

RCRA FACILITY INVESTIGATION DRAFT FINAL REPORT

Prepared for
Vicksburg Chemical Company
Vicksburg, Mississippi

August 2001

File No. 35092B007C.00-04004

URS

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2822 O'Neal Lane
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URS

December 5, 2001

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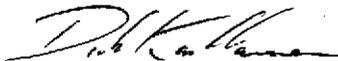
Mr. Scott Mills
Mississippi Department of Environmental Quality
P.O.Box 10385
Jackson, Mississippi 39289 - 0385

Re: Vicksburg Chemical Company
RFI Report (August 2001)

Dear Scott:

I was using my copy of the referenced report and noticed that Figures 9-1 through 9-5 were missing. The figures are listed in the Table of Figures and referenced in the document. On the assumption that the omission was universal I have attached one set of the figures.

Very truly yours,



Dick Karkkainen

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January 8, 2001

Mr. Steve Boswell
Vicksburg Chemical
4280 Rifle Range Road
Vicksburg, Mississippi 39180

Re: Potential for Off-Site Transport of Arsenic From SWMU 11, 12 15
URS File No. 35-092B007C.00 03006

Dear Steve:

The Solid Waste Management Unit (SWMU) at Vicksburg Chemical Company referred to as SWMU 11, 12 and 15 is the former manufacturing site of arsenical pesticides. The process has been shut down, equipment removed from the area, and the concrete foundations cleaned with high-pressure water equipment.

A characterization of the soil and groundwater at SWMU 11, 12 and 15 has been made and reported in "RCRA Facility Investigation Interim Report and Phase II Work Plan" dated December 15, 2000. An area of residual contamination of soil by arsenic has been reported. Likewise a groundwater plume of arsenic has been reported beneath the soil contamination.

SWMU 11, 12 and 15 and the soil and groundwater contamination is at least 800 feet from Hennessey's Bayou, the nearest pathway to off-site. Theoretically, soil contaminated with arsenic could be, in time, transported to the bayou. Theoretically, groundwater contaminated with arsenic could be, in time, transported to the bayou. A substantial number of soil and groundwater samples have been obtained in the area between SWMU 11, 12 and 15. This note summarizes the analytical data on arsenic and information on the background concentration of arsenic in soil and groundwater in order to determine if there is imminent danger of off-site transport of arsenic, and therefore potential for exposure, evident in the pattern of data established since the shut down of the arsenical pesticides process approximately 14 years ago.

ARSENIC IN SOIL

The following data on arsenic concentration (not including SWMU 11, 12 and 15) in soil is obtained from "RCRA Facility Investigation Interim Report and Phase II Work Plan" December 15, 2000. The locations of the SWMUs are noted on Figure 1 of that report.

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TABLE 1			
ARSENIC CONCENTRATIONS IN SOIL			
SWMU Number	Number of Samples Analyzed	Range of Concentrations Reported µg/kg (ppb)	Average Concentration µg/kg (ppb)
1, 16, 17	90	1,570 – 27,000	7,400
1, 16, 17	10	7,470 – 11,800	9,372
2 (Hill)	17	<500 – 4,460	2,024
2 (Valley)	14	2,200 – 5,200	3,393
4	6	5,100 – 15,700	8,433
5	16	<500 – 174,000	19,694
5 ⁽¹⁾	15 ⁽¹⁾	<500 – 39,200	9,407
7	9	<500 – <500	<500
8	4	<500 – 9,800	3,900
9	16	3,800 – 61,000	19,744
9 ⁽²⁾	13 ⁽²⁾	3,800 – 30,600	10,531
9	3	7,320 – 9,570	8,650
13	9	2,700 – 8,800	4,356
14	17	<500 – 1,900	665
18	5	<500 – 17,500	7,540
20	32	<500 – 10,900	1,763
23	13	340 – 4,900	1,656

NOTES:

- (1) The 174,000 ppb location is within the SWMU 11, 12, 15 boundary.
- (2) One location (3 sample points) is probably contaminated soil excavated elsewhere and used as fill.

ARSENIC IN GROUNDWATER

The predominant data on arsenic concentrations in groundwater is from analyses of the monitor wells. The monitor well data is summarized in "Response to July 3, 2000 Comments by the U.S. EPA on the "Amended and Supplemental Groundwater Assessment Work Plan December 1999 dated July 31, 2000". There have been 45 to 50 samples analyzed per well beginning as early as December 1981. Additional data on concentration of arsenic in groundwater is found in "RCRA Facility Investigation Interim Report and Phase II Work Plan dated December 15, 2000." The data for monitor wells is as follows:

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TABLE 2

CONCENTRATION OF ARSENIC IN MONITOR WELLS

Monitor Well Number	Range of Arsenic Concentration µg/l (ppb)	Average Arsenic Concentration µg/l (ppb)
MW-1A	<5 – 54.0	6
MW-2	<5 – 8.0	5
MW-4	<5 – 8.9	5
MW-5	<5 – 70.0	8
MW-6	<5 – 19.0	6
MW-7	<5 – 113.0	14.5
MW-8	<5 – 80.0	32.7
MW-9	<5 – 9.0	6
MW-10	<5 – 15.0	6
MW-11	<5 – 12.0	5.3
MW-12	<5 – 20.0	7.4
MW-13	<5 – 32.0	14.9
MW-14	<5 – 7.0	5.8
MW-16	<5 – 21.0	5.7

Data from piezometers and temporary wells has been obtained on a one-time basis. The following is a table of that data:

TABLE 3

CONCENTRATION OF ARSENIC IN TEMPORARY WELLS OR PIEZOMETERS

Temporary Well or Piezometer Number	Data Obtained During Investigation of SWMU	Concentration of Arsenic µg/l (ppb)
12B	23	0.9
12A	23	1.8
20B	23	1.4
20A	23	0.8

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TABLE 3		
CONCENTRATION OF ARSENIC IN TEMPORARY WELLS OR PIEZOMETERS		
Temporary Well or Piezometer Number	Data Obtained During Investigation of SWMU	Concentration of Arsenic µg/l (ppb)
21A	23	1.4
22B	23	2.0
22A	23	1.8
23B	23	0.4
23A	23	0.4
24B	23	0.4
25B	23	0.4
21A-FB	23	0.4
2-W-TA	1, 16, 17	538
LS1-W	2	<10
LS2-W	2	<10
LS3-W	2	<10
LS4-W	2	<10
LS4-W Dup	2	<10
LS5-W	2	<10
TP-1	9	378

ARSENIC DETERMINATION IN SOILS ON THE VICKSBURG SITE BUT AWAY FROM PRODUCTION AREAS

Three soil samples were obtained adjacent to the parking lot to the north of the north plant administration building. An additional three samples were obtained in Vicksburg Chemical employee park located between the north plant administration building and the Mississippi River. The samples were first reported on Page 27 of the "Expedited RCRA Facility Investigation Report SWMUs 16, 1, 17 dated June 1997."

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TABLE 4		
CONCENTRATION OF ARSENIC IN SOIL OF NON-MANUFACTURING AREAS		
Sample Number	Data Obtained During Investigation of SWMU	Concentration of Arsenic µg/l (ppb)
B1-0, 2-A	16, 1, 17	9,380
B2-0, 2-A	16, 1, 17	7,470
B3-0, 2-A	16, 1, 17	7,270
B4-0, 2-A	16, 1, 17	10,800
B5-0, 2-A	16, 1, 17	11,700
B5-0, 2-A	16, 1, 17	11,800

The average concentration is 9,700 ppb.

SUMMARY OF CONCLUSIONS

Soil

The concentration of arsenic in the soil at the Vicksburg site presents an interesting challenge. There is obvious arsenic contamination in the SWMU 11, 12 and 15 area caused during the manufacture of MSMA. It is not obvious, however, what is background arsenic and what may be caused by contaminant transport from SWMU 11, 12 and 15. The background level of arsenic on the site is variable, but does exceed the values presented in the MSDEQ Tier 1 TRG Table. Examination of the average concentration values presented in Table 1 and Table 4 lead to the following generalizations:

- The south plant manufacturing areas can be characterized as an area where the background concentration of arsenic is about 10,000 ppb. The evidence is the concentration of arsenic in soil at SWMUs 1, 16, 17, 5, 8, 9 and 18.
- The "background" concentrations of arsenic were obtained in areas geologically similar to the south plant manufacturing areas. That concentration is likewise about 10,000 ppb.

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- The railroad area (SWMUs 20, 7, 14 and 4), hill upon which SWMU 23 was constructed, hill upon which SWMU 2 was constructed and the southwest drainage ditch (SWMU 13) can be characterized by an arsenic concentration of less than 5,000 ppb. These are the areas nearest to Hennessey's Bayou.

From the data it can be concluded that there has been no erosional mechanism that has transported arsenic from the source at SWMU 11, 12, 15. The background concentration of arsenic in soils in areas where there is no potential for transport by erosion is high. In fact, some of the areas are underneath concrete in buildings where there has never been manufacture or storage of arsenic compounds.

Examination of external sources of information lends support to the thesis that there is a variation in the concentration of arsenic in natural soils and that concentration can exceed remediation goals. The EPA Region 9 has published remediation goals in a program that is in concept similar to the MDEQ Brownfields Program. In the "Region 9 Preliminary Remediation Goals (PRGs) for 1998", background concentrations are addressed as follows:

"Before embarking on an extensive sampling and analysis program to determine local background concentrations in the area, one should first compile existing data on the subject. Far too often, there is pertinent information in the literature that gets ignored, resulting in needless expenditures of time and money. An illustrative example of this is naturally occurring arsenic in soils which frequently is higher than the risk-based PRG set at one-in-one-million cancer risk (PRG for residential soils is 0.38 mg/kg):

TABLE 5						
BACKGROUND CONCENTRATIONS OF SELECTED ELEMENTS IN SOILS						
Trace Element	U.S. Study Data ¹			California Data ²		
	Range	GeoMean	ArMean	Range	GeoMean	ArMean
Arsenic	<1-97	5.2 mg/kg	7.2 mg/kg	0.59-11	2.75 mg/kg	3.54 mg/kg
Beryllium	<1-15	0.63 mg/kg	0.92 mg/kg	0.10-2.7	1.14 mg/kg	1.28 mg/kg
Cadmium	<1-10	--	<1	0.05-1.7	0.26 mg/kg	0.36 mg/kg
Chromium	1-2000	37	54	23-1579	76.25 mg/kg	122.08 mg/kg
Nickel	<5-700	13	19	9.0-509	35.75 mg/kg	56.60 mg/kg

NOTES:

¹ Shackle and Hansford, "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States", USGS Professional Paper 1270, 1984.
² Bradford et al, "Background Concentrations of Trace and Major Elements in California Soils", Kearney Foundation Special Report, UC-Riverside and CAL-EPA DTSC, March 1996.

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Where anthropogenic "background" levels exceed PRGs and EPA has determined that a response is necessary and feasible, EPA's goals will be to develop a comprehensive response to the widespread contamination. This will often require coordination with different authorities that have jurisdiction over the sources of contamination in the area.

After considering background concentrations in a local area, EPA Region 9 has at times used the non-cancer PRG for arsenic (22 mg/kg) to evaluate sites recognizing that this value tends to be above background levels yet still falls within the range of soil concentrations (0.38-38 mg/kg) that equate the EPA's "permissible" cancer risk (10E-6 to 10E-4)."

Table 5, which presents the background concentrations of selected elements in soils, references "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States", Shackle and Hansford, USGS Professional Paper 1270, 1984. On page 14 of that reference, a map depicts the location of the arsenic data points. The four points that are nearest the Vicksburg site range from 4.1 to 97 ppm arsenic. The 97 ppm is the highest value reported in the USGS study.

Aside from the examination of data that indicates no erosional transport of arsenic, the physical layout of the arsenic contamination source area at SWMU 11, 12, 15 also supports the thesis that there is no erosional transport. The area is overlaid with hard packed soil, asphalt and concrete. No erosional areas are evident.

Groundwater

The plume of arsenic contamination reported at SWMU 11, 12, 15 is depicted as Figure 9-4 of the "RCRA Facility Investigation Interim Report and Phase II Work Plan dated December 15, 2000. The question at hand is whether that plume can migrate to Hennessey's Bayou and offsite in the near term.

Examination of the data presented in Tables 2 and 3 can lead to some general conclusions:

- The groundwater in an area where the natural soil is low in arsenic is likewise low in arsenic. The concentration of arsenic in groundwater at SWMU 23 is less than 2 ppb.
- The groundwater in an area where the natural soil is relatively high in arsenic is likewise relatively high in arsenic. MW-4 is the "official" background well. It is

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located in the north plant away from manufacturing areas but nearby the area where background concentration of arsenic in soil is 9,700 ppb. The concentration of arsenic in MW-4 has been analyzed as high as 8.9 ppb and averages 5 ppb.

- The detection of an average of 5 to 6 ppb arsenic in groundwater noted in the monitor well network (MW-1A, MW-2, MW-4, MW-5, MW-6, MW-9, MW-10, MW-11, MW-12, MW-14 and MW-16) is not indicative that the plume has reached the well. Concentrations at MW-7, MW-8, and MW-13 may indicate the beginning of impact from the arsenic source at SWMU 11, 12, 15. Moreover, it is noted that MWs 7, 8 and 13 are screened in the shallow zone as opposed to most of the wells in the network.

It can be concluded that there is no danger of imminent impact of the arsenic plume on Hennessey's Bayou and therefore offsite. There is confirmation, however, that additional monitoring should take place. Therefore, the program consisting of installing nested wells MW-17A/MW-17B and MW-18A/MW-18B and shallow zone wells MW-10C, MW-12C and MW-16C should be implemented.

Very truly yours,



Richard D. Karkkainen

RDK:cm

URS

Vicksburg Chemical

August 23, 2001

Mr. Steve Boswell
Vicksburg Chemical
4280 Rifle Range Road
Vicksburg, Mississippi 39180

Dr. Judy Sophianopoulos
United States Environmental Protection Agency
Region 4
61 Forsyth Street
Atlanta, Georgia 30303-3104

Mr. Scott Mills
Mississippi Department of Environmental Quality
2380 Highway 80 West
Jackson, Mississippi 39204

Re: Vicksburg Chemical
Vicksburg, Mississippi
RFI Draft Final Report
Tables 8-6 and 9-8
URS File 35-092B007C.00 04004

Dear Mr. Boswell, Dr. Sophianopoulos, and Mr. Mills:

Enclosed are two copies for each of you of Tables 8-6 and 9-8 for the RFI Draft Final Report for Vicksburg Chemical. Previous tables sent to you contained word processing errors in the order of listing of the top five chemicals in the tables. I regret the error. The error did not lead to further error; for example, utilization in figures or discussions.

Very truly yours,



Dick Karkkainen

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Prepared for
Vicksburg Chemical Company
Vicksburg, Mississippi

August 2001

File No. 35092B007C.00-04004

URS

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Vicksburg Chemical Company (VCC) retained URS Corporation (URS) to perform activities associated with a RCRA corrective action program. The corrective action program is in response to a Consent Decree which became effective July 1, 1991. The Consent Decree requires that a RCRA Facility Investigation (RFI) be conducted at the Vicksburg, Mississippi manufacturing facility, and that it be followed up by corrective measures as needed.

The purpose of the RFI is to determine the nature and extent of releases of hazardous wastes and/or constituents from regulated units, solid waste management units (SWMUs), and other areas of concern (AOCs) at the facility and to gather all necessary data to support any corrective action required.

The RFI constitutes the second phase of the RCRA corrective action program. The program's first phase consists of the RCRA Facility Assessment (RFA) which is conducted by the EPA and precedes the RFI. The RFI itself is divided into several separate tasks. The tasks include the Preliminary Report, the RFI Work Plan, the Facility Investigation, and the Investigative Analysis Report (RFI Report). Subsequent phases of the RCRA corrective action program concern defining and implementing any needed measures that will protect human health and the environment. In addition, a Groundwater Assessment (GWA) Work Plan, a Closure Plan for SWMU 1 and SWMU 17, and Annual Groundwater Assessment Reports are required by the Consent Decree.

VCC submitted the Preliminary Report and Closure Plan for SWMU 1 and SWMU 17, and subsequently updated the Preliminary Report. The Preliminary Report and Closure Plan for SWMU 1 and SWMU 17 have been approved. VCC submitted the RFI Work Plan and the GWA Work Plan and has updated both plans. The RFI Work Plan has been approved. This report is an interim report of the RFI activity and also a workplan to complete additional investigative work that is required.

Additionally, VCC has published documents describing expedited investigative and corrective action activity at various SWMUs. The activity was expedited because of VCC's plans to construct new manufacturing facilities and also utilize some of the SWMU areas for storage, transportation, or other related activity. The following is a tabulation of the publications:

TABLE 1-1			
SWMU ACTIVITY			
Report	Date	Status	Comment
RFI Work Plan SWMUs 9 and 16	August 1994	Submitted	--
RFI Report SWMUs 9 and 16	September 1994	Submitted	--
SWMU 23 North Pond RFI Work Plan RFI Report	October 1994	Submitted	14 piezometers were installed.
Closure Plan SWMUs 1 and 17	February 1995 (Modified 10-26-95)	Approved by the U.S. EPA and MSDEQ	--
RFI Work Plan Entire Site	June 1996	Modified 12-16-99 and subsequently approved	Incorporated investigative phase of "Closure Plan SWMUs 1 and 17".
GWA Work Plan Entire Site	June 1996	Modified 12-16-99. To be revised after completion of Final RFI Report	--
RFI Expedited Work Plan SWMUs 12, 11, 15, 16, 1 and 17	January 1997	Submitted	VCC planned to expand manufacturing capability into SWMU 12, 11 and 15 area or SWMU 16, 1 and 17 area.
RFI Report, Corrective Measures Study, RCRA Corrective Measures Implementation Plan SWMUs 16, 1 and 17	June 1997	Approved by the U.S. EPA and MSDEQ	--
Corrective Action Management Unit Application	June 1997	Approved by the U.S. EPA and MSDEQ	--
RFI Report SWMUs 12, 11 and 15	April 1998	Submitted	--
Corrective Measures Implementation Plan SWMUs 12, 11 and 15	April 1998 (as amended July 15, 1998)	Submitted	To be revised by 11-15-00
Corrective Action Observation Confirmatory Sampling and Analysis SWMUs 1 and 17	July 1998	Submitted	--
Arsenic Data Sets Arsenic Data Sets – Addendum	October 15, 1998 October 26, 1998	Submitted Submitted	Evaluation of arsenic background data.

TABLE 1-1 (Continued)			
SWMU ACTIVITY			
Report	Date	Status	Comment
SWMU 9 Corrective Action Observation	March 11, 1999	Submitted	--
Observations and Sampling of Ditch	September 8, 1999	Submitted	Surficial dinoseb contamination of soil noted during excavation of a ditch for a new water drainage line.
Response to July 3, 1999 Comments by the U.S. EPA on the "Amended and Supplemental Groundwater Assessment Work Plan"	July 31, 2000	Submitted	Summarized previously written description of SWMUs and work accomplished at each SWMU. Additionally responded to questions.
RCRA Facility Investigation SWMU 2 – Inactive Landfill Interim Report	October 2000	Submitted	--
Interim Revised Corrective Measures Implementation Plan SWMU 12 – Former MSMA Salt Unloading Area SWMU 11 – Former MSMA Production Area SWMU 15 – Former Methyl Parathion Production Area	November 2000	Submitted	Need agreement of arsenic clean up standards based on background. Need completion of RFI and GWA to completely verify and define problem.
RCRA Facility Investigation Interim Report and Phase II Workplan	December 15, 2000	Submitted (Later revised by VCC)	Contained some analytical laboratory calculation errors.
RCRA Facility Investigation Interim Report and Phase II Workplan	March 16, 2001	Submitted and Approved	Corrected analytical errors and added results of a surface and soil pile sampling program completed on February 16, 2001.
Final RFI Report	August 2001	Submitted	Contains information on entire RFI program, including the Phase II effort.

In May 2000, the RFI fieldwork was completed for the remaining SWMUs with the completion of Phase II of the investigation. The list of SWMUs investigated is as follows:

SWMU 2	-	Inactive Landfill
SWMU 4	-	Activated Carbon Treatment Unit
SWMU 5	-	South Plant Drainage System
SWMU 7	-	Dinoseb Manufacturing and SWMU 20 – Railroad Area
SWMU 8	-	Dinoseb Loading Area
SWMU 13	-	Drainage Ditch
SWMU 14	-	Toxaphene Manufacturing
SWMU 18	-	Blue Tank Area
SWMU 22	-	North Plant Neutralization System
SWMU 30	-	Waste Oil
SWMU 34	-	Surplus Equipment Yard

In addition, the following SWMUs were only inspected:

SWMU 29	-	North Plant Oil Collection System
SWMU 31	-	North Plant No. 6 Fuel Oil Area
SWMU 25	-	North Plant Waste Water Pipes

One purpose of this report is to discuss the field activity and the results derived from that activity. A summary of all data collected is included in tables.

An additional purpose of this report is to summarize work previously completed at various SWMUs. Data tables are included containing only concentrations of constituents detected; references to the document containing tables of all the data and the appended laboratory data sheets are also included.

A third purpose of this report is to note the location of permanent or temporary wells to monitor the extent of contamination in the groundwater and relate that to specific SWMUs. Geologic cross sections of the site previously submitted have been modified to add well screening and piezometric elevation data.

In order to most effectively summarize and convey all the activity described above, a separate section is written on each SWMU for which there has been field activity. In some cases, the section may cover more than one SWMU if the field campaign was concurrently conducted on more than one SWMU. Within each section the following information is included:

- Description of the SWMU

- RFI Strategy and Technical Approach
- Results of Sampling and Analysis
- Conclusions

Section 18 of the report is a summary of all the conclusions. It summarizes the planned corrective action, where necessary. The schedule for conducting the corrective action is contained in the overall project schedule of Section 19. The RFI Report will be followed by a Groundwater Assessment Report for full and complete characterization of the Vicksburg site.

SECTION TWO

SWMU 1 – Container (Drum) Storage Area, SWMU 16 – Former Atrazine Production Area, and SWMU 17 – Returned Product Storage Area

2.1 DESCRIPTION

SWMU 1 – CONTAINER STORAGE AREA

SWMU 1 is a "less than ninety day hazardous waste drum storage area" that was located at the South Plant adjacent to the Former Atrazine Production Area (SWMU 16) across a walkway from the Returned Product Storage Area (SWMU 17). This area was diked. The roof over the area was destroyed by a windstorm during mid-1990. Spills were collected in a sump common to both this area and the Returned Product Storage Area (SWMU 17). The floor has been cleaned through sweeping, scraping, chipping, and reacting the dinoseb with hydrogen peroxide and a ferrous iron catalyst. A closure plan for the Container (Drum) Storage Area (SWMU 1) and the Returned Production Storage Area (SWMU 17) was developed by URS for VCC. The closure plan is consistent with RCRA rules and regulations. The closure plan was originally submitted in June 1992 as a 60-day deliverable to the EPA and MSDEQ by VCC.

A facility for the manufacture of potassium phosphate has been constructed on the SWMU 1 site.

SWMU 16 – FORMER ATRAZINE PRODUCTION AREA

The Former Atrazine Production Area is located adjacent to the Container (Drum) Storage Area (SWMU 1) and the Returned Product Storage Area (SWMU 17). In addition to producing atrazine, this process area manufactured the herbicide cyanazine under the packaged name Bladex. The former atrazine warehouse is located adjacent to the Former Atrazine Production Area (SWMU 16). The warehouse was used to store dinoseb as well as atrazine.

The warehouse continues in service in order to store various fertilizer products manufactured by VCC. The Atrazine Production Area was demolished and was reconstructed for the production of potassium phosphate.

SECTION TWO

SWMU 1 – Container (Drum) Storage Area, SWMU 16 – Former Atrazine Production Area, and SWMU 17 – Returned Product Storage Area

SWMU 17 – RETURNED PRODUCT STORAGE AREA

The Returned Products Storage Area was located across a walkway from the Container (Drum) Storage Area (SWMU 1). Product formulations returned by consumers and off-spec product were stored here until they could be reblended, re-containerized, and sold or disposed of as a hazardous waste. The floor has been cleaned through sweeping, scraping, chipping, and reacting the dinoseb with hydrogen peroxide and ferrous iron catalyst. A closure plan for the Container (Drum) Storage Area (SWMU 1) and the Returned Production Storage Area (SWMU 17) was submitted by VCC as a 60-day deliverable pursuant to the Consent Decree.

The SWMU 17 site was part of the site of a potassium phosphate manufacturing facility. As noted above the potassium phosphate groundwater facility encompasses SWMU 1, the production area of SWMU 16 and SWMU 17.

2.2 RFI STRATEGY AND TECHNICAL APPROACH

The investigations for SWMUs 1, 16, and 17 were carried out in one campaign with two phases in 1997. There was some follow up work in the Phase II RFI work in May 2001. The sample points were established on the basis of one sample per 2,500 ft² of operational or storage area. Additional sample points were established outside but adjacent to storage or operational areas.

For each sample point there were two or three samples taken:

- A core of the concrete for sample points in a former production or storage area.
- A “shallow” sample of the first 0 to 12 inches of soil beneath the concrete.
- A “deep” sample of soil generally 12 to 24 inches beneath the concrete.

The total number of samples submitted for analysis was as follows:

SECTION TWO

SWMU 1 – Container (Drum) Storage Area, SWMU 16 – Former Atrazine Production Area, and SWMU 17 – Returned Product Storage Area

TABLE 2-1
SAMPLES SUBMITTED – PHASE I

SWMU Number	Sample Description	Sample Points	Number of Samples	Analyte List
16 Atrazine Warehouse	Concrete and Soil	5 concrete and soil	15	C
	Soil	1 soil	2	B
16 Atrazine Production Area	Concrete and Soil	6	18	C
	Soil	11	22	B
1, 17 Container Storage and Off-Spec Storage	Concrete and Soil	10 concrete and soil	30	A
	Soil	2 soil	4	A

LEGEND:

- A Atrazine, Cyanazine, Arsenic, Dinoseb, Toxaphene, Toluene
- B TCL, TAL, Atrazine, Cyanazine, Dinoseb
- C Atrazine, Cyanazine, Arsenic, Dinoseb, Toxaphene
- D TCL, Dioxin, TAL, Atrazine, Cyanazine, Dinoseb
- E BTEX, TPH
- F BTEX, TPH, Atrazine, Cyanazine, Arsenic, Dinoseb, Toxaphene
- G Arsenic

Upon receiving results of analyses, a Phase II continuation of sampling and analysis was executed in 1997 based on the following criteria for resampling:

- Analytical results above the action levels established in Closure Plan for SWMU 1 and SWMU 17:

TABLE 2-2
TRIGGER CONCENTRATIONS**

Constituent	Concentrations (ppb) Above Which Additional Sampling is Triggered
dinoseb	80,000
arsenic	20,000 (background*)
toxaphene	2,600
atrazine	400,000
toluene	16,000,000

* Arsenic is present as a background component of natural soils. VCC had originally proposed a lower toxicity based number prior to knowledge of the

SECTION TWO

SWMU 1 – Container (Drum) Storage Area, SWMU 16 – Former Atrazine Production Area, and SWMU 17 – Returned Product Storage Area

concentration of arsenic occurring naturally in some of the soils in the Vicksburg area. The arithmetic mean of arsenic in background soil samples is 9,700 ppb. The upper 95 percent confidence limit is 11,800 ppb. Examination of literature indicates that the natural concentration of arsenic can be much higher. See the discussion of SWMU 11 – Former MSMA Production Area in Section 9.0 for additional discussion of arsenic. VCC suggests that 20,000 ppb be recognized as an “effective background concentration”.

Trigger concentrations were subsequently replaced by the EPA and MSDEQ by values presented in the MDEQ Tier 1 TRG Table. VCC continues to suggest that 20,000 ppb be recognized as an “effective background concentration.” Tables in this RFI Interim Report and Phase II Workplan include a listing of the MDEQ Tier 1 TRG Table values. Both an “unrestricted” value and a “restricted” value are listed for soils. In essence, concentrations of contaminants below the unrestricted value are of no environmental consequence. The determination of no consequence was made by applying the principals of risk assessment. Concentrations of contaminants between the unrestricted value and restricted value are of no environmental consequences long as access to the site is restricted to industrial workers and the contamination is contained on the site. Concentrations of contaminants greater than the restricted values have to be considered for further assessment of risk or for corrective action.

- If concentration of any analyte noted above in a sample of 12- to 24-inch interval exceeded the concentration in sample of 0- to 12-inch interval.

If either condition noted above was met, the soil was sampled in 4-foot intervals to groundwater. The soil and groundwater were analyzed for the analyte causing the exceedance.

The total number of samples submitted for analysis in the Phase II 1997 effort is as follows:

SWMU Number	Sample Description	Sample Points	Number of Samples	Analytes
16 Atrazine Warehouse	Soil and Groundwater	2	7	Toxaphene
		1	4	Toxaphene and Arsenic
16 Atrazine Production Area	Soil and Groundwater	1	4	Toxaphene

SECTION TWO

SWMU 1 – Container (Drum) Storage Area, SWMU 16 – Former Atrazine Production Area, and SWMU 17 – Returned Product Storage Area

SWMU Number	Sample Description	Sample Points	Number of Samples	Analytes
1, 17 Container Storage and Off-Spec Storage	Concrete	1	1	Dinoseb and Arsenic
Background	Soil	6	6	Arsenic

The locations of the SWMUs are depicted on Figure 1. The sampling points are located on Figures 2-1, 2-2, and 2-3. Figure 2-1 emphasizes soil sample locations on the periphery of the SWMUs. Figure 2-2 emphasizes locations where both the concrete floor and soil underneath were sampled. Figure 2-3 emphasizes the Phase II sampling locations. Also note that three background samples for arsenic were obtained in a level field immediately west of the parking lot serving the main administration building in the North Plant and three background samples were obtained from the Vicksburg Chemicals Employee Park located between the plant site and the Mississippi River to the west.

Arsenic was detected at a concentration of 538 ppb in groundwater at location 2, underneath the Atrazine Warehouse of SWMU 16. It was suggested that the source of the arsenic might be localized caused by a spill of MSMA in the warehouse or might be part of a longer plume from SWMU 11, the Former MSMA production area (see the discussion of SWMU 11 in Section 9.0). Monitor wells MW-17A, MW-17B, MW-18A and MW-18B were installed in May 2001 to help resolve the question. Additionally, in May 1997 one groundwater sample and three soil samples were obtained from each of two borings with temporary wells near location 2 in the SWMU 16 Atrazine Warehouse, but outside the warehouse. The samples were analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles. The sample locations are noted on Figure 2-3. As reported below in Section 2.3, the results of soil and groundwater analysis (no arsenic contamination above background) for arsenic demonstrates that the groundwater contamination was the result of an isolated spill within the warehouse. (Location 2 had been chosen on a joint within the warehouse). Also the arsenic plume in groundwater from SWMU 11, 12, 15 does not reach the SWMU 16 area. A map of arsenic in groundwater for the entire Vicksburg site is presented as Figure 18-1.

SECTION TWO

SWMU 1 – Container (Drum) Storage Area, SWMU 16 – Former Atrazine Production Area, and SWMU 17 – Returned Product Storage Area

2.3 RESULTS OF SAMPLING AND ANALYSIS

A set of complete analytical data for the 1997 effort is provided in the original “RFI Report, SWMUs 16, 1 and 17”, June 1997 as Attachment 3. The analytical results of Phase I 1997 sampling are summarized in Table 2-4. The results of Phase II 1997 sampling are summarized in Table 2-5 for groundwater and Table 2-6 for soil. The results of the May 2001 follow up effort are reported in the following tables:

- Table 2-7 – Soil Samples from 16-1 and 16-2
- Table 2-8 – Groundwater Samples from 16-1 and 6-2

SECTION TWO

**SWMU 1 – Contalner (Drum) Storage Area,
SWMU 16 – Former Atrazine Production Area,
and SWMU 17 – Returned Product Storage Area**

TABLE 2-4

RESULTS OF PHASE I SAMPLING $\mu\text{g}/\text{kg}$ (ppb)

	A-1-B	A-2-B	B-1-B	B-2-B	C-1-B	C-2-B	D-1-B	D-2-B	E-1-B	E-2-B	F-1-B	F-2-B	G-1-B	G-2-B	H-1-B	H-2-B	I-1-B	I-2-B	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
Atrazine	ND	22.7	ND	ND	ND	ND	8,850	8,380	82.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	ND	ND	ND	32.4	ND	ND	ND	ND	ND	ND	ND	898	ND	760	6,810
Dinoseb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	78,200	204,000
Toxaphene	332	2,830	ND	ND	ND	ND	195	583	ND	ND	ND	ND	ND	ND	732	ND	31,700	343	581	5,200
Arsenic	11,800	5,660	11,100	10,300	5,120	8,470	12,500	5,140	8,480	9,410	8,820	8,580	7,730	8,460	3,140	7,300	27,000	7,860	426	3,820
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	38,000	38,000
TCL/TAL Compound Detection (Above Background)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
	J-1-B	J-2-B	K-1-A	K-2-A	L-1-A	L-2-A	M-1-B	M-2-B	N-1-B	N-2-B	1-C-C	1-1-C	1-2-C	2-C-C	2-1-C	2-2-C	3-C-C	3-1-C	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
Atrazine	ND	ND	ND	ND	ND	ND	74.2	ND	819	ND	835	726	272	1,150	94.8	29.3	2,210	ND	2,880	25,800
Cyanazine	ND	ND	ND	ND	265	263	ND	ND	ND	ND	ND	22.7	ND	ND	ND	ND	ND	ND	760	6,810
Dinoseb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	644	ND	ND	ND	78,200	204,000
Toxaphene	372	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,680	554	1,680	4,050	980	3,970	581	5,200
Arsenic	3,890	4,720	10,500	11,300	14,500	8,550	8,440	7,530	6,320	6,090	2,650	5,710	7,890	36,000	7,270	7,220	3,220	5,020	426	3,820
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	38,000	38,000
TCL/TAL Compound Detection (Above Background)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
	3-2-C	4-C-C	4-1-C	4-2-C	5-C-C	5-1-C	5-2-C	6-C-C	6-1-C	6-2-C	7-C-C	7-1-C	7-2-C	8-C-C	8-1-C	8-2-C	9-C-C	9-1-C	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
Atrazine	ND	180	10,100	327	ND	3,200	69.4	ND	ND	ND	ND	ND	ND	2,110	ND	ND	ND	ND	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	760	6,810
Dinoseb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	78,200	204,000
Toxaphene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	581	5,200
Arsenic	5,050	9,560	7,070	6,520	3,890	8,940	4,980	3,830	3,410	4,990	3,910	4,280	4,670	6,940	4,070	5,680	2,710	2,380	426	3,820
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	38,000	38,000
TCL/TAL Compound Detection (Above Background)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		

SECTION TWO

**SWMU 1 – Container (Drum) Storage Area,
SWMU 16 – Former Atrazine Production Area,
and SWMU 17 – Returned Product Storage Area**

TABLE 2-4 (Continued)

RESULTS OF PHASE I SAMPLING $\mu\text{g}/\text{kg}$ (ppb)

	9-2-C	10-C-C	10-1-C	11-C-C	11-1-C	11-2-C	12-C-A	12-1-A	12-2-A	13-C-A	13-1-A	13-2-A	14-C-A	14-1-A	14-2-A	15-C-A	15-1-A	15-2-A	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
Atrazine	ND	30.4	18	52,800	5,510	3,850	132	21.6	ND	ND	249	50.1	5,920	6,820	212	ND	ND	ND	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	ND	ND	20.9	ND	760	6,810									
Dinoseb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6,660	14,300	ND	ND	ND	446	78,200	204,000
Toxaphene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	479	ND	ND	ND	ND	ND	581	5,200
Arsenic	3,200	10,100	2,100	7,140	3,290	3,450	3,340	4,690	13,300	6,270	3,980	8,130	5,590	5,360	8,000	4,670	7,760	12,900	426	3,820
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	278	ND	118	54.3	ND	ND	38,000	38,000
TCL/TAL Compound Detection (Above Background)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		

	16-C-A	16-1-A	16-2-A	17-C-A	17-1-A	17-2-A	18-C-A	18-1-A	18-2-A	19-C-A	19-1-A	19-2-A	20-C-A	21-1-A	20-2-A	21-C-A	21-1-A	21-2-A	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
Atrazine	145	21.4	ND	17.8	1,030	726	20.2	7,320	191	19.7	405	203	ND	189	36	ND	40	ND	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	ND	85.8	ND	760	6,810										
Dinoseb	ND	ND	ND	ND	ND	ND	97,500	ND	ND	15,700	ND	78,200	204,000							
Toxaphene	545	ND	ND	237	ND	ND	ND	ND	ND	636	ND	ND	506	ND	ND	ND	ND	ND	581	5,200
Arsenic	13,700	8,000	6,760	3,660	4,390	1,750	27,000	4,510	9,660	18,800	4,400	4,160	8,330	3,760	4,090	2,050	3,600	2,590	426	3,820
Toluene	ND	38,000	38,000																	
TCL/TAL Compound Detection (Above Background)	ND																			

NOTES:

(1) Sample ID = Location-Type-Parameters

Location:

Alphabetic = Soil
Numeric = Concrete/Soil

Type:

C = Concrete
1 = 0 to 12-inch Soil
2 = 12 to 24-inch Soil

Parameters:

A = Atrazine, Cyanazine, Arsenic, Dinoseb, Toxaphene, Toluene
B = TCL, TAL, Atrazine, Cyanazine, Dinoseb
C = Atrazine, Cyanazine, Arsenic, Dinoseb,

(2) ND = Nondetect

NR = Not required and not requested for analysis

TABLE 2-5
PHASE II 1997 GROUNDWATER SAMPLES $\mu\text{g/l}$ (ppb)

	A-W-T	D-W-T	1-W-T	2-W-TA	MDEQ Tier 1 TRG Table $\mu\text{g/l}$ (ppb)
Arsenic	NR	NR	NR	538	50
Dinoseb	NR	NR	NR	NR	7
Toxaphene	ND	ND	ND	ND	3

NOTES:

(1) Sample ID = Location-Type-Parameters

Location:	Type:	Parameters:
Alphabetic = Soil	C = Concrete	A = Atrazine, Cyanazine, Arsenic, Dinoseb,
Numeric = Concrete/Soil	1 = 0 to 12-inch Soil	Toxaphene, Toluene
	2 = 12 to 24-inch Soil	B = TCL, TAL, Atrazine, Cyanazine, Dinoseb
		C = Atrazine, Cyanazine, Arsenic, Dinoseb,

(2) ND = Nondetect
NR = Not required and not requested for analysis

TABLE 2-6
PHASE II 1997 SOIL SAMPLES $\mu\text{g/kg}$ (ppb)

	A-2, 4-T	A-4, 8-T	A-8, 12-T	D-2, 4-T	D-4, 8-T	D-8, 12-T	1,2,4-T	1-4, 8-T	1-8, 12-T	2-2,4-TA	2-4, 8-A	S-8, 12-TA	18-C-DA	B1-0, 2-A	B2-0, 2A	B3-0, 2-A	B4-0, 2-A	B5-0, 2-A	B5-0, 2-A	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g/kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g/kg}$ (ppb)
Arsenic	NR	NR	NR	NR	NR	NR	NR	NR	NR	9,210	8,050	10,200	7,840	9,380	7,470	7,270	10,800	11,700	11,800	426	3,820
Dinoseb	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	78,200	204,000
Toxaphene	4,510	ND	ND	ND	ND	ND	ND	ND	ND	1,530	ND	ND	NR	NR	NR	NR	NR	NR	NR	581	5,200

NOTES:

(1) Sample ID = Location - Type - Parameters

Location:	Type:	Parameters:
Alphabetic = Soil	c = concrete	T = Toxaphene
Numeric = Concrete/Soil	2, 4 = 2 to 4 foot soil interval	TA = Toxaphene and Arsenic
	4, 8 = 4 to 8 foot soil interval	DA = Dinoseb and Arsenic
	8, 12 = 8 to 12 foot soil interval	A = Arsenic
	W = groundwater	

(2) ND = Nondetect
NR = Not required and not requested for analysis

SECTION TWO

**SWMU 1 – Container (Drum) Storage Area,
SWMU 16 – Former Atrazine Production Area,
and SWMU 17 – Returned Product Storage Area**

TABLE 2-7

**MAY 2001 RFI RESULTS – SOIL SAMPLES
SAMPLING POINTS 16-1 AND 16-2**

Compound	16-1A	16-1B	16-1C	16-2A	16-2B	16-2C	MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/kg (ppb)
Atrazine	ND	ND	ND	ND	277	44	2,880	25,800
Cyanazine	ND	ND	ND	ND	26	40	760	6,810
Dinoseb	49	12	ND	57	ND	ND	78,200	204,000
Toxaphene	1335	642	ND	1,352	ND	ND	581	5,200
Arsenic	300	3,300	ND	3,800	3,000	4,100	426	3,820
Volatile Organics Component Name								
Chloromethane	ND	ND	ND	ND	ND	ND	49,100	
Bromomethane	ND	ND	ND	ND	ND	ND	2,970	
Vinyl Chloride	ND	ND	ND	ND	ND	ND	33	
Chloroethane	ND	ND	ND	ND	ND	ND	220,000	
Methylene Chloride	ND	ND	ND	ND	ND	ND	14,300	
Acetone	ND	ND	ND	2,315	52.2	ND	7,820,000	
Carbon Disulfide	ND	ND	ND	ND	ND	ND	7,970	
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	77.2	
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	116,000	
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	782,000	
Chloroform	ND	ND	ND	ND	ND	ND	312	
2-Butanone	ND	ND	ND	ND	ND	ND	129,000	
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	406	
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	1,190,000	
Carbon Tetrachloride	30.2	ND	ND	ND	ND	ND	371	
Bromodichloroethane	ND	ND	ND	ND	ND	ND	10,300	
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	445	
c-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	134	
Trichloroethene	ND	ND	ND	ND	ND	ND	7,600	
Benzene	ND	ND	ND	ND	ND	ND	887	
Dibromochloromethane	ND	ND	ND	ND	ND	ND	7,600	
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	134	
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	1,090	
Bromoform	ND	ND	ND	ND	ND	ND	58,800	
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	6,260,000	
Tetrachloroethene	ND	ND	ND	ND	ND	ND	11,900	
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	656	
2-Hexanone	ND	ND	ND	ND	ND	ND	3,130,000	
Toluene	ND	ND	ND	ND	ND	ND	38,000	
Chlorobenzene	ND	ND	ND	ND	ND	ND	1,190	
Ethylbenzene	ND	ND	ND	ND	ND	ND	395,000	
Styrene	ND	ND	ND	ND	ND	ND	384,000	
Xylenes (total)	ND	ND	ND	ND	ND	ND	318,000	

SECTION TWO

SWMU 1 – Container (Drum) Storage Area, SWMU 16 – Former Atrazine Production Area, and SWMU 17 – Returned Product Storage Area

TABLE 2-8

SUMMARY OF GROUNDWATER DATA OBTAINED FROM
TEMPORARY WELLS 16-1 AND 16-2 IN MAY 2002

Compound	16-1-W	16-2-W	MDEQ Tier 1 TRG Table µg/L (ppb)
Arsenic	7	ND	50
Atrazine	ND	ND	3
Cyanazine	ND	ND	0.0797
Dinoseb	ND	ND	7
Toxaphene	ND	ND	3
Volatile Organics Component			
Chloromethane	ND	ND	1.49
Bromomethane	ND	ND	8.52
Vinyl Chloride	ND	ND	2.0
Chloroethane	ND	ND	3.64
Methylene Chloride	ND	ND	5.0
Acetone	ND	ND	3,650
Carbon Disulfide	ND	ND	1,040
1,1-Dichloroethene	ND	ND	7.0
1,1-Dichloroethane	ND	ND	798
1,2-Dichloroethene (total)	ND	ND	70
Chloroform	ND	ND	0.152
2-Butanone	ND	ND	1,910
1,2-Dichloroethane	ND	ND	5.0
1,1,1-Trichloroethane	ND	ND	200
Carbon Tetrachloride	ND	ND	5.00
Bromodichloromethane	ND	ND	1.08
1,2-Dichloropropane	ND	ND	5.0
c-1,3-Dichloropropene	ND	ND	0.765
Trichloroethene	ND	ND	5.0
Benzene	ND	ND	5.0
Dibromochloroemethane	ND	ND	5.0
t-1,3-Dichloropropene	ND	ND	0.0765
1,1,2-Trichloroethane	ND	ND	5.0
Bromoform	ND	ND	2.33
4-Methyl-2-pentanone	ND	ND	2,920
Tetrachloroethene	ND	ND	5.0
1,1,2,2-Tetrachloroethane	ND	ND	0.0527

2.4 CONCLUSIONS

- The absence of significant (above background) detection of TCL/TAL compounds other than the atrazine, cyanazine, arsenic, dinoseb, and toxaphene which are known to be present in low concentrations in some areas of the plant is indicative that the VCC claim that "through process knowledge the investigation can limit target parameters" is accurate.
- Arsenic is present as a background component of natural soils. The arithmetic mean of arsenic in background soil samples is 9,700 ppb. The upper 95 percent confidence limit is 11,800 ppb. Examination of literature indicates that the natural concentration of arsenic can be much higher. See the discussion of SWMU 11 – Former MSMA Production Area in Section 9.0 for additional discussion of arsenic. VCC suggests that 20,000 ppb be recognized as an "effective background concentration".
- A Phase II RFI for SWMUs 1, 16, and 17 was executed in 1997 and the results summarized in Section 2.3. In four locations, soil was sampled continuously to groundwater; groundwater samples were also obtained. In one location, a concrete sample was obtained.
- Contamination noted at sample point locations in SWMUs 1 and 17 was removed. The resampling effort after the cleanup is documented in "Corrective Action Observation Sampling and Analysis SWMUs 1 and 17", July 1998. Regulatory clean closure of SWMUs 1 and 17 was obtained.
- Arsenic was detected at a concentration of 538 ppb in groundwater at location 2, underneath the Atrazine Warehouse of SWMU 16. The source of the arsenic was localized caused by a spill of MSMA in the warehouse and is not part of a longer plume from SWMU 11, the Former MSMA production area (see the discussion of SWMU 11 in Section 9.0).

3.1 DESCRIPTION

SWMU 2 is a hill with a natural elevation approximately 30 feet above immediate surrounding areas. A landfill and four pits or ponds were constructed on the hill and utilized from 1972 to 1975. One pit was constructed to store dinoseb process wastewater. Three pits were used as disposal locations for pallets, empty fiber and steel drums. In 1977 many of the drums in the pits, but not the landfill, were removed and disposed off-site. The location of the closed pits and closed landfill are shown on Figure 1. The locations are approximate and based on a March, 1979 aerial photograph. The boundary lines of the pits were partially destroyed during regrading efforts in late 1979. In 1979 all the pits were drained, regraded so the hill was flattened and covered with a soil cap. Some of the soil was obtained off-site and placed on the landfill area. In 1983, there was additional grading and capping of the entire area consistent with an engineered plan approved by the MSDNR. In 1988 the SWMU 3 wastewater ponds, which are adjacent to SWMU 2, were lined and a repository for pond sediments (SWACA) was constructed. The SWACA was constructed in the pond location denoted by boring LS-3. The sediments from the SWMU 3 wastewater ponds and most of the sediment of the LS-3 pond are within the SWACA. The pond lining and SWACA construction is consistent with RCRA guidelines.

3.2 RFI STRATEGY AND TECHNICAL APPROACH

The RFI rationale in choosing sample points is based on VCC's process knowledge of the historical usage of the SWMUs. The historical usage is discussed above.

The information to be gathered during the SWMU 2 RFI included the following:

- The vertical and horizontal extent of releases that have or are occurring within the SWMU boundaries which could potentially impact human health or the environment.
- The transport mechanisms, rates, and pathways for migration of hazardous constituents from SWMU areas.

The horizontal extent of releases within the SWMU 2 boundary is limited by the natural shape of the hill. The hill is approximately 30 feet higher than immediately surrounding areas, flattened on the top and has steep slopes. Due to the use of the hill for landfills, pits

and ponds from 1972 through 1975 and the regrading and filling during closure in late 1979, it is likely that no subsurface portions of the hill is completely free of contamination.

There are two potential transport mechanisms for migration of hazardous constituents from SWMU 2. One is transport via surface erosion. The cap on SWMU 2 now partially prevents such transport; however, transport could have occurred prior to 1983, and also the cap may not have been extended sufficiently far along the southwest edge. A likely pathway is the drainage area between the railroad track and SWMU 2. The other method of transport is by vertical leaching to the groundwater aquifer underneath SWMU 2. The leaching is now inhibited by the cap, but the mechanism was certainly available prior to late 1979.

Sampling locations were established by examining aerial photographs of SWMU 2 that were taken prior to the regrading in late 1979. The former pits and landfill were located on the plan view of SWMU locations and presented as Figure 1 “SWMU Locations, RFI Soil and Concrete Sample Points, GWA Monitor Well Locations”. Boring locations were chosen that were adjacent to or through the closed out areas. The locations are shown as LS1, LS2, LS3, LS4, and LS5 on Figure 1.

In September 2000, SWMU 2 was investigated for a release of hazardous constituents leaching into the soils and uppermost groundwater. Continuous sampling at the five locations shown on Figure 1 was performed until groundwater was reached at 90 to 100 feet elevation. Groundwater samples were obtained. Three soil samples were submitted for chemical analysis from each boring. One sample was taken from the 4-foot increment immediately above the uppermost groundwater zone and another was taken from the initial 4-foot increment. An additional sample was taken for analysis. The additional sample chosen was that which represents the 4-foot increment with the highest visual or olfactory contamination evident by field observation. A PID was used to assist in the field observation. The soil sampling determined the vertical extent of the contamination to groundwater.

The maximum horizontal extent of the contamination in the uppermost 30 feet of soil is defined by the natural boundary of the SWMU 2 edge. In order to determine if through surface water runoff and erosion, hazardous constituents have been further released horizontally from SWMU 2, seven shallow (hand auger and shovel) borings were taken in October 2000 in the runoff area west of SWMU 2 and sloped toward the southwest. The hand auger and shovel borings were 2½ feet in depth. A sample was obtained in the 6- to 12-

inch below ground surface (bgs) elevation and the 24- to 30-inch bgs elevation. The sample points are located on Figure 1 and are identified as locations 2-1 through 2-7.

Samples obtained from the borings and hand samples in September 2000 were submitted for analysis of compounds on the Toxic Compound List, the Toxic Analyte List, atrazine, cyanazine, and dinoseb.

Samples of soil on the Hill area were obtained utilizing a geoprobe. The geoprobe contained a clear plastic tube. A new tube was used for each thrust of the geoprobe. Each thrust penetrated to 4 feet thereby filling the plastic tube with a continuous 4-foot core that was examined and logged. (The logs are provided in "RCRA Facility Investigation – SWMU 2 – Inactive Landfill Interim Report", October 2000 as Attachment 1.) The soil samples were transferred to sample bottles, appropriately labeled, and placed on ice for transport to the laboratory.

Groundwater samples were obtained from each of the locations on the Hill area. PVC pipe was inserted into each boring. Boring LS1 was provided with subsurface casing since there was some evidence that there might be perched water above the groundwater table. (There was no such evidence at the other boring locations.) The PVC pipes were fitted with 5-foot long screens. Samples were obtained with a pump and/or bailer. The formation at each location was very slow at yielding groundwater.

The delineation of the surface water runoff area called the "valley" was not complete. There is evidence of toxaphene contamination probably due to runoff and erosion. Therefore, some sampling of the side of the hill west of the location LS-5 was required. Additionally the area covered by further sampling was extended to the north and south parallel to the railroad tracks.

Ten locations were sampled for Phase II during May 2001. Samples at nine of the locations included soil at a depth of 6 to 12 inches. The tenth location was a boring to groundwater and included three soil samples and one groundwater sample. Sample locations are depicted as 2-8 through 2-17 on Figure 1. The soil and groundwater samples were analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles.

3.3 RESULTS OF SAMPLING AND ANALYSIS

3.3.1 Hill Area

Evidence of contamination has been found in the “hill area” of SWMU 2 and the groundwater beneath the “hill area”. A full report of the investigation is found in “RCRA Facility Investigation SWMU 2 – Inactive Landfill Interim Report”, October 2000.

The exposure route for contaminants in SWMU 2 is infiltration/percolation to the groundwater then discharge into the groundwater. The shallow aquifer underlying the VCC plant site, including SWMU-2, is hydraulically connected to Stouts Bayou and Hennessey’s Bayou. Hatcher Bayou and Stout’s Bayou merge east of the plant site to form Hennessey’s Bayou, which flows to the Mississippi River.

Monitor wells MW-5, MW-6, and MW-7 intercept the shallow aquifer between SWMU 2 and Hennessey’s Bayou. These wells have been sampled since 1991 and analyzed for atrazine, dinoseb, toxaphene, arsenic, and volatiles. The following Table 3-1 is a summary of hits from analysis of the groundwater in MW-5, MW-6, and MW-7. The MCLs are also listed for the compounds. Table 3-1 is obtained from Table 5, page 3-5 of the “Amended and Supplemental Groundwater Assessment Work Plan”, December 1999. All groundwater data is included in Appendix H of that workplan.

Compound	MW-5	MW-6	MW-7	MDEQ Tier 1 TRG Table µg/L (ppb)
Arsenic	ND – 0.07	ND – 0.015	ND – 0.113	10.0 MCL
Dinitrobutylphenol (Dinoseb)	ND – 12.0	ND – 75.0	ND – 4.5	7.0 MCL
Toxaphene	ND	ND – 25.0	ND – 2.77	3.0 MCL
Trichloroethene	ND – 79.0	ND – 9.03	ND	5.0 MCL
Vinyl Chloride	ND	ND – 4.0	ND	2.0 MCL
Total Xylenes	ND – 10.0	ND – 7.0	ND	10,000 MCL

A similar table, Table 3-2, can be made for groundwater samples LS1-W, LS2-W, LS3-W, LS4-W, and LS5-W. The table lists compounds for which there is a detection of organic contamination in one of the samples. There are no metal constituents that exceed MDEQ

Tier 1 TRG Table values. A complete tabulation of analytical data for the groundwater is found in "RCRA Facility Investigation – Inactive Landfill Interim Report", October 2000 on pages 7-3, 7-6, 7-7, 7-9, 7-11 and 7-13.

TABLE 3-2

LW1-W, LS2-W, LS3-W, LS4-W, LS5-W
SUMMARY OF HITS (ppb)
GROUNDWATER SAMPLING AND ANALYSIS

Compound	LS1-W	LS2-W	LS3-W	LS4-W	LS5-W	MDEQ Tier 1 TRG Table $\mu\text{g/L}$ (ppb)
Chloroform	ND	221	ND	17.3	105	0.152
2-Butanone	ND	69.1	ND	126	63.4	1,910
Carbon Tetrachloride	ND	71.4	ND	126	ND	5 MCL
Ethylbenzene	ND	ND	ND	ND	12.3	700 MCL
Xylene (total)	ND	19.5	ND	ND	40.0	10,000 MCL
Acetaphenone	ND	ND	ND	ND	18.92	0.0416
Caprolactam	15.51	ND	12,202.74	38.96	11,475.73	18,300
Dimethylphthalate	ND	ND	ND	28.99	ND	365,000
4-Nitrophenol	ND	547.61	ND	ND	2,358.87	292
Diethylphthalate	11.29	11.36	21.73	15.9	8.2	29,200
Di-n-butyl-phthalate	43.62	160.65	132.92	54.13	149.77	3,650
Bis-(2-ethyl)hexylphthalate	213.44	34.93	474.04	42.03	130.9	6.0
Atrazine	ND	478	ND	ND	6.33	3 MCL
Dinoseb	ND	8,714	ND	597	797	7 MCL

Monitor wells MW-5, MW-6 and MW-7 are located less than 100 feet from Hennessey's Bayou. Aquifer properties have been obtained at various wells, including MW-6, and are reported below in Table 3-3. Table 3-3 is obtained from Table 7 on page 3-10 in the "Amended and Supplemental Groundwater Assessment Workplan", December 1999.

TABLE 3-3

AQUIFER PROPERTIES-IT CORPORATION STUDY

Monitor Well No.	Porosity (%)	Standard Thickness (ft)	Hydraulic Gradient (ft/ft)	Hydraulic Conductivity (cm/sec)	Velocity (ft/year)	Transmissivity (gal/day) (ft)
1*	46	30	0.04	9.07×10^{-5}	8.03	58
6	45	20.5	0.025	9.26×10^{-5}	5.48	40
11	44	42	0.11	2.59×10^{-4}	67.2	232
12	42	41	0.011	1.3×10^{-4}	3.65	116

NOTE: * MW-1 was replaced by MW-1A in 1986.

It is probable that Hennessey's Bayou will be impacted.

Table 3-4 is a summary table comparable to Table 3-2 but is for organic contaminants detected in the soil samples. A complete tabulation of analytical data for the soil samples is found in "RCRA Facility Investigation – Inactive Landfill Interim Report", October 2000 on pages 7-2, 7-4, 7-5, 7-8, 7-10 and 7-12. There are no metal constituents that exceed MDEQ Tier 1 table values with the exception of arsenic. Arsenic is significantly below the value suggested by VCC to use as a background concentration.

TABLE 3-4

SUMMARY OR SOIL HITS $\mu\text{g}/\text{kg}$ (ppb)

Compound	LS1-A	LS1-B	LS1-C	LS2-A	LS2-B	LS2-C	LS3-A	LS3-B	LS3-C	LS4-A	LS4-B	LS4-C	LS5-A	LS5-B	LS5-C	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
Acetone	ND	142	101	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,528	7,820,000	104,000,000
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19,216	ND	7,970	7,970
Chloroform	ND	ND	ND	111	74.7	40.4	ND	ND	ND	ND	ND	16.2	ND	96.9	33	312	478
2-Butanone	ND	186	206	18.2	602	ND	ND	ND	ND	281	ND	839	ND	92.1	78	129,000	129,000
Carbon Tetrachloride	ND	ND	ND	112	41.9	37.6	ND	ND	ND	ND	6,659	62.4	ND	138	5	371	569
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.8	15	38,000	38,000
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6,207	39.1	ND	253	645	395,000	395,000
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	49.9	68,895	585	ND	ND	ND	384,000	384,000
Xylenes	ND	ND	ND	14.3	36.3	31.9	ND	ND	ND	ND	53,106	383	ND	1,945	1,569	318,000	318,000
Benzaldehyde	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,416	ND	ND	ND	ND	7,820,000	204,000,000
2,4-Dinitrophenol	ND	ND	2,930	ND	1,473	ND	ND	ND	ND	ND	4,437	ND	ND	ND	ND	156,000	408,000
4-Nitrophenol	ND	ND	ND	ND	3,257	ND	ND	ND	ND	ND	737.44	ND	ND	ND	ND	626,000	16,400,000
2,4-Dinitrotoluene	ND	437	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	156,000	408,000
Diethylphthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,970,000	1,970,000
Di-n-butylphthalate	1,526.70	2,214.43	2,877.51	ND	ND	ND	6,600	8,290	5,950	ND	ND	ND	ND	ND	ND	2,280,000	2,280,000
Bis-(2-Ethylhexyl)phthalate	264.6	342.68	409.97	ND	ND	ND	792.82	1,228.55	1,111.6	ND	ND	ND	ND	ND	ND	45,600	409,000
Atrazine	3,514	ND	ND	ND	ND	683	ND	ND	ND	ND	ND	ND	ND	3,410	ND	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	4,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	760	6,810
Dinoseb	ND	41,300	34,700	ND	ND	ND	ND	ND	ND	24,600	279,600	ND	ND	8,282,600	3,229	78,200	204,000
Toxaphene	ND	ND	ND	1510	ND	ND	ND	ND	ND	ND	ND	ND	ND	19,210	ND	581	5,200

3.3.2 Valley

The “valley” is the runoff area west of the SWMU 2 “hill”. It slopes toward the southwest. Shovel and hand auger samples were obtained 6 to 12 inches bgs and 24 inches bgs. The samples were obtained in the October 2000 field campaign, are not reported elsewhere, and are, therefore, tabulated in full in this report in Tables 3-5 through 3-9 on the pages that follow. There are separate tables for volatiles, semi-volatiles, pesticide/PCBs, atrazine/cyanazine/dinoseb, and metals.

Ten locations were sampled during May 2001. At nine locations (2-8 through 2-14, 2-16 and 2-17) samples were obtained to a depth of 6 to 12 inches and analyzed for arsenic, atrazine, cyanazine, dinoseb and toxaphene.

Location 2-15 was a boring to groundwater which included three soil samples and one groundwater sample. The soil sample results are included in Table 3-10. The results of analysis of groundwater are included in Table 3-11.

TABLE 3-5

SWMU 2 VALLEY – VOLATILES IN SOIL

Volatile Organics Component Name	Sample Results ug/Kg (ppb)														Component MDL ug/Kg (ppb)	MDEQ Tier 1 TRG Table Unrestricted (ppb)
	2-1A	2-1B	2-2A	2-2B	2-3A	2-3B	2-4A	2-4B	2-5A	2-5B	2-6A	2-6B	2-7A	2-7B		
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	49,100
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	2,970
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	33
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	220,000
Methylene Chloride	46.3	262	40.1	191	282	222	285	104	40.9	49.2	47.7	79.8	23.8	62.8	5	14,300
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50	7,820,000
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	7,970
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	77.2
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	116,000
1,2-Dichloroethane (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	782,000
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	312
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50	129,000
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	406
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	1,190,000
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	371
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	10,300
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	445
c-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	134
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	7,600
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	887
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	7,600
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	134
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	1,090
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	58,800
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50	6,260,000
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	11,900
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	656
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50	3,130,000
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	38,000
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	1,190
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	395,000
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	384,000
Xylenes (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	318,000

TABLE 3-6

SWMU 2 VALLEY – SEMI-VOLATILES IN SOIL

Semi-Volatile Organics Component Name	Sample Results ug/Kg (ppb)														Component MDL ug/Kg (ppb)	MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)
	2-1A	2-1B	2-2A	2-2B	2-3A	2-3B	2-4A	2-4B	2-5A	2-5B	2-6A	2-6B	2-7A	2-7B		
Benzaldehyde	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	7,820,000
Phenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	46,900,000
bis(2-Chloroethyl) ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	273
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	391,000
2-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	3,910,000
2,2'-oxybis(1-Chloropropane)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	--
Acetaphenone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	2,630
4-Methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	391,000
N-Nitroso-di-n-propylamine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	91.2
Hexachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	45,600
Nitrobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	8,410
Isophorone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	672,000
2-Nitrophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	626,000
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	1,560,000
bis(2-Chloroethoxy) methane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	--
2,4-Dichloropohnol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	235,000
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	645,000
4-Chloroaniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	313,000
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	88.2
Caprolactam	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	39,100
4-Chloro-3-methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	--
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	3,130,000
Hexachlorocyclopentadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	951
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	58,100
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	830	7,820,000
1,1'-Biphenyl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	3,910,000
2-Chloronaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	6,260,000
2-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	830	--
Dimethylphthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	782,000,000
Acenaphthylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	4,690,000
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	78,200
3-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	830	--
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	4,690,000
2,4-Dinitrophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	830	156,000
4-Nitrophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	830	626,000
Dibenzofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	313,000
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	156,000
Diethylphthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	1,970,000
4-Chlorophenol-phenyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	--
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	3,130,000
4-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	830	--

TABLE 3-6 (Continued)

SWMU 2 VALLEY – SEMI-VOLATILES IN SOIL

Semi-Volatile Organics Component Name	Sample Results ug/Kg (ppb)														Component MDL $\mu\text{g/Kg}$ (ppb)	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g/kg(ppb)}$
	2-1A	2-1B	2-2A	2-2B	2-3A	2-3B	2-4A	2-4B	2-5A	2-5B	2-6A	2-6B	2-7A	2-7B		
4,6-Dinitro-2-methylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,435.03	830	7,820
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	130,000
4-Bromophenyl-phenyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	–
Hexachlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	399
Atrazine	ND	ND	ND	ND	ND	ND	410.1	ND	330	2,880						
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	830	2,660
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	2,350,000
Anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	23,500,000
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	31,900
Di-n-butylphthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	2,280,000
Flouranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	3,130,000
Pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	2,350,000
Butylbenzylphthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	928,000
3,3-Dichlorobenzidine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	1,420
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	875
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	87,500
Bis-(2-Ethylhexyl)phthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	45,600
Di-n-octylphthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	1,560,000
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	875
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	8,750
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	87.5
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	875
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	87.5
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	330	2,350,000

TABLE 3-7

SWMU 2 VALLEY – PESTICIDE/PCB IN SOIL

Organic Compound	Sample Results														MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
	2-1A	2-1B	2-2A	2-2B	2-3A	2-3B	2-4A	2-4B	2-5A	2-5B	2-6A	2-6B	2-7A	2-7B		
Alpha – BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	101	908
beta – BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	355	3,180
delta – BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
gamma – BHC (Lindane)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	491	4,400
Heptachlor	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	127	195
Aldrin	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	37.6	337
Heptachlor epoxide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	70.2	629
4,4' – DDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,880	16,800
Dieldrin	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	39.9	358
Endrin	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	23,500	61,300
Endosulfan I	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	469,000	1,230,000
Endosulfan II	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	469,000	1,230,000
4,4' – DDD	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,660	23,800
Endrin Aldehyde	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
Endrin Ketone	ND	ND	ND	ND	ND	ND	ND	ND	25	ND	ND	ND	ND	ND	--	--
Methoxychlor	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	391,000	1,020,000
4,4' – DDT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,880	16,800
Endosulfan Sulfate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--
alpha – Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,820	12,300
gamma – Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,820	12,300
Toxaphene	1,138	492	357	215	2,761	649	2,094	976	208	838	984	726	636	811	581	5,200
PCB – 1016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,480	81,800
PCB – 1221	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,000	2,860
PCB – 1232	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,000	2,860
PCB – 1242	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,000	2,860
PCB – 1248	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,000	2,860
PCB – 1254	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,000	2,860
PCB – 1260	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,000	2,860

TABLE 3-8

SWMU 2 VALLEY – ATRAZINE, CYANAZINE AND DINOSEB IN SOIL µg/kg

Organics Component	Sample Results (ppb)														MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/kg (ppb)
	2-1A	2-1B	2-2A	2-2B	2-3A	2-3B	2-4A	2-4B	2-5A	2-5B	2-6A	2-6B	2-7A	2-7B		
Atrazine	ND	ND	ND	ND	ND	ND	ND	0.4	ND	ND	ND	ND	ND	ND	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	760	6,810
Dinoseb	69	22	30	32	287	31	180	32	31	23	24	32	25	159	78,200	204,000

TABLE 3-9

SWMU 2 VALLEY – METALS IN SOIL

Target Analyte	Sample Results mg/Kg (ppm)														Component MDL mg/Kg (ppm)	MDEQ Tier 1 TRG Values, Unrestricted mg/Kg (ppm)
	2-1A	2-1B	2-2A	2-2B	2-3A	2-3B	2-4A	2-4B	2-5A	2-5B	2-6A	2-6B	2-7A	2-7B		
Aluminum	5,770	2,830	3,540	3,225	3,370	4,030	3,550	3,235	3,625	4,085	4,810	5,460	3,395	4,080	10	78,200
Antimony	ND	ND	1.5	1	0.92	1.5	ND	1.2	ND	ND	1.4	2.1	1.4	1.4	0.3	31.3
Arsenic	4.6	2.7	4.2	2.2	3.6	3.5	5.2	2.4	2.7	2.4	3.4	4.3	2.7	3.6	0.5	0.426
Barium	127	96	121	91	121	115	59	103	94	115	131	156	109	146	10	5,480
Beryllium	0.36	ND	ND	ND	ND	ND	0.5	ND	ND	0.27	0.3	0.37	ND	0.3	0.25	156
Cadmium	0.55	0.31	0.45	0.3	0.33	0.34	0.47	0.32	0.32	0.39	0.49	0.54	0.31	0.44	0.25	78.2
Calcium	11,625	12,410	9,225	12,300	8,865	9,795	5,325	10,865	19,555	12,825	12,200	10,070	12,935	11,705	0.1	--
Chromium	10.7	6	6.2	6.8	6.8	7.2	5	6	25.8	8.4	9.5	10.2	6.8	8.2	0.5	227
Cobalt	12.5	4	6.2	3.6	5.2	4	6.5	5	4.4	5.4	8.5	8.8	4.2	7.2	2.5	4,690
Copper	12.8	6.9	7.2	7.6	19.9	9.3	7.2	8.1	8.4	10.3	10.7	13.7	8.7	11.1	1.25	3,130
Iron	1,583	1,600	1,597	1,599	1,594	1,594	1,599	1,596	1,592	1,592	1,587	1,582	1,595	1,589	5	23,500
Lead	7.7	3.6	5.6	3.7	4.4	4.8	9.1	4.6	3.8	7	5.9	7.6	4.3	6.3	0.15	400
Magnesium	4,650	6,885	6,295	7,145	5,850	6,400	3,200	6,125	12,005	7,565	7,740	6,625	7,610	6,190	0.75	--
Manganese	438	236.2	422	240	439	350	323	439	438	414	438	438	434	438	0.75	3,600
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.04	10
Nickel	17.0	9.0	10.0	9.0	11.0	10.0	9.0	10.0	10.0	12.0	14.0	17.0	10.4	13.0	2	1,560
Potassium	1,148	828	1,586	1,480	8,945	1,882	1,974	798	1,337	1,161	1,364	1,329	1,084	1,218	5	--
Selenium	0.56	ND	ND	ND	0.63	ND	0.6	ND	ND	ND	ND	ND	ND	0.49	0.25	391
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	391
Sodium	416	368	416	436	411	307	489	365	161	241	244	297	202	259	0.75	--
Thallium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.36	ND	ND	ND	0.5	5.48
Vanadium	18.3	11.9	12	13.1	12.9	13.7	9.2	12.4	13.8	15.4	19	20	13.1	15.4	2.5	548
Zinc	41.0	25.0	31.0	28.0	31.0	34.0	30.0	28.0	30.0	36.0	37.0	45	31.0	37.0	1	23,500
Cyanide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	1,560

TABLE 3-10

SWMU 2 – VALLEY AREA – RESULTS FROM SOIL SAMPLES MAY 2001

Compound	Sample Results												DEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/kg (ppb)
	2-8	2-9	2-10	2-11	2-12	2-13	2-14	2-15A	2-15B	2-15C	2-16	2-17		
Atrazine	ND	ND	217	ND	ND	44	22	15	40	ND	33	20	2,880	25,800
Cyanazine	ND	ND	43	ND	25	ND	760	6,810						
Dinoseb	ND	ND	24	31	36	ND	22	ND	ND	ND	ND	ND	78,200	204,000
Toxaphene	697	ND	560	388	389	322	2,247	983	475	ND	1,816	230	581	5,200
Arsenic	700	1,100	ND	3,100	1,600	2,400	1,700	1,330	2,160	3,050	1,320	2,000	426	3,820
Volatile Organics Component														
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	49,100	
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,970	
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	33	
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	220,000	
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14,300	
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,820,000	
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,970	
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	77.2	
1,1-Dichloroethane	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	116,00	
1,2-Dichloroethane (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	782,000	
Chloroform	ND	ND	ND	73.0	ND	42	ND	ND	ND	ND	ND	ND	312	
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	129,000	
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	406	
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,190,000	
Carbon Tetrachloride	ND	ND	ND	127	ND	24.2	ND	ND	ND	ND	ND	ND	371	
Bromodichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,300	
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	445	
c-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	134	
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,600	
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	887	
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,600	
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	134	
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,090	
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	58,800	
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6,260,000	
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11,900	
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	656	
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,130,000	
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	38,000	
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,190	
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	395,000	
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	384,000	
Xylenes (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	318,000	

TABLE 3-11		
SUMMARY OF GROUNDWATER DATA OBTAINED FROM TEMPORARY WELLS IN MAY 2001		
Compound	SWMU 2	MDEQ Tier 1 TRG Table µg/L (ppb)
	2-15-W	
Arsenic	9	50
Atrazine	123	3
Cyanazine	ND	0.0797
Dinoseb	ND	7
Toxaphene	ND	3
Volatile Organics Component		
Choromethane	ND	1.49
Bromomethane	ND	8.52
Vinyl Chloride	ND	2.0
Chloroethane	ND	3.64
Methylene Chloride	ND	5.0
Acetone	ND	3,650
Carbon Disulfide	ND	1,040
1,1-Dichloroethene	ND	7.0
1,1-Dichloroethane	ND	798
1,2-Dichloroethene (total)	ND	70
Chloroform	ND	0.152
2-Butanone	ND	1,910
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	200
Carbon Tetrachloride	ND	5.00
Bromodichloromethane	ND	1.08
1,2-Dichloropropane	ND	5.0
c-1,3-Dichloropropene	ND	0.765
Trichloroethene	ND	5.0
Benzene	ND	5.0
Dibromochloroemethane	ND	5.0
t-1,3-Dichloropropene	ND	0.0765
1,1,2-Trichloroethane	ND	5.0
Bromoform	ND	2.33
4-Methyl-2-pentanone	ND	2,920
Tetrachloroethene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	0.0527

3.4 CONCLUSIONS

The delineation of horizontal and vertical contamination in the "Hill" area is complete. The entire hill is a contaminated inactive secure landfill to the depth of the groundwater. Monitor wells MW-5, MW-6 and MW-7 are adequately spaced and screened to detect presence of chemical constituents. The next task to address at SWMU 2 is a Corrective Measures Study to address the need to intercept groundwater that is contaminated by SWMU 2 and prevent it from discharging into Hennessey's Bayou.

The delineation of the surface water runoff area called the "valley" is complete. There is evidence of toxaphene contamination probably due to runoff and erosion. The extent of the dispersion in soil has been determined. The valley area will have to remain a restricted area. The natural vegetation that has developed in the area should prevent further erosion. The area is not an attraction for people. Plant personnel have no need to go to the area.

The investigation of groundwater in the SWMU 2 valley is not complete. A concentration of atrazine in groundwater at location 2-15 is puzzling. There is no soil data from the investigations of SWMUs 1, 16, 17, 20 or 2 that point to a source area. Furthermore, there is no data from analysis of groundwater at locations 20-24, 20-23, MW-2, 16-1, 16-2, MW-8, LS-1, LS-2, LS-3, LS-4 or LS-5 that indicate a similar problem. Therefore, it is proposed that as part of the groundwater assessment fieldwork in August 2001 that six borings surrounding location 2-15 be advanced to groundwater. Temporary wells would be installed in the borings and samples of groundwater obtained for analysis of atrazine.

4.1 DESCRIPTION

The Activated Carbon (Adsorption) Treatment Unit treats wastewater from the Surface Impoundment (SWMU 3) to remove organic materials before the water is pumped to the Mississippi River in accordance with the NPDES permit. Secondary containment for the unit consists of a concrete pad approximately 100 feet long, 20 feet wide with 1-foot tall containment curbs. The concrete containment unit is cracked and stained. There is visual evidence of spillage of carbon on the east side of the containment area.

4.2 STRATEGY AND TECHNICAL APPROACH

The soil around the Activated Carbon Treatment Unit containment pad was sampled. Six auger or shovel borings were made to a depth of 12 inches. Samples were taken from the 6- to 12-inch depth. Two of the samples were obtained on the east side of the containment area and directly underneath the spilled carbon. The locations are depicted as 4-1 through 4-6 on Figures 1 and 2. These samples were analyzed for TCL, TAL plus atrazine, cyanazine and dinoseb. Due to the proximity of the Former Dinoseb Production Area (SWMU 7) and Railroad Loading/Unloading Station (SWMU 20) to SWMU 4, Phase I sampling around the Carbon Treatment Units was limited to the perimeter of the concrete pad.

4.3 RESULTS OF SAMPLING AND ANALYSIS

The results are tabulated in full on the pages that follow in Tables 4-1 through 4-5. The samples were obtained in the October 2000 field campaign and are not reported elsewhere.

Based on the toxaphene contamination found near the SWMU 4 containment area, additional samples were obtained in May 2001. The runoff area between the main railroad line and the first Vicksburg track was of particular interest. SWMU 4 (Activated Carbon Unit) is so near SWMU 7 (Former Dinoseb Manufacturing Area), SWMU 14 (Former Toxaphene Manufacturing Area) and SWMU 20 (Railroad Area) that it is difficult to ascertain with certainty that operation of SWMU 4 is the source of contamination. Therefore, the Phase II investigation was carried forward in the SWMUs (4, 7, 14 and 20) area as one area-wide investigation. A discussion of that investigation is found in Section 13 – SWMU 20 Railroad Area. During Phase II it was proposed that three soil samples and one groundwater sample be obtained at one boring location along the drainage path from SWMU 4. The boring is noted as location 20-18 on Figure 1 and the results are presented in Section 13.

Volatile Organics Component Name	Sample Results ug/Kg (ppb)						Component MDL ug/Kg (ppb)	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g/kg}$ (ppb)
	4-1	4-2	4-3	4-4	4-5	4-6		
Chloromethane	ND	ND	ND	ND	ND	ND	10	49,100
Bromomethane	ND	ND	ND	ND	ND	ND	10	2,970
Vinyl Chloride	ND	ND	ND	ND	ND	ND	10	33
Chloroethane	ND	ND	ND	ND	ND	ND	10	220,000
Methylene Chloride	427	229	132	602	285	316	5	14,300
Acetone	ND	ND	ND	ND	ND	ND	50	7,820,000
Carbon Disulfide	ND	ND	ND	ND	ND	ND	5	7,970
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	5	77.2
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	5	116,000
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	5	782,000
Chloroform	ND	ND	ND	5.54	16.9	ND	5	312
2-Butanone	ND	ND	ND	ND	ND	ND	50	129,000
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	5	406
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	5	1,190,000
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	5	371
Bromodichloromethane	ND	ND	ND	ND	ND	ND	5	10,300
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	5	445
c-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	5	134
Trichloroethene	ND	ND	ND	ND	ND	ND	5	7,600
Benzene	ND	ND	ND	ND	ND	ND	5	887
Dibromochloromethane	ND	ND	ND	ND	ND	ND	5	7,600
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	5	134
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	5	1,090
Bromoform	ND	ND	ND	ND	ND	ND	5	58,800
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	50	6,260,000
Tetrachloroethene	ND	ND	ND	ND	ND	ND	5	11,900
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	5	656
2-Hexanone	ND	ND	ND	ND	ND	ND	50	3,130,000
Toluene	ND	ND	ND	ND	ND	ND	5	38,000
Chlorobenzene	ND	ND	ND	ND	ND	ND	5	1,190
Ethylbenzene	ND	ND	ND	ND	ND	ND	5	395,000
Styrene	ND	ND	ND	ND	ND	ND	5	384,000
Xylenes (total)	ND	ND	ND	ND	ND	ND	5	318,000

Semi-Volatile Organics Component Name	Sample Results ug/Kg (ppb)						Component MDL ug/kg (ppb)	MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)
	4-1	4-2	4-3	4-4	4-5	4-6		
Benzaldehyde	ND	ND	ND	ND	ND	ND	330	7,820,000
Phenol	ND	ND	ND	ND	ND	ND	330	46,900,000
bis(2-Chloroethyl) ether	ND	ND	ND	ND	ND	ND	330	273
2-Chlorophenol	ND	ND	ND	ND	ND	ND	330	391,000
2-Methylphenol	ND	ND	ND	ND	ND	ND	330	3,910,000
2,2'-oxybis(1-Chloropropane)	ND	ND	ND	ND	ND	ND	330	--
Acetaphenone	ND	ND	ND	ND	ND	ND	330	2,630
4-Methylphenol	ND	ND	ND	ND	ND	ND	330	391,000
N-Nitroso-di-n-propylamine	ND	ND	ND	ND	ND	ND	330	91.2
Hexachloroethane	ND	ND	ND	ND	ND	ND	330	45,600
Nitrobenzene	ND	ND	ND	ND	ND	ND	330	8,410
Isophorone	ND	ND	ND	ND	ND	ND	330	672,000
2-Nitrophenol	ND	ND	ND	ND	ND	ND	330	626,000
2,4-Dimethylphenol	ND	ND	ND	ND	ND	ND	330	1,560,000
bis(2-Chloroethoxy) methane	ND	ND	ND	ND	ND	ND	330	--
2,4-Dichloroephnol	ND	ND	ND	ND	ND	ND	330	235,000
Naphthalene	ND	ND	ND	ND	ND	ND	330	645,000
4-Chloroaniline	ND	ND	ND	ND	ND	ND	330	313,000
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	330	88.2
Caprolactam	ND	ND	ND	ND	ND	ND	330	39,100
4-Chloro-3-methylphenol	ND	ND	ND	ND	ND	ND	330	--
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	330	3,130,000
Hexachlorocyclopentadiene	ND	ND	ND	ND	ND	ND	330	951
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	330	58,100
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	ND	830	7,820,000
1,1'-Biphenyl	ND	ND	ND	ND	ND	ND	330	3,910,000
2-Chloronaphthalene	ND	ND	ND	ND	ND	ND	330	6,260,000
2-Nitroaniline	ND	ND	ND	ND	ND	ND	830	--
Dimethylphthalate	ND	ND	ND	ND	ND	ND	330	782,000,000
Acenaphthylene	ND	ND	ND	ND	ND	ND	330	4,690,000
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	ND	330	78,200
3-Nitroaniline	ND	ND	ND	ND	ND	ND	830	--
Acenaphthene	ND	ND	ND	ND	ND	ND	330	4,690,000
2,4-Dinitrophenol	ND	ND	ND	ND	ND	ND	830	156,000

TABLE 4-2 (Continued)								
SWMU 4 – ACTIVATED CARBON TREATMENT UNIT – SEMI-VOLATILES IN SOIL								
Semi-Volatile Organics Component Name	Sample Results ug/Kg (ppb)						Component MDL ug/kg (ppb)	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g/kg}$ (ppb)
	4-1	4-2	4-3	4-4	4-5	4-6		
4-Nitrophenol	ND	ND	ND	ND	ND	ND	830	626,000
Dibenzofuran	ND	ND	ND	ND	ND	ND	330	313,000
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	ND	330	156,000
Diethylphthalate	ND	ND	ND	ND	ND	ND	330	1,970,000
4-Chlorophenol-phenyl ether	ND	ND	ND	ND	ND	ND	330	--
Fluorene	ND	ND	ND	ND	ND	ND	330	3,130,000
4-Nitroaniline	ND	ND	ND	ND	ND	ND	830	--
4,6-Dinitro-2-methylphenol	ND	ND	ND	ND	ND	ND	830	7,820
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	ND	330	130,000
4-Bromophenyl-phenyl ether	ND	ND	ND	ND	ND	ND	330	--
Hexachlorobenzene	ND	ND	ND	ND	ND	ND	330	399
Atrazine	ND	ND	ND	ND	ND	ND	330	2,880
Pentachlorophenol	ND	ND	ND	ND	ND	ND	830	2,660
Phenanthrene	ND	ND	ND	ND	ND	ND	330	2,350,000
Anthracene	ND	ND	ND	ND	ND	ND	330	23,500,000
Carbazole	ND	ND	ND	ND	ND	ND	330	31,900
Di-n-butylphthalate	ND	ND	ND	ND	ND	ND	330	2,280,000
Flouranthene	ND	ND	ND	ND	ND	ND	330	3,130,000
Pyrene	ND	ND	ND	ND	ND	ND	330	2,350,000
Butylbenzylphthalate	4,500	ND	3,669.3	3,891	4,026.3	3,792.8	330	928,000
3,3-Dichlorobenzidine	ND	ND	ND	ND	ND	ND	330	1,420
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	330	875
Chrysene	ND	ND	ND	ND	ND	ND	330	87,500
Bis-(2-Ethylhexyl)phthalate	375.3	ND	325.5	333.6	361.2	363.3	330	45,600
Di-n-octylphthalate	ND	ND	ND	ND	ND	ND	330	1,560,000
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	330	875
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	330	8,750
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	330	87.5
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND	ND	330	875
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	330	87.5
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND	330	2,350,000

Organic Compound	Sample Results (ppb)						MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
	4-1	4-2	4-3	4-4	4-5	4-6		
alpha – BHC	ND	ND	ND	ND	ND	ND	101	908
beta – BHC	ND	ND	ND	ND	ND	ND	355	3,180
delta – BHC	ND	ND	ND	ND	ND	ND	--	--
gamma – BHC (Lindane)	ND	ND	ND	ND	ND	ND	491	4,400
Heptachlor	ND	ND	ND	ND	ND	ND	127	195
Aldrin	ND	ND	ND	ND	ND	ND	37.6	337
Heptachlor epoxide	ND	ND	ND	ND	ND	ND	70.2	629
4,4' – DDE	ND	ND	ND	ND	ND	ND	1,880	16,800
Dieldrin	ND	ND	ND	ND	ND	ND	39.9	358
Endrin	ND	ND	ND	ND	ND	ND	23,500	61,300
Endosulfan I	ND	ND	ND	ND	ND	ND	469,000	1,230,000
Endosulfan II	ND	ND	ND	ND	ND	ND	469,000	1,230,000
4-4' – DDD	ND	ND	ND	ND	ND	ND	2,660	23,800
Endrin Aldehyde	ND	ND	ND	ND	ND	ND	--	--
Endrin Ketone	ND	ND	ND	ND	ND	ND	--	--
Methoxychlor	ND	ND	ND	ND	ND	ND	391,000	1,020,000
4,4' – DDT	ND	ND	ND	ND	ND	ND	1,880	16,800
Endosulfan Sulfate	ND	ND	ND	ND	ND	ND	--	--
alpha – Chlordane	ND	ND	ND	ND	ND	ND	1,820	12,700
gamma – Chlordane	ND	ND	ND	ND	ND	ND	1,820	12,300
Toxaphene	505	ND	247	403	ND	82	581	5,200
PCB – 1016	ND	ND	ND	ND	ND	ND	5,480	81,800
PCB – 1221	ND	ND	ND	ND	ND	ND	1,000	2,860
PCB – 1232	ND	ND	ND	ND	ND	ND	1,000	2,860
PCB – 1242	ND	ND	ND	ND	ND	ND	1,000	2,860
PCB – 1248	ND	ND	ND	ND	ND	ND	1,000	2,860
PCB – 1254	ND	ND	ND	ND	ND	ND	1,000	2,860
PCB - 1260	ND	ND	ND	ND	ND	ND	1,000	2,860

TABLE 4-4

SWMU 4 – ACTIVATED CARBON TREATMENT UNIT – ATRAZINE, CYANAZINE AND DINOSEB IN SOIL (ppb)

Organics Component	Sample Results (ppb)						MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
	4-1	4-2	4-3	4-4	4-5	4-6		
Atrazine	ND	1	ND	ND	24	ND	2,880	25,800
Cyanazine	6	ND	ND	ND	4	1	760	6,810
Dinoseb	136	13	21	313	16	15	78,200	204,000

Target Analyte	Sample Results mg/Kg (ppm)						Component MDL mg/Kg (ppm)	MDEQ Tier 1 TRG Values, Unrestricted mg/Kg (ppm)
	4-1	4-2	4-3	4-4	4-5	4-6		
Aluminum	1,439	4,425	1,278	2,341	2,900	2,358	10	78,200
Antimony	ND	14.2	ND	ND	ND	ND	0.3	31.3
Arsenic	8.8	7.6	6.2	15.7	7.2	5.1	0.5	0.426
Barium	88	99	58	43	91	44	10	5,480
Beryllium	ND	ND	ND	ND	ND	0.27	0.25	156
Cadmium	0.52	0.31	0.3	ND	ND	ND	0.25	78.2
Calcium	53,350	8,635	79,650	2,200	6,990	11,310	0.1	--
Chromium	15.9	9.2	8.1	16.2	8.3	6.8	0.5	227
Cobalt	2.9	4.6	ND	3	ND	5	2.5	4,690
Copper	42.0	10.9	6.4	8.9	12.2	9.0	1.25	3,130
Iron	1,906	1,912	1,912	1,923	1,905	1,925	5	23,500
Lead	21.6	5.5	4	40.1	7.1	4.2	0.15	400
Magnesium	3,785	4,780	6,310	1,790	1,565	2,800	0.75	--
Manganese	149	400	217	58	125	269	0.75	3,600
Mercury	ND	ND	ND	0.18	ND	ND	0.04	10
Nickel	11.0	11.0	5.0	7.0	6.0	6.0	2	1,560
Potassium	1,539	1,386	1,126	1,620	2,176	1,328	5	--
Selenium	ND	ND	ND	ND	ND	ND	0.25	391
Silver	ND	ND	ND	ND	ND	ND	0.5	391
Sodium	833	981	129	478	600	532	0.75	--
Thallium	ND	ND	ND	ND	ND	ND	0.5	5.48
Vanadium	6.4	16	5.8	8.1	16.2	7.1	2.5	548
Zinc	57	35.0	28.0	58.0	34.0	19.0	1	23,500
Cyanide	ND	ND	ND	ND	ND	ND	0.2	1,560

4.4 CONCLUSIONS

See Section 13 for a discussion of conclusions.

5.1 DESCRIPTION

The South Plant Drainage System was designed to transfer storm water and process water to the Surface Impoundment (SWMU 3) for containment prior to treatment. Sumps exist within the former MSMA, dinoseb and toxaphene production, packaging and shipping areas of the South Plant. At one time, some of the sumps carried water to the Surface Impoundment (SWMU 3); however, due to regulations which became effective in November 1985, sumps in the pesticide process and handling areas were blocked. This precluded the possibility of pesticide spills from entering the Surface Impoundment (SWMU 3) by gravity flow through the Drainage System.

5.2 RFI STRATEGY AND TECHNICAL APPROACH

The investigation of the South Plant Drainage System has taken place in segments:

- The portion of the drainage system within MSMA production areas was investigated and is reported in "RCRA Facility Investigation Expedited Report SWMU 12 – Former MSMA Salt Unloading Area, SWMU 11 – Former MSMA Production Area, SWMU 15 – Former Methyl Parathion Production Area, April 1998. Analytical results on solids within the system are reported in Table 7-1 on pages 7-1 and 7-2. Corrective action is suggested for this segment. The corrective action is described in "Interim Revised Corrective Measures Implementation Plan SWMU 17 – former MSMA Salt Unloading Area, SWMU 11 – Former MSMA Production Area, SWMU 15 – Former Methyl Parathion Production Area, November 2000. The required activity including excavations and also cleaning the drainage system and sumps is described in Section 3 on pages 3-1 through 3-7.
- The Dinoseb Manufacturing Area, including the drainage system, has been totally demolished. Potential soil contamination from the drainage system would be indistinguishable with the SWMU 7 – Dinoseb Manufacturing Area samples 7-1 through 7-3 or the surrounding area samples. The surrounding area is the SWMU 20 – Railroad Area; samples from that area are labeled 20-1 through 20-16.

- The Toxaphene Manufacturing Area, including the drainage system, has been partially demolished. The remaining portion is the concrete foundation. Potential soil contamination from the drainage system would be indistinguishable with the SWMU 14 – Toxaphene Manufacturing Area samples 14-1 through 14-6 or the surrounding area samples. The surrounding area is the SWMU 20 – Railroad Area; samples from that area are labeled 20-1 through 20-16.
- The remaining portion of the drainage system is depicted in Figure 1 and Figure 2 and is identified by sample locations 5-1 through 5-16.

The Phase I investigation involved discrete soil sampling adjacent to the pipe and analysis for atrazine, cyanazine, arsenic, dinoseb and toxaphene. The samples were taken in the 6-inch interval at the depth of the buried drainage pipes and conduits. The drainage pipes are from three to 10 feet below ground surface. The sample locations are noted on Figure 2. It can be observed that the distance between sample point 5-3 and 5-4 is considerable. Subsurface samples were deliberately avoided because the area is laden with subsurface utility piping and is all covered by concrete. The rationale was that if results of other samples gave cause for careful and tedious exploration of the gap, then it could be performed as part of Phase II.

5.3 RESULTS OF SAMPLING AND ANALYSIS

Results of the sixteen sample points are noted in full on the following table, Table 5-1. Samples were obtained in the October 2000 sample campaign and are not reported elsewhere. Additionally, there are other sections of the drainage system which were handled as follows:

- At location 5-13 arsenic is the contaminant. The source of arsenic was the MSMA plant. This location was identified in the SWMU 11, 12 and 15 investigation and has been sufficiently characterized. The Phase II RFI implemented in May 2001 included installation of wells that monitor groundwater from SWMUs 11, 12 and 15 to help define the extent of the problem. Refer to Section 9 for that discussion.
- Refer to Section 13 for discussion of work implemented at SWMUs 7, 14 and 20 in May 2001.

TABLE 5-1

SWMU 5 – SOUTH PLANT DRAINAGE SYSTEM – ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE AND ARSENIC IN SOIL (ppb)

Organics Compound	Sample Results (ppb)																MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
	5-1	5-2	5-3	5-4	5-5	5-6	5-7	5-8	5-9	5-10	5-11	5-12	5-13	5-14	5-15	5-16		
Atrazine	ND	ND	ND	3	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,880	25,800
Cyanazine	ND	ND	ND	ND	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	760	6,810
Dinoseb	6	ND	ND	ND	ND	ND	15	ND	318	10	4	ND	ND	4	346	9	78,200	204,000
Toxaphene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	80	ND	581	5,200
Arsenic	900	900	1,000	39,200	4,900	ND	ND	3,500	3,300	2,300	30,800	600	174,000	39,000	11,400	2,300	426	3,820

5.4 CONCLUSIONS

The area is adequately characterized. There are clean up issues to consider at drainage with SWMU 11, 12 and 15; refer to Section 9 for that discussion. There are clean up issues to consider at drainage within SWMU 7, 14 and 12; refer to Section 13 for that discussion.

6.1 DESCRIPTION

The Former Dinoseb Production Area is located near the railroad tracks. The production area and foundation have been demolished and removed and a portion treated in a CAMU. Some discolored soil has been removed. Due to the acid involved in the manufacturing of the herbicide, the concrete and cement in the process area had been badly corroded and etched. The dinoseb manufacturing process consisted of sulfonation and nitration reactors, two formulation blending tanks, and a settling tank. At one time, acidic process wastewater was neutralized with sodium hydroxide or ammonia and then discharged to the Surface Impoundment (SWMU 3) through carbon adsorption beds. Emission from the nitration reactor was controlled by a butane-fired flare. Flare failure required immediate plant shut down; however, the soil in the area surrounding the flare is suspected to be contaminated. The area is surrounded by the Railroad Area (SWMU 20) and is adjacent to the Toxaphene Area (SWMU 14).

6.2 RFI STRATEGY AND TECHNICAL APPROACH

Three sample locations were chosen directly underneath the former location of the production area in the October 2000 investigation. The locations are depicted on Figures 1 and 2. A geoprobe was used to obtain soil samples to a depth of 12 feet. Samples for analysis were obtained at 2 to 4 feet, 6 to 8 feet and 10 to 12 feet.

Based on the toxaphene and contamination found, additional samples were obtained in May 2001. The runoff area between the main railroad line and the first Vicksburg track and from manufacturing areas were of particular interest. SWMU 4 (Activated Carbon Unit) is so near SWMU 7 (Former Dinoseb Manufacturing Area), SWMU 14 (Former Toxaphene Manufacturing Area) and SWMU 20 (Railroad Area) that it is difficult to ascertain with certainty that operation of any particular SWMU is the source of contamination. Therefore, the Phase II investigation was carried forward in the SWMUs (4, 7, 14 and 20) area as one area-wide investigation. A discussion of that investigation is found in Section 13 – SWMU 20 Railroad Area.

6.3 RESULTS OF SAMPLING AND ANALYSIS

Soil was sampled in October 2000 for atrazine, cyanazine, dinoseb, toxaphene, arsenic, and toluene. Results are tabulated in full in the following table, Table 6-1.

SECTION SIX

SWMU 7 – Former Dinoseb Production Area

The environmental impact of SWMU 7 may extend to the adjacent Toxaphene Manufacturing Area (SWMU 14) or the surrounding Railroad Area (SWMU 20). At SWMU 14, five samples were obtained in October, 2000 at depths of 2 to 4 feet, 6 to 8 feet, and 10 to 12 feet. At SWMU 20, sixteen samples were obtained in October, 2000 at depths of 2 to 4 feet and 6 to 8 feet.

Rationale and results of the May 2001 Phase II investigation are reported in Section 13, SWMU 20 – Railroad Area.

TABLE 6-1												
SWMU 7 – FORMER DINOSEB PRODUCTION AREA – ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE, ARSENIC, AND TOLUENE												
Organics Component	Sample Results (ppb)									MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/kg (ppb)	
	7-1A	7-1B	7-1C	7-2A	7-2B	7-2C	7-3A	7-3B	7-3C			
Atrazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	760	6,810
Dinoseb	ND	ND	ND	7	ND	5	49	4	ND	ND	78,200	204,000
Toxaphene	ND	ND	ND	46	17	19	ND	ND	ND	ND	581	5,200
Arsenic	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	426	3,820
Toluene	ND	5.05	11.2	ND	24.6	14.2	ND	14.6	9.89	ND	38,000	38,000

6.4 CONCLUSIONS

The groundwater and soil contamination around SWMU 4, 17, 14 and 20 are discussed in Section 13. The area is well characterized and no additional samples are needed.

7.1 DESCRIPTION

The Dinoseb Truck Loading/Unloading Area is located in the central section of the South Plant adjacent to the Dinoseb Drumming Area (SWMU 9). It is a concrete pad that used to contain spillage associated with the truck loading/unloading operations at the Former Dinoseb Drumming Area (SWMU 9). The pad is approximately 25 feet long and 15 feet wide.

The loading/unloading area is now covered with asphalt and within a warehouse/operations area for production of Multi Cote (coated fertilizers for slow release of nutrients). It continues to be used as a loading/unloading area.

7.2 RFI STRATEGY AND TECHNICAL APPROACH

Due to the good condition and appearance of SWMU 8, it was believed that there is little potential for contamination. One sample location was chosen, 8-1. (Location 8-1 is depicted on Figure 1. Soil samples were obtained by geoprobe at depths of 2 to 4 feet, 6 to 8 feet, and 10 to 12 feet. A concrete sample of the six inches of concrete beneath the asphalt was also obtained. Monitor wells MW-18A and MW-18B were constructed in May 2001. The monitor wells were established to monitor potential contaminant transport from SWMU 9 (Dinoseb Drumming Area) and from SWMU 12 (MSMA Manufacturing Area)).

7.3 RESULTS OF SAMPLING AND ANALYSIS

The samples were obtained in October 2000 and were analyzed for atrazine, cyanazine, dinoseb, toxaphene, arsenic, and toluene. Results in full are tabulated below in Table 7-1.

TABLE 7-1					
SWMU 8 – DINOSEB LOADING/UNLOADING AREA – ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE, ARSENIC AND TOLUENE					
Component	Sample Results (ppb)				MDEQ Tier 1 TRG Unrestricted Table (ppb)
	8-1 Concrete	8-1A	8-1B	8-1C	
Atrazine	39	ND	ND	26	2,880
Cyanazine	ND	ND	ND	ND	760
Dinoseb	ND	ND	4	213	78,200
Toxaphene	123	107	ND	48	581

TABLE 7-1

**SWMU 8 – DINOSEB LOADING/UNLOADING AREA – ATRAZINE,
CYANAZINE, DINOSEB, TOXAPHENE, ARSENIC AND TOLUENE**

Component	Sample Results (ppb)				MDEQ Tier 1 TRG Unrestricted Table (ppb)
	8-1 Concrete	8-1A	8-1B	8-1C	
Arsenic	9,800	3,200	2,100	ND	426
Toluene	ND	ND	ND	ND	38,000

7.4 CONCLUSIONS

Monitor wells MW-18A and MW-18B were installed. Results of groundwater to monitor SWMU 8, and SWMUs 9 and 12 are discussed in Section 9, SWMU 11, 12, 15 and in the Groundwater Assessment Report, which will follow this RFI Report after completion of a minor amount of field work to obtain groundwater samples surrounding location 2-15 and perhaps other locations in order to verify information on plumes of contamination.

8.1 DESCRIPTION

Drumming of the dinoseb and toxaphene formulations took place in the south end of a warehouse in the central section of the South Plant. In the drumming operation of the dinoseb and toxaphene, an absorbent was placed on the floor to prevent material reaching the Surface Impoundment from spills. Yellow stains were evident on the floor.

The SWMU 9 site is presently the site on which a facility to coat and then store various fertilizer mixtures has been constructed. Prior to the construction the area was sampled and cleaned up. The activities are reported in the following:

- “RFI Work Plan SWMUs 9 and 11”, August 1994
- “RFI Report SWMUs 9 and 16”, September 1994
- “SWMU 9 Corrective Action Observation”, March 1999

The initial sampling results prior to the cleanup are tabulated below in Table 8-1. The results were first reported on page 11 of the September 1994 document noted above.

TABLE 8-1

SWMU 9 – DINOSEB DRUMMING AREA – ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE AND ARSENIC IN SOIL

Organics Component	Sample Results (ppb)																MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
	1S	2S	2D	3S	4S	4D	4C	5S	5D	5C	6S	6C	7S	8S	8D	8C		
Atrazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30	21,000	390	61	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8,700	570	120	760	6,810
Dinoseb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	78,200	204,000
Toxaphene	ND	850	1,300	19,000	ND	ND	ND	1,200	ND	100	ND	ND	800	250,000	25,000	4,200	581	5,200
Arsenic	8,200	30,600	14,000	4,100	5,900	7,700	24,000	6,200	7,100	4,800	8,500	3,800	12,000	61,000	60,000	58,000	426	3,820

NOTES:

- S Shallow sample; 6" - 12"
- D Deep sample; 18" - 24"
- C Concrete sample
- ND Not detected

The entire surface of the concrete in SWMU 9 was treated by grinding off a veneer of concrete then by placing a layer of compost atop it in an attempt to draw contaminants from the surface of the concrete into the compost where biological degradation would occur. The effort was experimental and results were uncertain. Subsequently, concrete and some soil were removed from a section comprising the middle third of SWMU 9. All concrete grindings, concrete debris, and soil removed were taken to the Treatment Unit for eventual biodegradation/composting within the provisions of the CAMU permit. The soil characterized by the results of sample 8S and 8D remain underneath the production facilities. SWMU 9 is located on Figure 1. The sample locations are depicted on Figure 8-1.

8.2 RFI STRATEGY AND TECHNICAL APPROACH

During the partial cleanup noted above, additional samples were obtained in the area where soil and concrete had been removed. The resample locations are noted as "Sample Locations November 1998" on Figure 8-1. Also during the November 1998 sampling, a groundwater sample was obtained by geo-probe.

8.3 RESULTS OF SAMPLING AND ANALYSIS

Results of the November 1998 sampling effort are reported on pages 6 through 9 of "SWMU 9 Corrective Action Observation", March 1999. Compounds detected in the soil are summarized on Tables 8-2 and 8-3. Compounds detected in the groundwater are summarized on Tables 8-4 and 8-5.

	A-1 Result (mg/kg)	B-2 Result (mg/kg)	B-4 Result (mg/kg)	MDEQ Tier 1 TRG Table Unrestricted mg/kg (ppm)
Antimony	ND	ND	ND	31.3
Arsenic	9.06	7.32	9.57	0.426
Barium	59.7	85.9	72.1	5,486
Beryllium	0.896	0.705	0.530	156
Cadmium	0.874	0.610	0.398	78.2
Chromium	245.3	45.60	11.21	227
Cobalt	7.91	8.52	8.28	4,696
Copper	29.11	13.73	13.52	3,130
Lead	46.09	14.38	12.18	400
Mercury	0.144	ND	ND	10
Nickel	21.09	19.15	17.70	1,560

	A-1 Result (mg/kg)	B-2 Result (mg/kg)	B-4 Result (mg/kg)	MDEQ Tier 1 TRG Table Unrestricted mg/kg (ppm)
Selenium	ND	ND	ND	391
Silver	ND	ND	ND	391
Thallium	8.04	6.85	5.39	5.48
Vanadium	23.50	22.0	16.77	548
Zinc	82.04	48.9	49.79	23,500
Cyanide	ND	ND	ND	1,560

	A-1 Result ($\mu\text{g}/\text{kg}$)	B-2 Result ($\mu\text{g}/\text{kg}$)	B-4 Result ($\mu\text{g}/\text{kg}$)	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
Atrazine	ND	ND	ND	2,880	25,800
Dinoseb	ND	ND	ND	78,200	204,000
Toxaphene	ND	ND	ND	581	5,200
Benzo(a)anthracene	1,110	ND	ND	875	7,840
Benzo(a)pyrene	1,160	ND	ND	87.5	784
Benzo(b)fluoranthene	977	D	ND	875	7,840
Benzo(g,h,i)perylene	551	ND	ND	2,350,000	61,300,000
Benzo(k)fluoranthene	1,150	ND	ND	8,750	78,400
Chrysene	1,340	ND	ND	87,500	784,000
Fluoranthene	1,350	ND	ND	3,130,000	71,700,000
Phenanthrene	338	ND	ND	2,350,000	61,300,000
4-4'-DDE	11	ND	ND	2,660	16,800
PCB-1254	527	ND	ND	1,000	2,860

	Groundwater Sample TP-1 $\mu\text{g}/\text{l}$ (ppb)	MDEQ Tier 1 TRG Table $\mu\text{g}/\text{l}$ (ppb)
Antimony	12	6
Arsenic	378	50
Barium	220	2,000
Beryllium	ND	4
Cadmium	ND	5
Chromium	ND	100
Cobalt	60	2,190
Copper	ND	1,300
Lead	ND	15
Mercury	ND	2
Nickel	90	730

TABLE 8-4		
INORGANICS IN GROUNDWATER		
	Groundwater Sample TP-1 (µg/l)	MDEQ Tier 1 TRG Table µg/l (ppb)
Selenium	ND	50
Silver	ND	183
Thallium	ND	2
Vanadium	ND	256
Zinc	70	11,000
Cyanide	ND	200

TABLE 8-5		
ORGANICS IN GROUNDWATER		
	Groundwater Sample TP-1 (µg/l)	MDEQ Tier 1 TRG Table µg/l (ppb)
1,2-Dichlorobenzene	11	606
Cis-1,2-Dichloroethene	26	70
Trans-1,2-Dichloroethene	6	100
Trichloroethene	68	5
Xylenes	14	10,000
1,2-Dichlorobenzene	4	600
m-Nitrosodiphenyl amine	2	13.7
Atrazine	ND	3
Dinoseb	ND	7
Toxaphene	ND	3

8.4 CONCLUSIONS

A nested pair of wells MW-18A and MW-18B were installed adjacent to the southeast corner of SWMU 9. Groundwater was obtained from each well and analyzed for arsenic, atrazine, cyanazine, *dinoseb*, *toxaphene* and volatiles. The well will monitor the potential transport of *toxaphene*, atrazine, cyanazine and arsenic from the soil underneath the production and warehouse facilities constructed on SWMU 9. Results of the initial groundwater analysis is reported in Section 9, the Groundwater Assessment Report and Table 8-6. A map of *dinoseb* concentration in groundwater for the entire Vicksburg site is presented as Figure 18-2.

TABLE 8-6

**SUMMARY OF GROUNDWATER DATA OBTAINED
FROM WELLS MW-18A AND MW-18B**

Compound	MW-18A	MW-18B	MDEQ Tier 1 TRG Table µg/L (ppb)
Arsenic	319	194	50
Atrazine	ND	ND	3
Cyanazine	ND	ND	0.0797
Dinoseb	1.3	132	7
Toxaphene	ND	ND	3
Volatile Organics Compound			
Chloromethane	ND	ND	1.49
Bromomethane	ND	ND	8.52
Vinyl Chloride	ND	ND	2.0
Chloroethane	ND	ND	3.64
Methylene Chloride	ND	ND	5.0
Acetone	ND	ND	3,650
Carbon Disulfide	ND	ND	1,040
1,1-Dichloroethene	ND	ND	7.0
1,1-Dichloroethane	ND	ND	798
1,2-Dichloroethene (total)	ND	ND	70
Chloroform	ND	ND	0.152
2-Butanone	ND	ND	1,1910
1,2-Dichloroethane	ND	ND	5.0
1,1,1-Trichloroethane	ND	ND	200
Carbon Tetrachloride	ND	ND	5.00
Bromodichloroethane	ND	ND	1.08
1,2-Dichloropropane	ND	ND	5.0
c-1,3-Dichloropropene	ND	ND	0.765
Trichloroethene	ND	ND	5.0
Benzene	ND	ND	5.0
Dibromochloromethane	ND	ND	5.0
t-1,3-Dichloropropene	ND	ND	0.0765
1,1,2-Trichloroethane	ND	ND	5.0
Bromoform	ND	ND	2.33
4-Methyl-2-pentanone	ND	ND	2,920
Tetrachloroethene	ND	ND	5.0
1,1,2,2-Tetrachloroethane	ND	ND	0.0527
2-Hexanone	ND	ND	1,460
Toluene	ND	2.38	1,000
Chlorobenzene	ND	ND	100
Ethylbenzene	ND	296	700
Styrene	ND	ND	100
Xylenes (total)	1.52	948	10,000

TABLE 8-6

SUMMARY OF GROUNDWATER DATA OBTAINED
FROM WELLS MW-18A AND MW-18B

Compound	MW-18A	MW-18B	MDEQ Tier 1 TRG Table µg/L (ppb)
Atrazine	319	194	50
Cyanazine	ND	ND	3
Dinoseb	ND	ND	0.0797
Toxaphene	1.3	132	7
Arsenic	ND	ND	3
Volatile Organics Compound			
Chloromethane	ND	ND	1.49
Bromomethane	ND	ND	8.52
Vinyl Chloride	ND	ND	2.0
Chloroethane	ND	ND	3.64
Methylene Chloride	ND	ND	5.0
Acetone	ND	ND	3,650
Carbon Disulfide	ND	ND	1,040
1,1-Dichloroethene	ND	ND	7.0
1,1-Dichloroethane	ND	ND	798
1,2-Dichloroethene (total)	ND	ND	70
Chloroform	ND	ND	0.152
2-Butanone	ND	ND	1,1910
1,2-Dichloroethane	ND	ND	5.0
1,1,1-Trichloroethane	ND	ND	200
Carbon Tetrachloride	ND	ND	5.00
Bromodichloroethane	ND	ND	1.08
1,2-Dichloropropane	ND	ND	5.0
c-1,3-Dichloropropene	ND	ND	0.765
Trichloroethene	ND	ND	5.0
Benzene	ND	ND	5.0
Dibromochloromethane	ND	ND	5.0
t-1,3-Dichloropropene	ND	ND	0.0765
1,1,2-Trichloroethane	ND	ND	5.0
Bromoform	ND	ND	2.33
4-Methyl-2-pentanone	ND	ND	2,920
Tetrachloroethene	ND	ND	5.0
1,1,2,2-Tetrachloroethane	ND	ND	0.0527
2-Hexanone	ND	ND	1,460
Toluene	ND	2.38	1,000
Chlorobenzene	ND	ND	100
Ethylbenzene	ND	296	700
Styrene	ND	ND	100
Xylenes (total)	1.52	948	10,000

SECTION NINE

SWMU 11 – Former MSMA Production Area

SWMU 12 – Former MSMA Salt Unloading Area

SWMU 15 – Former Methyl Parathion Production Area

9.1 DESCRIPTION

The MSMA Production Area was constructed over the remains of the Former Methyl Parathion facility (SWMU 15) in 1983. Subsequently, the MSMA process was shut down and equipment from the area was removed and the concrete foundation of the area was cleaned with high-pressure water equipment.

The MSMA Salt Unloading Unit was an integral part of the MSMA Production Area (SWMU 11). Salts were discharged directly from a centrifuge into containers located within the area.

The original process unit was constructed in the early 1970s to produce methyl parathion. The methyl parathion manufacturing facility was destroyed in an explosion and fire on March 7, 1978.

9.2 RFI STRATEGY AND TECHNICAL APPROACH

There has been considerable investigative work accomplished at SWMUs 11, 12, and 15. The sampling SWMUs 12, 11 and 15 occurred in two phases. Reporting of events and results and suggestions for future action are presented in detail in the following publications:

- “RFI Expedited Work Plan SWMUs 12, 11, 15, 16, and 17”, January 1997
- “RFI Report SWMUs 12, 11 and 15, April 1998
- “Corrective Measure Implementation Plan”, April 1998 (as amended July 15, 1998)
- “Interim Revised Corrective Measures Implementation Plan, SWMUs 11, 12 and 15”, November 2000

9.3 RESULTS OF SAMPLING AND ANALYSIS

The “RFI Report SWMUs 11, 12 and 15”, April 1998 summarizes the analytical data available for the site. The appropriate reference pages from that report are noted below in Tables 9-1 and 9-2.

SECTION NINE

SWMU 11 – Former MSMA Production Area SWMU 12 – Former MSMA Salt Unloading Area SWMU 15 – Former Methyl Parathion Production Area

TABLE 9-1

PHASE I SAMPLING ACCOMPLISHED – SWMUs 12, 11 and 15

Description	No. of Sample Locations	No. of Samples	Analyte List	SWMU 11, 12 and 15 RFI Report Reference Page*
Sludge/sediment sample location (TCL, TAL, atrazine, cyanazine, dinoseb, dioxin)	10	10	D	7-1 and 7-2
Concrete, asphalt or soil sample (TCL, TAL, atrazine, cyanazine, dinoseb, dioxin)	4	5	D	7-3
Concrete or asphalt and or soil (arsenic only)	21	45	G	7-5 and 7-6
Wipe. 100 square centimeter of five locations: Floor 1 inside laboratory duct. Floor 2 wall, horizontal column and inside chute (arsenic only)	5	5	G	7-4
10-foot soil boring (analyze for toxaphene, dinoseb, arsenic, and BTEX)	5	15	H	7-6
1-foot boring (analyze for toxaphene, dinoseb, arsenic, and BTEX)	4	4	H	7-6

TABLE 9-2

PHASE II SAMPLING ACCOMPLISHED – SWMUs 12, 11 AND 15

Description	Sample Points	No. of Samples	Analyte List	SWMU 11, 12 and 15 RFI Report Reference Page*
10-foot soil boring (analyze for arsenic)	13	51	G	7-7 and 7-8
Groundwater sample from boring (analyze for arsenic)	13	13	G	7-9
Isolated Soil	1	1	G	7-8

NOTE:

* The laboratory data sheets are found in Attachment 5 which is provided as a two volume set accompanying the report.

LEGEND:

C Atrazine, Arsenic, Dinoseb, Toxaphene
D TCL, TAL, Atrazine, Cyanazine, Dioxin
G Arsenic
H BTEX, Arsenic, Dinoseb, Toxaphene

SECTION NINE

SWMU 11 – Former MSMA Production Area

SWMU 12 – Former MSMA Salt Unloading Area

SWMU 15 – Former Methyl Parathion Production Area

The SWMUs are located on Figure 1. The sampling locations are provided on Figures 9-1, 9-2 and 9-3. Figure 9-1 depicts the initial sampling locations at SWMUs 11, 12 and 15. Figure 9-2 depicts sampling locations on the southwest edge of the railroad area (SWMU 20). The locations on Figure 9-2 are unrelated to SWMUs 11, 12 and 15 but the sampling and analysis was done during the same field campaign; the objective was to investigate the area prior to the planned construction of a conveyor. Figure 9-3 depicts the Phase II sampling locations.

The analytical results for arsenic are shown on Figures 9-4 and 9-5. Figure 9-~~4~~⁶ depicts the concentration of arsenic in groundwater at SWMUs 11, 12 and 15. Figure 18-1 depicts the concentration of arsenic in groundwater for the entire Vicksburg site. Figure 9-5 shows the concentrations of arsenic in soil for those locations where it exceeds 20,000 ppb.

The analytical data from the investigation is also presented in the following tables:

- Table 9-3 – Summary of Hits from Sampling Sumps and Drainage Systems, TCL/TAL Compounds plus Cyanazine and Dioxin
- Table 9-4 – Summary of Hits from Sampling Concrete, Asphalt, and Soil for TCL/TAL Compounds plus Cyanazine and Dioxin
- Table 9-5 – Arsenic Concentrations in Soil, Asphalt or Concrete
- Table 9-6 – Arsenic Concentrations in Groundwater

The SWMU 11, 12 and 15 area has been adequately characterized. As a check, location EE, a sump which is part of the drainage system, was resampled and analyzed for dioxin. The sump is 1.5 feet by 1.5 feet and contains about 0.5 inches of solids on the bottom. Results of the dioxin analysis are contained in Table 9-7. Location EE is depicted on Figure 9-1.

Wells MW-17A, MW-17B, MW-18A, and MW-18B were installed as part of Phase II RFI work to monitor the potential transport of arsenic in groundwater. Samples from each well were obtained and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles. Results are contained in Table 9-8.

TABLE 9-3

SUMMARY OF HITS FROM SAMPLING SUMPS AND DRAINAGE SYSTEMS
 TCL/TAL COMPOUNDS PLUS CYANAZINE AND DIOXIN $\mu\text{g}/\text{kg}$ (ppb)

	B-1-D	E-1-D	F-1-D	BB-1-D	Q-1-D	EE-1-D	V-1-D	W-1-D	Y-1-D	M-1-D	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)
Arsenic	39,400	345,000	4,170	2,870,000	2,080,000	456,000	2,770,000	145,000	60,200	35,600	426
Lead	ND	ND	ND	1,340,000	367,000	632,000	1,700,000	ND	ND	ND	400,000
Mercury	ND	3,710	ND	ND	2,700	ND	ND	ND	ND	ND	10,000
Ethylbenzene	ND	ND	29	ND	ND	ND	29	ND	ND	ND	395,000
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	20	ND	318,000
Trichloroethene	28	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,170
1,2,4-Trichlorobenzene	1,480	ND	ND	ND	ND	ND	ND	ND	ND	ND	527,000
Phenanthrene	822	ND	ND	ND	ND	ND	ND	ND	ND	ND	350,000
Fluoranthene	567	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,130,000
Pyrene	3,350	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,350,000
Benzo(a)anthracene	629	ND	ND	ND	ND	ND	ND	ND	ND	ND	875
Chrysene	909	ND	ND	ND	ND	ND	ND	ND	ND	ND	87,500
Benzo(b)fluoranthene	667	ND	ND	ND	ND	ND	ND	ND	ND	ND	875
Benzo(k)fluoranthene	588	ND	ND	ND	ND	ND	ND	ND	ND	ND	8,750
Idano(1,2,3-cd)pyrene	475	ND	ND	ND	ND	ND	ND	ND	ND	ND	875
PCDD/PCDF Toxicity**	0.027	0.003	0.004	0.008	0.0151	0.344	0.006	0	0.005	0.016	0.00426

** Toxicity Equivalency Factors related to 2,3,7,8-Tetrachlorodibenzodioxin

Compound:	TEF:	Compound:	TEF:	Compound:	TEF:
Mono-, Di-, and Tri-CDDs	0	2,3,7,8-HpCDDs	0.01	Other PeCDFs	0
2,3,7,8-TCDDs	1	Other HpCDDs	0	2,3,7,8-HxCDF	0.1
Other TCDDs	0	OCDD	0.001	Other HxCDFs	0
2,3,7,8-PeCDD	0.5	Mono-, Di-, and Tri-CDFs	0	2,3,7,8-HpCDFs	0.01
Other PeCDDs	0	2,3,7,8-TCDFs	1	Other HpCDFs	0
2,3,7,8-HxCDD	0.1	Other TCDFs	0	OCDF	0.001
Other HxCDDs	0	2,3,7,8-PeCDF	0.5		

TABLE 9-4

SUMMARY OF HITS FROM SAMPLING CONCRETE, ASPHALT, AND SOIL FOR TCL/TAL COMPOUNDS PLUS CYANAZINE AND DIOXIN $\mu\text{g}/\text{kg}$ (ppb)

	1-C-D	4-C-D-1	4-C-D-2	5-C-D	6-1-D	6-2-D	MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
Arsenic	18,400	ND	ND	70,600	24,900	14,100	426	3,820
Dinoseb	ND	ND	ND	11,700	1,250	ND	78,200	204,000
Mercury	ND	ND	ND	9,290	ND	ND	10,000	61,300
PCB 360	ND	ND	ND	NS	0.0004	ND	1,000	2,860
PCB 460	ND	ND	ND	NS	ND	0.0008	1,000	2,860
PCDD/PCDF Toxicity**	0	0	0	0.006	0.0004	0.0008	0.00426	0.0382

** Toxicity Equivalency Factors related to 2,3,7,8-Tetrachlorodibenzodioxin

Compound:	TEF:	Compound:	TEF:	Compound:	TEF:
Mono-, Di-, and Tri-CDDs	0	2,3,7,8-HpCDDs	0.01	Other PeCDFs	0
2,3,7,8-TCDDs	1	Other HpCDDs	0	2,3,7,8-HxCDF	0.1
Other TCDDs	0	OCDD	0.001	Other HxCDFs	0
2,3,7,8-PeCDD	0.5	Mono-, Di-, and Tri-CDFs	0	2,3,7,8-HpCDFs	0.01
Other PeCDDs	0	2,3,7,8-TCDFs	1	Other HpCDFs	0
2,3,7,8-HxCDD	0.1	Other TCDFs	0	OCDF	0.001
Other HxCDDs	0	2,3,7,8-PeCDF	0.5		

TABLE 9-5

ARSENIC CONCENTRATIONS IN SOIL, ASPHALT OR CONCRETE $\mu\text{g}/\text{kg}$ (ppb)

	A-1-G	C-1-G	C-2-G	C-3-G	C-4-G	C-5-G	D-1-G	D-2-G	D-3-G	D-4-G	D-5-G	D-6-G
Arsenic	5,960	216,000	501,000	76,000	109,000	114,000	48,800	309,000	10,600	27,600	14,700	1,910
	G-1-G	G-2-G	H-1-G	H-2-G	I-1-G	I-2-G	I-3-G	I-4-G	I-5-G	J-1-G	J-2-G	K-1-G
Arsenic	8,480	4,850	22,300	2,560	72,800	57,500	185,000	241,000	138,000	101,000	205,000	38,800
	K-2-G	K-3-G	K-4-G	K-5-G	K-6-G	L-1-G	L-2-G	O-1-G	O-2-G	P-1-G	P-2-G	R-1-G
Arsenic	31,500	14,600	46,600	2,010	55,100	132,000	80,600	254,000	41,400	4,870	5,330	1,350
	R-2-G	R-3-G	R-4-G	S-1-G	S-2-G	T-1-G	T-2-G	X-1-G	X-2-G	X-3-G	Z-1-G	Z-2-G
Arsenic	4,670	6,310	8,010	3,140	6,970	11,500	14,400	64,400	63,300	5,540	323,000	51,200
	Z-3-G	Z-4-G	Z-5-G	Z-6-G	CC-1-G	CC-2-G	DD-1-G	DD-2-G	WW-1-G	WW-2-G	WW-3-G	WW-4-G
Arsenic	22,300	6,120	6,570	3,700	9,690	8,050	24,300	59,600	3,450	6,230	4,180	4,040
	WW-5-G	WW-6-G	YY-1-G	YY-2-G	YY-3-G	YY-4-G	YY-5-G	YY-6-G	YY-7-G	ZZ-1-G	ZZ-2-G	ZZ-3-G
Arsenic	7,800	6,540	4,660	3,310	5,300	6,500	7,770	2,640	ND	11,900	18,100	4,740
	ZZ-4-G	ZZ-5-G	ZZ-6-G	ZZ-7-G	2-C-C	2-1-G	2-2-G	3-C-G	3-1-G	3-2-G	7-C-G	
Arsenic	7,740	7,420	5,610	2,880	1,410	3,130	7,290	2,110	7,380	7,920	68,200	

NOTES:

⁽¹⁾ Sample ID = Location-Type-Analyte List

Location:

Alphabetic = Soil, sludge or sediment

Numeric = Concrete, asphalt or soil

Type:

c = concrete or asphalt 3 = 24 to 48 inches 6 = 96 to 120 inches
1 = 0 to 12 inches soil 4 = 48 to 72 inches 7 = 120 to 144 inches
2 = 12 to 24 inches soil 5 = 72 to 96 inches W = groundwater

Analyte List:

D = TCC, TAL, atrazine, cyanazine, dinoseb, dioxin

G = Arsenic

MDEQ Tier 1 TRG Table = 426

TABLE 9-6

ARSENIC CONCENTRATION IN GROUNDWATER $\mu\text{g/l}$ (ppb)

	G-W-G	D-W-G	I-W-G	K-W-G	R-W-G	X-W-G	Z-W-G	MDEQ Tier 1 TRG Table $\mu\text{g/l}$ (ppb)
Arsenic	14,300	253	288,000	297	5,260	730	1,720	50
	DD-W-G	V-V-G	WW-W-G	YY-W-G	ZZ-W-G	7-W-G		MDEQ Tier 1 TRG Table $\mu\text{g/l}$ (ppb)
Arsenic	1,260	14	56	26	216	51,000		50

NOTES:

⁽¹⁾ Sample ID = Location-Type-Analyte List

Location:

Alphabetic = Soil, sludge or sediment
 Numeric = Concrete, asphalt or soil

Type:

c = concrete or asphalt 3 = 24 to 48 inches 6 = 96 to 120 inches
 1 = 0 to 12 inches soil 4 = 48 to 72 inches 7 = 120 to 144 inches
 2 = 12 to 24 inches soil 5 = 72 to 96 inches W = groundwater

Analyte List:

D = TCC, TAL, atrazine, cyanazine, dinoseb, dioxin
 G = Arsenic

SECTION NINE

SWMU 11 – Former MSMA Production Area
SWMU 12 – Former MSMA Salt Unloading Area
SWMU 15 – Former Methyl Parathion Production Area

TABLE 9-7**DIOXIN CONCENTRATIONS IN SOLIDS ON BOTTOM OF SUMP E (ug/kg)**

Compound	TEF**	Concentration	PCDD/PCDF Toxicity
Mono-, Di, and Tri-CDDs	0	0	0
2,3,7,8-TCDDs	1	0.0009	0.0009
Other TCDDs	0	0.0139	0
2,3,7,8-PeCDD	0.5	0	0
Other PeCDDs	0	0.0061	0
2,3,7,8-HxCDD	0.1	0	0
Other HxCDDs	0	0.0527	0
2,3,7,8-HpCDDs	0.01	0	0
Other HpCDDs	0	0.189	0
OCDD	0.001	0.129	0.000129
Mono-, Di-, and Tri-CDFs	0	0	0
2,3,7,8-TCDFs	1	0.0653	0.0653
Other TCDFs	0	0.0857	0
2,3,7,8-PeCDF	0.5	0	0
Other PeCDFs	0	0.0061	0
2,3,7,8-HxCDF	0.1	0	0
Other HxCDFs	0	190	0
2,3,7,8-HpCDFs	0.01	0	0
Other HpCDFs	0	0.00393	0
OCDF	0.001	0	0
Total PCDD/PCOF Toxicity***			0.066

NOTES:

** Toxicity Equivalency Factors related to 2,3,7,8-Tetrachlorodibenzodioxin

*** MDEQ Tier 1 TRG Table Unrestricted 0.00426 ppb

MDEQ Tier 1 TRG Table Restricted 0.0382 ppb

SECTION NINE

SWMU 11 – Former MSMA Production Area SWMU 12 – Former MSMA Salt Unloading Area SWMU 15 – Former Methyl Parathion Production Area

TABLE 9-8

SUMMARY OF GROUNDWATER DATA OBTAINED
FROM WELLS MW-17A, MW-17B, MW-18A AND MW-18B

Compound	MW-17A	MW-17B	MW-18A	MW-18B	MDEQ Tier 1 TRG Table µg/L (ppb)
Arsenic	ND	8	319	194	50
Atrazine	ND	ND	ND	ND	3
Cyanazine	ND	ND	ND	ND	0.0797
Dinoseb	ND	ND	1.3	132	7
Toxaphene	ND	ND	ND	ND	3
Volatile Organics Compound					
Chloromethane	ND	ND	ND	ND	1.49
Bromomethane	ND	ND	ND	ND	8.52
Vinyl Chloride	ND	ND	ND	ND	2.0
Chloroethane	ND	ND	ND	ND	3.64
Methylene Chloride	ND	ND	ND	ND	5.0
Acetone	ND	ND	ND	ND	3,650
Carbon Disulfide	ND	ND	ND	ND	1,040
1,1-Dichloroethene	ND	ND	ND	ND	7.0
1,1-Dichloroethane	ND	ND	ND	ND	798
1,2-Dichloroethene (total)	ND	ND	ND	ND	70
Chloroform	ND	1.43	ND	ND	0.152
2-Butanone	ND	ND	ND	ND	1,910
1,2-Dichloroethane	ND	ND	ND	ND	5.0
1,1,1-Trichloroethane	ND	ND	ND	ND	200
Carbon Tetrachloride	7.25	2.59	ND	ND	5.0
Bromodichloroemthane	ND	ND	ND	ND	1.08
1,2-Dichloropropane	ND	ND	ND	ND	5.0
c-1,3-Dichloropropene	ND	ND	ND	ND	0.765
Trichloroethene	ND	ND	ND	ND	5.0
Benzene	ND	ND	ND	ND	5.0
Dibromochloromethane	ND	ND	ND	ND	5.0
t-1,3-Dichloropropene	ND	ND	ND	ND	0.0765
1,1,2-Trichloroethane	ND	ND	ND	ND	5.0
Bromoform	ND	ND	ND	ND	2.33
4-Methyl-2-pentanone	ND	ND	ND	ND	2,920
Tetrachloroethene	ND	ND	ND	ND	5.0
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	0.0527
2-Hexanone	ND	ND	ND	ND	1,460
Toluene	ND	ND	ND	2.38	1,000
Chlorobenzene	ND	ND	ND	ND	100
Ethylbenzene	ND	ND	ND	296	700
Styrene	ND	ND	ND	ND	100
Xylenes (total)	ND	ND	6.52	948	10,000

SECTION NINE

SWMU 11 – Former MSMA Production Area SWMU 12 – Former MSMA Salt Unloading Area SWMU 15 – Former Methyl Parathion Production Area

TABLE 9-8

SUMMARY OF GROUNDWATER DATA OBTAINED
FROM WELLS MW-17A, MW-17B, MW-18A AND MW-18B

Compound	MW-17A	MW-17B	MW-18A	MW-18B	MDEQ Tier 1 TRG Table $\mu\text{g/L}$ (ppb)
Atrazine	ND	8	319	194	50
Cyanazine	ND	ND	ND	ND	3
Dinoseb	ND	ND	ND	ND	0.0797
Toxaphene	ND	ND	1.3	132	7
Arsenic	ND	ND	ND	ND	3
Volatile Organics Compound					
Chloromethane	ND	ND	ND	ND	1.49
Bromomethane	ND	ND	ND	ND	8.52
Vinyl Chloride	ND	ND	ND	ND	2.0
Chloroethane	ND	ND	ND	ND	3.64
Methylene Chloride	ND	ND	ND	ND	5.0
Acetone	ND	ND	ND	ND	3,650
Carbon Disulfide	ND	ND	ND	ND	1,040
1,1-Dichloroethene	ND	ND	ND	ND	7.0
1,1-Dichloroethane	ND	ND	ND	ND	798
1,2-Dichloroethene (total)	ND	ND	ND	ND	70
Chloroform	ND	1.43	ND	ND	0.152
2-Butanone	ND	ND	ND	ND	1,910
1,2-Dichloroethane	ND	ND	ND	ND	5.0
1,1,1-Trichloroethane	ND	ND	ND	ND	200
Carbon Tetrachloride	7.25	2.59	ND	ND	5.0
Bromodichloroethane	ND	ND	ND	ND	1.08
1,2-Dichloropropane	ND	ND	ND	ND	5.0
c-1,3-Dichloropropene	ND	ND	ND	ND	0.765
Trichloroethene	ND	ND	ND	ND	5.0
Benzene	ND	ND	ND	ND	5.0
Dibromochloromethane	ND	ND	ND	ND	5.0
t-1,3-Dichloropropene	ND	ND	ND	ND	0.0765
1,1,2-Trichloroethane	ND	ND	ND	ND	5.0
Bromoform	ND	ND	ND	ND	2.33
4-Methyl-2-pentanone	ND	ND	ND	ND	2,920
Tetrachloroethene	ND	ND	ND	ND	5.0
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	0.0527
2-Hexanone	ND	ND	ND	ND	1,460
Toluene	ND	ND	ND	2.38	1,000
Chlorobenzene	ND	ND	ND	ND	100
Ethylbenzene	ND	ND	ND	296	700
Styrene	ND	ND	ND	ND	100
Xylenes (total)	ND	ND	6.52	948	10,000

SECTION NINE

SWMU 11 – Former MSMA Production Area

SWMU 12 – Former MSMA Salt Unloading Area

SWMU 15 – Former Methyl Parathion Production Area

9.4 CONCLUSIONS

The recheck on sump EE showed that sump must be cleaned out. The contents must be shipped to a permitted dioxin incinerator.

Wells MW-17A, MW-17B, MW-18A and MW-18B monitor groundwater from SWMUs 11, 12 and 15, and have helped define the extent of the arsenic groundwater plume. The plume is depicted on Figure 18-1.

Consideration should be given to corrective action for SWMUs 11, 12 and 15. There have been several studies on phytoremediation of arsenic using ferns that must be carefully considered.

10.1 DESCRIPTION

There is one major Drainage Ditch which runs along the western border of the South Plant and empties into Hennessey's Bayou. No contaminated Drainage System (SWMU 5) water or NPDES permitted discharge is received by the major Drainage Ditch. However, some storm water runoff has discharged into the major Drainage Ditch from the South Plant. Additionally, drainage from a portion of SWMU 34 – The Junkyard discharges into the drainage ditch.

10.2 RFI STRATEGY AND TECHNICAL APPROACH

The investigation of the major South Plant Drainage Ditch involved discrete sediment sampling and analysis. Sediment samples were taken in October 2000 from 6 to 12 inches in depth at roughly 200-foot intervals along the bottom of the drainage ditch. Samples were taken from nine accessible locations from SWMU 34 (Junkyard) to the vicinity of the railroad track. Samples were analyzed for atrazine, cyanazine, arsenic, dinoseb and toxaphene. The sample points are depicted on Figure 1 as locations 13-1 through 13-9.

The results of analysis indicated contamination of soil by toxaphene in the South Plant Drainage Ditch. The concentration of toxaphene increases as the drainage ditch approaches the SWMU 34 – Surplus Equipment Yard. Further investigation of the source was pursued in May 2001. The drainage ditch is generally inaccessible by geoprobe; however, the geoprobe can gain access near to location 13-9, which is nearest SWMU 34 and highest in toxaphene concentration. The edge of SWMU 34 adjacent to location 13-9 was chosen as the site of one soil boring. Three soil samples and one groundwater sample were obtained at location 13-10 and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles. In addition, four surface samples of soil were obtained at a depth of 6 to 12 inches in the area surrounding location 13-9. The samples were analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles. The sample locations are identified as 13-12, 13-13, 13-14, and 13-15 on Figure 1.

10.3 RESULTS OF SAMPLING AND ANALYSIS

The results of the October 2000 effort are tabulated below in Table 10-1. The results of the May 2001 effort are tabulation in Table 10-2 and Table 10-3.

TABLE 10-1

SWMU 13 – SOUTH PLANT DRAINAGE DITCH – ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE AND ARSENIC IN SOIL

Organics Component	Sample Results (ppb)									MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
	13-1	13-2	13-3	13-4	13-5	13-6	13-7	13-8	13-9		
Atrazine	ND	ND	ND	ND	ND	ND	ND	ND	52	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	760	6,810
Dinoseb	ND	7	7	9	8	ND	16	20	11	78,200	204,000
Toxaphene	ND	ND	ND	44	75	84	179	131	564	581	5,200
Arsenic	3,300	3,700	2,900	2,700	3,300	2,500	3,200	8,800	8,800	426	3,820

TABLE 10-2

SWMU 13 – SOUTH PLANT DRAINAGE DITCH – RESULTS FROM SOIL SAMPLES MAY 2001

Compound	Sample Results							MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/kg (ppb)
	13-10A	13-10B	13-10C	13-12	13-13	13-14	13-15		
Atrazine	ND	ND	ND	ND	ND	ND	ND	2,880	25,800
Cyanazine	ND	ND	ND	ND	25	ND	ND	760	6,810
Dinoseb	ND	ND	ND	36	ND	53	ND	78,200	204,000
Toxaphene	1,358	ND	ND	351	164	746	364	581	5,200
Arsenic	3,600	2,100	ND	4,400	2,900	3,500	1,100	426	3,820
Volatile Organics Component									
Chloromethane	ND	ND	ND	ND	ND	ND	ND	49,100	
Bromomethane	ND	ND	ND	ND	ND	ND	ND	2,970	
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	33	
Chloroethane	ND	ND	ND	ND	ND	ND	ND	220,000	
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	14,300	
Acetone	ND	ND	ND	ND	ND	ND	ND	7,820,000	
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	7,970	
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	77.2	
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	116,000	
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	ND	782,000	
Chloroform	ND	19.5	7.22	14.6	33.8	12	25	312	
2-Butanone	ND	ND	ND	ND	ND	ND	ND	129,000	
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	406	
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	1,190,000	
Carbon Tetrachloride	ND	5.94	6.4	7.12	66.1	16.8	28.6	371	
Bromodichloroethane	ND	ND	ND	ND	ND	ND	ND	10,300	
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	445	
c-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	134	
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	7,600	
Benzene	ND	ND	ND	ND	ND	ND	ND	887	
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	7,600	
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	134	
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	1,090	
Bromoform	ND	ND	ND	ND	ND	ND	ND	58,800	
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	6,260,000	
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	11,900	
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	656	
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	3,130,000	
Toluene	ND	ND	ND	ND	ND	ND	ND	38,000	
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	1,190	
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	395,000	
Styrene	ND	ND	ND	ND	ND	ND	ND	384,000	
Xylenes (total)	ND	ND	ND	ND	ND	ND	ND	318,000	

TABLE 10-3

SUMMARY OF GROUNDWATER DATA OBTAINED FROM TEMPORARY
WELLS 13-10 IN PHASE II AT SWMU 13 – DRAINAGE DITCH

Compound	13-10-W	MDEQ Tier 1 TRG Table µg/L (ppb)
Arsenic	ND	50
Atrazine	ND	3
Cyanazine	ND	0.0797
Dinoseb	4	7
Toxaphene	ND	3
Volatile Organics Component		
Chloromethane	ND	1.49
Bromomethane	ND	8.52
Vinyl Chloride	ND	2.0
Chloroethane	ND	3.64
Methylene Chloride	ND	5.0
Acetone	ND	3,650
Carbon Disulfide	ND	1,040
1,1-Dichloroethene	ND	7.0
1,1-Dichloroethane	ND	798
1,2-Dichloroethene (total)	ND	70
Chloroform	ND	0.152
2-Butanone	ND	1,910
1,2-Dichloroethane	ND	5.0
1,1,1-Trichloroethane	ND	200
Carbon Tetrachloride	ND	5.00
Bromodichloromethane	ND	1.08
1,2-Dichloropropane	ND	5.0
c-1,3-Dichloropropene	ND	0.765
Trichloroethene	ND	5.0
Benzene	ND	5.0
Dibromochloroemethane	ND	5.0
t-1,3-Dichloropropene	ND	0.0765
1,1,2-Trichloroethane	ND	5.0
Bromoform	ND	2.33
4-Methyl-2-pentanone	ND	2,920
Tetrachlorethene	ND	5.0
1,1,2,2-Tetrachloroethane	ND	0.0527
2-Hexanone	ND	1,460
Toluene	ND	1,000
Chlorobenzene	ND	100
Ethylbenzene	ND	700
Styrene	ND	100
Xylenes (total)	ND	10,000

10.4 CONCLUSIONS

The results of analysis indicate that there is trace contamination of soil by toxaphene in the South Plant Drainage Ditch. The concentration of toxaphene increases as the drainage ditch approaches the SWMU 34-Surplus Equipment Junkyard. The area is well characterized and needs to continue being regarded as a restricted area.

11.1 DESCRIPTION

The Former Toxaphene Production Area is adjacent to SWMU 7 - The Dinoseb Production Area and is surrounded by SWMU 20 – The Railroad Area.

Raw material used in the toxaphene manufacturing process included sodium hydroxide, xylene, epichlorohydrin, chlorine, carbon tetrachloride, and camphene. Caustic scrubber water from the toxaphene operation was discharged to the sump adjacent to the Former Dinoseb Processing.

The processing equipment from the Toxaphene plant has all been removed. The foundations and secondary containment concrete structure were in good repair and were not demolished. The foundation presently serves as a repository for soil excavated from various parts of the South Plant during construction activity. The soil is to be treated by a biological degradation composting process.

11.2 RFI STRATEGY AND TECHNICAL APPROACH

Five sample locations were chosen directly adjacent to the concrete foundation. A geoprobe was used to obtain soil samples in October 2000 to a depth of 12 feet. Samples for analysis were obtained at 2 to 4 feet, 6 to 8 feet and 10 to 12 feet.

Based on the toxaphene contamination found near the SWMU 14 area, additional samples were obtained in May 2001. SWMU 4 (Activated Carbon Unit), SWMU 7 (Former Dinoseb Manufacturing Area), SWMU 14 (Former Toxaphene Manufacturing Area, and SWMU 20 (Railroad Area) are in close proximity to one another. It is difficult to ascertain with certainty which SWMU is the source of contamination. Therefore, the Phase II investigation was carried forward in the SWMUs (4, 7, 14 and 20) area as one area-wide investigation. A discussion of that investigation is found in Section 13 – SWMU 20 Railroad Area.

11.3 RESULTS OF SAMPLING AND ANALYSIS

Soil was sampled for atrazine, cyanazine, dinoseb, toxaphene, arsenic and toluene in October 2000. Results are tabulated in the following table, Table 11-1. Sample locations are noted on Figures 1 and 2. The phase II results of sampling in May 2001 are tabulated and discussed in Section 13.

TABLE 11-1

SWMU 14 – TOXAPHENE PRODUCTION AREA – ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE, ARSENIC, AND TOLUENE IN SOIL

Organics Component	Sample Results (ppb)																MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)	
	14-1A	14-1B	14-1C	14-1D	14-2A	14-2B	14-2C	14-3A	14-3B	14-3C	14-4A	14-4B	14-4C	14-5A	14-5B	14-5C			14-5D
Atrazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	760	6,810
Dinoseb	ND	ND	ND	ND	ND	ND	ND	14,156	ND	78,200	204,000								
Toxaphene	ND	ND	ND	ND	57	ND	ND	108	ND	581	5,200								
Arsenic	1,200	1,200	ND	ND	ND	ND	ND	ND	1,900	ND	426	7,820							
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	38,000	38,000

12.1 DESCRIPTION

The Former Blue Tank (SWMU 18) received unneutralized dinoseb process wastewater prior to off-site disposal by deep well injection. The unit was located northwest of the Former Dinoseb Production Area (SWMU 7) and adjacent to the Nitric Acid Production Area in the South Plant. A gravel covered area exists at the location of the Former Blue Tank (SWMU 18). The original 16,000-gallon tank was fiberglass. The fiberglass tank leaked. Two repair attempts failed in 1983 causing the fiberglass tank to be replaced by a stainless steel tank at the dinoseb plant. The fiberglass tank was demolished and removed from the site.

12.2 RFI STRATEGY AND TECHNICAL APPROACH

Five soil surface samples were obtained in October 2000 in the immediate location of the Former Blue Tank (SWMU 18) and the ditch leading to a water drainage system sump. The samples were taken from 6 to 12 inches in depth. The samples were analyzed for atrazine, cyanazine, arsenic, dinoseb and toxaphene. The sample locations are depicted on Figure 1 as 18-1 through 18-5.

12.3 RESULTS OF SAMPLING AND ANALYSIS

The results are tabulated below in Table 12-1.

TABLE 12-1							
SWMU 18 – BLUE TANK AREA – ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE AND ARSENIC IN SOIL							
Organics Component	Sample Results (ppb)					MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/kg (ppb)
	18-1	18-2	18-3	18-4	18-5		
Atrazine	ND	ND	ND	ND	ND	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	760	6,810
Dinoseb	3,111	1,085	360	9	4	78,200	204,000
Toxaphene	133	168	524	153	84	581	5,200
Arsenic	17,500	4,500	12,800	ND	2,400	426	3,820

12.4 CONCLUSIONS

The evidence of the failed tank is present in the trace dinoseb concentrations at location 18-1 and 18-2. The source of the trace toxaphene contamination at all the locations is unknown. The concentrations of toxaphene and dinoseb are less than the listed value in the MDEQ Tier 1 TRG Table.

No additional was recommended for Phase II. The area is well characterized.

13.1 DESCRIPTION

The Railroad Area (SWMU 20) including the Railroad Car Loading/Unloading Station is located at the eastern boundary of the manufacturing portion of the South Plant. The railcar station was the primary area for the loading/unloading of materials for the various operations conducted at the South Plant. The area spans several hundred feet along the multiple-lane railyard. The ground in the surrounding area has received spillage from the loading/unloading operations. In addition to railyard operations, the flare for the dinoseb production area nitration reactor was located directly across the tracks from the railyard. Incomplete flaring discharged constituents onto the ground in the area surround the flare. The flare area is indistinguishable from the Railroad Area (SWMU 20).

SWMU 20 also surrounds SWMU 7 – The Former Dinoseb Production Area and SWMU 14 – The Former Toxaphene Production Area. SWMU 4 – The Activated Carbon Unit is on the eastern edge of SWMU 20.

13.2 RFI STRATEGY AND TECHNICAL APPROACH

SWMU 20 is a large corridor potentially impacted by activities related to SWMUs 4, 7 and 14 as well as the transportation, loading and unloading activity of train traffic. In order to characterize the area, two parallel lines of samples were obtained on the west and east sides of SWMUs 7 and 14. The western line begins 400 feet south of the southern most manufacturing/warehousing facility and extends to the north edge of the northern most manufacturing facility in the north plant. Sample locations are spaced at 200 feet. The eastern line begins at SWMU 4 – The Activated Carbon Treatment Unit and extends to the MW-1A location.

A total of 16 borings were obtained in the Phase I sampling. Sample locations are depicted on Figure 1 as 20-1 through 20-16. Samples were taken at 2 to 4 feet and at 6 to 8 feet. Samples were analyzed for atrazine, cyanazine, dinoseb, toxaphene, and arsenic.

After completion of the Phase I sampling and analysis there was a concern that the immediate surface of the soil was not adequately characterized and concern that three soil piles were left out of the original sampling program. A special sampling program called Phase I Jr. was devised and implemented.

The Phase I Jr. program consisted of the preparation of composite samples from the surface and from the soil piles and analysis of the samples for dinoseb and toxaphene. The surface sampling grids are depicted on Figure 3 and 4. The soil piles are also depicted on the figures. One soil pile, approximately 160 feet in length, is directly atop the areas noted as SWMU 7 and SWMU 14 on Figure 3; it extends from sample location 14-1 to sample location 7.2. Another soil pile extends approximately 65 feet eastward, parallel to the railroad track, starting at sample location 7-1. A third soil pile can be located with reference to Figure 4; it is located adjacent to SWMU 13 beginning midway between sample location 13-5 and 13-6 and extending 500 feet to sample location 13-3.

The surface sampling and soil pile sampling protocols are described in the following two paragraphs:

Surface Sampling

Sampling at railroad area near former dinoseb and toxaphene manufacturing area (see Figure 3) and area south of atrazine warehouse (see Figure 4).

- Locate and place a stake at the center point of each 100-foot by 100-foot section.
- Obtain two to eight grab samples at the surface in each quartile of the section. Grab sample locations were biased toward selection of discolored soil. Approximately the same volume of soil should be obtained in each quartile, placed atop one spot within the 100-foot by 100-foot section and mixed thoroughly with the sampling tool.
- Remove rocks and any foreign objects.
- Mix contents again.
- Fill a sample bottle from soil in the pile. Label the bottle.

Soil Pile Sampling

Sampling soil pile at railroad area atop the former dinoseb and toxaphene manufacturing areas and soil pile south of atrazine warehouse.

- Partition, by placing of stakes, the two soil piles in the railroad area into 40-foot segments lengthwise. Similarly, partition the soil pile south of the atrazine warehouse into 60-foot sections.
- In each segment obtain approximately eight grab samples. The same approximate volume of soil should be obtained in each sample, placed in a five-gallon bucket, and stirred thoroughly.
- Remove rocks and any foreign objects.
- Stir contents again.
- Fill a sample bottle from soil in the bucket. Label the bottle.
- Empty the bucket onto the ground.
- Decontaminate the bucket by removing visible traces of soil then rinsing the bucket with water.

The SWMUs 4, 7, 14 and 20 were merged for purposes of one campaign for Phase II. The following are discussions of the Phase II program as implemented.

- One boring to groundwater was advanced downgradient of location 4-1. The location is noted as 20-18 on Figure 1. Also one boring to groundwater was advanced downgradient of location 20-13. The location is noted as 20-19 on Figure 1. Locations 20-18 and 20-19 are accessible only from the main line railroad track. Three soil samples and one groundwater sample were obtained from each boring and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles.
- The immediate surface soil (0-6 inches) does require further assessment or corrective action. From the Phase I sampling it was concluded that soil deeper than two feet does not require corrective action. The Phase II sampling effort included sampling of groundwater in the most contaminated surface areas as noted below.
- Three borings to groundwater were placed at locations 20-20, 20-21 and 20-22 as depicted on Figure 3. Three soil samples and one groundwater sample were obtained per boring and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles. Additionally, the horizontal extent of the surface

sampling grids was expanded. Seven additional surface composite sample areas were added as 20-P through 20-U on Figure 3.

- In order to investigate the railroad area south of the atrazine warehouse, two borings to groundwater were placed at locations 20-23 and 20-24 as depicted on Figure 4. Three soil samples and one groundwater sample were obtained per boring and were analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles. Additionally, the horizontal extent of the surface sampling grids were expanded. Three additional surface composite sample areas were added as 20-V through 20-X on Figure 4.
- Shallow wells MW-12C and MW-10C were installed to more adequately monitor potential groundwater contamination from SWMUs 14 and 7. There are now nested pairs at monitor well locations 12 and 10. Groundwater samples were obtained and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles.

13.3 RESULTS OF SAMPLING AND ANALYSIS

Results of Phase I sampling are tabulated in Table 13-1 and results of Phase I Jr. sampling are tabulated in Table 13-2. Results of Phase II sampling are presented in the following tables:

- Table 13-3 – Composite Surface Soil (0-6 inches) Samples
- Table 13-4 – Soil from Samples 20-18 through 20-24
- Table 13-5 – Groundwater from samples 20-18 through 20-24.

TABLE 13-1

SWMU 20 – RAILROAD AREA – ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE AND ARSENIC IN SOIL

Organics Compound	Sample Results																MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
	20-1A	20-1B	20-2A	20-2B	20-3A	20-3B	20-4A	20-4B	20-5A	20-5B	20-6A	20-6B	20-7A	20-7B	20-8A	20-8B		
Atrazine	ND	ND	ND	10	21	ND	ND	9	ND	2,880	25,800							
Cyanazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	ND	ND	ND	ND	760	6,810
Dinoseb	ND	ND	2	29	ND	ND	ND	ND	ND	ND	58	ND	ND	ND	4	ND	78,200	204,000
Toxaphene	ND	ND	ND	ND	247	ND	ND	ND	ND	ND	162	ND	263	42	ND	ND	581	5,200
Arsenic	ND	ND	1,400	ND	2,300	ND	5,100	3,400	2,700	3,600	ND	2,000	2,100	ND	ND	ND	426	3,820
	20-9A	20-9B	20-10A	20-10B	20-11A	20-11B	20-12A	20-12B	20-13A	20-13B	20-14A	20-14B	20-15A	20-15B	20-16A	20-16B		
Atrazine	ND	ND	ND	ND	43	7	41	90	ND	107	ND	ND	ND	ND	3	10	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	760	6,810
Dinoseb	25	4	76	10	7	ND	ND	205	246	1,468	22	12	10	ND	ND	ND	78,200	204,000
Toxaphene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	57	ND	ND	ND	581	5,200
Arsenic	10,900	ND	800	ND	3,300	1,800	3,400	4,600	426	3,820								

TABLE 13-2

SWMU 20 – RAILROAD AREA – COMPOSITE SURFACE SAMPLES

Organic Compound	Sample Results															MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
	20-A	20-B	20-C	20-D	20-E	20-F	20-G	20-H	20-I	20-J	20-K	20-L	20-M	20-N	20-O		
Dinoseb	25,956	7,016	355,541	988	145	1,078,068	683	110,881	122	1,100	54,767	46.8	31.4	48.6	612	78,200	204,000
Toxaphene	8,240	18,989	8,401	14,200	2,102	10,318	22,981	19,052	110,964	41,652	6,098	2,643	3,149	9,263	6,727	581	5,200

TABLE 13-2

SWMU 20 – RAILROAD AREA – COMPOSITE SOIL PILE SAMPLES

Organic Compound	Sample Results													MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
	20-AA	20-BB	20-CC	20-DD	20-EE	20-FF	20-GG	20-HH	20-II	20-JJ	20-K	20-LL	20-MM		
Dinoseb	8.75	ND	ND	49	475	130,675	115	69.1	110	172	10.7	1,037	752	78,200	204,000
Toxaphene	3,796	37,036	6,852	14,691	16,815	76,683	2,697	606	17,413	4,568	449	14,673	11.152	581	5,200

TABLE 13-3

SWMU 20 – RAILROAD AREA – ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE, ARSENIC AND VOAS IN COMPOSITE SURFACE SOIL SAMPLES

Compound	Sample Results									MDEQ Tier 1 TRG Table Unrestricted $\mu\text{g}/\text{kg}$ (ppb)	MDEQ Tier 1 TRG Table Restricted $\mu\text{g}/\text{kg}$ (ppb)
	20-P	20-Q	20-R	20-S	20-T	20-U	20-V	20-W	20-X		
Atrazine	ND	ND	ND	ND	204	185	ND	ND	ND	2,880	25,800
Arsenic	2,300	2,100	3,800	2,000	12,100	ND	2,100	1,320	3,400	760	6,810
Cyanazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	78,200	204,000
Dinoseb	ND	29	ND	ND	ND	220	97	ND	21	581	5,200
Toxaphene	565	357	532	621	7,617	3,194	2,947	1,007	1,745	426	3,820
Volatile Organics Component											
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	49,100	
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,970	
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	33	
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	220,000	
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	14,300	
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,820,000	
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,970	
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	77.2	
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	116,000	
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	782,000	
Chloroform	ND	ND	ND	ND	ND	ND	ND	247	ND	312	
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	129,000	
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	406	
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,190,000	
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	7.47	10.2	371	
Bromodichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,300	
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	445	
c-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	134	
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,600	
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	887	
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,600	
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	134	
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,090	
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	58,800	
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	6,260,000	
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	11,900	
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	656	
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,130,000	
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	38,000	
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,190	
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	395,000	
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	384,000	
Xylenes (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	318,000	

TABLE 13-4

SWMU 20 - RAILROAD AREA - ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE, ARSENIC AND VOAS IN SOIL BORINGS

Compound	Sample Results															MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/kg (ppb)
	20-18A	20-18B	20-18C	20-19A	20-19B	20-19C	20-20A	20-20B	20-20C	20-21A	20-21B	20-21C	20-22A	20-22B	20-22C		
Atrazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,880	25,800
Arsenic	2,400	ND	ND	4,100	ND	700	9,400	ND	3,400	2,100	ND	ND	1,900	ND	ND	760	6,810
Cyanazine	10.7	ND	78,200	204,000													
Dinoseb	ND	ND	ND	50	ND	ND	ND	ND	490	300	ND	ND	ND	ND	ND	581	5,200
Toxaphene	228	ND	ND	854	ND	ND	710	ND	ND	4,412	ND	ND	567	285	ND	426	3,820
Volatile Organics Compound 228																	
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	49,100	
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,970	
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	33	
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	220,000	
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14,300	
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,820,000	
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,970	
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	77.2	
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	116,000	
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	23.4	ND	ND	ND	782,000	
Chloroform	ND	ND	ND	8.99	7.69	6.75	9.37	ND	10.2	17.4	14.9	2,186	22.5	32.3	27.8	312	
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	129,000	
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	52.7	ND	ND	ND	406	
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,190,000	
Carbon Tetrachloride	ND	ND	ND	ND	ND	7.34	18.4	ND	8.15	6.39	ND	165	12.8	20.6	ND	371	
Bromodichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	165	12.8	20.6	ND	10,300	
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	51.7	ND	ND	ND	445	
c-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	134	
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.0	ND	ND	ND	7,600	
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	887	
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,600	
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	134	
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	47.7	ND	ND	ND	1,090	
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	58,800	
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6,260,000	
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	19.8	ND	ND	9.7	ND	ND	11,900	
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	656	
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,130,000	
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	38,000	
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,190	
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	395,000	
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	384,000	
Xylenes (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.3	24.7	ND	ND	ND	318,000	

TABLE 13-4 (Continued)

SWMU 20 – RAILROAD AREA – ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE, ARSENIC AND VOAS IN SOIL BORINGS

Compound	Sample Results						MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/kg (ppb)
	20-23A	20-23B	20-23C	20-24A	20-24B	20-24C		
Atrazine	ND	ND	ND	ND	ND	ND	2,880	25,800
Arsenic	3,000	1,330	2,160	3,050	2,400	ND	760	6,810
Cyanazine	ND	ND	ND	ND	259	83	78,200	204,000
Dinoseb	19	ND	ND	61	24	25	581	5,200
Toxaphene	835	1,159	ND	1,270	ND	ND	426	3,820
Volatile Organics Component								
Chloromethane	ND	ND	ND	ND	ND	ND	49,100	
Bromomethane	ND	ND	ND	ND	ND	ND	2,970	
Vinyl Chloride	ND	ND	ND	ND	ND	ND	33	
Chloroethane	ND	ND	ND	ND	ND	ND	220,000	
Methylene Chloride	ND	ND	ND	ND	ND	ND	14,300	
Acetone	ND	ND	ND	ND	ND	ND	7,820,000	
Carbon Disulfide	ND	ND	ND	ND	ND	ND	7,970	
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	77.2	
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	116,000	
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	782,000	
Chloroform	ND	ND	ND	ND	ND	ND	312	
2-Butanone	ND	ND	ND	ND	ND	ND	129,000	
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	406	
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	1,190,000	
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	371	
Bromodichloroemthane	ND	ND	ND	ND	ND	ND	10,300	
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	445	
c-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	134	
Trichloroethene	ND	ND	ND	ND	ND	ND	7,600	
Benzene	ND	ND	ND	ND	ND	ND	887	
Dibromochloromethane	ND	ND	ND	ND	ND	ND	7,600	
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	134	
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	1,090	
Bromoform	ND	ND	ND	ND	ND	ND	58,800	
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	6,260,000	
Tetrachloroethene	ND	ND	ND	ND	ND	ND	11,900	
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	656	
2-Hexanone	ND	ND	ND	ND	ND	ND	3,130,000	
Toluene	ND	ND	ND	ND	ND	ND	38,000	
Chlorobenzene	ND	ND	ND	ND	ND	ND	1,190	
Ethylbenzene	ND	ND	ND	ND	ND	ND	395,000	
Styrene	ND	ND	ND	ND	ND	ND	384,000	
Xylenes (total)	ND	ND	ND	ND	ND	ND	318,000	

TABLE 13-5

SUMMARY OF GROUNDWATER DATA OBTAINED FROM PERMANENT AND TEMPORARY WELLS IN PHASE II AT SWMU 20

Compound	Sample Results										MDEQ Tier 1 TRG Table µg/L (ppb)
	MW-12C	MW-10C	MW-1C	20-18-W	20-19-W	20-20-W	20-21-W	20-22-W	20-23-W	20-24-W	
Arsenic	9	ND	ND	7	ND	ND	ND	19	ND	ND	50
Atrazine	ND	ND	ND	65	ND	ND	140	146	30	ND	3
Cyanazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0797
Dinoseb	277	717	ND	ND	ND	18,821	ND	396	27	ND	7
Toxaphene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3
Volatile Organics Component											
Chloromethane	ND	ND	ND	ND	ND	3.36	126	ND	ND	ND	1.49
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.52
Vinyl Chloride	13.0	ND	ND	ND	ND	ND	5.46	46.5	ND	ND	2.0
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.64
Methylene Chloride	ND	ND	ND	ND	ND	ND	908	45.7	ND	ND	5.0
Acetone	ND	ND	ND	ND	ND	ND	126	ND	ND	ND	3,650
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,040
1,1-Dichloroethene	7.39	ND	ND	ND	ND	ND	54.6	3.33	ND	ND	7.0
1,1-Dichloroethane	3.91	ND	ND	ND	ND	ND	142	12.1	ND	ND	798
1,2-Dichloroethene (total)	88.3	ND	ND	ND	ND	ND	1,758	125	ND	ND	70
Chloroform	3,879	1,076	1.38	21.5	ND	10.2	37,380	5,120	ND	ND	0.152
2-Butanone	ND	ND	ND	ND	ND	5.14	ND	ND	ND	ND	1,910
1,2-Dichloroethane	113	ND	ND	ND	ND	ND	321	68.2	ND	ND	5.0
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200
Carbon Tetrachloride	23,350	1,486	ND	13.3	2.39	46.2	357,500	4,705	ND	ND	5.00
Bromodichloroethane	ND	ND	ND	ND	ND	ND	296	75.8	ND	ND	1.08
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	42.3	11.2	ND	ND	5.0
c-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.765
Trichloroethene	90.8	ND	10.8	ND	ND	ND	1,346	44.6	ND	ND	5.0
Benzene	13.9	ND	ND	9.58	7.21	ND	23.7	9.33	ND	ND	5.0
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0765
1,1,2-Trichloroethane	84.2	1.63	ND	ND	ND	ND	290	74.4	ND	ND	5.0
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.33
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	7.37	ND	ND	ND	ND	2,920
Tetrachloroethene	174	4.05	ND	ND	ND	ND	180	55.2	ND	ND	5.0
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0527
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,460
Toluene	ND	ND	ND	ND	ND	2.05	31.9	ND	ND	ND	1,000
Chlorobenzene	1.47	ND	ND	ND	ND	ND	3.2	1.39	ND	ND	100
Ethylbenzene	ND	ND	ND	ND	ND	1.4	87.4	1.58	ND	ND	700
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
Xylenes (total)	8.11	ND	ND	ND	1.15	10.7	490	1.60	ND	ND	10,000

13.4 CONCLUSIONS

The SWMUs 4, 7, 14 and 20 were merged for purposes of one campaign for Phase II. The following are discussions of conclusions and suggestions resulting from the Phase I program, the follow up Phase I Jr. program, and the Phase II program.

As a result of the Phase I investigation, it was concluded:

- SWMU 20 may be environmentally impacted by SWMUs 4, 7, and 14. At SWMU 4, six samples were obtained at 6 to 12 inches. At SWMU 7 and 14 samples were obtained at eight locations at depths of 2 to 4 feet, 6 to 8 feet, and 10 to 12 feet. No samples obtained at SWMUs 7 and 14 evidenced concentrations of contaminants above the values listed in the MDEQ Tier 1 TRG Table. Surface soil samples 4-1 and 4-5 on the perimeter of SWMU 4 were found to be contaminated with trace atrazine and dinoseb concentrations less than the number listed in the MDEQ Tier 1 TRG Table; however, sample 4-1 was close in toxaphene concentration to the MDEQ Tier 1 TRG Table listed concentration.
- Soil in the railroad area is slightly contaminated from location 20-2 to 20-16 along the railroad track to a depth of 4-8 feet; however concentrations are less than MDEQ Tier 1 TRG Table values.
- It was suggested that one boring to groundwater be advanced downgradient of location 4-1. The location is noted as 20-18 on Figure 1. It was additionally suggested that one boring to groundwater be advanced downgradient of location 20-13. The location is noted as 20-19 on Figure 1. Three soil samples and one groundwater sample were obtained from the boring and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles.

The results of the Phase I Jr. program lead to the following conclusions:

- The immediate surface soil (0-6 inches) and the soil piles are contaminated with toxaphene and dinoseb. A few results are less than the MDEQ Tier 1 TRG Table restricted values. In essence the concentrations below restricted to industrial workers and the contamination is contained on the site. Most of the

concentrations are greater than the restricted values and have to be considered for further assessment of risk or for corrective action.

- The soil piles are most likely from various near surface excavations related to demolition of former toxaphene and dinoseb manufacturing, storage and transportation facilities. There is about 3,000 cubic yards of soil in the soil piles.
- The immediate surface soil (0-6 inches) does require further assessment or corrective action. From the Phase I sampling it can be concluded that soil deeper than two feet does not require corrective action. The Phase II sampling effort included sampling of groundwater in the most contaminated areas as noted below. There is about 7,000 cubic yards of soil to consider.

The results of the Phase II program lead to the following conclusions:

- In order to further investigate the railroad area near the former toxaphene and dinoseb and manufacturing areas, three borings to groundwater were placed at locations 20-20, 20-21 and 20-22 as depicted on Figure 3. Also, borings at locations 2-18 and 2-19, previously discussed, were advanced. Three soil samples and one groundwater sample were obtained per boring and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles. Additionally, the horizontal extent of the surface sample grids were expanded. Seven additional surface composite sample areas have been added as 20-P through 20-U on Figure 3. The soil and borings and the composite samples obtained during the Phase II investigation did not exceed values noted in the MSDEQ Tier I TRG Table. Therefore, it can be concluded that previous (Phase I and Phase I Jr.) characterization of soil was adequate. The groundwater, however, is contaminated with chloroform, carbon tetrachloride and other NOAs as well as the pesticide dinoseb. It can be concluded that the soil has been leached of dinoseb and the chemicals remain in the groundwater. The pesticide toxaphene did not leach and has remained in the immediate surface (0-6 inches) and in the waste piles.
- In order to investigate the railroad area south of the atrazine warehouse, two borings to groundwater were placed at locations 20-23 and 20-24 as depicted

on Figure 4. Three soil samples and one groundwater sample were obtained per boring and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles. Additionally, the horizontal extent of the surface sampling grids needs to be expanded. Three additional surface composite sample areas have been added as 20-V through 20-X as depicted on Figure 4. The soil in the borings and the composite samples did not exceed values noted in the MSDEQ Tier I TRG Table. Therefore, it can be concluded that previous (Phase I and Phase I Jr.) characterization of soil was adequate. The groundwater in this area is not contaminated.

- Corrective action consideration must be given to the waste piles, immediate surface (0-6 inches) and groundwater underneath the former dinoseb and toxaphene manufacturing areas.

14.1 DESCRIPTION

This unlined pond also known as the North Pond was located on the North Plant site and was utilized for neutralization of acidic wastewater from the potassium nitrate production process. The neutralization of the water in the Neutralization Pond was achieved using limestone. The potassium nitrate production wastewater is no longer routed through the equalization and neutralization ponds. The pond at the North Plant is inactive. The pH of the rainwater in the pond has been checked and found to be near neutral. URS conducted an RFI in the North Pond Area in November and December 1993.

14.2 RFI STRATEGY AND TECHNICAL APPROACH

The following were objectives of the November 1993 investigation:

- Sample and analyze the sludge within the pond for hazardous waste characteristics.
- Sample the surrounding soil and groundwater for TCL and TAL compounds.

14.3 RESULTS OF SAMPLING AND ANALYSIS

The sludge was determined to be not hazardous.

Compound	Concentration Found (ppb)	TCLP Regulatory Trigger (ppb)
Chloroform	440	6,000
Carbon Tetrachloride	29	550

The constituents in soil and groundwater analysis are tabulated below in Table 14-2 and Table 14-3. Complete analyses are found in the "North Pond RCRA Facility Investigation Report", February 1994 on pages 14-16, Volume I. The analytical data sheets were attached as Volume II. The sample locations are depicted on Figure 1.

SECTIONFOURTEEN

SWMU 23 -- Equalization/Neutralization Pond (North Plant)

In May 2001 a nested pair of wells PZ 2CA and PZ 26B were installed to monitor the extent of a potential plume from SWMU 23. Results of groundwater analysis are tabulated on Tables 14-4. In addition, boring locations 22-1 and 22-2, although advanced to investigate SWMU 22, help identify any potential problems from SWMU 23. Results of analysis of groundwater from locations 22-1 and 22-2 are also found on Table 14-4. Analysis of soil borings from locations 22-1 and 22-2 are found on Table 14-5.

TABLE 14-2

SWMU 23 – NORTH POND – CONTAMINATION DETECTED IN SOIL

Organic Compound Detected	19-A	19-B	12-RA	12-RB	20-A	20-B	21-A	22-B	23-A	23-B	24-A	24-B	25-B	MDEQ Tier 1 TRG Table Unrestricted (ppb)	MDEQ Tier 1 TRG Table Restricted (ppb)
Chloroform	ND	ND	ND	ND	13	45	ND	830	26	ND	ND	ND	ND	312	478

TABLE 14-3

SWMU 23 – NORTH POND – CONTAMINATION DETECTED IN GROUNDWATER

Organic Compound Detected	19-A	19-B	12-RA	12-RB	20-A	20-B	21-A	22-A	22-B	23-A	23-B	24-A	25-B	MDEQ Tier 1 TRG Table (ppb)
Chloroform	ND	ND	ND	ND	ND	1,700	ND	44	1,600	ND	79	ND	ND	0.152
Carbon Tetrachloride	ND	ND	ND	ND	ND	4	ND	ND	ND	ND	ND	ND	ND	5.0
Bromodichloromethane	ND	ND	ND	ND	ND	36	ND	ND	66	ND	ND	ND	ND	1.08
Trichloroethene	ND	ND	ND	ND	ND	1	ND	ND	ND	ND	ND	ND	ND	5.0
Dibromochloromethane	ND	ND	ND	ND	ND	14	ND	ND	78	ND	ND	ND	ND	0.126
Bromoform	ND	ND	ND	ND	ND	1	ND	ND	160	ND	8	ND	ND	2.33
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	440	ND	ND	19,100

* B wells are the shallow wells.

SECTION FOURTEEN

SWMU 23 – Equalization/Neutralization Pond (North Plant)

TABLE 14-4

SUMMARY OF GROUNDWATER DATA OBTAINED FROM TEMPORARY WELLS 22-1 AND 22-2 AND MONITORING WELLS PZ-26A AND PZ-26B DURING THE PHASE II INVESTIGATION IN MAY 2001

Compound	Sample Results				MDEQ Tier 1 TRG Table µg/L (ppb)
	22-1-W	22-2-W	PZ-26A	PZ-26B	
Arsenic	ND	ND	6	8	5
Atrazine	ND	ND	ND	ND	3
Cyanazine	ND	ND	ND	ND	0.0797
Dinoseb	1.4	1.8	ND	ND	7
Toxaphene	ND	ND	ND	ND	3
Volatile Organics Component					
Choromethane	ND	ND	ND	ND	1.49
Bromomethane	ND	ND	ND	ND	8.52
Vinyl Chloride	ND	ND	ND	ND	2.0
Chloroethane	ND	ND	ND	ND	3.64
Methylene Chloride	ND	ND	ND	ND	5.0
Acetone	ND	ND	ND	ND	3,650
Carbon Disulfide	ND	ND	ND	ND	1,040
1,1-Dichloroethene	ND	ND	ND	ND	7.0
1,1-Dichloroethane	ND	ND	ND	ND	798
1,2-Dichloroethene (total)	ND	ND	ND	ND	70
Chloroform	6.78	D	ND	ND	0.152
2-Butanone	ND	ND	ND	ND	1,910
1,2-Dichloroethane	ND	ND	ND	ND	5.0
1,1,1-Trichloroethane	ND	ND	ND	ND	200
Carbon Tetrachloride	ND	ND	ND	ND	5.00
Bromodichloromethane	ND	ND	ND	ND	1.08
1,2-Dichloropropane	ND	ND	ND	ND	5.0
c-1,3-Dichloropropene	ND	ND	ND	ND	0.765
Trichloroethene	ND	ND	ND	ND	5.0
Benzene	1.08	ND	ND	ND	5.0
Dibromochloroemethane	ND	ND	ND	ND	5.0
t-1,3-Dichloropropene	ND	ND	ND	ND	0.0765
1,1,2-Trichloroethane	ND	ND	ND	ND	5.0
Bromoform	ND	ND	ND	ND	2.33
4-Methyl-2-pentanone	ND	ND	ND	ND	2,920
Tetrachlorethene	ND	ND	ND	ND	5.0
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	0.0527
2-Hexanone	ND	ND	ND	ND	1,460
Toluene	ND	ND	ND	ND	1,000
Chlorobenzene	ND	ND	ND	ND	100
Ethylbenzene	ND	ND	ND	ND	700
Styrene	ND	ND	ND	ND	100
Xylenes (total)	ND	ND	ND	ND	10,000

TABLE 14-5

SWMU 23 – NORTH POND – RESULTS FROM SOIL SAMPLES MAY 2001

Compound	Sample Results						MDEQ Tier 1	MDEQ Tier 1
	22-1A	22-1B	22-1C	22-2A	22-2B	22-2C	TRG Table Unrestricted µg/kg (ppb)	TRG Table Restricted µg/kg (ppb)
Atrazine	ND	ND	ND	ND	ND	ND	2,880	25,800
Cyanazine	ND	ND	51	ND	ND	22	760	6,810
Dinoseb	ND	ND	43	ND	ND	ND	78,200	204,000
Toxaphene	ND	ND	ND	ND	ND	240	581	5,200
Arsenic	ND	4,100	ND	700	9,400	ND	426	3,820
Volatiles Organic Component								
Chloromethane	ND	ND	ND	ND	ND	ND	49,100	
Bromomethane	ND	ND	ND	ND	ND	ND	2,970	
Vinyl Chloride	ND	ND	ND	ND	ND	ND	33	
Chloroethane	ND	ND	ND	ND	ND	ND	220,000	
Methylene Chloride	ND	ND	ND	ND	ND	ND	14,300	
Acetone	ND	ND	ND	ND	ND	ND	7,820,000	
Carbon Disulfide	ND	ND	ND	ND	ND	ND	7,970	
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	77.2	
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	116,000	
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	782,000	
Chloroform	ND	30.8	ND	ND	ND	ND	312	
2-Butanone	ND	ND	ND	ND	ND	ND	129,000	
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	406	
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	1,190,000	
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	371	
Bromodichloromethane	ND	ND	ND	ND	ND	ND	10,300	
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	445	
c-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	134	
Trichloroethene	ND	ND	ND	ND	ND	ND	7,600	
Benzene	ND	ND	ND	ND	ND	ND	887	
Dibromochloromethane	ND	ND	ND	ND	ND	ND	7,600	
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	134	
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	1,090	
Bromoform	ND	ND	ND	ND	ND	ND	58,800	
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	6,260,000	
Tetrachloroethene	ND	ND	ND	ND	ND	ND	11,900	
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	656	
2-Hexanone	ND	ND	ND	ND	ND	ND	3,130,000	
Toluene	ND	ND	ND	ND	ND	ND	38,000	
Chlorobenzene	ND	ND	ND	ND	ND	ND	1,190	
Ethylbenzene	ND	ND	ND	ND	ND	ND	395,000	
Styrene	ND	ND	ND	ND	ND	ND	384,000	
Xylenes (total)	ND	ND	ND	ND	ND	ND	318,000	

14.4 CONCLUSIONS

The soil and groundwater well characterized.

15.1 DESCRIPTION

The Waste Oil Satellite Accumulation Area (SWMU 30) is an outdoor drum staging area located in the south section of the North Plant. The unit is downgradient from the Inactive North Plant Surface Impoundment (SWMU 23). The unit consists of a concrete pad with secondary containment in the form of concrete curbing used to stage drums of new and waste lubricant oils prior to off-site recycling. The area is situated in the vicinity of a lubricant storage area. The area is roofed.

15.2 RFI STRATEGY AND TECHNICAL APPROACH

The North Plant Waste Oil Accumulation Area was investigated in the October 2000 sampling campaign for a release of hazardous constituents into the surface soils. Sampling at three locations on the outside periphery of secondary containment was performed to a depth of 6 to 12 inches bgs. Samples were analyzed for benzene, ethylbenzene, toluene, xylene (BTEX) and total petroleum hydrocarbon (TPH).

15.3 RESULTS AND SUGGESTIONS

Results are tabulated below.

TABLE 15-1			
SWMU 30 – NORTH PLANT WASTE OIL ACCUMULATION AREA RESULTS OF SOIL SAMPLING (ppb)			
Organic Component	30-1	30-2	30-3
Benzene	ND	ND	ND
Ethylbenzene	ND	ND	ND
Toluene	ND	ND	ND
Xylenes	ND	ND	ND
Total Petroleum Hydrocarbons	4,433,000	699,000	15,431,000

15.4 CONCLUSIONS

The presence of contamination is confirmed on the northwest edge of the area. The contaminated soil can be visually identified.

SECTION FIFTEEN

SWMU 30 – North Plant Waste Oil Accumulation Area

It is suggested that the discolored soil be excavated and removed as part of the future corrective action program. Confirmation sampling can be done after the cleanup. The horizontal and vertical extent of contamination is visually evident.

16.1 DESCRIPTION

The Surplus Equipment Storage Areas are located at the western edge of the South Plant at the head of the South Plant Drainage Ditch (SWMU 13) and at the western edge of the North Plant. The main storage area is the one located in the South Plant. The storage areas were used for temporary storage of old equipment, and other scrap material. Most items have been removed for recycling.

16.2 RFI STRATEGY AND TECHNICAL APPROACH

Three locations in each area were sampled during October 2000. The sample locations, 34-1 through 34-6, are shown on Figure 1. In addition, a location in the South Plant Drainage Ditch (SWMU 13, point 13-9) was sampled directly downgradient of the South Plant Surplus Equipment Storage Area.

16.3 RESULTS OF SAMPLING AND ANALYSIS

The samples were analyzed for BTEX, TPH, atrazine, cyanazine, arsenic, dinoseb and toxaphene. Results are tabulated below.

Component	Sample Results (ppb)						MDEQ Tier 1 TRG Table Unrestricted (ppb)
	34-1	34-2	34-3	34-4	34-5	34-6	
Atrazine	ND	ND	ND	ND	ND	ND	2,880
Cyanazine	ND	ND	ND	ND	ND	ND	760
Dinoseb	ND	ND	5	11	12	9	78,200
Toxaphene	ND	56	64	194	68	ND	581
Arsenic	4,100	4,300	3,500	3,400	4,700	3,000	426
TPH	ND	9,900	ND	13,300	3,300	ND	200,000
Benzene	ND	ND	ND	ND	ND	ND	887
Ethyl Benzene	ND	ND	ND	ND	ND	ND	395,000
Toluene	ND	ND	ND	ND	ND	ND	38,000
Xylenes	ND	ND	ND	ND	ND	ND	318,000

16.4 CONCLUSIONS

There is evidence of trace toxaphene contamination at the south and the north Surplus Equipment Storage Areas. The source is unknown but presumably either equipment or fill dirt contaminated with toxaphene was placed in both locations at some period in history. Concentrations do not exceed the value listed in the MDEQ Tier 1 TRG Table.

Part of the investigation of the south Surplus Equipment Storage Area consists of the boring and four surface samples near location 13-9 which are made in conjunction with the SWMU 13 Phase II investigation. No additional sampling is suggested for Phase II at SWMU 34.

SECTION SEVENTEEN **SWMU 29 – North Plant Oil Collection Unit**
SWMU 31 – North Plant No. 6 Fuel Oil Area
SWMU 25 – North Plant Waste Water Pipes
SWMU 22 – North Plant Neutralization System

17.1 DESCRIPTION

The four items are grouped together. They were mentioned in the RFA. The locations are noted on Figure 1. In the Preliminary Report, it was suggested that inspections of the areas should be made during the field investigations of the RFI prior to determining if field sampling was required. Some cleaning effort was required prior to inspection.

SWMU 29 is a drum that collects oil drips from the potassium nitrate cooling cylinder. The oil collection system has been modified so that oil drips are now directly piped to the drum.

SWMU 31 is a concrete sump that formerly housed pumps to move fuel oil from tanks to boilers. The tanks and pumps had been removed prior to the writing of the Preliminary Report; however, deposits of soil in the sump made it impossible to observe whether there had been cracks in the concrete. The cracks would be potential avenues of escape of fuel oil in the event it leaked from pumps into the sumps.

SWMU 25 is the system of waste water pipes carrying waste water that can be acidic from the North Plant Manufacturing to a sump from which it is pumped to the neutralization system.

SWMU 22 is the sump collecting wastewater as noted above and the neutralization system itself. The neutralization system was not questionable in the Preliminary Report as a source of contamination into the soil and groundwater; however, the integrity of the sump was questioned.

17.2 RFI STRATEGY AND TECHNICAL APPROACH

The rationale during the Phase I RFI was to inspect the SWMUs for deficiencies or questions raised during the RFA or the Preliminary Report. The inspection was done after the SWMUs were sufficiently cleaned to make observations possible.

SECTION SEVENTEEN **SWMU 29 – North Plant Oil Collection Unit**
SWMU 31 – North Plant No. 6 Fuel Oil Area
SWMU 25 – North Plant Waste Water Pipes
SWMU 22 – North Plant Neutralization System

17.3 RESULTS OF INSPECTIONS

The revised collection system at SWMU 29 effectively collects drips. The old system had missed some oil drips. There was no evidence of oil discolored surrounding areas.

The concrete sump at SWMU 31 was free of defects that might have allowed oil spills to leak through to the surrounding environment. There were pipes leading into the sump but there was evidence that the space between the pipes and the sump had been grouted during use of the sump prior to demolition of the fuel tanks and pumps.

The SWMU 25 waste water pipes are PVC and have held up during operation. There was no evidence of leaks. The pipes were partially underground but there was no evidence of erosion or deterioration of the surrounding soil.

The SWMU 22 inground wastewater collection sump was not in good repair. There is visual evidence of subsurface erosion. The rest of the neutralization system is in good repair. The collection sump is partially subsurface.

Two borings with temporary wells were advanced in the area of the collection sump in May 2001. Three soil samples and one groundwater sample were obtained per boring. The samples were analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles. The results are reported on Tables 17-1 and 17-2.

Prior to the investigation in May 2001, Vicksburg Chemical had replaced the inground wastewater collection sump.

17.4 CONCLUSIONS

The area has been well characterized.

SECTION SEVENTEEN SWMU 29 – North Plant Oil Collection Unit
SWMU 31 – North Plant No. 6 Fuel Oil Area
SWMU 25 – North Plant Waste Water Pipes
SWMU 22 – North Plant Neutralization System

TABLE 17-1

SUMMARY OF GROUNDWATER DATA OBTAINED FROM TEMPORARY WELLS
 22-1 AND 22-2 AND MONITORING WELLS PZ-26A AND PZ-26B DURING
 THE PHASE II INVESTIGATION IN MAY 2001

Compound	Sample Results				MDEQ Tier 1 TRG Table µg/L (ppb)
	22-1-W	22-2-W	PZ-26A	PZ-26B	
Arsenic	ND	ND	6	8	5
Atrazine	ND	ND	ND	ND	3
Cyanazine	ND	ND	ND	ND	0.0797
Dinoseb	1.4	1.8	ND	ND	7
Toxaphene	ND	ND	ND	ND	3
Volatile Organics Component					
Choromethane	ND	ND	ND	ND	1.49
Bromomethane	ND	ND	ND	ND	8.52
Vinyl Chloride	ND	ND	ND	ND	2.0
Chloroethane	ND	ND	ND	ND	3.64
Methylene Chloride	ND	ND	ND	ND	5.0
Acetone	ND	ND	ND	ND	3,650
Carbon Disulfide	ND	ND	ND	ND	1,040
1,1-Dichloroethene	ND	ND	ND	ND	7.0
1,1-Dichloroethane	ND	ND	ND	ND	798
1,2-Dichloroethene (total)	ND	ND	ND	ND	70
Chloroform	6.78	D	ND	ND	0.152
2-Butanone	ND	ND	ND	ND	1,910
1,2-Dichloroethane	ND	ND	ND	ND	5.0
1,1,1-Trichloroethane	ND	ND	ND	ND	200
Carbon Tetrachloride	ND	ND	ND	ND	5.00
Bromodichloromethane	ND	ND	ND	ND	1.08
1,2-Dichloropropane	ND	ND	ND	ND	5.0
c-1,3-Dichloropropene	ND	ND	ND	ND	0.765
Trichloroethene	ND	ND	ND	ND	5.0
Benzene	1.08	ND	ND	ND	5.0
Dibromochloroemethane	ND	ND	ND	ND	5.0
t-1,3-Dichloropropene	ND	ND	ND	ND	0.0765
1,1,2-Trichloroethane	ND	ND	ND	ND	5.0
Bromoform	ND	ND	ND	ND	2.33
4-Methyl-2-pentanone	ND	ND	ND	ND	2,920
Tetrachlorethene	ND	ND	ND	ND	5.0
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	0.0527
2-Hexanone	ND	ND	ND	ND	1,460
Toluene	ND	ND	ND	ND	1,000
Chlorobenzene	ND	ND	ND	ND	100
Ethylbenzene	ND	ND	ND	ND	700
Styrene	ND	ND	ND	ND	100
Xylenes (total)	ND	ND	ND	ND	10,000

SECTION SEVENTEEN

**SWMU 29 – North Plant Oil Collection Unit
 SWMU 31 – North Plant No. 6 Fuel Oil Area
 SWMU 25 – North Plant Waste Water Pipes
 SWMU 22 – North Plant Neutralization System**

TABLE 17-2

SWMU 22 – NORTH PLANT NEUTRALIZATION SYSTEM – RESULTS FROM SOIL SAMPLES – MAY 2001

Compound	Sample Results						MDEQ Tier 1 TRG Table Unrestricted (ppb)	MDEQ Tier 1 TRG Table Restricted (ppb)
	22-1A	22-1B	22-1C	22-2A	22-2B	22-2C		
Atrazine	ND	ND	ND	ND	ND	ND	2,880	25,800
Cyanazine	ND	ND	51	ND	ND	22	760	6,810
Dinoseb	ND	ND	43	ND	ND	ND	78,200	204,000
Toxaphene	ND	ND	ND	ND	ND	240	581	5,200
Arsenic	ND	4,100	ND	700	9,400	ND	426	3,820
Volatile Organics Component								
Chloromethane	ND	ND	ND	ND	ND	ND	49,100	
Bromomethane	ND	ND	ND	ND	ND	ND	2,970	
Vinyl Chloride	ND	ND	ND	ND	ND	ND	33	
Chloroethane	ND	ND	ND	ND	ND	ND	220,000	
Methylene Chloride	ND	ND	ND	ND	ND	ND	14,300	
Acetone	ND	ND	ND	ND	ND	ND	7,820,000	
Carbon Disulfide	ND	ND	ND	ND	ND	ND	7,970	
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	77.2	
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	116,000	
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	782,000	
Chloroform	ND	30.8	ND	ND	ND	ND	312	
2-Butanone	ND	ND	ND	ND	ND	ND	129,000	
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	406	
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	1,190,000	
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	371	
Bromodichloroethane	ND	ND	ND	ND	ND	ND	10,300	
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	445	
c-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	134	
Trichloroethene	ND	ND	ND	ND	ND	ND	7,600	
Benzene	ND	ND	ND	ND	ND	ND	887	
Dibromochloromethane	ND	ND	ND	ND	ND	ND	7,600	
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	134	
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	1,090	
Bromoform	ND	ND	ND	ND	ND	ND	58,800	
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	6,260,000	
Tetrachloroethene	ND	ND	ND	ND	ND	ND	11,900	
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	656	
2-Hexanone	ND	ND	ND	ND	ND	ND	3,130,000	
Toluene	ND	ND	ND	ND	ND	ND	38,000	
Chlorobenzene	ND	ND	ND	ND	ND	ND	1,190	
Ethylbenzene	ND	ND	ND	ND	ND	ND	395,000	
Styrene	ND	ND	ND	ND	ND	ND	384,000	
Xylenes (total)	ND	ND	ND	ND	ND	ND	318,000	

SECTION EIGHTEEN

Overall Conclusions

The following is a summary of the conclusions presented at the end of each report section:

TABLE 18-1			
SUMMARY OF RFI CONCLUSIONS			
SWMU Number / Name	Data Found in Section:	Further Investigative Work Required	Further Corrective Measures Study Required
1, 16, 17 / Container (Drum) Storage Area, Atrazine Production Area, Returned Product Storage Area	2	None	None
2 / Inactive Landfill	3	Additional groundwater investigation in the "valley area" around location 2-15	Restrict access to "valley area" Report groundwater results in Groundwater Assessment Report
4 / Activated Carbon Unit	4&13	Additional groundwater investigation between location 20-18 and 2-15.	See SWMU 20
5 / South Plant Drainage System	5&13	None	See SWMU 20
7 / Dinoseb Production Area	6&13	None	See SWMU 20
8 / Dinoseb Loading/Unloading Area	7	None	None
9 / Dinoseb Drumming Area	8	None	None
11, 12, 15 / MSMA Production Area, MSMA Salt Unloading Area, Methyl Parathion Production Area	9	None	Corrective Measure Studies needed for soil and groundwater
13 / South Plant Drainage Ditch	10	None	Restrict access to portion of ditch near SWMU 34 - Surplus Equipment Storage
14 / Toxaphene Production Area	11&13	None	See SWMU 20
18 / Blue Tank	12	None	None
20 / Railroad Area (including SWMUs 4, 7, 14 and part of 5)	13	None	Corrective Measures Studies needed for soil and groundwater
23 / North Pond	14	None	None
30 / North Plant Waste Oil Accumulation Area	15	None	There is visual evidence of some small amount of petroleum contamination. It can be removed by excavation at any time.

TABLE 18-1 (Continued)			
SUMMARY OF RFI CONCLUSIONS			
SWMU Number / Name	Data Found in Section:	Further Investigative Work Required	Further Corrective Measures Study Required
34 / Surplus Equipment Storage	16	None	None
29, 31, 6, 22 / Oil Collection Unit, Fuel Oil Area, Waste Water Pipes, Neutralization System	17	None	None

In order to present a better overall understanding of the contamination at the Vicksburg sites, the following maps have been created:

- Figure 18-1 Overview of Site Wide Arsenic Contamination in Groundwater
- Figure 18-2 Overview of Site Wide Dinoseb Contamination in Groundwater
- Figure 18-3 Overview of Site Wide Contamination in Groundwater
- Figure 18-4 Overview of Site Wide VOA Contamination in Groundwater
- Figure 18-5 Overview of Site Wide Atrazine/Cyanazine Contamination in Groundwater
- Figure 18-6 Overview of Site Wide Soil Contamination

The schedule of relevant recent historical events and suggested future events are as follows:

- October 1-9, 2000 – Mobilize at Vicksburg Chemical and implement the RFI Phase I Field Work.
- October 10 – November 14, 2000 – Analyze samples at Magnolia Scientific Laboratory.
- October 10 – December 15, 2000 – Write "RCRA Facility Investigation Interim Report and Phase II Work Plan."
- December 15, 2000 – Submit the draft report and work plan to the MSDEQ and U.S. EPA.
- February 14-16, 2001 – Implement the RFI Phase I Jr. Field Work.
- February 19-March 7, 2001 – Analyze samples at Magnolia Scientific Laboratory.
- March 16, 2001 – Submit Revision 1 of the draft interim report and Phase II work plan to the MSDEQ and U.S. EPA.
- March 23, 2001 – MSDEQ and U.S. EPA comment on the draft interim report and Phase II work plan.
- March 30, 2001 – Draft Interim Report and Phase II work plan are finalized.
- May 7-19, 2001 – The Phase II RFI field work is implemented.
- May 22-July 6, 2001 – Analyze samples.
- July 9-August 9, 2001 – Write Draft Final RFI
- August 10, 2001 – Submit report to MSDEQ and EPA.

- September 2001 – The remaining fieldwork for the groundwater assessment is implemented.
- October 2001 – The Groundwater Assessment Report is completed and submitted to the MSDEQ and EPA.
- November 2001 – The MSDEQ and EPA comment on the RFI Report and GWA Report.
- December 2001 – The RFI Report and GWA Report are finalized.
- January 2002-January 2003 – Corrective Measures Studies are undertaken for soil and groundwater at the Vicksburg site.

The Project Management Plan consists of the following elements:

- Project task definition
- Specific personnel positions within the project organizational structure

20.1 PROJECT TASK DEFINITION

VCC has retained the services of URS to develop the RFI and GWA Work Plans to the satisfaction of the EPA and MSDEQ and assist VCC in implementing the work plans.

20.2 PROJECT PERSONNEL

Duties of key personnel are described below.

20.2.1 U.S. EPA and MSDEQ Project Coordinator

The U.S. EPA and MSDEQ project coordinators or designated agents will observe work plan activities to any extent deemed necessary to confirm that the requirements of the Consent Decree, and the RFI Work Plan are met.

20.2.2 Project Director

The Project Director is Mr. Steve Boswell. He is an employee of and is the official representative for VCC. He is in charge of administration of the work and the completion of the project.

20.2.3 URS Project Manager

The URS Project Manager develops the plans required by the Consent Decree and oversees work implementing the Work Plan on behalf of VCC, and is the primary contact with VCC. The URS Project Manager is Richard D. Karkkainen. Mr. Karkkainen is a Principal Environmental Engineer in URS.

20.2.4 URS Field Investigation Site Coordinator

The URS Field Investigation Site Coordinator will handle day to day activities and coordinate them with other RFI and GWA activities. He will coordinate efforts and oversee their implementation. The Project Manager is expected to fulfill this role. He will be assisted by Dean Lowe, a geologist with 40 years of experience. Mr. Lowe is a Principal Geologist associated with Petra Environmental the geo-probe subcontractor.

20.2.5 Health and Safety Officer

A Health and Safety (H & S) officer will be responsible for the administration and implementation of the site Health and Safety for Groundwater Assessment activities. The H & S Officer will coordinate efforts through a Site Safety Officer. The Site Safety Officer will coordinate effort with the VCC safety personnel. The Project Manager may fulfill this role. A Health and Safety Plan is found in Appendix C of the Amended and Supplemental RFI Work Plan, December 1999. The H & S officer will have the overall responsibility for safety and health and will:

- Ensure that an employee medical surveillance program which meets the requirements of 29 CFR 1910.120 is instituted and maintained.
- Be responsible for the initial pre-construction indoctrination of all on-site personnel with regard to the H & S Plan and other safety requirements to be observed during the construction, including but not limited to:
 - potential hazards
 - personal hygiene principles
 - personnel protective equipment
 - respiratory protection equipment usage and fit testing, and
 - emergency response including site evacuation, dealing with fire and medical situations
- Be responsible for the maintenance of separate exclusion, contamination reduction, and support zones if needed as described in the Contractor's H & S Plan and on the drawings.

- Ensure that personnel exposure air monitoring, if needed, is properly conducted and recorded.
- During on-site activity, maintain a recordkeeping system which will include daily records of all site activity, waste quantities produced, waste transportation activity information, laboratory results, and other information.

20.2.6 QA/QC Manager

The QA/QC Manager will be responsible for coordination with the analytical laboratory and for the validation of data. Mr. Rodney Culpepper, analytical chemist and manager of Magnolia Scientific Laboratory, is QA/QC Manager.

The following information describes the environmental setting on a regional and local basis.

21.1 REGIONAL GEOLOGY

The Vicksburg area lies on the eastern flank, near the axis, of the Mississippi Embayment, containing unconsolidated sediments of Cretaceous to Quaternary Age, the sediments thicken in the structural trough toward the axis of the Embayment and the Gulf of Mexico.

Wind-borne silty sediments, named Pleistocene loess, were deposited in the Vicksburg area. The Pleistocene loess in the Vicksburg area is a homogeneous, massive silt with variable clay content. The loess underlies the ground surface through the local region. Loess generally is characterized by a higher vertical permeability in comparison to its horizontal permeability.

Underlying the Pleistocene loess is the Oligocene Vicksburg formation. This formation consists of alternating beds of sandy marl, clay marl, montmorillonitic clay and thin beds of limestone.

21.2 SITE GEOLOGIC FEATURES OF THE PLANT SITE

Developers International Services Corporation (DISC) provided the initial descriptions of the geology of the site in a November 1981 report "Hydrogeological Investigation." A second description was provided by IT Corporation in a January 1985 "Final Report: Groundwater Assessment Program". Both reports provided hydraulic conductivity data from laboratory testing on soil obtained from borings on site and supplemented the information by generalized descriptions obtained from U.S.G.S. publications.

It was observed in both reports that the loess with variable clay content extends from about 6 to 48 feet below the surface across the site. Immediately below the loess, a thin layer (1 to 2 feet) of greenish-gray sandy clay is usually present. Underlying the sandy clay is a marl from the Vicksburg formation called the Byram marl. The top of the marl varies across the site from 60 to 65 feet mean sea level (msl). This marl serves as the bottom of a shallow confined aquifer. Various cross sections of the geology beneath the South Plant are shown in Figures 21-1 through 21-7. The cross sections portray silt with variable clay content as interpreted by individual loggers; the formation is Pleistocene loess to approximately 60 feet msl.

The bedrock underlying the facility is a layer of Glendon limestone of the Vicksburg Formation and, beneath the limestone, is the Jackson Formation. The top of the Glendon limestone is expected to be 80 to 100 feet beneath the plant site and ranges from 25 to 65 feet thick. The Glendon is a dark gray to brown, dense, fine-grained limestone. The underlying non-permeable Jackson Formation is 40 to 150 feet thick.

Information in the 1965 Bulletin 105 "Mississippi Geological, Economic and Topographical Survey" by William H. Moore describes the Glendon limestone and the Byram marl which is located at the top of the highest hard limestone ledge of the Glendon:

"The Glendon limestone consists of alternating beds of gray, fossiliferous, glauconitic, slightly sandy limestone and gray-green, glauconitic, fossiliferous, sandy marl. The Glendon weathers to a yellowish or buff color. The limestone beds in the Glendon are not constant with the number, thickness and stratigraphic position varying from place to place. A hard bed about 10 feet from the top of the Glendon is the most consistent and usually the thickest. On the outcrop the marls weather more rapidly and the limestone ledges tend to stand out. The Glendon weathers completely in places leaving a dark-brown residual clay. ... At some localities the residual clay contains white, partly weathered limestone and contains at other localities a white, waxy, clayey material. ... The material is a clay giving an x-ray pattern of major montmorillonite and halloysite in which kaolinite is still a trace constituent.

Thick beds of bentonite are present between ledges of Glendon limestone in Smith County. In Warren and Yazoo Counties thin beds of bentonite are present in the same stratigraphic position. ...

The Byram marl consists of gray-green, glauconitic, fossiliferous, clayey marl and gray-green, glauconitic, fossiliferous, limy clay."

The site is in a valley with process areas cut into the hillside. As a generalization the following is a table of notable elevations:

Area	Approximate Elevation (feet MSL)
Surface of Inactive Disposal Area (SWMU 2)	135
North Pond Area (SWMU 23)	133
South Plant	120
North Plant	115
Railroad Track, Surface Pond Area, Area Surrounding Inactive Disposal Area	100-110
Stout's and Hennessey's Bayou	85

21.3 REGIONAL GROUNDWATER HYDROLOGY

A shallow confined loess aquifer underlying the VCC plant is on top of the Byram marl formation. Reported wells in the area are upgradient of the plant and are producing water from deeper, more productive aquifers such as the Catahoula and Forrest Hill formation. These deeper aquifers are apparently hydraulically separated from the shallow groundwater aquifer.

The shallow aquifer underlying the VCC plant is, however, hydraulically connected to Stout's Bayou and Hennessey's Bayou. Hatcher Bayou and Stouts Bayou merge southeast of the plant site to form Hennessey's Bayou, which flows to the Mississippi River. Noted as intermittent streams on USGS topographical maps these bayous are limited to fresh water fish and wildlife habitat. They are not drinking water or recreational water sources. The major use of the Mississippi River downstream of its confluence with Hennessey's Bayou is as a marine transportation route. There are no drinking water intakes in these waters within three miles downstream of the facility.

21.4 SHALLOW GROUNDWATER HYDROLOGY BENEATH THE PLANT

The Byram marl in the Vicksburg Formation constitutes the bottom of the uppermost water-bearing zone underlying the facility. The Byram marl is described as representing mixed clastic and carbonate sedimentation in an open shelf or platform environment. The argillaceous, massive and medium dense character of the marl would inhibit any significant movement of water through this unit, and there is no indication of secondary permeability. The uppermost water bearing zone is approximately 40 feet thick consisting almost exclusively of Pleistocene loess (silt). The clayey fill material placed atop the loess is acting as a "cap"

inhibiting the vertical migration of the groundwater. The presence of the marl on the bottom of the aquifer creates a slightly artesian confined aquifer which is not hydraulically connected to any potential water-bearing zones at greater depths. The artesian property is characteristic of an aquifer which is under pressure from above and below. The background water quality of this aquifer is marginally acceptable for drinking water; however, due to its low lateral flow and yield characteristics its usefulness as a domestic water supply is severely limited.

21.5 GEOLOGIC AND HYDROGEOLOGIC FEATURES

The following is a list of geologic cross sections that describe the site. Well screen and piezometric elevations have been added to the cross sections. The piezometric data was obtained in November 1993.

- Figure 21-1 – Potentiometric Contours with Cross Section Locations
- Figure 21-2 – Section A-A'; generally north/south at the railroad track elevation from the north plant to the south plant.
- Figure 21-3 – Section B-B'; generally east/west at the southern boundary of the south plant.
- Figure 21-4 – Section C-C'; generally east/west through the center of the south plant.
- Figure 21-5 – Section D-D'; generally east/west on the northern boundary of the south plant.
- Figure 21-6 – Section E-E'; generally east/west through the North Pond.
- Figure 21-7 – Section F-F'; generally north/south on the eastern boundary in the south plant.

The various cross sections depict the wind-borne deposited silty sediments, or Pleistocene loess, underlying the Vicksburg Chemical site. The Pleistocene loess is a homogeneous, massive silt with variable clay content. SWMU 2, historically called the "hill area", is

entirely a loess deposit. There may be less clay content in the SWMU 2 than is present in the loess underlying most of the plant.

Groundwater potentiometric contours are depicted on Figure 21-1. The temporary piezometers at SWMU 2, LS2, LS3, LS4, and LS5, were installed in the generally flat top elevation of SWMU which is 135 feet msl. LS1 was installed down slope about 5 feet at 130 feet msl. The groundwater levels in SWMU 2 are consistent with the levels projected from previous work in surrounding monitor wells (MW-2, MW-7, MW-5, MW-3, MW-11, MW-14, MW-12, MW-8, MW-10, MW-16). There does not appear to be any trapped water perched within the hill or mounding effects due to historic use of the pits, ponds, and landfill, which were drained and closed in 1979.

The shallow aquifer underlying the VCC plant site, is hydraulically connected to Stouts Bayou and Hennessey's Bayou. Hatcher Bayou and Stouts Bayou merge southeast of the plant site to form Hennessey's Bayou, which flows to the Mississippi River. Existing monitor wells MW-2, MW-8, MW-7, MW-6, MW-5, MW-12, MW-10, MW-16, MW-1A, MW-11, MW-14, PZ-25B, PZ-24B, and proposed monitor wells MW-12C, MW-10C, MW-16C, PZ-26A and PZ-26B effectively intercept and monitor the shallow aquifer between the site and Hennessey's Bayou.

There are additional observations that can be made from the piezometric and well screen elevations on the geologic cross sections:

- Cross section A-A'. The piezometric elevations do not vary with the variations in screen elevations thus demonstrating the interconnectivity of the zones in the aquifer. Nonetheless, due to the proximity of SWMUs 4, 7, 14 and 20 to the line of wells in cross section A-A', it is suggested that shallow wells be installed at MW-12, MW-10 and MW-16 locations to make certain that any potential plume be intercepted.
- Cross section B-B'. The cross section of the "valley" demonstrates the potential for seepage from spills in the southern edge of the south plant to discharge. Another observations is that the groundwater level observed in LS-5 is consistent with levels at MW-8 and MW-7 without mounding or any evidence of a perched zone.

- Cross section C-C'. The groundwater levels observed in LS-1, LS-2, LS-3 and LS-4 are consistent with levels at MW-12 and MW-6. Elevations estimated for nested wells at MW-17 and MW-18 effectively intercept the entire aquifer.
- Cross section D-D'. Hennessey's Bayou is shown to be a likely location of contaminated groundwater discharge.
- Cross section E-E'. Evidence of a perched zone of groundwater is exhibited by the difference in groundwater elevations in shallow wells versus deeper wells. The perched groundwater may connect with the aquifer at locations PZ-22, PZ-23 and PZ-24. Installation of PZ-26A and PZ-26B will add information.

21.6 LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

During the investigative activities at the various SWMUs installation of new wells was implemented. In addition, monitor well MW-8 was repaired. The following Table 21-2 is a summary that describes the sets of wells that monitor each SWMU, or notes the reason there is no groundwater contamination associated with the SWMU, or notes the additional groundwater samples to be obtained in a groundwater assessment. The contaminants that have been detected in the groundwater from each well have also been listed. Note that information from temporary wells is not contained within the table.

TABLE 21-2

LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

SWMU Numbers	Groundwater Sampled at Temporary Wells	Additional Groundwater Samples to be Obtained in September 2001 for Groundwater Assessment	Comments	Monitored by Permanent Monitor Wells, Containment Detected (Concentration* ppb)/MDEQ Tier 1 TRG Table Value
1 – Hazardous Waste Storage 16 – Atrazine Manufacturing and Warehousing 17 – Returned Product Storage	Locations A, D, 1, 2, 16-1, and 16-2 Reference: Table 2-5 and Figures 2-3	None	Soil and concrete generally clean. Arsenic in groundwater at Location 2 (Reference: Figure 2-3) found to be clean.	MW-2: Arsenic (ND-2.6)/10 1,2-Dichloroethene (ND-7.36)/100 Trichloroethene (ND-2.0)/5.0 MW-8: Arsenic (ND-80)/10 Dinoseb (ND-0.686)/7.0 Vinyl Chloride (ND-5)/2.0
2 - Inactive Landfill	Locations LS1, LS2, LS3, LS4 and LS4 Reference: Table 3-2 and Figure 1 Location 2-15 Reference: Table 3-11	Groundwater surrounding location 2-15 for atrazine	Report results in Groundwater Assessment Report	MW-5: Arsenic (ND-70)/10 Dinoseb (ND-12.0)/7.0 Trichloroethene (ND-79)/5.0 Xylene (ND-10)/10,000 MW-6: Arsenic (ND-15)/10 Dinoseb (ND-75.0)/7.0 Toxaphene (ND-25.0)/3.0 Trichloroethene (ND-9.03)/5.0 Vinyl Chloride (ND-4)/2.0 Xylene (ND-7)/10,000 MW-7: Arsenic (ND-30)/10 Dinoseb (ND-4.5)/7.0 Toxaphene (ND-2.8)/3.0
4 – Activated Carbon Unit	Location 2-18	Groundwater between location 20-18 and 2-15 for chloroform and carbon tetrachloride.	Report results in Groundwater Assessment Report.	None
5 – South Plant Drainage System	None	None	MW-8, MW-12, MW-12C, MW-10, MW-10C, MW-16, and MW-9 effectively monitor the entire south plant drainage system.	MW-8: Arsenic (ND-80)/10 Dinoseb (ND-0.686)/7.0 Vinyl Chloride (ND-5.0)/2.0 MW-12: Arsenic (ND-20)/10 Dinoseb (ND-0.91)/7.0 Chloroform (ND-1.37)/0.152 Xylenes (ND-5.0)/10,000

TABLE 21-2

LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

SWMU Numbers	Groundwater Sampled at Temporary Wells	Additional Groundwater Samples to be Obtained in September 2001 for Groundwater Assessment	Comments	Monitored by Permanent Monitor Wells, Containment Detected (Concentration* ppb)/MDEQ Tier 1 TRG Table Value
5 – South Plant Drainage System (Continued)				<p>MW-12C: Arsenic (9)/10 Dinoseb (277)/7.0 Vinyl Chloride (13)/2.0 1,1 Dichloroethene (7.4)/7.0 1,2 Dichloroethene (88)/70 Chloroform (3,879)/0.152 1,2-Dichloroethane (113)/5.0 Carbon Tetrachloride (23,350)/5.0 Trichloroethene (91)/5.0 Benzene (13.9)/5.0 1,1,2 Trichloroethane (84)/5.0 Tetrachloroethene (174)/5.0</p> <p>MW-10: Arsenic (ND-15)/50 Dinoseb (ND-0.836)/7.0</p> <p>MW-10C: Dinoseb (717)/7.0 Chloroform (1,076)/0.152 Carbon Tetrachloride (1,486)/5.0</p> <p>MW-16: Arsenic (ND-9)/50 Dinoseb (ND-0.391)/50</p> <p>MW-9: Arsenic (ND-0.009)/50 Dinoseb (ND-11.4)/7.0</p>
7 – Dinoseb Manufacturing Area	Location 20-12, 20-19, 20-20, 20-2 , 20-22	None	Corrective action is indicated	<p>MW-12: Arsenic (ND-20)/50 Dinoseb (ND-0.91)/7.0 Chloroform (ND-1.37)/0.152 Xylenes (ND-5.0)/10,000</p>

TABLE 21-2

LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

SWMU Numbers	Groundwater Sampled at Temporary Wells	Additional Groundwater Samples to be Obtained in September 2001 for Groundwater Assessment	Comments	Monitored by Permanent Monitor Wells, Containment Detected (Concentration* ppb)/MDEQ Tier 1 TRG Table Value
7 – Dinoseb Manufacturing Area (Continued)				MW-12C: Arsenic (9)/10 Dinoseb (277)/7.0 Vinyl Chloride (13)/2.0 1,1 Dichloroethene (7.4)/7.0 1,2 Dichloroethene (88)/70 Chloroform (3,879)/0.152 1,2-Dichloroethane (113)/5.0 Carbon Tetrachloride (23,350)/5.0 Trichloroethene (91)/5.0 Benzene (13.9)/5.0 1,1,2 Trichloroethane (84)/5.0 Tetrachloroethene (174)/5.0 MW-10: Arsenic (ND-15)/50 Dinoseb (ND-0.836)/7.0
8 – Dinoseb Loading/Unloading Area	None	None	None	MW-18A: Arsenic (319)/50 MW-18B: Arsenic (194)/50 Dinoseb (132)/7.0
9 – Dinoseb Drumming Area	Location TP-1 Reference: Figure 8-1, Table 8-4 and Table 8-5	None	None	MW-18A: Arsenic (319)/50 MW-18B: Arsenic (194)/50 Dinoseb (132)/7.0
11 – MSMA Salt Unloading 12 – MSMA Manufacturing Area 15 – Methyl Parathion Manufacturing Area	Locations G-W-G, D-W-G, I-W-G, K-W-G, 12-W-G, X-W-G, Z-W-G, DD-W-G, V-V-G, WW-W-G, YY-W-G, ZZ-W-G, 7-W-G Reference: Table 9-6 and Figures 9-3 and 9-4	None	The new wells are close to the source of arsenic. The monitor well network consisting of MW-8, MW-12, MW-12C, MW-10, MW-10C, MW-16, MW-16C and MW-9 are 400 to 800 feet away from the source but do cover the downgradient pathway.	MW-17A: Carbon tetrachloride (7.25)/5.0 MW-17B: Chloroform (1.43)/0.152 MW-18A: Arsenic (319)/50 MW-18B: Arsenic (194)/50 Dinoseb (132)/7.0

TABLE 21-2

LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

SWMU Numbers	Groundwater Sampled at Temporary Wells	Additional Groundwater Samples to be Obtained in September 2001 for Groundwater Assessment	Comments	Monitored by Permanent Monitor Wells, Containment Detected (Concentration* ppb)/MDEQ Tier 1 TRG Table Value
11 – MSMA Salt Unloading 12 – MSMA Manufacturing Area 15 – Methyl Parathion Manufacturing Area (Continued)				MW-8: Arsenic (ND-80)/50 Dinoseb (ND-0.686)/7.0 Vinyl Chloride (ND-5.0)/2.0 MW-12: Arsenic (ND-20)/50 Dinoseb (ND-0.91)/7.0 Chloroform (ND-1.37)/0.152 Xylenes (ND-5.0)/10,000 MW-12C: Arsenic (9)/10 Dinoseb (277)/7.0 Vinyl Chloride (13)/2.0 1,1 Dichloroethene (7.4)/7.0 1,2 Dichloroethene (88)/70 Chloroform (3,879)/0.152 1,2-Dichloroethane (113)/5.0 Carbon Tetrachloride (23,350)/5.0 Trichloroethene (91)/5.0 Benzene (13.9)/5.0 1,1,2 Trichloroethane (84)/5.0 Tetrachloroethene (174)/5.0 MW-10: Arsenic (ND-15)/50 Dinoseb (ND-0.836)/7.0 MW-10C: Dinoseb (717)/7.0 Chloroform (1,076)/0.152 Carbon Tetrachloride (1,486)/5.0 MW-16: Arsenic (ND-9)/50 Dinoseb (ND-0.391)/50 MW-9: Arsenic (ND-9)/50 Dinoseb (ND-11.4)/7.0
13 – South Plant Drainage Ditch	Location 13-10	None	Clean	None

TABLE 21-2

LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

SWMU Numbers	Groundwater Sampled at Temporary Wells	Additional Groundwater Samples to be Obtained in September 2001 for Groundwater Assessment	Comments	Monitored by Permanent Monitor Wells, Containment Detected (Concentration* ppb)/MDEQ Tier 1 TRG Table Value
14 - Toxaphene Manufacturing Area	Locations 20-18, 20-19, 20-20, 20-21, 20-22	None	The new wells, in combination with MW-12 and MW-10 effectively monitor SWMU 14.	MW-12: Arsenic (ND-20)/50 Dinoseb (ND-0.91)/7.0 Chloroform (ND-1.37)/0.152 Xylenes (5.0)/10,000 MW-12C: Arsenic (9)/10 Dinoseb (277)/7.0 Vinyl Chloride (13)/2.0 1,1 Dichloroethene (7.4)/7.0 1,2 Dichloroethene (88)/70 Chloroform (3,879)/0.152 1,2-Dichloroethane (113)/5.0 Carbon Tetrachloride (23,350)/5.0 Trichloroethene (91)/5.0 Benzene (13.9)/5.0 1,1,2 Trichloroethane (84)/5.0 Tetrachloroethene (174)/5.0 MW-10: Arsenic (ND-15)/50 Dinoseb (ND-0.836)/7.0 MW-10C: Dinoseb (717)/7.0 Chloroform (1,076)/0.152 Carbon Tetrachloride (1,486)/5.0
18 - Blue Tank	None	None	Monitored by MW-9.	MW-9: Arsenic (ND-9)/50 Dinoseb (ND-11.4)/7.0
20 - Railroad Area	Locations: 20-18, 20-19, 20-20, 20-21, 20-22, 20-23, 20-24	Groundwater at MW-12C, MW-10C and MW-16C. Groundwater from temporary wells will be obtained at locations 20-18, 20-19, 20-20, 20-21 and 20-22 and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles.	The new wells, in combination with MW-2, MW-8, MW-12, MW-10, MW-16, MW-1A and MW-14 effectively monitor SWMU 20.	MW-2: Arsenic (ND-26)/10 1,2-Dichloroethene (ND-7.36)/100 Trichloroethene (ND-2.0)/5.0 MW-8: Arsenic (ND-80)/10 Dinoseb (ND-0.686)/7.0 Vinyl Chloride (ND-5.0)/2.0

TABLE 21-2

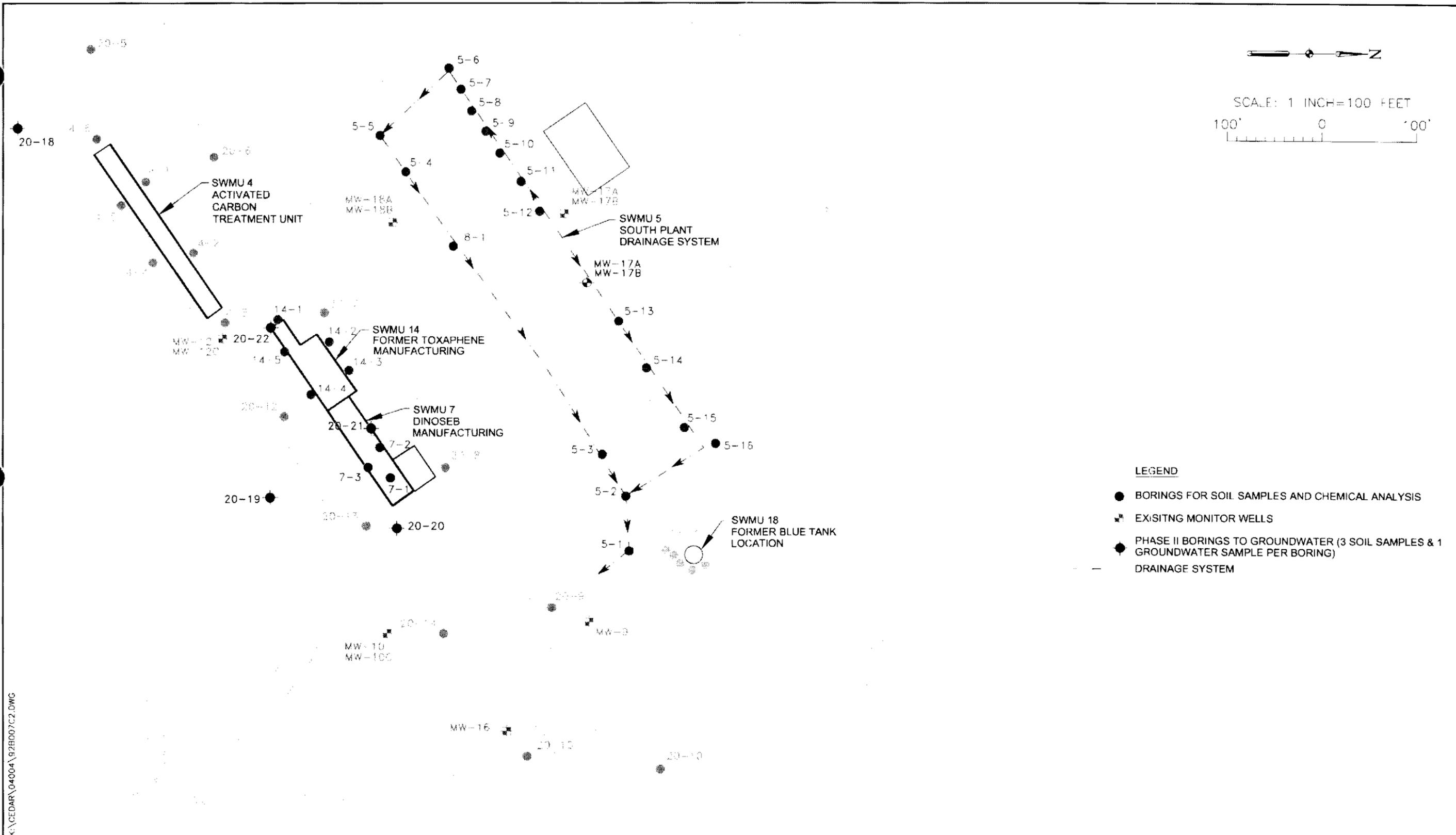
LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

SWMU Numbers	Groundwater Sampled at Temporary Wells	Additional Groundwater Samples to be Obtained in September 2001 for Groundwater Assessment	Comments	Monitored by Permanent Monitor Wells, Containment Detected (Concentration* ppb)/MDEQ Tier 1 TRG Table Value
20 – Railroad Area (Continued)				<p>MW-12: Arsenic (ND-20)/10 Dinoseb (ND-0.91)/7.0 Chloroform (ND-1.37)/0.152 Xylenes (ND-5.0)/10,000</p> <p>MW-12C: Arsenic (9)/10 Dinoseb (277)/7.0 Vinyl Chloride (13)/2.0 1,1 Dichloroethene (7.4)/7.0 1,2 Dichloroethene (88)/70 Chloroform (3,879)/0.152 1,2-Dichloroethane (113)/5.0 Carbon Tetrachloride (23,350)/5.0 Trichloroethene (91)/5.0 Benzene (13.9)/5.0 1,1,2 Trichloroethane (84)/5.0 Tetrachloroethene (174)/5.0</p> <p>MW-10: Arsenic (ND-15)/10 Dinoseb (ND-0.836)/7.0</p> <p>MW-10C: Dinoseb (717)/7.0 Chloroform (1,076)/0.152 Carbon Tetrachloride (1,486)/5.0</p> <p>MW-16: Arsenic (ND-9)/10 Dinoseb (ND-0.391)/50</p> <p>MW-1A: Arsenic (ND-54)/10 Dinoseb (2.34-5,500)/50 Chloroform (ND-4.0)/0.152 Dichlorobenzene (ND-2.75)/75 Trichloroethene (ND-13)/5.0 Xylene (ND-5)/10,000</p>

TABLE 21-2

LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

SWMU Numbers	Groundwater Sampled at Temporary Wells	Additional Groundwater Samples to be Obtained in September 2001 for Groundwater Assessment	Comments	Monitored by Permanent Monitor Wells, Containment Detected (Concentration* ppb)/MDEQ Tier 1 TRG Table Value
20 – Railroad Area (Continued)				MW-14: Arsenic (ND-7)/10 Dinoseb (ND-0.746)/50
23 – North Pond	22-1, 22-2	None	The new wells, in combination with PZ-24B, PZ-20A, PZ-20B, PZ-23A, PZ-23B, PZ-22A, PZ-22B, and PZ-21A will effectively monitor the groundwater associated with SWMU 23.	PZ-24B: ND PZ-20A: ND PZ-20B: Bromodichloromethane (36)/1.08 Bromoform (18)/2.33 Carbon Tetrachloride (4)/5.0 Chloroform (1,700)/0.152 Chlorodibromomethane (18)/0.126 Trichloroethene (1.0)/5.0 PZ-23A: ND PZ-23B: Bromoform (8)/2.33 PZ-22A: ND PZ-22B: Bromodichloromethane (66)/1.08 Bromoform (160)/2.33 Chloroform (1,600)/0.152 Chlorobromomethane (78)/0.126 PZ-21A: ND PZ-26A: ND PZ-26B: ND
30 – North Plant Waste Oil Accumulation Area	None	None	Soil discoloration muds need to be cleaned up.	None
34 – Surplus Equipment Storage	13-10	None	Clean	None
29 – North Plant Oil Collection System 31 – North Plant No. 6 Fuel Oil Area 25 – North Plant Waste Water Pipes 22 – North Plant Neutralization System	22-1, 22-2	None	Clean	PZ-26A: ND PZ-26B: ND



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REV	DESCRIPTION OF REVISION	BY	DATE
△	ADD PHASE II BORINGS	PCG	12/98
△	MODIFY PER REVISED TOXAPHENE DINOSEB AND ATRAZINE ANALYSES	PCG	1/18/01
△	MODIFY PER PHASE II 'AS IS'	PCG	7/18/01

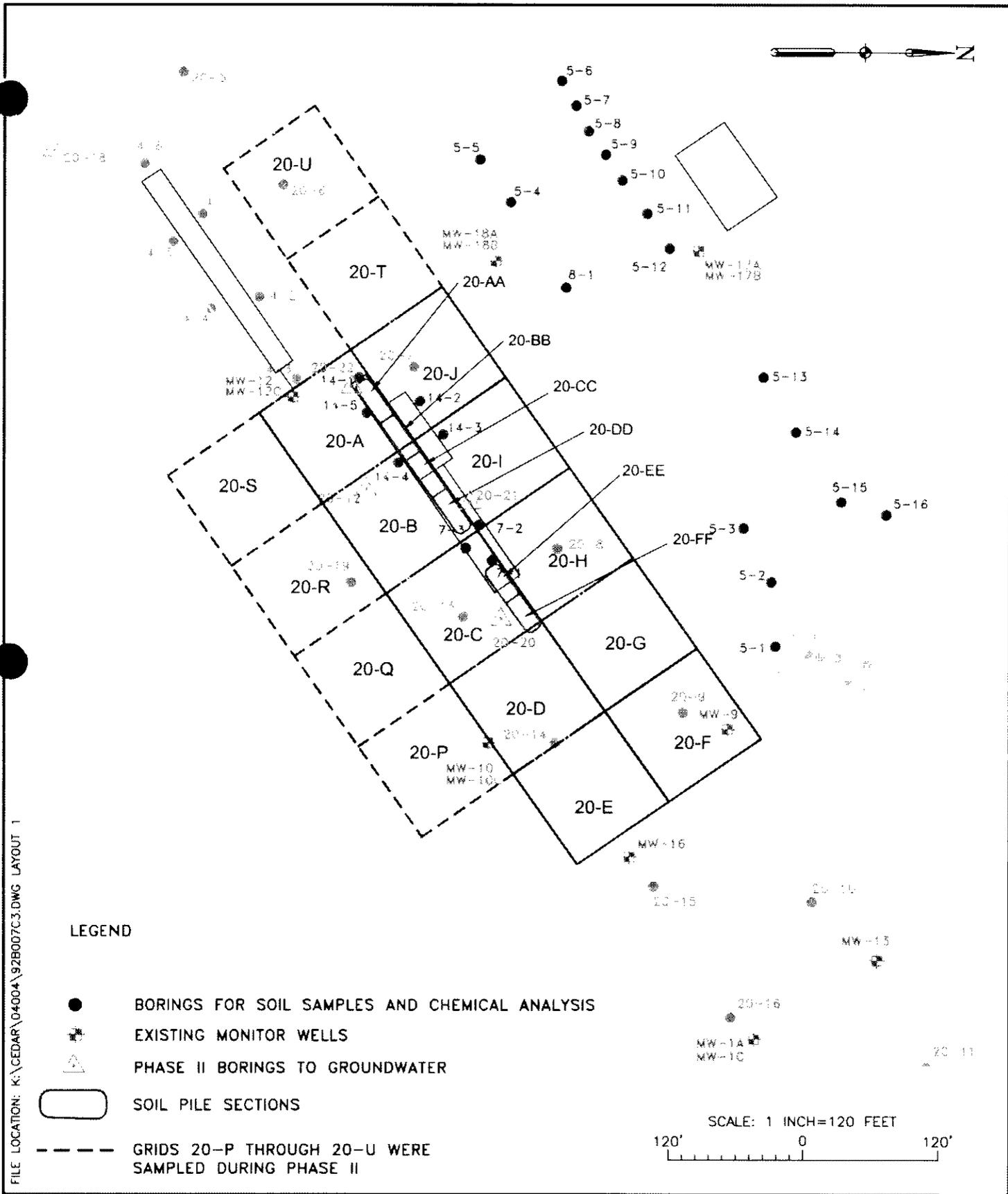
VICKSBURG CHEMICAL COMPANY
VICKSBURG, MISSISSIPPI

URS
2822 O'Neal Lane
Baton Rouge, Louisiana 70816
225/751-1873

REFERENCE DRAWINGS	SCALE
	1" = 100'
	DESIGNED
	DRAWN PCG
	CHECKED
	PEER REVIEWED
	DATE 7/18/01

RCRA FACILITY INVESTIGATION (AS EXECUTED)
ADDITIONAL DETAIL ON SAMPLING AT SWMUs 4, 5, 7, 14 & 18

REVISION
3
PROJECT 35092B007C
FIGURE
2



FILE LOCATION: K:\CEDAR\04004\92B007C3.DWG LAYOUT 1

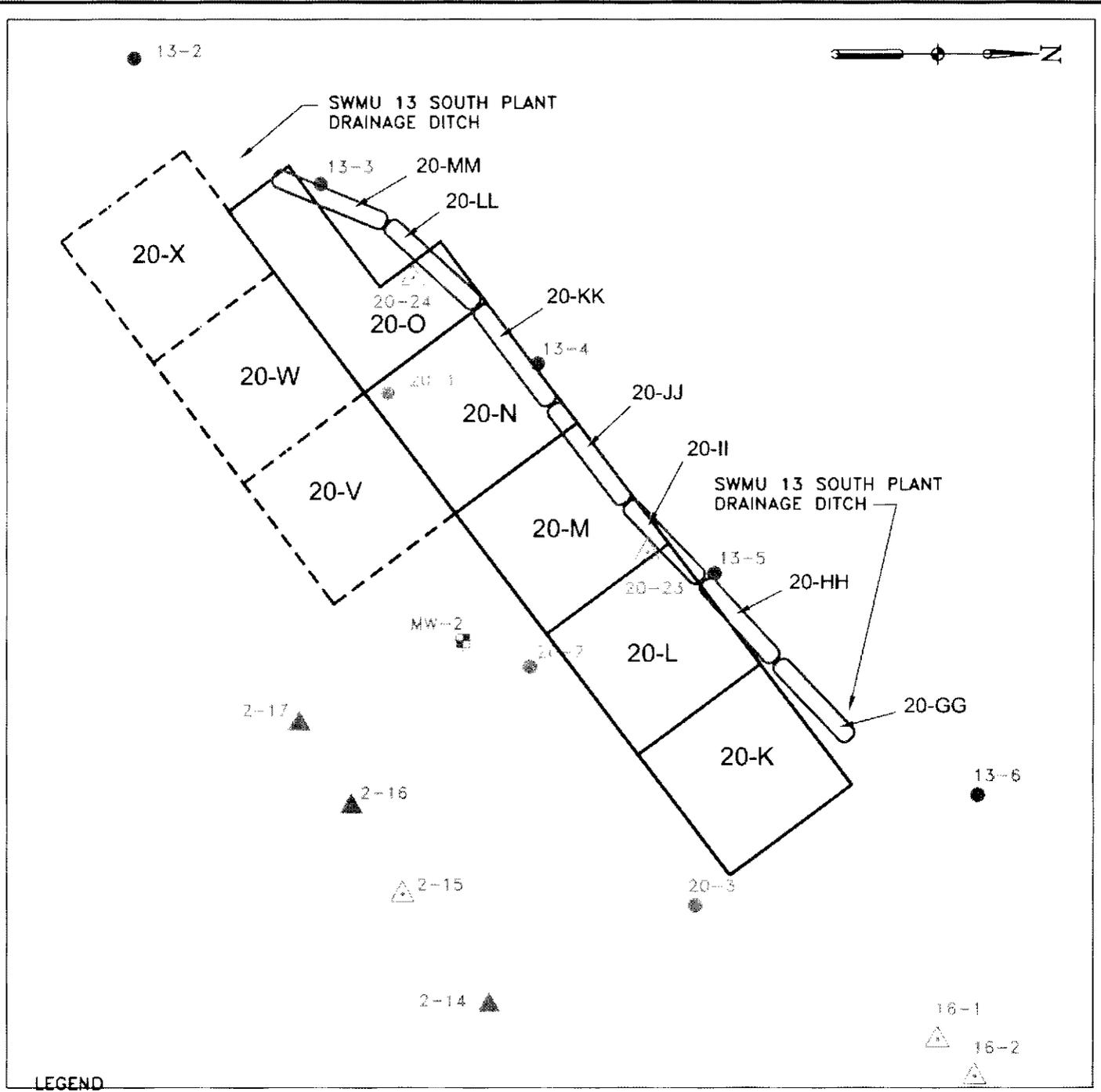
LEGEND

- BORINGS FOR SOIL SAMPLES AND CHEMICAL ANALYSIS
- ⊠ EXISTING MONITOR WELLS
- ▲ PHASE II BORINGS TO GROUNDWATER
- ▭ SOIL PILE SECTIONS
- - - GRIDS 20-P THROUGH 20-U WERE SAMPLED DURING PHASE II

SCALE: 1 INCH=120 FEET
 120' 0 120'

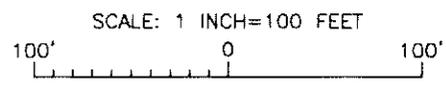
VICKSBURG CHEMICAL VICKSBURG, MISSISSIPPI	URS 2822 O'Neal Lane Baton Rouge, Louisiana 70816 225/751-1873		RAILROAD AREA NEAR FORMER TOXAPHENE & DINOSEB MANUFACTURING	PROJ. NO. 35092B007C
	SCALE: 1"=120'	DRAWN BY: PCG CHKD. BY:	DATE: 7/18/01 DATE:	SURFACE SOIL COMPOSITE SAMPLING GRID AND SOIL PILE COMPOSITE SAMPLING SECTIONS

FILE LOCATION: K:\CEDAR\04004\92B007C3.DWG LAYOUT 2



LEGEND

- BORINGS FOR SOIL SAMPLES AND CHEMICAL ANALYSIS
- EXISTING MONITOR WELLS
- △ PHASE II BORINGS TO GROUNDWATER
- ▲ PHASE II SOIL SAMPLE
- SOIL PILE SECTIONS
- - - GRIDS 20-V THROUGH 20-X WERE SAMPLED DURING PHASE II



VICKSBURG CHEMICAL
VICKSBURG, MISSISSIPPI



2822 O'Neal Lane
Baton Rouge, Louisiana 70816
225/751-1873

SCALE:
1"=100'

DRAWN BY: PCG
CHKD. BY:

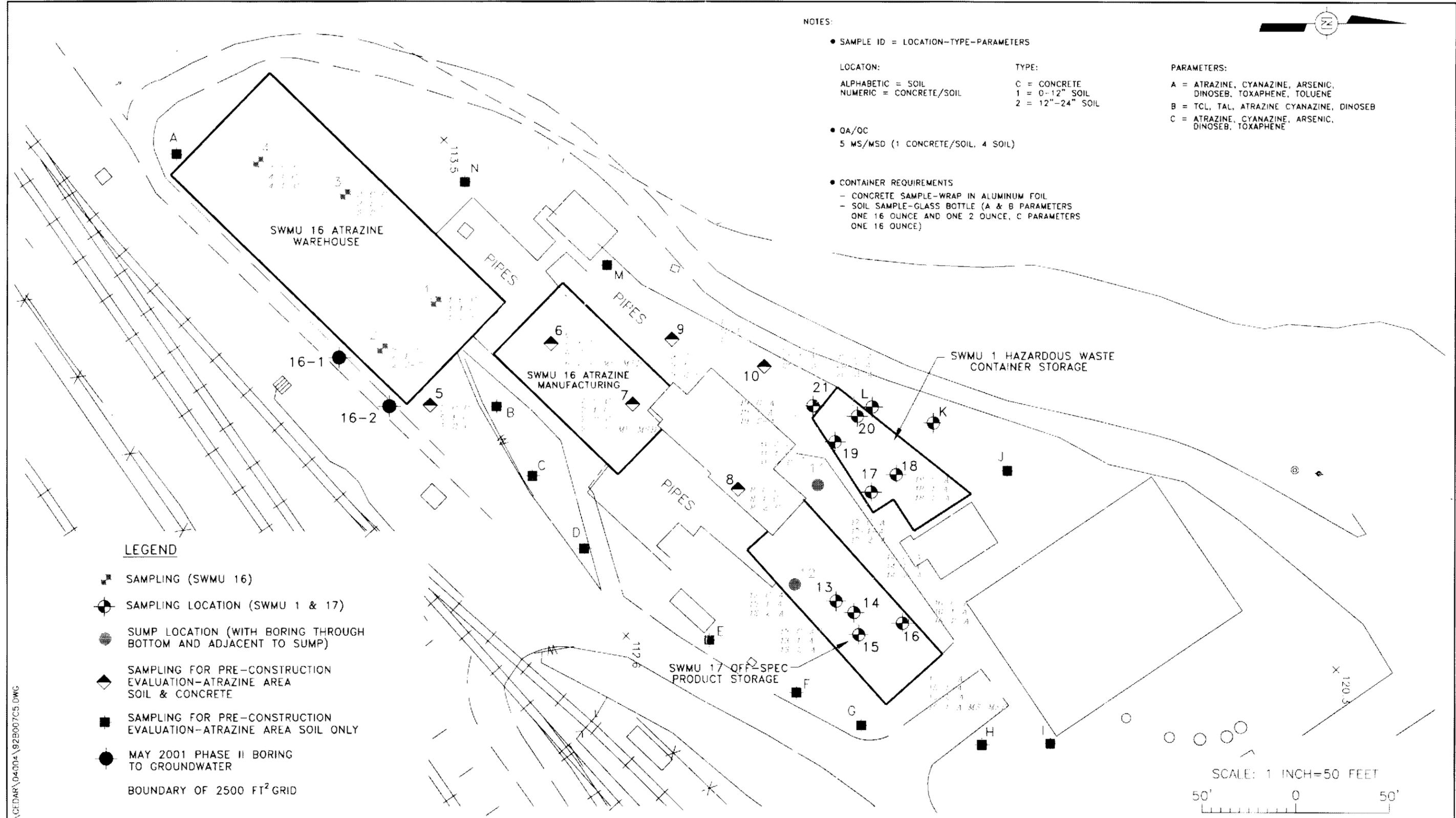
DATE: 7/18/01
DATE:

RAILROAD AREA SOUTH OF
ATRAZINE WAREHOUSE

**SURFACE SOIL COMPOSITE
SAMPLING GRID AND SOIL
PILE COMPOSITE SAMPLING
SECTIONS**

PROJ. NO.
35092B007C

FIG. NO.
4



NOTES:

• SAMPLE ID = LOCATION-TYPE-PARAMETERS

LOCATON:

ALPHABETIC = SOIL
 NUMERIC = CONCRETE/SOIL

TYPE:

C = CONCRETE
 1 = 0-12" SOIL
 2 = 12"-24" SOIL

PARAMETERS:

A = ATRAZINE, CYANAZINE, ARSENIC, DINOSEB, TOXAPHENE, TOLUENE
 B = TCL, TAL, ATRAZINE, CYANAZINE, DINOSEB
 C = ATRAZINE, CYANAZINE, ARSENIC, DINOSEB, TOXAPHENE

• QA/QC

5 MS/MSD (1 CONCRETE/SOIL, 4 SOIL)

• CONTAINER REQUIREMENTS

- CONCRETE SAMPLE-WRAP IN ALUMINUM FOIL
- SOIL SAMPLE-GLASS BOTTLE (A & B PARAMETERS ONE 16 OUNCE AND ONE 2 OUNCE, C PARAMETERS ONE 16 OUNCE)

LEGEND

- SAMPLING (SWMU 16)
- ⊙ SAMPLING LOCATION (SWMU 1 & 17)
- SUMP LOCATION (WITH BORING THROUGH BOTTOM AND ADJACENT TO SUMP)
- ◆ SAMPLING FOR PRE-CONSTRUCTION EVALUATION-ATRAZINE AREA SOIL & CONCRETE
- SAMPLING FOR PRE-CONSTRUCTION EVALUATION-ATRAZINE AREA SOIL ONLY
- MAY 2001 PHASE II BORING TO GROUNDWATER

BOUNDARY OF 2500 FT² GRID

K:\CEDAR\04004\92B007C5.DWG

REV	DESCRIPTION OF REVISION	BY	DATE

VICKSBURG CHEMICAL
 VICKSBURG, MISSISSIPPI

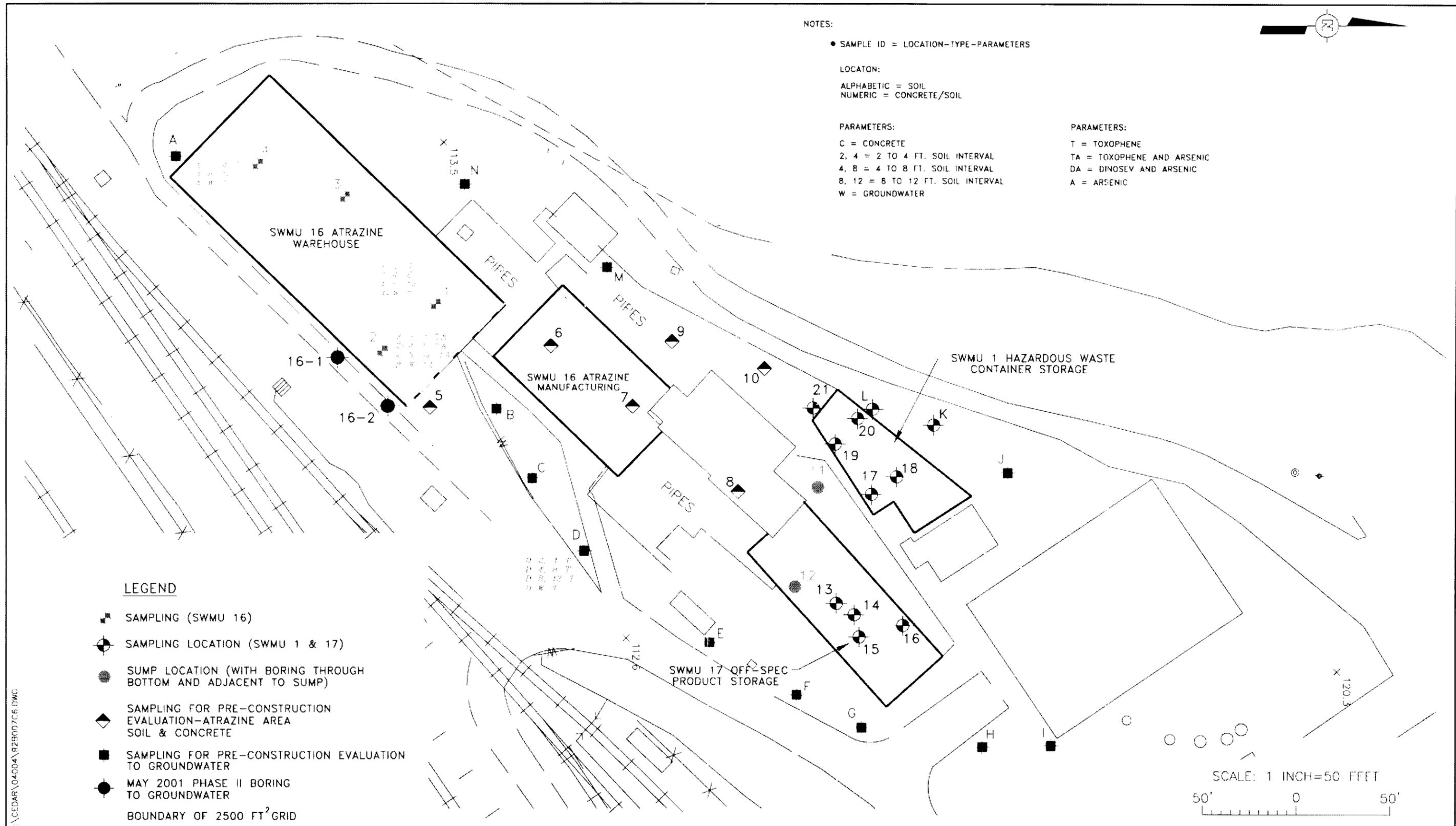
URS
 2822 O'Neal Lane
 Baton Rouge, Louisiana 70816
 225/751-1873

REFERENCE DRAWINGS	SCALE 1"=50'
DESIGNED	
DRAWN PCG	
CHECKED	
PEER REVIEWED	
DATE 7/18/01	

SWMU 16, 1, AND 17

LOCATIONS AND SAMPLE NUMBERS WHERE BOTH THE CONCRETE FLOOR AND SOIL UNDERNEATH WERE SAMPLED

REVISION	
PROJECT 35092B007C	
FIGURE 2-2	



NOTES:

- SAMPLE ID = LOCATION-TYPE-PARAMETERS

LOCATON:

- ALPHABETIC = SOIL
- NUMERIC = CONCRETE/SOIL

PARAMETERS:

- C = CONCRETE
- 2, 4 = 2 TO 4 FT. SOIL INTERVAL
- 4, 8 = 4 TO 8 FT. SOIL INTERVAL
- 8, 12 = 8 TO 12 FT. SOIL INTERVAL
- W = GROUNDWATER

PARAMETERS:

- T = TOXOPHENE
- TA = TOXOPHENE AND ARSENIC
- DA = DINOSELY AND ARSENIC
- A = ARSENIC

LEGEND

- SAMPLING (SWMU 16)
- SAMPLING LOCATION (SWMU 1 & 17)
- SUMP LOCATION (WITH BORING THROUGH BOTTOM AND ADJACENT TO SUMP)
- ◆ SAMPLING FOR PRE-CONSTRUCTION EVALUATION-ATRAZINE AREA SOIL & CONCRETE
- SAMPLING FOR PRE-CONSTRUCTION EVALUATION TO GROUNDWATER
- MAY 2001 PHASE II BORING TO GROUNDWATER
- BOUNDARY OF 2500 FT² GRID

K:\CEDAR\04004\92B007C6.DWG

REV	DESCRIPTION OF REVISION	BY	DATE
△			
△			
△			
△			
△	YEAR 2001 - PHASE II SAMPLE POINTS ADDED	PCG	12/5

VICKSBURG CHEMICAL
VICKSBURG, MISSISSIPPI

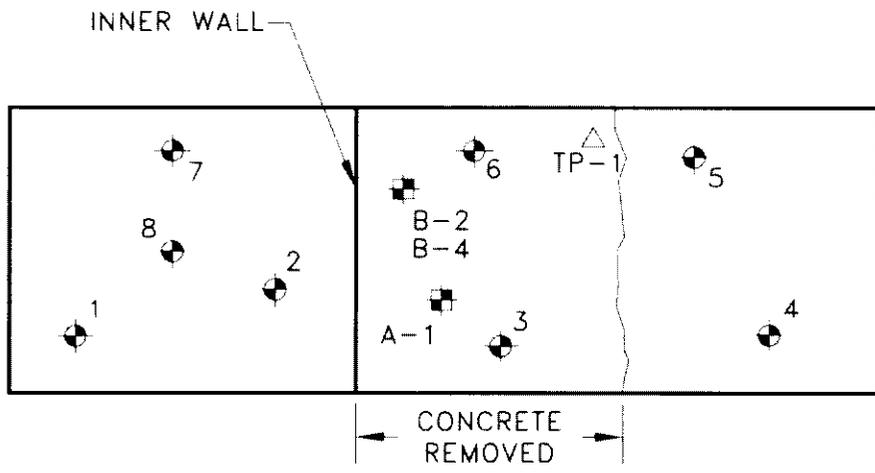
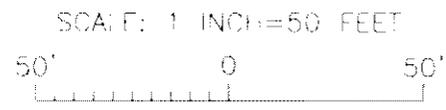
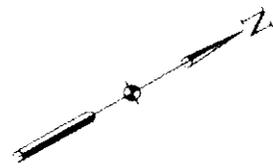
URS
2822 O'Neal Lane
Baton Rouge, Louisiana 70816
225/751-1873

REFERENCE DRAWINGS	SCALE 1"=50'
	DESIGNED
	DRAWN PCG
	CHECKED
	PEER REVIEWED
	DATE 11/2/00

SWMU 16, 1, AND 17

LOCATIONS SAMPLED FOR PHASE II

REVISION	1
PROJECT	35092B007C
FIGURE	2-3



LEGEND

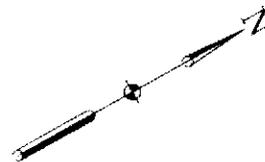
- ⊗ SAMPLE LOCATIONS SEPTEMBER, 1994
- ⊕ SAMPLE LOCATIONS NOVEMBER, 1998
- △ GROUNDWATER SAMPLE LOCATION NOVEMBER, 1998

NOTE:

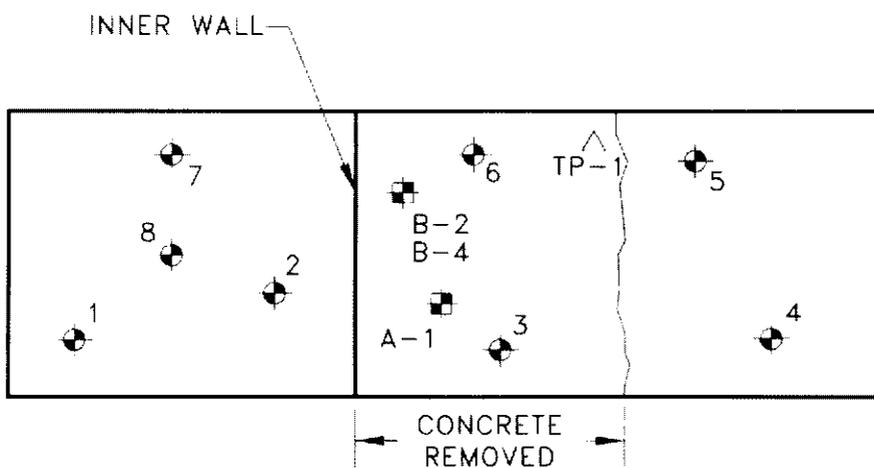
- 800 ppb TOXAPHENE AT LOCATION 7
- 25,000 AND 250,000 ppb TOXAPHENE AT LOCATION 8
- 60,000 ppb ARSENIC AT LOCATION 8

A:\CEGAR\04004\928007C7.DWG

VICKSBURG CHEMICAL VICKSBURG, MISSISSIPPI	 2822 O'Neal Lane Baton Rouge, Louisiana 70816 225/751-1873		SWMU 9	PROJ. NO. 35092B1007C
	SCALE: 1"=50'	DRAWN BY: PCC CHKD. BY:	DATE: 11/2/00 DATE:	SAMPLING LOCATIONS



SCALE: 1 INCH=50 FEET
 50' 0 50'



LEGEND

- ◆ SAMPLE LOCATIONS SEPTEMBER, 1994
- SAMPLE LOCATIONS NOVEMBER, 1998
- △ GROUNDWATER SAMPLE LOCATION NOVEMBER, 1998

NOTE:

- 800 ppb TOXAPHENE AT LOCATION 7
- 25,000 AND 250,000 ppb TOXAPHENE AT LOCATION 8
- 60,000 ppb ARSENIC AT LOCATION 8

k:\CEDAR\04004\92B007C7.DWG

VICKSBURG CHEMICAL
 VICKSBURG, MISSISSIPPI

URS
 2822 O'Neal Lane
 Baton Rouge, Louisiana 70816
 225/751-1873

SCALE:
 1"=50'

DRAWN BY: PCG
 CHKD. BY:

DATE: 11/2/00
 DATE:

SWMU 9

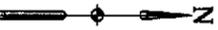
SAMPLING LOCATIONS

PROJ. NO.

35092B1007C

FIGURE

8-1



LEGEND

SYMBOL OF SAMPLE LOCATION	ANALYTE LIST	DESCRIPTION	NUMBER OF SAMPLE LOCATIONS	NUMBER OF SAMPLES
▲	D	SLUDGE/SEDIMENT SAMPLE LOCATION (TCL, TAL, ATRAZINE, CYANAZINE, DINOSEB, DIOXIN)	10	10
◆	D	CONCRETE, ASPHALT OR SOIL SAMPLE (TCL, TAL, ATRAZINE, CYANAZINE, DINOSEB, DIOXIN)	4	6
◆	G	CONCRETE OR ASPHALT AND/OR SOIL (ARSENIC ONLY)	21	45

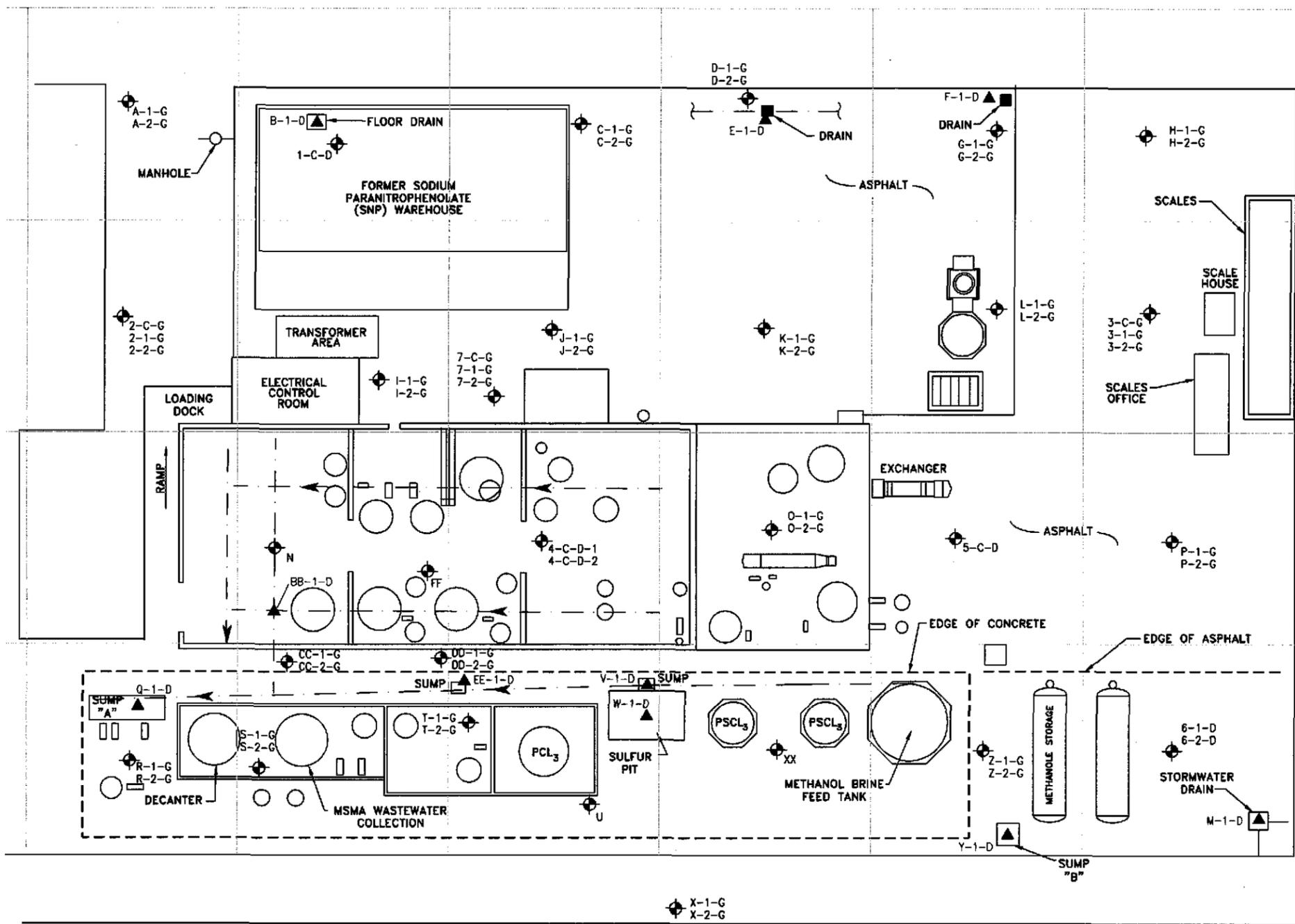
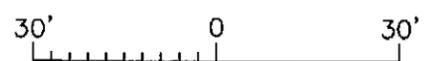
GRID 2500 FT²

NOTES

- *SAMPLE ID = LOCATION - TYPE - ANALYTE LIST
- LOCATION:
ALPHABETIC = SOIL, SLUDGE OR SEDIMENT
NUMERIC = CONCRETE, ASPHALT, OR SOIL
- TYPE:
C = CONCRETE OR ASPHALT
1 = 0-12' SOIL
2 = 12"-24" SOIL
- ANALYTE LIST:
D = TCL, TAL, ATRAZINE, CYANAZINE, DINOSEB, DIOXIN
G = ARSENIC
- * DID NOT PENETRATE CONCRETE AT FOLLOWING:

LOCATION	CONCRETE DEPTH EXCEEDS (FROM GROUND SURFACE)
4	55 INCHES
N	46 INCHES
FF	28 INCHES
XX	28 INCHES
- * DID NOT PENETRATE RUBBLE BENEATH ASPHALT AT LOCATION 5
- * TWO CONCRETE CORES ANALYZED AT LOCATION 4 (0-18" & 18"-55")
- * FIVE WIPE SAMPLES OF SUPERSTRUCTURE ANALYZED FOR ARSENIC (LOCATIONS NOT NOTED)

SCALE: 1 INCH=30 FEET



K:\CEDAR\92B007C\92B007CR.DWG

REV	DESCRIPTION OF REVISION	BY	DATE

VICKSBURG CHEMICAL
VICKSBURG, MISSISSIPPI

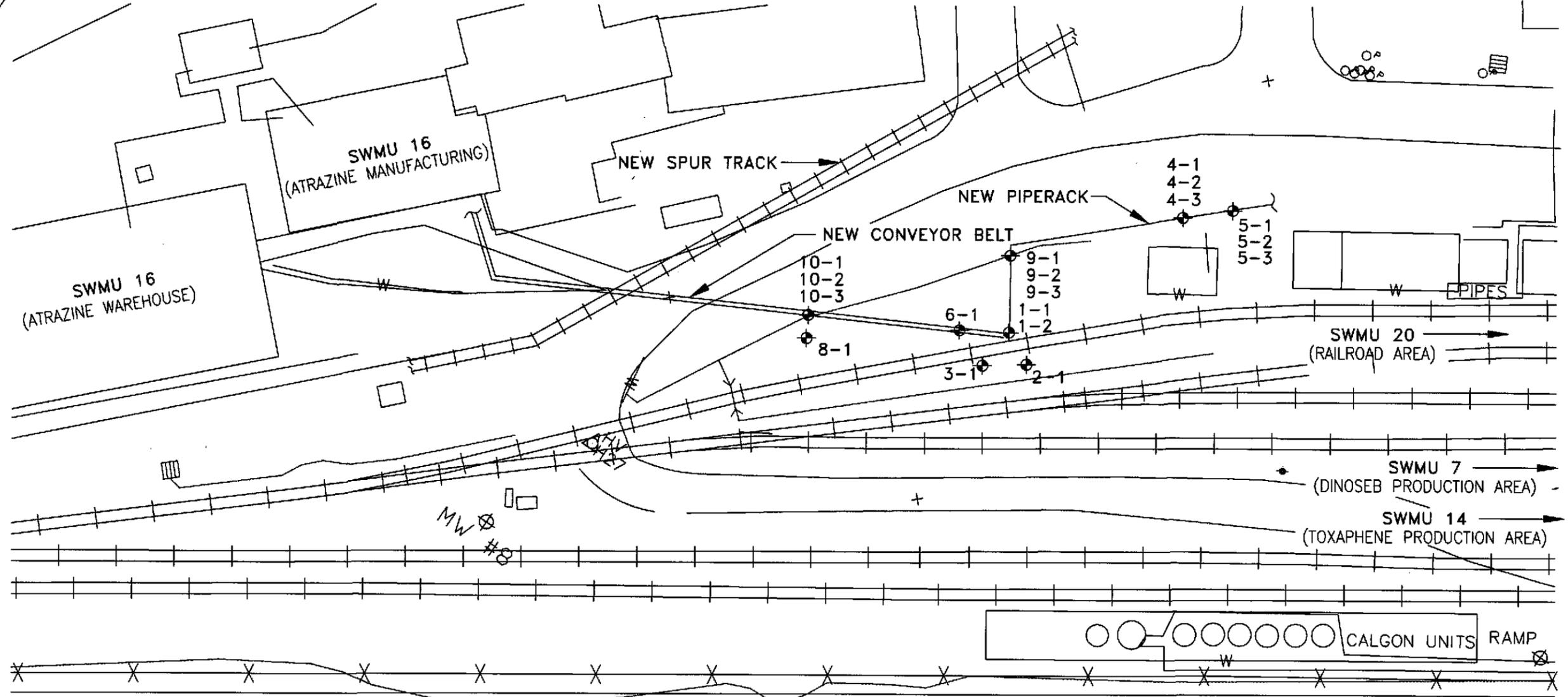
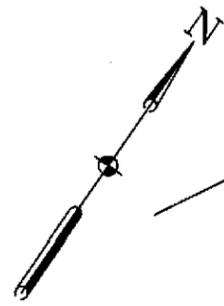
URS
2822 O'Neal Lane
Baton Rouge, Louisiana 70816
225/751-1873

REFERENCE DRAWINGS	SCALE
	1"=30'
DESIGNED	
DRAWN	PCG
CHECKED	
PEER REVIEWED	
DTE	11/3/00

SWMU 11, 12, 15 EXPEDITED RFI

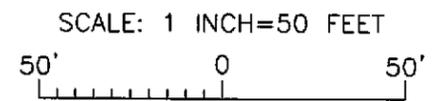
INITIAL LOCATIONS SAMPLED

REVISION	PROJECT	FIGURE
	35092B007C	9-1



LEGEND:

SYMBOL OF SAMPLE LOCATION	DESCRIPTION	NUMBER OF SAMPLE LOCATIONS	
		NUMBER OF SAMPLE LOCATIONS	NUMBER OF SAMPLES
◆	10' BORING (ANALYZE FOR TOXAPHENE, DINOSEB, ARSENIC, & BTEX)	5	15
◆	1' BORING (ANALYZE FOR TOXAPHENE, DINOSEB, ARSENIC, & BTEX)	4	4



K:\CEDAR\92B007C\92B007CS.DWG

REV	DESCRIPTION OF REVISION	BY	DATE

VICKSBURG CHEMICAL
VICKSBURG, MISSISSIPPI

URS
2822 O'Neal Lane
Baton Rouge, Louisiana 70816
225/751-1873

REFERENCE DRAWINGS	SCALE
	1"=50'
DESIGNED	
DRAWN	
CHECKED	
PEER REVIEWED	
DATE	11/3/00

1998 CONVEYOR CONSTRUCTION AREA
(SAMPLED DURING SWMU 11, 12 & 15 CAMPAIGN)

**LOCATIONS SAMPLED AT
SOUTHWEST EDGE OF SWMU 20**

REVISION
PROJECT 35092B007C
FIGURE 9-2

WV-1-G
WV-2-G
WV-3-G
WV-4-G
WV-5-G
WV-6-G
WV-W-G



LEGEND

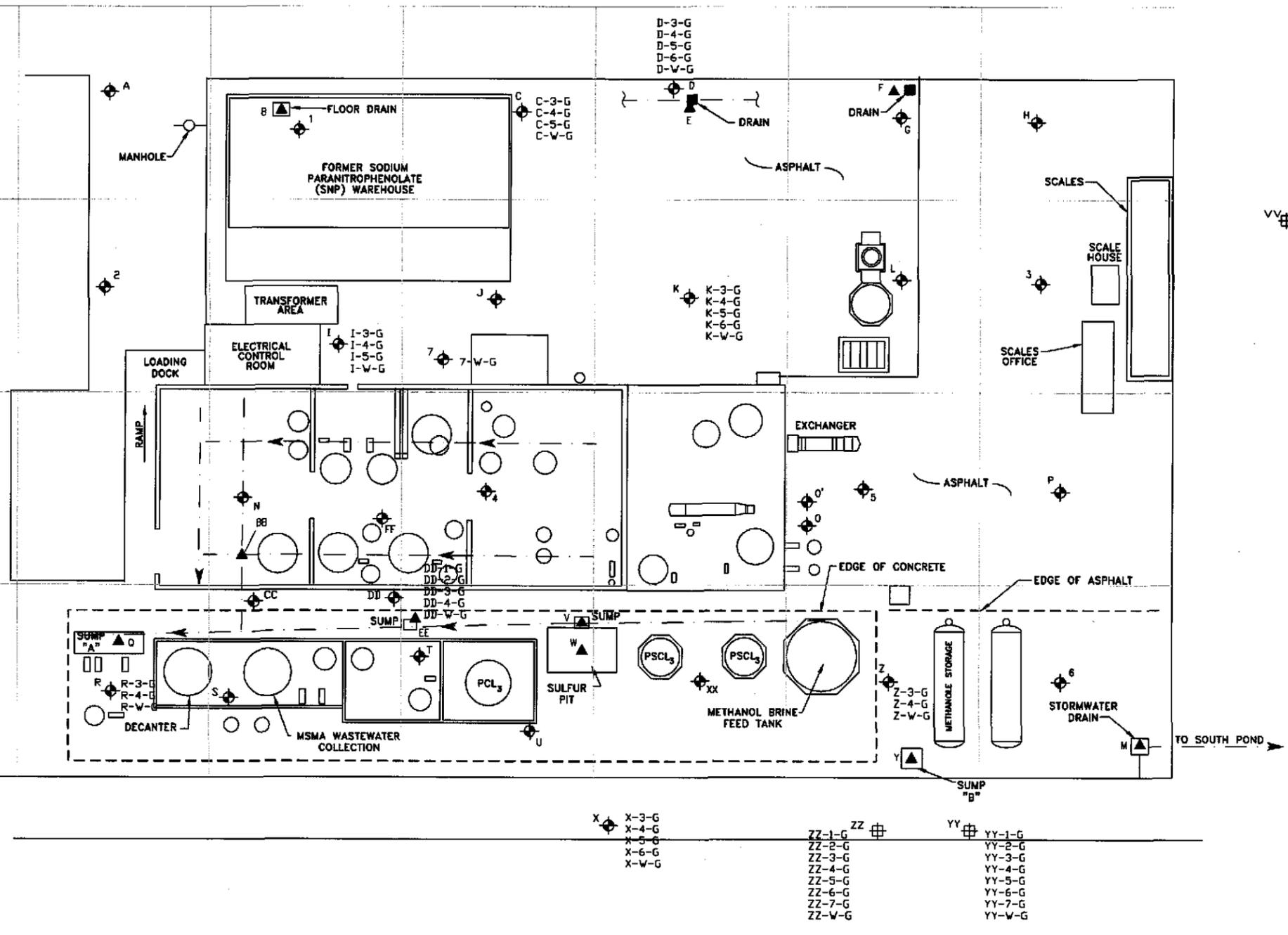
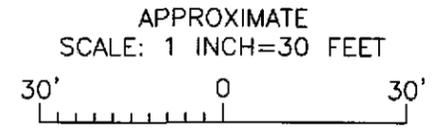
SYMBOL OF SAMPLE LOCATION	ANALYTE LIST	DESCRIPTION	NUMBER OF SAMPLE LOCATIONS	NUMBER OF SAMPLES
▲	SEE FIGURE 2			
◆	SEE FIGURE 2			
◆	G	CONCRETE OR ASPHALT AND/OR SOIL (ARSENIC ONLY)	9	26 SOIL 9 WATER
⊕	G	NEW LOCATIONS - SPECIFIC TO PHASE II (ARSENIC ONLY)	4	25 SOIL 4 WATER

GRID 2500 FT²

NOTES

- SAMPLE ID = LOCATION - TYPE - ANALYTE LIST
- LOCATION:
ALPHABETIC = SOIL, SLUDGE OR SEDIMENT
NUMERIC = CONCRETE, ASPHALT, OR SOIL
- TYPE:
C = CONCRETE OR ASPHALT
1 = 0-12" SOIL
2 = 12"-24" SOIL
3 = 24"-48" SOIL
4 = 48"-72" SOIL
5 = 72"-96" SOIL
6 = 96"-120" SOIL
7 = 120"-144" SOIL
W = GROUNDWATER
- ANALYTE LIST:
G = ARSENIC
- DID NOT PENETRATE CONCRETE AT FOLLOWING:

LOCATION	CONCRETE DEPTH EXCEEDS (FROM GROUND SURFACE)
4	55 INCHES
N	46 INCHES
FF	28 INCHES
XX	28 INCHES
- SECOND CONCRETE FOUNDATION AT 24" AT LOCATIONS 7, J, & L.
- DID NOT PENETRATE RUBBLE BENEATH ASPHALT AT LOCATION 5 & 0'
- TWO CONCRETE CORES ANALYZED AT LOCATION 4 (0-18" & 18"-55")
- FIVE WIPE SAMPLES OF SUPERSTRUCTURE ANALYZED FOR ARSENIC (LOCATIONS NOT NOTED. SEE WRITTEN TEXT OF REPORT)



X-3-G
X-4-G
X-5-G
X-6-G
X-W-G

ZZ-1-G
ZZ-2-G
ZZ-3-G
ZZ-4-G
ZZ-5-G
ZZ-6-G
ZZ-7-G
ZZ-W-G

YY-1-G
YY-2-G
YY-3-G
YY-4-G
YY-5-G
YY-6-G
YY-7-G
YY-W-G

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REV	DESCRIPTION OF REVISION	BY	DATE

VICKSBURG CHEMICAL
VICKSBURG, MISSISSIPPI

URS
2822 O'Neal Lane
Baton Rouge, Louisiana 70816
225/751-1873

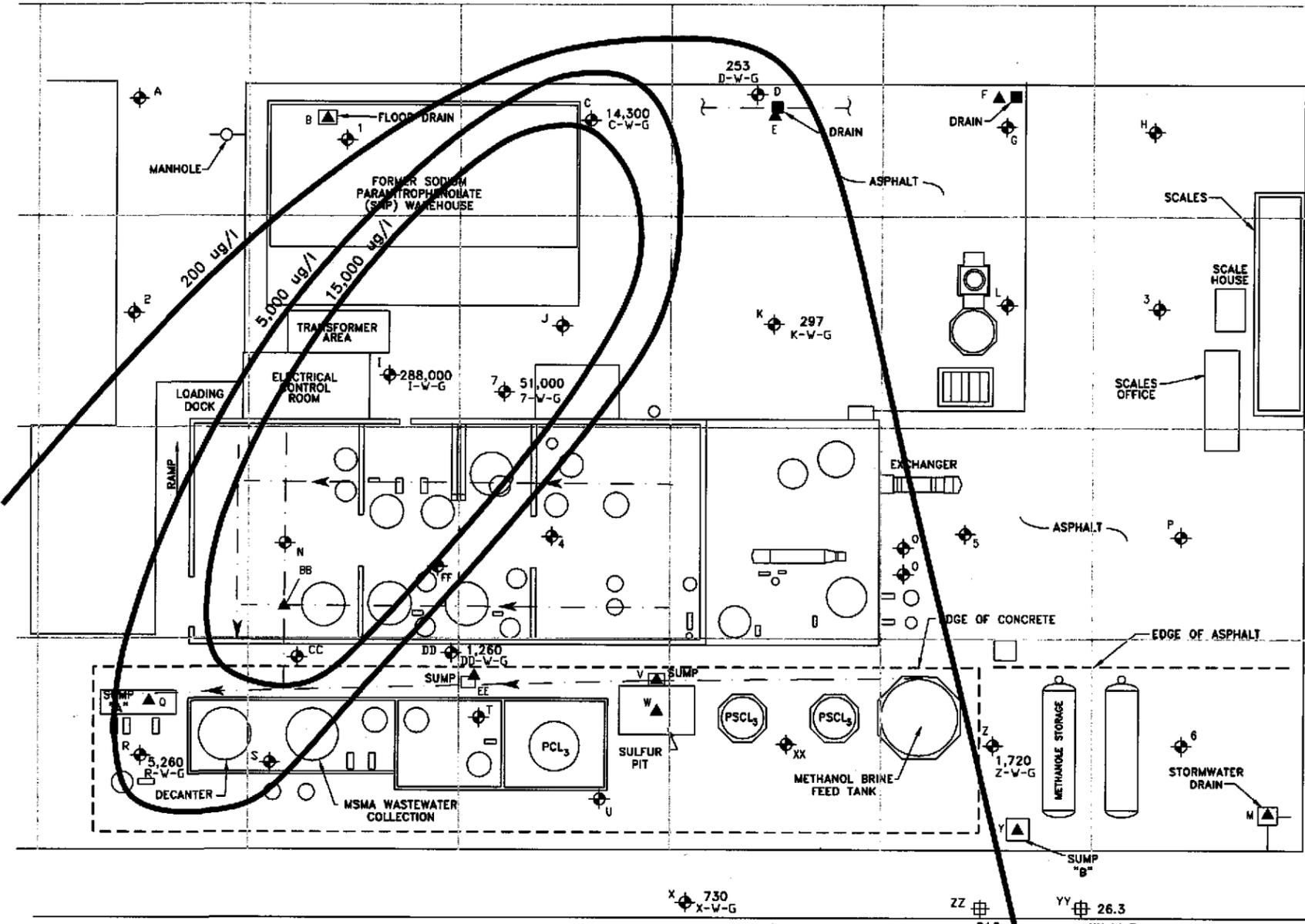
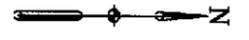
REFERENCE DRAWINGS	SCALE
	1"=30'
DESIGNED	
DRAWN	
CHECKED	
PEER REVIEWED	
DATE	11/3/00

SWMU 11, 12, 15 EXPEDITED RFI

LOCATIONS SAMPLED FOR PHASE II

REVISION
PROJECT 35092B007C
FIGURE 9-3

55.7
VV-V-G



LEGEND

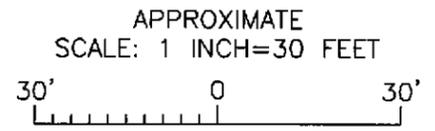
SYMBOL OF SAMPLE LOCATION	ANALYTE LIST	DESCRIPTION	NUMBER OF SAMPLE LOCATIONS	NUMBER OF SAMPLES
▲	SEE FIGURE 2			
◆	SEE FIGURE 2			
◆	G	CONCRETE OR ASPHALT AND/OR SOIL (ARSENIC ONLY)	9	26 SOIL 9 WATER
◆	G	NEW LOCATIONS - SPECIFIC TO PHASE II (ARSENIC ONLY)	4	25 SOIL 4 WATER

GRID 2500 FT²

NOTES

- SAMPLE ID = LOCATION - TYPE - ANALYTE LIST
- LOCATION:
ALPHABETIC = SOIL, SLUDGE OR SEDIMENT
NUMERIC = CONCRETE, ASPHALT, OR SOIL
- TYPE:
C = CONCRETE OR ASPHALT
1 = 0"-12" SOIL
2 = 12"-24" SOIL
3 = 24"-48" SOIL
4 = 48"-72" SOIL
5 = 72"-96" SOIL
6 = 96"-120" SOIL
7 = 120"-144" SOIL
W = GROUNDWATER
- ANALYTE LIST:
G = ARSENIC
- DID NOT PENETRATE CONCRETE AT FOLLOWING:

LOCATION	CONCRETE DEPTH EXCEEDS (FROM GROUND SURFACE)
4	55 INCHES
N	46 INCHES
FF	28 INCHES
XX	28 INCHES
- SECOND CONCRETE FOUNDATION AT 24" AT LOCATIONS 7, J, & L.
- DID NOT PENETRATE RUBBLE BENEATH ASPHALT AT LOCATION 5 & O'
- TWO CONCRETE CORES ANALYZED AT LOCATION 4 (0-18" & 18"-55")
- FIVE WIPE SAMPLES OF SUPERSTRUCTURE ANALYZED FOR ARSENIC (LOCATIONS NOT NOTED. SEE WRITTEN TEXT OF REPORT)
- PERCHED WATER AT 2' BELOW GROUND SURFACE AT LOCATION 7; OTHERWISE, SAMPLES WERE OBTAINED AT 4' TO 6' BELOW GROUND SURFACE
- NUMBERS SHOWN ARE CONCENTRATIONS OF ARSENIC IN GROUNDWATER (ug/l)



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REV	DESCRIPTION OF REVISION	BY	DATE

VICKSBURG CHEMICAL
VICKSBURG, MISSISSIPPI

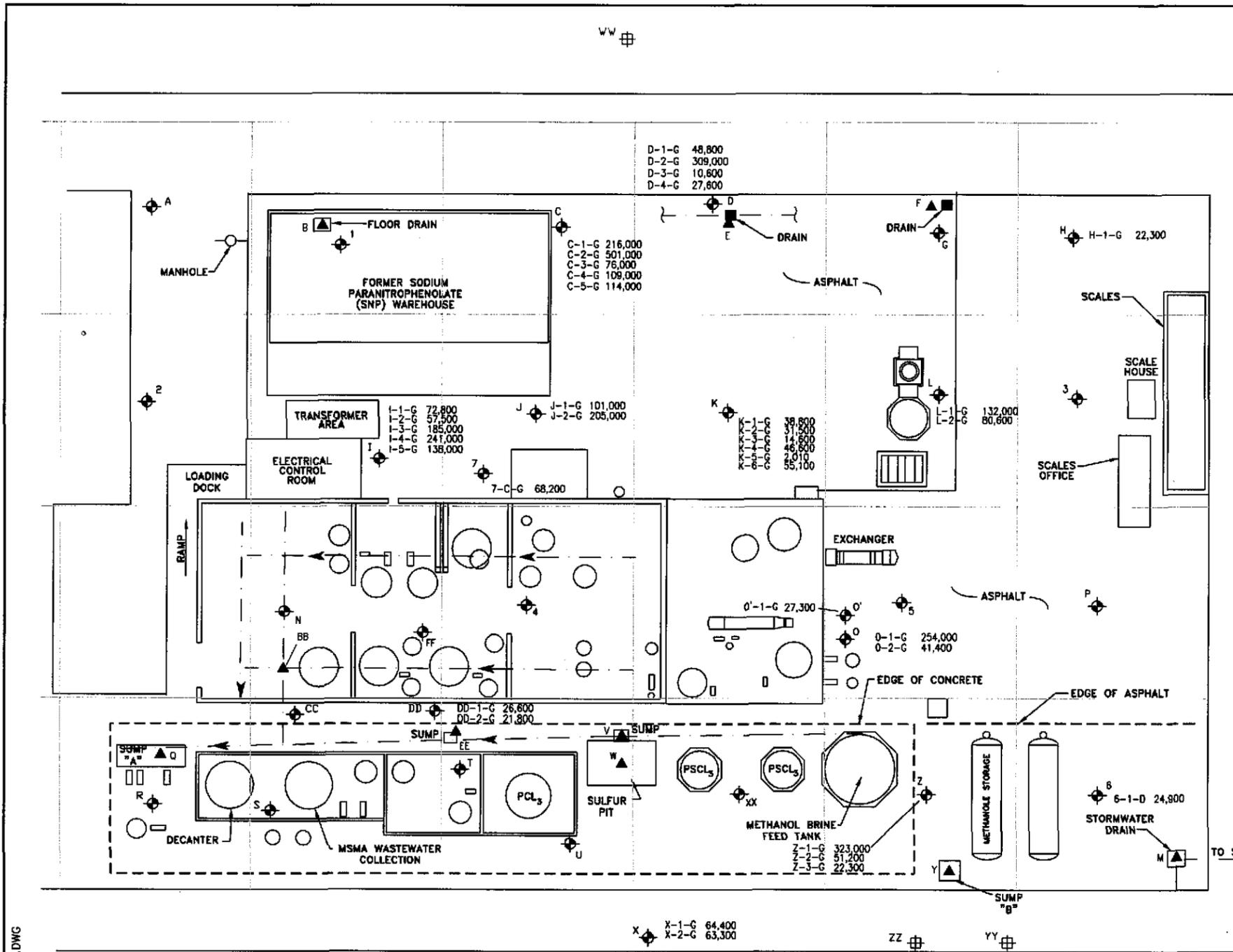
URS
2822 O'Neal Lane
Baton Rouge, Louisiana 70816
225/751-1873

REFERENCE DRAWINGS	SCALE
	1"=30'
DESIGNED	
DRAWN	
CHECKED	
PEER REVIEWED	
DATE	11/3/00

SWMUS 11, 12, 15 EXPEDITED RFI - ESTIMATE OF
GROUNDWATER PLUME

CONCENTRATION OF ARSENIC
IN GROUNDWATER

REVISION
PROJECT 35092B007C
FIGURE 9-4



D-1-G 48,800
 D-2-G 309,000
 D-3-G 10,600
 D-4-G 27,600

C-1-G 216,000
 C-2-G 501,000
 C-3-G 76,000
 C-4-G 109,000
 C-5-G 114,000

I-1-G 72,800
 I-2-G 57,500
 I-3-G 185,000
 I-4-G 241,000
 I-5-G 138,000

K-1 39,800
 K-2 31,500
 K-3 14,600
 K-4 46,800
 K-5 6,010
 K-6 55,100

L-1-G 132,000
 L-2-G 80,800

J-1-G 101,000
 J-2-G 205,000

O-1-G 27,300
 O-2-G 41,400

DD-1-G 26,800
 DD-2-G 21,800

Z-1-G 323,000
 Z-2-G 51,200
 Z-3-G 22,300

X-1-G 64,400
 X-2-G 63,300

LEGEND

SYMBOL OF SAMPLE LOCATION	ANALYTE LIST	DESCRIPTION	NUMBER OF SAMPLE LOCATIONS	NUMBER OF SAMPLES
▲	SEE FIGURE 2			
◆	SEE FIGURE 2			
◆	G	CONCRETE OR ASPHALT AND/OR SOIL (ARSENIC ONLY)	9	26 SOIL 9 WATER
⊕	G	NEW LOCATIONS - SPECIFIC TO PHASE II (ARSENIC ONLY)	4	25 SOIL 4 WATER

GRID 2500 FT²

NOTES

• SAMPLE ID = LOCATION - TYPE - ANALYTE LIST

LOCATION:
 ALPHABETIC = SOIL, SLUDGE OR SEDIMENT
 NUMERIC = CONCRETE, ASPHALT, OR SOIL

TYPE:

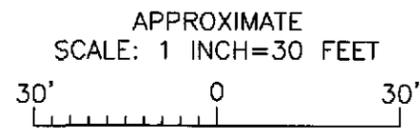
- C = CONCRETE OR ASPHALT
- 1 = 0-12" SOIL
- 2 = 12"-24" SOIL
- 3 = 24"-48" SOIL
- 4 = 48"-72" SOIL
- 5 = 72"-96" SOIL
- 6 = 96"-120" SOIL
- 7 = 120"-144" SOIL
- W = GROUNDWATER

ANALYTE LIST:
 G = ARSENIC

• DID NOT PENETRATE CONCRETE AT FOLLOWING:

LOCATION	CONCRETE DEPTH EXCEEDS (FROM GROUND SURFACE)
4	55 INCHES
N	46 INCHES
FF	28 INCHES
XX	28 INCHES

- SECOND CONCRETE FOUNDATION AT 24" AT LOCATIONS 7, J, & L
- DID NOT PENETRATE RUBBLE BENEATH ASPHALT AT LOCATION 5 & O'
- TWO CONCRETE CORES ANALYZED AT LOCATION 4 (0-18" & 18"-55")
- FIVE WIPE SAMPLES OF SUPERSTRUCTURE ANALYZED FOR ARSENIC (LOCATIONS NOT NOTED. SEE WRITTEN TEXT OF REPORT)



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REV	DESCRIPTION OF REVISION	BY	DATE

VICKSBURG CHEMICAL
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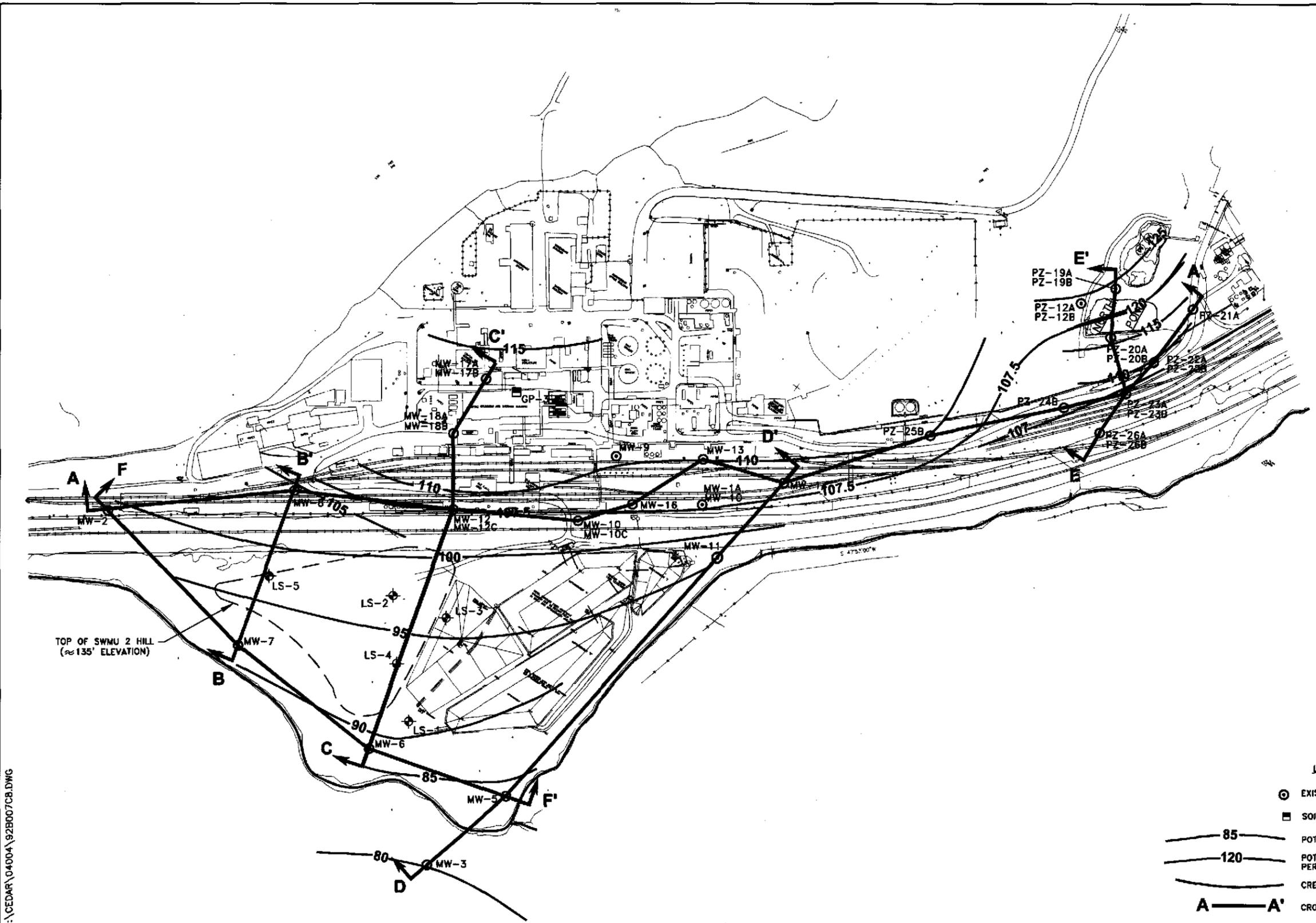
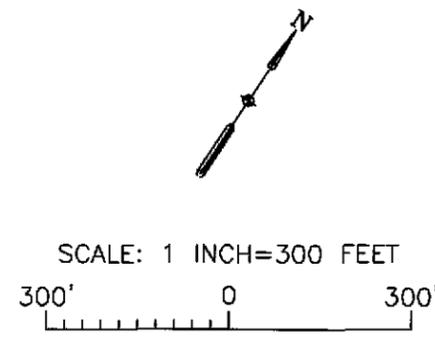
URS
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REFERENCE DRAWINGS	SCALE
	1"=30'
DESIGNED	
DRAWN	
CHECKED	
PEER REVIEWED	
DATE	11/3/00

SWMU 11, 12 15 EXPEDITED RFI

CONCENTRATION OF ARSENIC IN SOIL

REVISION
PROJECT 35092B007C
FIGURE 9-5



- LEGEND:**
- ⊙ EXISTING MONITOR WELL OR PIEZOMETER LOCATION
 - SOIL BORING LOCATION
 - 85 — POTENTIOMETRIC CONTOUR (UPPERMOST AQUIFER)
 - 120 — POTENTIOMETRIC CONTOUR PERCHED WATER TABLE IN NORTH POND AREA
 - CREEK
 - A — A' CROSS-SECTION LOCATION LINE

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REV	DESCRIPTION OF REVISION	BY	DATE
AS OF MAY 2001		POG	8/16/01
ADD SWMU 2 BORINGS		POG	8/17/00

VICKSBURG CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI

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SCALE	1"=300'
DESIGNED	
DRAWN	PCG
CHECKED	
PEER REVIEWED	
DATE	8/17/01

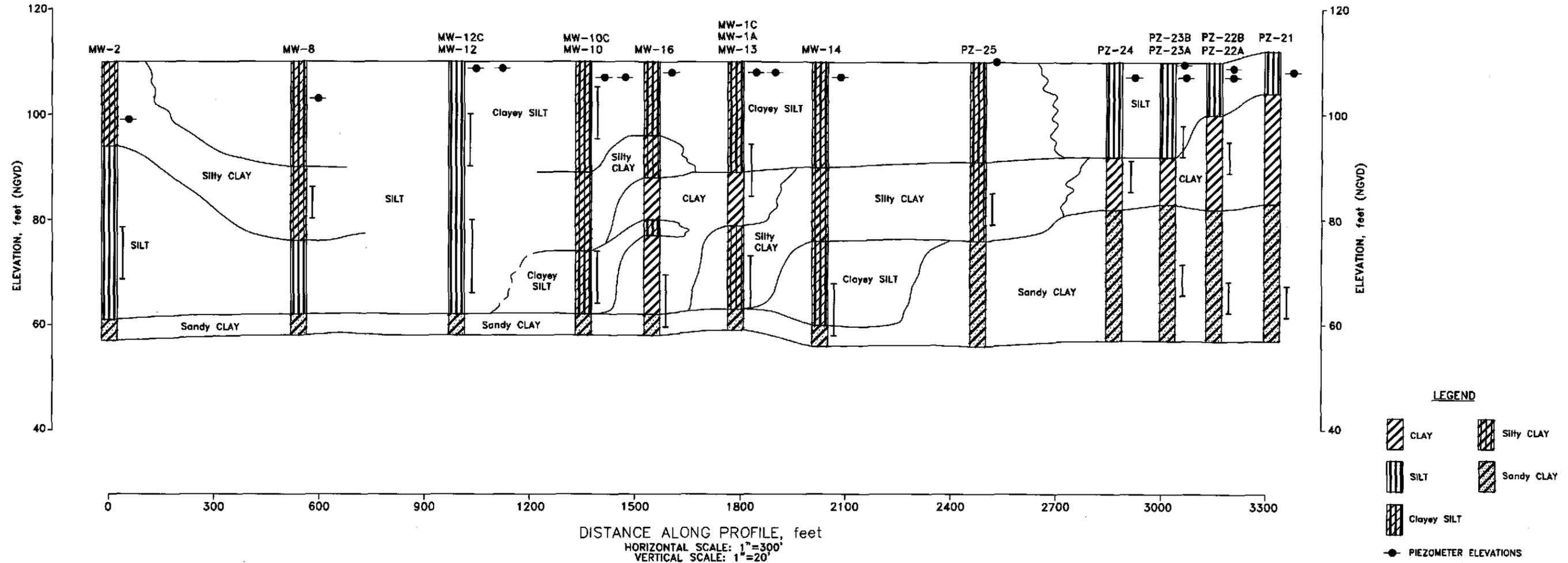
SWMU 2 REPORT

**POTENTIOMETRIC CONTOURS
WITH CROSS SECTION LOCATIONS**

REVISION	2
PROJECT	35092B007C
FIGURE	21-1

A
WEST

A'
EAST



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△			
△			
△			
△			
△	"AS IS" PER MAY 2001 RFI PHASE II	PCG	7/19/01
△	ADD WELL SCREEN AND PIEZOMETER ELEVATIONS	PCG	11/3/00
REV	DESCRIPTION OF REVISION	BY	DATE

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VICKSBURG, MISSISSIPPI

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REFERENCE DRAWINGS	SCALE
	AS SHOWN
	DESIGNED
	DRAWN PCG
	CHECKED
	PEER REVIEWED
	DATE 7/19/01

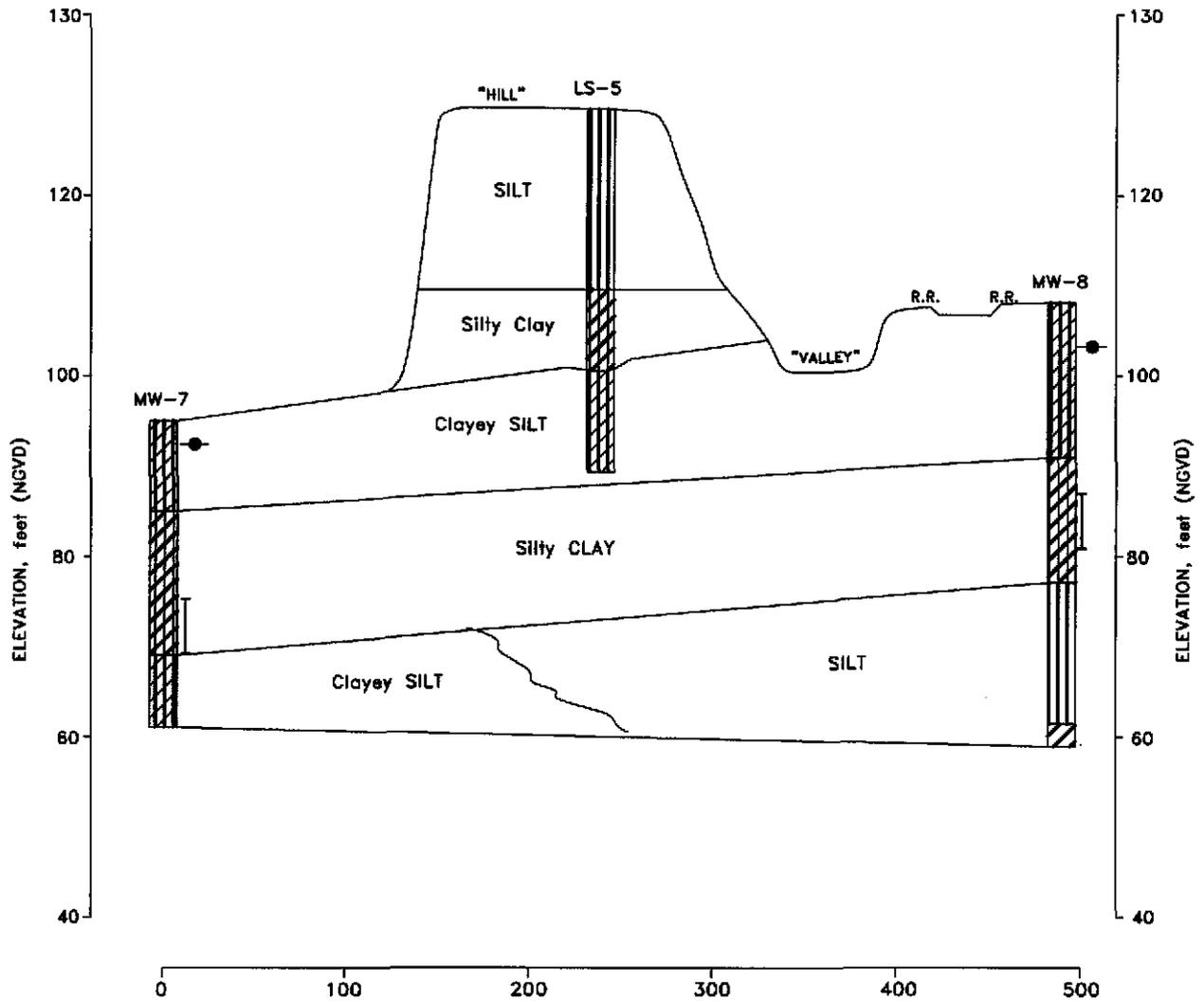
RFI REPORT

CROSS-SECTION A-A'

REVISION	△
PROJECT	3596B007C
FIGURE	21-2

B
SOUTH

B'
NORTH



LEGEND

- CLAY
- Silty CLAY
- SILT
- Sandy CLAY
- Clayey SILT
- PIEZOMETER ELEVATIONS
- EXISTING SCREEN ELEVATION

DISTANCE ALONG PROFILE, feet

HORIZONTAL SCALE: 1"=100'
VERTICAL SCALE: 1"=20'

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SCALE: AS SHOWN	DRAWN BY: PCG CHKD. BY:	DATE: 7/19/01 DATE:
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RFI REPORT

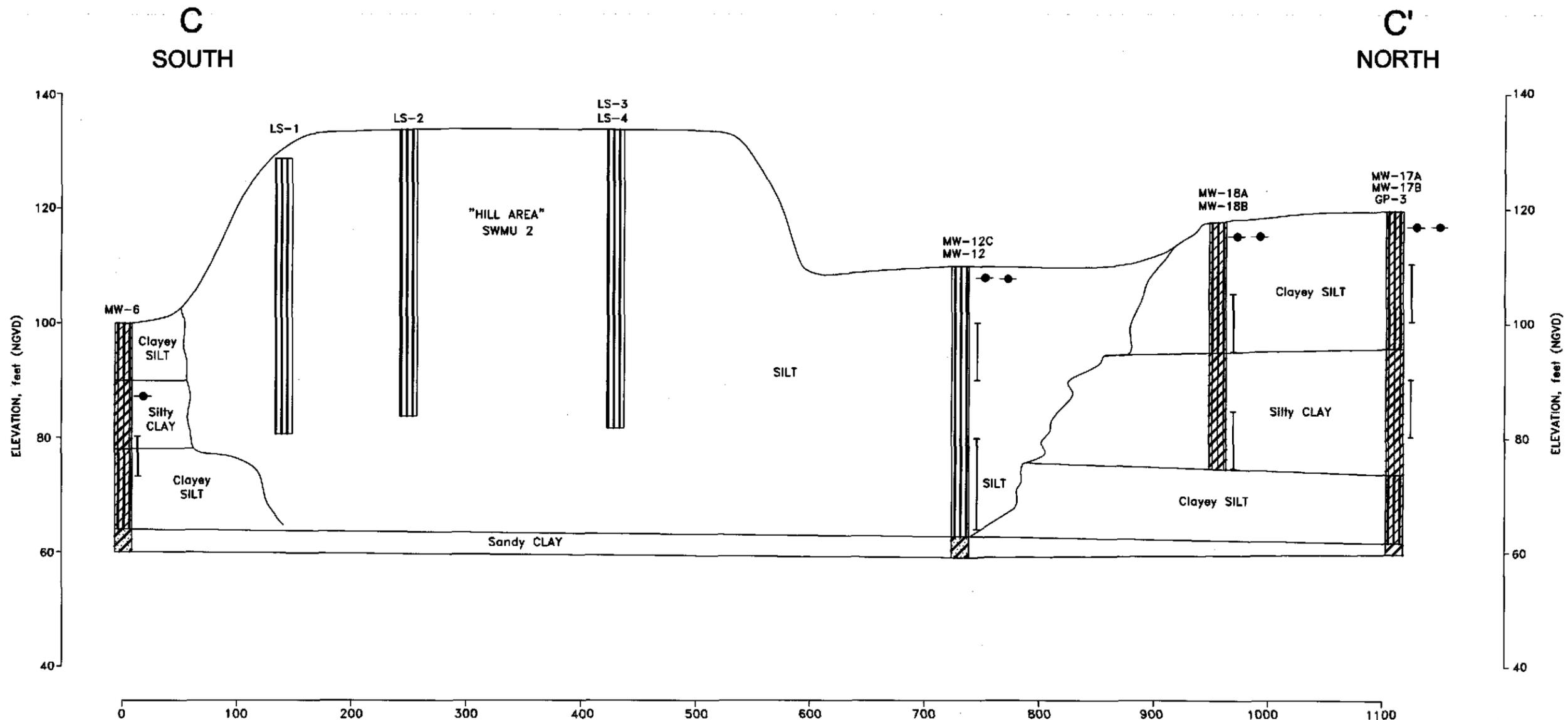
CROSS-SECTION B-B'

PROJ. NO.

35082B007C

FIGURE

21-3



DISTANCE ALONG PROFILE, feet
 HORIZONTAL SCALE: 1"=100'
 VERTICAL SCALE: 1"=20'

LEGEND

- CLAY
- Silty CLAY
- PIEZOMETER ELEVATIONS
- SILT
- Sandy CLAY
- PIEZOMETER ELEVATIONS
- Clayey SILT
- EXISTING SCREEN ELEVATION
- EXISTING SCREEN ELEVATION

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△			
△			
△			
△	AS IS" PER MAY 2001 RFI PHASE II	PCG	7/19/01
△	ADD WELL SCREEN & PIEZOMETER ELEVATIONS	PCG	11/3/00
REV	DESCRIPTION OF REVISION	BY	DATE

VICKSBURG CHEMICAL CORPORATION
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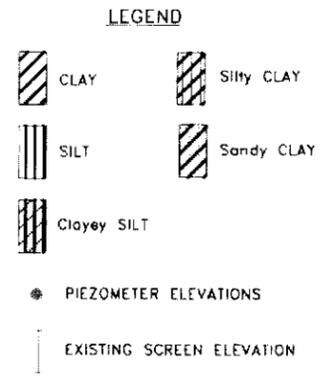
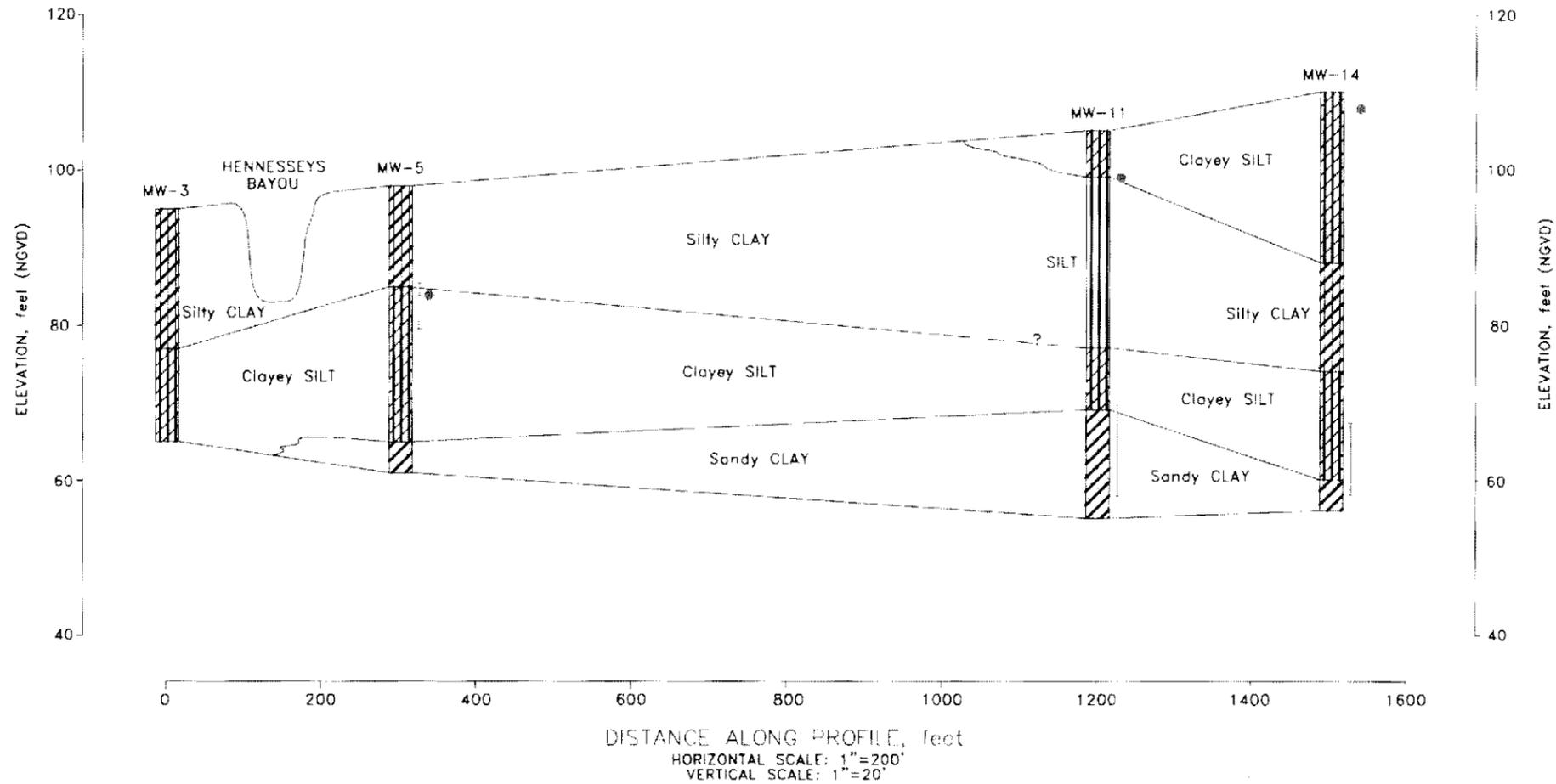
REFERENCE DRAWINGS	SCALE
	AS SHOWN
	DESIGNED
	DRAWN PCG
	CHECKED
	PEER REVIEWED
	DATE 7/19/01

RFI REPORT	
CROSS-SECTION C-C'	

REVISION	△
2	
PROJECT	35096B007C
FIGURE	21-4

D
SOUTH

D'
NORTH



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△			
△			
△			
△			
△	ADD WELL SCREEN AND PIEZOMETER ELEVATIONS	PCG	11/3/00
REV	DESCRIPTION OF REVISION	BY	DATE

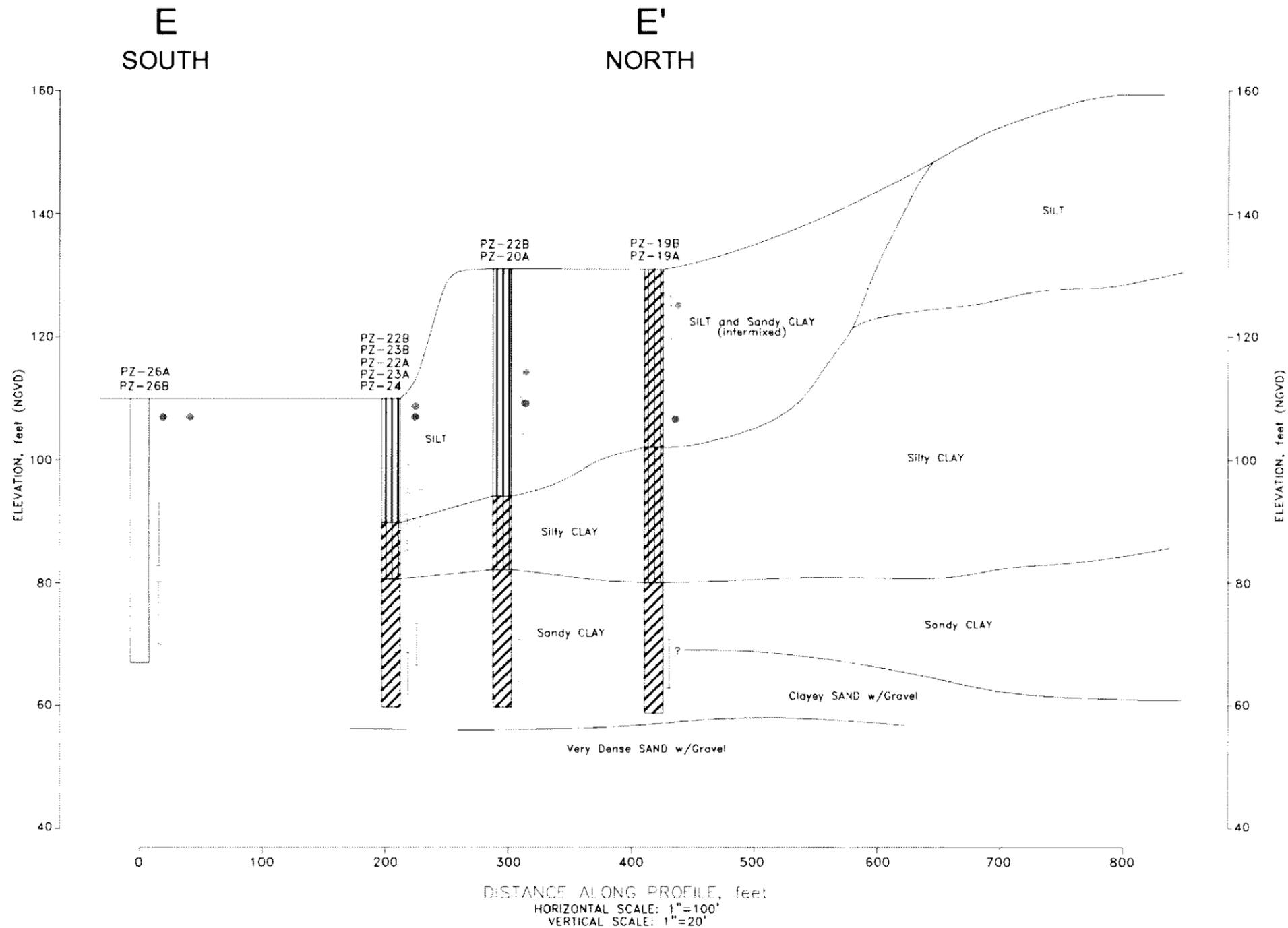
VICKSBURG CHEMICAL CORPORATION
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2822 O'Neal Lane
Baton Rouge, Louisiana 70816
225/751-1873

REFERENCE DRAWINGS	SCALE AS SHOWN
	DESIGNED
	DRAWN PCG
	CHECKED
	PEER REVIEWED
	DATE 7/19/01

RFI REPORT
CROSS-SECTION D-D'

REVISION	
PROJECT	35092B007C
FIGURE	21-5



LEGEND

	CLAY		Silty CLAY
	SILT		Sandy CLAY
	Clayey SILT		
●	PIEZOMETER ELEVATIONS		
⊕	PIEZOMETER ELEVATIONS		
---	EXISTING SCREEN ELEVATION		
---	EXISTING SCREEN ELEVATION		
---	EXISTING SCREEN ELEVATION		

K:\CEDAR\04004\92B007C13.DWG

REV	DESCRIPTION OF REVISION	BY	DATE
△			
△			
△	"AS IS" PER MAY 2001 RFI PHASE II	PCG	7/19/01
△	ADD WELL SCREEN & PIEZOMETER ELEVATIONS	PCG	11/3/00
△	ADD PROPOSED PZ-26	PCG	11/3/00

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REFERENCE DRAWINGS	SCALE
	AS SHOWN
	DESIGNED
	DRAWN
	CHECKED PCG
	PEER REVIEWED
	DATE 7/19/01

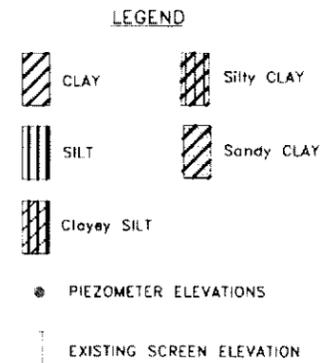
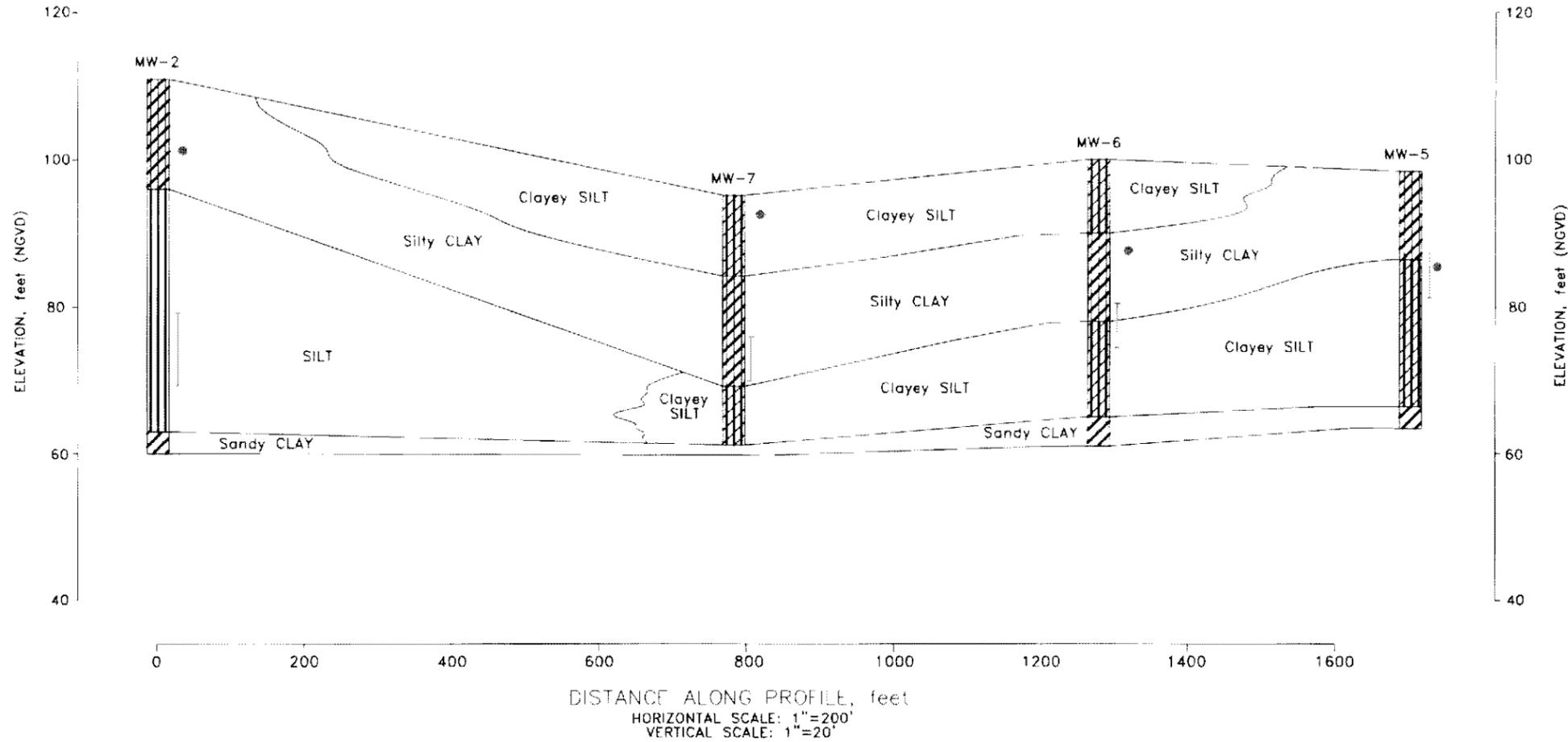
RFI REPORT

CROSS-SECTION E-E'

REVISION
2
PROJECT 35092B1007C
FIGURE 21-6

F
WEST

F'
EAST



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△			
△			
△			
△			
△	ADD WELL SCREEN AND PIEZOMETER ELEVATIONS	PCG	11/22/00
REV	DESCRIPTION OF REVISION	BY	DATE

VICKSBURG CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI

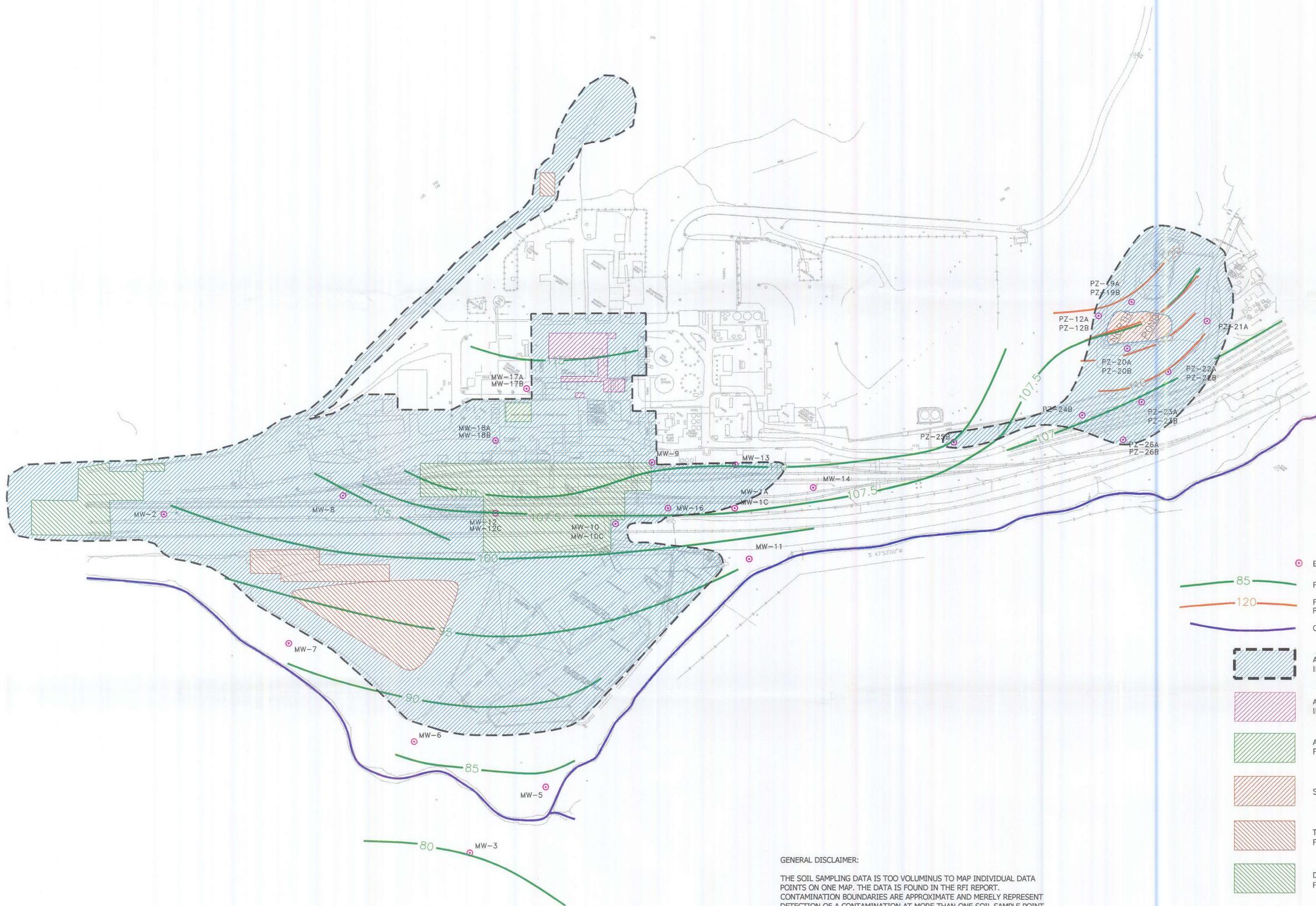
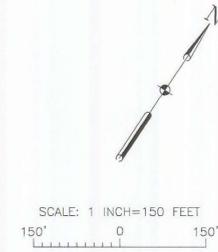
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225/751-1873

REFERENCE DRAWINGS	SCALE AS SHOWN
	DESIGNED
	DRAWN PCG
	CHECKED
	PEER REVIEWED
	DATE 7/19/01

RFI REPORT

CROSS-SECTION F-F'

REVISION	1
PROJECT	35092B007C
FIGURE	21-7



LEGEND:

- EXISTING PERMANENT MONITOR WELL OR PIEZOMETER LOCATION
- 85 POTENTIOMETRIC CONTOUR (UPPERMOST AQUIFER)
- 120 POTENTIOMETRIC CONTOUR PERCHED WATER TABLE IN NORTH POND AREA
- CREEK
- APPROXIMATE BOUNDARIES OF SOIL/CONCRETE INVESTIGATIONS
- ARSENIC CONTAMINATION FOUND WITHIN INVESTIGATED BOUNDARIES
- ARSENIC AND TOXAPHENE CONTAMINATION FOUND WITHIN INVESTIGATED BOUNDARIES
- SOIL/SLUDGE CONTAINING VOAs
- TOXAPHENE CONTAMINATION FOUND WITHIN INVESTIGATED BOUNDARIES
- DINOSEB AND TOXAPHENE CONTAMINATION FOUND WITHIN INVESTIGATED BOUNDARIES

GENERAL DISCLAIMER:
THE SOIL SAMPLING DATA IS TOO VOLUMINUS TO MAP INDIVIDUAL DATA POINTS ON ONE MAP. THE DATA IS FOUND IN THE RFI REPORT. CONTAMINATION BOUNDARIES ARE APPROXIMATE AND MERELY REPRESENT DETECTION OF A CONTAMINATION AT MORE THAN ONE SOIL SAMPLE POINT AND NOT NECESSARILY IN CONCENTRATIONS THAT EXCEED VALUES IN THE MDEQ TIER 1 TABLE.

REV	DESCRIPTION OF REVISION	BY	DATE
1	RFI COMPLETE	PCG	7/19/01
2	MODIFY CONTAMINATION AREA TO INCLUDE PORTION OF ATRAZINE WAREHOUSE & NORTH POND	PCG	7/18/00
3	RELOCATE MW-18A/MW-18B, ADD MW-1C, PZ-26A/PZ-26B		

VICKSBURG CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI

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REFERENCE DRAWINGS	SCALE: 1"=150'
DESIGNED:	
DRAWN: PCG	
CHECKED:	
PEER REVIEWED:	
DATE: 7/19/01	

RFI REPORT
OVERVIEW OF SITE WIDE
SOIL CONTAMINATION

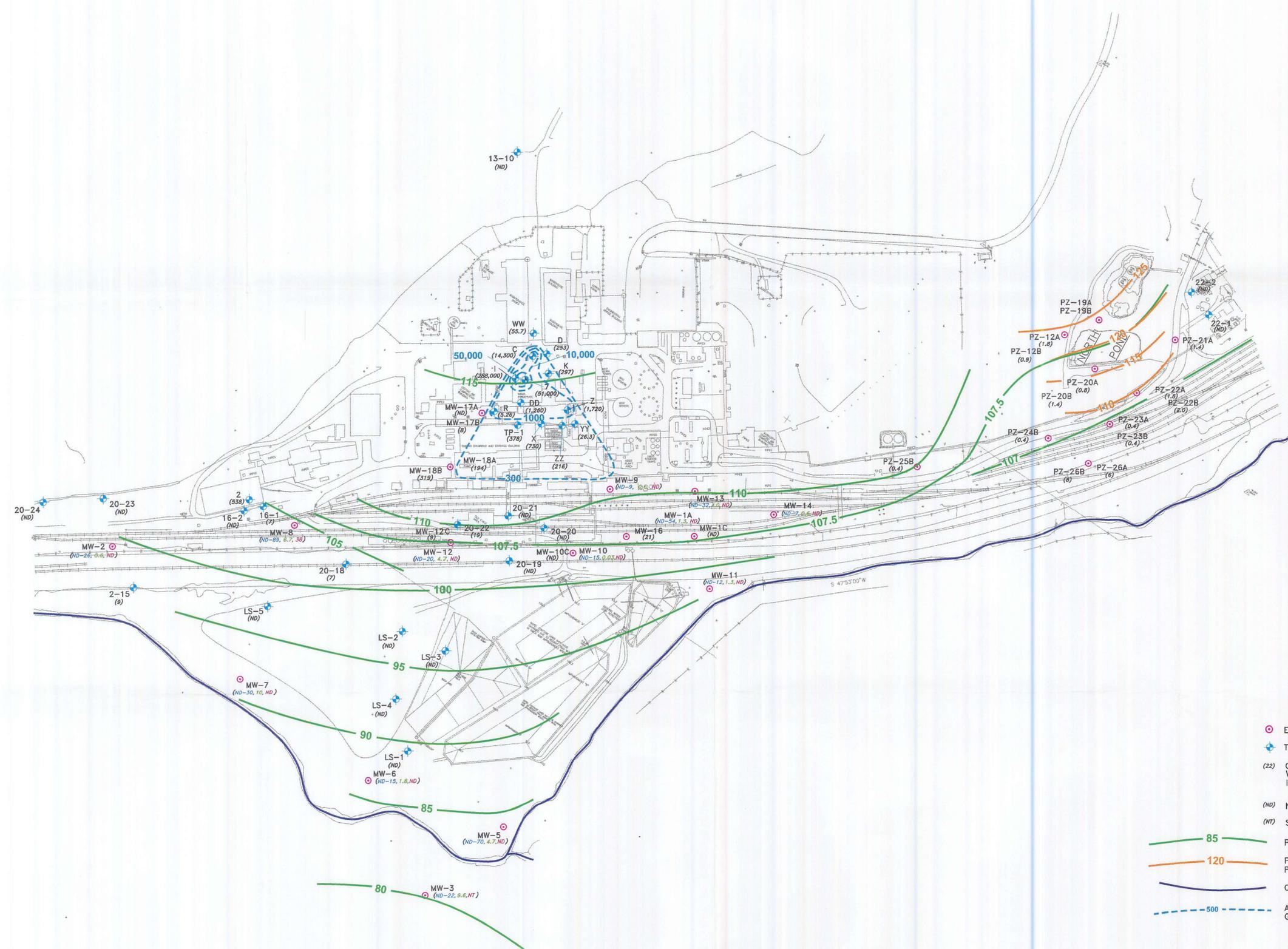
REVISION:
PROJECT: 35092B007C
DRAWING: 18-6

K:\CEDAR\04004\928007\15.DWG

DRAWING:



SCALE: 1 INCH=150 FEET
150' 0 150'



- LEGEND:**
- EXISTING MONITOR WELL OR PIEZOMETER LOCATION
 - ⊕ TEMPORARY GROUNDWATER MONITORING WELL
 - (22) CONCENTRATIONS OF ARSENIC IN GROUNDWATER ug/l WHERE MULTIPLE ANALYSES ARE AVAILABLE THE CONCENTRATION IS RECORDED AS (RANGE, AVERAGE, JUNE 2001 CONCENTRATIONS)
 - (ND) NOT DETECTED
 - (NT) SAMPLE NOT OBTAINED
 - 85 POTENTIOMETRIC CONTOUR (UPPERMOST AQUIFER)
 - 120 POTENTIOMETRIC CONTOUR PERCHED WATER TABLE IN NORTH POND AREA
 - CREEK
 - 500 ARSENIC CONCENTRATION IN GROUNDWATER ISOPLETHS (ppb)

TRG-10 ug/l

K:\CEDAR\0400A\92B007\CHASEZ.DWG

REV	DESCRIPTION OF REVISION	BY	DATE

VICKSBURG CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI

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2822 O'Neal Lane
Baton Rouge, Louisiana 70816
225/751-1873

REFERENCE DRAWINGS	SCALE: 1"=150'
	DESIGNED: PGG
	DRAWN: PGG
	CHECKED: PGG
	PEER REVIEWED: PGG
	DATE: 7/17/01

RFI REPORT
**OVERVIEW OF SITE WIDE ARSENIC
GROUNDWATER CONTAMINATION**

REVISION	PROJECT	DRAWING
	35092B007C	18-1

30NMV202



SCALE: 1 INCH=150 FEET
150' 0 150'



LEGEND:

- ⊙ EXISTING MONITOR WELL OR PIEZOMETER LOCATION
- ⊕ TEMPORARY GROUNDWATER MONITORING WELL
- (22) CONCENTRATIONS OF TOXAPHENE IN GROUNDWATER ug/l WHERE MULTIPLE ANALYSES ARE AVAILABLE THE CONCENTRATION IS RECORDED AS (RANGE, AVERAGE, JUNE 2001 CONCENTRATIONS)
- (ND) NOT DETECTED

- 85 POTENTIOMETRIC CONTOUR (UPPERMOST AQUIFER)
- 120 POTENTIOMETRIC CONTOUR PERCHED WATER TABLE IN NORTH POND AREA
- CREEK

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REV	DESCRIPTION OF REVISION	BY	DATE

VICKSBURG CHEMICAL CORPORATION
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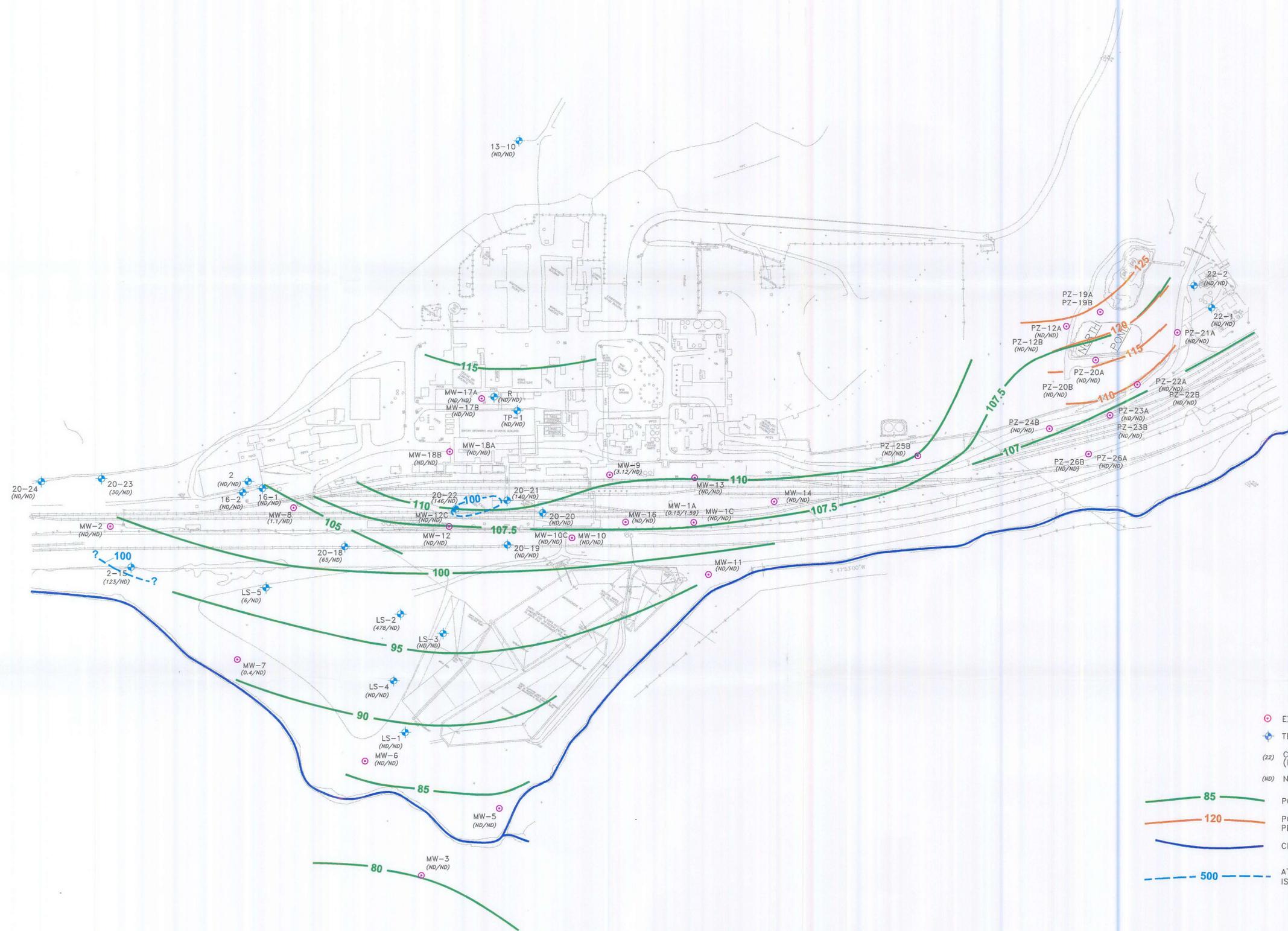
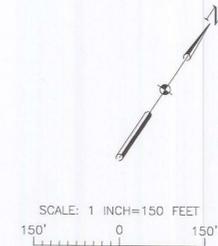
REFERENCE DRAWINGS

SCALE:	1"=150'
DESIGNED:	
DRAWN:	PCG
CHECKED:	
PEER REVIEWED:	
DATE:	7/17/01

RFI REPORT

OVERVIEW OF SITE WIDE TOXAPHENE
GROUNDWATER CONTAMINATION

REVISION:	
PROJECT:	35092B007C
DRAWING:	18-3



- LEGEND:**
- EXISTING MONITOR WELL OR PIEZOMETER LOCATION
 - ⊕ TEMPORARY GROUNDWATER MONITORING WELL
 - (22) CONCENTRATIONS OF ATRAZINE/CYANAZINE IN GROUNDWATER ug/l (HIGHEST CONCENTRATION RECORDED AT WELL)
 - (ND) NOT DETECTED
 - 85 — POTENTIOMETRIC CONTOUR (UPPERMOST AQUIFER)
 - 120 — POTENTIOMETRIC CONTOUR PERCHED WATER TABLE IN NORTH POND AREA
 - CREEK
 - - - 500 - - - ATRAZINE CONCENTRATION IN GROUNDWATER ISOPLETHS (ppb)

K:\CEDAR\0400A\92B007CBASE.DWG (ATRAZINE-CYANAZINE)

REV	DESCRIPTION OF REVISION	BY	DATE

VICKSBURG CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI

URS
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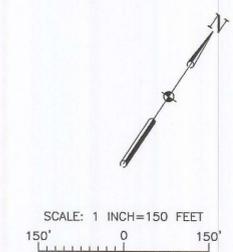
REFERENCE DRAWINGS	SCALE: 1"=150'
	DESIGNED:
	DRAWN: PCG
	CHECKED:
	PEER REVIEWED:
	DATE: 7/17/01

RFI REPORT

OVERVIEW OF SITE WIDE ATRAZINE AND CYANAZINE GROUNDWATER CONTAMINATION

REVISION	△
PROJECT:	35092B007C
DRAWING:	18-5

DRAWING



LEGEND:

- EXISTING PERMANENT MONITOR WELL OR PIEZOMETER LOCATION
- 85 POTENTIOMETRIC CONTOUR (UPPERMOST AQUIFER)
- 120 POTENTIOMETRIC CONTOUR PERCHED WATER TABLE IN NORTH POND AREA
- CREEK
- APPROXIMATE BOUNDARIES OF SOIL/CONCRETE INVESTIGATIONS
- ARSENIC CONTAMINATION FOUND WITHIN INVESTIGATED BOUNDARIES
- ARSENIC AND TOXAPHENE CONTAMINATION FOUND WITHIN INVESTIGATED BOUNDARIES
- SOIL/SLUDGE CONTAINING VOAs
- TOXAPHENE CONTAMINATION FOUND WITHIN INVESTIGATED BOUNDARIES
- DINOSEB AND TOXAPHENE CONTAMINATION FOUND WITHIN INVESTIGATED BOUNDARIES

GENERAL DISCLAIMER:

THE SOIL SAMPLING DATA IS TOO VOLUMINUS TO MAP INDIVIDUAL DATA POINTS ON ONE MAP. THE DATA IS FOUND IN THE RFI REPORT. CONTAMINATION BOUNDARIES ARE APPROXIMATE AND MERELY REPRESENT DETECTION OF A CONTAMINATION AT MORE THAN ONE SOIL SAMPLE POINT AND NOT NECESSARILY IN CONCENTRATIONS THAT EXCEED VALUES IN THE MDEQ TIER 1 TABLE.

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REV	DESCRIPTION OF REVISION	BY	DATE
△			
△			
△	RFI COMPLETE	PCG	7/19/01
△	MODIFY CONTAMINATION AREA TO INCLUDE PORTION OF ATRAZINE WAREHOUSE & NORTH POND	PCG	7/18/00
△	RELOCATE MW-18A/MW-18B, ADD MW-1C, PZ-26A/PZ-26B		

VICKSBURG CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI

URS
2822 O'Neal Lane
Baton Rouge, Louisiana 70816
225/751-1873

REFERENCE DRAWINGS	SCALE: 1"=150'
	DESIGNED:
	DRAWN: PCG
	CHECKED:
	PEER REVIEWED:
	DATE: 7/19/01

RFI REPORT

OVERVIEW OF SITE WIDE
SOIL CONTAMINATION

REVISION	PROJECT:
△	35092B007C
	DRAWING:
	18-6