Appendix K.6

Addendum to the Report of the Phase II RCRA Facility
Investigation (RFI) Conducted on the Union Carbide
Corporation Woodbine, Georgia Facility
Apex Environmental, Inc.
June 1997

140 Pages









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ADDENDUM to the Report of the Phase II RCRA Facility Investigation (RFI)

Conducted on the

Union Carbide Corporation Woodbine, Georgia Facility

Apex Job No.: 097.005

June 12, 1997

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1.0 INTRODUCTION

Apex Environmental, Inc. (Apex) has prepared this addendum to the Phase II Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) in response to recommendations in Apex's Phase II RFI report dated September 30, 1996, and comments by the Georgia Environmental Protection Division (GAEPD) on the Phase II RFI report dated January 10, 1997. On February 13, 1996, Apex issued an Addendum to the original Work Plan dated September 15, 1995, which was approved by GAEPD on September 21, 1995. The Addendum to the Work Plan was approved by GAEPD in a letter dated February 12, 1997.

2.0 OBJECTIVES

In comments on the Phase II RFI report, the GAEPD recommended that the ground water monitoring wells be resampled for metals analyses using a "quiescent" method as outlined in GAEPD's Hazardous Waste Management Program: Ground Water Testing, Appendix IX - Georgia Modified Standard Method, revised February 1991. The quiescent method requires that ground water monitoring wells be allowed to stabilize for a period of not more than 24 hours between purging and sampling before collecting ground water samples for metals analyses (this method is used for metals only). The waiting interval allows sediments suspended in the water by purging to settle out. The concern being that the presence of suspended sediments may lead to false positive analytical results in unfiltered ground water samples.

At solid waste management unit (SWMU) 03, Apex observed additional surface areas containing ordnance related items during field work for the Phase II RFI. These areas were outside the work zones to be cleared of ordnance for the geophysical surveys and test pitting conducted as a portion of the Phase II RFI. In the Phase II RFI report, Apex recommended completing a surface sweep in these additional areas at SWMU 03 and deactivating any ordnance related items found.

At SWMU 04, Apex completed a series of shallow soil borings as part of the Phase II RFI in an overflow ditch on the south and east sides of the Acetone Evaporation Pond. Apex collected a shallow and deep sample from each boring location. Analysis of volatile organic compounds (VOCs) indicated that acetone is present in several of the shallow (two to three feet below ground surface) and deep (five feet below ground surface) soil samples. Apex recommended in the Phase II RFI report that additional soil borings be completed to assess the lateral extent of soil contamination and the possible impact of the acetone on ground water quality.

At SWMU 06, Apex completed a series of test pits for the Phase II RFI in areas identified by the geophysical survey as possessing anomalous signatures. Analysis of soil and waste materials from the test pits showed VOC concentrations above the method detection limits (MDLs) including test pits 1 through 4 in the Borrow Pit Area and test pits 6 and 7 in the Trench II area. Apex recommended in the Phase II RFI that additional soil borings be completed in these areas to assess the extent of soil contamination and determine if ground water has been impacted.

3.0 ADDITIONAL INVESTIGATION

This section summarizes Apex's recommendations from the Phase II RFI and the GAEPD concerns expressed in its comments to the Phase II RFI as they relate to the additional work conducted for the Phase II RFI Addendum. The summary also discusses the methodology and results of the additional work Apex performed for the Phase II RFI Addendum. Apex's responses to the GAEPD's comments on the background statistical analysis and the revised data tables are included as Appendix A and Appendix B respectively.

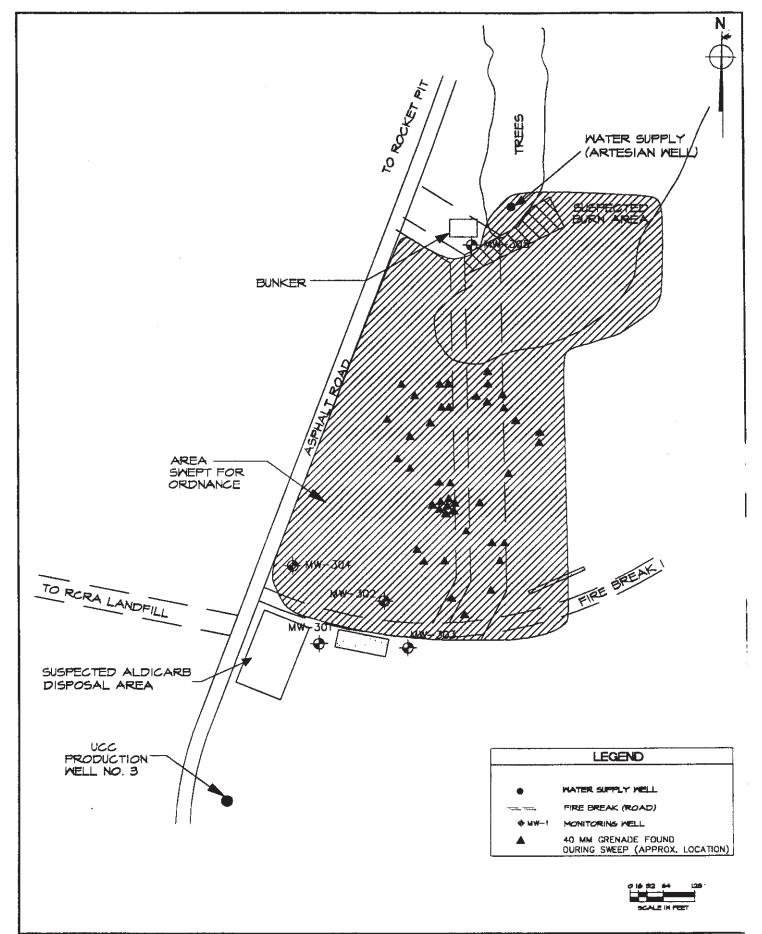
3.1 SWMU 03 - Surface Ordnance Removal

On February 18, 1997, Apex and EOD mobilized to the Woodbine, Georgia, facility to clear surface ordnance items identified on the fire break road at SWMU 03. EOD swept the area from fire break road to the paved Rocket Test Pad road. EOD also swept the area from the dirt road eastward approximately 75 feet. EOD did not find ordnance related items between 50 and 75 feet east of fire break and road and, therefore, did not sweep further eastward. EOD also reswept the SWMU 03 Burn Area and an area northwest of the Rocket Test Pad (see Figure 1 for ordnance locations) in order to ensure complete clearance of previously swept areas.

EOD used Schoenstedt metal detectors to locate ordnance and ordnance related objects. In addition, EOD used visual observations to assess the site where concrete and metallic non-ordnance objects interfered with the Schoenstedt operation. The fire break road was swept first and all 40 millimeters (mm) grenades were flagged with survey stakes. EOD then cleared both sides of the fire break road, SWMU 03 Burn Area, and the Rocket Test Pad.

A total of forty-six 40 mm grenades were located on and near the dirt road. An additional two rounds were found in the SWMU 03 Burn Area, and one round was found near the Rocket Test Pad. EOD deactivated the 40 mm grenades in place using individual shaped charges. EOD also located approximately twenty-four XM15 CS cartridges near the Rocket Test Pad and approximately twenty-six 40 mm CS grenades in the vicinity of the fire break road. The CS cartridges and grenades were stored in a 55-gallon drum on site in the bunker at the Rocket Test Pad.

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FIGURE I SWMU 3 UNEXPLODED ORDNANCE LOCATION

WOODBINE, GEORGIA

PHASE II RFI ADENDUM
THIOKOL CORPORATION
WOODSINE, GA

		Project Number:
6-11-47	CDC	097.005
ÇAD File:	Scale:	Client:
UNION-A	AS SHOWN	THIOKOL CORP.

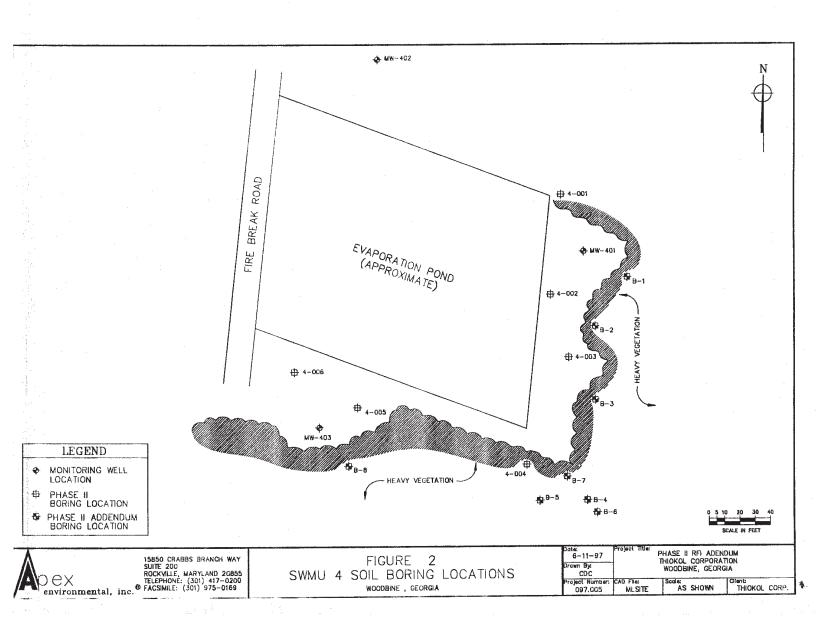
3.2 SWMU 04

Apex identified acetone in soil beneath the overflow ditch on the east and south sides of the Acetone Evaporation Pond during the Phase II RFI. In order to further delineate the acetone, Apex proposed to complete a minimum of six soil probes hydraulically downgradient from the areas previously documented to contain acetone. Each probe was completed using the methodology detailed in Section 4.5 of the Phase II RFI Work Plan dated September 15, 1995. Hand tools were used to collect the soil samples. Sample locations are shown in Figure 2. All soil samples were collected in accordance with the methodology outlined in Apex's Work Plan dated February 12, 1997. Soil boring logs are presented in Appendix C.

A Microtip photoionization detector (PID) was used to screen the soil samples. Prior to field activities, the PID was calibrated with a span gas of 400 parts per million (ppm) toluene in air. After screening the soil samples from each boring, the operation of the PID was checked against the span gas to ensure that the PID was functioning properly and calibrated properly. Apex also collected two ground water samples for VOC analysis using geoprobe equipment. Ground water samples were collected by first placing a slotted probe into the soil below the ground water table. Disposable polyethylene tubing with a foot valve was then used to retrieve a sufficient quantity of water. Ground water samples were collected in 40 milliliter (ml) glass vials with Teflon septums.

3.2.1 Soil Results

A total of eight probes were completed on the east and south sides of the Evaporation Pond, approximately 20 to 30 feet hydraulically downgradient from the overflow ditch. Figure 2 shows the probe locations. Soil samples were containerized and field screened as noted above from seven of the eight boring locations (B-1 through B-6 and B-8) in order to assess the extent of acetone. Only ground water was collected from the eighth location (B-7) because the boring was located between borings and because field screening indicated that soil in this area was contaminated with VOCs.



Soil samples were submitted from the 2 to 4 foot sample depths from boring B-1 through B-6 and B-8 for laboratory analysis of VOCs. Headspace screening of the soil samples did not detect any VOC concentrations above the instrument detection level (0.1 ppm) except for a detection of 10.6 ppm in boring B-4 from 0 to 2 feet below ground surface (bgs). Analysis of the soil samples did not detect VOCs above the MDLs except in the sample (#9245) collected from location B-2. Only acetone was detected from B-2 at a concentration of 200 micrograms per kilogram (µg/kg), which is near the PID instrument detection level. Analytical results of all soil samples are summarized in Table 1. Copies of the laboratory data sheets are presented in Appendix D.

3.2.2 Ground Water Results

Apex collected ground water samples from two soil borings, B-6 and B-7, using geoprobe equipment. Since headspace analysis did not detect VOC concentrations above the PID instrument detection level except as noted above, Apex based ground water sample locations on Phase II RFI analytical results, locations of the existing monitoring wells, and the previously calculated ground water flow direction. The southeast corner of the Evaporation Pond showed the highest soil VOC concentrations in the Phase II RFI, was in a downgradient location, and was located approximately equidistant from the nearest monitoring wells (MW-401 and MW-403). Therefore, Apex collected ground water samples from two locations downgradient from the southeast corner of the Evaporation Pond in order to assess whether acetone has migrated with ground water away from the potential source area.

Analysis of the ground water samples detected acetone in both locations. Ground water analytical results are summarized in Table 2. Copies of the laboratory data sheets are presented in Appendix D. The location furthest from the evaporation pond (B-6) contained the highest acetone concentration at 590 micrograms per liter (µg/L), while the closer location (B-7) contained a lower concentration at 66 µg/L. There is no maximum contaminant level (MCL) established for acetone to compare these concentrations against. A single trip blank was submitted with the ground water samples and analyzed for VOCs. No VOCs were detected in the trip blank. The laboratory data sheet for the trip blank along with all laboratory quality control/quality assurance (QA/QC) is included in Appendix D.

Table 1

SWMU 04 - Phase II Addendum Soil Analytical Results - VOCs

	9244	9245	9246	9247	9248	9249
Compound	B-1	B-2	B-3	B-4	B-5	B-6
Acetone	<72	200	<62	<62	<63	<62

All results are reported in µg/kg dry weight.
< - Compound not detected above method detection limit shown.

Table 2

SWMU 04 - Phase II Addendum **Ground Water Analytical Results - VOCs**

	9250	9251	9223
Compound	B-6	B-7	MW-401
Acetone	590	66	<50

All results are reported in µg/L.
< - compound not detected above method detection limit shown.</p>

3.3 SWMU 06

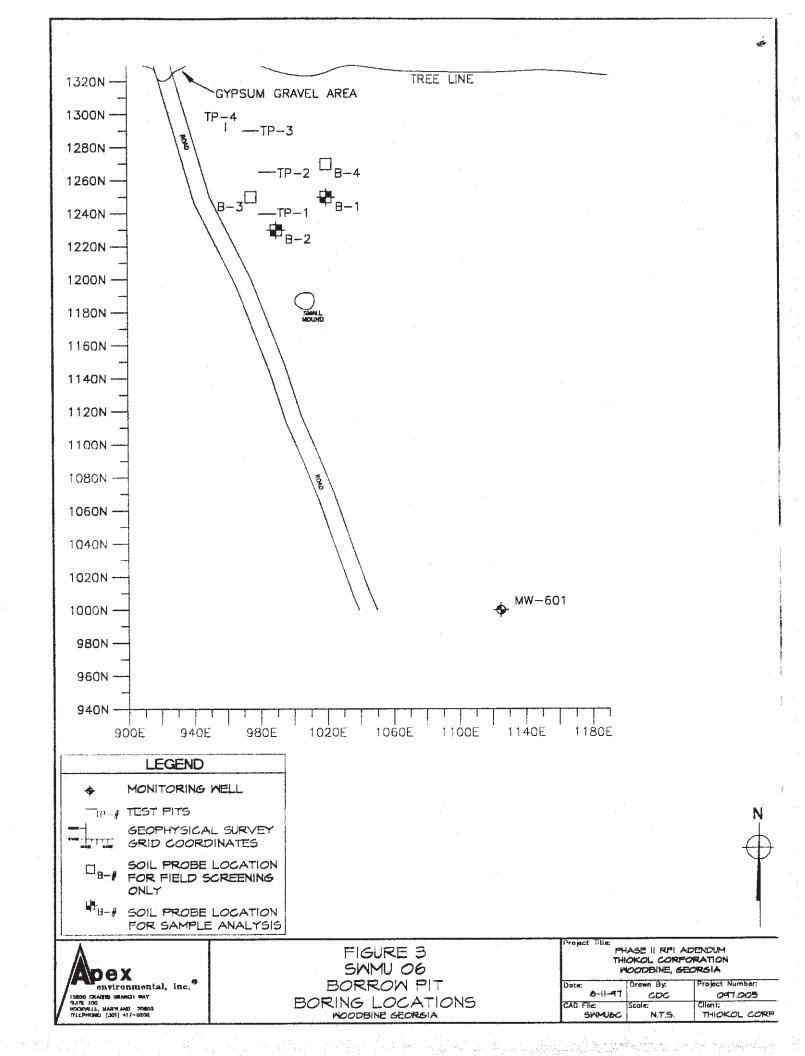
As part of this Addendum, Apex proposed to complete a minimum of six soil probes in the vicinity of the Borrow Pit and east side of Trench II. Each probe was completed using the methodology detailed in Section 4.5 of the Phase II RFI Work Plan dated September 15, 1995. Apex completed the investigation in two phases. A series of soil borings was completed during the first phase to assess the extent of VOCs. Soil samples were collected from each location and field screened using headspace analysis to assess whether VOCs were present and determine the extent of VOCs (if present). The second phase entailed revisiting selected locations for the collection of soil and ground water samples for laboratory analysis. Apex used the headspace data to return to the most appropriate locations to collect soil and ground water samples. Soil boring logs are presented in Appendix C.

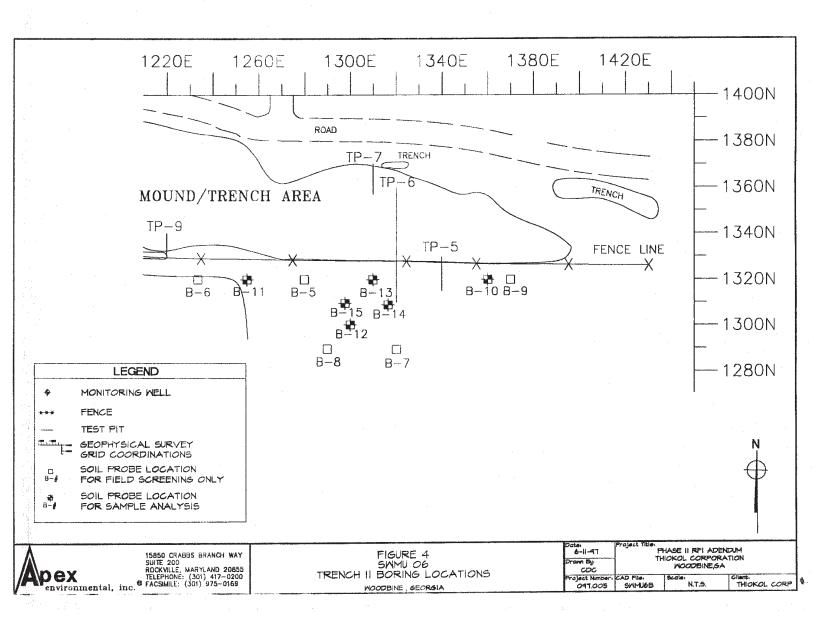
A Microtip PID was used to screen the soil samples. Prior to field activities, the PID was calibrated to a span gas of 400 ppm toluene in air. After screening the soil samples from each boring, the operation of the PID was checked against the span gas to ensure that the PID was functioning properly and calibrated properly. Apex also collected two ground water samples for VOC analysis using geoprobe equipment. Ground water samples were collected by first placing a slotted probe into the soil below the ground water table. Disposable polyethylene tubing with a foot valve was then used to retrieve a sufficient quantity of water. Ground water samples were collected in 40 ml glass vials with Teflon septums.

3.3.1 Soil Results

A total of 15 soil borings was completed at SWMU 06. Four borings were completed in the Borrow Pit Area, and ten borings were completed near the east end of Trench II (eight for soil and two for ground water). Figure 3 shows the boring locations in the Borrow Pit Area and Figure 4 shows the boring locations at Trench II.

Samples were first collected for headspace analysis to determine the best placement of probes to collect samples for laboratory analysis. Sample locations for laboratory analysis were chosen to either delineate the extent of contamination or confirm that contamination had not impacted an area as indicated by the headspace analyses.





In the Borrow Pit Area, VOCs were not detected above the PID instrument detection levels. Therefore, two sample locations were selected downgradient of the areas where VOCs were detected in the soil during the Phase II RFI. These sample locations were within two feet of the locations where headspace readings were collected during this effort. Laboratory analysis did not detect any VOCs above the MDLs (Table 3).

Trench II headspace readings did indicate that VOCs may be present in the soil collected at B-5 (Figure 4). Borings were completed around B-5 to define the extent of the possible contamination. Headspace readings from the additional probes did not detect VOCs above the PID instrument detection level. Sample locations for ground water sampling and laboratory analysis were then chosen to delineate the extent of possible VOC contamination. Locations were biased to collect samples from the downgradient side of the possible contamination.

A total of four soil samples was submitted for laboratory analysis of VOCs. Analytical results are summarized in Table 3. Copies of laboratory data sheets are presented in Appendix D. Samples submitted from B-11 and B-13 contained acetone at 100 µg/kg and 85 µg/kg, respectively. These concentrations are near the PID instrument detection level, explaining why no PID readings above background were detected. No other VOCs were detected above the MDLs. Laboratory analysis of samples from B-10 and B-12 downgradient from these locations did not detect any VOCs above the MDLs.

3.3.2 Ground Water Results

Apex collected ground water samples from two soil borings, B-14 and B-15, using geoprobe equipment (Figure 4). Apex based ground water sample locations on Phase II RFI analytical results, ground water flow direction, and headspace readings. Ground water sample locations were selected near and downgradient of B-5 on the east side of Trench II where headspace analysis indicated the possible presence of VOCs. The analysis of the ground water samples detected acetone in the ground water in B-14 at 110 µg/L. No other VOCs were detected above the MDLs. No VOCs were detected above the MDLs in the ground water at B-15. Ground water analytical results for VOCs are summarized in Table 4. A single trip

Table 3

SWMU 06 - Phase II Addendum Soil Analytical Results - VOCs

	Borrow Pit		Trench II			
	9236	9237	9238	9239	9240	9241
Compound	B-1	B-2	B-10	B-11	B-12	B-13
Acetone	<63	<62	<62	100	<65	85

All results are reported in µg/kg dry weight.
< - compound not detected above method detection limit shown.

Table 4

SWMU 06 - Phase II Addendum **Ground Water Analytical Results - VOCs**

	Trer	nch II
	9242	9243
Compound	B-14	B-15
Acetone	<50	110

All results are reported in µg/L.
< - compound not detected above method detection limit shown.

blank was submitted with the ground water samples and analyzed for VOCs. No VOCs were detected in the trip blank. The laboratory data sheet for the trip blank, along with all laboratory QA/QC, is included in Appendix D.

Apex also attempted to collect a ground water sample from the Borrow Pit Area. Apex encountered an organic, cemented soil horizon at approximately 5.5 feet below the ground surface and could not penetrate the horizon with hand tools. The same soil horizon (hardpan layer) was encountered during test pitting for the Phase II RFI. The geoprobe rods were left in the boring overnight to attempt to allow ground water to infiltrate the boring. Unfortunately, no ground water was present the following day; therefore, no ground water sample was collected from the Borrow Pit Area.

3.4 Ground Water Sampling

As requested by GAEPD in a letter dated January 10, 1996, Apex resampled all ground water monitoring wells at the site for analysis of metals. The GAEPD requested that "quiescent" sampling of the monitoring wells be conducted as outlined in GAEPD's *Hazardous Waste Management Program: Ground Water Testing, Appendix IX,*" revised February 1991. Quiescent sampling is conducted by purging the wells and then sampling the wells at a later time. Sediments disturbed by purging are allowed to settle out of the water before sampling. The quiescent method of sampling ground water for metals is intended to provide a water sample more representative of the actual concentrations present in the water. The presence of sediment in turbid water is speculated to result in elevated metals concentrations due to metals bound to the colloidal (fine grained soil) material which are released from the colloids by the acid digestion process which the laboratory uses to prepare the samples for analysis.

Apex purged the wells on February 25, 1997, using disposable Teflon bailers dedicated to each well. Apex also measured pH, conductivity, and temperature water quality parameters initially and after each well volume. Purging was considered complete if the water quality parameters did not vary by more than ten percent from the previous reading and at least three well volumes had been purged. After purging, the wells were closed and locked.

On February 26 (after approximately 24 hours), the wells were reopened and the samples collected. Unused, dedicated, disposable bailers were used to collect the samples. The samples were collected by slowly and gently filling and removing the bailer in each

monitoring well to minimize disturbing the sediments. Only one full bailer was required to collect sufficient sample volume from each well. Samples for analysis of metals were collected in one 500 ml and one 250 ml plastic bottles, and stored on ice immediately after collection. The bottles were prepreserved by the laboratory with nitric acid to a pH of less than 2. After collection of all ground water samples from all SWMUs, the samples were transported directly to Savannah Laboratories in Savannah, Georgia, under strict chain of custody. Copies of all laboratory data sheets and chain of custody forms are included in Appendix D.

3.4.1 SWMU 03 Results

Apex purged all five wells at SWMU 03 on February 25, 1997, and sampled the wells for metals on February 26, 1997. A minimum of three well volumes was purged from each well. Suspended sediments were not visible in the water at the time of sample collection. Analytical results are summarized in Table 5 and compared to previous metal analytical results from the Phase I and II RFI. Analytical results indicate all metals except barium are below the MDLs. Barium was detected below the established MCL. Analysis of ground water samples collected during Phase I and Phase II of the RFI detected cadmium, chromium, and lead above the respective MCLs. The ubiquitous occurrence of barium in ground water above the MDL but below the MCL may be the result of natural concentrations of barium in ground water at this site. Additionally, barium occurs in monitoring wells located upgradient and downgradient of each SWMU, indicating that the barium is naturally occurring and not a result of waste disposal at the site. Analysis of ground water by the quiescent method detected lower concentrations of metals more representative of the actual ground water quality beneath this SWMU.

3.4.2 SWMU 04 Results

Apex purged all four wells at SWMU 04 on February 25, 1997, and sampled the wells for metals on February 26, 1997. MW-401 was also resampled for VOCs due to the detection of 1,1,2-trichloroethane above its MCL during the Phase II RFI. Apex collected the VOC sample on the same day as purging after allowing the well

Table 5

SWMU 03 - Phase II RFI Addendum **Ground Water Analytical Results - Metals**

		Sample Number and Location					
Compound/		9217	9218	9219	9220	9221	
Element	MCL	MW-301	MW-302	MW-303	MW-304	MW-305	
Arsenic	0.05	<0.010	<0.010	<0.010	<0.010	<0.010	
Barium	2	<0.010	0.012	0.017	<0.010	<0.010	
Cadmium	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Chromium	0.1	<0.010	<0.010	<0.010	<0.010	<0.010	
Lead	0.015	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Mercury	0.002	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	

All Results are reported in mg/L.
< - Compound was not detected above the method detection limit shown.

to recharge. A minimum of three well volumes was purged from each well. Suspended sediments remained in MW-404 at the time of sampling, while suspended sediments were not visible in the water from the other wells at the time of sample collection. Analytical results are summarized in Table 6 and compared to previous metal analytical results from the Phase I and II RFI. Analytical results indicate all metals except barium are below the MDLs. Barium was detected below the established MCL. Analysis of ground water samples collected during Phase II of the RFI detected arsenic, banum, cadmium, chromium, and lead above the respective MCLs (no metals exceeded the MCLs during Phase I of the RFI). The ubiquitous occurrence of barium in ground water above the MDL but below the MCL may be the result of natural concentrations of barium in ground water at this site. Additionally, barium occurs in monitoring wells located upgradient and downgradient of each SWMU, indicating that the banum is naturally occurring and not a result of waste disposal at the site. Analysis of ground water by the quiescent method detected lower concentrations of metals more representative of the actual ground water quality beneath this SWMU.

3.4.3 SWMU 05 Results

Apex purged the single well at SWMU 05 on February 25, 1997, and sampled the well for metals on February 26, 1997. A minimum of three well volumes was purged from the well. Suspended sediments were not visible in the water at the time of sample collection. Analytical results are summarized in Table 7 and compared to previous analytical results from the Phase I and II RFI. Analytical results indicate all metals except barium are below the MDLs. Barium was detected below the established MCL. Analysis of ground water samples collected during Phase I and Phase II of the RFI did not detect metals above any of the respective MCLs. The ubiquitous occurrence of barium in ground water above the MDL but below the MCL may be the result of natural concentrations of barium in ground water at this site. Additionally, barium occurs in monitoring wells located upgradient and downgradient of each SWMU, indicating that the barium is naturally occurring and not a result of waste disposal at the site. Analysis of ground water by the quiescent method detected lower concentrations of metals more representative of the actual ground water quality beneath this SWMU.

Table 6

SWMU 04 - Phase II RFI Addendum **Ground Water Analytical Results - Metals**

		Sample Number and Location					
Compound/		9222	9224	9225	9226		
Element	MCL	MW-401	MW-402	MW-403	MW-404		
Arsenic	0.05	<0.010	<0.010	<0.010	<0.010		
Barium	2	0.037	0.039	0.022	0.030		
Cadmium	0.005	<0.0050	<0.0050	<0.0050	<0.0050		
Chromium	0.1	<0.010	<0.010	<0.010	<0.010		
Lead	0.015	<0.0050	<0.0050	<0.0050	<0.0050		
Mercury	0.002	<0.00020	<0.00020	<0.00020	<0.00020		

All Results are reported in mg/L.
< - Compound was not detected above the method detection limit shown.

Table 7

SWMU 05 - Phase II RFI Addendum Ground Water Analytical Results - Metals

Compound/		9227
Element	MCL	MW-501
Arsenic	0.05	<0.010
Barium	2	0.035
Cadmium	0.005	<0.0050
Chromium	0.010	<0.010
Lead	0.015	<0.0050
Mercury	0.002	<0.00020

< - Compound was not detected above the method detection limit shown.</p>

3.4.4 SWMU 06 Results

Apex purged all four wells at SWMU 06 on February 25, 1997, and sampled the wells for metals on February 26, 1997. A minimum of three well volumes was purged from each well. Suspended sediments were not visible in the water at the time of sample collection. Analytical results are summarized in Table 8 and compared to previous metals analytical results from the Phase I and II RFI. Analytical results indicate all metals except banum are below the MDLs. Banum was detected below the established MCL. Analysis of ground water samples collected during Phase If of the RFI detected arsenic and lead above the respective MCLs (no metals were detected above the MCLs during Phase I of the RFI). The ubiquitous occurrence of barium in ground water above the MDL but below the MCL may be the result of natural concentrations of barium in ground water at this site. Additionally, barium occurs in monitoring wells located upgradient and downgradient of each SWMU, indicating that the barium is naturally occurring and not a result of waste disposal at the site. Analysis of ground water by the quiescent method detected lower concentrations of metals more representative of the actual ground water quality beneath this SWMU.

3.4.5 SWMU 07 Results

Apex purged all four wells at SWMU 07 on February 25, 1997, and sampled the wells for metals on February 26, 1997. A minimum of three well volumes was purged from each well. Suspended sediments were not visible in the water at the time of sample collection. Analytical results are summarized in Table 9 and compared to previous metals analytical results from the Phase I and II RFI. Analytical results indicate all metals except barium are below the MDLs. Barium was detected below the established MCL. Analysis of ground water samples collected during Phase I and Phase II of the RFI detected arsenic, cadmium, chromium, lead, and mercury above the respective MCLs. The ubiquitous occurrence of barium in ground water above the MDL but below the MCL may be the result of natural concentrations of barium in ground water at this site. Additionally, barium occurs in monitoring wells located upgradient and downgradient of each SWMU, indicating that the barium is naturally occurring and not a result of waste disposal at the site. Analysis of ground water by the quiescent method detected lower concentrations of metals more representative of the actual ground water quality beneath this SWMU.

Table 8

SWMU 06 - Phase II RFI Addendum **Ground Water Analytical Results - Metals**

Compound/		9228	9229	9230	9231
Element	MCL	MW-601	MW-602	MW-603	MW-604
Arsenic	0.05	<0.010	<0.010	<0.010	<0.010
Barium	2	0.019	0.017	0.059	0.018
Cadmium	0.01	<0.0050	<0.0050	<0.0050	<0.0050
Chromium	0.1	<0.010	<0.010	<0.010	<0.010
Lead	0.015	<0.0050	<0.0050	<0.0050	<0.0050
Mercury	0	<0.00020	<0.00020	<0.00020	<0.00020

All Results are reported in mg/L. < - Compound was not detected above the method detection limit shown.

Table 9

SWMU 07 - Phase II RFI Addendum **Ground Water Analytical Results - Metals**

Compound/		9232	9233	9234	9235
Element	MCL	MW-701	MW-702	MW-703	MW-704
Arsenic	0.05	<0.010	<0.010	<0.010	<0.010
Barium	2	<0.010	<0.010	0.018	<0.010
Cadmium	0.01	<0.0050	<0.0050	<0.0050	<0.0050
Chromium	0.1	<0.010	<0.010	<0.010	<0.010
Lead	0.015	<0.0050	<0.0050	<0.0050	<0.0050
Mercury	0	<0.00020	<0.00020	<0.00020	<0.00020

All Results are reported in mg/L.
< - Compound was not detected above the method detection limit shown.

4.0 CONCLUSIONS

Analysis of ground water samples collected from the existing monitoring wells at the site using the quiescent method indicate that metals are not present in ground water above their respective MCLs. In addition, resampling of MW-401 for VOCs indicates that the ground water beneath this site does not exceed the MCL for 1,1,1-TCA as reported in the Phase II RFI. This recent data, coupled with data generated during the Phase I and Phase II of the RFI for the site, suggest that ground water beneath SWMUs 02, 03, 05, and 06 has not been impacted by former activities associated with these SWMUs. These results are consistent with Apex's conclusions in the Phase II RFI report dated September 30, 1996. Therefore, Apex recommends that no further action be required for SWMUs 02, 03, 05, and 06 (see below for a further discussion of the recent results at SWMU 06). The recent analytical data also indicate that ground water beneath SWMU 07 has not been impacted by metals. The lower metals results from all SWMUs relative to the previous (non-quiescent) ground water sampling are likely more representative of actual ground water quality at the facility.

Data collected at SWMU 04 in Apex's previous investigation, coupled with the data from the recent investigation, suggests that soil beneath the overflow ditch and ground water immediately downgradient from the Acetone Evaporation Pond contains acetone. No MCL, health advisory limit (HAL), or other action limits exist for acetone in soil or ground water. The U.S. Environmental Protection Agency (EPA) Office of Solid Waste and Emergency Response (OSWER) has developed a guidance which presents soil screening levels (SSL). These SSLs are risk based concentrations derived by comparing exposure information with toxicity data. SSLs have been prepared for acetone in soil for human exposure via ingestion, inhalation, and migration to ground water. The SSL for acetone for ground water impact is 8,000 ug/kg. In addition, EPA Region III has developed risk based concentrations (RBCs) for a variety of contaminants in tap water, air, fish, and soil. The RBC for acetone in tap water is 3,700 µg/L. Neither the SSL or RBC is intended to be used as a regulatory action limit, however, they are used by EPA toxicologists to screen sites for consideration of future action. These risk based numbers suggest that the concentrations of acetone detected in soil and ground water at SWMU 04 (maximum in soil of 1,100 µg/kg and maximum in ground water of 590 µg/L) do not pose a risk to human health.

Apex's recent investigation indicates that VOC contamination at SWMU 06 in the Borrow Pit Area and the Trench II Area is limited. Soil samples collected during test pitting for the Phase II RFI detected VOCs in soil and waste material (the highest concentrations were present in the waste material). Analysis of soil and ground water collected during the current investigation indicates that acetone is present in the vicinity of Trench II but that the VOC contamination is limited to the area

immediately surrounding the original detections. Soil and ground water downgradient from both the Trench II and Borrow Pit Areas does not contain VOCs, indicating that the documented VOCs have not migrated away from the source area. The concentrations of acetone in soil and ground water at SWMU 06 are less than the concentrations at SWMU 04 (with the exception of waste samples analyzed in the Phase II RFI) and, as with SWMU 04, are viewed as a risk to human health.

Apex's current investigation did not include additional work at SWMU 07 beyond resampling the ground water monitoring wells. Data generated during the Phase II RFI indicated that substantial quantities of ordnance, ordnance related scrap metal, drums, and CS gas remain in the soil at the site. Apex recommended in the Phase II RFI report that a corrective action plan be developed for SWMU 07.

Appendix A

Response to GAEPD Comments on Statistical Analysis

BACKGROUND STATISTICAL ANALYSES

Question 1. Please present the graphical evaluations that were used for determining the data distributions. The report indicates the data were assessed to determine if a "normal of lognormal" distribution existed. Once the distribution was known, how was this information used? Were distributions other than normal or lognormal encountered? Were the data able to be normalized? Please discuss these issues in the report and

present the evaluations.

Answer: Graphical evaluations that were used for determining data distributions are attached at the end of this Appendix. The overall data for determination of background concentrations did approximate a normal distribution. Due to the limited number of samples at each of the respective SWMUs, normalcy for the data from each individual SWMU was not addressed although the sample population as a whole did approximate a normal distribution. No normalization of data was required for this assessment.

Question 2. Table 4 presents the results of the background metals statistical analysis. In this table an upper mean and lower mean were calculated per SWMU and on a total SWMU basis. Please state the reason why the lower mean was calculated? No where throughout the report were these values used? It appears the upper mean is equal to the mean plus one standard deviation and the lower mean is equal to the mean minus one standard deviation. These statistical evaluations differ from what was discussed in the text. The text reports the upper tolerance level as being defined as the 95 percent level of confidence that at least 95 percent of the data fall below this value. This would yield the following equation for a normal distribution:

 $X = \mu + zo$;

where X = upper tolerance level, μ = sample mean, 0 = standard deviation, and z = normal deviate, which is 1.64 at the 95th percentile. The report also states that the higher of the individual SWMU background value and the total SWMU background value would be used to establish the background concentration at each SWMU. This would be done in order to maximize the use of the collected background information while reducing the potential of setting too low of a background concentration at any one SWMU. This approach was not implemented in the report. Changes need to be made throughout the report to correct these discrepancies.

Answer: The lower mean was calculated as a part of the statistical software package. Since Apex was attempting to determine if a respective metal concentration exceeded the normal distribution of the background sample concentrations, the lower mean is not really relevant and has been removed from the tables.

Question 3. Please present all background sampling data in tabular format.

Answer: Background sample data are presented in tabular form. All data tables from the Phase II Report as well as the new table of background data are included in Appendix B.

R489:Thlokol2(097,005);vre

GENERAL COMMENTS

Question 1. Please update the MCL for lead to 0.015 mg/l and Aldicarb to 0.007 mg/l. Naphthalene does not have an MCL.

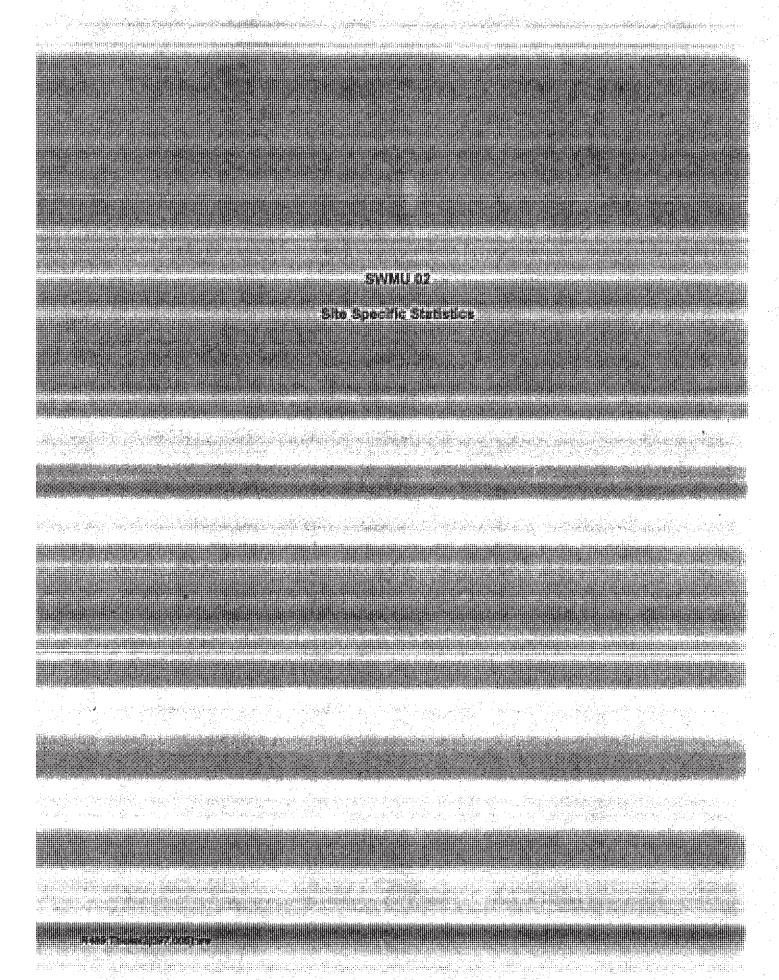
Answer: The MCLs listed have been updated in the report. Please refer to the modified tables attached as Appendix B to this report.

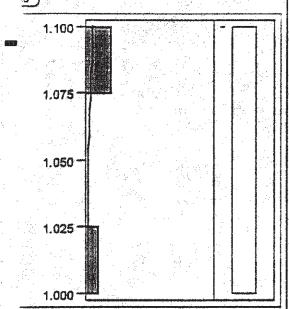
Question 2. What procedures were used in the collection of ground water samples for metals analysis? Were samples collected immediately after well recovery, or was the quiescent sampling procedure employed to minimize sediment introduction into the ground water sample? Union Carbide has had problems at the closed RCRA landfill with sediment in ground water samples. To minimize the introduction of sediment into the ground water sample, Union Carbide has switched to the quiescent sampling procedure.

Answer: Ground water samples collected for metals analysis were collected immediately after well purging and did contain significant sediment. This comment has been addressed through the re-sampling of the wells in accordance with GAEPD's "Quiescent Sampling" procedures. Please refer to the text of this addendum for a comparison of the results from the more recent sampling event.

Question 3. Enclosed is a copy of the EPD's Guidance for Selecting Media Remediation Levels at RCRA Solid Waste Management Units. This guidance was finalized November 4, 1996 and may be used in lieu of remediating to background concentration and MCLs. EPD is differing its comments on which SWMUs require further investigation/corrective action until a response is made on the aforementioned comments.

Answer: No response is required to this comment.

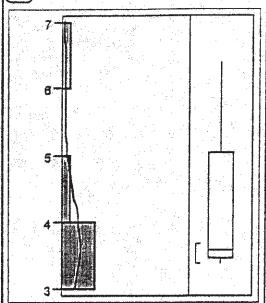




Kernel Std 0.032479

Quantiles		
maximum	100.0%	1.1000
	99.5%	1.1000
	97.5%	1.1000
	90.0%	1.1000
quartile	75.0%	1.1000
median	50.0%	1.1000
quartile	25.0%	1.0000
A4	10,0%	1.0000
	2.5%	1.0000
	0.5%	1,0000
minimum	0.0%	1.0000

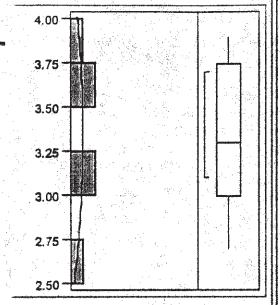
(Moments	
Mean	1.066667
Std Dev	0.051640
Std Err Mean	0.021082
upper 95% Mean	1,120859
lower 95% Mean	1.012475
N .	6.000000
Sum Wgts	6.000000



Kernel Std	 		
0.737145		. <u>1</u> -	1

Quantiles	and Saladar Angles Saladar	
maximum	100.0%	6.4000
	99.5%	6.4000
	97.5%	6.4000
	90.0%	6.4000
quartile	75.0%	5.0500
median	50.0%	3,6000
quartile	25.0%	3.4750
The state of	10.0%	3.4000
	2.5%	3.4000
	0.5%	3.4000
minimum	0.0%	3.4000

Moments	
Mean	4.183333
Std Dev	1.172035
Std Err Mean	0.478481
upper 95% Mean	5.413291
lower 95% Mean	2.953376
N	6.000000
Sum Wgts	6.000000



Kernel Std

0.280333 [

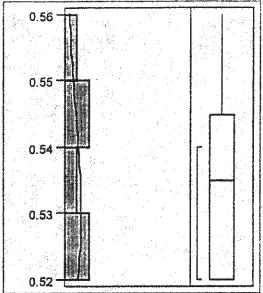
minimum

Quantiles		
maximum	100.0%	3.9000
	99.5%	3.9000
	97.5%	3.9000
	90.0%	3,9000
quartile	75.0%	3.7500
median	50.0%	3.3000
quartile	25.0%	3.0000
	10.0%	2.7000
	2.5%	2.7000
	0.5%	2 7000

0.0%

2,7000

(Moments	
Mean	3.333333
Std Dev	0.445720
Std Err Mean	0.181965
upper 95% Mean	3.801081
lower 95% Mean	2.865585
N	6.000000
Sum Wgts	6.000000



Kernel Std

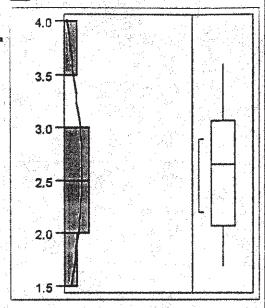
0.009538

(QI	an	til	es	

maximum	100.0%	0.56000
	99.5%	0.56000
	97.5%	0.56000
	90.0%	0,56000
quartile	75.0%	0.54500
median	50.0%	0.53500
quartile	25.0%	0.52000
	10.0%	0.52000
	2.5%	0.52000
	0.5%	0,52000
minimum	0.0%	0.52000

Moments

Mean	0.535000
Std Dev	0.015166
Std Err Mean	0.006191
upper 95% Mean	0.550915
lower 95% Mean	0.519085
N joining	6.000000
Sum Wgts	6.000000

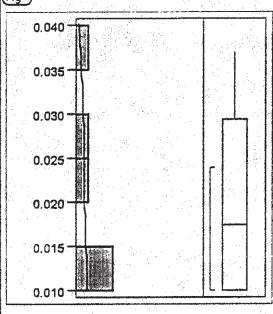


Kernel Std

0.416087

Quantiles		
maximum	100.0%	3.6000
	99.5%	3.6000
	97.5%	3.6000
	90.0%	3,6000
quartile	75.0%	3.0750
median	50.0%	2,6500
quartile	25.0%	2.0750
	10.0%	1.7000
	2.5%	1.7000
	0.5%	1.7000
minimum	0.0%	1,7000

Moments	
Меап	2.616667
Std Dev	0.661564
Std Err Mean	0.270082
upper 95% Mean	3.310925
lower 95% Mean	1.922408
N	6.000000
Sum Wgts	6.000000



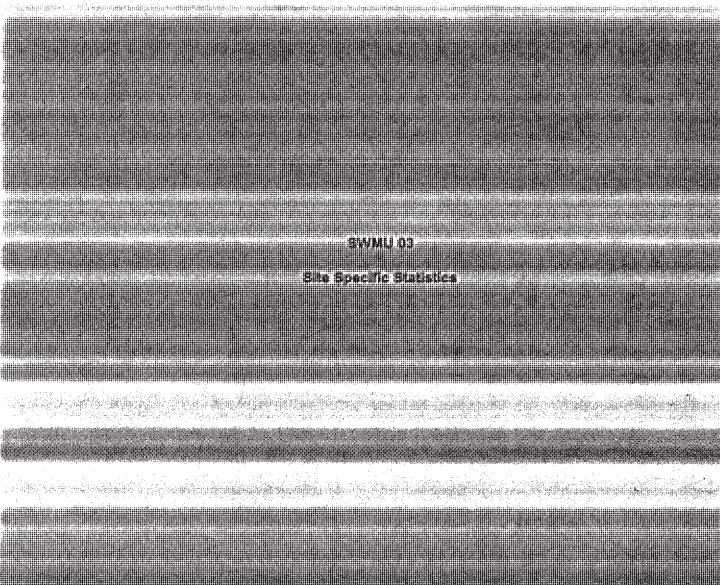
0.007087

Quantiles

		100
maximum	100.0%	0.03700
	99.5%	0.03700
150	97.5%	0.03700
	90.0%	0.03700
quartile	75.0%	0.02950
median	50.0%	0.01750
quartile	25.0%	0.01000
	10.0%	0.01000
	2.5%	0.01000
	0.5%	0.01000
minimum	0.0%	0.01000

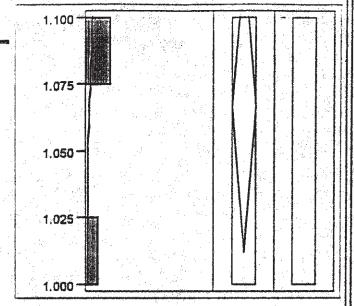
Moments

Sum Wgts	6.000000
N Section 1	6.000000
lower 95% Mean	0.008009
upper 95% Mean	0.031658
Std Err Mean	0.004600
Std Dev	0.011268
Mean	0.019833





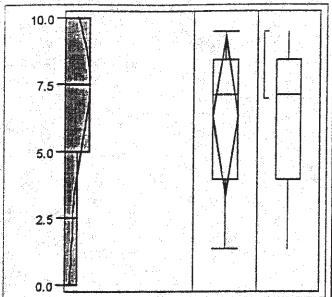






Quantiles		
maximum	100.0%	1.1000
, 38,	99.5%	1.1000
	97.5%	1.1000
	90.0%	1,1000
quartile	75.0%	1.1000
median	50.0%	1.1000
quartile	25.0%	1.0000
	10.0%	1.0000
	2.5%	1.0000
	0.5%	1,0000
minimum	0.0%	1.0000

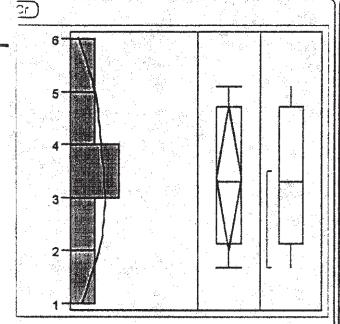
(Moments)	
Mean	1.066667
Std Dev	0.051640
Std Err Mean	0.021082
upper 95% Mean	1.120859
lower 95% Mean	1.012475
N	6.000000
Sum Wgts	6.000000



Kernel Std 1.805739

Quantiles)		
maximum	100.0%	9.5000
	99.5%	9.5000
	97.5%	9.5000
	90.0%	9,5000
quartile	75.0%	8.4500
median	50.0%	7.1500
quartile	25.0%	3.9500
	10.0%	1.4000
100	2,5%	1.4000
	0.5%	1.4000
minimum	0.0%	1,4000

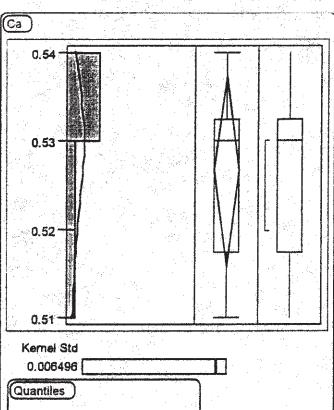
(Moments	
Mean	6.350000
Std Dev	2.871063
Std Err Mean	1.172106
upper 95% Mean	9.362952
lower 95% Mean	3.337048
- N ; - ∴	6.000000
Sum Wgts	6.000000



0.821409

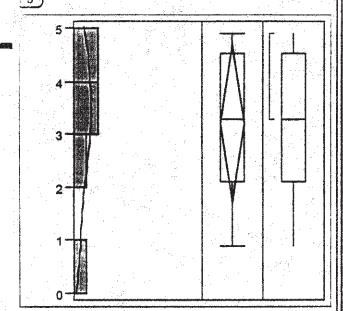
Quantiles		
maximum	100.0%	5.1000
T 4 (4)	99.5%	5.1000
	97.5%	5.1000
	90.0%	5.1000
quartile	75.0%	4.7250
median	50.0%	3.3000
quartile	25.0%	2.1500
	10.0%	1,7000
	2.5%	1.7000
7	0.5%	1.7000
minimum	0.0%	1.7000

Moments		
Mean	3.383333	
Std Dev	1.306012	
Std Err Mean	0.533177	
upper 95% Mean	4.753889	
lower 95% Mean	2.012778	
N	6.000000	
Sum Wgts	6.000000	



Quantiles		
maximum	100.0%	0.54000
	99.5%	0.54000
	97.5%	0.54000
	90.0%	0.54000
quartile	75.0%	0.53250
median	50.0%	0.53000
quartile	25.0%	0.51750
	10.0%	0.51000
	2.5%	0.51000
	0.5%	0.51000
minimum	0.0%	0.51000

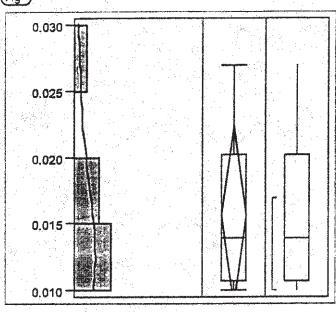
Moments	
Mean	0.526667
Std Dev	0.010328
Std Err Mean	0.004216
upper 95% Mean	0.537505
lower 95% Mean	0.515828
N	6.000000
Sum Wgts	6.000000



Kernel Std 0.8972

Quantiles		
maximum	100.0%	4.9000
	99.5%	4.9000
	97.5%	4.9000
	90.0%	4,9000
quartile	75.0%	4. 5 250
median	50.0%	3,3000
quartile	25.0%	2.0975
	10.0%	0.8900
	2.5%	0.8900
	0.5%	0.8900
minimum	0.0%	0.8900

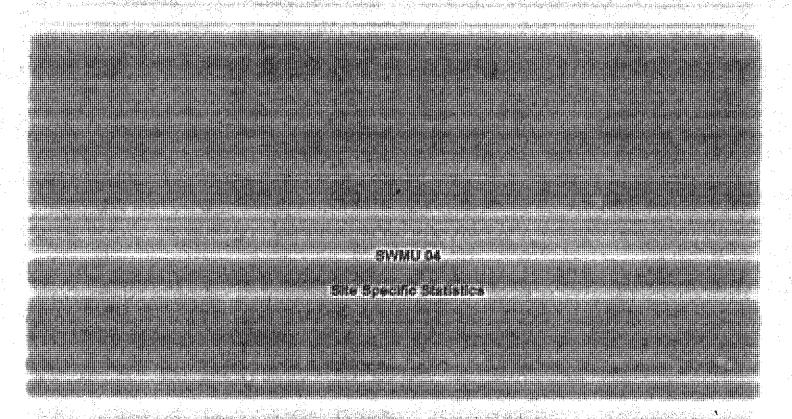
(Moments	V.
Mean	3.215000
Std Dev	1.426517
Std Err Mean	0.582373
upper 95% Mean	4.712016
lower 95% Mean	1.717984
N	6,000000
Sum Wgts	6.000000

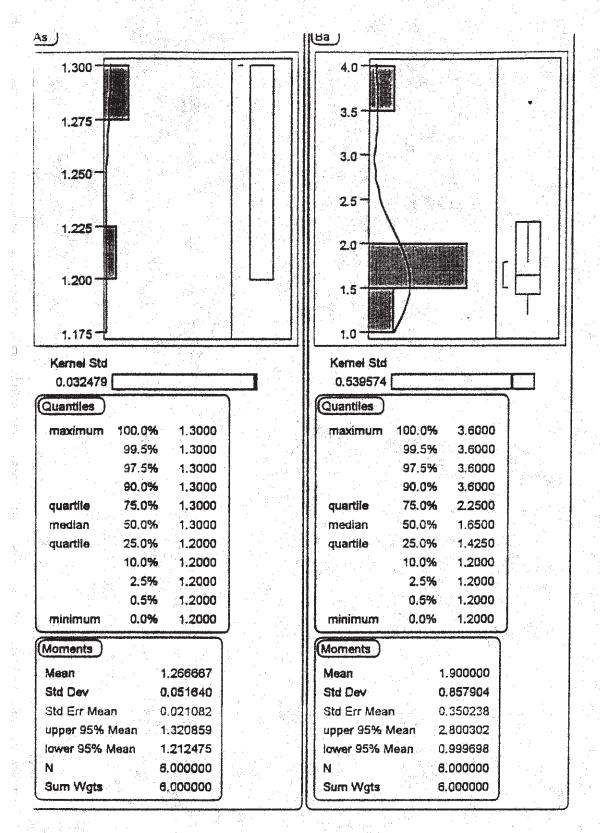


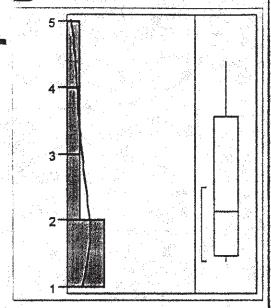
Kernel Std	
0.004089	

Quantiles		
maximum	100.0%	0.02700
	99.5%	0.02700
	97.5%	0.02700
	90.0%	0.02700
quartile	75.0%	0.02025
median	50.0%	0.01400
quartile	25.0%	0.01075
	10.0%	0.01000
	2.5%	0.01000
	0.5%	0.01000
minimum	0.0%	0.01000

(Moments	
Mean	0.015667
Std Dev	0.006501
Std Err Mean	0.002654
upper 95% Mean	0.022489
lower 95% Mean	0.008844
N	6.000000
Sum Wgts	6.000000



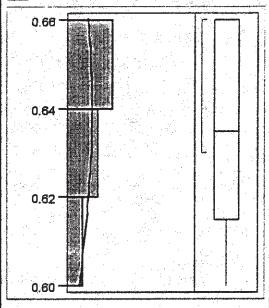




Kernei Std 0.741426

Quantiles		
maximum	100.0%	4.4000
	99.5%	4.4000
	97.5%	4.4000
	90.0%	4,4000
quartile	75.0%	3,5750
median	50.0%	2,1500
quartile	25.0%	1,4750
	10.0%	1.4000
	2.5%	1.4000
	0.5%	1.4000
minimum	0.0%	1.4000

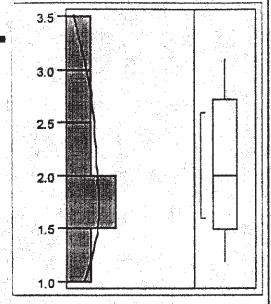
(Moments	
Mean	2.483333
Std Dev	1.178841
Std Err Mean	0.481260
upper 95% Mean	3.720433
lower 95% Mean	1.246233
N	0.000000
Sum Wgts	6.000000



Kernel Std	 a (500
0.01475		
(A49)	 77	

(Graining)		ta a ta
maximum	100.0%	0.66000
	99.5%	0.66000
	97.5%	0.66000
	90.0%	0,660 00
quartile	75.0%	0.66000
median	50.0%	0.63500
quartile	25.0%	0.61500
1 1	10.0%	0.60000
	2.5%	0.60000
	0.5%	0.60000
minimum	0.0%	0.60000

*
0.635000
0.023452
0.009574
0.659611
0.610389
6.000000
6.000000

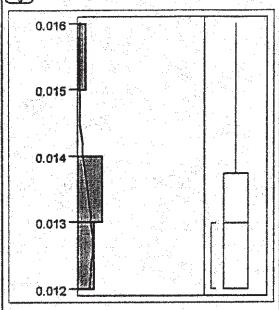


Kernel Std 0.445471

Quantiles		
maximum	100.0%	3.1000
	99.5%	3.1000
	97.5%	3,1000
	90.0%	3,1000
quartile	75.0%	2.7250
median	50.0%	2.0000
quartile	25.0%	1.5000
	10.0%	1.2000
	2.5%	1.2000
	0.5%	1.2000
minimum	0.0%	1,2000

(Moments)

Mean	2.083333
Std Dav	0.708284
Std Err Mean	0.289156
upper 95% Mean	2.826621
lower 95% Mean	1.340045
N	6.000000
Sum Wgts	6,000000



Kernel Std

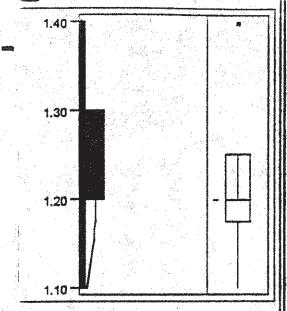
0.000926

Quantiles

100,0%	0.01600
99.5%	0.01600
97.5%	0.01600
90.0%	0.01600
75.0%	0.01375
50.0%	0.01300
25.0%	0.01200
10.0%	0.01200
2.5%	0.01200
0.5%	0.01200
0.0%	0.01200
	99.5% 97.5% 90.0% 75.0% 50.0% 25.0% 10.0% 2.5% 0.5%

(Moments

Mean	0.013167
Std Dev	0.001472
Std Err Mean	0.000601
upper 95% Mean	0.014711
lower 95% Mean	0.011622
N	6.000000
Sum Wgts	6.000000

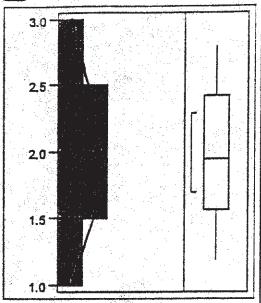


Kernel Std

0.061837

Quantiles)		
maximum	100.0%	1.4000
	99.5%	1.4000
	97.5%	1.4000
	90.0%	1.4000
quartile	75.0%	1.2500
median	50.0%	1.2000
quartile	25.0%	1,1750
	10.0%	1.1000
	2,5%	1.1000
	0.5%	1.1000
minimum	0.0%	1.1000

(Moments	
Mean	1.216667
Std Dev	0.098319
Std Err Mean	0.040139
upper 95% Mean	1.319845
lower 95% Mean	1,113488
N	6.000000
Sum Wgts	6.000000



Kernel Std

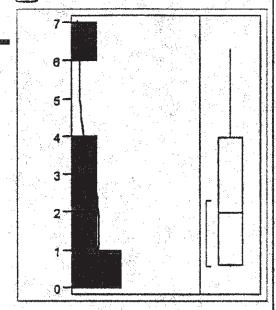
0.345443

minimum

Quantiles		
maximum	100.0%	2,8000
	99.5%	2.8000
	97.5%	2,8000
	90.0%	2.8000
quartile	75.0%	2,4250
median	50.0%	1.9500
quartile	25.0%	1.5750
0. 0. 0. 2.	10.0%	1.2000
	2,5%	1,2000
	0.5%	1.2000

0.0% 1.2000

Moments	a filosofia de la composición de la co
Mean	1,983333
Std Dev	0.549242
Std Err Mean	0.224227
upper 95% Mean	2,559719
lower 95% Mean	1,406948
N	6.000000
Sum Wgts	6.000000

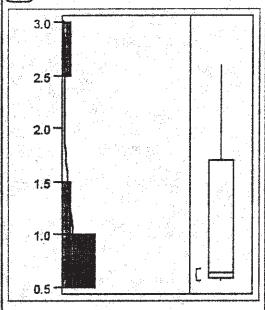


Kernel Std

1.343523 [

e e	144
100.0%	6.3000
99.5%	6.3000
97.5%	6.3000
90.0%	6,3000
75.0%	3.9750
50.0%	2,0000
25.0%	0.6100
10.0%	0.5800
2.5%	0.5800
0.5%	0.5800
0.0%	0.5800
	99.5% 97.5% 90.0% 75.0% 50.0% 25.0% 10.0% 2.5% 0.5%

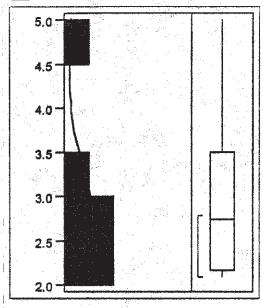
(Motheritz)	and a second
Меап	2.450000
Std Dev	2.136155
Std Err Mean	0.872082
upper 95% Mean	4.691725
lower 95% Mean	0.208275
N	6.000000
Sum Wats	6.000000

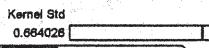


Kernel Std	
0.508271	

Quantiles		
maximum	100.0%	2.6000
	99.5%	2.6000
	97.5%	2.6000
	90.0%	2,6000
quartile	75.0%	1.7000
median	50.0%	0.6500
quartile	25.0%	0.6000
100 miles	10.0%	0,5700
	2.5%	0.5700
1 y	0.5%	0.5700
minimum	0.0%	0.5700

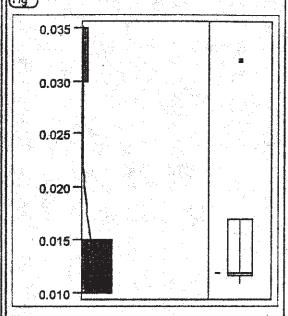
(Maments)	
Mean	1.080000
Std Dev	0.808134
Std Err Mean	0.329919
upper 95% Mean	1.928072
lower 95% Mean	0.231928
N	6.000000
Sum Wgts	6.000000





Quantiles		
maximum	100.0%	5.0000
	99.5%	5.0000
	97.5%	5.0000
	90.0%	5.0000
quartile	75.0%	3,5000
median	50.0%	2.7500
quartile	25.0%	2,1750
	10.0%	2.1000
	2.5%	2,1000
	0.5%	2.1000
minimum	0.0%	2.1000

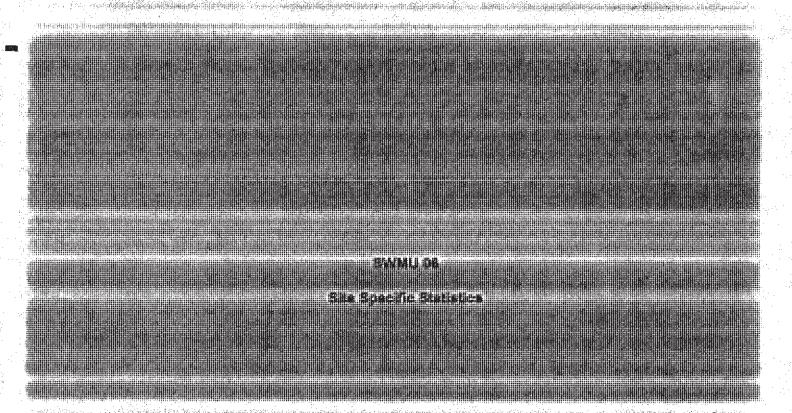
Moments	r dili di
Mean	2,966667
Std Dev	1.055778
Std Err Mean	0:431019
upper 95% Mean	4.074621
lower 95% Mean	1.858712
N	6,000000
Sum Wgts	6.000000



Kernel Std		
0.005193		

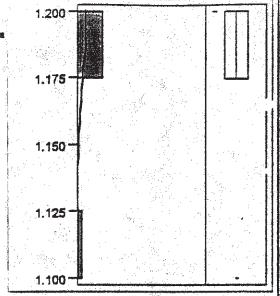
Quantiles		
maximum	100.0%	0.03200
	99.5%	0.03200
	97.5%	0.03200
	90.0%	0.03200
quartile	75.0%	0.01700
median	50.0%	0.01200
quartile	25.0%	0.01175
	10.0%	0.01100
	2.5%	0.01100
	0.5%	0.01100
minimum	0.0%	0.01100

(Moments	
Mean	0.015167
Std Dev	0.008256
Std Err Mean	0.003371
upper 95% Mean	0.023831
lower 95% Mean	0.006502
N	6.000000
Sum Wgts	6.000000



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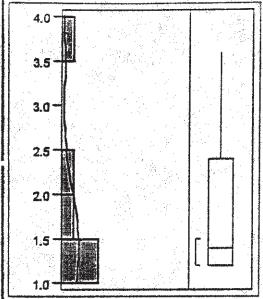


Kernei Std

0.025677

Quantiles)	ige Service	
maximum	100.0%	1.2000
	99.5%	1.2000
"	97.5%	1.2000
	90.0%	1.2000
quartile	75.0%	1.2000
median	50.0%	1.2000
quartile	25.0%	1.1750
	10.0%	1.1000
	2.5%	1.1000
A. O. Day	0.5%	1.1000
minimum	0.0%	1.1000

(Malliantz)	af i
Mean	1.183333
Std Dev	0.040825
Std Err Mean	0.016667
upper 95% Mean	1.226176
lower 95% Mean	1,140491
N	0.000000
Sum Wgts	6.000000



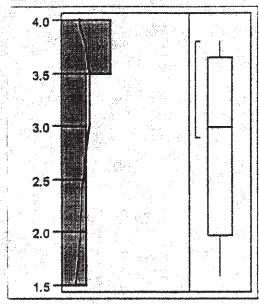
Kernel Std

0.585966 [

Quantiles		
maximum	100.0%	3.6000
	99.5%	3.6000
	97.5%	3.6000
	90.0%	3.6000
quartile	75.0%	2.4000
median	50.0%	1.4000
quartile	25.0%	1.2000
	10.0%	1,2000
	2.5%	1,2000
	0.5%	1.2000
minimum	0.0%	1.2000

(Mornents

Mean	1.800000
Std Dev	0.931665
Std Err Mean	0.380351
upper 95% Mean	2.777708
lower 95% Mean	0.822292
N N	6.000000
Sum Wgts	6,000000



⊋r.).

Kernel Std 0.537738

Quantiles 3.8000 maximum 100.0% 99.5% 3.8000 97.5% 3.8000 90.0% 3.8000 75.0% 3,6500 quartile 50.0% 3.0000 median 25.0% 1.9750 quartile 10.0% 1.6000 2.5% 1,6000 0.5% 1.6000 0.0% 1,6000 minimum

 Moments

 Mean
 2.850000

 Std Dev
 0.854985

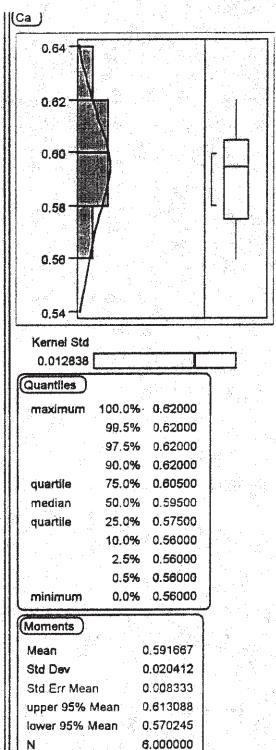
 Std Err Mean
 0.349046

 upper 95% Mean
 3.747239

 lower 95% Mean
 1.952761

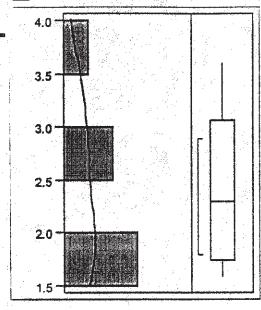
 N
 6.000000

 Sum Wgts
 6.000000



6.000000

Sum Wgts



Kernel Std 0,489473

Quantiles 100,0% 3.6000 maximum 99.5% 3,6000 97.5% 3,6000 90,0% 3.6000 75.0% 3.0750 quartile 50.0% 2,3000 median quartile 25.0% 1,7500 10.0% 1,6000 1.8000 2.5% 1.6000 0.5% 1.6000 minimum 0.0%

 Moments

 Mean
 2.416667

 Std Dev
 0.778246

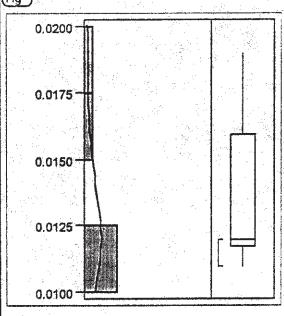
 Std Err Mean
 0.317718

 upper 95% Mean
 3.233374

 lower 95% Mean
 1.599960

 N
 6.000000

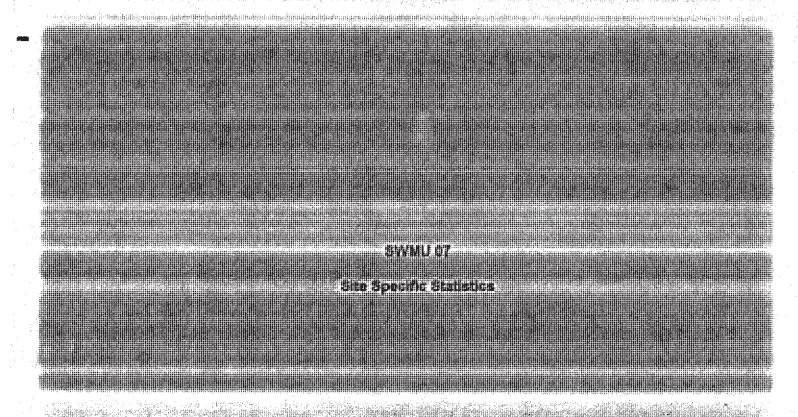
 Sum Wgts
 8.000000

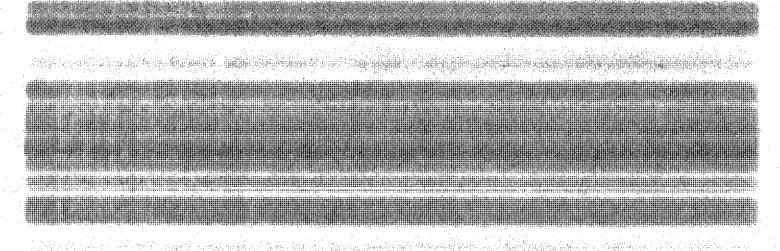


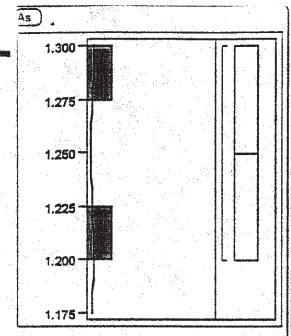
Kernel Std	
0.001897	

100.0%	0,01900
99.5%	0.01900
97.5%	0.01900
90.0%	0.01900
75.0%	0.01600
50.0%	0.01200
25.0%	0.01175
10.0%	0.01100
2.5%	0.01100
0.5%	0.01100
0.0%	0.01100
	99.5% 97.5% 90.0% 75.0% 50.0% 25.0% 10.0% 2.5% 0.5%

(Moments)	
Mean	0.013500
Std Dev	0.003017
Std Err Mean	0.001232
upper 95% Mean	0.016666
lower 95% Mean	0.010334
Ň	6.000000
Sum Wgts	6.000000





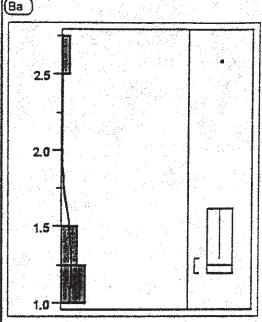


Kernel Std 0.034449

luantilos

Quantiles		
maximum	100.0%	1.3000
	99.5%	1.3000
	97.5%	1.3000
	90.0%	1.3000
quartile	75.0%	1.3000
median	50.0%	1,2500
quartile	25.0%	1.2000
	10.0%	1.2000
	2.5%	1.2000
i AA	0.5%	1.2000
minimum	0.0%	1.2000

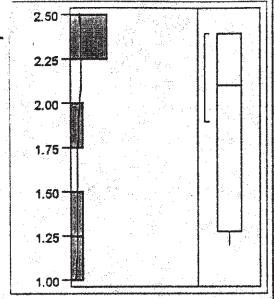
(Moments)		
Mean	1.250000	
Std Dav	0.054772	
Std Err Mean	0.022361	
upper 95% Mean	1.307479	
lower 95% Mean	1.192521	
N	6.000000	
Sum Wgts	a.000000	

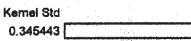


Kernel Std 0.350558

Quantiles)		
maximum	100.0%	2.5000
	99.5%	2,6000
	97.5%	2,6000
	90.0%	2.6000
quartile	75.0%	1.6250
median	50.0%	1.2500
quartile	25.0%	1.2000
**	10.0%	1.2000
	2.5%	1.2000
	0.5%	1.2000
minimum	0.0%	1.2000
	maximum quartile median quartile	maximum 100.0% 99.5% 97.5% 90.0% quartile 75.0% quartile 25.0% 10.0% 2.5% 0.5%

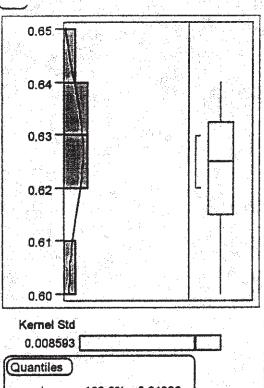
(Moments	
Mean	1.466667
Std Dev	0.557375
Std Err Mean	0.227547
upper 95% Mean	2.051587
lower 95% Mean	0.881746
N	6.000000
Sum Wgts	6.000000





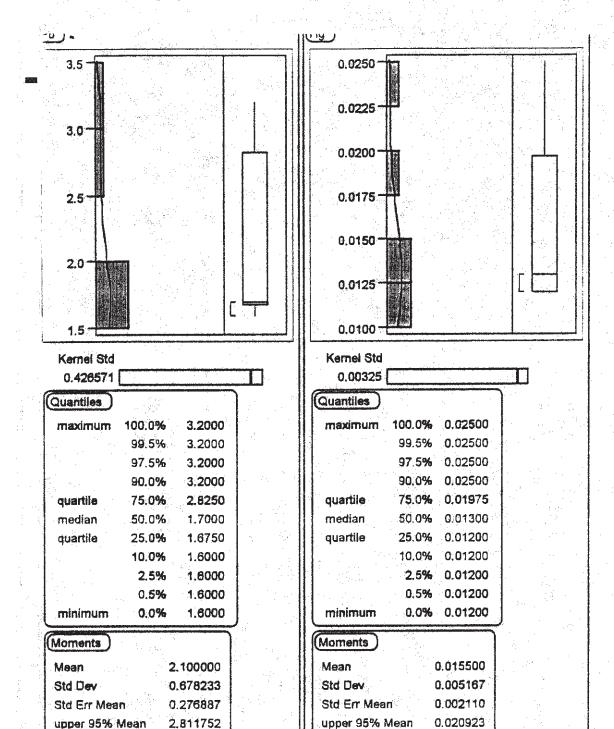
Quantiles	2. 4	
maximum	100.0%	2.4000
	99.5%	2.4000
	97.5%	2.4000
	90.0%	2,4000
quartile	75.0%	2.4000
median	50.0%	2.1000
quartile	25.0%	1.2750
	10.0%	1.2000
	2.5%	1,2000
	0.5%	1.2000
minimum	0.0%	1.2000

(Moments	
Mean	1.916667
Std Dev	0.549242
Std Err Mean	0.224227
upper 95% Mean	2,493052
lower 95% Mean	1.340281
N	6.000000
Sum Wgts	6.000000



0.008593			
Quantiles	K e Migra		
maximum	100.0%	0.84000	
	99.5%	0.64000	
	97.5%	0.64000	
	90.0%	0.64000	
quartile	75.0%	0.63250	
median	50.0%	0.62500	
quartile	25.0%	0.61500	1 1 1 1
	10.0%	0.60000	V- /
	2.5%	0.60000	1 1
	0.5%	0.60000	
minimum	0.0%	0.60000	

0.623333
0.013663
0.005578
0.637671
0.608996
6.000000
5.000000



lower 95% Mean

Sum Wgts

0.010077

6,000000

6.000000

upper 95% Mean

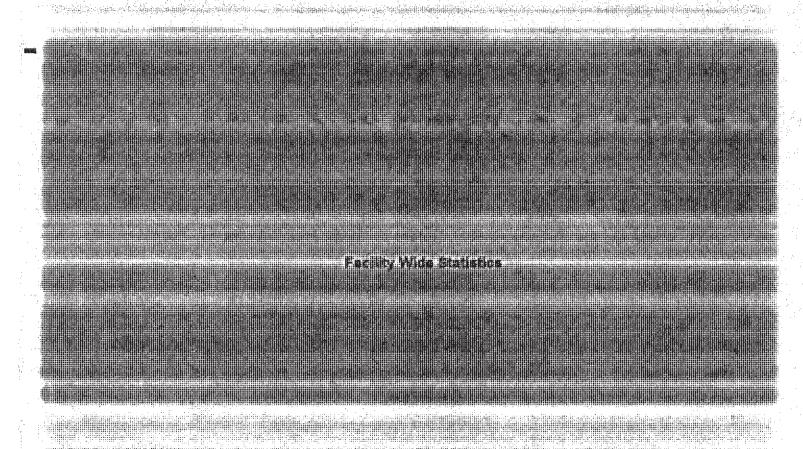
lower 95% Mean

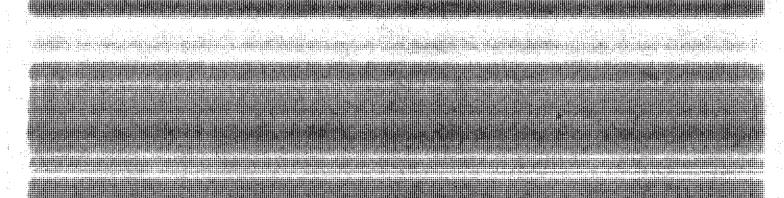
Sum Wgts

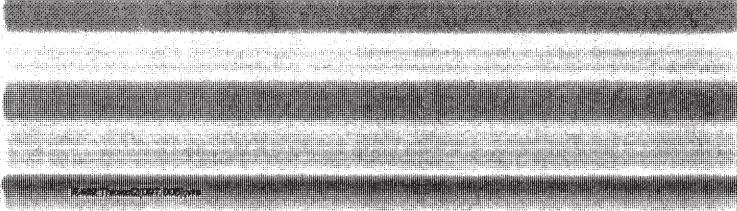
2.811752

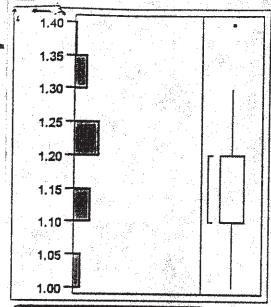
1,388248

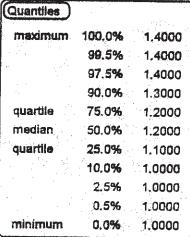
6.000000 6.000000



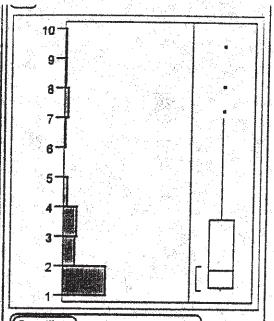






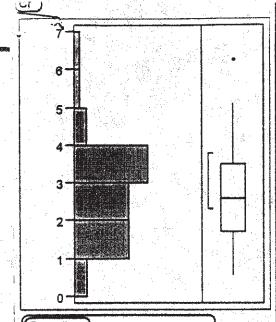


(Moments	A
Mean	1.17500
Std Dev	0.09984
Std Err Mean	0.01861
upper 95% Mean	1.20871
lower 95% Mean	1.14129
N	36.00000
Sum Wgts	36.00000



Quantiles		
maximum	100.0%	9.5000
+ B	99.5%	9.5000
	97.5%	9.5000
	90.0%	7.0900
quartile	75.0%	3.6000
median	50.0%	1.9000
quartile	25.0%	1.3000
	10.0%	1.2000
	2.5%	1.2000
	0.5%	1.2000
minimum	0.0%	1.2000

Moments	
Mean	2.94722
Std Dev	2.21043
Std Err Mean	0.36840
upper 95% Mean	3.69512
lower 95% Mean	2.19933
N	36,00000
Sum Wgts	36.00000



Quantiles maximum 100.0% 6,3000 99.5% 6.3000 6.3000 97.5% 90.0% 4.4600 75.0% 3.5000 quartile median 50.0% 2.6000 quartile 25.0% 1.7250 1.2700 10.0% 2.5% 0.5800 0.5% 0.5800 0.0% 0.5800 minimum

 Moments

 Mean
 2.73611

 Std Dev
 1.24308

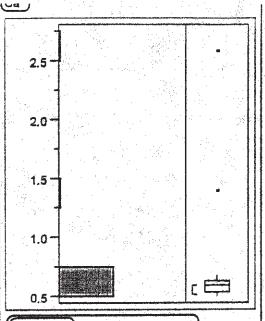
 Std Err Mean
 0.20718

 upper 95% Mean
 3.15671

 lower 95% Mean
 2.31552

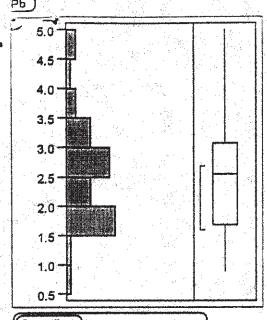
 N
 36.00000

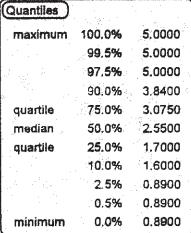
 Sum Wgts
 36.00000



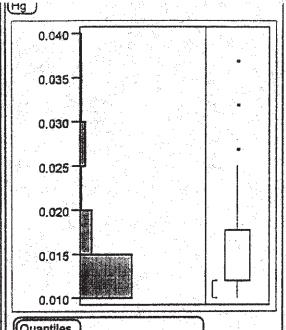
Quantiles)		
maximum	100.0%	2.6000
	99.5%	2.6000
	97.5%	2.600 0
	90.0%	0.6660
quartile	75.0%	0.6300
median	50.0%	0.6000
quartile	25.0%	0.5400
	10.0%	0.5200
	2.5%	0.5100
	0.5%	0.5100
minimum	0.0%	0.5100

Moments	
Mean	0.66528
Std Dev	0.36137
Std Err Mean	0.06023
upper 95% Mean	0.78755
lower 95% Mean	0.54301
N	36.00000
Sum Wgts	36.00000





	(Moments)	Maria de la companione
-	Mean	2,56639
	Std Dev	0.95788
	Std Err Mean	0.15965
	upper 95% Mean	2.89049
	lower 95% Mean	2.24229
	N	36,00000
	Sum Wgts	36.00000



100.0%	0.03700
99.5%	0.03700
97.5%	0.03700
90.0%	0.02700
75.0%	0.01775
50.0%	0.01200
25.0%	0.01200
10.0%	0.01070
2.5%	0.01000
0.5%	0.01000
0.0%	0.01000
	99.5% 97.5% 90.0% 75.0% 50.0% 25.0% 10.0% 2.5% 0.5%

Moments	
Mean	0.01547
Std Dev	0.00665
Std Err Mean	0.00111
upper 95% Mean	0.01772
lower 95% Mean	0.01322
N	36.00000
Sum Wgts	36.00000

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Appendix B

Phase II RFI Revised Tables

Table 1
Summary - RFI Phase I and II

Thiokol - Woodbine Facility

SWMU	RFI Phase	Ground Water Investigation	Ground Water Analytes	Soil Investigation	Soil Analytes	Geophysical Survey	Ordnance
2	Phase I	none	none	4 - shallow sample locations 4 - samples	VOC, BNA, metals, CS compounds	none	попе
	Phase II	None	None	6 - background soil samples	Metals	none	none
3 - CS Burial/ Trench/Surface Disposal	Phase I	3 - monitoring wells 3 - samples	VOCs, BNA, metals, CS compounds	5 - test pits (CS Burial) 1 - sample 3 - test pits (Trench) 2 - samples 6 - shallow sample locations 6 - samples	VOC. BNA, metals, aldicarb, CS compounds	none	Surface Sweep
	Phase II	3 - samples	VOC, BNA, metals, aldicarb, CS compounds	6 - background soil samples	metals	none	none
3 - Burn Area	Phase II	1 - monitoring well 1- sample	VOC, BNA, metals, aldicarb, CS compounds	4 - test pits 6 - samples 6 - soil borings 1 - soil sample 6 -background soil samples	VOCs, BNA, metals, aldicarb, CS compounds	GPR, magnetometer	40 mm grenades (CS and HE)
3 - Aldicarb disposal Area	Phase II	1- monitoring well 1-sampte	VOC, BNA, metals, aldicarb, CS Compounds	5-test pits 10 - samples 3-soil borings 6-background soil samples	VOCs, BNA, metals, aldicarb, CS Compounds	GPR, EM31, magnetometer	Surface sweep

R486:thiok02(097,005);njm

Table 1 (cont'd)

SWMU	RFI Phase	Ground Water Investigation	Ground Water Analytes	Soil Investigation	Soil Analytes	Geophysical Survey	Ordnance
4 - Borrow Pit/ Evaporation Pond	Phase I	4 - monitoring wells 4- samples	VOC, BNA, metals, aldicarb	5 - shallow sample locations (evaporation pond) 5 - samples 7 - test pits (Borrow Pit) 2 - samples	VOC. BNA, metals, aldicarb, pH	none	none
4 - Evaporation Pond	Phase II	4 - samples	VOCs, BNA, metals, aldicarb	6 - hand auger locations 12 - samples 6 - background soil samples	VOC, BNA, metals, aldicarb	none	none
5	Phase I	1 - monitoring well 1 - sample	VOC, BNA. metals, aldicarb	5 - shallow sample locations 5 - samples 1 - waste material sample	VOC, BNA, metals, aldicarb	none	none
	Phase II	1-sample	VOC, BNA, metals, aldicarb	6 - background soil samples	metals	none	none
6 - Surface Disposal	Phase I	1 - monitoring well (MW -603) 1 - sample	VOC, BNA, metals, aldicarb, CS Compounds	3 - shallow sample locations 3 - samples	VOC. BNA, metals, aldicarb, CS Compounds	none	none
	Phase II	1 - sample	VOC, BNA, metals, aldicarb, CS Compounds	6 - background soil samples	VOC. BNA, metals, aldicarb, CS Compounds	none	none
6 - Trench i	Phase I	1 - monitoring well (MW -602) 1 - sample	VOC, BNA, metals, aldicarb, CS Compounds	7 - test pits	none	none	none
	Phase II	1 - sample	VOC, BNA, metals, aldicarb, CS Compounds	3 - soil borings 6 - samples 6 - background soil samples	VOC. BNA, metals, aldicarb, CS compounds	none	none

R486:thiok02(097.005);njm

Table 1 (cont'd)

SWMU	RFI Phase	Ground Water Investigation	Ground Water Analytes	Soil Investigation	Soil Analytes	Geophysical Survey	Ordnance
6 - Trench II	Phase I	1 - monitoring well (MW-604) 1 - samples	VOCs, BNA, metals, aldicarb, CS compounds	6 - test pits 4 - samples (1 duplicate)	VOC, BNA, metals, aldicarb, CS Compounds	none	none
	Phase II	1 - sample	VOCs, BNA, metals, aldicarb, CS Compounds	6 - test pits 3 - samples 6 - background soil samples	VOC, BNA, metals, aldicarb, CS Compounds	GPR, EM31	none
6 - Borrow Pit	Phase I	1 - monitoring well (MW-601) 1 - samples	VOCs, BNA, metals, aldicarb, CS Compounds	5 - test pits 2 - samples	VOC, BNA, metals, aldicarb, CS Compounds	none	none
	Phase II	1 - sample	VOCs, BNA, metals, aldicarb, CS Compounds	4 - test pits 5 - samples 6 - background soil samples	VOC, BNA, metals, aldicarb, CS Compounds	GPR, EM31	none
SWMU 7	Phase I	4 - monitoring wells 4 - samples	VOC, BNA, metals, aldicarb, CS Compounds	none	none	none	none
	Phase II	4 -samples	VOC, BNA, metals, aldicarb, CS compounds	31 - exploratory test pits 18 - test pits 18 - samples 6-background soil samples	VOCs, BNA, metals, aldicarb, CS compounds	Magnetometer	408 drums of ordnance related items.

R486:thiok02(097.005);njm

Table 2 **Ground Water Elevations** Phase I and II RFI

Thiokol - Woodbine Facility

Well No.	Top of Casing (feet)	Ground Water Elevation - 10/92 (feet)	Ground Water Elevation - 12/92 (feet)	Ground Water Elevation - 11/95 (feet)	Ground Water Elevation - 03/96 (feet)	Ground Water Elevation - 02/97 (feet)
MW-301	26.89	16.83	15.77	18.80	16.75	16.08
MW-302	28.20	16.14	15.15	18.11	16,04	15.38
MW-303	27.60	16.6	15.6	18.52	16.55	15.92
MW-304	25.85	NI ¹	NI	NI	15.38	14.69
MW-305	24.41	NI	NI	N	9.95	9.49
MW-401	21.20	18.08	18.11	17.94	NG²	17.90
MW-402	23.92	18.54	18.41	18.25	NG	18.14
MW-403	23.01	18.94	18.45	18.37	NG	18.07
MW-404	23.33	19.30	18.79	18.70	NG	18.46
MW-501	22.43	18.86	18.38	18.46	NG	17.64
MW-601	21.76	17.13	15.79	16.13	NG	14.72
MW-602	22.47	18.85	17.65	17.99	NG	16.48
MW-603	23.23	18.70	17.92	18.21	NG	16.99
MW-604	21.37	18.00	17.14	17.48	16.04	16.22
MW-701	19.32	15.22	14.59	14.81	NG	13.36
MW-702	19.78	15.44	14.68	14.95	NG	13.41
MW-703	19.35	14.89	13.99	14.87	NG	12.83
MW-704	17.64	14.85	14.08	14.84	NG	12.93

¹NI = well not installed as of this date. ²NG = not gauged during this sampling event.

Table 3 Sample Containers, Quantities, and Preservatives Phase II RFI

Thiokol - Woodbine Facility

		Sample Containers and Quantities									
Matrix	VOCs	BNAs	Aldicarb	CS Compounds	Metals						
Soil	125 ml amber glass (1)	250 ml clear glass (1)	100 ml clear glass (1)	100 ml clear glass (1)	250 ml plastic (1)						
Aqueous	40 ml glass vial (3)	1 liter amber glass (3)	125 ml amber glass (1)	1 liter amber glass (1)	500 ml plastic (1) 250 ml plastic (1) mercury						

			Preservatives .			
Matrix	VOCs	BNAs	Aldicarb	CS Compounds	Metals	
Soil	Ice	Ice	lce	Ice	Ice	
Aqueous	Hydrochloric acid	lce	lce	Ice	Nitric Acid	

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Table 4 **Background Metals Statistical Analysis**

Thiokol - Woodbine Facility

				SWMU SPECIFIC											
	All S	All SWMUs		1		swi	SWMU-3 SWMU-4		SWMU-5		swmu-6		SWMU-7		
	upper mean	lower mean													
As	1.2	1.1	1.2ª	1.0	1.2"	1.0	1.3	1.2	1.3	1.1	1.2	1.1	1.3	1.2	
Ва	3.7	2.2	5.4	3.0	9.4	3.3	3.7°	1.0	3.7°	1.4	3.7ª	0.8	3.7"	0.9	
Cr	3.2	2.3	3.8	2.9	4.8	2.0	3.7	1.3	4.7	0.2	3.8	2.0	3.2°	1.3	
Cd	0.79	0.54	0.79ª	0.52	0.79*	0.52	0.79	0.61	1.92	0.23	0.79°	0.57	0.79°	0.61	
Pb	2.9	2.2	3.3	1.9	4.7	1.7	2.8°	1.3	4.1	1.9	3.2	1.6	2.8	1.4	
Hg	0.020	0.010	0.030	0.010	0.020	0.010	0 .020	0.010	0.020	0.010	0.020	0.010	0.020	0.010	

All results reported in mg/kg.
*SWMU specific BUMC replaced by facility wide BUMC wher the facility wide concentration is higher.

R486:thiok02(097.005);njm

Table 5 Background Results Metals Analysis

Phase II RFI Thiokol Corporation Woodbine, Georgia

Sample No.	SWMU	Sample Depth (feet)	Arsenic Result (mg/kg)	Barium Result (mg/kg)	Chromium Result (mg/kg)	Cadmium Result (mg/kg)	Lead Result (mg/kg)	Mercury Result (mg/kg)
9000	03	2	<1.1	8.1	1.7	<0.53	3.3	0.018
9001	03	4	<1.0	9.5	3.5	<0.51	2.5	<0.010
9002	03	2	<1.1	7.0	4.6	<0.54	4.4	0.027
9003	03	4	<1.1	7.3	5.1	<0.53	4.9	<0.011
9004	03	2	<1.0	4.8	3.1	<0.52	3.3	0.017
9005	03	4	<1.1	1.4	2.3	<0.53	0.89	<0.011
9006	02	2	<1.1	3.7	3.5	<0.54	2.9	0.037
9007	02	4	<1.1	4.6	3.9	<0.53	2.9	<0.011
9008	02	2	<1.1	3.5	2.7	<0.54	2.4	0.027
9009	02	4	<1.0	3.5	3.1	<0.52	2.2	<0.010
9010	02	2	<1.1	3.4	3.1	<0.56	1.7	0.024
9011	02	4	<1.0	6.4	3.7	<0.52	3.6	<0.010
9012	04	2	<1.3	1.7	1.4	<0.66	2.6	<0.013
9013	04	4	<1.3	1.8	2.5	<0.66	1.7	<0.013

Table 5 (cont'd)

Sample No.	SWMU	Sample Depth (feet)	Arsenic Result (mg/kg)	Barium Result (mg/kg)	Chromium Result (mg/kg)	Cadmium Result (mg/kg)	Lead Result (mg/kg)	Mercury Result (mg/kg)
9014	04	2	<1.2	<1.2	1.5	<0.60	2.3	<0.012
9015	04	4	<1.3	1.5	4.4	<0.63	1.2	<0.013
9016	04	2	<1.2	3.6	1.8	<0.62	3.1	<0.012
9017	04	4	<1.3	1.6	3.3	<0.64	1.6	0.016
9018	05	2	<1.4	2.1	6.3	<0.68	5.0	0.032
9019	05	4	<1.2	2.3	3.2	<0.61	2.2	<0.012
9020	05	2	<1.1	2.8	1.7	<0.57	2.7	<0.011
9021	05	4	<1.2	1.7	2.3	<0.62	2.1	<0.012
9024	05	2	<1.2	<1.2	1.6	<0.58	2.7	0.015
9025	05	4	<1.2	1.5	3.6	<0.62	1.9	<0.012
9026	06	2	<1.2	1.3	3.8	<0.59	3.6	0.019
9027	06	4	<1.2	1.2	3,1	<0.60	1.8	<0.012
9028	06	2	<1.1	3.6	2.1	<0.56	2.9	<0.011
9029	06	4	<1.2	2.0	2.9	<0.60	1.6	<0.012
9030	06	2	<1.2	<1.2	<1.2	<0.60	1.7	<0.012
9031	06	4	<1.3	1.3	1.9	<0.63	1.6	<0.013
9032	07	2	<1.3	<1.3	<1.3	<0.63	1.7	<0.013

Table 5 (cont'd)

Sampie No.	SWMU	Sample Depth (feet)	Arsenic Resuit (mg/kg)	Barium Result (mg/kg)	Chromium Result (mg/kg)	Cadmium Result (mg/kg)	Lead Result (mg/kg)	Mercury Result (mg/kg)
9033	07	4	<1.3	2.6	2.3	<0.64	3.2	0.018
9034	07	2	<1.2	<1.2	2.4	<0.62	2.7	0.025
9035	07	4	<1.2	<1.2	2.4	<0.62	1.7	<0.012
9081	07	2	<1.2	1.2	<0.58	1.4	3,0	0.012
9082	07	4	<1.2	1.8	<0.62	2.6	2.8	<0.012

SWMU 02 - Phase I RFI Soil Sample Analytical Results

Table 6

Thickol - Woodbine Facility

	Background	Sample Location				
Compound/Element	upper mean	SS-201	SS-202	SS-203	SS-204	
Barium	5.4	7.5	6.9	7.8	7.7	
Chromium	3.8	2.7	3.5	3.5	3.2	
Lead	3.3	3.2	3.1	4.8	3.5	
Mercury	0.030	0.027	0.020	0.030	0.013	

All results reported in mg/kg.
Shaded results show concentrations equal to or greater than the respective BUMC.

Table 7

SWMU 03 - Surface Disposal - Phase I RFI Soil Sample Analytical Results

Thickol - Woodbine Facility

	Background			Loca	ation		
Element/Compound	upper mean	SS-301	SS-302	55-303	SS-304	SS-305	SS-306
Barium	9.4	7.6	11.0	9.1	7.4	6.4	9.2
Chromium	4.8	3.8	4,9	2.4	1.9	3.0	3.4
Lead	4.7	8.9	8.2	6,1	4.3	2.9	4.8
Mercury	0.020	0.051	0.021	0.025	0.029	0.022	0.026

All results reported in mg/kg. Shaded results show concentrations equal to or greater than the respective BUMC.

Table 8

SWMU 03 - Phase I and II RFI Ground Water Analytical Results

Thiokol - Woodbine Facility

	4	Phase I	RFI Analytica	l Results	11/44	Phase II	RFI Analytica	l Results	* 11*1
Compound/Element MCL		Sampled in October 1992			No	Sampled on ovember 17, 1	Sampled on March 12, 1996		
		MW-301	MW-302	MW-303	MW-301	MW-302	MW-303	MW-304	MW-305
Arsenic	0.050	ND¹	ND	ND	0.010	0.031	0.017	ND	ND
Barium	2.0	ND	0.019	0.020	0.53	0.41	0.29	0.25	0.22
Cadmium	0.0050	ND	ND	ND	ND	0.009	ND	ND	ND
Chromium	0.10	ND	ND	ND	0.23	0.22	0.15	0.12	0.088
Lead	0.015	ND	ND	ND	0.031	0.057	0.030	0.034	0.021
Mercury	0.0020	ND	ND	ND	0.00058	0.00056	0.00036	0.00034	0.00042

'ND = Not detected above MDL.
All results reported in mg/L.
Shaded results are concentrations equal to or greater than the MCL for that compound.

SWMU 03 - Burn Area - Phase II RFI Soil Sample Analytical Results

Thiokol - Woodbine Facility

	Background	9113	9114	9115	9116	9117	9118	9099
Compound <i>l</i> Element	upper mean	Test pit 1 (2 feet)	Test pit 1 (6 feet)	Test pit 2 (2 feet)	Test pit 2 (6 feet)	Test pit 4 (2 feet)	Test pit 4 (6 feet)	3-004 (4-5 feet)
Barium	9.4	8.2	7.1	6.8	10	9.6	6.9	7.9
Chromium	4.8	2.7	7.6	2.0	3.4	3.3	4.1	4.1
Lead	4.7	3.5	4.7	2.7	3.8	3.5	5.0	3.4
Mercury	0.020	0.029	0.042	0.011	0.017	0.014	ND ¹	0.013

'ND = not detected above method detection limit (MDL).
All results reported in mg/kg.
Shaded results are concentrations equal to or greater than the respective BUMC.

Table 10 SWMU 03 - Aldicarb Disposal Area - Phase II RFI Soil Sample Analytical Results

Thiokol - Woodbine Facility

	Background	9107	9108	9109	9110	9111	9112
Compound/ Element	upper mean	Test pit 3 (4 feet)	Test pit 3 (9 feet)	Test pit 4 (4 feet)	Test pit 4 (8 feet)	Test pit 5 (4 feet)	Test pit 5 (8 feet)
Barium	9.4	6.1	5.2	7.3	7.0	6.2	4.6
Chromium	4.8	2.8	7.7	3.0	6.3	2.6	5.6
Lead	4.7	4.3	2.9	3.8	4.8	3.7	7.6
Mercury	0.020	0.031	0.018	ND ¹	ND	0.033	ND

¹ND = not detected above MDL. All results reported in mg/kg. Shaded results show concentrations equal to or greater than the respective BUMC.

Table 11

SWMU 04 - Phase I RFI Soil Sample Analytical Results

Thiokol - Woodbine Facility

	Background	SS-401	SS-402	SS-403	SS-404	SS-405
Compound/ Element	upper mean	Evap. Pond	Evap. Pond	Evap. Pond	Evap. Pond	Evap. Pond
Barium	3.7	4,5	14.0	12.0	7.7	4.0
Chromium	3.7	ND1	1.3	4.2	4.2	ND
Lead	2.9	3.4	4.5	2.1	2.4	2.7
Mercury	0.020	0.037	0.04	0.016	ND	0,025
Acetone	NA ²	0.034	0.13	0.13	0.091	ND
Tetrachloroethene	NA	ND	0.014	ND	ND	0.018
Toluene	NA	0.032	0.076	0.021	ND	0.066
1,1,1-trichloroethane	NA	ND	ND	ND	ND	0.0075
Xylenes, total	NA	0.0084	0.0093	ND	ND	ND

¹ND = Not detected above MDL.

²NA = Not applicable; statistics not generated for VOCs.

All results reported in mg/kg.

Shaded results show concentrations equal to or greater than the respective BUMC.

Table 12 SWMU 04 - Phase II RFI Soil Sample Analytical Results

Thiokol - Woodbine Facility

						12	100		E			
Background	9036	9037	9038	9039	90 40	9041	9042	9043	9044	9045	9046	9047
upper mean	4-001S ¹	4-001D ²	4-002S	4-002D	4-0038	4-003D	4-0045	4-004D	4-00551	4-005D ²	4-006S	4-006D
3.7	2.7	6.5	4.3	8.7	2.6	16	1,5	8.0	8.4	17	1.4	4.6
3.7	3.9	4.8	3.6	6,5	2.5	6.0	2.5	9.9	ND ³	3.1	1.8	8.3
2.9	2.7	1.9	3.5	3.6	3.3	10	2.6	3.6	3.6	1.1	2.5	3.2
0.020	0.019	0.024	0.015	0.022	0.017	0.057	ND4	ND	0.027	0.026	ND ³	0.020
NA ³	0.61	0.35	0.80	0.12	0.72	0.71	ND	1.1	ND	0.27	0.76	ND
NA	ND	ND	0.034	ND	ND	ND	0.57	ND	ND	ND	ND	ND
ŇA	0.670	ND	ND	ND	ND	0.49	0.45	ND	ND	ND	ND	ND
	upper mean 3.7 3.7 2.9 0.020 NA ³ NA	upper mean 4-0018¹ 3.7 2.7 3.7 3.9 2.9 2.7 0.020 0.019 NA³ 0.61 NA ND	upper mean 4-001S¹ 4-001D² 3.7 2.7 6.9 3.7 3.9 4.8 2.9 2.7 1.9 0.020 0.019 0.024 NA³ 0.61 0.35 NA ND ND	upper mean 4-001S¹ 4-001D² 4-002S 3.7 2.7 6.5 4.3 3.7 3.9 4.8 3.6 2.9 2.7 1.9 3.5 0.020 0.019 0.024 0.015 NA³ 0.61 0.35 0.80 NA ND ND 0.034	upper mean 4-001S¹ 4-001D² 4-002S 4-002D 3.7 2.7 6.9 4.3 8.7 3.7 3.9 4.8 3.6 6.5 2.9 2.7 1.9 3.5 3.6 0.020 0.019 0.024 0.015 0.022 NA³ 0.61 0.35 0.80 0.12 NA ND ND 0.034 ND	upper mean 4-001S¹ 4-001D² 4-002S 4-002D 4-003S 3.7 2.7 6.5 4.3 8.7 2.6 3.7 3.9 4.8 3.6 6.5 2.5 2.9 2.7 1.9 3.5 3.6 3.3 0.020 0.019 0.024 0.015 0.022 0.017 NA³ 0.61 0.35 0.80 0.12 0.72 NA ND ND 0.034 ND ND	upper mean 4-001S¹ 4-001D² 4-002S 4-002D 4-003S 4-003D 3.7 2.7 6.5 4.3 8.7 2.6 16 3.7 3.9 4.8 3.6 6.5 2.5 6.0 2.9 2.7 1.9 3.5 3.6 3.3 10 0.020 0.019 0.024 0.015 0.022 0.017 0.057 NA³ 0.61 0.35 0.80 0.12 0.72 0.71 NA ND ND 0.034 ND ND ND	upper mean 4-001S¹ 4-001D² 4-002S 4-002D 4-003S 4-003D 4-004S 3.7 2.7 6.5 4.3 8.7 2.6 16 1.5 3.7 3.9 4.8 3.6 6.5 2.5 6.0 2.5 2.9 2.7 1.9 3.5 3.6 3.3 10 2.6 0.020 0.019 0.024 0.015 0.022 0.017 0.057 ND⁴ NA³ 0.61 0.35 0.80 0.12 0.72 0.71 ND NA ND ND 0.034 ND ND ND 0.57	upper mean 4-001S¹ 4-001D² 4-002S 4-002D 4-003S 4-003D 4-004S 4-004D 3.7 2.7 6.5 4.3 8.7 2.6 16 1.5 8.0 3.7 3.9 4.8 3.6 6.5 2.5 6.0 2.5 9.9 2.9 2.7 1.9 3.5 3.6 3.3 10 2.6 3.6 0.020 0.019 0.024 0.015 0.022 0.017 0.057 ND⁴ ND NA³ 0.61 0.35 0.80 0.12 0.72 0.71 ND 1.1 NA ND ND ND ND 0.57 ND	upper mean 4-001S¹ 4-001D² 4-002S 4-002D 4-003S 4-003D 4-004S 4-004D 4-005S¹ 3.7 2.7 6.5 4.3 8.7 2.6 16 1.5 8.0 8.4 3.7 3.9 4.8 3.6 6.5 2.5 6.0 2.5 9.9 ND³ 2.9 2.7 1.9 3.5 3.6 3.3 10 2.6 3.6 3.6 0.020 0.019 0.024 0.015 0.022 0.017 0.057 ND¹ ND 0.027 NA³ 0.61 0.35 0.80 0.12 0.72 0.71 ND 1.1 ND NA ND ND ND ND ND 0.57 ND ND	upper mean 4-001S¹ 4-001D² 4-002S 4-002D 4-003S 4-003D 4-004S 4-004D 4-005S¹ 4-005D² 3.7 2.7 6.6 4.3 8.7 2.6 16 1.5 8.0 8.4 17 3.7 3.9 4.8 3.6 6.5 2.5 6.0 2.5 9.9 ND³ 3.1 2.9 2.7 1.9 3.6 3.6 3.3 10 2.6 3.6 3.6 1.1 0.020 0.019 0.024 0.015 0.022 0.017 0.057 ND⁴ ND 0.027 0.026 NA³ 0.61 0.35 0.80 0.12 0.72 0.71 ND 1.1 ND 0.27 NA ND ND ND ND 0.57 ND ND ND	upper mean 4-001S¹ 4-001D² 4-002S 4-002D 4-003S 4-003D 4-004S 4-004D 4-005S¹ 4-005D² 4-006S 3.7 2.7 6.5 4.3 8.7 2.6 16 1.5 8.0 8.4 17 1.4 3.7 3.9 4.8 3.6 6.5 2.5 6.0 2.5 9.9 ND³ 3.1 1.8 2.9 2.7 1.9 3.5 3.6 3.3 10 2.6 3.6 3.6 1.1 2.5 0.020 0.019 0.024 0.015 0.022 0.017 0.057 ND⁴ ND 0.027 0.026 ND³ NA³ 0.61 0.35 0.80 0.12 0.72 0.71 ND 1.1 ND 0.27 0.76 NA ND ND

¹S = Shallow sample.

²D = Deep sample.

³NA = Not applicable; statistics not generated for VOCs.

⁴ND = Not detected above MDL.

All results reported in mg/kg.

Shaded results show concentrations equal to or greater than the respective BUMC.

Table 13 SWMU 04 - Phase I and II RFI Ground Water Analytical Results

Thiokol - Woodbine Facility

		F	hase I RFI And	alytical Resul	ls		hase II RFI An	alytical Resul	ts
Compound/Element	MCL	MW-401	MW-402	MW-403	MW-404	MW-401	MW-402	MW-403	MW-404
Arsenic	0.050	ND ¹	0.011	0.011	0.017	0.15	0.16	0.020	0.040
Barium	2.0	0.097	0.12	0.036	0.038	1.7	2.3	0.24	0.36
Cadmium	0.0050	ND	ND	ND	ND	0.015	0.009	ND	ND
Chromium	0.10	ND	0.017	ND	ND	0.32	0.11	0.058	0.077
Lead	0.015	0.005	0.0058	ND	ND	0.10	0.16	0.018	0.020
Mercury	0.0020	ND	ND	ND	ND	0.0013	0.0012	0.00024	0.00048
1,1,2-trichlorethane	0.0050	ND	ND	ND	ND	0.005	ND	ND	ND
cis-1,2-dichloroethene	0.070	0.028	ND	ND	ND	ND	ND	ND	ND

¹ND = Not detected above MDL. All results reported in mg/L. Shaded results show concentrations equal to or greater than the respective MCL.

Table 14

SWMU 05 - Phase I RFI Soil Sample Analytical Results

Thiokol - Woodbine Facility

	Background	SS-501	SS-502	SS-503	SS-504	SS-505	SO-501
Compound/Element	upper mean	Soil	Soil	Soil	Soil	Soil	Waste
Barium	3.7	2.7	2.1	2.7	4.1	2.5	3.6
Chromium	4.7	3.4	2.3	2.7	2.5	3.0	ND
Lead	4.1	2.5	2.8	3.3	3.9	2.6	ND
Mercury	0.024	0.028	0.016	0.015	0.013	0.022	ND

'ND = Not detected above MDL. All results reported in mg/kg. Shaded results show concentrations equal to or greater than the respective BUMC.

Table 15

SWMU 05 - Phase I and II RFI **Ground Water Analytical Results**

Thiokol - Woodbine Facility

		Phase I RFI Analytical Results	Phase II RFI Analytical Results
Compound/Element	MCL	MW-501	MW-501
Arsenic	0.050	0.026	0.011
Barium	2.0	0.092	0.20
Chromium	0.10	ND	0.029
Lead	0.015	ND	0.010
Naphthalene	NA ²	0.018	ND

¹ND = Not detected above MDL,

²NA = Not applicable/no MCL.

All results reported in mg/L.

Shaded results show concentrations equal to or greater than the respective MCL

Table 16

SWMU 06 - Phase I RFI Soil Sample Analytical Results Summary

Thiokol - Woodbine Facility

	Background	SS-601	SS-602	SS-603	SO-607A	SO-607B	50-624A	SO-624B	SO-624C	SO-625
Compound/Element	upper mean	Scrap	Scrap	Scrap	Borrow Pit	Borrow Pit	Trench II	Trench II	Trench II	Trench
Barium	3.7	2.3	1.9	7.4	1.6	1.7	ND1	ND	3.1	8.9
Chromium	3.8	2.1	1,9	3.6	4.5	2.0	ND	ND	4.2	ND
Lead	3.2	1.3	2.6	3.5	3.4	1.2	ND	ND	1.9	ND
Mercury	0.020	0.023	0.015	0.018	0.014	ND	ND	ND	0.015	0.013
Aldicarb	NA ²	ND	ND	ND	ND	ND	ND	ND	0.22	ND
Benzoic acid	NA	ND	ND	ND	ND	ND	41.0	73.0	5.3	ND
p-isopropyltoluene	NA	ND	ND	ND	ND	ND	0.021	ND	ND	ND
p-cresol	NA	ND	ND	ND	ND	ND	17.0	17.0	4.2	ND
Naphthalene	NA	ND	ND	ND	0.014	ND	ND	ND	ND	0.0095
Toluene	NA	0.02	ND	ND	ND	ND	0.11	ND .	ND	ND
1,2,4-trimethylbenzene	NA	ND	ND	ND	0.0094	ND	ND	ND	ND	ND

'ND = Not detected above MDL.

2NA = Not applicable, statistics not generated for VOCs.
All results reported in mg/kg.
Shaded results show concentrations equal to or greater than the respective BUMC.

Table 17

SWMU 06 - Trench 1 - Phase II RFI Soil Samples Analytical Results

Thiokol Woodbine Facility

	Background	9048	9100	9050	9101	9052	9102
Compound/ Element	upper mean	6-001S ¹ Waste	6-001D ²	6-002S Waste	6-002D	6-003S Waste	6-003D
Barium	3.7	1.7	7.3	ND ³	5.4	11	7.3
Chromium	3.8	3.5	3.0	1.9	18	1.6	4.4
Lead	3.2	3.1	1.0	1.1	2.0	1.2	1.3
Mercury	0.020	0.015	ND	ND	ND	ND	ND
Acetone	NA ⁴	0.085	ND	0.032	ND	0.55	ND
Aldicarb	NA	ND	ND	ND	0.038	ND	ND

¹S = Shallow Sample. ²D = Deep Sample. ³ND = Not detected above MDL.

⁴NA = Not applicable; statistics not generated for VOCs.

All results reported in mg/kg.

Shaded results show concentrations equal to or greater than the respective BUMC.

Table 18

SWMU 06 - Trench 2 - Phase II RFI Soil Sample Analytical Results Summary

Thiokol - Woodbine Facility

	Background	9136	9137	9138
Compound/ Element	upper mean	Test Pit 6 Waste	Test Pit 7 Waste	Test Pit 10
Barium	3.7	ND ¹	ND	2.9
Chromium	3.8	5.0	ND	ND
Lead	3.2	4.1	ND	1.0
Acetone	NA ²	0.83	460	ND
m&p-cresol	NA	ND	12	ND
2,4-dimethylphenol	NA	ND	1.3	ND

¹ND = Not detected above MDL.

²NA = Not applicable; statistics not generated for VOCs.

All results reported in mg/kg.

Shaded results show concentrations above the respective BUMC.

Table 19 SWMU 06 - Borrow Pit - Phase II RFI Soil Sample Analytical Results

Thiokol - Woodbine Facility

	Background	9131	9132	9133	9134	9135
Compound/ Element	upper mean	Test Pit 1 Waste	Test Pit 2 Waste	Test Pit 2 Waste	Test Pit 2 Waste	Test Pit 3 Soil
Barium	3.7	13	ND1	ND	15	4.1
Chromium	3.8	3.7	ND	7.5	4.5	7.9
Lead	3.2	4.0	0.64	59	44	5.7
Mercury	0.017	0.73	ND	ND	0.023	0.012
Acetone	NA ²	0.059	0.58	ND	0.034J ³	ND
Carbon disulfide	NA	ND	ND	ND	0.30	ND
Benzene	NA	ND	0.078	ND	ND	ND
Toluene	NA	ND	0.44	ND	ND	ND
Ethylbenzene	NA	ND	0.15	ND	ND	ND
Xylenes, total	NA NA	ND	0.82	ND	ND	ND

¹ND = Not detected above MDL.

²NA = Not applicable; statistics not generated for VOCs.All results reported in mg/kg.

³J = Estimated value below detection limit.

Table 20 SWMU 06 - Phase I and II RFI **Ground Water Analytical Results Summary**

Thiokot - Woodbine Facility

			Phase I RFI Ar	nalytical Resul	ts		Phase II RFI Ar	alytical Resu	lts
Compound/ Element	MCL	MW-601	MW-602	MW-603	MW-604	MW-601	MW-602	MW-603	MW-604
Arsenic	0.050	0.016	0.016	0.016	0.032	0.015	0.086	0.017	ND
Barium	2.0	0.05	0.088	0.1	0.12	0.21	0.27	0.30	0.091
Chromium	0.10	ND	0.015	ND	0.016	0.041	0.059	0.048	0.017
Lead	0.015	ND	ND	ND	0.0061	0.011	0.020	0.014	0.0060
Mercury	0.002	ND	ND	ND	ND	ND	0.00020	ND.	ND
Aldicarb	0.007	ND	ND	ND	ND	ND	0.00050	ND	ND

¹ND = Not detected above MDL. All results reported in mg/L. Shaded results show concentrations equal to or greater than the respective MCL.

Table 21 SWMU 07 - Phase II RFI Soil Sample Analytical Results Summary

Thiokol - Woodbine Facility

	Background	9159 9173	9160 9174	9161 9175	9162 9176	9163 9177	9164 9178	9165 9179	9166 9180	9167 1981	9168 9182	9169 9183	9170 9184	917 1 9185	9172 9186	9189 9194	9190 9195	9191 9196	9192 9197	9193 9198
Compound/ Element	upper mean	Test Pit 32 Waste	Test Pit 33 Waste	Test Pit 34	Test Pit 35	Test Pit 36 Waste	Test Pit 37	Test Pit 38	Test Pit 39	Test Pit 40 Waste	Test Pit 41 Waste	Test Pit 42 Waste	Test Pit 43 Waste	Test Pit 43 Waste	Test Pit 44	Test Pit 45	Test Pit 46	Test Pit 47	Test Pit 48	Test Pit 49
Arsenic	1.3	4.3	1.9	ND1	ND	ND	ND	ND	ND	ND	ND	1.3	5.5	3.2	ND	ND	ND	ND	ND	ND
Barium	3.7	14	74	1.7	ND	ND	2.5	ND	2.2	ND	59	130	5.6	28	1.4	1.5	7.6	95	ND	2.1
Chromium	3.2	11	15	2.2	1.2	2.1	5.2	1.8	2.4	1.7	10	15	7.3	12	3.4	ND	ND	ND	ND	650
Cadmium	0.79	4.0	2.7	1.8	ND	ND	ND	ND	ND	ND	16	1.5	ND	ND	ND	ND	ND	ND	ND	0.60
Lead	2.9	49	79	9.2	3.7	3.9	15	2.2	6.5	2.6	15	49	5.7	25	3.1	2.3	9.3	1.7	1.0	2.0
Mercury	0.020	0.27	1.5	0.024	0.020	0.015	0.058	ИD	ND	ND	ND	0.016	0.72	0.040	0.028	ND	ND	ND	ND	ND
o-Chlorobenz- aldehyde	NA ²	ND	660	610	ND	ND	ND	ND	150,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Chloro- benzylidene malononitrile	NA	ND	16,000	ND	ND	ND	180,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Malononitrile	NA	ND	ND	ND	ND	ND	ND	ND	ND	35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 21 (cont'd)

										-										
	Background	9159 9173	9160 9174	9161 9175	9162 9176	9163 9177	9164 9178	9165 9179	9166 9180	9167 1981	9168 9182	9169 9183	9170 9184	9171 9185	9172 9186	9189 9194	9190 9195	9191 9196	9192 9197	9193 9198
Compound/ Element	upper mean	Test Pit 32 Waste	Test Pit 33 Waste	Test Pit 34	Test Pit 35	Test Pit 36 Waste	Test Pit 37	Test Pit 38	Test Pit 39	Test Pit 40 Waste	Test Pit 41 Waste	Test Pit 42 Waste	Test Pit 43 Waste	Test Pit 43 Waste	Test Pit 44	Test Pit 45	Test Pit 46	Test Pit 47	Test Pit 48	Test Pit 49
Methyl Ethyl Ketone	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	39	ND	ND	ND	ND	ND	ND	ND
Benz ene	NA	ND	ND	ND	ND	ND	ND	ND	0.83	ND	ND	ND	6.8	ND	ND	ND	ND	ND	ND	ND
Acetone	NA	0.29	1.4	0.20	ND	ND	0.22	ND	ND	ND	ND	ND	94	ND	0.14	ND	ND	ND	ND	ND
Ethylbenzene	NA	ND	0.056	ND	ND	0.020	ND	ND	0.043	ND	0.12	0.011	ND	130	0.016	ND	ND	ND	ND	ND
Toluene	NA	ND	ND	ND	ND	ND	0.0070	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NĐ	ND	ND
Xylenes, total	NA	ND	0.25	ND	ND	0.027	0.017	ND	0.076	3.1	0.18	0.062	24	810	0.062	ND	ND	ND	ND	ND
4-methyl 2- pentanone	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30.0	ND	ND	ND	ND	ND	ND	ND
Pyrene	NA	ND	ND	ND	ND	ND .	ND	ND	ND	ND	ND	ND	ND	1.2	ND	ND	ND	ND	ND	ND
2,4- dimethylphenol	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	ND	ND	ND	ND	ND	ND
m- and p-cresol	NA	ND	ND	ND	ND	ND	ND	ND	ND	2.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	NA	ND	ND	ND	ND	ND	ND	ND	ND	3.6	ND	ND	ND	ND	21	ND	ND	ND	ND	ND
							·													

'ND = Not detected above MDL.
'NA = Not applicable; statistics not generated for VOCs.
All results reported in mg/kg.
Shaded results show concentrations equal to or greater than the respective BUMC.

Table 22

SWMU 07 - Phase I and II RFI **Ground Water Analytical Results**

Thiokol - Woodbine Facility

	100	P	hase I RFI An	alytical Resul	ts		Phase II RFI An	alytical Resul	ts
Compound/Element	MCL	MW-701	MW-702	MW-703	MW-704	MW-701	MW-702	MW-703	MW-704
Arsenic	0.050	ND	ND	ND	0.012	0.011	0.11	0.011	ND
Barium	2.0	0.019	0.019	0.058	0.41	0.11	0.71	0.15	0.071
Cadmium	0.0050	ND	ND	ND	ND	ND	0.0069	ND	ND
Chromium	0.10	ND	ND	0.022	0.16	0.12	0.25	0.052	0.046
Lead	0.015	ND	ND	0.0098	0.04	0.029	0.075	0.023	0.0060
Mercury	0.0020	ND	ND	ND	0.00025	0.00052	0.00065	0.00024	ND
Benzene	0.0050	ND	ND	ND	0.017	ND	ND	ND	ND
2,4-dimethylphenol	NE²	ND	ND	ND	0.014	ND	ND	ND	ND
Ethylbenzene	0.70	ND	ND	ND	0.021	ND	ND	ND	ND
Xylenes, total	10	ND	ND	ND	0.165	ND	ND	ND	0.040
Bis(2-ethylhexyl) phthalate	0.0060	ND	ND	ND	ND	0.030	ND	ND	ND

'ND = Not detected above MDL.

2NE = MCL not established for this compound.
All results reported in mg/L.
Shaded results show concentrations equal to or greater than the respective MCL.

Apexenvironmental, inc.

Appendix C

Soil Boring Logs

SST CHARS SHAUTHAN 20055 MINOTIES AND MINOTI		i A	, i	24	San San	ነና <u>ጸ</u> ኗስ ሮጀ	IA PARAL	RANGEL MA	/ h	Project: Thickol - Woodbine facility		Boring ID:	
SAND - light gray to dark brown, trace silt, poorly graded, moist. Wet at 2 feet. S-2 easy 24/24 0.0 Significant contents (10 contents) and the signific		Λ				SUITE 20	00						V.
environmental,inc. Sample Description Sample Scale Sample Scale Sample Sa		1	D6	XE		ROCKVIL	LE, MAR'	YLAND 20	n I		East	B1	Š.
SAMPLE DESCRIPTION REMARKS Sample 9244 Collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97	//-	4	env	ironmen			ANE (SU	H) 411 TUZU			<u> </u>		
SAMPLE DESCRIPTION REMARKS Sample 9244 collected for VOC analysis. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97	/				4		1.00			SWMU: 4	a - 1		-
SAMPLE DESCRIPTION REMARKS Sample 9244 collected for VOC analysis. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97		₹		띮	LE.	(md	ш		y.				٠.
SAND - light gray to dark brown, trace silt, poorly graded, moist. Wet at 2 feet. Sample 9244 collected for VOC analysis. End of Probe 8 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97	$ \Xi $	ER	ш	Ž			181	λg		되었다. 하시아 아이는 그러워 어린			
SAND - light gray to dark brown, trace silt, poorly graded, moist. Wet at 2 feet. Sample 9244 collected for VOC analysis. End of Probe 8 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97	I	Z	로ㅁ	ΑDΛ	RE	CE	1 T	070		SAMPLE DESCRIPTION		REMARKS	
SAND - light gray to dark brown, trace silt, poorly graded, moist. Wet at 2 feet. Sample 9244 collected for VOC analysis. End of Probe 8 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97	EPT	삘	SA	Щ	끷	SP	TE	H					
SAND - light gray to dark brown, trace silt, poorly graded, moist. Wet at 2 feet. Sample 9244 collected for VOC analysis. End of Probe 8 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97		A A		PRO!	AM	EAC	X X		tari.				
S-I wasy 24/24 0.0 poorly graded, moist. Wet at 2 feet. Sample 9244 collected for VOC analysis. End of Probe @ 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97		S		14,	S	Į		247232	<u> </u>		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
S-1 wasy 24/24 0.0 poorly graded, moist. Wet at 2 feet. Sample 9244 collected for VOC analysis. End of Probe 9 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97			100						VF 9				
S-1 wasy 24/24 0.0 poorly graded, moist. Wet at 2 feet. Sample 9244 collected for VOC analysis. End of Probe 9 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97					43								.3
S-1 wasy 24/24 0.0 poorly graded, moist. Wet at 2 feet. Sample 9244 collected for VOC analysis. End of Probe 9 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97										SAND - light gray to dark brown, trace silt.			
Sample 9244 collected for VOC analysis. End of Probe 9 4 feet 86S. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97													
Sample 9244 collected for VOC analysis. End of Probe @ 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97			S-1	easy	24/24	0.0			2.00				
Sample 9244 collected for VOC analysis. End of Probe @ 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97									d.				
Sample 9244 collected for VOC analysis. End of Probe @ 4 feet 86S. End of Probe @ 5 feet 86S. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97	"												
Sample 9244 collected for VOC analysis. End of Probe @ 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97				e de la company		.e	41						
Sample 9244 collected for VOC analysis. End of Probe @ 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97													
Sample 9244 collected for VOC analysis. End of Probe @ 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97						·		2.			,		
Sample 9244 collected for VOC analysis. End of Probe @ 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97												, 14	-
Sample 9244 collected for VOC analysis. End of Probe @ 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97													
S-2 easy 24/24 0.0 Collected for VVC analysis. End of Probe © 4 feet BGS. End of Probe © 5 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97.	2			1,7			ı		- 1 m			Sample 9244	
End of Probe & 4 feet BGS. End of Probe & 4 feet BGS. COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97				414.			+					•	2
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97			S-2	easy	24/24	0.0			. ** *		: ": "	analysis.	
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97						74							
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97					7.								
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97			N.										
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97													
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97	3_										1.		
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97													v.
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97													
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97	1 1		M. A.								2 20 24		٠
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97				- 1 d v									
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97													
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97	4		4						1			Very service of the Market of	
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97	T				1.4					End of Probe @ 4 feet BGS.			
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COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97			5										
COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97								1.50					
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COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97											Y A		ż
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Geologist: M Landsman Complete Date: 2726/9									- 5		D 3 0 0	Lot 1	

Λ		1M		SUITE 20	00	RANCH WAY	Project: Thiokol - Woodbine facility Job No.: 097.005	Boring ID:
//\	D	3X		HOCKVIL TELEPHI	LE, MAR ONF: (30	(LAND 2085 1) 417-0200	Location: Acetone Evaporation Pond - East	B2
	V en	rironmer	ntal,in	C.	, (OO	, ,,, ,,,	Date. 2/20/91	
			,		84 ²⁷	•	SWMU: 4	
SAMPLE INTERVAL	SAMPLE ID	ADVANCE	: REC, (in.)	ACE (ppm)	WATER TABLE	. Ітносову	SAMPLE DESCRIPTION	REMARKS
SAMPLE INT	Ś	PROBE	SAMPLE REC,	HEADSPACE	WATE	5		
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							SAND - light gray to dark brown, trace silt, poorly graded, moist. Wet at 2 feet.	2
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4						11111	End of Probe @ 4 feet BGS.	
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		anaiysis calibrate					ton with 10.6 eV bulb. Instrument Complete (Date: 2/26/97
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	Λ	1.5%	TH		SUITE 2	00	2	40.00	Job No.: 097.005		
	// /		ay		ROCKVII	LLE, MAR	YLAND 20	0855	Location: Acetone Evaporation Pond - East		_ B3
		V	rironmen	talie	IFIFIH	UNE: (30	11) 417-02	UU	Date: 2/26/97		
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Ge	olog	gist: N	1 Landsm	ian				•	pag	61011	

[45850 C	ARRS B	RANCH WAY	Project: Thiokol - Woodbine facility	Boring ID:
	The state of the s	Λ				SHITE 2	nn i		Job No.: 097.005	
ľ		Λ\	D	XE		ROCKVIL	LE, MAR'	YLAND 20855 1) 417-0200	Location: Acetone Evaporation Pond - East	B4
ŀ	/#		env	ironmer	ntal,in	IC.	OME, (DO	11 TE OE CO	Date. 2/20/01	-
1	, -							·	SWMU: 4	<u> </u>
	2	RVAL		ANCE	(in.)	(mdd)	l li	9⊀		
	UEPTH (TE.)	INT	SAMPLE ID	ADV	E REC	PACE	WATER TABLE	LITHOLOGY	SAMPLE DESCRIPTION	REMARKS
	ב ב	SAMPLE INTERVAL	Š	PROBE ADVANCE	SAMPLE REC,	HEADSPACE	WATE	רנו		
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			· _	٠.					poorly graded, moist. Wet at 2 feet.	
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									End of Probe @ 4 feet BGS.	en e
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				1.	As,					
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	CO	MME	NTS:	oil samp	oles c	ollect	ed wi	th 24" g	eoprobe soil sampler. Headspace Start Date	: 2/26/97

analysis collected with MSA Photon with 10.6 eV bulb. Instrument calibrated to 400 ppm toluene in air.

Complete Date: 2/26/97

page 1 of 1

Geologist: <u>M Landsman</u>

		P	ex		SUITE 2 ROCKVII TELEPH	00	RANCH WAY YLAND 20855 N) 417-0200	Project: Thiokol - Woodbine facility Job No.: 097.005 Location: Acetone Evaporation Pond - East Date: 2/26/97	Boring ID:
<u>/</u>		™ en	vironme	14				SWMU: 4	
0EPTH (ft.)	SAMPLE INTERVAL	SAMPLE ID	PROBE ADVANCE	SAMPLE REC. (in.)	HEADSPACE (ppm)	WATER TABLE	LITHOLOGY	SAMPLE DESCRIPTION	REMARKS
								SAND - light gray to dark brown, trace silt,	
		S-1	easy	24/24	0.0			poorly graded, moist. Wet at 2 feet.	
2						Ā			Sample 9248
		S-2	easy	24/24	0.0	<u>₹</u> 5			collected for VOC analysis.
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3									
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ÇO	MME								Date: 2/26/97
							oluene in	on with 10.6 eV bulb. Instrument air. Comp	ete Date: 2/26/97
Ge	oloc	ist:	M Land:	man				page	Fof 1

RECORD RECORD RECORD AND AND AND AND AND AND AND AND AND AN	٨		TM		15850 C	RABBS BI	RANCH-WA	ıΥ	Project: Thickal - Woodbine facility	Boring ID:
environmental,inc. Samult		14. y			SUITE 2	00			Job No.: 097.005	
environmental,inc. Samult	//\\	D	ex.		ROCK VII TELEPH	LLE, MAK ONE 130	YLANU 20 11) 417-021)855 NA		B6
SWMU: 4 SAMPLE DESCRIPTION REMARKS SAMPLE DESCRIPTION REMARKS SAMPLE DESCRIPTION REMARKS SAMPLE DESCRIPTION REMARKS Sample 9249 Collected sample 9249 Collected for VOC analysis of groundwater. End of Probe 4 feet 86S. Collected sample 9249 Collected sam	//-	V env	ironmen	ital.in	C.	VIII. (00				
SAMPLE DESCRIPTION REMARKS SAMPLE DESCRIPTION REMARKS SAMPLE DESCRIPTION REMARKS SAMPLE DESCRIPTION REMARKS Sample 9249 collected for VOC analysis of groundwater. End of Probe 9 4 feet 86S. Start Date: 2/26/97 analysis collected with MSA Photon with 10.6 eV butb. Instrument.								: <u> </u>	SWMU: 4	
SAND - light gray to dark brown, trace silt, poorly graded, moist. Wet at 2 feet. Sample 9249 collected for VOC analysis. Collected sample 9250 for VOC analysis of groundwater. End of Probe © 4 feet BGS. Start Date: 2/26/97 analysis collected with P4" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.8 eV bulb. Instrument	DEPTH (ft.) IPLE INTERVAL	SAMPLE ID	SE ADVANCE	REC,		TER TABLE	THOLOGY		SAMPLE DESCRIPTION	REMARKS
S-1 easy 24/24 0.0 Poorly graded, most. Wet at 2 feet. S-2 easy 24/24 0.0 Sample 9249 collected for VOC analysis. Collected sample 9250 for VOC analysis of groundwater. End of Probe 4 feet BGS. Start Date: 2/26/97 analysis collected with MSA Photon with 10.8 eV bub. Instrument	SAMP		PROE	SAMP	上 上 上 日	¥	.			
S-1 easy 24/24 0.0 Poorly graded, most. Wet at 2 feet. S-2 easy 24/24 0.0 Sample 9249 collected for VOC analysis. Collected sample 9250 for VOC analysis of groundwater. End of Probe 4 feet BGS. Start Date: 2/26/97 analysis collected with MSA Photon with 10.8 eV bub. Instrument										
Sample 9249 collected for VOC analysis. Collected sample 9250 for VOC analysis of groundwater. End of Probe 9 4 feet EGS. Start Date: 2/26/97 analysis collected with MSA Photon with 10.8 eV bulb. Instrument		.		0.4 (0.4	0.0					
Collected for VOC analysis. Collected sample 9250 for VOC analysis of groundwater. End of Probe @ 4 feet BGS. DMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.8 eV builb. Instrument		J-1	gasy	24/24	0,0					
Collected for VOC analysis. Collected sample 9250 for VOC analysis of groundwater. End of Probe @ 4 feet BGS. DMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.8 eV builb. Instrument					Y V					
Collected for VOC analysis. Collected sample 9250 for VOC analysis of groundwater. End of Probe @ 4 feet BGS. DMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.8 eV builb. Instrument										
S-2 easy 24/24 0.0 Collected sample 9250 for VOC analysis of groundwater. End of Probe @ 4 feet BGS. MMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.8 eV builb. Instrument	2					Ť				1
End of Probe @ 4 feet BGS. End of Probe @ 4 feet BGS. DMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.8 eV bulb. Instrument		: S−2	easy	24/24	0.0					1 :
End of Probe @ 4 feet BGS. End of Probe @ 4 feet BGS. DMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.8 eV bulb. Instrument										
End of Probe @ 4 feet BGS. End of Probe @ 4 feet BGS. DMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.8 eV bulb. Instrument	3									
End of Probe @ 4 feet BGS. End of Probe @ 4 feet BGS. DMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.6 eV bulb. Instrument										1
DMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97 analysis collected with MSA Photon with 10.8 eV bulb. Instrument	4									analysis of
DMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97 analysis collected with MSA Photon with 10.8 eV bulb. Instrument	3								End of Probe @ 4 feet BGS.	
DMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97 analysis collected with MSA Photon with 10.8 eV bulb. Instrument					. 1-					
DMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97 analysis collected with MSA Photon with 10.8 eV bulb. Instrument		uib ^{mi}		a				, A.		
DMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97 analysis collected with MSA Photon with 10.8 eV bulb. Instrument	197									
DMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97 analysis collected with MSA Photon with 10.8 eV bulb. Instrument	1 / / 1 / / 1									
DMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97 analysis collected with MSA Photon with 10.8 eV bulb. Instrument										
DMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/26/97 analysis collected with MSA Photon with 10.8 eV bulb. Instrument	5_				in the second se					
analysis collected with MSA Photon with 10.8 eV bulb. Instrument	7									
analysis collected with MSA Photon with 10.8 eV bulb. Instrument	OMMF	NTSIS	oil samo	les or	llect	ed wi	:i th 24"	. ae	porobe soil sampler. Headspace	Date: 2/26/07
	. w r 11 (96)	a	inalysis d	collec	ted w	iith M	SA Ph	oto	n with 10.8 eV bulb. Instrument	
calibrated to 400 ppm toluene in air. Complete Date: 2/26/97										lete Date: 2/26/97
eologist: M. Landsman page 1 of 1	ieoloc	ist: M	Landsm	an		*. *	4		page	foft

	\Pen\	>X vironmen		SUITE 20 ROCKVIL TELEPHO C.)()	IANCH WAY (LAND 20855 1) 417-0200	Project: Thiokol - Woodbine facility Job No.: 097.005 Location: Acetone Evaporation Pond - E Date: 2/26/97 SWMU: 4	East	Boring ID:
SAMPLE INTERVAL	SAMPLE	PROBE ADVANCE	SAMPLE REC. (in.)	HEADSPACE (ppm)	WATER TABLE	L1THOLOGY	SAMPLE DESCRIPTION		REMARKS
2	S-1		24/24				SAND - light gray to dark brown, trace silt, poorly graded, moist. Wet at 2 feet.		nple not mitted from this ing.
4				de la companya de la			End of Probe @ 4 feet BGS.		
i est			d to	ted v	vith M	SA Phot	on with 10.8 eV bulb. Instrument air.	<u> </u>	e: 2/26/97 Date: 2/26/97

1 4		**			REBEN OF	ים. זמ. סממענ	AN HONAF	Project: Thiokol - Woodbine facility	Boring ID:
	Λ		TN		SUITE 2	14003 CH 00	IANGIT NA	Job No.: 097.005	
1	W		2~		ROCKVIL	LE, MAR	YLAND 20 1) 417-020	Location: Borrow Pit -1250N 1020E] B1
	4	1	ンへ ivene==		TELEPH	DNE: (30	n 41/-020	Date: 2/26/97	
/-	1.18	env	ironmen	icai,in	U.			SWMU: 8	
DEPTH (ft.)	SAMPLE INTERVAL	SAMPLE IO	PROBE ADVANCE	SAMPLE REC, (in.)	HEADSPACE (ppm)	WATER TABLE	LITHOLOGY	SAMPLE DESCRIPTION	REMARKS
		S-1	easy	24/24	0.0				
		11997	1 . . As 1					SAND - pale brown and brown silty fine SAND,	
4								poorly graded, moist.	
1						95	(XXX)		
				H197		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
							第 第		
		1 4							
						1			
2	191			1 41					odini se sa
		17							
	*	S-2	easy	24/24	0.0				
		4) 4)	. 9						
	Ш								
3									
,									e
	Ш								
			eri Artese						
4		*						Car	nple 9236
7			P 75						ected for VOC
		S-3	moderati	24/24	0.0				lysis.
					1	1			
5				A.,					
"									
						r.	臣田	SAND - black silty fine SAND, poorly graded,	Solution of the second
6								maist, organic cemented.	· · · · · · · · · · · · · · · · · · ·
,]						End of Probe @ 6 feet BGS.	
	Ì								
			1. 1.						
7									
$V^{*}U$	 -	1 100	1	1	1	1	1.	The first of the f	

COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.6 eV bulb. Instrument calibrated to 400 ppm toluene in air.

Start Date: 2/24/97 Complete Date: 2/24/97

Geologist: M Landsman

		s i			COEO OF	ומ מממאו	ARCH WAV	Project: Thickol - Woodbine facility	Boring ID:
	Λ		TH		SUITE 21	00	IANCH WAY	Job No.: 097.005	
	M		N		ROCKVIL	LE, MARY	LAND 20855 0 417-0200	Location: Borrow Pit -1230N 990E	B2
		V and	ironmer	منادات	TELEPH	ME (30)	0 417-0200	Date: 2/26/97	
/		GHV	ii Orinier	itai,iii	L.			SWMU: 6	
DEPTH (ft.)	SAMPLE INTERVAL	SAMPLE ID	PROBE ADVANCE	SAMPLE REC, (in.)	HEADSPACE (ppm)	WATER TABLE	LITHOLOGY	SAMPLE DESCRIPTION	REMARKS
		S-1	PASV	24/24	0.0				
			203,	2-7,2-3	3.3			CAND and brown and brown with the CAND	
								SAND - pale brown and brown sitty fine SAND, poorly graded, moist.	
- 1									
1						1	77.7		
				1	l n				
		Threshold the							
				1 2 1					
2					•				
		S-2	easy	24/24	0.0			Table 1. And	
		ľ	to the space			1			
3			-	1		1			
						100			
			\$44						
					1				
		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						a a State A Maria a filia ta	the second second
4	Ш					1		Sar	nple 9237
							探题		ected for VOC
Ϋ.		S-3	moderat	e24/24	0.0				ilysis.
Å,				1					
				1 1 1/2		- A			e ja o to
5									
				1					4. 概定
			1					SAND - black silty fine SAND, poorly graded,	AL CONTRACTOR
								moist, organic cemented.	
6		1					===		
				-				End of Probe @ 6 feet BGS.	
	.	1.5							
		1	-	1	1				and the second of the

COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.6 eV bulb. Instrument

calibrated to 400 ppm toluene in air.

Geologist: M.L.andsman

Complete Date: 2/24/97

Start Date: 2/24/97

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			W.			inen on	ኒኒስስድ መ	AUMISIAN	Project: Thickol - Woodbine facility	Boring ID:
		1	4 JA	TH		SUITE 20		ANCH WAY	Job No.: 097.005	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		1		2		ROCKVII	IF MARY	LAND 208	55 Location; Borrow Pit -1250N 975E	B3
	//-	7	1	ironmen		TELEPHO	INE: (30)	417-0200	Date: 2/26/97	
/	-	•	- env	n onmen	ıtaı,ın	U.			SWMU: 6	
<u> </u>	T	7	11	נען	(ju)	(E				
1	3	SAMPLE INTERVAL		ADVANCE		(mdd)	WATER TABLE	>5		
3	חברות ווני		SAMPLE ID	à	SAMPLE REC,	览	TA	LITHOLOGY	SAMPLE DESCRIPTION	REMARKS
1		L	SAM	EA	E F	HEADSPACE	ER	모	SAMPLE BESCHIFTION	TIET ATTIC
Ľ	5	₹	,	PROBE	MP.	YD.	₹AT	- I		
L		SA		9	Ŝ	里	_		and the second s	Mine in the second seco
				222	0.4/0.4	0.0				
			S-1	easy	24/24	0.0	Su As			
L	<i>§</i> .								SANO - pale brown and brown silty fine SAND,	
									poorly graded, moist.	
	1									
L						ļ			The second of th	
ŀ							1 2 2 2			
	+			100						
	2	<u>}</u> .5	1							
										Arte Comment
			S-2	easy	24/24	0.0				
ŀ				S.						
						Y				
].	3									
				100						, exercis
1			. #14							
1								发送		en e
1	4								No.	ample collected
1							ļ.·			this boring.
1			S-3	moderate	24/24	0.0				the second
1										
1					3					
	5			F . 1. 1						
	Ť									
								7		
1	1								CAND - block albu the CAND poorly graded	
									SAND - black silty fine SAND, poorly graded, moist, organic cemented.	
	6		1	1.4					moist, vigarac cemented.	
	1				1 4 5				End of Probe @ 6 feet BGS.	
1		*				1				
1										
1						1, 37				
	7									

COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.6 eV bulb. Instrument calibrated to 400 ppm toluene in air.

Complete Date: 2/24/97

Start Date: 2/24/97

Geologist: M Landsman

page 1 of 1.

	A ISB50 CRABBS BRANCH WAY						Project: Thiokol - Woodbine facility Boring ID:				
Λ		M	Johann	SUITE 20	00		Job No.: 097.005				
		ay.		ROCKVIL	LE, MAR	YLAND 2085 N 417-0200	Location: Borrow Pit -1270N 1020E	B4			
$/\!$		ronmer	ما الجار	IELEPH	UNE (30	ni 417-U200	Date: 2/26/97				
, . '	env	u oumer	ital,in	U.			SWMU: 6				
SAMPLE INTERVAL		ADVANCE	(ju)	(mdd)	J.						
PLE INTER	SAMPLE	A	REC,		WATER TABLE	LITHOLOGY	CANOLE DESCRIPTION	REMARKS			
	A M	₹	E E	HEADSPACE	E .	물	SAMPLE DESCRIPTION	NEMARKS			
를	US.	PROBE	SAMPLE	S	Ι¥	5					
SA		£	SA	<u> </u>	-	1. "					
		H. 1884 1.				74.74					
	5-1	easy	24/24	0.0							
							SAND - pale brown and brown silty fine SAND,				
					1 1		poorly graded, moist.				
1						医		A STATE OF THE STA			
				-				er en			
		7 7			w						
2	_										
	S-2	easy	24/24	0.0							
		AN ALL				683					
	i .										
3						[2]					
		1 2 22									
	y h										
	N.	la de la									
4		**						No sample collected			
								from this boring.			
	S-3	moderate	e24/24	.0,0							
_		100									
5_								e de Maria			
		1		100	1						
	4,			1. 5				en e			
				1.	-		SAND - black silty fine SAND, poorly graded,				
	1			.,			moist, organic cemented.				
6	-					===					
	1 1 1					1 1	End of Probe @ 6 feet BGS.				
					1						
7											
1		100 miles		12							
OMM	ENTS	Soil samr	oles c	ollect	ed w	th 24"	geoprobe soil sampler. Headspace Start	Date: 2/24/97			
							ton with 10.8 eV bulb. Instrument	A VENT A STATE OF THE STATE OF			
								lete Date: 2/24/97			
	ē		collec	ted v	vith M	ISA Pho	ton with 10.6 eV bulb. Instrument	Date: 2/24/97 lete Date: 2/24/9			

Geologist: M. Landsman

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	Λ	272.77		policina.	SUITE 20	00	a valeti.	000 No.: 087.005	
2	// \	De	=X	Mga Afrika Afrika	ROCKVIL	LE MARI	(LAND 21 1) 417-02	OO 1	B5
		env	ironmen			JNC. (30	11 411 702	Date: 2/26/97	
/	4.	~ · · · ·	OC.	ا الواقعا ا	.			SWMU: 6	
DEPTH (ft.)	SAMPLE INTERVAL	SAMPLE ID	PROBE ADVANCE	SAMPLE REC, (in.)	HEADSPACE (ppm)	WATER TABLE	LITHOLOGY	SAMPLE DESCRIPTION	REMARKS
		S-1		04/04	0.0				
÷		3-1	easy	24/24	0.0				
. \$								SAND - brown to yellowish brown silty fine SAND, poorly graded, moist.	
1							7		
					1.0				
_									
2									
		S-2	easy	24/24	0.0				600
						. A		SAND - gray silty fine SAND, poorly graded, moist	
3									
		. '							The second secon
							7		
									No seemle sellected
4					100				No sample collected from this boring.
		S-3	moderate	24/24	74.5				Hom tring bonning.
						1		SAND - dark brown and yellowish brown, silty fine	
						w		SAND, poorly graded, moist to wet.	
_						Ţ			
) 3									
								SAND - black silty fine SAND, poorly graded.	
٥								moist, organic cemented.	
6		1						End of Probe @ 6 feet BGS.	
					4	1			
) yet						
7		-							
Γ'									
CC	MM(ENTS:	Soil same	les c	ollect	ed wi	th 24	geoprobe soil sampler. Headspace Start	Date: 2/24/97
		6	analysis	collec	ted v	vith M	SA PI	noton with 10.6 eV bulb. Instrument	-1- D-1- 0/01/07

calibrated to 400 ppm toluene in air.

Complete Date: 2/24/97

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					יכובה הנ	RABBS BR	AMPU WA	Project: Thiokol - Woodbine facility	Boring ID:
	A		† #.		SUITE 20	00		JOD NO.: 097.005	
	ΛN	D	24		ROCKVIL	LE MARY	LAND 20	Location: Trench II - 1320N 1240E	_ B6
1/	$\boldsymbol{\mu}$	env	ironmen	ital in	TELETHI IC)NE: (301) 411-UZ	Date: 2/26/97	
		U ,,,	,ı yınışı			* 32		SWMU; 6	
	/AL	<u>.</u>	핑	(jn.)	(mdd)	11.1			
E	ER	Ш	Ž	4 1		TABLE	ξ		
I	INTERVAL	SAMPLE 10	ADVANCE	REC,	HEADSPACE	्रें	LITHOLOGY	SAMPLE DESCRIPTION	REMARKS
DEPTH	SAMPLE	SAL	H		SP	WATER	E		
=	A M		PROBE	SAMPLE	AD	X X			
-	S		<u> </u>	S	I				
		S-1	easy	24/24	5.3				
								SAND - brown to yellowish brown silty fine SAND,	
								poorly graded, moist.	
			l Park						
		ļ .							
		1,54,5							
1,									
4									
		S-2	easy	24/24	0.0				
								SAND - gray silty fine SAND, poorly graded, moist	
] 3						17. 1			
			Part of the						yang salah sal Salah salah sa
			1.0				<i>.</i>		
		1.0							
4				15.0				No.	sample collected
		S-3	moderate	24/24	0.0			of the second se	this boring.
15		3-3	moderate	24/24	10.0				
				4 1 4		_		SAND - dark brown and yellowish brown, silty fine SAND, poorly graded, moist to wet.	
	8					Å		SAND, poorly graded, most to net	
. 5			100		1 2 2				1. (1. (1. (1. (1. (1. (1. (1. (1. (1. (
									A.A.
									in the second of
								SAND - black silty fine SAND, poorly graded,	
							EEE	moist, organic cemented.	
1 6		1						End of Probe @ 6 feet BGS.	
1			1 500			1			
					100		10.0		
١,			L. New				4.2		1. The state of th
'			1 190						
		***************************************							A. 1. 1

COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.6 eV bulb. Instrument calibrated to 400 ppm toluene in air.

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Geologist: M Landsman

Complete Date: 2/24/97

Start Date: 2/24/97

1			Sec. 1		יער אבאי פי	O ADDO DO	RANCH WA	Project: Thickol - Woodbine facility Boring ID:				
	Λ		TH		SUITE 2		nanun na	Job No.: 097.005				
	/		2		ROCKVI	LE, MARY	YLANU 20 11) 417-020	855 Location: Trench II - 1290N 1320E	B7			
		//			TELEPH	ONE: (30	11) 417-020	Date: 2/26/97				
1/		• env	rironmer	ntal,in	ic.	1.7		SWMU: 6				
1		T T		Γ 🚗	2			TOMINO. O				
-	SAMPLE INTERVAL		ADVANCE	E.	(mdd)	ш	_					
=	Ü	ш	₹ .	ڻ		TABLE	99					
DEPTH (ft.)	Z	SAMPLE	4	SAMPLE REC.	HEADSPACE	H T	LITHOLOGY	SAMPLE DESCRIPTION	REMARKS			
EP	W	8	PROBE	LE	dS.	WATER	Ė					
0	E		8	₩ W	¥	₹	-					
 	S	 	4	S	工							
		S-1	easy	24/24	0.0							
			2039	67/27	0.0							
				W .				SAND - brown to yellowish brown silty fine SAND,				
								poorly graded, moist.				
				N								

١,		1										
1 -		717.77			19.		7.7					
		S-2	easy	24/24	0.0							
1								SAND - gray silty fine SAND, poorly graded, moist				
			1						· · · · · ·			
1.												
	3H											
1							9.75					
4	1				ľ				No sample collected			
		S-3	moderate	24/24	0.0				from this boring.			
]	"							
								SAND - dark brown and yellowish brown, silty fine SAND, poorly graded, moist to wet.				
	si .					▼		SAND, poorly graded, moist to wet.				
1.5	5 -											
					ĺ		7.74					
								SAND - black sitty fine SAND, poorly graded,				
								moist, organic cemented.				
1 6	3							most, organic cometica.				
`		1						End of Probe 0 6 feet BGS.				
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COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.8 eV bulb. Instrument calibrated to 400 ppm toluene in air.

Start Date: 2/24/97

Complete Date: 2/24/97

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Geologist: M. Landsman

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		À		n en		:5850 CF	RABBS PE	RANCH WA	Project: Thiokol - Woodbine facility	Boring ID:
		N				SUITE 20	00		Job No.: 097.005	
		Λ		X		ROCKVIL	LE, MARY	(LAND 20 1) 417-020	D855 Location: Trench II - 1290N 1290E	B8
17	//-	4	Ven.	rironmer	ntal in	TELETAL IC.	URNEL (JU)	g 41/702\	Date: 2/26/97	
1/				1111161		Ž.			SWMU: 6	
DEPTH (ft)		SAMPLE INTERVAL	SAMPLE ID	PROBE ADVANCE	SAMPLE REC, (in.)	HEADSPACE (ppm)	WATER TABLE	ГІТНОГОВҮ	SAMPLE DESCRIPTION	REMARKS
			S-1	easy	24/24	0.0				
1000									SAND – brown to yellowish brown silty fine SAND, poorly graded, moist.	
	2		S-2	easy	24/24	0.0				
									SAND - gray silty fine SAND, poorly graded, moist	
	3									
	4									No sample collected
			S-3	moderati	e24/24	0.0				from this boring.
	***************************************						Ţ		SAND – dark brown and yellowish brown, silty fine SAND, poorly graded, moist to wet.	
	5			Address of the second s	-					
	6_		3					Serge Avide Avenue of the Control of	SAND - black silty fine SAND, poorly graded, moist, organic cemented.	
	***************************************								End of Probe @ 6 feet BGS.	
							100			

COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.6 eV bulb. Instrument

calibrated to 400 ppm toluene in air.

Geologist: M Landsman

Complete Date: 2/24/97

Start Date: 2/24/97

					(ርወርስ ጣ	MDDC DO	IANCH WAY	Project: Thickol - Woodbine facility	Boring ID:	
	Λ	No.	114	Sala Sala	SUITE 20	00		Job No.: 097.005		
	//\ \	De	ZY		ROCKVIL	LE, MARY	LAND 20855	Location: Trench II - 1320N 1370E	B9	
	H	Pany	ironmen			are (JU)) 417-0200	Date: 2/26/97		
	<u></u>		n ommen		<u>. </u>		<u> </u>	SWMU: 6		
DEPTH (ft.)	SAMPLE INTERVAL	SAMPLE ID	PROBE ADVANCE	SAMPLE REC, (in.)	HEADSPACE (ppm)	WATER TABLE	LITHOLOGY	SAMPLE DESCRIPTION	REMARKS	
	SAN	* *	PR	SA	빞	X				
		S-1	easy	24/24	0.0					
								SAND - brown to yellowish brown silty fine SAND,		
12								poorly graded, moist.		
Ĭ.,					1					
							A272		And the second	
10			i,							
			.;							
2				is .						
		S-2	easy	24/24	0.0					
		3-2	easy	24/24	u .o					
		ŀ		1				SAND - gray silty fine SAND, poorly graded, moist		
							72.72			
3	4									
1										
1										
			1							
1 4					1				No sample collected from this boring.	
		S-3	moderate	24/24	0.0				nom this borng.	
								SAND - dark brown and yellowish brown, silty fine		
						Y		SANO, poorly graded, moist to wet.		
						+				
`			16							
						1				
				2.	1 1 2		1,7,222,7,7,2	SAND - black silty fine SAND, poorly graded,		
								moist, organic cemented.		
1 6					fore .		===			
								End of Probe @ 6 feet BGS.		
						- 250 s		· [1] 기교가 되는 기 등 생활한 경기를 받는 것이다.		
7	1	1								
C	MM	-NTC-	Soil same	les ci	nilect	ed wi	th 24" a	eoprobe soil sampler. Headspace Start	Date: 2/24/97	
``	£ا")!"بى							on with 10.6 eV bulb. Instrument		
	1						duene in	10.000	lete Date: 2/24/97	
C	anina	nist. k	1 Landsn	nan				page	1 of the second	
100	- 410	ا به ب اوي		911						

				\$4. \$4.	#ደበ ድስ ፖር	MODE CO	IANCH WA	Project: Thiokol - Woodbine facility	Boring ID:
	Λ		πн		SULTE 20	10	1,444	JOD NO.: U97.UU5	
	// \	D	NE	68,	ROCKVIL	LE, MARY	(LAND 20 1) 417-020	855 Location: Trench II - 1320N 1360E	B10
		V env	ironmen	tal in	TELEPHO C)NE: (30)	I)* 41/ =U20	Date: 2/26/97	1,000 0 1,000
/		· - Cili	ii Oilineii	rai,iii	O.	1		SWMU: 6	
DEPTH (ft.)	SAMPLE INTERVAL	SAMPLE ID	PROBE ADVANCE	SAMPLE REC, (in.)	HEADSPACE (ppm)	MATER TABLE	гтногову	SAMPLE DESCRIPTION	REMARKS
					a s	19 1 19 1 1			
i i					X The	-47		SAND - brown to yellowish brown silty fine SAND, poorly graded, moist.	
			. 14.						
		1			2				
2									
								SAMD - aroy alloy ting SAMD poorly graded moist	
								SAND - gray silty fine SAND, poorly graded, moist	
3									A STATE OF THE STA
,				•					
	1			est,					
ľ,									
4						1. 18			Sample 9238 collected for VOC
		S-I	moderate	24/24	0.0				analysis.
								SANO - dark brown and yellowish brown, silty fine	
					1	V	Market 1	SANO, poorly graded, moist to wet.	
									A. A.
· .				马囊					
							===	SAND - black silty fine SAND, poorly graded,	
								moist, organic cemented.	
	3	1						End of Probe @ 6 feet BGS.	
					ļ., .			Associated and the second seco	
				25					

COMMENTS: Soil samples collected with 24" geoprobe soil sampler. Headspace

analysis collected with MSA Photon with 10.6 eV bulb. Instrument

calibrated to 400 ppm toluene in air.

Geologist: M.Landsman

Start Date: 2/24/97

Complete Date: 2/24/97

	na Jer ik				15850 CE	TARRS RE	RANCH WAY	Project: Thickol - Woodbine facility	Round In:		
1.2	$\mathbf{\Lambda}$		•	in the	SHITE 2	00		JOD NO.: 097.005			
1	// \		YE		ROCKVIL	LE, MARY	YLAND 208 1) 417-0200	55 Location: Trench II - 1320N 1255E] B11		
				Ant in	TELEPH	INE (30	II 417-0200	Date: 2/26/97			
//		- env	ironmen	itai,iii	C,			SWMU: 6			
-	-		hi	3	E						
-	SAMPLE INTERVAL		AOVANCE	(in.)	(wdd)	Ш					
OEPTH (ft.)	三	Ш	A Y	REC,	ш	TABLE	LITHOLOGY				
Ξ	K	SAMPLE	PΟ	E.	HEADSPACE	H H	호	SAMPLE DESCRIPTION	REMARKS		
8	Ш	SA	PROBE	SAMPLE	SP	WATER					
0	3		2	A	AC	¥			$= \left(\frac{1}{2} \left(\frac{1}{2} \left(\frac{1}{2} \right) \right) - \frac{1}{2} \left(\frac{1}{2} \left(\frac{1}{2} \right) \right) \right)$		
	S.		<u>n</u>	S	<u> </u>		202				
						100					
9,1					4 14						
			3 10				4333	SAND - brown to yellowish brown silty fine SAND,			
			4					poorly graded, moist.			
١.,											
'	T										
1							7.33				
	1			17.					the second second		
2	-										
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			ļ								
								SAND - gray silty fine SAND, poorly graded, moist			
1									gradient of the second		
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٦	T								and the second		
					ļ.,						
			N W								
							7.7				
4	-	-			17				ple 9239		
		C_1	moderate	24/24	0.0			and the second of the second o	ected for VOC		
١.,		3-1	I MODELATE	24/24	0.0				lysis.		
					\$ 15 miles			SAND adark brown and yellowish brown, silty fine			
					[32]	Ţ	7.554	SAND, poorly graded, moist to wet.			
-					[.	-					
1		·									
						1 4, 7	3.3.3				
1						ŀ		SAND - black silty fine SAND, poorly graded,	· · · · · · · · · · · · · · · · · · ·		
							====	moist, organic cemented.			
6		1			1.0		===1				
1								End of Probe @ 8 feet BGS.			
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					1 .	'	1	(中国智慧的) 17	$(x,y) = \frac{\partial y}{\partial x} = xy.$		
				1 1 2 2							
,			1 905								
1 '	Γ				134	1					
C	IMMC	ENTS:	Soil same	les c	ollect	ed wi	th 24"	geoprobe soil sampler. Headspace Start Date	3: 2/24/97		
	COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace Start Date: 2/24/97 analysis collected with MSA Photon with 10.6 eV bulb. Instrument										

calibrated to 400 ppm toluene in air.

Complete Date: 2/24/97

_	•	<u> </u>	100 To 150		5		- <u> </u>	1.		Doda To
	À		₩		15850 CF	IABBS BF	RANCH WA	A Y	Project: Thiokol – Woodbine facility	Boring ID:
1 2 2	Λ	a sa		70	SULTE 20	00	100	1	Job No.: 097.005	
	// \	De	27		ROCKVIL	LE, MARI	(LAND 20 1) 417-02	0855	ocation: Trench II - 1300N 1300E	B12
1/	H	en	ironmen	fal in	LETELHI G	INIE (30)	# 4##-UZ	.vv [Date: 2/26/97	
1/		CITA	u Oranieli	ir al ^s i()	U ,		1 de	3	SWMU: 6	
	A F		ш	7	Ê					
3	SAMPLE INTERVAL		ADVANCE	(ju.)	(mdd)	TABLE	>			
E	1	Щ	××	្ត		¥B	8			
DEPTH (ft.)	Z	SAMPLE	¥Ľ	2	AC	Œ	LITHOLOGY		SAMPLE DESCRIPTION	REMARKS
造	1 2	Ŝ	H	PE)St	MATER	E	100		
2	¥.		PROBE	SAMPLE REC,	HEAUSPACE	¥.				
	S		<u> </u>	(U)	エ		1000			
		1	. 4 1. 2 -	A STATE		3				
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					V				SAND - brown to yellowish brown silty fine SAND.	
	1								poorly graded, moist.	
1	L		e e e	192	111		No. of			
	Γ								프랑프인 그리는 그런 부탁인 후 모드 네워.	
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			Sept.							
				1400						
		1					Ver	4		
2	-									100 m
	lui.		. J.					, i		
		79	4. j							
								1	SAND - gray silty fine SAND, poorly graded, moist	
3										
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	1				10.0	h **				
			e de							
4	-	4						.]		Sample 9240
ŀ										ollected for VOC
		S-1	moderate	24/24	u.u				* ·	nalysis.
				4,		100			SAND - dark brown and yellowish brown, silty fine	
1			l ar r		P	V	100		SAND, poorly graded, moist to wet.	V 1 (1)
						-				
						4 3				
			100			1	1333			
					25		===:	+	SAND - black silty fine SAND, poorly graded,	¥
			1 - 47						moist, organic cemented.	
ϵ		-		12.75			===			
	1						1000		End of Probe 0 6 feet BGS.	
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		1 5								
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COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.8 eV bulb. Instrument calibrated to 400 ppm toluene in air.

Complete Date: 2/24/97

Start Date: 2/24/97

Geologist: M Landsman

page | of |

14.50	·	September 1997. September 1997. September 1997. September 1997. September 1997. September 1997. September 1997							**
					IEGEN (CO	ADDE DO	ANCH WAY	Project: Thiokol - Woodbine facility	Boring ID:
	Λ		7 ₩	in Jand	SUITE 20	иа саак 10	AIVOR NAT	Job No.: 097.005	
	/N	100	YE		ROCKVIL	LE MARY	LANO 208) 417-020	Location: Trench II - 1320N 1310E	B13
1/		N any	ironmen	talin	LETENHO	NE: (301	417-020	Date: 2/26/97	
1/	-	77 G119	n Ornincia	r cartur	U			SWMU: 8	
DEPTH (ft.)	SAMPLE INTERVAL	SAMPLE ID	PROBE ADVANCE	SAMPLE REC, (in.)	HEADSPACE (ppm)	WATER TABLE	гітногову	SAMPLE DESCRIPTION	REMARKS
								SAND - brown to yellowish brown silty fine SAND, poorly graded, moist.	
	2_								
	(1)							SAND - gray silty fine SAND, poorly graded, moist	
	4							San	npie 9241

SAND - dark brown and yellowish brown, silty fine

SAND - black silty fine SAND, poorly graded,

SAND, poorly graded, moist to wet.

moist, organic cemented.

End of Probe @ 6 feet BGS.

COMMENTS:Soil samples collected with 24" geoprobe soil sampler. Headspace analysis collected with MSA Photon with 10.6 eV bulb. Instrument calibrated to 400 ppm toluene in air.

Start Date: 2/24/97

Complete Date: 2/24/97

collected for VOC

analysis.

page 1 of 1

Geologist: M Landsman

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Apexenvironmental, inc.

Appendix D

Laboratory Data Sheets

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SAVANNAH LABORATORIES Fax: (912) 352-0165 Phone: (912) 354-7858 202 LaRoche Avenue, Savannah, GA 31404 Fax: (904) 878-9504 Phone: (904) 878-3994 & ENVIRONMENTAL SERVICES, INC. 1346 Industrial Plaza Drive, Tallahassee, FL 32301 Phone: (954) 421-7400 Fax: (954) 421-2584 414 SW 12th Avenue, Deerfield Beach, FL 33442 Fax: (334) 666-6696 Phone: (334) 666-6633 900 Lakeside Drive. Mobile, AL 36693 ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD Phone: (813) 885-7427 Fax: (813) 885-7049 6712 Benjamin Road, Suite 100, Tampa, FL 33634 Fax: (504) 725-1163 Phone: (504) 764-1100 100 Alpha Drive. Suite 110, Destrehan, LA 70047 P.O. NUMBER PROJECT REFERENCE PROJECT NO. MATRIX TYPE PAGES OF THICKOL-WOUSINS 097.005 REQUIRED ANALYSES 701-417-0200 SAMPLER(s) NAME STANDARD REPORT DELIVERY 10,2 CLIENT PROJECT MANAGER CLIEMT NAME 4720 ARK CORBIN CLIENT ADDRESS (CITY STATE ZIP) 61.75200 EXPEDITED REPORT DELIVERY(surcharge) NAT 20815 Date Due: SAMPLE SL NUMBER OF CONTAINERS SUBMITTED REMARKS DATE TIME NO. SAMPLE IDENTIFICATION 9243 2/26/97 1715 9244 0945 9245 0955 9246 1 1030 9247 1010 9248 1050 ı l 1110 9249 2 9250 1110 2 1220 9251 3 2/11/17 1330 9252 TIME RELINQUISHED BY: (SIGNATURE) RELINQUISHED BY: (SIGNATURE) DATE DATE TIME RELINQUISHED BY: (SIGNATURE) 2/27/1 1300 41. +Alh: DATE TIME DATE RECEIVED BY: (SIGNATURE) RECEIVED BY: (SIGNATURE) RECEIVED BY (SIGNATURE) DATE TIME 1330 2/4/17 SL LOG NO. LABORATORY REMARKS * LABORATORY USE ONLY 24 IGNATURE) DATE CUSTODY INTACT CUSTODY SEAL NO. TIME 1:00

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IANIGIAC

ANAL	SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC. NALYSIS REQUEST AND CHAIN OF CUSTODY RECORD DIECT REFERENCE : PROJECT NO							Phone: (912) 354-7858 2 1346 Industrial Pisza Drive, Tallahassee, FL 32301 2 414 SW 12th Avenue, Deerfield Beach, FL 33442 2 500 Lakeside Drive, Mobile, AL 36693 3 6 6712 Benjamin Road, Suite 100, Tampa, FL 33634 3 100 Alpha Drive. Suite 110, Destrehan, LA 70047 Phone: (912) 354-7858 Phone: (904) 878-3994 Phone: (954) 421-7400 Phone: (954) 421-7400 Phone: (913) 885-7427 Phone: (913) 885-7427 Phone: (914) 764-1100					994 F 400 F 633 F 427 F	ax: (912) 3: ax: (904) 8: ax: (954) 4: ax: (334) 6: ax: (813) 8: ax: (504) 7:	78-9 504 21-2 584 66-6 696 85-7 049			
PROJECT	REFERENÇ	E	PROJECT	NO P	O. NUMBER													
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CLIENT AD	DRESS (CIT	Y STATE ZIP		10.75 20			¥ /3L	_7_	7 3) 		/	+	/	$-\!\!\!\!/$	Date D	DELIVERY	D REPORT (surcharge)
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2/24/17	1630		9236												* .			
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RECEIVED TO A LABORATORY TO TOGRATURE) DATE

TIME 1.00 CUSTODY INTACT CUSTODY SEAL NO. SLLOG NO. PLABORATORY REMARKS TO CLOSE TO CONTROL (NOTICE OF CONTROL OF CONTRO

and vocs.

LOG NO: S7-71140 Received: 27 FEB 97 Reported: 10 MAR 97

Mr. Mark Corbin

Apex Environmental, Inc.

15850 Crabbs Branch Way #300

Rockville, MD 20855

Project: THIKOL/WOODBINE

Client PO. No.: 097.005

Sampled By: Client

Code: 163670310

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION		AMPLES		DATE/ TIME SAMPLE	rage 9
	9242 9243				05-25-97/13/ 02-25-97/10/ 02-26-97/17/ 02-26-97/11/	00 15
71140-23	9251				02-26-97/12	20
PARAMETER		71140-19				
	by GC/MS (8260)					
	hane, ug/l	<10	<10	<10	<10	<10
Bromometh	ane, ug/l	<10			<10	
Vinyl chl	oride, ug/l	<10	<10	<10	<10	<10
Chloroeth	ane, ug/l	<10	<10	<10	<10	<10
	chloride	<5.0	<5.0	<5.0	<5.0	<5.0
(Dichlor	omethane), ug/l					
Acetone,	- ·	<50	<50	110	590	66
	sulfide, ug/l	<5.0	<5.0	<5.0	<5.0	<5.0
	oroethene, ug/l	<5.0	<5.0	<5.0	<5.0	<5.0
	oroethane, ug/l	<5.0	< 5.0	<5.0	<5.0	<5.0
	-Dichloroethylene,	ug/l <5.0	< 5.0	<5.0	<5.0	< 5.0
Chlorofor	-		<5.0	<5.0	<5.0	<5.0
	oroethane, ug/l	<5.0	<5.0	<5.0	<5.0	<5.0
	le (MEK), ug/1	<25	< 25	<25	<25	<25
	.chloroethane, ug/l				<5.0	
	trachloride, ug/l		<5.0	<5.0	<5.0	< 5 .0
-	tate, ug/l	<10	<10	<10	<10	<10
Bromodich	loromethane, ug/l	<5.0	<5.0	<5.0	<5.0	<5.0

LOG NO: S7-71140 Received: 27 FEB 97 Reported: 10 MAR 97

Mr. Mark Corbin

Apex Environmental, Inc. 15850 Crabbs Branch Way #300

Client PO. No.: 097.005

Rockville, MD 20855

Project: THIKOL/WOODBINE

Sampled By: Client

Code: 163670310

		REPORT O	OF RESULTS			Page 10
					DATE/	_
LOG NO	SAMPLE DESCRIPTION ,	LIQUID SA	AMPLES		TIME SAMPLEI)
71140-19	9223				05-25-97/134	12
71140-20	9242				02-25-97/100	00
71140-21	9243				02-26-97/171	L5
71140-22	9250				02-26-97/111	LO
71140-23	9251				02-26-97/122	20
PARAMETER	,	71140-19	71140-20	71140-21	71140-22	71140-23
1,1,2,2-Te	trachloroethane, ug/l	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichlo	ropropane, ug/l	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-	Dichloropropene, ug/l	< 5.0	<5.0	<5.0	<5.0	<5.0
Trichloroe	thene, ug/l	< 5.0	<5.0	<5.0	<5.0	<5.0
Dibromochl	oromethane, ug/l	<5.0	<5.0	<5.0	<5.0	< 5.0
1,1,2-Tric	hloroethane, ug/l	<5.0	<5.0	<5.0	<5.0	<5. 0
Be nzene , u	g/1	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,3-Di	.chloropropene, ug/l	<5.0	<5.0	<5.0	<5.0	<5.0
2-Chloroet	hylvinyl ether, ug/l	<50	<50	<50	<50	<50
Bromoform,	ug/l	<5.0	<5.0	<5.0	<5.0	<5.0
2-Hexanone	e, ug/l	<25	<25	<25	<25	<25
4-Methyl-2	-pentanone (MIBK), ug	/1 <25	<25	<25	<25	<25
Tetrachlor	oethene, ug/l	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene, u	ig/l	< 5.0	<5.0	<5.0	<5.0	< 5.0
Chlorobenz	ene, ug/l	< 5.0	<5.0	<5.0	< 5.0	< 5.0
Ethylbenze	ne, ug/l	< 5.0	<5.0	< 5.0	< 5.0	< 5.0
Styrene, u	lg/l	<5.0	<5.0	<5.0	<5.0	<5. 0
Xylenes, u	g/1	<5.0	<5.0	<5.0	<5.0	<5.0
Surrogate	- Toluene-d8	94 %	94 %	94 %	92 %	94 %

LOG NO: S7-71140 Received: 27 FEB 97 Reported: 10 MAR 97

Mr. Mark Corbin Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855

Client PO. No.: 097.005

Project: THIKOL/WOODBINE

Sampled By: Client

Code: 163670310

REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , LIQUID SAMPLES TIME SAMPLED	
71140-19 9223 05-25-97/1342	
71140-20 9242 02-25-97/1000	
71140-21 9243 02-26-97/1715	
71140-22 9250 02-26-97/1110	
71140-23 9251 02-26-97/1220	
PARAMETER 71140-19 71140-20 71140-21 71140-22 71140-2	3
Surrogate - 4-Bromofluorobenzene 120 % 126 % 122 % 108 % 120	5
Surrogate - Dibromofluoromethane 134 % 132 % 128 % 138 % 130	5
Date Analyzed 03.03.97 03.03.97 03.04.97 03.04.9	7
Dilution factor 1.0 1.0 1.0 1.0 1.)
Batch ID 0303B 0303B 0303B 0303B 0303B	3
Clock ID 1H0303 1H0303 1H0304 1H0304	3
Method Number 8260 8260 8260 8260 826)

LOG NO: S7-71140 Received: 27 FEB 97 Reported: 10 MAR 97

Mr. Mark Corbin
Apex Environmental, Inc.
15850 Crabbs Branch Way #300
Rockville, MD 20855

Client PO. No.: 097.005

Project: THIKOL/WOODBINE

Sampled By: Client Code: 163670310

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		KHIOKI	Of KEDODID		,	rage I
LOG NO	SAMPLE DESCRIPTI	ON , LIQUID S	AMPLES		DATE/ TIME SAMPLE	o
71140-1	9217				02-26-97/14	 56
71140-2	9218				02-26-97/15	00
71140-3	9219				02-26-97/15	06
71140-4	9220				02-26-97/15	15
	9221				02-26-97/15	
PARAMETER		71140-1	71140-2	71140-3	71140-4	71140-5
Arsenic (60						
Arsenic (6	010), $mg/1$	<0.010	<0.010	<0.010	<0.010	<0.010
Preparatio	n Date	02.28.97	02.28.97	02.28.97	02.28.97	02.28.97
Date Analy		03.04.97	03.04.97	03.04.97	03.04.97	03.04.97
Dilution f	actor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L	0228L	0228L
Barium (601	0)					
Barium (60	_ ·		0.012	0.017	<0.010	<0.010
Preparatio		02.28.97	02.28.97	02.28.97	02.28.97	02.28.97
Date Analy		03.04.97	03.04.97	03.04.97	03.04.97	03.04.97
Dilution f	actor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L	0228L	0228L
Cadmium (60						
	010), mg/l	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Preparatio		02.28.97	02.28.97	02.28.97	02.28.97	02.28.97
Date Analy		03.04.97	03.04.97	03.04.97	03.04.97	03.04.97
Dilution f	actor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L	0228L	0228L

LOG NO: S7-71140 Received: 27 FEB 97 Reported: 10 MAR 97

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REPORT OF RESULTS

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					DATE/	
LOG NO	SAMPLE DESCRIPTION	, LIQUID SA	AMPLES		TIME SAMPLE)
71140-1	9217				00 00 00/144	
	9218				02-26-97/145	
					02-26-97/150	
	9219				02-26-97/150	
	9220				02-26-97/15	
71140-5	9221		_		02-26-97/152	20
PARAMETER					71140-4	
Chromium (6	010)					
		<0.010	<0.010	<0.010	<0.010	<0.010
Preparatio					02.28.97	
Date Analy	zed				03.04.97	
Dilution f	actor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L	0228L	
Lead (6010)						
Lead (6010), mg/l	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Preparatio					02.28.97	
Date Analy	zed	03.04.97	03.04.97	03.04.97	03.04.97	03.04.97
Dilution f	actor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L	0228L	022 8L
Mercury (74	70)					
Mercury (7	470), mg/l	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Preparatio	n Date	02.28.97	02.28.97	02.28.97	02.28.97	02.28.97
Date Analy	zed	03.03.97	03.03.97	03.03.97	03.03.97	03.03.97
Dilution f	actor	1.0	1.0	1.0	1.0	
Batch ID					0228T	

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LOG NO	SAMPLE DESCRIPTION	, LIQUID S	AMPLES		DATE/ TIME SAMPLE	D
77777						
71140-6	9222				02-26-97/15	
	9224		•		02-26-97/15	
	9225				02-26-97/15	
71140-9					02-26-97/15	
71140-10	9227				02-26-97/15	51
PARAMETER		71140-6	71140-7	71140-8	71140-9	71140-10
Arsenic (6						
Arsenic (6010), mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Preparatio					02 .28.97	
Date Anal	yzed				03.04.97	
Dilution	factor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L			0228L	
Barium (60	10)					
Barium (6	010), mg/l	0.037	0.039	0.022	0.030	0.035
Preparation	on Date	02.28.97	02.28.97	02.28.97	02.28.97	02.28.97
Date Anal		03.04.97	03.04.97	03.04.97	03.04.97	03.04.97
Dilution	factor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L	0228L	0228L
Cadmium (6	010)					
Cadmium (6010), mg/l	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Preparatio	on Date	02.28.97	02.28.97	02.28.97	02.28.97	02.28.97
Date Anal	yzed	03.04.97	03.04.97	03.04.97	03.04.97	03.04.97
Dilution	factor	1.0	1.0	1.0	1.0	1.0
Batch ID			0228L	0228L	0228L	

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LOG NO	SAMPLE DESCRIPTI	ION , LIQUID S	AMPLES		DATE/ TIME SAMPLE	ED
71140-6 71140-7	9222 9224				02-26-97/15	
71140-8	9225				02-26-97/19	
71140-9					02-26-97/15	
71140-10	9227				02-26-97/15	
PARAMETER		71140-6				
Chromium (
Chromium	(6010), mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Preparatio		02.28.97	02.28.97	02.28.97	02.28.97	02.28.97
Date Analy	yzed	03.04.97	03.04. 9 7	03.04.97	03.04.97	03.04.97
Dilution .	factor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L	0228L	0228L
Lead (6010))					
Lead (601		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Preparation		02.28.97	02.28.97	02.28.97	02.28.97	02.28.97
Date Analy	yzed	03.04.97	03.04.97	03.04.97	03.04.97	03.04.97
Dilution :	factor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L	0228L	0228L
Mercury (7	4 70)					
Mercury (7470), mg/l	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Preparatio	on Date	02.28.97	02.28.97	02.28.97	02.28.97	02.28.97
Date Analy	yzed	03.03.97	03.03.97	03.03.97	03.03.97	03.03.97
Dilution !	factor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228T	0228T	0228T	0228T	0228T

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Mr. Mark Corbin Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855

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LOG NO	SAMPLE DESCRIPTION	, LIQUID S	AMPLES		DATE/ TIME SAMPLE	ED
71140-11 71140-12 71140-13 71140-14 71140-15	9229 9230 9231				02-26-97/16 02-26-97/16 02-26-97/15 02-26-97/16 02-26-97/16	03 56 10
	<u></u>					
Arsenic (60 Arsenic (6	010), mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Preparatio					02.28.97	
Date Analy		03.04.97	03.04.97	03.04.97	03.04.97	03.04.97
Dilution E	actor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L	0228L	0228L
Barium (601	0)					
Barium (60	10), mg/l	0.019	0.017	0.059	0.018	<0.010
Preparatio	n Date	02.28.97	02.28.97	02.28.97	02.28.97	02.28.97
Date Analy	zed	03.04.97	03.04.97	03.04.97	03.04.97	03.04.97
Dilution f	actor	1.0	1.0	1.0	1.0	1.0
Batch ID		02 28L	0228L	0228L	0228L	0228L
Cadmium (60						
Cadmium (6	010), mg/l	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Preparatio	n Date	02,28.97	02.28.97	02.28.97	02.28.97	02.28.97
Date Analy		03.04.97	03.04.97	03.04.97	03.04.97	03.04.97
Dilution f	actor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L	0228L	0228L

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Mr. Mark Corbin

Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855 Client PO. No.: 097.005

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LOG NO	SAMPLE DESCRIPTION	, LIQUID S	AMPLES		DATE/ TIME SAMPLE	D
71140-11	9228				02-26-97/16	25
71140-12	9229				02-26-97/16	03
71140-13	9230				02-26-97/15	56
71140-14	9231				02-26-97/16	10
71140-15	9232				02-26-97/16	40
PARAMETER					71140-14	
Chromium (6	010)					
Chromium (<0.010	
Preparatio		02.28.97	02.28.97	02.28.97	02.28.97	02.28.97
Date Analy		03.04.97	03.04.97	03.04.97	03.04.97	03.04.97
Dilution f	actor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L	0228L	0228L
Lead (6010)						
Lead (6010	-	<0.0050	<0.0050		<0.0050	<0.0050
Preparatio		02.28.97	02.28.97			
Date Analy		03.04.97	03.04.97	03.04.97	03.04.97	03.04.97
Dilution f	actor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L	0228L	0228L
Mercury (74						
-	(470), mg/l	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Preparatio			02.28.97			02.28.97
Date Analy		03.03.97	03.03.97	03 .03. 9 7	03.03.97	03.03.97
Dilution f	actor	1.0	1.0	1.0	1.0	1.0
Batch ID		0228T	0228T	0228T	0228T	0228T
						

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SAMPLE DESCRIPTION ,			
9234 9235		02-26-97/163 02-26-97/164	35 46
	71140-16		71140-18
10) 010), mg/l n Date zed actor 0) 10), mg/l n Date zed actor 10) 010), mg/l n Date	<0.010 02.28.97 03.04.97 1.0 0228L <0.010 02.28.97 03.04.97 1.0 0228L <0.0050 02.28.97 03.04.97	<0.010 02.28.97 03.04.97 1.0 0228L 0.018 02.28.97 03.04.97 1.0 0228L <0.0050 02.28.97 03.04.97	02.28.97 03.04.97 1.0 0228L <0.010 02.28.97 03.04.97 1.0 0228L <0.0050 02.28.97 03.04.97
	02281	0228L	0228L
	9233 9234 9235	9234 9235 71140-16 10) 010), mg/l	DATE/ SAMPLE DESCRIPTION , LIQUID SAMPLES 9233 9234 9235 71140-16 71140-17 10) 010), mg/l n Date 02.28.97 2ed 03.04.97 actor 1.0 010), mg/l n Date 02.28.97 2ed 03.04.97 actor 1.0 0228L 0) 10), mg/l n Date 02.28.97 2ed 03.04.97 actor 1.0 0228L 0228L 0) 10), mg/l n Date 02.28.97 2ed 03.04.97 actor 1.0 0228L 0228L 00) 10), mg/l n Date 02.28.97 2ed 03.04.97 actor 1.0 0228L 0228L 0228L 00) 10), mg/l n Date 02.28.97 02.28.97 actor 1.0 0228L 0228L 00) 010), mg/l 000000000000000000000000000000000000

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES		DATE/ TIME SAMPLE	D
71140-16 71140-17 71140-18	9234		02-26-97/16 02-26-97/16 02-26-97/16	46 51
PARAMETER		71140-16	71140-17	71140-18
Chromium (60	10)			
Chromium (6		<0.010	<0.010	<0.010
Preparation		02.28.97	02.28.97	02.28.97
Date Analyz		03.04.97	03.04.97	03.04.97
Dilution fa	ctor	1.0	1.0	1.0
Batch ID		022 8 L	0228L	0228L
Lead (6010)				
Lead (6010)		<0.0050	<0.0050	<0.0050
Preparation		02.28.97	02.28.97	02.28.97
Date Analyz		03.04.97	03.04.97	03.04.97
Dilution fa	ctor	1.0	1.0	1.0
Batch ID		0228L	0228L	0228L
Mercury (747				
Mercury (74	-	<0.00020	<0.00020	<0.00020
Preparation		02.28.97	02.28.97	02.28.97
Date Analyz		03.03.97	03.03.97	03.03.97
Dilution fa	ctor	1.0	1.0	1.0
Batch ID			0228T	

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	9236 9237				02-24-97/16	50
	9238				02-24-97/14	
71140-28					02-24-97/14	
71140-29	9240				02-24-97/15	15
PARAMETER		71140-25	71140-26	71140-27	71140-28	71140-29
	oy GC/MS (8260)					
Chlorometh	nane, ug/kg dw	<13	<12	<12	<13	<13
Bromometha	ne, ug/kg dw	<13	<12	<12	<13	<13
Vinyl chlo	oride, ug/kg dw	<13	<12	<12	<13	<13
Chloroetha	ane, ug/kg dw	<13	<12	<12	<13	<13
Methylene		<6.3	<6.2	<6.2	<6.3	<6.5
	omethane), ug/kg dw					
Acetone, t		<63	<62	<62	100	<65
	sulfide, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6.5
	proethene, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6.5
1,1-Dichlo	oroethane, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6.5
trans-1,2- ug/kg dv	-Dichloroethylene, W	<6.3	<6.2	<6.2	<6.3	<6.5
Chloroform	m, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6 .5
1,2-Dichlo	proethane, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6.5
2-Butanone	e (MEK), ug/kg dw	<32	<31	<31	<32	< 32
	chloroethane, ug/kg dw					
Carbon tet	crachloride, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6.5
=	ate, ug/kg dw	<13	<12	<12		<13

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71140-25 71140-26					02-24-97/165	50
71140-27 71140-28 71140-29	9239				02-24-97/143 02-24-97/143 02-24-97/153	55
PARAMETER					71140-28	
Bromodich	loromethane, ug/kg dw					
1,1,2,2-T ug/kg dw	etrachloroethane,	<6.3	<6.2	<6.2	<6.3	<6.5
1,2-Dichl	oropropane, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6 .5
trans-1,3 ug/kg dw	-Dichloropropene,	<6.3	<6.2	<6.2	<6.3	<6.5
Trichloro	ethene, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6.5
Dibromoch	loromethane, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6.5
1,1,2-Tri	chloroethane, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6.5
Benzene,		<6.3	<6.2	<6.2	<6.3	<6.5
cis-1,3-D	ichloropropene, ug/kg	dw <6.3	<6.2	<6.2	<6.3	<6.5
2-Chloroe	thylvinyl ether, ug/kg	dw <63	<62	<62	<63	< 6 5
Bromoform	, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6.5
2-Hexanon	e, ug/kg dw	<32	<31	<31	<32	< 32
4-Methyl- (MIBK),	2-pentan o ne ug/kg dw	<32	<31	<31	<32	<32
Tetrachlo	roethene, ug/kg dw	<6.3	<6.2	<6 .2	<6.3	<6. 5
	ug/kg dw		<6.2	<6.2	<6.3	<6.5
Chloroben	zene, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6.5

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LOG NO	SAMPLE DESCRIPTION	, SOLID OR	SEMISOLID		DATE/ TIME SAMPLE	ED .
71140-25	9236				02-24-97/16	30
71140-26	9237				02-24-97/16	50
71140-27	9238				02-24-97/14	130
71140-28	9239				02-24-97/14	.5 5
71140-29	9240				02-24-97/15	515
PARAMETER		71140-25	71140-26	71140-27	71140-28	71140-29
Ethylbenzei	ne, ug/kg dw	<6.3	<6.2	<6.2	<6.3	<6.5
Styrene, u	g/kg dw	<6.3	<6.2	<6.2	<6.3	<6.5
Zylenes, ug	g/kg dw	<6.3	<6.2	<6.2	<6.3	<6. 5
Surrogate -	- Toluene-d8	95 %	92 %	97 ક	95 %	95 %
Surrogate -	- 4-Bromofluorobenze	ne 95 %	97 %	98 %	102 %	100 %
Surrogate -	 Dibromofluorometha 	ne 114 %	111 %	116 %	116 %	115 %
Date Analy:	zed	03.03.97	03.03.97	03.03.97	03.03.97	03.03.97
Dilution fa	actor	1.0	1.0	1.0	1.0	1.0
Batch ID		0303A	AE080	AE0E0	0303A	0303A
Clock ID		1L0303	1L0303	1L0303	1L0303	1L0303
Method Numl	ber	8260	8260	82 60	8260	8260
Percent Sol:	ids (160.3), %	79	81	80	79	77

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LOG NO	SAMPLE DESCRIPTION ,				DATE/ TIME SAMPLE)
71140-30 71140-31 71140-32 71140-33	9241 9244 9245 9246				02-24-97/15: 02-26-97/09: 02-26-97/09: 02-26-97/10:	45 55 30
71140-34	9247				02-26-97/10	10
PARAMETER		71140-30	71140-31	71140-32	71140-33	71140-34
	oy GC/MS (8260)					
	nane, ug/kg dw	<14	<14	<12	<12	<12
Bromometha	ine, ug/kg dw		<14		<12	
Vinyl chlo	oride, ug/kg dw	<14	<14	<12	<12	<12
Chloroetha	ne, ug/kg dw	<14	<14	<12	<12	<12
Methylene	chloride	<6.8	<7.2	<6.2	<6.2	<6.2
(Dichlore	omethane), ug/kg dw					
Acetone, u	ıg/kg dw	85	<72	200	<62	<62
	sulfide, ug/kg dw		<7.2	<6. 2	<6.2	<6.2
1,1-Dichlo	proethene, ug/kg dw	<6.8	<7.2	<6.2	<6.2	<6.2
1,1-Dichlo	oroethane, ug/kg dw	<6.8	<7.2	<6 .2	<6.2	<6.2
trans-1,2- ug/kg dw	Dichloroethyle ne ,	<6.8	<7.2	<6. 2	<6.2	<6.2
Chloroform	n, ug/kg dw	<6.8	<7.2	<6.2	<6.2	<6.2
1,2-Dichlo	proethane, ug/kg dw	<6.8	<7.2	<6.2	<6.2	<6.2
2-Butanone	e (MEK), ug/kg dw	<34	<36	<31	<31	<31
1,1,1-Tric	chloroethane, ug/kg dw	v <6.8	<7.2	<6.2	<6.2	<6.2
Carbon tet	rachloride, ug/kg dw	<6.8	<7.2	<6.2	<6.2	<6.2
-	cate, ug/kg dw		<14			

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Mr. Mark Corbin Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855

Client PO. No.: 097.005

Project: THIKOL/WOODBINE

Sampled By: Client Code: 163670310

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REPORT OF RESULTS

DATE/
LOG NO SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES TIME SAMPLED

71140-30 9241 02-24-97/1535
71140-31 9244 02-26-97/0945
71140-32 9245 02-26-97/0955
71140-33 9246 02-26-97/1030
71140-34 9247 02-26-97/1010

PARAMETER 71140-30 71140-31 71140-32 71140-33 71140-34

71140-33 9246 71140-34 9247				02-26-97/10: 02-26-97/10:	
PARAMETER	71140-30		71140-32	71140-33	71140-34
Bromodichloromethane, ug/k		<7.2	<6.2	<6.2	<6.2
1,1,2,2-Tetrachloroethane, ug/kg dw		<7.2			
1,2-Dichloropropane, ug/kg	dw <6.8	<7.2	<6.2	<6.2	<6.2
trans-1,3-Dichloropropene, ug/kg dw	<6.8	<7.2	<6.2	<6.2	<6.2
Trichloroethene, ug/kg dw	<6.8	<7.2	<6.2	<6.2	<6.2
Dibromochloromethane, ug/k	g dw <6.8	<7.2	<6.2	<6.2	<6.2
1,1,2-Trichloroethane, ug/	kg dw <6.8	<7.2	<6.2	<6.2	<6.2
Benzene, ug/kg dw	<6.8	<7.2	<6.2	<6.2	<б.2
cis-1,3-Dichloropropene, u	g/kg dw <6.8	<7.2	<6.2	<6.2	<6.2
2-Chloroethylvinyl ether,	ug/kg dw <68	<72	<62	<62	<62
Bromoform, ug/kg dw	<6.8	<7.2	<6.2	<6.2	<6.2
2-Hexanone, ug/kg dw	<34	<36	<31	<31	<31
4-Methyl-2-pentanone (MIBK), ug/kg dw	<34	<36	<31	<31	<31
Tetrachloroethene, ug/kg d	w <6.8	<7.2	<6.2	<6.2	<6.2
Toluene, ug/kg dw	<6.8	<7.2	<6.2	<6.2	<6.2
Chlorobenzene, ug/kg dw	<6.8	<7.2	<6.2	<6.2	<6.2

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Mr. Mark Corbin Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855

Batch ID

Method Number

Percent Solids (160.3), %

Clock ID

Dilution factor

Client PO. No.: 097.005

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Sampled By: Client

Code: 163670310 REPORT OF RESULTS Dage 19

1.0 1.0 1.0 1.0

0303A

80

8260

0303A

1L0303

8260

0303A

1L0303 1L0303 1L0303

81

8260

		REPORT (OF RESULTS			Page 19
					DATE/	
LOG NO	SAMPLE DESCRIPTION	N , SOLID OR	SEMISOLID	SAMPLES	TIME SAMPLEI	
71140-30	9241				02-24-97/153	35
71140-31	9244				02-26-97/094	15
71140-32	9245				02-26-97/095	55
71140-33	9246				02-26-97/103	30
71140-34	9247				02-26-97/101	LO
PARAMETER					71140-33	
	ne, ug/kg dw	<6.8			<6.2	
Styrene, u	g/kg dw	<6.8	<7.2	<6.2	<6.2	<6.2
Xylenes, u	g/kg dw	<6.8	<7.2	< 6 .2	<6.2	<6.2
Surrogate	- Toluene-d8	96 ક	96 %	95 %	100 %	95 %
Surrogate	- 4-Bromofluoroben	zene 101 %	97 %	100 %	98 %	103 %
Surrogate	- Dibromofluoromet	hane 115 %	114 %	114 %	108 %	113 %
Date Analy:	zed	03.03.97	03.03.97	03.03.97	03.03.97	03.03.97

0303A

8260

69

1.0

0303**A**

1L0303

8260

73

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Mr. Mark Corbin Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855

Client PO. No.: 097.005

Project: THIKOL/WOODBINE

Sampled By: Client Code: 163670310

REPORT OF RESULTS

	SAMPLE DESCRIPTION , SOLID OR				
71140-35 71140-36	9248			02-26-97/10	50 LO
PARAMETER			71140-35	71140-36	
Volatiles by	/ GC/MS (8260) ane, ug/kg dw	*		<12	
	ne, ug/kg dw		<13	<12	
-	ride, ug/kg dw		<13	<12	
	ne, ug/kg dw			<12	
	chloride (Dichloromethane), ug,	/kg dw	<6.3	<6.2	
Acetone, ug	-		<63	<62	
	ılfide, ug/kg dw		<6.3	<6.2	
	roethene, ug/kg dw		<6.3	<6.2	
	roethane, ug/kg dw		<6.3	<6.2	
	Dichloroethylene, ug/kg dw		<6.3	<6.2	
Chloroform,			<6.3	<6.2	
	roethane, ug/kg dw		<6.3	<6.2	
	(MEK), ug/kg dw		<32	<31	
	nloroethane, ug/kg dw		<6.3	<6.2	
	rachloride, ug/kg dw		<6.3	<6.2	
	ate, ug/kg dw		<13	<12	
	promethane, ug/kg dw		<6.3	<6.2	
	rachloroethane, ug/kg dw		<6.3	<6.2	
1,2-Dichlor	ropropane, ug/kg dw		<6.3	<6.2	
trans-1,3-	Dichloropropene, ug/kg dw		<6.3	<6.2	
	hene, ug/kg dw			<6.2	

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Mr. Mark Corbin Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR		DATE/ TIME SAMPLED	·
71140-35 71140-36			02-26-97/105	
PARAMETER		71140-35	71140-36	
Dibromochlo 1,1,2-Tricl Benzene, us cis-1,3-Did 2-Chloroetl Bromoform, 2-Hexanone 4-Methyl-2 Tetrachlor Toluene, us Chlorobenze Ethylbenze Styrene, us Xylenes, us Surrogate Surrogate	promethane, ug/kg dw hloroethane, ug/kg dw g/kg dw chloropropene, ug/kg dw hylvinyl ether, ug/kg dw ug/kg dw -pentanone (MIBK), ug/kg dw pethene, ug/kg dw g/kg dw ene, ug/kg dw g/kg dw g/kg dw - Toluene-d8 - 4-Bromofluoromethane zed	<6.3 <6.3 <6.3 <6.3 <6.3 <6.3 <32 <32 <6.3 <6.3 <6.3 <6.3 <6.3 <111 % 114 % 03.03.97	<6.2 <6.2 <6.2 <6.2 <6.2 <6.2 <31 <31 <6.2 <6.2 <6.2 <6.2 <6.2 <6.2 <6.2 <1.2 <6.2 <1.2 <1.2 <1.2 <1.2 <1.2 <1.2 <1.2 <1	
Method Numbercent Sol	ber ids (160.3), %		8260	

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Mr. Mark Corbin Apex Environmental, Inc.

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100 NO			DATE/	-
	SAMPLE DESCRIPTION , LIQUID SAMPLES		TIME SAMPLED	
71140-24			02-26-97/1330	
PARAMETER		71140-24		
Volatiles b	y GC/MS (8260)			
Chlorometh	ane, ug/l	<10		
Bromometha	ne, ug/l	<10		
Vinyl chlo	ride, ug/l	<10		
Chloroetha		<10		
Methylene	chloride (Dichloromethane), ug/l	<5.0		
Acetone, u	보다 :	<50		
	ulfide, ug/l	<5.0		
	roethene, ug/l	<5.0		
	roethane, ug/l	<5.0		
	Dichloroethylene, ug/l	<5.0		
Chloroform		<5.0		
	roethane, ug/l	<5.0		
	(MEK), ug/l	<25		
	hloroethane, ug/l	<5.0		
	rachloride, ug/l	<5.0		
Vinyl Acet		<10		
	oromethane, ug/l	<5.0		
	trachloroethane, ug/l	<5.0		
	ropropane, ug/l	<5.0		
	Dichloropropene, ug/l	<5.0		
	thene, ug/l	<5.0		
	oromethane, ug/l	<5.0		

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Mr. Mark Corbin

Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855

Client PO. No.: 097.005

Project: THIKOL/WOODBINE

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REPORT OF RESULTS

		01 1100011		rage 13
LOG NO	SAMPLE DESCRIPTION , LIQUID S		DATE/ TIME SAMPLED	
71140-24			02-26-97/1330	*
PARAMETER		71140-24		
	hloroethane, ug/l	<5.0 <5.0		
	chloropropene, ug/l	<5.0 <5.0		
	hylvinyl ether, ug/l	<50		
Bromoform,		<5.0		
2-Hexanone	, ug/l	<25		
4-Methyl-2	-pentanone (MIBK), ug/l	<25		
Tetrachlor	oethene, ug/l	<5.0		
Toluene, u	g/l	<5.0		
Chlorobenz	<u> </u>	<5.0		
Ethylbenze	ne, ug/l	<5.0		
Styrene, u	•	<5.0		
Xylenes, u	-	<5.0		
	- Toluene-d8	102 %		
-	- 4-Bromofluorobenzene	104 %		
_	- Dibromofluoromethane	140 %		
Date Analy		03.03.97		
Dilution f	actor	1.0		
Batch ID		0303B		
Clock ID		1H03 0 3		
Method Num	ber	8260		

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Mr. Mark Corbin Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQU			
71140-38	Method Blank Lab Control Standard % Recovery			
PARAMETER		71140-37	71140-38	
Arsenic (6				
	6010), mg/l	<0.010	89 %	
Preparation Date		02.28.97		
Date Analyzed		03.04.97		
Dilution factor		1.0		
Batch ID		0228L		
Barium (60)	10)			
Barium (6010), mg/l		<0.010	103 %	
Preparation Date		02.28.97		
Date Analyzed		03.04.97		
Dilution	factor	1.0		
Batch ID		02 2 8L		
Cadmium (6	•			
	6010), mg/l	<0.0050	93 %	
Preparation		02.28.97		
Date Analyzed		03.04.97		
Dilution	factor	1.0		
Batch ID		0228L	~ ~ ~	
Chromium (6010)			
Chromium	(6010), mg/l	<0.010	99 %	
Preparation		02.28.97		
Date Anal	-	03.04.97		
Dilution	factor	1.0		
Batch ID		0228L		

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REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR LIQU	ID SAMPLES		
71140-37 Method Blank 71140-38 Lab Control Standard % Recovery			
PARAMETER		71140-38	
Lead (6010)			
Lead (6010), mg/l	<0.0050	94 %	
Preparation Date	02.28.97		
Date Analyzed	03.04.97		
Dilution factor	1.0		
Batch ID	0228L		
Mercury (7470)			
Mercury (7470), mg/l	<0.00020	90 %	
Preparation Date	02.28.97		
Date Analyzed	03.03.97		
Dilution factor	1.0		
Batch ID	0228T		

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Mr. Mark Corbin Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855

2-Butanone (MEK), ug/l

Vinyl Acetate, ug/l

1,1,1-Trichloroethane, ug/l

Carbon tetrachloride, ug/l

Bromodichloromethane, ug/l

1,2-Dichloropropane, ug/l

Trichloroethene, ug/l

1,1,2,2-Tetrachloroethane, ug/l

trans-1,3-Dichloropropene, ug/1

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REPORT OF RESULTS

SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES 71140-37 Method Blank 71140-38 Lab Control Standard % Recovery PARAMETER 71140-37 71140-38 Volatiles by GC/MS (8260) Chloromethane, ug/l <10 Bromomethane, ug/l <10 Vinyl chloride, ug/l <10 Chloroethane, ug/1 <10 Methylene chloride (Dichloromethane), ug/l < 5.0 ---< 50 Acetone, ug/l Carbon disulfide, ug/l <5.0 ---1,1-Dichloroethene, ug/l 72 % <5.0 1,1-Dichloroethane, ug/l <5.0 trans-1,2-Dichloroethylene, ug/1 <5.0 Chloroform, ug/1 < 5.0 1,2-Dichloroethane, ug/l <5.0

<25

<5.0

<5.0

<10

< 5.0

< 5.0

< 5.0

<5.0

<5.0

96 %

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Mr. Mark Corbin Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855

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REPORT OF RESULTS

SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES 71140-37 Method Blank Lab Control Standard % Recovery 71140-38 PARAMETER 71140-37 71140-38 Dibromochloromethane, ug/l < 5.0 1,1,2-Trichloroethane, ug/l < 5.0 Benzene, ug/l <5.0 90 % cis-1,3-Dichloropropene, ug/l <5.0 2-Chloroethylvinyl ether, ug/l < 50 Bromoform, ug/l <5.0 ---

2-Hexanone, ug/l <25 ---4-Methyl-2-pentanone (MIBK), ug/l <25 Tetrachloroethene, ug/l <5.0 ---Toluene, ug/l <5.0 96 % Chlorobenzene, ug/l 102 % < 5.0 Ethylbenzene, ug/l < 5.0 Styrene, ug/l < 5.0 ___ Xylenes, ug/l <5.0 Surrogate - Toluene-d8 102 % 94 % Surrogate - 4-Bromofluorobenzene 116 % 88 % Surrogate - Dibromofluoromethane 140 % 136 % Date Analyzed 03.03.97 03.03.97 Dilution factor 1.0 1.0 Batch ID 0303B 0303B Clock ID 1H0303 1H0303 Method Number

8260

8260

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Mr. Mark Corbin Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR	SOLID/SEMISOLID		
71140-40	Method Blank Lab Control Standard & Recovery			
PARAMETER		71140-39	71140-40	
Volatiles by	y GC/MS (8260)			
Chloromethane, ug/kg dw		<10		
Bromomethane, ug/kg dw		<10		
Vinyl chlor	ride, ug/kg dw	<10		
Chloroethane, ug/kg dw		<10		
Methylene chloride (Dichloromethane), ug/kg dw		w <5.0		
Acetone, ug/kg dw		<50		
Carbon disulfide, ug/kg dw		<5.0		
1,1-Dichloroethene, ug/kg dw		<5.0	90 %	
1,1-Dichloroethane, ug/kg dw		<5.0		
trans-1,2-Dichloroethylene, ug/kg dw		<5.0		
Chloroform, ug/kg dw		<5.0		
1,2-Dichloroethane, ug/kg dw		<5.0		
2-Butanone (MEK), ug/kg dw		<25		
1,1,1-Trichloroethane, ug/kg dw		<5.0		
Carbon tetrachloride, ug/kg dw		<5.0		
Vinyl Acetate, ug/kg dw		<10		
	promethane, ug/kg dw	<5.0		
	trachloroethane, ug/kg dw	<5.0		
1,2-Dichloropropane, ug/kg dw		<5. 0		
trans-1,3-Dichloropropene, ug/kg dw		<5.0		
Trichloroet	thene, ug/kg dw	<5.0	86 %	



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Mr. Mark Corbin Apex Environmental, Inc. 15850 Crabbs Branch Way #300 Rockville, MD 20855

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REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID

71140-39 Method Blank

71140-40 Lab Control Standard % Recovery

PARAMETER	71140-39	71140-40	
Dibromochloromethane, ug/kg dw	<5.0		
1,1,2-Trichloroethane, ug/kg dw	<5.0		
Benzene, ug/kg dw	<5.0		
cis-1,3-Dichloropropene, ug/kg dw	<5.0	=	
2-Chloroethylvinyl ether, ug/kg dw	<50		
Bromoform, ug/kg dw	<5.0		
2-Hexanone, ug/kg dw	<25		
4-Methyl-2-pentanone (MIBK), ug/kg dw	<25		
Tetrachloroethene, ug/kg dw	<5.0		
Toluene, ug/kg dw	<5.0	96 %	
Chlorobenzene, ug/kg dw	<5.0	100 %	
Ethylbenzene, ug/kg dw	<5.0		
Styrene, ug/kg dw	<5.0		
Xylenes, ug/kg dw	<5.0		
Surrogate - Toluene-d8	94 %	94 %	
Surrogate - 4-Bromofluorobenzene	94 %	88 %	
Surrogate - Dibromofluoromethane	108 %	104 %	
Date Analyzed	03.03.97	03.03.97	
Dilution factor	1.0	1.0	
Batch ID	0303A	0303A	
Clock ID	1L0303	1L0303	
Method Number	8260	8260	

Methods: EPA SW-846

Linda A. Wolfe, Project Manager

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