-Dichlorophenol	mg/kg	< 0.43	< 0.44	< 0.39	< 0.39	< 37	< 38	N/A	N/A
4-Nitrophenol	mg/kg	< 2.2	< 2.3	< 2.0	< 2.0	< 190	< 190	N/A	N/A
o,o,o-Triethylphosphorothioate	mg/kg	< 0.43	< 0.44	< 0.39	< 0.39	< 37	< 38	N/A	N/A
Pentachlorophenol	mg/kg	< 2.2	< 2.3	< 2.0	< 2.0	< 190	< 190	N/A	N/A
Phenol	mg/kg	< 0.43	< 0.44	< 0.39	< 0.39	< 37	< 38	N/A	N/A
VOCs									
1,1,2,2-Tetrachloroethane	mg/kg	< 0.0057	< 0.0058	< 0.005	< 0.0048	< 0.0067	< 0.0049	N/A	N/A
Chlorobenzene	mg/kg	< 0.0057	< 0.0058	0.0088	0.017	< 0.0067	< 0.0049	N/A	N/A
Isopropylbenzene	mg/kg	< 0.0057	< 0.0058	< 0.005	< 0.0048	< 0.0067	< 0.0049	N/A	N/A
Methylene chloride	mg/kg	< 0.0057	< 0.0058	< 0.005	< 0.0048	< 0.0067	< 0.0049	N/A	N/A

N/A = Not Analyzed
Q = Duplicate
J = Estimated Value

REPORT ON

DATA VALIDATION REPORT
SUPPLEMENTAL RFI/CS INVESTIGATION SAMPLING
FIRST QUARTER, 2003
SOLUTIA, INC.
ANNISTON, ALABAMA FACILITY
CALHOUN COUNTY, ALABAMA

Submitted to:

Solutia, Inc.
702 Clydesdale Avenue
Anniston, Alabama 36201

DISTRIBUTION:

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DATA VALIDATION NARRATIVE

TABLE OF CONTENTS

1. INTRODUCTION

Soil samples were collected from various locations on the Solutia property in Anniston, Alabama in accordance with the *Supplemental RFI/CS Work Plan* (Golder, August 2002). Samples were collected at various times in January, February, and March 2003 and submitted to Severn Trent Laboratories, Inc. (STL) in Savannah, Georgia for analysis. Golder Associates Inc. (Golder) performed Level 2 and Level 4 validation of the laboratory analytical data in accordance with the USEPA Region IV Validation Standards Operating Procedures (SOPs) and the site-specific Quality Assurance Project Plan (QAPP). The sample points identification, list of analytical parameters, sampling dates, and Sample Delivery Groups (SDG) information for these samples are summarized in Table 1.

The soil samples were analyzed by the laboratory primarily for polychlorinated biphenyls (PCBs) in accordance with *SW-846 Test Methods for Evaluating Solid Waste, Method 8082, Final Update III* (December 1996). Some samples from SWMU-12 were analyzed for mercury using Method 7471. Samples from SWMU-42 were analyzed for polychlorinated dibenzofurans (PCDFs), in accordance with *SW-846 Test Methods for Evaluating Solid Waste, Method 8290, Final Update III* (December 1996). Groundwater samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), organophosphorus pesticides (OPP), PCBs, and metals. All analyses were performed in accordance with *SW-846 Test Methods for Evaluating Solid Waste, Final Update III* (December 1996). Table 1 references the methodologies utilized by STL.

Data validation of these data was performed in accordance with the *USEPA Region IV CLP RAS Validation SOP Revision 2.1,* (July 1999), as appropriate to the level of data validation required. If there was a conflict between the documents, the method-specific criteria were used. In general, soil samples, with the exception of samples for PCDF analysis underwent a Level 2 validation. PCDF soil data and groundwater data underwent a Level 4 validation.

Data qualifiers are defined in Table 2. Where quality control criteria were met, positive results were not qualified and non-detected results were qualified "U" signifying that the result is below the quantitation limit (organics) or detection limit (inorganics). Where quality control criteria were not achieved, the data were qualified as indicated in the following sections. Where more than one qualifier for a sample result was warranted, the most general qualifier was applied to the results.

Sections 2 through 7 summarize the specific instances where quality control criteria in the data validation guidelines were not met for these samples. As specified in the guidelines, if the non-adherence to quality control criteria is slight, qualification of data may not be warranted. However, if the non-adherence is significant, qualification and possible rejection of the data may be necessary.

2. VOLATILE ORGANIC COMPOUNDS

Samples were collected from five (5) groundwater monitoring well locations and analyzed for specific VOCs (1,1,2,2-tetrachlorethane, chlorobenzene, dichloromethane (methylene chloride), and isopropylbenzene). Additionally, a duplicate sample was collected from groundwater monitoring well OWR-13. Triple volumes were collected from well OWR-13 for Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis. One field blank, one equipment rinsate blank and two trip blanks were shipped along with the samples for VOC analysis. The types and number of samples collected for analysis and the parameters analyzed are summarized in Table 1. These samples were incorporated, by the laboratory, into Log-in Groups 80948, 81106, and 81017 and prepared and analyzed using SW846 methodologies. All samples were validated in accordance with the functional guidelines. Results of the validation are summarized below.

Data Quality Objectives

Precision: Goals for laboratory and field precision were met.

Accuracy: Goals for accuracy were met.

Sample Result Verification: All sample results were supported in the raw data. For sample OW-21R the data reported on the laboratory summary differed from that reported in the data package. The data summary and database were corrected to reflect this change.

Detection Limits: The detection limits for some of these analyses were raised due to elevated levels of non-target analytes.

Completeness: The data packages were complete for all requested analyses. The data packages contained six (6) groundwater samples that were validated in this data set. A total of 24 results for these samples were reported in which all were deemed valid. This resulted in a completeness of 100 % for groundwater VOC samples.

Major Quality Control Issues

There were no major QC issues that required rejection of the data.

Minor Quality Control Issues

There were no minor QC issues that required qualification of the data.

3. SEMIVOLATILE ORGANIC COMPOUNDS

Samples were collected from five (5) groundwater monitoring well locations and analyzed for specific SVOCs (1,2-dichlorobenzene, 1,4-dichlorobenzene, phenol, 2,4-dichlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 4-nitrophenol, pentachlorophenol, and O,O,O-triethyl phosphorothioate). Additionally, a duplicate sample was collected from groundwater monitoring well OWR-13. Triple volumes were collected from well OWR-13 for Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis. One field blank, and one equipment rinsate blank were shipped along with the samples for SVOC analysis. The types and number of samples collected for analysis and the parameters analyzed are summarized in Table 1. These samples were incorporated, by the laboratory, into Log-in Groups 80948, 81106, and 81017 and prepared and analyzed using SW846 methodologies. All samples were validated in accordance with the functional guidelines. Results of the validation are summarized below.

Data Quality Objectives

Precision: Goals for laboratory and field precision were met.

Accuracy: Goals for accuracy were met.

Sample Result Verification: All sample results were supported in the raw data except as follows. For sample OWR-11 the data reported on the laboratory summary showed a detection of phenol at 7.8 ug/l which was not reported in the data package. Since the data validator could not find evidence to support this result, the data summary and database were corrected to reflect that the compound was not detected.

Detection Limits: The detection limits for some of these analyses were raised due to elevated levels of target and non-target analytes.

Completeness: The data packages were complete for all requested analyses. The data packages contained six (6) groundwater samples that were validated in this data set. A total of 54 results for these samples were reported in which all were deemed valid. This resulted in a completeness of 100 % for groundwater SVOC samples.

Major Quality Control Issues

There were no major QC issues that required rejection of the data.

Minor Quality Control Issues

There were no minor QC issues that required qualification of the data.

4. ORGANOPHOSPHORUS PESTICIDES

Samples were collected from five (5) groundwater monitoring well locations and analyzed for specific OPPs (methyl parathion, sulfotepp (tetraethyldithiopyrophosphate), and ethyl parathion). Additionally, a duplicate sample was collected from groundwater monitoring well OWR-13. Triple volumes were collected from well OWR-13 for Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis. One field blank, and one equipment rinsate blank were shipped along with the samples for OPP analysis. The types and number of samples collected for analysis and the parameters analyzed are summarized in Table 1. These samples were incorporated, by the laboratory, into Log-in Groups 80948, 81106, and 81017 and prepared and analyzed using SW846 methodologies. All samples were validated in accordance with the functional guidelines. Results of the validation are summarized below.

Data Quality Objectives

Precision: Goals for laboratory and field precision were met.

Accuracy: Goals for accuracy were met.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limits for some of these analyses were raised due to elevated levels of target and non-target analytes.

Completeness: The data packages were complete for all requested analyses. The data packages contained six (6) groundwater samples that were validated in this data set. A total of 18 results for these samples were reported in which all were deemed valid. This resulted in a completeness of 100 % for groundwater OPP samples.

Major Quality Control Issues

There were no major QC issues that required rejection of the data.

Minor Quality Control Issues

The minor QC issues that required qualification of the data are identified below and summarized in Table 3.

Pesticides are analyzed on a gas chromatograph with two analytical columns to confirm any detection for target analytes. When the percent difference (%D) of the results on these two columns is greater than 25%, the quantification of the compound is questionable. Depending upon the degree to which the criterion is exceeded, the data may be qualified as estimated (J) or tentatively identified with and estimated value (JN). In addition, if the analytical result is reported as a value less than the reporting limit and the percent difference is greater than 75%, the result is changed to the CRQL and qualified as undetected (U). Percent differences were exceeded in a number of samples for reported detections of pesticides. Table 3 summarizes the qualifications that were made.

5. POLYCHLORINATED BIPHENYLS

Filtered and unfiltered samples were collected from five (5) groundwater monitoring well locations and analyzed for PCBs. Additionally, a duplicate sample was collected from groundwater monitoring well OWR-13. Triple volumes were collected from well OWR-13 for Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis. One field blank, and one equipment rinsate blank were shipped along with the groundwater samples for PCB analysis. These samples were incorporated, by the laboratory, into Log-in Groups 80948, 81106, and 81017 and prepared and analyzed using SW846 methodologies.

Samples were collected from eighteen (18) soil locations and analyzed for PCBs. Additionally, a duplicate sample was collected from location SWMU-12-24A. Additional volume was collected from location SWMU-12-24G for Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis. One equipment rinsate blank was shipped along with the groundwater samples for PCB analysis. These samples were incorporated, by the laboratory, into Log-in Groups 80597 and 81141 and prepared and analyzed using SW846 methodologies.

The types and number of samples collected for analysis and the parameters analyzed are summarized in Table 1. All samples were validated in accordance with the functional guidelines. Results of the validation are summarized below.

Data Quality Objectives

Precision: Goals for laboratory and field precision were met.

Accuracy: Goals for accuracy were met.

Sample Result Verification: All sample results were supported in the raw data. For sample OWR-11 the data reported on the laboratory summary differed from that reported in the data package. The data summary and database were corrected to reflect this change.

Detection Limits: The detection limits for some of these analyses were raised due to elevated levels of target and non-target analytes.

Completeness: The data packages were complete for all requested analyses. The data packages contained twelve (12) groundwater samples that were validated in this data set. A total of 96 results for these groundwater samples were reported in which all were deemed valid. This resulted in a completeness of 100 % for groundwater PCB samples. The data packages contained nineteen (19) soil samples that were validated in this data set. A total of 152 results for these soil samples were reported in which all were deemed valid. This resulted in a completeness of 100 % for soil PCB samples.

Major Quality Control Issues

There were no major QC issues that required rejection of the data.

Minor Quality Control Issues

The minor QC issues that required qualification of the data are identified below and summarized in Table 4.

Decachlorobiphenyl (DCB) is used as the surrogate for PCB analysis. However, from time to time, sample matrix interference may cause the surrogate recovery to either be elevated or not be determined at all. Consequently, it is difficult to properly evaluate the analytical performance of the method for the Aroclors that elute at higher retention times. If the DCB recovery was elevated due to matrix interference, positive results for Aroclor 1254, Aroclor 1260, and Aroclor 1268 were qualified as estimated values (J). If the DCB recovery could not be calculated, positive results for these three Aroclors were qualified as estimated values (J) while non-detected results were qualified as estimated quantitation limits (UJ). Table 4 summarizes the qualifications that were made.

6. METALS

Filtered and unfiltered samples were collected from five (5) groundwater monitoring well locations and analyzed for specific metals (arsenic, barium, beryllium, chromium, cobalt, lead, manganese, mercury, nickel, and vanadium). Additionally, a duplicate sample was collected from groundwater monitoring well OWR-13. Triple volumes were collected from well OWR-13 for Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis. One field blank, and one equipment rinsate blank were shipped along with the samples for metals analysis. These samples were incorporated, by the laboratory, into Log-in Groups 80948, 81106, and 81017 and prepared and analyzed using SW846 methodologies.

Samples were collected from two (2) soil locations and analyzed for mercury. Additional volume was collected from location SWMU-12-24G for Matrix Spike/Matrix Spike Duplicate (MS/MSD) analysis. One equipment rinsate blank was shipped along with the groundwater samples for mercury analysis. These samples were incorporated, by the laboratory, into Log-in Group 80597 and prepared and analyzed using SW846 methodologies.

The types and number of samples collected for analysis and the parameters analyzed are summarized in Table 1. All samples were validated in accordance with the functional guidelines. Results of the validation are summarized below.

Data Quality Objectives

Precision: Goals for laboratory and field precision were met.

Accuracy: Goals for accuracy were met.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limits for some of these analyses were raised due to elevated levels of target and non-target analytes.

Completeness: The data packages were complete for all requested analyses. The data packages contained twelve (12) groundwater samples that were validated in this data set. A total of 132 results for these samples were reported in which all were deemed valid. This resulted in a completeness of 100 % for groundwater metals samples. The data packages contained two (2) soil samples that were validated in this data set. A total of 2 results for these soil samples were reported in which all were deemed valid. This resulted in a completeness of 100 % for soil mercury samples.

Major Quality Control Issues

There were no major QC issues that required rejection of the data.

Minor Quality Control Issues

The minor QC issues that required qualification of the data are identified below and summarized in Table 5.

CRDL standards are used to ensure the accuracy of laboratory instruments at the lower end of the calibration range. The instrument must meet an 80-120% recovery (%R) of each analyte in the standard. There were various instances during the sample analysis where the laboratory did not meet the required %R for arsenic, lead, and cobalt. Positive cobalt results for samples that were analyzed before and after the affected standards were qualified as estimated values (J). Undetected lead results were qualified with estimated detection limits (UJ). Arsenic recoveries were elevated but since arsenic was not detected in any of the affected samples, the results did not warrant qualification.

ICP serial dilution is performed in order to determine the chemical or physical interferences that could effect the sample matrix. Percent difference (%D) is measured between the initial sample result and the serial dilution result for results greater than 50 times the instrument detection limit (IDL). If the %D is greater than 10%, the associated sample data is qualified as estimated values (J) for results greater than 10 times the IDL. Sample OWR-11 and OWR-11F were affected by ICP serial dilution being out of the determined control limits for nickel and beryllium for groundwater.

7. POLYCHLORINATED DIBENZOFURANS

Samples were collected from two (2) soil locations and analyzed for PCDFs. Additionally, a duplicate sample was collected from location SWMU-42. These samples were incorporated, by the laboratory, into Log-in Groups P2783 and prepared and analyzed using SW846 methodologies.

The types and number of samples collected for analysis and the parameters analyzed are summarized in Table 1. All samples were validated in accordance with the functional guidelines. Results of the validation are summarized below.

Data Quality Objectives

Precision: Goals for laboratory and field precision were met.

Accuracy: Goals for accuracy were met.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limits for some of these analyses were raised due to elevated levels of target and non-target analytes.

Completeness: The data packages were complete for all requested analyses. The data packages contained three (3) soil samples that were validated in this data set. A total of 30 results for these groundwater samples were reported in which all were deemed valid. This resulted in a completeness of 100 % for soil PCDF samples.

Major Quality Control Issues

There were no major QC issues that required rejection of the data.

Minor Quality Control Issues

There were no minor QC issues that required qualification of the data.

8. SUMMARY

Golder validated the First Quarter 2003 data collected in support of the Supplemental RCRA Facility Investigation in accordance with USEPA Region IV data validation guidelines, as applicable, and the criteria specified by the specific methods and the QAPP.

None of these data required rejection due to quality control criteria that were not achieved, and all the data was deemed usable in terms of the objectives of the analytical program. Some data were qualified due to minor non-conformance to the functional guidelines, however the data is deemed usable in terms of the objectives since the overall completeness for the analytical parameters was 100%. In those cases where a positive result was qualified as estimated, the analyte should be considered present. Similarly, a non-detected result which was qualified as an estimated quantitation/detection limit should be considered not present for the purposes of this study, although the limit itself may not be precise.

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REPORT ON

DATA VALIDATION FOR THE 2005 SAMPLING EVENT
SOLUTIA REMEDIAL INVESTIGATION
OPERABLE UNIT-3
ANNISTON FACILITY
CALHOUN COUNTY, ALABAMA

Submitted to:

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DATA VALIDATION FOR THE 2005 SAMPLING EVENT
SOLUTIA REMEDIAL INVESTIGATION
OPERABLE UNIT-3
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1.0 INTRODUCTION

Golder Associates Inc. (Golder Associates) validated the analytical data for the soil and groundwater samples associated with the Operable Unit No. 3 (OU-3) Remedial Investigations for the Solutia property in Anniston, Alabama. Golder Associates collected soil samples from June 1, 2005 through June 6, 2005 and on July 6, 2005. Golder Associates collected groundwater samples from June 28, 2005 through July 13, 2005. A total of thirty-eight groundwater samples and thirty-three soil samples were collected. Table 1 summarizes the samples collected for analysis. The samples were submitted to STL-Savannah of Savannah, Georgia (STL) and placed into sample delivery groups (SDGs) 680-5538-1, 680-5512-1, 680-5985-1, 680-5540-1, 680-5496-1, 680-5737-1, 680-4616, 680-4474-1, 680-5737-3 and 680-5534-1.

Specific samples were chosen for high resolution analysis of PCB Congeners using EPA method 1668A and for polychlorinated dibenzo dioxins and polychlorinated dibenzo furans (PCDD/PCDF) using SW846 method 8290. These samples were submitted to Alta Analytical Perspectives (Alta) for analysis. The samples chosen for these analyses are shown in Table 1.

Samples submitted to STL were analyzed using SW846 methodologies and analyzed for the Contract Laboratory Program (CLP) Target Compound List (TCL) volatile organic compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), TCL pesticides, polychlorinated biphenyls (PCBs), organophosphate pesticides (OPP) and Target Analyte List (TAL) inorganics. STL employed appropriate methods from Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd edition, Final Update III, December 1996 (and all current updates). Specific samples were analyzed for a subset of the TCL/TAL identified as potential constituents of concern (PCOC). The samples and the PCOCs are shown in Table 1.

Samples were collected in duplicate from six groundwater sampling locations and three soil sampling locations to evaluate field and laboratory precision. The laboratory used additional sample volumes for site-specific Matrix Spike/Matrix Spike Duplicate (MS/MSD) analyses. In addition, field blanks and equipment blanks were shipped along with the samples and analyzed to identify any potential sources of cross contamination.

The laboratory data were validated to prevent erroneous or otherwise unusable data, from entering the project record. Validation was performed on 100% of the data submitted by the laboratories. Data validation was performed in accordance with the national data validation guidelines specified below as well as the USEPA Region IV data validation SOPs, the Quality Assurance Project Plan (QAPP), and method-specific criteria.

- USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999.
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, February 1994.
- EPA Region III Interim Guidelines for the Validation of Data Generated Unsin Method 1668 PCB Congener Data, April 21, 2004
- Data Validation Standard Operating Procedures for Chlorinated Dioxin/ Furan by High Resolution Gas Chromatography/High Resolution Mass Spectrometry, May 2002

These documents are hereafter referred to as the "functional guidelines". If there was a conflict between the functional guidelines and the quality control criteria specified in the analytical method, the method-specific criteria were used.

Data qualifiers are defined in Table 2. Where quality control criteria were met, positive results were not qualified and non-detected results were qualified "U" signifying that the result is below the quantitation limit (organics) or detection limit (inorganics). There were several sample results qualified by the laboratory as estimated values (J) for analytes detected at concentrations less than the reporting limit. Where more than one qualifier for a sample result was warranted, the most general qualifier was applied to the results.

Sections 2 through 8 summarize the specific instances where quality control criteria in the functional guidelines were not met. Tables 3 through 9 list the specific samples for which qualification occurred. As specified in the functional guidelines, if the non-adherence to quality control criteria is slight, professional judgment was used in qualification of the data. However, if the non-adherence is significant, qualification and rejection of the data was necessary.

Following data validation, the qualified data were summarized in tables, which are included in the body of the main report.

2.0 VOLATILE ORGANIC COMPOUNDS

Seven groundwater samples were collected for analysis of PCOC VOCs[1]; ten groundwater samples and three soil samples were collected for TCL VOC analysis. In addition, two field duplicates, one field blank and two equipment blanks were shipped along with the samples for analysis. Table 1 summarizes the samples collected and the parameters analyzed. The samples were integrated by STL into SDGs 680-5512-1, 680-5985-1, 680-5540-1, 680-5496-1 and 680-5737-1 and were prepared and analyzed using EPA approved methodology. All samples were validated in accordance with the functional guidelines. Results of the validation are summarized below.

2.1 Data Quality Objectives

Precision: Goals for laboratory and field precision were generally met.

Accuracy: Goals for accuracy were generally met.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses, except where dilutions were required due to elevated levels of target analytes or matrix interference.

Completeness: The data packages were complete for all requested analyses. A total of 548 groundwater results were reported of which all were deemed valid. This results in a completeness of 100%. A total of 98 soil sample results were reported of 96 were deemed valid. This results in completeness 98%.

2.2 Major Deficiencies

Identified below are the major quality control deficiencies that required rejection of the data. Refer to Table 3 for the specific samples affected by each deficiency.

The Laboratory Control Sample (LCS) is used by the laboratory to assess analytical performance with respect to accuracy. The LCS is prepared by spiking known concentrations of target analytes into lab purified water. The accuracy of the analysis is measured based upon the recovery of the spiked analytes. The use of the LCS eliminates the problems associated with Matrix Spikes as the LCS matrix does not cause analytical interference. The recovery of 2-butanone from the soil LCS was less

[1] PCOC VOCs are chlorobenzene, methylene chloride, isopropylbenzene, 1,1,2,2-tetrachloroethane, 1,4-dichlorobenzene and 1,2-dichlorobenzene

than 30%. In accordance with the functional guidelines, if the %R is less than 30%, non-detected results are considered unusable (R).

2.3 Minor Deficiencies

Identified below are the minor quality control deficiencies that required qualification of the data. Refer to Table 3 for the specific samples affected by each deficiency.

Requirements for acceptable instrument calibration are established to ensure the instrument is capable of generating satisfactory data. The functional guidelines require that the percent difference (%D) between the initial calibration relative response factors (RRFs) and the continuing calibration RRFs be within +/- 20%. The %D for bromochloromethane, acetone and methyl acetate exceeded this criterion. In accordance with the functional guidelines, non-detected results were qualified with estimated reporting limits (UJ).

Field duplicates are collected at a frequency of one out of twenty samples per matrix. The sample results must agree within 50% of each other. The results for 1,2-dichlorobenzene and 1,2,4-trichlorobenzene for the groundwater field duplicate did not meet this criterion. Positive results for these compounds in the field duplicate pair were qualified as estimated values (J) and non-detected results were qualified with estimated reporting limits (UJ).

Holding times are the time frame under which samples are to be prepared and analyzed. Holding times are calculated from time of sample collection to time of preparation or analysis. Two groundwater samples were not analyzed within holding time. Positive results in these two samples were qualified as estimated values (J) and non-detected results were qualified with estimated reporting limits (UJ).

3.0 SEMI-VOLATILE ORGANIC COMPOUNDS

Eight groundwater samples were collected for PCOC SVOC[2] analysis; eleven groundwater samples and three soil samples were collected for TCL SVOC analysis. In addition, three field duplicate samples, one field blank and two equipment blanks were shipped along with the samples for analysis. Table 1 summarizes the samples collected and the parameters analyzed. The samples were integrated, by STL, into SDGs 680-5538-1, 680-5512-1, 680-5985-1, 680-5540-1, 680-5496-1, 680-5737-1 and 680-5737-3 and were prepared and analyzed using EPA approved methodology. All samples were validated in accordance with the functional guidelines. Results of the validation are summarized below.

The required detection limit for pentachlorophenol (PCP) is lower than the detection limit which the laboratory can achieve from a full-scan SVOC analysis. For samples in which PCP was reported as not detected, the samples were reanalyzed using selective ion monitoring (SW846 8270 SIM) in order to achieve the required detection limits.

3.1 Data Quality Objectives

Precision: Goals for laboratory and field precision were generally met.

Accuracy: Goals for accuracy were generally met.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses, except where dilutions were required due to elevated levels of target analytes or matrix interference.

Completeness: The data packages were complete for all requested analyses. A total of 696 groundwater results were reported of which 694 were deemed valid. This results in a completeness of 99.7% for groundwater samples. A total of 134 soil results were reported of which all were deemed valid. This results in a completeness of 100 % for soil samples.

3.2 Major Deficiencies

Identified below are the major quality control deficiencies that required rejection of the data. Refer to Table 4 for the specific samples affected by each deficiency.

[2] PCOC SVOCs are 2,4-dichlorophenol, 4-nitrophenol, pentachlorophenol, o,o,o-triethylphosphorothioate, 2,4,5-trichlorophenol and 2,4,6-trichlorophenol

The Laboratory Control Sample (LCS) is used by the laboratory to assess analytical performance with respect to accuracy. The LCS is prepared by spiking known concentrations of target analytes into lab purified water. The accuracy of the analysis is measured based upon the recovery of the spiked analytes. The use of the LCS eliminates the problems associated with Matrix Spikes as the LCS matrix does not cause analytical interference. The recoveries of two compounds from the LCS associated with sample T-1 were less than 30%. In accordance with the functional guidelines, if the %R is less than 30%, non-detected results for these compounds are considered unusable (R).

3.3 Minor Deficiencies

Identified below are the minor quality control deficiencies that required qualification of the data. Refer to Table 4 for the specific samples affected by each deficiency.

Surrogate analytes not commonly found in nature are added to every sample to assess method performance. These surrogates must recover within the laboratory specific QC limits. The criteria for surrogate recoveries were not achieved for various samples. In accordance with the functional guidelines, positive results in the associated samples were qualified as estimated values (J) and non-detected results were qualified with estimated reporting limits (UJ).

A known quantity of internal standard compounds is added to every primary and QA/QC sample. The method requires that the area count for the internal standard be within -50% to +100% of the area for the corresponding internal standard in the daily calibration confirmation standard. The recovery of one or more internal standards associated with several compounds exceeded the upper control limits for sample OWR-15D. In accordance with the functional guidelines, positive results quantitated with the affected internal standards were qualified as estimated values (J) and non-detected results were qualified with estimated reporting limits (UJ).

The Laboratory Control Sample (LCS) is used by the laboratory to assess analytical performance with respect to accuracy. The LCS is prepared by spiking known concentrations of target analytes into lab purified water. The accuracy of the analysis is measured based upon the recovery of the spiked analytes. The use of the LCS eliminates the problems associated with Matrix Spikes as the LCS matrix does not cause analytical interference. The recoveries of several compounds from the LCS associated with sample T-1 were less than the lower control limit. In accordance with the functional guidelines, if the %R is less than the QC criteria, non-detected results are qualified with estimated reporting limits (UJ).

Requirements for acceptable instrument calibration are established to ensure the instrument is capable of generating satisfactory data. The functional guidelines require that the percent difference (%D) between the initial calibration relative response factors (RRFs) and the continuing calibration RRFs be within ±20%. The %D for various compounds exceeded this criterion for the calibrations associated with soil samples. In accordance with the functional guidelines, the non-detected results were qualified with estimated reporting limits (UJ).

Spectral criteria were not achieved for bis(2-ethylhexyl)phthalate in sample SSRI-11-06. Based upon professional judgment of the data validation specialist, because the criteria was largely met with some smaller ions missing in the sample spectra or a disparity in ion ratios, the result was qualified as JN indicating that the compound was tentatively identified and the reported result should be considered an estimated value.

4.0 PESTICIDES/PCBs

Thirty-seven groundwater samples and thirty soil samples were collected for analysis of PCBs including Aroclor 1268. Ten groundwater samples and three soil samples were collected for TCL Pesticide analysis. Six groundwater and three soil field duplicates were also collected. In addition, one field blank and four equipment blanks were shipped along with the samples for TCL Pesticide/PCB analysis. Table 1 summarizes the samples collected and the parameters analyzed. The samples were integrated, by STL, into SDG 680-5538-1, 680-5512-1, 680-5985-1, 680-5540-1, 680-5496-1, 680-4474-1, 680-4616-1 and 680-5737-1 and were prepared and analyzed using EPA approved methodology. All samples were validated in accordance with the functional guidelines. Results of the validation are summarized below.

4.1 Data Quality Objectives

Precision: Goals for laboratory and field precision were generally met.

Accuracy: Goals for accuracy were generally met.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses, except where dilutions were required due to elevated levels of target analytes or matrix interference.

Completeness: The data packages were complete for all requested analyses. A total of 430 groundwater results were reported of which all were deemed valid. This results in a completeness of 100%. A total of 298 soil sample results were reported of which all were deemed valid. This results in a completeness of 100%.

4.2 Major Deficiencies

There were no major deficiencies that required rejection of data.

4.3 Minor Deficiencies

Identified below are the minor quality control deficiencies that required qualification of the data. Refer to Table 5 for the specific samples affected by each deficiency.

Pesticides and PCBs are analyzed on a gas chromatograph with two dissimilar analytical columns to confirm any detection for target analytes. If the %D is greater than 25% but less than 70%, qualification of the data is required. This criterion was not achieved for several compounds. In accordance with the functional guidelines, positive results in the affected samples were qualified as estimated values (J).

Surrogate analytes not commonly found in nature are added to every sample to assess method performance. These surrogates must recover within the laboratory specific QC limits. The criteria for surrogate recoveries were not achieved for various samples. In accordance with the functional guidelines, positive results in the associated samples were qualified as estimated values (J) and non-detected results were qualified with estimated reporting limits (UJ).

The Laboratory Control Sample (LCS) is used by the laboratory to assess analytical performance with respect to accuracy. The LCS is prepared by spiking known concentrations of target analytes into lab purified water. The accuracy of the analysis is measured based upon the recovery of the spiked analytes. The use of the LCS eliminates the problems associated with Matrix Spikes as the LCS matrix does not cause analytical interference. The recovery of heptachlor epoxide from the LCS associated with sample T-1 was less than the lower control limit. In accordance with the functional guidelines, if the %R is less than the QC criteria, non-detected results in the associated samples are qualified with estimated reporting limits (UJ).

Requirements for acceptable instrument calibration are established to ensure the instrument is capable of generating satisfactory data. The functional guidelines require that the percent difference (%D) between the initial calibration relative response factors (RRFs) and the continuing calibration RRFs be within $\pm$15%. The %D for endrin aldehyde in the calibration associated with soil sample SSRI-04-06 exceeded this criterion. In accordance with the functional guidelines, the non-detected result was qualified with an estimated reporting limit (UJ).

For several samples, the presence of PCBs caused peaks to be present within the retention time windows of some of the single component pesticides. Review of the raw data and chromatograms indicate that these pesticides are not actually present in these samples. The positive results reported by the laboratory for these samples were changed to non-detect (U) based upon the professional judgment of the data validation specialist.

Aroclor 1232 was reported as a detection in sample OW-16A. Review of the raw data and chromatograms indicate that the peaks are part of a sample matrix interference and do not really meet the pattern for identification. The positive result reported by the laboratory for this sample was changed to non-detect (U) based upon the professional judgment of the data validation specialist.

For several samples, the presence of PCBs caused interference within the retention time windows of some of the single component pesticides. Review of the raw data and chromatograms indicate that these pesticides may be present in these samples. Based upon the professional judgment of the data validation specialist, these results were qualified as JN indicating that the compounds were tentatively identified and the reported results should be considered estimated values.

Review of the raw data for sample OW-16-F indicated that the pattern identified as Aroclor 1221 may have been misidentified and that the PCB pattern appeared weathered. Based upon the professional judgment of the data validation specialist, this result was qualified as JN indicating that the compound was tentatively identified and the reported result should be considered an estimated value.

5.0 ORGANOPHOSPHORUS PESTICIDES (OPP)

Nineteen groundwater samples and three soil samples were collected for analysis of organophosphorus pesticides (OPP). In addition, two field duplicate samples, two equipment blanks and one field blank were shipped along with the samples for OPP analysis. Table 1 summarizes the samples collected and the parameters analyzed. The samples were integrated, by STL, into SDGs 680-5538-1, 680-5512-1, 680-5496-1, 680-5985-1, 680-5737-1 and 680-5534-1 and were prepared and analyzed using EPA approved methodology. All samples were validated in accordance with the functional guidelines. Results of the validation are summarized below.

5.1 Data Quality Objectives

Precision: Goals for laboratory and field precision were generally met.

Accuracy: Goals for accuracy were generally met.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses, except where dilutions were required due to elevated levels of target analytes or matrix interference.

Completeness: The data packages were complete for all requested analyses. A total of 52 groundwater results were reported of which all were deemed valid. This results in a completeness of 100%. A total of 9 soil sample results were reported of which all were deemed valid. This results in a completeness of 100%.

5.2 Major Deficiencies

There were no major deficiencies with the sample analyses to warrant rejection of data.

5.3 Minor Deficiencies

Identified below are the minor quality control deficiencies that required qualification of the data. Refer to Table 6 for the specific samples affected by each deficiency.

Holding times are the time frame under which samples are to be prepared and analyzed. Holding times are calculated from time of sample collection to time of preparation or analysis. Several samples were not extracted within holding time. Additionally, MW-07 was re-extracted outside of holding time for ethyl parathion. In the affected samples, positive results are qualified as estimated values (J) and non-detected results are qualified with estimated reporting limits (UJ).

An LCS is a low concentration water blank generated by the laboratory to determine the accuracy of the analytical method and the performance of the laboratory. The %R is measured and must meet established QC limits. The recoveries of several compounds from the LCS associated with groundwater samples and soil samples were less than the lower control limit. In accordance with the functional guidelines, if the %R is less than the QC criteria, non-detected results are qualified with estimated reporting limits (UJ).

OPPs are analyzed on a gas chromatograph with two dissimilar analytical columns to confirm any detection for target analytes. If the %D of the results on these two columns is greater than 25% but less than 100%, the quantification of the compound is questionable. This criterion was not achieved for methyl parathion for OW-16A. In accordance with the functional guidelines, the positive result was qualified as an estimated value (J). For sample T-4, the %D for methyl parathion exceeded 100%. In accordance with the functional guideline the non-detected result was qualified with estimated reporting limit (UJ).

6.0 TAL METALS

Fourteen groundwater samples were collected for PCOC[3] Metals; two groundwater samples were collected for Cobalt analysis; twenty groundwater samples and three soil samples were collected for TAL Metals analysis. In addition to the TAL Metals analysis, TAL Cyanide was performed on the soil samples and ten of the groundwater samples. Five field duplicate samples, one field blank and three equipment blanks were shipped along with the samples for analysis. Table 1 summarizes the samples collected and the parameters analyzed. The samples were integrated, by STL, into SDGs 680-5538-1, 680-5512-1, 680-5985-1, 680-5540-1, 680-5496-1 and 680-5737-1 and were prepared and analyzed using EPA approved methodologies. All samples were validated in accordance with the functional guidelines. Results of the validation are summarized below.

6.1 Data Quality Objectives

Precision: Goals for laboratory and field precision were generally met.

Accuracy: Goals for accuracy were generally met.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses, except where dilutions were required due to elevated levels of target analytes or matrix interference.

Completeness: The data packages were complete for all requested analyses. A total of 592 groundwater results were reported of which all were deemed valid. This results in a completeness of 100%. A total of 44 soil results were reported of which all were deemed valid. This results in a completeness of 100%.

6.2 Major Deficiencies

There were no major deficiencies with the sample analyses to warrant rejection of data.

6.3 Minor Deficiencies

Identified below are the minor quality control deficiencies that required qualification of the data. Refer to Table 7 for the specific samples affected by each deficiency.

Laboratory method blanks, preparation blanks and rinsate blanks are evaluated to determine target analyte contamination. Several analytes were detected in various blanks associated with

[3] PCOC Metals are arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, vanadium and mercury.

these samples. An action level of 5 times the highest concentration found in the associated blank was calculated to assess potential contamination. Concentrations of these contaminants below the respective action levels were deemed suspect and considered not present in the samples. Consequently, the results were changed to reflect the reporting limit and qualified as not detected (U). If the analyte was detected as a positive result above the action limit, no qualification was warranted. However, if the analyte concentration approximated that of the action level, the positive results for those analytes were qualified as estimated values (J) based upon professional judgment.

7.0 PCB Congeners

Ten groundwater samples and three soil samples were collected for analysis of PCB congeners. In addition, one aqueous field duplicate sample and one equipment blank were shipped along with the samples for congner analysis. Table 1 summarizes the samples collected and the parameters analyzed. The samples were integrated, by Alta, into SDGs P5568, P5590, P5591, and P5612 and were prepared and analyzed using EPA approved methodology. All samples were validated in accordance with functional guidelines and method specific criteria. Results of the validation are summarized below.

7.1 Data Quality Objectives

Precision: Goals for laboratory and field precision were generally met.

Accuracy: Goals for accuracy were generally met, except where significant dilutions caused no recovery of spikes.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses, except where dilutions were required due to elevated levels of target analytes or matrix interference.

Completeness: The data packages were complete for all requested analyses. All of the reported groundwater results were deemed valid resulting in a completeness of 100%. All of the reported soil sample results were deemed valid resulting in a completeness of 100%.

7.2 Major Deficiencies

There were no major deficiencies with the sample analyses to warrant rejection of data.

7.3 Minor Deficiencies

Identified below are the minor quality control deficiencies that required qualification of the data. Refer to Table 8 for the specific samples affected by each deficiency.

The soil samples and the majority of the groundwater samples from this Site contained PCBs in excess of the typical analytical and calibration ranges of Method 1668A. As a result of the PCB content of the samples, the laboratory was required to perform significant dilutions of the samples. Because the laboratory uses the isotope dilution technique for 1668A analysis, the isotope solution was used for these dilutions. Quantitation was performed using the recoveries of the carbon-13 labeled congeners. Based upon the professional judgment of the data validation specialist, the dilution of these samples caused uncertainty in the quantitation of the PCB congeners for all of the samples. As a result of this uncertainty, the data validation specialist qualified positive results as estimated values (J) and undetected results with estimated reporting limits (UJ).

8.0 PCDD/PCDF

Ten groundwater samples and three soil samples were collected for analysis of PCDD/PCDF. In addition, one aqueous field duplicate sample and one equipment blank were shipped along with the samples for congner analysis. Table 1 summarizes the samples collected and the parameters analyzed. The samples were integrated, by Alta, into SDGs P5568, P5590, P5591, and P5612 and were prepared and analyzed using EPA approved methodology. All samples were validated in accordance with functional guidelines and method specific criteria. Results of the validation are summarized below.

8.1 Data Quality Objectives

Precision: Goals for laboratory and field precision were generally met.

Accuracy: Goals for accuracy were generally met.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: The detection limit goals were achieved for all analyses, except where dilutions were required due to elevated levels of target analytes or matrix interference.

Completeness: The data packages were complete for all requested analyses. All of the reported groundwater results were deemed valid resulting in a completeness of 100%. All of the reported soil sample results were deemed valid resulting in a completeness of 100%.

8.2 Major Deficiencies

There were no major deficiencies with the sample analyses to warrant rejection of data.

8.3 Minor Deficiencies

Identified below are the minor quality control deficiencies that required qualification of the data. Refer to Table 9 for the specific samples affected by each deficiency.

For the soil samples, the laboratory reported estimated possible maximum concentrations (EMPCs) for several 2,3,7,8-substituted PCDDs. And EMPC is calculated and reported by the laboratory when a PCDD or PCDF has a response with a signal to noise (S/N) ratio of at least 2.5 and meets all the identification criteria with the exception of ion abundance ratio. These data are reported by the laboratory as a non-detect using the EMPC as the reporting limit. Using professional judgment, the data validation specialist has qualified these EMPCs as estimated reporting limits (UJ) as they are based upon a calculated S/N ratio.

Sample SSRI-04-06 exhibited matrix interference within the retention time windows for the penta CDDs and penta CDFs (PeCDDs/PeCDFs). This interference caused uncertainty in the quantitation of the PeCDDs and PeCDFs and poor resolution of individual isomers. Based upon professional judgment, the data validation specialist qualified these results as estimated values (J). Consequently the results for Total PeCDDs and Total PeCDFs are qualified as estimated values (J).

9.0 SUMMARY

Golder Associates validated the data collected during the OU-3 RI sampling event from the Solutia property in Anniston, Alabama in accordance with USEPA National and Regional data validation guidelines.

Although some data required qualification due to quality control criteria that were not achieved, the majority of the data was deemed usable in terms of the objectives of the investigation. Where a positive result was qualified as estimated, the analyte should be considered present. Similarly, a non-detected result, which was qualified as an estimated reporting limit, should be considered not present for the purposes of this program, although the limit itself may not be precise. Rejected data that were assigned the "R" qualifier should not be used. These rejected data have been included in the reporting tables only for the purpose of completeness. The completeness for the entire data set was 99.9%.

GOLDER ASSOCIATES INC.

Kim Godfrey

Kim Godfrey
Staff Scientist

Lori Anne Hendel

Lori Anne Hendel, CHMM
Senior Consultant / Senior Reviewer

G:\Projects\943\943-3680\-RFI\OU-3 RI Sampling Summer 2005\Data Validation\GW June 2005\narr 1205.doc

APPENDIX G

ANALYTICAL DATA VALIDATION SUMMARY

In accordance with the Operable Unit 3 Field Sampling Plan (OU 3 FSP) Addendum No. 1 - Revised, dated August 14, 2006, Solutia installed and collected samples from two (2) temporary shallow bedrock monitoring wells at its facility in Anniston, Alabama. The samples were submitted to STL-Savannah for the analysis of Aroclors using EPA Method 8082 and Polychlorinated Biphenyl (PCB) Homolog analysis using EPA Method 680. Samples were also collected using 1.0-micron filters for analysis by both methods. The groundwater laboratory results were validated to determine the following:

- if proper chain-of-custody was maintained;
- if proper methods were used;
- if holding times were met;
- if proper detection limits were achieved;
- if method blanks, and/or equipment blanks indicated any contamination;
- if relative percent differences (RPDs) between a sample and its field duplicate were within control limits;
- if surrogate recoveries were within method established control limits;
- if any matrix interference was evident; and
- if laboratory control samples (LCS), LCS duplicate recoveries and RPDs were within control limits.

The data validation was done according to USEPA SW846 (SW846) methodologies and USEPA Region IV Contract Laboratory Program (CLP) Routine Analytical Services (RAS) Standard Operating Procedure (SOP), Revision 2.1 (July 1999), and professional judgment.

Chain-of custody forms and holding times were examined and determined to be acceptable. Holding times were met for all analyses.

Required detection limits were achieved for the majority of the parameters and samples. For Homolog analysis, the laboratory reported the results using their established method detection limits (MDLs), as the reporting limits (RLs) specified by the Quality Assurance Project Plan (QAPP) were lower than the laboratory-established RLs. The detection limits for nonachlorobiphenyl and decachlorobiphenyl in all samples were slightly higher than the QAPP RLs and were the lowest detection limits that could be achieved by the laboratory.

Equipment blanks were collected to ensure constituents of concern were not introduced to samples in the field. Equipment blanks were collected using the same equipment used for sampling the wells. Target analytes were not reported in any method blanks or equipment blanks.

Prior to sample preparation, samples are spiked with surrogate compounds by the laboratory to monitor the laboratory's analytical performance on individual samples. All surrogate recoveries for Aroclor and Homolog analyses were within the established control limits for all samples.

The laboratory analyzes a Laboratory Control Sample (LCS) to verify that the laboratory can recover the analytes of interest when no matrix effect occurs. The Aroclor LCS results were within established control limits. The LCS recovery for monochlorobiphenyl was greater than the upper control limit established by the laboratory. Positive results for monochlorobiphenyl were qualified as estimated values (J) and non-detected results did not require qualification.

Matrix Spikes are analyzed to verify that the matrix does not cause interference with recovering the analytes of interest. Matrix spike results were acceptable for both Aroclor and Homolog analyses.

Duplicate sample analysis verifies the laboratory and field precision at the time of analysis. The relative percent difference between the sample and its duplicate should be within a control limit of 25%. Duplicate samples were collected at T-06 (DUP-01) to represent samples from the bedrock well monitoring program. This criterion was achieved for all analyses.

APPENDIX F

DATA VALIDATION SUMMARY

The soil and groundwater laboratory results associated with the additional well installation for Operable Unit 1/Operable Unit 2 (OU-1/OU-2) at the Anniston Site were validated to determine the following:

- if proper chain-of-custody was maintained;
- if proper methods were used;
- if holding times were met;
- if proper detection limits were achieved;
- if any blanks indicated contamination;
- if surrogate recoveries were within method established control limits;
- if laboratory control samples and duplicates (LCS/LCSD) and relative percent differences (RPDs) were within control limits;
- if matrix spike control samples and duplicates (MS/MSD) and RPDs were within control limits; and
- if RPDs between a sample and its field duplicate were within control limits.

The data validation was performed according to USEPA SW846 (SW846) methodologies and USEPA Region IV Contract Laboratory Program (CLP) Routine Analytical Services (RAS) Standard Operating Procedure (SOP), Revision 2.1 (July 1999), and professional judgment. In accordance with Revision 4 of the Site-Wide Quality Assurance Plan for the Anniston PCB Site (Site-Wide QAPP) (BBL, 2007), all of the data underwent Level II validation and Level IV validation was performed on approximately 5% of the analytical data.

Chain-of-custody forms and holding times were examined and determined to be acceptable. Soil samples were analyzed for polychlorinated biphenyls (PCBs) as Aroclors and as Homologs. Groundwater samples were analyzed for PCB Aroclors and Homologs as well as para-nitrophenol (PNP) and parathion in select wells. Appropriate analytical methods were used for analysis of these samples and appropriate detection levels were achieved except where samples required dilution due to the presence of target analytes.

Laboratory method blanks and equipment blanks were evaluated for target compound contamination. While a low concentration of monochlorobiphenyl was reported in the equipment blank, none of the sample data required qualification. No other constituents were detected in any of the blanks.

Prior to sample preparation, samples are spiked with surrogate compounds by the laboratory to monitor the laboratories analytical performance on individual samples. The surrogate recoveries for the PCB Aroclor analysis associated with several samples in SDG 680-35352, 680-35474 and 680-35931 and for the PCB homolog analysis of one sample were outside established control limits. The associated detects were qualified as estimated values (J) and non-detected results were qualified with estimated reporting limits (UJ).

Sample	Parameters	Qualifiers
Soil		
T-12 4-6’	PCB-1254, PCB-1260, PCB-1268	J
T-09 8-10’	PCB-1254	J
T-09 4-6’	PCB-1268	J
T-09 4-6’ DUP	PCB-1254, PCB-1268	J
T-08 10-12’	PCB-1248, PCB-1254, PCB-1260, PCB-1268	J
T-12 10-12’	PCB-1254, PCB-1260, PCB-1268	J
T-11 6-8’	PCB-1254, PCB-1260	J
Groundwater		
T-12 F-2	PCB-1016, PCB-1221, PCB-1232, PCB-1242, PCB-1248, PCB-1254, PCB-1260, PCB-1268	UJ
T-12	All homolog parameters	UJ

The laboratory control sample (LCS) and lab control duplicate (LCSD) analyses are performed to verify the effect that the laboratory analytical technique has on the precision and accuracy of the method and to verify the laboratories precision and accuracy in recovery of the target analyte during analysis. The LCS/LCSD recoveries and RPDs were within control limits for these analyses.

The MS and MSD analyses are performed to verify the effect the sample matrix has on the precision and accuracy of the method and to verify the laboratories precision and accuracy in recovery of the target analyte during analysis. The MS/MSD recoveries for Parathion associated with SDG 680-35931 were less than the lower control limits. In accordance with the functional guidelines, since the percent recovery was less than the lower control limit, the non-detected result for sample T-09 was qualified as an estimated reporting limit (UJ).

PCBs are analyzed as Aroclors with a gas chromatograph with two dissimilar analytical columns to confirm any detection for target analytes. When the percent difference (%D) of the results on these two columns is greater than 25% but less than 100%, the quantification of the compound is questionable. When the %D is greater than 25% but less than 70%, the data are qualified as estimated values (J). In accordance with the functional guidelines, detected results for samples T-08 6-8, T-09 4-6, T-09 4-6 DUP associated with SDG 680-35352 and sample T-11 4-6' associated with SDG 680-35474 were qualified as estimated values (J). Upon review of chromatograms for soil sample T-09 8-10' in SDG 680-35352, the pattern for PCB-1254 was present but the %D exceeds 100%. Using professional judgment, the result was qualified as tentatively identified at an estimated value (JN).

Duplicate sample analysis verifies the laboratory and field precision at the time of analysis. The sample results for water samples must agree within 40% and soil samples must agree within 50% of each other. This criterion was not achieved for the soil field duplicates associated with the PCB Aroclor and Homolog analyses in SDG 680-35352. Detected results were qualified as estimated values (J) and non-detected results were qualified with estimated reporting limits (UJ).

Golder Associates validated 100% of the analytical data associated with the OU-2 well installation soil and groundwater samples collected from the Solutia Site. Although some data required qualification due to minor quality control criteria that were not achieved, the data were deemed usable in terms of the objectives of the monitoring program. Where a positive result was qualified as estimated, the analyte should be considered present. Similarly, a non-detected result, which was qualified as an estimated quantitation/detection limit, should be considered not present for the purposes of this program, although the limit itself may not be precise. The overall completeness for the data from this sampling event was 100%.

GOLDER ASSOCIATES INC.

Kim Godfrey

Kim Godfrey
Environmental Staff Scientist

Lori Anne Hendel

Lori Anne Hendel, CHMM
Senior Chemist and Quality Assurance Manager

APPENDIX I

POTW Constituents and Analytical Results

PART I

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to introduce industrial wastes into the POTW from the following outfall(s):

DSN002S: Treated process wastewater and groundwater from chemical manufacturing operations, non-contact cooling water and steam condensate.

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	UNITS	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS 1/	
		Daily Minimum	Daily Maximum	Monthly Average	Measurement Frequency	Sample Type
Flow	MGD	-	Monitor	Monitor	Continuous	totalizer
pH	s.u.	5.0	10.5	-	Daily	recorder 3/
Biochemical Oxygen Demand, 5-day	mg/l	-	Monitor	Monitor	5/week	composite
Total Suspended Solids	mg/l	-	Monitor	Monitor	5/week	composite
Chemical Oxygen Demand	mg/l	-	Monitor	Monitor	5/week	composite
Acenaphthene	ppd	-	0.0118	0.0048	1/6 months	grab
Anthracene	ppd	-	0.0118	0.0048	1/6 months	grab
Benzene	ppd	-	0.0335	0.0143	1/6 months	grab
Bis (2-Ethylhexyl) phthalate	ppd	-	0.0646	0.0238	1/6 months	grab
Carbon Tetrachloride	ppd	-	0.0951	0.0355	1/6 months	grab
Chlorobenzene	ppd	-	0.0951	0.0355	1/6 months	grab
Chloroethane	ppd	-	0.0738	0.0275	1/6 months	grab
Chloroform	ppd	-	0.0813	0.0278	1/6 months	grab
Di-N-Butyl Phthalate	ppd	-	0.0108	0.0050	1/6 months	grab
1,2-Dichlorobenzene	ppd	-	0.1987	0.0490	1/6 months	grab
1,3-Dichlorobenzene	ppd	-	0.0951	0.0355	1/6 months	grab
1,4-Dichlorobenzene	ppd	-	0.0951	0.0355	1/6 months	grab
1,1-Dichloroethane	ppd	-	0.0148	0.0055	1/6 months	grab

1/ Samples collected to comply with the monitoring requirements specified above shall be collected at the following location: At the nearest accessible location just prior to discharge and after final treatment. Unless otherwise specified, composite samples shall be time composite samples collected using automatic sampling equipment or a minimum of eight (8) equal volume grab samples collected over equal time intervals. All composite samples shall be collected for the total period of discharge not to exceed 24 hours.

2/ If only one sampling event occurs during a month, the sample result shall be reported on the discharge monitoring report as both the monthly average and daily maximum value for all parameters with a monthly average limitation.

PART I

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to introduce industrial wastes into the POTW from the following outfall(s):

DSN002S: Treated process wastewater and groundwater from chemical manufacturing operations, non-contact cooling water and steam condensate.

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	UNITS	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS 1/	
		Daily Minimum	Daily Maximum	Monthly Average	Measurement Frequency	Sample Type
1,2-Dichlorethane	ppd	-	0.1436	0.0450	1/6 months	grab
1,1-Dichloroethylene	ppd	-	0.0150	0.0055	1/6 months	grab
1,2-Trans-Dichloroethylene	ppd	-	0.0165	0.0063	1/6 months	grab
1,2-Dichlorcpropane	ppd	-	0.1987	0.0490	1/6 months	grab
1,3-Dichloropropylene	ppd	-	0.1987	0.0490	1/6 months	grab
Diethyl Phthalate	ppd	-	0.0283	0.0115	1/6 months	grab
Dimethyl Phthalate	ppd	-	0.0118	0.0048	1/6 months	grab
4,6-Dinitro-O-Cresol	ppd	-	0.0693	0.0195	1/6 months	grab
Ethylbenzene	ppd	-	0.0951	0.0355	1/6 months	grab
Flouranthene	ppd	-	0.0135	0.0055	1/6 months	grab
Flourene	ppd	-	0.0118	0.0048	1/6 months	grab
Hexachlorobenzene	ppd	-	0.0060	0.0030	1/6 months	grab
Hexachorobutadiene	ppd	-	0.0951	0.0355	1/6 months	grab
Hexachloroethane	ppd	-	0.1987	0.0490	1/6 months	grab
Methyl Chloride	ppd	-	0.0738	0.0275	1/6 months	grab

1/ Samples collected to comply with the monitoring requirements specified above shall be collected at the following location: At the nearest accessible location just prior to discharge and after final treatment. Unless otherwise specified, composite samples shall be time composite samples collected using automatic sampling equipment or a minimum of eight (8) equal volume grab samples collected over equal time intervals. All composite samples shall be collected for the total period of discharge not to exceed 24 hours.

2/ If only one sampling event occurs during a month, the sample result shall be reported on the discharge monitoring report as both the monthly average and daily maximum value for all parameters with a monthly average limitation.

☑004

SOLUTIA

06/12/2008 09:00 FAX 256 231 8451

PART I

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to introduce industrial wastes into the POTW from the following outfall(s):

DSN002S: Treated process wastewater and groundwater from chemical manufacturing operations, non-contact cooling water and steam condensate.

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	UNITS	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS 1/	
		Daily Minimum	Daily Maximum	Monthly Average	Measurement Frequency	Sample Type
Methylene Chloride	ppd	-	0.0425	0.0090	1/6 months	grab
Naphthalene	ppd	-	0.0118	0.0048	1/6 months	grab
Nitrobenzene	ppd	-	1.6018	0.5597	1/6 months	grab
2-Nitrophenol	ppd	-	0.0578	0.0163	1/6 months	grab
4-Nitrophenol	ppd	-	0.1441	0.0405	1/6 months	grab
Phenanthrene	ppd	-	0.0118	0.0048	1/6 months	grab
Pyrene	ppd	-	0.0120	0.0050	1/6 months	grab
Tetrachloroethylene	ppd	-	0.0410	0.0130	1/6 months	grab
Toluene	ppd	-	0.0185	0.0070	1/6 months	grab
Total Cyanide	ppd	-	0.3002	0.1051	1/6 months	grab
Total Lead	ppd	-	0.1726	0.0801	1/6 months	grab
Total Zinc	ppd	-	0.6543	0.2627	1/6 months	grab
1,2,4-Trichlorobenzene	ppd	-	0.1987	0.0490	1/6 months	grab
1,1,1-Trichloroethane	ppd	-	0.0148	0.0055	1/6 months	grab
1,1,2-Thrichloroethane	ppd	-	0.0318	0.0080	1/6 months	grab
Trichloroethylene	ppd	-	0.0173	0.0065	1/6 months	grab
Vinyl Chloride	ppd	-	0.0430	0.0243	1/6 months	grab

1/ Samples collected to comply with the monitoring requirements specified above shall be collected at the following location: At the nearest accessible location just prior to discharge and after final treatment. Unless otherwise specified, composite samples shall be time composite samples collected using automatic sampling equipment or a minimum of eight (8) equal volume grab samples collected over equal time intervals. All composite samples shall be collected for the total period of discharge not to exceed 24 hours.

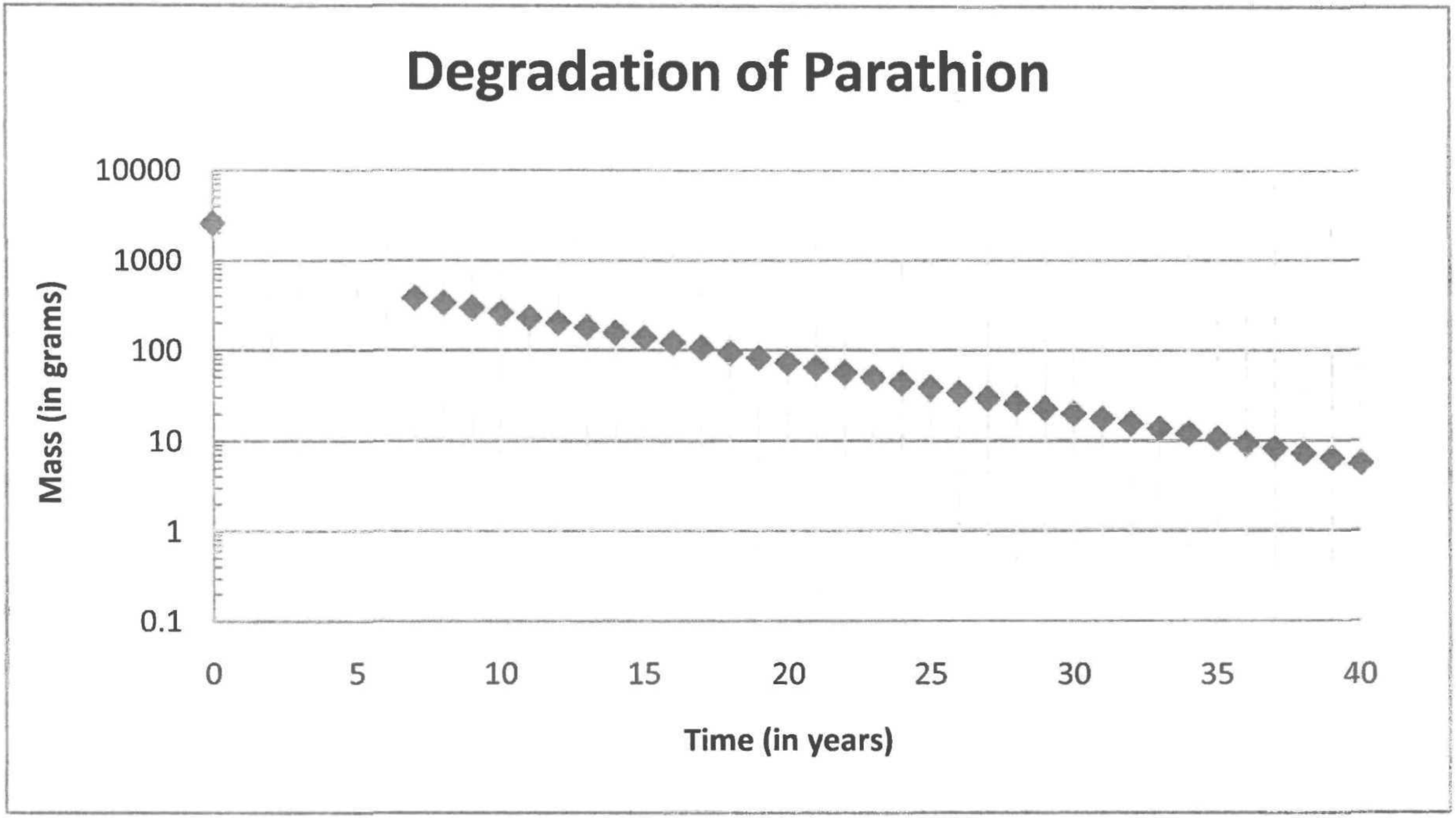
2/ If only one sampling event occurs during a month, the sample result shall be reported on the discharge monitoring report as both the monthly average and daily maximum value for all parameters with a monthly average limitation.

APPENDIX J

Monitored Natural Attenuation for Parathion and PNP

APPENDIX I

MONITORED NATURAL ATTENUATION
FOR
PARATHION AND PNP


Degradation of Parathion
Mass (in grams)
10000
1000
100
10
1
0.1
0
5
10
15
20
25
30
35
40
Time (in years)

Data from
RFI/CS Report
Golder, 2002

8.0 NATURAL ATTENUATION

Natural attenuation involves the combined effects of dispersion, dilution, adsorption, abiotic transformation (e.g., hydrolysis), volatilization and biological degradation. These mechanisms can effectively reduce contaminant toxicity to levels that are protective of human health and the environment. Abiotic transformation and biodegradation are important "destructive" attenuation mechanisms as they typically transform the constituent to less toxic compounds, and can ultimately result in the complete degradation of a compound to benign end products such as ethene or carbon dioxide. The RFI/CS field program has included assessment of the capture of COPCs by the Groundwater Corrective Action Systems, and natural attenuation of the COPCs downgradient of these systems. This assessment has provided information for corrective action strategies. The potential natural attenuation of constituents in the vicinity of each Groundwater Corrective Action System is discussed below.

8.1 South Landfill Corrective Action System

Interceptor wells installed along the western and northern boundaries of the South Landfill constitute the Western Landfill Corrective Action System (wells IW-1, IW-2, IW-3, and IW-4) and the Northern Landfill Corrective Action System (wells IW-5, IW-6, IW-7, IW-8, IW-9, IW-10, IW-11, IW-12, and IW-13). Together, they comprise the South Landfill Groundwater Corrective Action System. The historic reduction of concentrations of constituents in groundwater associated with the Western Landfill system has resulted in only well IW-2 currently being active. Observation wells OW-11 and OW-12 are located directly upgradient to IW-2 and OW-17 is located directly upgradient to IW-11. Interceptor wells IW-5 through IW-10 and IW-12 through IW-13 do not have upgradient monitoring or observation wells. Wells OW-13, OW-14 and OWR-5D are located among the IW wells, but are neither upgradient nor downgradient of the South Landfill System. Downgradient groundwater quality is represented in wells OW-5, OW-06, OW-15, and OW-16A.

For the South Landfill, monitored natural attenuation has been assessed to determine its potential viability as a remediation technology for the Facility. Preliminary review suggests that natural attenuation could be a viable remedial solution for groundwater associated with the South Landfill.

Since there is a significant amount of historical parathion data for the Site, Parathion was used as an example to understand if natural attenuation may be occurring at the Facility. A literature review of the possible breakdown pathways of parathion has been performed. Parathion is the common term for the organophosphate o,o-diethyl-o-4-nitrophenyl phosphorothioate. This compound contains carbon, oxygen, hydrogen, sulfur, and phosphorus and is biodegraded to 4-nitrophenol with the mineralization of sulfur and phosphorus. Additionally:

- Parathion has been shown to undergo hydrolysis to 4-nitrophenol. This process can be enhanced in the presence of excess calcium, magnesium, iron, or copper ions. The rate of hydrolysis is significantly affected by water content with an optimal rate occurring at the limit of sorbed water (about 11 percent). Dissolved organic matter can play an important role in affecting hydrolysis kinetics of organic pollutants. Its effect on the hydrolysis of parathion is not known.
- Parathion can be reduced to aminoparathion by an enzyme. This in turn breaks down to p-aminophenol or diethylthiophosphoric acid which themselves are degraded to mineralization.
- Parathion can degrade in sunlight to 4-nitrophenol.
- Clays, sediments and dusts in surface soils can promote the oxidation of parathion to produce paraoxon which degrades to 4-nitrophenol and diethyl phosphoric acid which themselves are degraded to mineralization via carboxylic acid and other aliphatics.

Three lines of evidence can be used to support biodegradation of chemicals of concern, including:

1. An observed reduction of chemical concentrations along the flow path downgradient from the source area;
2. A documented loss of contaminant mass using analytical data or a conservative tracer; and
3. Microbiological laboratory or field data that support the occurrence and rate of biodegradation.

Initial data collection at the Facility in support of natural attenuation has included analytical data for concentrations of parathion and 4-nitrophenol in groundwater, and collection of a suite of geochemical data that could indicate electron donor and acceptor concentrations in groundwater, which can then be correlated to increases in metabolic end products.

USEPA Region 4, in their draft "Suggested Practices for Evaluation of a Site for Natural Attenuation (Biological Degradation) of Chlorinated Solvents", dated November 1997, provide a screening mechanism to indicate evidence of biodegradation based on reducing conditions. Although developed for chlorinated solvents, this same mechanism can be used to determine reducing conditions that could be causing the natural attenuation, by reduction, of parathion.

In general, strong evidence of a reducing environment is indicated by:

- Dissolved oxygen less than 0.5 mg/l;
- Nitrate less than 1 mg/l;
- $Iron^{II}$ greater than 1 mg/l;
- Sulfate less than 20 mg/l;
- Sulfide greater than 1 mg/l; and
- Alkalinity greater than two times background.

These indicator parameters were collected at wells across the Facility. The results of analyses are presented in the table below. Based on these results, the following wells indicate more reducing conditions:

	Strong Evidence of Reducing Conditions per USEPA, 1997		Site Evidence of Reducing Conditions	
Parameter	Concentration	Wells	Concentration	See Figure
Dissolved oxygen	<0.5 mg/L	OWR-01D	<0.9 mg/L	M-1 (App. M)

	Strong Evidence of Reducing Conditions per USEPA, 1997		Site Evidence of Reducing Conditions	
Parameter	Concentration	Wells	Concentration	See Figure
Nitrate	<1 mg/L	MW-01B, OWR-01D, OWR-05D, MW-01B, OW-06A	<1.1 mg/L	
Iron[II]	>1 mg/L	OWR-05D		
Sulfate	<20 mg/L	CB-85, MW-01B, OW-06A, OW-10, OWR-01D, OWR-02D, OWR-02S, OWR-05D		
Alkalinity	>2xbackground	OWR-01D, OWR-02D, OWR-02S, OW-10, OW-06A, OWR-05D, OWR-01S	>80 mg/L	M-2
Redox	<-190mv	OWR-02D	<0 mv	M-3

Figures M-1 through M-4 illustrate the evidence for natural attenuation via biological degradation. As shown on Figure M-1, the area of consumption of dissolved oxygen to concentrations less than 0.8 mg/L is quite extensive. Associated with this dissolved oxygen consumption, Figure M-3 shows that area of strongly reducing conditions, as mapped by $eH \leq 0$ millivolts. Figure M-2 shows the area of increased alkalinity that would correspond to a reducing environment, as CO_2 is evolved during the respiration process and then partitions to alkalinity in the aqueous phase and through the direct production of alkalinity during the cell synthesis reaction. Figure M-4 combines Figures M-1 through M-3, showing those well locations where more than one parameter is indicative of a "natural attenuation environment".

Based on review of these data, it appears that there may be a robust natural attenuation environment at the site. Additionally, biological plate counts were performed on water from the same well set, and the following wells reported bacterial culture populations greater than background: OW-06A, OWR-01D, OWR-01S, OWR-05D, OWR-02S, OWR-02D, and OW-10.

The tracking of the breakdown of parathion by review of daughter products is not possible with the data collected to date, since 4-nitrophenol, the main anticipated degradation product, was produced at the Facility. Breakdown products of 4-nitrophenol have not been analyzed at this point.

Review of mechanistic chemistry and microbiological processes suggests that microorganisms incorporate carbon and phosphorus from the parathion into their cell structure. The parathion is biodegraded to 4-nitrophenol that biodegrades to carboxylic acid by mineralization of nitrogen and breaking of the six member carbon ring. The sulfur is released from the organic molecule as a reactive species, which is immediately scavenged by the cations in the soil.

With a maximum of 68.5 µg/L parathion in any downgradient monitoring well in the vicinity of the South Landfill, this could only liberate 7.54 µg/L of sulfur. Therefore, with a plume width of less than 500 ft at the downgradient toe of the landfill, a plume thickness of 50 feet, a flow rate of 17 ft/yr, and an effective porosity of 10 percent, this would result in less than 11 grams per year of sulfur liberated from landfills from the biodegradation of parathion as described. Hence, this amount of sulfur would be easily quenched by very little limestone (stoichiometrically about 35 grams). Therefore, the soil on site has, in practice, a limitless ability to quench the sulfur released by biodegradation of parathion without the water containing any sulfide above the Method Detection Limit.

The screening level, 2-dimensional model Bioscreen was used to examine the possibility of parathion biodegradation. Bioscreen is a model created by USEPA to provide support in assessing the applicability of natural attenuation to specific sites. Input to the model included:

Hydrogeological parameters of

- hydraulic conductivity 3×10^{-5} cm/s
- hydraulic gradient 0.055 ft/ft
- effective porosity 0.1

Dispersion estimates of

- longitudinal dispersivity 80 feet
- transverse dispersivity 8 feet

Adsorption estimates of

- soil bulk density 1.64 kg/L
- parathion partition coefficient 460 L/kg
- fraction organic carbon 3.5×10^{-3}

A biodegradation half-life for parathion of one year was used. An exact field value for the half-life of the parathion is not known, and is therefore based on published half-lives for parathion by hydrolysis (half-life of 72 days at pH 7, Howard et al., 1991) and by base-catalyzed hydrolysis (half-life of 45 days, Howard et al, 1991). The value of one year appears to be conservatively approximate.

Initially, an area downgradient of the South Landfill, outside the calculated capture zone of the remediation system was selected for evaluation. Under natural conditions groundwater flows from the South Landfill at about 17 ft/yr. This number was based on calculated hydraulic gradients immediately downgradient of the South Landfill. The first extraction wells at the Landfill started operating in 1983. Therefore, the chemicals any further downgradient than about 255 feet from the landfill (15 years at 17 ft/yr) would have left the area with no capture by those extraction wells and will be showing the effects of natural attenuation, if present.

Bioscreen was run assuming a source area starting at OW-16 (assumed outside the active remediation system capture zone) and extending downgradient. The model predicts the distribution of parathion at various distances from the source area, first based on dilution with no attenuation, and second also allowing for biodegradation assuming the given half-life. The model runs were compared with actual data collected from monitoring wells (OW-5, OW-15, and IW-14) downgradient of the landfill.

The model was run using a time of 38 years (assuming parathion had migrated from the landfill since 1960 when the first cells were used through to the present day). The model indicates that parathion will have reduced to non-detect at 60 feet from the source area when including the effects of biodegradation, while if no attenuation were occurring the parathion would have migrated approximately 150 feet. Comparison of predicted and actual parathion concentrations with distance from the source match well with the data set provided. A sensitivity analysis was performed by substituting different parathion half-lives into the model run. It appeared that a half-life between six months and five years had little effect on the concentration-distance curve, so a half-life of one year was retained in the model parameters.

The model was then run for extended periods of time to assess the relative travel distances of parathion, with and without the effects of natural attenuation. The model results indicate that without the effects of biodegradation (but including advection and dispersion), the parathion will reach the Facility boundary (approximately 2,000 feet) in 2,000 years, while with the effects of natural attenuation, the parathion concentrations will have stabilized to a maximum distance of approximately 300 feet from the source area. This distance is prior to reaching the plant site groundwater system and another source area for parathion. Model runs are included in Appendix M.

Since the data set indicates that the effects of natural attenuation occur within 60 feet of the source area based on a 38-year source migration, monitoring for natural attenuation will be required close to the landfill. Data collected close to the landfill will allow more exact elucidation of the attenuation rates.

Based on this model, it is concluded that if the South Landfill Corrective Action System was shut off, parathion would still naturally attenuate prior to crossing the Facility boundary. Additional monitoring points would need to be installed close to the landfill to assess this natural attenuation. Recommendations for the South Landfill Groundwater Corrective Action System are presented in Section 9.4.1.

8.2 Plant Corrective Action System

Neither parathion nor 4-nitrophenol have been reported in the last samples taken from the extraction wells (IW-14 and IW-15) that comprise the Plant Corrective Action System. Furthermore, parathion and 4-nitrophenol have not been detected in the last samples taken from two wells (OW-5 and OW-15) immediately upgradient of this system. No detections of these compounds have occurred in OW-5 since October 1991. In upgradient wells OW-16 and OW-16A, parathion was detected in samples from January and April 1988, with sporadic detections of 4-nitrophenol from April 1988 to October 1998. PCBs were reported in the unfiltered aliquot, but not in the filtered aliquot of the last sample collected from OW-15 in April 1998. In summary, since no chemicals of concern are present, there is no need to consider the possibility

APPENDIX K

Human Health Risk Assessment
(provided in electronic format on CD)

U.S. Environmental Protection Agency

Anniston PCB Site Operable Unit 3
Baseline Risk Assessment
Anniston, Alabama

Contract No. 68-S7-03-04
Task Order No. 0023

January 2008

Revised Final
Human Health Baseline Risk Assessment Report

Parametrix CDM
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

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January 14, 2008

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Remedial Project Manager
U.S. Environmental Protection Agency
Region 4
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61 Forsyth Street, S.W.
Atlanta, Georgia 30303-3104

Project: Contract No. : 68-57-03-04
Task Order No. : 0023

Subject: Revised Final Report - Anniston OU 3 Human Health Risk Assessment

Dear Ms. Scully:

CDM FEDERAL PROGRAMS CORPORATION (CDM) is pleased to submit 10 copies of the above referenced document, along with 10 CDs containing the report in a PDF format. Comments received on December 13, 2007 on the November 2007 Final Human Health Baseline Risk Assessment have been resolved and addressed as discussed in follow-up conference calls with EPA and PRP representatives.

CDM is pleased to assist EPA with this assignment, and we look forward to providing further technical assistance on this project. If you have any questions concerning the attached, please call me at (404) 720-1324.

Sincerely yours,

CDM Federal Programs Corporation

Tony Isolda

Tony Isolda
Project Manager

Attachment

cc: Rob Stern, EPA Project Officer (letter only)
Gary Clemons, CDM (letter only)
Jim LaVelle, CDM (1 copy)
Project File (Atlanta) (1 copy)

U.S. EPA CONTRACT NO. 68-S7-03-04

Revised Final
HUMAN HEALTH BASELINE RISK ASSESSMENT REPORT

FOR
ANNISTON PCB SITE OPERABLE UNIT 3
ANNISTON, ALABAMA

January 2008

TASK ORDER NO. 0023

Prepared for:
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA, GEORGIA

Prepared by:
CDM Federal Programs Corporation
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U.S. EPA CONTRACT NO. 68-S7-03-04

Revised Final
HUMAN HEALTH
BASELINE RISK ASSESSMENT REPORT

FOR
ANNISTON PCB SITE OPERABLE UNIT 3
ANNISTON, ALABAMA

January 2008

TASK ORDER NO. 0023

Prepared for:
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4

Prepared By: James M. LaVelle, Ph.D PA Date: 1/14/08
James M. LaVelle, Ph.D
Risk Assessor

Approved By: Tony Isolda Date: 1/14/08
Tony Isolda
Project Manager

Approved By: Tony Isolda Date: 1/14/08
for Gary P. Clemons, Ph.D.
Region 4 Program Manager

Contents

Figures

Tables

Acronyms and Abbreviations

ADD	average daily dose
ADEM	Alabama Department of Environmental Management
amsl	above mean sea level
bgs	below ground surface
CDM	CDM Federal Programs Corporation
cm^2	square centimeters
COPC	chemical of potential concern
CS	confirmatory sampling
CSF	cancer slope factor
CSM	conceptual site model
CTE	central tendency exposure
ELCR	excess lifetime cancer risk
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
FS	Feasibility Study
gpm	gallons per minute
HEAST	Health Effects Assessment Summary Tables
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
IRIS	Integrated Risk Information System
KM	Kaplan-Meier
L	liter
L/hour	liters per hour
LADD	lifetime average daily dose
m^3	cubic meters
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
MLE	maximum likelihood estimation
m/s	meter per second
MS	matrix spike
MSD	matrix spike duplicate
mg/kg	milligram per kilogram
NCEA	National Center for Environmental Assessment
ND	non-detect
ng/m^3	nanograms per cubic meter
NIOSH	National Institute of Occupational Safety and Health
NOAEL	no-observed-adverse-effect-level
OLBSI	Old Limestone Bed Surface Impoundment
O&M	operations and maintenance
OSHA	Occupational Health and Safety Agency

OSWER	Office of Solid Waste and Emergency Response
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PAR	Pathway Analysis Report
PCB	polychlorinated biphenyl
PEF	particulate emission factor
PNCB	para-nitrochlorobenzene
PNP	4-nitrophenol
PPRTVs	EPA's Provisional Peer Reviewed Toxicity Values
PQL	practical quantitation limit
PRG	Preliminary Remediation Goal
PRP	potentially responsible party
PUF	polyurethane foam
QA	quality assurance
QC	quality control
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RfC	reference concentration
RfD	reference dose
RFI	RCRA Facility Investigation
RI	remedial investigation
RL	reporting limit
RME	reasonable maximum exposure
ROS	regression on order statistics
STSC	Superfund Health Risk Technical Support Center
SVOC	semi-volatile organics
TAL	Target Analyte List
TCL	Target Compound List
TEF	toxic equivalency factor
TEQ	toxic equivalents
UCL	upper confidence limit
UPLs	upper prediction limits
VOC	volatile organic compounds
WHO	World Health Organization
WMA	waste management area
XAD	Hydrophobic Polyaromatic resin

Executive Summary

CDM was tasked by the U.S. Environmental Protection Agency (EPA) through Task Order No. 023 to perform a baseline human health risk assessment for the Anniston Polychlorinated Biphenyl (PCB) Site (herein after referred to as "the Site". As used in this report, the Site refers to the area where hazardous substances including PCBs associated with releases or discharges as a result of the operations, including waste disposal, of the Anniston Plant by Solutia Inc. (Solutia), Monsanto Chemical Company (Monsanto) and their predecessors have come to be located.

To best manage the cleanup and study of PCBs in the Anniston area, site management activities were initially divided among four operable units (OUs): OU-1, Anniston residential properties; OU-2, Anniston non-residential properties: OU-3, the former Monsanto PCB plant and landfills; and OU-4, the length of Choccolocco Creek and its floodplain from the confluence with Snow Creek including the backwater area and upstream on Snow Creek to Highway 78 to Lake Logan Martin. However, it was later determined that OU-1 and OU-2 could be combined into a single OU based on their geographic similarity and land use. This document concerns OU-3, the former Monsanto PCB plant and landfills. The term of OU-3 in this report refers to Solutia Inc.'s Anniston Plant Site, the closed South Landfill and the closed West End Landfill.

This Human Health Risk Assessment (HHRA) was developed to characterize the exposure setting and receptor characteristics for OU-3 and estimate ranges of risks to people exposed at OU-3. Screening-level risk estimates are also included for some exposure pathways for residents living near the Anniston Plant.

Overview of the Human Health Risk Assessment

The approach to developing the HHRA for OU-3 followed EPA guidelines for conducting an HHRA, with modifications made to accommodate conditions at OU-3. In planning for the HHRA, CDM reviewed available information obtained from the Resource Conservation and Recovery Act (RCRA) facility Investigation and Confirmatory Sampling (RFI/CS) Report (Solutia 2002), the Supplemental RFI (Golder 2003), and the Preliminary Site Characterization Summary (PSCS) Report (Solutia 2005). These data were collected as part of the PSCS and provide the basis for estimating potential exposure concentrations for chemicals of potential concern (COPCs) at and near OU-3.

Based on data collected during the RFI/CS, RI/Feasibility Study (FS), and post-closure groundwater monitoring, the HHRA identifies COPCs associated with historical releases at OU-3, evaluates potential exposure pathways by which people may contact COPCs, identifies appropriate toxicity criteria for use in quantifying potential risks, and characterizes potential cancer risks and non-cancer hazards associated with possible current and future exposure to COPCs. Uncertainties in the risk assessment process are discussed to provide an appropriate perspective for interpreting and using the results of the quantitative analysis.

Areas of Potential Concern

Areas of potential concern identified in the HHRA include the Facility Area portion of OU-3, the South Landfill, the West End Landfill, areas downgradient where COPCs in groundwater may have migrated in the shallow residuum, and adjacent properties. These areas are of concern because people could be exposed in each of these areas, either currently or in the future. A brief description of each area of potential concern follows.

Facility Area— The Facility Area encompasses buildings and paved parking lots, as well as grass, gravel and concrete covered areas. Many potential areas of concern have been covered with pavement, gravel or concrete, and grassed areas have previously been remediated.

South Landfill— The South Landfill is currently enclosed with fencing, limiting access, and capped with vegetation, precluding exposure to landfill contents. However, if the fence and/or cap is not maintained or should be disturbed in the future, exposures could occur.

West End Landfill— The West End Landfill is currently enclosed with fencing, limiting access, and capped, precluding exposure to landfill contents. However, if the fencing and/or RCRA compliant cap is not maintained or should be disturbed in the future, exposures could occur.

Downgradient Groundwater—Contaminants from source areas at OU-3 have migrated to the shallow residuum. These contaminants may have migrated downgradient of OU-3.

Adjacent Properties—Contaminants from source areas at OU-3 may migrate to adjacent properties via ambient air.

Potentially Exposed Populations

Information obtained from the Solutia Inc., and Pharmacia Corporation's *Preliminary Site Characterization Summary Report on Operable* Unit 3 (Solutia 2005) indicates OU-3 is largely occupied by buildings, parking lots, other areas some of which are actively used for industrial purposes, and impervious surfaces, making potential for contact with soil relatively low under current conditions.

The Preliminary Site Characterization Summary Report on Operable Unit 3 (Solutia 2005) also indicates area residents obtain water from the local water utility. The water utility obtains its water from Coldwater Spring which is located approximately five miles southwest (up gradient) of the manufacturing plant.

Based on the information above, in the HHRA, contaminants in surface soil, subsurface soil, ambient air and/or groundwater at OU-3 were quantitatively evaluated for potential health threats to the following receptors:

Current and future land use:

(1) O&M workers (South Landfill, West End Landfill)
(2) Trespasser (South Landfill, West End Landfill)
(3) Construction workers (Facility Area)

Current land use:

(1) Operations area workers (Facility Area)
(2) O&M workers (Facility Area)
(3) Trespasser (Facility Area)
(4) Off-site residents (ambient air)

Future land use:

(1) Operations area workers (Facility Area)
(2) O&M workers (Facility Area)
(3) Trespasser (Facility Area)
(4) Operations area workers (groundwater)
(5) O&M workers (groundwater)
(6) Off-site residents (groundwater)

Exposure Pathways

Based on possible sources, receptors, and exposure pathways considering both current and potential future land use, the following exposure pathways were considered to be complete and are evaluated as part of the assessment of exposure to contaminants at OU-3. Some complete exposure pathways may not represent significant sources of human exposure. Pathways considered complete are presented below.

Current/Future Land Use

- O&M Worker (Adult)

  Surface soil (South Landfill, West End Landfill)
  - incidental ingestion
  - dermal contact

  Ambient air (South Landfill, West End Landfill)
  - inhalation of volatile chemicals

- Trespasser (Adolescent [7-16 years old])

  Surface soil (South Landfill, West End Landfill)
  - incidental ingestion
  - dermal contact

  Ambient air (South Landfill, West End Landfill)
  - inhalation of volatile chemicals

- Construction Worker (Adult)

  Surface and subsurface soil (Facility Area)
  - incidental ingestion
  - dermal contact

  Ambient air (Facility Area)
  - inhalation of volatile chemicals

Current Land Use

- Operations Area Worker (Adult)

  Surface soil (Facility Area)
  - incidental ingestion
  - dermal contact

  Ambient air (Facility Area)
  - inhalation of volatile chemicals

- O&M Worker (Adult)

  Surface soil (Facility Area)
  - incidental ingestion
  - dermal contact

  Ambient air (Facility Area)
  - inhalation of volatile chemicals

- Trespasser (Adolescent [7-16 years old])

  Surface soil (Facility Area)
  - incidental ingestion
  - dermal contact

  Ambient air (Facility Area)
  - inhalation of volatile chemicals

- Off-site Resident (Lifetime Resident and Young Child [0-6 years old])

  Ambient air
  - inhalation of volatile chemicals

Future Land Use

- Operations Area Worker (Adult)

  Surface soil (Facility Area)
  - incidental ingestion
  - dermal contact

Ambient air (Facility Area)
- inhalation of volatile chemicals

Groundwater (OU-3 private well)
- ingestion

- O&M Worker (Adult)

  Surface soil (Facility Area)
  - incidental ingestion
  - dermal contact

  Ambient air (Facility Area)
  - inhalation of volatile chemicals

  Groundwater (OU-3 private well)
  - ingestion

- Trespasser (Adolescent [7-16 years old])

  Surface soil (Facility Area)
  - incidental ingestion
  - dermal contact

  Ambient air (Facility Area)
  - inhalation of volatile chemicals

- Off-site Resident [Lifetime Resident and Young Child (0-6 years old)]

  Groundwater (OU-3 private well)
  - ingestion
  - dermal contact during showering and bathing
  - inhalation of volatile chemicals during showering and bathing

  Ambient air
  - inhalation of volatile chemicals

Exposure Assumptions

Exposure assumptions are used along with estimates for EPCs to estimate daily exposure to COPCs. Exposure assumptions were primarily taken from EPA documents (EPA 1989, 1991, 1992, 1997a, 2002a, 2004a) and from discussions with the EPA Region 4 risk assessor. EPA's standard default assumptions (EPA 1991) were used, where available. Otherwise professional judgment or values from the most recent guidance available were implemented unless EPA Region 4 has a known preference for a specific value. Reasonable maximum exposure (RME) and central tendency exposure (CTE) parameters were implemented, as well as site-specific exposure parameters for:

- exposed skin surface area;
- dermal absorption factor;
- soil adherence factor;
- intestinal absorption factor;
- soil ingestion rate; and
- exposure frequency.

Site-specific exposure parameters were obtained from the Solutia RFI/CS report (Solutia 2002). The basis and justification for these RCRA values are provided in the 2002 Solutia document.

Toxicity Assessment

Toxicity criteria used in this risk assessment were obtained from a variety of sources according to a hierarchy established in the Office of Solid Waste and Emergency Response (OSWER) Directive 9285.7-53 (EPA 2003). The toxicity value hierarchy is as follows:

- **Tier 1** — EPA's Integrated Risk Information System (IRIS).

- **Tier 2** — EPA's Provisional Peer Reviewed Toxicity Values (PPRTVs): The Office of Research and Development/National Center for Environmental Assessment (NCEA)/Superfund Health Risk Technical Support Center (STSC) develops PPRTVs on a chemical-specific basis when requested by EPA's Superfund program.

- **Tier 3** — Other Toxicity Values: Tier 3 includes additional EPA and non-EPA sources of toxicity information. Priority should be given to those sources of information that are the most current, the basis for which is transparent and publicly available, and which have been peer-reviewed.

Health criteria for chemicals exhibiting non-carcinogenic effects for use in risk assessment are generally EPA-derived reference doses (RfDs) and reference concentrations (RfCs). The RfD or RfC is an estimate of average daily exposure to an individual (including sensitive individuals) that is likely to be without appreciable risk of deleterious effects during a lifetime.

The carcinogenic potential of a chemical is expressed as a cancer slope factor (CSF) [in units of (mg/kg body weight-day)-1], which estimates the risk of cancer per unit dose. When a slope factor is multiplied by an estimate of lifetime average daily dose (ADD) of a potential carcinogen (in mg/kg body weight-day), the result is an estimate of the lifetime excess cancer risk associated with exposure at that dose.

Summary of Site Risks

Estimates of possible exposure were combined with toxicity criteria to provide estimates of cancer risks and noncancer hazards for the various human populations described above. Generally, cancer risks and non-cancer hazards for current and future workers within the Facility Area exceed EPA's thresholds, often by orders of magnitude. This conclusion generally holds for risk and hazard estimates developed from default EPA exposure assumptions, and from site-specific assumptions used previously at the site. Even when site-specific information was used, risks and hazards remain elevated in the Facility Area for current/future construction workers; current trespassers; and future O&M workers and trespassers.

These estimates suggest that cancer risks for the site may be above the acceptable range as defined by EPA, due mainly to PCBs in soil and groundwater. These risks are associated with existing contamination in the Facility Area and are dependent on receptor behavior. For example, office workers at the site may receive little exposure and estimates of risk and hazards may be greatly overestimated for this population. On the other hand, risks may be more appropriately applied to workers that have opportunity for frequent contact with soil. Workers involved in outdoor maintenance, clean-up, sampling, and monitoring might fall into this category.

In contrast, risks and hazards are estimated to be at or below EPA thresholds for workers that frequent the South and West End Landfills currently and in the future, indicating that health threats for these exposure areas are minimal. Note, however, that the risk assessment did not evaluate a scenario where current landfill containment was compromised. The assessment assumes that landfill covers would remain intact as part of site remediation and closure activities.

Risks to future receptors exposed to groundwater exceeded acceptable cancer risk and non-cancer health hazard threshold, again by orders of magnitude, suggesting the potential for significant exposure if shallow groundwater were to be used for drinking. These risks and hazards would be realized only if wells are installed in the residuum at locations where they would draw water from the most contaminated part of existing plumes. Given the availability of municipal water supplies, installation of drinking water wells in such locations seems unlikely. However, risks are sufficiently high to suggest some consideration be given to ensuring the pathway remains incomplete indefinitely.

Cancer risks associated with exposure of off-site residents to PCB vapors in ambient air are low and may indicate that no unacceptable health threats currently exist. The highest risks for residents, which assume a worst case ambient air concentration of PCBs (2 in one million) is only slightly higher than the bottom of the EPA's risk range. Adjustment of air concentrations based on wind speed and direction would very likely lower estimated ambient air concentrations to the point where estimated risks would fall within the range considered negligible.

Finally, risks and hazards associated with trespassers in the landfill areas are low and suggest negligible risk and hazard. Current and future use of these areas by occasional visitors does not appear to be associated with significant health threats from exposure to PCBs and other site-related chemicals. However, risks and hazards associated with trespassers in the Facility Area are at the high end of or exceed acceptable cancer risk and the non-cancer health hazard threshold, suggesting significant exposure could occur if trespassing became common. Facility security appears to be sufficient to deter most or all trespassing currently.

Section 1 Introduction

CDM was tasked by the U.S. Environmental Protection Agency (EPA) through Task Order No. 023 to perform a baseline human health risk assessment for the Anniston Polychlorinated Biphenyl (PCB) Site (herein after referred to as "the Site"). As used in this report, the Site refers to the area where hazardous substances including PCBs associated with releases or discharges as a result of the operations, including waste disposal, of the Anniston Plant by Solutia Inc. (Solutia), Monsanto Chemical Company (Monsanto) and their predecessors have come to be located. The term of operable unit 3 (OU-3) in this report refers to Solutia Inc.'s Anniston Plant Site, the closed South Landfill and the closed West End Landfill. This Human Health Risk Assessment (HHRA) was developed to characterize the exposure setting and receptor characteristics for OU-3 and estimate ranges of risks to people exposed at OU-3. Screening-level risk estimates are also included for some exposure pathways for residents living near the Anniston Plant.

This HHRA has been developed from data collected during the Resource Conservation and Recovery Act (RCRA) Facility Investigation and Confirmatory Sampling (RFI/CS), the Remedial Investigation and Feasibility Study (RI/FS), and post-closure groundwater monitoring. These data are used to characterize potential for exposure to site-related chemicals.

Note that while state agencies or the federal Occupational Safety and Health Administration (OSHA) are typically responsible for risks to workers at a site, these organizations are primarily concerned with air exposures. OSHA does not have a validated method for assessing risk resulting from oral or dermal exposure to PCBs. Thus, the HHRA is a useful tool to estimate risk based on soil as the primary medium of exposure and provides an adjunct method of assessing total risk.

1.1 Overview of the Human Health Risk Assessment

The approach to developing the HHRA for OU-3 followed EPA guidelines for conducting an HHRA, with modifications made to accommodate conditions at OU-3. In planning for the HHRA, CDM reviewed available information obtained from the RFI/CS (Solutia 2002), the Supplemental RFI (Golder 2003), and the Preliminary Site Characterization Summary (PSCS) Report (Solutia 2005). These data were collected as part of the PSCS and provide the basis for estimating potential exposure concentrations for chemicals of potential concern (COPCs) at and near OU-3.

Based on data collected during the RFI/CS, RI/FS, and post-closure groundwater monitoring, the HHRA identifies COPCs associated with historical releases at OU-3, evaluates potential exposure pathways by which people may contact COPCs, identifies appropriate toxicity criteria for use in quantifying potential risks, and characterizes potential cancer risks and non-cancer hazards associated with possible current and future exposure to COPCs. Uncertainties in the risk assessment process are discussed to provide an appropriate perspective for interpreting and using the results of the quantitative analysis.

The HHRA is developed in accordance with EPA guidance set forth in the following documents:

- Risk Assessment Guidance for Superfund: Human Health Evaluation Manual, Part A (EPA 1989).
- Risk Assessment Guidance for Superfund: Human Health Evaluation Manual, Part D (EPA 2001).
- Risk Assessment Guidance for Superfund: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. Final (EPA 2004a).
- Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA 2002a).
- ProUCL Version 4.0 Users Guide (EPA 2007a).
- Exposure Factors Handbook, Volumes I, II, and III (EPA 1997a, with 1999 revisions).
- Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors (EPA 1991).
- Integrated Risk Information System (IRIS) (on-line database of toxicity information) (EPA 2007b).
- Human Health Toxicity Values in Superfund Risk Assessments (EPA 2003).
- Health Effects Assessment Summary Tables FY-1997 Annual (HEAST) (EPA 1997b).
- National Center for Environmental Assessment (NCEA) (EPA agency, additional toxicity information not found in IRIS or HEAST and updates for the HEAST values).

Exposure pathways and receptors, exposure variables, toxicity values, and risks are presented in tabular form in accordance with the standard tables of *Risk Assessment Guidance for Superfund (RAGS) Part D* (EPA 2001).

1.2 HHRA Contents

This HHRA is composed of eight sections:

Section 1 – Introduction

Section 2 - Site Background and Setting - briefly describes the site background

Section 3 - Hazard Identification - describes soil, fugitive dust, groundwater and ambient air datasets

Section 4 - Exposure Assessment - identifies receptors and potential exposure pathways, including exposure variables and means of calculating the exposure point concentrations (EPCs) from site data

Section 5 - Toxicity Assessment – discusses the relevant toxicity information for the identified COPCs

Section 6 - Risk Characterization - identifies the total estimated cancer risks and non-cancer health hazards for each of the receptors and discusses the uncertainties associated with the risk estimates

Section 7 - Summary and Conclusions- provides a brief overview of the methodologies and results of the risk assessment

Section 8 - References - contains the report references

The following appendices are also included in the report:

- Attachment A provides lists of the samples included in the risk assessment and figures showing the locations of those samples.
- Attachment B includes the results of the risk calculations using reasonable maximum exposure (RME) assumptions.
- Attachment C presents statistics (output from ProUCL Version 4.0 software) for COPC chemical data that were used in the development of exposure point concentrations (EPCs).
- Attachment D lists assumptions used in the Schaum et al. (1994) model to estimate indoor air concentrations of volatile organic compounds (VOCs) from groundwater while showering.
- Attachment E presents the results of the risk calculations using central tendency exposure (CTE) assumptions.
- Attachment F presents the results of the risk calculations using site-specific assumptions provided by the potentially responsible party (PRP).

Section 2
Site Background and Setting

2.1 Site Location and Description

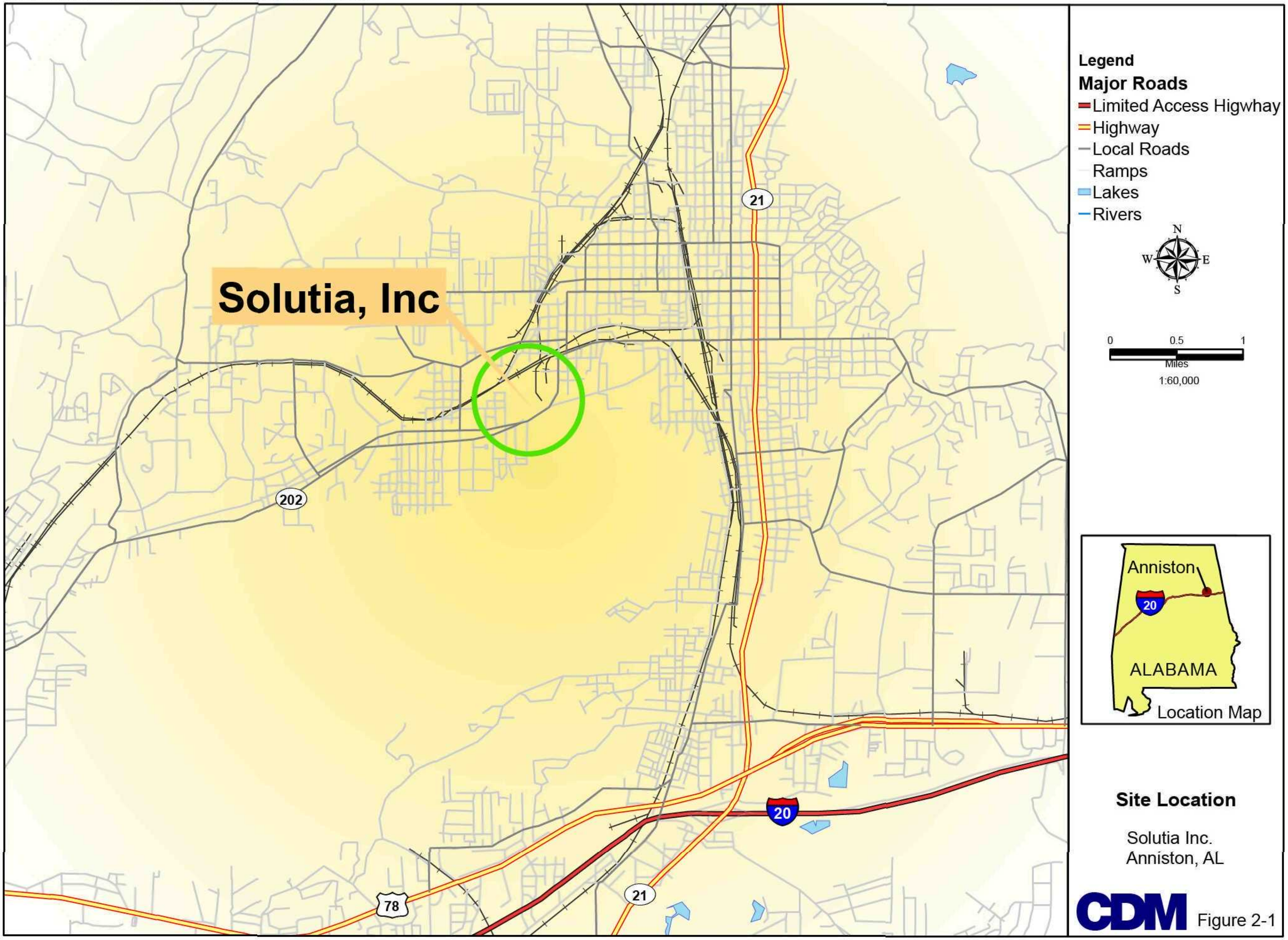
The Site is located in Calhoun County in the north-central part of Alabama **(Figure 2-1).** The Site consists of the area where hazardous substances, including PCBs associated with releases or discharges as a result of the operations, including waste disposal, of the Anniston plant by Solutia, Inc. (Solutia), Monsanto Company, and their predecessors have come to be located. A RI is currently being conducted to evaluate the nature and extent of contamination in the Anniston area from the former Monsanto Company's PCB manufacturing plant and Solutia's current manufacturing plant. Today the former PCB plant property is owned by Solutia. Solutia currently produces polyphenyl compounds and blends and packages phosphate-ester based, non-flammable hydraulic fluids at the Anniston plant.

To better manage the cleanup and study of PCBs in the Anniston area, site management activities were initially divided among four OUs: OU-1, Anniston residential properties; OU-2, Anniston non-residential properties: OU-3, the former Monsanto PCB plant and landfills; and OU-4, the length of Choccolocco Creek and its floodplain from the confluence with Snow Creek including the backwater area and upstream on Snow Creek to Highway 78 to Lake Logan Martin. However, it was later determined that OU-1 and OU-2 could be combined into a single OU based on their geographic similarity and land use. This document concerns OU-3, the former Monsanto PCB plant and landfills.

The Site has been evaluated extensively since 1980. Environmental work has included a combination of investigative and remedial efforts conducted pursuant to a variety of environmental permits. The environmental response efforts under the RCRA included the general areas of the Solutia manufacturing plant, which were termed the "on-site" area; and areas downstream of the Solutia manufacturing plant, termed the "off-site" area. The on-site area is geographically similar to the OU-3 area, which includes the manufacturing plant and the South and West End landfills. The borders of OU-3 depicted in **Figure 2-2**, are the railway to the north, the South Landfill to the south, Clydesdale Avenue to the east, and First Avenue to the west. Contaminated groundwater that originates from sources at the manufacturing plant and has migrated beyond the physical boundaries of OU-3 described above are also included in the characterization of OU-3.

2.2 Site History

A thorough discussion of the manufacturing history at this site was included in the RCRA RFI/CS Work Plan for the Anniston, Alabama, Facility (Golder 1997). As reported therein, manufacturing operations began in 1917 with the production of ferro-manganese, ferro-silicon, ferro-phosphorous compounds, and, later, phosphoric acid by the Southern Manganese Corporation. In 1927, the production of organic chemicals began with the introduction of biphenyl, which remains a major product today. In 1930, Southern Manganese Corporation became Swann Chemical Company densvr2\cdmprojects\Anniston\gis\mxd\Anniston_SiteLocation.mxd scp 050907



Site Location

Solutia Inc.
Anniston, AL

CDM Figure 2-1

densvr2\cdmprojects\Anniston\gis\mxd\Anniston_SiteMap.mxd scp 050907

Legend

OU-3

RR Track

N
W
E
S

0 125 250 500

Feet

1:6,046

Site Map

Solutia Inc.
Anniston, AL

CDM

Figure 2-2

(Swann); in May 1935, Monsanto purchased Swann. Monsanto created Solutia, the present owner, as a spin-off in 1997. A variety of organic and inorganic chemicals, including PCBs, parathion, phosphorus pentasulfide, and 4-nitrophenol (PNP), have been produced during the plant's operational history. Production of PNP was discontinued in 2004. The plant currently manufactures polyphenyl compounds (utilized in a variety of heat transfer fluid, plasticizer, and lubricant applications) and blends and packages phosphate-ester based, non-flammable hydraulic fluids primarily used in the aviation industry. These compounds have been produced for many years using the same raw materials and intermediates, even though there have been several expansions and process modifications.

A summary description of the various manufacturing and associated support processes is provided below.

- Phosphate ester-based Hydraulic Fluids (2006 to present) – Phosphate esters (e.g., tributyl phosphate) are blended to produce non-flammable hydraulic fluids.
- Polyphenyl Production (1927 to present)—Polyphenyls are manufactured from benzene and cumene (isopropyl benzene) in a continuous pyrolysis unit. The crude product is separated into various polyphenyl products including Santotar®.
- 4-Nitrophenol Production (1965 to 2004)—4-Nitrophenol was manufactured by the hydrolysis of para-nitrochlorobenzene (PNCB). PNCB and sodium hydroxide are reacted and acidified with sulfuric acid before the product is filtered and dried.
- Therminol® Production (1983 to Present)—Therminol® is produced from polyethylbenzene. Distillation residues (Therminol® ends) are managed in a totally enclosed treatment facility. The ends are blended with Santotar® and burned as a non-hazardous back-up fuel in the plant's boiler.
- Parathion and Methyl Parathion Production (1957 to 1986)—Parathion (or Niran®) and methyl parathion were produced on a seasonal basis. These materials were produced by reacting ethanol or methanol with phosphorus pentasulfide to form "thio acid." The thio acid was stripped, chlorinated and then distilled to produce an intermediate. The intermediate was either sold or reacted with acetone, 4-nitrophenol, and soda ash to produce crude parathion. Wet acetone from the operation was recovered in a solvent recovery system. The residue from the distillation of the chlorinated thio acid was recycled to a crystallizer. The filtrate was returned to the parathion process, and sulfur waste was returned to the production process or landfilled.
- Phosphorus Pentasulfide Production (1967 to 1988)—Phosphorus pentasulfide was produced by reacting elemental sulfur and phosphorus. The resulting phosphorus pentasulfide was drummed for sale or used in the parathion process.
- PCB Production (late 1929 to 1971)—PCBs were produced by reacting chlorine and biphenyl. Chlorine was produced between 1952 and 1969 solely for this purpose.

2.3 Site Historical Waste Disposal Practices

Multiple areas of OU-3 were used as disposal areas for process wastes.

West End Landfill

The West End Landfill is located along the western boundary of the Facility and operated as a single cell from approximately 1930 to approximately 1960, receiving production wastes and general trash from the facility. A multi-media cap was constructed over the landfill, and the area surrounding the landfill was covered with soil.

South Landfill and WMA-I

The South Landfill consisted of 10 individual cells from 1960 to 1988. Production wastes, demolition materials and trash from the Facility were disposed of in this landfill. This landfill was closed in 1989 with compacted soil and a vegetative layer. Also located within the South Landfill was one of two hazardous waste management areas (WMAs). WMA-I consisted of two cells, cells 4E and 5E, which were closed with a RCRA compliant cap in 1989. The remaining cells in the South Landfill were covered with compacted soil and a vegetative layer.

In 1997 and 1998, additional interim remedial measures were constructed on the western cells of the South Landfill and included cap and surface water management system upgrades.

OLBSI and WMA-II

The Old Limestone Bed Surface Impoundment (OLBSI) received acidic wastewater from the parathion intermediates operation from approximately 1960 to 1977. WMA-II consisted of a limestone bed, storage area and sump, and was used to partially neutralize acidic wastewaters generated by the parathion intermediates operation prior to biological treatment in the Facility's wastewater treatment plant from 1977 to 1988.

Phosphoric Acid Basins

The North and South Phosphoric Acid Basins were located along the eastern border of the Facility. Both basins were unlined impoundments with limestone beds where acidic wastewaters from the former parathion, PCB and phosphoric production areas were neutralized.

Former Phosphate "Landfill"

This area was not actually used as a landfill, but as a staging area and a basin for treatment of acidic wastewater. The area also coincides with the location of a neutralization basin, which operated as a part of the parathion production process.

This basin received acidic wastewater from the scrubber system of the Sulfur Incinerator which was used to burn residues from intermediates of the parathion production process. The effluent from the neutralization basin was discharged through the plant sewer system to the Phosphoric Acid Basins. The area is currently covered by gravel.

Substantial remediation has been performed at OU-3 during the recent operating history of the plant. Some of these activities are important for risk assessment associated with existing site conditions, including:

Former Parathion Production Area -- soils in the immediate vicinity of the former plant buildings were excavated to a maximum depth of 20 feet below ground surface (bgs);

Former Phosphorus Production Area -- after decommissioning, areas not already covered by concrete were covered with gravel;

Phosphoric Acid Basins -- the South Basin was excavated to a depth of approximately 10 to 12 feet bgs, and the North Basin, was excavated to a depth of 0-3 feet bgs.

Additionally, the property on which the manufacturing plant is located (including the landfills) is encumbered by a legal deed restriction. The deed restriction ensures that there will be no future residential development or any on-site use of groundwater for industrial, potable, or irrigation purposes.

2.4 Land Use

2.4.1 Site Topography and Land Use

The following descriptions were obtained from the Solutia Inc., and Pharmacia Corporation's *Preliminary Site Characterization Summary Report on Operable Unit 3* (Solutia 2005).

Approximately 90 percent of Calhoun County, including the Facility, lies within the Valley and Ridge physiographic province. The geology of this area is characterized by fold and thrust faulting, with the dominant structural features being the numerous thrust faults. The Facility is located in the Weisner Ridges subsection of the Valley and Ridge province, which consists of maturely dissected, faulted and folded quartzite mountains of high relief with intervening carbonate valleys.

Topography in the area is characterized by flat to gently rolling, northeastward trending valleys that are paralleled by ridges and mountains. The highest point at the Facility, at approximately 940 feet above mean sea level (amsl), is near the southern property line. The ground surface declines rapidly across the South Landfill (moving south to north) and then slopes gently to the north across the rest of the Facility.

The manufacturing plant itself is largely occupied by buildings, parking lots, other areas actively used for industrial purposes, and impervious surfaces. Impervious surfaces (buildings, roads, parking lots, and concrete or asphalt surfaces) make up approximately 12% of the total area of OU-3. Other types of engineered covers, such as gravel or engineered landfill covers, occupy much of the remaining area (55% of the total area). Only 33% of the OU-3 area can be considered to have no existing soil cover. Some of these portions of the property have not been used previously for chemical manufacturing.

The property on which the manufacturing plant is located (including the landfills) is encumbered by a legal deed restriction. The deed restriction ensures that there will be no future residential development or any use of on-site groundwater for industrial, potable, or irrigation purposes.

2.4.2 Hydrology and Groundwater Use

Information pertaining to hydrology and groundwater was taken from the *Preliminary Site Characterization Summary Report on Operable Unit 3* (Solutia 2005).

2.4.2.1 Regional Hydrogeology

The stratigraphic and structural relationships of the rocks throughout most of Calhoun County are typical of the Valley and Ridge physiographic province of the southern Appalachian Highlands. Rocks that range in age from Cambrian to Pennsylvanian have been sharply folded into northeast trending anticlines and synclines that are complicated by thrust faults. The thrust faults are the dominant structural features of the Valley and Ridge province and cause the repetition of the geologic units on the surface. Secondary stresses caused numerous high-angle faults of more limited extent.

This faulting, folding, and crushing of rock units has caused the sometimes chaotic surficial distribution of formations in the County, including portions underlying the Facility. Nine consolidated units ("bedrock" units, including the Shady Dolomite) and the overlying residuum are considered significant water-bearing units in Calhoun County. Although vertical conductivity in these units varies, there is no readily identifiable regional confining layer or layers to isolate the units into separate systems. Groundwater occurs in a variety of hydrogeologic environments. The majority of the water-bearing units in the area are carbonate rocks. Typically, these carbonate units yield only enough water for individual domestic use. Regional groundwater flow is controlled by topography and the transmissivity of the units and geologic structure of the underlying formations. The Shady Dolomite Formation is present along the lower slopes of Coldwater Mountain in the vicinity of the Facility. This formation is approximately 500 feet thick and consists of bluish-gray or pale-yellowish gray, thick-bedded, dolomite with chert. The Shady Dolomite is considered a good aquifer in Calhoun County, and wells developed in this aquifer supply enough water for municipal or industrial uses.

Lesser quantities of groundwater are obtained from sandstone, shale, mudstone, and quartzite units present in the County. These groundwater sources can be sufficient for domestic uses; however, it is difficult to obtain sufficient amounts of groundwater from these sources for municipal or industrial uses. The groundwater yield from these rocks is controlled by fracture orientation, grain size, grain distribution, and secondary permeability.

Minor amounts of groundwater are obtained from the metamorphic rocks in the extreme eastern and southeastern parts of the County. These minor systems are associated with the Piedmont province and usually supply only enough water for light domestic use.

Approximately 150 springs have been identified and located in the County during studies of the area. The discharge of these springs is variable, ranging from less than 1 gallon per minute (gpm) to over 17,000 gpm. Many of these springs are found along the trace of thrust faults and produce enough water for domestic uses and, in some instances, for municipal supply. It is estimated that 80 percent of these springs are used for domestic, farm, stock, municipal, industrial, or recreational water supplies.

One major spring in the Anniston area is Coldwater Spring. Coldwater Spring is located approximately five miles southwest (upgradient) of the Facility. The spring is the primary water source for the cities of Anniston, Fort McClellan, Anniston Ordnance Depot, and other municipalities and communities within Calhoun County. Although the hydrogeology of the spring is not well understood, it is believed that the spring discharges from the brecciated zones of the Jacksonville Fault (Warman and Causey, 1962; Scott, *et al.*, 1987). The Jacksonville Fault surface trace lays approximately 1/4-mile north of the northern boundary of OU-3. The fault is projected to have dipped below the Facility; however, evidence of the fault was not encountered in the deepest Facility boring at over 950 feet bgs. Groundwater at the Facility predominantly flows laterally, although a downward gradient exists. The fault, and hence the spring, are consequently protected by the predominant lateral flow and by over 950 feet of soil and rock (approximately 100 feet of low permeability residuum followed by the Shady Dolomite Formation).

2.4.2.2 OU-3 Hydrogeology

As reported in the RFI/CS Report (Solutia 2002), investigations conducted at the Facility have determined that the near-surface site geology consists of two water-bearing zones; the residuum and the Shady Dolomite. The residuum consists of low permeability silts and clays that are the products of weathering. Locally, the residuum extends to a depth of over 100 feet and acts as a semi-confining unit to the underlying Shady Dolomite. Water levels in the residuum reflect recent and seasonal variations in precipitation. The quality of groundwater in the residuum is variable and reflects surface and near-surface conditions.

Groundwater within the residuum generally occurs under unconfined (water table) conditions. Typically, the water table surface is a reflection of the ground surface and shallow groundwater flow follows topography. The predominant lateral groundwater flow direction within the residuum is to the north. This flow direction is a result of a relatively steep gradient that exists across the northern face of Coldwater Mountain, trending into a much flatter gradient across the production area of the Facility.

There is a distinct northeast component of flow in the shallow residuum in the northeast portion of the Facility. However, there is a northwest component of flow in the deep residuum. This general northwest component of flow is also present in the shallow residuum along the northern plant boundary in the vicinity of the OLBSI Corrective Action System.

The shallow groundwater is influenced by anthropogenic features such as backfilled excavations, caps, etc., which produce variable hydraulic conductivities and groundwater recharge rates. Also, three groundwater extraction systems (the South Landfill Corrective Action System, the Plant Corrective Action System, and the OLBSI Corrective Action System) influence the groundwater flow patterns in localized areas of the Facility.

The deep residuum is characterized by the same silty clay materials as the shallow residuum. However, there are localized areas within the deep residuum consisting of dense clay with little or no secondary permeability, particularly in the northern portion of the Facility. Locally, these areas could act as groundwater flow barriers.

2.4.2.3 Groundwater Use

Within one mile of the Site, eleven wells were identified on four commercial properties. Ten of these wells were determined to be monitoring/observation wells, and one, located at The Union Foundry property, was identified as being used for process water. The Union Foundry is well outside any areas of groundwater impact associated with OU-3. No potable water wells have been identified in the area.

Section 3
Hazard Identification

This section was developed to identify potential areas of concern; summarize available soil, groundwater and air data for use in the characterization; select COPCs; and discuss the calculation of EPCs.

3.1 Areas of Potential Concern

Areas of potential concern include the Facility Area portion of OU-3, the South Landfill, the West End Landfill, areas downgradient where COPCs in groundwater may have migrated in the shallow residuum, and adjacent properties. These areas are of concern because people could be exposed in each of these areas, either currently or in the future. A brief description of each area of potential concern follows.

Facility Area—The Facility Area encompasses buildings and paved parking lots, as well as grass, gravel and concrete covered areas. Many potential areas of concern have been covered with pavement, gravel or concrete, and grassed areas have previously been remediated.

South Landfill— The South Landfill is currently enclosed with fencing, limiting access, and capped with vegetation, precluding exposure to landfill contents. However, if the fence and/or cap is not maintained or should be disturbed in the future, exposures could occur.

West End Landfill— The West End Landfill is currently enclosed with fencing, limiting access, and capped, precluding exposure to landfill contents. However, if the fencing and/or RCRA compliant cap is not maintained or should be disturbed in the future, exposures could occur.

Downgradient Groundwater—Contaminants from source areas at OU-3 have migrated to the shallow residuum. These contaminants may have migrated downgradient of OU-3.

Adjacent Properties—Contaminants from source areas at OU-3 may migrate to adjacent properties via ambient air.

3.2 Data Summary

OU-3 investigations included collection and analysis of samples from surface soil, subsurface soil, groundwater and air. Details of the investigations and sample analyses are summarized below. Appendix A provides tables summarizing the samples collected from each medium and the date of collection, as well as figures showing the sample locations. Soil sampling locations are shown on Figure A-1; groundwater sampling locations are shown on Figure A-2; and air sampling locations are shown on Figure A-3.

As much as possible, this risk assessment attempts to account for any cleanup activities that have been completed since data collection. The focus of the risk assessment is on evaluation of current and potential future site conditions.

3.2.1 Surface Soil

Surface soil samples from 47 locations were collected during the RFI, the supplemental RFI, and the PSCS. Surface soil samples were collected from varying depth intervals. For purposes of this characterization, all samples with a sampling depth beginning within six inches of ground surface were included in the surface soil data set. Of the 54 samples collected from 47 sample locations, all but one sample (collected from location SWMU-42) were analyzed for PCBs. The sample collected from location SWMU-42 was analyzed only for furans. In addition to PCBs, samples collected from SSR-01, SSR-02 and SSR-18 were analyzed for the COPC list extant at the time of the investigation (arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, vanadium, methyl parathion, parathion, tetraethyldithiopyrophosphate, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dichlorophenol, 4-nitrophenol, o,o,o-triethylphosphorothioate, phenol, pentachlorophenol, 1,1,2,2-tetrachloroethane, chlorobenzene, isopropylbenzene, and methlyene chloride). Samples collected from locations SSRI-04-06, SSRI-07-06 and SSRI-11-06 were analyzed for furans; dioxins; PCB congeners; organophosphorous pesticides; chlorinated pesticides; Target Analyte List (TAL) metals and cyanide; and Target Compound List (TCL) VOCs, semi-volatile organics (SVOCs) and pesticides, in addition to PCBs. Seven duplicate samples were collected from surface soil locations SSR-18, SSRI-04, SSRI-07, SSRI-11, SSRI-15,, SWMU-42 and SWMU-12-24A.

The list of the surface soil samples used in the risk assessment is provided in Table A-1. Surface soil data are divided into two data sets to address current and future land uses. As shown in Table A-1, at the South Landfill and West End Landfill, datasets used for this HHRA are the same for both current and future land-use scenarios. However, at the facility area, the datasets for current and future land-use scenarios are different. The dataset for the current land-use scenario does not include sample SSR-18, as the location is currently under a concrete cap, precluding exposure. The dataset for the future land-use scenario includes all soil samples, assuming the concrete cap might not be maintained or could be removed in the future. Sampling locations are shown on Figure A-1.

3.2.2 Subsurface Soil

An additional 34 subsurface soil samples were collected during the RFI/CS, and the RI/FS. Subsurface soil samples were collected from varying depth intervals. Any sample with a starting depth equal to or greater than six inches bgs was considered subsurface soil. Two samples were eliminated from this characterization because they were located in an area of the northern phosphoric acid basin (SSR-03) and the former parathion production area (SSR-16) that were subsequently excavated. One sample (SSR-10), collected below 12 feet bgs, is not evaluated in this assessment because the construction worker scenario in the assessment assumed the excavation depth would not extend below 12 feet bgs. Of the remaining 31 samples, all were sampled for PCBs. Fifteen of the subsurface soil samples were additionally analyzed for the COPC list extant at the time of the investigation (arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, vanadium, methyl parathion, parathion, tetraethyldithiopyrophosphate, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dichlorophenol, 4-nitrophenol, o,o,o-triethylphosphorothioate, phenol, pentachlorophenol, 1,1,2,2-tetrachloroethane, chlorobenzene, isopropylbenzene, and methylene chloride). Three duplicate samples were collected from subsurface soil location SSR-15, SSRI-06 and SSRI-12.

Surface soil and subsurface soil datasets are combined into one current/future dataset for evaluating risks to construction workers who may come into contact with soil both at the surface and subsurface regardless of the presence of a concrete cap. If construction work were to take place either currently or in the future, the cap would be removed, exposing the construction worker to all soil. The list of the surface and subsurface soil samples used in the risk assessment is provided in Table A-2, and sampling locations are shown on Figure A-1.

Surface soil and subsurface soil datasets are combined and collectively referred to as "subsurface soil" for the remainder of the document for construction workers who may come into contact with soil both at the surface and at depth.

3.2.3 Groundwater

The groundwater data set consists of analytical results from samples from 38 monitoring wells. All samples were analyzed for PCBs. Additional analyses were performed on a subset of these wells. Results from the last two years of monitoring from each well were used to select COPCs. However, in keeping with Region 4 policy, only those wells within the portions of plumes with the highest chemical concentrations, defined as MW-07, MW-09A, MW-14, MW-15, MW-16, MW-20A, MW-21A, and T-4, were used to assess risk (CDM 2006). Therefore, not all groundwater COPCs are represented in the risk calculations.

Monitoring well MW-16 is installed in the deep residuum, while the remaining seven are installed in the shallow residuum. All of these wells were, however, grouped for purposes of evaluating potential risks and hazards. This approach assumes that a well installed in the future could be screened across both units. The list of the groundwater samples used in the risk assessment is provided in Table A-3, however, only the most contaminated well from the plume area was assessed for risk to future receptors. Well locations are shown in Figure A-2.

3.2.4 Air

As reported in the *Preliminary Site Characterization Summary Report on Operable Unit 3* (Solutia 2005), field data and laboratory analytical data were collected. Field data included information necessary for the calculation of sampler air volumes, which are then used to calculate ambient concentrations from the analytical results supplied by the laboratory. For each sample, ambient PCB concentrations were calculated for each sample by dividing chemical weight by sample volume, yielding an estimate of mass per unit volume in ambient air (nanograms per cubic meter [ng/m^3]). Calculations were made for each PCB congener class (mono through deca), and total PCBs were reported on a per sample basis by summing the values given for each of the ten congener classes. A value of zero was used to calculate total PCBs for the congener classes reported as non-detected. Meteorological monitoring data were collected at the same time as air samples.

Ambient air PCB results included in the risk characterization from the *Preliminary Site Characterization Summary Report on Operable Unit 3* (Solutia 2005) are summarized in Table A-4, and seven of the eight sampling locations are shown on Figure A-3. Sampling location 8-Far West is not shown on the figure, but is located off-site, approximately 550 meters west of sampling location 3-West.

Volatilization of PCBs and suspension of PCB containing particles may contribute to total PCBs in ambient air. To differentiate between vapor and particulate phases, 16 samples were collected at the Near East sample location and subjected to separate analysis of the filter and polyurethane foam/hydrophobic polyaromatic resin (PUF/XAD) media. PCBs were not detected on the filter (particulate) in any of the samples taken during different months and temperature ranges. PCBs found were measured in the PUF/XAD (vapor phase) media. The detection limit for PCBs in particulate matter (0.7 ng/m^3) is sufficiently low that, if any PCBs were present in particulate matter, they would be of little consequence for human health risk. These observations indicate PCBs in ambient air are almost exclusively in the vapor phase in the area surrounding the Solutia Facility. Potential exposure to PCBs in air-borne dust is not further addressed in this risk assessment.

As presented in the *Preliminary Site Characterization Summary Report on Operable Unit 3* (Solutia 2005), average ambient PCB concentration levels at the eight sites monitored varied from 2.3 to 27.1 ng/m^3, with a maximum total PCB concentration of 145.4 ng/m^3 measured at the Northwest sample location. Average and maximum PCB concentrations measured during the program, although an order of magnitude above ambient air Preliminary Remediation Goals (PRGs) of 3.4 ng/m^3, were well below the National Institute of Occupational Safety and Health (NIOSH) PCB standard of 1,000 ng/m^3 and OSHA PCB standard of 1,000,000 ng/m^3.

3.2.5 Quality Control

As presented in the quality assurance (QA) sections of the RFI/CS (Solutia 2002), supplemental RFI (Golder 2003), and PSCS reports (Solutia 2005) data was subjected to the data validation process. The validation process includes the evaluation of holding times, method blanks, surrogate spike recoveries, laboratory control samples, laboratory matrix spikes and laboratory duplicates. In addition to laboratory quality assurance/quality control (QA/QC), field duplicates, matrix spike/matrix spike duplicates (MS/MSDs), and trip and rinsate blanks were utilized in the field programs to provide important information on analytical variability and error, the overall performance of the field sampling effort, and the uncertainty surrounding the analytical results

Overall, considering laboratory and field QA/QC, data employed in the risk characterization are considered of sufficient quality to support quantitative risk characterization. Rejected data are not used in any analysis; however qualified data are incorporated into the data analysis and the uncertainty around the use of this data is discussed in the risk assessment uncertainty section.

3.3 Selection of Chemicals of Potential Concern

Tables B-2.1 through B-2.4 in Attachment B summarize analytical data by medium and identifies COPCs for the risk assessment. The range of detected concentrations, detection frequency, and the range of detection limits presented in these tables were evaluated using complete datasets. These datasets started with all of the surface soil, subsurface soil, groundwater and air data described above in Section 3.2. Rejected data were eliminated for each dataset, and duplicate sample results were evaluated. For duplicate samples, the following criteria were used:

- If an analyte was detected in both the sample and the duplicate, the higher detected concentration was employed.
- If an analyte was detected in either the duplicate or the sample but was not detected in the other, the detected concentration was used.
- If an analyte was not detected in either the sample or the duplicate, the lower detection limit was identified, and one-half the detection limit was used.

No method is available to determine the most appropriate representative concentration from duplicate results. In this assessment, the higher of duplicate concentrations was used because, in several instances, duplicate differed by a large amount (up to a factor of 10). Use of the average of the duplicate results or using only the original result could result in an underestimate of actual chemical concentrations. Use of the higher value is therefore less likely to underestimate the actual concentration.

It is possible that use of the higher of duplicate values may overestimate actual concentrations in some samples. Where many duplicate samples are included in calculations, exposure point concentrations may be overestimated. Such overestimation is minimal when duplicate concentrations are similar. When large differences exist, overestimation could be noticeable in the calculations. However, because EPCs are upper confidence limits on means, single values typically do not make large differences in calculated values, except where data sets are small or the single values are extreme. In the current assessment, use of the larger of duplicate concentrations is expected to make relatively small differences in exposure point concentrations. However, in one instance, at location SSRI-11, the difference between the sample and duplicate results for PCBs is notable for surface soil. The sample PCB result was 154 mg/kg and the duplicate 930 mg/kg. Implications for this wide disparity for this sampling location are further discussed in Section 6 under uncertainties.

Maximum detected concentrations of chemicals were compared, by medium, to risk-based screening levels to identify COPCs for each medium. Screening levels were taken from EPA Region 9 PRGs for residential soil and tap water (EPA 2004b), using a target cancer risk of 10^{-6} (one in one million) and a target hazard quotient of 0.1. Chemicals were considered COPCs if their maximum detected concentration exceeded their respective screening levels.

Risk-based screening levels were not available for the following chemicals: calcium, lead (for groundwater only), magnesium, potassium, sodium, 4-nitrophenol, o,o,o-triethylphosphorothioate and sulfotepp.

Calcium, magnesium, potassium, and sodium are essential metals and were not selected as COPCs. 4-Nitrophenol, o,o,o,-triethylphosphorothioate and sulfotepp were not selected as COPCs because no toxicity information is available for assessment. Lead was retained as a COPC.
COPCs are summarized in **Table 3-1**.

Local ambient levels (background) of inorganic constituents were not considered in the selection of COPCs. Ambient levels are evaluated in Section 6.2.1.2, Background Conditions.

3.4 Exposure Point Concentrations

An EPC is an estimate of the concentration of a COPC at points of exposure for different groups of receptors. This concentration term is calculated as the lower of the maximum detected concentration or the 95 percent upper confidence limit (UCL) of the arithmetic mean. This approach provides a conservative (protective) estimate of average COPC concentrations to account for uncertainties in the risk assessment dataset (EPA 1989). EPCs may be estimated by (1) using environmental data alone, or (2) using a combination of environmental data and environmental fate and transport models. In this assessment, EPCs for soil, groundwater, and air were estimated using environmental data only.

3.4.1 Calculation of Exposure Point Concentrations

EPCs represent concentrations of COPCs to which receptors may be exposed. EPCs serve as input into risk calculations and are derived for all COPCs for each area of concern. EPCs can be used, along with appropriate exposure assumptions, to reflect a range of potential exposures (average, reasonable upper range, worst case). Most often where data quantity allow, single EPCs are used to represent possible exposure concentrations. Typically, EPCs are estimated as the lower concentration of the maximum detected concentration or the upper one-sided 95% confidence limit of the

Table 3-1
Summary of Chemical of Potential Concern for Human Health Risk Assessment
Anniston PCB Site
Operable Unit 3

CAS No.	Chemical	Surface Soil	Surface/ Subsurface Soil	Groundwater	Ambient Air
	Volatile Organic Compounds				
120-82-1	1,2,4-Trichlorobenzene	--	--	YES	--
106-46-7	1,4-Dichlorobenzene	--	--	YES	--
108-90-7	Chlorobenzene	--	NO	YES	--
156-59-2	cis-1,2-Dichloroethene	--	--	YES	--
87-86-5	Pentachlorophenol	--	--	YES	--
79-01-6	Trichloroethylene	--	--	YES	--
	Semi-volatile Organic Compounds				
88-06-2	2,4,6-Trichlorophenol	--	--	YES	--
56-55-3	Benzo(a)anthracene	YES	YES	--	--
50-32-8	Benzo(a)pyrene	YES	YES	--	--
205-99-2	Benzo(b)fluoranthene	YES	YES	--	--
53-70-3	Dibenz(a,h)anthracene	YES	YES	--	--
193-39-5	Indeno(1,2,3-cd)pyrene	YES	YES	YES	--
	Pesticides/PCBs				
1336-36-3	PCBs, Total	YES	YES	YES	YES
58-89-9	gamma-BHC	--	--	YES	--
1024-57-3	Heptachlor epoxide	YES	YES	--	--
298-00-0	Methyl parathion	NO	NO	YES	--
56-38-2	Parathion	NO	NO	YES	--
	Dioxin				
NA	Dioxin TEQ	YES	YES	YES	--
	Inorganics				
7429-90-5	Aluminum	YES	YES	NO	--
7440-36-0	Antimony	YES	YES	YES	--
7440-38-2	Arsenic	YES	YES	YES	--
7440-39-3	Barium	NO	YES	NO	--
7440-43-9	Cadmium	YES	YES	--	--
7440-47-3	Chromium	YES	YES	--	--
7439-89-6	Iron	YES	YES	NO	--
7439-92-1	Lead	YES	YES	NO	--
7439-96-5	Manganese	YES	YES	YES	--
7439-97-6	Mercury	YES	YES	YES	--
7440-02-0	Nickel	NO	YES	--	--
7440-62-2	Vanadium	YES	YES	NO	--

Notes:

See Appendix B, Tables B-2.1 through 2.4 for a full list of detected chemicals and basis for selection as Chemical of Potential Concern (COPC).

YES = Chemical was detected in media and selected as a COPC.

NO = Chemical was detected in media but not selected as a COPC.

-- = Chemical was not detected in media.

arithmetic mean concentration (95% UCL) to help ensure that the actual average concentration is not underestimated. The choice of the arithmetic mean as an appropriate statistic for characterizing exposure at an exposure point is based on the assumption of random exposure within the exposure area (EPA 1989).

For each chemical with 10 or more samples, a 95%UCL on the arithmetic mean concentration was calculated and compared to the maximum detected concentration for that chemical. The lower value of the UCL and the maximum detected value was then selected as the EPC, as recommended by EPA (EPA 1992). For chemicals with less than 10 samples, the maximum detected concentration was used.

Different statistical methods can be used to estimate the 95% UCL of a data set, depending upon the data distribution. Therefore, two key steps are required to estimate the 95% UCL of a data set:

- Determine the distribution of the data (i.e., normal, lognormal, gamma or other).
- Compute the 95% UCL using the appropriate procedure for the data distribution.

In this assessment, both steps were performed with the ProUCL statistical software Version 4.0 developed for EPA (2007a). The ProUCL program contains rigorous parametric and nonparametric (including bootstrap methods) statistical methods (instead of simple *ad hoc* or substitution methods) that can be used on full data sets without nondetects (NDs) and on data sets with below reporting limit (RL) or ND observations.

ProUCL computes the 95%UCL using state-of-the-art parametric and nonparametric methods that can be used on full-uncensored data sets without NDs and also on data sets with below RL observations. ProUCL also provides goodness-of-fit tests for normal, lognormal, and gamma distributions where the ND values can be extrapolated (estimated) based upon normal regression on statistics (ROS), gamma ROS, and lognormal ROS (robust ROS) methods.

For highly censored datasets (i.e. if the percentage of NDs within a data set is greater than 80%) the maximum RL for ND data is compared to the maximum detected concentration. If the maximum RL for the NDs is greater or equal to the maximum concentration, then all NDs with RLs greater than the maximum concentration are excluded from the data set. Otherwise, the RL is used as the substitute for ND values. Using the data set generated from the ND evaluation, percentiles of the data set are determined, and the 95th percentile is selected as the EPC.

Soil EPCs for both current and future land use scenarios were calculated for the Facility Area. EPCs for current land use were calculated using only those samples that are currently accessible (i.e. not under the concrete cap). EPCs for future land use were calculated using all soil samples, because if the concrete cap is not maintained, soil beneath it may become accessible. Since no construction was taking place at the

time this assessment was developed, construction workers are only evaluated for future exposures.
Only one set of soil EPCs for each the South Landfill and West End Landfill were calculated using available data from the soil caps. Separate EPCs for future land use were not calculated, because any exposure to soils beneath the cap is assumed to be unacceptable due to hazardous substances placed in the landfill.

EPCs for air were calculated using all data from each of the air sampling stations. Risks and hazards from inhalation exposure were then estimated for three locations, station 2-South at the South Landfill, station 3 - West at the West End Landfill, and station 6 - Near East roughly in the middle of the operating facility. Potential risks associated with vapor inhalation for the remaining stations were then discussed using the calculated EPCs to estimate possible risks.

Tables B-3.1 through B-3.9 present EPCs for each COPC in each medium and identify the statistical procedure used to calculate UCLs. ProUCL Version 4.0 output tables are provided in Attachment C.

3.4.2 Calculation of Indoor Air Exposure Point Concentrations

3.4.2.1 Shower Volatilization

Modeling is required to estimate the indoor air concentrations of VOCs from groundwater while showering. In this scenario, receptors were assumed to inhale VOCs while showering and during time spent in the bathroom after showering. The dermal absorption of volatilized VOCs was assumed to be negligible due to low dermal permeabilities. A chapter entitled, "Estimating Dermal and Inhalation Exposure to Volatile Chemicals in Domestic Water" by J. Schaum *et al.* (1994), which appears as Chapter 13 in the book entitled *Water Contamination and Health: Integration of Exposure Assessment, Toxicology, and Risk Assessment*, was utilized to perform the shower modeling. This chapter presents methodology for estimating exposure to VOCs in domestic water supplies for the inhalation exposure route.

The methods treat the bathroom as one compartment and estimate an air concentration averaged over the time of the actual shower and the time spent in the bathroom after the shower. The model was derived by assuming that COPCs volatilize at a constant rate, instantly mix uniformly with bathroom air, and ventilation with clean air does not occur. These assumptions imply that chemical concentrations in the air increases linearly from zero to a maximum at the end of the shower, and then remain constant during the time an individual spends in the bathroom immediately after showering. Air concentrations are estimated as follows:

$$C_a = \frac{\left(\frac{C_{aMax}}{2}\right)t_1 + \left(C_{aMax}\right)t_2}{t_1 + t_2}$$

where:

C_a	=	concentration of a chemical contaminant in air, milligrams per cubic meter (mg/m^3)
C_{aMax}	=	maximum concentration of a chemical contaminant in air (mg/m^3)
t_1	=	time of shower (hour)
t_2	=	time after shower (hour)

C_{aMax} is estimated as follows:

$$C_{aMax} = \frac{C_W f F_W t_1}{V_a}$$

where:

C_{aMax}	=	maximum concentration of a chemical contaminant in air (mg/m^3)
C_w	=	water concentration, milligrams per liter (mg/L)
f	=	fraction volatilized (unitless)
F_w	=	water flow rate, liters per hour (L/hour)
t_1	=	time of shower (hour)
V_a	=	bathroom volume, cubic meters (m^3)

Water concentration, C_w, is a site-specific value that refers to the concentration of a chemical in water as it enters the shower. The 95% UCL value or the maximum detected value was utilized as the water concentration (i.e., the EPC listed in Table B-3.6 in Appendix B).

Fraction volatilized, f, is a chemical-specific value that refers to the mass fraction of chemical in water that volatilizes over the course of the shower. Volatilization rates depend on properties such as Henry's Law constants and molecular weights. Chemical-specific fraction volatilized values were calculated from these chemical properties using the equation provided by Schaum *et al.* (1994) (see Tables D-1 and D-2 in Appendix D).

Water flow rate, F_w, refers to the rate at which water flows into the shower. A value of 1,000 L/hour was assumed in the model for the RME scenario and 500 L/hour for the CTE scenario (Schaum *et al.* 1994).

Bathroom volume, V_a, refers to the volume of the bathroom including the shower stall. A value of 6 m^3 was assumed in the model for the RME scenario and 16 m^3 for the CTE scenario (Schaum *et al.* 1994). Shower time, t_1, refers to the actual time of the shower. Values of 15 and 27 minutes for adults and young children, respectively, for the RME; and 6 and 8.4 minutes for adults and young children (0–6 years), respectively, for the CTE (EPA 2001c) were assumed in the model.

Time spent in the bathroom after showering, t_2, was assumed to be 20 and 33 minutes for adults and young children (0–6 years), respectively, for the RME; and 9 and 11.5 minutes for adults and young children, respectively, for the CTE (EPA 2001c).

Three important assumptions make the model conservative (protective), including:

- Volatilization rate is constant.
- Air in the bathroom is not exchanged during the shower and time afterwards.
- Mixing of air in the shower chamber and bathroom air is so rapid that the combined volume can be treated as a single chamber with a single concentration of volatilized chemical (i.e., same chemical concentration throughout shower and bathroom).

Exposure point air concentrations from the shower model are presented in Appendix D. Tables D-3 and D-4 estimate indoor air concentrations from the potable well data for adult and child (0-6 years), respectively.

Section 4
Exposure Assessment

This section evaluates the potential for human exposure to COPCs at OU-3. As discussed in Section 2, OU-3 is comprised of three distinct exposure areas: the Facility Area, the South Landfill and the West End Landfill. Because each area is unique to uses and land covers, each area was individually assessed for appropriate receptors and exposure pathways

The key aspect of this assessment is development of a conceptual site model (CSM) that illustrates how chemicals may move from historical release points to locations where human exposure may occur. Based on this exposure model, this section also discusses exposure factors for people who may contact contamination.

4.1 Identification of Exposure Pathways

As defined in the *Risk Assessment Guidance for Superfund Part A* (EPA 1989), an exposure pathway is composed of the following elements:

- A source and mechanism of chemical release to the environment.
- An environmental transport medium (e.g., groundwater) for the released chemical and/or mechanism of transfer of the chemical from one medium to another.
- A point of potential contact by humans with a contaminated medium.
- A route of exposure (i.e., ingestion, inhalation, or dermal contact).

In this risk assessment, pathways are identified to estimate risks and hazards to current and future receptors assuming that no additional site remediation occurs and that no additional restrictions to site access or use will be put in place in the future. Thus, the goal of the assessment is to estimate possible current and future risks and hazards based on existing site conditions.

Contamination at OU-3 is linked to releases associated with past manufacturing and waste disposal processes. Releases during operations and disposal occurred primarily to soil. However, contaminants in soil have apparently migrated through the vadose zone to affect area groundwater. Further, PCBs do volatilize from soils and are measured in air on and near the site. Potential exposure to COPCs in soil, groundwater and air are therefore considered possible for people using OU-3.

4.2 Characterization of Potentially Exposed Populations

Information obtained from the Solutia Inc., and Pharmacia Corporation's *Preliminary Site Characterization Summary Report on Operable Unit 3* (Solutia 2005) indicates OU-3 is largely occupied by buildings, parking lots, other areas some of which are actively used for industrial purposes, and impervious surfaces, making potential for contact with soil relatively low under current conditions.

The *Preliminary Site Characterization Summary Report on Operable Unit 3* (Solutia 2005) also indicates area residents obtain water from the local water utility. The water utility obtains its water from Coldwater Spring which is located approximately five miles southwest (up gradient) of the manufacturing plant.

The Alabama Department of Environmental Management (ADEM) completed a water supply well survey for the area as part of its preliminary assessment of an unrelated facility in the vicinity of the Solutia plant (ADEM 2000) and reported only one active water supply well within four miles of the site. The well is located on the Union Foundry property, approximately one mile from the plant. As part of the supplemental RFI, Solutia identified two wells within a one-mile radius from the plant; however, the wells were not in use and were not in good enough condition to be used. During the remedial investigation (RI) field investigation, 11 parcels occupied by commercial enterprises were found to have monitoring wells. No potable wells are known to exist in the area.

Based on the above information, potentially exposed populations previously presented in the Pathway Analysis Report (PAR) (CDM 2006) consisted of current/future operations area workers, operations and maintenance (O&M) workers, trespassers, and construction workers. Future on-site residents were also considered as potential future receptors. It was also assumed that exposure to contaminated soils and to PCBs in air as fugitive dust would be ongoing for these receptors. No complete pathway was identified for exposure to groundwater. However, these initial potentially exposed populations have been modified for this characterization following availability of additional information.

Receptors in this characterization include current/future operations area workers, O&M workers, trespassers, and construction workers. Future on-site residents were eliminated from the characterization based on an existing deed restriction preventing residential use. However, current/future off-site residents were included, as they may be exposed to site-related contamination that migrates off-site in groundwater or air. Inhalation of fugitive dust was eliminated as a pathway of concern for all receptors, because PCBs were not identified in fugitive dust. Instead, exposures to ambient air were included.

As stated earlier, the three areas of concern at the site have different uses and land covers, and each area was individually assessed for different receptors. For exposures to contaminants in soil, the Facility Area was assessed for all receptors including operations area workers, operations and maintenance (O&M) workers, trespassers, and construction workers. Only O&M workers and trespassers were assessed for the South and West End Landfills. For exposures to contaminants in groundwater operations area workers, O&M workers, and off-site residents were assumed to have access to groundwater for drinking water under a future land-use scenario.

Detailed discussion of each of these receptor groups is included below and summarized in **Table 4-1**.

4.2.1 Current/Future Receptors

Receptors identified for current/future scenarios include O&M workers and trespassers exposed to surface soil a the South Landfill and West End Landfill, and construction workers exposed to surface and subsurface soil in the Facility Area. For all receptors at the landfills and for construction work at the operating facility, current and future exposure conditions are assumed to be identical and these two time frames are evaluated concurrently in a "current/future" scenario.

Operations and Maintenance Workers

O&M workers may come into contact with contaminants in surface soil through incidental ingestion, dermal contact, and inhalation of vapors or particulates in ambient air during routine inspection of the South Landfill and West End Landfill. Semi-annual groundwater monitoring, occasional cap repair, periodic inspection and mowing could be typical activities. O&M workers are evaluated using site-specific and default parameters recommended by EPA as described in Section 4.4.2.

Trespassers

Trespassers who cross the fence into OU-3 may be exposed to contaminants in surface soil at the South Landfill and West End Landfill via incidental ingestion, dermal contact, and inhalation of vapors or particulates in ambient air. Trespassers are examined using site-specific and default parameters recommended by EPA Region 4 as described in Section 4.4.4.

Construction Workers

Construction workers could be exposed to subsurface soils at the Facility Area through incidental ingestion, dermal contact, and inhalation of vapors or particulates in ambient air. They are examined using site-specific and default parameters recommended by EPA as described in Section 4.4.3.

4.2.2 Current Receptors

Receptors identified for current scenarios include operations area workers, O&M workers and trespassers exposed to current surface soil at the Facility Area, and off-site residents exposed to ambient air.

Operations Area Workers

Operations area workers may come into contact with contaminants in current surface soil at the Facility Area through incidental ingestion, dermal contact, and inhalation of vapors or particulates in ambient air. Workers are evaluated using a combination of default and site-specific parameters recommended by EPA and used in a recent risk assessment for the facility (Solutia 2005). The reader is referred to the Solutia report for detailed explanation of these parameters as described in Section 4.4.1.

TABLE 4-1

Anniston PCB Site, Operable Unit 3

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current / Future	Surface Soil	Surface Soil	South Landfill	O&M Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				Trespassers	Adolescent (7-16 yrs)	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil
			West End Landfill	O&M Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				Trespassers	Adolescent (7-16 yrs)	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil
	Surface/ Subsurface Soil	Surface/ Subsurface Soil	Facility Area	Construction Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
	Air	Ambient Air	South Landfill	O&M Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
				Trespassers	Adolescent (7-16 yrs)	Inhalation	On-Site	Quant	Trespassers may inhale ambient air
			West End Landfill	O&M Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
				Trespassers	Adolescent (7-16 yrs)	Inhalation	On-Site	Quant	Trespassers may inhale ambient air
			Facility Area	Construction Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
Current	Surface Soil	Surface Soil	Facility Area	Operations Area Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				O&M Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				Trespassers	Adolescent (7-16 yrs)	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil

TABLE 4-1

Anniston PCB Site, Operable Unit 3

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Air	Ambient Air	Facility Area	Operations Area Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
				O&M Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
				Trespassers	Adolescent (7-16 yrs)	Inhalation	On-Site	Quant	Trespassers may inhale ambient air
			Ambient Air[1]	Off-site Resident	Child to Adult	Inhalation	Off-Site	Quant	Residents may inhale ambient air
					Child (0-6 yrs)	Inhalation	Off-Site	Quant	Residents may inhale ambient air
Future	Surface Soil	Surface Soil	Facility Area	Operations Area Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				O&M Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				Trespassers	Adolescent (7-16 yrs)	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil
	Groundwater	Groundwater	Tap	Off-site Resident	Child to Adult	Dermal	Off-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
						Ingestion	Off-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
					Child (0-6 yrs)	Dermal	Off-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
						Ingestion	Off-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
				Operations Area Worker	Adult	Ingestion	On-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
				O&M Worker	Adult	Ingestion	On-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
		Air	Vapors in Bath	Off-site Resident	Child to Adult	Inhalation	Off-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
					Child (0-6 yrs)	Inhalation	Off-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.

TABLE 4-1

Anniston PCB Site, Operable Unit 3

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Air	Ambient Air	Ambient Air[1]	Off-site Resident	Child to Adult	Inhalation	Off-Site	Quant	Residents may inhale ambient air
					Child (0-6 yrs)	Inhalation	Off-Site	Quant	Residents may inhale ambient air
				Operations Area Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
				O&M Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
				Trespassers	Adolescent (7-16 yrs)	Inhalation	On-Site	Quant	Trespassers may inhale ambient air

Quant = Quantitative risk analysis performed.

[1]The highest of air exposure point at Facility Area, South Landfill, or West End Landfill.

Operations and Maintenance Workers
O&M workers may come into contact with contaminants in current surface soil at the Facility Area through incidental ingestion, dermal contact, and inhalation of vapors or particulates in ambient air while conducting unspecified duties in the Facility Area. O&M workers are evaluated using site-specific and default parameters recommended by EPA as described in Section 4.4.2.

Trespassers
Trespassers who cross the fence into OU-3 may be exposed to contaminants in current surface soil at the Facility Area via incidental ingestion, dermal contact, and inhalation of vapors or particulates in ambient air. Trespassers are examined using site-specific and default parameters recommended by EPA Region 4 as described in Section 4.4.4.

Off-site Residents
Off-site residents (lifetime residents and young children [0–6 years old]) may come into contact with contaminants via inhalation of contaminants released to and transported off-site in ambient air. Off-site residents are examined using default parameters recommended by EPA as described in Section 4.4.5.

4.2.3 Future Receptors
Receptors identified for future scenarios include operations area workers, O&M workers and trespassers exposed to future surface soil at the Facility Area; operations area workers and O&M workers exposed to site-wide groundwater; and off-site residents exposed to ambient air and site-wide groundwater.

Operations Area Workers
Operations area workers may come into contact with contaminants in future surface soil at the Facility Area through incidental ingestion, dermal contact, and inhalation of vapors or particulates in ambient air.

Future operations area workers were assessed using EPA default assumptions, since future site use is uncertain and current worker activities and locations may change. In addition, future workers are assessed for possible exposure to contaminated groundwater. In theory, a well could be placed on-site and workers could use water from this well for drinking and/or washing. Exposure parameters are discussed Section 4.4.1.

Operations and Maintenance Workers
O&M workers may come into contact with contaminants in future surface soil at the Facility Area via incidental ingestion, dermal contact, and inhalation of vapors or particulates in ambient air while conducting unspecified duties.

O&M workers are also evaluated for a scenario where wells are installed in the future that draw water from the contaminated part of the aquifer for potable use at OU-3. Therefore, future O&M workers are also assumed to ingest groundwater. O&M workers are evaluated using site-specific and default parameters recommended by EPA as described in Section 4.4.2.

Trespassers
Trespassers who cross the fence into OU-3 may be exposed to contaminants in future surface soil at the Facility Area via incidental ingestion, dermal contact, and inhalation of vapors or particulates in ambient air. Trespassers are examined using site-specific and default parameters recommended by EPA Region 4 as described in Section 4.4.4.

Off-site Residents
As discussed above, development of shallow groundwater resources at OU-3 is unlikely, and the deed for the OU-3 property restricts future residential development. However, in theory, a residential drinking water well could be installed near the property boundary that would draw water from the contaminated residuum beneath the site. The risk assessment evaluates such a scenario. Future off-site residents (lifetime residents and young children [0–6 years old]) are evaluated for ingestion, dermal contact, and inhalation of VOCs in groundwater during washing, bathing, showering, laundering, and cooking. Additionally, future off-site residents may inhale ambient air containing PCB vapors originating on-site. Future residents are examined using default parameters recommended by EPA also as described in Section 4.4.5.

4.3 Summary of Exposure Pathways

Based on possible sources, receptors, and exposure pathways considering both current and potential future land use, the following exposure pathways were considered to be complete and are evaluated as part of the assessment of exposure to contaminants at OU-3. Some complete exposure pathways may not represent significant sources of human exposure. Results of this analysis of possible exposure pathways are combined into a Conceptual Site Model (**Figure 4-1**). Pathways considered complete are presented below.

Current/Future Land Use

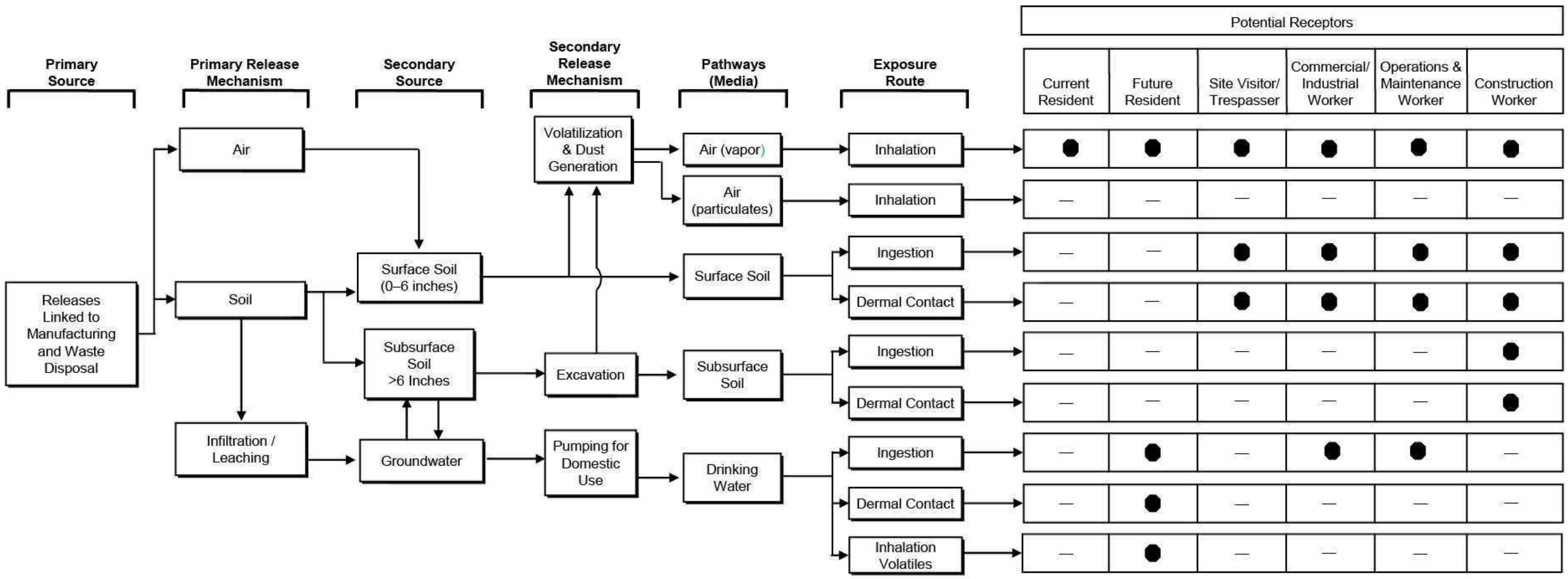
- O&M Worker (Adult)

    Surface soil (South Landfill, West End Landfill)

    - incidental ingestion
    - dermal contact

    Ambient air (South Landfill, West End Landfill)

    - inhalation of volatile chemicals



LEGEND

→ = Pathways, current, historical and future

⬣ = Pathways for quantitative evaluation

— = Incomplete or insignificant pathways

CDM

Anniston CSM
11/20/2007

Figure 4-1
Site Conceptual Exposure Model
Anniston PCB Site, Operable Unit 3
Anniston, Alabama

- Trespasser (Adolescent [7-16 years old])
  - Surface soil (South Landfill, West End Landfill)
    - incidental ingestion
    - dermal contact
  - Ambient air (South Landfill, West End Landfill)
    - inhalation of volatile chemicals
- Construction Worker (Adult)
  - Surface and subsurface soil (Facility Area)
    - incidental ingestion
    - dermal contact
  - Ambient air (Facility Area)
    - inhalation of volatile chemicals

Current Land Use

- Operations Area Worker (Adult)
  - Surface soil (Facility Area)
    - incidental ingestion
    - dermal contact
  - Ambient air (Facility Area)
    - inhalation of volatile chemicals
- O&M Worker (Adult)
  - Surface soil (Facility Area)
    - incidental ingestion
    - dermal contact
  - Ambient air (Facility Area)
    - inhalation of volatile chemicals
- Trespasser (Adolescent [7-16 years old])
  - Surface soil (Facility Area)
    - incidental ingestion
    - dermal contact
  - Ambient air (Facility Area)
    - inhalation of volatile chemicals
- Off-site Resident (Lifetime Resident and Young Child [0 - 6 years old])
  - Ambient air
    - inhalation of volatile chemicals

Future Land Use

- Operations Area Worker (Adult)
  - Surface soil (Facility Area)
    - incidental ingestion
    - dermal contact
  - Ambient air (Facility Area)
    - inhalation of volatile chemicals
  - Groundwater (OU-3 private well)
    - ingestion
- O&M Worker (Adult)
  - Surface soil (Facility Area)
    - incidental ingestion
    - dermal contact
  - Ambient air (Facility Area)
    - inhalation of volatile chemicals
  - Groundwater (OU-3 private well)
    - ingestion
- Trespasser (Adolescent [7-16 years old])
  - Surface soil (Facility Area)
    - incidental ingestion
    - dermal contact
  - Ambient air (Facility Area)
    - inhalation of volatile chemicals
- Off-site Resident [Lifetime Resident and Young Child (0–6 years old)]
  - Groundwater (OU-3 private well)
    - ingestion
    - dermal contact during showering and bathing
    - inhalation of volatile chemicals during showering and bathing
  - Ambient air
    - inhalation of volatile chemicals

4.4 Exposure Assumptions

Exposure assumptions are values for such parameters as the amount of air inhaled each day (20 m^3 for an adult, 10 m^3 for a child), the amount of water consumed per day (1 liter for the operations area worker, O&M worker and child resident; and 2 liters for an adult resident), and body weight (70 kg for an adult and 15 kg for a child). These values are subject to uncertainty and will vary to some degree within the exposed population. They are, however, considered representative for exposure calculations.

Exposure assumptions are used along with estimates for EPCs to estimate daily exposure to COPCs. Exposure assumptions were primarily taken from EPA documents (EPA 1989, 1991, 1992, 1997a, 2002a, 2004a) and from discussions with the EPA Region 4 risk assessor. EPA's standard default assumptions (EPA 1991) were used, where available. Otherwise professional judgment or values from the most recent guidance available were implemented unless EPA Region 4 has a known preference for a specific value. RME and CTE exposure parameters and equations that are used in the risk assessment are provided in RAGS Part D Tables B-4.1, B-4.2, and B-4.3 for soil, groundwater, and air, respectively.

The RFI/CS report (Solutia 2002) proposes site-specific exposure parameters for:

- exposed skin surface area
- dermal absorption factor
- soil adherence factor
- intestinal absorption factor
- soil ingestion rate
- exposure frequency

Site-specific exposure parameters are presented in Tables B-4.4 and B-4.5 and are employed in Section 6 of the risk characterization. The basis and justification for these RCRA values are provided in the 2002 Solutia document.

4.4.1 Operations Area Worker Exposure Assumptions

In the current and future land use RME scenarios, operations area workers are assumed to be exposed to current and future Facility Area surface soil while outdoors at work via incidental ingestion, dermal contact, and inhalation of ambient air. While future commercial/industrial use of OU-3 could include both indoor and outdoor workers, soil and ambient air exposures are conservatively estimated assuming the worker is a full time employee who spends most of the workday conducting maintenance activities outdoors. Activities for this receptor (e.g., moderate digging, landscaping) would involve on-site exposures to surface soil and air. Soil and air exposure factors are given in RAGS Part D Tables B-4.1 and B-4.3, respectively. The future land use scenario also includes the possibility of a private well being installed and used for potable purposes. Groundwater exposure factors are presented in RAGS Part D Table B-4.2.

Under the current RME and CTE scenarios, the soil incidental ingestion rate of site workers was assumed to be 50 mg/day, with an intestinal absorption factor of 0.3 for PCBs and arsenic (Solutia 2002). For dermal contact with soil, the exposed skin surface area for adult workers is 2,290 cm^2 (Solutia 2002). A dermal adherence factor of 0.2 mg/cm^2 was assumed for the RME scenario (Solutia 2002) and 0.02 mg/cm^2 for the CTE scenario (EPA 2004a). Chemical specific dermal absorption factors for COPCs are presented in **Table 4-2**.

Under future RME and CTE scenarios, the soil incidental ingestion rate of site workers was assumed to be 100 mg/day (EPA 2002a). For dermal contact with soil, an adult worker was assumed to wear a short-sleeved shirt, long pants, and shoes; therefore, the exposed skin surface is limited to the head, hands, and forearms. The exposed skin surface area for workers is 3,300 cm^2, the average of the 50^{th} percentile for males and females older than 18 years of age (EPA 2004a). A dermal adherence factor of 0.2 mg/cm^2 was assumed for the RME scenario and 0.02 mg/cm^2 under the CTE scenario (EPA 2004a). Chemical specific dermal absorption factors for COPCs are presented in **Table 4-2**.

Inhalation of ambient air may also occur. An inhalation rate of 1.5 m^3/hour was assumed (EPA 1997a) for both RME and CTE scenarios. Exposure time for inhalation of ambient air is assumed to be 8 hours per day.

For ingestion of groundwater, an ingestion rate of 1 liter (L) of water per day was assumed. Workers are assumed to be exposed for 250 days per year for the RME scenario (EPA 2002a) and 219 days per year for the CTE scenario (EPA 2004a). Exposure duration for site workers is 25 years, based on the 95^{th} percentile value for job tenure for men in the manufacturing sector (EPA 1991, 1997a, 2002a). A life expectancy of 70 years (EPA 2002a) was used as the averaging time for exposure to carcinogenic contaminants. Averaging time for non-carcinogenic effects is equal to the exposure duration, or 25 years for site workers under the RME scenario and nine years under the CTE scenario. A body weight of 70 kg was used (EPA 2002a).

4.4.2 Operation and Maintenance Worker Exposure Assumptions

In the current/future land use RME scenarios, O&M workers are assumed to be exposed to current/future soil at the South and West End Landfills, and current and future Facility Area surface soil while outdoors at work via incidental ingestion, dermal contact, and inhalation of ambient air.

Under both RME and CTE scenarios, the soil incidental ingestion rate of site workers was assumed to be 100 mg/day (EPA 2002a). For dermal contact with soil, an adult

TABLE 4-2

PHYSICAL/CHEMICAL PROPERTIES FOR COPC

Anniston PCB Site, Operable Unit 3

Chemical of Potential Concern	Permeability Coefficient (1) (cm/hr) (water)	Dermal Absorption Fraction (1) (soil)	Henry's Law Constant (atm-m3/mol-K)	Diffusion Coeff. in Air (cm2/s) (3)	Diffusion Coeff. in Water (cm2/s) (3)	Chemical-Specific Fraction Volatilized
VOCs						
1,2,4-Trichlorobenzene	6.6E-02	NA	1.4E-03	3.0E-02	8.2E-06	4.6E-01
1,4-Dichlorobenzene	4.2E-02	NA	2.4E-03	6.9E-02	7.9E-06	4.4E-01
Chlorobenzene	2.8E-02	NA	3.7E-03	7.3E-02	8.7E-06	4.7E-01
cis-1,2-Dichloroethene	NA	NA	4.1E-03	7.4E-02	1.1E-05	5.6E-01
Pentachlorophenol	3.9E-01	2.5E-01	2.4E-08	5.6E-02	6.1E-06	3.7E-01
Trichloroethylene	1.2E-02	NA	1.0E-02	7.9E-02	9.1E-06	4.9E-01
SVOCs						
2,4,6-Trichlorophenol	3.5E-02	1.0E-01	7.8E-06	3.2E-02	6.3E-06	3.8E-01
Benzo(a)anthracene	4.7E-01	1.3E-01	3.4E-06	5.1E-02	9.0E-06	4.8E-01
Benzo(a)pyrene	7.0E-01	1.3E-01	1.1E-06	4.3E-02	9.0E-06	4.8E-01
Benzo(b)fluoranthene	7.0E-01	1.3E-01	1.1E-04	2.3E-02	5.6E-06	3.5E-01
Dibenz(a,h)anthracene	1.5E+00	1.3E-01	1.5E-08	2.0E-02	5.2E-06	3.3E-01
Indeno(1,2,3-cd)pyrene	1.0E+00	1.3E-01	1.6E-06	1.9E-02	5.7E-06	3.6E-01
P/PCBs						
PCBs, Total (3)	7.5E-01	6.0E-02	NA	NA	NA	NA
gamma-BHC	1.1E-02	4.0E-02	1.4E-05	1.4E-02	7.3E-06	4.2E-01
Heptachlor epoxide	NA	NA	9.5E-06	1.3E-02	4.2E-06	2.9E-01
Methyl parathion	NA	NA	NA	NA	NA	NA
Parathion	1.3E-02	NA	NA	NA	NA	NA
Dioxin						
Dioxin TEQ	NA	3.0E-02	NA	NA	NA	NA
Inorganics						
Aluminum	1.0E-03	NA	NA	NA	NA	NA
Antimony	1.0E-03	NA	NA	NA	NA	NA
Arsenic	1.0E-03	3.0E-02	NA	NA	NA	NA
Barium	1.0E-03	NA	NA	NA	NA	NA
Cadmium (4)	1.0E-03	1.0E-03	NA	NA	NA	NA
Chromium (5)	2.0E-03	NA	NA	NA	NA	NA
Iron	1.0E-03	NA	NA	NA	NA	NA
Lead	1.0E-04	NA	NA	NA	NA	NA
Manganese	1.0E-03	NA	NA	NA	NA	NA
Mercury (6)	1.0E-03	NA	1.1E-02	3.1E-02	6.3E-06	3.8E-01
Nickel (7)	2.0E-04	NA	NA	NA	NA	NA
Vanadium	1.0E-03	NA	NA	NA	NA	NA

VOC: volatile organic compounds.

SVOC: semi-volatile organic compounds.

P/PCB: pesticides/polychlorinated biphenols.

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(2) Estimated for volatile chemicals using Eqn. 5 from Schaum et al (1994) (p. 308), with radon as the reference chemical (j).

(3) Source: Soil Screening Guidance, May 1996, EPA/540/R95/128.

(4) Permiability Coefficient for hexavalent chromium applied to total chromium.

$$f_i = f_j * \frac{(2.5/D_w^{0.67} + RT/\ D_a^{0.67}H)_j}{(2.5/D_w^{0.67} + RT/\ D_a^{0.67}H)_i}$$

Where:

fi = volatilization fraction for chemical i.

fj = volatilization fraction for chemical j = Radon.

Da = diffusion coefficient in air, m^2/s.

Dw = diffusion coefficient in water, m^2/s.

R = gas constant, atm-m3/mol-K = 8.21 x 10-5.

H = Henry's law constant, atm-m3/mol-K.

T = temperature, K = 293.

For radon:

fj = 0.65.

Da = 2.0 E-5 m2/s.

Dw = 1.4 e-9 m2/s.

H = 70 torr-m3/mol-K.

worker was assumed to wear a short-sleeved shirt, long pants, and shoes; therefore, the exposed skin surface is limited to the head, hands, and forearms. Exposed skin surface area for workers is 3,300 cm^2, the average of the 50th percentile for males and females greater than 18 years of age (EPA 2004a). A dermal adherence factor of 0.9 mg/cm^2 was assumed for the RME scenario and 0.2 mg/cm^2 for the CTE scenario (EPA 2004a). Chemical specific dermal absorption factors for COPCs are presented in Table 4-2.

Exposure frequency was assumed to be twice per month, or 24 days per year under the RME scenario. One half of that exposure frequency was assumed for the CTE scenario, or 12 days per year. A life expectancy of 70 years (EPA 2002a) was used as the averaging time for exposure to carcinogenic contaminants. Averaging time for non-carcinogenic effects is equal to the exposure duration, or 25 years for the RME scenario (EPA 2002a) and 9 years for the CTE scenario. A body weight of 70 kg was used for construction workers (EPA 2002a).

Inhalation of ambient air may also occur to an O&M worker. An inhalation rate of 1.5 m^3/hour was assumed (EPA 1997a) for both RME and CTE scenarios. Exposure time for inhalation of ambient air is assumed to be 8 hours per day.

4.4.3 Construction Worker Exposure Assumptions

In the current/future land use scenario, construction workers are assumed to be exposed to future Facility Area surface/subsurface soil over the duration of a single construction project (typically five months). If multiple non-concurrent construction projects are anticipated, it is assumed that different workers are employed for each project. Activities for this receptor typically involve substantial exposures to subsurface soils via incidental ingestion, dermal contact, and inhalation of ambient air. Soil and air exposure factors are presented in RAGS Part D Tables B-4.1 and B-4.3, respectively.

Soil incidental ingestion rate of construction workers was assumed to be 330 mg/day under both RME and CTE scenarios. This value is based on the 95th percentile value for adult soil intake rates (EPA 2002a). For dermal contact with soil, an adult construction worker was assumed to wear a short-sleeved shirt, long pants, and shoes; therefore, the exposed skin surface is limited to the head, hands, and forearms. Exposed skin surface area for workers is 3,300 cm^2, the average of the 50th percentile for males and females greater than 18 years of age (EPA 2004a). A dermal adherence factor of 0.3 mg/cm^2 was assumed under the RME scenario and 0.1 mg/cm^2 under the CTE scenario (EPA 2004a), corresponding to the 95th percentile value that has been measured for construction workers. Chemical specific dermal absorption factors for COPCs are presented in Table 4-2.

Inhalation of ambient air may also occur. An inhalation rate of 2.5 m^3/hr was assumed (EPA 1997a) for both RME and CTE scenarios. Exposure time for inhalation of ambient air is assumed to be eight hours per day.

Construction workers are assumed to be exposed for five months (100 workdays) per year under the RME scenario and exposure frequency for the CTE scenario is assumed to be 40 days per year. Exposure duration for construction workers is one year.

A life expectancy of 70 years (EPA 1989) was used for all receptor groups as the averaging time for exposure to carcinogenic contaminants. Averaging time for non-carcinogenic effects is equal to the exposure duration, or one year for construction workers (EPA 1989) for both RME and CTE scenarios. A body weight of 70 kg was used for construction workers (EPA 2002a).

4.4.4 Trespasser Exposure Assumptions

The trespasser is assumed to be an adolescent 7 to 16 years old (a 10 year exposure duration (EPA 2000)). While adults could also trespass at OU-3, adolescent trespassers are expected to have a greater intake of site contaminants because of their lower body weight and because they have more time available to visit OU-3 more frequently.

In the current/future land use scenarios, adolescent trespassers (ages 7 to 16 years old) are assumed to cross the fence and be exposed to current/future soil at the South and West End Landfills, and current and future Facility Area surface soil via ingestion, dermal contact, and inhalation of ambient air. Trespassers are assumed to be exposed for 1 day per week or about 50 days per year under the RME scenario and 10 days per year under the CTE scenario (EPA 2000).

Soil incidental ingestion rate of trespassers was assumed to be 100 mg/day (EPA 1991, 2001b) for both RME and CTE scenarios. For dermal contact with soil, the adolescent trespasser was assumed to wear a short-sleeved shirt, shorts, and shoes; therefore, the exposed skin surface is limited to the head, hands, forearms, and lower legs. For dermal contact with soil, exposed skin surface area for adolescent trespassers was assumed to be 2.800 cm^2 (EPA 2004a). A dermal adherence factor of 0.2 mg/cm^2 was assumed under the RME scenario and 0.04 mg/cm^2 under the CTE scenario (EPA 2004a). Chemical-specific dermal absorption fractions for COPCs are presented in Table 4-2.

Inhalation of ambient air may also occur to a trespasser. An inhalation rate of 1.07 m^3/hour was assumed (EPA 1997a) for both RME and CTE scenarios. Exposure time for inhalation of ambient air is assumed to be four hours per day for the RME scenario and two hours per day for the CTE scenario.

A life expectancy of 70 years (EPA 1989) was used for all receptor groups as the averaging time for exposure to carcinogenic contaminants. Averaging time for non-carcinogenic effects is equal to the exposure duration, or 365 days for trespassers under both RME and CTE scenarios (EPA 1989). A body weight considered representative of the age range of 7-16 years old , 45 kg, was used for adolescent trespassers (EPA 2000).

4.4.5 Residential Exposure Assumptions

In the future land-use scenario, off-site residents are exposed to groundwater via ingestion, dermal contact, and inhalation during showering. In this future land-use scenario, the site groundwater is assumed to be the sole source of water supply for the exposed population.

Residents are assumed to be exposed for 350 days per year (EPA 2000a). The total RME exposure duration for residents is assumed to be 30 years (EPA 2000a): 24 years as an adult and 6 years as a young child. A life expectancy of 70 years (EPA 1989) was used for all receptor groups as the averaging time for exposure to carcinogenic contaminants. Averaging time for non-carcinogenic effects is equal to the exposure duration, or 6 years for children. A body weight of 70 kg was used for all adult residents and 15 kg for children (0 to 6 years) under both scenarios (EPA 2004a).

As a measure of conservatism and to avoid redundancy, an effort was made to identify the most sensitive receptor to calculate non-cancer hazards and excess cancer risk levels. In the case of non-carcinogens, a child resident is the most sensitive receptor, owing to his lower body mass relative to the amount of chemical intake. The 95th percentile of the drinking water intake rate for children ages 1–10 years is 1 L/day (EPA 2000a). Therefore, groundwater ingestion rate for child residents is assumed to be 1 L/day.

For carcinogens, a resident from child through adult (child/adult) is the most sensitive receptor because the excess cancer risk for the child (exposure duration of six years) is assumed to be additive to that of an adult (exposure duration of 24 years). For this reason, no calculations of excess cancer risk are included for child residents and no calculations of non-cancer hazards are included for child/adult residents. An intake factor that accounts for changing body mass and consumption over 30 years was used to assess risk for a lifetime resident. The method is described in EPA's *Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure*

Factors (EPA 1991). The resulting groundwater ingestion factor is 1.09 L-yr/kg-d based on the adult groundwater ingestion rate of 2 L/day.

Inhalation and dermal exposure of residents to groundwater may occur through showering and other household activities. Shower duration for adults is assumed to be 15 minutes, with an additional 20 minutes for drying off, brushing teeth, combing hair, etc., for a total of 0.58 hour (EPA 2001c). Children (0–6 years) are assumed to spend 27 minutes in the bath, with an additional 33 minutes spent in the bathroom afterwards, for a total of 1 hour (EPA 2001c). Showering inhalation rates for both adults and the child (0–6 years) are assumed to be 1 m^3/hour (EPA 1997a). Inhalation rates are based on the mean short-term rate for light activities (e.g., walking at 1.5–3 miles per hour). For surface area exposed, estimates of total body surface areas for adults and children, respectively, are: 18,000 cm^2 and 6,600 cm^2 (EPA 2004a); these values are based on the 50th percentiles for males and females. The chemical-specific dermal permeability coefficients for COPCs are presented in Table 4-2 (EPA 2004a).

Inhalation of ambient air may also occur for the current off-site resident. An inhalation rate of 13 m^3/day was assumed for adult residents (EPA 1997a). An inhalation rate of 7.5 m^3/day was assumed for child residents (EPA 1997a).

Section 5
Toxicity Assessment

A toxicity assessment identifies chemical specific criteria that reflect the intrinsic toxicity of COPCs to humans. These criteria are used, along with estimates of exposure, to estimate potential cancer risks and non-cancer hazards for receptors identified in Section 4. Risk and hazard estimates are provided in Section 6.

Toxicity criteria used in this risk assessment were obtained from a variety of sources according to a hierarchy established in the Office of Solid Waste and Emergency Response (OSWER) Directive 9285.7-53 (EPA 2003). The toxicity value hierarchy is as follows:

- Tier 1—EPA's Integrated Risk Information System (IRIS).
- Tier 2—EPA's Provisional Peer Reviewed Toxicity Values (PPRTVs): The Office of Research and Development/NCEA/Superfund Health Risk Technical Support Center (STSC) develops PPRTVs on a chemical-specific basis when requested by EPA's Superfund program.
- Tier 3—Other Toxicity Values: Tier 3 includes additional EPA and non-EPA sources of toxicity information. Priority should be given to those sources of information that are the most current, the basis for which is transparent and publicly available, and which have been peer-reviewed.

5.1 Health Effects Criteria for Non-carcinogens

For chemicals that exhibit non-carcinogenic (e.g., systemic) effects, organisms have repair and detoxification capabilities that must be exceeded by some critical concentration (threshold) before the health effect is manifested. This threshold view holds that a range of exposures from just above zero to some finite value can be tolerated by the organism without an appreciable hazard of adverse effects.

Health criteria for chemicals exhibiting non-carcinogenic effects for use in risk assessment are generally EPA-derived reference doses (RfDs) and reference concentrations (RfCs). The RfD or RfC is an estimate of average daily exposure to an individual (including sensitive individuals) that is likely to be without appreciable risk of deleterious effects during a lifetime. The RfD is expressed in units of milligram (mg) chemical per kilogram (kg) body weight per day (mg/kg-day); while the RfC is expressed in units of mg chemical per cubic meter (m^3) of air (mg/m^3). RfDs and RfCs are usually derived either from human studies involving work-place exposures or from animal studies, and are adjusted using uncertainty factors to ensure that they are unlikely to underestimate the potential for adverse non-carcinogenic effects to occur. Uncertainty factors reflect scientific judgment regarding the various types of data used to estimate the RfD/RfC and generally consist of multiples of factors ranging from 1 to 10. For example, a factor of 10 may be introduced to account for possible differences in response between humans and animals in prolonged exposure studies.

Other factors may be used to account for variation in susceptibility among individuals in the human population, use of data from a study with less-than-lifetime exposure, and/or use of data from a study that did not identify a no-observed-adverse-effect level (NOAEL).

RfDs and RfCs provide benchmarks against which estimated doses (i.e., those projected from human exposures to various environmental conditions) are compared. Doses that are significantly higher than the RfD/RfC may indicate an increased potential of hazard from the exposure, while doses that are less than the RfD/RfC are not likely to be associated with adverse health effects. It should be noted that an exceedance of the RfD/RfC does not provide an estimate of the likelihood of adverse effects. It only reflects an increased potential hazard for non-cancer health effects.

5.2 Health Effects Criteria for Potential Carcinogens

For chemicals that exhibit carcinogenic effects, EPA recognizes that more than one molecular event must occur to transform a cell from its normal state into a cancerous one. However, EPA regulates carcinogens using a non-threshold concept that assumes that a single change to the genome of a cell can initiate the carcinogenesis process. This non-threshold theory of carcinogenesis therefore assumes that any level of exposure to a carcinogen is associated with some finite possibility of causing cancer. Generally, regulatory agencies assume that the non-threshold hypothesis for carcinogens holds regardless of information concerning mechanisms of carcinogenic action for the chemical.

The carcinogenic potential of a chemical is expressed as as cancer slope factor (CSF) [in units of (mg/kg body weight-day)$^{-1}$], which estimates the risk of cancer per unit dose. When a slope factor is multiplied by an estimate of lifetime average daily dose (ADD) of a potential carcinogen (in mg/kg body weight-day), the result is an estimate of the lifetime excess cancer risk associated with exposure at that dose. EPA develops CSFs in a conservative manner, and risk estimates using slope factors are considered to be upper bound estimates of those possible. Risks estimated using slope factors are considered unlikely to underestimate actual risks and may substantially overestimate risks for a given exposure.

Excess lifetime cancer risks (ELCRs) are generally expressed in scientific notation and are probabilities. An ELCR of 1×10^{-6} (one in one million), for example, represents the incremental probability that an individual will develop cancer as a result of exposure to a carcinogenic chemical over a 70-year lifetime under specified exposure conditions. In addition, CSFs are developed for a specific route of exposure, either oral or inhalation, and ELCRs are estimated separately for these two routes of exposure.

In practice, CSF estimates are derived from the results of human epidemiology studies or chronic animal bioassays. The animal studies are conducted for a range of doses, including a high dose, in order to detect possible adverse effects. Since humans are expected to be exposed at lower doses than those used in animal studies, the data are adjusted via mathematical models. The data from animal studies are typically fitted to the linearized multistage model to obtain a dose-response curve. EPA evaluates a range of possible models based on the available data before conducting the extrapolation. The most appropriate model to reflect the data is selected based on an analysis of the data set.

The 95% UCL slope of the dose-response curve, subject to various adjustments and an inter-species scaling factor, is applied to derive the health protective CSF estimate for humans. Dose-response data from human epidemiological studies are fitted to dose-time-response curves. These models provide rough, but reasonable, estimates of the upper limits on lifetime risk. CSF estimates based on human epidemiological data are also derived using health protective assumptions and, as such, they too are considered unlikely to underestimate risks. Therefore, while actual risks associated with exposures to potential carcinogens are unlikely to be higher than the risks calculated using a slope factor estimate, they could be considerably lower.

In addition, there are varying degrees of confidence in the weight of evidence for carcinogenicity of a given chemical. EPA (1989) has proposed a system for characterizing the overall weight of evidence based on the availability of animal, human, and other supportive data. The weight-of-evidence classification is an attempt to determine the likelihood that an agent is a human carcinogen and thus qualitatively affects the estimation of potential health risks.

Three major factors are considered in characterizing the overall weight of evidence for human carcinogenicity: (1) the availability and quality of evidence from human studies, (2) the availability and quality of evidence from animal studies, and (3) other supportive information which is assessed to determine whether the overall weight of evidence should be modified. Carcinogens have often been grouped into the following five categories based on strength of this evidence:

- Human Carcinogen: There is at least sufficient evidence from human epidemiological studies to support a causal association between an agent and cancer.

- Probable Human Carcinogen: There is at least limited evidence from epidemiological studies of carcinogenicity in humans (Group B1) or, in the absence of adequate data in humans, there is sufficient evidence of carcinogenicity in animals (Group B2).

- Possible Human Carcinogen: There is inadequate evidence of carcinogenicity in humans.

- Not Classified: There is inadequate data or no existing data for the chemical.

- No Evidence of Carcinogenicity in Humans: There is no evidence for carcinogenicity in at least two adequate animal tests in different species or in both epidemiological and animal studies.

The EPA 2005 Cancer Guidelines update previous versions and suggest a slightly different approach to categorizing carcinogens. These guidelines emphasize the value of understanding the biological changes a chemical can cause and how these changes might lead to the development of cancer. They also discuss methods to evaluate and use such information, including information about an agent's postulated *mode-of-action*. Mode-of-action data, when available and of sufficient quality, may be useful in drawing conclusions about the potency of an agent, its potential effects at low doses, whether findings in animals are relevant to humans, and which populations or life stages may be particularly susceptible. In the absence of mode-of-action information, default options are available to allow the risk assessment to proceed.

The 2005 Cancer Guidelines recommend an agent's human carcinogenic potential be described in a *weight-of-evidence narrative* rather than the previously identified categories. The narrative summarizes the full range of available evidence and describes any conditions associated with conclusions about an agent's hazard potential. For example, the narrative may explain that an agent appears to be carcinogenic by some routes of exposure but not others (e.g., by inhalation but not ingestion). Similarly, a hazard may be attributed to exposures during sensitive life stages of development but not at other times. The narrative also summarizes uncertainties and key default options that have been invoked.

The following five standard hazard descriptors are still used in the newest guidelines:

- Carcinogenic to humans.
- Likely to be carcinogenic to humans.
- Suggestive evidence of carcinogenic potential.
- Inadequate information to assess carcinogenic potential.
- Not likely to be carcinogenic to humans.

However, requirements for in-depth analysis of "mode-of-action data" and other modifying information preclude the use of these descriptors to place chemicals into categories as was done previously.

The 2005 Cancer Guidelines also include Supplemental Guidance on the evaluation of early lifetime exposures. For example, where data are available that indicate a chemical is mutagenic, the Supplemental Guidance recommends either developing age-specific slope factors or generic age dependent adjustment factors. Application of the supplemental guidance for this risk assessment is explained in text of the exposure assessment (Section 4), and, where appropriate, was used to adjust cancer risk estimates.

5.3 Toxicological Assessment

Tables 5-1 and **5-2** summarize the chronic RfDs and RfCs used to estimate non-carcinogenic effects for the COPCs, and **Tables 5-3** and **5-4** summarize the CSFs used to estimate cancer risks for the COPCs. These criteria are the most current data, obtained from the May 2007 on-line version of IRIS and current NCEA recommendations.

The use of surrogate toxicity values can be seen noted in Tables 5-1 through 5-4. Regarding dioxin-like PCB congeners, a qualitative assessment of excess risk is made as described in the streamlined risk evaluation in support of residential cleanup (EPA 2002c). Note the congener data is not included in the summary tables in Appendix B.

Chromium VI toxicity values have been applied to total chromium. Chromium VI is considered a carcinogen by the inhalation route, but not a carcinogen by the oral route. Toxicity values for mercuric chloride were applied to all forms of mercury.

The RfD for Aroclor-1254 was used as a surrogate for total PCBs. The upper bound CSF intended for Aroclors having high risk and persistence for total PCBs of [2 $(mg/kg\text{-}day)^{-1}$] was used for RME scenarios and the central estimate CSF [1 $(mg/kg\text{-}day)^{-1}$] was used for CTE scenarios. The oral CSFs for the carcinogenic polycyclic aromatic hydrocarbons (PAHs) are derived using the relative potency approach (EPA 1993, *Provisional Guidance for Quantitative Assessment of Polycyclic Aromatic Hydrocarbons*, EPA/600/R-93/089).

TABLE 5-1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
Anniston PCB Site, Operable Unit 3

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal (1)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factor	RfD: Target Organ(s)	
		Value	Unit		Value	Unit			Source(s)	Date(s) (2) (MM/DD/YYYY)
VOCs										
1,2,4-Trichlorobenzene	Chronic	1.0E-02	mg/kg-day	–	1.0E-02	mg/kg-day	Adrenals	1,000	IRIS	05/11/2007
1,4-Dichlorobenzene	Chronic	3.0E-02	mg/kg-day	–	3.0E-02	mg/kg-day	NA	NA	NCEA	10/2004
Chlorobenzene	Chronic	2.0E-02	mg/kg-day	–	2.0E-02	mg/kg-day	Liver	1,000	IRIS	05/11/2007
cis-1,2-Dichloroethene	Chronic	1.0E-02	mg/kg-day	–	1.0E-02	mg/kg-day	Blood	3,000	PPRTV	01/17/2007
Pentachlorophenol	Chronic	3.0E-02	mg/kg-day	76%	3.0E-02	mg/kg-day	Liver/Kidney	100	IRIS	05/11/2007
Trichloroethylene	Chronic	3.0E-04	mg/kg-day	–	3.0E-04	mg/kg-day	Liver/Kidney/Fetus	3,000	NCEA	10/25/2004
SVOCs										
2,4,6-Trichlorophenol	Chronic	1.0E-04	mg/kg-day	–	1.0E-04	mg/kg-day	NA	NA	NCEA	10/2004
Benzo(a)anthracene	NA	NA	NA	–	NA	NA	NA	NA	IRIS	05/11/2007
Benzo(a)pyrene	NA	NA	NA	89%	NA	NA	NA	NA	IRIS	05/11/2007
Benzo(b)fluoranthene	NA	NA	NA	–	NA	NA	NA	NA	IRIS	05/11/2007
Dibenz(a,h)anthracene	NA	NA	NA	–	NA	NA	NA	NA	IRIS	05/11/2007
Indeno(1,2,3-cd)pyrene	NA	NA	NA	–	NA	NA	NA	NA	IRIS	05/11/2007
P/PCBs										
PCBs, Total (3)	Chronic	2.0E-05	mg/kg-day	–	2.0E-05	mg/kg-day	Eye/Skin/Nails/Immune System	300	IRIS	05/11/2007
gamma-BHC	Chronic	3.0E-04	mg/kg-day	–	3.0E-04	mg/kg-day	Liver/Kidney	1,000	IRIS	05/11/2007
Heptachlor epoxide	Chronic	1.3E-05	mg/kg-day	–	1.3E-05	mg/kg-day	Liver	1,000	IRIS	05/11/2007
Methyl parathion	Chronic	2.5E-04	mg/kg-day	–	2.5E-04	mg/kg-day	Blood	100	IRIS	05/11/2007
Parathion	Chronic	6.0E-03	mg/kg-day	–	6.0E-03	mg/kg-day	NA	NA	HEAST	07/01/1997
Dioxin										
Dioxin TEQ	NA	NA	NA	–	NA	NA	NA	NA	IRIS	05/11/2007
Inorganics										
Aluminum	Chronic	1.0E+00	mg/kg-day	–	1.0E+00	mg/kg-day	GI Tract/CNS	100	NCEA	11/10/2003
Antimony	Chronic	4.0E-04	mg/kg-day	15%	6.0E-05	mg/kg-day	Whole Body/Blood	1,000	IRIS	05/11/2007
Arsenic	Chronic	3.0E-04	mg/kg-day	–	3.0E-04	mg/kg-day	Skin	3	IRIS	05/11/2007
Barium	Chronic	2.0E-01	mg/kg-day	7%	1.4E-02	mg/kg-day	CNS	300	IRIS	05/11/2007
Cadmium (4)	Chronic	1.0E-03	mg/kg-day	3%	2.5E-05	mg/kg-day	Kidney	10	IRIS	05/11/2007
Chromium (5)	Chronic	3.0E-03	mg/kg-day	2.5%	7.5E-05	mg/kg-day	GI Tract	900	IRIS	05/11/2007
Iron	Chronic	7.0E-01	mg/kg-day	–	7.0E-01	mg/kg-day	GI Tract/Liver	NA	PPRTV	01/17/2007
Lead	NA	NA	NA	–	NA	NA	NA	NA	IRIS	05/11/2007
Manganese	Chronic	1.4E-01	mg/kg-day	4%	5.6E-03	mg/kg/day	CNS	1	IRIS	05/11/2007
Mercury (6)	Chronic	3.0E-04	mg/kg-day	95%	2.9E-04	mg/kg/day	Immune System	1,000	IRIS	05/11/2007
Nickel (7)	Chronic	2.0E-02	mg/kg-day	4%	8.0E-04	mg/kg-day	Body and Organ Weight	300	IRIS	05/11/2007
Vanadium	Chronic	1.0E-03	mg/kg-day	2.6%	2.6E-05	mg/kg/day	Metabolic	100	NCEA	12/14/2005

NCEA = National Center for Environmental Assessment.
IRIS = Integrated Risk Information System.
PPRTV = Provisional Peer Reviewed Toxicity Values.
HEAST = Health Effects Assessment Summary Tables. July 1997.
RfD = Reference dose.
VOC = Volatile organic compound.
SVOC = Semi-volatile organic compound.
P/PCB = Pesticide/polychlorinated biphenyl.
CNS = Central Nervous System.

(1) The dermal RfD was assumed to equal the oral RfD, unless an adjustment factor was found in Exhibit 4.1 of RAGS-E (EPA 2001b).
(2) IRIS values were confirmed against the EPA's online database, May 2007.
NCEA and PPRTV values were provided by EPA.
(3) The RfD for total PCBs based on Aroclor 1254.
(4) The RfD for cadmium (food) is 0.001 mg/kg-day and cadmium (water) is 0.0005 mg/kg-day.
(5) The RfD for hexavalent chromium has been applied to total chromium.
(6) The RfD for methyl mercury has been applied to mercury.
(7) The RfD for nickel (soluble salt) has been applied to nickel.

TABLE 5-2
NON-CANCER TOXICITY DATA -- INHALATION
Anniston PCB Site, Operable Unit 3

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD (1)		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfC Target Organ(s)	
		Value	Unit	Value	Unit			Source(s)	Date(s) (2) (MM/DD/YYYY)
VOCs									
1,2,4-Trichlorobenzene	NA	NA	NA	1.0E-03	mg/kg-day	NA	NA	PPRTV	10/2004
1,4-Dichlorobenzene	Chronic	8.0E-01	mg/m^3	2.3E-01	mg/kg-day	Liver	100	IRIS	05/11/2007
Chlorobenzene	Chronic	NA	NA	1.7E-02	mg/kg-day	NA	NA	NCEA	10/2004
cis-1,2-Dichloroethene	Chronic	NA	NA	1.0E-02	mg/kg-day	NA	NA	PPRTV (3)	10/2004
Pentachlorophenol	Chronic	NA	NA	3.0E-02	mg/kg-day	NA	NA	IRIS (3)	10/2004
Trichloroethylene	Chronic	4.0E-02	mg/m^3	1.1E-02	mg/kg/day	CNS	1,000	NCEA	04/15/2003
SVOCs									
2,4,6-Trichlorophenol	Chronic	NA	NA	1.0E-04	mg/kg-day	NA	NA	NCEA (3)	10/2004
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
P/PCBs									
PCBs, Total	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
gamma-BHC	Chronic	NA	NA	3.0E-04	mg/kg-day	NA	NA	HEAST (3)	10/2004
Heptachlor epoxide	Chronic	NA	NA	1.3E-05	mg/kg-day	NA	NA	IRIS (3)	10/2004
Methyl parathion	Chronic	NA	NA	2.5E-04	mg/kg-day	NA	NA	IRIS (3)	10/2004
Parathion	Chronic	NA	NA	6.0E-03	mg/kg-day	NA	NA	HEAST (3)	10/2004
Dioxin									
Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Inorganics									
Aluminum	Chronic	5.0E-03	mg/m^3	1.4E-03	mg/kg-day	CNS	300	NCEA	10/25/2004
Antimony	Chronic	4.0E-05	mg/m^3	1.1E-05	mg/kg-day	Lungs	1,000	NCEA	01/22/2003
Arsenic	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Barium	Chronic	4.9E-04	mg/m^3	1.4E-04	mg/kg-day	NA	NA	NCEA	01/17/2007
Cadmium	Chronic	2.0E-04	mg/m^3	5.7E-05	mg/kg-day	NA	NA	NCEA	03/10/2003
Chromium (4)	Chronic	8.0E-06	mg/m^3	2.3E-06	mg/kg-day	Nasal septum atrophy	90	IRIS	05/11/2007
Iron	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Lead	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Manganese	Chronic	5.0E-05	mg/m^3	1.4E-05	mg/kg-day	CNS	1,000	IRIS	05/11/2007
Mercury	Chronic	3.0E-04	mg/m^3	8.6E-05	mg/kg-day	CNS	30	IRIS	05/11/2007
Nickel	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Vanadium	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007

NCEA = National Center for Environmental Assessment.
IRIS = Integrated Risk Information System.
HEAST = Health Effects Assessment Summary Tables. July 1997.
RfC = Reference concentration.
RfD = Reference dose.

VOC = Volatile organic compound.
SVOC = Semi-volatile organic compound.
P/PCB = Pesticide/polychlorinated biphenyl.

(1) Inhalation RfDs were calculated from Inhalation RfCs assuming a 70 kg individual has an inhalation rate of 20 m^3/day.(USEPA Risk Assessment Guidance for Superfund, Part A; December 1989).
(2) IRIS values were confirmed against the EPA's online database, May 2007.
NCEA values were provided by EPA.
(3) Route-to-route extrapolation from EPA Region 9 PRG tables updated October 2004, http://www.epa.gov/region09/waste/sfund/prg/index.htm.
(4) The RfC information for hexavalent chromium has been applied to total chromium.

TABLE 5-3

CANCER TOXICITY DATA -- ORAL/DERMAL

Anniston PCB Site, Operable Unit 3

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal (1)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Unit		Value	Unit		Source(s)	Date(s) (2)
VOCs								
1,2,4-Trichlorobenzene	NA	NA	--	NA	NA	D	IRIS	05/11/2007
1,4-Dichlorobenzene	2.4E-02	$(mg/kg\text{-}day)^{-1}$	--	2.4E-02	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	07/01/1997
Chlorobenzene	NA	NA	--	NA	NA	D	IRIS	05/11/2007
cis-1,2-Dichloroethene	NA	NA	--	NA	NA	D	IRIS	05/11/2007
Pentachlorophenol	1.2E-01	$(mg/kg\text{-}day)^{-1}$	--	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Trichloroethylene	4.0E-01	$(mg/kg\text{-}day)^{-1}$	--	4.0E-01	$(mg/kg\text{-}day)^{-1}$	B2-C	NCEA	01/22/2003
SVOCs								
2,4,6-Trichlorophenol	1.1E-02	$(mg/kg\text{-}day)^{-1}$	--	1.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Benzo(a)anthracene (3)	7.3E-01	$(mg/kg\text{-}day)^{-1}$	58% - 89%	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Benzo(a)pyrene (3)	7.3E+00	$(mg/kg\text{-}day)^{-1}$	58% - 89%	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Benzo(b)fluoranthene (3)	7.3E-01	$(mg/kg\text{-}day)^{-1}$	58% - 89%	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Dibenz(a,h)anthracene (3)	7.3E+00	$(mg/kg\text{-}day)^{-1}$	58% - 89%	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Indeno(1,2,3-cd)pyrene (3)	7.3E-01	$(mg/kg\text{-}day)^{-1}$	58% - 89%	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
P/PCBs								
PCBs, Total (4)	2.0E+00	$(mg/kg\text{-}day)^{-1}$	80% - 96%	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
gamma-BHC	1.3E+00	$(mg/kg\text{-}day)^{-1}$	--	1.3E+00	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	07/01/1997
Heptachlor epoxide	9.1E+00	$(mg/kg\text{-}day)^{-1}$	--	9.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Methyl parathion	NA	NA	--	NA	NA	NA	IRIS	05/11/2007
Parathion	NA	NA	--	NA	NA	C	IRIS	05/11/2007
Dioxin								
Dioxin TEQ	1.5E+05	$(mg/kg\text{-}day)^{-1}$	--	1.5E+05	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	07/01/1997
Inorganics								
Aluminum	NA	NA	--	NA	NA	D	NCEA	01/22/2003
Antimony	NA	NA	--	NA	NA	D	NCEA	01/22/2003
Arsenic	1.5E+00	$(mg/kg\text{-}day)^{-1}$	95%	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	05/11/2007
Barium	NA	NA	--	NA	NA	D	IRIS	05/11/2007
Cadmium	NA	NA	--	NA	NA	B1	IRIS	05/11/2007
Chromium (5)	NA	NA	--	NA	NA	D	IRIS	05/11/2007
Iron	NA	NA	--	NA	NA	NA	IRIS	05/11/2007
Lead	NA	NA	--	NA	NA	B2	IRIS	05/11/2007
Manganese	NA	NA	--	NA	NA	D	IRIS	05/11/2007
Mercury (6)	NA	NA	--	NA	NA	C	IRIS	05/11/2007
Nickel	NA	NA	--	NA	NA	NA	IRIS	05/11/2007
Vanadium	NA	NA	--	NA	NA	NA	IRIS	05/11/2007

NCEA = National Center for Environmental Assessment.

HEAST = Health Effects Assessment Summary Tables. July 1997.

CSF = Cancer slope factor.

(1) The dermal CSF was assumed to equal the oral CSF, unless an adjustment factor was found in Exhibit 4.1 of RAGS-E (EPA 2001b).

(2) IRIS values were confirmed against the EPA's online database, May 2007. NCEA values were provided by EPA.

(3) The Oral Cancer Slope Factors for PAHs derived using the relative potency approach (USEPA. 1993. Provisional Guidance for Quantitative Assessment of Polycyclic Aromatic Hydrocarbons; EPA/600/R-93/089).

(4) The upper bound CSF [2 $(mg/kg\text{-}day)^{-1}$] was used for Reasonable Maximum Exposure scenario and central estimate CSF [1 $(mg/kg\text{-}day)^{-1}$] was used for Central Tendency Exposure scenario.

(5) The oral CSF for hexavalent chromium has been applied to total chromium.

(6) The oral CSF for methyl mercury has been applied to mercury.

EPA Weight of Evidence (EPA 1986, EPA 1996):

A - Human Carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans.

C - Possible human carcinogen.

D - Not classifiable as human carcinogen.

E - Evidence of noncarcinogenicity.

VOC = Volatile organic compound.

SVOC = Semi-volatile organic compound.

P/PCB = Pesticide/polychlorinated biphenyl.

TABLE 5-4
CANCER TOXICITY DATA -- INHALATION
Anniston PCB Site, Operable Unit 3

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor (1)		Weight of Evidence/ Cancer Guideline Description	Unit Risk: Inhalation CSF	
	Value	Unit	Value	Unit		Source(s)	Date(s) (2)
VOCs							
1,2,4-Trichlorobenzene	NA	NA	NA	NA	D	IRIS	05/11/2007
1,4-Dichlorobenzene	NA	NA	2.2E-02	$(mg/kg\text{-}day)^{-1}$	NA	NCEA	10/2004
Chlorobenzene	NA	NA	NA	NA	D	IRIS	05/11/2007
cis-1,2-Dichloroethene	NA	NA	NA	NA	D	IRIS	05/11/2007
Pentachlorophenol	NA	NA	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Trichloroethylene	NA	NA	4.0E-01	$(mg/kg\text{-}day)^{-1}$	B2-C	EPA	01/17/2007
SVOCs							
2,4,6-Trichlorophenol	3.1E-06	$(\mu g/m^3)^{-1}$	1.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Benzo(a)anthracene (3)	NA	NA	3.1E-01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	01/22/2003
Benzo(a)pyrene (3)	8.9E-04	$(\mu g/m^3)^{-1}$	3.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	01/22/2003
Benzo(b)fluoranthene (3)	NA	NA	3.1E-01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	01/22/2003
Dibenz(a,h)anthracene (3)	NA	NA	3.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	01/22/2003
Indeno(1,2,3-cd)pyrene (3)	NA	NA	3.1E-01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	01/22/2003
P/PCBs							
PCBs, Total	1.0E-04	$(\mu g/m^3)^{-1}$	3.5E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
gamma-BHC	NA	NA	1.3E+00	$(mg/kg\text{-}day)^{-1}$	NA	HEAST (4)	10/2004
Heptachlor epoxide	2.6E-03	$(\mu g/m^3)^{-1}$	9.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Methyl parathion	NA	NA	NA	NA	NA	IRIS	05/11/2007
Parathion	NA	NA	NA	NA	C	IRIS	05/11/2007
Dioxin							
Dioxin TEQ	NA	NA	1.5E+05	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	07/01/1997
Inorganics							
Aluminum	NA	NA	NA	NA	D	NCEA	01/22/2003
Antimony	NA	NA	NA	NA	B1	NCEA	01/22/2003
Arsenic	4.3E-03	$(\mu g/m^3)^{-1}$	1.5E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	05/11/2007
Barium	NA	NA	NA	NA	D	IRIS	05/11/2007
Cadmium	1.8E-03	$(\mu g/m^3)^{-1}$	6.3E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	05/11/2007
Chromium (5)	1.2E-02	$(\mu g/m^3)^{-1}$	4.2E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	05/11/2007
Iron	NA	NA	NA	NA	NA	IRIS	05/11/2007
Lead	NA	NA	NA	NA	B2	IRIS	05/11/2007
Manganese	NA	NA	NA	NA	D	IRIS	05/11/2007
Mercury (6)	NA	NA	NA	NA	C	IRIS	05/11/2007
Nickel	NA	NA	NA	NA	NA	IRIS	05/11/2007
Vanadium	NA	NA	NA	NA	NA	IRIS	05/11/2007

NCEA = National Center for Environmental Assessment.
IRIS = Integrated Risk Information System.
CSF = Cancer slope factor.
(1) Inhalation CSFs were calculated from unit risks assuming a 70 kg individual has an inhalation rate of 20 m^3/day.
(2) IRIS values were confirmed against the EPA's online database, May 2007.
NCEA values were provided by EPA.
(3) The Inhalation CSF for PAHs derived using the relative potency approach (USEPA 1993).
Provisional Guidance for Quantitative Assessment of Polycyclic Aromatic Hydrocarbons; EPA/600/R-93/089).
(4) Route-to-route extrapolation from EPA Region 9 PRG tables updated October 2004,
http://www.epa.gov/region09/waste/sfund/prg/index.htm.
(5) The unit risk for hexavalent chromium has been applied to total chromium.
(6) The inhalation CSF for methyl mercury has been applied to mercury.

EPA Weight of Evidence (EPA 1986, EPA 1996):
A - Human Carcinogen.
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans.
C - Possible human carcinogen.
D - Not classifiable as human carcinogen.
E - Evidence of noncarcinogenicity.

VOC = Volatile organic compound.
SVOC = Semi-volatile organic compound.
P/PCB = Pesticide/polychlorinated biphenyl.

Section 6
Risk Characterization

In this section of the risk assessment, human health risks potentially associated with complete human exposure pathways identified in Section 4 are characterized, integrating toxicity and exposure assessments into quantitative expressions of carcinogenic risk and non-cancer hazards. Potential risks due to exposures to soil, groundwater, and air from OU-3 via incidental ingestion, dermal contact, and inhalation were quantitatively evaluated. Cancer risk and non-cancer hazard calculations for all COPCs for RME scenarios are presented in RAGS Part D Tables B-7.1 through B-7.17 and then summarized in RAGS Part D Tables B-9.1 through B-9.17 and B-10.1 through B-10.17. Cancer risk and non-cancer hazard calculations for all COPCs for CTE scenarios are presented in RAGS Part D Tables E-7.1 through E-7.13 and then summarized in RAGS Part D Tables E-9.1 through E-9.13 and E-10.1 through E-10.13. Total cancer risk and non-cancer hazard for each area and receptor are summarized in **Tables 6-1** and **6-2** for the RME and CTE scenarios, respectively.

Potential for non-cancer health hazards was evaluated by comparing ADDs with reference doses applicable for chronic (long-term) and subchronic (shorter-term) exposure. This ratio of exposure to toxicity is referred to as a hazard quotient (HQ). A hazard index (HI) is the sum of HQs from individual chemicals. A RfD or RfC defines an ADD below which it is unlikely even for sensitive populations to experience adverse health effects. Thus, if an HI exceeds unity (1), the ADD is higher than a "safe" exposure level and some concern for potential non-cancer effects exists. An HI is not, however, an expression of probability of non-cancer effects occurring. Generally, the greater the HI above unity, the greater the level of concern. HQs are typically only added together to estimate HIs for chemicals that affect the same target organ(s) or tissue(s).

Cancer risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. The upper-bound ELCR is estimated by multiplying the lifetime average daily dose (LADD) (Section 4) by an appropriate CSF (Section 5). ELCRs are generally expressed in scientific notation as incremental probabilities. An ELCR of 1×10^{-6} (1 in 1,000,000), for example, represents the incremental probability that an individual will develop cancer as a result of exposure to a carcinogenic chemical over a 70-year lifetime under specified exposure conditions. This increment is in addition to the risk of developing cancer from causes unrelated to the exposure. Typical cancer rates in the United States are in the range of 1 in 4 to 1 in 2.

Generally, EPA uses a target cancer risk range of 10^{-6} to 10^{-4} (1 in 1,000,000 to 1 in 10,000) to evaluate the need for remediation or mitigation at a site (EPA 1991b). Cancer risks below 1 in 1,000,000 are typically assumed to be *de minimis* and would require no remediation or mitigation. Risks within the risk range are often considered acceptable, but decisions on whether to remediate or mitigate risk that fall in this

TABLE 6-1
SUMMARY OF CARCINOGENIC RISKS AND NON-CARCINOGENIC HEALTH HAZARDS
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Area	Receptor	Cancer Risk	Cancer Risk Note	Noncancer Hazard Index (HI)	Noncancer HI Note
Current/Future Land Use					
South Landfill	O&M Worker	$3x10^{-6}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	0.2	HI value is below 1.
	Trespasser - Adolescent (7-16 yrs)	$2x10^{-6}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	0.3	HI value is below 1.
West End Landfill	O&M Worker	$1x10^{-8}$	Cancer risk is below the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	NA	There is no detected data for surface soil in this area.
	Trespasser - Adolescent (7-16 yrs)	$7x10^{-9}$	Cancer risk is below the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	NA	There is no detected data for surface soil in this area.
Facility Area	Construction Worker	$1x10^{-4}$	Cancer risk is at the upper limit of the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	250	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
Current Land Use					
Facility Area	Operations Area Worker	$2x10^{-4}$	Cancer risk is primarily due to ingestion and dermal contact exposure to PCBs from soil (risk = $1x10^{-4}$).	8	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
	O&M Worker	$1x10^{-4}$	Cancer risk is at the upper limit of the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	5	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
	Trespasser - Adolescent (7-16 yrs)	$8x10^{-5}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	8	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
Site Wide	Off-site Resident - Child to Adult (Lifetime Resident)	$2x10^{-6}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	NA	There is no toxicity value for inhalation of PCBs.
	Off-site Resident - Child (0-6 yrs)	$1x10^{-6}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	NA	There is no toxicity value for inhalation of PCBs.
Future Land Use					
Facility Area	Operations Area Worker	$6x10^{-3}$	Cancer risk is primarily due to ingestion and dermal contact exposure to PCBs from soil (risk = $6x10^{-3}$).	416	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
	O&M Worker	$1x10^{-3}$	Cancer risk is primarily due to ingestion and dermal contact exposure to PCBs from soil (risk = $1x10^{-3}$).	79	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
	Trespasser - Adolescent (7-16 yrs)	$7x10^{-4}$	Cancer risk is primarily due to ingestion and dermal contact exposure to PCBs from soil (risk = $7x10^{-4}$).	124	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
Site Wide	Off-site Resident - Child to Adult (Lifetime Resident)	$4x10^{-1}$	Cancer risk is primarily due to ingestion and dermal contact exposure to PCBs from groundwater (risk = $4x10^{-1}$).	30,445	The HI for eye/nails/skin/immune system (mostly from PCBs in groundwater) exceeded 1.
	Off-site Resident - Child (0-6 yrs)	$2x10^{-1}$	Cancer risk is primarily due to ingestion and dermal contact exposure to PCBs from groundwater (risk = $2x10^{-1}$).	46,553	The HI for eye/nails/skin/immune system (mostly from PCBs in groundwater) exceeded 1.
	Operations Area Worker	$2x10^{-2}$	Cancer risk is primarily due to ingestion exposure to PCBs from groundwater (risk = $2x10^{-2}$).	1,212	The HI for eye/nails/skin (mostly from PCBs in groundwater) exceeded 1.
	O&M Worker	$2x10^{-3}$	Cancer risk is primarily due to ingestion exposure to PCBs from groundwater (risk = $2x10^{-3}$).	116	The HI for eye/nails/skin (mostly from PCBs in groundwater) exceeded 1.

Cancer risks: An excess lifetime cancer risk of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes. EPA's generally acceptable risk range for site-related exposures is $1x10^{-6}$ to $1x10^{-4}$ (one in one million to one in ten thousand).

Noncancer hazards: EPA Risk Assessment Guidance for Superfund (EPA 1989) states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse noncancer effects.

TABLE 6-2
SUMMARY OF CARCINOGENIC RISKS AND NON-CARCINOGENIC HEALTH HAZARDS
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Area	Receptor	Cancer Risk	Cancer Risk Note	Noncancer Hazard Index (HI)	Noncancer HI Note
Current/Future Land Use					
South Landfill	O&M Worker	$1x10^{-7}$	Cancer risk is below the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	0.04	HI value is below 1.
	Trespasser - Adolescent (7-16 yrs)	$1x10^{-7}$	Cancer risk is below the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	0.04	HI value is below 1.
West End Landfill	O&M Worker	$3x10^{-9}$	Cancer risk is below the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	NA	There is no detected data for surface soil in this area.
	Trespasser - Adolescent (7-16 yrs)	$7x10^{-10}$	Cancer risk is below the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	NA	There is no detected data for surface soil in this area.
Facility Area	Construction Worker	$3x10^{-5}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	90	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
Current Land Use					
Facility Area	Operations Area Worker	$4x10^{-5}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	3	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
	O&M Worker	$8x10^{-6}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	1	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) meets 1.
	Trespasser - Adolescent (7-16 yrs)	$1x10^{-5}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	1	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) meets 1.
Future Land Use					
Facility Area	Operations Area Worker	$1x10^{-3}$	Cancer risk is primarily due to ingestion and dermal contact exposure to PCBs from soil (risk = $1x10^{-3}$).	364	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
	O&M Worker	$6x10^{-5}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	20	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
	Trespasser - Adolescent (7-16 yrs)	$6x10^{-5}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	20	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
Site Wide	Operations Area Worker	$3x10^{-3}$	Cancer risk is primarily due to ingestion exposure to PCBs from groundwater (risk = $3x10^{-3}$).	432	The HI for eye/nails/skin (mostly from PCBs in groundwater) exceeded 1.
	O&M Worker	$2x10^{-4}$	Cancer risk is primarily due to ingestion exposure to PCBs from groundwater (risk = $2x10^{-4}$).	66	The HI for eye/nails/skin (mostly from PCBs in groundwater) exceeded 1.

Cancer risks: An excess lifetime cancer risk of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes. EPA's generally acceptable risk range for site-related exposures is $1x10^{-6}$ to $1x10^{-4}$ (one in one million to one in ten thousand).

Noncancer hazards: EPA Risk Assessment Guidance for Superfund (EPA 1989) states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse noncancer effects.

range are made on a site-specific basis. Risks that exceed 1 in 10,000 often require remediation and/or mitigation; however, no "bright line" has been established at the upper end of the risk range, and, again, risk management decisions are made on a site-by-site basis.

Estimates of cancer risk and hazard indices are compared to the above targets to put the magnitude of cancer risks and non-cancer hazards into perspective for the risk manager.

6.1 Results of Risk Calculations

As discussed in Section 4, OU-3 is comprised of three distinct areas of concern: the Facility Area, the South Landfill and the West End Landfill. Potential risks were estimated for each area of concern for applicable receptors. In some instances, the site was considered as a whole (single exposure unit). Exposure to ambient air was considered a single exposure unit for current and future off-site residents, employing the site wide maximum detected concentration; and exposure to groundwater was considered a single exposure unit for future off-site residents, operations area workers and O&M workers, employing EPCs from the most impacted area of the plume.

6.1.1 Risk Summary for OU-3

Cancer risks and non-cancer health hazards for each receptor in each area under current/future, current, and future land use conditions are discussed in the following sections.

6.1.1.1 Current/Future Land Use

The following receptors were evaluated for current/future land use:

(1) Construction workers (Facility Area)
(2) O&M workers (South Landfill)
(3) Trespasser (South Landfill)
(4) O&M workers (West End Landfill)
(5) Trespasser (West End Landfill)

6.1.1.1.1 Facility Area

Construction Workers: Current/future construction workers at the Facility Area could be potentially exposed to contaminants in surface and subsurface soil via incidental ingestion and dermal contact as well as inhalation of ambient air.

The total estimated cancer risk for current/future construction workers in the Facility Area (1 x 10-4) meets the upper limit of EPA's target cancer risk range of 1 × 10-6 to 1 × 10-4 for the RME scenario. The cancer risk is predominately due to incidental ingestion (85%) and dermal contact (15%) exposure to total PCBs in surface and subsurface soil. When a more typical exposure is considered under the CTE scenario, the cancer risk (3x 10-5) is within EPA's target cancer risk range of 1 × 10-6 to 1 × 10-4.

The total HI for construction workers in the Facility Area exceeded EPA's non-cancer hazard threshold of 1 for both RME (250) and CTE (90) scenarios. Non-cancer health hazards are predominately due to incidental ingestion (85%) and dermal contact (15%) exposure to total PCBs in surface and subsurface soil which can cause adverse health effects to the eyes, nails, skin and immune system.

Other contaminants that contributed to cancer risk with individual chemical contributions within EPA's risk range included dioxin TEQ and arsenic. Arsenic also contributed to non-cancer hazard to a lesser extent, with skin as the target organ.

6.1.1.1.2 South Landfill

Similar to the Facility Area, potential risks for O&M workers and trespassers exposed to soil at the South Landfill were evaluated.

O&M Workers: Current/future O&M workers at the South Landfill may also be exposed to contaminants in surface soil via incidental ingestion and dermal contact, and inhalation of ambient air.

The total estimated cancer risk for current/future O&M workers in the South Landfill (3×10^{-6}) for the RME scenario is within EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}. The cancer risk is due to incidental ingestion (36%) and dermal contact (64%) exposure to total PCBs in surface soil. As expected, cancer risk under the CTE scenario (1×10^{-7}) is below EPA's target cancer risk range. The total HI for O&M workers in the South Landfill is below EPA's non-cancer hazard threshold of 1 for both RME (0.2) and CTE (0.04) scenarios.

Trespasser (Adolescent 7 to 16 years): Current/future trespassers at the South Landfill could be potentially exposed to contaminants in surface soil via incidental ingestion and dermal contact, and inhalation of ambient air.

The total estimated cancer risk for current/future trespassers in the South Landfill (2×10^{-6}) under the RME scenario is at the low end of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}. The cancer risk is due to incidental ingestion (56%) and dermal contact (44%) exposure to total PCBs in surface soil. When a more typical exposure is considered under the CTE scenario, the cancer risk (1×10^{-7}) is below EPA's target cancer risk range. The total HI for trespassers in the South Landfill is below EPA's non-cancer threshold of 1 for both RME (0.3) and CTE (0.04) scenarios.

6.1.1.1.3 West End Landfill

Potential risks for O&M workers and trespassers exposed to soil at the West End Landfill were also evaluated.

O&M Workers: Current/future O&M workers at the West End Landfill may also be exposed to contaminants in surface soil via incidental ingestion and dermal contact, and inhalation of ambient air.

The total estimated cancer risk for current/future O&M workers in the West End Landfill (1×10^{-8}) for the RME scenario was well below EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}. Non-cancer risk was not applicable at the West End Landfill, as no non-carcinogens were identified as COPCs.

Trespasser (Adolescent 7 to 16 years): Current/future trespassers at the West End Landfill could be potentially exposed to contaminants in surface soil via incidental ingestion and dermal contact, and inhalation of ambient air.

The total estimated cancer risk for current/future trespassers in the West End Landfill (7×10^{-9}) under the RME scenario is well below EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}. Non-cancer risk was not applicable at the West End Landfill, as no non-carcinogens were identified as COPCs.

6.1.1.2 Current Land Use

The following receptors were evaluated for current land use:

(1) Operations area workers (Facility Area)
(2) O&M workers (Facility Area)
(3) Trespasser (Facility Area)
(4) Off-site residents (ambient air)

6.1.1.2.1 Facility Area

Operations Area Workers: Current operations area workers at the Facility Area may be exposed to contaminants in soil, via incidental ingestion and dermal contact, and inhalation of ambient air.

The total estimated cancer risk for current operations area workers in the Facility Area (2×10^{-4}) is above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} for the RME scenario. Cancer risk from dermal contact (54%) with and incidental ingestion (46%) of soil, the primary routes of exposure, is predominately due to total PCBs in surface soil. When a more typical exposure is considered (CTE), cancer risk (4×10^{-5}) is within EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}, again due to incidental ingestion and dermal contact exposure to total PCBs in soil.

The total HI for operations area workers in the Facility Area (8) exceeded EPA's non-cancer threshold of 1 for the RME scenario. Non-cancer health effects from incidental ingestion (37%) and dermal contact (63%) with soil, the primary routes of exposure, are predominately due to total PCBs in surface soil. The total HI also exceeded EPA's non-cancer threshold of 1 (3) under the CTE scenario, again due to total PCBs. The exposure to PCBs can cause adverse effects to the eyes, nails, skin, and immune system. [Note that PCBs found at the site are consistent with Aroclor 1254, a mixture that contains relatively high levels of chlorination. Non-cancer health effects for total PCBs were, therefore, assessed using the RfD for Aroclor 1254. Neurotoxiciy and reproductive toxicity form the basis for non-cancer effects from exposure to Arochlors 1248 and 1016, respectively. Use of the RfD for Aroclor 1254 is not likely to underestimate the magnitude of non-cancer health impacts, since this RfD is lower that those for other Aroclors. However, health impacts other than to the eyes, skin, nails and immune system are possible given the range of chlorination observed in PCB congener s at the site.]

Other contaminants that contributed to cancer risk with individual chemical contributions within EPA's risk range included benzo(a)pyrene, dioxin TEQ and arsenic. Chemicals contributing to non-cancer hazard to a lesser extent included arsenic, with skin as the target organ.

O&M Workers: Current O&M workers at the Facility Area may be exposed to contaminants in soil via incidental ingestion and dermal contact, and inhalation of ambient air.

The total estimated cancer risk for current O&M workers in the Facility Area (1×10^{-4}) is estimated at the upper limit of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} for the RME scenario. The cancer risk is predominately due to incidental ingestion (42%) and dermal contact (58%) exposure to total PCBs in surface soil. When a more typical exposure is considered under the CTE scenario, the cancer risk (8×10^{-6}) is within EPA's target cancer risk range.

The total HI for O&M workers in the Facility Area exceeded EPA's non-cancer threshold of 1 under the RME (5) scenario and met the limit under the CTE (1) scenario. Non-cancer health hazards are predominately due to incidental ingestion (37%) and dermal contact (63%) exposure to total PCBs in surface soil which causes adverse heath effects to the eyes, nails, skin, and immune system.

Other contaminants that contributed to cancer risk with individual chemical contributions within EPA's risk range included benzo(a)pyrene, dioxin TEQ and arsenic. Arsenic also contributed to non-cancer hazard to a lesser extent, with skin as the target organ.

Trespasser (Adolescent 7 to 16 years): Current trespassers at the Facility Area could be potentially exposed to contaminants in surface soil via incidental ingestion and dermal contact, and inhalation of ambient air.

The total estimated cancer risk for current trespassers in the Facility Area (8×10^{-5}) is within EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} for the RME scenario. The cancer risk is predominately due to incidental ingestion (79%) and dermal contact (21%) exposure to total PCBs in surface soil. When a more typical exposure is considered under the CTE scenario, the cancer risk (1×10^{-5}) is also within EPA's target cancer risk range.

The total HI for trespassers in the Facility Area exceeds EPA's non-cancer threshold of 1 for the RME scenario (8) and meets the threshold for the CTE (1) scenario. Non-cancer health hazards are predominately due to incidental ingestion (76%) and dermal contact (24%) exposure to total PCBs in surface soil. Exposure to total PCBs causes toxic effects to the eyes, nails, skin and immune system.

Other contaminants that contributed to cancer risk with individual chemical contributions within EPA's risk range included dioxin TEQ and arsenic. Arsenic also contributed to non-cancer hazard to a lesser extent, with skin as the target organ.

6.1.1.2.2 Site Wide Ambient Air

Current off-site residents may be exposed to on-site contaminants via inhalation of ambient air were evaluated on a screening basis for both lifetime exposures and childhood exposures (0-6 years). The EPC for these exposures was assumed to be equal to the highest detected value from air monitoring results. This maximum was detected by an on-site monitor.

Lifetime Off-site Resident: The total estimated cancer risk for current lifetime residents exposed to ambient air in the Facility Area (2×10^{-6}) is within EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}. Total PCBs were the only COPCs identified in ambient air. No non-cancer inhalation toxicity information is available for PCBs, and therefore non-cancer effects were not evaluated.

Child (0-6 years old): The total estimated cancer risks for current child residents exposed to ambient air in the Facility Area (1×10^{-6}) is at the low end of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}. Total PCBs were the only COPCs identified in ambient air. No non-cancer inhalation toxicity information is available for PCBs, and therefore non-cancer effects were not evaluated.

Ambient air measurements were taken from several samplers placed on and near the facility and landfills. PCBs in the vapor phase were detected at all of these locations in most or all samples (detection frequencies ranged from 85 to 100 percent). Cancer risks for residents were estimated for one of these locations, representing roughly the middle of the facility area. Results from other sample locations can be evaluated using the results from this sample location.

Summary data for all sampling locations is provided in **Table 6-3**; data from the sampler at 6 - Near East was used in the risk calculations. Risks implied were estimated using the ratio of the EPC from 6 - Near East to the estimated cancer risk at this location to calculate the risk for EPCs calculated for other sampling locations. These implied risks for other air samplers are all less than the risk estimated for 6 - Near East, except for the risk at 7 - Northwest. The EPC for this location (83 ng/m^3) is slightly higher than the EPC used for the risk calculations (73 ng/m^3) and results in a risk that is about 14 percent higher. All risks due to inhalation of PCBs in ambient air near the facility fall at or below the low end of EPA's acceptable risk range.

Note that all of these risks were estimated as if the air samplers were located in a residential yard and residents were exposed to PCBs via inhalation constantly.

TABLE 6-3

SUMMARY OF AMBIENT AIR DATA AND ESTIMATED CANCER RISKS ASSOCIATED WITH INHALATION OF AMBIENT AIR

Anniston PCB Site, Operable Unit 3

	Units	Minimum Concentration	Maximum Concentration	Arithmetic Mean	EPC (1)	Detection Frequency	Implied Risk (2)
1 - East	ng/m^3	0.1	27.3	5.7	7	72 / 84	2.30E-07
1 - East (Colo)	ng/m^3	0.05	22.7	4.6	6.8	35 / 41	2.20E-07
2 - South	ng/m^3	0.1	39.2	5.6	7	76 / 82	2.30E-07
3 - West	ng/m^3	0.2	43.4	8.3	10.1	81 / 84	3.40E-07
4 - North	ng/m^3	0.1	115.6	21	26	80 / 83	8.60E-07
5 - Northeast	ng/m^3	0.6	90.8	11.6	13.6	73 / 74	4.50E-07
6 - Near East	ng/m^3	10.8	72.6	32.5	72.6	6 / 6	2.40E-06
7 - Northwest	ng/m^3	2.9	145.5	37.5	83.1	10 / 10	2.70E-06
8 - Far West	ng/m^3	6.1	26.6	15.2	26.6	6 / 6	8.80E-07

(1) Exposure point concentrations (EPCs) were estimated using ProUCL 4.0. ProUCL output is provided in Appendix C.

(2) Risk per ng/m^3.

Currently, no one lives adjacent to the landfill and any exposure that occurs will be intermittent, perhaps when people walk along the fence line or otherwise visit areas immediately surrounding the site. Any ongoing exposures to PCBs in ambient air will be less than those estimated for residents and any risks can be assumed to fall below EPA's risk range. Such low risks are typically considered negligible or *de minimis*.

Also note some data collected at air sampling locations on and near the operating facility were not available in electronic format for inclusion in the risk calculations, due to difficulties in communication with Solutia. Examination of the complete dataset, however, indicated that the results of the analysis of the air pathway would not change substantively if these additional data were considered. For example, many additional data points were available for sampling location 6 - Near East, but the maximum value of about 72 ng/m^3 did not change when considering these additional data. Since this maximum value was used as the exposure point concentration, risk estimates remain conservative. That is, any exposure point concentration calculated from the full dataset would be equal to or less than the EPC used in the calculations. Because risk estimates in this report are conservative, and because risks overall are at or below the low end of EPA's acceptable risk range, the risk analysis was not changed to include additional air data. The complete dataset for air can be found in the *Preliminary Site Characterization Report on Operable Unit 3* (Solutia 2005).

6.1.1.3 Future Land Use

The following receptors were evaluated for future land use:

(1) Operations area workers (Facility Area)
(2) O&M workers (Facility Area)
(3) Trespasser (Facility Area)
(4) Operations area workers (groundwater)
(5) O&M workers (groundwater)
(6) Off-site residents (groundwater)

6.1.1.3.1 Facility Area

Operations Area Workers: Future operations area workers at the Facility Area may be exposed to contaminants in soil via incidental ingestion and dermal contact, and inhalation of ambient air.

The total estimated cancer risk for future operations area workers in the Facility Area ($6x\ 10^{-3}$) is above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} for the RME scenario. Cancer risk from incidental ingestion (72%) and dermal contact (28%) with soil, the primary routes of exposure, is predominately due to total PCBs in surface soil. When a more typical exposure is considered (CTE), cancer risk (1×10^{-3}) still exceeds EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}, again due to incidental ingestion and dermal contact exposure to total PCBs in soil.

The total HI for operations area workers in the Facility Area (416) exceeded EPA's non-cancer threshold of 1 for the RME scenario by over 2 orders of magnitude. Non-cancer health effects from incidental ingestion (72%) and dermal contact (28%) with soil, the primary routes of exposure, are predominately due to total PCBs in surface soil. The total HI also exceeded EPA's non-cancer threshold of 1 (364) under the CTE scenario, again due to total PCBs. The exposure to PCBs can cause adverse effects to the eyes, nails, skin, and immune system. [Note that PCBs found at the site are consistent with Aroclor 1254, a mixture that contains relatively high levels of chlorination. Non-cancer health effects for total PCBs were, therefore, assessed using the RfD for Aroclor 1254. Neurotoxiciy and reproductive toxicity form the basis for non-cancer effects from exposure to Arochlors 1248 and 1016, respectively. Use of the RfD for Aroclor 1254 is not likely to underestimate the magnitude of non-cancer health impacts, since this RfD is lower that those for other Aroclors. However, health impacts other than to the eyes, skin, nails and immune system are possible given the range of chlorination observed in PCB congener s at the site.]

Other contaminants that contributed to cancer risk with individual chemical contributions within EPA's risk range included benzo(a)pyrene, dibenzo(a,h)anthracene, heptachlor epoxide, dioxin TEQ and arsenic. Chemicals contributing to non-cancer hazard to a lesser extent included arsenic, with skin as the target organ.

O&M Workers: Future O&M workers at the Facility Area may be exposed to contaminants in soil via incidental ingestion and dermal contact, and inhalation of ambient air.

The total estimated cancer risk for future O&M workers in the Facility Area (1×10^{-3}) exceeds EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} for the RME scenario. The cancer risk is predominately due to incidental ingestion (37%) and dermal contact (63%) exposure to total PCBs in surface soil. When a more typical exposure is considered under the CTE scenario, the cancer risk (6×10^{-5}) is within EPA's target cancer risk range.

The total HI for O&M workers in the Facility Area exceeded EPA's non-cancer threshold of 1 under both RME (79) and CTE (20) scenarios. Non-cancer health hazards are predominately due to incidental ingestion (36%) and dermal contact (64%) exposure to total PCBs in surface soil which causes adverse heath effects to the eyes, nails, skin, and immune system.

Other contaminants that contributed to cancer risk with individual chemical contributions within EPA's risk range included benzo(a)pyrene, dioxin TEQ and arsenic. Arsenic also contributed to non-cancer hazard to a lesser extent, with skin as the target organ.

Trespasser (Adolescent 7 to 16 years): Future trespassers at the Facility Area could be potentially exposed to contaminants in surface soil via incidental ingestion and dermal contact, and inhalation of ambient air.

The total estimated cancer risk for future trespassers in the Facility Area (7×10^{-4}) is above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} for the RME scenario. The cancer risk is predominately due to incidental ingestion (75%) and dermal contact (25%) exposure to total PCBs in surface soil. When a more typical exposure is considered under the CTE scenario, the cancer risk (6×10^{-5}) is within EPA's target cancer risk range.

The total HI for trespassers in the Facility Area exceeds EPA's non-cancer threshold of 1 for both RME (124) and CTE (20) scenarios. Non-cancer health hazards are predominately due to incidental ingestion (75%) and dermal contact (25%) exposure to total PCBs in surface soil. Exposure to total PCBs causes toxic effects to the eyes, nails, skin and immune system.

Other contaminants that contributed to cancer risk with individual chemical contributions within EPA's risk range included dioxin TEQ and arsenic. Arsenic also contributed to non-cancer hazard to a lesser extent, with skin as the target organ.

6.1.1.3.2 Site Wide Groundwater

Operations area workers, O&M workers and off-site residents were evaluated for potential risks using EPCs based on groundwater data. These receptors were evaluated for exposures to site-related contaminants in groundwater. As previously discussed, these receptors were assumed to use water from a well completed in the residuum and that draws water from a heavily contaminated portion of shallow groundwater.

Operations Area Workers: Should a potable well be installed in the future that draws water from the contaminated part of the aquifer for potable use at OU-3, future operations area workers may be exposed to groundwater via ingestion. The total estimated cancer risk for operations area workers (2×10^{-2}) is above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} for the RME scenario. Cancer risk is due to ingestion (100%) exposure to total PCBs in groundwater. When a more typical exposure is considered under the CTE scenario, the cancer risk (3×10^{-3}) is also above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}.

The total HI for operations area workers is above EPA's non-cancer threshold of 1 for both RME (1,212) and CTE (432) scenarios. Non-cancer health effects were due to ingestion (100%) exposure to total PCBs in groundwater which can cause toxic effects to the eyes, nails, skin and immune system. Other contaminants that may cause deleterious non-cancer effects are 2,4,6-trichlorophenol, methyl parathion, and parathion. Methyl parathion affects blood, while 2,4,6-trichlorophenol and parathion do not affect specific target organs.

O&M Workers: Should a potable well be installed in the future that draws water from the contaminated part of the aquifer for potable use at OU-3, future O&M workers may be exposed to groundwater via ingestion. The total estimated cancer risk for O&M workers ($2x\ 10^{-3}$) is above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} for the RME scenario. Cancer risk is due to ingestion (100%) exposure to total PCBs in groundwater. When a more typical exposure is considered under the CTE scenario, cancer risk (2×10^{-4}) is slightly above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}.

The total HI for operations area workers is above EPA's non-cancer threshold of 1 for both RME (116) and CTE (66) scenarios. Non-cancer health effects were due to ingestion (100%) exposure to total PCBs in groundwater which can cause toxic effects to the eyes, nails, skin and immune system. Other contaminants that may cause deleterious non-cancer effects are 2,4,6-trichlorophenol, methyl parathion, and parathion. Methyl parathion affects blood while 2,4,6-trichlorophenol and parathion do not affect specific target organs.

Off-site Residents: Should a potable well be installed in the future that draws water from the contaminated part of the aquifer for potable use, future off-site residents may be exposed to groundwater via incidental ingestion, dermal contact and inhalation of vapors in the bath as well as via inhalation of ambient air. Future on-site residents were evaluated for both lifetime exposures and childhood exposures (0-6 years old).

The total estimated cancer risks for lifetime off-site residents (4×10^{-1}) is above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}. Cancer risks are predominately due to incidental ingestion (19%) and dermal contact (81%) exposure to total PCBs in groundwater. Note that the emphasis of the HHRA for OU3 is on receptors expected to use the current operational facility and the two landfills. Residents will be evaluated in more detail in the risk assessment for OUs 1 and 2. Thus, only RME was evaluated for limited exposure pathways for residents. Both RME and CTE scenarios will be evaluated in subsequent risk assessments for a more complete set of exposure pathways.

The total HI for lifetime residents (30,445) exceeded EPA's non-cancer threshold of 1 by orders of magnitude. Non-cancer health hazards are predominately due to exposure to incidental ingestion (26%) and dermal contact (74%) exposure to total PCBs in groundwater which can cause adverse health effects to the eyes, nails, skin and immune system. Other contaminants which pose lesser but still potentially significant hazards include 2,4,6-trichlorophenol, methyl parathion, parathion, and arsenic. Exposure to methyl parathion affects the blood, and arsenic affects the skin. RfDs for parathion and 2,4,6-trichlorophenol are not based on specific target organ effects.

The total estimated cancer risks for child residents (0 – 6 years old) (2×10^{-1}) is above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}. Cancer risks are predominately due to incidental ingestion (17%) and dermal contact (83%) exposure to total PCBs in groundwater.

The total HI for child residents (46,553) exceeded EPA's non-cancer threshold of 1. Similar to adults, non-cancer health effects are predominately due to exposure to incidental ingestion (17%) and dermal contact (83%) exposure to total PCBs in groundwater which can cause toxic effects to the eyes, nails, skin and immune system. Other contaminants that contributed less to total HI, but still could be associated with significant exposure include 2,4,6-trichlorophenol, methyl parathion, parathion and arsenic.

In summary, risks and hazards for receptors estimated using RME assumptions resulted in exceedences of the EPA threshold of 1 x 10^{-4} for future operations area workers, and future O&M workers, and trespassers exposed to contaminants in the Facility Area, as well as operations area workers, O&M workers and off-site residents exposed to groundwater within the most contaminated parts of the current groundwater plume. In addition, total HIs for non-cancer effects for all receptors exposed to soil in the Facility Area, and for operations area workers, O&M workers and off-site residents exposed to groundwater within the most contaminated parts of the current groundwater plume exceeded the EPA threshold of 1.

Risks and hazards were also estimated using CTE assumptions in cases where the RME assumptions resulted in risk estimates above EPA thresholds. The comparison of RME and CTE risks and health hazards provides information about the degree to which variability in and uncertainty about receptor behavior (e.g., number of days receptor is exposed) influence the risk estimates.

Risks and hazards estimated for receptors using CTE assumptions resulted in exceedences of the EPA threshold of 1 x 10^{-4} for future operations area workers exposed to contaminants in the Facility Area, as well as operations area workers and O&M workers exposed to groundwater. In addition, total HIs for non-cancer effects for the current/future construction worker, current operations area worker, and all future receptors exposed to the Facility Area; and for operations area workers and O&M workers exposed to groundwater exceeded the EPA threshold of 1.

Risks associated with inhalation of PCB vapors in ambient air were estimated to be at the lower end of or below the EPA risk range (see discussion in section 6.1.1.2.2). These risks, based on recent measurements of PCBs in ambient air at and near the facility are expected to be applicable to future conditions. PCBs are no longer manufactured at the facility and no increases in releases to ambient air are anticipated. Thus, risks based on current ambient air data are likely to be at least as high as any risks associated with future releases. At some point, the source of PCBs to ambient air will be depleted and risks associated with inhalation of PCBs will be eliminated. The time frame for such depletion is not known.

6.1.1.4 Site-specific Current/Future Land Use

In sections 6.1.1.1 through 6.1.1.3, assumptions were made based on RME and CTE, and, in most cases, values were specified by EPA guidance documents. Exposure assumptions for estimating RME are often taken from the upper range of those that are possible, while CTE are calculated using generally more realistic or typical assumptions.

Previous risk assessment efforts for OU-3, developed site-specific information that could be used to define risks for current workers. These assumptions were used to estimate CTE in this risk assessment. Site-specific exposure assumptions are presented in Tables B-4.4 and B-4.5.

Site-specific assumptions included reducing the O&M worker ingestion rate of soil from a default rate of 100 mg/day to 50 mg/day; increasing the exposure frequency from 24 days to 50 days; decreasing the skin surface area from a default of 3,300 cm^2 to 1,300 cm^2 for an adult head and 990 cm^2 for adult hands; and decreasing the dermal adherence from 0.9 mg/cm^2 to 0.004 mg/cm^2 for head and 0.046 mg/cm^2 for hands.

For the trespasser, exposure frequency was increased from 50 days to 60 days, skin surface area was increased from 2,800 cm^2 to 5,300 cm^2, and dermal adherence factor was decreased from 0.2 mg/cm^2 to 0.04 mg/cm^2. An intestinal absorption factor of 0.3 was also added for PCBs and arsenic.

For the construction worker, ingestion rate of soil was increased from 330 mg/day to 480 mg/day; exposure frequency was increased from 100 days to 120 days; skin surface area was increased from 3,300 cm^2 to 1,300 cm^2 for head and 990 cm^2 for hands; and dermal adherence factor was decreased from 0.3 mg/cm^2 to 0.029 mg/cm^2 for head and 0.24 mg/cm^2 for hands. An intestinal absorption factor of 0.3 was also added for PCBs and arsenic.

Cancer risk and non-cancer hazard calculations for all COPCs based on site-specific assumptions (modified exposures) for the O&M worker, trespasser, and construction worker are presented in RAGS Part D Tables F-7.1 through F-7.9 and then summarized in RAGS Part D Tables F-9.1 through F-9.9 and F-10.1 through F-10.9. Cancer and non-cancer risk estimates for each exposure are presented in **Table 6-4** for site-specific scenarios. **Table 6-5** provides a comparison of RME, CTE and site-specific risk estimates.

6.1.1.4.1 O&M Workers

Current/future O&M workers at the South Landfill and West End Landfill may be exposed to contaminants in soil via incidental ingestion and dermal contact. Using site-specific exposure assumptions, the total estimated RME cancer risk in the South Landfill was reduced by an order of magnitude from 3 x 10^{-6} to 4 x 10^{-7}, and the total RME HI was reduced from 0.2 to 0.02. In the West End Landfill the total estimated

TABLE 6-4

SUMMARY OF CARCINOGENIC RISKS AND NON-CARCINOGENIC HEALTH HAZARDS

MODIFIED EXPOSURE

Anniston PCB Site, Operable Unit 3

Area	Receptor	Cancer Risk	Cancer Risk Note	Noncancer Hazard Index (HI)	Noncancer HI Note
Current/Future Land Use					
South Landfill	O&M Worker	$4x10^{-7}$	Cancer risk is below the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	0.02	HI value is below 1.
	Trespasser - Adolescent (7-16 yrs)	$6x10^{-7}$	Cancer risk is below the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	0.1	HI value is below 1.
West End Landfill	O&M Worker	$3x10^{-8}$	Cancer risk is below the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	NA	There is no detected data for surface soil in this area.
	Trespasser - Adolescent (7-16 yrs)	$8x10^{-9}$	Cancer risk is below the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	NA	There is no detected data for surface soil in this area.
Facility Area	Construction Worker	$8x10^{-5}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	124	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
Current Land Use					
Facility Area	O&M Worker	$2x10^{-5}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	1	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) meets 1.
	Trespasser - Adolescent (7-16 yrs)	$4x10^{-5}$	Cancer risk is within the EPA target range of $1x10^{-4}$ to $1x10^{-6}$	3	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
Future Land Use					
Facility Area	O&M Worker	$2x10^{-4}$	Cancer risk is primarily due to ingestion and dermal contact exposure to PCBs from soil (risk = $2x10^{-4}$).	11	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.
	Trespasser - Adolescent (7-16 yrs)	$3x10^{-4}$	Cancer risk is primarily due to ingestion and dermal contact exposure to PCBs from soil (risk = $3x10^{-4}$).	48	The HI for eye/nails/skin/immune system (mostly from PCBs in soil) exceeded 1.

Cancer risks: An excess lifetime cancer risk of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes. EPA's generally acceptable risk range for site-related exposures is $1x10^{-6}$ to $1x10^{-4}$ (one in one million to one in ten thousand).

Noncancer hazards: EPA Risk Assessment Guidance for Superfund (EPA 1989) states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse noncancer effects.

TABLE 6-5
SUMMARY OF CARCINOGENIC RISKS AND NON-CARCINOGENIC HEALTH HAZARDS
RME, CTE AND MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Area	Receptor	Cancer Risk			Noncancer Hazard Index (HI)		
		RME	CTE	Modified	RME	CTE	Modified
Current/Future Land Use							
South Landfill	O&M Worker	$3x10^{-6}$	$1x10^{-7}$	$4x10^{-7}$	0.2	0.04	0.02
	Trespasser - Adolescent (7-16 yrs)	$2x10^{-6}$	$1x10^{-7}$	$6x10^{-7}$	0.3	0.04	0.1
West End Landfill	O&M Worker	$1x10^{-8}$	$3x10^{-9}$	$3x10^{-8}$	NA	NA	NA
	Trespasser - Adolescent (7-16 yrs)	$7x10^{-9}$	$7x10^{-10}$	$8x10^{-9}$	NA	NA	NA
Facility Area	Construction Worker	$1x10^{-4}$	$3x10^{-5}$	$8x10^{-5}$	250	90	124
Current Land Use							
Facility Area	Operation Area Worker	$2x10^{-4}$	$4x10^{-5}$	NA	8	3	NA
	O&M Worker	$1x10^{-4}$	$8x10^{-6}$	$2x10^{-5}$	5	1	1
	Trespasser - Adolescent (7-16 yrs)	$8x10^{-5}$	$1x10^{-5}$	$4x10^{-5}$	8	1	3
Site Wide	Off-site Resident - Child to Adult (Lifetime Resident)	$2x10^{-6}$	NA	NA	NA	NA	NA
	Off-site Resident - Child (0-6 yrs)	$1x10^{-6}$	NA	NA	NA	NA	NA
Future Land Use							
Facility Area	Operation Area Worker	$6x10^{-3}$	$1x10^{-3}$	NA	416	364	NA
	O&M Worker	$1x10^{-3}$	$6x10^{-5}$	$2x10^{-4}$	79	20	11
	Trespasser - Adolescent (7-16 yrs)	$7x10^{-4}$	$6x10^{-5}$	$3x10^{-4}$	124	20	48
Site Wide	Off-site Resident - Child to Adult (Lifetime Resident)	$4x10^{-1}$	NA	NA	30,445	NA	NA
	Off-site Resident - Child (0-6 yrs)	$2x10^{-1}$	NA	NA	46,553	NA	NA
	Operations Area Worker	$2x10^{-2}$	$3x10^{-3}$	NA	1,212	432	NA
	O&M Worker	$2x10^{-3}$	$2x10^{-4}$	NA	116	66	NA

Cancer risks: An excess lifetime cancer risk of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes. EPA's generally acceptable risk range for site-related exposures is $1x10^{-6}$ to $1x10^{-4}$ (one in one million to one in ten thousand).

Noncancer hazards: EPA Risk Assessment Guidance for Superfund (EPA 1989) states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse noncancer effects.

NA: Scenario was not applicable.

RME cancer risk was increased from 1 x 10^{-8} to 3 x 10^{-8}, and HIs were not applicable because no chemicals were detected in surface soil.

Current and future O&M workers at the Facility Area may be exposed to contaminants in soil via incidental ingestion and dermal contact. Using site-specific exposure assumptions for current conditions, the total estimated RME cancer risk in the Facility Area was reduced by an order of magnitude from 1 x 10^{-4} to 2 x 10^{-5}, and the total RME HI was reduced from 5 to 1. Using site-specific exposure assumptions for future conditions, the total estimated RME cancer risk in the Facility Area was reduced by an order of magnitude from 1 x 10^{-3} to 2 x 10^{-4}, and the total RME HI was reduced from 79 to 11.

6.1.1.4.2 *Current/Future Trespasser (Adolescent 7 to 16 years)*

Current/future trespassers at the South Landfill and West End Landfill may be exposed to contaminants in surface soil via incidental ingestion and dermal contact. Using site-specific exposure assumptions, the total estimated RME cancer risk for trespassers in the South Landfill was reduced from 2 x 10^{-6} to 6 x 10^{-7}, and the total HI for was reduced from 0.3 to 0.1. In the West End Landfill the total estimated RME cancer risk increased from 7 x 10^{-9} to 8 x 10^{-9}, and HIs were not applicable, because no chemicals were detected in surface soil.

Current and future trespassers at the Facility Area can be potentially exposed to contaminants in surface soil via incidental ingestion and dermal contact. Using site-specific exposure assumptions for current conditions, the total estimated RME cancer risk for trespassers in the Facility Area was reduced from 8 x 10^{-5} to 4 x 10^{-5}, and the total HI was reduced from 8 to 3. Using site-specific exposure assumptions for future conditions, the total estimated RME cancer risk for trespassers in the Facility Area was reduced from 7 x 10^{-4} to 3 x 10^{-4}, and the total HI was reduced from 124 to 48.

6.1.1.4.3 *Current/Future Construction Worker*

Current/future construction workers at the Facility Area can be potentially exposed to contaminants in subsurface soil via incidental ingestion and dermal contact as well as inhalation of ambient air. Using site-specific exposure assumptions, the total estimated RME cancer risk for construction workers in the Facility Area was reduced from 1 x 10^{-4} to 8 x 10^{-5}, and the total HI was reduced from 250 to 124.

In general, site-specific exposure assumptions for current exposure conditions suggest potential risks and hazards that are about a factor of two less than those estimated using typical default values. Risks and hazards fall in a range similar to CTE estimates presented above.

6.2 Uncertainty in the Risk Assessment

As in any risk assessment, the estimates of potential health threats (cancer risks and non-cancer health hazards) have numerous associated uncertainties. The primary areas of uncertainty and limitations are qualitatively discussed here. Uncertainties in the following areas are discussed separately:

- Environmental data.
- Exposure parameter assumptions.
- Toxicological data.
- Risk characterization.

6.2.1 Environmental Data

Uncertainty is always involved in the estimation of chemical concentrations. Errors in the analytical data may stem from errors inherent in sampling and/or laboratory procedures. One of the most effective methods of minimizing procedural or systematic error is to subject the data to a strict QC review. This QC review procedure helps to eliminate many laboratory errors. However, even with all data vigorously validated, it must be realized that error is inherent in all laboratory procedures.

Additional uncertainty is associated with chemicals reported in samples at concentrations below the reported quantitation limits but still included in the analysis. These values are estimated and may result in the over- or underestimation of risk.

6.2.1.1 Groundwater Data

Groundwater data used in this assessment contributes a significant degree of uncertainty to the overall assessment. For the most part, these data represent current groundwater quality for areas where the plume is located. However, prediction of future concentrations, especially over the long time period that OU-3 may continue to operate, is not possible using current information. Groundwater data are used, without modification, to represent potential future exposures. The presumption that contaminant concentrations will remain the same over time may overestimate the potential risk because dispersion and other natural processes are not accounted for.

Exposure to contaminants in groundwater at OU-3 is not ongoing for any current receptors. If, in the future, wells were installed in the vicinity OU-3, exposure to contaminants in groundwater would be of concern and could potentially pose a risk to exposed operations area workers, O&M workers or off-site residents using water for domestic purposes. The HHRA evaluated these hypothetical scenarios to provide risk managers an indication of degree of contamination of groundwater in the plume area. Risk estimates should be considered as rough indications of the magnitude of contamination in the worst part of existing plumes. When OUs 1 and 2 are evaluated, additional groundwater data may allow more confident estimation of potential risks.

Exposure to contaminated groundwater is made even more conservative by the assumption that exposure to COPCs in groundwater remains constant over time. This assumption suggests a nondiminishing source of contamination and that concentrations will remain at present levels for up to 30 years. In reality, COPCs that currently exist in groundwater will migrate, degrade, and volatilize. Future concentrations of COPCs in groundwater may vary substantially and will most likely be reduced, resulting in exposures significantly less than those calculated in this assessment.

6.2.1.2 Background Conditions

Inorganic EPCs for the Facility Area (the only area with identified inorganic COPCs) were compared to background upper prediction limits (UPLs) calculated from background data collected at Fort McClellan. For those inorganic constituents identified as COPCs in current and future surface soil in the operations area, aluminum, chromium, iron, manganese, and vanadium were all below the background UPLs (**Table 6-6**), typically by a factor of 2 to 3. The antimony EPC was just above the UPL, arsenic was detected at concentrations approximately 20 times the UPL, cadmium was approximately 4 times the UPL, lead exceeded the UPL by about 90 times, and mercury was detected at almost 25 times the UPL.

EPCs of combined surface and subsurface soil for barium, iron and vanadium in the Facility Area were also below the background UPL. Aluminum, antimony, cadmium, chromium and manganese concentrations in the Facility Area were slightly higher than the background UPL, while the arsenic EPC was about 5 times higher than the UPL, lead was almost 90 times the UPL, mercury was just over 20 times the UPL and nickel was just over 30 times the UPL.

These findings indicate several COPCs for the Facility Area are present only at local ambient concentrations and therefore are not site-related. However, because these chemicals do not contribute significantly to health hazards, the ultimate impact to risk estimates is negligible.

6.2.1.3 Surface Soil Data

As discussed briefly in Section 3.3, duplicate results for sample location SSRI-11 vary by almost an order of magnitude. The EPC for calculation of RME for surface soil used the higher of the two duplicate results. This EPC suggested a risk of 2×10^{-4} for current operations workers. One cannot determine whether the high or low result is representative of the actual sample concentration. Thus, use of the larger value could overestimate potential exposures. If the average of the duplicate values was used for EPC calculation, the resulting risk estimate is reduced to 1×10^{-4}. This risk is slightly less than the original estimate, showing that the treatment of data for SSRI-11 does not make a dramatic difference in surface soil EPCs.

Note also that the location of SSRI-11 is in an area of the facility not currently used by operations workers. Inclusion of this data point in calculations increases EPC estimates and may cause risk estimates for current conditions be biased high. However, the current worker scenario is intended to address working conditions and worker behaviors under Solutia management of the site. Minor changes in Solutia operations could in theory change the way the portion of the site where SSRI-11 is located is used. Thus, inclusion of SSRI-11 data was considered appropriate for this assessment.

TABLE 6-6
FACILITY AREA EPCS COMPARED TO FORT McCLELLAN BACKGROUND UPLS
Annitson PCB Site, Operable Unit 3

Chemical	Surface Soil			Surface/Subsurface Soil	
	Ft. McClellan Background UPL	Facility Area Current Land-Use Scenario EPC	Facility Area Future Land-Use Scenario EPC	Ft. McClellan Background UPL	Facility Area EPC
Aluminum	22,900	19,000	19,000	11,500	19,000
Antimony	7.14	9	9	7.14	9
Arsenic	19.5	390	390	31.5	148
Barium	161	NS	NS	205	192
Cadmium	1.2	5	5	0.7	1
Chromium	52.9	23	23	41.1	49
Iron	41,700	26,000	26,000	40,900	26,000
Lead	50.8	4,700	4,700	29.7	2,609
Manganese	2,520	830	830	2,060	2,786
Mercury	0.125	3	3	0.093	2
Nickel	14.6	NS	NS	27.5	890
Vanadium	88.1	40	40	67.8	47

NC: Not calculated. All samples returned results of non-detect.
NS: Not selected as a COPC.
UPL: Upper prediction limit.

If data from SSRI-11 were excluded, risk estimates for current operations workers would decrease by a factor of about 5 and would fall within EPA's risk range. The resulting EPC would be about 73 mg/kg compared to the value of 374 mg/kg used in the risk assessment. To assess current operations workers, a risk based on RME of about 4 x 10^{-5} may be most appropriate. For decisions on the need for site remediation, the RME risk between 2 x 10^{-4} and 6 x 10^{-3}, both of which are based on EPCs that use data from SSRI-11 may be more appropriate.

6.2.2 Exposure Parameter Assumptions

There are two major areas of uncertainty affecting exposure parameter estimation. The first relates to estimation of EPCs. The second relates to parameter values used to estimate chemical intake (e.g., ingestion rate, exposure frequency).

6.2.2.1 Exposure Point Concentrations

As discussed in Section 3, exposure point concentrations (EPCs) were calculated from datasets where the larger of values from duplicate samples was assumed to represent the actual sample concentration. This approach could lead to some overestimation of EPCs for some datasets. However, since it is not possible to determine which duplicate result is more representative, the magnitude any errors cannot be determined. In general, the larger the dataset and the small the difference between duplicate results, the smaller the error. Overall, the effect of treatment of duplicate samples on EPCs is expected to be relatively small.

The approach used in this HHRA to calculate EPCs may over- or underestimate potential exposures and thus risks. These methods were based on EPA guidance (EPA 2004a) and used ProUCL Version 4.0 (EPA, 2007a). EPA expects that their current methods will provide the best statistical estimates of EPCs for individual areas of concern. It should be noted, however, that ProUCL Version 4.0 does not have a recommendation for handling EPCs with high percentage of NDs. As a result, the 95th percentile was calculated as the EPC where the frequency of NDs is greater than 80%. This approach is uncertain and could lead to overestimation of exposure concentrations.

Inclusion of non-detect results in EPC calculations adds increased uncertainty. A ND result does not indicate whether the chemical is absent from the medium, present at a concentration just above zero, or present at a concentration just below the reporting limit. For chemicals that were infrequently detected, many of values used to estimate EPCs were based on reporting limits. In these cases, uncertainty may be high, but this uncertainty typically lies in a range of concentrations that are low compared to concentrations that might be of concern. Thus, the impact of this uncertainty on the results of the risk assessment is minimal.

Additional uncertainty is associated with chemicals reported in samples at concentrations below the reported quantitation limits, but still included in the analysis. These values are estimated and may result in the overestimation or underestimation of risk. For example several analytical results for PCBs in soil were qualified as estimated (i.e., J qualified) and the EPCs calculated for these COPCs based on estimated values may be under- or overestimated. Typically, J qualified values made up only a small fraction of data set used to calculate EPCs, and significant effects on risk calculations are not expected.

The approach used to calculate EPCs may also overestimate potential exposures and thus risks due to certain data limitations. The 95% UCL is strongly influenced by sample size and variability and in some cases the 95% UCL estimate falls above the maximum detected concentration. In such cases, the EPC defaults to the maximum. This default occurred for surface soil EPCs for certain areas. Use of maximum concentrations may have had a substantial impact on estimated risks or hazards for a few COPCs in these areas. However, overall, the impact on total estimated risks and hazards was not substantial.

6.2.2.2 Exposure Parameter Assumptions

Exposure parameter values used are also uncertain. For example, assumptions were made for exposure time, frequency, and duration of potential chemical exposures as well as for the quantity of material ingested, inhaled, or absorbed. In general, assumptions were made based on RME and CTE, and, in most cases, values were specified in EPA guidance documents. Exposure assumptions for estimating RME are often taken from the upper range of those that are possible, while CTE are generally more realistic. Overall, use of RME values for many parameters is expected to be protective for most if not all groups of receptors. For this risk assessment, site-specific exposure parameters were also utilized; these parameters were taken from a previous risk assessment (Solutia 2002). These values are considered representative for current, but not future, activities at the site. Comparison of cancer risks and non-cancer hazards calculated using typical default parameters versus those calculated using site-specific parameters suggest that risk and hazards for current conditions could be overstated by a factor of 2 or more depending on receptor group and location.

6.2.3 Toxicological Data

Toxicological data uncertainty is a large source of uncertainty in this risk assessment. One source of uncertainty includes using dose-response information from effects observed at high doses in animals to predict adverse health effects from low level exposures to humans in contact with the chemical in the environment. Another source is the use of dose-response information from short-term exposure studies to predict the effects of long-term exposure. Uncertainties also arise from using dose-response information in animals to predict human health effects and from homogeneous animal and healthy human populations to predict effects likely to be observed in the general population, which consists of individuals with varying sensitivities.

Additionally, surrogate toxicity values of hexavalent chromium, methyl mercury and nickel as soluble salt were respectively employed for chromium, mercury and nickel.

The use of toxicity information for total PCBs also adds uncertainty to the characterization. PCBs found at the site are consistent with Aroclor 1254, a mixture that contains relatively high levels of chlorination. Non-cancer health effects for total PCBs were, therefore, assessed using the RfD for Aroclor 1254. Neurotoxiciy and reproductive toxicity form the basis for non-cancer effects from exposure to Arochlors 1248 and 1016, respectively. Use of the RfD for Aroclor 1254 is not likely to underestimate the magnitude of non-cancer health impacts, since this RfD is lower that those for other Aroclors. However, health impacts other than to the eyes, skin, nails and immune system are possible given the range of chlorination observed in PCB congeners at the site. For carcinogenic assessment of exposures to PCBs in soil and groundwater, the upperbound oral CSF for total PCBs of 2 $(mg/kg\text{-}day)^{-1}$ was used for RME scenarios and the central estimate oral CSF for total PCBs of 1 $(mg/kg\text{-}day)^{-1}$ was used for CTE scenarios. These choices for use of slope factors were based on the observation that Aroclors found at the site tend to reflect high levels of chlorination (e.g. Aroclors 1248, 1254, 1260 and 1268). Many of the higher chlorinated congeners are the most toxic, and suggest the highest risks from environmental exposures. These slope factors seem unlikely to underestimate risks, but could overestimate risks depending on the variety of factors discussed in Section 5.

6.2.4 Congener Data

PCBs were evaluated in this HHRA quantitatively by calculating cancer risks and non-cancer hazards using toxicity values derived from PCB Aroclors. In addition to PCB Aroclors, a select number of soil and groundwater samples were additionally analyzed for PCB congeners. PCBs were manufactured as a complex mixture of 209 different congeners. Commercial mixtures with higher proportions of chlorine contain higher percentages of the more heavily chlorinated congeners. Twelve of the 209 PCB congeners are considered "dioxin-like" based on their toxicity and certain features of their chemical structure. Dioxin has been associated with reproductive, immune and thyroid toxic effects and neurotoxicity. Dioxin-equivalent potency factors have been developed by the World Health Organization (WHO) (Van den Berg 1998) to assess this toxicity. PCB-126, for example, is considered the most potent congener with a TEF of 0.1, indicating that it is one tenth as toxic as TCDD. While the toxicity values of Aroclors included in the IRIS database reflect the contribution from the 12 dioxin-like congeners as well as any of the other 197 congeners that may be present in the PCB mixture, a qualitative discussion of dioxin-like PCB congener toxicity is also presented.

Table 6-7 presents the PCB congener results for the 12 dioxin-like congeners as well as the dioxin toxic equivalent (TEQ) concentrations for surface soil samples SSRI-04-06, SSRI-07-06, and SSRI-11-6. In the *Streamlined Risk Evaluation for Residential Areas Anniston PCB Site* (EPA 2002c), a cleanup goal of 1 µg/kg for dioxin TEQ was recommended for residential soils. The dioxin TEQ of 0.3 µg/kg derived for SSRI-04-06 was below the cleanup goal, however, the TEQs for SSRI-07-06 (134 µg/kg) and SSRI-11-06 (21 µg/kg) were higher than the cleanup goal. The total PCB concentrations based on Aroclors for these three samples were 12 mg/kg (SSRI-04-06),

TABLE 6-7
PCB CONGENER AND AROCLOR SOIL SAMPLING RESULTS
Anniston PCB Site, Operable Unit 3

Analyte	SSRI-04-06 µg/Kg	SSRI-07-06 µg/Kg	SSRI-11-06 µg/Kg
WHO Congeners			
PCB-77	39.1 J	16700 J	649 J
PCB-81	1.56 J	562 J	26.9 J
PCB-105	238 J	135000 J	12300 J
PCB-114	10.5 J	5730 J	758 J
PCB-118	403 J	286000 J	32400 J
PCB-123	9.88 J	5380 J	647 J
PCB-126	1.65 J	567 J	98.1 J
PCB-156/157	192 J	58400 J	11900 J
PCB-167	45.7 J	16400 J	4590 J
PCB-169	0.0628 UJ	28.6 UJ	3.14 UJ
PCB-189	25.1 J	4900 J	1570 J
PCB-209	456 J	371000 J	80000 J
TEQ Congeners	0.3 J	134.0 J	21.0 J
Total Homolog Groups			
Total Mono-CBs	15 J	26,700 J	265 J
Total Di-CBs	152 J	52,600 J	1,420 J
Total Tri-CBs	545 J	138,000 J	5,590 J
Total Tetra-CBs	1,610 J	1,090,000 J	47,800 J
Total Penta-CBs	2,970 J	1,990,000 J	202,000 J
Total Hexa-CBs	2,670 J	1,730,000 J	385,000 J
Total Hepta-CBs	1,730 J	1,020,000 J	236,000 J
Total Octa-CBs	1,190 J	734,000 J	133,000 J
Total Nona-CBs	825 J	532,000 J	102,000 J
PCB-209 (Deca-CB)	456 J	371,000 J	80,000 J
Total PCB Congeners	12,163 J	7,684,300 J	1,193,075 J
PCB-153	421 J	350,000 J	78,900 J
PCB Arolclors			
Aroclor 1016	0 U	0 U	0 U
Aroclor 1221	0 U	0 U	0 U
Aroclor 1232	0 U	0 U	0 U
Aroclor 1242	0 U	0 U	0 U
Aroclor 1248	1,700 J	15,000	0 U
Aroclor 1254	4,700	48,000	52,000
Aroclor 1260	4,000	45,000	66,000
Aroclor 1268	1,800	18,000	36,000
Total PCB Aroclors	12,200	126,000	154,000

Notes:
U = Below Detection Limit
UJ = Quantitation Limit Estimated
J = Estimated
TEQ calculated with ND=1/2DL and EMPC=EMPC.

126 mg/kg (SSRI-07-06), and 154 mg/kg (SSRI-11-06) as presented in Table 6-7. These results are not expected to be proportional since each Aroclor has a different mixture of congeners and the detected proportions of Aroclors differed in each of these three samples. In addition, once released into the environment and subjected to weathering or taken in by plants or animals and partially stored/metabolized/excreted, substantial changes occur in congener ratios.

Two groundwater samples employed in the risk characterization were analyzed for both PCB Aroclors and congeners as presented in **Table 6-8.** Both Aroclors and congeners were non-detect in the groundwater sample collected from location MW-14 in June 2005. The highest dioxin TEQ concentration in groundwater (1.3×10^{-4} µg/L) was detected in the groundwater sample collected from location T4. This concentration of 1.3×10^{-4} µg/L is elevated relative to the EPA Region 9 dioxin tap water PRG of 4.5×10^{-7} µg/L. In the total PCB sample from T4, only Aroclor 1232 was detected in the sample at a concentration of 120 µg/L. This concentration is also elevated relative to the EPA Region 9 total PCB tap water PRG of 0.96 µg/L.

While the soil and groundwater congener data are insufficient to support a congener-specific risk assessment, available data do suggest that risks based on dioxin-like congeners may be high. This general conclusion is consistent with the high risks estimated using total PCBs.

6.2.5 Risk Characterization

Some uncertainty in assessing risks is associated with exposures to mixtures of chemicals. In this assessment, the effects of exposure to each contaminant had initially been considered separately. However, COPCs occur together at OU-3, and individuals may be exposed to mixtures of these chemicals. Prediction of how mixtures of chemicals will interact must be based on an understanding of mechanisms of toxic action of chemicals in the body. Individual compounds may interact chemically in the body, yielding a new toxic component or causing different effects on different target organs. Suitable data are not currently available to rigorously characterize the effects of chemical mixtures. Consequently, as recommended by EPA (EPA 1989), chemicals present at the site were assumed to act additively, and potential health risks were evaluated by summing ELCR risks and calculating HIs for non-cancer effects. This approach to assessing risk and hazard associated with mixtures of chemicals assumes that no synergistic or antagonistic interactions among the chemicals occur at the levels of exposure estimated. To the extent that these assumptions are incorrect, actual risks could be under- or overestimated. Additionally, although risk and hazard estimates are very high, actual exposure is highly dependent on receptor behavior. For workers, risks would only be realized if activities involving frequent contact with soil occurred on a regular basis. Thus, currently, an O&M worker could have the greatest actual exposure even though their exposure frequency is much less that of an operations area worker. Trespassing is very unlikely currently because of fencing and on-site security. Risks for trespassers would most likely be realized if the site was abandoned in the future.

TABLE 6-8
PCB CONGENER AND AROCLOR GROUNDWATER SAMPLING RESULTS
Anniston PCB Site, Operable Unit 3

Analyte	**T4** µg/L	**MW-14** µg/L
WHO Congeners		
PCB-77	1.32E-01 J	1.44E-05 UJ
PCB-81	6.24E-03 J	1.44E-05 UJ
PCB-105	1.78E-01 J	1.28E-05 UJ
PCB-114	1.22E-02 J	1.23E-05 UJ
PCB-118	2.53E-01 J	1.24E-05 UJ
PCB-123	7.69E-03 J	1.29E-05 UJ
PCB-126	6.64E-04 J	1.43E-05 UJ
PCB-156/157	4.70E-03 J	1.74E-05 UJ
PCB-167	1.31E-03 J	1.26E-05 UJ
PCB-169	3.11E-05 J	1.48E-05 UJ
PCB-189	1.08E-04 J	1.37E-05 UJ
PCB-209	1.04E-04 J	7.21E-05 UJ
TEQ Congeners	1.33E-04 J	8.03E-07 J
Total Homolog Groups		
Total Mono-CBs	4.17E+01 J	1.78E-04 J
Total Di-CBs	2.36E+01 J	8.54E-05 J
Total Tri-CBs	3.06E+01 J	1.36E-04 J
Total Tetra-CBs	1.73E+01 J	2.15E-04 J
Total Penta-CBs	3.06E+00 J	1.02E-04 UJ
Total Hexa-CBs	2.43E-01 J	1.35E-05 UJ
Total Hepta-CBs	3.02E-02 J	1.18E-05 UJ
Total Octa-CBs	6.80E-03 J	1.28E-05 UJ
Total Nona-CBs	1.41E-03 J	7.12E-05 UJ
PCB-209 (Deca-CB)	1.04E-04 J	7.21E-05 UJ
Total PCB Congeners	1.17E+02 J	8.98E-04 J
PCB-153	3.26E-02 J	- UJ
PCB Aroclors		
Aroclor 1016	0 U	0 U
Aroclor 1221	0 U	0 U
Aroclor 1232	120 J	0 U
Aroclor 1242	0 U	0 U
Aroclor 1248	0 U	0 U
Aroclor 1254	0 U	0 U
Aroclor 1260	0 U	0 U
Aroclor 1268	0 U	0 U
Total PCB Aroclors	120 J	0 U

Notes:
U = Below Detection Limit
UJ = Quantitation Limit Estimated
J = Estimated
TEQ calculated with ND=1/2DL and EMPC=EMPC.

Construction worker risks are also predicated on excavation work in areas with significant contamination. In many locations, PCB contamination is relatively low and potential worker's risks would be much less than those reported.

The release of PCBs as vapor from the site could result in a negligible exposure to off-site residents. However, these estimates are not based on a large data set, and do not consider wind direction and wind speed. A more complete analysis would likely result in lower risk estimates.

Residents were not evaluated for on-site exposure in the future because of an existing deed restriction on the property. This approach seems reasonable and future residential exposure is highly unlikely. High risks for on-site workers suggest the current deed restrictions for residents, whose exposure would be expected to be higher, is an important protective mechanism.

Groundwater risks are highly uncertain and should only be interpreted as very general indications of the magnitude of groundwater contamination in the plume area. A more complete assessment of groundwater will likely be undertaken in the risk evaluation of OUs 1 and 2.

As a result of the uncertainties described above, this risk assessment should not be construed as presenting absolute risks or hazards. Rather, it is a conservative analysis intended to reflect potential risks and hazards at the upper end of those possible.

Section 7
Summary and Conclusions

7.1 Summary

7.1.1 Approach

In the HHRA, contaminants in surface soil, subsurface soil, ambient air and/or groundwater at OU-3 were quantitatively evaluated for potential health threats to the following receptors:

- Current and future land use:
  (1) O&M workers (South Landfill, West End Landfill)
  (2) Trespasser (South Landfill, West End Landfill)
  (3) Construction workers (Facility Area)

- Current land use:
  (1) Operations area workers (Facility Area)
  (2) O&M workers (Facility Area)
  (3) Trespasser (Facility Area)
  (4) Off-site residents (ambient air)

- Future land use:
  (1) Operations area workers (Facility Area)
  (2) O&M workers (Facility Area)
  (3) Trespasser (Facility Area)
  (4) Operations area workers (groundwater)
  (5) O&M workers (groundwater)
  (6) Off-site residents (groundwater)

Estimates of cancer risks and non-cancer health hazards were developed, and COPCs which make the greatest chemical contributions to these estimates were identified.

COPCs were selected based on a comparison to EPA Region 9 residential soil PRGs, drinking water PRGs, and ambient air PRGs. COPCs evaluated in the risk assessment were primarily PCBs in soil, groundwater and air, and inorganic constituents in soil.

Exposure routes and human receptor groups were identified and estimates of the magnitude, frequency, and duration of exposure were calculated. EPCs were estimated using the lower of the 95% UCL and the maximum detected concentration.. The EPA ProUCL Version 4.0 program (EPA 2007a) was used to calculate 95%UCLs. Chronic daily intakes were calculated based on RME scenarios, estimates of exposures well above average and among the highest expected to occur at OU-3, and CTE scenarios, estimates of exposures based on more typical assumptions. Chronic daily intakes were also calculated based on site-specific exposure assumptions developed in previous risk assessment efforts at the site.

In the toxicity assessment, current human toxicity criteria (i.e., reference doses/concentrations and slope factors) were obtained from various sources using EPA's IRIS online database and NCEA values.

Risk characterization integrated exposure and toxicity assessments into quantitative expressions of cancer risks and non-cancer health hazards. Specifically, chronic daily intakes were multiplied by CSFs to estimate incremental cancer risks, or were divided by reference doses or reference concentrations to estimate potential for non-cancer health hazards.

Generally, EPA uses a target cancer risk range of 10^{-6} to 10^{-4} (1 in 1,000,000 to 1 in 10,000) to evaluate the need for remediation or mitigation at a site (EPA 1991b). Cancer risks below 1 in 1,000,000 are typically assumed to be *de minimus* and would require no remediation or mitigation. Risks within the risk range are typically considered acceptable, but decisions on whether to remediate or mitigate risks that fall in this range are made on a site-specific basis. Risks that exceed 1 in 10,000 often require remediation and/or mitigation; however, no "bright line" has been established at the upper end of the risk range, and again, risk management decisions are made on a site-by-site basis.

For non-cancer hazards, EPA typically uses a target HI of unity (one). Where HIs exceed this target, remediation and/or mitigation may be indicated. However, no bright line is established at an HI of one, and risk management decisions are made on a site-by-site basis. Estimates of cancer risk and hazard indices are compared to the above targets as a means of providing perspective on levels of risk and hazard for the risk manager.

7.1.2 Summary of Site Risks

Total cancer risks and non-cancer health hazards for each receptor, including each exposure scenario that was quantitatively evaluated for potential health threats, are presented below.

7.1.2.1 Current/Future Land Use

Potential risks for receptors exposed to contaminants in environmental media released at the Facility Area and South Landfill were evaluated under the current/future land-use conditions.

7.1.2.1.1 Facility Area

The total incremental lifetime cancer risk estimates are:

- Construction workers: $1x10^{-4}$ for RME and $3x10^{-5}$ for CTE

The total HIs are:

- Construction workers: 250 for RME and 90 for CTE

The total estimated cancer risks for construction workers exposed to the Facility Area are above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}. Cancer risks are predominately due to ingestion and dermal contact with total PCBs in soil. Non-cancer health hazards calculated for these receptors exceed EPA's non-cancer threshold of unity. Non-cancer health hazards are predominately due to exposure to total PCBs in soil which can cause adverse health effects to the eyes, nails, skin, and immune system.

7.1.2.1.2 South Landfill

The total incremental lifetime cancer risk estimates are:

- O&M workers: $3x10^{-6}$ for RME and $1x10^{-7}$ for CTE
- Trespassers (Adolescent 7 to 16 years): $2x10^{-6}$ for RME and $1x10^{-7}$ for CTE

The total HIs are:

- O&M workers: 0.2 for RME and 0.04 for CTE
- Trespasser (Adolescent 7 to 16 years): 0.3 for RME and 0.04 for CTE

The total estimated cancer risks for O&M workers and trespassers exposed to the South Landfill are within EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} for the RME scenarios and below the risk range for the CTE scenarios. Non-cancer health hazards calculated for these receptors were below EPA's non-cancer threshold of unity.

7.1.2.1.3 West End Landfill

The total incremental lifetime cancer risk estimates are:

- O&M workers: $1x10^{-8}$ for RME and $3x10^{-9}$ for CTE
- Trespassers (Adolescent 7 to 16 years): $7x10^{-9}$ for RME and $7x10^{-10}$ for CTE

The total estimated cancer risks for O&M workers and trespassers exposed to the West End Landfill for both RME and CTE scenarios are well below EPA's target cancer risk range of 1 × 10-6 to 1 × 10-4. Non-cancer health hazards were not calculated, because COPCs evaluated for noncancer effects were not detected in surface soil.

7.1.2.2 Current Land Use

Potential risks for receptors exposed to contaminants in environmental media released at the Facility Area were evaluated under current conditions for the operations area workers, O&M workers, and trespassers, while off-site residents were evaluated under current site wide ambient air conditions.

7.1.2.2.1 Facility Area

The total incremental lifetime cancer risk estimates are:

- Operations area workers: $2x10^{-4}$ for RME and $4x10^{-5}$ for CTE

- O&M workers: $1x10^{-4}$ for RME and $8x10^{-6}$ for CTE
- Trespasser (Adolescent 7 to 16 years): $8x10^{-5}$ for RME and $1x10^{-5}$ for CTE

The total HIs are:

- Operations area workers: 8 for RME and 3 for CTE
- O&M workers: 5 for RME and 1 for CTE
- Trespasser (Adolescent 7 to 16 years): 8 for RME and 1 for CTE

Under RME scenarios, the total estimated cancer risks for operations area workers and O&M workers exposed to the Facility Area are above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}, while trespassers exposed to the Facility Area are at the upper limit of the risk range. CTE estimates for the all three receptors fell within the risk range. Cancer risks are predominately due to ingestion and dermal contact with total PCBs in soil.

Non-cancer health hazards calculated for these receptors exceed EPA's non-cancer threshold of unity, with the exception of the O&M worker and trespasser CTE estimates, which met the threshold. Non-cancer health hazards are predominately due to exposure to total PCBs in soil which can cause adverse health effects to the eyes, nails, skin, and immune system.

7.1.2.2.2 Site Wide Ambient Air

The total incremental lifetime cancer risk estimates are:

- Off-site residents (lifetime residents): 2×10^{-6} for RME
- Off-site residents (child 0 to 6 years): 1×10^{-6} for RME

The total estimated cancer risks for adult and child residents exposed to site wide ambient air are at the low end of EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}. Cancer risks are due to inhalation of total PCBs in ambient air. Non-cancer health hazards were not calculated, as non-cancer toxicity information is not available for inhalation of PCBs.

7.1.2.3 Future Land Use

Potential risks for receptors exposed to contaminants in environmental media released at the Facility Area and to groundwater were evaluated under the future land-use conditions.

7.1.2.3.1 Facility Area

The total incremental lifetime cancer risk estimates are:

- Operations area workers: $6x\ 10^{-3}$ for RME and $1x\ 10^{-3}$ for CTE
- O&M workers: $1x\ 10^{-3}$ for RME and $6x\ 10^{-5}$ for CTE
- Trespasser (adolescent 7 to 16 years): $7x\ 10^{-4}$ for RME and $6x\ 10^{-5}$ for CTE

The total HIs are:

- Operations area workers: 416 for RME and 364 for CTE
- O&M workers: 79 for RME and 270 for CTE
- Trespasser (adolescent 7 to 16 years): 124 for RME and 20 for CTE

The total estimated cancer risks for operations area workers, O&M workers and trespassers exposed to the Facility Area are above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} for RME scenarios and the operations area worker CTE scenario. Estimates for the O&M workers and trespassers fell within the risk range for CTE estimates. Cancer risks are predominately due to ingestion and dermal contact with total PCBs in soil.

Non-cancer health hazards calculated for these receptors exceed EPA's non-cancer threshold of unity. Non-cancer health hazards are predominately due to exposure to total PCBs in soil which can cause adverse health effects to the eyes, nails, skin and immune system.

7.1.2.3.2 Site Wide Groundwater

The total incremental lifetime cancer risk estimates are:

- Operations area workers: $2x10^{-2}$ for RME and $3x10^{-3}$ for CTE
- O&M workers: $2x10^{-3}$ for RME and $2x10^{-4}$ for CTE
- Off-site residents (lifetime residents): 4×10^{-1} for RME
- Off-site residents (child 0 to 6 years): 2×10^{-1} for RME

The total HIs are:

- Operations area workers: 1,212 for RME and 432 for CTE
- O&M workers: 116 for RME and 66 for CTE
- Off-site residents (lifetime residents): 30,445 for RME
- Off-site residents (child 0 to 6 years): 46,553 for RME

The total estimated cancer risks for operations area workers, O&M workers and off-site residents are above EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4}. Cancer risks are predominately due to total PCBs in groundwater.

Non-cancer health hazards calculated for these receptors exceed EPA's non-cancer threshold of unity. Non-cancer health hazards are predominately due to exposure to total PCBs in groundwater which can cause adverse health effects to the eyes, nails, skin and immune system.

7.2 Conclusions

Generally, cancer risks and non-cancer hazards for current and future workers within the Facility Area exceed EPA's thresholds, often by orders of magnitude. This conclusion generally holds for risk and hazard estimates developed from default EPA exposure assumptions, and from site-specific assumptions used previously at the site.

Even when site-specific information was used, risks and hazards remain elevated in the Facility Area for current/future construction workers; current trespassers; and future O&M workers and trespassers.

These estimates suggest that cancer risks for the site may be above the acceptable range as defined by EPA, due mainly to PCBs in soil and groundwater. These risks are associated with existing contamination in the Facility Area and are dependent on receptor behavior. For example, office workers at the site may receive little exposure and estimates of risk and hazards may be greatly overestimated for this population. On the other hand, risks may be more appropriately applied to workers that have opportunity for frequent contact with soil. Workers involved in outdoor maintenance, clean-up, sampling, and monitoring might fall into this category.

In contrast, risks and hazards are estimated to be at or below EPA thresholds for workers that frequent the South and West End Landfills currently and in the future, indicating that health threats for these exposure areas are minimal. Note, however, that the risk assessment did not evaluate a scenario where current landfill containment was compromised. The assessment assumes that landfill covers would remain intact as part of site remediation and closure activities.

Risks to future receptors exposed to groundwater exceeded acceptable cancer risk and non-cancer health hazard threshold, again by orders of magnitude, suggesting the potential for significant exposure if shallow groundwater were to be used for drinking. These risks and hazards would be realized only if wells are installed in the residuum at locations where they would draw water from the most contaminated part of existing plumes. Given the availability of municipal water supplies, installation of drinking water wells in such locations seems unlikely. However, risks are sufficiently high to suggest some consideration be given to ensuring the pathway remains incomplete indefinitely.

Cancer risks associated with exposure of off-site residents to PCB vapors in ambient air are low and may indicate that no unacceptable health threats currently exist. The highest risks for residents, which assume a worst case ambient air concentration of PCBs (2 in one million) is only slightly higher than the bottom of the EPA's risk range. Adjustment of air concentrations based on wind speed and direction would very likely lower estimated ambient air concentrations to the point where estimated risks would fall within the range considered negligible.

Finally, risks and hazards associated with trespassers in the landfill areas are low and suggest negligible risk and hazard. Current and future use of these areas by occasional visitors does not appear to be associated with significant health threats from exposure to PCBs and other site-related chemicals. However, risks and hazards associated with trespassers in the Facility Area are at the high end of or exceed acceptable cancer risk and the non-cancer health hazard threshold, suggesting significant exposure could occur if trespassing became common. Facility security appears to be sufficient to deter most or all trespassing currently.

Section 8
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Appendix A

Sample Information and Sampling Location Maps

List of Tables and Figures Included in Appendix A
Anniston PCB Site, Operable Unit 3

TABLE A-1
SURFACE SOIL SAMPLE INFORMATION
Anniston PCB Site, Operable Unit 3
Anniston, Alabama

Exposure Area	Location	Sample ID	Sample Depth (feet)	Date	Comment	Use in Risk Assessment-Current Scenarios	Use in Risk Assessment-Future Scenarios
Operations Area	AOC-A	AOC-A-6A	0-0.5	1/28/03		Y	Y
	SSR-01	SSR-01	0-2	8/19/98		Y	Y
	SSR-02	SSR-02	0-2	8/19/98		Y	Y
	SSR-03	SSR-03	0.5-2.5	8/18/98		N (1)	N (1)
	SSR-18	SSR-18	0.25-0.5	8/20/98		N (3)	Y
		SSR-18	0.25-0.5	8/20/98	Duplicate	N (3)	Y (2)
	SSR-21	SSR-21	0.33-2.5	8/20/98		Y	Y
	SSRI-01	SSRI-01-6	0-0.5	6/2/05		Y	Y
	SSRI-02	SSRI-02-6	0-0.5	6/1/05		Y	Y
	SSRI-03	SSRI-03-6	0-0.5	6/1/05		Y	Y
	SSRI-04	SSRI-04-6	0-0.5	6/1/05		Y	Y
		SSRI-04-06	0-0.5	7/6/05	Duplicate	Y (2)	Y (2)
	SSRI-05	SSRI-05-6	0-0.5	6/1/05		Y	Y
	SSRI-06	SSRI-06-6	0-0.5	6/2/05		Y	Y
	SSRI-07	SSRI-07-6	0-0.5	6/6/05		Y	Y
		SSRI-07-06	0-0.5	7/6/05	Duplicate	Y (2)	Y (2)
	SSRI-08	SSRI-08-6	0-0.5	6/2/05		Y	Y
	SSRI-09	SSRI-09-6	0-0.5	6/3/05		Y	Y
	SSRI-10	SSRI-10-6	0-0.5	6/3/05		Y	Y
	SSRI-11	SSRI-11-6	0-0.5	6/6/05		Y	Y
		SSRI-11-06	0-0.5	7/6/05	Duplicate	Y (5)	Y (2)
	SSRI-12	SSRI-12-6	0-0.5	6/6/05		Y	Y
	SSRI-13	SSRI-13-6	0-0.5	6/6/05		Y	Y
	SSRI-14	SSRI-14-6	0-0.5	6/6/05		Y	Y
	SWMU-17	SWMU-17-6A	0-0.5	1/28/03		Y	Y
	SWMU-25	SWMU-25-6A	0-0.5	1/28/03		Y	Y
	SWMU-31	SWMU-31-6A	0-0.5	1/28/03		Y	Y
	SWMU-42	SWMU-42-6A	0-0.5	2/20/03		Y	Y
		SWMU-42-6B	0-0.5	2/20/03	Duplicate	Y (2)	Y (2)
	SWMU-12-24A	SWMU-12-24A	0-2	1/29/03		Y	Y
		SWMU-12-24A-X	0-2	1/29/03	Duplicate	Y (2)	Y (2)
	SWMU-12-24B	SWMU-12-24B	0-2	1/29/03		Y	Y
	SWMU-12-24C	SWMU-12-24C	0-2	1/29/03		Y	Y
	SWMU-12-24D	SWMU-12-24D	0-2	1/29/03		Y	Y
	SWMU-12-24E	SWMU-12-24E	0-2	1/29/03		Y	Y
	SWMU-12-24F	SWMU-12-24F	0-2	1/29/03		Y	Y
	SWMU-12-24G	SWMU-12-24G	0-2	1/29/03		Y	Y
	SWMU-12-24H	SWMU-12-24H	0-2	1/29/03		Y	Y
	SWMU-12-24I	SWMU-12-24I	0-2	1/29/03		Y	Y
South Landfill	LFSL89	NA	NA	NA	May 23. 2006 letter from Solutia to US EPA (4)	Y	Y
	LFSL93	NA	NA	NA	May 23. 2006 letter from Solutia to US EPA (4)	Y	Y
	LFSL94	NA	NA	NA	May 23. 2006 letter from Solutia to US EPA (4)	Y	Y
	LFSL99	NA	NA	NA	May 23. 2006 letter from Solutia to US EPA (4)	Y	Y
	LFSL103	NA	NA	NA	May 23. 2006 letter from Solutia to US EPA (4)	Y	Y
	SL-3A	SL-3A	0-0.25	1/29/03		Y	Y
	SL-3B	SL-3B	0-0.25	1/29/03		Y	Y
	SL-3C	SL-3C	0-0.25	1/29/03		Y	Y
	SL-3D	SL-3D	0-0.25	1/29/03		Y	Y
	SLGM-3A	SLGM-3A	0-0.25	2/20/03		Y	Y
	SLGM-3B	SLGM-3B	0-0.25	2/20/03		Y	Y
	SLGM-3C	SLGM-3C	0-0.25	2/20/03		Y	Y
	SLGM-3D	SLGM-3D	0-0.25	2/20/03		Y	Y
West Landfill	SSRI-15	SSRI-15-6	0-0.5	6/6/05		Y	Y
		Dup-3	0-0.5	6/6/05	Duplicate	Y (2)	Y (2)
	SSRI-16	SSRI-16-6	0-0.5	6/6/05		Y	Y

N = No. Not used in risk assessment.
Y = Yes. Used in risk assessment.
NA = Sample information is not available.
(1) Samples are not included in the risk calculation since the location where they were sampled has been excavated.
(2) Maximum values of duplicate sample results and their original samples are used in risk calculations.
(3) Samples are not included in the risk calculation since the location where they were sampled is currently inaccessible due to a concrete cap.
(4) Data obtained from the figure attached to the May 23, 2006 letter from Solutia to Ms. Langston Scully at US EPA.
(5) Average of the duplicate sample results and the original sample results is used in risk calculations under central tendency exposure scenario.

TABLE A-2
SUBSURFACE SOIL SAMPLE INFORMATION
Anniston PCB Site, Operable Unit 3
Anniston, Alabama

Exposure Area	Location	Sample ID	Sample Depth (feet)	Date	Comment	Use in Risk Assessment-Current/Future Scenarios
Operations Area	AOC-A	AOC-A-6A	0-0.5	1/28/03		Y
	SSR-01	SSR-01	0-2	8/19/98		Y
	SSR-02	SSR-02	0-2	8/19/98		Y
	SSR-03	SSR-03	0.5-2.5	8/18/98		N (1)
	SSR-04	SSR-04	6-10	8/17/98		Y
	SSR-05	SSR-05	2.5-4.5	8/19/98		Y
	SSR-06	SSR-06	0.67-2	8/19/98		Y
	SSR-07	SSR-07	2-3	8/19/98		Y
	SSR-08	SSR-08	1-3	8/19/98		Y
	SSR-09	SSR-09	0.58-2.58	8/19/98		Y
	SSR-10	SSR-10	19-21	8/18/98		N (2)
	SSR-11	SSR-11	6-10	8/18/98		Y
	SSR-12	SSR-12	6-8	8/18/98		Y
	SSR-13	SSR-13	6-8	8/18/98		Y
	SSR-14	SSR-14	10-12	8/18/98		Y
	SSR-15	SSR-15	6-10	8/17/98		Y
		SSR-15-Q	6-10	8/17/98	Duplicate	Y (3)
	SSR-16	SSR-16	0.83-3	8/20/98		N (1)
	SSR-17	SSR-17	1.25-3.5	8/20/98		Y
	SSR-18	SSR-18	0.25-0.5	8/20/98		Y
		SSR-18	0.25-0.5	8/20/98	Duplicate	Y (3)
	SSR-19	SSR-19	0.67-3	8/20/98		Y
	SSR-21	SSR-21	0.33-2.5	8/20/98		Y
	SSRI-01	SSRI-01-6	0-0.5	6/2/05		Y
		SSRI-01-36	3-4	6/2/05		Y
	SSRI-02	SSRI-02-6	0-0.5	6/1/05		Y
		SSRI-02-36	3-4	6/1/05		Y
	SSRI-03	SSRI-03-6	0-0.5	6/1/05		Y
		SSRI-03-36	3-4	6/1/05		Y
	SSRI-04	SSRI-04-6	0-0.5	6/1/05		Y
		SSRI-04-06	0-0.5	7/6/05	Duplicate	Y (3)
		SSRI-04-36	3-4	6/1/05		Y
	SSRI-05	SSRI-05-6	0-0.5	6/1/05		Y
		SSRI-05-36	3-4	6/1/05		Y
	SSRI-06	SSRI-06-6	0-0.5	6/2/05		Y
		SSRI-06-36	3-4	6/2/05		Y
		DUP-1	3-4	6/2/05	Duplicate	Y (3)
	SSRI-07	SSRI-07-6	0-0.5	6/6/05		Y
		SSRI-07-06	0-0.5	7/6/05	Duplicate	Y (3)
		SSRI-07-42	3.5-3.5	6/6/05		Y
	SSRI-08	SSRI-08-6	0-0.5	6/2/05		Y
		SSRI-08-36	3-4	6/2/05		Y
	SSRI-09	SSRI-09-6	0-0.5	6/3/05		Y
		SSRI-09-36	3-4	6/3/05		Y
	SSRI-10	SSRI-10-6	0-0.5	6/3/05		Y
		SSRI-10-36	3-4	6/3/05		Y
	SSRI-11	SSRI-11-6	0-0.5	6/6/05		Y
		SSRI-11-06	0-0.5	7/6/05	Duplicate	Y (3)
		SSRI-11-36	3-4	6/6/05		Y
	SSRI-12	SSRI-12-6	0-0.5	6/6/05		Y
		SSRI-12-36	3-4	6/6/05		Y
		DUP-2	3-4	6/6/05	Duplicate	Y (3)
	SSRI-13	SSRI-13-6	0-0.5	6/6/05		Y
		SSRI-13-36	3-4	6/6/05		Y
	SSRI-14	SSRI-14-6	0-0.5	6/6/05		Y
		SSRI-14-36	3-4	6/6/05		Y
	SWMU-17	SWMU-17-6A	0-0.5	1/28/03		Y
	SWMU-25	SWMU-25-6A	0-0.5	1/28/03		Y
	SWMU-31	SWMU-31-6A	0-0.5	1/28/03		Y

TABLE A-2
SUBSURFACE SOIL SAMPLE INFORMATION
Anniston PCB Site, Operable Unit 3
Anniston, Alabama

Exposure Area	Location	Sample ID	Sample Depth (feet)	Date	Comment	Use in Risk Assessment-Current/Future Scenarios
Operations Area	SWMU-42	SWMU-42-6A	0-0.5	2/20/03		Y
		SWMU-42-6B	0-0.5	2/20/03	Duplicate	Y (3)
	SWMU-12-24A	SWMU-12-24A	0-2	1/29/03		Y
		SWMU-12-24A-X	0-2	1/29/03	Duplicate	Y (3)
	SWMU-12-24B	SWMU-12-24B	0-2	1/29/03		Y
	SWMU-12-24C	SWMU-12-24C	0-2	1/29/03		Y
	SWMU-12-24D	SWMU-12-24D	0-2	1/29/03		Y
	SWMU-12-24E	SWMU-12-24E	0-2	1/29/03		Y
	SWMU-12-24F	SWMU-12-24F	0-2	1/29/03		Y
	SWMU-12-24G	SWMU-12-24G	0-2	1/29/03		Y
	SWMU-12-24H	SWMU-12-24H	0-2	1/29/03		Y
	SWMU-12-24I	SWMU-12-24I	0-2	1/29/03		Y
South Landfill	LFSL89	NA	NA	NA	May 23, 2006 letter from Solutia to US EPA (4)	Y
	LFSL93	NA	NA	NA	May 23, 2006 letter from Solutia to US EPA (4)	Y
	LFSL94	NA	NA	NA	May 23, 2006 letter from Solutia to US EPA (4)	Y
	LFSL99	NA	NA	NA	May 23, 2006 letter from Solutia to US EPA (4)	Y
	LFSL103	NA	NA	NA	May 23, 2006 letter from Solutia to US EPA (4)	Y
	SL-3A	SL-3A	0-0.25	1/29/03		Y
	SL-3B	SL-3B	0-0.25	1/29/03		Y
	SL-3C	SL-3C	0-0.25	1/29/03		Y
	SL-3D	SL-3D	0-0.25	1/29/03		Y
	SLGM-3A	SLGM-3A	0-0.25	2/20/03		Y
	SLGM-3B	SLGM-3B	0-0.25	2/20/03		Y
	SLGM-3C	SLGM-3C	0-0.25	2/20/03		Y
	SLGM-3D	SLGM-3D	0-0.25	2/20/03		Y
West Landfill	SSRI-15	SSRI-15-6	0-0.5	6/6/05		Y
		Dup-3	0-0.5	6/6/05	Duplicate	Y (3)
	SSRI-16	SSRI-16-6	0-0.5	6/6/05		Y

N = No. Not used in risk assessment.
Y = Yes. Used in risk assessment.
NA = Sample information is not available.
(1) Samples are not included in the risk calculation since the location where they were sampled has been excavated.
(2) Sample was not included in the risk calculation since the sampling depth was greater than expected excavation depth.
(3) Maximum values of duplicate sample results and their original samples are used in risk calculations.
(4) Data obtained from the figure attached to the May 23, 2006 letter from Solutia to Ms. Langston Scully at US EPA.

TABLE A-3
GROUNDWATER SAMPLE INFORMATION
Anniston PCB Site, Operable Unit 3
Anniston, Alabama

Location	Sample ID	Date	Comment	Use in Risk Assessment
MW-07	MW-07	6/29/05		Y
	MW-07-F	6/29/05	Duplicate	Y (1)
MW-09A	MW-9R	4/7/03		Y
	MW-9R-04A	4/12/04		Y
	MW-9R	4/26/05		Y
	MW-34	4/26/05	Duplicate	Y
MW-14	MW-14	6/29/05		Y
	MW-14F	6/29/05	Duplicate	Y (1)
MW-15	MW-15	4/14/03		Y
	MW-15-F	4/14/03	Duplicate	Y (1)
	MW-15-03B	10/17/03		Y
	MW-15-03B-F	10/17/03	Duplicate	Y (1)
	MW-15-04A	4/12/04		Y
	MW-15-04A-F	4/12/04	Duplicate	Y (1)
	MW-15	10/7/04		Y
	MW-15F	10/7/04	Duplicate	Y (1)
	MW-15	4/25/05		Y
	MW-15-F	4/25/05	Duplicate	Y (1)
MW-16	MW-16	4/10/03		Y
	MW-16-03B	10/14/03		Y
	MW-16-04A	4/19/04		Y
	MW-16	10/7/04		Y
	MW-16	4/25/05		Y
MW-20A	MW-20A	4/10/03		Y
	MW-20A-03B	10/17/03		Y
	MW-D3	10/17/03	Duplicate	Y (1)
	MW-20A-04A	4/23/04		Y
	MW-20A	10/7/04		Y
	MW-03	10/7/04	Duplicate	Y (1)
	MW-20A	4/21/05		Y
OW-21A	OW-21R	2/17/03		Y
	OW-21RF	2/17/03	Duplicate	Y (1)
	OW-21R	4/7/03		Y
	OW-21RF	4/7/03	Duplicate	Y (1)
	OW-21A-04A	4/20/04		Y
	OW-21A-04A-F	4/20/04	Duplicate	Y (1)
	OW-21R	6/18/04		Y
	OW-21R-F	6/18/04	Duplicate	Y (1)
	OW-21A	4/27/05		Y
	OW-21A-F	4/27/05	Duplicate	Y (1)
T-4	T-4	6/29/05		Y
	T-4-F	6/29/05	Duplicate	Y (1)
	DUP-1	6/29/05	Duplicate	Y (1)
	DUP-1-F	6/29/05	Duplicate	Y (1)

N = No. Not used in risk assessment.
Y = Yes. Used in risk assessment.
(1) Maximum values of duplicate sample results and their original samples are used in risk calculations.

TABLE A-4
AIR SAMPLE INFORMATION
Anniston PCB Site, Operable Unit 3
Anniston, Alabama

Exposure Area	Location	Sample ID	Date	Comment	Use in Risk Assessment
Operations Area	6 - Near East	6 - Near East	8/14/03		Y
		6 - Near East	8/15/03		Y
		6 - Near East	9/10/03		Y
		6 - Near East	9/11/03		Y
		6 - Near East	10/22/03		Y
		6 - Near East	10/23/03		Y
South Landfill	2 - South	2 - South	1/26/00		Y
		2 - South	2/29/00		Y
		2 - South	3/28/00		Y
		2 - South	3/29/00		Y
		2 - South	4/29/00		Y
		2 - South	4/30/00		Y
		2 - South	5/21/00		Y
		2 - South	5/22/00		Y
		2 - South	6/28/00		Y
		2 - South	6/29/00		Y
		2 - South	7/26/00		Y
		2 - South	7/27/00		Y
		2 - South	8/23/00		Y
		2 - South	8/24/00		Y
		2 - South	9/28/00		Y
		2 - South	9/29/00		Y
		2 - South	10/26/00		Y
		2 - South	10/27/00		Y
		2 - South	11/28/00		Y
		2 - South	11/29/00		Y
		2 - South	12/20/00		Y
		2 - South	12/21/00		Y
		2 - South	1/17/01		Y
		2 - South	1/18/01		Y
		2 - South	5/16/01		Y
		2 - South	5/17/01		Y
		2 - South	6/19/01		Y
		2 - South	6/20/01		Y
		2 - South	7/20/01		Y
		2 - South	8/16/01		Y
		2 - South	8/17/01		Y
		2 - South	9/19/01		Y
		2 - South	9/20/01		Y
		2 - South	10/17/01		Y
		2 - South	10/18/01		Y
		2 - South	11/15/01		Y
		2 - South	11/16/01		Y
		2 - South	12/13/01		Y
		2 - South	12/14/01		Y
		2 - South	1/17/02		Y

TABLE A-4
AIR SAMPLE INFORMATION
Anniston PCB Site, Operable Unit 3
Anniston, Alabama

Exposure Area	Location	Sample ID	Date	Comment	Use in Risk Assessment
South Landfill	2 - South	2 - South	3/14/02		Y
		2 - South	3/15/02		Y
		2 - South	4/18/02		Y
		2 - South	4/19/02		Y
		2 - South	5/21/02		Y
		2 - South	5/22/02		Y
		2 - South	6/18/02		Y
		2 - South	6/19/02		Y
		2 - South	7/10/02		Y
		2 - South	7/11/02		Y
		2 - South	8/13/02		Y
		2 - South	8/14/02		Y
		2 - South	9/17/02		Y
		2 - South	9/18/02		Y
		2 - South	10/15/02		Y
		2 - South	10/16/02		Y
		2 - South	11/19/02		Y
		2 - South	11/20/02		Y
		2 - South	12/17/02		Y
		2 - South	12/18/02		Y
		2 - South	1/15/03		Y
		2 - South	1/16/03		Y
		2 - South	2/27/03		Y
		2 - South	2/28/03		Y
		2 - South	3/26/03		Y
		2 - South	3/27/03		Y
		2 - South	4/16/03		Y
		2 - South	4/17/03		Y
		2 - South	5/21/03		Y
		2 - South	5/22/03		Y
		2 - South	6/18/03		Y
		2 - South	6/19/03		Y
		2 - South	7/15/03		Y
		2 - South	7/16/03		Y
		2 - South	8/14/03		Y
		2 - South	8/15/03		Y
		2 - South	9/10/03		Y
		2 - South	9/11/03		Y
		2 - South	10/22/03		Y
		2 - South	10/23/03		Y
		2 - South (80)	2/21/02		Y
		2 - South (81)	2/21/02		Y
West Landfill	3 - West	3 - West	1/26/00		Y
		3 - West	1/27/00		Y
		3 - West	2/25/00		Y
		3 - West	2/29/00		Y

TABLE A-4
AIR SAMPLE INFORMATION
Anniston PCB Site, Operable Unit 3
Anniston, Alabama

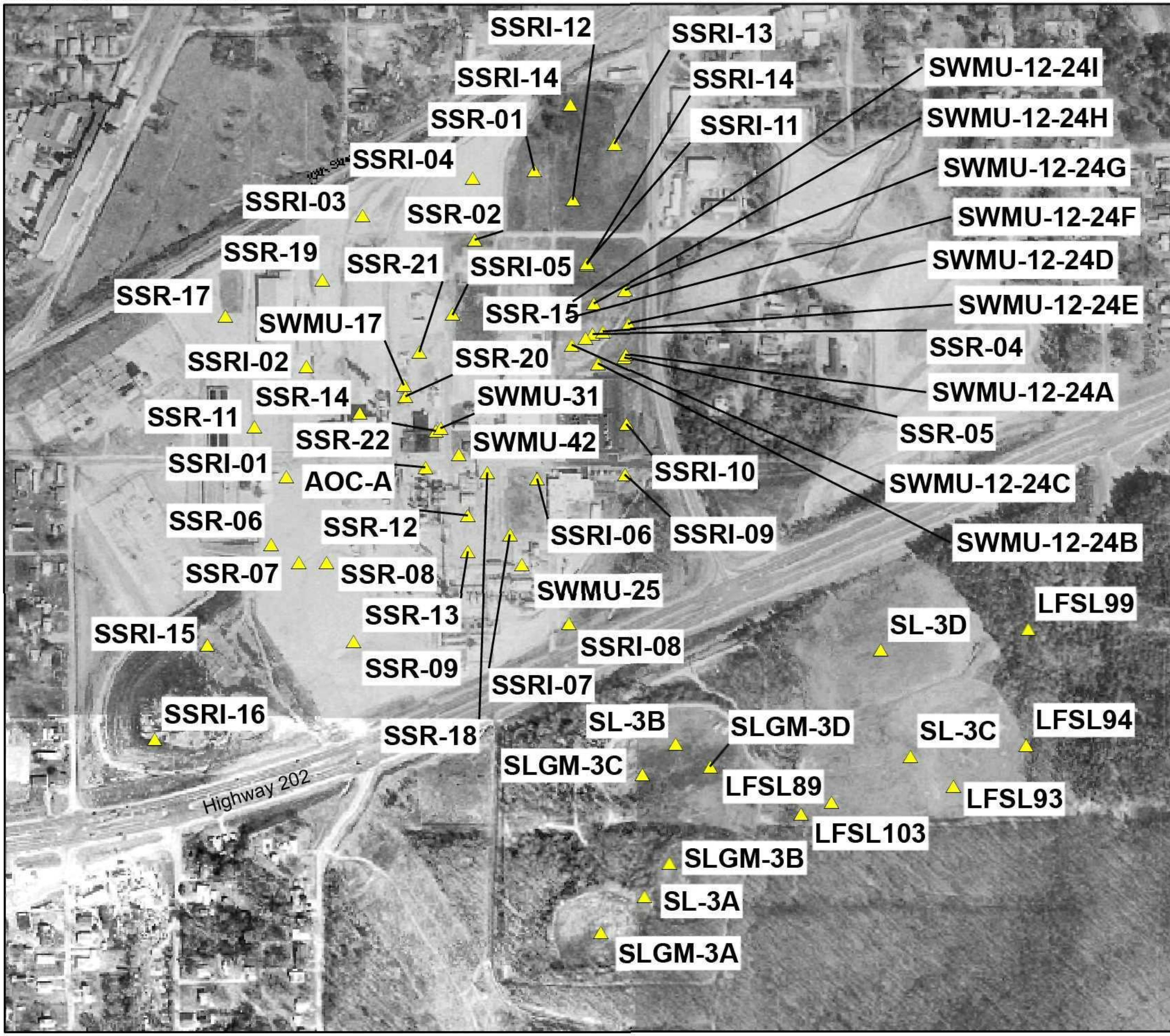
Exposure Area	Location	Sample ID	Date	Comment	Use in Risk Assessment
West Landfill	3 - West	3 - West	3/28/00		Y
		3 - West	3/29/00		Y
		3 - West	4/29/00		Y
		3 - West	4/30/00		Y
		3 - West	5/21/00		Y
		3 - West	5/22/00		Y
		3 - West	6/28/00		Y
		3 - West	6/29/00		Y
		3 - West	7/26/00		Y
		3 - West	7/27/00		Y
		3 - West	8/23/00		Y
		3 - West	8/24/00		Y
		3 - West	9/28/00		Y
		3 - West	9/29/00		Y
		3 - West	10/26/00		Y
		3 - West	10/27/00		Y
		3 - West	11/28/00		Y
		3 - West	11/29/00		Y
		3 - West	12/20/00		Y
		3 - West	12/21/00		Y
		3 - West	1/17/01		Y
		3 - West	1/18/01		Y
		3 - West	5/16/01		Y
		3 - West	5/17/01		Y
		3 - West	6/19/01		Y
		3 - West	6/20/01		Y
		3 - West	7/20/01		Y
		3 - West	8/16/01		Y
		3 - West	8/17/01		Y
		3 - West	9/19/01		Y
		3 - West	9/20/01		Y
		3 - West	10/17/01		Y
		3 - West	10/18/01		Y
		3 - West	11/15/01		Y
		3 - West	11/16/01		Y
		3 - West	12/13/01		Y
		3 - West	12/14/01		Y
		3 - West	1/16/02		Y
		3 - West	1/17/02		Y
		3 - West	3/14/02		Y
		3 - West	3/15/02		Y
		3 - West	4/18/02		Y
		3 - West	4/19/02		Y
		3 - West	5/21/02		Y
		3 - West	5/22/02		Y
		3 - West	6/18/02		Y

TABLE A-4
AIR SAMPLE INFORMATION
Anniston PCB Site, Operable Unit 3
Anniston, Alabama

Exposure Area	Location	Sample ID	Date	Comment	Use in Risk Assessment
West Landfill	3 - West	3 - West	7/10/02		Y
		3 - West	7/11/02		Y
		3 - West	8/13/02		Y
		3 - West	8/14/02		Y
		3 - West	9/17/02		Y
		3 - West	9/18/02		Y
		3 - West	10/15/02		Y
		3 - West	10/16/02		Y
		3 - West	11/19/02		Y
		3 - West	11/20/02		Y
		3 - West	12/17/02		Y
		3 - West	12/18/02		Y
		3 - West	1/15/03		Y
		3 - West	1/16/03		Y
		3 - West	2/27/03		Y
		3 - West	2/28/03		Y
		3 - West	3/26/03		Y
		3 - West	3/27/03		Y
		3 - West	4/16/03		Y
		3 - West	4/17/03		Y
		3 - West	5/21/03		Y
		3 - West	5/22/03		Y
		3 - West	6/18/03		Y
		3 - West	6/19/03		Y
		3 - West	7/15/03		Y
		3 - West	7/16/03		Y
		3 - West	8/14/03		Y
		3 - West	8/15/03		Y
		3 - West	9/10/03		Y
		3 - West	9/11/03		Y
		3 - West	10/22/03		Y
		3 - West	10/23/03		Y
		3 - West (80)	2/21/02		Y
		3 - West (81)	2/21/02		Y

N = No. Not used in risk assessment.
Y = Yes. Used in risk assessment.

densvr2\cdmprojects\Anniston\P:\Anniston\Anniston\gis\mxd scp 111907



Legend

SoilLocs_swmu-12

Soil Sample Locations

N
W
E
S

0 125 250 500

Feet

1:6,000

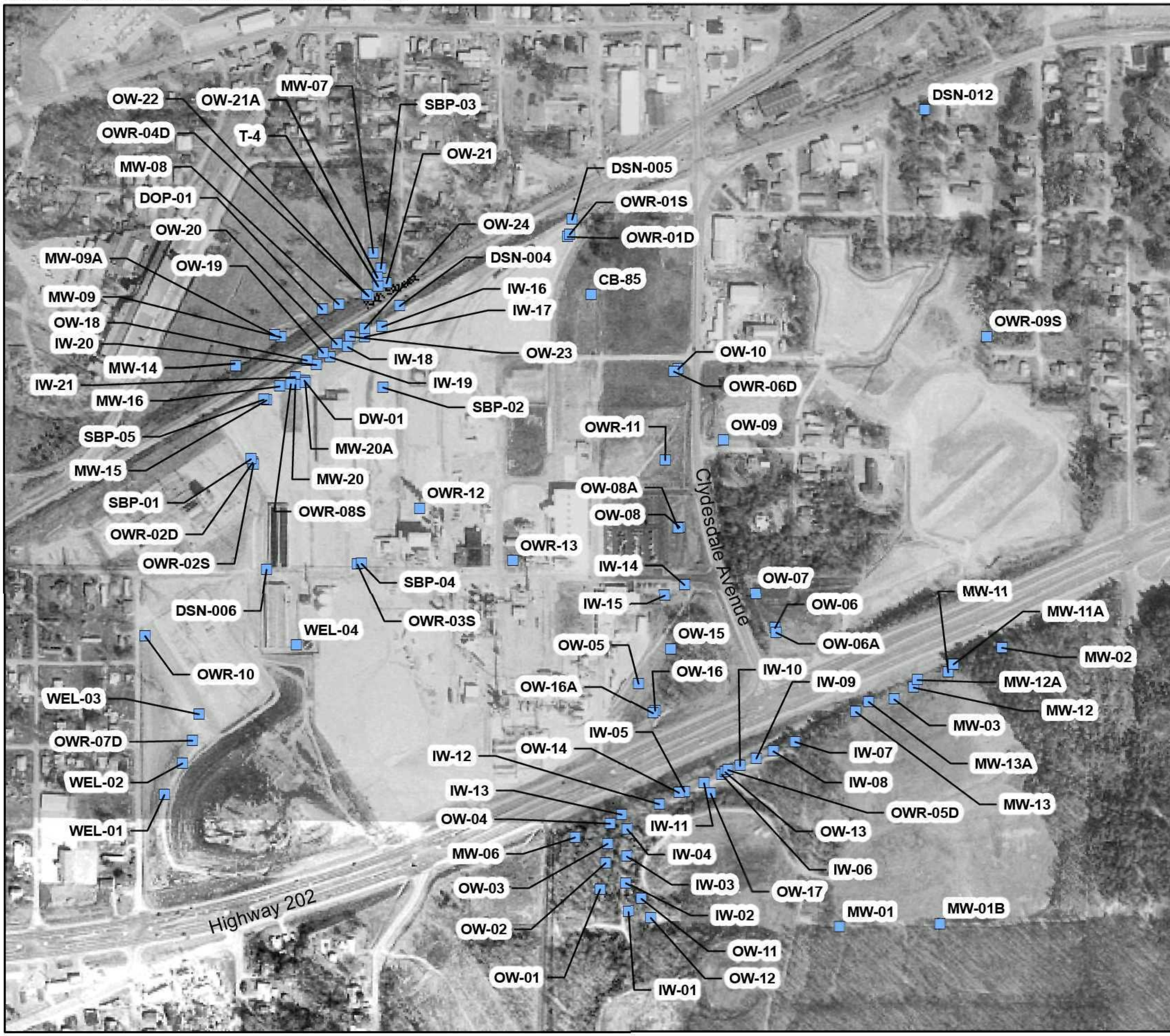
Sample Locations
Soil Samples

Solutia Inc.
Anniston, AL

CDM

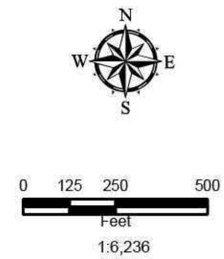
Figure A-1

densvr2\cdmprojects\Anniston\gis\mxd\Anniston_GWSamples.mxd scp 050907



Legend

Groundwater Sample Location



Groundwater Sample Locations

Solutia Inc.

Anniston, AL

CDM

Figure A-2

densvr2\cdmprojects\Anniston\gis\mxd\Anniston_AirSamples.mxd scp 050907

Legend

Air Sample Location

N
W E
S

0 125 250 500
Feet
1:6,000

Air Sample Locations

Solutia Inc.
Anniston, AL

CDM

Figure A-3

Appendix B

RAGS D Standard Tables –RME

List of Tables Included in Appendix B
Anniston PCB Site, Operable Unit 3

TABLES

List of Tables Included in Appendix B
Anniston PCB Site, Operable Unit 3

TABLES

TABLE B-1

SELECTION OF EXPOSURE PATHWAYS

Anniston PCB Site, Operable Unit 3

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current / Future	Surface Soil	Surface Soil	South Landfill	O&M Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				Trespassers	Adolescent (7-16 yrs)	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil
			West End Landfill	O&M Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				Trespassers	Adolescent (7-16 yrs)	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil
	Surface/ Subsurface Soil	Surface/ Subsurface Soil	Facility Area	Construction Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
	Air	Ambient Air	South Landfill	O&M Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
				Trespassers	Adolescent (7-16 yrs)	Inhalation	On-Site	Quant	Trespassers may inhale ambient air
			West End Landfill	O&M Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
				Trespassers	Adolescent (7-16 yrs)	Inhalation	On-Site	Quant	Trespassers may inhale ambient air
			Facility Area	Construction Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
Current	Surface Soil	Surface Soil	Facility Area	Operations Area Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				O&M Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				Trespassers	Adolescent (7-16 yrs)	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Air	Ambient Air	Facility Area	Operations Area Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
				O&M Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
				Trespassers	Adolescent (7-16 yrs)	Inhalation	On-Site	Quant	Trespassers may inhale ambient air
			Ambient Air[1]	Off-site Resident	Child to Adult	Inhalation	Off-Site	Quant	Residents may inhale ambient air
					Child (0-6 yrs)	Inhalation	Off-Site	Quant	Residents may inhale ambient air
Future	Surface Soil	Surface Soil	Facility Area	Operations Area Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				O&M Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				Trespassers	Adolescent (7-16 yrs)	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Incidental Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil
	Groundwater	Groundwater	Tap	Off-site Resident	Child to Adult	Dermal	Off-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
						Ingestion	Off-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
					Child (0-6 yrs)	Dermal	Off-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
						Ingestion	Off-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
				Operations Area Worker	Adult	Ingestion	On-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
				O&M Worker	Adult	Ingestion	On-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
		Air	Vapors in Bath	Off-site Resident	Child to Adult	Inhalation	Off-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.
					Child (0-6 yrs)	Inhalation	Off-Site	Quant	Groundwater is potable. It may be developed for drinking water use in the future.

TABLE B-1

SELECTION OF EXPOSURE PATHWAYS

Anniston PCB Site, Operable Unit 3

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Air	Ambient Air	Ambient Air[1]	Off-site Resident	Child to Adult	Inhalation	Off-Site	Quant	Residents may inhale ambient air
					Child (0-6 yrs)	Inhalation	Off-Site	Quant	Residents may inhale ambient air
				Operations Area Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
				O&M Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale ambient air
				Trespassers	Adolescent (7-16 yrs)	Inhalation	On-Site	Quant	Trespassers may inhale ambient air

Quant = Quantitative risk analysis performed.

[1]The highest of air exposure point at Facility Area, South Landfill, or West End Landfill.

TABLE B-2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Site-wide Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (nc/ca) (2)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (3)
Surface Soil		**VOCs**													
	67-64-1	Acetone	25 J	35 J	µg/kg	SSRI-11	2 / 3	49 - 49	3.5E+01	NA	1.4E+06 nc	NA	NA	NO	BSL
	75-15-0	Carbon disulfide	2.3 J	2.3 J	µg/kg	SSRI-04	1 / 3	4.9 - 8.3	2.3E+00	NA	3.6E+04 nc	NA	NA	NO	BSL
		SVOCs													
	92-52-4	1,1'-Biphenyl	45 J	140 J	µg/kg	SSRI-04	3 / 3	390 - 420	1.4E+02	NA	3.0E+05 nc	NA	NA	NO	BSL
	91-57-6	2-Methylnaphthalene	32 J	32 J	µg/kg	SSRI-11	1 / 3	390 - 420	3.2E+01	NA	5.6E+03 nc	NA	NA	NO	BSL
	120-12-7	Anthracene	41 J	120 J	µg/kg	SSRI-11	2 / 3	390 - 420	1.2E+02	NA	2.2E+06 nc	NA	NA	NO	BSL
	56-55-3	Benzo(a)anthracene	46 J	830	µg/kg	SSRI-11	3 / 3	390 - 420	8.3E+02	NA	6.2E+02 ca	NA	NA	YES	ASL
	50-32-8	Benzo(a)pyrene	24 J	1,900	µg/kg	SSRI-11	3 / 3	390 - 420	1.9E+03	NA	6.2E+01 ca	NA	NA	YES	ASL
	205-99-2	Benzo(b)fluoranthene	50 J	2,100	µg/kg	SSRI-11	3 / 3	390 - 420	2.1E+03	NA	6.2E+02 ca	NA	NA	YES	ASL
	191-24-2	Benzo(g,h,i)perylene	40 J	2,100	µg/kg	SSRI-11	3 / 3	390 - 420	2.1E+03	NA	2.3E+05 nc	NA	NA	NO	BSL
	207-08-9	Benzo(k)fluoranthene	88 J	1,500	µg/kg	SSRI-11	2 / 3	390 - 420	1.5E+03	NA	6.2E+03 ca	NA	NA	NO	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	57 J	200 J	µg/kg	SSRI-07	3 / 3	390 - 420	2.0E+02	NA	3.5E+04 ca	NA	NA	NO	BSL
	86-74-8	Carbazole	62 J	62 J	µg/kg	SSRI-11	1 / 3	390 - 420	6.2E+01	NA	2.4E+04 ca	NA	NA	NO	BSL
	218-01-9	Chrysene	290 J	1,900	µg/kg	SSRI-11	3 / 3	390 - 420	1.9E+03	NA	6.2E+04 ca	NA	NA	NO	BSL
	53-70-3	Dibenz(a,h)anthracene	41 J	620	µg/kg	SSRI-11	2 / 3	390 - 420	6.2E+02	NA	6.2E+01 ca	NA	NA	YES	ASL
	132-64-9	Dibenzofuran	31 J	31 J	µg/kg	SSRI-11	1 / 3	390 - 420	3.1E+01	NA	1.5E+04 nc	NA	NA	NO	BSL
	84-74-2	Di-n-butylphthalate	49 J	49 J	µg/kg	SSRI-07	1 / 3	390 - 420	4.9E+01	NA	6.1E+05 nc	NA	NA	NO	BSL
	206-44-0	Fluoranthene	42 J	940	µg/kg	SSRI-11	3 / 3	390 - 420	9.4E+02	NA	2.3E+05 nc	NA	NA	NO	BSL
	86-73-7	Fluorene	28 J	28 J	µg/kg	SSRI-07	1 / 3	390 - 420	2.8E+01	NA	2.7E+05 nc	NA	NA	NO	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	59 J	1,300	µg/kg	SSRI-11	2 / 3	390 - 420	1.3E+03	NA	6.2E+02 ca	NA	NA	YES	ASL
	91-20-3	Naphthalene	37 J	37 J	µg/kg	SSRI-11	1 / 3	390 - 420	3.7E+01	NA	5.6E+03 nc	NA	NA	NO	BSL
	85-01-8	Phenanthrene	74 J	470	µg/kg	SSRI-11	3 / 3	390 - 420	4.7E+02	NA	2.3E+05 nc	NA	NA	NO	BSL
	129-00-0	Pyrene	340 J	1,200	µg/kg	SSRI-11	3 / 3	390 - 420	1.2E+03	NA	2.3E+05 nc	NA	NA	NO	BSL
		P/PCBs													
	1336-36-3	PCBs, Total (4)	23	17,000,000	µg/kg	SSR-18	34 / 41	5.1 - 3,800,000	1.7E+07	NA	2.2E+02 ca	NA	NA	YES	ASL
	1024-57-3	Heptachlor epoxide	380	380	µg/kg	SSRI-11	1 / 3	31 - 380	3.8E+02	NA	5.3E+01 ca	NA	NA	YES	ASL
	298-00-0	Methyl parathion	49	100	µg/kg	SSR-18	2 / 7	20 - 21	1.0E+02	NA	1.5E+03 nc	NA	NA	NO	BSL
	56-38-2	Parathion	56 J	56 J	µg/kg	SSR-21	1 / 6	39 - 42	5.6E+01	NA	3.7E+04 nc	NA	NA	NO	BSL
		Dioxin													
	NA	Dioxin TEQ	0.191	0.756	µg/kg	SSRI-07	1 / 4	NA - NA	7.6E-01	NA	3.9E-03 ca	NA	NA	YES	ASL
		Inorganics													
	7429-90-5	Aluminum	11,000	19,000	mg/kg	SSRI-11	3 / 3	23 - 25	1.9E+04	NA	7.6E+03 nc	NA	NA	YES	ASL
	7440-36-0	Antimony	8.7	8.7	mg/kg	SSRI-11	1 / 3	2.3 - 2.5	8.7E+00	NA	3.1E+00 nc	NA	NA	YES	ASL
	7440-38-2	Arsenic	3.8	390	mg/kg	SSRI-11	7 / 7	1.1 - 1.2	3.9E+02	NA	3.9E-01 ca	NA	NA	YES	ASL/TOX
	7440-39-3	Barium	18	230	mg/kg	SSRI-11	7 / 7	1.1 - 1.2	2.3E+02	NA	5.4E+02 nc	NA	NA	NO	BSL
	7440-41-7	Beryllium	0.47 J	1	mg/kg	SSR-02	4 / 7	0.45 - 0.61	1.0E+00	NA	1.5E+01 nc	NA	NA	NO	BSL
	7440-43-9	Cadmium	0.52 J	4.7	mg/kg	SSRI-11	3 / 7	0.51 - 0.62	4.7E+00	NA	3.7E+00 nc	NA	NA	YES	ASL
	7440-70-2	Calcium	24,000	59,000	mg/kg	SSRI-04	3 / 3	56 - 62	5.9E+04	NA	NA	NA	NA	NO	NUT

TABLE B-2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Site-wide Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (nc/ca) (2)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (3)
	7440-47-3	Chromium	13	23	mg/kg	SSRI-11	7 / 7	1.1 - 1.2	2.3E+01	NA	3.0E+01 nc	NA	NA	YES	TOX
	7440-48-4	Cobalt	2	11	mg/kg	SSRI-07	7 / 7	1.1 - 1.2	1.1E+01	NA	9.0E+02 nc	NA	NA	NO	BSL
	7440-50-8	Copper	13	280	mg/kg	SSRI-11	3 / 3	2.3 - 2.5	2.8E+02	NA	3.1E+02 nc	NA	NA	NO	BSL
	57-12-5	Cyanide	0.65	0.65	mg/kg	SSRI-11	1 / 3	0.58 - 0.64	6.5E-01	NA	1.2E+02 nc	NA	NA	NO	BSL
	7439-89-6	Iron	19,000	26,000	mg/kg	SSRI-11	3 / 3	5.6 - 6.2	2.6E+04	NA	2.3E+03 nc	NA	NA	YES	ASL
	7439-92-1	Lead	8.7	4,700	mg/kg	SSRI-11	7 / 7	0.56 - 6.1	4.7E+03	NA	4.0E+01 nc	NA	NA	YES	ASL
	7439-95-4	Magnesium	850	34,000	mg/kg	SSRI-04	3 / 3	56 - 62	3.4E+04	NA	NA	NA	NA	NO	NUT
	7439-96-5	Manganese	70	830	mg/kg	SSRI-07	7 / 7	1.1 - 1.2	8.3E+02	NA	1.8E+02 nc	NA	NA	YES	ASL
	7439-97-6	Mercury	0.17	2.6	mg/kg	SSRI-07	6 / 7	0.024 - 0.42	2.6E+00	NA	2.3E+00 nc	NA	NA	YES	ASL
	7440-02-0	Nickel	8.6	33	mg/kg	SSRI-04	6 / 7	4.5 - 5	3.3E+01	NA	1.6E+02 nc	NA	NA	NO	BSL
	7440-09-7	Potassium	1,000	1,800	mg/kg	SSRI-04	3 / 3	110 - 120	1.8E+03	NA	NA	NA	NA	NO	NUT
	7782-49-2	Selenium	4.5	4.5	mg/kg	SSRI-11	1 / 3	2.8 - 3.1	4.5E+00	NA	3.9E+01 nc	NA	NA	NO	BSL
	7440-22-4	Silver	12	12	mg/kg	SSRI-11	1 / 3	1.1 - 1.2	1.2E+01	NA	3.9E+01 nc	NA	NA	NO	BSL
	7440-23-5	Sodium	150	400	mg/kg	SSRI-11	3 / 3	110 - 120	4.0E+02	NA	NA	NA	NA	NO	NUT
	7440-62-2	Vanadium	15	40	mg/kg	SSR-21	7 / 7	1.1 - 1.2	4.0E+01	NA	7.8E+00 nc	NA	NA	YES	ASL
	7440-66-6	Zinc	25	610	mg/kg	SSRI-11	3 / 3	2.3 - 2.5	6.1E+02	NA	2.3E+03 nc	NA	NA	NO	BSL

(1) Maximum detected concentration used for screening, units adjusted to ug/kg for organics and mg/kg for inorganics.

(2) Screened against EPA Region 9 Preliminary Remediation Goals (PRGs) for residential soil adjusted to cancer benchmark = 1E-6 and HQ = 0.1. The more conservative value of the combined cancer and combined hazard values (after adjustment) was used.Units adjusted to µg/kg for organics and mg/kg for inorganics. http://www.epa.gov/region09/waste/sfund/prg/index.htm.

(3) Rationale Codes:

Selection Reason: ASL = Above Screening Level.
TOX = Group A Carcinogen.
Deletion Reason: BSL = Below Screening Level.
NUT = Essential Nutrient.

Toxicity value surrogates:

Screening toxicity value for naphthalene applied to 2-methylnaphthalene.
Screening toxicity value for pyrene applied to benzo(g,h,i)perylene and phenanthrene.
Screening toxicity value for chromium VI applied to total chromium.

(4) Total PCBs calculated using sum of the detected Aroclors when at least one Aroclor detected or maximum practical quantitation limit for non-detected Aroclors when none of the Aroclors are detected.

Definitions: NA = Not Available.
nc = Screening Toxcity Value is based on noncancer effects.
ca = Screening Toxicity Value is based on cancer effects.
COPC = Chemical of Potential Concern.
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered.
TEQ = Toxic equivalents.
VOCs = Volatile organic compounds.
SVOCs = Semi-volatile organic compounds.
P/PCBs = Pesticides/polychlorinated biphenyls.
J = Estimated value.

TABLE B-2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Surface/Subsurface Soil
Exposure Medium:	Site-wide Surface/Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (nc/ca) (2)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (3)
Surface/		**VOCs**													
Subsurface	67-64-1	Acetone	25 J	35 J	µg/kg	SSRI-11	2 / 3	49 - 49	3.5E+01	NA	1.4E+06 nc	NA	NA	NO	BSL
Soil	75-15-0	Carbon disulfide	2.3 J	2.3 J	µg/kg	SSRI-04	1 / 3	4.9 - 8.3	2.3E+00	NA	3.6E+04 nc	NA	NA	NO	BSL
	108-90-7	Chlorobenzene	17	17	ug/kg	SSR-12/SSR-15	2 / 20	4.5 - 8.3	1.7E+01	NA	1.5E+04 nc	NA	NA	NO	BSL
	75-09-2	Methylene chloride	33	33	ug/kg	SSR-11	1 / 17	4.5 - 8.3	3.3E+01	NA	9.1E+03 ca	NA	NA	NO	BSL
		SVOCs													
	92-52-4	1,1'-Biphenyl	45 J	140 J	µg/kg	SSRI-04	3 / 3	390 - 420	1.4E+02	NA	3.0E+05 nc	NA	NA	NO	BSL
	91-57-6	2-Methylnaphthalene	32 J	32 J	µg/kg	SSRI-11	1 / 3	390 - 420	3.2E+01	NA	5.6E+03 nc	NA	NA	NO	BSL
	120-12-7	Anthracene	41 J	120 J	µg/kg	SSRI-11	2 / 3	390 - 420	1.2E+02	NA	2.2E+06 nc	NA	NA	NO	BSL
	56-55-3	Benzo(a)anthracene	46 J	830	µg/kg	SSRI-11	3 / 3	390 - 420	8.3E+02	NA	6.2E+02 ca	NA	NA	YES	ASL
	50-32-8	Benzo(a)pyrene	24 J	1,900	µg/kg	SSRI-11	3 / 3	390 - 420	1.9E+03	NA	6.2E+01 ca	NA	NA	YES	ASL
	205-99-2	Benzo(b)fluoranthene	50 J	2,100	µg/kg	SSRI-11	3 / 3	390 - 420	2.1E+03	NA	6.2E+02 ca	NA	NA	YES	ASL
	191-24-2	Benzo(g,h,i)perylene	40 J	2,100	µg/kg	SSRI-11	3 / 3	390 - 420	2.1E+03	NA	2.3E+05 nc	NA	NA	NO	BSL
	207-08-9	Benzo(k)fluoranthene	88 J	1,500	µg/kg	SSRI-11	2 / 3	390 - 420	1.5E+03	NA	6.2E+03 ca	NA	NA	NO	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	57 J	200 J	µg/kg	SSRI-07	3 / 3	390 - 420	2.0E+02	NA	3.5E+04 ca	NA	NA	NO	BSL
	86-74-8	Carbazole	62 J	62 J	µg/kg	SSRI-11	1 / 3	390 - 420	6.2E+01	NA	2.4E+04 ca	NA	NA	NO	BSL
	218-01-9	Chrysene	290 J	1,900	µg/kg	SSRI-11	3 / 3	390 - 420	1.9E+03	NA	6.2E+04 ca	NA	NA	NO	BSL
	53-70-3	Dibenz(a,h)anthracene	41 J	620	µg/kg	SSRI-11	2 / 3	390 - 420	6.2E+02	NA	6.2E+01 ca	NA	NA	YES	ASL
	132-64-9	Dibenzofuran	31 J	31 J	µg/kg	SSRI-11	1 / 3	390 - 420	3.1E+01	NA	1.5E+04 nc	NA	NA	NO	BSL
	84-74-2	Di-n-butylphthalate	49 J	49 J	µg/kg	SSRI-07	1 / 3	390 - 420	4.9E+01	NA	6.1E+05 nc	NA	NA	NO	BSL
	206-44-0	Fluoranthene	42 J	940	µg/kg	SSRI-11	3 / 3	390 - 420	9.4E+02	NA	2.3E+05 nc	NA	NA	NO	BSL
	86-73-7	Fluorene	28 J	28 J	µg/kg	SSRI-07	1 / 3	390 - 420	2.8E+01	NA	2.7E+05 nc	NA	NA	NO	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	59 J	1,300	µg/kg	SSRI-11	2 / 3	390 - 420	1.3E+03	NA	6.2E+02 ca	NA	NA	YES	ASL
	91-20-3	Naphthalene	37 J	37 J	µg/kg	SSRI-11	1 / 3	390 - 420	3.7E+01	NA	5.6E+03 nc	NA	NA	NO	BSL
	85-01-8	Phenanthrene	74 J	470	µg/kg	SSRI-11	3 / 3	390 - 420	4.7E+02	NA	2.3E+05 nc	NA	NA	NO	BSL
	129-00-0	Pyrene	340 J	1,200	µg/kg	SSRI-11	3 / 3	390 - 420	1.2E+03	NA	2.3E+05 nc	NA	NA	NO	BSL
		P/PCBs													
	1336-36-3	PCBs, Total (4)	23	17,000,000	µg/kg	SSR-18	57 / 68	5.1 - 3,800,000	1.7E+07	NA	2.2E+02 ca	NA	NA	YES	ASL
	1024-57-3	Heptachlor epoxide	380	380	µg/kg	SSRI-11	1 / 3	31 - 380	3.8E+02	NA	5.3E+01 ca	NA	NA	YES	ASL
	298-00-0	Methyl parathion	49	100	µg/kg	SSR-18	2 / 20	18 - 22,000	1.0E+02	NA	1.5E+03 nc	NA	NA	NO	BSL
	56-38-2	Parathion	56 J	56 J	µg/kg	SSR-21	1 / 17	37 - 42,000	5.6E+01	NA	3.7E+04 nc	NA	NA	NO	BSL
		Dioxin													
	NA	Dioxin TEQ	0.191	0.756	µg/kg	SSRI-07	1 / 4	NA - NA	7.6E-01	NA	3.9E-03 ca	NA	NA	YES	ASL
		Inorganics													
	7429-90-5	Aluminum	11,000	19,000	mg/kg	SSRI-11	3 / 3	23 - 25	1.9E+04	NA	7.6E+03 nc	NA	NA	YES	ASL
	7440-36-0	Antimony	8.7	8.7	mg/kg	SSRI-11	1 / 3	2.3 - 2.5	8.7E+00	NA	3.1E+00 nc	NA	NA	YES	ASL
	7440-38-2	Arsenic	3.8	390	mg/kg	SSR-11	19 / 20	1.1 - 12	3.9E+02	NA	3.9E-01 ca	NA	NA	YES	ASL/TOX
	7440-39-3	Barium	18	780	mg/kg	SSRI-09	20 / 20	1.1 - 13	7.8E+02	NA	5.4E+02 nc	NA	NA	YES	ASL

TABLE B-2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Surface/Subsurface Soil
Exposure Medium:	Site-wide Surface/Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (nc/ca) (2)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (3)
	7440-41-7	Beryllium	0.47 J	1	mg/kg	SSR-02/SSR-13	9 / 20	0.45 - 6	1.0E+00	NA	1.5E+01 nc	NA	NA	NO	BSL
	7440-43-9	Cadmium	0.52 J	4.7	mg/kg	SSRI-11	5 / 20	0.56 - 0.62	4.7E+00	NA	3.7E+00 nc	NA	NA	YES	ASL
	7440-70-2	Calcium	24,000	59,000	mg/kg	SSRI-04	3 / 3	56 - 62	5.9E+04	NA	NA	NA	NA	NO	NUT
	7440-47-3	Chromium	12	110	mg/kg	SSR-13	19 / 20	1.1 - 12	1.1E+02	NA	3.0E+01 nc	NA	NA	YES	ASL/TOX
	7440-48-4	Cobalt	2	74	mg/kg	SSR-17	20 / 20	1.1 - 13	7.4E+01	NA	9.0E+02 nc	NA	NA	NO	BSL
	7440-50-8	Copper	13	280	mg/kg	SSRI-11	3 / 3	2.3 - 2.5	2.8E+02	NA	3.1E+02 nc	NA	NA	NO	BSL
	57-12-5	Cyanide	0.65	0.65	mg/kg	SSRI-11	1 / 3	0.58 - 0.64	6.5E-01	NA	1.2E+02 nc	NA	NA	NO	BSL
	7439-89-6	Iron	19,000	26,000	mg/kg	SSRI-11	3 / 3	5.6 - 6.2	2.6E+04	NA	2.3E+03 nc	NA	NA	YES	ASL
	7439-92-1	Lead	8.7	4,700	mg/kg	SSRI-11	20 / 20	0.56 - 29	4.7E+03	NA	4.0E+01 nc	NA	NA	YES	ASL
	7439-95-4	Magnesium	850	34,000	mg/kg	SSRI-04	3 / 3	56 - 62	3.4E+04	NA	NA	NA	NA	NO	NUT
	7439-96-5	Manganese	68	12,000	mg/kg	SSR-09	20 / 20	1.1 - 13	1.2E+04	NA	1.8E+02 nc	NA	NA	YES	ASL
	7439-97-6	Mercury	0.032	3.3	mg/kg	SSR-15	19 / 20	0.024 - 0.71	3.3E+00	NA	2.3E+00 nc	NA	NA	YES	ASL
	7440-02-0	Nickel	7.5	2,400	mg/kg	SSR-07	19 / 20	4.4 - 53	2.4E+03	NA	1.6E+02 nc	NA	NA	YES	ASL
	7440-09-7	Potassium	1,000	1,800	mg/kg	SSRI-04	3 / 3	110 - 120	1.8E+03	NA	NA	NA	NA	NO	NUT
	7782-49-2	Selenium	4.5	4.5	mg/kg	SSRI-11	1 / 3	2.8 - 3.1	4.5E+00	NA	3.9E+01 nc	NA	NA	NO	BSL
	7440-22-4	Silver	12	12	mg/kg	SSRI-11	1 / 3	1.1 - 1.2	1.2E+01	NA	3.9E+01 nc	NA	NA	NO	BSL
	7440-23-5	Sodium	150	400	mg/kg	SSRI-11	3 / 3	110 - 120	4.0E+02	NA	NA	NA	NA	NO	NUT
	7440-62-2	Vanadium	15	93	mg/kg	SSR-19	20 / 20	1.1 - 13	9.3E+01	NA	7.8E+00 nc	NA	NA	YES	ASL
	7440-66-6	Zinc	25	610	mg/kg	SSRI-11	3 / 3	2.3 - 2.5	6.1E+02	NA	2.3E+03 nc	NA	NA	NO	BSL

(1) Maximum detected concentration used for screening, units adjusted to ug/kg for organics and mg/kg for inorganics.

(2) Screened against EPA Region 9 Preliminary Remediation Goals (PRGs) for residential soil adjusted to cancer benchmark = 1E-6 and HQ = 0.1. The more conservative value of the combined cancer and combined hazard values (after adjustment) was used.Units adjusted to µg/kg for organics and mg/kg for inorganics. http://www.epa.gov/region09/waste/sfund/prg/index.htm.

(3) Rationale Codes:

Selection Reason: ASL = Above Screening Level.
TOX = Group A Carcinogen.
Deletion Reason: BSL = Below Screening Level.
NUT = Essential Nutrient.

Toxicity value surrogates:

Screening toxicity value for naphthalene applied to 2-methylnaphthalene.
Screening toxicity value for pyrene applied to benzo(g,h,i)perylene and phenanthrene.
Screening toxicity value for chromium VI applied to total chromium.

(4) Total PCBs calculated using sum of the detected Aroclors when at least one Aroclor detected or maximum practical quantitation limit for non-detected Aroclors when none of the Aroclors are detected.

Definitions: NA = Not Available.
nc = Screening Toxcity Value is based on noncancer effects.
ca = Screening Toxicity Value is based on cancer effects.
COPC = Chemical of Potential Concern.
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered.
TEQ = Toxic equivalents.
VOCs = Volatile organic compounds.
SVOCs = Semi-volatile organic compounds.
P/PCBs = Pesticides/polychlorinated biphenyls.
J = Estimated value.

TABLE B-2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Site-wide Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (nc/ca) (2)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Tap		**VOCs**													
	120-82-1	1,2,4-Trichlorobenzene	11	11	µg/L	T-4	1 / 2	1 - 1	1.1E+01	NA	7.2E-01 nc	70	MCL	YES	ASL
	95-50-1	1,2-Dichlorobenzene	1.7	22	µg/L	OW-21A	4 / 19	1 - 2,000	2.2E+01	NA	3.7E+01 nc	600	MCL	NO	BSL
	106-46-7	1,4-Dichlorobenzene	2.6	2.6	µg/L	MW-20A	1 / 19	1 - 2,000	2.6E+00	NA	5.0E-01 ca	75	MCL	YES	ASL
	108-90-7	Chlorobenzene	3.4	12	µg/L	OW-21A	6 / 25	1 - 100	1.2E+01	NA	1.1E+01 nc	100	MCL	YES	ASL
	156-59-2	cis-1,2-Dichloroethene	10	10	µg/L	T-4	1 / 2	1 - 1	1.0E+01	NA	6.1E+00 nc	70	MCL	YES	ASL
	75-09-2	Methylene chloride	0.62	1	µg/L	MW-16	2 / 25	5 - 500	1.0E+00	NA	4.3E+00 ca	5	MCL	NO	BSL
	87-86-5	Pentachlorophenol	11	26	µg/L	MW-20A	5 / 25	0.94 - 5,000	2.6E+01	NA	5.6E-01 ca	1	MCL	YES	ASL
	156-60-5	trans-1,2-Dichloroethene	8.2	8.2	µg/L	T-4	1 / 2	1 - 1	8.2E+00	NA	1.2E+01 nc	100	MCL	NO	BSL
	79-01-6	Trichloroethylene	3.4	3.4	µg/L	T-4	1 / 2	1 - 1	3.4E+00	NA	2.8E-02 ca	5	MCL	YES	ASL
		SVOCs													
	95-95-4	2,4,5-Trichlorophenol	4.3	4.3	µg/L	MW-20A	1 / 25	9.4 - 5,000	4.3E+00	NA	3.6E+02 nc	NA	NA	NO	IFD
	88-06-2	2,4,6-Trichlorophenol	9.4	17	µg/L	MW-20A	5 / 25	9.4 - 5,000	1.7E+01	NA	3.6E-01 nc	NA	NA	YES	ASL
	120-83-2	2,4-Dichlorophenol	1.4	1.4	µg/L	MW-20A	1 / 25	9.4 - 5,000	1.4E+00	NA	1.1E+01 nc	NA	NA	NO	IFD
	100-02-7	4-Nitrophenol	140	30,000	µg/L	OW-21A	5 / 25	50 - 5,300	3.0E+04	NA	NA	NA	NA	NO	NTX
	83-32-9	Acenaphthene	2	2	µg/L	T-4	1 / 2	9.9 - 10	2.0E+00	NA	3.7E+01 nc	NA	NA	NO	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.73	0.73	µg/L	MW-14	1 / 2	9.9 - 10	7.3E-01	NA	9.2E-02 ca	NA	NA	YES	ASL
	126-68-1	O,O,O-Triethylphosphorothioate	25	340	µg/L	OW-21A	6 / 25	9.4 - 2,500	3.4E+02	NA	NA	NA	NA	NO	NTX
		P/PCBs													
	1336-36-3	PCBs, Total (5)	2.8	15,500	µg/L	OW-21A	7 / 26	0.47 - 1,000	1.6E+04	NA	3.4E-02 ca	0.5	MCL	YES	ASL
	58-89-9	gamma-BHC	0.55	0.55	µg/L	T-4	1 / 2	0.047 - 0.048	5.5E-01	NA	5.2E-02 ca	0.2	MCL	YES	ASL
	298-00-0	Methyl parathion	74	74	µg/L	OW-21A	1 / 3	0.5 - 0.5	7.4E+01	NA	9.1E-01 nc	NA	NA	YES	ASL
	56-38-2	Parathion	51	23,000	µg/L	OW-21A	4 / 26	0.94 - 1,100	2.3E+04	NA	2.2E+01 nc	NA	NA	YES	ASL
	3689-24-5	Sulfotepp	0.33	150	µg/L	OW-21A	5 / 25	0.47 - 500	1.5E+02	NA	NA	NA	NA	NO	NTX
		Dioxin													
	NA	Dioxin TEQ	3.61E-06	3.61E-06	µg/L	T-4	1 / 2	NA - NA	3.6E-06	NA	4.5E-07 ca	NA	NA	YES	ASL
		Inorganics													
	7429-90-5	Aluminum	56	210	µg/L	MW-14	2 / 2	200 - 200	2.1E+02	NA	3.6E+03 nc	NA	NA	NO	BSL
	7440-36-0	Antimony	5.1	5.1	µg/L	T-4	1 / 2	20 - 20	5.1E+00	NA	1.5E+00 nc	6	MCL	YES	ASL
	7440-38-2	Arsenic	6.1	6.1	µg/L	T-4	1 / 2	10 - 10	6.1E+00	NA	4.5E-02 ca	10	MCL	YES	ASL/TOX
	7440-39-3	Barium	13	53	µg/L	OW-21A	3 / 3	10 - 10	5.3E+01	NA	2.6E+02 nc	2,000	MCL	NO	BSL
	7440-41-7	Beryllium	0.13	0.13	µg/L	MW-14	1 / 3	4 - 4	1.3E-01	NA	7.3E+00 nc	4	MCL	NO	BSL
	7440-70-2	Calcium	6,000	41,000	µg/L	T-4	2 / 2	500 - 500	4.1E+04	NA	NA	NA	NA	NO	NUT
	7440-48-4	Cobalt	1.9	62	µg/L	OW-21A	10 / 26	10 - 10	6.2E+01	NA	7.3E+01 nc	NA	NA	NO	BSL
	7439-89-6	Iron	40	78	µg/L	MW-14	2 / 2	50 - 50	7.8E+01	NA	1.1E+03 nc	NA	NA	NO	BSL
	7439-92-1	Lead	3.3	3.3	µg/L	T-4	1 / 3	5 - 5	3.3E+00	NA	NA	15	MCL	NO	BSL2
	7439-95-4	Magnesium	1,400	6,500	µg/L	T-4	2 / 2	500 - 500	6.5E+03	NA	NA	NA	NA	NO	NUT
	7439-96-5	Manganese	36	1,300	µg/L	OW-21A	3 / 3	10 - 10	1.3E+03	NA	8.8E+01 nc	NA	NA	YES	ASL
	7439-97-6	Mercury	1	4.1	µg/L	MW-15	6 / 19	0.2 - 0.2	4.1E+00	NA	1.1E+00 nc	2	MCL	YES	ASL

TABLE B-2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Site-wide Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (nc/ca) (2)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
	7440-09-7	Potassium	1,500	5,100	µg/L	T-4	2 / 2	1,000 - 1,000	5.1E+03	NA	NA	NA	NA	NO	NUT
	7440-23-5	Sodium	6,800	28,000	µg/L	T-4	2 / 2	1,000 - 1,000	2.8E+04	NA	NA	NA	NA	NO	NUT
	7440-62-2	Vanadium	2.3	2.3	µg/L	T-4	1 / 3	10 - 10	2.3E+00	NA	3.6E+00 nc	NA	NA	NO	BSL
	7440-66-6	Zinc	210	210	µg/L	T-4	1 / 2	20 - 20	2.1E+02	NA	1.1E+03 nc	NA	NA	NO	BSL

(1) Maximum detected concentration used for screening.

(2) Screened against EPA Region 9 Preliminary Remediation Goals (PRGs) for residential tap water adjusted to cancer benchmark = 1E-6 and HQ = 0.1. The more conservative value of the combined cancer and combined hazard values (after adjustment) was used.Units are ug/L. http://www.epa.gov/region09/waste/sfund/prg/index.htm.

(3) MCL = Maximum contaminant level.

(4) Rationale Codes:

Selection Reason: ASL = Above Screening Level.
TOX = Group A Carcinogen.
Deletion Reason: BSL = Below Screening Level.
BSL = Below ARAR/TBC Value.
NUT = Essential Nutrient.
NTX = Not Toxicity Value Available.

(5) Total PCBs calculated using sum of the detected Aroclors when at least one Aroclor detected or maximum practical quantitation limit for non-detected Aroclors when none of the Aroclors are detected.

Definitions: NA = Not Available.
nc = Screening Toxcity Value is based on noncancer effects.
ca = Screening Toxicity Value is based on cancer effects.
COPC = Chemical of Potential Concern.
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered.
VOCs = Volatile organic compounds.
SVOCs = Semi-volatile organic compounds.
P/PCBs = Pesticides/polychlorinated biphenyls.

TABLE B-2.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Air
Exposure Medium:	Site-wide Ambient Air

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (nc/ca) (2)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (3)
Air		**PCBs**													
	1336-36-3	PCBs, Total (4)	0.11	72.6	ng/m^3	6-Near East	163 / 172	NA - NA	7.3E+01	NA	3.4E+00 ca	NA	NA	YES	ASL

(1) Maximum detected concentration used for screening.

(2) Screened against EPA Region 9 Preliminary Remediation Goals (PRGs) for ambient air for cancer benchmark = 1E-6. Units adjusted to ng/m^3. http://www.epa.gov/region09/waste/sfund/prg/index.htm.

(3) Rationale Code:

Selection Reason: ASL = Above Screening Level.

(4) Total PCBs calculated using zero for non-detected homologs.

Definitions: NA = Not Available.
ca = Screening Toxicity Value is based on cancer effects.
COPC = Chemical of Potential Concern.
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered.
PCBs = Polychlorinated biphenyls.

TABLE B-3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Medium:	Surface Soil
Exposure Medium:	Surface Soil

Exposure Point	Chemical of Potential Concern	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Detection Frequency	Range of Detection Limit	Arithmetic Mean	95% UCL of Distribution	Exposure Point Concentration (1)			
									Value	Unit	Statistic	Rationale (2)
Facility Area	**SVOCs**											
	Benzo(a)anthracene	46 J	830	µg/kg	3 / 3	390 - 420	352	NA	830	µg/kg	Max	<ten samples
	Benzo(a)pyrene	24 J	1,900	µg/kg	3 / 3	390 - 420	701	NA	1,900	µg/kg	Max	<ten samples
	Benzo(b)fluoranthene	50 J	2,100	µg/kg	3 / 3	390 - 420	787	NA	2,100	µg/kg	Max	<ten samples
	Dibenz(a,h)anthracene	41 J	620	µg/kg	2 / 3	390 - 420	289	NA	620	µg/kg	Max	<ten samples
	Indeno(1,2,3-cd)pyrene	59 J	1,300	µg/kg	2 / 3	390 - 420	521	NA	1,300	µg/kg	Max	<ten samples
	P/PCBs											
	PCBs, Total (3,4)	23	930,000	µg/kg	27 / 30	37 - 88,000	58,994	373,914	373,914	µg/kg	UCL-NP	99% KM (Chebyshev) UCL
	Heptachlor epoxide	380	380	µg/kg	1 / 3	31 - 380	182	NA	380	µg/kg	Max	<ten samples
	Dioxin											
	Dioxin TEQ	0.191	0.756	µg/kg	1 / 4	NA - NA	NA	NA	0.756	µg/kg	Max	<ten samples
	Inorganics											
	Aluminum	11,000	19,000	mg/kg	3 / 3	23 - 25	14,333	NA	19,000	mg/kg	Max	<ten samples
	Antimony	8.7	8.7	mg/kg	1 / 3	2.3 - 2.5	4	NA	9	mg/kg	Max	<ten samples
	Arsenic	3.8	390	mg/kg	6 / 6	1.1 - 1.2	70	NA	390	mg/kg	Max	<ten samples
	Cadmium	0.52 J	4.7	mg/kg	3 / 6	0.54 - 0.62	1	NA	5	mg/kg	Max	<ten samples
	Chromium	13	23	mg/kg	5 / 6	1.1 - 1.2	17	NA	23	mg/kg	Max	<ten samples
	Iron	19,000	26,000	mg/kg	3 / 3	5.6 - 6.2	22,000	NA	26,000	mg/kg	Max	<ten samples
	Lead	8.7	4,700	mg/kg	5 / 6	0.56 - 6.1	813	NA	4,700	mg/kg	Max	<ten samples
	Manganese	70	830	mg/kg	5 / 6	1.1 - 1.2	498	NA	830	mg/kg	Max	<ten samples
	Mercury	0.091	2.6	mg/kg	7 / 8	0.024 - 0.42	0.7	NA	3	mg/kg	Max	<ten samples
	Vanadium	23	40	mg/kg	5 / 6	1.1 - 1.2	32	NA	40	mg/kg	Max	<ten samples

Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).

(1) Exposure point concentration (EPC) is the lower of the maximum concentration and the 95% Upper Confidence Limit (UCL) or 95th Percentile.

(2) The UCL listed were calculated using ProUCL 4.0 program.

(3) Total PCBs calculated using sum of the detected Aroclors when at least one Aroclor detected or maximum practical quantitation limit for non-detected Aroclors when none of the Aroclors are detected.
EPC was calculated using one-half the practical quantitation limit for non-detected Aroclors.

(4) Under Central Tendency Exposure (CTE) scenario, duplicate sample at SSRI-11 were average to calculate EPC. The mean value was selected as EPC.

TABLE B-3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Medium:	Surface Soil
Exposure Medium:	Surface Soil

Exposure Point	Chemical of Potential Concern	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Detection Frequency	Range of Detection Limit	Arithmetic Mean	95% UCL of Distribution	Exposure Point Concentration (1)			
									Value	Unit	Statistic	Rationale (2)
Facility Area	**SVOCs**											
	Benzo(a)anthracene	46 J	830	µg/kg	3 / 3	390 - 420	352	NA	830	µg/kg	Max	<ten samples
	Benzo(a)pyrene	24 J	1,900	µg/kg	3 / 3	390 - 420	701	NA	1,900	µg/kg	Max	<ten samples
	Benzo(b)fluoranthene	50 J	2,100	µg/kg	3 / 3	390 - 420	787	NA	2,100	µg/kg	Max	<ten samples
	Dibenz(a,h)anthracene	41 J	620	µg/kg	2 / 3	390 - 420	289	NA	620	µg/kg	Max	<ten samples
	Indeno(1,2,3-cd)pyrene	59 J	1,300	µg/kg	2 / 3	390 - 420	521	NA	1,300	µg/kg	Max	<ten samples
	P/PCBs											
	PCBs, Total (3)	23	17,000,000	µg/kg	28 / 31	37 - 3,800,000	605,472	6,061,165	6,061,165	µg/kg	UCL-NP	99% KM (Chebyshev) UCL
	Heptachlor epoxide	380	380	µg/kg	1 / 3	31 - 380	182	NA	380	µg/kg	Max	<ten samples
	Dioxin											
	Dioxin TEQ	0.191	0.756	µg/kg	1 / 4	NA - NA	NA	NA	0.756	µg/kg	Max	<ten samples
	Inorganics											
	Aluminum	11,000	19,000	mg/kg	3 / 3	23 - 25	14,333	NA	19,000	mg/kg	Max	<ten samples
	Antimony	8.7	8.7	mg/kg	1 / 3	2.3 - 2.5	4	NA	9	mg/kg	Max	<ten samples
	Arsenic	3.8	390	mg/kg	7 / 7	1.1 - 1.2	64	NA	390	mg/kg	Max	<ten samples
	Cadmium	0.52 J	4.7	mg/kg	3 / 7	0.51 - 0.62	1	NA	5	mg/kg	Max	<ten samples
	Chromium	13	23	mg/kg	7 / 7	1.1 - 1.2	18	NA	23	mg/kg	Max	<ten samples
	Iron	19,000	26,000	mg/kg	3 / 3	5.6 - 6.2	22,000	NA	26,000	mg/kg	Max	<ten samples
	Lead	8.7	4,700	mg/kg	7 / 7	0.56 - 28	712	NA	4,700	mg/kg	Max	<ten samples
	Manganese	70	830	mg/kg	7 / 7	1.1 - 1.2	480	NA	830	mg/kg	Max	<ten samples
	Mercury	0.091	2.6	mg/kg	8 / 9	0.024 - 0.42	0.7	NA	3	mg/kg	Max	<ten samples
	Vanadium	15	40	mg/kg	7 / 7	1.1 - 1.2	29	NA	40	mg/kg	Max	<ten samples

Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).

(1) Exposure point concentration (EPC) is the lower of the maximum concentration and the 95% Upper Confidence Limit (UCL) or 95th Percentile.

(2) The UCL listed were calculated using ProUCL 4.0 program.

(3) Total PCBs calculated using sum of the detected Aroclors when at least one Aroclor detected or maximum practical quantitation limit for non-detected Aroclors when none of the Aroclors are detected.
EPC was calculated using one-half the practical quantitation limit for non-detected Aroclors.

TABLE B-3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Surface Soil

Exposure Point	Chemical of Potential Concern	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Detection Frequency	Range of Detection Limit	Arithmetic Mean	95% UCL of Distribution	Exposure Point Concentration (1)			
									Value	Unit	Statistic	Rationale (2)
South Landfill	**SVOCs**											
	Benzo(a)anthracene	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Benzo(a)pyrene	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Benzo(b)fluoranthene	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Dibenz(a,h)anthracene	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	P/PCBs											
	PCBs, Total (3)	226	27,000	µg/kg	11 / 13	40 - 43	4,447	13,642	13,642	µg/kg	UCL-NP	95% KM (Chebyshev) UCL
	Heptachlor epoxide	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Dioxin											
	Dioxin TEQ	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Inorganics											
	Aluminum	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Antimony	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Arsenic	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Cadmium	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Chromium	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Iron	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Lead	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Manganese	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Mercury	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Vanadium	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data

Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).

(1) Exposure point concentration (EPC) is the lower of the maximum concentration and the 95% Upper Confidence Limit (UCL) or 95th Percentile.

(2) The UCL listed were calculated using ProUCL 4.0 program.

(3) Total PCBs calculated using sum of the detected Aroclors when at least one Aroclor detected or maximum practical quantitation limit for non-detected Aroclors when none of the Aroclors are detected. EPC was calculated using one-half the practical quantitation limit for non-detected Aroclors.

TABLE B-3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Surface Soil

Exposure Point	Chemical of Potential Concern	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Detection Frequency	Range of Detection Limit	Arithmetic Mean	95% UCL of Distribution	Exposure Point Concentration (1)			
									Value	Unit	Statistic	Rationale (2)
West End Landfill	**SVOCs**											
	Benzo(a)anthracene	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Benzo(a)pyrene	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Benzo(b)fluoranthene	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Dibenz(a,h)anthracene	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	P/PCBs											
	PCBs, Total (3)	ND	ND	µg/kg	0 / 2	38 - 44	NA	NA	NA	NA	NA	No Detected Value
	Heptachlor epoxide	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Dioxin											
	Dioxin TEQ	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Inorganics											
	Aluminum	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Antimony	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Arsenic	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Cadmium	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Chromium	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Iron	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Lead	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Manganese	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Mercury	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data
	Vanadium	NA	NA	NA	NA / NA	NA - NA	NA	NA	NA	NA	NA	No Data

Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).

(1) Exposure point concentration (EPC) is the lower of the maximum concentration and the 95% Upper Confidence Limit (UCL) or 95th Percentile.

(2) The UCL listed were calculated using ProUCL 4.0 program.

(3) Total PCBs calculated using sum of the detected Aroclors when at least one Aroclor detected or maximum practical quantitation limit for non-detected Aroclors when none of the Aroclors are detected.
EPC was calculated using one-half the practical quantitation limit for non-detected Aroclors.

TABLE B-3.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Surface/Subsurface Soil
Exposure Medium:	Surface/Subsurface Soil

Exposure Point	Chemical of Potential Concern	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Detection Frequency	Range of Detection Limit	Arithmetic Mean	95% UCL of Distribution	Exposure Point Concentration (1)			
									Value	Unit	Statistic	Rationale (2)
Facility Area	**SVOCs**											
	Benzo(a)anthracene	46 J	830	µg/kg	3 / 3	390 - 420	352	NA	830	µg/kg	Max	<ten samples
	Benzo(a)pyrene	24 J	1,900	µg/kg	3 / 3	390 - 420	701	NA	1,900	µg/kg	Max	<ten samples
	Benzo(b)fluoranthene	50 J	2,100	µg/kg	3 / 3	390 - 420	787	NA	2,100	µg/kg	Max	<ten samples
	Dibenz(a,h)anthracene	41 J	620	µg/kg	2 / 3	390 - 420	289	NA	620	µg/kg	Max	<ten samples
	Indeno(1,2,3-cd)pyrene	59 J	1,300	µg/kg	2 / 3	390 - 420	521	NA	1,300	µg/kg	Max	<ten samples
	P/PCBs											
	PCBs, Total (3)	23	17,000,000	µg/kg	51 / 58	37 - 3,800,000	355,060	3,272,601	3,272,601	µg/kg	UCL-NP	99% KM (Chebyshev) UCL
	Heptachlor epoxide	380	380	µg/kg	1 / 3	31 - 380	182	NA	380	µg/kg	Max	<ten samples
	Dioxin											
	Dioxin TEQ	0.191	0.756	µg/kg	1 / 4	NA - NA	NA	NA	0.756	µg/kg	Max	<ten samples
	Inorganics											
	Aluminum	11,000	19,000	mg/kg	3 / 3	23 - 25	14,333	NA	19,000	mg/kg	Max	<ten samples
	Antimony	8.7	8.7	mg/kg	1 / 3	2.3 - 2.5	4	NA	9	mg/kg	Max	<ten samples
	Arsenic	3.8	390	mg/kg	19 / 20	1.1 - 12	29	148	148	mg/kg	UCL-NP	97.5% KM (Chebyshev) UCL
	Barium	18	780	mg/kg	20 / 20	1.1 - 13	123	192	192	mg/kg	UCL-T	95% H-UCL
	Cadmium	0.52 J	4.7	mg/kg	5 / 20	0.53 - 6	1	1	1	mg/kg	UCL-NP	95% KM (% Bootstrap) UCL
	Chromium	12	110	mg/kg	19 / 20	1.1 - 12	26	47	47	mg/kg	UCL-NP	95% KM (Chebyshev) UCL
	Iron	19,000	26,000	mg/kg	3 / 3	5.6 - 6.2	22,000	NA	26,000	mg/kg	Max	<ten samples
	Lead	8.7	4,700	mg/kg	20 / 20	0.56 - 29	300	2,609	2,609	mg/kg	UCL-NP	99% Chebyshev (Mean, Sd) UCL
	Manganese	68	12,000	mg/kg	20 / 20	1.1 - 13	1,346	2,786	2,786	mg/kg	UCL-NP	95% Chebyshev (MVUE) UCL
	Mercury	0.032	3.3	mg/kg	21 / 22	0.024 - 0.71	1	2	2	mg/kg	UCL-NP	95% KM (Chebyshev) UCL
	Nickel	7.5	2,400	mg/kg	19 / 20	4.4 - 53	147	890	890	mg/kg	UCL-NP	97.5% KM (Chebyshev) UCL
	Vanadium	15	93	mg/kg	20 / 20	1.1 - 13	40	47	47	mg/kg	UCL-G	95% Approximate Gamma UCL

Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).

(1) Exposure point concentration (EPC) is the lower of the maximum concentration and the 95% Upper Confidence Limit (UCL) or 95th Percentile.

(2) The UCL listed were calculated using ProUCL 4.0 program.

(3) Total PCBs calculated using sum of the detected Aroclors when at least one Aroclor detected or maximum practical quantitation limit for non-detected Aroclors when none of the Aroclors are detected.
EPC was calculated using one-half the practical quantitation limit for non-detected Aroclors.

TABLE B-3.6
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Point	Chemical of Potential Concern	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Detection Frequency	Range of Detection Limit	Arithmetic Mean	95% UCL of Distribution	Exposure Point Concentration (1)			
									Value	Unit	Statistic	Rationale (2)
Tap	**VOCs**											
	1,2,4-Trichlorobenzene	11	11	µg/L	1 / 2	1 - 1	6	NA	11	µg/L	Max	<ten samples
	1,4-Dichlorobenzene	2.6	2.6	µg/L	1 / 19	1 - 2,000	2	2	2	µg/L	Perc	>80% Non-Detected Value
	Chlorobenzene	3.4	12	µg/L	6 / 25	1 - 100	4	5	5	µg/L	UCL-NP	95% KM (% Bootstrap) UCL
	cis-1,2-Dichloroethene	10	10	µg/L	1 / 2	1 - 1	5	NA	10	µg/L	Max	<ten samples
	Pentachlorophenol	11	26	µg/L	5 / 25	0.94 - 5,000	5	20	20	µg/L	Perc	>80% Non-Detected Value
	Trichloroethylene	3.4	3.4	µg/L	1 / 2	1 - 1	2	NA	3	µg/L	Max	<ten samples
	SVOCs											
	2,4,6-Trichlorophenol	9.4	17	µg/L	5 / 25	9.4 - 5,000	11	15	15	µg/L	Perc	>80% Non-Detected Value
	Indeno(1,2,3-cd)pyrene	0.73	0.73	µg/L	1 / 2	9.9 - 10	3	NA	0.73	µg/L	Max	<ten samples
	P/PCBs											
	PCBs, Total (3)	2.8	18,000	µg/L	7 / 26	0.47 - 1,000	1,178	2,435	2,435	µg/L	UCL-NP	95% KM (t) UCL
	gamma-BHC	0.55	0.55	µg/L	1 / 2	0.047 - 0.048	0.29	NA	0.55	µg/L	Max	<ten samples
	Methyl parathion	74	74	µg/L	1 / 3	0.5 - 0.5	37	NA	74	µg/L	Max	<ten samples
	Parathion	51	23,000	µg/L	4 / 26	0.94 - 1,100	1,484	9,375	9,375	µg/L	Perc	>80% Non-Detected Value
	Dioxin											
	Dioxin TEQ	3.61E-06	3.61E-06	µg/L	1 / 2	NA - NA	NA	NA	3.61E-06	µg/L	Max	<ten samples
	Inorganics											
	Antimony	5.1	5.1	µg/L	1 / 2	20 - 20	NA	NA	5	µg/L	Max	<ten samples
	Arsenic	6.1	6.1	µg/L	1 / 2	10 - 10	NA	NA	6	µg/L	Max	<ten samples
	Manganese	36	1,300	µg/L	3 / 3	10 - 10	629	NA	1,300	µg/L	Max	<ten samples
	Mercury	1	4.1	µg/L	6 / 19	0.2 - 0.2	1	2	2	µg/L	UCL-NP	95% KM (Percentile Bootstrap) UCL

Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).

(1) Exposure point concentration (EPC) is the lower of the maximum concentration and the 95% Upper Confidence Limit (UCL) or 95th Percentile.

(2) The UCL listed were calculated using ProUCL 4.0 program.

(3) Total PCBs calculated using sum of the detected Aroclors when at least one Aroclor detected or maximum practical quantitation limit for non-detected Aroclors when none of the Aroclors are detected. EPC was calculated using one-half the practical quantitation limit for non-detected Aroclors.

TABLE B-3.7
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Air
Exposure Medium:	Ambient Air

Exposure Point	Chemical of Potential Concern	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Detection Frequency	Range of Detection Limit	Arithmetic Mean	95% UCL of Distribution	Exposure Point Concentration (1)			
									Value	Unit	Statistic	Rationale (2)
Facility Area	**P/PCBs**											
	PCBs, Total (3)	11	73	ng/m^3	6 / 6	NA - NA	33	NA	73	ng/m^3	Max	<ten samples

Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).

(1) Exposure point concentration (EPC) is the lower of the maximum concentration and the 95% Upper Confidence Limit (UCL) or 95th Percentile.

(2) The UCL listed were calculated using ProUCL 4.0 program.

(3) Total PCBs calculated using zero for non-detected homologs.

TABLE B-3.8
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Air
Exposure Medium:	Ambient Air

Exposure Point	Chemical of Potential Concern	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Detection Frequency	Range of Detection Limit	Arithmetic Mean	95% UCL of Distribution	Exposure Point Concentration (1)			
									Value	Unit	Statistic	Rationale (2)
South Landfill	**P/PCBs**											
	PCBs, Total (3)	0.1	39	ng/m^3	76 / 82	NA - NA	6	7	7	ng/m^3	UCL-G	95% Approximate Gamma UCL

Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).

(1) Exposure point concentration (EPC) is the lower of the maximum concentration and the 95% Upper Confidence Limit (UCL) or 95th Percentile.

(2) The UCL listed were calculated using ProUCL 4.0 program.

(3) Total PCBs calculated using zero for non-detected homologs.

TABLE B-3.9
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Air
Exposure Medium:	Ambient Air

Exposure Point	Chemical of Potential Concern	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Unit	Detection Frequency	Range of Detection Limit	Arithmetic Mean	95% UCL of Distribution	Exposure Point Concentration (1)			
									Value	Unit	Statistic	Rationale (2)
West End Landfill	**P/PCBs**											
	PCBs, Total (3)	0.2	43	ng/m^3	81 / 84	NA - NA	8	10	10	ng/m^3	UCL-G	95% Approximate Gamma UCL

Statistics: Maximum Detected Value (Max); 95th Percentile (Perc); Normal Distribution (UCL-N); Lognormal Distribution (UCL-T); Gamma Distribution (UCL-G); Non-parametric UCL (UCL-NP).

(1) Exposure point concentration (EPC) is the lower of the maximum concentration and the 95% Upper Confidence Limit (UCL) or 95th Percentile.

(2) The UCL listed were calculated using ProUCL 4.0 program.

(3) Total PCBs calculated using zero for non-detected homologs.

TABLE B-4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Operations Area Worker (current)	Adult	Surface Soil	CS	Chemical Concentration in Soil	mg/kg	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	kg/mg	1E-06	--	1E-06	--	CS x CF x IR-S x IAF x EF x ED x
				IR-S	Ingestion Rate of Soil	mg/day	50	Solutia 2002; EPA 1991	50	Solutia 2002; EPA 1991	1/BW x 1/AT
				IAF	Intestinal Absorption Factor for PCBs and As	unitless	0.3	Solutia 2002	0.3	Solutia 2002	
				EF	Exposure Frequency	days/year	250	Solutia 2002; EPA 2002	219	EPA 2004a	
				ED	Exposure Duration	years	25	EPA 2002	9	EPA 2004a	
				BW	Body Weight	kg	70	EPA 2002	70	EPA 2002	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	9,125	EPA 1989	3,285	EPA 1989	
	Operations Area Worker (future)	Adult	Surface Soil	CS	Chemical Concentration in Soil	mg/kg	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	kg/mg	1E-06	--	1E-06	--	CS x CF x IR-S x EF x ED x
				IR-S	Ingestion Rate of Soil	mg/day	100	EPA 2002	100	EPA 2002	1/BW x 1/AT
				EF	Exposure Frequency	days/year	250	EPA 2002	219	EPA 2004a	
				ED	Exposure Duration	years	25	EPA 2002	9	EPA 2004a	
				BW	Body Weight	kg	70	EPA 2002	70	EPA 2002	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	9,125	EPA 1989	3,285	EPA 1989	
	Trespasser	Adolescent (7-16 yrs)	Surface Soil	CS	Chemical Concentration in Soil	mg/kg	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	kg/mg	1E-06	--	1E-06	--	CS x CF x IR-S x EF x ED x
				IR-S	Ingestion Rate of Soil	mg/day	100	professional judgment	100	professional judgment	1/BW x 1/AT
				EF	Exposure Frequency	days/year	50	professional judgment	10	professional judgment	
				ED	Exposure Duration	years	10	EPA 2000	10	professional judgment	
				BW	Body Weight	kg	45	EPA 2000	45	EPA 2000	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	3,650	EPA 1989	3,650	EPA 1989	
	O&M Worker	Adult	Surface Soil	CS	Chemical Concentration in Soil	mg/kg	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	kg/mg	1E-06	--	1E-06	--	CS x CF x IR-S x EF x ED x
				IR-S	Ingestion Rate of Soil	mg/day	100	EPA 2002	100	EPA 2002	1/BW x 1/AT
				EF	Exposure Frequency	days/year	24	professional judgment	12	professional judgment	
				ED	Exposure Duration	years	25	EPA 2002	9	EPA 2004a	
				BW	Body Weight	kg	70	EPA 2002	70	EPA 2002	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	9,125	EPA 1989	3,285	EPA 1989	
	Construction Worker	Adult	Surface/ Subsurface Soil	CS	Chemical Concentration in Soil	mg/kg	See Tables B-3.5	See Tables B-3.5	See Tables B-3.5	See Tables B-3.5	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	kg/mg	1E-06	--	1E-06	--	CS x CF x IR-S x EF x ED x
				IR-S	Ingestion Rate of Soil	mg/day	330	EPA 2002	330	EPA 2002	1/BW x 1/AT
				EF	Exposure Frequency	days/year	100	professional judgment	40	professional judgment	
				ED	Exposure Duration	years	1	professional judgment	1	professional judgment	
				BW	Body Weight	kg	70	EPA 2002	70	EPA 2002	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	365	EPA 1989	365	EPA 1989	

TABLE B-4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Operations Area Worker	Adult	Surface Soil	CS	Chemical Concentration in Soil	mg/kg	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	kg/mg	1E-06	--	1E-06	--	CS x CF x SA x AF x ABS x EF x ED x
	(current)			SA	Skin Surface Area Available for Contact	cm^2	2,290	Solutia 2002; EPA 2001	2,290	Solutia 2002; EPA 2001	1/BW x 1/AT
				AF	Adherence Factor	mg/cm^2	0.2	Solutia 2002; EPA 2001	0.02	EPA 2004a	
				ABS	Absorption Factor	unitless	See Table 4-2	See Table 4-2	See Table 4-2	See Table 4-2	
				EF	Exposure Frequency	days/year	250	EPA 2002	219	EPA 2004a	
				ED	Exposure Duration	years	25	EPA 2002	9	EPA 2004a	
				BW	Body Weight	kg	70	EPA 2002	70	EPA 2002	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	9,125	EPA 1989	3,285	EPA 1989	
	Operations Area Worker	Adult	Surface Soil	CS	Chemical Concentration in Soil	mg/kg	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	kg/mg	1E-06	--	1E-06	--	CS x CF x SA x AF x ABS x EF x ED x
	(future)			SA	Skin Surface Area Available for Contact	cm^2	3,300	EPA 2004a (1)	3,300	EPA 2004a (1)	1/BW x 1/AT
				AF	Adherence Factor	mg/cm^2	0.2	EPA 2004a	0.02	EPA 2004a	
				ABS	Absorption Factor	unitless	See Table 4-2	See Table 4-2	See Table 4-2	See Table 4-2	
				EF	Exposure Frequency	days/year	250	EPA 2002	219	EPA 2004a	
				ED	Exposure Duration	years	25	EPA 2002	9	EPA 2004a	
				BW	Body Weight	kg	70	EPA 2002	70	EPA 2002	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	9,125	EPA 1989	3,285	EPA 1989	
	Trespasser	Adolescent (7-16 yrs)	Surface Soil	CS	Chemical Concentration in Soil	mg/kg	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	kg/mg	1E-06	--	1E-06	--	CS x CF x SA x AF x ABS x EF x ED x
				SA	Skin Surface Area Available for Contact	cm^2	2,800	EPA 2004a	2,800	EPA 2004a	1/BW x 1/AT
				AF	Adherence Factor	mg/cm^2	0.2	EPA 2004a	0.04	EPA 2004a	
				ABS	Absorption Factor	unitless	See Table 4-2	See Table 4-2	See Table 4-2	See Table 4-2	
				EF	Exposure Frequency	days/year	50	professional judgment	10	professional judgment	
				ED	Exposure Duration	years	10	EPA 2000	10	EPA 2000	
				BW	Body Weight	kg	45	EPA 2000	45	EPA 2000	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	3,650	EPA 1989	3,650	EPA 1989	
	O&M Worker	Adult	Surface Soil	CS	Chemical Concentration in Soil	mg/kg	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	See Tables B-3.1 to B-3.4	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	kg/mg	1E-06	--	1E-06	--	CS x CF x SA x AF x ABS x EF x ED x
				SA	Skin Surface Area Available for Contact	cm^2	3,300	EPA 2004a (1)	3,300	EPA 2004a (1)	1/BW x 1/AT
				AF	Adherence Factor	mg/cm^2	0.9	EPA 2004a	0.2	EPA 2004a	
				ABS	Absorption Factor	unitless	See Table 4-2	See Table 4-2	See Table 4-2	See Table 4-2	
				EF	Exposure Frequency	days/year	24	professional judgment	12	professional judgment	
				ED	Exposure Duration	years	25	EPA 2002	9	EPA 2004a	
				BW	Body Weight	kg	70	EPA 2002	70	EPA 2002	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	9,125	EPA 1989	3,285	EPA 1989	

TABLE B-4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Construction Worker	Adult	Surface/ Subsurface Soil	CS	Chemical Concentration in Soil	mg/kg	See Tables B-3.5	See Tables B-3.5	See Tables B-3.5	See Tables B-3.5	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	kg/mg	1E-06	--	1E-06	--	CS x CF x SA x AF x ABS x EF x ED x
				SA	Skin Surface Area Available for Contact	cm^2	3,300	EPA 2004a (1)	3,300	EPA 2004a (1)	1/BW x 1/AT
				AF	Adherence Factor	mg/cm^2	0.3	EPA 2004a	0.1	EPA 2004a	
				ABS	Absorption Factor	unitless	See Table 4-2	See Table 4-2	See Table 4-2	See Table 4-2	
				EF	Exposure Frequency	days/year	100	professional judgment	40	professional judgment	
				ED	Exposure Duration	years	1	professional judgment	1	professional judgment	
				BW	Body Weight	kg	70	EPA 2002	70	EPA 2002	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	365	EPA 1989	365	EPA 1989	

RME = Reasonable Maximum Exposure.

CTE = Central Tendency Exposure.

(1) Based on 50th percentile values for men and women for the following body parts: head, hands, and forearms.

Sources:

EPA 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA 1997: Exposure Factors Handbook. Vol. 1: General Factors. ORD. EPA/600/P-95/002Fa.

EPA 2000."Supplemental Guidance to RAGS: Region 4 Bulletins. Human Health Risk Assessment." May.

EPA 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

EPA 2004a: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment Final. EPA/540/R/99/005.

Solutia 2002: RFI/CS Report for the Anniston Alabama Facility. October.

TABLE B-4.2
VALUES USED FOR DAILY INTAKE CALCULATIONS
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Child to Adult (Lifetime Resident)	Tap Water	CW	Chemical Concentration in Water	µg/L	See Table B-3.6	See Table B-3.6	Not Evaluated		IFw = (EDc x IR-Wc / BWc) +
				CF	Conversion Factor	mg/µg	1E-03	--			(EDtot - EDc) x (IR-Wa/BWa)
				IFw	Age-adjusted Ingestion Factor	L-yr/kg-day	1.09	Calculated			
				BWc	Body Weight, child	kg	15	EPA 2004a			Chronic Daily Intake (CDI) (mg/kg-day) =
				BWa	Body Weight, adult	kg	70	EPA 2004a			CW x IFw x CF x EF x 1/AT
				IR-Wc	Ingestion Rate of Water, child	L/day	1	EPA 2000			
				IR-Wa	ingestion Rate of Water, adult	L/day	2	EPA 2000			
				EDc	Exposure Duration, child	years	6	EPA 2000			
				EDtot	Exposure Duration, total	years	30	EPA 2000			
				EF	Exposure Frequency	days/year	350	EPA 2000			
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989			
		Child (0-6 yrs)	Tap Water	CW	Chemical Concentration in Water	µg/L	See Table B-3.6	See Table B-3.6	Not Evaluated		Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	mg/µg	1E-03	--			CW x CF1 x IRw x EF x ED x
				IRw	Ingestion Rate of Water	L/day	1	EPA 2000			1/BW x 1/AT
				EF	Exposure Frequency	days/year	350	EPA 2000			
				ED	Exposure Duration	years	6	EPA 2000			
				BW	Body Weight	kg	15	EPA 2004a			
				AT-N	Averaging Time (Noncancer)	days	2,190	EPA 1989			
	Operations Area Worker	Adult	Tap Water	CW	Chemical Concentration in Water	µg/L	See Table B-3.6	See Table B-3.6	See Table B-3.6	See Table B-3.6	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	mg/µg	1E-03	--	1E-03	--	CW x CF1 x IRw x EF x ED x
				IRw	Ingestion Rate of Water	L/day	1	EPA 2000	1	EPA 2000	1/BW x 1/AT
				EF	Exposure Frequency	days/year	250	EPA 2000	219	EPA 2004a	
				ED	Exposure Duration	years	25	EPA 2000	9	EPA 2004a	
				BW	Body Weight	kg	70	EPA 2004a	70	EPA 2004a	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	9,125	EPA 1989	3,285	EPA 1989	
	O&M Worker	Adult	Tap Water	CW	Chemical Concentration in Water	µg/L	See Table B-3.6	See Table B-3.6	See Table B-3.6	See Table B-3.6	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	mg/µg	1E-03	--	1E-03	--	CW x CF1 x IRw x EF x ED x
				IRw	Ingestion Rate of Water	L/day	1	EPA 2000	1	EPA 2000	1/BW x 1/AT
				EF	Exposure Frequency	days/year	24	EPA 2000	12	EPA 2004a	
				ED	Exposure Duration	years	25	EPA 2000	9	EPA 2004a	
				BW	Body Weight	kg	70	EPA 2004a	70	EPA 2004a	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	9,125	EPA 1989	3,285	EPA 1989	

TABLE B-4.2
VALUES USED FOR DAILY INTAKE CALCULATIONS
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Resident	Adult	Tap Water	CW	Chemical Concentration in Water	µg/L	See Table B-3.6	See Table B-3.6	Not Evaluated		Chronic Daily Intake (CDI) (mg/kg-day) =
				CF1	Conversion Factor	mg/µg	1E-03	--			CW x CF1 x CF2 x SA x EF x ED x
				SA	Surface Area Available for Contact	cm^2	18,000	EPA 2004a			1/BW x 1/AT
				K_p	Permeability Coefficient	cm/hr	See Table 4-2	See Table 4-2			
				CF2	Conversion Factor	L/cm^3	1E-03	--			
				ET	Exposure Time	hr/day	0.25	EPA 2001b			
				EF	Exposure Frequency	days/year	350	EPA 2004a			
				ED	Exposure Duration	years	24	EPA 2004a			
				BW	Body Weight	kg	70	EPA 2004a			
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989			
				AT-N	Averaging Time (Noncancer)	days	8,760	EPA 1989			
		Child (0-6 yrs)	Tap Water	CW	Chemical Concentration in Water	µg/L	See Table B-3.6	See Table B-3.6	Not Evaluated		Chronic Daily Intake (CDI) (mg/kg-day) =
				CF1	Conversion Factor	mg/µg	1E-03	--			CW x CF1 x CF2 x SA x EF x ED x
				SA	Surface Area Available for Contact	cm^2	6,600	EPA 2004a			1/BW x 1/AT
				K_p	Permeability Coefficient	cm/hr	See Table 4-2	See Table 4-2			
				CF2	Conversion Factor	L/cm^3	1E-03	--			
				ET	Exposure Time	hr/day	0.45	EPA 2001b			
				EF	Exposure Frequency	days/year	350	EPA 2004a			
				ED	Exposure Duration	years	6	EPA 2004a			
				BW	Body Weight	kg	15	EPA 2004a			
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989			
				AT-N	Averaging Time (Noncancer)	days	2,190	EPA 1989			
Inhalation at Showerhead	Resident	Adult	Air	CA	Chemical Concentration in Air	$µg/m^3$	See Tables D-3	See Tables D-3	Not Evaluated		Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion factor	mg/µg	1E-03	--			CA x IR-A x ET x EF x ED x CF x
				IR-A	Inhalation Rate of Air	m^3/hr	1	EPA 1999			1/BW x 1/AT
				ET	Exposure Time	hr/day	0.58	EPA 2004a (2)			
				EF	Exposure frequency	days/year	350	EPA 2004a			
				ED	Exposure duration	years	24	EPA 2004a			
				BW	Body weight	kg	70	EPA 2004a			
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989			
				AT-N	Averaging Time (Noncancer)	days	8,760	EPA 1989			

TABLE B-4.2
VALUES USED FOR DAILY INTAKE CALCULATIONS
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation at Showerhead	Resident	Child (0-6 yrs)	Air	CA	Chemical Concentration in Air	µg/m³	See Tables D-4	See Tables D-4	Not Evaluated		Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion factor	mg/µg	1E-03	--			CA x IR-A x ET x EF x ED x CF x
				IR-A	Inhalation Rate of Air	m³/hr	1	EPA 1999			1/BW x 1/AT
				ET	Exposure Time	hr/day	1	EPA 2004a (2)			
				EF	Exposure Frequency	days/year	350	EPA 2004a			
				ED	Exposure Duration	years	6	EPA 2004a			
				BW	Body Weight	kg	15	EPA 2004a			
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989			
				AT-N	Averaging Time (Noncancer)	days	2,190	EPA 1989			

RME = Reasonable Maximum Exposure.

CTE = Central Tendency Exposure.

(1) Based on the 50th percentile values for males and females. Since body weight and surface area are dependent variables, all surface areas used 50th percentiles.

(2) Inhalation exposure time is based on time in the shower/bath plus time in the bathroom after shower/bath.

Sources:

EPA 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA 1995."Supplemental Guidance to RAGS: Region 4 Bulletins. Human Health Risk Assessment." November.

EPA 1997: Exposure Factors Handbook. Vol. 1: General Factors. ORD. EPA/600/P-95/002Fa.

EPA 2001b: Personal communication with M. Olsen of EPA Region 2, July 13, 2001. Based on EPA Region 2 and the Andelman model as modified by Schaum et al.

EPA 2002: Child-Specific Exposure Factors Handbook. NCEA-W; EPA/600/P-00-002B.

EPA 2004a: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment Final. EPA/540/R/99/005.

TABLE B-4.3
VALUES USED FOR DAILY INTAKE CALCULATIONS
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Air
Exposure Medium:	Ambient Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation of ambient air	Resident	Adult	Air	CA	Chemical Concentration in Air	ng/m^3	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	Not Evaluated		Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion factor	mg/ng	1E-06	--			CA x IR-A x EF x ED x CF x
				IR-A	Inhalation Rate of Air	m^3/day	13	EPA 1999			1/BW x 1/AT
				EF	Exposure frequency	days/year	350	EPA 1991			
				ED	Exposure duration	years	24	EPA 1991			
				BW	Body weight	kg	70	EPA 1991			
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989			
				AT-N	Averaging Time (Noncancer)	days	8,760	EPA 1989			
		Child (0-6 yrs)	Air	CA	Chemical Concentration in Air	ng/m^3	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	Not Evaluated		Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion factor	mg/ng	1E-06	--			CA x IR-A x EF x ED x CF x
				IR-A	Inhalation Rate of Air	m^3/day	7.5	EPA 1999			1/BW x 1/AT
				EF	Exposure Frequency	days/year	350	EPA 1991			
				ED	Exposure Duration	years	6	EPA 1991			
				BW	Body Weight	kg	15	EPA 1991			
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989			
				AT-N	Averaging Time (Noncancer)	days	2,190	EPA 1989			
	Operations Area Worker	Adult	Air	CA	Chemical Concentration in Air	ng/m^3	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	Chronic Daily Intake (CDI) (mg/kg-day) =
				IR-A	Inhalation Rate of Air	m^3/hr	1.5	EPA 1999	1.5	EPA 1999	CA x IR-A x ET x EF x ED x CF x
				ET	Exposure Time	hr/day	8	EPA 1999	8	EPA 1999	1/BW x 1/AT
				EF	Exposure Frequency	days/year	250	EPA 2002	219	EPA 2004a	
				ED	Exposure Duration	years	25	EPA 2002	9	EPA 2004a	
				CF	Conversion Factor	mg/ng	1E-06	--	1E-06	--	
				BW	Body Weight	kg	70	EPA 2002	70	EPA 2002	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	9,125	EPA 1989	3,285	EPA 1989	
	Trespasser	Adolescent (7-16 yrs)	Air	CA	Chemical Concentration in Air	ng/m^3	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	Chronic Daily Intake (CDI) (mg/kg-day) =
				IR-A	Inhalation Rate of Air	m^3/hr	1.07	EPA 1999	1.07	EPA 1999	CA x IR-A x ET x EF x ED x CF x
				ET	Exposure Time	hr/day	4	EPA 1999	2	EPA 1999	1/BW x 1/AT
				EF	Exposure Frequency	days/year	50	professional judgment	10	professional judgment	
				ED	Exposure Duration	years	10	EPA 2000	10	EPA 2000	
				CF	Conversion Factor	mg/ng	1E-06	--	1E-06	--	
				BW	Body Weight	kg	45	EPA 2000	45	EPA 2002	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	3,650	EPA 1989	3,650	EPA 1989	

TABLE B-4.3

VALUES USED FOR DAILY INTAKE CALCULATIONS

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Air
Exposure Medium:	Ambient Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation of ambient air	O&M Worker	Adult	Air	CA	Chemical Concentration in Air	ng/m^3	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	Chronic Daily Intake (CDI) (mg/kg-day) =
				IR-A	Inhalation Rate of Air	m^3/hr	1.5	EPA 1999	1.5	EPA 1999	CA x IR-A x ET x EF x ED x CF x
				ET	Exposure Time	hr/day	8	EPA 1999	8	EPA 1999	1/BW x 1/AT
				EF	Exposure Frequency	days/year	24	professional judgment	12	professional judgment	
				ED	Exposure Duration	years	25	EPA 2002	9	EPA 2004a	
				CF	Conversion Factor	mg/ng	1E-06	--	1E-06	--	
				BW	Body Weight	kg	70	EPA 2002	70	EPA 2002	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	9,125	EPA 1989	3,285	EPA 1989	
	Construction Worker	Adult	Air	CA	Chemical Concentration in Air	ng/m^3	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	See Tables B-3.7 to B-3.9	Chronic Daily Intake (CDI) (mg/kg-day) =
				IR-A	Inhalation Rate of Air	m^3/hr	2.5	EPA 1999	2.5	EPA 1999	CA x IR-A x ET x EF x ED x CF x
				ET	Exposure Time	hr/day	8	EPA 1999	8	EPA 1999	1/BW x 1/AT
				EF	Exposure Frequency	days/year	100	professional judgment	40	professional judgment	
				ED	Exposure Duration	years	1	professional judgment	1	professional judgment	
				CF	Conversion Factor	mg/ng	1E-06	--	1E-06	--	
				BW	Body Weight	kg	70	EPA 2002	70	EPA 2002	
				AT-C	Averaging Time (Cancer)	days	25,550	EPA 1989	25,550	EPA 1989	
				AT-N	Averaging Time (Noncancer)	days	365	EPA 1989	365	EPA 1989	

RME = Reasonable Maximum Exposure.

CTE = Central Tendency Exposure.

(1) Based on 50th percentile values for men and women for the following body parts: head, hands, and forearms.

Sources:

EPA 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA 1999: Exposure Factors Handbook. ORD. EPA/800/C-99/001.

EPA 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

EPA 2004a: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment Final. EPA/540/R/99/005.

TABLE B-4.4

MODIFIED VALUES USED FOR DAILY INTAKE CALCULATIONS

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Modified Value	Unit	Modified Values Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespasser	Adolescent (7-16 yrs)	Surface Soil	CS	Chemical Concentration in Soil	See Tables B-3.1 to B-3.4	mg/kg	See Tables B-3.1 to B-3.4	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	1E-06	kg/mg	--	CS x CF x IR-S x IAF x EF x ED x
				IR-S	Ingestion Rate of Soil	100	mg/day	Solutia 2002	1/BW x 1/AT
				IAF	Intestinal Absorption Factor for PCBs and As	0.3	unitless	Solutia 2002	
				EF	Exposure Frequency	60	days/year	Solutia 2002	
				ED	Exposure Duration	10	years	Solutia 2002; EPA 2000	
				BW	Body Weight	45	kg	EPA 2000	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA 1989	
				AT-N	Averaging Time (Noncancer)	3,650	days	EPA 1989	
	O&M Worker	Adult	Surface Soil	CS	Chemical Concentration in Soil	See Tables B-3.1 to B-3.4	mg/kg	See Tables B-3.1 to B-3.4	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	1E-06	kg/mg	--	CS x CF x IR-S x IAF x EF x ED x
				IR-S	Ingestion Rate of Soil	50	mg/day	Solutia 2002; EPA 1991	1/BW x 1/AT
				IAF	Intestinal Absorption Factor for PCBs and As	0.3	unitless	Solutia 2002	
				EF	Exposure Frequency	50	days/year	Solutia 2002	
				ED	Exposure Duration	25	years	EPA 2002	
				BW	Body Weight	70	kg	EPA 2002	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA 1989	
				AT-N	Averaging Time (Noncancer)	9,125	days	EPA 1989	
	Construction Worker	Adult	Surface/ Subsurface Soil	CS	Chemical Concentration in Soil	See Tables B-3.5	mg/kg	See Tables B-3.5	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	1E-06	kg/mg	--	CS x CF x IR-S x IAF x EF x ED x
				IR-S	Ingestion Rate of Soil	480	mg/day	Solutia 2002; EPA 2002	1/BW x 1/AT
				IAF	Intestinal Absorption Factor for PCBs and As	0.3	unitless	Solutia 2002	
				EF	Exposure Frequency	120	days/year	Solutia 2002	
				ED	Exposure Duration	1	years	Solutia 2002	
				BW	Body Weight	70	kg	EPA 2002	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA 1989	
				AT-N	Averaging Time (Noncancer)	365	days	EPA 1989	

TABLE B-4.4

MODIFIED VALUES USED FOR DAILY INTAKE CALCULATIONS

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Modified Value	Unit	Modified Values Rationale/ Reference	Intake Equation/ Model Name
Dermal	Trespasser	Adolescent (7-16 yrs)	Surface Soil	CS	Chemical Concentration in Soil	See Tables B-3.1 to B-3.4	mg/kg	See Tables B-3.1 to B-3.4	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	1E-06	kg/mg	--	CS x CF x SA x AF x ABS x EF x ED x
				SA	Skin Surface Area Available for Contact	5,300	cm^2	Solutia 2002; EPA 2001	1/BW x 1/AT
				AF	Adherence Factor	0.04	mg/cm^2	Solutia 2002; EPA 2001	
				ABS	Absorption Factor	See Table 4-2	unitless	See Table 4-2	
				EF	Exposure Frequency	60	days/year	Solutia 2002	
				ED	Exposure Duration	10	years	EPA 2000	
				BW	Body Weight	45	kg	EPA 2000	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA 1989	
				AT-N	Averaging Time (Noncancer)	3,650	days	EPA 1989	
	O&M Worker	Adult	Surface Soil	CS	Chemical Concentration in Soil	See Tables B-3.1 to B-3.4	mg/kg	See Tables B-3.1 to B-3.4	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	1E-06	kg/mg	--	CS x CF x (SA_{hd} x AF_{hd} + SA_{hnd} x AF_{hnd}) x
				SA_{hd}	Exposed Surface Area - Adult Head	1,300	cm^2	Solutia 2002; EPA 2001	ABS x EF x ED x 1/BW x 1/AT
				AF_{hd}	Adherence Factor (head)	0.004	mg/cm^2	Solutia 2002; EPA 2001	
				SA_{hnd}	Exposed Surface Area - Adult Hands	990	cm^2	Solutia 2002; EPA 2001	
				AF_{hnd}	Adherence Factor (hands)	0.046	mg/cm^2	Solutia 2002; EPA 2001	
				ABS	Absorption Factor	See Table 4-2	unitless	See Table 4-2	
				EF	Exposure Frequency	50	days/year	Solutia 2002	
				ED	Exposure Duration	25	years	EPA 2002	
				BW	Body Weight	70	kg	EPA 2002	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA 1989	
				AT-N	Averaging Time (Noncancer)	9,125	days	EPA 1989	
	Construction Worker	Adult	Surface/ Subsurface Soil	CS	Chemical Concentration in Soil	See Tables B-3.5	mg/kg	See Tables B-3.5	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	1E-06	kg/mg	--	CS x CF x (SA_{hd} x AF_{hd} + SA_{hnd} x AF_{hnd}) x
				SA_{hd}	Exposed Surface Area - Adult Head	1,300	cm^2	Solutia 2002; EPA 2001	ABS x EF x ED x 1/BW x 1/AT
				AF_{hd}	Adherence Factor (head)	0.029	mg/cm^2	Solutia 2002; EPA 2001	
				SA_{hnd}	Exposed Surface Area - Adult Hands	990	cm^2	Solutia 2002; EPA 2001	
				AF_{hnd}	Adherence Factor (hands)	0.24	mg/cm^2	Solutia 2002; EPA 2001	
				ABS	Absorption Factor	See Table 4-2	unitless	See Table 4-2	
				EF	Exposure Frequency	120	days/year	Solutia 2002	
				ED	Exposure Duration	1	years	Solutia 2002	
				BW	Body Weight	70	kg	EPA 2002	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA 1989	
				AT-N	Averaging Time (Noncancer)	365	days	EPA 1989	

Sources:

EPA 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA 1997: Exposure Factors Handbook. Vol. 1: General Factors. ORD. EPA/600/P-95/002Fa.

EPA 2000."Supplemental Guidance to RAGS: Region 4 Bulletins. Human Health Risk Assessment." May.

EPA 2001: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Supplemental Guidance, Dermal Risk Assessment. Interim Guidance. EPA/540/R/99/005.

EPA 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

Solutia 2002: RFI/CS Report for the Anniston Alabama Facility. October.

TABLE B-4.5

MODIFIED VALUES USED FOR DAILY INTAKE CALCULATIONS

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Medium:	Air
Exposure Medium:	Ambient Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Modified Value	Unit	Modified Values Rationale/ Reference	Intake Equation/ Model Name
Inhalation of Ambient Air	Trespasser	Child	Air	CA	Chemical Concentration in Air	See Tables B-3.7 to B-3.9	ng/m^3	See Tables B-3.7 to B-3.9	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	1E-06	mg/ng	--	CA x CF x IR-A x ET x EF x ED x 1/BW x 1/AT
				IR-A	Inhalation Rate of Air	1.07	m^3/hr	EPA 1999	
				ET	Exposure Time	4	hr/day	professional judgment	
				EF	Exposure Frequency	60	days/year	Solutia 2002	
				ED	Exposure Duration	10	years	EPA 2000	
				BW	Body Weight	45	kg	EPA 2002	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA 1989	
				AT-N	Averaging Time (Noncancer)	3,650	days	EPA 1989	
	Construction Worker	Adult	Air	CA	Chemical Concentration in Air	See Tables B-3.7 to B-3.9	ng/m^3	See Tables B-3.7 to B-3.9	Chronic Daily Intake (CDI) (mg/kg-day) =
				CF	Conversion Factor	1E-06	mg/ng	--	CA x CF x IR-A x ET x EF x ED x 1/BW x 1/AT
				IR-A	Inhalation Rate of Air	2.5	m^3/hr	EPA 1997	
				ET	Exposure Time	8	hr/day	EPA 1997	
				EF	Exposure Frequency	120	days/year	Solutia 2002	
				ED	Exposure Duration	1	years	Solutia 2002	
				BW	Body Weight	70	kg	EPA 2002	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA 1989	
				AT-N	Averaging Time (Noncancer)	365	days	EPA 1989	

Sources:

EPA 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA 1999: Exposure Factors Handbook. ORD. EPA/800/C-99/001.

EPA 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

Solutia 2002: RFI/CS Report for the Anniston Alabama Facility. October.

TABLE B-5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Anniston PCB Site, Operable Unit 3

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal (1)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factor	RfD: Target Organ(s)	
		Value	Unit		Value	Unit			Source(s)	Date(s) (2) (MM/DD/YYYY)
VOCs										
1,2,4-Trichlorobenzene	Chronic	1.0E-02	mg/kg-day	–	1.0E-02	mg/kg-day	Adrenals	1,000	IRIS	05/11/2007
1,4-Dichlorobenzene	Chronic	3.0E-02	mg/kg-day	–	3.0E-02	mg/kg-day	NA	NA	NCEA	10/2004
Chlorobenzene	Chronic	2.0E-02	mg/kg-day	–	2.0E-02	mg/kg-day	Liver	1,000	IRIS	05/11/2007
cis-1,2-Dichloroethene	Chronic	1.0E-02	mg/kg-day	–	1.0E-02	mg/kg-day	Blood	3,000	PPRTV	01/17/2007
Pentachlorophenol	Chronic	3.0E-02	mg/kg-day	76%	3.0E-02	mg/kg-day	Liver/Kidney	100	IRIS	05/11/2007
Trichloroethylene	Chronic	3.0E-04	mg/kg-day	–	3.0E-04	mg/kg-day	Liver/Kidney/Fetus	3,000	NCEA	10/25/2004
SVOCs										
2,4,6-Trichlorophenol	Chronic	1.0E-04	mg/kg-day	–	1.0E-04	mg/kg-day	NA	NA	NCEA	10/2004
Benzo(a)anthracene	NA	NA	NA	–	NA	NA	NA	NA	IRIS	05/11/2007
Benzo(a)pyrene	NA	NA	NA	89%	NA	NA	NA	NA	IRIS	05/11/2007
Benzo(b)fluoranthene	NA	NA	NA	–	NA	NA	NA	NA	IRIS	05/11/2007
Dibenz(a,h)anthracene	NA	NA	NA	–	NA	NA	NA	NA	IRIS	05/11/2007
Indeno(1,2,3-cd)pyrene	NA	NA	NA	–	NA	NA	NA	NA	IRIS	05/11/2007
P/PCBs										
PCBs, Total (3)	Chronic	2.0E-05	mg/kg-day	–	2.0E-05	mg/kg-day	Eye/Skin/Nails/Immune System	300	IRIS	05/11/2007
gamma-BHC	Chronic	3.0E-04	mg/kg-day	–	3.0E-04	mg/kg-day	Liver/Kidney	1,000	IRIS	05/11/2007
Heptachlor epoxide	Chronic	1.3E-05	mg/kg-day	–	1.3E-05	mg/kg-day	Liver	1,000	IRIS	05/11/2007
Methyl parathion	Chronic	2.5E-04	mg/kg-day	–	2.5E-04	mg/kg-day	Blood	100	IRIS	05/11/2007
Parathion	Chronic	6.0E-03	mg/kg-day	–	6.0E-03	mg/kg-day	NA	NA	HEAST	07/01/1997
Dioxin										
Dioxin TEQ	NA	NA	NA	–	NA	NA	NA	NA	IRIS	05/11/2007
Inorganics										
Aluminum	Chronic	1.0E+00	mg/kg-day	–	1.0E+00	mg/kg-day	GI Tract/CNS	100	NCEA	11/10/2003
Antimony	Chronic	4.0E-04	mg/kg-day	15%	6.0E-05	mg/kg-day	Whole Body/Blood	1,000	IRIS	05/11/2007
Arsenic	Chronic	3.0E-04	mg/kg-day	–	3.0E-04	mg/kg-day	Skin	3	IRIS	05/11/2007
Barium	Chronic	2.0E-01	mg/kg-day	7%	1.4E-02	mg/kg-day	CNS	300	IRIS	05/11/2007
Cadmium (4)	Chronic	1.0E-03	mg/kg-day	3%	2.5E-05	mg/kg-day	Kidney	10	IRIS	05/11/2007
Chromium (5)	Chronic	3.0E-03	mg/kg-day	2.5%	7.5E-05	mg/kg-day	GI Tract	900	IRIS	05/11/2007
Iron	Chronic	7.0E-01	mg/kg-day	–	7.0E-01	mg/kg-day	GI Tract/Liver	NA	PPRTV	01/17/2007
Lead	NA	NA	NA	–	NA	NA	NA	NA	IRIS	05/11/2007
Manganese	Chronic	1.4E-01	mg/kg-day	4%	5.6E-03	mg/kg/day	CNS	1	IRIS	05/11/2007
Mercury (6)	Chronic	3.0E-04	mg/kg-day	95%	2.9E-04	mg/kg/day	Immune System	1,000	IRIS	05/11/2007
Nickel (7)	Chronic	2.0E-02	mg/kg-day	4%	8.0E-04	mg/kg-day	Body and Organ Weight	300	IRIS	05/11/2007
Vanadium	Chronic	1.0E-03	mg/kg-day	2.6%	2.6E-05	mg/kg/day	Metabolic	100	NCEA	12/14/2005

NCEA = National Center for Environmental Assessment.
IRIS = Integrated Risk Information System.
PPRTV = Provisional Peer Reviewed Toxicity Values.
HEAST = Health Effects Assessment Summary Tables. July 1997.
RfD = Reference dose.
(1) The dermal RfD was assumed to equal the oral RfD, unless an adjustment factor was found in Exhibit 4.1 of RAGS-E (EPA 2001b).
(2) IRIS values were confirmed against the EPA's online database, May 2007.
NCEA and PPRTV values were provided by EPA.
(3) The RfD for total PCBs based on Aroclor 1254.
(4) The RfD for cadmium (food) is 0.001 mg/kg-day and cadmium (water) is 0.0005 mg/kg-day.
(5) The RfD for hexavalent chromium has been applied to total chromium.
(6) The RfD for methyl mercury has been applied to mercury.
(7) The RfD for nickel (soluble salt) has been applied to nickel.

VOC = Volatile organic compound.
SVOC = Semi-volatile organic compound.
P/PCB = Pesticide/polychlorinated biphenyl.
CNS = Central Nervous System.

TABLE B-5.2

NON-CANCER TOXICITY DATA -- INHALATION

Anniston PCB Site, Operable Unit 3

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD (1)		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfC Target Organ(s)	
		Value	Unit	Value	Unit			Source(s)	Date(s) (2) (MM/DD/YYYY)
VOCs									
1,2,4-Trichlorobenzene	NA	NA	NA	1.0E-03	mg/kg-day	NA	NA	PPRTV	10/2004
1,4-Dichlorobenzene	Chronic	8.0E-01	mg/m^3	2.3E-01	mg/kg-day	Liver	100	IRIS	05/11/2007
Chlorobenzene	Chronic	NA	NA	1.7E-02	mg/kg-day	NA	NA	NCEA	10/2004
cis-1,2-Dichloroethene	Chronic	NA	NA	1.0E-02	mg/kg-day	NA	NA	PPRTV (3)	10/2004
Pentachlorophenol	Chronic	NA	NA	3.0E-02	mg/kg-day	NA	NA	IRIS (3)	10/2004
Trichloroethylene	Chronic	4.0E-02	mg/m^3	1.1E-02	mg/kg/day	CNS	1,000	NCEA	04/15/2003
SVOCs									
2,4,6-Trichlorophenol	Chronic	NA	NA	1.0E-04	mg/kg-day	NA	NA	NCEA (3)	10/2004
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
P/PCBs									
PCBs, Total	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
gamma-BHC	Chronic	NA	NA	3.0E-04	mg/kg-day	NA	NA	HEAST (3)	10/2004
Heptachlor epoxide	Chronic	NA	NA	1.3E-05	mg/kg-day	NA	NA	IRIS (3)	10/2004
Methyl parathion	Chronic	NA	NA	2.5E-04	mg/kg-day	NA	NA	IRIS (3)	10/2004
Parathion	Chronic	NA	NA	6.0E-03	mg/kg-day	NA	NA	HEAST (3)	10/2004
Dioxin									
Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Inorganics									
Aluminum	Chronic	5.0E-03	mg/m^3	1.4E-03	mg/kg-day	CNS	300	NCEA	10/25/2004
Antimony	Chronic	4.0E-05	mg/m^3	1.1E-05	mg/kg-day	Lungs	1,000	NCEA	01/22/2003
Arsenic	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Barium	Chronic	4.9E-04	mg/m^3	1.4E-04	mg/kg-day	NA	NA	NCEA	01/17/2007
Cadmium	Chronic	2.0E-04	mg/m^3	5.7E-05	mg/kg-day	NA	NA	NCEA	03/10/2003
Chromium (4)	Chronic	8.0E-06	mg/m^3	2.3E-06	mg/kg-day	Nasal septum atrophy	90	IRIS	05/11/2007
Iron	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Lead	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Manganese	Chronic	5.0E-05	mg/m^3	1.4E-05	mg/kg-day	CNS	1,000	IRIS	05/11/2007
Mercury	Chronic	3.0E-04	mg/m^3	8.6E-05	mg/kg-day	CNS	30	IRIS	05/11/2007
Nickel	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007
Vanadium	NA	NA	NA	NA	NA	NA	NA	IRIS	05/11/2007

NCEA = National Center for Environmental Assessment.

IRIS = Integrated Risk Information System.

HEAST = Health Effects Assessment Summary Tables. July 1997.

RfC = Reference concentration.

RfD = Reference dose.

(1) Inhalation RfDs were calculated from Inhalation RfCs assuming a 70 kg individual has an inhalation rate of 20 m^3/day.(USEPA Risk Assessment Guidance for Superfund, Part A; December 1989).

(2) IRIS values were confirmed against the EPA's online database, May 2007.
NCEA values were provided by EPA.

(3) Route-to-route extrapolation from EPA Region 9 PRG tables updated October 2004, http://www.epa.gov/region09/waste/sfund/prg/index.htm.

(4) The RfC information for hexavalent chromium has been applied to total chromium.

VOC = Volatile organic compound.

SVOC = Semi-volatile organic compound.

P/PCB = Pesticide/polychlorinated biphenyl.

TABLE B-6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

Anniston PCB Site, Operable Unit 3

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal (1)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Unit		Value	Unit		Source(s)	Date(s) (2)
VOCs								
1,2,4-Trichlorobenzene	NA	NA	–	NA	NA	D	IRIS	05/11/2007
1,4-Dichlorobenzene	2.4E-02	$(mg/kg\text{-}day)^{-1}$	–	2.4E-02	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	07/01/1997
Chlorobenzene	NA	NA	–	NA	NA	D	IRIS	05/11/2007
cis-1,2-Dichloroethene	NA	NA	–	NA	NA	D	IRIS	05/11/2007
Pentachlorophenol	1.2E-01	$(mg/kg\text{-}day)^{-1}$	–	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Trichloroethylene	4.0E-01	$(mg/kg\text{-}day)^{-1}$	–	4.0E-01	$(mg/kg\text{-}day)^{-1}$	B2-C	NCEA	01/22/2003
SVOCs								
2,4,6-Trichlorophenol	1.1E-02	$(mg/kg\text{-}day)^{-1}$	–	1.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Benzo(a)anthracene (3)	7.3E-01	$(mg/kg\text{-}day)^{-1}$	58% - 89%	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Benzo(a)pyrene (3)	7.3E+00	$(mg/kg\text{-}day)^{-1}$	58% - 89%	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Benzo(b)fluoranthene (3)	7.3E-01	$(mg/kg\text{-}day)^{-1}$	58% - 89%	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Dibenz(a,h)anthracene (3)	7.3E+00	$(mg/kg\text{-}day)^{-1}$	58% - 89%	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Indeno(1,2,3-cd)pyrene (3)	7.3E-01	$(mg/kg\text{-}day)^{-1}$	58% - 89%	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
P/PCBs								
PCBs, Total (4)	2.0E+00	$(mg/kg\text{-}day)^{-1}$	80% - 96%	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
gamma-BHC	1.3E+00	$(mg/kg\text{-}day)^{-1}$	–	1.3E+00	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	07/01/1997
Heptachlor epoxide	9.1E+00	$(mg/kg\text{-}day)^{-1}$	–	9.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Methyl parathion	NA	NA	–	NA	NA	NA	IRIS	05/11/2007
Parathion	NA	NA	–	NA	NA	C	IRIS	05/11/2007
Dioxin								
Dioxin TEQ	1.5E+05	$(mg/kg\text{-}day)^{-1}$	–	1.5E+05	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	07/01/1997
Inorganics								
Aluminum	NA	NA	–	NA	NA	D	NCEA	01/22/2003
Antimony	NA	NA	–	NA	NA	D	NCEA	01/22/2003
Arsenic	1.5E+00	$(mg/kg\text{-}day)^{-1}$	95%	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	05/11/2007
Barium	NA	NA	–	NA	NA	D	IRIS	05/11/2007
Cadmium	NA	NA	–	NA	NA	B1	IRIS	05/11/2007
Chromium (5)	NA	NA	–	NA	NA	D	IRIS	05/11/2007
Iron	NA	NA	–	NA	NA	NA	IRIS	05/11/2007
Lead	NA	NA	–	NA	NA	B2	IRIS	05/11/2007
Manganese	NA	NA	–	NA	NA	D	IRIS	05/11/2007
Mercury (6)	NA	NA	–	NA	NA	C	IRIS	05/11/2007
Nickel	NA	NA	–	NA	NA	NA	IRIS	05/11/2007
Vanadium	NA	NA	–	NA	NA	NA	IRIS	05/11/2007

NCEA = National Center for Environmental Assessment.

HEAST = Health Effects Assessment Summary Tables. July 1997.

CSF = Cancer slope factor.

(1) The dermal CSF was assumed to equal the oral CSF, unless an adjustment factor was found in Exhibit 4.1 of RAGS-E (EPA 2001b).

(2) IRIS values were confirmed against the EPA's online database, May 2007. NCEA values were provided by EPA.

(3) The Oral Cancer Slope Factors for PAHs derived using the relative potency approach (USEPA. 1993. Provisional Guidance for Quantitative Assessment of Polycyclic Aromatic Hydrocarbons; EPA/600/R-93/089).

(4) The upper bound CSF [2 $(mg/kg\text{-}day)^{-1}$] was used for Reasonable Maximum Exposure scenario and central estimate CSF [1 $(mg/kg\text{-}day)^{-1}$] was used for Central Tendency Exposure scenario.

(5) The oral CSF for hexavalent chromium has been applied to total chromium.

(6) The oral CSF for methyl mercury has been applied to mercury.

EPA Weight of Evidence (EPA 1986, EPA 1996):

A - Human Carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans.

C - Possible human carcinogen.

D - Not classifiable as human carcinogen.

E - Evidence of noncarcinogenicity.

VOC = Volatile organic compound.

SVOC = Semi-volatile organic compound.

P/PCB = Pesticide/polychlorinated biphenyl.

TABLE B-6.2
CANCER TOXICITY DATA -- INHALATION
Anniston PCB Site, Operable Unit 3

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor (1)		Weight of Evidence/ Cancer Guideline Description	Unit Risk: Inhalation CSF	
	Value	Unit	Value	Unit		Source(s)	Date(s) (2)
VOCs							
1,2,4-Trichlorobenzene	NA	NA	NA	NA	D	IRIS	05/11/2007
1,4-Dichlorobenzene	NA	NA	2.2E-02	$(mg/kg\text{-}day)^{-1}$	NA	NCEA	10/2004
Chlorobenzene	NA	NA	NA	NA	D	IRIS	05/11/2007
cis-1,2-Dichloroethene	NA	NA	NA	NA	D	IRIS	05/11/2007
Pentachlorophenol	NA	NA	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Trichloroethylene	NA	NA	4.0E-01	$(mg/kg\text{-}day)^{-1}$	B2-C	EPA	01/17/2007
SVOCs							
2,4,6-Trichlorophenol	3.1E-06	$(\mu g/m^3)^{-1}$	1.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Benzo(a)anthracene (3)	NA	NA	3.1E-01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	01/22/2003
Benzo(a)pyrene (3)	8.9E-04	$(\mu g/m^3)^{-1}$	3.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	01/22/2003
Benzo(b)fluoranthene (3)	NA	NA	3.1E-01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	01/22/2003
Dibenz(a,h)anthracene (3)	NA	NA	3.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	01/22/2003
Indeno(1,2,3-cd)pyrene (3)	NA	NA	3.1E-01	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	01/22/2003
P/PCBs							
PCBs, Total	1.0E-04	$(\mu g/m^3)^{-1}$	3.5E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
gamma-BHC	NA	NA	1.3E+00	$(mg/kg\text{-}day)^{-1}$	NA	HEAST (4)	10/2004
Heptachlor epoxide	2.6E-03	$(\mu g/m^3)^{-1}$	9.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	05/11/2007
Methyl parathion	NA	NA	NA	NA	NA	IRIS	05/11/2007
Parathion	NA	NA	NA	NA	C	IRIS	05/11/2007
Dioxin							
Dioxin TEQ	NA	NA	1.5E+05	$(mg/kg\text{-}day)^{-1}$	NA	HEAST	07/01/1997
Inorganics							
Aluminum	NA	NA	NA	NA	D	NCEA	01/22/2003
Antimony	NA	NA	NA	NA	B1	NCEA	01/22/2003
Arsenic	4.3E-03	$(\mu g/m^3)^{-1}$	1.5E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	05/11/2007
Barium	NA	NA	NA	NA	D	IRIS	05/11/2007
Cadmium	1.8E-03	$(\mu g/m^3)^{-1}$	6.3E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	05/11/2007
Chromium (5)	1.2E-02	$(\mu g/m^3)^{-1}$	4.2E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	05/11/2007
Iron	NA	NA	NA	NA	NA	IRIS	05/11/2007
Lead	NA	NA	NA	NA	B2	IRIS	05/11/2007
Manganese	NA	NA	NA	NA	D	IRIS	05/11/2007
Mercury (6)	NA	NA	NA	NA	C	IRIS	05/11/2007
Nickel	NA	NA	NA	NA	NA	IRIS	05/11/2007
Vanadium	NA	NA	NA	NA	NA	IRIS	05/11/2007

NCEA = National Center for Environmental Assessment.
IRIS = Integrated Risk Information System.
HEAST = Health Effects Assessment Summary Tables. July 1997.
CSF = Cancer slope factor.
(1) Inhalation CSFs were calculated from unit risks assuming a 70 kg individual has an inhalation rate of 20 m^3/day.
(2) IRIS values were confirmed against the EPA's online database, May 2007.
NCEA values were provided by EPA.
(3) The Inhalation CSF for PAHs derived using the relative potency approach (USEPA 1993).
Provisional Guidance for Quantitative Assessment of Polycyclic Aromatic Hydrocarbons; EPA/600/R-93/089).
(4) Route-to-route extrapolation from EPA Region 9 PRG tables updated October 2004,
http://www.epa.gov/region09/waste/sfund/prg/index.htm.
(5) The unit risk for hexavalent chromium has been applied to total chromium.
(6) The inhalation CSF for methyl mercury has been applied to mercury.

EPA Weight of Evidence (EPA 1986, EPA 1996):
A - Human Carcinogen.
B1 - Probable human carcinogen - indicates that limited human data are available.
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans.
C - Possible human carcinogen.
D - Not classifiable as human carcinogen.
E - Evidence of noncarcinogenicity.

VOC = Volatile organic compound.
SVOC = Semi-volatile organic compound.
P/PCB = Pesticide/polychlorinated biphenyl.

TABLE B-7.1

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Operations Area Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/ Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Unit	Value	Unit	Value	Unit		Value	Unit	Value	Unit	
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	1.5E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.1E-07	4.1E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	3.3E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.4E-06	9.3E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	3.7E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.7E-07	1.0E-06	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	1.1E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	7.9E-07	3.0E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	2.3E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.7E-07	6.4E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	2.0E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	3.9E-05	5.5E-05	mg/kg/day	2.0E-05	mg/kg-day	2.7E+00
				Heptachlor epoxide	3.8E-01	mg/kg	6.6E-08	mg/kg/day	9.1E+00	(mg/kg-day)-1	6.0E-07	1.9E-07	mg/kg/day	1.3E-05	mg/kg-day	1.4E-02
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	1.3E-10	mg/kg/day	1.5E+05	(mg/kg-day)-1	2.0E-05	3.7E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	3.3E-03	mg/kg/day	NA	NA	NA	9.3E-03	mg/kg/day	1.0E+00	mg/kg-day	9.3E-03
				Antimony	8.7E+00	mg/kg	1.5E-06	mg/kg/day	NA	NA	NA	4.3E-06	mg/kg/day	4.0E-04	mg/kg-day	1.1E-02
				Arsenic	3.9E+02	mg/kg	2.0E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	3.1E-05	5.7E-05	mg/kg/day	3.0E-04	mg/kg-day	1.9E-01
				Cadmium	4.7E+00	mg/kg	8.2E-07	mg/kg/day	NA	NA	NA	2.3E-06	mg/kg/day	1.0E-03	mg/kg-day	2.3E-03
				Chromium	2.3E+01	mg/kg	4.0E-06	mg/kg/day	NA	NA	NA	1.1E-05	mg/kg/day	3.0E-03	mg/kg-day	3.8E-03
				Iron	2.6E+04	mg/kg	4.5E-03	mg/kg/day	NA	NA	NA	1.3E-02	mg/kg/day	7.0E-01	mg/kg-day	1.8E-02
				Lead	4.7E+03	mg/kg	8.2E-04	mg/kg/day	NA	NA	NA	2.3E-03	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	1.5E-04	mg/kg/day	NA	NA	NA	4.1E-04	mg/kg/day	1.4E-01	mg/kg-day	2.9E-03
				Mercury	2.6E+00	mg/kg	4.5E-07	mg/kg/day	NA	NA	NA	1.3E-06	mg/kg/day	3.0E-04	mg/kg-day	4.2E-03
				Vanadium	4.0E+01	mg/kg	7.0E-06	mg/kg/day	NA	NA	NA	2.0E-05	mg/kg/day	1.0E-03	mg/kg-day	2.0E-02
			Exp. Route Total								9.4E-05					3.0E+00
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	1.7E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.3E-07	4.8E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	4.0E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.9E-06	1.1E-06	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	4.4E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.2E-07	1.2E-06	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	1.3E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	9.4E-07	3.6E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	2.7E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.0E-07	7.6E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	3.6E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	7.2E-05	1.0E-04	mg/kg/day	2.0E-05	mg/kg-day	5.0E+00
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	3.6E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	5.4E-06	1.0E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	1.9E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	2.8E-05	5.2E-05	mg/kg/day	3.0E-04	mg/kg-day	1.7E-01
				Cadmium	4.7E+00	mg/kg	7.5E-09	mg/kg/day	NA	NA	NA	2.1E-08	mg/kg/day	2.5E-05	mg/kg-day	8.4E-04
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								1.1E-04					5.2E+00
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	3.0E-06	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.1E-06	8.5E-06	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.1E-06					NA
		Exposure Point Total									2E-04					8E+00

TABLE B-7.2
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Operations Area Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	2.9E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.1E-07	8.1E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	6.6E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	4.8E-06	1.9E-06	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	7.3E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.4E-07	2.1E-06	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	2.2E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.6E-06	6.1E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	4.5E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.3E-07	1.3E-06	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	2.1E-03	mg/kg/day	2.0E+00	(mg/kg-day)-1	4.2E-03	5.9E-03	mg/kg/day	2.0E-05	mg/kg-day	3.0E+02
				Heptachlor epoxide	3.8E-01	mg/kg	1.3E-07	mg/kg/day	9.1E+00	(mg/kg-day)-1	1.2E-06	3.7E-07	mg/kg/day	1.3E-05	mg/kg-day	2.9E-02
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	2.6E-10	mg/kg/day	1.5E+05	(mg/kg-day)-1	4.0E-05	7.4E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	6.6E-03	mg/kg/day	NA	NA	NA	1.9E-02	mg/kg/day	1.0E+00	mg/kg-day	1.9E-02
				Antimony	8.7E+00	mg/kg	3.0E-06	mg/kg/day	NA	NA	NA	8.5E-06	mg/kg/day	4.0E-04	mg/kg-day	2.1E-02
				Arsenic	3.9E+02	mg/kg	1.4E-04	mg/kg/day	1.5E+00	(mg/kg-day)-1	2.0E-04	3.8E-04	mg/kg/day	3.0E-04	mg/kg-day	1.3E+00
				Cadmium	4.7E+00	mg/kg	1.6E-06	mg/kg/day	NA	NA	NA	4.6E-06	mg/kg/day	1.0E-03	mg/kg-day	4.6E-03
				Chromium	2.3E+01	mg/kg	8.0E-06	mg/kg/day	NA	NA	NA	2.3E-05	mg/kg/day	3.0E-03	mg/kg-day	7.5E-03
				Iron	2.6E+04	mg/kg	9.1E-03	mg/kg/day	NA	NA	NA	2.5E-02	mg/kg/day	7.0E-01	mg/kg-day	3.6E-02
				Lead	4.7E+03	mg/kg	1.6E-03	mg/kg/day	NA	NA	NA	4.6E-03	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	2.9E-04	mg/kg/day	NA	NA	NA	8.1E-04	mg/kg/day	1.4E-01	mg/kg-day	5.8E-03
				Mercury	2.6E+00	mg/kg	9.1E-07	mg/kg/day	NA	NA	NA	2.5E-06	mg/kg/day	3.0E-04	mg/kg-day	8.5E-03
				Vanadium	4.0E+01	mg/kg	1.4E-05	mg/kg/day	NA	NA	NA	3.9E-05	mg/kg/day	1.0E-03	mg/kg-day	3.9E-02
			Exp. Route Total								4.5E-03					3.0E+02
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	2.5E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.8E-07	7.0E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	5.7E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	4.2E-06	1.6E-06	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	6.3E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.6E-07	1.8E-06	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	1.9E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.4E-06	5.2E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	3.9E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.8E-07	1.1E-06	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	8.4E-04	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.7E-03	2.3E-03	mg/kg/day	2.0E-05	mg/kg-day	1.2E+02
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	5.2E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	7.8E-06	1.5E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	2.7E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	4.0E-05	7.6E-05	mg/kg/day	3.0E-04	mg/kg-day	2.5E-01
				Cadmium	4.7E+00	mg/kg	1.1E-08	mg/kg/day	NA	NA	NA	3.0E-08	mg/kg/day	2.5E-05	mg/kg-day	1.2E-03
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								1.7E-03					1.2E+02
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	3.0E-06	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.1E-06	8.5E-06	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.1E-06					NA
		Exposure Point Total									6E-03					4E+02

TABLE B-7.3

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	2.8E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.0E-08	7.8E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	6.4E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	4.7E-07	1.8E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	7.0E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.1E-08	2.0E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	2.1E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.5E-07	5.8E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	4.4E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.2E-08	1.2E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	1.3E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	2.5E-05	3.5E-05	mg/kg/day	2.0E-05	mg/kg-day	1.8E+00
				Heptachlor epoxide	3.8E-01	mg/kg	1.3E-08	mg/kg/day	9.1E+00	(mg/kg-day)-1	1.2E-07	3.6E-08	mg/kg/day	1.3E-05	mg/kg-day	2.7E-03
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	2.5E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	3.8E-06	7.1E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	6.4E-04	mg/kg/day	NA	NA	NA	1.8E-03	mg/kg/day	1.0E+00	mg/kg-day	1.8E-03
				Antimony	8.7E+00	mg/kg	2.9E-07	mg/kg/day	NA	NA	NA	8.2E-07	mg/kg/day	4.0E-04	mg/kg-day	2.0E-03
				Arsenic	3.9E+02	mg/kg	1.3E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	2.0E-05	3.7E-05	mg/kg/day	3.0E-04	mg/kg-day	1.2E-01
				Cadmium	4.7E+00	mg/kg	1.6E-07	mg/kg/day	NA	NA	NA	4.4E-07	mg/kg/day	1.0E-03	mg/kg-day	4.4E-04
				Chromium	2.3E+01	mg/kg	7.7E-07	mg/kg/day	NA	NA	NA	2.2E-06	mg/kg/day	3.0E-03	mg/kg-day	7.2E-04
				Iron	2.6E+04	mg/kg	8.7E-04	mg/kg/day	NA	NA	NA	2.4E-03	mg/kg/day	7.0E-01	mg/kg-day	3.5E-03
				Lead	4.7E+03	mg/kg	1.6E-04	mg/kg/day	NA	NA	NA	4.4E-04	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	2.8E-05	mg/kg/day	NA	NA	NA	7.8E-05	mg/kg/day	1.4E-01	mg/kg-day	5.6E-04
				Mercury	2.6E+00	mg/kg	8.7E-08	mg/kg/day	NA	NA	NA	2.4E-07	mg/kg/day	3.0E-04	mg/kg-day	8.1E-04
				Vanadium	4.0E+01	mg/kg	1.3E-06	mg/kg/day	NA	NA	NA	3.8E-06	mg/kg/day	1.0E-03	mg/kg-day	3.8E-03
			Exp. Route Total								4.9E-05					1.9E+00
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	1.1E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	7.8E-08	3.0E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	2.5E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.8E-06	6.9E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	2.7E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.0E-07	7.6E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	8.0E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	5.9E-07	2.2E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	1.7E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.2E-07	4.7E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	2.2E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	4.5E-05	6.3E-05	mg/kg/day	2.0E-05	mg/kg-day	3.1E+00
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	2.3E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	3.4E-06	6.3E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	1.2E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	1.7E-05	3.3E-05	mg/kg/day	3.0E-04	mg/kg-day	1.1E-01
				Cadmium	4.7E+00	mg/kg	4.7E-09	mg/kg/day	NA	NA	NA	1.3E-08	mg/kg/day	2.5E-05	mg/kg-day	5.2E-04
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								6.8E-05					3.2E+00
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	2.9E-07	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.0E-07	8.2E-07	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.0E-07					NA
		Exposure Point Total									1E-04					5E+00

TABLE B-7.4
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil	Incidental Ingestion	**SVOCs**												
		Facility Area		Benzo(a)anthracene	8.3E-01	mg/kg	2.8E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.0E-08	7.8E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	6.4E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	4.7E-07	1.8E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	7.0E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.1E-08	2.0E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	2.1E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.5E-07	5.8E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	4.4E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.2E-08	1.2E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	2.0E-04	mg/kg/day	2.0E+00	(mg/kg-day)-1	4.1E-04	5.7E-04	mg/kg/day	2.0E-05	mg/kg-day	2.8E+01
				Heptachlor epoxide	3.8E-01	mg/kg	1.3E-08	mg/kg/day	9.1E+00	(mg/kg-day)-1	1.2E-07	3.6E-08	mg/kg/day	1.3E-05	mg/kg-day	2.7E-03
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	2.5E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	3.8E-06	7.1E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	6.4E-04	mg/kg/day	NA	NA	NA	1.8E-03	mg/kg/day	1.0E+00	mg/kg-day	1.8E-03
				Antimony	8.7E+00	mg/kg	2.9E-07	mg/kg/day	NA	NA	NA	8.2E-07	mg/kg/day	4.0E-04	mg/kg-day	2.0E-03
				Arsenic	3.9E+02	mg/kg	1.3E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	2.0E-05	3.7E-05	mg/kg/day	3.0E-04	mg/kg-day	1.2E-01
				Cadmium	4.7E+00	mg/kg	1.6E-07	mg/kg/day	NA	NA	NA	4.4E-07	mg/kg/day	1.0E-03	mg/kg-day	4.4E-04
				Chromium	2.3E+01	mg/kg	7.7E-07	mg/kg/day	NA	NA	NA	2.2E-06	mg/kg/day	3.0E-03	mg/kg-day	7.2E-04
				Iron	2.6E+04	mg/kg	8.7E-04	mg/kg/day	NA	NA	NA	2.4E-03	mg/kg/day	7.0E-01	mg/kg-day	3.5E-03
				Lead	4.7E+03	mg/kg	1.6E-04	mg/kg/day	NA	NA	NA	4.4E-04	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	2.8E-05	mg/kg/day	NA	NA	NA	7.8E-05	mg/kg/day	1.4E-01	mg/kg-day	5.6E-04
				Mercury	2.6E+00	mg/kg	8.7E-08	mg/kg/day	NA	NA	NA	2.4E-07	mg/kg/day	3.0E-04	mg/kg-day	8.1E-04
				Vanadium	4.0E+01	mg/kg	1.3E-06	mg/kg/day	NA	NA	NA	3.8E-06	mg/kg/day	1.0E-03	mg/kg-day	3.8E-03
			Exp. Route Total								4.3E-04					2.9E+01
Surface Soil	Surface Soil	Surface Soil	Dermal Contact	**SVOCs**												
		Facility Area		Benzo(a)anthracene	8.3E-01	mg/kg	1.1E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	7.8E-08	3.0E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	2.5E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.8E-06	6.9E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	2.7E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.0E-07	7.6E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	8.0E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	5.9E-07	2.2E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	1.7E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.2E-07	4.7E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	3.6E-04	mg/kg/day	2.0E+00	(mg/kg-day)-1	7.2E-04	1.0E-03	mg/kg/day	2.0E-05	mg/kg-day	5.1E+01
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	2.3E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	3.4E-06	6.3E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	1.2E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	1.7E-05	3.3E-05	mg/kg/day	3.0E-04	mg/kg-day	1.1E-01
				Cadmium	4.7E+00	mg/kg	4.7E-09	mg/kg/day	NA	NA	NA	1.3E-08	mg/kg/day	2.5E-05	mg/kg-day	5.2E-04
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								7.5E-04					5.1E+01
Air	Ambient Air	Ambient Air	Inhalation	**P/PCBs**												
		Facility Area		PCBs, Total	7.3E+01	ng/m3	2.9E-07	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.0E-07	8.2E-07	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.0E-07					NA
		Exposure Point Total									1E-03					8E+01

TABLE B-7.5

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Trespasser
Receptor Age:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	3.6E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.6E-08	2.5E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	8.3E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	6.0E-07	5.8E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	9.1E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	6.7E-08	6.4E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	2.7E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.0E-07	1.9E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	5.7E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.1E-08	4.0E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	1.6E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	3.3E-05	1.1E-04	mg/kg/day	2.0E-05	mg/kg-day	5.7E+00
				Heptachlor epoxide	3.8E-01	mg/kg	1.7E-08	mg/kg/day	9.1E+00	(mg/kg-day)-1	1.5E-07	1.2E-07	mg/kg/day	1.3E-05	mg/kg-day	8.9E-03
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	3.3E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	4.9E-06	2.3E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	8.3E-04	mg/kg/day	NA	NA	NA	5.8E-03	mg/kg/day	1.0E+00	mg/kg-day	5.8E-03
				Antimony	8.7E+00	mg/kg	3.8E-07	mg/kg/day	NA	NA	NA	2.6E-06	mg/kg/day	4.0E-04	mg/kg-day	6.6E-03
				Arsenic	3.9E+02	mg/kg	1.7E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	2.5E-05	1.2E-04	mg/kg/day	3.0E-04	mg/kg-day	4.0E-01
				Cadmium	4.7E+00	mg/kg	2.0E-07	mg/kg/day	NA	NA	NA	1.4E-06	mg/kg/day	1.0E-03	mg/kg-day	1.4E-03
				Chromium	2.3E+01	mg/kg	1.0E-06	mg/kg/day	NA	NA	NA	7.0E-06	mg/kg/day	3.0E-03	mg/kg-day	2.3E-03
				Iron	2.6E+04	mg/kg	1.1E-03	mg/kg/day	NA	NA	NA	7.9E-03	mg/kg/day	7.0E-01	mg/kg-day	1.1E-02
				Lead	4.7E+03	mg/kg	2.0E-04	mg/kg/day	NA	NA	NA	1.4E-03	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	3.6E-05	mg/kg/day	NA	NA	NA	2.5E-04	mg/kg/day	1.4E-01	mg/kg-day	1.8E-03
				Mercury	2.6E+00	mg/kg	1.1E-07	mg/kg/day	NA	NA	NA	7.9E-07	mg/kg/day	3.0E-04	mg/kg-day	2.6E-03
				Vanadium	4.0E+01	mg/kg	1.7E-06	mg/kg/day	NA	NA	NA	1.2E-05	mg/kg/day	1.0E-03	mg/kg-day	1.2E-02
			Exp. Route Total								6.4E-05					6.1E+00
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	2.6E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.9E-08	1.8E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	6.0E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	4.4E-07	4.2E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	6.6E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.9E-08	4.7E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	2.0E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.4E-07	1.4E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	4.1E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.0E-08	2.9E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	5.5E-06	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.1E-05	3.8E-05	mg/kg/day	2.0E-05	mg/kg-day	1.9E+00
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	5.5E-12	mg/kg/day	1.5E+05	(mg/kg-day)-1	8.3E-07	3.9E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	2.8E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	4.3E-06	2.0E-05	mg/kg/day	3.0E-04	mg/kg-day	6.6E-02
				Cadmium	4.7E+00	mg/kg	1.1E-09	mg/kg/day	NA	NA	NA	8.0E-09	mg/kg/day	2.5E-05	mg/kg-day	3.2E-04
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								1.7E-05					2.0E+00
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	1.4E-07	mg/kg/day	3.5E-01	(mg/kg-day)-1	4.7E-08	9.5E-07	mg/kg/day	NA	NA	NA
			Exp. Route Total								4.7E-08					NA
		Exposure Point Total									8E-05					8E+00

TABLE B-7.6
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Trespasser
Receptor Age:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/ Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Unit	Value	Unit	Value	Unit		Value	Unit	Value	Unit	
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	3.6E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.6E-08	2.5E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	8.3E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	6.0E-07	5.8E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	9.1E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	6.7E-08	6.4E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	2.7E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.0E-07	1.9E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	5.7E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.1E-08	4.0E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	2.6E-04	mg/kg/day	2.0E+00	(mg/kg-day)-1	5.3E-04	1.8E-03	mg/kg/day	2.0E-05	mg/kg-day	9.2E+01
				Heptachlor epoxide	3.8E-01	mg/kg	1.7E-08	mg/kg/day	9.1E+00	(mg/kg-day)-1	1.5E-07	1.2E-07	mg/kg/day	1.3E-05	mg/kg-day	8.9E-03
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	3.3E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	4.9E-06	2.3E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	8.3E-04	mg/kg/day	NA	NA	NA	5.8E-03	mg/kg/day	1.0E+00	mg/kg-day	5.8E-03
				Antimony	8.7E+00	mg/kg	3.8E-07	mg/kg/day	NA	NA	NA	2.6E-06	mg/kg/day	4.0E-04	mg/kg-day	6.6E-03
				Arsenic	3.9E+02	mg/kg	1.7E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	2.5E-05	1.2E-04	mg/kg/day	3.0E-04	mg/kg-day	4.0E-01
				Cadmium	4.7E+00	mg/kg	2.0E-07	mg/kg/day	NA	NA	NA	1.4E-06	mg/kg/day	1.0E-03	mg/kg-day	1.4E-03
				Chromium	2.3E+01	mg/kg	1.0E-06	mg/kg/day	NA	NA	NA	7.0E-06	mg/kg/day	3.0E-03	mg/kg-day	2.3E-03
				Iron	2.6E+04	mg/kg	1.1E-03	mg/kg/day	NA	NA	NA	7.9E-03	mg/kg/day	7.0E-01	mg/kg-day	1.1E-02
				Lead	4.7E+03	mg/kg	2.0E-04	mg/kg/day	NA	NA	NA	1.4E-03	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	3.6E-05	mg/kg/day	NA	NA	NA	2.5E-04	mg/kg/day	1.4E-01	mg/kg-day	1.8E-03
				Mercury	2.6E+00	mg/kg	1.1E-07	mg/kg/day	NA	NA	NA	7.9E-07	mg/kg/day	3.0E-04	mg/kg-day	2.6E-03
				Vanadium	4.0E+01	mg/kg	1.7E-06	mg/kg/day	NA	NA	NA	1.2E-05	mg/kg/day	1.0E-03	mg/kg-day	1.2E-02
			Exp. Route Total								5.6E-04					9.3E+01
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	2.6E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.9E-08	1.8E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	6.0E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	4.4E-07	4.2E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	6.6E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.9E-08	4.7E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	2.0E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.4E-07	1.4E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	4.1E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.0E-08	2.9E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	8.9E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.8E-04	6.2E-04	mg/kg/day	2.0E-05	mg/kg-day	3.1E+01
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	5.5E-12	mg/kg/day	1.5E+05	(mg/kg-day)-1	8.3E-07	3.9E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	2.8E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	4.3E-06	2.0E-05	mg/kg/day	3.0E-04	mg/kg-day	6.6E-02
				Cadmium	4.7E+00	mg/kg	1.1E-09	mg/kg/day	NA	NA	NA	8.0E-09	mg/kg/day	2.5E-05	mg/kg-day	3.2E-04
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								1.8E-04					3.1E+01
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	1.4E-07	mg/kg/day	3.5E-01	(mg/kg-day)-1	4.7E-08	9.5E-07	mg/kg/day	NA	NA	NA
			Exp. Route Total								4.7E-08					NA
		Exposure Point Total									7E-04					1E+02

TABLE B-7.7

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface/ Subsurface Soil	Surface/ Subsurface Soil	Surface/ Subsurface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	1.5E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.1E-08	1.1E-06	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	3.5E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.6E-07	2.5E-06	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	3.9E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.8E-08	2.7E-06	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	1.1E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	8.4E-08	8.0E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	2.4E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.8E-08	1.7E-06	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.3E+03	mg/kg	6.0E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.2E-04	4.2E-03	mg/kg/day	2.0E-05	mg/kg-day	2.1E+02
				Heptachlor epoxide	3.8E-01	mg/kg	7.0E-09	mg/kg/day	9.1E+00	(mg/kg-day)-1	6.4E-08	4.9E-07	mg/kg/day	1.3E-05	mg/kg-day	3.8E-02
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	1.4E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	2.1E-06	9.8E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	3.5E-04	mg/kg/day	NA	NA	NA	2.5E-02	mg/kg/day	1.0E+00	mg/kg-day	2.5E-02
				Antimony	8.7E+00	mg/kg	1.6E-07	mg/kg/day	NA	NA	NA	1.1E-05	mg/kg/day	4.0E-04	mg/kg-day	2.8E-02
				Arsenic	1.5E+02	mg/kg	2.7E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	4.1E-06	1.9E-04	mg/kg/day	3.0E-04	mg/kg-day	6.4E-01
				Barium	1.9E+02	mg/kg	3.5E-06	mg/kg/day	NA	NA	NA	2.5E-04	mg/kg/day	2.0E-01	mg/kg-day	1.2E-03
				Cadmium	1.3E+00	mg/kg	2.4E-08	mg/kg/day	NA	NA	NA	1.7E-06	mg/kg/day	1.0E-03	mg/kg-day	1.7E-03
				Chromium	4.7E+01	mg/kg	8.7E-07	mg/kg/day	NA	NA	NA	6.1E-05	mg/kg/day	3.0E-03	mg/kg-day	2.0E-02
				Iron	2.6E+04	mg/kg	4.8E-04	mg/kg/day	NA	NA	NA	3.4E-02	mg/kg/day	7.0E-01	mg/kg-day	4.8E-02
				Lead	2.6E+03	mg/kg	4.8E-05	mg/kg/day	NA	NA	NA	3.4E-03	mg/kg/day	NA	NA	NA
				Manganese	2.8E+03	mg/kg	5.1E-05	mg/kg/day	NA	NA	NA	3.6E-03	mg/kg/day	1.4E-01	mg/kg-day	2.6E-02
				Mercury	1.5E+00	mg/kg	2.8E-08	mg/kg/day	NA	NA	NA	1.9E-06	mg/kg/day	3.0E-04	mg/kg-day	6.5E-03
				Nickel	8.9E+02	mg/kg	1.6E-05	mg/kg/day	NA	NA	NA	1.1E-03	mg/kg/day	2.0E-02	mg/kg-day	5.7E-02
				Vanadium	4.7E+01	mg/kg	8.7E-07	mg/kg/day	NA	NA	NA	6.1E-05	mg/kg/day	1.0E-03	mg/kg-day	6.1E-02
			Exp. Route Total								1.3E-04					2.1E+02
Surface/ Subsurface Soil	Surface/ Subsurface Soil	Surface/ Subsurface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	6.0E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.4E-09	4.2E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	1.4E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.0E-07	9.6E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	1.5E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.1E-08	1.1E-06	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	4.5E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	3.3E-08	3.1E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	9.4E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	6.8E-09	6.5E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.3E+03	mg/kg	1.1E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	2.2E-05	7.6E-04	mg/kg/day	2.0E-05	mg/kg-day	3.8E+01
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	1.3E-12	mg/kg/day	1.5E+05	(mg/kg-day)-1	1.9E-07	8.8E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	1.5E+02	mg/kg	2.5E-07	mg/kg/day	1.5E+00	(mg/kg-day)-1	3.7E-07	1.7E-05	mg/kg/day	3.0E-04	mg/kg-day	5.7E-02
				Barium	1.9E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.4E-02	mg/kg-day	NA
				Cadmium	1.3E+00	mg/kg	7.3E-11	mg/kg/day	NA	NA	NA	5.1E-09	mg/kg/day	2.5E-05	mg/kg-day	2.0E-04
				Chromium	4.7E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	2.6E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	2.8E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	1.5E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Nickel	8.9E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	8.0E-04	mg/kg-day	NA
				Vanadium	4.7E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								2.2E-05					3.8E+01
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	8.1E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	2.8E-08	5.7E-06	mg/kg/day	NA	NA	NA
			Exp. Route Total								2.8E-08					NA
		Exposure Point Total									1E-04					3E+02

TABLE B-7.8
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil South Landfill	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.4E+01	mg/kg	4.6E-07	mg/kg/day	2.0E+00	(mg/kg-day)-1	9.2E-07	1.3E-06	mg/kg/day	2.0E-05	mg/kg-day	6.4E-02
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.0E-04	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-03	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-01	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
			Exp. Route Total								9.2E-07					6.4E-02
Surface Soil	Surface Soil	Surface Soil South Landfill	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.4E+01	mg/kg	8.2E-07	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.6E-06	2.3E-06	mg/kg/day	2.0E-05	mg/kg-day	1.1E-01
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-05	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								1.6E-06					1.1E-01
Air	Ambien Air	Ambient Air South Landfill	Inhalation	**P/PCBs**												
				PCBs, Total	7.0E+00	ng/m3	2.8E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	9.8E-09	7.9E-08	mg/kg/day	NA	NA	NA
			Exp. Route Total								9.8E-09					NA
		Exposure Point Total									3E-06					2E-01

TABLE B-7.9
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor Age:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil	Incidental Ingestion	**SVOCs**												
		South Landfill		Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.4E+01	mg/kg	5.9E-07	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.2E-06	4.2E-06	mg/kg/day	2.0E-05	mg/kg-day	2.1E-01
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.0E-04	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-03	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-01	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
			Exp. Route Total								1.2E-06					2.1E-01
Surface Soil	Surface Soil	Surface Soil	Dermal Contact	**SVOCs**												
		South Landfill		Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.4E+01	mg/kg	2.0E-07	mg/kg/day	2.0E+00	(mg/kg-day)-1	4.0E-07	1.4E-06	mg/kg/day	2.0E-05	mg/kg-day	7.0E-02
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-05	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								4.0E-07					7.0E-02
Air	Ambient Air	Ambient Air	Inhalation	**P/PCBs**												
		South Landfill		PCBs, Total	7.0E+00	ng/m3	1.3E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	4.5E-09	9.1E-08	mg/kg/day	NA	NA	NA
			Exp. Route Total								4.5E-09					NA
		Exposure Point Total									2E-06					3E-01

TABLE B-7.10

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil	Incidental Ingestion	**SVOCs**												
		West End Landfill		Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	2.0E+00	(mg/kg-day)-1	NA	NA	NA	2.0E-05	mg/kg-day	NA
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.0E-04	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-03	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-01	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
			Exp. Route Total								0.0E+00					0.0E+00
Surface Soil	Surface Soil	Surface Soil	Dermal Contact	**SVOCs**												
		West End Landfill		Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	2.0E+00	(mg/kg-day)-1	NA	NA	NA	2.0E-05	mg/kg-day	NA
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-05	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								0.0E+00					0.0E+00
Air	Ambient Air	Ambient Air	Inhalation	**P/PCBs**												
		West Landfill		PCBs, Total	1.0E+01	ng/m3	4.1E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.4E-08	1.1E-07	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.4E-08					0.0E+00
		Exposure Point Total									1E-08					0E+00

TABLE B-7.11

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor Age:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil	Incidental Ingestion	**SVOCs**												
		West End Landfill		Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	2.0E+00	(mg/kg-day)-1	NA	NA	NA	2.0E-05	mg/kg-day	NA
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.0E-04	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-03	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-01	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
			Exp. Route Total								0.0E+00					0.0E+00
Surface Soil	Surface Soil	Surface Soil	Dermal Contact	**SVOCs**												
		West End Landfill		Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	2.0E+00	(mg/kg-day)-1	NA	NA	NA	2.0E-05	mg/kg-day	NA
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-05	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								0.0E+00					0.0E+00
Air	Ambient Air	Ambient Air	Inhalation	**P/PCBs**												
		West Landfill		PCBs, Total	1.0E+01	ng/m3	1.9E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	6.6E-09	1.3E-07	mg/kg/day	NA	NA	NA
			Exp. Route Total								6.6E-09					0.0E+00
		Exposure Point Total									7E-09					0E+00

TABLE B-7.12

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Off-site Residents
Receptor Age:	Child to Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Air	Ambient Air	Ambient Air	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	4.4E-06	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.6E-06	1.3E-05	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.6E-06					0.0E+00
		Exposure Point Total									2E-06					0E+00

TABLE B-7.13
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Off-site Residents
Receptor Age:	Child (0-6 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Air	Ambient Air	Ambient Air	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	3.0E-06	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.0E-06	3.5E-05	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.0E-06					0.0E+00
		Exposure Point Total									1E-06					0E+00

TABLE B-7.14

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Off-site Residents
Receptor Age:	Child to Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Groundwater	Groundwater	Tap Water	Ingestion	**VOCs**												
				1,2,4-Trichlorobenzene	1.1E+01	µg/L	1.6E-04	mg/kg/day	NA	NA	NA	7.0E-04	mg/kg/day	1.0E-02	mg/kg-day	7.0E-02
				1,4-Dichlorobenzene	2.4E+00	µg/L	3.6E-05	mg/kg/day	2.4E-02	(mg/kg-day)-1	8.7E-07	1.6E-04	mg/kg/day	3.0E-02	mg/kg-day	5.2E-03
				Chlorobenzene	5.1E+00	µg/L	7.6E-05	mg/kg/day	NA	NA	NA	3.3E-04	mg/kg/day	2.0E-02	mg/kg-day	1.6E-02
				cis-1,2-Dichloroethene	1.0E+01	µg/L	1.5E-04	mg/kg/day	NA	NA	NA	6.4E-04	mg/kg/day	1.0E-02	mg/kg-day	6.4E-02
				Pentachlorophenol	2.0E+01	µg/L	2.9E-04	mg/kg/day	1.2E-01	(mg/kg-day)-1	3.5E-05	1.3E-03	mg/kg/day	3.0E-02	mg/kg-day	4.2E-02
				Trichloroethylene	3.4E+00	µg/L	5.1E-05	mg/kg/day	4.0E-01	(mg/kg-day)-1	2.0E-05	2.2E-04	mg/kg/day	3.0E-04	mg/kg-day	7.2E-01
				SVOCs												
				2,4,6-Trichlorophenol	1.5E+01	µg/L	2.2E-04	mg/kg/day	1.1E-02	(mg/kg-day)-1	2.5E-06	9.6E-04	mg/kg/day	1.0E-04	mg/kg-day	9.6E+00
				Indeno(1,2,3-cd)pyrene	7.3E-01	µg/L	1.1E-05	mg/kg/day	7.3E-01	(mg/kg-day)-1	8.0E-06	4.7E-05	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	2.4E+03	µg/L	3.6E-02	mg/kg/day	2.0E+00	(mg/kg-day)-1	7.3E-02	1.6E-01	mg/kg/day	2.0E-05	mg/kg-day	7.8E+03
				gamma-BHC	5.5E-01	µg/L	8.2E-06	mg/kg/day	1.3E+00	(mg/kg-day)-1	1.1E-05	3.5E-05	mg/kg/day	3.0E-04	mg/kg-day	1.2E-01
				Methyl parathion	7.4E+01	µg/L	1.1E-03	mg/kg/day	NA	NA	NA	4.7E-03	mg/kg/day	2.5E-04	mg/kg-day	1.9E+01
				Parathion	9.4E+03	µg/L	1.4E-01	mg/kg/day	NA	NA	NA	6.0E-01	mg/kg/day	6.0E-03	mg/kg-day	1.0E+02
				Dioxin												
				Dioxin TEQ	3.6E-06	µg/L	5.4E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	8.1E-06	2.3E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Antimony	5.1E+00	µg/L	7.6E-05	mg/kg/day	NA	NA	NA	3.3E-04	mg/kg/day	4.0E-04	mg/kg-day	8.2E-01
				Arsenic	6.1E+00	µg/L	9.1E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	1.4E-04	3.9E-04	mg/kg/day	3.0E-04	mg/kg-day	1.3E+00
				Manganese	1.3E+03	µg/L	1.9E-02	mg/kg/day	NA	NA	NA	8.3E-02	mg/kg/day	1.4E-01	mg/kg-day	5.9E-01
				Mercury	1.8E+00	µg/L	2.7E-05	mg/kg/day	NA	NA	NA	1.1E-04	mg/kg/day	3.0E-04	mg/kg-day	3.8E-01
			Exp. Route Total								7.3E-02					7.9E+03
Groundwater	Groundwater	Tap Water	Dermal Contact	**VOCs**												
				1,2,4-Trichlorobenzene	1.1E+01	µg/L	6.1E-05	mg/kg/day	NA	NA	NA	1.8E-04	mg/kg/day	1.0E-02	mg/kg-day	1.8E-02
				1,4-Dichlorobenzene	2.4E+00	µg/L	8.7E-06	mg/kg/day	2.4E-02	(mg/kg-day)-1	2.1E-07	2.5E-05	mg/kg/day	3.0E-02	mg/kg-day	8.4E-04
				Chlorobenzene	5.1E+00	µg/L	1.2E-05	mg/kg/day	NA	NA	NA	3.5E-05	mg/kg/day	2.0E-02	mg/kg-day	1.8E-03
				cis-1,2-Dichloroethene	1.0E+01	µg/L	NA	NA	NA	NA	NA	NA	NA	1.0E-02	mg/kg-day	NA
				Pentachlorophenol	2.0E+01	µg/L	6.5E-04	mg/kg/day	1.2E-01	(mg/kg-day)-1	7.8E-05	1.9E-03	mg/kg/day	3.0E-02	mg/kg-day	6.3E-02
				Trichloroethylene	3.4E+00	µg/L	3.4E-06	mg/kg/day	4.0E-01	(mg/kg-day)-1	1.4E-06	1.0E-05	mg/kg/day	3.0E-04	mg/kg-day	3.4E-02
				SVOCs												
				2,4,6-Trichlorophenol	1.5E+01	µg/L	4.4E-05	mg/kg/day	1.1E-02	(mg/kg-day)-1	4.9E-07	1.3E-04	mg/kg/day	1.0E-04	mg/kg-day	1.3E+00
				Indeno(1,2,3-cd)pyrene	7.3E-01	µg/L	6.2E-05	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.5E-05	1.8E-04	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	2.4E+03	µg/L	1.5E-01	mg/kg/day	2.0E+00	(mg/kg-day)-1	3.1E-01	4.5E-01	mg/kg/day	2.0E-05	mg/kg-day	2.3E+04
				gamma-BHC	5.5E-01	µg/L	5.1E-07	mg/kg/day	1.3E+00	(mg/kg-day)-1	6.6E-07	1.5E-06	mg/kg/day	3.0E-04	mg/kg-day	5.0E-03
				Methyl parathion	7.4E+01	µg/L	NA	NA	NA	NA	NA	NA	NA	2.5E-04	mg/kg-day	NA
				Parathion	9.4E+03	µg/L	1.0E-02	mg/kg/day	NA	NA	NA	3.0E-02	mg/kg/day	6.0E-03	mg/kg-day	5.0E+00
				Dioxin												
				Dioxin TEQ	3.6E-06	µg/L	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Antimony	5.1E+00	µg/L	4.3E-07	mg/kg/day	NA	NA	NA	1.3E-06	mg/kg/day	6.0E-05	mg/kg-day	2.1E-02
				Arsenic	6.1E+00	µg/L	5.2E-07	mg/kg/day	1.5E+00	(mg/kg-day)-1	7.7E-07	1.5E-06	mg/kg/day	3.0E-04	mg/kg-day	5.0E-03
				Manganese	1.3E+03	µg/L	1.1E-04	mg/kg/day	NA	NA	NA	3.2E-04	mg/kg/day	5.6E-03	mg/kg-day	5.7E-02
				Mercury	1.8E+00	µg/L	1.5E-07	mg/kg/day	NA	NA	NA	4.4E-07	mg/kg/day	2.9E-04	mg/kg-day	1.5E-03
			Exp. Route Total								3.1E-01					2.3E+04

TABLE B-7.14
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Off-site Residents
Receptor Age:	Child to Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Groundwater	Air	Vapors in Bath	Inhalation	**VOCs**												
				1,2,4-Trichlorobenzene	6.1E+01	µg/m3	1.7E-04	mg/kg/day	NA	NA	NA	4.9E-04	mg/kg/day	1.0E-03	mg/kg-day	4.9E-01
				1,4-Dichlorobenzene	1.3E+01	µg/m3	3.6E-05	mg/kg/day	2.2E-02	(mg/kg-day)-1	7.9E-07	1.1E-04	mg/kg/day	2.3E-01	mg/kg-day	4.6E-04
				Chlorobenzene	3.0E+01	µg/m3	8.1E-05	mg/kg/day	NA	NA	NA	2.4E-04	mg/kg/day	1.7E-02	mg/kg-day	1.4E-02
				cis-1,2-Dichloroethene	6.9E+01	µg/m3	1.9E-04	mg/kg/day	NA	NA	NA	5.5E-04	mg/kg/day	1.0E-02	mg/kg-day	5.5E-02
				Pentachlorophenol	9.0E+01	µg/m3	2.5E-04	mg/kg/day	1.2E-01	(mg/kg-day)-1	2.9E-05	7.1E-04	mg/kg/day	3.0E-02	mg/kg-day	2.4E-02
				Trichloroethylene	2.0E+01	µg/m3	5.5E-05	mg/kg/day	4.0E-01	(mg/kg-day)-1	2.2E-05	1.6E-04	mg/kg/day	1.1E-02	mg/kg/day	1.4E-02
				SVOCs												
				2,4,6-Trichlorophenol	7.0E+01	µg/m3	1.9E-04	mg/kg/day	1.1E-02	(mg/kg-day)-1	2.1E-06	5.5E-04	mg/kg/day	1.0E-04	mg/kg-day	5.5E+00
				Indeno(1,2,3-cd)pyrene	3.2E+00	µg/m3	8.7E-06	mg/kg/day	3.1E-01	(mg/kg-day)-1	2.7E-06	2.5E-05	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	3.5E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				gamma-BHC	2.8E+00	µg/m3	7.7E-06	mg/kg/day	1.3E+00	(mg/kg-day)-1	1.0E-05	2.3E-05	mg/kg/day	3.0E-04	mg/kg-day	7.5E-02
				Methyl parathion	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-04	mg/kg-day	NA
				Parathion	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-03	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.1E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-05	mg/kg-day	NA
				Mercury	8.3E+00	µg/m3	2.3E-05	mg/kg/day	NA	NA	NA	6.6E-05	mg/kg/day	8.6E-05	mg/kg-day	7.7E-01
			Exp. Route Total								6.7E-05					7.0E+00
Air	Ambient Air	Ambient Air	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	4.4E-06	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.6E-06	1.3E-05	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.6E-06					0.0E+00
		Exposure Point Total									4E-01					3E+04

TABLE B-7.15

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Off-site Residents
Receptor Age:	Child (0-6 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Groundwater	Groundwater	Tap Water	Ingestion	**VOCs**												
				1,2,4-Trichlorobenzene	1.1E+01	µg/L	6.0E-05	mg/kg/day	NA	NA	NA	7.0E-04	mg/kg/day	1.0E-02	mg/kg-day	7.0E-02
				1,4-Dichlorobenzene	2.4E+00	µg/L	1.3E-05	mg/kg/day	2.4E-02	(mg/kg-day)-1	3.2E-07	1.6E-04	mg/kg/day	3.0E-02	mg/kg-day	5.2E-03
				Chlorobenzene	5.1E+00	µg/L	2.8E-05	mg/kg/day	NA	NA	NA	3.3E-04	mg/kg/day	2.0E-02	mg/kg-day	1.6E-02
				cis-1,2-Dichloroethene	1.0E+01	µg/L	5.5E-05	mg/kg/day	NA	NA	NA	6.4E-04	mg/kg/day	1.0E-02	mg/kg-day	6.4E-02
				Pentachlorophenol	2.0E+01	µg/L	1.1E-04	mg/kg/day	1.2E-01	(mg/kg-day)-1	1.3E-05	1.3E-03	mg/kg/day	3.0E-02	mg/kg-day	4.2E-02
				Trichloroethylene	3.4E+00	µg/L	1.9E-05	mg/kg/day	4.0E-01	(mg/kg-day)-1	7.5E-06	2.2E-04	mg/kg/day	3.0E-04	mg/kg-day	7.2E-01
				SVOCs												
				2,4,6-Trichlorophenol	1.5E+01	µg/L	8.2E-05	mg/kg/day	1.1E-02	(mg/kg-day)-1	9.0E-07	9.6E-04	mg/kg/day	1.0E-04	mg/kg-day	9.6E+00
				Indeno(1,2,3-cd)pyrene	7.3E-01	µg/L	4.0E-06	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.9E-06	4.7E-05	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	2.4E+03	µg/L	1.3E-02	mg/kg/day	2.0E+00	(mg/kg-day)-1	2.7E-02	1.6E-01	mg/kg/day	2.0E-05	mg/kg-day	7.8E+03
				gamma-BHC	5.5E-01	µg/L	3.0E-06	mg/kg/day	1.3E+00	(mg/kg-day)-1	3.9E-06	3.5E-05	mg/kg/day	3.0E-04	mg/kg-day	1.2E-01
				Methyl parathion	7.4E+01	µg/L	4.1E-04	mg/kg/day	NA	NA	NA	4.7E-03	mg/kg/day	2.5E-04	mg/kg-day	1.9E+01
				Parathion	9.4E+03	µg/L	5.1E-02	mg/kg/day	NA	NA	NA	6.0E-01	mg/kg/day	6.0E-03	mg/kg-day	1.0E+02
				Dioxin												
				Dioxin TEQ	3.6E-06	µg/L	2.0E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	3.0E-06	2.3E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Antimony	5.1E+00	µg/L	2.8E-05	mg/kg/day	NA	NA	NA	3.3E-04	mg/kg/day	4.0E-04	mg/kg-day	8.2E-01
				Arsenic	6.1E+00	µg/L	3.3E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	5.0E-05	3.9E-04	mg/kg/day	3.0E-04	mg/kg-day	1.3E+00
				Manganese	1.3E+03	µg/L	7.1E-03	mg/kg/day	NA	NA	NA	8.3E-02	mg/kg/day	1.4E-01	mg/kg-day	5.9E-01
				Mercury	1.8E+00	µg/L	9.8E-06	mg/kg/day	NA	NA	NA	1.1E-04	mg/kg/day	3.0E-04	mg/kg-day	3.8E-01
			Exp. Route Total								2.7E-02					7.9E+03
Groundwater	Groundwater	Tap Water	Dermal Contact	**VOCs**												
				1,2,4-Trichlorobenzene	1.1E+01	µg/L	2.6E-05	mg/kg/day	NA	NA	NA	3.1E-04	mg/kg/day	1.0E-02	mg/kg-day	3.1E-02
				1,4-Dichlorobenzene	2.4E+00	µg/L	3.7E-06	mg/kg/day	2.4E-02	(mg/kg-day)-1	8.9E-08	4.3E-05	mg/kg/day	3.0E-02	mg/kg-day	1.4E-03
				Chlorobenzene	5.1E+00	µg/L	5.2E-06	mg/kg/day	NA	NA	NA	6.0E-05	mg/kg/day	2.0E-02	mg/kg-day	3.0E-03
				cis-1,2-Dichloroethene	1.0E+01	µg/L	NA	NA	NA	NA	NA	NA	NA	1.0E-02	mg/kg-day	NA
				Pentachlorophenol	2.0E+01	µg/L	2.8E-04	mg/kg/day	1.2E-01	(mg/kg-day)-1	3.3E-05	3.2E-03	mg/kg/day	3.0E-02	mg/kg-day	1.1E-01
				Trichloroethylene	3.4E+00	µg/L	1.5E-06	mg/kg/day	4.0E-01	(mg/kg-day)-1	5.9E-07	1.7E-05	mg/kg/day	3.0E-04	mg/kg-day	5.7E-02
				SVOCs												
				2,4,6-Trichlorophenol	1.5E+01	µg/L	1.9E-05	mg/kg/day	1.1E-02	(mg/kg-day)-1	2.1E-07	2.2E-04	mg/kg/day	1.0E-04	mg/kg-day	2.2E+00
				Indeno(1,2,3-cd)pyrene	7.3E-01	µg/L	2.6E-05	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.9E-05	3.1E-04	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	2.4E+03	µg/L	6.6E-02	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.3E-01	7.7E-01	mg/kg/day	2.0E-05	mg/kg-day	3.9E+04
				gamma-BHC	5.5E-01	µg/L	2.2E-07	mg/kg/day	1.3E+00	(mg/kg-day)-1	2.8E-07	2.6E-06	mg/kg/day	3.0E-04	mg/kg-day	8.5E-03
				Methyl parathion	7.4E+01	µg/L	NA	NA	NA	NA	NA	NA	NA	2.5E-04	mg/kg-day	NA
				Parathion	9.4E+03	µg/L	4.4E-03	mg/kg/day	NA	NA	NA	5.1E-02	mg/kg/day	6.0E-03	mg/kg-day	8.6E+00
				Dioxin												
				Dioxin TEQ	3.6E-06	µg/L	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Antimony	5.1E+00	µg/L	1.8E-07	mg/kg/day	NA	NA	NA	2.2E-06	mg/kg/day	6.0E-05	mg/kg-day	3.6E-02
				Arsenic	6.1E+00	µg/L	2.2E-07	mg/kg/day	1.5E+00	(mg/kg-day)-1	3.3E-07	2.6E-06	mg/kg/day	3.0E-04	mg/kg-day	8.6E-03
				Manganese	1.3E+03	µg/L	4.7E-05	mg/kg/day	NA	NA	NA	5.5E-04	mg/kg/day	5.6E-03	mg/kg-day	9.8E-02
				Mercury	1.8E+00	µg/L	6.5E-08	mg/kg/day	NA	NA	NA	7.5E-07	mg/kg/day	2.9E-04	mg/kg-day	2.6E-03
			Exp. Route Total								1.3E-01					3.9E+04

TABLE B-7.15

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Off-site Residents
Receptor Age:	Child (0-6 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/ Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Unit	Value	Unit	Value	Unit		Value	Unit	Value	Unit	
Groundwater	Air	Vapors in Bath	Inhalation	**VOCs**												
				1,2,4-Trichlorobenzene	1.1E+02	µg/m3	6.0E-04	mg/kg/day	NA	NA	NA	7.0E-03	mg/kg/day	1.0E-03	mg/kg-day	7.0E+00
				1,4-Dichlorobenzene	2.4E+01	µg/m3	1.3E-04	mg/kg/day	2.2E-02	(mg/kg-day)-1	2.8E-06	1.5E-03	mg/kg/day	2.3E-01	mg/kg-day	6.6E-03
				Chlorobenzene	5.3E+01	µg/m3	2.9E-04	mg/kg/day	NA	NA	NA	3.4E-03	mg/kg/day	1.7E-02	mg/kg-day	2.0E-01
				cis-1,2-Dichloroethene	1.2E+02	µg/m3	6.7E-04	mg/kg/day	NA	NA	NA	7.8E-03	mg/kg/day	1.0E-02	mg/kg-day	7.8E-01
				Pentachlorophenol	1.6E+02	µg/m3	8.8E-04	mg/kg/day	1.2E-01	(mg/kg-day)-1	1.1E-04	1.0E-02	mg/kg/day	3.0E-02	mg/kg-day	3.4E-01
				Trichloroethylene	3.6E+01	µg/m3	2.0E-04	mg/kg/day	4.0E-01	(mg/kg-day)-1	7.9E-05	2.3E-03	mg/kg/day	1.1E-02	mg/kg/day	2.0E-01
				SVOCs												
				2,4,6-Trichlorophenol	1.2E+02	µg/m3	6.8E-04	mg/kg/day	1.1E-02	(mg/kg-day)-1	7.4E-06	7.9E-03	mg/kg/day	1.0E-04	mg/kg-day	7.9E+01
				Indeno(1,2,3-cd)pyrene	5.7E+00	µg/m3	3.1E-05	mg/kg/day	3.1E-01	(mg/kg-day)-1	9.7E-06	3.6E-04	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	3.5E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				gamma-BHC	5.1E+00	µg/m3	2.8E-05	mg/kg/day	1.3E+00	(mg/kg-day)-1	3.6E-05	3.2E-04	mg/kg/day	3.0E-04	mg/kg-day	1.1E+00
				Methyl parathion	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-04	mg/kg-day	NA
				Parathion	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-03	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.1E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-05	mg/kg-day	NA
				Mercury	1.5E+01	µg/m3	8.1E-05	mg/kg/day	NA	NA	NA	9.5E-04	mg/kg/day	8.6E-05	mg/kg-day	1.1E+01
			Exp. Route Total								2.4E-04					1.0E+02
Air	Ambient Air	Ambient Air	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	3.0E-06	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.0E-06	3.5E-05	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.0E-06					0.0E+00
		Exposure Point Total									2E-01					5E+04

TABLE B-7.16

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Operations Area Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/ Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Unit	Value	Unit	Value	Unit		Value	Unit	Value	Unit	
Groundwater	Groundwater	Tap Water	Ingestion	**VOCs**												
				1,2,4-Trichlorobenzene	1.1E+01	µg/L	3.8E-05	mg/kg/day	NA	NA	NA	1.1E-04	mg/kg/day	1.0E-02	mg/kg-day	1.1E-02
				1,4-Dichlorobenzene	2.4E+00	µg/L	8.5E-06	mg/kg/day	2.4E-02	(mg/kg-day)-1	2.0E-07	2.4E-05	mg/kg/day	3.0E-02	mg/kg-day	8.0E-04
				Chlorobenzene	5.1E+00	µg/L	1.8E-05	mg/kg/day	NA	NA	NA	5.0E-05	mg/kg/day	2.0E-02	mg/kg-day	2.5E-03
				cis-1,2-Dichloroethene	1.0E+01	µg/L	3.5E-05	mg/kg/day	NA	NA	NA	9.8E-05	mg/kg/day	1.0E-02	mg/kg-day	9.8E-03
				Pentachlorophenol	2.0E+01	µg/L	6.9E-05	mg/kg/day	1.2E-01	(mg/kg-day)-1	8.3E-06	1.9E-04	mg/kg/day	3.0E-02	mg/kg-day	6.4E-03
				Trichloroethylene	3.4E+00	µg/L	1.2E-05	mg/kg/day	4.0E-01	(mg/kg-day)-1	4.8E-06	3.3E-05	mg/kg/day	3.0E-04	mg/kg-day	1.1E-01
				SVOCs												
				2,4,6-Trichlorophenol	1.5E+01	µg/L	5.2E-05	mg/kg/day	1.1E-02	(mg/kg-day)-1	5.8E-07	1.5E-04	mg/kg/day	1.0E-04	mg/kg-day	1.5E+00
				Indeno(1,2,3-cd)pyrene	7.3E-01	µg/L	2.6E-06	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.9E-06	7.1E-06	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	2.4E+03	µg/L	8.5E-03	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.7E-02	2.4E-02	mg/kg/day	2.0E-05	mg/kg-day	1.2E+03
				gamma-BHC	5.5E-01	µg/L	1.9E-06	mg/kg/day	1.3E+00	(mg/kg-day)-1	2.5E-06	5.4E-06	mg/kg/day	3.0E-04	mg/kg-day	1.8E-02
				Methyl parathion	7.4E+01	µg/L	2.6E-04	mg/kg/day	NA	NA	NA	7.2E-04	mg/kg/day	2.5E-04	mg/kg-day	2.9E+00
				Parathion	9.4E+03	µg/L	3.3E-02	mg/kg/day	NA	NA	NA	9.2E-02	mg/kg/day	6.0E-03	mg/kg-day	1.5E+01
				Dioxin												
				Dioxin TEQ	3.6E-06	µg/L	1.3E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	1.9E-06	3.5E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Antimony	5.1E+00	µg/L	1.8E-05	mg/kg/day	NA	NA	NA	5.0E-05	mg/kg/day	4.0E-04	mg/kg-day	1.2E-01
				Arsenic	6.1E+00	µg/L	2.1E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	3.2E-05	6.0E-05	mg/kg/day	3.0E-04	mg/kg-day	2.0E-01
				Manganese	1.3E+03	µg/L	4.5E-03	mg/kg/day	NA	NA	NA	1.3E-02	mg/kg/day	1.4E-01	mg/kg-day	9.1E-02
				Mercury	1.8E+00	µg/L	6.2E-06	mg/kg/day	NA	NA	NA	1.7E-05	mg/kg/day	3.0E-04	mg/kg-day	5.8E-02
			Exp. Route Total								1.7E-02					1.2E+03
		Exposure Point Total									2E-02					1E+03

TABLE B-7.17

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/ Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Unit	Value	Unit	Value	Unit		Value	Unit	Value	Unit	
Groundwater	Groundwater	Tap Water	Ingestion	**VOCs**												
				1,2,4-Trichlorobenzene	1.1E+01	µg/L	3.7E-06	mg/kg/day	NA	NA	NA	1.0E-05	mg/kg/day	1.0E-02	mg/kg-day	1.0E-03
				1,4-Dichlorobenzene	2.4E+00	µg/L	8.2E-07	mg/kg/day	2.4E-02	(mg/kg-day)-1	2.0E-08	2.3E-06	mg/kg/day	3.0E-02	mg/kg-day	7.6E-05
				Chlorobenzene	5.1E+00	µg/L	1.7E-06	mg/kg/day	NA	NA	NA	4.8E-06	mg/kg/day	2.0E-02	mg/kg-day	2.4E-04
				cis-1,2-Dichloroethene	1.0E+01	µg/L	3.4E-06	mg/kg/day	NA	NA	NA	9.4E-06	mg/kg/day	1.0E-02	mg/kg-day	9.4E-04
				Pentachlorophenol	2.0E+01	µg/L	6.6E-06	mg/kg/day	1.2E-01	(mg/kg-day)-1	7.9E-07	1.9E-05	mg/kg/day	3.0E-02	mg/kg-day	6.2E-04
				Trichloroethylene	3.4E+00	µg/L	1.1E-06	mg/kg/day	4.0E-01	(mg/kg-day)-1	4.6E-07	3.2E-06	mg/kg/day	3.0E-04	mg/kg-day	1.1E-02
				SVOCs												
				2,4,6-Trichlorophenol	1.5E+01	µg/L	5.0E-06	mg/kg/day	1.1E-02	(mg/kg-day)-1	5.5E-08	1.4E-05	mg/kg/day	1.0E-04	mg/kg-day	1.4E-01
				Indeno(1,2,3-cd)pyrene	7.3E-01	µg/L	2.4E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.8E-07	6.9E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	2.4E+03	µg/L	8.2E-04	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.6E-03	2.3E-03	mg/kg/day	2.0E-05	mg/kg-day	1.1E+02
				gamma-BHC	5.5E-01	µg/L	1.8E-07	mg/kg/day	1.3E+00	(mg/kg-day)-1	2.4E-07	5.2E-07	mg/kg/day	3.0E-04	mg/kg-day	1.7E-03
				Methyl parathion	7.4E+01	µg/L	2.5E-05	mg/kg/day	NA	NA	NA	7.0E-05	mg/kg/day	2.5E-04	mg/kg-day	2.8E-01
				Parathion	9.4E+03	µg/L	3.1E-03	mg/kg/day	NA	NA	NA	8.8E-03	mg/kg/day	6.0E-03	mg/kg-day	1.5E+00
				Dioxin												
				Dioxin TEQ	3.6E-06	µg/L	1.2E-12	mg/kg/day	1.5E+05	(mg/kg-day)-1	1.8E-07	3.4E-12	mg/kg/day	NA	NA	NA
				Inorganics												
				Antimony	5.1E+00	µg/L	1.7E-06	mg/kg/day	NA	NA	NA	4.8E-06	mg/kg/day	4.0E-04	mg/kg-day	1.2E-02
				Arsenic	6.1E+00	µg/L	2.0E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	3.1E-06	5.7E-06	mg/kg/day	3.0E-04	mg/kg-day	1.9E-02
				Manganese	1.3E+03	µg/L	4.4E-04	mg/kg/day	NA	NA	NA	1.2E-03	mg/kg/day	1.4E-01	mg/kg-day	8.7E-03
				Mercury	1.8E+00	µg/L	6.0E-07	mg/kg/day	NA	NA	NA	1.7E-06	mg/kg/day	3.0E-04	mg/kg-day	5.6E-03
			Exp. Route Total								1.6E-03					1.2E+02
		Exposure Point Total									2E-03					1E+02

TABLE B-8.1
CALCULATION OF RADIATION CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	NA
Receptor Population:	NA
Receptor Age:	NA

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
				NOT APPLICABLE TO THIS SITE								
			Exp. Route Total									
		Exposure Point Total										
									Total of Receptor Risks Across All Media			

TABLE B-9.1
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Operations Area Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		Facility Area	Benzo(a)anthracene	1.1E-07	NA	1.3E-07	2.3E-07	NA	NA	NA	NA	NA
			Benzo(a)pyrene	2.4E-06	NA	2.9E-06	5.3E-06	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	2.7E-07	NA	3.2E-07	5.9E-07	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	7.9E-07	NA	9.4E-07	1.7E-06	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	1.7E-07	NA	2.0E-07	3.6E-07	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	3.9E-05	NA	7.2E-05	1.1E-04	Eye/Skin/Nails/Immune System	2.7E+00	NA	5.0E+00	7.8E+00
			Heptachlor epoxide	6.0E-07	NA	NA	6.0E-07	Liver	1.4E-02	NA	NA	1.4E-02
			Dioxin									
			Dioxin TEQ	2.0E-05	NA	5.4E-06	2.5E-05	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	9.3E-03	NA	NA	9.3E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	1.1E-02	NA	NA	1.1E-02
			Arsenic	3.1E-05	NA	2.8E-05	5.9E-05	Skin	1.9E-01	NA	1.7E-01	3.7E-01
			Cadmium	NA	NA	NA	NA	Kidney	2.3E-03	NA	8.4E-04	3.1E-03
			Chromium	NA	NA	NA	NA	GI Tract	3.8E-03	NA	NA	3.8E-03
			Iron	NA	NA	NA	NA	GI Tract/Liver	1.8E-02	NA	NA	1.8E-02
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	2.9E-03	NA	NA	2.9E-03
			Mercury	NA	NA	NA	NA	Immune System	4.2E-03	NA	NA	4.2E-03
			Vanadium	NA	NA	NA	NA	Metabolic	2.0E-02	NA	NA	2.0E-02
			Chemical Total	9.4E-05	NA	1.1E-04	2.0E-04		3.0E+00	NA	5.2E+00	8.2E+00
		Exposure Point Total					2.0E-04					8.2E+00
	Exposure Medium Total						2.0E-04					8.2E+00
Surface Soil Total							2.0E-04					8.2E+00
Air	Ambient Air	Ambient Air	**P/PCBs**									
		Facility Area	PCBs, Total	NA	1.1E-06	NA	1.1E-06	NA	NA	NA	NA	NA
			Chemical Total	NA	1.1E-06	NA	1.1E-06		NA	NA	NA	NA
		Exposure Point Total					1.1E-06					NA
	Exposure Medium Total						1.1E-06					NA
Air Total							1.1E-06					NA
Receptor Total							2.0E-04					8.2E+00

Total Risk Across All Media = 2E-04

Total Hazard Across All Media = 8

Total Liver HI Across All Media =	0.03
Total Eye HI Across All Media =	8
Total GI Tract HI Across All Media =	0.03
Total Nails HI Across All Media =	8
Total Blood HI Across All Media =	0.01
Total Whole Body HI Across All Media =	0.01
Total Skin HI Across All Media =	8
Total Kidney HI Across All Media =	0.003
Total CNS HI Across All Media =	0.01
Total Immune System HI Across All Media =	8
Total Metabolic HI Across All Media =	0.02

TABLE B-9.2
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Operations Area Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		Facility Area	Benzo(a)anthracene	2.1E-07	NA	1.8E-07	3.9E-07	NA	NA	NA	NA	NA
			Benzo(a)pyrene	4.8E-06	NA	4.2E-06	9.0E-06	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	5.4E-07	NA	4.6E-07	1.0E-06	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	1.6E-06	NA	1.4E-06	2.9E-06	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	3.3E-07	NA	2.8E-07	6.2E-07	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	4.2E-03	NA	1.7E-03	5.9E-03	Eye/Skin/Nails/Immune System	3.0E+02	NA	1.2E+02	4.1E+02
			Heptachlor epoxide	1.2E-06	NA	NA	1.2E-06	Liver	2.9E-02	NA	NA	2.9E-02
			Dioxin									
			Dioxin TEQ	4.0E-05	NA	7.8E-06	4.7E-05	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	1.9E-02	NA	NA	1.9E-02
			Antimony	NA	NA	NA	NA	Whole Body/Blood	2.1E-02	NA	NA	2.1E-02
			Arsenic	2.0E-04	NA	4.0E-05	2.4E-04	Skin	1.3E+00	NA	2.5E-01	1.5E+00
			Cadmium	NA	NA	NA	NA	Kidney	4.6E-03	NA	1.2E-03	5.8E-03
			Chromium	NA	NA	NA	NA	GI Tract	7.5E-03	NA	NA	7.5E-03
			Iron	NA	NA	NA	NA	GI Tract/Liver	3.6E-02	NA	NA	3.6E-02
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	5.8E-03	NA	NA	5.8E-03
			Mercury	NA	NA	NA	NA	Immune System	8.5E-03	NA	NA	8.5E-03
			Vanadium	NA	NA	NA	NA	Metabolic	3.9E-02	NA	NA	3.9E-02
			Chemical Total	4.5E-03	NA	1.7E-03	6.2E-03		3.0E+02	NA	1.2E+02	4.2E+02
		Exposure Point Total					6.2E-03					4.2E+02
	Exposure Medium Total						6.2E-03					4.2E+02
Surface Soil Total							6.2E-03					4.2E+02
Air	Ambient Air	Ambient Air	**P/PCBs**									
		Facility Area	PCBs, Total	NA	1.1E-06	NA	1.1E-06	NA	NA	NA	NA	NA
			Chemical Total	NA	1.1E-06	NA	1.1E-06		NA	NA	NA	NA
		Exposure Point Total					1.1E-06					NA
	Exposure Medium Total						1.1E-06					NA
Air Total							1.1E-06					NA
Receptor Total							6.2E-03					4.2E+02

Total Risk Across All Media =	6E-03
Total Hazard Across All Media =	416
Total Liver HI Across All Media =	0.06
Total Eye HI Across All Media =	414
Total GI Tract HI Across All Media =	0.06
Total Nails HI Across All Media =	414
Total Blood HI Across All Media =	0.02
Total Whole Body HI Across All Media =	0.02
Total Skin HI Across All Media =	415
Total Kidney HI Across All Media =	0.006
Total CNS HI Across All Media =	0.02
Total Immune System HI Across All Media =	414
Total Metabolic HI Across All Media =	0.04

TABLE B-9.3
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		Facility Area	Benzo(a)anthracene	2.0E-08	NA	7.8E-08	9.9E-08	NA	NA	NA	NA	NA
			Benzo(a)pyrene	4.7E-07	NA	1.8E-06	2.3E-06	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	5.1E-08	NA	2.0E-07	2.5E-07	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	1.5E-07	NA	5.9E-07	7.4E-07	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	3.2E-08	NA	1.2E-07	1.5E-07	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	2.5E-05	NA	4.5E-05	7.0E-05	Eye/Skin/Nails/Immune System	1.8E+00	NA	3.1E+00	4.9E+00
			Heptachlor epoxide	1.2E-07	NA	NA	1.2E-07	Liver	2.7E-03	NA	NA	2.7E-03
			Dioxin									
			Dioxin TEQ	3.8E-06	NA	3.4E-06	7.2E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	1.8E-03	NA	NA	1.8E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	2.0E-03	NA	NA	2.0E-03
			Arsenic	2.0E-05	NA	1.7E-05	3.7E-05	Skin	1.2E-01	NA	1.1E-01	2.3E-01
			Cadmium	NA	NA	NA	NA	Kidney	4.4E-04	NA	5.2E-04	9.7E-04
			Chromium	NA	NA	NA	NA	GI Tract	7.2E-04	NA	NA	7.2E-04
			Iron	NA	NA	NA	NA	GI Tract/Liver	3.5E-03	NA	NA	3.5E-03
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	5.6E-04	NA	NA	5.6E-04
			Mercury	NA	NA	NA	NA	Immune System	8.1E-04	NA	NA	8.1E-04
			Vanadium	NA	NA	NA	NA	Metabolic	3.8E-03	NA	NA	3.8E-03
			Chemical Total	4.9E-05	NA	6.8E-05	1.2E-04		1.9E+00	NA	3.2E+00	5.1E+00
		Exposure Point Total					1.2E-04					5.1E+00
	Exposure Medium Total						1.2E-04					5.1E+00
Surface Soil Total							1.2E-04					5.1E+00
Air	Ambient Air	Ambient Air	**P/PCBs**									
		Facility Area	PCBs, Total	NA	1.0E-07	NA	1.0E-07	NA	NA	NA	NA	NA
			Chemical Total	NA	1.0E-07	NA	1.0E-07		NA	NA	NA	NA
		Exposure Point Total					1.0E-07					NA
	Exposure Medium Total						1.0E-07					NA
Air Total							1.0E-07					NA
Receptor Total							1.2E-04					5.1E+00

Total Risk Across All Media = 1E-04

Total Hazard Across All Media =	5
Total Liver HI Across All Media =	0.006
Total Eye HI Across All Media =	5
Total GI Tract HI Across All Media =	0.006
Total Nails HI Across All Media =	5
Total Blood HI Across All Media =	0.002
Total Whole Body HI Across All Media =	0.002
Total Skin HI Across All Media =	5
Total Kidney HI Across All Media =	0.001
Total CNS HI Across All Media =	0.002
Total Immune System HI Across All Media =	5
Total Metabolic HI Across All Media =	0.004

TABLE B-9.4
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**SVOCs**									
			Benzo(a)anthracene	2.0E-08	NA	7.8E-08	9.9E-08	NA	NA	NA	NA	NA
			Benzo(a)pyrene	4.7E-07	NA	1.8E-06	2.3E-06	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	5.1E-08	NA	2.0E-07	2.5E-07	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	1.5E-07	NA	5.9E-07	7.4E-07	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	3.2E-08	NA	1.2E-07	1.5E-07	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	4.1E-04	NA	7.2E-04	1.1E-03	Eye/Skin/Nails/Immune System	2.8E+01	NA	5.1E+01	7.9E+01
			Heptachlor epoxide	1.2E-07	NA	NA	1.2E-07	Liver	2.7E-03	NA	NA	2.7E-03
			Dioxin									
			Dioxin TEQ	3.8E-06	NA	3.4E-06	7.2E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	1.8E-03	NA	NA	1.8E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	2.0E-03	NA	NA	2.0E-03
			Arsenic	2.0E-05	NA	1.7E-05	3.7E-05	Skin	1.2E-01	NA	1.1E-01	2.3E-01
			Cadmium	NA	NA	NA	NA	Kidney	4.4E-04	NA	5.2E-04	9.7E-04
			Chromium	NA	NA	NA	NA	GI Tract	7.2E-04	NA	NA	7.2E-04
			Iron	NA	NA	NA	NA	GI Tract/Liver	3.5E-03	NA	NA	3.5E-03
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	5.6E-04	NA	NA	5.6E-04
			Mercury	NA	NA	NA	NA	Immune System	8.1E-04	NA	NA	8.1E-04
			Vanadium	NA	NA	NA	NA	Metabolic	3.8E-03	NA	NA	3.8E-03
			Chemical Total	4.3E-04	NA	7.5E-04	1.2E-03		2.9E+01	NA	5.1E+01	7.9E+01
		Exposure Point Total					1.2E-03					7.9E+01
	Exposure Medium Total						1.2E-03					7.9E+01
Surface Soil Total							1.2E-03					7.9E+01
Air	Ambient Air	Ambient Air Facility Area	**P/PCBs**									
			PCBs, Total	NA	1.0E-07	NA	1.0E-07	NA	NA	NA	NA	NA
			Chemical Total	NA	1.0E-07	NA	1.0E-07		NA	NA	NA	NA
		Exposure Point Total					1.0E-07					NA
	Exposure Medium Total						1.0E-07					NA
Air Total							1.0E-07					NA
Receptor Total							1.2E-03					7.9E+01

Total Risk Across All Media = 1E-03

Total Hazard Across All Media = 79

Total Liver HI Across All Media =	0.006
Total Eye HI Across All Media =	79
Total GI Tract HI Across All Media =	0.006
Total Nails HI Across All Media =	79
Total Blood HI Across All Media =	0.002
Total Whole Body HI Across All Media =	0.002
Total Skin HI Across All Media =	79
Total Kidney HI Across All Media =	0.001
Total CNS HI Across All Media =	0.002
Total Immune System HI Across All Media =	79
Total Metabolic HI Across All Media =	0.004

TABLE B-9.5
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**SVOCs**									
			Benzo(a)anthracene	2.6E-08	NA	1.9E-08	4.6E-08	NA	NA	NA	NA	NA
			Benzo(a)pyrene	6.0E-07	NA	4.4E-07	1.0E-06	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	6.7E-08	NA	4.9E-08	1.2E-07	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	2.0E-07	NA	1.4E-07	3.4E-07	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	4.1E-08	NA	3.0E-08	7.1E-08	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	3.3E-05	NA	1.1E-05	4.3E-05	Eye/Skin/Nails/Immune System	5.7E+00	NA	1.9E+00	7.6E+00
			Heptachlor epoxide	1.5E-07	NA	NA	1.5E-07	Liver	8.9E-03	NA	NA	8.9E-03
			Dioxin									
			Dioxin TEQ	4.9E-06	NA	8.3E-07	5.8E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	5.8E-03	NA	NA	5.8E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	6.6E-03	NA	NA	6.6E-03
			Arsenic	2.5E-05	NA	4.3E-06	3.0E-05	Skin	4.0E-01	NA	6.6E-02	4.6E-01
			Cadmium	NA	NA	NA	NA	Kidney	1.4E-03	NA	3.2E-04	1.8E-03
			Chromium	NA	NA	NA	NA	GI Tract	2.3E-03	NA	NA	2.3E-03
			Iron	NA	NA	NA	NA	GI Tract/Liver	1.1E-02	NA	NA	1.1E-02
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	1.8E-03	NA	NA	1.8E-03
			Mercury	NA	NA	NA	NA	Immune System	2.6E-03	NA	NA	2.6E-03
			Vanadium	NA	NA	NA	NA	Metabolic	1.2E-02	NA	NA	1.2E-02
			Chemical Total	6.4E-05	NA	1.7E-05	8.1E-05		6.1E+00	NA	2.0E+00	8.1E+00
		Exposure Point Total					8.1E-05					8.1E+00
	Exposure Medium Total						8.1E-05					8.1E+00
Surface Soil Total							8.1E-05					8.1E+00
Air	Ambient Air	Ambient Air Facility Area	**P/PCBs**									
			PCBs, Total	NA	4.7E-08	NA	4.7E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	4.7E-08	NA	4.7E-08		NA	NA	NA	NA
		Exposure Point Total					4.7E-08					NA
	Exposure Medium Total						4.7E-08					NA
Air Total							4.7E-08					NA
Receptor Total							8.1E-05					8.1E+00

Total Risk Across All Media = 8E-05

Total Hazard Across All Media = 8

Total Liver HI Across All Media =	0.02
Total Eye HI Across All Media =	8
Total GI Tract HI Across All Media =	0.02
Total Nails HI Across All Media =	8
Total Blood HI Across All Media =	0.007
Total Whole Body HI Across All Media =	0.007
Total Skin HI Across All Media =	8
Total Kidney HI Across All Media =	0.002
Total CNS HI Across All Media =	0.008
Total Immune System HI Across All Media =	8
Total Metabolic HI Across All Media =	0.01

TABLE B-9.6
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**SVOCs**									
			Benzo(a)anthracene	2.6E-08	NA	1.9E-08	4.6E-08	NA	NA	NA	NA	NA
			Benzo(a)pyrene	6.0E-07	NA	4.4E-07	1.0E-06	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	6.7E-08	NA	4.9E-08	1.2E-07	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	2.0E-07	NA	1.4E-07	3.4E-07	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	4.1E-08	NA	3.0E-08	7.1E-08	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	5.3E-04	NA	1.8E-04	7.0E-04	Eye/Skin/Nails/Immune System	9.2E+01	NA	3.1E+01	1.2E+02
			Heptachlor epoxide	1.5E-07	NA	NA	1.5E-07	Liver	8.9E-03	NA	NA	8.9E-03
			Dioxin									
			Dioxin TEQ	4.9E-06	NA	8.3E-07	5.8E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	5.8E-03	NA	NA	5.8E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	6.6E-03	NA	NA	6.6E-03
			Arsenic	2.5E-05	NA	4.3E-06	3.0E-05	Skin	4.0E-01	NA	6.6E-02	4.6E-01
			Cadmium	NA	NA	NA	NA	Kidney	1.4E-03	NA	3.2E-04	1.8E-03
			Chromium	NA	NA	NA	NA	GI Tract	2.3E-03	NA	NA	2.3E-03
			Iron	NA	NA	NA	NA	GI Tract/Liver	1.1E-02	NA	NA	1.1E-02
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	1.8E-03	NA	NA	1.8E-03
			Mercury	NA	NA	NA	NA	Immune System	2.6E-03	NA	NA	2.6E-03
			Vanadium	NA	NA	NA	NA	Metabolic	1.2E-02	NA	NA	1.2E-02
			Chemical Total	5.6E-04	NA	1.8E-04	7.4E-04		9.3E+01	NA	3.1E+01	1.2E+02
		Exposure Point Total					7.4E-04					1.2E+02
	Exposure Medium Total						7.4E-04					1.2E+02
Surface Soil Total							7.4E-04					1.2E+02
Air	Ambient Air	Ambient Air Facility Area	**P/PCBs**									
			PCBs, Total	NA	4.7E-08	NA	4.7E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	4.7E-08	NA	4.7E-08		NA	NA	NA	NA
		Exposure Point Total					4.7E-08					NA
	Exposure Medium Total						4.7E-08					NA
Air Total							4.7E-08					NA
Receptor Total							7.4E-04					1.2E+02

Total Risk Across All Media = 7E-04

Total Hazard Across All Media = 124

Total Liver HI Across All Media =	0.02
Total Eye HI Across All Media =	123
Total GI Tract HI Across All Media =	0.02
Total Nails HI Across All Media =	123
Total Blood HI Across All Media =	0.007
Total Whole Body HI Across All Media =	0.007
Total Skin HI Across All Media =	124
Total Kidney HI Across All Media =	0.002
Total CNS HI Across All Media =	0.008
Total Immune System HI Across All Media =	123
Total Metabolic HI Across All Media =	0.01

TABLE B-9.7
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface/ Subsurface Soil	Surface Soil Subsurface Soil	Surface Soil Subsurface Soil Facility Area	**SVOCs**									
			Benzo(a)anthracene	1.1E-08	NA	4.4E-09	1.6E-08	NA	NA	NA	NA	NA
			Benzo(a)pyrene	2.6E-07	NA	1.0E-07	3.6E-07	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	2.8E-08	NA	1.1E-08	3.9E-08	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	8.4E-08	NA	3.3E-08	1.2E-07	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	1.8E-08	NA	6.8E-09	2.4E-08	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	1.2E-04	NA	2.2E-05	1.4E-04	Eye/Skin/Nails/Immune System	2.1E+02	NA	3.8E+01	2.5E+02
			Heptachlor epoxide	6.4E-08	NA	NA	6.4E-08	Liver	3.8E-02	NA	NA	3.8E-02
			Dioxin									
			Dioxin TEQ	2.1E-06	NA	1.9E-07	2.3E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	2.5E-02	NA	NA	2.5E-02
			Antimony	NA	NA	NA	NA	Whole Body/Blood	2.8E-02	NA	NA	2.8E-02
			Arsenic	4.1E-06	NA	3.7E-07	4.5E-06	Skin	6.4E-01	NA	5.7E-02	6.9E-01
			Barium	NA	NA	NA	NA	CNS	1.2E-03	NA	NA	1.2E-03
			Cadmium	NA	NA	NA	NA	Kidney	1.7E-03	NA	2.0E-04	1.9E-03
			Chromium	NA	NA	NA	NA	GI Tract	2.0E-02	NA	NA	2.0E-02
			Iron	NA	NA	NA	NA	GI Tract/Liver	4.8E-02	NA	NA	4.8E-02
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	2.6E-02	NA	NA	2.6E-02
			Mercury	NA	NA	NA	NA	Immune System	6.5E-03	NA	NA	6.5E-03
			Nickel	NA	NA	NA	NA	Body and Organ Weight	5.7E-02	NA	NA	5.7E-02
			Vanadium	NA	NA	NA	NA	Metabolic	6.1E-02	NA	NA	6.1E-02
			Chemical Total	1.3E-04	NA	2.2E-05	1.5E-04		2.1E+02	NA	3.8E+01	2.5E+02
		Exposure Point Total					1.5E-04					2.5E+02
	Exposure Medium Total						1.5E-04					2.5E+02
Surface/Subsurface Soil Total							1.5E-04					2.5E+02
Air	Ambient Air	Ambient Air Facility Area	**P/PCBs**									
			PCBs, Total	NA	2.8E-08	NA	2.8E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	2.8E-08	NA	2.8E-08		NA	NA	NA	NA
		Exposure Point Total					2.8E-08					NA
	Exposure Medium Total						2.8E-08					NA
Air Total							2.8E-08					NA
Receptor Total							1.5E-04					2.5E+02

Total Risk Across All Media = 1E-04

Total Hazard Across All Media = 250

Total Liver HI Across All Media =	0.09
Total Eye HI Across All Media =	249
Total GI Tract HI Across All Media =	0.09
Total Nails HI Across All Media =	249
Total Blood HI Across All Media =	0.03
Total Whole Body HI Across All Media =	0.03
Total Skin HI Across All Media =	250
Total Kidney HI Across All Media =	0.002
Total CNS HI Across All Media =	0.05
Total Immune System HI Across All Media =	249
Total Body and Organ Weight HI Across All Media =	0.06
Total Metabolic HI Across All Media =	0.06

TABLE B-9.8
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		South Landfill	Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	9.2E-07	NA	1.6E-06	2.5E-06	Eye/Skin/Nails/Immune System	6.4E-02	NA	1.1E-01	1.8E-01
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
			Chemical Total	9.2E-07	NA	1.6E-06	2.5E-06		6.4E-02	NA	1.1E-01	1.8E-01
		Exposure Point Total					2.5E-06					1.8E-01
	Exposure Medium Total						2.5E-06					1.8E-01
Surface Soil Total							2.5E-06					1.8E-01
Air	Ambient Air	Ambient Air	**P/PCBs**									
		South Landfill	PCBs, Total	NA	9.8E-09	NA	9.8E-09	NA	NA	NA	NA	NA
			Chemical Total	NA	9.8E-09	NA	9.8E-09		NA	NA	NA	NA
		Exposure Point Total					9.8E-09					NA
	Exposure Medium Total						9.8E-09					NA
Air Total							9.8E-09					NA
Receptor Total							2.6E-06					1.8E-01

Total Risk Across All Media = 3E-06

Total Hazard Across All Media = 0.2

Total Eye HI Across All Media = 0.2
Total Nails HI Across All Media = 0.2
Total Skin HI Across All Media = 0.2
Total Immune System HI Across All Media = 0.2

TABLE B-9.9
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		South Landfill	Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	1.2E-06	NA	4.0E-07	1.6E-06	Eye/Skin/Nails/Immune System	2.1E-01	NA	7.0E-02	2.8E-01
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
			Chemical Total	1.2E-06	NA	4.0E-07	1.6E-06		2.1E-01	NA	7.0E-02	2.8E-01
		Exposure Point Total					1.6E-06					2.8E-01
	Exposure Medium Total						1.6E-06					2.8E-01
Surface Soil Total							1.6E-06					2.8E-01
Air	Ambient Air	Ambient Air	**P/PCBs**									
		South Landfill	PCBs, Total	NA	4.5E-09	NA	4.5E-09	NA	NA	NA	NA	NA
			Chemical Total	NA	4.5E-09	NA	4.5E-09		NA	NA	NA	NA
		Exposure Point Total					4.5E-09					NA
	Exposure Medium Total						4.5E-09					NA
Air Total							4.5E-09					NA
Receptor Total							1.6E-06					2.8E-01

Total Risk Across All Media = 2E-06

Total Hazard Across All Media = 0.3

Total Eye HI Across All Media = 0.3
Total Nails HI Across All Media = 0.3
Total Skin HI Across All Media = 0.3
Total Immune System HI Across All Media = 0.3

TABLE B-9.10
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		West End Landfill	Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	NA	NA	NA	NA	Eye/Skin/Nails/Immune System	NA	NA	NA	NA
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
			Chemical Total	NA	NA	NA	NA		NA	NA	NA	NA
		Exposure Point Total					NA					NA
	Exposure Medium Total						NA					NA
Surface Soil Total							NA					NA
Air	Ambient Air	Ambient Air	**P/PCBs**									
		West End Landfill	PCBs, Total	NA	1.4E-08	NA	1.4E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	1.4E-08	NA	1.4E-08		NA	NA	NA	NA
		Exposure Point Total					1.4E-08					NA
	Exposure Medium Total						1.4E-08					NA
Air Total							1.4E-08					NA
Receptor Total							1.4E-08					0.0E+00

Total Risk Across All Media = 1E-08

Total Hazard Across All Media = NA

TABLE B-9.11
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		West End Landfill	Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	NA	NA	NA	NA	Eye/Skin/Nails/Immune System	NA	NA	NA	NA
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
			Chemical Total	NA	NA	NA	NA		NA	NA	NA	NA
		Exposure Point Total					NA					NA
	Exposure Medium Total						NA					NA
Surface Soil Total							NA					NA
Air	Ambient Air	Ambient Air	**P/PCBs**									
		West End Landfill	PCBs, Total	NA	6.6E-09	NA	6.6E-09	NA	NA	NA	NA	NA
			Chemical Total	NA	6.6E-09	NA	6.6E-09		NA	NA	NA	NA
		Exposure Point Total					6.6E-09					NA
	Exposure Medium Total						6.6E-09					NA
Air Total							6.6E-09					NA
Receptor Total							6.6E-09					NA

Total Risk Across All Media = 7E-09

Total Hazard Across All Media = NA

TABLE B-9.12
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Off-site Residents
Receptor:	Child to Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Air	Ambient Air	Ambient Air	**P/PCBs**											
			PCBs, Total	NA	NA	1.6E-06	NA	1.6E-06	NA	NA	NA	NA	NA	NA
			Chemical Total	NA	NA	1.6E-06	NA	1.6E-06		NA	NA	NA	NA	NA
		Exposure Point Total						1.6E-06						NA
	Exposure Medium Total							1.6E-06						NA
Air Total								1.6E-06						NA
Receptor Total								1.6E-06						NA

Total Risk Across All Media = 2E-06

Total Hazard Across All Media = NA

TABLE B-9.13
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Off-site Residents
Receptor:	Child (0-6 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Air	Ambient Air	Ambient Air	**P/PCBs**											
			PCBs, Total	NA	NA	1.0E-06	NA	1.0E-06	NA	NA	NA	NA	NA	NA
			Chemical Total	NA	NA	1.0E-06	NA	1.0E-06		NA	NA	NA	NA	NA
		Exposure Point Total						1.0E-06						NA
	Exposure Medium Total							1.0E-06						NA
Air Total								1.0E-06						NA
Receptor Total								1.0E-06						NA

Total Risk Across All Media = 1E-06

Total Hazard Across All Media = NA

TABLE B-9.14
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Off-site Residents
Receptor:	Child to Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**VOCs**											
			1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	Adrenals	7.0E-02	4.9E-01	NA	1.8E-02	5.8E-01
			1,4-Dichlorobenzene	8.7E-07	7.9E-07	NA	2.1E-07	1.9E-06	NA	5.2E-03	4.6E-04	NA	8.4E-04	6.5E-03
			Chlorobenzene	NA	NA	NA	NA	NA	Liver	1.6E-02	1.4E-02	NA	1.8E-03	3.2E-02
			cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	Blood	6.4E-02	5.5E-02	NA	NA	1.2E-01
			Pentachlorophenol	3.5E-05	2.9E-05	NA	7.8E-05	1.4E-04	Liver/Kidney	4.2E-02	2.4E-02	NA	6.3E-02	1.3E-01
			Trichloroethylene	2.0E-05	2.2E-05	NA	1.4E-06	4.4E-05	Liver/Kidney/Fetus	7.2E-01	1.4E-02	NA	3.4E-02	7.7E-01
			SVOCs											
			2,4,6-Trichlorophenol	2.5E-06	2.1E-06	NA	4.9E-07	5.0E-06	NA	9.6E+00	5.5E+00	NA	1.3E+00	1.6E+01
			Indeno(1,2,3-cd)pyrene	8.0E-06	2.7E-06	NA	4.5E-05	5.6E-05	NA	NA	NA	NA	NA	NA
			P/PCBs											
			PCBs, Total	7.3E-02	NA	NA	3.1E-01	3.8E-01	Eye/Skin/Nails/Immune System	7.8E+03	NA	NA	2.3E+04	3.0E+04
			gamma-BHC	1.1E-05	1.0E-05	NA	6.6E-07	2.1E-05	Liver/Kidney	1.2E-01	7.5E-02	NA	5.0E-03	2.0E-01
			Methyl parathion	NA	NA	NA	NA	NA	Blood	1.9E+01	NA	NA	NA	1.9E+01
			Parathion	NA	NA	NA	NA	NA	NA	1.0E+02	NA	NA	5.0E+00	1.0E+02
			Dioxin											
			Dioxin TEQ	8.1E-06	NA	NA	NA	8.1E-06	NA	NA	NA	NA	NA	NA
			Inorganics											
			Antimony	NA	NA	NA	NA	NA	Whole Body/Blood	8.2E-01	NA	NA	2.1E-02	8.4E-01
			Arsenic	1.4E-04	NA	NA	7.7E-07	1.4E-04	Skin	1.3E+00	NA	NA	5.0E-03	1.3E+00
			Manganese	NA	NA	NA	NA	NA	CNS	5.9E-01	NA	NA	5.7E-02	6.5E-01
			Mercury	NA	NA	NA	NA	NA	Immune System	3.8E-01	7.7E-01	NA	1.5E-03	1.2E+00
			Chemical Total	7.3E-02	6.7E-05	NA	3.1E-01	3.8E-01		7.9E+03	7.0E+00	NA	2.3E+04	3.0E+04
		Exposure Point Total						3.8E-01						3.0E+04
	Exposure Medium Total							3.8E-01						3.0E+04
Groundwater Total								3.8E-01						3.0E+04
Air	Ambient Air	Ambient Air	**P/PCBs**											
			PCBs, Total	NA	NA	1.6E-06	NA	1.6E-06	NA	NA	NA	NA	NA	NA
			Chemical Total	NA	NA	1.6E-06	NA	1.6E-06		NA	NA	NA	NA	NA
		Exposure Point Total						1.6E-06						NA
	Exposure Medium Total							1.6E-06						NA
Air Total								1.6E-06						NA
Receptor Total								3.8E-01						3.0E+04

Total Risk Across All Media = 4E-01

Total Hazard Across All Media = 30,445

Total Liver HI Across All Media =	1
Total Eye HI Across All Media =	30,299
Total Adrenals HI Across All Media =	0.6
Total Nails HI Across All Media =	30,299
Total Blood HI Across All Media =	20
Total Whole Body HI Across All Media =	0.8
Total Skin HI Across All Media =	30,300
Total Kidney HI Across All Media =	1
Total CNS HI Across All Media =	0.7
Total Immune System HI Across All Media =	30,300

TABLE B-9.15
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Off-site Residents
Receptor:	Child (0-6 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**VOCs**											
			1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	Adrenals	7.0E-02	7.0E+00	NA	3.1E-02	7.1E+00
			1,4-Dichlorobenzene	3.2E-07	2.8E-06	NA	8.9E-08	3.3E-06	NA	5.2E-03	6.6E-03	NA	1.4E-03	1.3E-02
			Chlorobenzene	NA	NA	NA	NA	NA	Liver	1.6E-02	2.0E-01	NA	3.0E-03	2.2E-01
			cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	Blood	6.4E-02	7.8E-01	NA	NA	8.5E-01
			Pentachlorophenol	1.3E-05	1.1E-04	NA	3.3E-05	1.5E-04	Liver/Kidney	4.2E-02	3.4E-01	NA	1.1E-01	4.9E-01
			Trichloroethylene	7.5E-06	7.9E-05	NA	5.9E-07	8.7E-05	Liver/Kidney/Fetus	7.2E-01	2.0E-01	NA	5.7E-02	9.8E-01
			SVOCs											
			2,4,6-Trichlorophenol	9.0E-07	7.4E-06	NA	2.1E-07	8.5E-06	NA	9.6E+00	7.9E+01	NA	2.2E+00	9.1E+01
			Indeno(1,2,3-cd)pyrene	2.9E-06	9.7E-06	NA	1.9E-05	3.2E-05	NA	NA	NA	NA	NA	NA
			P/PCBs											
			PCBs, Total	2.7E-02	NA	NA	1.3E-01	1.6E-01	Eye/Skin/Nails/Immune System	7.8E+03	NA	NA	3.9E+04	4.6E+04
			gamma-BHC	3.9E-06	3.6E-05	NA	2.8E-07	4.0E-05	Liver/Kidney	1.2E-01	1.1E+00	NA	8.5E-03	1.2E+00
			Methyl parathion	NA	NA	NA	NA	NA	Blood	1.9E+01	NA	NA	NA	1.9E+01
			Parathion	NA	NA	NA	NA	NA	NA	1.0E+02	NA	NA	8.6E+00	1.1E+02
			Dioxin											
			Dioxin TEQ	3.0E-06	NA	NA	NA	3.0E-06	NA	NA	NA	NA	NA	NA
			Inorganics											
			Antimony	NA	NA	NA	NA	NA	Whole Body/Blood	8.2E-01	NA	NA	3.6E-02	8.5E-01
			Arsenic	5.0E-05	NA	NA	3.3E-07	5.0E-05	Skin	1.3E+00	NA	NA	8.6E-03	1.3E+00
			Manganese	NA	NA	NA	NA	NA	CNS	5.9E-01	NA	NA	9.8E-02	6.9E-01
			Mercury	NA	NA	NA	NA	NA	Immune System	3.8E-01	1.1E+01	NA	2.6E-03	1.1E+01
			Chemical Total	2.7E-02	2.4E-04	NA	1.3E-01	1.6E-01		7.9E+03	1.0E+02	NA	3.9E+04	4.7E+04
		Exposure Point Total						1.6E-01						4.7E+04
	Exposure Medium Total							1.6E-01						4.7E+04
Groundwater Total								1.6E-01						4.7E+04
Air	Ambient Air	Ambient Air	**P/PCBs**											
			PCBs, Total	NA	NA	1.0E-06	NA	1.0E-06	NA	NA	NA	NA	NA	NA
			Chemical Total	NA	NA	1.0E-06	NA	1.0E-06		NA	NA	NA	NA	NA
		Exposure Point Total						1.0E-06						NA
	Exposure Medium Total							1.0E-06						NA
Air Total								1.0E-06						NA
Receptor Total								1.6E-01						4.7E+04

Total Risk Across All Media = 2E-01

Total Hazard Across All Media = 46,553

Total Liver HI Across All Media =	3
Total Eye HI Across All Media =	46,309
Total Adrenals HI Across All Media =	7
Total Nails HI Across All Media =	46,309
Total Blood HI Across All Media =	21
Total Whole Body HI Across All Media =	0.9
Total Skin HI Across All Media =	46,311
Total Kidney HI Across All Media =	3
Total CNS HI Across All Media =	0.7
Total Immune System HI Across All Media =	46,321

TABLE B-9.16
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Operations Area Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**VOCs**											
			1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	Adrenals	1.1E-02	NA	NA	NA	1.1E-02
			1,4-Dichlorobenzene	2.0E-07	NA	NA	NA	2.0E-07	NA	8.0E-04	NA	NA	NA	8.0E-04
			Chlorobenzene	NA	NA	NA	NA	NA	Liver	2.5E-03	NA	NA	NA	2.5E-03
			cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	Blood	9.8E-03	NA	NA	NA	9.8E-03
			Pentachlorophenol	8.3E-06	NA	NA	NA	8.3E-06	Liver/Kidney	6.4E-03	NA	NA	NA	6.4E-03
			Trichloroethylene	4.8E-06	NA	NA	NA	4.8E-06	Liver/Kidney/Fetus	1.1E-01	NA	NA	NA	1.1E-01
			SVOCs											
			2,4,6-Trichlorophenol	5.8E-07	NA	NA	NA	5.8E-07	NA	1.5E+00	NA	NA	NA	1.5E+00
			Indeno(1,2,3-cd)pyrene	1.9E-06	NA	NA	NA	1.9E-06	NA	NA	NA	NA	NA	NA
			P/PCBs											
			PCBs, Total	1.7E-02	NA	NA	NA	1.7E-02	Eye/Skin/Nails/Immune System	1.2E+03	NA	NA	NA	1.2E+03
			gamma-BHC	2.5E-06	NA	NA	NA	2.5E-06	Liver/Kidney	1.8E-02	NA	NA	NA	1.8E-02
			Methyl parathion	NA	NA	NA	NA	NA	Blood	2.9E+00	NA	NA	NA	2.9E+00
			Parathion	NA	NA	NA	NA	NA	NA	1.5E+01	NA	NA	NA	1.5E+01
			Dioxin											
			Dioxin TEQ	1.9E-06	NA	NA	NA	1.9E-06	NA	NA	NA	NA	NA	NA
			Inorganics											
			Antimony	NA	NA	NA	NA	NA	Whole Body/Blood	1.2E-01	NA	NA	NA	1.2E-01
			Arsenic	3.2E-05	NA	NA	NA	3.2E-05	Skin	2.0E-01	NA	NA	NA	2.0E-01
			Manganese	NA	NA	NA	NA	NA	CNS	9.1E-02	NA	NA	NA	9.1E-02
			Mercury	NA	NA	NA	NA	NA	Immune System	5.8E-02	NA	NA	NA	5.8E-02
			Chemical Total	1.7E-02	NA	NA	NA	1.7E-02		1.2E+03	NA	NA	NA	1.2E+03
		Exposure Point Total						1.7E-02						1.2E+03
	Exposure Medium Total							1.7E-02						1.2E+03
Groundwater Total								1.7E-02						1.2E+03
Receptor Total								1.7E-02						1.2E+03

Total Risk Across All Media =	2E-02
Total Hazard Across All Media =	1,212

Total Liver HI Across All Media =	0.1
Total Eye HI Across All Media =	1,191
Total Adrenals HI Across All Media =	0.01
Total Nails HI Across All Media =	1,191
Total Blood HI Across All Media =	3
Total Whole Body HI Across All Media =	0.1
Total Skin HI Across All Media =	1,191
Total Kidney HI Across All Media =	0.1
Total CNS HI Across All Media =	0.09
Total Immune System HI Across All Media =	1,191

TABLE B-9.17
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**VOCs**											
			1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	Adrenals	1.0E-03	NA	NA	NA	1.0E-03
			1,4-Dichlorobenzene	2.0E-08	NA	NA	NA	2.0E-08	NA	7.6E-05	NA	NA	NA	7.6E-05
			Chlorobenzene	NA	NA	NA	NA	NA	Liver	2.4E-04	NA	NA	NA	2.4E-04
			cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	Blood	9.4E-04	NA	NA	NA	9.4E-04
			Pentachlorophenol	7.9E-07	NA	NA	NA	7.9E-07	Liver/Kidney	6.2E-04	NA	NA	NA	6.2E-04
			Trichloroethylene	4.6E-07	NA	NA	NA	4.6E-07	Liver/Kidney/Fetus	1.1E-02	NA	NA	NA	1.1E-02
			SVOCs											
			2,4,6-Trichlorophenol	5.5E-08	NA	NA	NA	5.5E-08	NA	1.4E-01	NA	NA	NA	1.4E-01
			Indeno(1,2,3-cd)pyrene	1.8E-07	NA	NA	NA	1.8E-07	NA	NA	NA	NA	NA	NA
			P/PCBs											
			PCBs, Total	1.6E-03	NA	NA	NA	1.6E-03	Eye/Skin/Nails/Immune System	1.1E+02	NA	NA	NA	1.1E+02
			gamma-BHC	2.4E-07	NA	NA	NA	2.4E-07	Liver/Kidney	1.7E-03	NA	NA	NA	1.7E-03
			Methyl parathion	NA	NA	NA	NA	NA	Blood	2.8E-01	NA	NA	NA	2.8E-01
			Parathion	NA	NA	NA	NA	NA	NA	1.5E+00	NA	NA	NA	1.5E+00
			Dioxin											
			Dioxin TEQ	1.8E-07	NA	NA	NA	1.8E-07	NA	NA	NA	NA	NA	NA
			Inorganics											
			Antimony	NA	NA	NA	NA	NA	Whole Body/Blood	1.2E-02	NA	NA	NA	1.2E-02
			Arsenic	3.1E-06	NA	NA	NA	3.1E-06	Skin	1.9E-02	NA	NA	NA	1.9E-02
			Manganese	NA	NA	NA	NA	NA	CNS	8.7E-03	NA	NA	NA	8.7E-03
			Mercury	NA	NA	NA	NA	NA	Immune System	5.6E-03	NA	NA	NA	5.6E-03
			Chemical Total	1.6E-03	NA	NA	NA	1.6E-03		1.2E+02	NA	NA	NA	1.2E+02
		Exposure Point Total						1.6E-03						1.2E+02
	Exposure Medium Total							1.6E-03						1.2E+02
Groundwater Total								1.6E-03						1.2E+02
Receptor Total								1.6E-03						1.2E+02

Total Risk Across All Media = 2E-03

Total Hazard Across All Media = 116

Total Liver HI Across All Media =	0.01
Total Eye HI Across All Media =	114
Total Adrenals HI Across All Media =	0.001
Total Nails HI Across All Media =	114
Total Blood HI Across All Media =	0.3
Total Whole Body HI Across All Media =	0.01
Total Skin HI Across All Media =	114
Total Kidney HI Across All Media =	0.01
Total CNS HI Across All Media =	0.01
Total Immune System HI Across All Media =	114

TABLE B-10.1
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Operations Area Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**SVOCs**									
			Benzo(a)pyrene	2.4E-06	NA	2.9E-06	5.3E-06	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	7.9E-07	NA	9.4E-07	1.7E-06	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	3.9E-05	NA	7.2E-05	1.1E-04	Eye/Skin/Nails/Immune System	2.7E+00	NA	5.0E+00	7.8E+00
			Dioxin									
			Dioxin TEQ	2.0E-05	NA	5.4E-06	2.5E-05	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	3.1E-05	NA	2.8E-05	5.9E-05	Skin	1.9E-01	NA	1.7E-01	3.7E-01
			Chemical Total	9.4E-05	NA	1.1E-04	2.0E-04		3.0E+00	NA	5.2E+00	8.2E+00
		Exposure Point Total					2.0E-04					8.2E+00
	Exposure Medium Total						2.0E-04					8.2E+00
Surface Soil Total							2.0E-04					8.2E+00
Air	Ambient Air	Ambient Air Facility Area	**P/PCBs**									
			PCBs, Total	NA	1.1E-06	NA	1.1E-06	NA	NA	NA	NA	NA
			Chemical Total	NA	1.1E-06	NA	1.1E-06		NA	NA	NA	NA
		Exposure Point Total					1.1E-06					NA
	Exposure Medium Total						1.1E-06					NA
Air Total							1.1E-06					NA
Receptor Total							2.0E-04					8.2E+00

Total Risk Across All Media = 2E-04

Total Hazard Across All Media = 8

Total Liver HI Across All Media =	0.03
Total Eye HI Across All Media =	8
Total GI Tract HI Across All Media =	0.03
Total Nails HI Across All Media =	8
Total Blood HI Across All Media =	0.01
Total Whole Body HI Across All Media =	0.01
Total Skin HI Across All Media =	8
Total Kidney HI Across All Media =	0.003
Total CNS HI Across All Media =	0.01
Total Immune System HI Across All Media =	8
Total Metabolic HI Across All Media =	0.02

TABLE B-10.2
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Operations Area Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**SVOCs**									
			Benzo(a)pyrene	4.8E-06	NA	4.2E-06	9.0E-06	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	5.4E-07	NA	4.6E-07	1.0E-06	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	1.6E-06	NA	1.4E-06	2.9E-06	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	4.2E-03	NA	1.7E-03	5.9E-03	Eye/Skin/Nails/Immune System	3.0E+02	NA	1.2E+02	4.1E+02
			Heptachlor epoxide	1.2E-06	NA	NA	1.2E-06	Liver	2.9E-02	NA	NA	2.9E-02
			Dioxin									
			Dioxin TEQ	4.0E-05	NA	7.8E-06	4.7E-05	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	2.0E-04	NA	4.0E-05	2.4E-04	Skin	1.3E+00	NA	2.5E-01	1.5E+00
			Chemical Total	4.5E-03	NA	1.7E-03	6.2E-03		3.0E+02	NA	1.2E+02	4.2E+02
		Exposure Point Total					6.2E-03					4.2E+02
	Exposure Medium Total						6.2E-03					4.2E+02
Surface Soil Total							6.2E-03					4.2E+02
Air	Ambient Air	Ambient Air Facility Area	**P/PCBs**									
			PCBs, Total	NA	1.1E-06	NA	1.1E-06	NA	NA	NA	NA	NA
			Chemical Total	NA	1.1E-06	NA	1.1E-06		NA	NA	NA	NA
		Exposure Point Total					1.1E-06					NA
	Exposure Medium Total						1.1E-06					NA
Air Total							1.1E-06					NA
Receptor Total							6.2E-03					4.2E+02

Total Risk Across All Media = 6E-03

Total Hazard Across All Media = 416

Total Liver HI Across All Media =	0.06
Total Eye HI Across All Media =	414
Total GI Tract HI Across All Media =	0.06
Total Nails HI Across All Media =	414
Total Blood HI Across All Media =	0.02
Total Whole Body HI Across All Media =	0.02
Total Skin HI Across All Media =	415
Total Kidney HI Across All Media =	0.006
Total CNS HI Across All Media =	0.02
Total Immune System HI Across All Media =	414
Total Metabolic HI Across All Media =	0.04

TABLE B-10.3
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		Facility Area	Benzo(a)pyrene	4.7E-07	NA	1.8E-06	2.3E-06	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	2.5E-05	NA	4.5E-05	7.0E-05	Eye/Skin/Nails/Immune System	1.8E+00	NA	3.1E+00	4.9E+00
			Dioxin									
			Dioxin TEQ	3.8E-06	NA	3.4E-06	7.2E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	2.0E-05	NA	1.7E-05	3.7E-05	Skin	1.2E-01	NA	1.1E-01	2.3E-01
			Chemical Total	4.9E-05	NA	6.8E-05	1.2E-04		1.9E+00	NA	3.2E+00	5.1E+00
		Exposure Point Total					1.2E-04					5.1E+00
	Exposure Medium Total						1.2E-04					5.1E+00
Surface Soil Total							1.2E-04					5.1E+00
Receptor Total							1.2E-04					5.1E+00

Total Risk Across All Media = 1E-04

Total Hazard Across All Media = 5

Total Liver HI Across All Media =	0.006
Total Eye HI Across All Media =	5
Total GI Tract HI Across All Media =	0.006
Total Nails HI Across All Media =	5
Total Blood HI Across All Media =	0.002
Total Whole Body HI Across All Media =	0.002
Total Skin HI Across All Media =	5
Total Kidney HI Across All Media =	0.001
Total CNS HI Across All Media =	0.002
Total Immune System HI Across All Media =	5
Total Metabolic HI Across All Media =	0.004

TABLE B-10.4
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		Facility Area	Benzo(a)pyrene	4.7E-07	NA	1.8E-06	2.3E-06	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	4.1E-04	NA	7.2E-04	1.1E-03	Eye/Skin/Nails/Immune System	2.8E+01	NA	5.1E+01	7.9E+01
			Dioxin									
			Dioxin TEQ	3.8E-06	NA	3.4E-06	7.2E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	2.0E-05	NA	1.7E-05	3.7E-05	Skin	1.2E-01	NA	1.1E-01	2.3E-01
			Chemical Total	4.3E-04	NA	7.5E-04	1.2E-03		2.9E+01	NA	5.1E+01	7.9E+01
		Exposure Point Total					1.2E-03					7.9E+01
	Exposure Medium Total						1.2E-03					7.9E+01
Surface Soil Total							1.2E-03					7.9E+01
Receptor Total							1.2E-03					7.9E+01

Total Risk Across All Media = 1E-03

Total Hazard Across All Media = 79

Total Liver HI Across All Media =	0.006
Total Eye HI Across All Media =	79
Total GI Tract HI Across All Media =	0.006
Total Nails HI Across All Media =	79
Total Blood HI Across All Media =	0.002
Total Whole Body HI Across All Media =	0.002
Total Skin HI Across All Media =	79
Total Kidney HI Across All Media =	0.001
Total CNS HI Across All Media =	0.002
Total Immune System HI Across All Media =	79
Total Metabolic HI Across All Media =	0.004

TABLE B-10.5
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**SVOCs**									
			Benzo(a)pyrene	6.0E-07	NA	4.4E-07	1.0E-06	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	3.3E-05	NA	1.1E-05	4.3E-05	Eye/Skin/Nails/Immune System	5.7E+00	NA	1.9E+00	7.6E+00
			Dioxin									
			Dioxin TEQ	4.9E-06	NA	8.3E-07	5.8E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	2.5E-05	NA	4.3E-06	3.0E-05	Skin	4.0E-01	NA	6.6E-02	4.6E-01
			Chemical Total	6.4E-05	NA	1.7E-05	8.1E-05		6.1E+00	NA	2.0E+00	8.1E+00
		Exposure Point Total					8.1E-05					8.1E+00
	Exposure Medium Total						8.1E-05					8.1E+00
Surface Soil Total							8.1E-05					8.1E+00
Receptor Total							8.1E-05					8.1E+00

Total Risk Across All Media = 8E-05

Total Hazard Across All Media = 8

Total Liver HI Across All Media =	0.02
Total Eye HI Across All Media =	8
Total GI Tract HI Across All Media =	0.02
Total Nails HI Across All Media =	8
Total Blood HI Across All Media =	0.007
Total Whole Body HI Across All Media =	0.007
Total Skin HI Across All Media =	8
Total Kidney HI Across All Media =	0.002
Total CNS HI Across All Media =	0.008
Total Immune System HI Across All Media =	8
Total Metabolic HI Across All Media =	0.01

TABLE B-10.6
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**SVOCs**									
			Benzo(a)pyrene	6.0E-07	NA	4.4E-07	1.0E-06	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	5.3E-04	NA	1.8E-04	7.0E-04	Eye/Skin/Nails/Immune System	9.2E+01	NA	3.1E+01	1.2E+02
			Dioxin									
			Dioxin TEQ	4.9E-06	NA	8.3E-07	5.8E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	2.5E-05	NA	4.3E-06	3.0E-05	Skin	4.0E-01	NA	6.6E-02	4.6E-01
			Chemical Total	5.6E-04	NA	1.8E-04	7.4E-04		9.3E+01	NA	3.1E+01	1.2E+02
		Exposure Point Total					7.4E-04					1.2E+02
	Exposure Medium Total						7.4E-04					1.2E+02
Surface Soil Total							7.4E-04					1.2E+02
Receptor Total							7.4E-04					1.2E+02

Total Risk Across All Media = 7E-04

Total Hazard Across All Media = 124

Total Liver HI Across All Media =	0.02
Total Eye HI Across All Media =	123
Total GI Tract HI Across All Media =	0.02
Total Nails HI Across All Media =	123
Total Blood HI Across All Media =	0.007
Total Whole Body HI Across All Media =	0.007
Total Skin HI Across All Media =	124
Total Kidney HI Across All Media =	0.002
Total CNS HI Across All Media =	0.008
Total Immune System HI Across All Media =	123
Total Metabolic HI Across All Media =	0.01

TABLE B-10.7
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface/ Subsurface Soil	Surface Soil Subsurface Soil	Surface Soil Subsurface Soil Facility Area	**P/PCBs**									
			PCBs, Total	1.2E-04	NA	2.2E-05	1.4E-04	Eye/Skin/Nails/Immune System	2.1E+02	NA	3.8E+01	2.5E+02
			Dioxin									
			Dioxin TEQ	2.1E-06	NA	1.9E-07	2.3E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	4.1E-06	NA	3.7E-07	4.5E-06	Skin	6.4E-01	NA	5.7E-02	6.9E-01
			Chemical Total	1.3E-04	NA	2.2E-05	1.5E-04		2.1E+02	NA	3.8E+01	2.5E+02
		Exposure Point Total					1.5E-04					2.5E+02
	Exposure Medium Total						1.5E-04					2.5E+02
Surface/Subsurface Soil Total							1.5E-04					2.5E+02
Air	Ambient Air	Ambient Air Facility Area	**P/PCBs**									
			PCBs, Total	NA	2.8E-08	NA	2.8E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	2.8E-08	NA	2.8E-08		NA	NA	NA	NA
		Exposure Point Total					2.8E-08					NA
	Exposure Medium Total						2.8E-08					NA
Air Total							2.8E-08					NA
Receptor Total							1.5E-04					2.5E+02

Total Risk Across All Media =	1E-04
Total Hazard Across All Media =	250

Total Liver HI Across All Media =	0.09
Total Eye HI Across All Media =	249
Total GI Tract HI Across All Media =	0.09
Total Nails HI Across All Media =	249
Total Blood HI Across All Media =	0.03
Total Whole Body HI Across All Media =	0.03
Total Skin HI Across All Media =	250
Total Kidney HI Across All Media =	0.002
Total CNS HI Across All Media =	0.05
Total Immune System HI Across All Media =	249
Total Body and Organ Weight HI Across All Media =	0.06
Total Metabolic HI Across All Media =	0.06

TABLE B-10.8
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil South Landfill	**P/PCBs**									
			PCBs, Total	9.2E-07	NA	1.6E-06	2.5E-06	Eye/Skin/Nails/Immune System	6.4E-02	NA	1.1E-01	1.8E-01
			Chemical Total	9.2E-07	NA	1.6E-06	2.5E-06		6.4E-02	NA	1.1E-01	1.8E-01
		Exposure Point Total					2.5E-06					1.8E-01
	Exposure Medium Total						2.5E-06					1.8E-01
Surface Soil Total							2.5E-06					1.8E-01
Receptor Total							2.6E-06					1.8E-01

Total Risk Across All Media = 3E-06

Total Hazard Across All Media = 0.2

Total Eye HI Across All Media = 0.2
Total Nails HI Across All Media = 0.2
Total Skin HI Across All Media = 0.2
Total Immune System HI Across All Media = 0.2

TABLE B-10.9
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil South Landfill	**P/PCBs**									
			PCBs, Total	1.2E-06	NA	4.0E-07	1.6E-06	Eye/Skin/Nails/Immune System	2.1E-01	NA	7.0E-02	2.8E-01
			Chemical Total	1.2E-06	NA	4.0E-07	1.6E-06		2.1E-01	NA	7.0E-02	2.8E-01
		Exposure Point Total					1.6E-06					2.8E-01
	Exposure Medium Total						1.6E-06					2.8E-01
Surface Soil Total							1.6E-06					2.8E-01
Receptor Total							1.6E-06					2.8E-01

Total Risk Across All Media = 2E-06

Total Hazard Across All Media = 0.3

Total Eye HI Across All Media = 0.3
Total Nails HI Across All Media = 0.3
Total Skin HI Across All Media = 0.3
Total Immune System HI Across All Media = 0.3

TABLE B-10.10
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil West End Landfill	Surface Soil	Surface Soil	Chemical Total	NA	NA	NA	NA		NA	NA	NA	NA
		Exposure Point Total					NA					NA
	Exposure Medium Total						NA					NA
Surface Soil Total							NA					NA
Receptor Total							1.4E-08					NA

Total Risk Across All Media = 1E-08

Total Hazard Across All Media = NA

TABLE B-10.11
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil West End Landfill	Surface Soil	Surface Soil	Chemical Total	NA	NA	NA	NA		NA	NA	NA	NA
		Exposure Point Total					NA					NA
	Exposure Medium Total						NA					NA
Surface Soil Total							NA					NA
Receptor Total							6.6E-09					NA

Total Risk Across All Media = 7E-09

Total Hazard Across All Media = NA

TABLE B-10.12
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Off-site Residents
Receptor:	Child to Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Air	Ambient Air	Ambient Air	**P/PCBs**											
			PCBs, Total	NA	NA	1.6E-06	NA	1.6E-06	NA	NA	NA	NA	NA	NA
			Chemical Total	NA	NA	1.6E-06	NA	1.6E-06		NA	NA	NA	NA	NA
		Exposure Point Total						1.6E-06						NA
	Exposure Medium Total							1.6E-06						NA
Air Total								1.6E-06						NA
Receptor Total								1.6E-06						NA

Total Risk Across All Media = 2E-06

Total Hazard Across All Media = NA

TABLE B-10.13
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Off-site Residents
Receptor:	Child (0-6 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Air	Ambient Air	Ambient Air	**P/PCBs**											
			PCBs, Total	NA	NA	1.0E-06	NA	1.0E-06	NA	NA	NA	NA	NA	NA
			Chemical Total	NA	NA	1.0E-06	NA	1.0E-06		NA	NA	NA	NA	NA
		Exposure Point Total						1.0E-06						NA
	Exposure Medium Total							1.0E-06						NA
Air Total								1.0E-06						NA
Receptor Total								1.0E-06						NA

Total Risk Across All Media = 1E-06

Total Hazard Across All Media = NA

TABLE B-10.14
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Off-site Residents
Receptor:	Child to Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**VOCs**											
			1,4-Dichlorobenzene	8.7E-07	7.9E-07	NA	2.1E-07	1.9E-06	NA	5.2E-03	4.6E-04	NA	8.4E-04	6.5E-03
			Pentachlorophenol	3.5E-05	2.9E-05	NA	7.8E-05	1.4E-04	Liver/Kidney	4.2E-02	2.4E-02	NA	6.3E-02	1.3E-01
			Trichloroethylene	2.0E-05	2.2E-05	NA	1.4E-06	4.4E-05	Liver/Kidney/Fetus	7.2E-01	1.4E-02	NA	3.4E-02	7.7E-01
			SVOCs											
			2,4,6-Trichlorophenol	2.5E-06	2.1E-06	NA	4.9E-07	5.0E-06	NA	9.6E+00	5.5E+00	NA	1.3E+00	1.6E+01
			Indeno(1,2,3-cd)pyrene	8.0E-06	2.7E-06	NA	4.5E-05	5.6E-05	NA	NA	NA	NA	NA	NA
			P/PCBs											
			PCBs, Total	7.3E-02	NA	NA	3.1E-01	3.8E-01	Eye/Skin/Nails/Immune System	7.8E+03	NA	NA	2.3E+04	3.0E+04
			Methyl parathion	NA	NA	NA	NA	NA	Blood	1.9E+01	NA	NA	NA	1.9E+01
			Parathion	NA	NA	NA	NA	NA	NA	1.0E+02	NA	NA	5.0E+00	1.0E+02
			Dioxin											
			Dioxin TEQ	8.1E-06	NA	NA	NA	8.1E-06	NA	NA	NA	NA	NA	NA
			Inorganics											
			Arsenic	1.4E-04	NA	NA	7.7E-07	1.4E-04	Skin	1.3E+00	NA	NA	5.0E-03	1.3E+00
			Chemical Total	7.3E-02	6.7E-05	NA	3.1E-01	3.8E-01		7.9E+03	7.0E+00	NA	2.3E+04	3.0E+04
		Exposure Point Total						3.8E-01						3.0E+04
	Exposure Medium Total							3.8E-01						3.0E+04
Groundwater Total								3.8E-01						3.0E+04
Air	Ambient Air	Ambient Air	**P/PCBs**											
			PCBs, Total	NA	NA	1.6E-06	NA	1.6E-06	NA	NA	NA	NA	NA	NA
			Chemical Total	NA	NA	1.6E-06	NA	1.6E-06		NA	NA	NA	NA	NA
		Exposure Point Total						1.6E-06						NA
	Exposure Medium Total							1.6E-06						NA
Air Total								1.6E-06						NA
Receptor Total								3.8E-01						3.0E+04

Total Risk Across All Media = 4E-01

Total Hazard Across All Media = 30,445

Total Liver HI Across All Media = 1
Total Eye HI Across All Media = 30,299
Total Adrenals HI Across All Media = 0.6
Total Nails HI Across All Media = 30,299
Total Blood HI Across All Media = 20
Total Whole Body HI Across All Media = 0.8
Total Skin HI Across All Media = 30,300
Total Kidney HI Across All Media = 1
Total CNS HI Across All Media = 0.7
Total Immune System HI Across All Media = 30,300

TABLE B-10.15
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Off-site Residents
Receptor:	Child (0-6 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**VOCs**											
			1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	Adrenals	7.0E-02	7.0E+00	NA	3.1E-02	7.1E+00
			1,4-Dichlorobenzene	3.2E-07	2.8E-06	NA	8.9E-08	3.3E-06	NA	5.2E-03	6.6E-03	NA	1.4E-03	1.3E-02
			Pentachlorophenol	1.3E-05	1.1E-04	NA	3.3E-05	1.5E-04	Liver/Kidney	4.2E-02	3.4E-01	NA	1.1E-01	4.9E-01
			Trichloroethylene	7.5E-06	7.9E-05	NA	5.9E-07	8.7E-05	Liver/Kidney/Fetus	7.2E-01	2.0E-01	NA	5.7E-02	9.8E-01
			SVOCs											
			2,4,6-Trichlorophenol	9.0E-07	7.4E-06	NA	2.1E-07	8.5E-06	NA	9.6E+00	7.9E+01	NA	2.2E+00	9.1E+01
			Indeno(1,2,3-cd)pyrene	2.9E-06	9.7E-06	NA	1.9E-05	3.2E-05	NA	NA	NA	NA	NA	NA
			P/PCBs											
			PCBs, Total	2.7E-02	NA	NA	1.3E-01	1.6E-01	Eye/Skin/Nails/Immune System	7.8E+03	NA	NA	3.9E+04	4.6E+04
			gamma-BHC	3.9E-06	3.6E-05	NA	2.8E-07	4.0E-05	Liver/Kidney	1.2E-01	1.1E+00	NA	8.5E-03	1.2E+00
			Methyl parathion	NA	NA	NA	NA	NA	Blood	1.9E+01	NA	NA	NA	1.9E+01
			Parathion	NA	NA	NA	NA	NA	NA	1.0E+02	NA	NA	8.6E+00	1.1E+02
			Dioxin											
			Dioxin TEQ	3.0E-06	NA	NA	NA	3.0E-06	NA	NA	NA	NA	NA	NA
			Inorganics											
			Arsenic	5.0E-05	NA	NA	3.3E-07	5.0E-05	Skin	1.3E+00	NA	NA	8.6E-03	1.3E+00
			Mercury	NA	NA	NA	NA	NA	Immune System	3.8E-01	1.1E+01	NA	2.6E-03	1.1E+01
			Chemical Total	2.7E-02	2.4E-04	NA	1.3E-01	1.6E-01		7.9E+03	1.0E+02	NA	3.9E+04	4.7E+04
		Exposure Point Total						1.6E-01						4.7E+04
	Exposure Medium Total							1.6E-01						4.7E+04
Groundwater Total								1.6E-01						4.7E+04
Air	Ambient Air	Ambient Air	**P/PCBs**											
			PCBs, Total	NA	NA	1.0E-06	NA	1.0E-06	NA	NA	NA	NA	NA	NA
			Chemical Total	NA	NA	1.0E-06	NA	1.0E-06		NA	NA	NA	NA	NA
		Exposure Point Total						1.0E-06						NA
	Exposure Medium Total							1.0E-06						NA
Air Total								1.0E-06						NA
Receptor Total								1.6E-01						4.7E+04

Total Risk Across All Media =	2E-01

Total Hazard Across All Media =	46,553
Total Liver HI Across All Media =	3
Total Eye HI Across All Media =	46,309
Total Adrenals HI Across All Media =	7
Total Nails HI Across All Media =	46,309
Total Blood HI Across All Media =	21
Total Whole Body HI Across All Media =	0.9
Total Skin HI Across All Media =	46,311
Total Kidney HI Across All Media =	3
Total CNS HI Across All Media =	0.7
Total Immune System HI Across All Media =	46,321

TABLE B-10.16
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Operations Area Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**VOCs**											
			Pentachlorophenol	8.3E-06	NA	NA	NA	8.3E-06	Liver/Kidney	6.4E-03	NA	NA	NA	6.4E-03
			Trichloroethylene	4.8E-06	NA	NA	NA	4.8E-06	Liver/Kidney/Fetus	1.1E-01	NA	NA	NA	1.1E-01
			SVOCs											
			2,4,6-Trichlorophenol	5.8E-07	NA	NA	NA	5.8E-07	NA	1.5E+00	NA	NA	NA	1.5E+00
			Indeno(1,2,3-cd)pyrene	1.9E-06	NA	NA	NA	1.9E-06	NA	NA	NA	NA	NA	NA
			P/PCBs											
			PCBs, Total	1.7E-02	NA	NA	NA	1.7E-02	Eye/Skin/Nails/Immune System	1.2E+03	NA	NA	NA	1.2E+03
			Methyl parathion	NA	NA	NA	NA	NA	Blood	2.9E+00	NA	NA	NA	2.9E+00
			Parathion	NA	NA	NA	NA	NA	NA	1.5E+01	NA	NA	NA	1.5E+01
			Dioxin											
			Dioxin TEQ	1.9E-06	NA	NA	NA	1.9E-06	NA	NA	NA	NA	NA	NA
			Inorganics											
			Arsenic	3.2E-05	NA	NA	NA	3.2E-05	Skin	2.0E-01	NA	NA	NA	2.0E-01
			Chemical Total	1.7E-02	NA	NA	NA	1.7E-02		1.2E+03	NA	NA	NA	1.2E+03
		Exposure Point Total						1.7E-02						1.2E+03
	Exposure Medium Total							1.7E-02						1.2E+03
Groundwater Total								1.7E-02						1.2E+03
Receptor Total								1.7E-02						1.2E+03

Total Risk Across All Media = 2E-02

Total Hazard Across All Media = 1,212

Total Liver HI Across All Media =	0.1
Total Eye HI Across All Media =	1,191
Total Adrenals HI Across All Media =	0.01
Total Nails HI Across All Media =	1,191
Total Blood HI Across All Media =	3
Total Whole Body HI Across All Media =	0.1
Total Skin HI Across All Media =	1,191
Total Kidney HI Across All Media =	0.1
Total CNS HI Across All Media =	0.09
Total Immune System HI Across All Media =	1,191

TABLE B-10.17
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**VOCs**											
			Pentachlorophenol	7.9E-07	NA	NA	NA	7.9E-07	Liver/Kidney	6.2E-04	NA	NA	NA	6.2E-04
			Trichloroethylene	4.6E-07	NA	NA	NA	4.6E-07	Liver/Kidney/Fetus	1.1E-02	NA	NA	NA	1.1E-02
			SVOCs											
			2,4,6-Trichlorophenol	5.5E-08	NA	NA	NA	5.5E-08	NA	1.4E-01	NA	NA	NA	1.4E-01
			Indeno(1,2,3-cd)pyrene	1.8E-07	NA	NA	NA	1.8E-07	NA	NA	NA	NA	NA	NA
			P/PCBs											
			PCBs, Total	1.6E-03	NA	NA	NA	1.6E-03	Eye/Skin/Nails/Immune System	1.1E+02	NA	NA	NA	1.1E+02
			Methyl parathion	NA	NA	NA	NA	NA	Blood	2.8E-01	NA	NA	NA	2.8E-01
			Parathion	NA	NA	NA	NA	NA	NA	1.5E+00	NA	NA	NA	1.5E+00
			Dioxin											
			Dioxin TEQ	1.8E-07	NA	NA	NA	1.8E-07	NA	NA	NA	NA	NA	NA
			Inorganics											
			Arsenic	3.1E-06	NA	NA	NA	3.1E-06	Skin	1.9E-02	NA	NA	NA	1.9E-02
			Chemical Total	1.6E-03	NA	NA	NA	1.6E-03		1.2E+02	NA	NA	NA	1.2E+02
		Exposure Point Total						1.6E-03						1.2E+02
	Exposure Medium Total							1.6E-03						1.2E+02
Groundwater Total								1.6E-03						1.2E+02
Receptor Total								1.6E-03						1.2E+02

Total Risk Across All Media = 2E-03

Total Hazard Across All Media = 116

Total Liver HI Across All Media =	0.01
Total Eye HI Across All Media =	114
Total Adrenals HI Across All Media =	0.001
Total Nails HI Across All Media =	114
Total Blood HI Across All Media =	0.3
Total Whole Body HI Across All Media =	0.01
Total Skin HI Across All Media =	114
Total Kidney HI Across All Media =	0.01
Total CNS HI Across All Media =	0.01
Total Immune System HI Across All Media =	114

Appendix C

ProUCL Output

List of ProUCL Output Included in Appendix C
Anniston PCB Site, Operable Unit 3

Surface Soil (Current Land-use Scenario)
- PCBs (Facility Area)

Surface Soil (Future Land-use Scenario)
- PCBs (Facility Area)

Subsurface Soil (Current and Future Land-use Scenario)
- PCBs (Facility Area)
- Arsenic (Facility Area)
- Barium (Facility Area)
- Cadmium (Facility Area)
- Chromium (Facility Area)
- Lead (Facility Area)
- Manganese (Facility Area)
- Mercury (Facility Area)
- Nickel (Facility Area)
- Vanadium (Facility Area)

Surface Soil (Current and Future Land-use Scenario)
- PCBs (South Landfill)

Groundwater
- Chlorobenzene
- PCBs
- Mercury

Ambient Air
- PCBs (South Landfill)
- PCBs (West End Landfill)
- PCBs (All Locations)

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	F:\All Works\Anniston\Final Report\Data\Input\ProUCL input files\SS_OA_current.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

PCBmax

General Statistics

Number of Valid Samples	30	Number of Detected Data	27
Number of Unique Samples	27	Number of Non-Detect Data	3
		Percent Non-Detects	10.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	23	Minimum Detected	3.135
Maximum Detected	930000	Maximum Detected	13.74
Mean of Detected	65540	Mean of Detected	9.131
SD of Detected	181515	SD of Detected	2.33
Minimum Non-Detect	38	Minimum Non-Detect	3.638
Maximum Non-Detect	44	Maximum Non-Detect	3.784

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	4
Number treated as Detected	26
Single DL Non-Detect Percentage	13.33%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.378	Shapiro Wilk Test Statistic	0.969
5% Shapiro Wilk Critical Value	0.923	5% Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	58988	Mean	8.518
SD	173029	SD	2.892
95% DL/2 (t) UCL	112664	95% H-Stat (DL/2) UCL	3482286
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	41059	Mean in Log Scale	8.666
SD	186045	SD in Log Scale	2.623
95% MLE (t) UCL	98774	Mean in Original Scale	58994
95% MLE (Tiku) UCL	95147	SD in Original Scale	173027
		95% Percentile Bootstrap UCL	116820
		95% BCA Bootstrap UCL	159248

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.331	Data appear Lognormal at 5% Significance Level	
Theta Star	198229		
nu star	17.85		
A-D Test Statistic	0.98	**Nonparametric Statistics**	

5% A-D Critical Value	0.843	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.843	Mean	58988
5% K-S Critical Value	0.182	SD	170121
Data not Gamma Distributed at 5% Significance Level		SE of Mean	31651
		95% KM (t) UCL	112768
Assuming Gamma Distribution		95% KM (z) UCL	111050
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	112651
Minimum	0	95% KM (bootstrap t) UCL	280091
Maximum	930000	95% KM (BCA) UCL	124303
Mean	58986	95% KM (Percentile Bootstrap) UCL	116432
Median	11500	95% KM (Chebyshev) UCL	196953
SD	173030	97.5% KM (Chebyshev) UCL	256650
k star	0.164	99% KM (Chebyshev) UCL	373914
Theta star	359396		
Nu star	9.847	**Potential UCLs to Use**	
AppChi2	3.847	99% KM (Chebyshev) UCL	373914
95% Gamma Approximate UCL	151004		
95% Adjusted Gamma UCL	159918		

Note: DL/2 is not a recommended method.

PCBavg

General Statistics

Number of Valid Samples	30	Number of Detected Data	27
Number of Unique Samples	27	Number of Non-Detect Data	3
		Percent Non-Detects	10.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	23	Minimum Detected	3.135
Maximum Detected	542000	Maximum Detected	13.2
Mean of Detected	51169	Mean of Detected	9.111
SD of Detected	112795	SD of Detected	2.291
Minimum Non-Detect	38	Minimum Non-Detect	3.638
Maximum Non-Detect	44	Maximum Non-Detect	3.784

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	4
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	26
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	13.33%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.483	Shapiro Wilk Test Statistic	0.963
5% Shapiro Wilk Critical Value	0.923	5% Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	46054	Mean	8.5
SD	107936	SD	2.86
95% DL/2 (t) UCL	79538	95% H-Stat (DL/2) UCL	2939060
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	

Mean	35223	Mean in Log Scale	8.655
SD	116487	SD in Log Scale	2.578
95% MLE (t) UCL	71359	Mean in Original Scale	46062
95% MLE (Tiku) UCL	69240	SD in Original Scale	107932
		95% Percentile Bootstrap UCL	81240
		95% BCA Bootstrap UCL	97821

Gamma Distribution Test with Detected Values Only

Data Distribution Test with Detected Values Only

Data Follow Appr. Gamma Distribution at 5% Significance Level

k star (bias corrected)	0.365
Theta Star	140227
nu star	19.7
A-D Test Statistic	0.632
5% A-D Critical Value	0.834
K-S Test Statistic	0.834
5% K-S Critical Value	0.181

Data follow Appr. Gamma Distribution at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	0
Maximum	542000
Mean	46052
Median	11500
SD	107936
k star	0.17
Theta star	270486
Nu star	10.22
AppChi2	4.077
95% Gamma Approximate UCL	115394
95% Adjusted Gamma UCL	122037

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	46055
SD	106121
SE of Mean	19744
95% KM (t) UCL	79602
95% KM (z) UCL	78531
95% KM (jackknife) UCL	79525
95% KM (bootstrap t) UCL	142445
95% KM (BCA) UCL	87207
95% KM (Percentile Bootstrap) UCL	81925
95% KM (Chebyshev) UCL	132117
97.5% KM (Chebyshev) UCL	169356
99% KM (Chebyshev) UCL	242506

Potential UCLs to Use

95% KM (Chebyshev) UCL	132117

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	F:\All Works\Anniston\Final Report\Data\Input\ProUCL input files\SS_OA_future.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

PCB

General Statistics

Number of Valid Samples	31	Number of Detected Data	28
Number of Unique Samples	28	Number of Non-Detect Data	3
		Percent Non-Detects	9.68%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	23	Minimum Detected	3.135
Maximum Detected	17000000	Maximum Detected	16.65
Mean of Detected	670342	Mean of Detected	9.4
SD of Detected	3205265	SD of Detected	2.692
Minimum Non-Detect	38	Minimum Non-Detect	3.638
Maximum Non-Detect	44	Maximum Non-Detect	3.784

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	4
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	27
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	12.90%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.218	Shapiro Wilk Test Statistic	0.971
5% Shapiro Wilk Critical Value	0.924	5% Shapiro Wilk Critical Value	0.924
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	605472	Mean	8.781
SD	3047448	SD	3.197
95% DL/2 (t) UCL	1534447	95% H-Stat (DL/2) UCL	18314751
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	284179	Mean in Log Scale	8.878
SD	3246869	SD in Log Scale	3.024
95% MLE (t) UCL	1273944	Mean in Original Scale	605475
95% MLE (Tiku) UCL	1206542	SD in Original Scale	3047447
		95% Percentile Bootstrap UCL	1695204
		95% BCA Bootstrap UCL	2268077

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.189	Data appear Lognormal at 5% Significance Level	
Theta Star	3540015		
nu star	10.6		
A-D Test Statistic	3.895	**Nonparametric Statistics**	

5% A-D Critical Value	0.904
K-S Test Statistic	0.904
5% K-S Critical Value	0.184

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	0
Maximum	17000000
Mean	605470
Median	11800
SD	3047448
k star	0.127
Theta star	4774994
Nu star	7.862
AppChi2	2.655
95% Gamma Approximate UCL	1792737
95% Adjusted Gamma UCL	1911986

Note: DL/2 is not a recommended method.

Kaplan-Meier (KM) Method

Mean	605472
SD	2997892
SE of Mean	548318
95% KM (t) UCL	1536110
95% KM (z) UCL	1507375
95% KM (jackknife) UCL	1534433
95% KM (bootstrap t) UCL	38145082
95% KM (BCA) UCL	1696109
95% KM (Percentile Bootstrap) UCL	1670757
95% KM (Chebyshev) UCL	2995534
97.5% KM (Chebyshev) UCL	4029716
99% KM (Chebyshev) UCL	6061165

Potential UCLs to Use

99% KM (Chebyshev) UCL	6061165

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	F:\Anniston Data\Data\Input Data\SS&SB_OA_Future_Input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

PCB

General Statistics

Number of Valid Samples	58	Number of Detected Data	51
Number of Unique Samples	50	Number of Non-Detect Data	7
		Percent Non-Detects	12.07%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	23	Minimum Detected	3.135
Maximum Detected	17000000	Maximum Detected	16.65
Mean of Detected	403790	Mean of Detected	9.124
SD of Detected	2377237	SD of Detected	2.716
Minimum Non-Detect	18.5	Minimum Non-Detect	2.918
Maximum Non-Detect	47.5	Maximum Non-Detect	3.861

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	9
Number treated as Detected	49
Single DL Non-Detect Percentage	15.52%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Lilliefors Test Statistic	0.462	Lilliefors Test Statistic	0.0879
5% Lilliefors Critical Value	0.124	5% Lilliefors Critical Value	0.124
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	355059	Mean	8.378
SD	2230437	SD	3.256
95% DL/2 (t) UCL	844747	95% H-Stat (DL/2) UCL	3861964
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	57220	Mean in Log Scale	8.438
SD	2431507	SD in Log Scale	3.163
95% MLE (t) UCL	591053	Mean in Original Scale	355061
95% MLE (Tiku) UCL	562709	SD in Original Scale	2230437
		95% Percentile Bootstrap UCL	938615
		95% BCA Bootstrap UCL	1497852

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.197
Theta Star	2051957
nu star	20.07
A-D Test Statistic	5.291
5% A-D Critical Value	0.911
K-S Test Statistic	0.911
5% K-S Critical Value	0.138

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0
Maximum	17000000
Mean	355056
Median	7985
SD	2230437
k star	0.116
Theta star	3054278
Nu star	13.48
AppChi2	6.22
95% Gamma Approximate UCL	769730
95% Adjusted Gamma UCL	785649

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	355060
SD	2211125
SE of Mean	293224
95% KM (t) UCL	845338
95% KM (z) UCL	837370
95% KM (jackknife) UCL	844747
95% KM (bootstrap t) UCL	6253768
95% KM (BCA) UCL	951176
95% KM (Percentile Bootstrap) UCL	942494
95% KM (Chebyshev) UCL	1633193
97.5% KM (Chebyshev) UCL	2186243
99% KM (Chebyshev) UCL	3272601

Potential UCLs to Use

99% KM (Chebyshev) UCL	3272601

Arsenic

General Statistics

Number of Valid Samples	19	Number of Detected Data	18
Number of Unique Samples	17	Number of Non-Detect Data	1
		Percent Non-Detects	5.26%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	3.8	Minimum Detected	1.335
Maximum Detected	390	Maximum Detected	5.966
Mean of Detected	30.86	Mean of Detected	2.33
SD of Detected	89.87	SD of Detected	1.053
Minimum Non-Detect	12	Minimum Non-Detect	2.485
Maximum Non-Detect	12	Maximum Non-Detect	2.485

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.304	Shapiro Wilk Test Statistic	0.721
5% Shapiro Wilk Critical Value	0.897	5% Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	29.55	Mean	2.301
SD	87.53	SD	1.031
95% DL/2 (t) UCL	64.37	95% H-Stat (DL/2) UCL	32.48
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	2.308
		SD in Log Scale	1.028
		Mean in Original Scale	29.59
		SD in Original Scale	87.52
		95% Percentile Bootstrap UCL	69.07
		95% BCA Bootstrap UCL	89.68

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.509	Data do not follow a Discernable Distribution (0.05)	
Theta Star	60.59		
nu star	18.33		
A-D Test Statistic	3.58	**Nonparametric Statistics**	
5% A-D Critical Value	0.794	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.794	Mean	29.59
5% K-S Critical Value	0.214	SD	85.18
Data not Gamma Distributed at 5% Significance Level		SE of Mean	20.11
		95% KM (t) UCL	64.46

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0
Maximum	390
Mean	29.23
Median	7.9
SD	87.63
k star	0.292
Theta star	100.3
Nu star	11.08
AppChi2	4.626
95% Gamma Approximate UCL	70
95% Adjusted Gamma UCL	75.9

Note: DL/2 is not a recommended method.

95% KM (z) UCL	62.67
95% KM (jackknife) UCL	64.41
95% KM (bootstrap t) UCL	634.1
95% KM (BCA) UCL	69.51
95% KM (Percentile Bootstrap) UCL	69.37
95% KM (Chebyshev) UCL	117.2
97.5% KM (Chebyshev) UCL	155.2
99% KM (Chebyshev) UCL	229.7

Potential UCLs to Use

97.5% KM (Chebyshev) UCL	155.2

Barium

General Statistics

Number of Valid Samples	19	Number of Unique Samples	19

Raw Statistics		Log-transformed Statistics	
Minimum	18	Minimum of Log Data	2.89
Maximum	780	Maximum of Log Data	6.659
Mean	126.7	Mean of log Data	4.318
Median	55	SD of log Data	0.947
SD	178.8		
Coefficient of Variation	1.411		
Skewness	3.084		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.584	Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	197.9	95% H-UCL	207.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	233.1
95% Adjusted-CLT UCL	225.2	97.5% Chebyshev (MVUE) UCL	284.7
95% Modified-t UCL	202.7	99% Chebyshev (MVUE) UCL	386

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.954	Data appear Lognormal at 5% Significance Level	
Theta Star	132.8		
nu star	36.25		
Approximate Chi Square Value (.05)	23.47	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0369	95% CLT UCL	194.2
Adjusted Chi Square Value	22.58	95% Jackknife UCL	197.9
		95% Standard Bootstrap UCL	193.8
Anderson-Darling Test Statistic	1.23	95% Bootstrap-t UCL	314.4
Anderson-Darling 5% Critical Value	0.767	95% Hall's Bootstrap UCL	453.6
Kolmogorov-Smirnov Test Statistic	0.246	95% Percentile Bootstrap UCL	197.1
Kolmogorov-Smirnov 5% Critical Value	0.204	95% BCA Bootstrap UCL	235.3
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	305.5
		97.5% Chebyshev(Mean, Sd) UCL	382.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	534.8
95% Approximate Gamma UCL	195.7		
95% Adjusted Gamma UCL	203.5		

Potential UCL to Use		Use 95% H-UCL	207.7

Cadmium

General Statistics

Number of Valid Samples	19	Number of Detected Data	5
Number of Unique Samples	5	Number of Non-Detect Data	14
		Percent Non-Detects	73.68%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.52	Minimum Detected	-0.654
Maximum Detected	4.7	Maximum Detected	1.548
Mean of Detected	1.502	Mean of Detected	0.00985
SD of Detected	1.794	SD of Detected	0.884
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	6	Maximum Non-Detect	1.792

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	19
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.629	Shapiro Wilk Test Statistic	0.769
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.871	Mean	-0.712
SD	1.235	SD	0.953
95% DL/2 (t) UCL	1.363	95% H-Stat (DL/2) UCL	1.828
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.522
		SD in Log Scale	1.136
		Mean in Original Scale	0.502
		SD in Original Scale	1.047
		95% Percentile Bootstrap UCL	0.937
		95% BCA Bootstrap UCL	1.223

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.695	Data appear Lognormal at 5% Significance Level	
Theta Star	2.163		
nu star	6.945		
A-D Test Statistic	0.849	Nonparametric Statistics	
5% A-D Critical Value	0.687	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.687	Mean	0.809
5% K-S Critical Value	0.362	SD	0.978
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.265

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0.52
Maximum	4.7
Mean	1.487
Median	1.196
SD	0.936
k star	3.154
Theta star	0.471
Nu star	119.8
AppChi2	95.56
95% Gamma Approximate UCL	1.865
95% Adjusted Gamma UCL	1.902

Note: DL/2 is not a recommended method.

95% KM (t) UCL	1.269
95% KM (z) UCL	1.245
95% KM (jackknife) UCL	1.184
95% KM (bootstrap t) UCL	4.244
95% KM (BCA) UCL	1.723
95% KM (Percentile Bootstrap) UCL	1.391
95% KM (Chebyshev) UCL	1.965
97.5% KM (Chebyshev) UCL	2.466
99% KM (Chebyshev) UCL	3.449

Potential UCLs to Use

95% KM (t) UCL	1.269
95% KM (% Bootstrap) UCL	1.391

Chromium

General Statistics

Number of Valid Samples	19	Number of Detected Data	18
Number of Unique Samples	12	Number of Non-Detect Data	1
		Percent Non-Detects	5.26%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	12	Minimum Detected	2.485
Maximum Detected	110	Maximum Detected	4.7
Mean of Detected	26.89	Mean of Detected	3.102
SD of Detected	23.02	SD of Detected	0.556
Minimum Non-Detect	12	Minimum Non-Detect	2.485
Maximum Non-Detect	12	Maximum Non-Detect	2.485

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.595	Shapiro Wilk Test Statistic	0.844
5% Shapiro Wilk Critical Value	0.897	5% Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	25.79	Mean	3.033
SD	22.88	SD	0.618
95% DL/2 (t) UCL	34.89	95% H-Stat (DL/2) UCL	32.57
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	25.36	Mean in Log Scale	3.035
SD	22.87	SD in Log Scale	0.615
95% MLE (t) UCL	34.46	Mean in Original Scale	25.8
95% MLE (Tiku) UCL	33.75	SD in Original Scale	22.87
		95% Percentile Bootstrap UCL	34.84
		95% BCA Bootstrap UCL	40.11
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	2.368	Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.36		
nu star	85.23		
A-D Test Statistic	1.493	**Nonparametric Statistics**	
5% A-D Critical Value	0.747	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.747	Mean	26.11
5% K-S Critical Value	0.205	SD	22.03
Data not Gamma Distributed at 5% Significance Level		SE of Mean	5.2
		95% KM (t) UCL	35.12
Assuming Gamma Distribution		95% KM (z) UCL	34.66
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	35.07

Minimum	0
Maximum	110
Mean	25.47
Median	19
SD	23.21
k star	0.425
Theta star	59.97
Nu star	16.14
AppChi2	8.063
95% Gamma Approximate UCL	51
95% Adjusted Gamma UCL	54.34

Note: DL/2 is not a recommended method.

95% KM (bootstrap t) UCL	47.39
95% KM (BCA) UCL	35.63
95% KM (Percentile Bootstrap) UCL	35.58
95% KM (Chebyshev) UCL	48.77
97.5% KM (Chebyshev) UCL	58.58
99% KM (Chebyshev) UCL	77.84

Potential UCLs to Use

95% KM (Chebyshev) UCL	48.77

Lead

General Statistics

Number of Valid Samples	19	Number of Unique Samples	16

Raw Statistics		Log-transformed Statistics	
Minimum	8.7	Minimum of Log Data	2.163
Maximum	4700	Maximum of Log Data	8.455
Mean	302.4	Mean of log Data	3.987
Median	41	SD of log Data	1.346
SD	1066		
Coefficient of Variation	3.526		
Skewness	4.342		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.279	Shapiro Wilk Test Statistic	0.811
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	726.5	95% H-UCL	362.6
95% UCLs (Adjusted for Skewness)		*95% Chebyshev (MVUE) UCL*	315.9
95% Adjusted-CLT UCL	965	97.5% Chebyshev (MVUE) UCL	399.5
95% Modified-t UCL	767.1	99% Chebyshev (MVUE) UCL	563.5

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.358	Data do not follow a Discernable Distribution (0.05)	
Theta Star	843.4		
nu star	13.62		
Approximate Chi Square Value (.05)	6.313	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0369	95% CLT UCL	704.7
Adjusted Chi Square Value	5.882	95% Jackknife UCL	726.5
		95% Standard Bootstrap UCL	702.4
Anderson-Darling Test Statistic	3.664	95% Bootstrap-t UCL	8449
Anderson-Darling 5% Critical Value	0.826	95% Hall's Bootstrap UCL	4804
Kolmogorov-Smirnov Test Statistic	0.347	95% Percentile Bootstrap UCL	782.8
Kolmogorov-Smirnov 5% Critical Value	0.213	95% BCA Bootstrap UCL	1050
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1369
		97.5% Chebyshev(Mean, Sd) UCL	1830
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2736
95% Approximate Gamma UCL	652.4		
95% Adjusted Gamma UCL	700.2		

Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	2736

Manganese

General Statistics

Number of Valid Samples	19	Number of Unique Samples	17

Raw Statistics		Log-transformed Statistics	
Minimum	70	Minimum of Log Data	4.248
Maximum	12000	Maximum of Log Data	9.393
Mean	1413	Mean of log Data	6.234
Median	590	SD of log Data	1.327
SD	2857		
Coefficient of Variation	2.022		
Skewness	3.297		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.486	Shapiro Wilk Test Statistic	0.924
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	2550	95% H-UCL	3271
95% UCLs (Adjusted for Skewness)		*95% Chebyshev (MVUE) UCL*	*2897*
95% Adjusted-CLT UCL	3021	97.5% Chebyshev (MVUE) UCL	3658
95% Modified-t UCL	2632	99% Chebyshev (MVUE) UCL	5153

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.545	Data appear Lognormal at 5% Significance Level	
Theta Star	2594		
nu star	20.7		
Approximate Chi Square Value (.05)	11.37	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0369	95% CLT UCL	2491
Adjusted Chi Square Value	10.77	95% Jackknife UCL	2550
		95% Standard Bootstrap UCL	2478
Anderson-Darling Test Statistic	1.633	95% Bootstrap-t UCL	6114
Anderson-Darling 5% Critical Value	0.793	95% Hall's Bootstrap UCL	6220
Kolmogorov-Smirnov Test Statistic	0.316	95% Percentile Bootstrap UCL	2532
Kolmogorov-Smirnov 5% Critical Value	0.208	95% BCA Bootstrap UCL	3104
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4270
		97.5% Chebyshev(Mean, Sd) UCL	5506
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	7934
95% Approximate Gamma UCL	2573		
95% Adjusted Gamma UCL	2717		

Potential UCL to Use		Use 95% Chebyshev (MVUE) UCL	2897

Mercury

General Statistics

Number of Valid Samples	19	Number of Detected Data	18
Number of Unique Samples	17	Number of Non-Detect Data	1
		Percent Non-Detects	5.26%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.032	Minimum Detected	-3.442
Maximum Detected	3.3	Maximum Detected	1.194
Mean of Detected	0.751	Mean of Detected	-1.213
SD of Detected	0.964	SD of Detected	1.522
Minimum Non-Detect	0.033	Minimum Non-Detect	-3.411
Maximum Non-Detect	0.033	Maximum Non-Detect	-3.411

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.762	Shapiro Wilk Test Statistic	0.933
5% Shapiro Wilk Critical Value	0.897	5% Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.712	Mean	-1.365
SD	0.952	SD	1.621
95% DL/2 (t) UCL	1.091	95% H-Stat (DL/2) UCL	3.794
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.648	Mean in Log Scale	-1.369
SD	1.004	SD in Log Scale	1.629
95% MLE (t) UCL	1.048	Mean in Original Scale	0.712
95% MLE (Tiku) UCL	1.029	SD in Original Scale	0.952
		95% Percentile Bootstrap UCL	1.091
		95% BCA Bootstrap UCL	1.15

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.585	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.283		
nu star	21.08		
A-D Test Statistic	0.538	Nonparametric Statistics	
5% A-D Critical Value	0.786	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.786	Mean	0.713
5% K-S Critical Value	0.213	SD	0.926
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.219
		95% KM (t) UCL	1.092

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	0
Maximum	3.3
Mean	0.711
Median	0.3
SD	0.953
k star	0.333
Theta star	2.138
Nu star	12.65
AppChi2	5.655
95% Gamma Approximate UCL	1.591
95% Adjusted Gamma UCL	1.713

Note: DL/2 is not a recommended method.

95% KM (z) UCL	1.073
95% KM (jackknife) UCL	1.091
95% KM (bootstrap t) UCL	1.301
95% KM (BCA) UCL	1.083
95% KM (Percentile Bootstrap) UCL	1.09
95% KM (Chebyshev) UCL	1.666
97.5% KM (Chebyshev) UCL	2.078
99% KM (Chebyshev) UCL	2.888

Potential UCLs to Use

95% KM (Chebyshev) UCL	1.666

Nickel

General Statistics

Number of Valid Samples	19	Number of Detected Data	18
Number of Unique Samples	15	Number of Non-Detect Data	1
		Percent Non-Detects	5.26%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	7.5	Minimum Detected	2.015
Maximum Detected	2400	Maximum Detected	7.783
Mean of Detected	163.1	Mean of Detected	3.31
SD of Detected	559.2	SD of Detected	1.402
Minimum Non-Detect	4.4	Minimum Non-Detect	1.482
Maximum Non-Detect	4.4	Maximum Non-Detect	1.482

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.294	Shapiro Wilk Test Statistic	0.79
5% Shapiro Wilk Critical Value	0.897	5% Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	154.6	Mean	3.177
SD	544.7	SD	1.481
95% DL/2 (t) UCL	371.3	95% H-Stat (DL/2) UCL	233.3
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	134.1	Mean in Log Scale	3.145
SD	547.7	SD in Log Scale	1.54
95% MLE (t) UCL	351.9	Mean in Original Scale	154.6
95% MLE (Tiku) UCL	329.5	SD in Original Scale	544.7
		95% Percentile Bootstrap UCL	404
		95% BCA Bootstrap UCL	538.4
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.348	Data do not follow a Discernable Distribution (0.05)	
Theta Star	468.9		
nu star	12.52		
A-D Test Statistic	3.275	**Nonparametric Statistics**	
5% A-D Critical Value	0.827	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.827	Mean	154.9
5% K-S Critical Value	0.219	SD	530.1
Data not Gamma Distributed at 5% Significance Level		SE of Mean	125.1
		95% KM (t) UCL	371.9

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0
Maximum	2400
Mean	154.5
Median	15
SD	544.7
k star	0.236
Theta star	654
Nu star	8.977
AppChi2	3.313
95% Gamma Approximate UCL	418.7
95% Adjusted Gamma UCL	459.5

Note: DL/2 is not a recommended method.

95% KM (z) UCL	360.7
95% KM (jackknife) UCL	371.5
95% KM (bootstrap t) UCL	3498
95% KM (BCA) UCL	412.2
95% KM (Percentile Bootstrap) UCL	405.1
95% KM (Chebyshev) UCL	700.4
97.5% KM (Chebyshev) UCL	936.4
99% KM (Chebyshev) UCL	1400

Potential UCLs to Use

97.5% KM (Chebyshev) UCL	936.4

Vanadium

General Statistics

Number of Valid Samples	19	Number of Unique Samples	17

Raw Statistics		Log-transformed Statistics	
Minimum	15	Minimum of Log Data	2.708
Maximum	93	Maximum of Log Data	4.533
Mean	40.26	Mean of log Data	3.612
Median	39	SD of log Data	0.417
SD	17.83		
Coefficient of Variation	0.443		
Skewness	1.495		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.89	Shapiro Wilk Test Statistic	0.984
Shapiro Wilk Critical Value	0.901	Shapiro Wilk Critical Value	0.901
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	47.35	95% H-UCL	48.91
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	57.43
95% Adjusted-CLT UCL	48.49	97.5% Chebyshev (MVUE) UCL	64.87
95% Modified-t UCL	47.59	99% Chebyshev (MVUE) UCL	79.5

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	5.225	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	7.707		
nu star	198.5		
Approximate Chi Square Value (.05)	166.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0369	95% CLT UCL	46.99
Adjusted Chi Square Value	164.4	95% Jackknife UCL	47.35
		95% Standard Bootstrap UCL	46.95
Anderson-Darling Test Statistic	0.241	95% Bootstrap-t UCL	49.84
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	53.92
Kolmogorov-Smirnov Test Statistic	0.108	95% Percentile Bootstrap UCL	47.32
Kolmogorov-Smirnov 5% Critical Value	0.199	95% BCA Bootstrap UCL	47.68
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	58.09
		97.5% Chebyshev(Mean, Sd) UCL	65.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	80.95
95% Approximate Gamma UCL	47.89		
95% Adjusted Gamma UCL	48.62		

Potential UCL to Use — Use 95% Approximate Gamma UCL 47.89

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	F:\Anniston Data\Data\Input Data\SS_SL_Current&Future_Input_PCB.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

PCB

General Statistics

Number of Valid Samples	13	Number of Detected Data	11
Number of Unique Samples	11	Number of Non-Detect Data	2
		Percent Non-Detects	15.38%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	226	Minimum Detected	5.421
Maximum Detected	27000	Maximum Detected	10.2
Mean of Detected	5215	Mean of Detected	7.312
SD of Detected	8009	SD of Detected	1.812
Minimum Non-Detect	40	Minimum Non-Detect	3.689
Maximum Non-Detect	43	Maximum Non-Detect	3.761

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	2
Number treated as Detected	11
Single DL Non-Detect Percentage	15.38%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.682	Shapiro Wilk Test Statistic	0.86
5% Shapiro Wilk Critical Value	0.85	5% Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4416	Mean	6.654
SD	7567	SD	2.307
95% DL/2 (t) UCL	8156	95% H-Stat (DL/2) UCL	270896
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	3591	Mean in Log Scale	6.668
SD	8168	SD in Log Scale	2.282
95% MLE (t) UCL	7629	Mean in Original Scale	4416
95% MLE (Tiku) UCL	7477	SD in Original Scale	7567
		95% Percentile Bootstrap UCL	8164
		95% BCA Bootstrap UCL	9750

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.43
Theta Star	12125
nu star	9.462
A-D Test Statistic	0.668
5% A-D Critical Value	0.78
K-S Test Statistic	0.78
5% K-S Critical Value	0.269

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0
Maximum	27000
Mean	4413
Median	348
SD	7569
k star	0.162
Theta star	27303
Nu star	4.202
AppChi2	0.803
95% Gamma Approximate UCL	23088
95% Adjusted Gamma UCL	29966

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	4447
SD	7252
SE of Mean	2109
95% KM (t) UCL	8207
95% KM (z) UCL	7917
95% KM (jackknife) UCL	8178
95% KM (bootstrap t) UCL	12960
95% KM (BCA) UCL	7858
95% KM (Percentile Bootstrap) UCL	8012
95% KM (Chebyshev) UCL	13642
97.5% KM (Chebyshev) UCL	17621
99% KM (Chebyshev) UCL	25436

Potential UCLs to Use

95% KM (Chebyshev) UCL	13642

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	F:\Anniston Data\Data\Input Data\GW_Input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chlorobenzene

General Statistics

Number of Valid Samples	25	Number of Detected Data	6
Number of Unique Samples	6	Number of Non-Detect Data	19
		Percent Non-Detects	76.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	3.4	Minimum Detected	1.224
Maximum Detected	12	Maximum Detected	2.485
Mean of Detected	5.45	Mean of Detected	1.593
SD of Detected	3.241	SD of Detected	0.451
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	100	Maximum Non-Detect	4.605

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	25
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.633	Shapiro Wilk Test Statistic	0.734
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.408	Mean	0.436
SD	10.86	SD	1.513
95% DL/2 (t) UCL	9.123	95% H-Stat (DL/2) UCL	9.499
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	0.418
		SD in Log Scale	0.891
		Mean in Original Scale	2.245
		SD in Original Scale	2.425
		95% Percentile Bootstrap UCL	3.131
		95% BCA Bootstrap UCL	3.338

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	2.625
Theta Star	2.076
nu star	31.5
A-D Test Statistic	0.999
5% A-D Critical Value	0.698
K-S Test Statistic	0.698
5% K-S Critical Value	0.333
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	2.083
Maximum	13.59
Mean	8.536
Median	9.174
SD	3.694
k star	3.937
Theta star	2.168
Nu star	196.8
AppChi2	165.4
95% Gamma Approximate UCL	10.16
95% Adjusted Gamma UCL	10.28

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data do not follow a Discernable Distribution (0.05)	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	3.986
SD	1.833
SE of Mean	0.438
95% KM (t) UCL	4.735
95% KM (z) UCL	4.706
95% KM (jackknife) UCL	4.61
95% KM (bootstrap t) UCL	6.376
95% KM (BCA) UCL	5.52
95% KM (Percentile Bootstrap) UCL	5.035
95% KM (Chebyshev) UCL	5.895
97.5% KM (Chebyshev) UCL	6.721
99% KM (Chebyshev) UCL	8.344
Potential UCLs to Use	
95% KM (t) UCL	4.735
95% KM (% Bootstrap) UCL	5.035

PCB

General Statistics

Number of Valid Samples	26	Number of Detected Data	7
Number of Unique Samples	6	Number of Non-Detect Data	19
		Percent Non-Detects	73.08%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.3	Minimum Detected	0.262
Maximum Detected	15500	Maximum Detected	9.649
Mean of Detected	4371	Mean of Detected	5.911
SD of Detected	6001	SD of Detected	3.407
Minimum Non-Detect	0.235	Minimum Non-Detect	-1.448
Maximum Non-Detect	0.495	Maximum Non-Detect	-0.703

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	19
Number treated as Detected	7
Single DL Non-Detect Percentage	73.08%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.771	Shapiro Wilk Test Statistic	0.891
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1177	Mean	0.121
SD	3543	SD	3.957
95% DL/2 (t) UCL	2364	95% H-Stat (DL/2) UCL	875858
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-3.159
		SD in Log Scale	6.888
		Mean in Original Scale	1177
		SD in Original Scale	3543
		95% Percentile Bootstrap UCL	2365
		95% BCA Bootstrap UCL	2966

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.256	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	17054		
nu star	3.588		
A-D Test Statistic	0.528	**Nonparametric Statistics**	
5% A-D Critical Value	0.791	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.791	Mean	1178
5% K-S Critical Value	0.336	SD	3474
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	735.8
		95% KM (t) UCL	2435

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0
Maximum	15500
Mean	2733
Median	1199
SD	3707
k star	0.113
Theta star	24238
Nu star	5.864
AppChi2	1.571
95% Gamma Approximate UCL	10204
95% Adjusted Gamma UCL	11211

Note: DL/2 is not a recommended method.

95% KM (z) UCL	2388
95% KM (jackknife) UCL	2326
95% KM (bootstrap t) UCL	3300
95% KM (BCA) UCL	2758
95% KM (Percentile Bootstrap) UCL	2447
95% KM (Chebyshev) UCL	4385
97.5% KM (Chebyshev) UCL	5773
99% KM (Chebyshev) UCL	8499

Potential UCLs to Use

95% KM (t) UCL	2435

Mercury

General Statistics

Number of Valid Samples	19	Number of Detected Data	6
Number of Unique Samples	6	Number of Non-Detect Data	13
		Percent Non-Detects	68.42%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1	Minimum Detected	0
Maximum Detected	4.1	Maximum Detected	1.411
Mean of Detected	2	Mean of Detected	0.558
SD of Detected	1.193	SD of Detected	0.558
Minimum Non-Detect	0.2	Minimum Non-Detect	-1.609
Maximum Non-Detect	0.2	Maximum Non-Detect	-1.609

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.854	Shapiro Wilk Test Statistic	0.905
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.7	Mean	-1.399
SD	1.104	SD	1.397
95% DL/2 (t) UCL	1.139	95% H-Stat (DL/2) UCL	0.72
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	2.126	Mean in Log Scale	-0.901
SD	1.089	SD in Log Scale	1.259
95% MLE (t) UCL	2.559	Mean in Original Scale	0.818
95% MLE (Tiku) UCL	2.884	SD in Original Scale	1.049
		95% Percentile Bootstrap UCL	1.224
		95% BCA Bootstrap UCL	1.332
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	2.038	Data appear Normal at 5% Significance Level	
Theta Star	0.982		
nu star	24.45		
A-D Test Statistic	0.396	**Nonparametric Statistics**	
5% A-D Critical Value	0.7	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.7	Mean	1.316
5% K-S Critical Value	0.334	SD	0.769
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.193
		95% KM (t) UCL	1.651

Assuming Gamma Distribution			
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	1.634
Minimum	0.442	95% KM (jackknife) UCL	1.594
Maximum	5.664	95% KM (bootstrap t) UCL	1.849
Mean	2.995	95% KM (BCA) UCL	2.353
Median	2.84	95% KM (Percentile Bootstrap) UCL	1.784
SD	1.632	95% KM (Chebyshev) UCL	2.158
k star	2.367	97.5% KM (Chebyshev) UCL	2.522
Theta star	1.265	99% KM (Chebyshev) UCL	3.238
Nu star	89.93	**Potential UCLs to Use**	
AppChi2	69.07	95% KM (t) UCL	1.651
95% Gamma Approximate UCL	3.899	95% KM (Percentile Bootstrap) UCL	1.784
95% Adjusted Gamma UCL	3.992		

Note: DL/2 is not a recommended method.

General UCL Statistics for Full Data Sets

User Selected Options

From File	F:\Anniston Data\Data\Input Data\Air_SL_Input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

PCB

General Statistics

Number of Valid Samples	76	Number of Unique Samples	76
Number of Missing Values	6		

Raw Statistics		Log-transformed Statistics	
Minimum	0.109	Minimum of Log Data	-2.219
Maximum	39.22	Maximum of Log Data	3.669
Mean	5.591	Mean of log Data	1.029
Median	3.756	SD of log Data	1.399
SD	6.192		
Coefficient of Variation	1.108		
Skewness	2.603		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.188	Lilliefors Test Statistic	0.104
Lilliefors Critical Value	0.102	Lilliefors Critical Value	0.102
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	6.774	95% H-UCL	11.45
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	14.04
95% Adjusted-CLT UCL	6.986	97.5% Chebyshev (MVUE) UCL	16.97
95% Modified-t UCL	6.809	99% Chebyshev (MVUE) UCL	22.72

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.826	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	6.768		
nu star	125.6		
Approximate Chi Square Value (.05)	100.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0468	95% CLT UCL	6.759
Adjusted Chi Square Value	100.3	95% Jackknife UCL	6.774
		95% Standard Bootstrap UCL	6.762
Anderson-Darling Test Statistic	0.338	95% Bootstrap-t UCL	7.1
Anderson-Darling 5% Critical Value	0.788	95% Hall's Bootstrap UCL	7.261
Kolmogorov-Smirnov Test Statistic	0.0639	95% Percentile Bootstrap UCL	6.768
Kolmogorov-Smirnov 5% Critical Value	0.106	95% BCA Bootstrap UCL	7.018
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.687
		97.5% Chebyshev(Mean, Sd) UCL	10.03

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.973	99% Chebyshev(Mean, Sd) UCL	12.66
95% Adjusted Gamma UCL	7.002		

Potential UCL to Use Use 95% Approximate Gamma UCL 6.973

General UCL Statistics for Full Data Sets

User Selected Options

From File	F:\Anniston Data\Data\Input Data\Air_WL_Input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

PCB

General Statistics

Number of Valid Samples	81	Number of Unique Samples	81
Number of Missing Values	3		

Raw Statistics		Log-transformed Statistics	
Minimum	0.205	Minimum of Log Data	-1.586
Maximum	43.43	Maximum of Log Data	3.771
Mean	8.338	Mean of log Data	1.547
Median	6.897	SD of log Data	1.284
SD	7.952		
Coefficient of Variation	0.954		
Skewness	1.866		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.153	Lilliefors Test Statistic	0.156
Lilliefors Critical Value	0.0984	Lilliefors Critical Value	0.0984
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	9.808	95% H-UCL	15.39
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	18.99
95% Adjusted-CLT UCL	9.987	97.5% Chebyshev (MVUE) UCL	22.65
95% Modified-t UCL	9.839	99% Chebyshev (MVUE) UCL	29.85

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.976	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	8.543		
nu star	158.1		
Approximate Chi Square Value (.05)	130	**Nonparametric Statistics**	
Adjusted Level of Significance	0.047	95% CLT UCL	9.791
Adjusted Chi Square Value	129.6	95% Jackknife UCL	9.808
		95% Standard Bootstrap UCL	9.805
Anderson-Darling Test Statistic	0.525	95% Bootstrap-t UCL	10.02
Anderson-Darling 5% Critical Value	0.782	95% Hall's Bootstrap UCL	10.14
Kolmogorov-Smirnov Test Statistic	0.0995	95% Percentile Bootstrap UCL	9.813
Kolmogorov-Smirnov 5% Critical Value	0.102	95% BCA Bootstrap UCL	10.14
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.19
		97.5% Chebyshev(Mean, Sd) UCL	13.86

Assuming Gamma Distribution

95% Approximate Gamma UCL 10.14

95% Adjusted Gamma UCL 10.17

99% Chebyshev(Mean, Sd) UCL 17.13

Potential UCL to Use

Use 95% Approximate Gamma UCL 10.14

General UCL Statistics for Full Data Sets

User Selected Options

From File	E:\All Works\Anniston\Air Analysis\ProUCL Air Data.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1 - East

General Statistics

Number of Valid Samples	72	Number of Unique Samples	72

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.146	Minimum of Log Data	-1.924
Maximum	27.3	Maximum of Log Data	3.307
Mean	5.651	Mean of log Data	1.135
Median	4.269	SD of log Data	1.269
SD	5.562		
Coefficient of Variation	0.984		
Skewness	1.685		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Lilliefors Test Statistic	*0.161*	*Lilliefors Test Statistic*	*0.124*
Lilliefors Critical Value	0.104	Lilliefors Critical Value	0.104
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	6.743	95% H-UCL	10.18
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.52
95% Adjusted-CLT UCL	6.868	97.5% Chebyshev (MVUE) UCL	14.99
95% Modified-t UCL	6.765	99% Chebyshev (MVUE) UCL	19.83
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.94	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	6.011		
nu star	135.4		
Approximate Chi Square Value (.05)	109.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0467	95% CLT UCL	6.729
Adjusted Chi Square Value	109	95% Jackknife UCL	6.743
		95% Standard Bootstrap UCL	6.701
Anderson-Darling Test Statistic	0.574	95% Bootstrap-t UCL	7.004
Anderson-Darling 5% Critical Value	0.782	95% Hall's Bootstrap UCL	6.894
Kolmogorov-Smirnov Test Statistic	0.0854	95% Percentile Bootstrap UCL	6.768
Kolmogorov-Smirnov 5% Critical Value	0.108	95% BCA Bootstrap UCL	6.919
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.508
		97.5% Chebyshev(Mean, Sd) UCL	9.745
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.17
95% Approximate Gamma UCL	6.987		
95% Adjusted Gamma UCL	7.017		
Potential UCL to Use		Use 95% Approximate Gamma UCL	6.987

1 - East (Colo)

General Statistics

Number of Valid Samples	35	Number of Unique Samples	35

Raw Statistics		Log-transformed Statistics	
Minimum	0.054	Minimum of Log Data	-2.92
Maximum	22.69	Maximum of Log Data	3.122
Mean	4.638	Mean of log Data	0.667
Median	2.432	SD of log Data	1.547
SD	5.654		
Coefficient of Variation	1.219		
Skewness	1.886		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.761	Shapiro Wilk Critical Value	0.957
Shapiro Wilk Critical Value	0.934	Shapiro Wilk Critical Value	0.934
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	6.254	95% H-UCL	14.69
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	14.9
95% Adjusted-CLT UCL	6.536	97.5% Chebyshev (MVUE) UCL	18.74
95% Modified-t UCL	6.305	99% Chebyshev (MVUE) UCL	26.29
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.656	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	7.065		
nu star	45.95		
Approximate Chi Square Value (.05)	31.4	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0425	95% CLT UCL	6.21
Adjusted Chi Square Value	30.83	95% Jackknife UCL	6.254
		95% Standard Bootstrap UCL	6.179
Anderson-Darling Test Statistic	0.305	95% Bootstrap-t UCL	6.951
Anderson-Darling 5% Critical Value	0.793	95% Hall's Bootstrap UCL	6.896
Kolmogorov-Smirnov Test Statistic	0.0878	95% Percentile Bootstrap UCL	6.192
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	6.375
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.804
		97.5% Chebyshev(Mean, Sd) UCL	10.61
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.15
95% Approximate Gamma UCL	6.788		
95% Adjusted Gamma UCL	6.913		
Potential UCL to Use		Use 95% Approximate Gamma UCL	6.788

General Statistics

Number of Valid Samples	76	Number of Unique Samples	76

Raw Statistics		Log-transformed Statistics	
Minimum	0.109	Minimum of Log Data	-2.219
Maximum	39.22	Maximum of Log Data	3.669
Mean	5.591	Mean of log Data	1.029
Median	3.756	SD of log Data	1.399
SD	6.192		
Coefficient of Variation	1.108		
Skewness	2.603		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.188	Lilliefors Test Statistic	0.104
Lilliefors Critical Value	0.102	Lilliefors Critical Value	0.102
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	6.774	95% H-UCL	11.45
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	14.04
95% Adjusted-CLT UCL	6.986	97.5% Chebyshev (MVUE) UCL	16.97
95% Modified-t UCL	*6.809*	*99% Chebyshev (MVUE) UCL*	*22.72*

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.826	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	6.768		
nu star	125.6		
Approximate Chi Square Value (.05)	100.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0468	95% CLT UCL	6.759
Adjusted Chi Square Value	100.3	95% Jackknife UCL	6.774
		95% Standard Bootstrap UCL	6.755
Anderson-Darling Test Statistic	0.338	95% Bootstrap-t UCL	7.069
Anderson-Darling 5% Critical Value	0.788	95% Hall's Bootstrap UCL	7.333
Kolmogorov-Smirnov Test Statistic	0.0639	95% Percentile Bootstrap UCL	6.869
Kolmogorov-Smirnov 5% Critical Value	0.106	95% BCA Bootstrap UCL	7.061
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.687
		97.5% Chebyshev(Mean, Sd) UCL	10.03
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.66
95% Approximate Gamma UCL	6.973		
95% Adjusted Gamma UCL	7.002		

Potential UCL to Use		Use 95% Approximate Gamma UCL	6.973

General Statistics

Number of Valid Samples	81	Number of Unique Samples	81

Raw Statistics		Log-transformed Statistics	
Minimum	0.205	Minimum of Log Data	-1.586
Maximum	43.43	Maximum of Log Data	3.771
Mean	8.338	Mean of log Data	1.547
Median	6.897	SD of log Data	1.284
SD	7.952		
Coefficient of Variation	0.954		
Skewness	1.866		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.153	Lilliefors Test Statistic	0.156
Lilliefors Critical Value	0.0984	Lilliefors Critical Value	0.0984
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	9.808	95% H-UCL	15.39
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	18.99
95% Adjusted-CLT UCL	9.987	97.5% Chebyshev (MVUE) UCL	22.65
95% Modified-t UCL	*9.839*	*99% Chebyshev (MVUE) UCL*	*29.85*

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.976	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	8.543		
nu star	158.1		
Approximate Chi Square Value (.05)	130	**Nonparametric Statistics**	
Adjusted Level of Significance	0.047	95% CLT UCL	9.791
Adjusted Chi Square Value	129.6	95% Jackknife UCL	9.808
		95% Standard Bootstrap UCL	9.743
Anderson-Darling Test Statistic	0.525	95% Bootstrap-t UCL	9.97
Anderson-Darling 5% Critical Value	0.782	95% Hall's Bootstrap UCL	10
Kolmogorov-Smirnov Test Statistic	0.0995	95% Percentile Bootstrap UCL	9.85
Kolmogorov-Smirnov 5% Critical Value	0.102	95% BCA Bootstrap UCL	10.04
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	12.19
		97.5% Chebyshev(Mean, Sd) UCL	13.86
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17.13
95% Approximate Gamma UCL	10.14		
95% Adjusted Gamma UCL	10.17		

Potential UCL to Use		Use 95% Approximate Gamma UCL	10.14

General Statistics

Number of Valid Samples	80	Number of Unique Samples	80

Raw Statistics		Log-transformed Statistics	
Minimum	0.0679	Minimum of Log Data	-2.69
Maximum	115.6	Maximum of Log Data	4.75
Mean	21.01	Mean of log Data	2.352
Median	14.28	SD of log Data	1.452
SD	22.99		
Coefficient of Variation	1.094		
Skewness	1.982		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.225	Lilliefors Test Statistic	0.145
Lilliefors Critical Value	0.0991	Lilliefors Critical Value	0.0991
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	25.29	95% H-UCL	46.94
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	57.53
95% Adjusted-CLT UCL	25.84	97.5% Chebyshev (MVUE) UCL	69.71
95% Modified-t UCL	*25.38*	*99% Chebyshev (MVUE) UCL*	*93.64*

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.826	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	25.42		
nu star	132.2		
Approximate Chi Square Value (.05)	106.6	**Nonparametric Statistics**	
Adjusted Level of Significance	0.047	95% CLT UCL	25.24
Adjusted Chi Square Value	106.2	95% Jackknife UCL	25.29
		95% Standard Bootstrap UCL	25.19
Anderson-Darling Test Statistic	0.454	95% Bootstrap-t UCL	26.2
Anderson-Darling 5% Critical Value	0.789	95% Hall's Bootstrap UCL	25.8
Kolmogorov-Smirnov Test Statistic	0.0871	95% Percentile Bootstrap UCL	25.02
Kolmogorov-Smirnov 5% Critical Value	0.103	95% BCA Bootstrap UCL	25.84
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	32.21
		97.5% Chebyshev(Mean, Sd) UCL	37.06
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	46.58
95% Approximate Gamma UCL	26.04		
95% Adjusted Gamma UCL	26.15		

Potential UCL to Use		Use 95% Approximate Gamma UCL	26.04

General Statistics

Number of Valid Samples 73

Number of Unique Samples 73

Raw Statistics

Minimum	0.614
Maximum	90.82
Mean	11.55
Median	9.217
SD	12.42
Coefficient of Variation	1.076
Skewness	4.102

Log-transformed Statistics

Minimum of Log Data	-0.488
Maximum of Log Data	4.509
Mean of log Data	2.085
SD of log Data	0.869

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.217
Lilliefors Critical Value	0.104

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.0839
Lilliefors Critical Value	0.104

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	13.97

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	14.68
95% Modified-t UCL	*14.08*

Assuming Lognormal Distribution

95% H-UCL	14.58
95% Chebyshev (MVUE) UCL	17.57
97.5% Chebyshev (MVUE) UCL	20.14
99% Chebyshev (MVUE) UCL	*25.18*

Gamma Distribution Test

k star (bias corrected)	1.474
Theta Star	7.834
nu star	215.2
Approximate Chi Square Value (.05)	182.2
Adjusted Level of Significance	0.0467
Adjusted Chi Square Value	181.6
Anderson-Darling Test Statistic	0.704
Anderson-Darling 5% Critical Value	0.769
Kolmogorov-Smirnov Test Statistic	0.099
Kolmogorov-Smirnov 5% Critical Value	0.106

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	13.63
95% Adjusted Gamma UCL	13.68

Nonparametric Statistics

95% CLT UCL	13.94
95% Jackknife UCL	13.97
95% Standard Bootstrap UCL	13.94
95% Bootstrap-t UCL	15.21
95% Hall's Bootstrap UCL	23.81
95% Percentile Bootstrap UCL	14.22
95% BCA Bootstrap UCL	14.93
95% Chebyshev(Mean, Sd) UCL	17.88
97.5% Chebyshev(Mean, Sd) UCL	20.62
99% Chebyshev(Mean, Sd) UCL	26.01

Potential UCL to Use

Use 95% Approximate Gamma UCL 13.63

6 - Near East

General Statistics

Number of Valid Samples	6	Number of Unique Samples	6

Raw Statistics		Log-transformed Statistics	
Minimum	10.76	Minimum of Log Data	2.376
Maximum	72.58	Maximum of Log Data	4.285
Mean	32.51	Mean of log Data	3.264
Median	25.71	SD of log Data	0.727
SD	23.48		
Coefficient of Variation	0.722		
Skewness	1.096		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.887	Shapiro Wilk Test Statistic	0.951
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	51.83	95% H-UCL	101.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	74.04
95% Adjusted-CLT UCL	52.87	97.5% Chebyshev (MVUE) UCL	92.07
95% Modified-t UCL	52.55	99% Chebyshev (MVUE) UCL	127.5

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.334	Data appear Normal at 5% Significance Level	
Theta Star	24.37		
nu star	16.01		
Approximate Chi Square Value (.05)	7.969	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0122	95% CLT UCL	48.28
Adjusted Chi Square Value	6.036	95% Jackknife UCL	51.83
		95% Standard Bootstrap UCL	46.81
Anderson-Darling Test Statistic	0.294	95% Bootstrap-t UCL	58.84
Anderson-Darling 5% Critical Value	0.703	95% Hall's Bootstrap UCL	64.35
Kolmogorov-Smirnov Test Statistic	0.253	95% Percentile Bootstrap UCL	47.69
Kolmogorov-Smirnov 5% Critical Value	0.335	95% BCA Bootstrap UCL	51.26
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	74.3
		97.5% Chebyshev(Mean, Sd) UCL	92.38
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	127.9
95% Approximate Gamma UCL	65.32		
95% Adjusted Gamma UCL	86.24		

Potential UCL to Use		Use 95% Student's-t UCL	51.83

General Statistics

Number of Valid Samples	10	Number of Unique Samples	10

Raw Statistics		Log-transformed Statistics	
Minimum	2.89	Minimum of Log Data	1.061
Maximum	145.5	Maximum of Log Data	4.98
Mean	37.47	Mean of log Data	2.906
Median	12.66	SD of log Data	1.249
SD	48.77		
Coefficient of Variation	1.301		
Skewness	1.653		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.719	Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	65.74	95% H-UCL	181
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	99.92
95% Adjusted-CLT UCL	71.45	97.5% Chebyshev (MVUE) UCL	127.8
95% Modified-t UCL	67.08	99% Chebyshev (MVUE) UCL	182.6

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.643	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	58.24		
nu star	12.87		
Approximate Chi Square Value (.05)	5.803	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	62.83
Adjusted Chi Square Value	5.003	95% Jackknife UCL	65.74
		95% Standard Bootstrap UCL	61.49
Anderson-Darling Test Statistic	0.724	95% Bootstrap-t UCL	112
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	85.98
Kolmogorov-Smirnov Test Statistic	0.269	95% Percentile Bootstrap UCL	63.78
Kolmogorov-Smirnov 5% Critical Value	0.275	95% BCA Bootstrap UCL	72.07
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	104.7
		97.5% Chebyshev(Mean, Sd) UCL	133.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	190.9
95% Approximate Gamma UCL	83.08		
95% Adjusted Gamma UCL	96.36		

Potential UCL to Use		Use 95% Approximate Gamma UCL	83.08

General Statistics

Number of Valid Samples	6	Number of Unique Samples	6

Raw Statistics		Log-transformed Statistics	
Minimum	6.053	Minimum of Log Data	1.801
Maximum	26.65	Maximum of Log Data	3.283
Mean	15.23	Mean of log Data	2.602
Median	12.8	SD of log Data	0.55
SD	8.013		
Coefficient of Variation	0.526		
Skewness	0.605		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.915	Shapiro Wilk Test Statistic	0.958
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	21.82	95% H-UCL	31.58
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	30.2
95% Adjusted-CLT UCL	21.48	97.5% Chebyshev (MVUE) UCL	36.66
95% Modified-t UCL	21.96	99% Chebyshev (MVUE) UCL	49.35

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.248	Data appear Normal at 5% Significance Level	
Theta Star	6.775		
nu star	26.98		
Approximate Chi Square Value (.05)	16.13	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0122	95% CLT UCL	20.61
Adjusted Chi Square Value	13.2	95% Jackknife UCL	21.82
		95% Standard Bootstrap UCL	20.23
Anderson-Darling Test Statistic	0.266	95% Bootstrap-t UCL	28.41
Anderson-Darling 5% Critical Value	0.699	95% Hall's Bootstrap UCL	77.88
Kolmogorov-Smirnov Test Statistic	0.197	95% Percentile Bootstrap UCL	20.29
Kolmogorov-Smirnov 5% Critical Value	0.333	95% BCA Bootstrap UCL	20.53
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	29.49
		97.5% Chebyshev(Mean, Sd) UCL	35.66
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	47.78
95% Approximate Gamma UCL	25.47		
95% Adjusted Gamma UCL	31.12		

Potential UCL to Use		Use 95% Student's-t UCL	21.82

Appendix D

Shower Model Assumptions and Calculations

List of Tables Included in Appendix D
Anniston PCB Site, Operable Unit 3

TABLES

TABLE D-1

VALUES USED FOR SHOWER MODEL

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air
Receptor Population:	Resident
Receptor Age:	Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CW	Chemical Concentration in Water	µg/L	See Table D-3	See Table D-3	See Table D-3	See Table D-3	Maximum air concentration in bathroom
	f	Fraction volatilized	--	See Table 4-2	Schaum et al. (1)	See Table 4-2	Schaum et al. (1)	(Camax) (µg/m^3) =
	Fw	Water flow rate	L/hr	1,000	Schaum et al.	500	Schaum et al.	CW x f x Fw x t1 x 1/Va
	t1	Time of shower	hr	0.25	EPA 2001e	0.10	EPA 2001e	
	Va	Bathroom volume	m^3	16	Schaum et al.	6	Schaum et al.	EPC (µg/m^3) =
	t2	Time after shower in bathroom	hr	0.33	EPA 2001	0.15	EPA 2001	(((Camax/2) x t1) + (Camax x t2)) / (t1 + t2)

RME = Reasonable Maximum Exposure.

CTE = Central Tendency Exposure.

EPC = Exposure Point Concentration, the average air concentration in the bathroom during and after shower.

(1) Applies only to volatile chemicals.

Sources:

EPA 2001: Personal communication with M. Olsen of EPA Region 2, July 13, 2001. Based on EPA Region 2 and the Andelman model as modified by Schaum et al.

Schaum et al. 1994. Estimating Dermal and Inhalation Exposure to Volatile Chemicals in Domestic Water. Water Contamination and Health, edited by Rhoda G.M. Wang. New York: Marcel Dekker, Inc.

TABLE D-2

VALUES USED FOR SHOWER MODEL

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air
Receptor Population:	Resident
Receptor Age:	Child (0-6 yrs)

Exposure Route	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CW	Chemical Concentration in Water	µg/L	See Table D-4	See Table D-4	See Table D-4	See Table D-4	Maximum air concentration in bathroom
	f	Fraction volatilized	--	See Table 4-2	Schaum et al. (1)	See Table 4-2	Schaum et al. (1)	(Camax) (µg/m^3) =
	Fw	Water flow rate	L/hr	1,000	Schaum et al.	500	Schaum et al.	CW x f x Fw x t1 x 1/Va
	t1	Time of shower	hr	0.45	EPA 2001	0.14	EPA 2001	
	Va	Bathroom volume	m^3	16	Schaum et al.	6	Schaum et al.	EPC (µg/m^3) =
	t2	Time after shower in bathroom	hr	0.55	EPA 2001	0.19	EPA 2001	(((Camax/2) x t1) + (Camax x t2)) / (t1 + t2)

RME = Reasonable Maximum Exposure.

CTE = Central Tendency Exposure.

EPC = Exposure Point Concentration, the average air concentration in the bathroom during and after shower.

(1) Applies only to volatile chemicals.

Sources:

EPA 2001: Personal communication with M. Olsen of EPA Region 2, July 13, 2001. Based on EPA Region 2 and the Andelman model as modified by Schaum et al.

Schaum et al. 1994. Estimating Dermal and Inhalation Exposure to Volatile Chemicals in Domestic Water. Water Contamination and Health, edited by Rhoda G.M. Wang. New York: Marcel Dekker, Inc.

TABLE D-3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air
Receptor Population:	Resident
Receptor Age:	Adult

Exposure Point	Chemical of Potential Concern	Groundwater EPC Value (µg/L)	Reasonable Maximum Exposure				Central Tendency Exposure			
			Fraction Volatilized	Camax Value (µg/m^3)	Medium EPC Value	Medium EPC Unit	Fraction Volatilized	Camax Value (µg/m^3)	Medium EPC Value	Medium EPC Unit
Groundwater	**VOCs**									
	1,2,4-Trichlorobenzene	1.1E+01	4.6E-01	7.8E+01	6.1E+01	µg/m^3	4.6E-01	4.2E+01	3.3E+01	µg/m^3
	1,4-Dichlorobenzene	2.4E+00	4.4E-01	1.7E+01	1.3E+01	µg/m^3	4.4E-01	9.0E+00	7.2E+00	µg/m^3
	Chlorobenzene	5.1E+00	4.7E-01	3.8E+01	3.0E+01	µg/m^3	4.7E-01	2.0E+01	1.6E+01	µg/m^3
	cis-1,2-Dichloroethene	1.0E+01	5.6E-01	8.8E+01	6.9E+01	µg/m^3	5.6E-01	4.7E+01	3.8E+01	µg/m^3
	Pentachlorophenol	2.0E+01	3.7E-01	1.1E+02	9.0E+01	µg/m^3	3.7E-01	6.1E+01	4.9E+01	µg/m^3
	Trichloroethylene	3.4E+00	4.9E-01	2.6E+01	2.0E+01	µg/m^3	4.9E-01	1.4E+01	1.1E+01	µg/m^3
	SVOCs									
	2,4,6-Trichlorophenol	1.5E+01	3.8E-01	8.9E+01	7.0E+01	µg/m^3	3.8E-01	4.7E+01	3.8E+01	µg/m^3
	Indeno(1,2,3-cd)pyrene	7.3E-01	3.6E-01	4.1E+00	3.2E+00	µg/m^3	3.6E-01	2.2E+00	1.7E+00	µg/m^3
	P/PCBs									
	PCBs, Total	2.8E+03	NA	NA	NA	NA	NA	NA	NA	NA
	gamma-BHC	5.5E-01	4.2E-01	3.6E+00	2.8E+00	µg/m^3	4.2E-01	1.9E+00	1.5E+00	µg/m^3
	Methyl parathion	7.4E+01	NA	NA	NA	NA	NA	NA	NA	NA
	Parathion	9.4E+03	NA	NA	NA	NA	NA	NA	NA	NA
	Dioxin									
	Dioxin TEQ	3.6E-06	NA	NA	NA	NA	NA	NA	NA	NA
	Inorganics									
	Antimony	5.1E+00	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	6.1E+00	NA	NA	NA	NA	NA	NA	NA	NA
	Manganese	1.3E+03	NA	NA	NA	NA	NA	NA	NA	NA
	Mercury	1.8E+00	3.8E-01	1.1E+01	8.3E+00	µg/m^3	3.8E-01	5.7E+00	4.5E+00	µg/m^3

EPC = Exposure Point Concentration.

Camax = Maximum concentration of contaminant in air .

TABLE D-4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air
Receptor Population:	Resident
Receptor Age:	Child (0-6 yrs)

Exposure Point	Chemical of Potential Concern	Groundwater EPC Value (µg/L)	Reasonable Maximum Exposure				Central Tendency Exposure			
			Fraction Volatilized	Camax Value (µg/m^3)	Medium EPC Value	Medium EPC Unit	Fraction Volatilized	Camax Value (µg/m^3)	Medium EPC Value	Medium EPC Unit
Groundwater	**VOCs**									
	1,2,4-Trichlorobenzene	1.1E+01	4.6E-01	1.4E+02	1.1E+02	µg/m^3	4.6E-01	5.8E+01	4.6E+01	µg/m^3
	1,4-Dichlorobenzene	2.4E+00	4.4E-01	3.0E+01	2.4E+01	µg/m^3	4.4E-01	1.3E+01	9.9E+00	µg/m^3
	Chlorobenzene	5.1E+00	4.7E-01	6.8E+01	5.3E+01	µg/m^3	4.7E-01	2.8E+01	2.2E+01	µg/m^3
	cis-1,2-Dichloroethene	1.0E+01	5.6E-01	1.6E+02	1.2E+02	µg/m^3	5.6E-01	6.6E+01	5.2E+01	µg/m^3
	Pentachlorophenol	2.0E+01	3.7E-01	2.1E+02	1.6E+02	µg/m^3	3.7E-01	8.6E+01	6.7E+01	µg/m^3
	Trichloroethylene	3.4E+00	4.9E-01	4.7E+01	3.6E+01	µg/m^3	4.9E-01	1.9E+01	1.5E+01	µg/m^3
	SVOCs									
	2,4,6-Trichlorophenol	1.5E+01	3.8E-01	1.6E+02	1.2E+02	µg/m^3	3.8E-01	6.6E+01	5.2E+01	µg/m^3
	Indeno(1,2,3-cd)pyrene	7.3E-01	3.6E-01	7.3E+00	5.7E+00	µg/m^3	3.6E-01	3.0E+00	2.4E+00	µg/m^3
	P/PCBs									
	PCBs, Total	2.8E+03	NA	NA	NA	NA	NA	NA	NA	NA
	gamma-BHC	5.5E-01	4.2E-01	6.5E+00	5.1E+00	µg/m^3	4.2E-01	2.7E+00	2.1E+00	µg/m^3
	Methyl parathion	7.4E+01	NA	NA	NA	NA	NA	NA	NA	NA
	Parathion	9.4E+03	NA	NA	NA	NA	NA	NA	NA	NA
	Dioxin									
	Dioxin TEQ	3.6E-06	NA	NA	NA	NA	NA	NA	NA	NA
	Inorganics									
	Antimony	5.1E+00	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	6.1E+00	NA	NA	NA	NA	NA	NA	NA	NA
	Manganese	1.3E+03	NA	NA	NA	NA	NA	NA	NA	NA
	Mercury	1.8E+00	3.8E-01	1.9E+01	1.5E+01	µg/m^3	3.8E-01	7.9E+00	6.2E+00	µg/m^3

EPC = Exposure Point Concentration.

Camax = Maximum concentration of contaminant in air.

Appendix E

RAGS D Standard Tables – CTE

List of Tables Included in Appendix E
Anniston PCB Site, Operable Unit 3

TABLES

TABLE E-7.1
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Operations Area Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Unit	Cancer Risk Calculations: Intake/ Exposure Concentration Value	Intake/ Exposure Concentration Unit	CSF/Unit Risk Value	CSF/Unit Risk Unit	Cancer Risk	Non-Cancer Hazard Calculations: Intake/ Exposure Concentration Value	Intake/ Exposure Concentration Unit	RfD/RfC Value	RfD/RfC Unit	Hazard Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	4.6E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.3E-08	3.6E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	1.0E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	7.6E-07	8.1E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	1.2E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	8.4E-08	9.0E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	3.4E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.5E-07	2.7E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	7.2E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.2E-08	5.6E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.3E+02	mg/kg	2.2E-06	mg/kg/day	1.0E+00	(mg/kg-day)-1	2.2E-06	1.7E-05	mg/kg/day	2.0E-05	mg/kg-day	8.5E-01
				Heptachlor epoxide	3.8E-01	mg/kg	2.1E-08	mg/kg/day	9.1E+00	(mg/kg-day)-1	1.9E-07	1.6E-07	mg/kg/day	1.3E-05	mg/kg-day	1.3E-02
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	4.2E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	6.2E-06	3.2E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	1.0E-03	mg/kg/day	NA	NA	NA	8.1E-03	mg/kg/day	1.0E+00	mg/kg-day	8.1E-03
				Antimony	8.7E+00	mg/kg	4.8E-07	mg/kg/day	NA	NA	NA	3.7E-06	mg/kg/day	4.0E-04	mg/kg-day	9.3E-03
				Arsenic	3.9E+02	mg/kg	6.4E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	9.7E-06	5.0E-05	mg/kg/day	3.0E-04	mg/kg-day	1.7E-01
				Cadmium	4.7E+00	mg/kg	2.6E-07	mg/kg/day	NA	NA	NA	2.0E-06	mg/kg/day	1.0E-03	mg/kg-day	2.0E-03
				Chromium	2.3E+01	mg/kg	1.3E-06	mg/kg/day	NA	NA	NA	9.9E-06	mg/kg/day	3.0E-03	mg/kg-day	3.3E-03
				Iron	2.6E+04	mg/kg	1.4E-03	mg/kg/day	NA	NA	NA	1.1E-02	mg/kg/day	7.0E-01	mg/kg-day	1.6E-02
				Lead	4.7E+03	mg/kg	2.6E-04	mg/kg/day	NA	NA	NA	2.0E-03	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	4.6E-05	mg/kg/day	NA	NA	NA	3.6E-04	mg/kg/day	1.4E-01	mg/kg-day	2.5E-03
				Mercury	2.6E+00	mg/kg	1.4E-07	mg/kg/day	NA	NA	NA	1.1E-06	mg/kg/day	3.0E-04	mg/kg-day	3.7E-03
				Vanadium	4.0E+01	mg/kg	2.2E-06	mg/kg/day	NA	NA	NA	1.7E-05	mg/kg/day	1.0E-03	mg/kg-day	1.7E-02
			Exp. Route Total								1.9E-05					1.1E+00
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	5.4E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.0E-08	4.2E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	1.2E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	9.1E-07	9.7E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	1.4E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.0E-07	1.1E-06	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	4.1E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	3.0E-07	3.2E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	8.5E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	6.2E-08	6.6E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.3E+02	mg/kg	4.0E-06	mg/kg/day	1.0E+00	(mg/kg-day)-1	4.0E-06	3.1E-05	mg/kg/day	2.0E-05	mg/kg-day	1.6E+00
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	1.1E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	1.7E-06	8.9E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	5.9E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	8.9E-06	4.6E-05	mg/kg/day	3.0E-04	mg/kg-day	1.5E-01
				Cadmium	4.7E+00	mg/kg	2.4E-09	mg/kg/day	NA	NA	NA	1.8E-08	mg/kg/day	2.5E-05	mg/kg-day	7.4E-04
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								1.6E-05					1.7E+00
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	9.6E-07	mg/kg/day	3.5E-01	(mg/kg-day)-1	3.4E-07	2.7E-06	mg/kg/day	NA	NA	NA
			Exp. Route Total								3.4E-07					NA
		Exposure Point Total									4E-05					3E+00

TABLE E-7.2
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Operations Area Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	9.1E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	6.7E-08	7.1E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	2.1E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.5E-06	1.6E-06	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	2.3E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.7E-07	1.8E-06	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	6.8E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	5.0E-07	5.3E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	1.4E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.0E-07	1.1E-06	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	6.7E-04	mg/kg/day	1.0E+00	(mg/kg-day)-1	6.7E-04	5.2E-03	mg/kg/day	2.0E-05	mg/kg-day	2.6E+02
				Heptachlor epoxide	3.8E-01	mg/kg	4.2E-08	mg/kg/day	9.1E+00	(mg/kg-day)-1	3.8E-07	3.3E-07	mg/kg/day	1.3E-05	mg/kg-day	2.5E-02
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	8.3E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	1.2E-05	6.5E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	2.1E-03	mg/kg/day	NA	NA	NA	1.6E-02	mg/kg/day	1.0E+00	mg/kg-day	1.6E-02
				Antimony	8.7E+00	mg/kg	9.6E-07	mg/kg/day	NA	NA	NA	7.5E-06	mg/kg/day	4.0E-04	mg/kg-day	1.9E-02
				Arsenic	3.9E+02	mg/kg	4.3E-05	mg/kg/day	1.5E+00	(mg/kg-day)-1	6.4E-05	3.3E-04	mg/kg/day	3.0E-04	mg/kg-day	1.1E+00
				Cadmium	4.7E+00	mg/kg	5.2E-07	mg/kg/day	NA	NA	NA	4.0E-06	mg/kg/day	1.0E-03	mg/kg-day	4.0E-03
				Chromium	2.3E+01	mg/kg	2.5E-06	mg/kg/day	NA	NA	NA	2.0E-05	mg/kg/day	3.0E-03	mg/kg-day	6.6E-03
				Iron	2.6E+04	mg/kg	2.9E-03	mg/kg/day	NA	NA	NA	2.2E-02	mg/kg/day	7.0E-01	mg/kg-day	3.2E-02
				Lead	4.7E+03	mg/kg	5.2E-04	mg/kg/day	NA	NA	NA	4.0E-03	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	9.1E-05	mg/kg/day	NA	NA	NA	7.1E-04	mg/kg/day	1.4E-01	mg/kg-day	5.1E-03
				Mercury	2.6E+00	mg/kg	2.9E-07	mg/kg/day	NA	NA	NA	2.2E-06	mg/kg/day	3.0E-04	mg/kg-day	7.4E-03
				Vanadium	4.0E+01	mg/kg	4.4E-06	mg/kg/day	NA	NA	NA	3.4E-05	mg/kg/day	1.0E-03	mg/kg-day	3.4E-02
			Exp. Route Total								7.5E-04					2.6E+02
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	7.8E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.7E-08	6.1E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	1.8E-07	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.3E-06	1.4E-06	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	2.0E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.4E-07	1.5E-06	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	5.9E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	4.3E-07	4.6E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	1.2E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	9.0E-08	9.6E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	2.6E-04	mg/kg/day	1.0E+00	(mg/kg-day)-1	2.6E-04	2.1E-03	mg/kg/day	2.0E-05	mg/kg-day	1.0E+02
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	1.6E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	2.5E-06	1.3E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	8.5E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	1.3E-05	6.6E-05	mg/kg/day	3.0E-04	mg/kg-day	2.2E-01
				Cadmium	4.7E+00	mg/kg	3.4E-09	mg/kg/day	NA	NA	NA	2.7E-08	mg/kg/day	2.5E-05	mg/kg-day	1.1E-03
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								2.8E-04					1.0E+02
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	9.6E-07	mg/kg/day	3.5E-01	(mg/kg-day)-1	3.4E-07	2.7E-06	mg/kg/day	NA	NA	NA
			Exp. Route Total								3.4E-07					NA
		Exposure Point Total									1E-03					4E+02

TABLE E-7.3
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	5.0E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.7E-09	3.9E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	1.1E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	8.4E-08	8.9E-08	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	1.3E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	9.3E-09	9.9E-08	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	3.7E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.7E-08	2.9E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	7.9E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.7E-09	6.1E-08	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	2.3E-06	mg/kg/day	1.0E+00	(mg/kg-day)-1	2.3E-06	1.8E-05	mg/kg/day	2.0E-05	mg/kg-day	8.8E-01
				Heptachlor epoxide	3.8E-01	mg/kg	2.3E-09	mg/kg/day	9.1E+00	(mg/kg-day)-1	2.1E-08	1.8E-08	mg/kg/day	1.3E-05	mg/kg-day	1.4E-03
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	4.6E-12	mg/kg/day	1.5E+05	(mg/kg-day)-1	6.8E-07	3.6E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	1.1E-04	mg/kg/day	NA	NA	NA	8.9E-04	mg/kg/day	1.0E+00	mg/kg-day	8.9E-04
				Antimony	8.7E+00	mg/kg	5.3E-08	mg/kg/day	NA	NA	NA	4.1E-07	mg/kg/day	4.0E-04	mg/kg-day	1.0E-03
				Arsenic	3.9E+02	mg/kg	2.4E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	3.5E-06	1.8E-05	mg/kg/day	3.0E-04	mg/kg-day	6.1E-02
				Cadmium	4.7E+00	mg/kg	2.8E-08	mg/kg/day	NA	NA	NA	2.2E-07	mg/kg/day	1.0E-03	mg/kg-day	2.2E-04
				Chromium	2.3E+01	mg/kg	1.4E-07	mg/kg/day	NA	NA	NA	1.1E-06	mg/kg/day	3.0E-03	mg/kg-day	3.6E-04
				Iron	2.6E+04	mg/kg	1.6E-04	mg/kg/day	NA	NA	NA	1.2E-03	mg/kg/day	7.0E-01	mg/kg-day	1.7E-03
				Lead	4.7E+03	mg/kg	2.8E-05	mg/kg/day	NA	NA	NA	2.2E-04	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	5.0E-06	mg/kg/day	NA	NA	NA	3.9E-05	mg/kg/day	1.4E-01	mg/kg-day	2.8E-04
				Mercury	2.6E+00	mg/kg	1.6E-08	mg/kg/day	NA	NA	NA	1.2E-07	mg/kg/day	3.0E-04	mg/kg-day	4.1E-04
				Vanadium	4.0E+01	mg/kg	2.4E-07	mg/kg/day	NA	NA	NA	1.9E-06	mg/kg/day	1.0E-03	mg/kg-day	1.9E-03
			Exp. Route Total								6.6E-06					9.5E-01
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	4.3E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.1E-09	3.3E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	9.8E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	7.2E-08	7.7E-08	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	1.1E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	7.9E-09	8.5E-08	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	3.2E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.3E-08	2.5E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	6.7E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.9E-09	5.2E-08	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	8.9E-07	mg/kg/day	1.0E+00	(mg/kg-day)-1	8.9E-07	7.0E-06	mg/kg/day	2.0E-05	mg/kg-day	3.5E-01
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	9.0E-13	mg/kg/day	1.5E+05	(mg/kg-day)-1	1.4E-07	7.0E-12	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	4.7E-07	mg/kg/day	1.5E+00	(mg/kg-day)-1	7.0E-07	3.6E-06	mg/kg/day	3.0E-04	mg/kg-day	1.2E-02
				Cadmium	4.7E+00	mg/kg	1.9E-10	mg/kg/day	NA	NA	NA	1.5E-09	mg/kg/day	2.5E-05	mg/kg-day	5.8E-05
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								1.8E-06					3.6E-01
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	5.3E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.8E-08	4.1E-07	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.8E-08					NA
		Exposure Point Total									8E-06					1E+00

TABLE E-7.4
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	5.0E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.7E-09	3.9E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	1.1E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	8.4E-08	8.9E-08	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	1.3E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	9.3E-09	9.9E-08	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	3.7E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.7E-08	2.9E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	7.9E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.7E-09	6.1E-08	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	3.7E-05	mg/kg/day	1.0E+00	(mg/kg-day)-1	3.7E-05	2.8E-04	mg/kg/day	2.0E-05	mg/kg-day	1.4E+01
				Heptachlor epoxide	3.8E-01	mg/kg	2.3E-09	mg/kg/day	9.1E+00	(mg/kg-day)-1	2.1E-08	1.8E-08	mg/kg/day	1.3E-05	mg/kg-day	1.4E-03
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	4.6E-12	mg/kg/day	1.5E+05	(mg/kg-day)-1	6.8E-07	3.6E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	1.1E-04	mg/kg/day	NA	NA	NA	8.9E-04	mg/kg/day	1.0E+00	mg/kg-day	8.9E-04
				Antimony	8.7E+00	mg/kg	5.3E-08	mg/kg/day	NA	NA	NA	4.1E-07	mg/kg/day	4.0E-04	mg/kg-day	1.0E-03
				Arsenic	3.9E+02	mg/kg	2.4E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	3.5E-06	1.8E-05	mg/kg/day	3.0E-04	mg/kg-day	6.1E-02
				Cadmium	4.7E+00	mg/kg	2.8E-08	mg/kg/day	NA	NA	NA	2.2E-07	mg/kg/day	1.0E-03	mg/kg-day	2.2E-04
				Chromium	2.3E+01	mg/kg	1.4E-07	mg/kg/day	NA	NA	NA	1.1E-06	mg/kg/day	3.0E-03	mg/kg-day	3.6E-04
				Iron	2.6E+04	mg/kg	1.6E-04	mg/kg/day	NA	NA	NA	1.2E-03	mg/kg/day	7.0E-01	mg/kg-day	1.7E-03
				Lead	4.7E+03	mg/kg	2.8E-05	mg/kg/day	NA	NA	NA	2.2E-04	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	5.0E-06	mg/kg/day	NA	NA	NA	3.9E-05	mg/kg/day	1.4E-01	mg/kg-day	2.8E-04
				Mercury	2.6E+00	mg/kg	1.6E-08	mg/kg/day	NA	NA	NA	1.2E-07	mg/kg/day	3.0E-04	mg/kg-day	4.1E-04
				Vanadium	4.0E+01	mg/kg	2.4E-07	mg/kg/day	NA	NA	NA	1.9E-06	mg/kg/day	1.0E-03	mg/kg-day	1.9E-03
			Exp. Route Total								4.1E-05					1.4E+01
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	4.3E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.1E-09	3.3E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	9.8E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	7.2E-08	7.7E-08	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	1.1E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	7.9E-09	8.5E-08	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	3.2E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.3E-08	2.5E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	6.7E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.9E-09	5.2E-08	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	1.4E-05	mg/kg/day	1.0E+00	(mg/kg-day)-1	1.4E-05	1.1E-04	mg/kg/day	2.0E-05	mg/kg-day	5.6E+00
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	9.0E-13	mg/kg/day	1.5E+05	(mg/kg-day)-1	1.4E-07	7.0E-12	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	4.7E-07	mg/kg/day	1.5E+00	(mg/kg-day)-1	7.0E-07	3.6E-06	mg/kg/day	3.0E-04	mg/kg-day	1.2E-02
				Cadmium	4.7E+00	mg/kg	1.9E-10	mg/kg/day	NA	NA	NA	1.5E-09	mg/kg/day	2.5E-05	mg/kg-day	5.8E-05
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								1.5E-05					5.6E+00
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	5.3E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.8E-08	4.1E-07	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.8E-08					NA
		Exposure Point Total									6E-05					2E+01

TABLE E-7.5

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Trespasser
Receptor Age:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	7.2E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.3E-09	5.1E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	1.7E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.2E-07	1.2E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	1.8E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.3E-08	1.3E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	5.4E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	3.9E-08	3.8E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	1.1E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	8.3E-09	7.9E-08	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	3.3E-06	mg/kg/day	1.0E+00	(mg/kg-day)-1	3.3E-06	2.3E-05	mg/kg/day	2.0E-05	mg/kg-day	1.1E+00
				Heptachlor epoxide	3.8E-01	mg/kg	3.3E-09	mg/kg/day	9.1E+00	(mg/kg-day)-1	3.0E-08	2.3E-08	mg/kg/day	1.3E-05	mg/kg-day	1.8E-03
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	6.6E-12	mg/kg/day	1.5E+05	(mg/kg-day)-1	9.9E-07	4.6E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	1.7E-04	mg/kg/day	NA	NA	NA	1.2E-03	mg/kg/day	1.0E+00	mg/kg-day	1.2E-03
				Antimony	8.7E+00	mg/kg	7.6E-08	mg/kg/day	NA	NA	NA	5.3E-07	mg/kg/day	4.0E-04	mg/kg-day	1.3E-03
				Arsenic	3.9E+02	mg/kg	3.4E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	5.1E-06	2.4E-05	mg/kg/day	3.0E-04	mg/kg-day	7.9E-02
				Cadmium	4.7E+00	mg/kg	4.1E-08	mg/kg/day	NA	NA	NA	2.9E-07	mg/kg/day	1.0E-03	mg/kg-day	2.9E-04
				Chromium	2.3E+01	mg/kg	2.0E-07	mg/kg/day	NA	NA	NA	1.4E-06	mg/kg/day	3.0E-03	mg/kg-day	4.7E-04
				Iron	2.6E+04	mg/kg	2.3E-04	mg/kg/day	NA	NA	NA	1.6E-03	mg/kg/day	7.0E-01	mg/kg-day	2.3E-03
				Lead	4.7E+03	mg/kg	4.1E-05	mg/kg/day	NA	NA	NA	2.9E-04	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	7.2E-06	mg/kg/day	NA	NA	NA	5.1E-05	mg/kg/day	1.4E-01	mg/kg-day	3.6E-04
				Mercury	2.6E+00	mg/kg	2.3E-08	mg/kg/day	NA	NA	NA	1.6E-07	mg/kg/day	3.0E-04	mg/kg-day	5.3E-04
				Vanadium	4.0E+01	mg/kg	3.5E-07	mg/kg/day	NA	NA	NA	2.4E-06	mg/kg/day	1.0E-03	mg/kg-day	2.4E-03
			Exp. Route Total								9.5E-06					1.2E+00
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	1.1E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	7.7E-10	7.4E-09	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	2.4E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.8E-08	1.7E-08	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	2.7E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.9E-09	1.9E-08	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	7.9E-10	mg/kg/day	7.3E+00	(mg/kg-day)-1	5.7E-09	5.5E-09	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	1.6E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.2E-09	1.2E-08	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	2.2E-07	mg/kg/day	1.0E+00	(mg/kg-day)-1	2.2E-07	1.5E-06	mg/kg/day	2.0E-05	mg/kg-day	7.6E-02
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	2.2E-13	mg/kg/day	1.5E+05	(mg/kg-day)-1	3.3E-08	1.5E-12	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	1.1E-07	mg/kg/day	1.5E+00	(mg/kg-day)-1	1.7E-07	8.0E-07	mg/kg/day	3.0E-04	mg/kg-day	2.7E-03
				Cadmium	4.7E+00	mg/kg	4.6E-11	mg/kg/day	NA	NA	NA	3.2E-10	mg/kg/day	2.5E-05	mg/kg-day	1.3E-05
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								4.5E-07					7.9E-02
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	1.4E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	4.7E-09	9.5E-08	mg/kg/day	NA	NA	NA
			Exp. Route Total								4.7E-09					NA
		Exposure Point Total									1E-05					1E+00

TABLE E-7.6

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Trespasser
Receptor Age:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	7.2E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.3E-09	5.1E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	1.7E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.2E-07	1.2E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	1.8E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.3E-08	1.3E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	5.4E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	3.9E-08	3.8E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	1.1E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	8.3E-09	7.9E-08	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	5.3E-05	mg/kg/day	1.0E+00	(mg/kg-day)-1	5.3E-05	3.7E-04	mg/kg/day	2.0E-05	mg/kg-day	1.8E+01
				Heptachlor epoxide	3.8E-01	mg/kg	3.3E-09	mg/kg/day	9.1E+00	(mg/kg-day)-1	3.0E-08	2.3E-08	mg/kg/day	1.3E-05	mg/kg-day	1.8E-03
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	6.6E-12	mg/kg/day	1.5E+05	(mg/kg-day)-1	9.9E-07	4.6E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	1.7E-04	mg/kg/day	NA	NA	NA	1.2E-03	mg/kg/day	1.0E+00	mg/kg-day	1.2E-03
				Antimony	8.7E+00	mg/kg	7.6E-08	mg/kg/day	NA	NA	NA	5.3E-07	mg/kg/day	4.0E-04	mg/kg-day	1.3E-03
				Arsenic	3.9E+02	mg/kg	3.4E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	5.1E-06	2.4E-05	mg/kg/day	3.0E-04	mg/kg-day	7.9E-02
				Cadmium	4.7E+00	mg/kg	4.1E-08	mg/kg/day	NA	NA	NA	2.9E-07	mg/kg/day	1.0E-03	mg/kg-day	2.9E-04
				Chromium	2.3E+01	mg/kg	2.0E-07	mg/kg/day	NA	NA	NA	1.4E-06	mg/kg/day	3.0E-03	mg/kg-day	4.7E-04
				Iron	2.6E+04	mg/kg	2.3E-04	mg/kg/day	NA	NA	NA	1.6E-03	mg/kg/day	7.0E-01	mg/kg-day	2.3E-03
				Lead	4.7E+03	mg/kg	4.1E-05	mg/kg/day	NA	NA	NA	2.9E-04	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	7.2E-06	mg/kg/day	NA	NA	NA	5.1E-05	mg/kg/day	1.4E-01	mg/kg-day	3.6E-04
				Mercury	2.6E+00	mg/kg	2.3E-08	mg/kg/day	NA	NA	NA	1.6E-07	mg/kg/day	3.0E-04	mg/kg-day	5.3E-04
				Vanadium	4.0E+01	mg/kg	3.5E-07	mg/kg/day	NA	NA	NA	2.4E-06	mg/kg/day	1.0E-03	mg/kg-day	2.4E-03
			Exp. Route Total								5.9E-05					1.9E+01
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	1.1E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	7.7E-10	7.4E-09	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	2.4E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.8E-08	1.7E-08	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	2.7E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.9E-09	1.9E-08	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	7.9E-10	mg/kg/day	7.3E+00	(mg/kg-day)-1	5.7E-09	5.5E-09	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	1.6E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.2E-09	1.2E-08	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	3.5E-06	mg/kg/day	1.0E+00	(mg/kg-day)-1	3.5E-06	2.5E-05	mg/kg/day	2.0E-05	mg/kg-day	1.2E+00
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	2.2E-13	mg/kg/day	1.5E+05	(mg/kg-day)-1	3.3E-08	1.5E-12	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	1.1E-07	mg/kg/day	1.5E+00	(mg/kg-day)-1	1.7E-07	8.0E-07	mg/kg/day	3.0E-04	mg/kg-day	2.7E-03
				Cadmium	4.7E+00	mg/kg	4.6E-11	mg/kg/day	NA	NA	NA	3.2E-10	mg/kg/day	2.5E-05	mg/kg-day	1.3E-05
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								3.8E-06					1.2E+00
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	1.4E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	4.7E-09	9.5E-08	mg/kg/day	NA	NA	NA
			Exp. Route Total								4.7E-09					NA
		Exposure Point Total									6E-05					2E+01

TABLE E-7.7

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/ Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Unit	Value	Unit	Value	Unit		Value	Unit	Value	Unit	
Surface/ Subsurface Soil	Surface/ Subsurface Soil	Surface/ Subsurface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	6.1E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.5E-09	4.3E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	1.4E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.0E-07	9.8E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	1.5E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.1E-08	1.1E-06	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	4.6E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	3.3E-08	3.2E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	9.6E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	7.0E-09	6.7E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.3E+03	mg/kg	2.4E-05	mg/kg/day	1.0E+00	(mg/kg-day)-1	2.4E-05	1.7E-03	mg/kg/day	2.0E-05	mg/kg-day	8.5E+01
				Heptachlor epoxide	3.8E-01	mg/kg	2.8E-09	mg/kg/day	9.1E+00	(mg/kg-day)-1	2.6E-08	2.0E-07	mg/kg/day	1.3E-05	mg/kg-day	1.5E-02
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	5.6E-12	mg/kg/day	1.5E+05	(mg/kg-day)-1	8.4E-07	3.9E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	1.4E-04	mg/kg/day	NA	NA	NA	9.8E-03	mg/kg/day	1.0E+00	mg/kg-day	9.8E-03
				Antimony	8.7E+00	mg/kg	6.4E-08	mg/kg/day	NA	NA	NA	4.5E-06	mg/kg/day	4.0E-04	mg/kg-day	1.1E-02
				Arsenic	1.5E+02	mg/kg	1.1E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	1.6E-06	7.6E-05	mg/kg/day	3.0E-04	mg/kg-day	2.5E-01
				Barium	1.9E+02	mg/kg	1.4E-06	mg/kg/day	NA	NA	NA	9.9E-05	mg/kg/day	2.0E-01	mg/kg-day	5.0E-04
				Cadmium	1.3E+00	mg/kg	9.7E-09	mg/kg/day	NA	NA	NA	6.8E-07	mg/kg/day	1.0E-03	mg/kg-day	6.8E-04
				Chromium	4.7E+01	mg/kg	3.5E-07	mg/kg/day	NA	NA	NA	2.4E-05	mg/kg/day	3.0E-03	mg/kg-day	8.1E-03
				Iron	2.6E+04	mg/kg	1.9E-04	mg/kg/day	NA	NA	NA	1.3E-02	mg/kg/day	7.0E-01	mg/kg-day	1.9E-02
				Lead	2.6E+03	mg/kg	1.9E-05	mg/kg/day	NA	NA	NA	1.3E-03	mg/kg/day	NA	NA	NA
				Manganese	2.8E+03	mg/kg	2.1E-05	mg/kg/day	NA	NA	NA	1.4E-03	mg/kg/day	1.4E-01	mg/kg-day	1.0E-02
				Mercury	1.5E+00	mg/kg	1.1E-08	mg/kg/day	NA	NA	NA	7.8E-07	mg/kg/day	3.0E-04	mg/kg-day	2.6E-03
				Nickel	8.9E+02	mg/kg	6.6E-06	mg/kg/day	NA	NA	NA	4.6E-04	mg/kg/day	2.0E-02	mg/kg-day	2.3E-02
				Vanadium	4.7E+01	mg/kg	3.5E-07	mg/kg/day	NA	NA	NA	2.4E-05	mg/kg/day	1.0E-03	mg/kg-day	2.4E-02
			Exp. Route Total								2.7E-05					8.5E+01
Surface/ Subsurface Soil	Surface/ Subsurface Soil	Surface/ Subsurface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	8.0E-10	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.8E-10	5.6E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	1.8E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.3E-08	1.3E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	2.0E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.5E-09	1.4E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	5.9E-10	mg/kg/day	7.3E+00	(mg/kg-day)-1	4.3E-09	4.2E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	1.2E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	9.1E-10	8.7E-08	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.3E+03	mg/kg	1.4E-06	mg/kg/day	1.0E+00	(mg/kg-day)-1	1.4E-06	1.0E-04	mg/kg/day	2.0E-05	mg/kg-day	5.1E+00
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	1.7E-13	mg/kg/day	1.5E+05	(mg/kg-day)-1	2.5E-08	1.2E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	1.5E+02	mg/kg	3.3E-08	mg/kg/day	1.5E+00	(mg/kg-day)-1	4.9E-08	2.3E-06	mg/kg/day	3.0E-04	mg/kg-day	7.6E-03
				Barium	1.9E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.4E-02	mg/kg-day	NA
				Cadmium	1.3E+00	mg/kg	9.7E-12	mg/kg/day	NA	NA	NA	6.8E-10	mg/kg/day	2.5E-05	mg/kg-day	2.7E-05
				Chromium	4.7E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	2.6E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	2.8E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	1.5E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Nickel	8.9E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	8.0E-04	mg/kg-day	NA
				Vanadium	4.7E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								1.5E-06					5.1E+00
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	3.2E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.1E-08	2.3E-06	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.1E-08					NA
		Exposure Point Total									3E-05					9E+01

TABLE E-7.8
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil South Landfill	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.4E+01	mg/kg	8.2E-08	mg/kg/day	1.0E+00	(mg/kg-day)-1	8.2E-08	6.4E-07	mg/kg/day	2.0E-05	mg/kg-day	3.2E-02
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.0E-04	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-03	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-01	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
			Exp. Route Total								8.2E-08					3.2E-02
Surface Soil	Surface Soil	Surface Soil South Landfill	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.4E+01	mg/kg	3.3E-08	mg/kg/day	1.0E+00	(mg/kg-day)-1	3.3E-08	2.5E-07	mg/kg/day	2.0E-05	mg/kg-day	1.3E-02
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-05	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								3.3E-08					1.3E-02
Air	Ambien Air	Ambient Air South Landfill	Inhalation	**P/PCBs**												
				PCBs, Total	7.0E+00	ng/m3	5.1E-09	mg/kg/day	3.5E-01	(mg/kg-day)-1	1.8E-09	3.9E-08	mg/kg/day	NA	NA	NA
			Exp. Route Total								1.8E-09					NA
		Exposure Point Total									1E-07					4E-02

TABLE E-7.9

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor Age:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil South Landfill	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.4E+01	mg/kg	1.2E-07	mg/kg/day	1.0E+00	(mg/kg-day)-1	1.2E-07	8.3E-07	mg/kg/day	2.0E-05	mg/kg-day	4.2E-02
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.0E-04	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-03	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-01	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
			Exp. Route Total								1.2E-07					4.2E-02
Surface Soil	Surface Soil	Surface Soil South Landfill	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.4E+01	mg/kg	8.0E-09	mg/kg/day	1.0E+00	(mg/kg-day)-1	8.0E-09	5.6E-08	mg/kg/day	2.0E-05	mg/kg-day	2.8E-03
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-05	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								8.0E-09					2.8E-03
Air	Ambient Air	Ambient Air South Landfill	Inhalation	**P/PCBs**												
				PCBs, Total	7.0E+00	ng/m3	1.3E-09	mg/kg/day	3.5E-01	(mg/kg-day)-1	4.5E-10	9.1E-09	mg/kg/day	NA	NA	NA
			Exp. Route Total								4.5E-10					NA
		Exposure Point Total									1E-07					4E-02

TABLE E-7.10

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil West End Landfill	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	1.0E+00	(mg/kg-day)-1	NA	NA	NA	2.0E-05	mg/kg-day	NA
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.0E-04	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-03	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-01	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
			Exp. Route Total								NA					NA
Surface Soil	Surface Soil	Surface Soil West End Landfill	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	1.0E+00	(mg/kg-day)-1	NA	NA	NA	2.0E-05	mg/kg-day	NA
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-05	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								NA					NA
Air	Ambient Air	Ambient Air West Landfill	Inhalation	**P/PCBs**												
				PCBs, Total	1.0E+01	ng/m3	7.3E-09	mg/kg/day	3.5E-01	(mg/kg-day)-1	2.6E-09	5.7E-08	mg/kg/day	NA	NA	NA
			Exp. Route Total								2.6E-09					NA
		Exposure Point Total									3E-09					NA

TABLE E-7.11

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor Age:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil West End Landfill	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	1.0E+00	(mg/kg-day)-1	NA	NA	NA	2.0E-05	mg/kg-day	NA
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.0E-04	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-03	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-01	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
			Exp. Route Total								NA					NA
Surface Soil	Surface Soil	Surface Soil West End Landfill	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	1.0E+00	(mg/kg-day)-1	NA	NA	NA	2.0E-05	mg/kg-day	NA
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-05	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								NA					NA
Air	Ambient Air	Ambient Air West Landfill	Inhalation	**P/PCBs**												
				PCBs, Total	1.0E+01	ng/m3	1.9E-09	mg/kg/day	3.5E-01	(mg/kg-day)-1	6.6E-10	1.3E-08	mg/kg/day	NA	NA	NA
			Exp. Route Total								6.6E-10					NA
		Exposure Point Total									7E-10					NA

TABLE E-7.12

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Operations Area Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Groundwater	Groundwater	Tap Water	Ingestion	**VOCs**												
				1,2,4-Trichlorobenzene	1.1E+01	µg/L	1.2E-05	mg/kg/day	NA	NA	NA	3.4E-05	mg/kg/day	1.0E-02	mg/kg-day	3.4E-03
				1,4-Dichlorobenzene	2.4E+00	µg/L	2.7E-06	mg/kg/day	2.4E-02	(mg/kg-day)-1	6.5E-08	7.5E-06	mg/kg/day	3.0E-02	mg/kg-day	2.5E-04
				Chlorobenzene	5.1E+00	µg/L	5.6E-06	mg/kg/day	NA	NA	NA	1.6E-05	mg/kg/day	2.0E-02	mg/kg-day	7.9E-04
				cis-1,2-Dichloroethene	1.0E+01	µg/L	1.1E-05	mg/kg/day	NA	NA	NA	3.1E-05	mg/kg/day	1.0E-02	mg/kg-day	3.1E-03
				Pentachlorophenol	2.0E+01	µg/L	2.2E-05	mg/kg/day	1.2E-01	(mg/kg-day)-1	2.6E-06	6.1E-05	mg/kg/day	3.0E-02	mg/kg-day	2.0E-03
				Trichloroethylene	3.4E+00	µg/L	3.7E-06	mg/kg/day	4.0E-01	(mg/kg-day)-1	1.5E-06	1.0E-05	mg/kg/day	3.0E-04	mg/kg-day	3.5E-02
				SVOCs												
				2,4,6-Trichlorophenol	1.5E+01	µg/L	1.7E-05	mg/kg/day	1.1E-02	(mg/kg-day)-1	1.8E-07	4.6E-05	mg/kg/day	1.0E-04	mg/kg-day	4.6E-01
				Indeno(1,2,3-cd)pyrene	7.3E-01	µg/L	8.0E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.9E-07	2.3E-06	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	2.8E+03	µg/L	3.0E-03	mg/kg/day	1.0E+00	(mg/kg-day)-1	3.0E-03	8.5E-03	mg/kg/day	2.0E-05	mg/kg-day	4.3E+02
				gamma-BHC	5.5E-01	µg/L	6.1E-07	mg/kg/day	1.3E+00	(mg/kg-day)-1	7.9E-07	1.7E-06	mg/kg/day	3.0E-04	mg/kg-day	5.7E-03
				Methyl parathion	7.4E+01	µg/L	8.2E-05	mg/kg/day	NA	NA	NA	2.3E-04	mg/kg/day	2.5E-04	mg/kg-day	9.1E-01
				Parathion	9.4E+03	µg/L	1.0E-02	mg/kg/day	NA	NA	NA	2.9E-02	mg/kg/day	6.0E-03	mg/kg-day	4.8E+00
				Dioxin												
				Dioxin TEQ	3.6E-06	µg/L	4.0E-12	mg/kg/day	1.5E+05	(mg/kg-day)-1	6.0E-07	1.1E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Antimony	5.1E+00	µg/L	5.6E-06	mg/kg/day	NA	NA	NA	1.6E-05	mg/kg/day	4.0E-04	mg/kg-day	3.9E-02
				Arsenic	6.1E+00	µg/L	6.7E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	1.0E-05	1.9E-05	mg/kg/day	3.0E-04	mg/kg-day	6.3E-02
				Manganese	1.3E+03	µg/L	1.4E-03	mg/kg/day	NA	NA	NA	4.0E-03	mg/kg/day	1.4E-01	mg/kg-day	2.9E-02
				Mercury	1.8E+00	µg/L	2.0E-06	mg/kg/day	NA	NA	NA	5.5E-06	mg/kg/day	3.0E-04	mg/kg-day	1.8E-02
			Exp. Route Total								3.1E-03					4.3E+02
		Exposure Point Total									3E-03					4E+02

TABLE E-7.13

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Groundwater	Groundwater	Tap Water	Ingestion	**VOCs**												
				1,2,4-Trichlorobenzene	1.1E+01	µg/L	6.6E-07	mg/kg/day	NA	NA	NA	5.2E-06	mg/kg/day	1.0E-02	mg/kg-day	5.2E-04
				1,4-Dichlorobenzene	2.4E+00	µg/L	1.5E-07	mg/kg/day	2.4E-02	(mg/kg-day)-1	3.5E-09	1.1E-06	mg/kg/day	3.0E-02	mg/kg-day	3.8E-05
				Chlorobenzene	5.1E+00	µg/L	3.1E-07	mg/kg/day	NA	NA	NA	2.4E-06	mg/kg/day	2.0E-02	mg/kg-day	1.2E-04
				cis-1,2-Dichloroethene	1.0E+01	µg/L	6.0E-07	mg/kg/day	NA	NA	NA	4.7E-06	mg/kg/day	1.0E-02	mg/kg-day	4.7E-04
				Pentachlorophenol	2.0E+01	µg/L	1.2E-06	mg/kg/day	1.2E-01	(mg/kg-day)-1	1.4E-07	9.3E-06	mg/kg/day	3.0E-02	mg/kg-day	3.1E-04
				Trichloroethylene	3.4E+00	µg/L	2.1E-07	mg/kg/day	4.0E-01	(mg/kg-day)-1	8.2E-08	1.6E-06	mg/kg/day	3.0E-04	mg/kg-day	5.3E-03
				SVOCs												
				2,4,6-Trichlorophenol	1.5E+01	µg/L	9.1E-07	mg/kg/day	1.1E-02	(mg/kg-day)-1	1.0E-08	7.0E-06	mg/kg/day	1.0E-04	mg/kg-day	7.0E-02
				Indeno(1,2,3-cd)pyrene	7.3E-01	µg/L	4.4E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.2E-08	3.4E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	2.8E+03	µg/L	1.7E-04	mg/kg/day	1.0E+00	(mg/kg-day)-1	1.7E-04	1.3E-03	mg/kg/day	2.0E-05	mg/kg-day	6.5E+01
				gamma-BHC	5.5E-01	µg/L	3.3E-08	mg/kg/day	1.3E+00	(mg/kg-day)-1	4.3E-08	2.6E-07	mg/kg/day	3.0E-04	mg/kg-day	8.6E-04
				Methyl parathion	7.4E+01	µg/L	4.5E-06	mg/kg/day	NA	NA	NA	3.5E-05	mg/kg/day	2.5E-04	mg/kg-day	1.4E-01
				Parathion	9.4E+03	µg/L	5.7E-04	mg/kg/day	NA	NA	NA	4.4E-03	mg/kg/day	6.0E-03	mg/kg-day	7.3E-01
				Dioxin												
				Dioxin TEQ	3.6E-06	µg/L	2.2E-13	mg/kg/day	1.5E+05	(mg/kg-day)-1	3.3E-08	1.7E-12	mg/kg/day	NA	NA	NA
				Inorganics												
				Antimony	5.1E+00	µg/L	3.1E-07	mg/kg/day	NA	NA	NA	2.4E-06	mg/kg/day	4.0E-04	mg/kg-day	6.0E-03
				Arsenic	6.1E+00	µg/L	3.7E-07	mg/kg/day	1.5E+00	(mg/kg-day)-1	5.5E-07	2.9E-06	mg/kg/day	3.0E-04	mg/kg-day	9.5E-03
				Manganese	1.3E+03	µg/L	7.9E-05	mg/kg/day	NA	NA	NA	6.1E-04	mg/kg/day	1.4E-01	mg/kg-day	4.4E-03
				Mercury	1.8E+00	µg/L	1.1E-07	mg/kg/day	NA	NA	NA	8.4E-07	mg/kg/day	3.0E-04	mg/kg-day	2.8E-03
			Exp. Route Total								1.7E-04					6.6E+01
		Exposure Point Total									2E-04					7E+01

TABLE E-8.1
CALCULATION OF RADIATION CANCER RISKS
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	NA
Receptor Population:	NA
Receptor Age:	NA

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
			NOT APPLICABLE TO THIS SITE									
			Exp. Route Total									
		Exposure Point Total										
								Total of Receptor Risks Across All Media				

TABLE E-9.1
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Operations Area Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		Facility Area	Benzo(a)anthracene	3.3E-08	NA	4.0E-08	7.3E-08	NA	NA	NA	NA	NA
			Benzo(a)pyrene	7.6E-07	NA	9.1E-07	1.7E-06	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	8.4E-08	NA	1.0E-07	1.9E-07	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	2.5E-07	NA	3.0E-07	5.5E-07	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	5.2E-08	NA	6.2E-08	1.1E-07	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	2.2E-06	NA	4.0E-06	6.2E-06	Eye/Skin/Nails/Immune System	8.5E-01	NA	1.6E+00	2.4E+00
			Heptachlor epoxide	1.9E-07	NA	NA	1.9E-07	Liver	1.3E-02	NA	NA	1.3E-02
			Dioxin									
			Dioxin TEQ	6.2E-06	NA	1.7E-06	8.0E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	8.1E-03	NA	NA	8.1E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	9.3E-03	NA	NA	9.3E-03
			Arsenic	9.7E-06	NA	8.9E-06	1.9E-05	Skin	1.7E-01	NA	1.5E-01	3.2E-01
			Cadmium	NA	NA	NA	NA	Kidney	2.0E-03	NA	7.4E-04	2.8E-03
			Chromium	NA	NA	NA	NA	GI Tract	3.3E-03	NA	NA	3.3E-03
			Iron	NA	NA	NA	NA	GI Tract/Liver	1.6E-02	NA	NA	1.6E-02
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	2.5E-03	NA	NA	2.5E-03
			Mercury	NA	NA	NA	NA	Immune System	3.7E-03	NA	NA	3.7E-03
			Vanadium	NA	NA	NA	NA	Metabolic	1.7E-02	NA	NA	1.7E-02
			Chemical Total	1.9E-05	NA	1.6E-05	3.5E-05		1.1E+00	NA	1.7E+00	2.8E+00
		Exposure Point Total					3.5E-05					2.8E+00
	Exposure Medium Total						3.5E-05					2.8E+00
Surface Soil Total							3.5E-05					2.8E+00
Air	Ambient Air	Ambient Air	**P/PCBs**									
		Facility Area	PCBs, Total	NA	3.4E-07	NA	3.4E-07	NA	NA	NA	NA	NA
			Chemical Total	NA	3.4E-07	NA	3.4E-07		NA	NA	NA	NA
		Exposure Point Total					3.4E-07					NA
	Exposure Medium Total						3.4E-07					NA
Air Total							3.4E-07					NA
Receptor Total							3.6E-05					2.8E+00

Total Risk Across All Media =	4E-05
Total Hazard Across All Media =	3
Total Liver HI Across All Media =	0.03
Total Eye HI Across All Media =	2
Total GI Tract HI Across All Media =	0.03
Total Nails HI Across All Media =	2
Total Blood HI Across All Media =	0.01
Total Whole Body HI Across All Media =	0.01
Total Skin HI Across All Media =	3
Total Kidney HI Across All Media =	0.003
Total CNS HI Across All Media =	0.01
Total Immune System HI Across All Media =	2
Total Metabolic HI Across All Media =	0.02

TABLE E-9.2
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Operations Area Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		Facility Area	Benzo(a)anthracene	6.7E-08	NA	5.7E-08	1.2E-07	NA	NA	NA	NA	NA
			Benzo(a)pyrene	1.5E-06	NA	1.3E-06	2.8E-06	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	1.7E-07	NA	1.4E-07	3.1E-07	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	5.0E-07	NA	4.3E-07	9.3E-07	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	1.0E-07	NA	9.0E-08	1.9E-07	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	6.7E-04	NA	2.6E-04	9.3E-04	Eye/Skin/Nails/Immune System	2.6E+02	NA	1.0E+02	3.6E+02
			Heptachlor epoxide	3.8E-07	NA	NA	3.8E-07	Liver	2.5E-02	NA	NA	2.5E-02
			Dioxin									
			Dioxin TEQ	1.2E-05	NA	2.5E-06	1.5E-05	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	1.6E-02	NA	NA	1.6E-02
			Antimony	NA	NA	NA	NA	Whole Body/Blood	1.9E-02	NA	NA	1.9E-02
			Arsenic	6.4E-05	NA	1.3E-05	7.7E-05	Skin	1.1E+00	NA	2.2E-01	1.3E+00
			Cadmium	NA	NA	NA	NA	Kidney	4.0E-03	NA	1.1E-03	5.1E-03
			Chromium	NA	NA	NA	NA	GI Tract	6.6E-03	NA	NA	6.6E-03
			Iron	NA	NA	NA	NA	GI Tract/Liver	3.2E-02	NA	NA	3.2E-02
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	5.1E-03	NA	NA	5.1E-03
			Mercury	NA	NA	NA	NA	Immune System	7.4E-03	NA	NA	7.4E-03
			Vanadium	NA	NA	NA	NA	Metabolic	3.4E-02	NA	NA	3.4E-02
			Chemical Total	7.5E-04	NA	2.8E-04	1.0E-03		2.6E+02	NA	1.0E+02	3.6E+02
		Exposure Point Total					1.0E-03					3.6E+02
	Exposure Medium Total						1.0E-03					3.6E+02
Surface Soil Total							1.0E-03					3.6E+02
Air	Ambient Air	Ambient Air	**P/PCBs**									
		Facility Area	PCBs, Total	NA	3.4E-07	NA	3.4E-07	NA	NA	NA	NA	NA
			Chemical Total	NA	3.4E-07	NA	3.4E-07		NA	NA	NA	NA
		Exposure Point Total					3.4E-07					NA
	Exposure Medium Total						3.4E-07					NA
Air Total							3.4E-07					NA
Receptor Total							1.0E-03					3.6E+02

Total Risk Across All Media = 1E-03

Total Hazard Across All Media = 364

Total Liver HI Across All Media =	0.06
Total Eye HI Across All Media =	363
Total GI Tract HI Across All Media =	0.05
Total Nails HI Across All Media =	363
Total Blood HI Across All Media =	0.02
Total Whole Body HI Across All Media =	0.02
Total Skin HI Across All Media =	364
Total Kidney HI Across All Media =	0.005
Total CNS HI Across All Media =	0.02
Total Immune System HI Across All Media =	363
Total Metabolic HI Across All Media =	0.03

TABLE E-9.3
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**SVOCs**									
			Benzo(a)anthracene	3.7E-09	NA	3.1E-09	6.8E-09	NA	NA	NA	NA	NA
			Benzo(a)pyrene	8.4E-08	NA	7.2E-08	1.6E-07	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	9.3E-09	NA	7.9E-09	1.7E-08	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	2.7E-08	NA	2.3E-08	5.1E-08	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	5.7E-09	NA	4.9E-09	1.1E-08	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	2.3E-06	NA	8.9E-07	3.2E-06	Eye/Skin/Nails/Immune System	8.8E-01	NA	3.5E-01	1.2E+00
			Heptachlor epoxide	2.1E-08	NA	NA	2.1E-08	Liver	1.4E-03	NA	NA	1.4E-03
			Dioxin									
			Dioxin TEQ	6.8E-07	NA	1.4E-07	8.2E-07	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	8.9E-04	NA	NA	8.9E-04
			Antimony	NA	NA	NA	NA	Whole Body/Blood	1.0E-03	NA	NA	1.0E-03
			Arsenic	3.5E-06	NA	7.0E-07	4.2E-06	Skin	6.1E-02	NA	1.2E-02	7.3E-02
			Cadmium	NA	NA	NA	NA	Kidney	2.2E-04	NA	5.8E-05	2.8E-04
			Chromium	NA	NA	NA	NA	GI Tract	3.6E-04	NA	NA	3.6E-04
			Iron	NA	NA	NA	NA	GI Tract/Liver	1.7E-03	NA	NA	1.7E-03
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	2.8E-04	NA	NA	2.8E-04
			Mercury	NA	NA	NA	NA	Immune System	4.1E-04	NA	NA	4.1E-04
			Vanadium	NA	NA	NA	NA	Metabolic	1.9E-03	NA	NA	1.9E-03
			Chemical Total	6.6E-06	NA	1.8E-06	8.5E-06		9.5E-01	NA	3.6E-01	1.3E+00
		Exposure Point Total					8.5E-06					1.3E+00
	Exposure Medium Total						8.5E-06					1.3E+00
Surface Soil Total							8.5E-06					1.3E+00
Air	Ambient Air	Ambient Air Facility Area	**P/PCBs**									
			PCBs, Total	NA	1.8E-08	NA	1.8E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	1.8E-08	NA	1.8E-08		NA	NA	NA	NA
		Exposure Point Total					1.8E-08					NA
	Exposure Medium Total						1.8E-08					NA
Air Total							1.8E-08					NA
Receptor Total							8.5E-06					1.3E+00

Total Risk Across All Media = 8E-06

Total Hazard Across All Media = 1

Total Liver HI Across All Media =	0.003
Total Eye HI Across All Media =	1
Total GI Tract HI Across All Media =	0.003
Total Nails HI Across All Media =	1
Total Blood HI Across All Media =	0.001
Total Whole Body HI Across All Media =	0.001
Total Skin HI Across All Media =	1
Total Kidney HI Across All Media =	0.0003
Total CNS HI Across All Media =	0.001
Total Immune System HI Across All Media =	1
Total Metabolic HI Across All Media =	0.002

TABLE E-9.4
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		Facility Area	Benzo(a)anthracene	3.7E-09	NA	3.1E-09	6.8E-09	NA	NA	NA	NA	NA
			Benzo(a)pyrene	8.4E-08	NA	7.2E-08	1.6E-07	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	9.3E-09	NA	7.9E-09	1.7E-08	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	2.7E-08	NA	2.3E-08	5.1E-08	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	5.7E-09	NA	4.9E-09	1.1E-08	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	3.7E-05	NA	1.4E-05	5.1E-05	Eye/Skin/Nails/Immune System	1.4E+01	NA	5.6E+00	2.0E+01
			Heptachlor epoxide	2.1E-08	NA	NA	2.1E-08	Liver	1.4E-03	NA	NA	1.4E-03
			Dioxin									
			Dioxin TEQ	6.8E-07	NA	1.4E-07	8.2E-07	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	8.9E-04	NA	NA	8.9E-04
			Antimony	NA	NA	NA	NA	Whole Body/Blood	1.0E-03	NA	NA	1.0E-03
			Arsenic	3.5E-06	NA	7.0E-07	4.2E-06	Skin	6.1E-02	NA	1.2E-02	7.3E-02
			Cadmium	NA	NA	NA	NA	Kidney	2.2E-04	NA	5.8E-05	2.8E-04
			Chromium	NA	NA	NA	NA	GI Tract	3.6E-04	NA	NA	3.6E-04
			Iron	NA	NA	NA	NA	GI Tract/Liver	1.7E-03	NA	NA	1.7E-03
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	2.8E-04	NA	NA	2.8E-04
			Mercury	NA	NA	NA	NA	Immune System	4.1E-04	NA	NA	4.1E-04
			Vanadium	NA	NA	NA	NA	Metabolic	1.9E-03	NA	NA	1.9E-03
			Chemical Total	4.1E-05	NA	1.5E-05	5.6E-05		1.4E+01	NA	5.6E+00	2.0E+01
		Exposure Point Total					5.6E-05					2.0E+01
	Exposure Medium Total						5.6E-05					2.0E+01
Surface Soil Total							5.6E-05					2.0E+01
Air	Ambient Air	Ambient Air	**P/PCBs**									
		Facility Area	PCBs, Total	NA	1.8E-08	NA	1.8E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	1.8E-08	NA	1.8E-08		NA	NA	NA	NA
		Exposure Point Total					1.8E-08					NA
	Exposure Medium Total						1.8E-08					NA
Air Total							1.8E-08					NA
Receptor Total							5.6E-05					2.0E+01

Total Risk Across All Media = 6E-05

Total Hazard Across All Media = 20

Total Liver HI Across All Media =	0.003
Total Eye HI Across All Media =	20
Total GI Tract HI Across All Media =	0.003
Total Nails HI Across All Media =	20
Total Blood HI Across All Media =	0.001
Total Whole Body HI Across All Media =	0.001
Total Skin HI Across All Media =	20
Total Kidney HI Across All Media =	0.0003
Total CNS HI Across All Media =	0.001
Total Immune System HI Across All Media =	20
Total Metabolic HI Across All Media =	0.002

TABLE E-9.5
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**SVOCs**									
			Benzo(a)anthracene	5.3E-09	NA	7.7E-10	6.0E-09	NA	NA	NA	NA	NA
			Benzo(a)pyrene	1.2E-07	NA	1.8E-08	1.4E-07	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	1.3E-08	NA	1.9E-09	1.5E-08	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	3.9E-08	NA	5.7E-09	4.5E-08	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	8.3E-09	NA	1.2E-09	9.5E-09	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	3.3E-06	NA	2.2E-07	3.5E-06	Eye/Skin/Nails/Immune System	1.1E+00	NA	7.6E-02	1.2E+00
			Heptachlor epoxide	3.0E-08	NA	NA	3.0E-08	Liver	1.8E-03	NA	NA	1.8E-03
			Dioxin									
			Dioxin TEQ	9.9E-07	NA	3.3E-08	1.0E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	1.2E-03	NA	NA	1.2E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	1.3E-03	NA	NA	1.3E-03
			Arsenic	5.1E-06	NA	1.7E-07	5.3E-06	Skin	7.9E-02	NA	2.7E-03	8.2E-02
			Cadmium	NA	NA	NA	NA	Kidney	2.9E-04	NA	1.3E-05	3.0E-04
			Chromium	NA	NA	NA	NA	GI Tract	4.7E-04	NA	NA	4.7E-04
			Iron	NA	NA	NA	NA	GI Tract/Liver	2.3E-03	NA	NA	2.3E-03
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	3.6E-04	NA	NA	3.6E-04
			Mercury	NA	NA	NA	NA	Immune System	5.3E-04	NA	NA	5.3E-04
			Vanadium	NA	NA	NA	NA	Metabolic	2.4E-03	NA	NA	2.4E-03
			Chemical Total	9.5E-06	NA	4.5E-07	1.0E-05		1.2E+00	NA	7.9E-02	1.3E+00
		Exposure Point Total					1.0E-05					1.3E+00
	Exposure Medium Total						1.0E-05					1.3E+00
Surface Soil Total							1.0E-05					1.3E+00
Air	Ambient Air	Ambient Air Facility Area	**P/PCBs**									
			PCBs, Total	NA	4.7E-09	NA	4.7E-09	NA	NA	NA	NA	NA
			Chemical Total	NA	4.7E-09	NA	4.7E-09		NA	NA	NA	NA
		Exposure Point Total					4.7E-09					NA
	Exposure Medium Total						4.7E-09					NA
Air Total							4.7E-09					NA
Receptor Total							1.0E-05					1.3E+00

Total Risk Across All Media = 1E-05

Total Hazard Across All Media = 1

Total Liver HI Across All Media =	0.004
Total Eye HI Across All Media =	1
Total GI Tract HI Across All Media =	0.004
Total Nails HI Across All Media =	1
Total Blood HI Across All Media =	0.001
Total Whole Body HI Across All Media =	0.001
Total Skin HI Across All Media =	1
Total Kidney HI Across All Media =	0.0003
Total CNS HI Across All Media =	0.002
Total Immune System HI Across All Media =	1
Total Metabolic HI Across All Media =	0.002

TABLE E-9.6
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		Facility Area	Benzo(a)anthracene	5.3E-09	NA	7.7E-10	6.0E-09	NA	NA	NA	NA	NA
			Benzo(a)pyrene	1.2E-07	NA	1.8E-08	1.4E-07	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	1.3E-08	NA	1.9E-09	1.5E-08	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	3.9E-08	NA	5.7E-09	4.5E-08	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	8.3E-09	NA	1.2E-09	9.5E-09	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	5.3E-05	NA	3.5E-06	5.6E-05	Eye/Skin/Nails/Immune System	1.8E+01	NA	1.2E+00	2.0E+01
			Heptachlor epoxide	3.0E-08	NA	NA	3.0E-08	Liver	1.8E-03	NA	NA	1.8E-03
			Dioxin									
			Dioxin TEQ	9.9E-07	NA	3.3E-08	1.0E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	1.2E-03	NA	NA	1.2E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	1.3E-03	NA	NA	1.3E-03
			Arsenic	5.1E-06	NA	1.7E-07	5.3E-06	Skin	7.9E-02	NA	2.7E-03	8.2E-02
			Cadmium	NA	NA	NA	NA	Kidney	2.9E-04	NA	1.3E-05	3.0E-04
			Chromium	NA	NA	NA	NA	GI Tract	4.7E-04	NA	NA	4.7E-04
			Iron	NA	NA	NA	NA	GI Tract/Liver	2.3E-03	NA	NA	2.3E-03
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	3.6E-04	NA	NA	3.6E-04
			Mercury	NA	NA	NA	NA	Immune System	5.3E-04	NA	NA	5.3E-04
			Vanadium	NA	NA	NA	NA	Metabolic	2.4E-03	NA	NA	2.4E-03
			Chemical Total	5.9E-05	NA	3.8E-06	6.3E-05		1.9E+01	NA	1.2E+00	2.0E+01
		Exposure Point Total					6.3E-05					2.0E+01
	Exposure Medium Total						6.3E-05					2.0E+01
Surface Soil Total							6.3E-05					2.0E+01
Air	Ambient Air	Ambient Air	**P/PCBs**									
		Facility Area	PCBs, Total	NA	4.7E-09	NA	4.7E-09	NA	NA	NA	NA	NA
			Chemical Total	NA	4.7E-09	NA	4.7E-09		NA	NA	NA	NA
		Exposure Point Total					4.7E-09					NA
	Exposure Medium Total						4.7E-09					NA
Air Total							4.7E-09					NA
Receptor Total							6.3E-05					2.0E+01

Total Risk Across All Media =	6E-05
Total Hazard Across All Media =	20
Total Liver HI Across All Media =	0.004
Total Eye HI Across All Media =	20
Total GI Tract HI Across All Media =	0.004
Total Nails HI Across All Media =	20
Total Blood HI Across All Media =	0.001
Total Whole Body HI Across All Media =	0.001
Total Skin HI Across All Media =	20
Total Kidney HI Across All Media =	0.0003
Total CNS HI Across All Media =	0.002
Total Immune System HI Across All Media =	20
Total Metabolic HI Across All Media =	0.002

TABLE E-9.7
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface/ Subsurface Soil	Surface Soil Subsurface Soil	Surface Soil Subsurface Soil Facility Area	**SVOCs**									
			Benzo(a)anthracene	4.5E-09	NA	5.8E-10	5.1E-09	NA	NA	NA	NA	NA
			Benzo(a)pyrene	1.0E-07	NA	1.3E-08	1.2E-07	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	1.1E-08	NA	1.5E-09	1.3E-08	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	3.3E-08	NA	4.3E-09	3.8E-08	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	7.0E-09	NA	9.1E-10	7.9E-09	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	2.4E-05	NA	1.4E-06	2.6E-05	Eye/Skin/Nails/Immune System	8.5E+01	NA	5.1E+00	9.0E+01
			Heptachlor epoxide	2.6E-08	NA	NA	2.6E-08	Liver	1.5E-02	NA	NA	1.5E-02
			Dioxin									
			Dioxin TEQ	8.4E-07	NA	2.5E-08	8.6E-07	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	9.8E-03	NA	NA	9.8E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	1.1E-02	NA	NA	1.1E-02
			Arsenic	1.6E-06	NA	4.9E-08	1.7E-06	Skin	2.5E-01	NA	7.6E-03	2.6E-01
			Barium	NA	NA	NA	NA	CNS	5.0E-04	NA	NA	5.0E-04
			Cadmium	NA	NA	NA	NA	Kidney	6.8E-04	NA	2.7E-05	7.1E-04
			Chromium	NA	NA	NA	NA	GI Tract	8.1E-03	NA	NA	8.1E-03
			Iron	NA	NA	NA	NA	GI Tract/Liver	1.9E-02	NA	NA	1.9E-02
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	1.0E-02	NA	NA	1.0E-02
			Mercury	NA	NA	NA	NA	Immune System	2.6E-03	NA	NA	2.6E-03
			Nickel	NA	NA	NA	NA	Body and Organ Weight	2.3E-02	NA	NA	2.3E-02
			Vanadium	NA	NA	NA	NA	Metabolic	2.4E-02	NA	NA	2.4E-02
			Chemical Total	2.7E-05	NA	1.5E-06	2.8E-05		8.5E+01	NA	5.1E+00	9.0E+01
		Exposure Point Total					2.8E-05					9.0E+01
	Exposure Medium Total						2.8E-05					9.0E+01
Surface/Subsurface Soil Total							2.8E-05					9.0E+01
Air	Ambient Air	Ambient Air Facility Area	**P/PCBs**									
			PCBs, Total	NA	1.1E-08	NA	1.1E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	1.1E-08	NA	1.1E-08		NA	NA	NA	NA
		Exposure Point Total					1.1E-08					NA
	Exposure Medium Total						1.1E-08					NA
Air Total							1.1E-08					NA
Receptor Total							2.8E-05					9.0E+01

Total Risk Across All Media = 3E-05

Total Hazard Across All Media = 90

Total Liver HI Across All Media =	0.03
Total Eye HI Across All Media =	90
Total GI Tract HI Across All Media =	0.04
Total Nails HI Across All Media =	90
Total Blood HI Across All Media =	0.01
Total Whole Body HI Across All Media =	0.01
Total Skin HI Across All Media =	90
Total Kidney HI Across All Media =	0.0007
Total CNS HI Across All Media =	0.02
Total Immune System HI Across All Media =	90
Total Body and Organ Weight HI Across All Media =	0.02
Total Metabolic HI Across All Media =	0.02

TABLE E-9.8
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		South Landfill	Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	8.2E-08	NA	3.3E-08	1.2E-07	Eye/Skin/Nails/Immune System	3.2E-02	NA	1.3E-02	4.5E-02
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
			Chemical Total	8.2E-08	NA	3.3E-08	1.2E-07		3.2E-02	NA	1.3E-02	4.5E-02
		Exposure Point Total					1.2E-07					4.5E-02
	Exposure Medium Total						1.2E-07					4.5E-02
Surface Soil Total							1.2E-07					4.5E-02
Air	Ambient Air	Ambient Air	**P/PCBs**									
		South Landfill	PCBs, Total	NA	1.8E-09	NA	1.8E-09	NA	NA	NA	NA	NA
			Chemical Total	NA	1.8E-09	NA	1.8E-09		NA	NA	NA	NA
		Exposure Point Total					1.8E-09					NA
	Exposure Medium Total						1.8E-09					NA
Air Total							1.8E-09					NA
Receptor Total							1.2E-07					4.5E-02

Total Risk Across All Media = 1E-07

Total Hazard Across All Media = 0.04

Total Eye HI Across All Media = 0.04
Total Nails HI Across All Media = 0.04
Total Skin HI Across All Media = 0.04
Total Immune System HI Across All Media = 0.04

TABLE E-9.9
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		South Landfill	Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	1.2E-07	NA	8.0E-09	1.3E-07	Eye/Skin/Nails/Immune System	4.2E-02	NA	2.8E-03	4.4E-02
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
			Chemical Total	1.2E-07	NA	8.0E-09	1.3E-07		4.2E-02	NA	2.8E-03	4.4E-02
		Exposure Point Total					1.3E-07					4.4E-02
	Exposure Medium Total						1.3E-07					4.4E-02
Surface Soil Total							1.3E-07					4.4E-02
Air	Ambient Air	Ambient Air	**P/PCBs**									
		South Landfill	PCBs, Total	NA	4.5E-10	NA	4.5E-10	NA	NA	NA	NA	NA
			Chemical Total	NA	4.5E-10	NA	4.5E-10		NA	NA	NA	NA
		Exposure Point Total					4.5E-10					NA
	Exposure Medium Total						4.5E-10					NA
Air Total							4.5E-10					NA
Receptor Total							1.3E-07					4.4E-02

Total Risk Across All Media = 1E-07

Total Hazard Across All Media = 0.04

Total Eye HI Across All Media = 0.04
Total Nails HI Across All Media = 0.04
Total Skin HI Across All Media = 0.04
Total Immune System HI Across All Media = 0.04

TABLE E-9.10
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		West End Landfill	Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	NA	NA	NA	NA	Eye/Skin/Nails/Immune System	NA	NA	NA	NA
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
			Chemical Total	NA	NA	NA	NA		NA	NA	NA	NA
		Exposure Point Total					NA					NA
	Exposure Medium Total						NA					NA
Surface Soil Total							NA					NA
Air	Ambient Air	Ambient Air	**P/PCBs**									
		West End Landfill	PCBs, Total	NA	2.6E-09	NA	2.6E-09	NA	NA	NA	NA	NA
			Chemical Total	NA	2.6E-09	NA	2.6E-09		NA	NA	NA	NA
		Exposure Point Total					2.6E-09					NA
	Exposure Medium Total						2.6E-09					NA
Air Total							2.6E-09					NA
Receptor Total							2.6E-09					NA

Total Risk Across All Media = 3E-09

Total Hazard Across All Media = NA

TABLE E-9.11
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		West End Landfill	Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	NA	NA	NA	NA	Eye/Skin/Nails/Immune System	NA	NA	NA	NA
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
			Chemical Total	NA	NA	NA	NA		NA	NA	NA	NA
		Exposure Point Total					NA					NA
	Exposure Medium Total						NA					NA
Surface Soil Total							NA					NA
Air	Ambient Air	Ambient Air	**P/PCBs**									
		West End Landfill	PCBs, Total	NA	6.6E-10	NA	6.6E-10	NA	NA	NA	NA	NA
			Chemical Total	NA	6.6E-10	NA	6.6E-10		NA	NA	NA	NA
		Exposure Point Total					6.6E-10					NA
	Exposure Medium Total						6.6E-10					NA
Air Total							6.6E-10					NA
Receptor Total							6.6E-10					NA

Total Risk Across All Media = 7E-10

Total Hazard Across All Media = NA

TABLE E-9.12
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Operations Area Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**VOCs**											
			1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	Adrenals	3.4E-03	NA	NA	NA	3.4E-03
			1,4-Dichlorobenzene	6.5E-08	NA	NA	NA	6.5E-08	NA	2.5E-04	NA	NA	NA	2.5E-04
			Chlorobenzene	NA	NA	NA	NA	NA	Liver	7.9E-04	NA	NA	NA	7.9E-04
			cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	Blood	3.1E-03	NA	NA	NA	3.1E-03
			Pentachlorophenol	2.6E-06	NA	NA	NA	2.6E-06	Liver/Kidney	2.0E-03	NA	NA	NA	2.0E-03
			Trichloroethylene	1.5E-06	NA	NA	NA	1.5E-06	Liver/Kidney/Fetus	3.5E-02	NA	NA	NA	3.5E-02
			SVOCs											
			2,4,6-Trichlorophenol	1.8E-07	NA	NA	NA	1.8E-07	NA	4.6E-01	NA	NA	NA	4.6E-01
			Indeno(1,2,3-cd)pyrene	5.9E-07	NA	NA	NA	5.9E-07	NA	NA	NA	NA	NA	NA
			P/PCBs											
			PCBs, Total	3.0E-03	NA	NA	NA	3.0E-03	Eye/Skin/Nails/Immune System	4.3E+02	NA	NA	NA	4.3E+02
			gamma-BHC	7.9E-07	NA	NA	NA	7.9E-07	Liver/Kidney	5.7E-03	NA	NA	NA	5.7E-03
			Methyl parathion	NA	NA	NA	NA	NA	Blood	9.1E-01	NA	NA	NA	9.1E-01
			Parathion	NA	NA	NA	NA	NA	NA	4.8E+00	NA	NA	NA	4.8E+00
			Dioxin											
			Dioxin TEQ	6.0E-07	NA	NA	NA	6.0E-07	NA	NA	NA	NA	NA	NA
			Inorganics											
			Antimony	NA	NA	NA	NA	NA	Whole Body/Blood	3.9E-02	NA	NA	NA	3.9E-02
			Arsenic	1.0E-05	NA	NA	NA	1.0E-05	Skin	6.3E-02	NA	NA	NA	6.3E-02
			Manganese	NA	NA	NA	NA	NA	CNS	2.9E-02	NA	NA	NA	2.9E-02
			Mercury	NA	NA	NA	NA	NA	Immune System	1.8E-02	NA	NA	NA	1.8E-02
			Chemical Total	3.1E-03	NA	NA	NA	3.1E-03		4.3E+02	NA	NA	NA	4.3E+02
		Exposure Point Total						3.1E-03						4.3E+02
	Exposure Medium Total							3.1E-03						4.3E+02
Groundwater Total								3.1E-03						4.3E+02
Receptor Total								3.1E-03						4.3E+02

Total Risk Across All Media = 3E-03

Total Hazard Across All Media = 432

Total Liver HI Across All Media =	0.04
Total Eye HI Across All Media =	426
Total Adrenals HI Across All Media =	0.003
Total Nails HI Across All Media =	426
Total Blood HI Across All Media =	1
Total Whole Body HI Across All Media =	0.04
Total Skin HI Across All Media =	426
Total Kidney HI Across All Media =	0.04
Total CNS HI Across All Media =	0.03
Total Immune System HI Across All Media =	426

TABLE E-9.13
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**VOCs**											
			1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	Adrenals	5.2E-04	NA	NA	NA	5.2E-04
			1,4-Dichlorobenzene	3.5E-09	NA	NA	NA	3.5E-09	NA	3.8E-05	NA	NA	NA	3.8E-05
			Chlorobenzene	NA	NA	NA	NA	NA	Liver	1.2E-04	NA	NA	NA	1.2E-04
			cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	Blood	4.7E-04	NA	NA	NA	4.7E-04
			Pentachlorophenol	1.4E-07	NA	NA	NA	1.4E-07	Liver/Kidney	3.1E-04	NA	NA	NA	3.1E-04
			Trichloroethylene	8.2E-08	NA	NA	NA	8.2E-08	Liver/Kidney/Fetus	5.3E-03	NA	NA	NA	5.3E-03
			SVOCs											
			2,4,6-Trichlorophenol	1.0E-08	NA	NA	NA	1.0E-08	NA	7.0E-02	NA	NA	NA	7.0E-02
			Indeno(1,2,3-cd)pyrene	3.2E-08	NA	NA	NA	3.2E-08	NA	NA	NA	NA	NA	NA
			P/PCBs											
			PCBs, Total	1.7E-04	NA	NA	NA	1.7E-04	Eye/Skin/Nails/Immune System	6.5E+01	NA	NA	NA	6.5E+01
			gamma-BHC	4.3E-08	NA	NA	NA	4.3E-08	Liver/Kidney	8.6E-04	NA	NA	NA	8.6E-04
			Methyl parathion	NA	NA	NA	NA	NA	Blood	1.4E-01	NA	NA	NA	1.4E-01
			Parathion	NA	NA	NA	NA	NA	NA	7.3E-01	NA	NA	NA	7.3E-01
			Dioxin											
			Dioxin TEQ	3.3E-08	NA	NA	NA	3.3E-08	NA	NA	NA	NA	NA	NA
			Inorganics											
			Antimony	NA	NA	NA	NA	NA	Whole Body/Blood	6.0E-03	NA	NA	NA	6.0E-03
			Arsenic	5.5E-07	NA	NA	NA	5.5E-07	Skin	9.5E-03	NA	NA	NA	9.5E-03
			Manganese	NA	NA	NA	NA	NA	CNS	4.4E-03	NA	NA	NA	4.4E-03
			Mercury	NA	NA	NA	NA	NA	Immune System	2.8E-03	NA	NA	NA	2.8E-03
			Chemical Total	1.7E-04	NA	NA	NA	1.7E-04		6.6E+01	NA	NA	NA	6.6E+01
		Exposure Point Total						1.7E-04						6.6E+01
	Exposure Medium Total							1.7E-04						6.6E+01
Groundwater Total								1.7E-04						6.6E+01
Receptor Total								1.7E-04						6.6E+01

Total Risk Across All Media = 2E-04

Total Hazard Across All Media = 66

Total Liver HI Across All Media =	0.007
Total Eye HI Across All Media =	65
Total Adrenals HI Across All Media =	0.0005
Total Nails HI Across All Media =	65
Total Blood HI Across All Media =	0.1
Total Whole Body HI Across All Media =	0.006
Total Skin HI Across All Media =	65
Total Kidney HI Across All Media =	0.006
Total CNS HI Across All Media =	0.004
Total Immune System HI Across All Media =	65

TABLE E-10.1
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Operations Area Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**SVOCs**									
			Benzo(a)pyrene	7.6E-07	NA	9.1E-07	1.7E-06	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	2.2E-06	NA	4.0E-06	6.2E-06	Eye/Skin/Nails/Immune System	8.5E-01	NA	1.6E+00	2.4E+00
			Dioxin									
			Dioxin TEQ	6.2E-06	NA	1.7E-06	8.0E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	9.7E-06	NA	8.9E-06	1.9E-05	Skin	1.7E-01	NA	1.5E-01	3.2E-01
			Chemical Total	1.9E-05	NA	1.6E-05	3.5E-05		1.1E+00	NA	1.7E+00	2.8E+00
		Exposure Point Total					3.5E-05					2.8E+00
	Exposure Medium Total						3.5E-05					2.8E+00
Surface Soil Total							3.5E-05					2.8E+00
Air Facility Area	Ambient Air	Ambient Air	Chemical Total	NA	3.4E-07	NA	3.4E-07		NA	NA	NA	NA
		Exposure Point Total					3.4E-07					NA
	Exposure Medium Total						3.4E-07					NA
Air Total							3.4E-07					NA
Receptor Total							3.6E-05					2.8E+00

Total Risk Across All Media = 4E-05

Total Hazard Across All Media =	3
Total Liver HI Across All Media =	0.03
Total Eye HI Across All Media =	2
Total GI Tract HI Across All Media =	0.03
Total Nails HI Across All Media =	2
Total Blood HI Across All Media =	0.01
Total Whole Body HI Across All Media =	0.01
Total Skin HI Across All Media =	3
Total Kidney HI Across All Media =	0.003
Total CNS HI Across All Media =	0.01
Total Immune System HI Across All Media =	2
Total Metabolic HI Across All Media =	0.02

TABLE E-10.2
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Operations Area Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		Facility Area	Benzo(a)pyrene	1.5E-06	NA	1.3E-06	2.8E-06	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	6.7E-04	NA	2.6E-04	9.3E-04	Eye/Skin/Nails/Immune System	2.6E+02	NA	1.0E+02	3.6E+02
			Dioxin									
			Dioxin TEQ	1.2E-05	NA	2.5E-06	1.5E-05	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	6.4E-05	NA	1.3E-05	7.7E-05	Skin	1.1E+00	NA	2.2E-01	1.3E+00
			Chemical Total	7.5E-04	NA	2.8E-04	1.0E-03		2.6E+02	NA	1.0E+02	3.6E+02
		Exposure Point Total					1.0E-03					3.6E+02
	Exposure Medium Total						1.0E-03					3.6E+02
Surface Soil Total							1.0E-03					3.6E+02
Air Facility Area	Ambient Air	Ambient Air	Chemical Total	NA	3.4E-07	NA	3.4E-07		NA	NA	NA	NA
		Exposure Point Total					3.4E-07					NA
	Exposure Medium Total						3.4E-07					NA
Air Total							3.4E-07					NA
Receptor Total							1.0E-03					3.6E+02

Total Risk Across All Media = 1E-03

Total Hazard Across All Media =	364
Total Liver HI Across All Media =	0.06
Total Eye HI Across All Media =	363
Total GI Tract HI Across All Media =	0.05
Total Nails HI Across All Media =	363
Total Blood HI Across All Media =	0.02
Total Whole Body HI Across All Media =	0.02
Total Skin HI Across All Media =	364
Total Kidney HI Across All Media =	0.005
Total CNS HI Across All Media =	0.02
Total Immune System HI Across All Media =	363
Total Metabolic HI Across All Media =	0.03

TABLE E-10.3
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**P/PCBs**									
			PCBs, Total	2.3E-06	NA	8.9E-07	3.2E-06	Eye/Skin/Nails/Immune System	8.8E-01	NA	3.5E-01	1.2E+00
			Inorganics									
			Arsenic	3.5E-06	NA	7.0E-07	4.2E-06	Skin	6.1E-02	NA	1.2E-02	7.3E-02
			Chemical Total	6.6E-06	NA	1.8E-06	8.5E-06		9.5E-01	NA	3.6E-01	1.3E+00
		Exposure Point Total					8.5E-06					1.3E+00
	Exposure Medium Total						8.5E-06					1.3E+00
Surface Soil Total							8.5E-06					1.3E+00
Air Facility Area	Ambient Air	Ambient Air	Chemical Total	NA	1.8E-08	NA	1.8E-08		NA	NA	NA	NA
		Exposure Point Total					1.8E-08					NA
	Exposure Medium Total						1.8E-08					NA
Air Total							1.8E-08					NA
Receptor Total							8.5E-06					1.3E+00

Total Risk Across All Media =	8E-06
Total Hazard Across All Media =	1

Total Liver HI Across All Media =	0.003
Total Eye HI Across All Media =	1
Total GI Tract HI Across All Media =	0.003
Total Nails HI Across All Media =	1
Total Blood HI Across All Media =	0.001
Total Whole Body HI Across All Media =	0.001
Total Skin HI Across All Media =	1
Total Kidney HI Across All Media =	0.0003
Total CNS HI Across All Media =	0.001
Total Immune System HI Across All Media =	1
Total Metabolic HI Across All Media =	0.002

TABLE E-10.4
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**P/PCBs**									
			PCBs, Total	3.7E-05	NA	1.4E-05	5.1E-05	Eye/Skin/Nails/Immune System	1.4E+01	NA	5.6E+00	2.0E+01
			Inorganics									
			Arsenic	3.5E-06	NA	7.0E-07	4.2E-06	Skin	6.1E-02	NA	1.2E-02	7.3E-02
			Chemical Total	4.1E-05	NA	1.5E-05	5.6E-05		1.4E+01	NA	5.6E+00	2.0E+01
		Exposure Point Total					5.6E-05					2.0E+01
	Exposure Medium Total						5.6E-05					2.0E+01
Surface Soil Total							5.6E-05					2.0E+01
Air Facility Area	Ambient Air	Ambient Air	Chemical Total	NA	1.8E-08	NA	1.8E-08		NA	NA	NA	NA
		Exposure Point Total					1.8E-08					NA
	Exposure Medium Total						1.8E-08					NA
Air Total							1.8E-08					NA
Receptor Total							5.6E-05					2.0E+01

Total Risk Across All Media = 6E-05

Total Hazard Across All Media = 20

Total Liver HI Across All Media =	0.003
Total Eye HI Across All Media =	20
Total GI Tract HI Across All Media =	0.003
Total Nails HI Across All Media =	20
Total Blood HI Across All Media =	0.001
Total Whole Body HI Across All Media =	0.001
Total Skin HI Across All Media =	20
Total Kidney HI Across All Media =	0.0003
Total CNS HI Across All Media =	0.001
Total Immune System HI Across All Media =	20
Total Metabolic HI Across All Media =	0.002

TABLE E-10.5
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**P/PCBs**									
			PCBs, Total	3.3E-06	NA	2.2E-07	3.5E-06	Eye/Skin/Nails/Immune System	1.1E+00	NA	7.6E-02	1.2E+00
			Dioxin									
			Dioxin TEQ	9.9E-07	NA	3.3E-08	1.0E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	5.1E-06	NA	1.7E-07	5.3E-06	Skin	7.9E-02	NA	2.7E-03	8.2E-02
			Chemical Total	9.5E-06	NA	4.5E-07	1.0E-05		1.2E+00	NA	7.9E-02	1.3E+00
		Exposure Point Total					1.0E-05					1.3E+00
	Exposure Medium Total						1.0E-05					1.3E+00
Surface Soil Total							1.0E-05					1.3E+00
Air Facility Area	Ambient Air	Ambient Air	Chemical Total	NA	4.7E-09	NA	4.7E-09		NA	NA	NA	NA
		Exposure Point Total					4.7E-09					NA
	Exposure Medium Total						4.7E-09					NA
Air Total							4.7E-09					NA
Receptor Total							1.0E-05					1.3E+00

Total Risk Across All Media = 1E-05

Total Hazard Across All Media =	1
Total Liver HI Across All Media =	0.004
Total Eye HI Across All Media =	1
Total GI Tract HI Across All Media =	0.004
Total Nails HI Across All Media =	1
Total Blood HI Across All Media =	0.001
Total Whole Body HI Across All Media =	0.001
Total Skin HI Across All Media =	1
Total Kidney HI Across All Media =	0.0003
Total CNS HI Across All Media =	0.002
Total Immune System HI Across All Media =	1
Total Metabolic HI Across All Media =	0.002

TABLE E-10.6
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**P/PCBs**									
			PCBs, Total	5.3E-05	NA	3.5E-06	5.6E-05	Eye/Skin/Nails/Immune System	1.8E+01	NA	1.2E+00	2.0E+01
			Dioxin									
			Dioxin TEQ	9.9E-07	NA	3.3E-08	1.0E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	5.1E-06	NA	1.7E-07	5.3E-06	Skin	7.9E-02	NA	2.7E-03	8.2E-02
			Chemical Total	5.9E-05	NA	3.8E-06	6.3E-05		1.9E+01	NA	1.2E+00	2.0E+01
		Exposure Point Total					6.3E-05					2.0E+01
	Exposure Medium Total						6.3E-05					2.0E+01
Surface Soil Total							6.3E-05					2.0E+01
Air Facility Area	Ambient Air	Ambient Air	Chemical Total	NA	4.7E-09	NA	4.7E-09		NA	NA	NA	NA
		Exposure Point Total					4.7E-09					NA
	Exposure Medium Total						4.7E-09					NA
Air Total							4.7E-09					NA
Receptor Total							6.3E-05					2.0E+01

Total Risk Across All Media = 6E-05

Total Hazard Across All Media = 20

Total Liver HI Across All Media =	0.004
Total Eye HI Across All Media =	20
Total GI Tract HI Across All Media =	0.004
Total Nails HI Across All Media =	20
Total Blood HI Across All Media =	0.001
Total Whole Body HI Across All Media =	0.001
Total Skin HI Across All Media =	20
Total Kidney HI Across All Media =	0.0003
Total CNS HI Across All Media =	0.002
Total Immune System HI Across All Media =	20
Total Metabolic HI Across All Media =	0.002

TABLE E-10.7
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface/ Subsurface Soil	Surface Soil Subsurface Soil	Surface Soil Subsurface Soil Facility Area	**P/PCBs**									
			PCBs, Total	2.4E-05	NA	1.4E-06	2.6E-05	Eye/Skin/Nails/Immune System	8.5E+01	NA	5.1E+00	9.0E+01
			Inorganics									
			Arsenic	1.6E-06	NA	4.9E-08	1.7E-06	Skin	2.5E-01	NA	7.6E-03	2.6E-01
			Chemical Total	2.7E-05	NA	1.5E-06	2.8E-05		8.5E+01	NA	5.1E+00	9.0E+01
		Exposure Point Total					2.8E-05					9.0E+01
	Exposure Medium Total						2.8E-05					9.0E+01
Surface/Subsurface Soil Total							2.8E-05					9.0E+01
Air Facility Area	Ambient Air	Ambient Air	Chemical Total	NA	1.1E-08	NA	1.1E-08		NA	NA	NA	NA
		Exposure Point Total					1.1E-08					NA
	Exposure Medium Total						1.1E-08					NA
Air Total							1.1E-08					NA
Receptor Total							2.8E-05					9.0E+01

Total Risk Across All Media =	3E-05
Total Hazard Across All Media =	90
Total Liver HI Across All Media =	0.03
Total Eye HI Across All Media =	90
Total GI Tract HI Across All Media =	0.04
Total Nails HI Across All Media =	90
Total Blood HI Across All Media =	0.01
Total Whole Body HI Across All Media =	0.01
Total Skin HI Across All Media =	90
Total Kidney HI Across All Media =	0.0007
Total CNS HI Across All Media =	0.02
Total Immune System HI Across All Media =	90
Total Body and Organ Weight HI Across All Media =	0.02
Total Metabolic HI Across All Media =	0.02

TABLE E-10.8
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil South Landfill	Surface Soil	Surface Soil	Chemical Total	8.2E-08	NA	3.3E-08	1.2E-07		3.2E-02	NA	1.3E-02	4.5E-02
		Exposure Point Total					1.2E-07					4.5E-02
	Exposure Medium Total						1.2E-07					4.5E-02
Surface Soil Total							1.2E-07					4.5E-02
Air South Landfill	Ambient Air	Ambient Air	Chemical Total	NA	1.8E-09	NA	1.8E-09		NA	NA	NA	NA
		Exposure Point Total					1.8E-09					NA
	Exposure Medium Total						1.8E-09					NA
Air Total							1.8E-09					NA
Receptor Total							1.2E-07					4.5E-02

Total Risk Across All Media = 1E-07

Total Hazard Across All Media = 0.04

Total Eye HI Across All Media = 0.04
Total Nails HI Across All Media = 0.04
Total Skin HI Across All Media = 0.04
Total Immune System HI Across All Media = 0.04

TABLE E-10.9
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil South Landfill	Surface Soil	Surface Soil	Chemical Total	1.2E-07	NA	8.0E-09	1.3E-07		4.2E-02	NA	2.8E-03	4.4E-02
		Exposure Point Total					1.3E-07					4.4E-02
	Exposure Medium Total						1.3E-07					4.4E-02
Surface Soil Total							1.3E-07					4.4E-02
Air South Landfill	Ambient Air	Ambient Air	Chemical Total	NA	4.5E-10	NA	4.5E-10		NA	NA	NA	NA
		Exposure Point Total					4.5E-10					NA
	Exposure Medium Total						4.5E-10					NA
Air Total							4.5E-10					NA
Receptor Total							1.3E-07					4.4E-02

Total Risk Across All Media = 1E-07

Total Hazard Across All Media = 0.04

Total Eye HI Across All Media = 0.04
Total Nails HI Across All Media = 0.04
Total Skin HI Across All Media = 0.04
Total Immune System HI Across All Media = 0.04

TABLE E-10.10
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil West End Landfill	Surface Soil	Surface Soil	Chemical Total	NA	NA	NA	NA		NA	NA	NA	NA
		Exposure Point Total					NA					NA
	Exposure Medium Total						NA					NA
Surface Soil Total							NA					NA
Air West End Landfill	Ambient Air	Ambient Air	Chemical Total	NA	2.6E-09	NA	2.6E-09		NA	NA	NA	NA
		Exposure Point Total					2.6E-09					NA
	Exposure Medium Total						2.6E-09					NA
Air Total							2.6E-09					NA
Receptor Total							2.6E-09					NA

Total Risk Across All Media = 3E-09

Total Hazard Across All Media = NA

TABLE E-10.11
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		West End Landfill	Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	NA	NA	NA	NA	Eye/Skin/Nails/Immune System	NA	NA	NA	NA
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
Surface Soil West End Landfill	Surface Soil	Surface Soil	Chemical Total	NA	NA	NA	NA		NA	NA	NA	NA
		Exposure Point Total					NA					NA
	Exposure Medium Total						NA					NA
Surface Soil Total							NA					NA
Air	Ambient Air	Ambient Air	**P/PCBs**									
		West End Landfill	PCBs, Total	NA	6.6E-10	NA	6.6E-10	NA	NA	NA	NA	NA
Air West End Landfill	Ambient Air	Ambient Air	Chemical Total	NA	6.6E-10	NA	6.6E-10		NA	NA	NA	NA
		Exposure Point Total					6.6E-10					NA
	Exposure Medium Total						6.6E-10					NA
Air Total							6.6E-10					NA
Receptor Total							6.6E-10					NA

Total Risk Across All Media = 7E-10

Total Hazard Across All Media = NA

TABLE E-10.12
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Operations Area Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**VOCs**											
			Pentachlorophenol	2.6E-06	NA	NA	NA	2.6E-06	Liver/Kidney	2.0E-03	NA	NA	NA	2.0E-03
			Trichloroethylene	1.5E-06	NA	NA	NA	1.5E-06	Liver/Kidney/Fetus	3.5E-02	NA	NA	NA	3.5E-02
			P/PCBs											
			PCBs, Total	3.0E-03	NA	NA	NA	3.0E-03	Eye/Skin/Nails/Immune System	4.3E+02	NA	NA	NA	4.3E+02
			Parathion	NA	NA	NA	NA	NA	NA	4.8E+00	NA	NA	NA	4.8E+00
			Inorganics											
			Arsenic	1.0E-05	NA	NA	NA	1.0E-05	Skin	6.3E-02	NA	NA	NA	6.3E-02
			Chemical Total	3.1E-03	NA	NA	NA	3.1E-03		4.3E+02	NA	NA	NA	4.3E+02
		Exposure Point Total						3.1E-03						4.3E+02
	Exposure Medium Total							3.1E-03						4.3E+02
Groundwater Total								3.1E-03						4.3E+02
Receptor Total								3.1E-03						4.3E+02

Total Risk Across All Media = 3E-03

Total Hazard Across All Media = 432

Total Liver HI Across All Media =	0.04
Total Eye HI Across All Media =	426
Total Adrenals HI Across All Media =	0.003
Total Nails HI Across All Media =	426
Total Blood HI Across All Media =	1
Total Whole Body HI Across All Media =	0.04
Total Skin HI Across All Media =	426
Total Kidney HI Across All Media =	0.04
Total CNS HI Across All Media =	0.03
Total Immune System HI Across All Media =	426

TABLE E-10.13
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**P/PCBs**											
			PCBs, Total	1.7E-04	NA	NA	NA	1.7E-04	Eye/Skin/Nails/Immune System	6.5E+01	NA	NA	NA	6.5E+01
			Chemical Total	1.7E-04	NA	NA	NA	1.7E-04		6.6E+01	NA	NA	NA	6.6E+01
		Exposure Point Total						1.7E-04						6.6E+01
	Exposure Medium Total							1.7E-04						6.6E+01
Groundwater Total								1.7E-04						6.6E+01
Receptor Total								1.7E-04						6.6E+01

Total Risk Across All Media = 2E-04

Total Hazard Across All Media = 66

Total Liver HI Across All Media =	0.007
Total Eye HI Across All Media =	65
Total Adrenals HI Across All Media =	0.0005
Total Nails HI Across All Media =	65
Total Blood HI Across All Media =	0.1
Total Whole Body HI Across All Media =	0.006
Total Skin HI Across All Media =	65
Total Kidney HI Across All Media =	0.006
Total CNS HI Across All Media =	0.004
Total Immune System HI Across All Media =	65

Appendix F

RAGS D Standard Tables – Site-Specific Assumptions

List of Tables Included in Appendix F
Anniston PCB Site, Operable Unit 3

TABLES

TABLE F-7.1
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	2.9E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.1E-08	8.1E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	6.6E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	4.8E-07	1.9E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	7.3E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.4E-08	2.1E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	2.2E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.6E-07	6.1E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	4.5E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.3E-08	1.3E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	3.9E-06	mg/kg/day	2.0E+00	(mg/kg-day)-1	7.8E-06	1.1E-05	mg/kg/day	2.0E-05	mg/kg-day	5.5E-01
				Heptachlor epoxide	3.8E-01	mg/kg	1.3E-08	mg/kg/day	9.1E+00	(mg/kg-day)-1	1.2E-07	3.7E-08	mg/kg/day	1.3E-05	mg/kg-day	2.9E-03
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	2.6E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	4.0E-06	7.4E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	6.6E-04	mg/kg/day	NA	NA	NA	1.9E-03	mg/kg/day	1.0E+00	mg/kg-day	1.9E-03
				Antimony	8.7E+00	mg/kg	3.0E-07	mg/kg/day	NA	NA	NA	8.5E-07	mg/kg/day	4.0E-04	mg/kg-day	2.1E-03
				Arsenic	3.9E+02	mg/kg	4.1E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	6.1E-06	1.1E-05	mg/kg/day	3.0E-04	mg/kg-day	3.8E-02
				Cadmium	4.7E+00	mg/kg	1.6E-07	mg/kg/day	NA	NA	NA	4.6E-07	mg/kg/day	1.0E-03	mg/kg-day	4.6E-04
				Chromium	2.3E+01	mg/kg	8.0E-07	mg/kg/day	NA	NA	NA	2.3E-06	mg/kg/day	3.0E-03	mg/kg-day	7.5E-04
				Iron	2.6E+04	mg/kg	9.1E-04	mg/kg/day	NA	NA	NA	2.5E-03	mg/kg/day	7.0E-01	mg/kg-day	3.6E-03
				Lead	4.7E+03	mg/kg	1.6E-04	mg/kg/day	NA	NA	NA	4.6E-04	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	2.9E-05	mg/kg/day	NA	NA	NA	8.1E-05	mg/kg/day	1.4E-01	mg/kg-day	5.8E-04
				Mercury	2.6E+00	mg/kg	9.1E-08	mg/kg/day	NA	NA	NA	2.5E-07	mg/kg/day	3.0E-04	mg/kg-day	8.5E-04
				Vanadium	4.0E+01	mg/kg	1.4E-06	mg/kg/day	NA	NA	NA	3.9E-06	mg/kg/day	1.0E-03	mg/kg-day	3.9E-03
			Exp. Route Total								1.9E-05					6.0E-01
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	3.8E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.8E-09	1.1E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	8.8E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	6.4E-08	2.5E-08	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	9.7E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	7.1E-09	2.7E-08	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	2.9E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.1E-08	8.0E-09	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	6.0E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.4E-09	1.7E-08	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	8.0E-07	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.6E-06	2.2E-06	mg/kg/day	2.0E-05	mg/kg-day	1.1E-01
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	8.0E-13	mg/kg/day	1.5E+05	(mg/kg-day)-1	1.2E-07	2.3E-12	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	4.1E-07	mg/kg/day	1.5E+00	(mg/kg-day)-1	6.2E-07	1.2E-06	mg/kg/day	3.0E-04	mg/kg-day	3.9E-03
				Cadmium	4.7E+00	mg/kg	1.7E-10	mg/kg/day	NA	NA	NA	4.7E-10	mg/kg/day	2.5E-05	mg/kg-day	1.9E-05
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								2.4E-06					1.2E-01
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	6.1E-07	mg/kg/day	3.5E-01	(mg/kg-day)-1	2.1E-07	1.7E-06	mg/kg/day	NA	NA	NA
			Exp. Route Total								2.1E-07					NA
		Exposure Point Total									2E-05					7E-01

TABLE F-7.2
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	2.9E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.1E-08	8.1E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	6.6E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	4.8E-07	1.9E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	7.3E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.4E-08	2.1E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	2.2E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.6E-07	6.1E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	4.5E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.3E-08	1.3E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	6.4E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.3E-04	1.8E-04	mg/kg/day	2.0E-05	mg/kg-day	8.9E+00
				Heptachlor epoxide	3.8E-01	mg/kg	1.3E-08	mg/kg/day	9.1E+00	(mg/kg-day)-1	1.2E-07	3.7E-08	mg/kg/day	1.3E-05	mg/kg-day	2.9E-03
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	2.6E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	4.0E-06	7.4E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	6.6E-04	mg/kg/day	NA	NA	NA	1.9E-03	mg/kg/day	1.0E+00	mg/kg-day	1.9E-03
				Antimony	8.7E+00	mg/kg	3.0E-07	mg/kg/day	NA	NA	NA	8.5E-07	mg/kg/day	4.0E-04	mg/kg-day	2.1E-03
				Arsenic	3.9E+02	mg/kg	4.1E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	6.1E-06	1.1E-05	mg/kg/day	3.0E-04	mg/kg-day	3.8E-02
				Cadmium	4.7E+00	mg/kg	1.6E-07	mg/kg/day	NA	NA	NA	4.6E-07	mg/kg/day	1.0E-03	mg/kg-day	4.6E-04
				Chromium	2.3E+01	mg/kg	8.0E-07	mg/kg/day	NA	NA	NA	2.3E-06	mg/kg/day	3.0E-03	mg/kg-day	7.5E-04
				Iron	2.6E+04	mg/kg	9.1E-04	mg/kg/day	NA	NA	NA	2.5E-03	mg/kg/day	7.0E-01	mg/kg-day	3.6E-03
				Lead	4.7E+03	mg/kg	1.6E-04	mg/kg/day	NA	NA	NA	4.6E-04	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	2.9E-05	mg/kg/day	NA	NA	NA	8.1E-05	mg/kg/day	1.4E-01	mg/kg-day	5.8E-04
				Mercury	2.6E+00	mg/kg	9.1E-08	mg/kg/day	NA	NA	NA	2.5E-07	mg/kg/day	3.0E-04	mg/kg-day	8.5E-04
				Vanadium	4.0E+01	mg/kg	1.4E-06	mg/kg/day	NA	NA	NA	3.9E-06	mg/kg/day	1.0E-03	mg/kg-day	3.9E-03
			Exp. Route Total								1.4E-04					9.0E+00
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	3.8E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.8E-09	1.1E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	8.8E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	6.4E-08	2.5E-08	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	9.7E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	7.1E-09	2.7E-08	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	2.9E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.1E-08	8.0E-09	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	6.0E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.4E-09	1.7E-08	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	1.3E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	2.6E-05	3.6E-05	mg/kg/day	2.0E-05	mg/kg-day	1.8E+00
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	8.0E-13	mg/kg/day	1.5E+05	(mg/kg-day)-1	1.2E-07	2.3E-12	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	4.1E-07	mg/kg/day	1.5E+00	(mg/kg-day)-1	6.2E-07	1.2E-06	mg/kg/day	3.0E-04	mg/kg-day	3.9E-03
				Cadmium	4.7E+00	mg/kg	1.7E-10	mg/kg/day	NA	NA	NA	4.7E-10	mg/kg/day	2.5E-05	mg/kg-day	1.9E-05
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								2.7E-05					1.8E+00
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	6.1E-07	mg/kg/day	3.5E-01	(mg/kg-day)-1	2.1E-07	1.7E-06	mg/kg/day	NA	NA	NA
			Exp. Route Total								2.1E-07					NA
		Exposure Point Total									2E-04					1E+01

TABLE F-7.3

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

MODIFIED EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Trespasser
Receptor Age:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	4.3E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.2E-08	3.0E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	9.9E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	7.2E-07	6.9E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	1.1E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	8.0E-08	7.7E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	3.2E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.4E-07	2.3E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	6.8E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.0E-08	4.7E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	5.9E-06	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.2E-05	4.1E-05	mg/kg/day	2.0E-05	mg/kg-day	2.0E+00
				Heptachlor epoxide	3.8E-01	mg/kg	2.0E-08	mg/kg/day	9.1E+00	(mg/kg-day)-1	1.8E-07	1.4E-07	mg/kg/day	1.3E-05	mg/kg-day	1.1E-02
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	3.9E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	5.9E-06	2.8E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	9.9E-04	mg/kg/day	NA	NA	NA	6.9E-03	mg/kg/day	1.0E+00	mg/kg-day	6.9E-03
				Antimony	8.7E+00	mg/kg	4.5E-07	mg/kg/day	NA	NA	NA	3.2E-06	mg/kg/day	4.0E-04	mg/kg-day	7.9E-03
				Arsenic	3.9E+02	mg/kg	6.1E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	9.2E-06	4.3E-05	mg/kg/day	3.0E-04	mg/kg-day	1.4E-01
				Cadmium	4.7E+00	mg/kg	2.5E-07	mg/kg/day	NA	NA	NA	1.7E-06	mg/kg/day	1.0E-03	mg/kg-day	1.7E-03
				Chromium	2.3E+01	mg/kg	1.2E-06	mg/kg/day	NA	NA	NA	8.4E-06	mg/kg/day	3.0E-03	mg/kg-day	2.8E-03
				Iron	2.6E+04	mg/kg	1.4E-03	mg/kg/day	NA	NA	NA	9.5E-03	mg/kg/day	7.0E-01	mg/kg-day	1.4E-02
				Lead	4.7E+03	mg/kg	2.5E-04	mg/kg/day	NA	NA	NA	1.7E-03	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	4.3E-05	mg/kg/day	NA	NA	NA	3.0E-04	mg/kg/day	1.4E-01	mg/kg-day	2.2E-03
				Mercury	2.6E+00	mg/kg	1.4E-07	mg/kg/day	NA	NA	NA	9.5E-07	mg/kg/day	3.0E-04	mg/kg-day	3.2E-03
				Vanadium	4.0E+01	mg/kg	2.1E-06	mg/kg/day	NA	NA	NA	1.5E-05	mg/kg/day	1.0E-03	mg/kg-day	1.5E-02
			Exp. Route Total								2.8E-05					2.3E+00
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	1.2E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	8.7E-09	8.4E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	2.7E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.0E-07	1.9E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	3.0E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.2E-08	2.1E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	8.9E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	6.5E-08	6.2E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	1.9E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.4E-08	1.3E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.7E+02	mg/kg	2.5E-06	mg/kg/day	2.0E+00	(mg/kg-day)-1	5.0E-06	1.7E-05	mg/kg/day	2.0E-05	mg/kg-day	8.7E-01
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	2.5E-12	mg/kg/day	1.5E+05	(mg/kg-day)-1	3.8E-07	1.8E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	1.3E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	1.9E-06	9.1E-06	mg/kg/day	3.0E-04	mg/kg-day	3.0E-02
				Cadmium	4.7E+00	mg/kg	5.2E-10	mg/kg/day	NA	NA	NA	3.6E-09	mg/kg/day	2.5E-05	mg/kg-day	1.5E-04
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								7.6E-06					9.0E-01
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	1.6E-07	mg/kg/day	3.5E-01	(mg/kg-day)-1	5.7E-08	1.1E-06	mg/kg/day	NA	NA	NA
			Exp. Route Total								5.7E-08					NA
		Exposure Point Total									4E-05					3E+00

TABLE F-7.4

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

MODIFIED EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Trespasser
Receptor Age:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil Facility Area	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	4.3E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.2E-08	3.0E-07	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	9.9E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	7.2E-07	6.9E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	1.1E-07	mg/kg/day	7.3E-01	(mg/kg-day)-1	8.0E-08	7.7E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	3.2E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.4E-07	2.3E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	6.8E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	5.0E-08	4.7E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	9.5E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.9E-04	6.6E-04	mg/kg/day	2.0E-05	mg/kg-day	3.3E+01
				Heptachlor epoxide	3.8E-01	mg/kg	2.0E-08	mg/kg/day	9.1E+00	(mg/kg-day)-1	1.8E-07	1.4E-07	mg/kg/day	1.3E-05	mg/kg-day	1.1E-02
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	3.9E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	5.9E-06	2.8E-10	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	9.9E-04	mg/kg/day	NA	NA	NA	6.9E-03	mg/kg/day	1.0E+00	mg/kg-day	6.9E-03
				Antimony	8.7E+00	mg/kg	4.5E-07	mg/kg/day	NA	NA	NA	3.2E-06	mg/kg/day	4.0E-04	mg/kg-day	7.9E-03
				Arsenic	3.9E+02	mg/kg	6.1E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	9.2E-06	4.3E-05	mg/kg/day	3.0E-04	mg/kg-day	1.4E-01
				Cadmium	4.7E+00	mg/kg	2.5E-07	mg/kg/day	NA	NA	NA	1.7E-06	mg/kg/day	1.0E-03	mg/kg-day	1.7E-03
				Chromium	2.3E+01	mg/kg	1.2E-06	mg/kg/day	NA	NA	NA	8.4E-06	mg/kg/day	3.0E-03	mg/kg-day	2.8E-03
				Iron	2.6E+04	mg/kg	1.4E-03	mg/kg/day	NA	NA	NA	9.5E-03	mg/kg/day	7.0E-01	mg/kg-day	1.4E-02
				Lead	4.7E+03	mg/kg	2.5E-04	mg/kg/day	NA	NA	NA	1.7E-03	mg/kg/day	NA	NA	NA
				Manganese	8.3E+02	mg/kg	4.3E-05	mg/kg/day	NA	NA	NA	3.0E-04	mg/kg/day	1.4E-01	mg/kg-day	2.2E-03
				Mercury	2.6E+00	mg/kg	1.4E-07	mg/kg/day	NA	NA	NA	9.5E-07	mg/kg/day	3.0E-04	mg/kg-day	3.2E-03
				Vanadium	4.0E+01	mg/kg	2.1E-06	mg/kg/day	NA	NA	NA	1.5E-05	mg/kg/day	1.0E-03	mg/kg-day	1.5E-02
			Exp. Route Total								2.1E-04					3.3E+01
Surface Soil	Surface Soil	Surface Soil Facility Area	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	8.3E-01	mg/kg	1.2E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	8.7E-09	8.4E-08	mg/kg/day	NA	NA	NA
				Benzo(a)pyrene	1.9E+00	mg/kg	2.7E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	2.0E-07	1.9E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	3.0E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.2E-08	2.1E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	8.9E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	6.5E-08	6.2E-08	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	1.9E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.4E-08	1.3E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	6.1E+03	mg/kg	4.0E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	8.0E-05	2.8E-04	mg/kg/day	2.0E-05	mg/kg-day	1.4E+01
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	2.5E-12	mg/kg/day	1.5E+05	(mg/kg-day)-1	3.8E-07	1.8E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	3.9E+02	mg/kg	1.3E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	1.9E-06	9.1E-06	mg/kg/day	3.0E-04	mg/kg-day	3.0E-02
				Cadmium	4.7E+00	mg/kg	5.2E-10	mg/kg/day	NA	NA	NA	3.6E-09	mg/kg/day	2.5E-05	mg/kg-day	1.5E-04
				Chromium	2.3E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	4.7E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	8.3E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	2.6E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	4.0E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								8.3E-05					1.4E+01
Air	Ambient Air	Ambient Air Facility Area	Inhalation	**P/PCBs**												
				PCBs, Total	7.3E+01	ng/m3	1.6E-07	mg/kg/day	3.5E-01	(mg/kg-day)-1	5.7E-08	1.1E-06	mg/kg/day	NA	NA	NA
			Exp. Route Total								5.7E-08					NA
		Exposure Point Total									3E-04					5E+01

TABLE F-7.5

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

MODIFIED EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface/	Surface/	Surface/	Incidental Ingestion	**SVOCs**												
Subsurface Soil	Subsurface Soil	Subsurface Soil		Benzo(a)anthracene	8.3E-01	mg/kg	2.7E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.0E-08	1.9E-06	mg/kg/day	NA	NA	NA
		Facility Area		Benzo(a)pyrene	1.9E+00	mg/kg	6.1E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	4.5E-07	4.3E-06	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	6.8E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	4.9E-08	4.7E-06	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	2.0E-08	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.5E-07	1.4E-06	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	4.2E-08	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.1E-08	2.9E-06	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.3E+03	mg/kg	3.2E-05	mg/kg/day	2.0E+00	(mg/kg-day)-1	6.3E-05	2.2E-03	mg/kg/day	2.0E-05	mg/kg-day	1.1E+02
				Heptachlor epoxide	3.8E-01	mg/kg	1.2E-08	mg/kg/day	9.1E+00	(mg/kg-day)-1	1.1E-07	8.6E-07	mg/kg/day	1.3E-05	mg/kg-day	6.6E-02
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	2.4E-11	mg/kg/day	1.5E+05	(mg/kg-day)-1	3.7E-06	1.7E-09	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	6.1E-04	mg/kg/day	NA	NA	NA	4.3E-02	mg/kg/day	1.0E+00	mg/kg-day	4.3E-02
				Antimony	8.7E+00	mg/kg	2.8E-07	mg/kg/day	NA	NA	NA	2.0E-05	mg/kg/day	4.0E-04	mg/kg-day	4.9E-02
				Arsenic	1.5E+02	mg/kg	1.4E-06	mg/kg/day	1.5E+00	(mg/kg-day)-1	2.1E-06	1.0E-04	mg/kg/day	3.0E-04	mg/kg-day	3.3E-01
				Barium	1.9E+02	mg/kg	6.2E-06	mg/kg/day	NA	NA	NA	4.3E-04	mg/kg/day	2.0E-01	mg/kg-day	2.2E-03
				Cadmium	1.3E+00	mg/kg	4.3E-08	mg/kg/day	NA	NA	NA	3.0E-06	mg/kg/day	1.0E-03	mg/kg-day	3.0E-03
				Chromium	4.7E+01	mg/kg	1.5E-06	mg/kg/day	NA	NA	NA	1.1E-04	mg/kg/day	3.0E-03	mg/kg-day	3.5E-02
				Iron	2.6E+04	mg/kg	8.4E-04	mg/kg/day	NA	NA	NA	5.9E-02	mg/kg/day	7.0E-01	mg/kg-day	8.4E-02
				Lead	2.6E+03	mg/kg	8.4E-05	mg/kg/day	NA	NA	NA	5.9E-03	mg/kg/day	NA	NA	NA
				Manganese	2.8E+03	mg/kg	9.0E-05	mg/kg/day	NA	NA	NA	6.3E-03	mg/kg/day	1.4E-01	mg/kg-day	4.5E-02
				Mercury	1.5E+00	mg/kg	4.8E-08	mg/kg/day	NA	NA	NA	3.4E-06	mg/kg/day	3.0E-04	mg/kg-day	1.1E-02
				Nickel	8.9E+02	mg/kg	2.9E-05	mg/kg/day	NA	NA	NA	2.0E-03	mg/kg/day	2.0E-02	mg/kg-day	1.0E-01
				Vanadium	4.7E+01	mg/kg	1.5E-06	mg/kg/day	NA	NA	NA	1.1E-04	mg/kg/day	1.0E-03	mg/kg-day	1.1E-01
			Exp. Route Total								7.0E-05					1.1E+02
Surface/	Surface/	Surface/	Dermal Contact	**SVOCs**												
Subsurface Soil	Subsurface Soil	Subsurface Soil		Benzo(a)anthracene	8.3E-01	mg/kg	2.0E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	1.5E-09	1.4E-07	mg/kg/day	NA	NA	NA
		Facility Area		Benzo(a)pyrene	1.9E+00	mg/kg	4.6E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	3.3E-08	3.2E-07	mg/kg/day	NA	NA	NA
				Benzo(b)fluoranthene	2.1E+00	mg/kg	5.0E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	3.7E-09	3.5E-07	mg/kg/day	NA	NA	NA
				Dibenz(a,h)anthracene	6.2E-01	mg/kg	1.5E-09	mg/kg/day	7.3E+00	(mg/kg-day)-1	1.1E-08	1.0E-07	mg/kg/day	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	1.3E+00	mg/kg	3.1E-09	mg/kg/day	7.3E-01	(mg/kg-day)-1	2.3E-09	2.2E-07	mg/kg/day	NA	NA	NA
				P/PCBs												
				PCBs, Total	3.3E+03	mg/kg	3.6E-06	mg/kg/day	2.0E+00	(mg/kg-day)-1	7.3E-06	2.5E-04	mg/kg/day	2.0E-05	mg/kg-day	1.3E+01
				Heptachlor epoxide	3.8E-01	mg/kg	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	7.6E-04	mg/kg	4.2E-13	mg/kg/day	1.5E+05	(mg/kg-day)-1	6.3E-08	2.9E-11	mg/kg/day	NA	NA	NA
				Inorganics												
				Aluminum	1.9E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	8.7E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	1.5E+02	mg/kg	8.2E-08	mg/kg/day	1.5E+00	(mg/kg-day)-1	1.2E-07	5.7E-06	mg/kg/day	3.0E-04	mg/kg-day	1.9E-02
				Barium	1.9E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	1.4E-02	mg/kg-day	NA
				Cadmium	1.3E+00	mg/kg	2.4E-11	mg/kg/day	NA	NA	NA	1.7E-09	mg/kg/day	2.5E-05	mg/kg-day	6.8E-05
				Chromium	4.7E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	2.6E+04	mg/kg	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	2.6E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	2.8E+03	mg/kg	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	1.5E+00	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Nickel	8.9E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	8.0E-04	mg/kg-day	NA
				Vanadium	4.7E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								7.5E-06					1.3E+01
Air	Ambient Air	Ambient Air	Inhalation	**P/PCBs**												
		Facility Area		PCBs, Total	7.3E+01	ng/m3	9.7E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	3.4E-08	6.8E-06	mg/kg/day	NA	NA	NA
			Exp. Route Total								3.4E-08					NA
		Exposure Point Total									8E-05					1E+02

TABLE F-7.6

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

MODIFIED EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil South Landfill	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.4E+01	mg/kg	1.4E-07	mg/kg/day	2.0E+00	(mg/kg-day)-1	2.9E-07	4.0E-07	mg/kg/day	2.0E-05	mg/kg-day	2.0E-02
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.0E-04	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-03	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-01	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
			Exp. Route Total								2.9E-07					2.0E-02
Surface Soil	Surface Soil	Surface Soil South Landfill	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.4E+01	mg/kg	2.9E-08	mg/kg/day	2.0E+00	(mg/kg-day)-1	5.8E-08	8.1E-08	mg/kg/day	2.0E-05	mg/kg-day	4.1E-03
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-05	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								5.8E-08					4.1E-03
Air	Ambien Air	Ambient Air South Landfill	Inhalation	**P/PCBs**												
				PCBs, Total	7.0E+00	ng/m3	5.8E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	2.0E-08	1.6E-07	mg/kg/day	NA	NA	NA
			Exp. Route Total								2.0E-08					NA
		Exposure Point Total									4E-07					2E-02

TABLE F-7.7

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

MODIFIED EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor Age:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/ Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Unit	Value	Unit	Value	Unit		Value	Unit	Value	Unit	
Surface Soil	Surface Soil	Surface Soil South Landfill	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.4E+01	mg/kg	2.1E-07	mg/kg/day	2.0E+00	(mg/kg-day)-1	4.3E-07	1.5E-06	mg/kg/day	2.0E-05	mg/kg-day	7.5E-02
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.0E-04	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-03	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-01	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
			Exp. Route Total								4.3E-07					7.5E-02
Surface Soil	Surface Soil	Surface Soil South Landfill	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	1.4E+01	mg/kg	9.1E-08	mg/kg/day	2.0E+00	(mg/kg-day)-1	1.8E-07	6.3E-07	mg/kg/day	2.0E-05	mg/kg-day	3.2E-02
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-05	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								1.8E-07					3.2E-02
Air	Ambient Air	Ambient Air South Landfill	Inhalation	**P/PCBs**												
				PCBs, Total	7.0E+00	ng/m3	1.6E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	5.5E-09	1.1E-07	mg/kg/day	NA	NA	NA
			Exp. Route Total								5.5E-09					NA
		Exposure Point Total									6E-07					1E-01

TABLE F-7.8

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

MODIFIED EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Surface Soil	Surface Soil	Surface Soil	Incidental Ingestion	**SVOCs**												
		West End Landfill		Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	2.0E+00	(mg/kg-day)-1	NA	NA	NA	2.0E-05	mg/kg-day	NA
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.0E-04	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-03	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-01	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
			Exp. Route Total								NA					NA
Surface Soil	Surface Soil	Surface Soil	Dermal Contact	**SVOCs**												
		West End Landfill		Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	2.0E+00	(mg/kg-day)-1	NA	NA	NA	2.0E-05	mg/kg-day	NA
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-05	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								NA					NA
Air	Ambient Air	Ambient Air	Inhalation	**P/PCBs**												
		West Landfill		PCBs, Total	1.0E+01	ng/m3	8.5E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	3.0E-08	2.4E-07	mg/kg/day	NA	NA	NA
			Exp. Route Total								3.0E-08					NA
		Exposure Point Total									3E-08					NA

TABLE F-7.9

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

MODIFIED EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor Age:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/ Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Unit	Value	Unit	Value	Unit		Value	Unit	Value	Unit	
Surface Soil	Surface Soil	Surface Soil West End Landfill	Incidental Ingestion	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	2.0E+00	(mg/kg-day)-1	NA	NA	NA	2.0E-05	mg/kg-day	NA
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.0E-04	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-03	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-01	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E-03	mg/kg-day	NA
			Exp. Route Total								NA					NA
Surface Soil	Surface Soil	Surface Soil West End Landfill	Dermal Contact	**SVOCs**												
				Benzo(a)anthracene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(a)pyrene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Benzo(b)fluoranthene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Dibenz(a,h)anthracene	NA	NA	NA	NA	7.3E+00	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	7.3E-01	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				P/PCBs												
				PCBs, Total	NA	NA	NA	NA	2.0E+00	(mg/kg-day)-1	NA	NA	NA	2.0E-05	mg/kg-day	NA
				Heptachlor epoxide	NA	NA	NA	NA	9.1E+00	(mg/kg-day)-1	NA	NA	NA	1.3E-05	mg/kg-day	NA
				Dioxin												
				Dioxin TEQ	NA	NA	NA	NA	1.5E+05	(mg/kg-day)-1	NA	NA	NA	NA	NA	NA
				Inorganics												
				Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0E+00	mg/kg-day	NA
				Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0E-05	mg/kg-day	NA
				Arsenic	NA	NA	NA	NA	1.5E+00	(mg/kg-day)-1	NA	NA	NA	3.0E-04	mg/kg-day	NA
				Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5E-05	mg/kg-day	NA
				Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5E-05	mg/kg-day	NA
				Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0E-01	mg/kg-day	NA
				Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
				Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6E-03	mg/kg-day	NA
				Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9E-04	mg/kg-day	NA
				Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.6E-05	mg/kg-day	NA
			Exp. Route Total								NA					NA
Air	Ambient Air	Ambient Air West Landfill	Inhalation	**P/PCBs**												
				PCBs, Total	1.0E+01	ng/m3	2.3E-08	mg/kg/day	3.5E-01	(mg/kg-day)-1	7.9E-09	1.6E-07	mg/kg/day	NA	NA	NA
			Exp. Route Total								7.9E-09					NA
		Exposure Point Total									8E-09					NA

TABLE F-8.1
CALCULATION OF RADIATION CANCER RISKS
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	NA
Receptor Population:	NA
Receptor Age:	NA

Medium	Exposure Medium	Exposure Point	Exposure Route	Radionuclide of Potential Concern	EPC		Risk Calculation Approach	Cancer Risk Calculations				
								Intake/Activity		CSF		Cancer Risk
					Value	Units		Value	Units	Value	Units	
				NOT APPLICABLE TO THIS SITE								
			Exp. Route Total									
		Exposure Point Total										
Total of Receptor Risks Across All Media												

TABLE F-9.1
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**SVOCs**									
			Benzo(a)anthracene	2.1E-08	NA	2.8E-09	2.4E-08	NA	NA	NA	NA	NA
			Benzo(a)pyrene	4.8E-07	NA	6.4E-08	5.5E-07	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	5.4E-08	NA	7.1E-09	6.1E-08	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	1.6E-07	NA	2.1E-08	1.8E-07	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	3.3E-08	NA	4.4E-09	3.8E-08	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	7.8E-06	NA	1.6E-06	9.4E-06	Eye/Skin/Nails/Immune System	5.5E-01	NA	1.1E-01	6.6E-01
			Heptachlor epoxide	1.2E-07	NA	NA	1.2E-07	Liver	2.9E-03	NA	NA	2.9E-03
			Dioxin									
			Dioxin TEQ	4.0E-06	NA	1.2E-07	4.1E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	1.9E-03	NA	NA	1.9E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	2.1E-03	NA	NA	2.1E-03
			Arsenic	6.1E-06	NA	6.2E-07	6.8E-06	Skin	3.8E-02	NA	3.9E-03	4.2E-02
			Cadmium	NA	NA	NA	NA	Kidney	4.6E-04	NA	1.9E-05	4.8E-04
			Chromium	NA	NA	NA	NA	GI Tract	7.5E-04	NA	NA	7.5E-04
			Iron	NA	NA	NA	NA	GI Tract/Liver	3.6E-03	NA	NA	3.6E-03
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	5.8E-04	NA	NA	5.8E-04
			Mercury	NA	NA	NA	NA	Immune System	8.5E-04	NA	NA	8.5E-04
			Vanadium	NA	NA	NA	NA	Metabolic	3.9E-03	NA	NA	3.9E-03
			Chemical Total	1.9E-05	NA	2.4E-06	2.1E-05		6.0E-01	NA	1.2E-01	7.2E-01
		Exposure Point Total					2.1E-05					7.2E-01
	Exposure Medium Total						2.1E-05					7.2E-01
Surface Soil Total							2.1E-05					7.2E-01
Air	Ambient Air	Ambient Air Facility Area	**P/PCBs**									
			PCBs, Total	NA	2.1E-07	NA	2.1E-07	NA	NA	NA	NA	NA
			Chemical Total	NA	2.1E-07	NA	2.1E-07		NA	NA	NA	NA
		Exposure Point Total					2.1E-07					NA
	Exposure Medium Total						2.1E-07					NA
Air Total							2.1E-07					NA
Receptor Total							2.1E-05					7.2E-01

Total Risk Across All Media =	2E-05
Total Hazard Across All Media =	1

Total Liver HI Across All Media =	0.006
Total Eye HI Across All Media =	1
Total GI Tract HI Across All Media =	0.006
Total Nails HI Across All Media =	1
Total Blood HI Across All Media =	0.002
Total Whole Body HI Across All Media =	0.002
Total Skin HI Across All Media =	1
Total Kidney HI Across All Media =	0.0005
Total CNS HI Across All Media =	0.002
Total Immune System HI Across All Media =	1
Total Metabolic HI Across All Media =	0.004

TABLE F-9.2
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		Facility Area	Benzo(a)anthracene	2.1E-08	NA	2.8E-09	2.4E-08	NA	NA	NA	NA	NA
			Benzo(a)pyrene	4.8E-07	NA	6.4E-08	5.5E-07	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	5.4E-08	NA	7.1E-09	6.1E-08	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	1.6E-07	NA	2.1E-08	1.8E-07	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	3.3E-08	NA	4.4E-09	3.8E-08	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	1.3E-04	NA	2.6E-05	1.5E-04	Eye/Skin/Nails/Immune System	8.9E+00	NA	1.8E+00	1.1E+01
			Heptachlor epoxide	1.2E-07	NA	NA	1.2E-07	Liver	2.9E-03	NA	NA	2.9E-03
			Dioxin									
			Dioxin TEQ	4.0E-06	NA	1.2E-07	4.1E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	1.9E-03	NA	NA	1.9E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	2.1E-03	NA	NA	2.1E-03
			Arsenic	6.1E-06	NA	6.2E-07	6.8E-06	Skin	3.8E-02	NA	3.9E-03	4.2E-02
			Cadmium	NA	NA	NA	NA	Kidney	4.6E-04	NA	1.9E-05	4.8E-04
			Chromium	NA	NA	NA	NA	GI Tract	7.5E-04	NA	NA	7.5E-04
			Iron	NA	NA	NA	NA	GI Tract/Liver	3.6E-03	NA	NA	3.6E-03
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	5.8E-04	NA	NA	5.8E-04
			Mercury	NA	NA	NA	NA	Immune System	8.5E-04	NA	NA	8.5E-04
			Vanadium	NA	NA	NA	NA	Metabolic	3.9E-03	NA	NA	3.9E-03
			Chemical Total	1.4E-04	NA	2.7E-05	1.6E-04		9.0E+00	NA	1.8E+00	1.1E+01
		Exposure Point Total					1.6E-04					1.1E+01
	Exposure Medium Total						1.6E-04					1.1E+01
Surface Soil Total							1.6E-04					1.1E+01
Air	Ambient Air	Ambient Air	**P/PCBs**									
		Facility Area	PCBs, Total	NA	2.1E-07	NA	2.1E-07	NA	NA	NA	NA	NA
Air	Ambient Air	Ambient Air	Chemical Total	NA	2.1E-07	NA	2.1E-07		NA	NA	NA	NA
Facility Area		Exposure Point Total					2.1E-07					NA
	Exposure Medium Total						2.1E-07					NA
Air Total							2.1E-07					NA
Receptor Total							1.6E-04					1.1E+01

Total Risk Across All Media = 2E-04

Total Hazard Across All Media = 11

Total Liver HI Across All Media =	0.006
Total Eye HI Across All Media =	11
Total GI Tract HI Across All Media =	0.006
Total Nails HI Across All Media =	11
Total Blood HI Across All Media =	0.002
Total Whole Body HI Across All Media =	0.002
Total Skin HI Across All Media =	11
Total Kidney HI Across All Media =	0.000
Total CNS HI Across All Media =	0.002
Total Immune System HI Across All Media =	11
Total Metabolic HI Across All Media =	0.004

TABLE F-9.3
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		Facility Area	Benzo(a)anthracene	3.2E-08	NA	8.7E-09	4.0E-08	NA	NA	NA	NA	NA
			Benzo(a)pyrene	7.2E-07	NA	2.0E-07	9.2E-07	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	8.0E-08	NA	2.2E-08	1.0E-07	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	2.4E-07	NA	6.5E-08	3.0E-07	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	5.0E-08	NA	1.4E-08	6.3E-08	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	1.2E-05	NA	5.0E-06	1.7E-05	Eye/Skin/Nails/Immune System	2.0E+00	NA	8.7E-01	2.9E+00
			Heptachlor epoxide	1.8E-07	NA	NA	1.8E-07	Liver	1.1E-02	NA	NA	1.1E-02
			Dioxin									
			Dioxin TEQ	5.9E-06	NA	3.8E-07	6.3E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	6.9E-03	NA	NA	6.9E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	7.9E-03	NA	NA	7.9E-03
			Arsenic	9.2E-06	NA	1.9E-06	1.1E-05	Skin	1.4E-01	NA	3.0E-02	1.7E-01
			Cadmium	NA	NA	NA	NA	Kidney	1.7E-03	NA	1.5E-04	1.9E-03
			Chromium	NA	NA	NA	NA	GI Tract	2.8E-03	NA	NA	2.8E-03
			Iron	NA	NA	NA	NA	GI Tract/Liver	1.4E-02	NA	NA	1.4E-02
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	2.2E-03	NA	NA	2.2E-03
			Mercury	NA	NA	NA	NA	Immune System	3.2E-03	NA	NA	3.2E-03
			Vanadium	NA	NA	NA	NA	Metabolic	1.5E-02	NA	NA	1.5E-02
			Chemical Total	2.8E-05	NA	7.6E-06	3.6E-05		2.3E+00	NA	9.0E-01	3.2E+00
		Exposure Point Total					3.6E-05					3.2E+00
	Exposure Medium Total						3.6E-05					3.2E+00
Surface Soil Total							3.6E-05					3.2E+00
Air	Ambient Air	Ambient Air	**P/PCBs**									
		Facility Area	PCBs, Total	NA	5.7E-08	NA	5.7E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	5.7E-08	NA	5.7E-08		NA	NA	NA	NA
		Exposure Point Total					5.7E-08					NA
	Exposure Medium Total						5.7E-08					NA
Air Total							5.7E-08					NA
Receptor Total							3.6E-05					3.2E+00

Total Risk Across All Media = 4E-05

Total Hazard Across All Media = 3

Total Liver HI Across All Media =	0.02
Total Eye HI Across All Media =	3
Total GI Tract HI Across All Media =	0.02
Total Nails HI Across All Media =	3
Total Blood HI Across All Media =	0.008
Total Whole Body HI Across All Media =	0.008
Total Skin HI Across All Media =	3
Total Kidney HI Across All Media =	0.002
Total CNS HI Across All Media =	0.009
Total Immune System HI Across All Media =	3
Total Metabolic HI Across All Media =	0.01

TABLE F-9.4
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**SVOCs**									
			Benzo(a)anthracene	3.2E-08	NA	8.7E-09	4.0E-08	NA	NA	NA	NA	NA
			Benzo(a)pyrene	7.2E-07	NA	2.0E-07	9.2E-07	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	8.0E-08	NA	2.2E-08	1.0E-07	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	2.4E-07	NA	6.5E-08	3.0E-07	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	5.0E-08	NA	1.4E-08	6.3E-08	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	1.9E-04	NA	8.0E-05	2.7E-04	Eye/Skin/Nails/Immune System	3.3E+01	NA	1.4E+01	4.7E+01
			Heptachlor epoxide	1.8E-07	NA	NA	1.8E-07	Liver	1.1E-02	NA	NA	1.1E-02
			Dioxin									
			Dioxin TEQ	5.9E-06	NA	3.8E-07	6.3E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	6.9E-03	NA	NA	6.9E-03
			Antimony	NA	NA	NA	NA	Whole Body/Blood	7.9E-03	NA	NA	7.9E-03
			Arsenic	9.2E-06	NA	1.9E-06	1.1E-05	Skin	1.4E-01	NA	3.0E-02	1.7E-01
			Cadmium	NA	NA	NA	NA	Kidney	1.7E-03	NA	1.5E-04	1.9E-03
			Chromium	NA	NA	NA	NA	GI Tract	2.8E-03	NA	NA	2.8E-03
			Iron	NA	NA	NA	NA	GI Tract/Liver	1.4E-02	NA	NA	1.4E-02
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	2.2E-03	NA	NA	2.2E-03
			Mercury	NA	NA	NA	NA	Immune System	3.2E-03	NA	NA	3.2E-03
			Vanadium	NA	NA	NA	NA	Metabolic	1.5E-02	NA	NA	1.5E-02
			Chemical Total	2.1E-04	NA	8.3E-05	2.9E-04		3.3E+01	NA	1.4E+01	4.8E+01
		Exposure Point Total					2.9E-04					4.8E+01
	Exposure Medium Total						2.9E-04					4.8E+01
Surface Soil Total							2.9E-04					4.8E+01
Air	Ambient Air	Ambient Air Facility Area	**P/PCBs**									
			PCBs, Total	NA	5.7E-08	NA	5.7E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	5.7E-08	NA	5.7E-08		NA	NA	NA	NA
		Exposure Point Total					5.7E-08					NA
	Exposure Medium Total						5.7E-08					NA
Air Total							5.7E-08					NA
Receptor Total							2.9E-04					4.8E+01

Total Risk Across All Media = 3E-04

Total Hazard Across All Media = 48

Total Liver HI Across All Media =	0.02
Total Eye HI Across All Media =	47
Total GI Tract HI Across All Media =	0.02
Total Nails HI Across All Media =	47
Total Blood HI Across All Media =	0.008
Total Whole Body HI Across All Media =	0.008
Total Skin HI Across All Media =	47
Total Kidney HI Across All Media =	0.002
Total CNS HI Across All Media =	0.009
Total Immune System HI Across All Media =	47
Total Metabolic HI Across All Media =	0.01

TABLE F-9.5
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface/	Surface Soil	Surface Soil	**SVOCs**									
Subsurface Soil	Subsurface Soil	Subsurface Soil	Benzo(a)anthracene	2.0E-08	NA	1.5E-09	2.1E-08	NA	NA	NA	NA	NA
		Facility Area	Benzo(a)pyrene	4.5E-07	NA	3.3E-08	4.8E-07	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	4.9E-08	NA	3.7E-09	5.3E-08	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	1.5E-07	NA	1.1E-08	1.6E-07	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	3.1E-08	NA	2.3E-09	3.3E-08	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	6.3E-05	NA	7.3E-06	7.0E-05	Eye/Skin/Nails/Immune System	1.1E+02	NA	1.3E+01	1.2E+02
			Heptachlor epoxide	1.1E-07	NA	NA	1.1E-07	Liver	6.6E-02	NA	NA	6.6E-02
			Dioxin									
			Dioxin TEQ	3.7E-06	NA	6.3E-08	3.7E-06	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	4.3E-02	NA	NA	4.3E-02
			Antimony	NA	NA	NA	NA	Whole Body/Blood	4.9E-02	NA	NA	4.9E-02
			Arsenic	2.1E-06	NA	1.2E-07	2.3E-06	Skin	3.3E-01	NA	1.9E-02	3.5E-01
			Barium	NA	NA	NA	NA	CNS	2.2E-03	NA	NA	2.2E-03
			Cadmium	NA	NA	NA	NA	Kidney	3.0E-03	NA	6.8E-05	3.0E-03
			Chromium	NA	NA	NA	NA	GI Tract	3.5E-02	NA	NA	3.5E-02
			Iron	NA	NA	NA	NA	GI Tract/Liver	8.4E-02	NA	NA	8.4E-02
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	4.5E-02	NA	NA	4.5E-02
			Mercury	NA	NA	NA	NA	Immune System	1.1E-02	NA	NA	1.1E-02
			Nickel	NA	NA	NA	NA	Body and Organ Weight	1.0E-01	NA	NA	1.0E-01
			Vanadium	NA	NA	NA	NA	Metabolic	1.1E-01	NA	NA	1.1E-01
			Chemical Total	7.0E-05	NA	7.5E-06	7.7E-05		1.1E+02	NA	1.3E+01	1.2E+02
		Exposure Point Total					7.7E-05					1.2E+02
	Exposure Medium Total						7.7E-05					1.2E+02
Surface/Subsurface Soil Total							7.7E-05					1.2E+02
Air	Ambient Air	Ambient Air	**P/PCBs**									
		Facility Area	PCBs, Total	NA	3.4E-08	NA	3.4E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	3.4E-08	NA	3.4E-08		NA	NA	NA	NA
		Exposure Point Total					3.4E-08					NA
	Exposure Medium Total						3.4E-08					NA
Air Total							3.4E-08					NA
Receptor Total							7.7E-05					1.2E+02

Total Risk Across All Media = 8E-05

Total Hazard Across All Media = 124

Total Liver HI Across All Media =	0.1
Total Eye HI Across All Media =	123
Total GI Tract HI Across All Media =	0.2
Total Nails HI Across All Media =	123
Total Blood HI Across All Media =	0.05
Total Whole Body HI Across All Media =	0.05
Total Skin HI Across All Media =	124
Total Kidney HI Across All Media =	0.003
Total CNS HI Across All Media =	0.09
Total Immune System HI Across All Media =	123
Total Body and Organ Weight HI Across All Media =	0.1
Total Metabolic HI Across All Media =	0.1

TABLE F-9.6
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil South Landfill	**SVOCs**									
			Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	2.9E-07	NA	5.8E-08	3.4E-07	Eye/Skin/Nails/Immune System	2.0E-02	NA	4.1E-03	2.4E-02
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
			Chemical Total	2.9E-07	NA	5.8E-08	3.4E-07		2.0E-02	NA	4.1E-03	2.4E-02
		Exposure Point Total					3.4E-07					2.4E-02
	Exposure Medium Total						3.4E-07					2.4E-02
Surface Soil Total							3.4E-07					2.4E-02
Air	Ambient Air	Ambient Air South Landfill	**P/PCBs**									
			PCBs, Total	NA	2.0E-08	NA	2.0E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	2.0E-08	NA	2.0E-08		NA	NA	NA	NA
		Exposure Point Total					2.0E-08					NA
	Exposure Medium Total						2.0E-08					NA
Air Total							2.0E-08					NA
Receptor Total							3.6E-07					2.4E-02

Total Risk Across All Media = 4E-07

Total Hazard Across All Media = 0.02

Total Eye HI Across All Media = 0.02
Total Nails HI Across All Media = 0.02
Total Skin HI Across All Media = 0.02
Total Immune System HI Across All Media = 0.02

TABLE F-9.7
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		South Landfill	Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	4.3E-07	NA	1.8E-07	6.1E-07	Eye/Skin/Nails/Immune System	7.5E-02	NA	3.2E-02	1.1E-01
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
			Chemical Total	4.3E-07	NA	1.8E-07	6.1E-07		7.5E-02	NA	3.2E-02	1.1E-01
		Exposure Point Total					6.1E-07					1.1E-01
	Exposure Medium Total						6.1E-07					1.1E-01
Surface Soil Total							6.1E-07					1.1E-01
Air	Ambient Air	Ambient Air	**P/PCBs**									
		South Landfill	PCBs, Total	NA	5.5E-09	NA	5.5E-09	NA	NA	NA	NA	NA
			Chemical Total	NA	5.5E-09	NA	5.5E-09		NA	NA	NA	NA
		Exposure Point Total					5.5E-09					NA
	Exposure Medium Total						5.5E-09					NA
Air Total							5.5E-09					NA
Receptor Total							6.1E-07					1.1E-01

Total Risk Across All Media = 6E-07

Total Hazard Across All Media = 0.1

Total Eye HI Across All Media = 0.1
Total Nails HI Across All Media = 0.1
Total Skin HI Across All Media = 0.1
Total Immune System HI Across All Media = 0.1

TABLE F-9.8
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		West End Landfill	Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	NA	NA	NA	NA	Eye/Skin/Nails/Immune System	NA	NA	NA	NA
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
			Chemical Total	NA	NA	NA	NA		NA	NA	NA	NA
		Exposure Point Total					NA					NA
	Exposure Medium Total						NA					NA
Surface Soil Total							NA					NA
Air	Ambient Air	Ambient Air	**P/PCBs**									
		West End Landfill	PCBs, Total	NA	3.0E-08	NA	3.0E-08	NA	NA	NA	NA	NA
			Chemical Total	NA	3.0E-08	NA	3.0E-08		NA	NA	NA	NA
		Exposure Point Total					3.0E-08					NA
	Exposure Medium Total						3.0E-08					NA
Air Total							3.0E-08					NA
Receptor Total							3.0E-08					NA

Total Risk Across All Media = 3E-08

Total Hazard Across All Media = NA

TABLE F-9.9
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil	**SVOCs**									
		West End Landfill	Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
			P/PCBs									
			PCBs, Total	NA	NA	NA	NA	Eye/Skin/Nails/Immune System	NA	NA	NA	NA
			Heptachlor epoxide	NA	NA	NA	NA	Liver	NA	NA	NA	NA
			Dioxin									
			Dioxin TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Inorganics									
			Aluminum	NA	NA	NA	NA	GI Tract/CNS	NA	NA	NA	NA
			Antimony	NA	NA	NA	NA	Whole Body/Blood	NA	NA	NA	NA
			Arsenic	NA	NA	NA	NA	Skin	NA	NA	NA	NA
			Cadmium	NA	NA	NA	NA	Kidney	NA	NA	NA	NA
			Chromium	NA	NA	NA	NA	GI Tract	NA	NA	NA	NA
			Iron	NA	NA	NA	NA	GI Tract/Liver	NA	NA	NA	NA
			Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Manganese	NA	NA	NA	NA	CNS	NA	NA	NA	NA
			Mercury	NA	NA	NA	NA	Immune System	NA	NA	NA	NA
			Vanadium	NA	NA	NA	NA	Metabolic	NA	NA	NA	NA
			Chemical Total	NA	NA	NA	NA		NA	NA	NA	NA
		Exposure Point Total					NA					NA
	Exposure Medium Total						NA					NA
Surface Soil Total							NA					NA
Air	Ambient Air	Ambient Air	**P/PCBs**									
		West End Landfill	PCBs, Total	NA	7.9E-09	NA	7.9E-09	NA	NA	NA	NA	NA
			Chemical Total	NA	7.9E-09	NA	7.9E-09		NA	NA	NA	NA
		Exposure Point Total					7.9E-09					NA
	Exposure Medium Total						7.9E-09					NA
Air Total							7.9E-09					NA
Receptor Total							7.9E-09					NA

Total Risk Across All Media = 8E-09

Total Hazard Across All Media = NA

TABLE F-10.1
RISK SUMMARY
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**P/PCBs**									
			PCBs, Total	7.8E-06	NA	1.6E-06	9.4E-06	Eye/Skin/Nails/Immune System	5.5E-01	NA	1.1E-01	6.6E-01
			Dioxin									
			Dioxin TEQ	4.0E-06	NA	1.2E-07	4.1E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	6.1E-06	NA	6.2E-07	6.8E-06	Skin	3.8E-02	NA	3.9E-03	4.2E-02
			Chemical Total	1.9E-05	NA	2.4E-06	2.1E-05		6.0E-01	NA	1.2E-01	7.2E-01
		Exposure Point Total					2.1E-05					7.2E-01
	Exposure Medium Total						2.1E-05					7.2E-01
Surface Soil Total							2.1E-05					7.2E-01
Air Facility Area	Ambient Air	Ambient Air	Chemical Total	NA	2.1E-07	NA	2.1E-07		NA	NA	NA	NA
		Exposure Point Total					2.1E-07					NA
	Exposure Medium Total						2.1E-07					NA
Air Total							2.1E-07					NA
Receptor Total							2.1E-05					7.2E-01

Total Risk Across All Media = 2E-05

Total Hazard Across All Media = 1

Total Liver HI Across All Media =	0.006
Total Eye HI Across All Media =	1
Total GI Tract HI Across All Media =	0.006
Total Nails HI Across All Media =	1
Total Blood HI Across All Media =	0.002
Total Whole Body HI Across All Media =	0.002
Total Skin HI Across All Media =	1
Total Kidney HI Across All Media =	0.0005
Total CNS HI Across All Media =	0.002
Total Immune System HI Across All Media =	1
Total Metabolic HI Across All Media =	0.004

TABLE F-10.2
RISK SUMMARY
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**P/PCBs**									
			PCBs, Total	1.3E-04	NA	2.6E-05	1.5E-04	Eye/Skin/Nails/Immune System	8.9E+00	NA	1.8E+00	1.1E+01
			Dioxin									
			Dioxin TEQ	4.0E-06	NA	1.2E-07	4.1E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	6.1E-06	NA	6.2E-07	6.8E-06	Skin	3.8E-02	NA	3.9E-03	4.2E-02
			Chemical Total	1.4E-04	NA	2.7E-05	1.6E-04		9.0E+00	NA	1.8E+00	1.1E+01
		Exposure Point Total					1.6E-04					1.1E+01
	Exposure Medium Total						1.6E-04					1.1E+01
Surface Soil Total							1.6E-04					1.1E+01
Air Facility Area	Ambient Air	Ambient Air	Chemical Total	NA	2.1E-07	NA	2.1E-07		NA	NA	NA	NA
		Exposure Point Total					2.1E-07					NA
	Exposure Medium Total						2.1E-07					NA
Air Total							2.1E-07					NA
Receptor Total							1.6E-04					1.1E+01

Total Risk Across All Media = 2E-04

Total Hazard Across All Media = 11

Total Liver HI Across All Media =	0.006
Total Eye HI Across All Media =	11
Total GI Tract HI Across All Media =	0.006
Total Nails HI Across All Media =	11
Total Blood HI Across All Media =	0.002
Total Whole Body HI Across All Media =	0.002
Total Skin HI Across All Media =	11
Total Kidney HI Across All Media =	0.000
Total CNS HI Across All Media =	0.002
Total Immune System HI Across All Media =	11
Total Metabolic HI Across All Media =	0.004

TABLE F-10.3
RISK SUMMARY
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**P/PCBs**									
			PCBs, Total	1.2E-05	NA	5.0E-06	1.7E-05	Eye/Skin/Nails/Immune System	2.0E+00	NA	8.7E-01	2.9E+00
			Dioxin									
			Dioxin TEQ	5.9E-06	NA	3.8E-07	6.3E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	9.2E-06	NA	1.9E-06	1.1E-05	Skin	1.4E-01	NA	3.0E-02	1.7E-01
			Chemical Total	2.8E-05	NA	7.6E-06	3.6E-05		2.3E+00	NA	9.0E-01	3.2E+00
		Exposure Point Total					3.6E-05					3.2E+00
	Exposure Medium Total						3.6E-05					3.2E+00
Surface Soil Total							3.6E-05					3.2E+00
Air Facility Area	Ambient Air	Ambient Air	Chemical Total	NA	5.7E-08	NA	5.7E-08		NA	NA	NA	NA
		Exposure Point Total					5.7E-08					NA
	Exposure Medium Total						5.7E-08					NA
Air Total							5.7E-08					NA
Receptor Total							3.6E-05					3.2E+00

Total Risk Across All Media = 4E-05

Total Hazard Across All Media = 3

Total Liver HI Across All Media =	0.02
Total Eye HI Across All Media =	3
Total GI Tract HI Across All Media =	0.02
Total Nails HI Across All Media =	3
Total Blood HI Across All Media =	0.008
Total Whole Body HI Across All Media =	0.008
Total Skin HI Across All Media =	3
Total Kidney HI Across All Media =	0.002
Total CNS HI Across All Media =	0.009
Total Immune System HI Across All Media =	3
Total Metabolic HI Across All Media =	0.01

TABLE F-10.4
RISK SUMMARY
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Surface Soil Facility Area	**P/PCBs**									
			PCBs, Total	1.9E-04	NA	8.0E-05	2.7E-04	Eye/Skin/Nails/Immune System	3.3E+01	NA	1.4E+01	4.7E+01
			Dioxin									
			Dioxin TEQ	5.9E-06	NA	3.8E-07	6.3E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	9.2E-06	NA	1.9E-06	1.1E-05	Skin	1.4E-01	NA	3.0E-02	1.7E-01
			Chemical Total	2.1E-04	NA	8.3E-05	2.9E-04		3.3E+01	NA	1.4E+01	4.8E+01
		Exposure Point Total					2.9E-04					4.8E+01
	Exposure Medium Total						2.9E-04					4.8E+01
Surface Soil Total							2.9E-04					4.8E+01
Air Facility Area	Ambient Air	Ambient Air	Chemical Total	NA	5.7E-08	NA	5.7E-08		NA	NA	NA	NA
		Exposure Point Total					5.7E-08					NA
	Exposure Medium Total						5.7E-08					NA
Air Total							5.7E-08					NA
Receptor Total							2.9E-04					4.8E+01

Total Risk Across All Media = 3E-04

Total Hazard Across All Media = 48

Total Liver HI Across All Media =	0.02
Total Eye HI Across All Media =	47
Total GI Tract HI Across All Media =	0.02
Total Nails HI Across All Media =	47
Total Blood HI Across All Media =	0.008
Total Whole Body HI Across All Media =	0.008
Total Skin HI Across All Media =	47
Total Kidney HI Across All Media =	0.002
Total CNS HI Across All Media =	0.009
Total Immune System HI Across All Media =	47
Total Metabolic HI Across All Media =	0.01

TABLE F-10.5
RISK SUMMARY
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Construction Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface/ Subsurface Soil	Surface Soil Subsurface Soil	Surface Soil Subsurface Soil Facility Area	**P/PCBs**									
			PCBs, Total	6.3E-05	NA	7.3E-06	7.0E-05	Eye/Skin/Nails/Immune System	1.1E+02	NA	1.3E+01	1.2E+02
			Dioxin									
			Dioxin TEQ	3.7E-06	NA	6.3E-08	3.7E-06	NA	NA	NA	NA	NA
			Inorganics									
			Arsenic	2.1E-06	NA	1.2E-07	2.3E-06	Skin	3.3E-01	NA	1.9E-02	3.5E-01
			Chemical Total	7.0E-05	NA	7.5E-06	7.7E-05		1.1E+02	NA	1.3E+01	1.2E+02
		Exposure Point Total					7.7E-05					1.2E+02
	Exposure Medium Total						7.7E-05					1.2E+02
Surface/Subsurface Soil Total							7.7E-05					1.2E+02
Air Facility Area	Ambient Air	Ambient Air	Chemical Total	NA	3.4E-08	NA	3.4E-08		NA	NA	NA	NA
		Exposure Point Total					3.4E-08					NA
	Exposure Medium Total						3.4E-08					NA
Air Total							3.4E-08					NA
Receptor Total							7.7E-05					1.2E+02

Total Risk Across All Media = 8E-05

Total Hazard Across All Media = 124

Total Liver HI Across All Media =	0.1
Total Eye HI Across All Media =	123
Total GI Tract HI Across All Media =	0.2
Total Nails HI Across All Media =	123
Total Blood HI Across All Media =	0.05
Total Whole Body HI Across All Media =	0.05
Total Skin HI Across All Media =	124
Total Kidney HI Across All Media =	0.003
Total CNS HI Across All Media =	0.09
Total Immune System HI Across All Media =	123
Total Body and Organ Weight HI Across All Media =	0.1
Total Metabolic HI Across All Media =	0.1

TABLE F-10.6
RISK SUMMARY
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil South Landfill	Surface Soil	Surface Soil	Chemical Total	2.9E-07	NA	5.8E-08	3.4E-07		2.0E-02	NA	4.1E-03	2.4E-02
		Exposure Point Total					3.4E-07					2.4E-02
	Exposure Medium Total						3.4E-07					2.4E-02
Surface Soil Total							3.4E-07					2.4E-02
Air South Landfill	Ambient Air	Ambient Air	Chemical Total	NA	2.0E-08	NA	2.0E-08		NA	NA	NA	NA
		Exposure Point Total					2.0E-08					NA
	Exposure Medium Total						2.0E-08					NA
Air Total							2.0E-08					NA
Receptor Total							3.6E-07					2.4E-02

Total Risk Across All Media = 4E-07

Total Hazard Across All Media = 0.02

Total Eye HI Across All Media = 0.02
Total Nails HI Across All Media = 0.02
Total Skin HI Across All Media = 0.02
Total Immune System HI Across All Media = 0.02

TABLE F-10.7
RISK SUMMARY
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil South Landfill	Surface Soil	Surface Soil	Chemical Total	4.3E-07	NA	1.8E-07	6.1E-07		7.5E-02	NA	3.2E-02	1.1E-01
		Exposure Point Total					6.1E-07					1.1E-01
	Exposure Medium Total						6.1E-07					1.1E-01
Surface Soil Total							6.1E-07					1.1E-01
Air South Landfill	Ambient Air	Ambient Air	Chemical Total	NA	5.5E-09	NA	5.5E-09		NA	NA	NA	NA
		Exposure Point Total					5.5E-09					NA
	Exposure Medium Total						5.5E-09					NA
Air Total							5.5E-09					NA
Receptor Total							6.1E-07					1.1E-01

Total Risk Across All Media = 6E-07

Total Hazard Across All Media = 0.1

Total Eye HI Across All Media = 0.1
Total Nails HI Across All Media = 0.1
Total Skin HI Across All Media = 0.1
Total Immune System HI Across All Media = 0.1

TABLE F-10.8
RISK SUMMARY
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	O&M Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil West End Landfill	Surface Soil	Surface Soil	Chemical Total	NA	NA	NA	NA		NA	NA	NA	NA
		Exposure Point Total					NA					NA
	Exposure Medium Total						NA					NA
Surface Soil Total							NA					NA
Air West End Landfill	Ambient Air	Ambient Air	Chemical Total	NA	3.0E-08	NA	3.0E-08		NA	NA	NA	NA
		Exposure Point Total					3.0E-08					NA
	Exposure Medium Total						3.0E-08					NA
Air Total							3.0E-08					NA
Receptor Total							3.0E-08					NA

Total Risk Across All Media = 3E-08

Total Hazard Across All Media = NA

TABLE F-10.9
RISK SUMMARY
MODIFIED EXPOSURE
Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Current/Future
Receptor Population:	Trespasser
Receptor:	Adolescent (7-16 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic-Hazard Quotient				
				Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Ambient Air	Dermal	Exposure Routes Total
Surface Soil West End Landfill	Surface Soil	Surface Soil	Chemical Total	NA	NA	NA	NA		NA	NA	NA	NA
		Exposure Point Total					NA					NA
	Exposure Medium Total						NA					NA
Surface Soil Total							NA					NA
Air West End Landfill	Ambient Air	Ambient Air	Chemical Total	NA	7.9E-09	NA	7.9E-09		NA	NA	NA	NA
		Exposure Point Total					7.9E-09					NA
	Exposure Medium Total						7.9E-09					NA
Air Total							7.9E-09					NA
Receptor Total							7.9E-09					NA

Total Risk Across All Media = 8E-09

Total Hazard Across All Media = NA

APPENDIX L

Risk-Based Remedial Goal Options
(provided in electronic format on CD)

A-4 Addendum to RGOs

Parametrix CDM

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September 3, 2009

Ms. Pamela J. Langston Scully
Remedial Project Manager
U.S. Environmental Protection Agency
Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, S.W.
Atlanta, Georgia 30303-3104

Project: Contract No. : 68-57-03-04
Task Order No. : 0023

Subject: Addendum to Remedial Goal Options for Anniston PCB Site, OU 3

Dear Ms. Scully:

CDM FEDERAL PROGRAMS CORPORATION (CDM) is pleased submit the above referenced document for your review. Per your request on August 21, 2009, remedial goal options (RGOs) have been calculated for 4-Nitrophneol and Sulfotepp. In addition, the RGO has been re-calculated for 2,4,6-trichlorophenol based on a new RfD recommended for 2,4,6-trichlorophenol.

CDM is pleased to assist EPA with this assignment, and we look forward to providing further technical assistance on this project. If you have any questions concerning the attached, please call me at (678) 852-6174 or (404)720-1400.

Sincerely yours,

CDM Federal Programs Corporation

Tony Isolda
Project Manager

Attachment

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Technical Memorandum
Remedial Goal Option Addendum
For the Anniston OU-3 Human Health Risk Assessment
September 3, 2009

This Remedial Goal Option (RGO) addendum memorandum for the Anniston OU-3 Human Health Risk Assessment (HHRA) presents groundwater RGOs for three chemicals: 2,4,6-trichlorophenol, 4-nitrophenol, and sulfotepp (tetraethyldithiopyrophosphate). The RGOs are presented in the revised Table 9 included in Attachment 1. Calculations that support the new RGOs are provided in spreadsheets in Attachment 1. The RGOs for 2,4,6-trichlorophenol are revised values based on an updated oral reference dose (RfD) toxicity value. The RGOs for 4-nitrophenol and sulfotepp are new values since these chemicals are listed in the RCRA permit and are detected in relatively high concentrations in OU-3 groundwater.

RGOs were calculated following guidance provided by USEPA Region 4 in the 2000 *Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment Bulletins*. For each chemical, RGOs were developed by deriving a ratio between the target risk and the calculated risk. This ratio provided the multiplier for the exposure point concentration (EPC) in groundwater and the product is the RGO. The proportion is as follows:

EPC[chemical i]/Calculated Risk[chemical i] = RGO [chemical i]/Target Risk

In general, RGOs are calculated separately for cancer and noncancer effects, corresponding to incremental cancer risk levels of $1x10^{-4}$, $1x10^{-5}$, and $1x10^{-6}$ and hazard quotients (HIs) of 0.1, 1 and 3. For this assessment, each RGO was based on noncancer effects based on available toxicity information. The oral RfD employed in this assessment for 2,4,6-trichlorophenol is the value currently recommended by Provisional Peer Reviewed Toxicity Value (PPRTV) derived by EPA's Superfund Health Risk Technical Support Center (STSC) and replaces the old Health Effects Assessment Summary Table (HEAST) value used in the original risk assessment. Oral RfDs for 4-nitrophenol and sulfotepp are values currently available through National Center for Environmental Assessment (NCEA) and Integrated Risk Information System ((IRIS), respectively. Support documentation for PPRTVs for 2,4,6-trichlorophenol and 4-nitrophenol are provided in Attachment 2.

Calculated risks used to derive each RGO were based on a young child (0-6 years) under the residential exposure scenario that was used in the original HHRA. This exposure scenario assumed that children could be exposed to chemicals detected in groundwater through ingestion of tapwater and dermal contact while bathing. Non-cancer hazards are higher for young children because these hazards are estimated based on dose rate expressed as mg/kg-d.

Lower body weights for young children result in higher estimates for dose rate. Thus, protection of young children in a residential setting will also protect other age groups.

For the ingestion and dermal pathways, exposure is assumed to occur for 350 days per year for six years. The ingestion rate for tapwater was assumed to be 1 liter/day, and the exposed skin surface area was assumed to be 6,600 cm2 for total immersion during bathing. Child body weight was assumed to be 15 kg. It should be noted that exposure resulting from inhalation of chemicals while bathing was not evaluated for these compounds because noncancer inhalation reference concentration (RfC) toxicity values are not available. None of the above chemicals are highly volatile however and lack of consideration of inhalation exposure is not expected to result in significant underestimation of exposure and HI. Henry's law constants for 2,4,6-trichlorophenol, 4-nitrophenol and sulfotepp are 2.6E-06, 4,15E-10, and 4.45E-06 atm-m^3/mole at 25°C, respectively (ChemID 2009). Typically, chemicals are classified as volatile only if Henry's law constants are above 1E-05 atm-m^3/mole (EPA 2004).

Groundwater exposure point concentrations were calculated using data from seven well locations (MW-09A, MW-14, MW-15, MW-16, MW-20A, OW-21A, and T4) that were analyzed for 2,4,6-trichlorophenol, 4-nitrophenol, and sulfotepp at least once. ProUCL (EPA 2007) was used to calculate these EPCs. Table A-3 in the OU-3 HHRA lists well locations and specific samples used in these calculation. Note that the groundwater sample from MW-07 was not analyzed for the three compounds of interest. Data collected from sampling rounds in 2003 through 2005 were employed in the evaluation.

REFERENCES:

ChemID (2009) Physical Properties.
http://chem.sis.nlm.nih.gov/chemidplus/jsp/common/PhysicalProperties.jsp?calledFrom=lite
http://chem.sis.nlm.nih.gov/chemidplus/jsp/common/PhysicalProperties.jsp?calledFrom=lite
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EPA (2004) User'a Guide for Evaluating Subsurface Vapor Intrustion into Buildings.
http://www.epa.gov/oswer/riskassessment/airmodel/pdf/2004_0222_3phase_users_guide.pdf

EPA (2007) ProUCL Version 4.00.04. http://www.epa.gov/nerlesd1/tsc/TSC_form.htm

EPA (2009) Intergrated Risk Information System. http://www.epa.gov/ncea/iris/index.html

Attachment 1

ProUCL output

Cancer Risk and HI calculations for child resident exposure to groundwater

Updated RGO Table

	A	B	C	D	E	F	G	H	I	J	K	L
1				General UCL Statistics for Data Sets with Non-Detects								
2		User Selected Options										
3			From File	C:\Documents and Settings\lamiepo\My Documents\My Documents\Anniston Ala\OU_3\OU3_GW_proucl.wst								
4			Full Precision	OFF								
5			Confidence Coefficient	95%								
6			*Number of Bootstrap Operations*	*2000*								
7												
8												
9	2,4,6-Trichlorophenol											
10												
11						General Statistics						
12					Number of Valid Data	25					Number of Detected Data	5
13					Number of Distinct Detected Data	5					Number of Non-Detect Data	20
14											Percent Non-Detects	80.00%
15												
16			Raw Statistics						Log-transformed Statistics			
17					Minimum Detected	9.4					Minimum Detected	2.241
18					Maximum Detected	17					Maximum Detected	2.833
19					Mean of Detected	13.68					Mean of Detected	2.597
20					SD of Detected	2.813					SD of Detected	0.222
21					Minimum Non-Detect	9.7					Minimum Non-Detect	2.272
22					Maximum Non-Detect	5000					Maximum Non-Detect	8.517
23												
24	Note: Data have multiple DLs - Use of KM Method is recommended										Number treated as Non-Detect	25
25	For all methods (except KM, DL/2, and ROS Methods),										Number treated as Detected	0
26	Observations < Largest ND are treated as NDs										Single DL Non-Detect Percentage	100.00%
27												
28					Warning: There are only 5 Detected Values in this data							
29				Note: It should be noted that even though bootstrap may be performed on this data set								
30				the resulting calculations may not be reliable enough to draw conclusions								
31												
32			It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.									
33												
34												
35						UCL Statistics						
36		Normal Distribution Test with Detected Values Only						Lognormal Distribution Test with Detected Values Only				
37					Shapiro Wilk Test Statistic	0.968					Shapiro Wilk Test Statistic	0.927
38					5% Shapiro Wilk Critical Value	0.762					5% Shapiro Wilk Critical Value	0.762
39		Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level				
40												
41			Assuming Normal Distribution						Assuming Lognormal Distribution			
42					DL/2 Substitution Method						DL/2 Substitution Method	
43					Mean	188					Mean	2.646
44					SD	537					SD	1.917
45					95% DL/2 (t) UCL	371.7					95% H-Stat (DL/2) UCL	385.5
46												
47					Maximum Likelihood Estimate(MLE) Method	N/A					Log ROS Method	
48			MLE method failed to converge properly								Mean in Log Scale	2.304
49											SD in Log Scale	0.223
50											Mean in Original Scale	10.27
51											SD in Original Scale	2.428
52											95% Percentile Bootstrap UCL	11.06

	A B C D E	F	G H I J K	L
53			95% BCA Bootstrap UCL	11.1
54				
55	Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
56	k star (bias corrected)	10.87	Data appear Normal at 5% Significance Level	
57	Theta Star	1.258		
58	nu star	108.7		
59				
60	A-D Test Statistic	0.287	Nonparametric Statistics	
61	5% A-D Critical Value	0.679	Kaplan-Meier (KM) Method	
62	K-S Test Statistic	0.679	Mean	10.42
63	5% K-S Critical Value	0.357	SD	2.198
64	Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.536
65			95% KM (t) UCL	11.34
66	Assuming Gamma Distribution		95% KM (z) UCL	11.3
67	Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	12.54
68	Minimum	9.4	95% KM (bootstrap t) UCL	11.09
69	Maximum	17	95% KM (BCA) UCL	15.09
70	Mean	12.71	95% KM (Percentile Bootstrap) UCL	14.32
71	Median	12.35	95% KM (Chebyshev) UCL	12.76
72	SD	1.783	97.5% KM (Chebyshev) UCL	13.77
73	k star	48.55	99% KM (Chebyshev) UCL	15.75
74	Theta star	0.262		
75	Nu star	2427	Potential UCLs to Use	
76	AppChi2	2314	95% KM (t) UCL	11.34
77	95% Gamma Approximate UCL	13.34	95% KM (Percentile Bootstrap) UCL	14.32
78	95% Adjusted Gamma UCL	13.38		
79	Note: DL/2 is not a recommended method.			
80				
81				
82	4-Nitrophenol			
83				
84	General Statistics			
85	Number of Valid Data	25	Number of Detected Data	5
86	Number of Distinct Detected Data	5	Number of Non-Detect Data	20
87			Percent Non-Detects	80.00%
88				
89	*Raw Statistics*		*Log-transformed Statistics*	
90	Minimum Detected	140	Minimum Detected	4.942
91	Maximum Detected	30000	Maximum Detected	10.31
92	Mean of Detected	15828	Mean of Detected	8.861
93	SD of Detected	10867	SD of Detected	2.213
94	Minimum Non-Detect	47	Minimum Non-Detect	3.85
95	Maximum Non-Detect	53	Maximum Non-Detect	3.97
96				
97	Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	20
98	For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	5
99	Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	80.00%
100				
101	Warning: There are only 5 Detected Values in this data			
102	Note: It should be noted that even though bootstrap may be performed on this data set			
103	the resulting calculations may not be reliable enough to draw conclusions			
104				

	A–E	F	G–K	L
105	It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
106				
107				
108		**UCL Statistics**		
109	**Normal Distribution Test with Detected Values Only**		**Lognormal Distribution Test with Detected Values Only**	
110	Shapiro Wilk Test Statistic	0.982	Shapiro Wilk Test Statistic	0.688
111	5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
112	**Data appear Normal at 5% Significance Level**		**Data not Lognormal at 5% Significance Level**	
113				
114	**Assuming Normal Distribution**		**Assuming Lognormal Distribution**	
115	DL/2 Substitution Method		DL/2 Substitution Method	
116	Mean	3186	Mean	4.349
117	SD	7830	SD	2.474
118	95% DL/2 (t) UCL	5865	95% H-Stat (DL/2) UCL	9940
119				
120	Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
121	**MLE yields a negative mean**		Mean in Log Scale	2.745
122			SD in Log Scale	4.136
123			Mean in Original Scale	3196
124			SD in Original Scale	7826
125			95% Percentile Bootstrap UCL	5946
126			95% BCA Bootstrap UCL	6896
127				
128	**Gamma Distribution Test with Detected Values Only**		**Data Distribution Test with Detected Values Only**	
129	k star (bias corrected)	0.43	**Data appear Normal at 5% Significance Level**	
130	Theta Star	36802		
131	nu star	4.301		
132				
133	A-D Test Statistic	0.741	**Nonparametric Statistics**	
134	5% A-D Critical Value	0.699	Kaplan-Meier (KM) Method	
135	K-S Test Statistic	0.699	Mean	3278
136	5% K-S Critical Value	0.367	SD	7634
137	**Data not Gamma Distributed at 5% Significance Level**		SE of Mean	1707
138			95% KM (t) UCL	6198
139	**Assuming Gamma Distribution**		95% KM (z) UCL	6085
140	Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	11012
141	Minimum	1E-09	95% KM (bootstrap t) UCL	5408
142	Maximum	30000	95% KM (BCA) UCL	20000
143	Mean	10164	95% KM (Percentile Bootstrap) UCL	17440
144	Median	8954	95% KM (Chebyshev) UCL	10718
145	SD	9448	97.5% KM (Chebyshev) UCL	13938
146	k star	0.103	99% KM (Chebyshev) UCL	20262
147	Theta star	98763		
148	Nu star	5.146	**Potential UCLs to Use**	
149	*AppChi2*	*1.22*	*95% KM (t) UCL*	*6198*
150	95% Gamma Approximate UCL	42867	95% KM (Percentile Bootstrap) UCL	17440
151	95% Adjusted Gamma UCL	47690		
152	**Note: DL/2 is not a recommended method.**			
153				
154				
155	**Chlorobenzene**			
156				

General Statistics			
Number of Valid Data	25	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	19
		Percent Non-Detects	76.00%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	3.4	Minimum Detected	1.224
Maximum Detected	12	Maximum Detected	2.485
Mean of Detected	5.45	Mean of Detected	1.593
SD of Detected	3.241	SD of Detected	0.451
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	100	Maximum Non-Detect	4.605
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	25
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 6 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics			
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.633	Shapiro Wilk Test Statistic	0.734
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.408	Mean	0.436
SD	10.86	SD	1.513
95% DL/2 (t) UCL	9.123	95% H-Stat (DL/2) UCL	11.58
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	0.418
		SD in Log Scale	0.891
		Mean in Original Scale	2.245
		SD in Original Scale	2.425
		95% Percentile Bootstrap UCL	3.106
		95% BCA Bootstrap UCL	3.367
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	2.625	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	2.076		
nu star	31.5		
A-D Test Statistic	0.999	**Nonparametric Statistics**	
5% A-D Critical Value	0.698	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.698	Mean	3.986

5% K-S Critical Value	0.333	SD	1.833
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.438
		95% KM (t) UCL	4.735
Assuming Gamma Distribution		95% KM (z) UCL	4.706
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	4.61
Minimum	2.083	95% KM (bootstrap t) UCL	6.569
Maximum	13.59	95% KM (BCA) UCL	5.486
Mean	8.536	95% KM (Percentile Bootstrap) UCL	5.068
Median	9.174	95% KM (Chebyshev) UCL	5.895
SD	3.694	97.5% KM (Chebyshev) UCL	6.721
k star	3.937	99% KM (Chebyshev) UCL	8.344
Theta star	2.168		
Nu star	196.8	**Potential UCLs to Use**	
AppChi2	165.4	95% KM (t) UCL	4.735
95% Gamma Approximate UCL	10.16	95% KM (% Bootstrap) UCL	5.068
95% Adjusted Gamma UCL	10.28		
Note: DL/2 is not a recommended method.			
Sulfotepp			
		General Statistics	
Number of Valid Data	25	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	21
		Percent Non-Detects	84.00%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	9.3	Minimum Detected	2.23
Maximum Detected	150	Maximum Detected	5.011
Mean of Detected	60.58	Mean of Detected	3.624
SD of Detected	63.16	SD of Detected	1.193
Minimum Non-Detect	0.33	Minimum Non-Detect	-1.109
Maximum Non-Detect	500	Maximum Non-Detect	6.215
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	25
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
		Warning: There are only 4 Distinct Detected Values in this data	
		Note: It should be noted that even though bootstrap may be performed on this data set	
		the resulting calculations may not be reliable enough to draw conclusions	
		It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.	
		UCL Statistics	
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.879	Shapiro Wilk Test Statistic	0.995
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	

	A–E	F	G–K	L
261	DL/2 Substitution Method		DL/2 Substitution Method	
262	Mean	19.89	Mean	-0.326
263	SD	57.47	SD	2.277
264	95% DL/2 (t) UCL	39.55	95% H-Stat (DL/2) UCL	57.04
265				
266	Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
267	**MLE method failed to converge properly**		Mean in Log Scale	-1.705
268			SD in Log Scale	3.214
269			Mean in Original Scale	10.02
270			SD in Original Scale	31.72
271			95% Percentile Bootstrap UCL	21.77
272			95% BCA Bootstrap UCL	29.87
273				
274	**Gamma Distribution Test with Detected Values Only**		**Data Distribution Test with Detected Values Only**	
275	k star (bias corrected)	0.462	**Data appear Normal at 5% Significance Level**	
276	Theta Star	131.1		
277	nu star	3.695		
278				
279	A-D Test Statistic	0.219	**Nonparametric Statistics**	
280	5% A-D Critical Value	0.665	Kaplan-Meier (KM) Method	
281	K-S Test Statistic	0.665	Mean	17.85
282	5% K-S Critical Value	0.401	SD	29.39
283	**Data appear Gamma Distributed at 5% Significance Level**		SE of Mean	6.927
284			95% KM (t) UCL	29.7
285	**Assuming Gamma Distribution**		95% KM (z) UCL	29.24
286	Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	29.61
287	Minimum	1E-09	95% KM (bootstrap t) UCL	34.68
288	Maximum	150	95% KM (BCA) UCL	150
289	Mean	50.7	95% KM (Percentile Bootstrap) UCL	67.27
290	Median	30.77	95% KM (Chebyshev) UCL	48.04
291	SD	55.77	97.5% KM (Chebyshev) UCL	61.11
292	k star	0.118	99% KM (Chebyshev) UCL	86.77
293	Theta star	431.5		
294	Nu star	5.875	**Potential UCLs to Use**	
295	AppChi2	1.577	95% KM (t) UCL	29.7
296	95% Gamma Approximate UCL	189	95% KM (Percentile Bootstrap) UCL	67.27
297	95% Adjusted Gamma UCL	N/A		
298	**Note: DL/2 is not a recommended method.**			
299				

TABLE B-7.15

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

SELECTION OF EXPOSURE PATHWAYS

Scenario Timeframe:	Future
Receptor Population:	Off-site Residents
Receptor Age:	Child (0-6 yrs)

Cancer Intake Factors

GROUNDWATER

Ingestion: 5.5E-06

Dermal: 3.6E-05

Inhalation Vapor in Bath: 5.5E-06

Inhalation Ambient Air: 4.1E-08

Noncancer Intake Factors

GROUNDWATER

Ingestion: 6.4E-05

Dermal: 4.2E-04

Inhalation Vapor in Bath: 6.4E-05

Inhalation Ambient Air: 4.8E-07

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/ Exposure Concentration		CSF/Unit Risk		Cancer	Intake/ Exposure Concentration		RfD/RfC		Hazard
					Value	Unit	Value	Unit	Value	Unit	Risk	Value	Unit	Value	Unit	Quotient
Groundwater	Groundwater	Tap Water	Ingestion													
				SVOCs												
				2,4,6-Trichlorophenol	14.32	ug/L	7.8E-05	mg/kg/day	1.10E-02	$(mg/kg/day)^{-1}$	8.6E-07	9.2E-04	mg/kg/day	1.0E-03	mg/kg/day	9.2E-01
				4-Nitrophenol	17,440	ug/L	9.6E-02	mg/kg/day	NA	NA	NA	1.1E+00	mg/kg/day	8.0E-03	mg/kg/day	1.4E+02
				P/PCBS												
				Sulfotepp	67.27	ug/L	3.7E-04	mg/kg/day	NA	NA	NA	4.3E-03	mg/kg/day	5.0E-04	mg/kg/day	8.6E+00
			Exp. Route Total								8.6E-07					1.5E+02
Groundwater	Groundwater	Tap Water	Dermal Contact													
				SVOCs												
				2,4,6-Trichlorophenol	14.32	ug/L	1.8E-05	mg/kg/day	1.10E-02	$(mg/kg/day)^{-1}$	2.0E-07	2.1E-04	mg/kg/day	1.0E-03	mg/kg/day	2.1E-01
				4-Nitrophenol	17,440	ug/L	3.0E-03	mg/kg/day	NA	NA	NA	3.5E-02	mg/kg/day	8.0E-03	mg/kg/day	4.4E+00
				P/PCBS												
				Sulfotepp	67.27	ug/L	3.4E-05	mg/kg/day	NA	NA	NA	4.0E-04	mg/kg/day	5.0E-04	mg/kg/day	7.9E-01
			Exp. Route Total								2.0E-07					5.4E+00
Groundwater	Air	Vapors in Bath	Inhalation													
				SVOCs												
				2,4,6-Trichlorophenol	119	ug/m^3	6.5E-04	mg/kg/day	1.1E-02	$(mg/kg/day)^{-1}$	7.1E-06	7.6E-03	mg/kg/day	NA	NA	NA
				4-Nitrophenol	144,452	ug/m^3	7.9E-01	mg/kg/day	NA	NA	NA	9.2E+00	mg/kg/day	NA	NA	NA
				P/PCBS												
				Sulfotepp	557	ug/m^3	3.1E-03	mg/kg/day	NA	NA	NA	3.6E-02	mg/kg/day	NA	mg/kg/day	NA
			Exp. Route Total								7.1E-06					0.0E+00
		Exposure Point Total									8.2E-06					1.5E+02

TABLE B-9.15

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Anniston PCB Site, Operable Unit 3

Scenario Timeframe:	Future
Receptor Population:	Off-site Residents
Receptor:	Child (0-6 yrs)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic-Hazard Quotient					
				Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation Vapors in Bath	Inhalation Ambient Air	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**SVOCs**											
			2,4,6-Trichlorophenol	8.6E-07	7.1E-06	NA	2.0E-07	8.2E-06	reproductive system	9.2E-01	NA	NA	2.1E-01	1.1E+00
			4-Nitrophenol	NA	NA	NA	NA	NA	NA	1.4E+02	NA	NA	4.4E+00	1.4E+02
			P/PCBs											
			Sulfotepp	NA	NA	NA	NA	NA	blood	8.6E+00	NA	NA	7.9E-01	9.4E+00
Exposure Point Total								8.2E-06						1.5E+02

Table 9

Risk-Based Remedial Goal Options and ARARs for Groundwater [1]

Future Offsite Resident - Child (0-6 Years)

Anniston PCB Site, Operable Unit 3

Chemical of Concern	EPC[2] (ug/L)	Cancer Risk Level [3] (ug/L)			Hazard Quotient Level[4] (ug/L)			ARAR[5]	(ug/L)
		1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3		
VOCs									
1,2,4-Trichlorbenzene	11	NA_{nc}	NA_{nc}	NA_{nc}	0.2	2	5	70	MCL
1,4-Dichlorobenzene	2.4	0.7	7	73	NA_c	NA_c	NA_c	75	MCL
Pentachlorophenol	20	0.1	1	13	4	41	122	1	MCL
Trichloroethylene	3.4	0.04	0.4	4	0.3	3	10	5	MCL
SVOCs									
2,4,6-Trichlorophenol	14	1.8	18	176	1.3	13	39	---	
4-Nitrophenol	17,440	NA_{nc}	NA_{nc}	NA_{nc}	12	125	374	---	
Indeno(1,2,3-cd)pyrene	0.73	0.02	0.2	2	NA_c	NA_c	NA_c	---	
P/PCBs									
PCBs, Total	2,400	0.02	0.2	2	0.01	0.05	0.2	0.5	MCL
gamma-BHC	0.55	0.01	0.1	1	0.05	0.5	1	0.2	MCL
Methyl parathion	74	NA_{nc}	NA_{nc}	NA_{nc}	0.4	4	12	---	
Parathion	9,400	NA_{nc}	NA_{nc}	NA_{nc}	9	85	256	---	
Sulfotepp	67	NA_{nc}	NA_{nc}	NA_{nc}	0.7	7	21	---	
Dioxin									
Dioxin TEQ	4.E-06	1.E-06	1.E-05	1.E-04	NA_c	NA_c	NA_c	0.00003	MCL
Inorganics									
Arsenic	6.1	0.1	1	12	0.5	5	14	10	MCL
Mercury	1.8	NA_{nc}	NA_{nc}	NA_{nc}	0.02	0.2	0.5	2	MCL

Notes:

1. RGO = EPC * target risk / calculated risk (Human Health Risk Assessment Bulletins -- Supplement to RAGS (USEPA Region 4, 2000).
2. EPC: Exposure point concentration in groundwater.
3. Remediation goal based on ingestion of groundwater using future child resident exposure assumptions and cancer slope factors.
4. Remediation goal based on ingestion of groundwater using future child resident exposure assumptions and reference doses.
5. ARAR: Applicable or Relevant and Appropriate Requirement. Alabama Department of Environmental Management (ADEM) Primary Drinking Water Standards, ADEM Admin. Code r. 335-7-2 available at: http://www.adem.state.al.us/regulations/div7/div712208.pdf

Acronyms:

HQ: Hazard quotient

NA_c: Not applicable - the chemical was evaluated as a carcinogen only.

NA_{nc}: Not applicable - the chemical was evaluated as a noncarcinogen only.

MCL: Maximum Contaminant Level

TEQ: Dioxin toxic equivalents - dioxin and dioxin-like compounds are summed as a weighted value that considers each chemical's toxicity relative to the most toxic compound in the category: 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) (WHO, 1997).

--- : Drinking Water standard not available

Attachment 2

Support documents for PPRTVs
for 2,4,6-trichlorophenol and 4-nitrophenol

Superfund Technical Support Center
National Center for Environmental Assessment
U.S. Environmental Protection Agency
26 West Martin Luther King Drive, MS-AG41
Cincinnati, Ohio 45268

Jon Reid/Director, Teresa Shannon/Administrator
Hotline 513-569-7300, FAX 513-569-7159, E-Mail: Superfund_STSC@epa.gov

August 25, 2009

Christine Julias
CDM
Accepted Requestor

ASSISTANCE REQUESTED: PPRTVs for p-Nitrophenol and 2,4,6-Trichlorophenol

ENCLOSED INFORMATION:

Attachment 1: **Provisional Peer Reviewed Toxicity Values for p-Nitrophenol (CASRN 100-02-7) Derivation of a Chronic Oral RfD**

Attachment 2: **Provisional Peer Reviewed Toxicity Values for p-Nitrophenol (CASRN 100-02-7) Derivation of a Chronic Inhalation RfC**

Attachment 3: **Provisional Peer Reviewed Toxicity Values for p-Nitrophenol (CASRN 100-02-7) Derivation of a Carcinogenicity Assessment**

Attachment 4: **Provisional Peer Reviewed Toxicity Values for 2,4,6-Trichlorophenol (CASRN 88-06-2)**

BE ADVISED: *Unless specifically indicated to have been peer reviewed, it is to be noted that the attached Provisional Toxicity Value Paper(s) have not been through the U.S. EPA's formal review process; therefore, they do not represent a U.S. EPA verified assessment.*

If you have any questions regarding this transmission, please contact the STSC at (513) 569-7300.

Attachments (1)

cc: STSC files

Supported by ECFlex, Incorporated, under
U.S. Environmental Protection Agency Contract No. EP-C-06-088.

09-25-02

Provisional Peer Reviewed Toxicity Values for

p- Nitrophenol
(CASRN 100-02-7)

Derivation of a Chronic Oral RfD

Superfund Health Risk Technical Support Center
National Center for Environmental Assessment
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, OH 45268

Acronyms and Abbreviations

bw	body weight
cc	cubic centimeters
CD	Caesarean Delivered
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CNS	central nervous system
cu.m	cubic meter
DWEL	Drinking Water Equivalent Level
FEL	frank-effect level
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
g	grams
GI	gastrointestinal
HEC	human equivalent concentration
Hgb	hemoglobin
i.m.	intramuscular
i.p.	intraperitoneal
i.v.	intravenous
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
kg	kilogram
L	liter
LEL	lowest-effect level
LOAEL	lowest-observed-adverse-effect level
LOAEL(ADJ)	LOAEL adjusted to continuous exposure duration
LOAEL(HEC)	LOAEL adjusted for dosimetric differences across species to a human
m	meter
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MF	modifying factor
mg	milligram
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MRL	minimal risk level

MTD	maximum tolerated dose
MTL	median threshold limit
NAAQS	National Ambient Air Quality Standards
NOAEL	no-observed-adverse-effect level
NOAEL(ADJ)	NOAEL adjusted to continuous exposure duration
NOAEL(HEC)	NOAEL adjusted for dosimetric differences across species to a human
NOEL	no-observed-effect level
OSF	oral slope factor
p-IUR	**provisional inhalation unit risk**
p-OSF	**provisional oral slope factor**
p-RfC	**provisional inhalation reference concentration**
p-RfD	**provisional oral reference dose**
PBPK	physiologically based pharmacokinetic
ppb	parts per billion
ppm	parts per million
PPRTV	**Provisional Peer Reviewed Toxicity Value**
RBC	red blood cell(s)
RCRA	Resource Conservation and Recovery Act
RDDR	Regional deposited dose ratio (for the indicated lung region)
REL	relative exposure level
RfC	inhalation reference concentration
RfD	oral reference dose
RGDR	Regional gas dose ratio (for the indicated lung region)
s.c.	subcutaneous
SCE	sister chromatid exchange
SDWA	Safe Drinking Water Act
sq.cm.	square centimeters
TSCA	Toxic Substances Control Act
UF	uncertainty factor
μg	microgram
μmol	micromoles
VOC	volatile organic compound

PROVISIONAL PEER REVIEWED TOXICITY VALUES FOR *p*-NITROPHENOL (CASRN 100-02-7) Derivation of a Chronic Oral RfD

Background

On December 5, 2003, the U.S. Environmental Protection Agency's (EPA's) Office of Superfund Remediation and Technology Innovation (OSRTI) revised its hierarchy of human health toxicity values for Superfund risk assessments, establishing the following three tiers as the new hierarchy:

1. EPA's Integrated Risk Information System (IRIS).

2. Provisional Peer-Reviewed Toxicity Values (PPRTV) used in EPA's Superfund Program.

3. Other (peer-reviewed) toxicity values, including:

    - Minimal Risk Levels produced by the Agency for Toxic Substances and Disease Registry (ATSDR),
    - California Environmental Protection Agency (CalEPA) values, and
    - EPA Health Effects Assessment Summary Table (HEAST) values.

A PPRTV is defined as a toxicity value derived for use in the Superfund Program when such a value is not available in EPA's Integrated Risk Information System (IRIS). PPRTVs are developed according to a Standard Operating Procedure (SOP) and are derived after a review of the relevant scientific literature using the same methods, sources of data, and Agency guidance for value derivation generally used by the EPA IRIS Program. All provisional toxicity values receive internal review by two EPA scientists and external peer review by three independently selected scientific experts. PPRTVs differ from IRIS values in that PPRTVs do not receive the multi-program consensus review provided for IRIS values. This is because IRIS values are generally intended to be used in all EPA programs, while PPRTVs are developed specifically for the Superfund Program.

Because science and available information evolve, PPRTVs are initially derived with a three-year life-cycle. However, EPA Regions or the EPA Headquarters Superfund Program sometimes request that a frequently used PPRTV be reassessed. Once an IRIS value for a specific chemical becomes available for Agency review, the analogous PPRTV for that same chemical is retired. It should also be noted that some PPRTV manuscripts conclude that a PPRTV cannot be derived based on inadequate data.

Disclaimers

Users of this document should first check to see if any IRIS values exist for the chemical of concern before proceeding to use a PPRTV. If no IRIS value is available, staff in the regional Superfund and RCRA program offices are advised to carefully review the information provided in this document to ensure that the PPRTVs used are appropriate for the types of exposures and circumstances at the Superfund site or RCRA facility in question. PPRTVs are periodically updated; therefore, users should ensure that the values contained in the PPRTV are current at the time of use.

It is important to remember that a provisional value alone tells very little about the adverse effects of a chemical or the quality of evidence on which the value is based. Therefore, users are strongly encouraged to read the entire PPRTV manuscript and understand the strengths and limitations of the derived provisional values. PPRTVs are developed by the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center for OSRTI. Other EPA programs or external parties who may choose of their own initiative to use these PPRTVs are advised that Superfund resources will not generally be used to respond to challenges of PPRTVs used in a context outside of the Superfund Program.

Questions Regarding PPRTVs

Questions regarding the contents of the PPRTVs and their appropriate use (e.g., on chemicals not covered, or whether chemicals have pending IRIS toxicity values) may be directed to the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center (513-569-7300), or OSRTI.

INTRODUCTION

An RfD for *p*-nitrophenol is not available on IRIS (U.S. EPA, 2002) or in the HEAST (U.S. EPA, 1997). The Drinking Water Standards and Health Advisory list reports an RfD of 8E-3 mg/kg-day (U.S. EPA, 2000), referenced to a Health Advisory (U.S. EPA, 1991a). The RfD was derived from a NOAEL of 25 mg/kg-day and LOAEL of 70 mg/kg-day for mortality and associated clinical signs and pathological changes in rats treated with *p*-nitrophenol by gavage for 13 weeks (Hazelton Laboratories, 1989). An uncertainty factor of 3000 (10 for intraspecies extrapolation, 10 for interspecies extrapolation, 10 to extrapolate from a subchronic study, and 3 for the lack of reproductive/developmental and chronic toxicity data) was applied to the NOAEL to calculate the RfD. Older U.S. EPA documents in the CARA list (U.S. EPA, 1991c, 1994), including a Health and Environmental Effects Profile (U.S. EPA, 1985) and a Health Effects Assessment (U.S. EPA, 1987), did not find relevant data on which to base an RfD.

ATSDR (1992) published a Toxicological Profile on 2- and 4-nitrophenol that declined to derive oral MRLs for *p*-nitrophenol due to the lack of adequate data. ATSDR (1992) did not use the Hazelton Laboratories (1989) study to derive an MRL "due to uncertainty regarding the monitoring of methemoglobin." The above-mentioned documents, the NTP (2001) status report, the WHO (2001) Environmental Health Criteria series, the IARC (2001) monograph series, and a review on aromatic nitro and amino compounds (Weisburger and Hudson, 2001) were consulted for relevant studies. In 1995, TOXLINE, DART, and ETIC had been searched (from 1989) for studies relevant to toxicity resulting from oral exposure to *p*-nitrophenol. Updated literature searches (1994 - 2001) of TOXLINE, MEDLINE, CANCERLIT, EMIC/EMICBACK, DART/ETICBACK, TSCATS, RTECS, HSDB, GENETOX, and CCRIS were conducted in September, 2001.

REVIEW OF PERTINENT DATA

Human Studies

No data regarding human toxicity resulting from oral exposure to *p*-nitrophenol were identified in the available reviews or the literature search.

Animal Studies

Groups of 20 male and 20 female Sprague-Dawley rats were treated by gavage with 0, 25, 70, or 140 mg/kg-day of *p*-nitrophenol for 13 weeks (Hazelton Laboratories, 1989). Animals were bled at 7 and 14 weeks for hematology and clinical chemistry. Other endpoints measured were clinical observations, body weight, food consumption, hematology, clinical chemistry (including methemoglobin formation), ophthalmoscopy, organ weights, gross pathology, and histopathology of selected tissues. A dose-related increase in mortality was reportedly statistically significant at 140 mg/kg for both sexes (0/20, 0/20, 1/20, and 15/20 for males and 0/20, 1/20, 1/20 and 6/20 for females). Death was associated with clinical symptoms of languid behavior, pale appearance, prostration, wheezing, dyspnea, and congestion of the lungs, liver, kidney, and other organs. The authors note that gavage error was responsible for the premature death of one rat in the 140 mg/kg group (gender not specified). The authors also state that blood collection at week 7 "is suspected to have contributed to" the premature death of 1 male treated with 70 mg/kg and 2 males and 3 females treated with 140 mg/kg. Statistically significant elevations in lymphocyte counts and erythrocyte polychromasia were observed in rats treated with 140 mg/kg of *p*-nitrophenol. Analytical problems reportedly occurred with methemoglobin analysis at 7 weeks, and analysis was not performed at 14 weeks. The authors concluded that 25 mg/kg-day represents a NOEL.

Developmental toxicity studies of *p*-nitrophenol were also located. In a study reported by Kavlock (1990), groups of pregnant rats received a single gavage dose of *p*-nitrophenol on gestational day 11. Increased mortality (3/13) was observed in the dams dosed with 667 mg/kg; no deaths were observed in the dams exposed to 333 mg/kg. No significant alterations in litter size, perinatal loss, pup weight, or litter biomass, and no external malformations, were observed in the offspring of rats dosed with up to 1000 mg/kg (Kavlock, 1990). In another developmental toxicity study (Hardin et al., 1987; Plasterer et al., 1985), groups of 50 pregnant CD-1 mice were dosed via gavage with 400 mg/kg-day of *p*-nitrophenol on gestational days 6-13. Increased mortality (9/50 versus 0/50 for controls) was observed in the dams, and no effects on maternal weight gain were observed. No effects on the number of viable litters, number of live births per litter, percent survival of pups, pup birth weights, or pup weight gain were observed. Abu-Qare et al. (1999, 2000) indicate that a single oral dose of 100 mg/kg given to pregnant Sprague-Dawley rats did not alter maternal or fetal methemoglobin content, plasma buyrylcholinesterase, or brain acetylcholinesterase; other endpoints were not reported.

FEASIBILITY OF DERIVING A PROVISIONAL RfD FOR p-NITROPHENOL

The Hazelton Laboratories (1989) study is not suitable for derivation of a p-RfD. No statistically significant effects, including mortality, were observed in rats treated with either 25 or 70 mg/kg-day of *p*-nitrophenol compared to control-treated animals. Moreover, the incidences of *p*-nitrophenol-induced mortality are confounded by experimental error during blood collection: *p*-nitrophenol treatment may be related to as few as 1/20, 1/20, 3/30, and 13/20 mortalities in females dosed with 25, 70 or 140 mg/kg and males dosed with 140 mg/kg-day, respectively. On this basis, clear evidence of a statistically significant elevation in mortality is seen only in males treated with 140 mg/kg-day of *p*-nitrophenol. The non-mortality endpoints found to be elevated in animals treated with 70 or 140 mg/kg, clinical signs and organ congestion, were only seen in a subset of animals dying prematurely, and therefore cannot be considered independent indicators of toxicity. The authors report that animals were observed twice daily for mortality and moribundity; therefore, it is unclear the degree to which organ congestion represents post-mortem rather than *p*-nitrophenol-induced changes. Methemoglobin formation is a relatively sensitive marker of acute mononitrophenol toxicity (reviewed in ATSDR, 1992; U.S. EPA, 1980, 1985, 1987) and this endpoint was not evaluated due to analytical problems. Because mortality is the only independent measure of toxicity found to be related to *p*-nitrophenol exposure by Hazelton Laboratories (1989), use of this study to calculate a p-RfD might tend to underestimate risk to human health caused by oral exposure to *p*-nitrophenol.

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09-25-02

Provisional Peer Reviewed Toxicity Values for

p-Nitrophenol
(CASRN 100-02-7)

Derivation of a Chronic Inhalation RfC

Superfund Health Risk Technical Support Center
National Center for Environmental Assessment
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, OH 45268

Acronyms and Abbreviations

bw	body weight
cc	cubic centimeters
CD	Caesarean Delivered
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CNS	central nervous system
cu.m	cubic meter
DWEL	Drinking Water Equivalent Level
FEL	frank-effect level
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
g	grams
GI	gastrointestinal
HEC	human equivalent concentration
Hgb	hemoglobin
i.m.	intramuscular
i.p.	intraperitoneal
i.v.	intravenous
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
kg	kilogram
L	liter
LEL	lowest-effect level
LOAEL	lowest-observed-adverse-effect level
LOAEL(ADJ)	LOAEL adjusted to continuous exposure duration
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MTD	maximum tolerated dose
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NAAQS	National Ambient Air Quality Standards
NOAEL	no-observed-adverse-effect level
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NOAEL(HEC)	NOAEL adjusted for dosimetric differences across species to a human
NOEL	no-observed-effect level
OSF	oral slope factor
p-IUR	**provisional inhalation unit risk**
p-OSF	**provisional oral slope factor**
p-RfC	**provisional inhalation reference concentration**
p-RfD	**provisional oral reference dose**
PBPK	physiologically based pharmacokinetic
ppb	parts per billion
ppm	parts per million
PPRTV	***Provisional Peer Reviewed Toxicity Value***
RBC	red blood cell(s)
RCRA	Resource Conservation and Recovery Act
RDDR	Regional deposited dose ratio (for the indicated lung region)
REL	relative exposure level
RfC	inhalation reference concentration
RfD	oral reference dose
RGDR	Regional gas dose ratio (for the indicated lung region)
s.c.	subcutaneous
SCE	sister chromatid exchange
SDWA	Safe Drinking Water Act
sq.cm.	square centimeters
TSCA	Toxic Substances Control Act
UF	uncertainty factor
μg	microgram
μmol	micromoles
VOC	volatile organic compound

PROVISIONAL PEER REVIEWED TOXICITY VALUES FOR *p*-NITROPHENOL (CASRN 100-02-7) Derivation of a Chronic Inhalation RfC

Background

On December 5, 2003, the U.S. Environmental Protection Agency's (EPA's) Office of Superfund Remediation and Technology Innovation (OSRTI) revised its hierarchy of human health toxicity values for Superfund risk assessments, establishing the following three tiers as the new hierarchy:

1. EPA's Integrated Risk Information System (IRIS).

2. Provisional Peer-Reviewed Toxicity Values (PPRTV) used in EPA's Superfund Program.

3. Other (peer-reviewed) toxicity values, including:

   - Minimal Risk Levels produced by the Agency for Toxic Substances and Disease Registry (ATSDR),
   - California Environmental Protection Agency (CalEPA) values, and
   - EPA Health Effects Assessment Summary Table (HEAST) values.

A PPRTV is defined as a toxicity value derived for use in the Superfund Program when such a value is not available in EPA's Integrated Risk Information System (IRIS). PPRTVs are developed according to a Standard Operating Procedure (SOP) and are derived after a review of the relevant scientific literature using the same methods, sources of data, and Agency guidance for value derivation generally used by the EPA IRIS Program. All provisional toxicity values receive internal review by two EPA scientists and external peer review by three independently selected scientific experts. PPRTVs differ from IRIS values in that PPRTVs do not receive the multi-program consensus review provided for IRIS values. This is because IRIS values are generally intended to be used in all EPA programs, while PPRTVs are developed specifically for the Superfund Program.

Because science and available information evolve, PPRTVs are initially derived with a three-year life-cycle. However, EPA Regions or the EPA Headquarters Superfund Program sometimes request that a frequently used PPRTV be reassessed. Once an IRIS value for a specific chemical becomes available for Agency review, the analogous PPRTV for that same chemical is retired. It should also be noted that some PPRTV manuscripts conclude that a PPRTV cannot be derived based on inadequate data.

Disclaimers

Users of this document should first check to see if any IRIS values exist for the chemical of concern before proceeding to use a PPRTV. If no IRIS value is available, staff in the regional Superfund and RCRA program offices are advised to carefully review the information provided in this document to ensure that the PPRTVs used are appropriate for the types of exposures and circumstances at the Superfund site or RCRA facility in question. PPRTVs are periodically updated; therefore, users should ensure that the values contained in the PPRTV are current at the time of use.

It is important to remember that a provisional value alone tells very little about the adverse effects of a chemical or the quality of evidence on which the value is based. Therefore, users are strongly encouraged to read the entire PPRTV manuscript and understand the strengths and limitations of the derived provisional values. PPRTVs are developed by the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center for OSRTI. Other EPA programs or external parties who may choose of their own initiative to use these PPRTVs are advised that Superfund resources will not generally be used to respond to challenges of PPRTVs used in a context outside of the Superfund Program.

Questions Regarding PPRTVs

Questions regarding the contents of the PPRTVs and their appropriate use (e.g., on chemicals not covered, or whether chemicals have pending IRIS toxicity values) may be directed to the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center (513-569-7300), or OSRTI.

INTRODUCTION

IRIS (U.S. EPA, 2002) lists the RfC for *p*-nitrophenol as not verifiable. The HEAST (U.S. EPA, 1997) includes a notation that data for nitrophenols are inadequate for quantitative risk assessment, referenced to a Health Effects Assessment (HEA) for nitrophenols (U.S. EPA, 1987). A Health and Environmental Effects Profile (HEEP) for nitrophenols (U.S. EPA, 1985), located in the CARA list (U.S. EPA, 1991a, 1994), also found an absence of relevant inhalation data. ATSDR (1992) published a Toxicological Profile on 2- and 4-nitrophenol that did not derive inhalation MRLs due to lack of adequate data. No occupational exposure limits for *p*-nitrophenol have been assigned by ACGIH (2001), OSHA (2001a,b) or NIOSH (2001). WHO (2001) and IARC (2001) have not produced documents on *p*-nitrophenol. The NTP (2001) status report and a review on aromatic nitro and amino compounds (Weisburger and Hudson, 2001) were consulted for relevant studies. In 1995, TOXLINE, DART, and ETIC had been searched (from 1989) for studies relevant to toxicity resulting from inhalation exposure to *p*-nitrophenol. Updated literature searches (1994 - 2001) of TOXLINE, MEDLINE, CANCERLIT, EMIC/EMICBACK, DART/ETICBACK, TSCATS, RTECS, HSDB, GENETOX, and CCRIS were conducted in September, 2001.

REVIEW OF PERTINENT DATA

No new inhalation studies were identified in the literature search; two relevant papers, which appear to discuss the same study, were considered (Monsanto, 1989a,b). Monsanto (1989a) exposed groups of 15 male and 15 female Sprague-Dawley rats to 0, 1.09, 5.27, or 29.18 mg/m^3 (target exposure 0, 1, 5, or 30 mg/m^3) of *p*-nitrophenol 6 hours/day, 5 days/week for 4 weeks (20 days of exposure). Animals were evaluated for ophthalmology, clinical observations, mortality, moribundity, body weight, organ weights, clinical pathology, gross pathology, and histopathology of 41 tissues including the lungs and nasal turbinates. No mortalities were observed. The intensity of "yellow stains on the fur" was reported to be related to dose. The following statistically significant effects were reported: increased methemoglobin in males exposed to 5.27 mg/m^3; increased hemoglobin and hematocrit in males exposed to 29.18 mg/m^3; increased bilirubin in females exposed to 1.09 mg/m^3; increased sodium in females exposed to 5.27 mg/m^3; decreased liver weights in females at 29.18 mg/m^3; increased relative lung weights in both male and female rats exposed to 29.18 mg/m^3; increased body weight or body weight gain in males exposed to 5.27 or 29.18 mg/m^3 at various time points; and decreased body weight or body weight gain in all *p*-nitrophenol-exposed females at various time points. However, Monsanto (1989a) concluded that none of these observed effects were consistently compound-related. Monsanto (1989a) did not report treatment-related effects on histopathology, but analysis of the raw data conducted by Syracuse Research Corporation using the Fisher exact test identified statistically significant differences in the incidences of ophthalmoscopic lesions (7/15 versus 1/15) and myocarditis (4/15 versus 0/15) in males exposed to 29.18 mg/m^3 compared to controls, and hepatocytic vacuolization (6/15 verus 1/15 and 14/15 versus 8/15) and periocular polymorphonuclear leukocyte infiltration (11/15 verus 4/15 and 8/15 versus 3/15) in both males and females exposed to 29.18 mg/m^3 versus controls. Histopathology incidence data were not provided for animals exposed to 1.09 or 5.27 mg/m^3 of *p*-nitrophenol, and therefore could not be evaluated. Although Monsanto (1989a) concluded that no observed health effects were compound-related, a summary document (Monsanto, 1989b) reported a NOAEL of 5.27 mg/m^3 and a LOAEL of 29.18 mg/m^3 on the basis of cataracts, corneal and conjunctival drying, and ocular lesions. This inhalation experiment cannot be adequately evaluated because of the lack of histopathology data for intermediate concentrations, and high background incidences of lung lesions and mononuclear infiltration of the nasal turbinates, liver and kidneys.

Smith et al. (1988) investigated the short-term inhalation toxicity of *p*-nitrophenol sodium salt (CASRN 824-78-2) in male Crl:CD rats. Aerosol exposures up to 4.7 g/m^3 for 4 hours did not cause mortalities. Subsequently, male rats were exposed for 6 hours per day for 10 days to 0, 0.03, 0.13, 0.34, or 2.47 g/m^3 of *p*-nitrophenol sodium salt aerosol, followed by a 14 day observation period. Urinalysis, hematology, and serum clinical chemistry were performed. No adverse effects were seen at 0.03 g/m^3. Transient methemoglobinemia was observed at 0.13 g/m^3 and higher. At 0.34 and 2.47 g/m^3, transient weight loss, dark urine, proteinuria, increased creatine and serum glutamic-oxaloacetic-transaminase activity were observed. Exposure to 2.47 g/m^3 also induced increased hematocrit, hemoglobin, and erythrocyte number. This study finds an acute inhalation LC_{50} greater than 4.7 g/m^3, a NOAEL of 0.03 g/m^3 and a LOAEL of 0.13 g/m^3. ATSDR (1992) chose not to derive an acute inhalation MRL from these data due to reporting inconsistencies, a lack of clearly toxic effects, and "the preliminary nature of the report."

FEASIBILITY OF DERIVING A PROVISIONAL RfC FOR p-NITROPHENOL

A provisional RfC for *p*-nitrophenol cannot be derived because of a lack of human inhalation data and the inadequacy of the animal inhalation data. The RfD/RfC Work Group (U.S. EPA, 1991b) indicated that "an RfC for 4-nitrophenol is non-verifiable based on the lack of adequate subchronic or chronic inhalation toxicity data, a lack of data on portal-of-entry effects, and the fact that a route-to-route extrapolation cannot be performed due to the lack of pharmacokinetic data." The Work Group also noted that because *p*-nitrophenol is a solid at room temperature, its aerosol nature and regional respiratory deposition are important considerations. It is not recommended to derive a provisional RfC for *p*-nitrophenol based on the provisional RfD, because sufficient information is not available regarding absorption of this chemical following oral or inhalation exposure and because it is not known whether this chemical will produce irritative respiratory effects when inhaled following subchronic or chronic exposure.

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09-25-02

Provisional Peer Reviewed Toxicity Values for

p-Nitrophenol
(CASRN 100-02-7)

Derivation of a Carcinogenicity Assessment

Superfund Health Risk Technical Support Center
National Center for Environmental Assessment
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, OH 45268

Acronyms and Abbreviations

bw	body weight
cc	cubic centimeters
CD	Caesarean Delivered
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CNS	central nervous system
cu.m	cubic meter
DWEL	Drinking Water Equivalent Level
FEL	frank-effect level
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
g	grams
GI	gastrointestinal
HEC	human equivalent concentration
Hgb	hemoglobin
i.m.	intramuscular
i.p.	intraperitoneal
i.v.	intravenous
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
kg	kilogram
L	liter
LEL	lowest-effect level
LOAEL	lowest-observed-adverse-effect level
LOAEL(ADJ)	LOAEL adjusted to continuous exposure duration
LOAEL(HEC)	LOAEL adjusted for dosimetric differences across species to a human
m	meter
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MF	modifying factor
mg	milligram
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MRL	minimal risk level

MTD	maximum tolerated dose
MTL	median threshold limit
NAAQS	National Ambient Air Quality Standards
NOAEL	no-observed-adverse-effect level
NOAEL(ADJ)	NOAEL adjusted to continuous exposure duration
NOAEL(HEC)	NOAEL adjusted for dosimetric differences across species to a human
NOEL	no-observed-effect level
OSF	oral slope factor
p-IUR	**provisional inhalation unit risk**
p-OSF	**provisional oral slope factor**
p-RfC	**provisional inhalation reference concentration**
p-RfD	**provisional oral reference dose**
PBPK	physiologically based pharmacokinetic
ppb	parts per billion
ppm	parts per million
PPRTV	**Provisional Peer Reviewed Toxicity Value**
RBC	red blood cell(s)
RCRA	Resource Conservation and Recovery Act
RDDR	Regional deposited dose ratio (for the indicated lung region)
REL	relative exposure level
RfC	inhalation reference concentration
RfD	oral reference dose
RGDR	Regional gas dose ratio (for the indicated lung region)
s.c.	subcutaneous
SCE	sister chromatid exchange
SDWA	Safe Drinking Water Act
sq.cm.	square centimeters
TSCA	Toxic Substances Control Act
UF	uncertainty factor
μg	microgram
μmol	micromoles
VOC	volatile organic compound

09-25-02

PROVISIONAL PEER REVIEWED TOXICITY VALUES FOR *p*-NITROPHENOL (CASRN 100-02-7)
Derivation of a Carcinogenicity Assessment

Background

On December 5, 2003, the U.S. Environmental Protection Agency's (EPA's) Office of Superfund Remediation and Technology Innovation (OSRTI) revised its hierarchy of human health toxicity values for Superfund risk assessments, establishing the following three tiers as the new hierarchy:

1. EPA's Integrated Risk Information System (IRIS).

2. Provisional Peer-Reviewed Toxicity Values (PPRTV) used in EPA's Superfund Program.

3. Other (peer-reviewed) toxicity values, including:

    - Minimal Risk Levels produced by the Agency for Toxic Substances and Disease Registry (ATSDR),
    - California Environmental Protection Agency (CalEPA) values, and
    - EPA Health Effects Assessment Summary Table (HEAST) values.

A PPRTV is defined as a toxicity value derived for use in the Superfund Program when such a value is not available in EPA's Integrated Risk Information System (IRIS). PPRTVs are developed according to a Standard Operating Procedure (SOP) and are derived after a review of the relevant scientific literature using the same methods, sources of data, and Agency guidance for value derivation generally used by the EPA IRIS Program. All provisional toxicity values receive internal review by two EPA scientists and external peer review by three independently selected scientific experts. PPRTVs differ from IRIS values in that PPRTVs do not receive the multi-program consensus review provided for IRIS values. This is because IRIS values are generally intended to be used in all EPA programs, while PPRTVs are developed specifically for the Superfund Program.

Because science and available information evolve, PPRTVs are initially derived with a three-year life-cycle. However, EPA Regions or the EPA Headquarters Superfund Program sometimes request that a frequently used PPRTV be reassessed. Once an IRIS value for a specific chemical becomes available for Agency review, the analogous PPRTV for that same chemical is retired. It should also be noted that some PPRTV manuscripts conclude that a PPRTV cannot be derived based on inadequate data.

Disclaimers

Users of this document should first check to see if any IRIS values exist for the chemical of concern before proceeding to use a PPRTV. If no IRIS value is available, staff in the regional Superfund and RCRA program offices are advised to carefully review the information provided in this document to ensure that the PPRTVs used are appropriate for the types of exposures and circumstances at the Superfund site or RCRA facility in question. PPRTVs are periodically updated; therefore, users should ensure that the values contained in the PPRTV are current at the time of use.

It is important to remember that a provisional value alone tells very little about the adverse effects of a chemical or the quality of evidence on which the value is based. Therefore, users are strongly encouraged to read the entire PPRTV manuscript and understand the strengths and limitations of the derived provisional values. PPRTVs are developed by the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center for OSRTI. Other EPA programs or external parties who may choose of their own initiative to use these PPRTVs are advised that Superfund resources will not generally be used to respond to challenges of PPRTVs used in a context outside of the Superfund Program.

Questions Regarding PPRTVs

Questions regarding the contents of the PPRTVs and their appropriate use (e.g., on chemicals not covered, or whether chemicals have pending IRIS toxicity values) may be directed to the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center (513-569-7300), or OSRTI.

INTRODUCTION

A carcinogenicity assessment for *p*-nitrophenol is not available on IRIS (U.S. EPA, 2002) or in the HEAST (U.S. EPA, 1997). The Drinking Water Standards and Health Advisory list (U.S. EPA, 2000) assigned *p*-nitrophenol to cancer group D, not classifiable as to human carcinogenicity. The source document for this assessment was a Health Advisory (U.S. EPA, 1991a). The CARA list (U.S. EPA, 1991b, 1994) includes a Health and Environmental Effects Profile (U.S. EPA, 1985) and Health Effects Assessment (U.S. EPA, 1987), both of which also assigned *p*-nitrophenol to cancer weight-of-evidence Group D. IARC (2001) has not assessed the carcinogenicity of *p*-nitrophenol. The NTP (2001) status report, the WHO Environmental Health Criteria series (2001), an ATSDR Toxicological Profile (ATSDR, 1992), and a review on aromatic nitro and amino compounds (Weisburger and Hudson, 2001) were consulted, and literature searches were conducted, to identify relevant studies. In 1995, TOXLINE, DART, and

ETIC had been searched (from 1989) for studies relevant to the carcinogenicity of *p*-nitrophenol. Updated literature searches (1994 - 2001) of TOXLINE, MEDLINE, CANCERLIT, EMIC/EMICBACK, DART/ETICBACK, TSCATS, RTECS, HSDB, GENETOX, and CCRIS were conducted in September 2001.

REVIEW OF PERTINENT DATA

Human Studies

No relevant data were located regarding the carcinogenicity of *p*-nitrophenol to humans by any route of exposure.

Animal Studies

No relevant data were located regarding the carcinogenicity of *p*-nitrophenol to animals following oral or inhalation exposure.

No carcinogenic alterations were observed in two repeated-exposure dermal studies (Boutwell and Bosch, 1959; NTP, 1991), although these studies had several design limitations. Application of 25 μL of a 20% solution of *p*-nitrophenol in dioxane to the shaved back of 31 female Sutter mice twice weekly for 12 weeks did not induce skin tumors or lesions that could be considered precancerous in nature (Boutwell and Bosch, 1959). Clear limitations of this study include the fact that no control group was used, no other site was examined, and the duration of the study may have been too short for evaluating carcinogenic potential.

NTP (1991) conducted an 18-month skin painting study with *p*-nitrophenol in Swiss-Webster mice. In this study, *p*-nitrophenol in acetone was applied to the interscapular skin of mice (60/sex/group) at doses of 0 (vehicle), 40, 80, or 160 mg/kg 3 days/week for 80 weeks. Gross and microscopical examination of all major tissues and organs at necropsy revealed no significant neoplastic alterations that could be attributed to treatment with *p*-nitrophenol. However, high mortality occurred in all groups, including controls, starting at 60 weeks. Less than 50% of the animals in all dose groups were alive at 80 weeks. This study was reviewed by a peer review panel that concluded that under the conditions of the study there was no evidence of carcinogenic activity in male or female Swiss-Webster mice. However, the panel noted that a severe limitation of the study was the fact that Swiss-Webster mice were used, because this strain of mice has a lifespan of only approximately 1 year. The low survival rate severely limited the statistical power of the study.

Other Studies

Testing of *p*-nitrophenol for genotoxicity has produced primarily negative results, although there is some evidence that this chemical can produce clastogenic effects. *p*-Nitrophenol did not produce mutations in the *Salmonella typhimurium* plate incorporation assay with or without metabolic activation (ATSDR, 1992; NTP, 1991). No DNA damage was observed in *Escherichia coli*, *Proteus mirabilis*, and *S. typhimurium* without metabolic activation (ATSDR, 1992). DNA damage was observed in *Bacillus subtilis* without metabolic activation (ATSDR, 1992). A review of unpublished experiments (Hoechst Celanese Corporation, 1989) reported negative results for genotoxicity in *Salmonella*. Negative results were seen in a HGPRT assay in Chinese hamster ovary cells (Oberly et al., 1990) and forward mutation assays in mouse lymphoma cells with and without metabolic activation (ATSDR, 1992; Oberly et al., 1996), and in a DNA repair assay in rat hepatocytes without metabolic activation (ATSDR, 1992). A weakly positive result was observed for inhibition of DNA synthesis in Chinese hamster ovary cells without metabolic activation (ATSDR, 1992). At cytotoxic doses, *p*-nitrophenol induced DNA double strand breaks in primary rat hepatocytes (Elia et al., 1994; Storer et al., 1996), but not in V79 Chinese hamster cells or human white blood cells (Hartmann and Speit, 1997). Negative results were seen in a sister chromatid exchange assay in Chinese hamster ovary cells with or without metabolic activation (NTP, 1991); however, a positive result for chromosomal aberrations was observed in Chinese hamster ovary cells in the presence of metabolic activation at concentrations that delayed cell cycle (NTP, 1991). In cultured human peripheral lymphocytes, *p*-nitrophenol caused a dose-dependent and statistically significant increase in the incidence of chromosomal abnormalities (Huang et al., 1995, 1996). Negative results were observed in three *in vivo* assays: a dominant lethal assay and a host-mediated assay in mice (ATSDR, 1992), and germ cell assays in *Drosophila melanogaster* (NTP, 1991; Foureman et al., 1994).

PROVISIONAL WEIGHT-OF-EVIDENCE CLASSIFICATION

Based on the lack of information regarding the carcinogenicity of *p*-nitrophenol in humans or animals after oral or inhalation exposure, and no evidence of carcinogenicity in animals after dermal exposure, *p*-nitrophenol can be given a weight-of-evidence classification of Group D, *not classifiable as to human carcinogenicity*, according to U.S. EPA (1986) guidelines. Under the proposed guidelines (U.S. EPA,1999) the *data are inadequate for an assessment of human carcinogenic potential.*

QUANTITATIVE ESTIMATES OF CARCINOGENIC RISK

Derivation of quantitative estimates of cancer risk for *p*-nitrophenol is precluded by the absence of data demonstrating carcinogenicity associated with *p*-nitrophenol exposure.

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3-21-2007

Provisional Peer Reviewed Toxicity Values for

2,4,6-Trichlorophenol
(CASRN 88-06-2)

Superfund Health Risk Technical Support Center
National Center for Environmental Assessment
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, OH 45268

Acronyms and Abbreviations

bw	body weight
cc	cubic centimeters
CD	Caesarean Delivered
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CNS	central nervous system
cu.m	cubic meter
DWEL	Drinking Water Equivalent Level
FEL	frank-effect level
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
g	grams
GI	gastrointestinal
HEC	human equivalent concentration
Hgb	hemoglobin
i.m.	intramuscular
i.p.	intraperitoneal
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
i.v.	intravenous
kg	kilogram
L	liter
LEL	lowest-effect level
LOAEL	lowest-observed-adverse-effect level
LOAEL(ADJ)	LOAEL adjusted to continuous exposure duration
LOAEL(HEC)	LOAEL adjusted for dosimetric differences across species to a human
m	meter
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MF	modifying factor
mg	milligram
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MRL	minimal risk level
MTD	maximum tolerated dose
MTL	median threshold limit

NAAQS	National Ambient Air Quality Standards
NOAEL	no-observed-adverse-effect level
NOAEL(ADJ)	NOAEL adjusted to continuous exposure duration
NOAEL(HEC)	NOAEL adjusted for dosimetric differences across species to a human
NOEL	no-observed-effect level
OSF	oral slope factor
p-IUR	provisional inhalation unit risk
p-OSF	provisional oral slope factor
p-RfC	provisional inhalation reference concentration
p-RfD	provisional oral reference dose
PBPK	physiologically based pharmacokinetic
ppb	parts per billion
ppm	parts per million
PPRTV	Provisional Peer Reviewed Toxicity Value
RBC	red blood cell(s)
RCRA	Resource Conservation and Recovery Act
RDDR	Regional deposited dose ratio (for the indicated lung region)
REL	relative exposure level
RfC	inhalation reference concentration
RfD	oral reference dose
RGDR	Regional gas dose ratio (for the indicated lung region)
s.c.	subcutaneous
SCE	sister chromatid exchange
SDWA	Safe Drinking Water Act
sq.cm.	square centimeters
TSCA	Toxic Substances Control Act
UF	uncertainty factor
µg	microgram
µmol	micromoles
VOC	volatile organic compound

3-21-2007

PROVISIONAL PEER REVIEWED TOXICITY VALUES FOR 2,4,6-TRICHLOROPHENOL (CASRN 88-06-2)

Background

On December 5, 2003, the U.S. Environmental Protection Agency's (EPA's) Office of Superfund Remediation and Technology Innovation (OSRTI) revised its hierarchy of human health toxicity values for Superfund risk assessments, establishing the following three tiers as the new hierarchy:

1. EPA's Integrated Risk Information System (IRIS).

2. Provisional Peer-Reviewed Toxicity Values (PPRTV) used in EPA's Superfund Program.

3. Other (peer-reviewed) toxicity values, including:

   - Minimal Risk Levels produced by the Agency for Toxic Substances and Disease Registry (ATSDR),
   - California Environmental Protection Agency (CalEPA) values, and
   - EPA Health Effects Assessment Summary Table (HEAST) values.

A PPRTV is defined as a toxicity value derived for use in the Superfund Program when such a value is not available in EPA's Integrated Risk Information System (IRIS). PPRTVs are developed according to a Standard Operating Procedure (SOP) and are derived after a review of the relevant scientific literature using the same methods, sources of data, and Agency guidance for value derivation generally used by the EPA IRIS Program. All provisional toxicity values receive internal review by two EPA scientists and external peer review by three independently selected scientific experts. PPRTVs differ from IRIS values in that PPRTVs do not receive the multi-program consensus review provided for IRIS values. This is because IRIS values are generally intended to be used in all EPA programs, while PPRTVs are developed specifically for the Superfund Program.

Because new information becomes available and scientific methods improve over time, PPRTVs are reviewed on a five-year basis and updated into the active database. Once an IRIS value for a specific chemical becomes available for Agency review, the analogous PPRTV for that same chemical is retired. It should also be noted that some PPRTV manuscripts conclude that a PPRTV cannot be derived based on inadequate data.

Disclaimers

Users of this document should first check to see if any IRIS values exist for the chemical of concern before proceeding to use a PPRTV. If no IRIS value is available, staff in the regional Superfund and RCRA program offices are advised to carefully review the information provided in this document to ensure that the PPRTVs used are appropriate for the types of exposures and circumstances at the Superfund site or RCRA facility in question. PPRTVs are periodically updated; therefore, users should ensure that the values contained in the PPRTV are current at the time of use.

It is important to remember that a provisional value alone tells very little about the adverse effects of a chemical or the quality of evidence on which the value is based. Therefore, users are strongly encouraged to read the entire PPRTV manuscript and understand the strengths and limitations of the derived provisional values. PPRTVs are developed by the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center for OSRTI. Other EPA programs or external parties who may choose of their own initiative to use these PPRTVs are advised that Superfund resources will not generally be used to respond to challenges of PPRTVs used in a context outside of the Superfund Program.

Questions Regarding PPRTVs

Questions regarding the contents of the PPRTVs and their appropriate use (e.g., on chemicals not covered, or whether chemicals have pending IRIS toxicity values) may be directed to the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center (513-569-7300), or OSRTI.

INTRODUCTION

Neither an RfD or RfC for 2,4,6-trichlorophenol (2,4,6-TCP) is available on IRIS (U.S. EPA, 2007) or in the HEAST (U.S. EPA, 1997). IRIS (U.S. EPA, 2007) provides an OSF and IUR. The Drinking Water and Health Advisories list (U.S. EPA, 2000) does not include an oral RfD for 2,4,6-TCP. ATSDR published a Toxicological Profile for 2,4,6-Trichlorophenol (ATSDR, 1990) in which an intermediate-duration oral MRL of 0.042 mg/kg-day was derived, based on a NOAEL of 4.2 mg/kg-day and a LOAEL of 42 mg/kg-day for reduced litter size in female Sprague-Dawley rats exposed to 2,4,6-trichlorophenol in the drinking water from 3 weeks of age through breeding and parturition (Exon and Koller, 1985). ATSDR subsequently published an updated Toxicological Profile for Chlorophenols (ATSDR, 1997), providing an intermediate-duration oral MRL of 0.003 mg/kg-day for chlorophenols as a class, based on decreased delayed type hypersensitivity response to bovine serum albumin in rats exposed to 2,4-dichlorophenol in drinking water (Exon and Koller, 1985). ATSDR (1997) did not provide an intermediate-duration oral MRL for 2,4,6-TCP per se. The CARA database (U.S. EPA, 1991,

1994) lists a Health Effects Assessment for 2,4,6-TCP (U.S. EPA, 1984) and a Health and Environmental Effects Document for Chlorinated Phenols (U.S. EPA, 1987), neither of which developed an RfD, because the focus was on carcinogenic potential. The NTP Status Report (NTP, 2000) and IARC (1999) were also searched for relevant information. Updated literature searches were conducted from 2000 to present (original search was from 1996). The databases searched were TOXLINE, MEDLINE, CANCERLIT, CCRIS, TSCATS, HSDB, RTECS, GENETOX, DART/ETICBACK, and EMIC/EMICBACK.

REVIEW OF THE PERTINENT LITERATURE

Human Oral Studies

No information was located concerning health effects in humans following oral exposure to 2,4,6-TCP.

Animal Oral Studies

NCI (1979) performed chronic oral studies designed to assess the carcinogenicity of 2,4,6-TCP in Fischer 344 rats and B6C3F$_1$ mice. Groups of 50 male and 50 female Fischer 344 rats were given 2,4,6-TCP (96-97% pure) in the diet at concentrations of 5000 or 10,000 ppm for 106 or 107 weeks. The authors did not estimate daily doses, nor did they report food consumption. Assuming a food factor of 0.05 for a chronic oral study in the rat (U.S. EPA, 2007), estimated doses of 2,4,6-TCP were 250 and 500 mg/kg-day for the 5000- and 10,000-ppm exposure groups, respectively. Groups of 50 male mice were similarly exposed to 5000 or 10,000 ppm for 105 weeks. Assuming a food factor of 0.15 for a chronic oral study in the mouse (U.S. EPA, 2007), the doses were estimated to be 750 and 1500 mg/kg-day, respectively. Groups of 50 female mice were given 10,000 or 20,000 ppm for 38 weeks; the concentrations were reduced to 2500 and 5000 ppm for the remaining 67 weeks of the study, due to excessively low mean body weights among treatment groups. The time-weighted average feed concentrations for the female mice were 5214 and 10,428 ppm in the low- and high-dose groups, respectively (doses of 782 and 1564 mg/kg-day assuming a food factor of 0.15 for a chronic oral study in the mouse). Groups of 20 rats and 20 mice of each sex served as controls. Animals were observed twice daily for clinical signs of toxicity, and gross and microscopic pathological examinations were performed on all major organs and tissues of animals that died or were found in a moribund state during the study (except for cases of cannibalization or autolysis) and on those surviving until terminal sacrifice. Incidences of various neoplastic and nonneoplastic lesions were reported, but none are applicable for derivation of the RfD. There were no significant dose-related trends in mortality in rats or mice of either sex. Throughout the course of the study, male and female rats and mice exhibited dose-related lower mean body weights than controls at the 38-week time period, when concentrations of 2,4,6-TCP were lowered, as well as throughout the remainder of the study. Clinical signs were common to both dosed and control groups of rats and mice. Male rats, only, exhibited dose-related significantly increased incidences of lymphomas or leukemias. Leukocytosis, monocytosis, and bone marrow hyperplasia were noted in some treated male and female rats not having lymphoma or leukemia, but not in the 20 control rats. In mice, a significantly increased incidence of hepatocyte hyperplasia was observed for mid-dose males. Other hepatotoxic effects (inflammation, necrosis) were commonly seen in the livers of dosed mice. Hepatocellular carcinomas or adenomas occurred in mice at incidences that were dose-related. For the purpose of deriving an RfD, all noncancer effects reported for both rats and mice in NCI (1979) are considered to be related to the carcinogenic process and are not relevant for deriving an RfD.

In preliminary range-finding studies by NCI (1979), groups of rats and mice (5/sex/species) were exposed to 10,000-46,000 ppm (rats) or 6800-31,500 ppm (mice) of 2,4,6-TCP in the diet for 7 weeks. Assuming a food factor of 0.1 for a subchronic oral study in rats and a food factor of 0.15 for a subchronic oral study in mice (U.S. EPA, 2007), estimated dose ranges were 1000-4600 mg/kg-day in rats and 1020-4725 mg/kg-day in mice. Relative to controls, dose-dependent lower mean body weights were reported in all exposed groups of rats, and in groups of mice at doses $\geq$735 mg/kg-day (males) or $\geq$1075 mg/kg-day (females). Survival was 100% for rats and mice (of both sexes) consuming doses $\leq$1470 mg/kg-day and $\leq$3225 mg/kg-day, respectively. The highest dose in rats (4600 mg/kg-day) resulted in the death of 2/5 males and 3/5 females. At the highest dose in mice (4725 mg/kg-day), mortality was observed in two mice of each sex. In rats, histopathologic signs of toxicity were seen only at the highest dose (4600 mg/kg-day) and consisted of moderate to marked increased splenic hematopoiesis in males and females and midzonal vacuolation of hepatocytes in males. Histological examination gave no indication of treatment-related toxicity in male and female mice of the 1075 mg/kg-day dose groups. The authors did not indicate whether or not histopathologic effects were seen at lower doses or the highest dose (4725 mg/kg-day) in mice. No other relevant data were provided. The lowest treatment level (735 mg/kg-day) is considered to be a LOAEL, but the dose levels in this study are too high to be useful for RfD derivation.

In a subchronic gavage study (Bercz et al., 1990), groups of 10 male and 10 female Sprague-Dawley rats, 49 days of age, were administered 2,4,6-TCP in oral doses of 0, 80, 240, or 720 mg/kg-day by gavage (in corn oil) for 90 days. Clinical observations were made daily; mortality and morbidity checks were performed twice daily. Body weights were recorded weekly, at which time animals were examined for obvious signs of abnormalities. Food consumption was measured weekly, ophthalomoscopic examinations were performed prior to treatment and during the final week of the study. Extensive analyses of hematology, blood chemistry, and urine profiles were performed at sacrifice. Comprehensive gross and microscopic examinations were performed on major tissues and organs, as well as all gross lesions. There were no significant treatment-related effects regarding mortality, body weight, food consumption, ophthalmology, or hematology. Significant dose-related effects consisted of increased absolute or relative liver weight in mid- and high-dose males and females and increased absolute and relative kidney weight in high-dose males. Other significant effects occurred primarily in the high-dose group, and included clinical signs (urine staining and salivation); increased relative testes weight (males), absolute lung, and relative adrenal weight (females); increased serum albumin, total protein, alkaline phosphatase, and ALT (males); decreased BUN (females); and decreased urinary pH (males and females). There were no significant treatment-related adverse effects in the low-dose groups of either sex. Histopathologic examination did not reveal pathological lesions that could be correlated to treatment-related changes in organ weights or biochemistry values. This study establishes a subchronic NOAEL and LOAEL of 80 and 240 mg/kg-day, respectively.

In a subchronic (1-generation female reproduction) study, groups of 12-14 female Sprague-Dawley rats were exposed to 2,4,6-TCP (98% pure) at concentrations of 0, 3, 30, or 300 ppm in the drinking water (Exon and Koller, 1985). Animals were exposed from 3 weeks of age through breeding (at 90 days of age to unexposed male rats) and parturition, for a total exposure period of approximately 13 weeks. The study authors did not report dam body weight or water consumption data, nor did they provide dose estimates. Based on the assumption that rats consume drinking water at a rate of 10% of their body weight per day (U.S. EPA, 2007), 2,4,6-TCP dose levels of 0.30, 3.0, and 30 mg/kg/day for the 3-, 30-, and 300-ppm exposure groups, respectively, were calculated. Following parturition, treatment of dams ceased and pups were observed until weaning. Reproductive toxicity was assessed with respect to percent conception, litter size, number of stillborn, birth and weaning weight, and survival to weaning. Maternal parameters such as body weight during pregnancy, feed consumption, and clinical signs of toxicity were not reported. Significantly decreased mean litter size ($p \leq 0.10$) was noted in the 300-ppm (30 mg/kg-day) group (9.1 pups/litter vs 12.1 in controls and 11.3 and 11.2 in the low- and mid-dose groups, respectively). Although the level of statistical significance (0.10) is higher than that commonly used (0.05), the magnitude of the decrease (25%) is considered to be biologically significant. Similar decreases in litter size were seen with other chlorophenols tested in this study (2-chlorophenol, 2,4-dichlorophenol), lending some support to this being an important endpoint for this class of chemicals. It is noteworthy, however, that average control litter size varied over a considerable range in the three experiments (9.8-12.1). This study identified a LOAEL of 30 mg/kg-day (300 ppm exposure group) and a NOAEL of 3.0 mg/kg-day (30 ppm exposure group) for 2,4,6-TCP, based on decreased mean litter size.

Exon and Koller (1985) also reported a continuation of the initial subchronic study, in which 3-week-old weanling Sprague-Dawley rats (10/exposure group) were randomly selected from the litters generated in the reproductive phase of the study were exposed to the same concentrations of 2,4,6-TCP in the drinking water as those previously used in the exposure of the corresponding dams. The exposure period covered an additional 12 weeks. Following exposure termination, immunologic assays were performed to assess humoral immunity, cell-mediated immunity, and macrophage function. Body weights and weights of liver, spleen, and thymus were recorded. No other information was reported regarding study design or endpoints examined. There were no statistically significant exposure-related effects on immune responses, although the authors noted that antibody levels, delayed type hypersensitivity responses, and macrophage numbers were consistently greater in 2,4,6-TCP-exposed rats, compared with controls. There were no significant exposure-related effects on mean body or thymus weights. The 300-ppm exposure group exhibited significantly increased mean spleen weight (1.07 g vs

0.93 g in controls). Significantly increased mean liver weight was observed in both 30- and 300-ppm exposure groups (12.5 and 14.1 g, respectively, vs 10.9 g in controls). Significantly increased mean spleen and liver weights were also seen in rats similarly exposed to 300-ppm of 2,4-DCP. The effects related to immune response and increased liver weight (at 30 mg-kg-day) were not considered to be adverse by Exon and Koller (1985).

Blackburn et al. (1986) administered 2,4,6-TCP (99% pure) to groups of 30 (low- and mid-dose) or 40 (controls and high-dose) adult female Long-Evans hooded rats in oral doses (gavage, in corn oil) of 0, 100, 500, or 1000 mg/kg-day, 5 days per week for 2 weeks, followed by dosing 7 days per week during mating with unexposed males of the same strain and throughout 21 days of gestation. Body weights were recorded daily from the beginning of treatment until delivery. Females that had not delivered by gestation day 24 were sacrificed, and ovaries and uteri examined for signs of post implantation loss. For those females delivering pups, date of delivery, sex ratio of the litter, and male and female pup body weights were recorded. Litters were culled to 8 pups (approximately equal numbers of males and females) on postpartum day 4. Body weights were recorded weekly thereafter and litters were culled to 2 males and 2 females each at weaning. Female pups were monitored for time of vaginal opening. On postpartum day 42, all remaining pups were sacrificed. Necropsy was limited to establishing whether or not intubation was the cause of death in treated dams that succumbed prior to the termination of treatment. Survival was 38/39, 29/29, 25/30, and 24/40 in 0-, 100-, 500-, and 1000-mg/kg-day groups of treated dams, respectively. The majority of deaths, particularly in the high-dose dams, were due to intubation errors. However, 3/16 high-dose deaths were attributed to 2,4,6-TCP exposure. Urogenital staining was noted in the high-dose group. Dose-related significantly lower mean body weights (relative to controls) were observed in dams at the end of the first and second weeks of pre-mating treatment, as well as throughout the first 14 days of gestation (the actual body weight values could not be determined from the graphically-presented body weight data). No significant treatment-related maternal body weight effects were apparent on gestation day 21. There were no statistically significant dose-related differences in breeding success, although breeding success was low in all study groups (63, 72, 60, and 50% for 0-, 100-, 500-, and 1000-mg/kg groups, respectively). No significant treatment-related differences were seen in mean litter sizes or pup survival. Mean litter body weights were significantly depressed in pups of the 500- and 1000-mg/kg groups initially, but from postpartum day 4 onward, there were no significant differences in mean litter body weights of any exposure group, relative to controls. The study authors indicated that the initial depressed pup body weights were most likely a reflection of maternal toxicity, as evidenced by increased mortality, clinical signs (urogenital staining), and decreased body weights in mid- and high-dose dams. A maternal FEL of 500 mg/kg-day is identified in this study based on decreased survival.

In a second experiment reported in Blackburn et al. (1986), male Long-Evans hooded rats (25 high-dose rats, 15 per group at other dose levels) were administered 2,4,6-TCP (99% pure) in oral doses (gavage, in corn oil) of 0, 100, 500, or 1000 mg/kg-day, 5 days per week for 11 weeks (Blackburn et al., 1986). Males used in this study had initial baseline sperm counts of 20 million or more and ejaculation latencies of 30 minutes or less. After 10 weeks of treatment, copulatory behavior and semen profiles were evaluated. Following 11 weeks of treatment, high-dose and control males were mated with unexposed females for fertility evaluation. Once mating was confirmed, females were isolated and followed until sacrifice on gestation day 18. Numbers of resorptions and fetal sex, weight, and viability were recorded. Treated and control male rats were sacrificed one week later, and blood was drawn for testosterone analysis. Weights of liver, kidney, lung, adrenal, spleen, heart, testis, prostate, seminal vesicle, vas deferens, and epididymis were recorded. Sperm counts were performed using epididymal tissue. The only consistent clinical sign of toxicity was that of urogenital staining, observed in all 2,4,6-TCP-treated groups. There were no additional clinical signs of toxicity among rats that died during treatment, and due to autolysis, necropsy of these rats was limited to examination for potential intubation errors. Treatment-related mortality was observed in 8/25 high-dose males during the first 4 weeks of treatment. All other deaths in treated animals were attributed to intubation errors. There were no significant treatment-related differences in mean body weights at most time points during treatment. No treatment-related adverse effects were seen in evaluations of mating behavior, which included mount and ejaculation latencies, or sperm count, motility, or morphology. No significant treatment-related differences were detected in male organ weights or plasma testosterone. There were no significant treatment-related effects on litter size, sex ratio, mean pup weight by sex, number of dead fetuses, or number of resorption and implantation sites in evaluations of litters produced by 2,4,6-TCP-treated males mated to untreated females. The lowest dose level of 100 mg/kg-day is considered to be a LOAEL based on clinical observations (urogenital staining).

DERIVATION OF A PROVISIONAL RfD FOR 2,4,6-TRICHLOROPHENOL

A provisional RfD for 2,4,6-TCP can be derived from the oral reproductive toxicity study in rats conducted by Exon and Koller (1985). This study identified a NOAEL of 3.0 mg/kg-day and a LOAEL of 30 mg/kg-day, based on decreased litter size in female Sprague-Dawley rats exposed to 2,4,6-TCP in the drinking water for 10 weeks prior to mating (weanlings when started) and continuing throughout mating and gestation. In the same study, decreased litter size was also noted for similar exposure to 2-chlorophenol and 3,4-dichlorophenol, thus lending some support to this finding. However, the decrease in litter size was small and there was considerable variation in litter size among controls in the three experiments. Apparently conflicting results were reported by Blackburn et al. (1986), in a study in which no reproductive toxicity was observed in female Long-Evans rats administered 2,4,6-TCP by daily gavage in corn oil starting 2 weeks prior to mating (adults when started) and continuing throughout mating and gestation at doses that were in excess of an order of magnitude higher than those estimated for Sprague-Dawley rats used in the Exon and Koller (1985) study. The disparity in results may be attributable, at least in part, to the use of different rat strains and procedural differences [Exon and Koller (1985) initiated exposure to weanlings 10 weeks prior to mating via the drinking water, whereas Blackburn et al. (1986) started dosing of adults 2 weeks prior to mating via bolus oral gavage.] The study of Blackburn et al. (1986) was limited by low reproductive success in all groups, including controls. The marginally increased mean absolute liver weight (11% greater than controls) reported for the 30 ppm group in the Exon and Koller (1985) continuation study is not considered to be an adverse effect. Also, the effects related to immune response reported by Exon and Koller (1985) are not considered for defining the LOAEL, as there is no dose-response relationship established.

The provisional RfD is derived by dividing the subchronic NOAEL of 3.0 mg/kg-day by an uncertainty factor of 3000 (10 for extrapolation from subchronic to chronic exposure duration, 10 for extrapolation from rodents to humans, 10 for protecting sensitive individuals, and 3 for deficiencies in the database, particularly the lack of a multigeneration reproduction study and supporting long-term toxicity studies in other species). The **provisional RfD** derived in this way **is 3.0 mg/kg-day ÷ 3000 = $1x10^{-3}$ or 1E-3 mg/kg-day.**[1]

STATEMENT OF CONFIDENCE

Confidence in the key studies is low. Although the critical animal study (Exon and Koller, 1985) examined reproductive endpoints, study details were limited, a single generation was produced, and only females were exposed. The study did, however, identify both a NOAEL and a LOAEL for reproductive effects. Confidence in the database is low due to the lack of a multigeneration reproduction study and supporting long-term toxicity studies. Consequently, there is low confidence in the provisional RfD.

DERIVATION OF A PROVISIONAL RfC FOR 2,4,6-TRICHLOROPHENOL

No values are developed due to lack of relevant information.

DERIVATION OF A PROVISIONAL CARCINOGENICITY ASSESSMENT FOR 2,4,6-TRICHLOROPHENOL

Cancer values are provided on IRIS (U.S. EPA, 2007).

[1] The RfD differs from the ATSDR intermediate-duration MRL of 4E-2 mg/kg-day. ATSDR never applies a database uncertainty factor and did not apply a derivation UF. When these UFs are applied the value would be divided by an additional 30 or 1E-3 which is identical to the RfD.

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Table 1

Risk-Based Remedial Goal Options and ARARs for Surface Soil [1]

Current Operations Area Worker - Adult

Anniston PCB Site, Operable Unit 3

Chemical of Concern	EPC[2] (mg/kg)	Cancer Risk Level [3] (mg/kg)			Hazard Quotient Level[4] (mg/kg)		
		1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3
SVOCs							
Benzo(a)pyrene	1.9	0.4	4	36	NA	NA	NA
Dibenzo(a,h)anthracene	0.62	0.4	4	36	NA	NA	NA
P/PCBs							
PCBs, Total	370	3	26	264	5	47	142
Dioxin							
Dioxin TEQ	8.E-04	3.E-05	3.E-04	3.E-03	NA	NA	NA
Inorganics							
Arsenic	390	7	66	661	105	1054	3162

Notes:

1. RGO = EPC * target risk / calculated risk (Human Health Risk Assessment Bulletins -- Supplement to RAGS (USEPA Region 4, 2000)
2. EPC: Exposure point concentration in surface soil.
3. Remediation goal based on contact with soil using current operations worker exposure assumptions and cancer slope factors.
4. Remediation goal based on contact with soil using current operations worker exposure assumptions and reference doses.
5. ARAR: Applicable or Relevant and Appropriate Requirement. There are no available ARARs for soil.

Acronyms:

HQ: Hazard quotient

NA: Not applicable - the chemical was evaluated as a carcinogen only.

TEQ: Dioxin toxic equivalents - dioxin and dioxin-like compounds are summed as a weighted value that considers each chemical's toxicity relative to the most toxic compound in the category: 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) (WHO, 1997).

Table 2
Risk-Based Remedial Goal Options and ARARs for Surface Soil [1]
Future Operations Area Worker - Adult
Anniston PCB Site, Operable Unit 3

Chemical of Concern	EPC[2] (mg/kg)	Cancer Risk Level [3] (mg/kg)			Hazard Quotient Level[4] (mg/kg)		
		1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3
SVOCs							
Benzo(a)pyrene	1 9	0.2	2	21	NA	NA	NA
Dibenzo(a,h)anthracene	0 62	0.2	2	21	NA	NA	NA
P/PCBs							
PCBs, Total	6100	1	10	103	1	15	45
Dioxin							
Dioxin TEQ	8.E-04	2.E-05	2.E-04	2.E-03	NA	NA	NA
Inorganics							
Arsenic	390	2	16	163	26	260	780

Notes:
1. RGO = EPC * target risk / calculated risk (Human Health Risk Assessment Bulletins -- Supplement to RAGS (USEPA Region 4, 2000).
2 EPC: Exposure point concentration in surface soil
3. Remediation goal based on contact with soil using future operations worker exposure assumptions and cancer slope factors.
4 Remediation goal based on contact with soil using future operations worker exposure assumptions and reference doses.
5. ARAR: Applicable or Relevant and Appropriate Requirement. There are no available ARARs for soil.
Acronyms:
HQ: Hazard quotient
NA Not applicable - the chemical was evaluated as a carcinogen only
TEQ. Dioxin toxic equivalents - dioxin and dioxin-like compounds are summed as a weighted value that considers each chemical's toxicity relative to the most toxic compound in the category: 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) (WHO, 1997).

Table 3

Risk-Based Remedial Goal Options and ARARs for Surface Soil [1]

Current O&M Worker - Adult

Anniston PCB Site, Operable Unit 3

Chemical of Concern	EPC[2] (mg/kg)	Cancer Risk Level [3] (mg/kg)			Hazard Quotient Level[4] (mg/kg)		
		1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3
SVOCs							
Benzo(a)pyrene	1.9	0.8	8	83	NA	NA	NA
P/PCBs							
PCBs, Total	370	5	53	529	8	76	227
Dioxin							
Dioxin TEQ	8.E-04	1.E-04	1.E-03	1.E-02	NA	NA	NA
Inorganics							
Arsenic	390	11	105	1054	170	1696	5087

Notes:

1. RGO = EPC * target risk / calculated risk (Human Health Risk Assessment Bulletins -- Supplement to RAGS (USEPA Region 4, 2000)
2. EPC: Exposure point concentration in surface soil.
3. Remediation goal based on contact with soil using current O&M worker exposure assumptions and cancer slope factors.
4. Remediation goal based on contact with soil using current O&M worker exposure assumptions and reference doses.
5. ARAR: Applicable or Relevant and Appropriate Requirement. There are no available ARARs for soil.

Acronyms:

HQ: Hazard quotient

NA: Not applicable - the chemical was evaluated as a carcinogen only

TEQ: Dioxin toxic equivalents - dioxin and dioxin-like compounds are summed as a weighted value that considers each chemical's toxicity relative to the most toxic compound in the category: 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) (WHO, 1997)

Table 4

Risk-Based Remedial Goal Options and ARARs for Surface Soil [1]

Future O&M Worker - Adult

Anniston PCB Site, Operable Unit 3

Chemical of Concern	EPC[2] (mg/kg)	Cancer Risk Level [3] (mg/kg)			Hazard Quotient Level[4] (mg/kg)		
		1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3
SVOCs							
Benzo(a)pyrene	1.9	0.8	8	83	NA	NA	NA
P/PCBs							
PCBs, Total	6100	6	55	555	77	772	2316
Dioxin							
Dioxin TEQ	8.E-04	1.E-04	1.E-03	1.E-02	NA	NA	NA
Inorganics							
Arsenic	390	11	105	1054	170	1696	5087

Notes:

1. RGO = EPC * target risk / calculated risk (Human Health Risk Assessment Bulletins -- Supplement to RAGS (USEPA Region 4, 2000).
2. EPC: Exposure point concentration in surface soil.
3. Remediation goal based on contact with soil using future O&M worker exposure assumptions and cancer slope factors
4. Remediation goal based on contact with soil using future O&M worker exposure assumptions and reference doses
5. ARAR: Applicable or Relevant and Appropriate Requirement. There are no available ARARs for soil.

Acronyms:

HQ: Hazard quotient

NA: Not applicable - the chemical was evaluated as a carcinogen only

TEQ: Dioxin toxic equivalents - dioxin and dioxin-like compounds are summed as a weighted value that considers each chemical's toxicity relative to the most toxic compound in the category: 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) (WHO, 1997)

Table 5
Risk-Based Remedial Goal Options and ARARs for Surface Soil [1]
Current Trespasser - Adolescent (7-16 years)
Anniston PCB Site, Operable Unit 3

Chemical of Concern	EPC[2] (mg/kg)	Cancer Risk Level [3] (mg/kg)			Hazard Quotient Level[4] (mg/kg)		
		1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3
P/PCBs							
PCBs, Total	370	NA	NA	NA	5	49	146
Inorganics							
Arsenic	390	NA	NA	NA	85	848	2543

Notes:
1. RGO = EPC * target risk / calculated risk (Human Health Risk Assessment Bulletins -- Supplement to RAGS (USEPA Region 4, 2000)
2. EPC: Exposure point concentration in surface soil.
3. Remediation goal was not calculated as cumulative excess lifetime cancer risk for current trespasser was less than 1E-4.
4. Remediation goal based on contact with soil using current adolescent trespasser exposure assumptions and reference doses.
5. ARAR: Applicable or Relevant and Appropriate Requirement. There are no available ARARs for soil.

Acronyms:
HQ: Hazard quotient
NA: Not applicable - the cumulative ELCR for exposure to surface soil was less than 1E-04, RGOs are not required.
TEQ: Dioxin toxic equivalents - dioxin and dioxin-like compounds are summed as a weighted value that considers each chemical's toxicity relative to the most toxic compound in the category: 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) (WHO, 1997)

Table 6

Risk-Based Remedial Goal Options and ARARs for Surface Soil [1]

Future Trespasser - Adolescent (7-16 years)

Anniston PCB Site, Operable Unit 3

Chemical of Concern	EPC[2] (mg/kg)	Cancer Risk Level [3] (mg/kg)			Hazard Quotient Level[4] (mg/kg)		
		1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3
P/PCBs							
PCBs, Total	6100	9	87	871	5	51	153
Dioxin							
Dioxin TEQ	8.E-04	1.E-04	1.E-03	1.E-02	NA	NA	NA
Inorganics							
Arsenic	390	13	130	1300	85	848	2543

Notes:

1. RGO = EPC * target risk / calculated risk (Human Health Risk Assessment Bulletins -- Supplement to RAGS (USEPA Region 4, 2000)
2. EPC: Exposure point concentration in surface soil.
3. Remediation goal based on contact with soil using future adolescent trespasser exposure assumptions and cancer slope factors
4. Remediation goal based on contact with soil using future adolescent trespasser exposure assumptions and reference doses.
5. ARAR: Applicable or Relevant and Appropriate Requirement. There are no available ARARs for soil.

Acronyms:

HQ: Hazard quotient

NA: Not applicable - the chemical was evaluated as a carcinogen only.

TEQ: Dioxin toxic equivalents - dioxin and dioxin-like compounds are summed as a weighted value that considers each chemical's toxicity relative to the most toxic compound in the category: 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) (WHO, 1997).

Table 7

Risk-Based Remedial Goal Options and ARARs for Surface Soil [1]

Current/Future Construction Worker - Adult

Anniston PCB Site, Operable Unit 3

Chemical of Concern	EPC[2] (mg/kg)	Cancer Risk Level [3] (mg/kg)			Hazard Quotient Level[4] (mg/kg)		
		1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3
P/PCBs					1		
PCBs, Total	3300	24	236	2357		13	40
Dioxin							
Dioxin TEQ	8.E-04	3.E-04	3.E-03	3.E-02	NA	NA	NA
Inorganics							
Arsenic	150	33	333	3333	22	217	652

Notes.

1. RGO = EPC * target risk / calculated risk (Human Health Risk Assessment Bulletins -- Supplement to RAGS (USEPA Region 4, 2000).

2. EPC: Exposure point concentration in surface soil.

3. Remediation goal based on contact with soil using adult construction worker exposure assumptions and cancer slope factors.

4. Remediation goal based on contact with soil using adult construction worker exposure assumptions and reference doses.

5. ARAR: Applicable or Relevant and Appropriate Requirement. There are no available ARARs for soil.

Acronyms:

HQ: Hazard quotient

NA: Not applicable - the chemical was evaluated as a carcinogen only

TEQ: Dioxin toxic equivalents - dioxin and dioxin-like compounds are summed as a weighted value that considers each chemical's toxicity relative to the most toxic compound in the category: 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) (WHO, 1997)

Table 8

Risk-Based Remedial Goal Options and ARARs for Groundwater [1]

Future Offsite Resident - Child to Adult

Anniston PCB Site, Operable Unit 3

Chemical of Concern	EPC[2] (ug/L)	Cancer Risk Level [3] (ug/L)			Hazard Quotient Level[4] (ug/L)			ARAR[5] (ug/L)	
		1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3		
VOCs									
1,4-Dichlorobenzene	2.4	1.3	13	126	NA_c	NA_c	NA_c	75	MCL
Pentachlorophenol	20	0.1	1	14	15	154	462	1	MCL
Trichloroethylene	3.4	0.1	1	8	0.4	4	13	5	MCL
SVOCs									
2,4,6-Trichlorophenol	15	3.0	30	300	0.1	1	3	- - -	
Indeno(1,2,3-cd)pyrene	0.73	0.01	0.1	1	NA_c	NA_c	NA_c	- - -	
P/PCBs									
PCBs, Total	2400	0.01	0.06	0.6	8.E-03	8.E-02	2.E-01	0.5	MCL
Methyl parathion	74	NA_{nc}	NA_{nc}	NA_{nc}	0.4	4	12	- - -	
Parathion	9400	NA_{nc}	NA_{nc}	NA_{nc}	9	94	282	- - -	
Dioxin									
Dioxin TEQ	4.E-06	4.E-07	4.E-06	4.E-05	NA_c	NA_c	NA_c	0.00003	MCL
Inorganics									
Arsenic	6.1	0.04	0.4	4	0.5	5	14	10	MCL

Notes:

1. RGO = EPC * target risk / calculated risk. (Human Health Risk Assessment Bulletins – Supplement to RAGS (USEPA Region 4, 2000)
2. EPC: Exposure point concentration in groundwater.
3. Remediation goal based on ingestion of groundwater using future child to adult residential exposure assumptions and cancer slope factors.
4. Remediation goal based on ingestion of groundwater using future child to adult residential exposure assumptions and reference doses.
5. ARAR: Applicable or Relevant and Appropriate Requirement. Alabama Department of Environmental Management (ADEM) Primary Drinking Water Standards. ADEM Admin. Code r. 335-7-2 available at: http://www.adem.state.al.us/regulations/div7/div712208.pdf

Acronyms:

HQ: Hazard quotient

NA_c: Not applicable - the chemical was evaluated as a carcinogen only

NA_{nc}: Not applicable - the chemical was evaluated as a noncarcinogen only

MCL: Maximum Contaminant Level

TEQ: Dioxin toxic equivalents - dioxin and dioxin-like compounds are summed as a weighted value that considers each chemical's toxicity relative to the most toxic compound in the category: 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) (WHO, 1997).

- - - : Drinking Water standard not available

Table 9

Risk-Based Remedial Goal Options and ARARs for Groundwater [1]

Future Offsite Resident - Child (0-6 Years)

Anniston PCB Site, Operable Unit 3

Chemical of Concern	EPC[2] (ug/L)	Cancer Risk Level [3] (ug/L)			Hazard Quotient Level[4] (ug/L)			ARAR[5]	(ug/L)
		1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3		
VOCs									
1,2,4-Trichlorbenzene	11	NA_{nc}	NA_{nc}	NA_{nc}	0.2	2	5	70	MCL
1,4-Dichlorobenzene	2.4	0.7	7	73	NA_c	NA_c	NA_c	75	MCL
Pentachlorophenol	20	0.1	1	13	4	41	122	1	MCL
Trichloroethylene	3.4	0.04	0.4	4	0.3	3	10	5	MCL
SVOCs									
2,4,6-Trichlorophenol	15	1.8	18	176	0.02	0.2	0.5	---	
Indeno(1,2,3-cd)pyrene	0.73	0.02	0.2	2	NA_c	NA_c	NA_c	---	
P/PCBs									
PCBs, Total	2400	0.02	0.2	2	0.01	0.05	0.2	0.5	MCL
gamma-BHC	0.55	0.01	0.1	1	0.05	0.5	1	0.2	MCL
Methyl parathion	74	NA_{nc}	NA_{nc}	NA_{nc}	0.4	4	12	---	
Parathion	9400	NA_{nc}	NA_{nc}	NA_{nc}	9	85	256	---	
Dioxin									
Dioxin TEQ	4.E-06	1.E-06	1.E-05	1.E-04	NA_c	NA_c	NA_c	0.00003	MCL
Inorganics									
Arsenic	6.1	0.1	1	12	0.5	5	14	10	MCL
Mercury	1.8	NA_{nc}	NA_{nc}	NA_{nc}	0.02	0.2	0.5	2	MCL

Notes:

1. RGO = EPC * target risk / calculated risk (Human Health Risk Assessment Bulletins -- Supplement to RAGS (USEPA Region 4, 2000)
2. EPC: Exposure point concentration in groundwater
3. Remediation goal based on ingestion of groundwater using future child resident exposure assumptions and cancer slope factors
4. Remediation goal based on ingestion of groundwater using future child resident exposure assumptions and reference doses.
5. ARAR: Applicable or Relevant and Appropriate Requirement. Alabama Department of Environmental Management (ADEM) Primary Drinking Water Standards, ADEM Admin. Code r. 335-7-2 available at: http://www.adem.state.al.us/regulations/div7/div712208.pdf

Acronyms:

HQ: Hazard quotient

NA_c: Not applicable - the chemical was evaluated as a carcinogen only.

NA_{nc}: Not applicable - the chemical was evaluated as a noncarcinogen only

MCL: Maximum Contaminant Level

TEQ: Dioxin toxic equivalents - dioxin and dioxin-like compounds are summed as a weighted value that considers each chemical's toxicity relative to the most toxic compound in the category: 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) (WHO, 1997).

- - - : Drinking Water standard not available

Table 10
Risk-Based Remedial Goal Options and ARARs for Groundwater [1]
Future Operations Area Worker - Adult
Anniston PCB Site, Operable Unit 3

Chemical of Concern	EPC[2] (ug/L)	Cancer Risk Level [3] (ug/L)			Hazard Quotient Level[4] (ug/L)			ARAR[5]	(ug/L)
		1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3		
VOCs									
Pentachlorophenol	20	2.4	24	241	NA_c	NA_c	NA_c	1	MCL
Trichloroethylene	3.4	0.7	7	71	NA_c	NA_c	NA_c	5	MCL
SVOCs									
2,4,6-Trichlorophenol	15	NA_{nc}	NA_{nc}	NA_{nc}	1	10	30	- - -	
Indeno(1,2,3-cd)pyrene	0.73	0.4	4	38	NA_c	NA_c	NA_c	- - -	
P/PCBs									
PCBs, Total	2400	0.1	1	14	0.2	2	6	0.5	MCL
Methyl parathion	74	NA_{nc}	NA_{nc}	NA_{nc}	3	26	77	- - -	
Parathion	9400	NA_{nc}	NA_{nc}	NA_{nc}	63	627	1880	- - -	
Dioxin									
Dioxin TEQ	4.E-06	2.E-06	2.E-05	2.E-04	NA_c	NA_c	NA_c	0.00003	MCL
Inorganics									
Arsenic	6.1	0.2	2	19	3	31	92	10	MCL

Notes

1. RGO = EPC * target risk / calculated risk. (Human Health Risk Assessment Bulletins – Supplement to RAGS (USEPA Region 4, 2000)
2. EPC: Exposure point concentration in groundwater.
3. Remediation goal based on ingestion of groundwater using future adult operations worker exposure assumptions and cancer slope factors
4. Remediation goal based on ingestion of groundwater using future adult operations worker exposure assumptions and reference doses.
5. ARAR: Applicable or Relevant and Appropriate Requirement. Alabama Department of Environmental Management (ADEM) Primary Drinking Water Standards, ADEM Admin. Code r. 335-7-2 available at: http://www.adem.state.al.us/regulations/div7/div712208.pdf

Acronyms:

HQ: Hazard quotient

NA_c: Not applicable - the chemical was evaluated as a carcinogen only

NA_{nc}: Not applicable - the chemical was evaluated as a noncarcinogen only.

MCL: Maximum Contaminant Level

TEQ: Dioxin toxic equivalents - dioxin and dioxin-like compounds are summed as a weighted value that considers each chemical's toxicity relative to the most toxic compound in the category, 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) (WHO, 1997).

- - - Drinking Water standard not available

Table 11

Risk-Based Remedial Goal Options and ARARs for Groundwater [1]

Future O&M Worker - Adult

Anniston PCB Site, Operable Unit 3

Chemical of Concern	EPC[2] (ug/L)	Cancer Risk Level [3] (ug/L)			Hazard Quotient Level[4] (ug/L)			ARAR[5] (ug/L)	
		1E-6	1E-5	1E-4	HQ=0.1	HQ=1	HQ=3		
P/PCBs									
PCBs, Total	2400	2	15	150	2	22	65	0.5	MCL
Parathion	9400	NA_{nc}	NA_{nc}	NA_{nc}	627	6267	18800	---	
Inorganics									
Arsenic	6 1	2	20	197	NA_c	NA_c	NA_c	10	MCL

Notes

1 RGO = EPC * target risk / calculated risk (Human Health Risk Assessment Bulletins – Supplement to RAGS (USEPA Region 4, 2000).

2 EPC Exposure point concentration in groundwater.

3 Remediation goal based on ingestion of groundwater using future adult O&M worker exposure assumptions and cancer slope factors

4 Remediation goal based on ingestion of groundwater using future adult O&M worker exposure assumptions and reference doses.

5 ARAR Applicable or Relevant and Appropriate Requirement, Alabama Department of Environmental Management (ADEM) Primary Drinking Water Standards, ADEM Admin Code r. 335-7-2 available at http://www.adem.state al.us/regulations/div7/div712208.pdf

Acronyms:

HQ Hazard quotient

NA_c Not applicable - the chemical was evaluated as a carcinogen only.

NA_{nc}: Not applicable - the chemical was evaluated as a noncarcinogen only.

MCL Maximum Contaminant Level

--- Drinking Water standard not available