RCRA FACILITY INVESTIGATION INTERIM REPORT AND PHASE II WORKPLAN

Prepared for
Vicksburg Chemical Company
Vicksburg, Mississippi

Revision 1
March 16, 2001

File No. 35092B007C.00-03012

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

Don Watts

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
7000 0520 0025 3772 8042

Vicksburg Chemical Company

February 1, 2001

Dr.Judy Sophianopoulos
Waste Compliance Section
RCRA and FF Branch
U.S.EPA, Region IV
Mailcode 4WD-RCRA
61 Forsyth Street, SW
Atlanta, Georgia 30303

Re: Vicksburg Chemical, Consent Decree W92-0008(B)
RFI Workplan - Minor Additions to Phase I.

Dear Dr. Sophianopoulos:

The Workplan for Phase I sampling was executed on the anticipation of finding widespread dinoseb contamination in the railroad area surrounding the former dinoseb manufacturing plant. The soil samples were obtained at a depth of two feet and six to eight feet; the presumption being that with the mobility of dinoseb and characteristics of the soil, the two feet deep sample would also represent the soil directly on the surface. Analysis of the soil samples revealed no widespread dinoseb contamination as originally theorized. It is known by internal Vicksburg analyses, that there is some dinoseb contamination on the surface. The surface contamination has not been delineated.

It is proposed to go into the field next week to sample soil directly on the surface in certain suspect areas and analyze only for dinoseb and toxaphene. Also there is a soil pile that has been accumulated for probable treatment that will be sampled and analyzed and another soil pile thought to be clean that will be sampled and analyzed.

SURFACE SAMPLING

Two sketches are attached which depict grids of 2500 square feet sections. The sketches have a scale of one-inch equals 100 feet. Two soil samples will be obtained from each 2500 square feet section and composited to create one sample for analysis in each 10,000 square feet area. Thus 10 composite samples will be obtained in the railroad area and 5 composite samples will be analyzed in the atrazine warehouse area.

SOIL PILE SAMPLING

There is a soil pile within the boundary of the railroad area grid that is about 200 feet long. It will be partitioned in eight sections, each 25 feet long. Four samples will be obtained in each section, two from the surface and two from within the pile. The four samples will be composited for one analysis.

There is a soil pile within the boundary of the atrazine warehouse grid that is about 400 feet long. It will be partitioned in eight sections, each 50 feet long. Four samples will be obtained in each section, two from the surface and two from within the pile. The four samples will be composited for one analysis.

INTERPRETATION OF RESULTS

Samples greater than the TRG Table 1 value will be "dirty". Samples less than the TRG Table 1 value divided by four will be "clean". Results obtained between the two concentrations will dictate additional discrete sampling and analysis of the particular 10,000 square feet section or pile section during the Phase II sampling effort.

OTHER CONSIDERATIONS

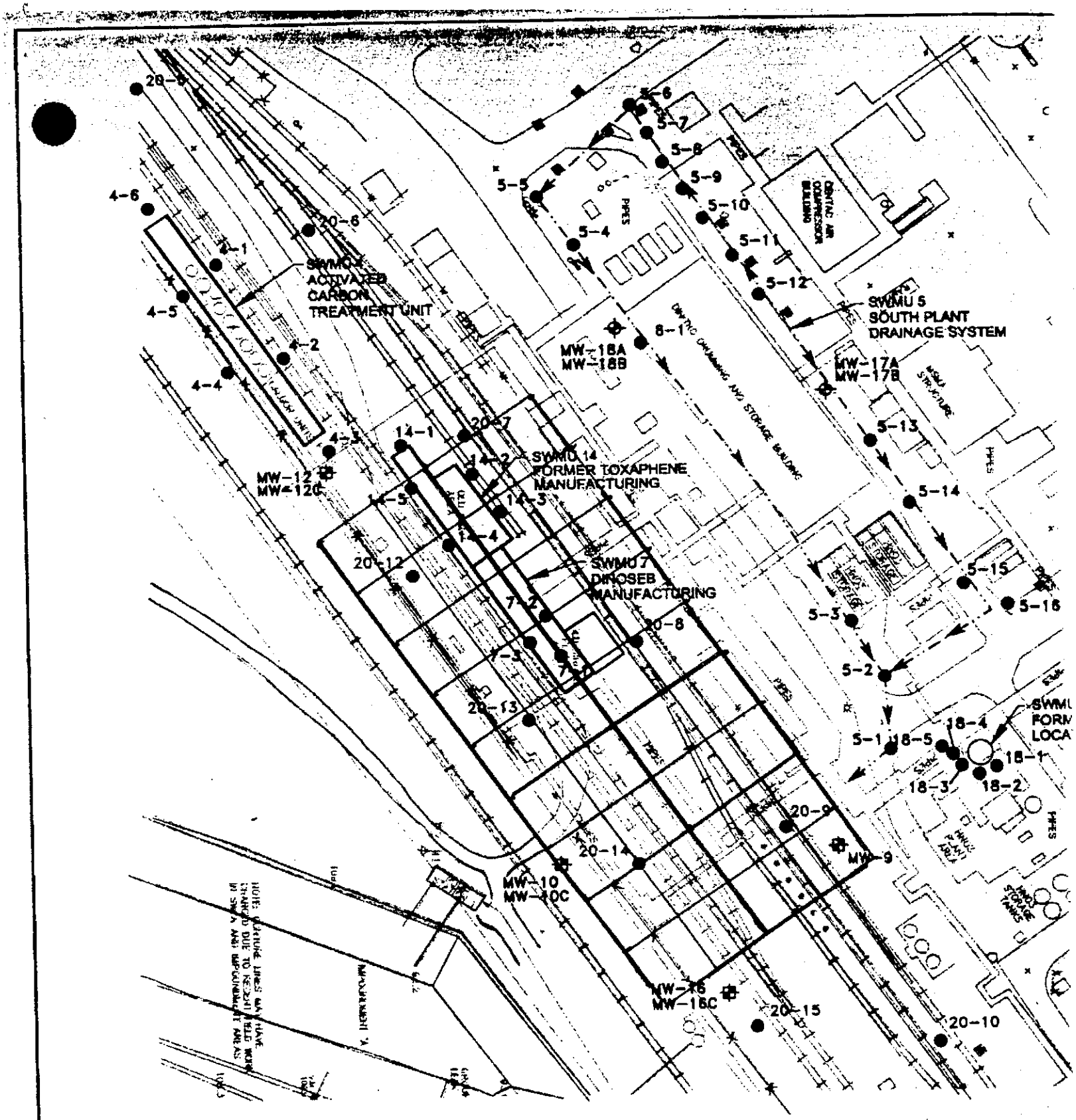
Samples will be composited by thorough stirring in a five-gallon bucket. Samples will be obtained by trowel, shovel or auger. Sampling equipment and the bucket will be decontaminated between composited samples. There will be two QA/QC samples.

If you have any questions, please call or e-mail. My e-mail for this location is sboswell@kpower.com.

Very truly yours,

Steve Boswell
Director of Environmental Affairs

xc: Mr. Jerry Banks, MSDEQ



REV	DESCRIPTION OF REVISION	BY	DATE
2	MODIFY PER REVISED TOXAPHENE DINOSEB AND ATRAZINE ANALYSES	POS	1/16/01
1	ADD PHASE I BORINGS	POS	12/9

VICKSBURG CHEMICAL COMPANY
VICKSBURG, MISSISSIPPI

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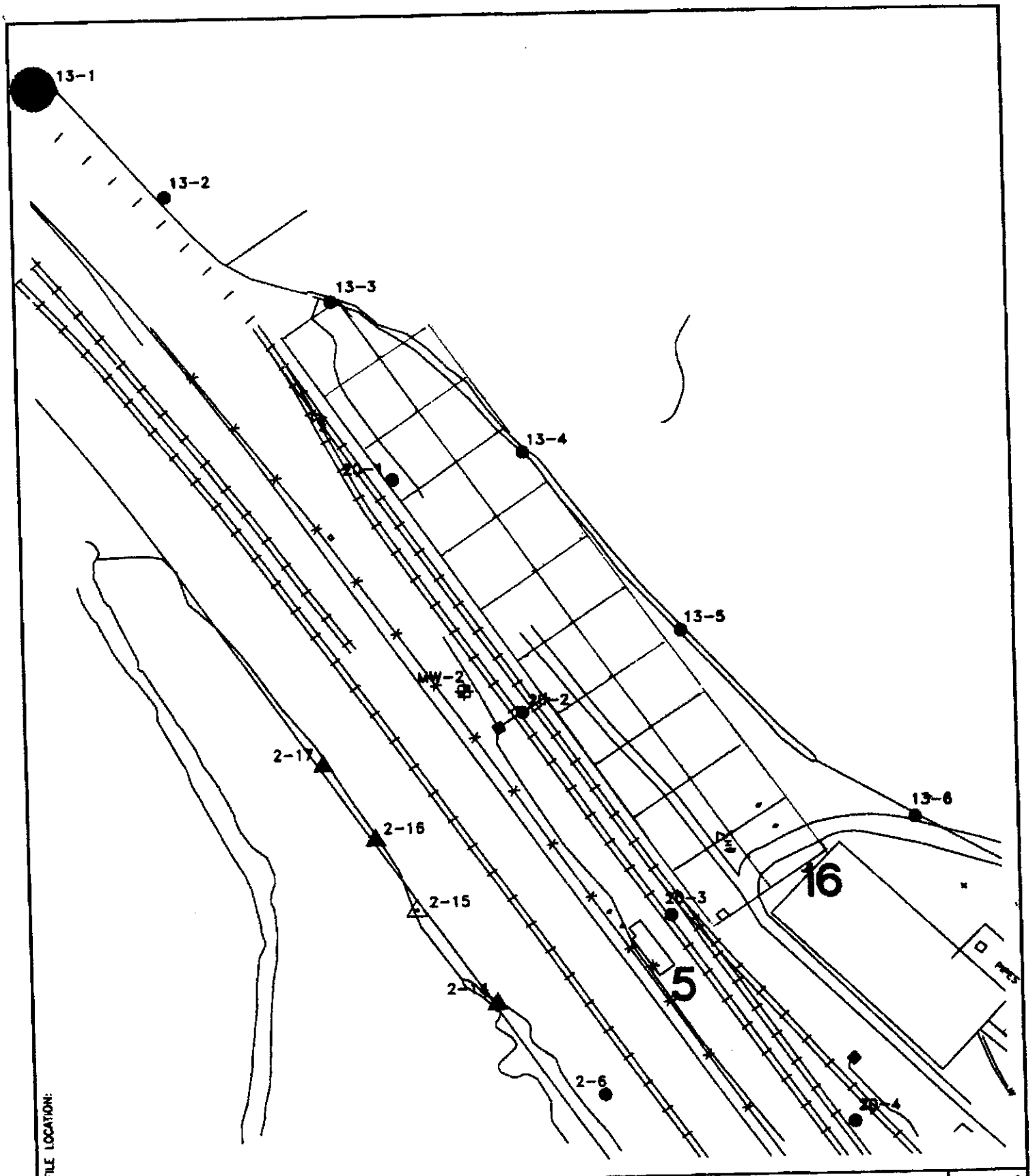
225/751-1873



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

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FIGURES

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 FRI 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 15,1 998)	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.

In October 2000, the Phase I RFI fieldwork was completed for the remaining SWMUs, the list 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
- SWMU 30 - Waste Oil
- SWMU 34 - Surplus Equipment Yard

In addition, the following SWMUs were inspected:

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

One purpose of this report is to discuss the October 2000 field activity, the results derived from that activity, and to suggest additional RFI field efforts required. A summary of all data collected in October 2000 is included in tables. The December 15, 2000 issue of this report contained some reporting errors by the analytical laboratory; the errors have been corrected in the March 16, 2001 Revision 1. In addition, the March 16, 2001 Revision 1 contains results of additional sampling of the direct surface done in the SWMU 20 area.

An additional purpose of this report is to summarize work previously completed at various SWMUs and suggest additional RFI field efforts required at those 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 suggest 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 and Suggestions for Phase II

The final section (Section 21) of the report is a summary of all the suggestions for Phase II work. It summarizes the planned Phase II activity. The schedule for conducting the Phase II

work is contained in the overall project schedule of Section 18. The Phase II work and a Groundwater Assessment Work Plan need to be implemented for full and complete characterization of the Vicksburg site.

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.

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. The sample points were established on the basis of one sample per 2,500 ft^2 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:

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 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

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 effort is as follows:

TABLE 2-3

SAMPLES SUBMITTED – PHASE II

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

TABLE 2-3

SAMPLES SUBMITTED – PHASE II

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.

2.3 RESULTS OF SAMPLING AND ANALYSIS

A set of complete analytical data is provided in the original "RFI Report, SWMUs 16, 1 and 17", June 1997 as Attachment 3. The analytical results of Phase I sampling are summarized in Table 2-4. The results of Phase II sampling are summarized in Table 2-5 for groundwater and Table 2-6 for soil.

TABLE 2-4

RESULTS OF PHASE I SAMPLING µg/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	6-1-B	6-2-B	H-1-B	H-2-B	I-1-B	I-2-B	MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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	2,550	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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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		

TABLE 2-4 (Continued)

RESULTS OF PHASE I SAMPLING µg/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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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	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	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	8,980	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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	760	6,810
Dinoseb	ND	ND	ND	ND	ND	ND	97,500	ND	ND	15,700	ND	ND	ND	ND	ND	ND	ND	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	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		

NOTES:

(1) Sample ID = Location-Type-Parameters

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

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

TABLE 2-5

PHASE II GROUNDWATER SAMPLES µg-l (ppb)

	A-W-T	D-W-T	1-W-T	2-W-TA	MDEQ Tier 1 TRG Table µg/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 SOIL SAMPLES µg/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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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

2.4 CONCLUSIONS AND SUGGESTIONS FOR ADDITIONAL PHASE II WORK

- 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 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 may be localized caused by a spill of MSMA in the warehouse or may 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 are proposed to help resolve the question. Additionally, it is proposed to obtain one groundwater sample and three soil samples from each of two borings with temporary wells near location 2 in the

SWMU 16 Atrazine Warehouse, but outside the warehouse. The samples would be analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles. The sample locations are noted on Figure 2-3.

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 were submitted for analysis of compounds on the Toxic Compound List, the Toxic Analyte List, atrazine, cyanazine, and dinoseb.

Samples of soil 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 five locations. 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.

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.

TABLE 3-1

MW-5, MW-6, MW-7
SUMMARY OF HITS (CONCENTRATION RANGE IN ppb)
GROUNDWATER SAMPLING AND ANALYSIS

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 µg/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

TABLE 3-2 (Continued)

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 µg/L (ppb)
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 µg/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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/kg (ppb)
Acetone	ND	142	101	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,928	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	1,969	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	3,251	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 "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.

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-Dichloroethene	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-Dichloroethene (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-Dichloropehnol	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
Hexachlorocylopentadiene	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 µg/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		
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	ND	ND	ND	ND	ND	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 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		
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

3.4 CONCLUSIONS AND SUGGESTIONS FOR PHASE II

The delineation of horizontal and vertical contamination in the "Hill" area is complete if it is acknowledged that 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 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 not complete. There is evidence of significant toxaphene contamination probably due to runoff and erosion in the 1970s. One can not assume that the continuing maintenance of the existing cap on the landfill is sufficient to avoid further contamination of soil in the valley. It is possible that the cap should extend further on the side of the hill west of location LS-5; therefore, some sampling of the side of the hill west of the location LS-5 is required. Additionally the area covered by further sampling needs to be extended to the north and south parallel to the railroad tracks. Some of the Phase II sampling needs to be at greater depth and include groundwater. A portion of the area is covered with dense underbrush and is difficult to access. Another portion is wet and muddy during the spring. A pathway can be cut from a utility right of way near MW-7 to allow passage of the geoprobe. A track mounted geoprobe may be required.

Sampling of ten locations is proposed for Phase II. Samples at nine of the locations would include soil at a depth of 6 to 12 inches. The tenth location would be a boring to groundwater and would include three soil samples and one groundwater sample. Sample locations are depicted as 2-8 through 2-17 on Figure 1. Locations in the field may vary somewhat due to conditions at the time of sampling. Analysis would be for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles.

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.

TABLE 4-1

SWMU 4 – ACTIVATED CARBON TREATMENT UNIT – VOLATILES IN SOIL

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		
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

TABLE 4-2

SWMU 4 – ACTIVATED CARBON TREATMENT UNIT – SEMI-VOLATILES IN SOIL

Semi-Volatile Organics Component Name	Sample Results ug/Kg (ppb)							MDEQ Tier 1 TRG Table Unrestricted μg/kg (ppb)
	4-1	4-2	4-3	4-4	4-5	4-6	Component MDL ug/kg (ppb)	
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-Dichloropehnol	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
Hexachlorocylopentadiene	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)							MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)
	4-1	4-2	4-3	4-4	4-5	4-6	Component MDL ug/kg (ppb)	
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

TABLE 4-3

SWMU 4 – ACTIVATED CARBON TREATMENT UNIT – PESTICIDE/PCB IN SOIL

Organic Compound	Sample Results (ppb)						MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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 µg/kg(ppb)	MDEQ Tier 1 TRG Table Restricted µg/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

TABLE 4-5

SWMU 4 – ACTIVATED CARBON UNIT – METALS IN SOIL

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 AND SUGGESTIONS FOR PHASE II

Based on the toxaphene contamination found near the SWMU 4 containment area, additional samples will have to be taken. The runoff area between the main railroad line and the first Vicksburg track is 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. It is proposed that the Phase II investigation be 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. The area east of SWMU 4 is difficult to access, drains generally southward, and seeps underneath the main railroad track into the SWMU 2 "valley" area at sample location 2-1 through 2-7. During Phase II it is proposed that three soil samples and one groundwater sample be obtained at one boring location along the drainage path. The boring is noted as location 20-18 on Figure 1.

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.

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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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 AND SUGGESTIONS FOR PHASE II

It can be concluded from the analytical results from the 5-1 through 5-16 sections that no further sampling is required except as discussed in the next paragraph. Additionally, there are other sections of the drainage system. It is suggested that the other sections be handled as follows:

- It is suggested that corrective action for the MSMA manufacturing area be prioritized. Before implementing a plan, there must be a resolution of the permanent cleanup level for arsenic at the Vicksburg site. Additionally, the Phase II RFI, which includes installation of wells that monitor groundwater from SWMUs 11, 12 and 15, should be implemented first to help define the extent of the problem.

- For conclusions on SWMUs 7, 14 and 20, refer to the report sections 6, 13 and 19.

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. No additional sample locations are suggested.

With the inclusion that one location discussed above is in an area that has previously been adequately characterized, it is concluded that no additional sampling of SWMU 5 is required.

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. 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.

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.

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 at depths of 2 to 4 feet, 6 to 8 feet, and 10 to 12 feet. At SWMU 20, sixteen samples were obtained at depths of 2 to 4 feet and 6 to 8 feet.

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	2,880	25,800
Cyanazine	ND	ND	ND	ND	ND	ND	ND	ND	ND	760	6,810
Dinoseb	ND	ND	ND	7	ND	5	49	4	ND	78,200	204,000
Toxaphene	ND	ND	ND	46	17	19	ND	ND	ND	581	5,200
Arsenic	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	38,000	38,000

6.4 CONCLUSIONS AND SUGGESTIONS FOR PHASE II

Trace concentrations of toxaphene and dinoseb were detected The concentrations of toxaphene and dinoseb detected were below the concentration listed in the MDEQ Tier 1 TRG Table. The SWMU 7 is adjacent to SWMU 14 (Former Toxaphene Manufacturing Area). It is suggested that the entire SWMU 4, 7, 14 and 20 area be investigated as one during Phase II and that program is described in Section 13-SWMU 20 Railroad Area.

Additionally it is indicated that groundwater in shallower zones be monitored at locations MW-12 and MW-10. It is suggested that wells MW-12C and MW-10C, screened from 10 feet to 20 feet bgs, be installed at both locations.

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. It is approximately where monitor wells MW-18A and MW-18B will be established. The monitor wells will be established to monitor potential contaminant transport from SWMU 9 (Dinoseb Drumming Area) and from SWMU 12 (MSMA Manufacturing Area)). 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.

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

	Sample Results (ppb)				MDEQ Tier 1 TRG Unrestricted
Component	8-1 Concrete	8-1A	8-1B	8-1C	Table (ppb)
Atrazine	39	ND	ND	26	2,880
Cyanazine	ND	ND	ND	ND	760
Dinoseb	ND	ND	4	213	78,200

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	
Toxaphene	123	107	ND	48	581
Arsenic	9,800	3,200	2,100	ND	426
Toluene	ND	ND	ND	ND	38,000

7.4 CONCLUSIONS AND SUGGESTIONS FOR PHASE II

It is suggested that monitor wells MW-18A and MW-18B be installed at sample location 8-1. The function of the monitor wells will be to monitor SWMU 8, and SWMUs 9 and 12.

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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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.

TABLE 8-2

SWMU 9 – INORGANICS IN SOIL

	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

TABLE 8-2

SWMU 9 – INORGANICS IN SOIL

	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

TABLE 8-3

SWMU 9 – ORGANICS IN SOIL

	A-1 Result (µg/kg)	B-2 Result (µg/kg)	B-4 Result (µg/kg)	MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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
Phenanthene	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

TABLE 8-4

INORGANICS IN GROUNDWATER

	Groundwater Sample TP-1 µg/l (ppb)	MDEQ Tier 1 TRG Table µg/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 AND SUGGESTIONS FOR PHASE II

Installation of a nested pair of wells MW-18A and MW-18B is recommended adjacent to the southeast corner of SWMU 9. A sample of groundwater would be 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.

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.

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

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 depicts the concentration of arsenic in groundwater at SWMUs 11, 12 and 15. 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

TABLE 9-3

SUMMARY OF HITS FROM SAMPLING SUMPS AND DRAINAGE SYSTEMS
TCL/TAL COMPOUNDS PLUS CYANAZINE AND DIOXIN µg/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 µg/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 µg/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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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 µg/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
1 = 0 to 12 inches soil
2 = 12 to 24 inches soil
3 = 24 to 48 inches
4 = 48 to 72 inches
5 = 72 to 96 inches
6 = 96 to 120 inches
7 = 120 to 144 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 µg/l (ppb)

	C Ø-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 µg/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 µg/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

9.4 CONCLUSIONS AND SUGGESTIONS FOR PHASE II

The SWMU 11, 12 and 15 area has been adequately characterized. As a check, it is suggested that location EE, a sump which is part of the drainage system, be resampled and analyzed for dioxin. At the same time the quantity of solids in the bottom of the sump would be determined. Location EE is depicted on Figure 9-1. It is recommended that wells MW-17A, MW-17B, MW-18A, and MW-18B be installed as part of Phase II work to monitor the potential transport of arsenic in groundwater. Samples from each well would be obtained and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles.

It is further suggested that consideration be given to corrective action. Before implementing a plan there must be a resolution of the permanent cleanup level for arsenic at the Vicksburg site. Additionally, the Phase II RFI, which includes installation of wells that monitor groundwater from SWMUs 11, 12 and 15, should be implemented first to help define the extent of the problem.

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 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. The sample points are depicted on Figure 1 as locations 13-1 through 13-9.

Samples were analyzed for atrazine, cyanazine, arsenic, dinoseb and toxaphene.

10.3 RESULTS OF SAMPLING AND ANALYSIS

The results are tabulated below in Table 10-1.

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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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

10.4 CONCLUSIONS AND SUGGESTIONS FOR PHASE II

The results of analysis indicate that there is at present 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. Further investigation of the source will be pursued at SWMU 34. The drainage ditch is generally inaccessible by geoprobe; however, the geoprobe can access location 13-9, which is nearest SWMU 34 and highest in toxaphene concentration. Adjacent to location 13-9 one soil boring will be advanced. Three soil samples and one groundwater sample will be obtained at location 13-10 and will be analyzed for arsenic, atrazine, cyanazine, dinoseb and toxaphene. In addition, four surface samples of soil will be obtained at a depth of 6 to 12 inches in the area surrounding location 13-9. The samples will be analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles; however, the intent will be to determine the lateral extent of toxaphene contamination. The sample locations are identified as 13-12, 13-13, 13-14, and 13-15 on Figure 1.

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 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.

11.3 RESULTS OF SAMPLING AND ANALYSIS

Soil was sampled for atrazine, cyanazine, dinoseb, toxaphene, arsenic and toluene. Results are tabulated in the following table, Table 11-1. Sample locations are noted on Figures 1 and 2.

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

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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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	ND	ND	ND	ND	ND	ND	ND	ND	78,200	204,000
Toxaphene	ND	ND	ND	ND	57	ND	ND	108	ND	ND	ND	ND	ND	ND	ND	ND	ND	581	5,200
Arsenic	1,200	1,200	ND	ND	ND	ND	ND	ND	1,900	ND	ND	ND	ND	ND	ND	ND	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

11.4 CONCLUSIONS AND SUGGESTIONS FOR PHASE II

Toxaphene and dinoseb were detected at trace concentrations less than the MDEQ Tier 1 TRG Table concentration. Since SWMUs 4, 7, 14 and 20 all require additional investigation and are in close proximity to one another, it is suggested the Phase II effort for the SWMUs be executed for the area as one campaign. That campaign is discussed in Section 13-SWMU 20 Railroad Area.

Additionally, it is indicated that groundwater in shallower zones be monitored at locations MW-12 and MW-10. It is suggested that wells MW-12C and MW-10C, screened from 10 feet to 20 feet bgs, be installed at both locations. A sample of groundwater would be obtained from each well and analyzed for arsenic, atrazine, cyanazine, dinoseb and toxaphene.

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 taken 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 – ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE AND ARSENIC IN SOIL

Organics Component	Sample Results (ppb) 18-1	18-2	18-3	18-4	18-5	MDEQ Tier 1 TRG Table Unrestricted µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/kg (ppb)
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 AND SUGGESTIONS FOR PHASE II

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 sampling is recommended for Phase II.

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 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.

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 form to 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.

13.3 RESULTS OF SAMPLING AND ANALYSIS

Results of Phase I sampling are tabulated in the following table, Table 13-1 and results of Phase I Jr. sampling are tabulated in Table 13-12.

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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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	ND	ND	ND	ND	ND	ND	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	ND	ND	ND	ND	ND	ND	ND	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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/kg (ppb)
	20-A	20-B	20-C	20-D	20-E	20-F	20-G	20-H	20-I	20-H	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 µg/kg (ppb)	MDEQ Tier 1 TRG Table Restricted µg/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

13.4 CONCLUSIONS AND SUGGESTIONS FOR PHASE II

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

As a result of the Phase I investigation, it is 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 is suggested that one boring to groundwater be advanced downgradient of location 4-1. The location is noted as 20-18 on Figure 1. It is additionally suggested that one boring to groundwater be advanced downgradient of location 20-13. The location is noted as 20-19 on Figure 1. Locations 20-18 and 20-19 are presently accessible only from the main line railroad track. Three soil samples and one groundwater sample would be 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 will include sampling of groundwater in the most contaminated areas as noted below. There is about 10,000 cubic yards of soil to consider.
- In order to further investigate the railroad are near the former toxaphene and dinoseb and manufacturing areas it is suggested that three borings to groundwater be placed at locations 20-20, 20-21 and 20-22 as depicted on Figure 3. Three soil samples and one groundwater sample would be obtained per boring and would be analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles. Additionally, the horizontal extent of the surface sampling grids needs to be expanded. Seven additional surface composite sample areas have been added as 20-P through 20-U on Figure 3.
- In order to investigate the railroad area south of the atrazine warehouse, it is suggested that two borings to groundwater be placed at locations 20-23 and 20-24 as depicted on Figure 4. Three soil samples and one groundwater sample would be obtained per boring and would be 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 Figure 4.

It has been suggested that shallow wells (MW-12C and MW-10C) be installed to more adequately monitor potential groundwater contamination from SWMUs 14 and 7.

In order to also more adequately monitor the entire SWMU 20 area, it is suggested that at the MW-16 location, a similar shallow well MW-16C be installed. A groundwater sample would be obtained and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles.

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

Trial Unrefrd 312

The constituents in soil and groundwater analysis are tabulated below in Table 14-1 and Table 14-2. 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.

TABLE 14-1

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 14-2

SWMU 23 – NORTH POND – CONTAMINATION DETECTED IN GROUNDWATER

Orga..ic 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.

14.4 CONCLUSIONS AND SUGGESTIONS FOR PHASE II

The soil is well characterized; however, the extent of transport of halomethanes within the groundwater has not been completely determined.

It is recommended that an additional nested pair of monitor wells, PZ-26A and PZ-26B, be installed. Groundwater would be analyzed for volatiles.

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 of-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 FOR PHASE II

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 AND SUGGESTIONS FOR PHASE II

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

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.

TABLE 16-1

SWMU 34 – SURPLUS EQUIPMENT STORAGE – ATRAZINE, CYANAZINE, DINOSEB, TOXAPHENE, ARSENIC, TPH AND BTEX

	Sample Results (ppb)						MDEQ Tier 1 TRG Table Unrestricted (ppb)
Component	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 AND SUGGESTIONS FOR PHASE II

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.

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.

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.

17.4 CONCLUSIONS AND SUGGESTIONS FOR PHASE II

It is suggested that two borings with temporary wells be made adjacent to the collection sump. Three soil samples and one groundwater sample would be obtained per boring. The samples would be analyzed for volatiles.

The schedule of relevant 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.
- April 2-13, 2001 – The Phase II RFI field work is implemented.
- April 16 – May 11, 2001 – Analyze samples.
- April 16 – May 18, 2001 – Write Draft Final RFI Report and submit to MSDEQ and U.S. EPA.

- May 25, 2001 – MSDEQ and EPA comment on the draft Final RFI Report.
- June 1, 2000 – Final RFI Report is published.
- June 8, 2001 – Revision to Groundwater Assessment Work Plan is issued.
- June 15, 2001 – MSDEQ and EPA comment on revised groundwater assessment work plan.
- June 22, 2001 – Groundwater Assessment Work Plan is finalized.
- June 25, 2001 – The groundwater assessment field work is implemented.
- July 20, 2001 – Draft Groundwater Assessment Report is issued.
- July 27, 2001 – MSDEQ and EPA comment on Groundwater Assessment Report.
- August 3, 2001 – Final Groundwater Assessment Report is issued.
- August 6 – December 31, 2001 – Corrective Measures Studies are executed 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

19.1 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.

19.2 PROJECT PERSONNEL

Duties of key personnel are described below.

19.2.1 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.

19.2.2 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.

19.2.3 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.

19.2.4 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.

19.2.5 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 and employee medial 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.

19.2.6 QA/QC Manager

The QA/QC Manager will be responsible for coordination with the analytical laboratory and for the validation of data. Mr. Rodney Culpeper, 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.

20.1 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.

20.2 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 20-1

through 20-7. 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:

TABLE 20-1 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

20.3 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.

20.4 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.

20.5 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 20-1 – Potentiometric Contours with Cross Section Locations
- Figure 20-2 – Section A-A'; generally north/south at the railroad track elevation from the north plant to the south plant.
- Figure 20-3 – Section B-B'; generally east/west at the southern boundary of the south plant.
- Figure 20-4 – Section C-C'; generally east/west through the center of the south plant.
- Figure 20-5 – Section D-D'; generally east/west on the northern boundary of the south plant.
- Figure 20-6 – Section E-E'; generally east/west through the North Pond.
- Figure 20-7 – 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 20-1. 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.

20.6 LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

During the discussion of the investigative activities at the various SWMUs and suggestions for Phase II activity the installation of new wells has been recommended. In addition, monitor wells MW-5, MW-6 and MW-8 will be replaced by new four-inch diameter wells screened similarly to the old wells. This subsection 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 the Phase II effort. The contaminants that have been detected in the groundwater from each well have also been listed.

TABLE 20-2

LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

SWMU Numbers	Groundwater Sampled at Temporary Wells	Additional Groundwater Samples to be Obtained in Year 2001-Phase II	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 and 2 Reference: Table 2-5 and Figures 2-3	Locations 16-1 and 16-2 Reference: Figure 2-3	Soil and concrete generally clean. Arsenic in groundwater at Location 2 (Reference: Figure 2-3) needs investigation.	**MW-2:** Arsenic (ND-0.026)/10 1,2-Dichloroethene (ND-7.36)/100 Trichloroethene (ND-2.0)/5.0 **MW-8:** Arsenic (ND-0.068)/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: Figure 1	The "Hill" area is contaminated. Study interception and treatment of groundwater.	**MW-5:** Arsenic (ND-0.07)/10 Dinoseb (ND-12.0)/7.0 Trichloroethene (ND-79)/5.0 Xylene (ND-10)/10,000 **MW-6:** Arsenic (ND-0.015)/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-0.113)/10 Dinoseb (ND-4.5)/7.0 Toxaphene (ND-2.77)/3.0
4 – Activated Carbon Unit	None	Groundwater sample to be obtained at Location 20-18 and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles.	Analysis of groundwater at Location 20-18 will help determine necessity of monitor well for SWMU 4.	None
5 – South Plant Drainage System	None	Groundwater at MW17A, MW17B, MW18A, MW18B, MW12C, MW10C, MW16C	The new wells in combination with MW-8, MW-12, MW-10, MW-16, and MW-9 effectively monitor the entire south plant drainage system.	**MW-8:** Arsenic (ND-0.068)/10 Dinoseb (ND-0.686)/7.0 Vinyl Chloride (ND-5.0)/2.0 **MW-12:** Arsenic (ND-0.02)/10 Dinoseb (ND-0.91)7.0 Chloroform (ND-1.37)/0.152 Xylenes (ND-5.0)/10,000

TABLE 20-2

LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

SWMU Numbers	Groundwater Sampled at Temporary Wells	Additional Groundwater Samples to be Obtained in Year 2001-Phase II	Comments	Monitored by Permanent Monitor Wells, Containment Detected (Concentration* ppb)/MDEQ Tier 1 TRG Table Value
5 – South Plant Drainage System (Continued)				**MW-10:** Arsenic (ND-0.015)10 Dinoseb (ND-0.836)/7.0 **MW-16:** Arsenic (ND-0.391)/10 Dinoseb (ND-0.391)/50 **MW-9:** Arsenic (ND-0.009)/10 Dinoseb (ND-11.4)/7.0
7 – Dinoseb Manufacturing Area	None	Groundwater at MW-12C and MW-10C Groundwater from boring locations 20-18 20-19, 20-20, 20-21 and 20-22.	The new wells, in combination with MW-12 and MW-10 effectively monitor SWMU 7. See the SWMU 20 discussion for discussion of temporary well placements.	**MW-12:** Arsenic (ND-0.02)/10 Dinoseb (ND-0.91)7.0 Chloroform (ND-1.37)/0.152 Xylenes (ND-5.0)/10,000 **MW-10:** Arsenic (ND-0.015)/10 Dinoseb (ND-0.836)/7.0
8 – Dinoseb Loading/Unloading Area	None	MW-18A, MW-18B, and MW-12C.	Perhaps contaminated fill was used at some time underneath SWMU 8 and SWMU 9.	**MW-12:** Arsenic (ND-0.02)/10 Dinoseb (ND-0.91)7.0 Chloroform (ND-1.37)/0.152 Xylenes (ND-5.0)/10,000
9 – Dinoseb Drumming Area	Location TP-1 Reference: Figure 8-1, Table 8-4 and Table 8-5	MW-18A, MW-18B, MW-12C, and MW-10C	MW-18A and MW-18B are immediately downgradient of area of contaminated soil underneath SWMU 9.	**MW-12:** Arsenic (ND-0.02)/10 Dinoseb (ND-0.91)7.0 Chloroform (ND-1.37)/0.152 Xylenes (ND-5.0)/10,000 **MW-10:** Arsenic (ND-0.015)/10 Dinoseb (ND-0.836)/7.0

TABLE 20-2

LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

SWMU Numbers	Groundwater Sampled at Temporary Wells	Additional Groundwater Samples to be Obtained in Year 2001-Phase II	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	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	MW-18A, MW-18B, MW-17A, and MW-17B	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-8:** Arsenic (ND-0.068)/10 Dinoseb (ND-0.686)/7.0 Vinyl Chloride (ND-5.0)/2.0 **MW-12:** Arsenic (ND-0.02)/10 Dinoseb (ND-0.91)7.0 Chloroform (ND-1.37)/0.152 Xylenes (ND-5.0)/10,000 **MW-10:** Arsenic (ND-0.015)10 Dinoseb (ND-0.836)/7.0 **MW-16:** Arsenic (ND-0.391)/10 Dinoseb (ND-0.391)/50 **MW-9:** Arsenic (ND-0.009)/10 Dinoseb (ND-11.4)/7.0
13 – South Plant Drainage Ditch	None	At boring in Locations 13-10.	Trace contamination originating at SWMU 34.	None
14 – Toxaphene Manufacturing Area	None	Groundwater at MW-12C and MW-10C. Groundwater from boring locations 20-18, 20-19, 20-20, 20-21 and 20-22. Groundwater samples to be obtained and analyzed for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles.	The new wells, in combination with MW-12 and MW-10 effectively monitor SWMU 14.	**MW-12:** Arsenic (ND-0.02)/10 Dinoseb (ND-0.91)7.0 Chloroform (ND-1.37)/0.152 Xylenes (ND-5.0)/10,000 **MW-10:** Arsenic (ND-0.015)10 Dinoseb (ND-0.836)/7.0
18 – Blue Tank	None	Three soil samples and one groundwater sample at one boring (18-6).	Monitored by MW-9.	**MW-9:** Arsenic (ND-0.009)/10 Dinoseb (ND-11.4)/7.0

TABLE 20-2

LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

SWMU Numbers	Groundwater Sampled at Temporary Wells	Additional Groundwater Samples to be Obtained in Year 200?-Phase II	Comments	Monitored by Permanent Monitor Wells, Containment Detected (Concentration* ppb)/MDEQ Tier 1 TRG Table Value
20 – Railroad Area	None	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-0.026)/10 1,2-Dichloroethene (ND-7.36)/100 Trichloroethene (ND-2.0)/5.0 **MW-8:** Arsenic (ND-0.068)/10 Dinoseb (ND-0.686)/7.0 Vinyl Chloride (ND-5.0)/2.0 **MW-12:** Arsenic (ND-0.02)/10 Dinoseb (ND-0.91)7.0 Chloroform (ND-1.37)/0.152 Xylenes (ND-5.0)/10,000 **MW-10:** Arsenic (ND-0.015)10 Dinoseb (ND-0.836)/7.0 **MW-16:** Arsenic (ND-0.391)/10 Dinoseb (ND-0.391)/50 **MW-1A:** Arsenic (ND-0.054)/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 **MW-14:** Arsenic (ND-0.007)/10 Dinoseb (ND-0.746)/50

TABLE 20-2

LIKELY CORRESPONDENCE BETWEEN WELLS AND SWMUs

SWMU Numbers	Groundwater Sampled at Temporary Wells	Additional Groundwater Samples to be Obtained in Year 2001-Phase II	Comments	Monitored by Permanent Monitor Wells, Containment Detected (Concentration* ppb)/MDEQ Tier 1 TRG Table Value
23 – North Pond	None	Groundwater at PZ-26A and PZ-26B.	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:** Bromodichloromethene (66)/1.08 Bromoform (160)/2.33 Chloroform (1,600)/0.152 Chlorobromomethane (78)/0.126 **PZ-21A:** ND
30 – North Plant Waste Oil Accumulation Area	None	None	Soil discoloration cleaned up.	None
34 – Surplus Equipment Storage	None	Groundwater samples will be obtained from Location 13-10.		None at present.
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	None	Two samples of groundwater from temporary wells near North Plant neutralization system (SWMU 22) sump.	Analyze for volatiles.	None

NOTES:

* Concentrations are obtained from Table 5, page 4-2 of "Response to July 3, 200 Comments by the U. S. EPA on the "Amended and Supplemental Groundwater Assessment Work Plan, December 1999".

The specific suggestions for Phase II effort are summarized on the following tables. The Phase II field program consists of the following:

- Three "deep" four-inch monitor wells (MW-17A, MW-18A and MW-26A) screened at 30 to 40 feet below ground surface. See Figure 1. Sample groundwater.
- Six "shallow" four-inch monitor wells (MW-17B, MW-18B, MW-26B, MW-10C, MW-12C and MW-16C) screened at 10 to 20 feet below ground surface. See Figure 1. Sample groundwater.
- Replace monitor well at location MW-8. See Figure 1. Sample groundwater.
- Sample groundwater at MW-12, MW-10 and MW-16. See Figure 1.
- Thirteen geoprobe borings (2-15, 13-10, 16-1, 16-2, 20-18, 20-19, 20-20, 20-21, 20-22, 20-23, 20-24, 22-1 and 22-2) to groundwater (12 to 20 feet). See Figure 1. Three soil samples and one groundwater sample per boring.
- Survey the location and elevation of the monitor wells.
- Twenty-two shallow soil samples (2-8, 2-9, 2-10, 2-11, 2-12, 2-13, 2-14, 2-16, 2-17, 13-12, 13-13, 13-14, 13-15, 20-P, 20-Q, 20-R, 20-S, 20-T, 20-U, 20-V, 20-W and 20-X). See Figures 1, 3, and 4.
- Analyze all soil and groundwater samples noted above for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles.
- Resample location EE at SWMU 11, 12, 15 and analyze for dioxin. Location EE, a sump in the drainage system, is depicted on Figure 9-1.

TABLE 21-1

SUMMARY OF SUGGESTIONS FOR PHASE II

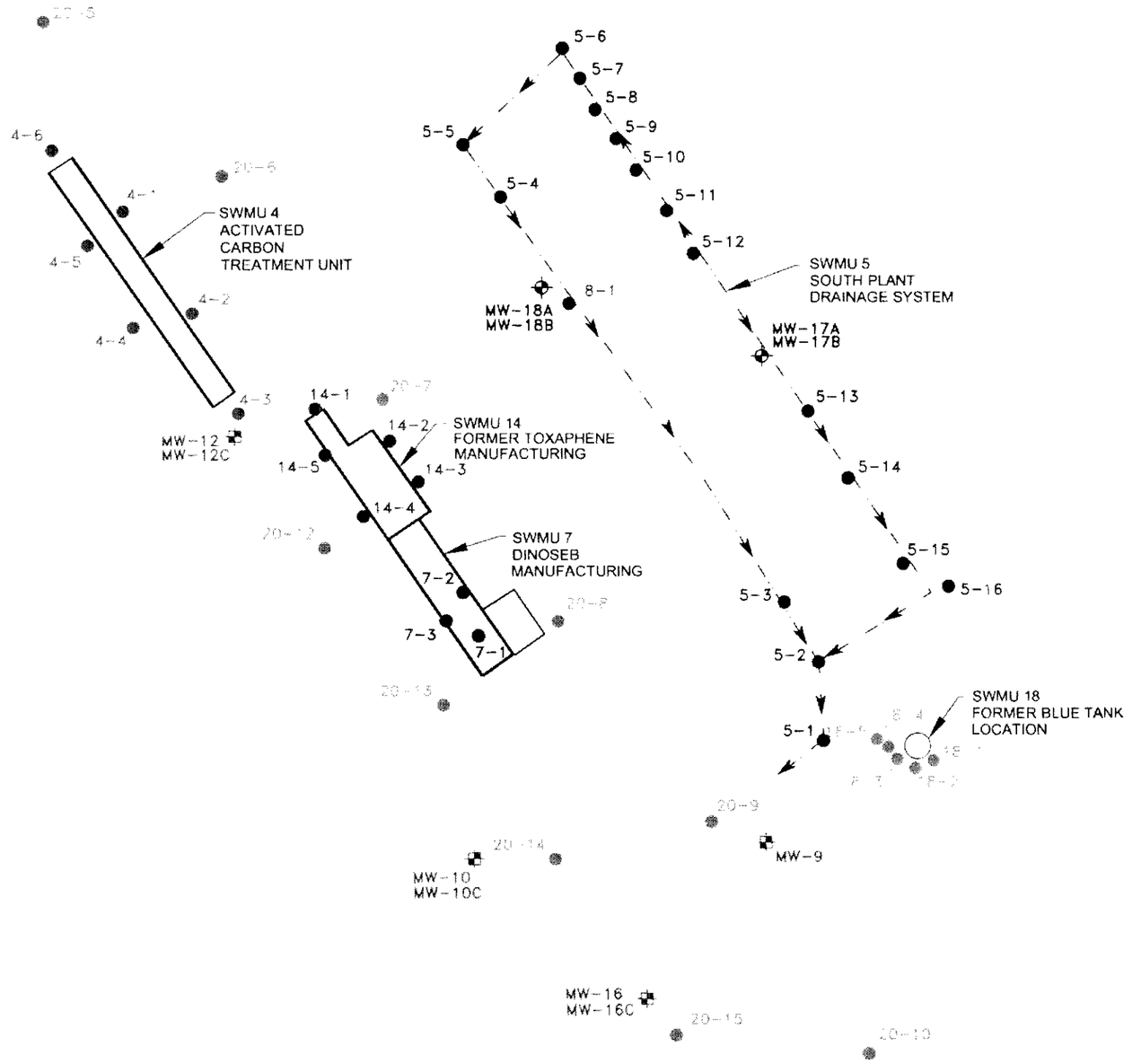
SWMU Numbers	Suggestions for Phase II	Information Gap that Phase II Effort Will Resolve	Comment
1 – Hazardous Waste Storage 16 – Atrazine Manufacturing and Warehousing 17 – Returned Product Storage	• Obtain three soil samples and one groundwater sample from each of two borings adjacent to location 2 of atrazine warehouse. Analyze for arsenic, atrazine, cyanazine, dinoseb, toxaphene, and volatiles. • Install two pairs of permanent nested wells, MW-17A, MW-17B, MW-18A and MW-18B, between SWMU 16 – location 2 and SWMUs 11, 12, and 15. Analyze groundwater sample for atrazine, cyanazine, dinoseb, toxaphene, and volatiles.	Is the 538 ppb concentration of arsenic at SWMU 16 – location 2 a result of a localized spill or the edges of the arsenic groundwater plume at SWMUs 11, 12 and 15?	--
2 – Inactive Landfill	• Sample ten locations for soil contamination. One of the locations (2-15) is a boring to groundwater that includes three soil samples and one groundwater sample. Analyze for arsenic, atrazine, cyanazine, dinoseb, toxaphene, and volatiles.	Horizontal and vertical extent of soil contamination in the "valley".	Study methods of intercepting groundwater that is contaminated by SWMU 2.
4 – Activated Carbon Unit	• Obtain groundwater sample and three soil samples from borings 20-18 between SWMU 4 and the main line railroad track. Analyze for atrazine, cyanazine, dinoseb, toxaphene, and volatiles.	Samples on the edge of SWMU 4 are contaminated with dinoseb, atrazine and toxaphene.	Total Phase II SWMU 4, 7, 14 and 20 program is discussed in the SWMU 20 section.
5 – South Plant Drainage System	None	Characterization is complete.	Characterization of other portions of the south plant drainage system have been completed within investigations of SWMUs 11, 12, 15, 7, 14 and 20.
7 – Dinoseb Manufacturing Area	• Install groundwater wells MW-12C and MW-10C. Both are screened at 10 feet to 20 feet below ground surface. Analyze for arsenic, atrazine, cyanazine, dinoseb, and toxaphene. • Expand the immediate surface soil sampling grid implemented in Phase I Jr. to include locations 20-P, 20-Q, 20-R, 20-S, 20-T, and 20-U. • Obtain groundwater sample and three soil samples from boring 20-18, 20-19, 20-20, 20-21 and 20-22. Analyze for atrazine, cyanazine, dinoseb, toxaphene and volatiles.	Characterization of soil and groundwater for Phase II will be carried out under SWMU 20.	Total Phase II SWMU 4, 7, 14 and 20 program is discussed in the SWMU 20 section.
8 – Dinoseb Loading/Unloading Area	• Install nested groundwater wells MW-18A and MW-18B at location 8-1. Analyze for arsenic, atrazine, cyanazine, dinoseb, toxaphene, and volatiles.	The function of the wells is to monitor SWMUs 8, 9, 11, 12 and 15.	--
9 – Dinoseb Drumming Area	• Install nested groundwater wells MW-18A and MW-18B adjacent to the southeast corner of SWMU 9 (location 8-1). Analyze for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles.	The well will monitor potential transport of toxaphene, atrazine, cyanazine and arsenic from the soil underneath the production and warehouse facilities constructed at SWMU 9.	It does not appear that despite the original function of the area, that of drumming, packaging, shipping and storing dinoseb, that presence of dinoseb is a problem directly underneath SWMU 9.

TABLE 21-1 (Continued)

SUMMARY OF SUGGESTIONS FOR PHASE II

SWMU Numbers	Suggestions for Phase II	Information Gap that Phase II Effort Will Resolve	Comment
11 – MSMA Salt Unloading 12 – MSMA Manufacturing Area 15 – Methyl Parathion Manufacturing Area	• Install the two nested pair of groundwater wells MW-17A, MW-17b, MW-18A and MW-18B. Analyze for arsenic, atrazine, cyanazine, dinoseb, and toxaphene. Resample sump location EE for dioxin and quantify contents of sump.	Extent of groundwater plume for arsenic	The CMIP for SWMUs 11, 12 and 15 should be considered after the groundwater plume is assessed and after a permanent clean up level for arsenic can be established.
13 – South Plant Drainage Ditch	• Obtain three soil samples and one groundwater sample from boring 13-10. • Obtain four surface samples in surrounding area.	Horizontal and vertical extent of contamination at location 13-9 and surrounding area.	SWMU 34 is likely source of contamination.
14 – Toxaphene Manufacturing Area	• Install groundwater wells MW-12C and MW-10C. Both are screened at 10 feet to 20 feet below ground surface. Analyze groundwater for arsenic, atrazine, cyanazine, dinoseb, and toxaphene.	Characterization of soil is complete.	See SWMU 20 – Railroad Truck Area. One Phase II campaign will encompass SWMUs 4, 7, 14 and 20.
18 – Blue Tank	None	Characterization is complete.	
20 – Railroad Area	• Advance five borings (20-18, 20-19, 20-20, 20-21, and 20-22) in the SWMU 4, 7, 14 and 20 area. Obtain three soil samples and one groundwater sample per boring. Analyze for arsenic, atrazine, cyanazine, dinoseb, toxaphene and volatiles. • Expand the immediate surface soil sampling grid implemented in Phase I Jr. to include 20-P, 20-Q, 20-R, 20-S, 20-T, 20-U, 20-V, 20-W and 20-X • At the MW-16A location install a well MW-16C which is screened from 10 feet to 20 feet below ground surface. Analyze a sample of groundwater for arsenic, atrazine, cyanazine, dinoseb, and toxaphene.	The Phase II soil sampling suggested for SWMUs 4, 7, 14, and 20 consists of obtaining three soil samples and one groundwater sample from one boring for analysis of arsenic, atrazine, cyanazine, dinoseb, toxaphene, and volatiles. The groundwater monitor well MW-16C in conjunction with MW-10C and MW-12C will allow more adequate permanent monitoring of the entire SWMU 20 area.	The Phase II effort for SWMU 4, 7, 14, and 20 is one campaign.
23 – North Pond	• Install an additional nested pair of monitor wells PZ-26A and PZ-26B. Analyze samples of groundwater for volatiles.	The extent of transport of halomethanes.	--
30 – North Plant Waste Oil Accumulation Area	• One confirmation sample for TPH during remediation.	Removal of visual contamination during remediation.	Remove visually contaminated soil.
34 – Surplus Equipment Storage	None	The characterization is complete.	--
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	• Two borings adjacent to the SWMU 22 collection sump. Obtain one groundwater sample and three soil sample per boring. Analyze for volatiles.	Will determine whether collection sump has leaked hazardous constituents to the surrounding soil and/or groundwater.	--

FIGURES



SCALE: 1 INCH=100 FEET

100' 0 100'

LEGEND

- BORINGS FOR SOIL SAMPLES AND CHEMICAL ANALYSIS
- EXISITNG MONITOR WELLS
- MONITOR WELL LOCATIONS
- PHASE II BORINGS TO GROUNDWATER (3 SOIL SAMPLES & 1 GROUNDWATER SAMPLE PER BORING)
- DRAINAGE SYSTEM

REV	DESCRIPTION OF REVISION	BY	DATE
3	MODIFY PER REVISED TOXAPHENE DINOSEB AND ATRAZINE ANALYSES	PCC	1/18/01
2	ADD PHASE II BORINGS	PCC	12/6
1			

VICKSBURG CHEMICAL COMPANY
VICKSBURG, MISSISSIPPI

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

REFERENCE DRAWINGS

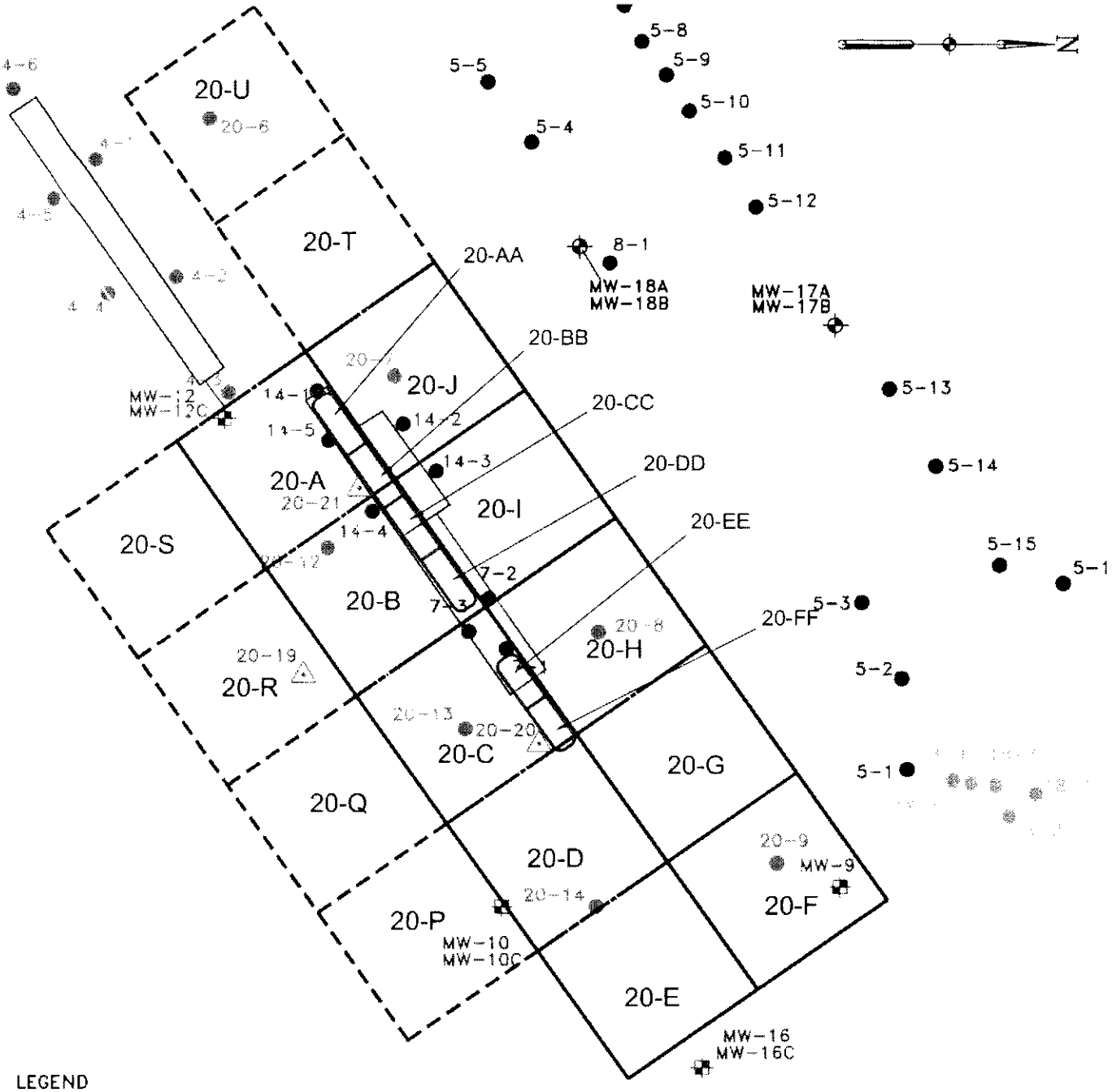
SCALE: 1"=100'
DESIGNED:
DRAWN: PCC
CHECKED:
PEER REVIEWED:
DATE: 11/3/00

RCRA FACILITY INVESTIGATION
(AS EXECUTED)

ADDITIONAL DETAIL ON SAMPLING AT
SWMUs 4, 5, 7, 14 & 18

REVISION: 2
PROJECT: 35092B007C
FIGURE: 2

K:\CEDAR\96B315A.dwg, figure 2, 01/18/2001 04:53:40 PM



LEGEND

- PROPOSED BORING LOCATION
- BORINGS FOR SOIL SAMPLES AND CHEMICAL ANALYSIS
- EXISTING MONITOR WELLS
- PHASE II BORINGS TO GROUNDWATER
- SOIL PILE SECTIONS
- GRIDS 20-P THROUGH 20-U ARE SUGGESTED FOR PHASE II

SCALE: 1 INCH=100 FEET

100' 0 100'

FILE LOCATION: K:\CEDAR\SMPLGRD.DWG LAYOUT 1

VICKSBURG CHEMICAL
VICKSBURG, MISSISSIPPI

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

SCALE:	DRAWN BY:	DATE:
	CHKD. BY:	DATE:

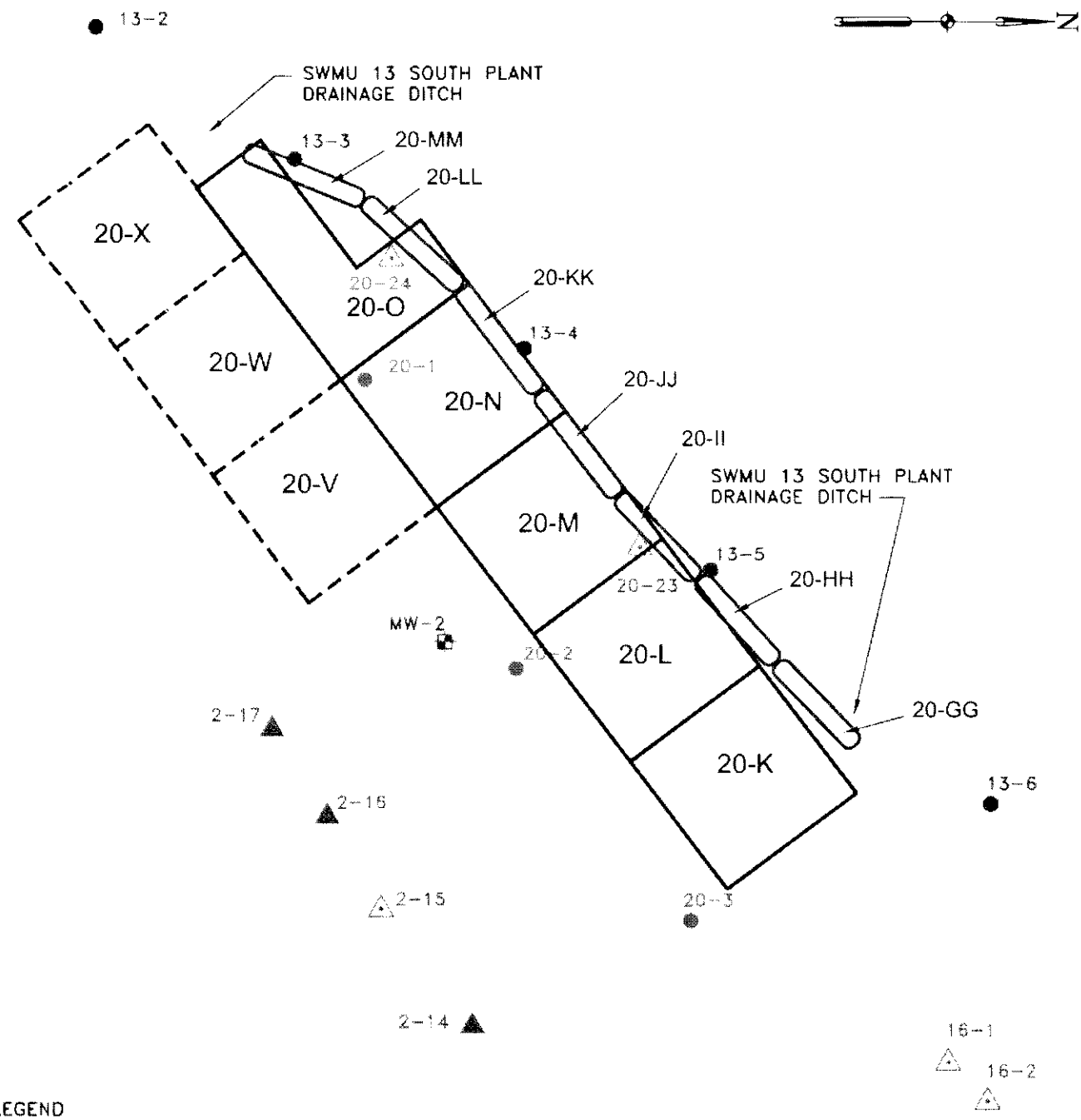
RAILROAD AREA NEAR FORMER TOXAPHENE & DINOSEB MANUFACTURING

SURFACE SOIL COMPOSITE SAMPLING GRID AND SOIL PILE COMPOSITE SAMPLING SECTIONS

PROJ. NO. 350928007C

FIG. NO. 3

K:\CEDAR\smplgrd.dwg, Layout1, 03/15/2001 10:04:13 AM



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 ARE SUGGESTED FOR PHASE II

SCALE: 1 INCH=100 FEET

100' 0 100'

FILE LOCATION: K:\CEDAR\SMPLGRD.DWG LAYOUT 2

VICKSBURG CHEMICAL
VICKSBURG, MISSISSIPPI

URS
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225/751-1873

SCALE:	DRAWN BY:	DATE:
	CHKD. BY:	DATE:

RAILROAD AREA SOUTH OF ATRAZINE WAREHOUSE

SURFACE SOIL COMPOSITE SAMPLING GRID AND SOIL PILE COMPOSITE SAMPLING SECTIONS

PROJ. NO. 35092B007C 03006

FIG. NO. 4

K:\CEDAR\smplgrd.dwg, Layout2, 03/15/2001 10:06:42 AM

NOTES:

- SAMPLE ID = LOCATION-TYPE-PARAMETERS

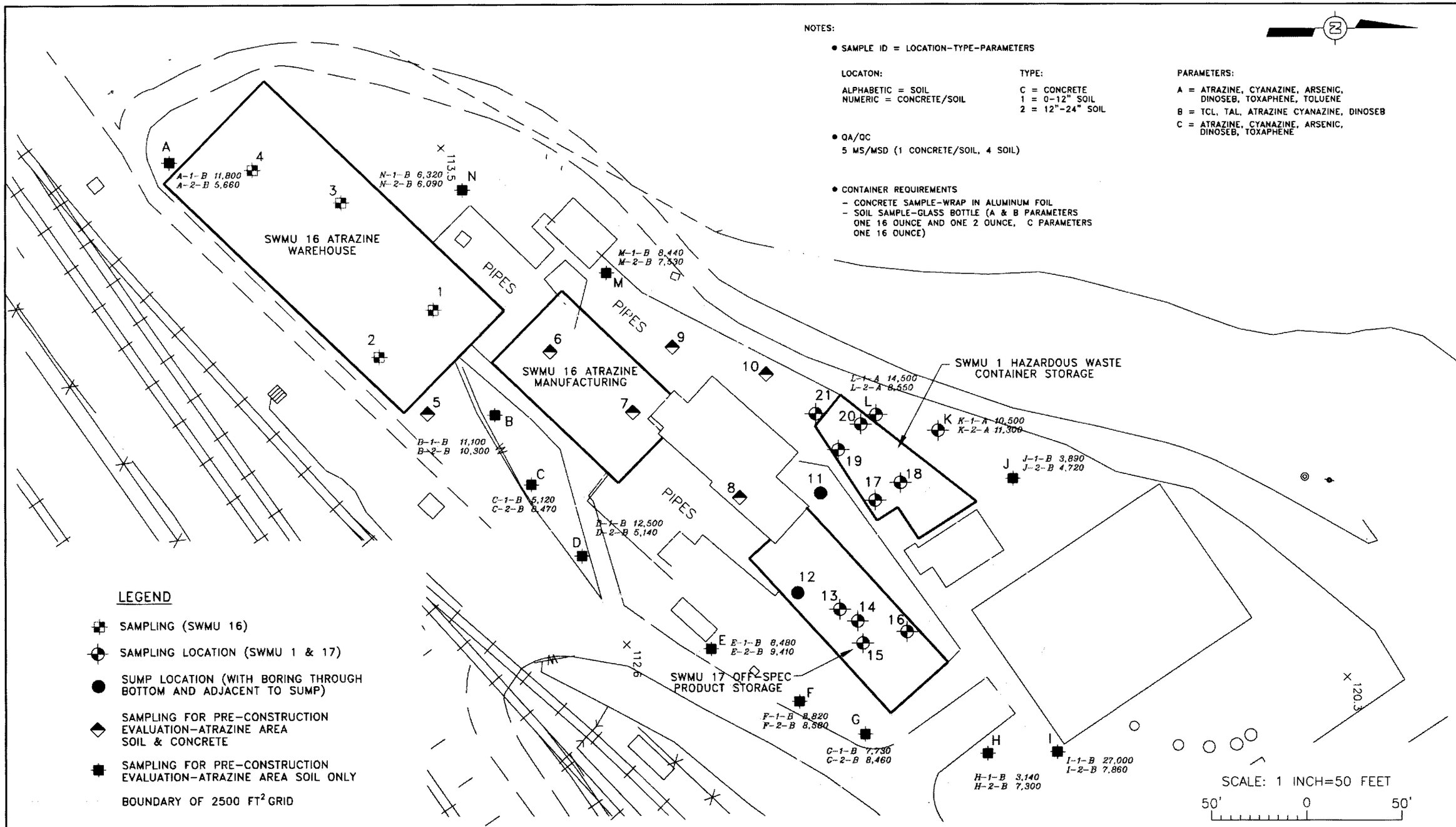
LOCATON:
ALPHABETIC = SOIL
NUMERIC = CONCRETE/SOIL

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
- BOUNDARY OF 2500 FT^2 GRID

REV	DESCRIPTION OF REVISION	BY	DATE
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△			
△			
△			
△			
△			

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REFERENCE DRAWINGS

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

SWMU 16, 1, AND 17

LOCATIONS AND SAMPLE NUMBERS ON THE PERIPHERY OF PROCESS AREAS SAMPLED FOR CONTAMINATION OF SOIL

REVISION △
PROJECT 35092B007C
FIGURE 2-1

K:\CEDAR\52B007C\52B007CO.DWG, Model, 03/15/2001 10:08:40 AM

NOTES:

- SAMPLE ID = LOCATION-TYPE-PARAMETERS

LOCATON:	TYPE:	PARAMETERS:
ALPHABETIC = SOIL NUMERIC = CONCRETE/SOIL	C = CONCRETE 1 = 0-12" SOIL 2 = 12"-24" SOIL	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)

SWMU 16 ATRAZINE WAREHOUSE

SWMU 16 ATRAZINE MANUFACTURING

SWMU 1 HAZARDOUS WASTE CONTAINER STORAGE

SWMU 17 OFF-SPEC PRODUCT STORAGE

PIPES

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
- BOUNDARY OF 2500 FT^2 GRID

SCALE: 1 INCH=50 FEET

50' 0 50'

REV	DESCRIPTION OF REVISION	BY	DATE
△			
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△			
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REFERENCE DRAWINGS

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

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

K:\CEDAR\92B007C\92B007CP.DWG, Model, 03/15/2001 10:08:13 AM

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 = DINOSEV AND ARSENIC
A = ARSENIC

SWMU 16 ATRAZINE WAREHOUSE

SWMU 16 ATRAZINE MANUFACTURING

SWMU 1 HAZARDOUS WASTE CONTAINER STORAGE

SWMU 17 OFF-SPEC PRODUCT STORAGE

PIPES

PIPES

PIPES

A-2, 4-T
A-8, 12-T
A-W-T

1-2, 4-T
1-4, 8-T
1-8, 12-T
1-W-T

2-5, 4-TA
2-4, 8-TA
2-8, 12-TA
2-W-TA

D-2, 4-T
D-4, 8-T
D-8, 12-T
D-W-T

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
- YEAR 2001 PHASE II SAMPLE POINTS-SOIL & GROUNDWATER PHASE II

BOUNDARY OF 2500 FT^2 GRID

SCALE: 1 INCH=50 FEET

50' 0 50'

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

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REFERENCE DRAWINGS

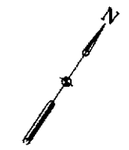
SCALE 1"=50'
DESIGNED
DRAWN PCG
CHECKED
PEER REVIEWED
DATE 11/2/00

SWMU 16, 1, AND 17

LOCATIONS SAMPLED FOR PHASE II

REVISION 1
PROJECT 35092B007C
FIGURE 2-3

K:\CEDA\R92B007C\92B007Cq.DWG, Model, 03/15/2001 10:09:40 AM



SCALE: 1 INCH=300 FEET

300' 0 300'

LEGEND:

- EXISTING MONITOR WELL OR PIEZOMETER LOCATION
- 85 — POTENTIOMETRIC CONTOUR (UPPERMOST AQUIFER)
- 120 — POTENTIOMETRIC CONTOUR PERCHED WATER TABLE IN NORTH POND AREA
- CREEK
- MW-17A, MW-17B, MW-18A, MW-10C, MW-12C, MW-15C, PZ-26A & PZ-26B ARE PROPOSED LOCATIONS
- SOIL BORING LOCATION
- A — A' CROSS-SECTION LOCATION LINE

REV	DESCRIPTION OF REVISION	BY	DATE
△			
△			
△			
△			
1	REVISE E-E'	PCG	11/3/00
1	ADD MW-15C, PZ-26A AND PZ-26B	PCG	11/3/00

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REFERENCE DRAWINGS

SCALE: 1"=300'
DESIGNED:
DRAWN: PCG
CHECKED:
PEER REVIEWED:
DATE: 11/3/00

GROUNDWATER ASSESSMENT WORK PLAN

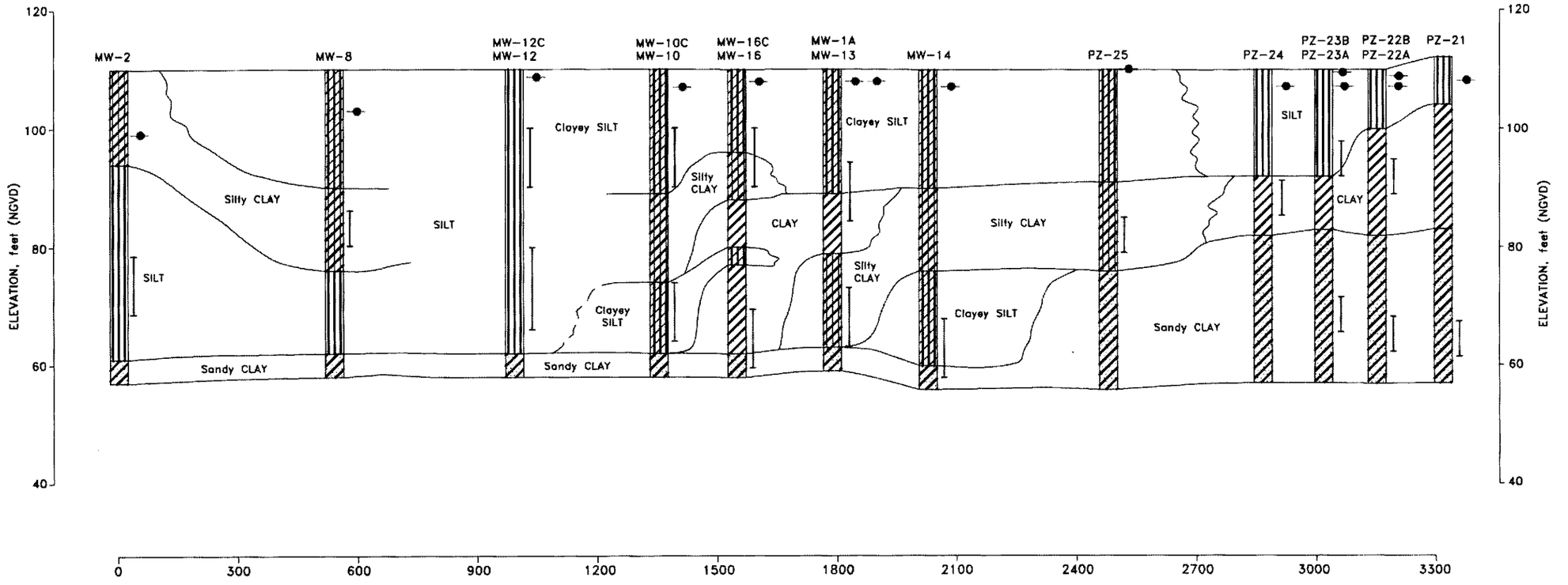
POTENTIOMETRIC CONTOURS
WITH CROSS SECTION LOCATIONS

REVISION: 1
PROJECT: 35092B007C
FIGURE: 20-1

K:\CEDAR\92B007\92B007CH.DWG, Model, 03/15/2001 10:12:30 AM

A
WEST

A'
EAST



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

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REFERENCE DRAWINGS

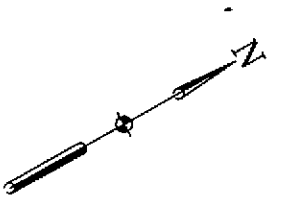
SCALE: AS SHOWN
DESIGNED:
DRAWN: PCG
CHECKED:
PEER REVIEWED:
DATE: 11/3/00

RFI REPORT

CROSS-SECTION A-A'

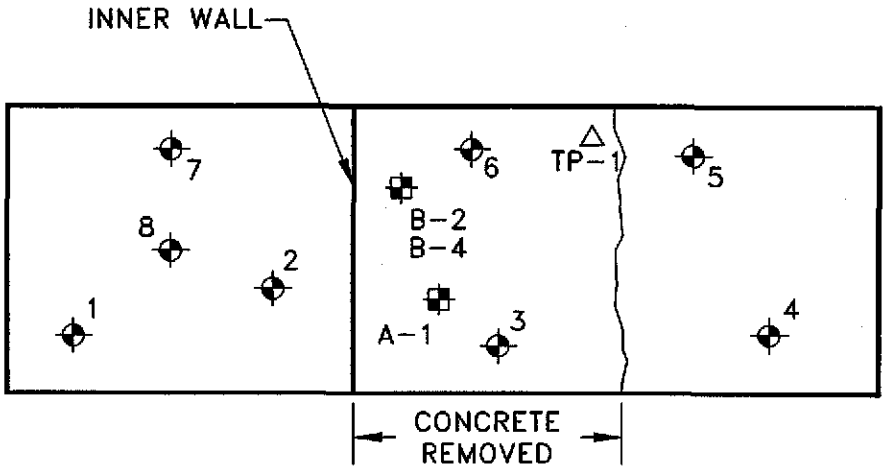
REVISION: 1
PROJECT: 3596B007C
FIGURE: 20-2

K:\CEDAR\6250007C\6B007CI.DWG, Model, 03/15/2001 10:16:45 AM



SCALE: 1 INCH=50 FEET

50' 0 50'



LEGEND

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

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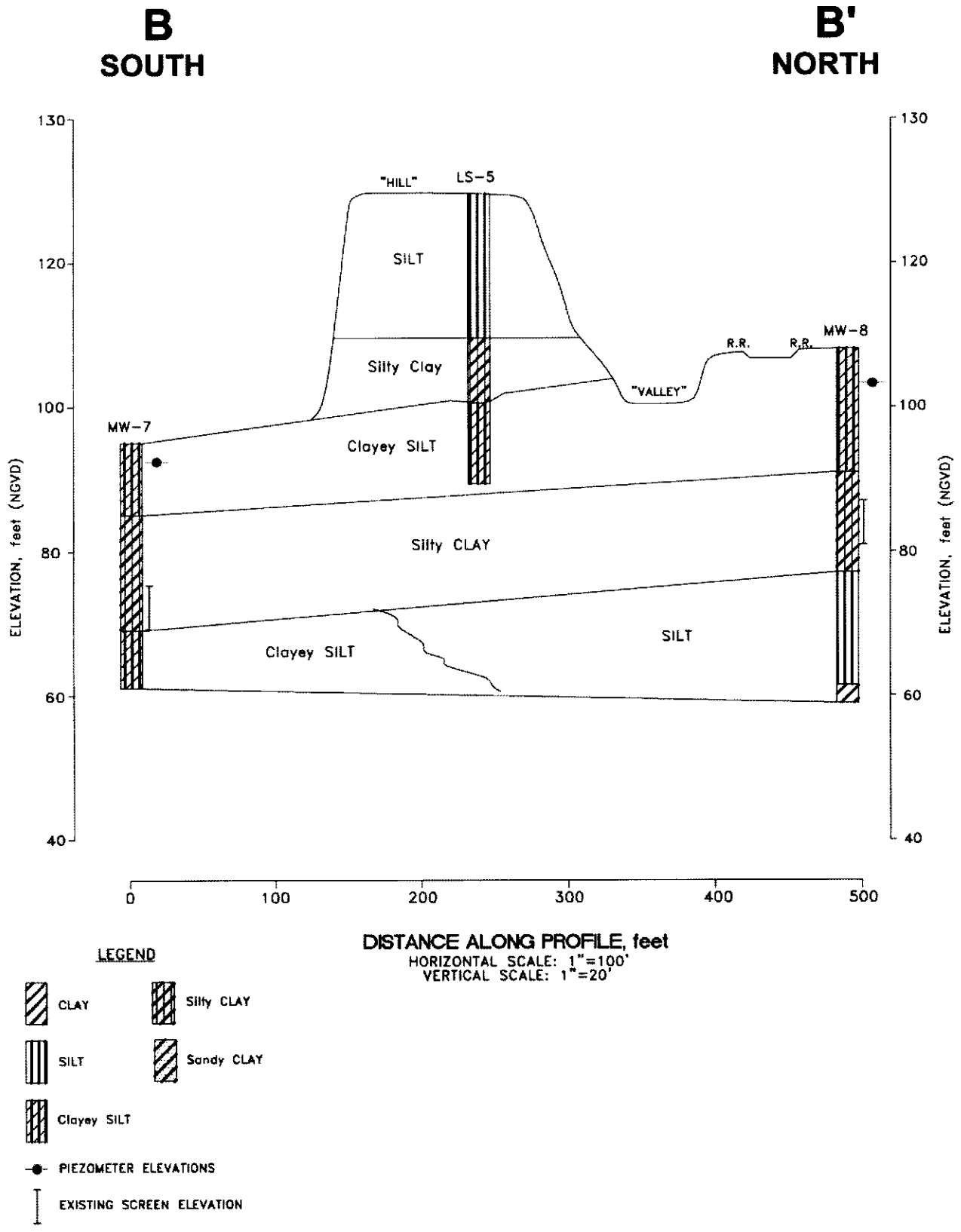
SCALE:	DRAWN BY: PCG	DATE: 11/2/00
1"=50'	CHKD. BY:	DATE:

SWMU 9

SAMPLING LOCATIONS

PROJ. NO. 35092B1007C

FIGURE 8-1



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SCALE:	DRAWN BY: PCG	DATE: 11/4/00
AS SHOWN	CHKD. BY:	DATE:

RFI REPORT

CROSS-SECTION B-B'

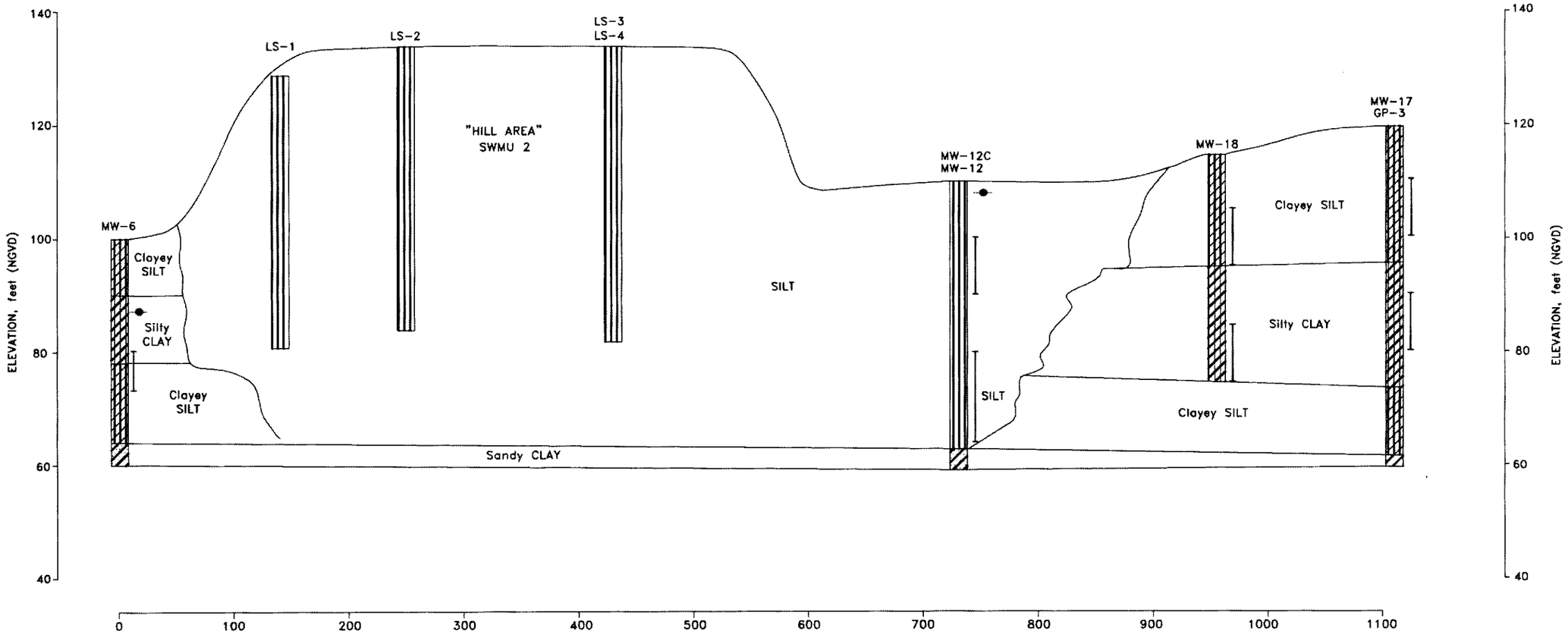
PROJ. NO. 3096B007C

FIGURE 20-3

K:\CEDAR\92B007C\96B007CJ.DWG, Model, 03/15/2001 10:17:11 AM

C
SOUTH

C'
NORTH



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

LEGEND

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

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

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REFERENCE DRAWINGS

SCALE: AS SHOWN
DESIGNED:
DRAWN: PCG
CHECKED:
PEER REVIEWED:
DATE: 11/6/00

RFI REPORT

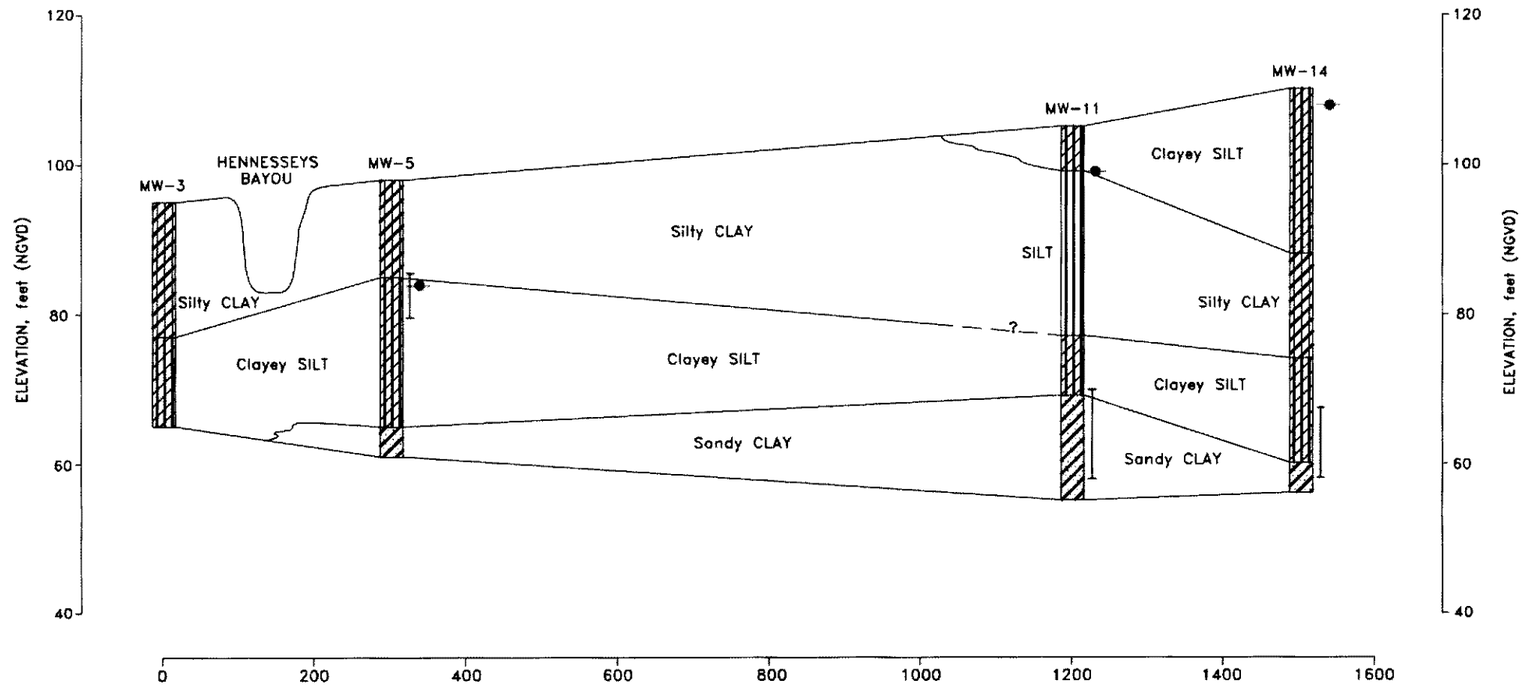
CROSS-SECTION C-C'

REVISION: 1
PROJECT: 35096B007C
FIGURE: 20-4

K:\CEDAR\92B007C\96B007CK.DWG, Model, 03/15/2001 10:17:52 AM

D
SOUTH

D'
NORTH



LEGEND

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

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

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REFERENCE DRAWINGS

SCALE: AS SHOWN
DESIGNED:
DRAWN: PCG
CHECKED:
PEER REVIEWED:
DATE: 11/2/00

RFI REPORT

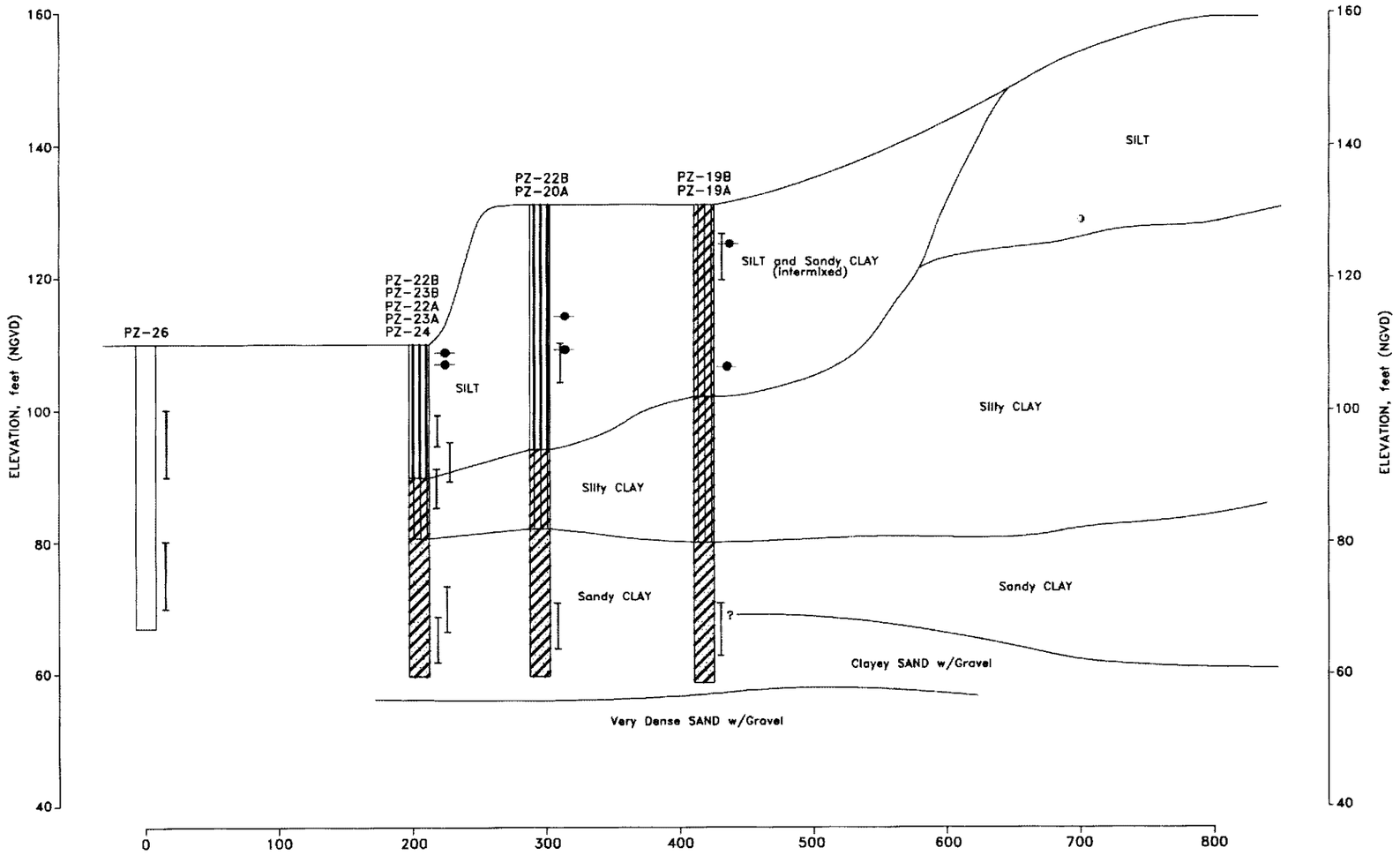
CROSSS-SECTION D-D'

REVISION: 1
PROJECT: 35096B007C
FIGURE: 20-5

K:\CEDAR\92B007C\96B007CL.DWG, Model, 03/15/2001 10:18:15 AM

E
SOUTH

E'
NORTH



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

LEGEND

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

REV	DESCRIPTION OF REVISION	BY	DATE
1	ADD WELL SCREEN & PIEZOMETER ELEVATIONS	PCG	11/3/00
1	ADD PROPOSED PZ-26	PCG	11/3/00

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REFERENCE DRAWINGS

SCALE: AS SHOWN
DESIGNED:
DRAWN: PCG
CHECKED:
PEER REVIEWED:
DATE: 11/2/00

RFI REPORT

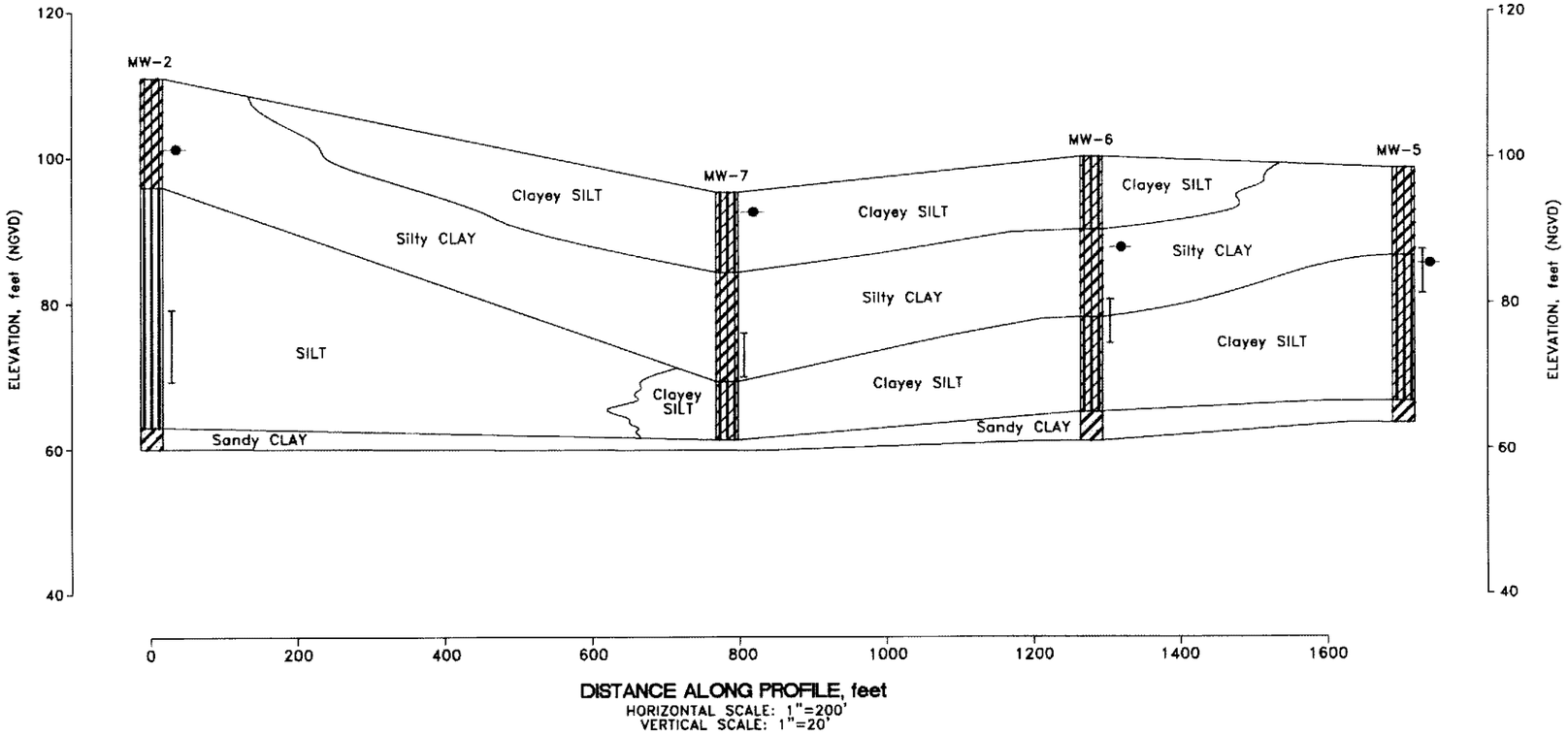
CROSS-SECTION E-E'

REVISION: 1
PROJECT: 35092B1007C
FIGURE: 20-6

K:\CEDAR\92B007C\96B1007CM.DWG, Model, 03/15/2001 10:18:36 AM

F
WEST

F'
EAST



LEGEND

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

REV	DESCRIPTION OF REVISION	BY	DATE
1	ADD WELL SCREEN AND PIEZOMETER ELEVATIONS	PCG	11/2/00

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REFERENCE DRAWINGS

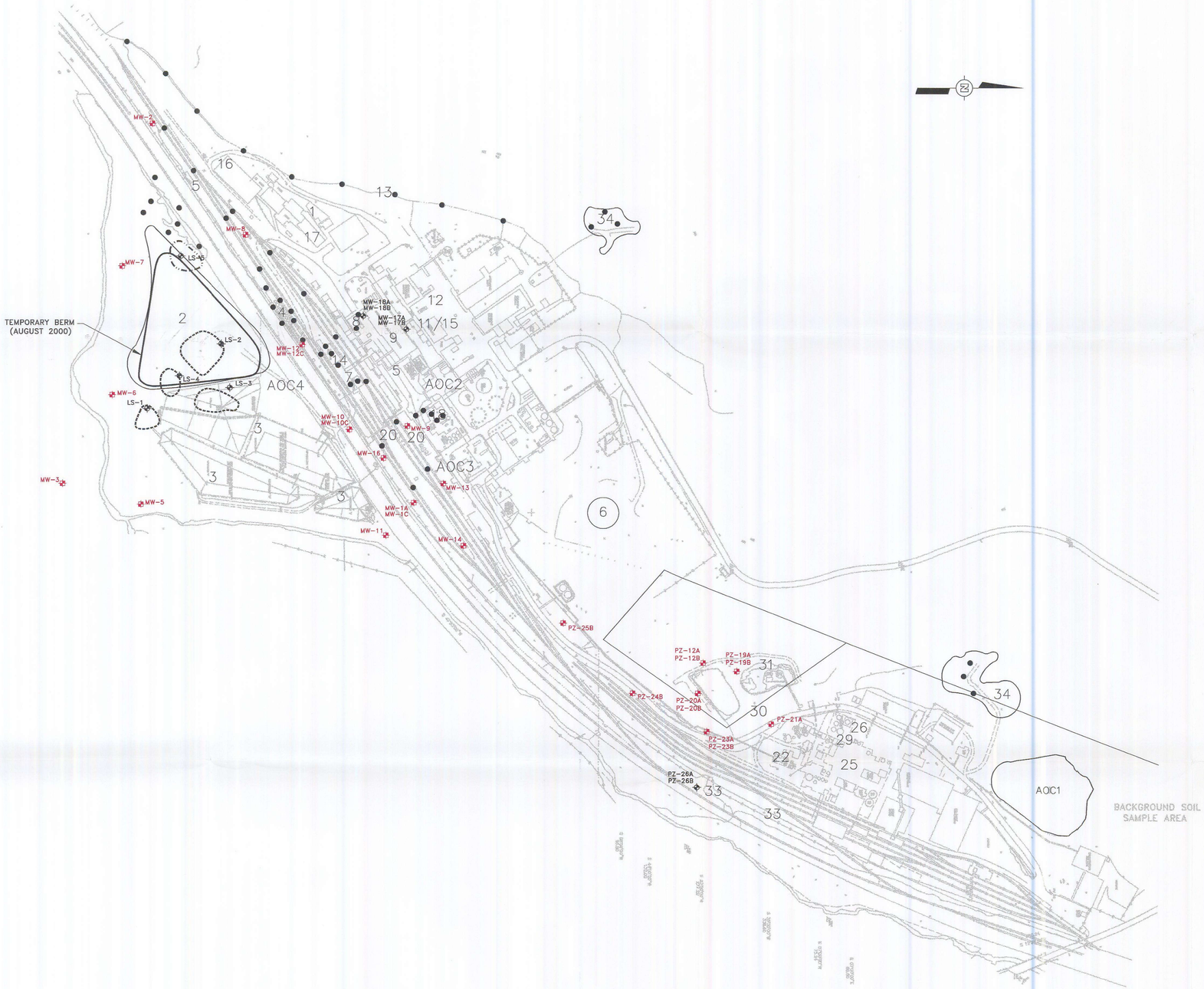
SCALE: AS SHOWN
DESIGNED:
DRAWN: PCG
CHECKED:
PEER REVIEWED:
DATE: 11/2/00

RFI REPORT

CROSS-SECTION F-F'

REVISION: 1
PROJECT: 35092B007C
FIGURE: 20-7

K:\CEDAR\92B007C\96BB007CN.DWG, Model, 03/15/2001 10:18:58 AM



SWMU NUMBER — SOUTH PLANT

1	CONTAINER (DRUM) STORAGE AREA
2	INACTIVE LANDFILL
3	SURFACE IMPOUNDMENT (SOUTH PLANT)
4	ACTIVATED CARBON TREATMENT UNITS
5	SOUTH PLANT DRAINAGE SYSTEMS
6	WASTEWATER STORAGE (HILL) TANKS
7	FORMER DINOSEB PRODUCTION AREA
8	DINOSEB LOADING/UNLOADING AREA
9	DINOSEB DRUMMING AREA
11	FORMER MSMA PRODUCTION AREA
12	FORMER MSMA SALT UNLOADING AREA
13	SOUTH PLANT DRAINAGE DITCHES
14	FORMER TOXAPHENE PRODUCTION AREA
15	FORMER METHYL PARATHION PRODUCTION AREA
16	FORMER ATRAZINE PRODUCTION AREA
17	RETURNED PRODUCT STORAGE AREA
18	FORMER BLUE TANK AREA
20	RAILROAD CAR UNLOADING STATION

NORTH PLANT

22	NORTH PLANT NEUTRALIZATION SYSTEM
23	EQUALIZATION/NEUTRALIZATION POND (NORTH PLANT)
25	NORTH PLANT WASTEWATER PIPES
26	C-10 SCRUBBER
29	OIL COLLECTION UNIT
30	NORTH PLANT WASTE OIL ACCUMULATION AREA
31	NO. 6 FUEL OIL AREA
33	NORTH PLANT DRAINAGE DITCHES

BOTH PLANTS

34	SURPLUS EQUIPMENT STORAGE (JUNKYARD)

AOC NUMBER — AOC NAME

1	FISH POND (NORTH PLANT)
2	DRUM STORAGE AREA
3	NEUTRALIZATION TANKS (SOUTH PLANT)
4	CHEMICAL CRYPT (SEPTIC TANKS)

LEGEND

- DEEP BORINGS LS-1, LS-2, LS-3, LS-4, LS-5
- MW-17A, MW-17B, MW-18A, MW-18B, MW-10C MW-12C, MW-1C, & PZ-26A/PZ-26B ARE PROPOSED LOCATIONS.
- SHALLOW BORINGS
- EXISTING MONITOR WELLS
- CLOSED PONDS
- CLOSED LANDFILL

SCALE
200 0 200 400 FEET

REV	DESCRIPTION OF REVISION	BY	DATE
2	SHOW SWMU 2 INVESTIGATION AUGUST 2000	PCG	8/11/00
1	SHOW NORTH POND WELLS; RELOCATE MW-18A/MW-18B; ADD MW-1C, PZ-26A/PZ-26B	RDK	7/18/00

VICKSBURG CHEMICAL COMPANY
VICKSBURG, MISSISSIPPI

URS Greiner Woodward Clyde
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Baton Rouge, Louisiana 70816
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REFERENCE DRAWINGS

SCALE: 1"=200'
DESIGNED:
DRAWN: PCG
CHECKED: RDK
PEER REVIEWED: 11/15/99
DATE: 7/18/00

RCRA FACILITY INVESTIGATION

SWMU LOCATIONS, RFI SOIL AND CONCRETE SAMPLE POINTS, GWA MONITOR WELL LOCATIONS

REVISION: 2
PROJECT: 35092B007C
DRAWING: 1

K:\CAD\35092B007C\dwg, 10/17/2000 10:51:27 AM