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TNRCC

Protecting Texas by Reducing and Preventing Pollution

Hazard Ranking System Documentation Record

Patrick Bayou Site
Deer Park, Harris County, Texas
TX0000605329

Volume I of II

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI

Prepared in cooperation with the U.S. Environmental Protection Agency

January 2001

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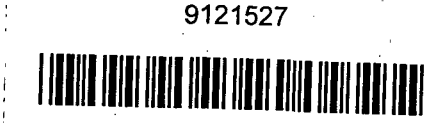

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Region VI

Prepared by

Protecting Texas
by Reducing and Preventing Pollution

Texas Natural Resource Conservation Commission
Site Assessment and Management Section
Superfund Site Discovery and Assessment Program
Austin, Texas

January 2001

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HRS DOCUMENTATION RECORD
REVIEW COVER SHEET

SITE NAME: PATRICK BAYOU SITE

CONTACT PERSON:

Brenda Cook, USEPA 214/665-7436
Region 6 NPL Coordinator

Pathway, Components, or Threats Not Evaluated

Ground Water Migration Pathway

The Ground Water Pathway was not evaluated due to the lack of targets and because the inclusion of this pathway would not significantly affect the site score.

Surface Water Pathway

The drinking water threat was not evaluated due to lack of targets and because the inclusion of this threat would not significantly effect the site score.

Soil Exposure Pathway

The Resident Population Threat, and Nearby Population Threat, were not evaluated due to the lack of targets and because the inclusion of this pathway would not significantly affect the site score.

Air Migration Pathway

The Air Migration Pathway was not evaluated due to the lack of targets and because the inclusion of this pathway would not significantly affect the site score.

NOTES TO THE READER

The following rules were used when citing references in the HRS Documentation Record:

1. All references attached to this report have been stamped with a designated page number (example: Ref. 1, p. 10 = 001 00010). However, if the reference being cited has an original page number, that page number was cited. If the reference being cited has no original page number or the pagination is not complete, then the designated page number is cited.

2. The State predecessor agencies: Texas Water Quality Board (TWQB), Texas Department of Water Resources (TDWR), Texas Water Commission (TWC), and Texas Air Control Board (TACB), referred to throughout this report are now known as the Texas Natural Resource Conservation Commission (TNRCC). The new agency, TNRCC, became effective September 1, 1993, as mandated under State Senate Bill 2 of the 73rd Regular Legislative Session.

HRS DOCUMENTATION RECORD

Name of Site: Patrick Bayou Site **Date Prepared:** 11/00

CERCLIS Site ID Number: TX0000605329

Site Specific Identifier: Other (Contaminated Sediments).

Street Address of Site: ..... None (see General Location below)

City, County, State: Deer Park, Harris County, Texas

General Location in the State:
The Patrick Bayou site is located approximately 1 mile north of Deer Park, Texas, originating south of SH 225 draining 2.85 miles north to the Houston Ship Channel along the southern Gulf Coast of Texas (see Figure 1a, Regional Location Map and Figure 1b, Site Location and Surrounding Land Use Map)

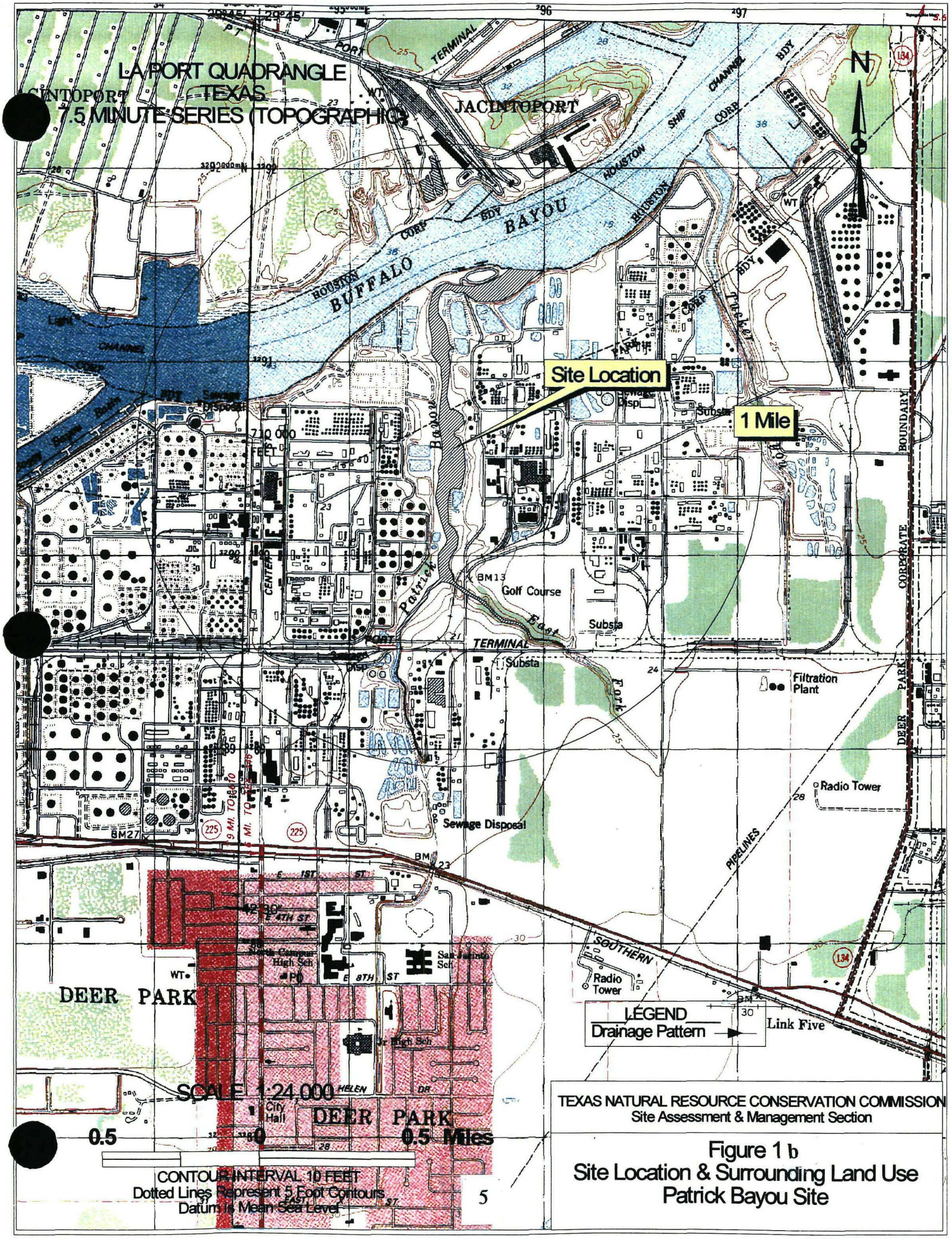
Topographic Map: US Geological Survey 7.5 Minute Topographic Map, La Porte Quadrangle.

Latitude: 29° 43' 55" North **Longitude:** 95° 06' 52.5" West
(Approximate center of bayou, see Reference 6, Topographic Map)

EPA Region 6

Pathway Scores:
Ground Water Migration Pathway - NE
Surface Water Migration Pathway - 100
Soil Exposure Pathway - NE
Air Migration Pathway - NE
NE = Not Evaluated

HRS SITE SCORE: 50


LA PORT QUADRANGLE
TEXAS
7.5 MINUTE SERIES (TOPOGRAPHIC)
JACINTOPORT
BUFFALO BAYOU
Site Location
1 Mile
N
Golf Course
Filtration Plant
Sewage Disposal
Radio Tower
DEER PARK
Link Five
LEGEND
Drainage Pattern
SCALE 1:24 000
0.5 0 0.5 Miles
CONTOUR INTERVAL 10 FEET
Dotted Lines Represent 5 Foot Contours
Datum is Mean Sea Level
TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Site Assessment & Management Section
Figure 1 b
Site Location & Surrounding Land Use
Patrick Bayou Site
5

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	NE	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100	10,000
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	NE	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	100	10,000
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NE	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NE	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,000
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root. **50**		

NE = Not Evaluated

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

Factor Categories and Factors			Maximum Value	Value Assigned	
DRINKING WATER THREAT					
Drinking Water Threat Score					
1.	Observed Release		550	NS	
2.	Potential to Release by Overland Flow:				
	2a.	Containment	10	NS	
	2b.	Runoff	25	NS	
	2c.	Distance to Surface Water	25	NS	
	2d.	Potential to Release by Overland Flow [Lines 2a x (2b + 2c)]	500	NS	
3.	Potential to Release by Flood:				
	3a.	Containment (Flood)	10	NS	
	3b.	Flood Frequency	50	NS	
	3c.	Potential to Release by Flood (Lines 3a x 3b)	500	NS	
4.	Potential to Release (Lines 2d + 3c, subject to a maximum of 500)		500	NS	
5.	Likelihood to Release (Higher of Lines 1 and 4)		550		NS
Waste Characteristics					
6.	Toxicity/Persistence		*	NS	
7.	Hazardous Waste Quantity		*	NS	
8.	Waste Characteristics		100		NS
Targets					
9.	Nearest Intake		50	NS	
10.	Population:				
	10a.	Level I Concentrations	**	NS	
	10b.	Level II Concentrations	**	NS	
	10c.	Potential Contamination	**	NS	
	10d.	Population (Lines 10a + 10b + 10c)	**	NS	
11.	Resources		5	NS	
12.	Targets (Lines 9 + 10d + 11)		**		NS

NS = Not Scored

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

DRINKING WATER THREAT (Concluded)

Factor Categories and Factors			Maximum Value	Value Assigned	
Drinking Water Threat Score					
13.	Drinking Water Threat Score [(Lines 5 x 8 x 12)/82,500, subject to a maximum of 100]		100		NS
HUMAN FOOD CHAIN THREAT					
Likelihood of Release					
14.	Likelihood of Release (Same value as Line 5)		550		550
Waste Characteristics					
15.	Toxicity/Persistence/Bioaccumulation		*	$5x10^8$	
16.	Hazardous Waste Quantity		*	100	
17.	Waste Characteristics		1,000		320
Targets					
18.	Food Chain Individual		50	20	
19.	Population:				
	19a.	Level I Concentrations	**	0	
	19b.	Level II Concentrations	**	0	
	19c.	Potential Human Food Chain Contamination	**	NS	
	19d.	Population (Lines 19a + 19b + 19c)	**	0	
20.	Targets (Value from Lines 18 + 19d)		**		20
Human Food Chain Threat Score					
21.	Human Food Chain Threat Score [(Lines 14 x 17 x 20)/82,500, subject to a maximum of 100]		100		42.67

NS = Not Scored

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

Factor Categories and Factors			Maximum Value	Value Assigned	
ENVIRONMENTAL THREAT					
Likelihood of Release					
22.	Likelihood of Release (Same Value as Line 5)		550		550
Waste Characteristics					
23.	Ecosystem Toxicity/Persistence/ Bioaccumulation		*	$5x10^8$	
24.	Hazardous Waste Quantity		*	100	
25.	Waste Characteristics		1,000		320
Targets					
26.	Sensitive Environments:				
	26a.	Level I Concentrations	**	0	
	26b.	Level II Concentrations	**	50	
	26c.	Potential Contamination	**	NS	
	26d.	Sensitive Environments			
		(Lines 26a + 26b + 26c)	**	50	
27.	Targets (Value from Line 26d)		**		50
Environmental Threat Score					
28.	Environmental Threat Score				
	[(Lines 22 x 25 x 27)/82,500, subject to a maximum of 60]		60		60
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED					
29.	WATERSHED SCORE***				
	(Lines 13 + 21 + 28, subject to a maximum of 100)		100		100
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE					
30.	Component Score (S_{of})*** (Highest score from Line 29 for all watersheds evaluated, subject to a maximum of 100)		100		100

NS = Not Scored

REFERENCE LISTING

Reference Number	Description of the Reference
1.	U.S. Environmental Protection Agency, Federal Register-40 CFR Part 300, *Hazard Ranking System*; Final Rule, Volume 55, No. 241, December 14, 1990. 135 pages.
2.	U.S. Environmental Protection Agency, *Superfund Chemical Data Matrix (SCDM)*. June 1996.
3.	U.S. Environmental Protection Agency, *Hazard Ranking System Guidance Manual*, Office of Solid Waste and Emergency Response, Publication 9345.1-07, November, 1992. 431 pages
4.	Broach, Linda, Field Operations Division, Region 12, Houston, Texas Natural Resource Conservation Commission and Crocker, Phillip, Water Quality Protection, Region 6, Dallas, United States Environmental Protection Agency. Containment Assessment of Patrick Bayou. December 1996. 70 pages.
5.	Texas Natural Resource Conservation Commission, The State of Texas Water Quality Inventory, Surface Water Quality Monitoring Program, 13th Edition, 1996, Volume 2 - Basin Summaries, Basin Maps, Graphical Basin Summaries, Segment Fact Sheets, and Water Quality Status Tables (Basins 1-10), SFR-50. December 1996. 7 pages.
6.	U. S. Geological Survey, La Porte Quadrangle, Texas, 7.5 Minute Series. Topographic Map. Provisional Edition 1965. (Site location, 1-mile radius, legend and map notations added by TNRCC). 1 page. (Figure 1b).
7.	U.S. Environmental Protection Agency, *Preliminary Assessment/Screening Site Inspection Work Plan for Patrick Bayou Site*. TX0 000 605 329, Deer Park, Harris County, Texas. March 2000. 188 pages/w attachments.
8.	Texas Natural Resource Conservation Commission. *Quality Assurance Project Plan for Texas Natural Resource Conservation Commission Preliminary Assessment/Site Inspection Program (FY 2000 and 2001)*. October 1999. 143 pages/w attachments.
9.	U.S. Environmental Protection Agency. Office of Emergency and Remedial Response, Quick Reference Fact Sheet (5204G), *Using Qualified Data to Document an Observed Release and Observed Contamination*. EPA 540-F-95-033. OSWER 9285-7-14FS. PB95-963320. November 1996. 18 pages.
10.	U.S. Environmental Protection Agency, Screening Site Inspection Field Log Book notes and photographs. March 27 - 30, 2000. 70 pages.

REFERENCE LISTING (continued)

Reference Number	Description of the Reference
11.	Texas Department of Transportation. County Maps of Texas, 1994. General High-way Map of Harris County, Texas, revised to January 1, 1994 data. Dated 1992. (Site location and 1-mile radius notations added by TNRCC). page 102. (Figure 2). 2 pages
12.	U.S. Environmental Protection Agency, Region 6, Houston Branch, *Case Number 27912, Sample Designation Group MFHM71, CLP Data Review and Inorganic Regional Data Assessment Package.* From: Marvelyn Humphrey, Alt. ESAT RPO, 6MD-HC, To: B. Rhotenberry, 6SF-RA. May 25, 2000. 25 pages.
13.	U.S. Environmental Protection Agency, Region 6, Houston Branch, *Case Number 27912, Sample Designation Group MFHW65, CLP Data Review and Inorganic Regional Data Assessment Package.* From: Marvelyn Humphrey, Alternate ESAT RPO, 6MD-HC, To: B. Rhotenberry, 6SF-RA. June 8, 2000. 31 pages.
14.	U.S. Environmental Protection Agency, Region 6, Houston Branch, *Case Number 27912, Sample Designation Group FGA73, CLP Data Review and Organic Regional Data Assessment Package.* From: Marvelyn Humphrey, Alternate ESAT RPO, 6MD-HC, To: B. Rhotenberry, 6SF-RA. July 6, 2000. 145 pages.
15.	U.S. Environmental Protection Agency, Region 6, Houston Branch, *Case Number 27912, Sample Designation Group FGW45, CLP Data Review and Organic Regional Data Assessment Package.* From: Marvelyn Humphrey, Alternate ESAT RPO, 6MD-HC, To: B. Rhotenberry, 6SF-RA. July 6, 2000. 163 pages.
16.	U.S. Department of the Interior. National Wetlands Inventory map. La Port, Texas Quadrangle. 1995. 1 page.
17.	Texas Natural Resource Conservation Commission, Compliance Evaluation Inspection (CEI), and Boiler and Industrial Furnace (BIF) Inspection conducted on November 30 and December 3, 9 and 10, 1998, letters/w attachments. From: Aron Athavaley, Field Investigator, Region 12 Office, Houston, To: Files. January 12, 1999. 82 pages.
18.	Texas Natural Resource Conservation Commission, Comprehensive Monitoring Evaluation (CME) at: The Lubrizol Corporation, 41 Tidal Road, Deer Park (Harris County), Texas, letter/w attachments. From: Rama Yadav, Ph. D., P. E., Team Leader, Waste Section, Region 12 Office, Houston, To: Julius Rexer, Sr. Env. Eng., Lubrizol Corporation, Pasadena, Texas. August 16, 2000. 40 pages.

REFERENCE LISTING (continued)

Reference Number	Description of the Reference
19.	Texas Natural Resource Conservation Commission, Compliance Evaluation Inspection (CEI) conducted on November 2, 7 and 9, 1995, letter/w attachment. From Matthew Chun, Field Investigator, Region 12 Office, Houston, To: Files. December 13, 1995. 23 pages.
20.	Texas Natural Resource Conservation Commission, Patrick Bayou Site, Screening Site Inspection (SSI) Data Assessment. 7 pages.
21.	Texas Department of Health, Seafood Safety Division. *Fish Advisories and Bans, 1997.* 6 pages.

SOURCE DESCRIPTION

2.2 SOURCE CHARACTERIZATION

2.2.1 Source Identification

Number of the source: 1

Name and description of the source: Other (Contaminated Sediments)

The Patrick Bayou site Source 1 consists of contaminated sediments retained within the boundaries of Patrick Bayou and the East Fork tributary as illustrated in Figures 1b and 2 containing elevated heavy metals, volatile and semi-volatile organic compounds, pesticides and PCBs. The site was initially identified to the TNRCC from studies completed in 1993 and 1994 by the City of Houston investigating wastes accumulating within the Houston Ship Channel (HSC) and its tributaries from nearby petrochemical plants and accidental shipping spills (Ref. 4, p. 9). A July 26, 1994 TNRCC Region 12 Office follow-up investigation jointly sponsored by the EPA Region 6 Office confirmed initial findings and greatly expanded the area of documented contamination. During the 1994 investigation, eleven (11) sediment samples and a duplicate and five (5) surface water samples were collected from selected locations within Patrick Bayou, at an up-stream location before any identified outfall source, along the East Fork tributary and at the TNRCC routine water quality sampling station (TNRCC Station No. 1006.9150) located in the mouth of Patrick Bayou (Ref. 4, pp. 12, 28-32, 39 and 50). The 1994 selected sample station locations (marked prior sample stations) are shown in Figure 3. Sediment samples were analyzed for priority pollutants and water samples were tested for routine water quality parameters (Ref. 4, pp. 14 and 61-64).

The 1994 sample results revealed more than 40 percent of the sediment samples in Patrick Bayou exceeded either the TNRCC sediment screening levels (85th percentile for tidal streams, *TNRCC 1994a* and/or National Oceanic and Atmospheric Administration [NOAA] Effects-Range Low [ERL] and Effect-Range Median [ERM] values, *Long et al. 1995*) or the draft EPA Sediment Quality Guideline [SQG] values, *USEPA 1994*, that had been published for chromium, copper, lead, mercury, nickel, selenium, zinc, hexachlorobenzene, polychlorinated biphenyls (PCBs), and bis(2-ethylhexyl) phthalate (Ref. 4, pp. 2 and 15). Very high levels of **mercury** (8.3 mg/Kg at Station No. 3 shown in Figure 3), **hexachlorobenzene** (83,900 µg/Kg at Station No. 2), **hexachlorobutadiene** (138,000 µg/Kg at Station No. 2), **PCBs** (Aroclor 1248 4,150 µg/Kg at Station No. 7), **polynuclear aromatic hydrocarbons** (total PAHs 97,380 µg/ Kg at Station No. 3) and **lead** (269 mg/Kg at Station No. 9) were found within Patrick Bayou sediments (Ref. 4, pp. 44-45).

Lesser values of **acenapthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)-pyrene, chrysene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene** and **pyrene** were also detected in sediments collected from Stations No. 1, 2, 2.5, 3, 7 and 9 that exceeded published NOAA ERM values indicating a significant accumulation of priority pollutants. The higher values and most significant number of pollutants were detected at sample Stations No. 3, 7 and 9 indicating contamination may be originating from a multitude locations along the entire bayou (Ref. 4, pp.

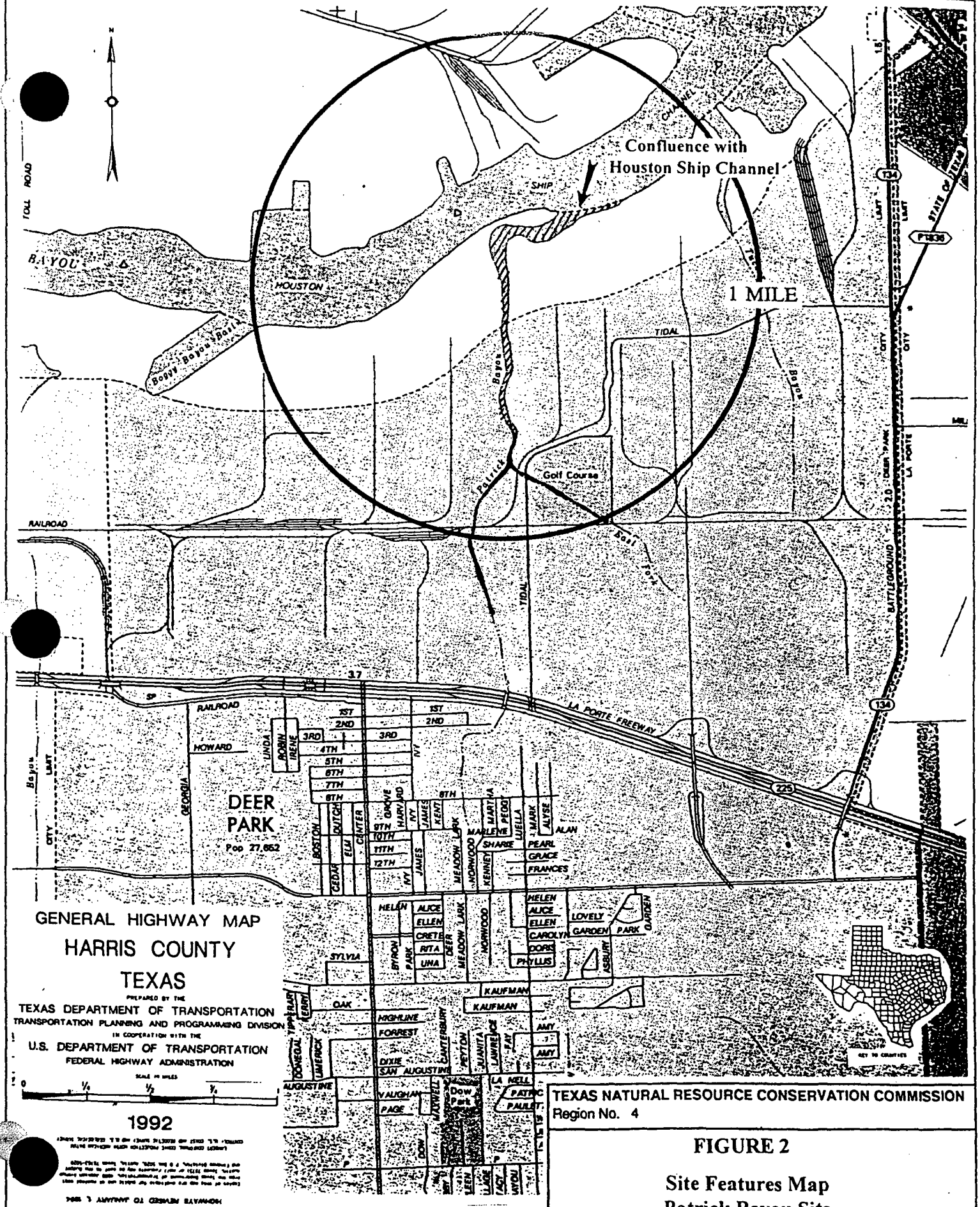
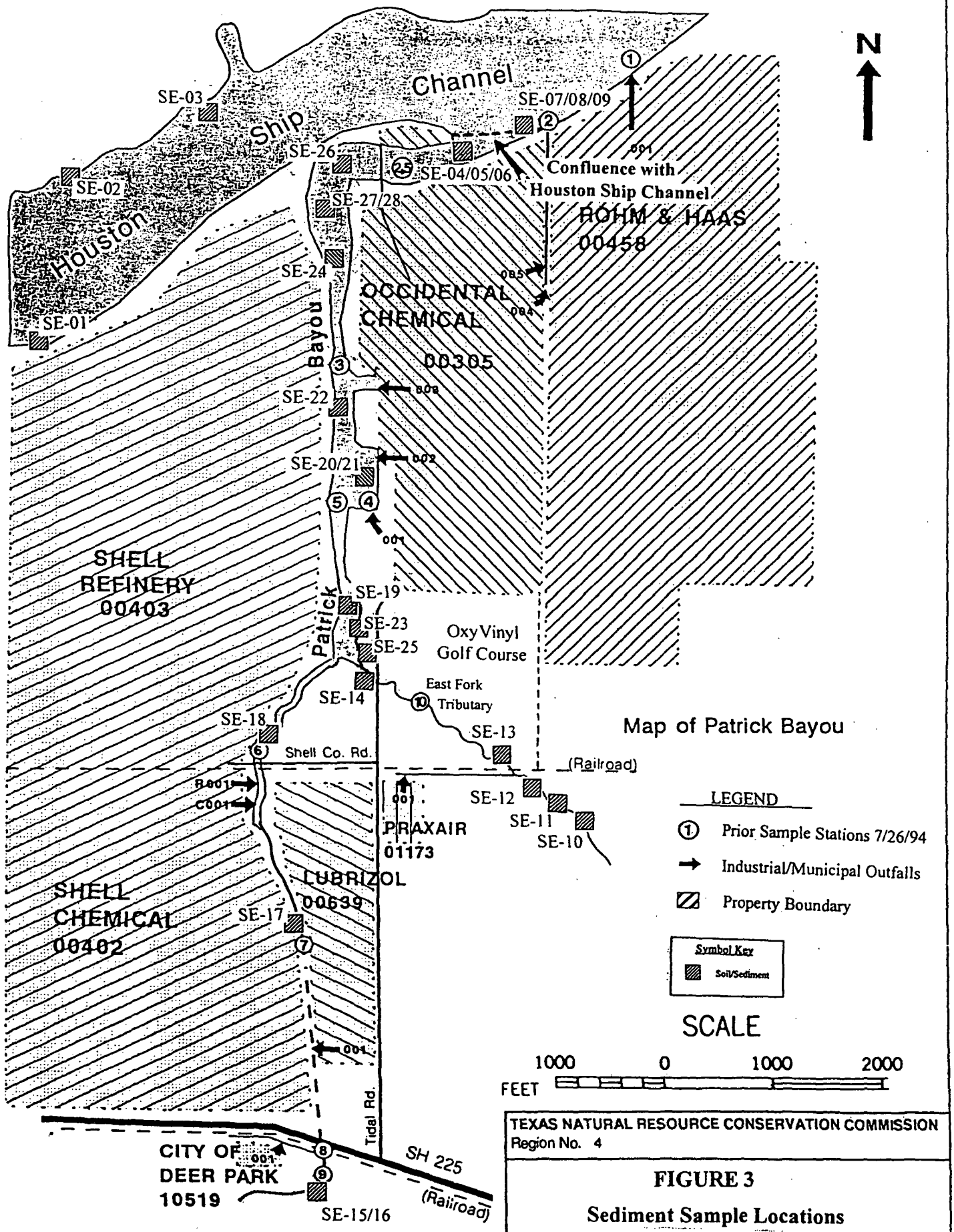


FIGURE 2

Site Features Map
Patrick Bayou Site



TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Region No. 4

FIGURE 3

Sediment Sample Locations
Patrick Bayou Site

28-32, 44-46 and 52-56). Based on prior studies and the 1994 sampling results, specific discharge sources for the contaminants of concern could not be sufficiently identified, but provided specific information on their potential sources (Ref. 4, p. 2). Therefore, this HRS Documentation Record will consider the identified contaminated sediments to: (1) have originated from historical accumulation within Patrick Bayou from a multitude of potential outfall/discharge sources and (2) they will be defined as "the source" for further waste characterization in this section.

Location of the source, with reference to a map of the site:

See Figure 1b, Site Location and Surrounding Land Use Map. The contaminated area within Patrick Bayou is identified as beginning at the combined storm water/outfall discharge drains (box culverts) near the Station No. 7/SE-17 sample location located approximately 1,800' north of SH 225 and ending just beyond the convergence of Patrick Bayou with the HSC and includes a portion of the East Fork tributary located just west of the railroad bridge beginning at the SE-14 sample location that is approximately 750' downstream from the Station No. 10 location shown in Figure 3. The contaminated area is described in more detail in Section 4.1.2.1.1 and the source was delineated using sample results presented in Table 6. The estimated lineal distance is approximately10,100' (1.91 mi.) (Ref. 10, pp. 3, 11, 26 and 29).

Source type for HRS evaluation purposes: Other (Contaminated sediments).

Containment

Gas release to air: The air migration pathway was not evaluated; therefore, gas containment was not evaluated (Ref. 7, pp. 13 and 24).

Particulate release to air: The air migration pathway was not evaluated; therefore, particulate containment was not evaluated (Ref. 7, pp. 13 and 24).

Release to ground water: The ground water migration pathway with respect to the contaminated sediments was not evaluated for lack of identified ground water targets (Ref. 7, pp. 1 and 10).

Release via overland migration and/or flood: Source consists of contaminated sediments. There is no containment and no liner present to prevent the migration of hazardous substances from the contaminated sediments. Evidence of migration was based on elevated levels of contaminants detected throughout Patrick Bayou releasing to the adjacent HSC (as substantiated during the SSI) and for lack of any physical barrier or containment structure noted along the surface water migratory pathway (Ref. 10, pp. 3, 5, 6 and 8). Therefore, the contaminated sediments were assigned a containment factor value of 10 as specified in Table 4-2 of the HRS Rule (Ref. 1, Section 4.1.2.1.2.1.1).

2.2.2 Hazardous Substances Associated with a Source

Based on the results of the March 27-30, 2000 SSI, the source area is defined as the contaminated sediments within the HSC, the East Fork Tributary and Patrick Bayou. Table 1 below represents the eighteen (18) individual samples collected during the SSI that define the source area. For a complete list of hazardous substances that meet observed release criteria and their concentrations at each sample location, see Table 6.

Locations of samples are depicted in Figure 3.

TABLE 1

Source Description Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
CLP Sample ID	**Sample ID No./Location**	**Sample/Depth**	**Date Collected**	**Location Reference**
MFHW68 FGW48	SE-04/HSC sample Confluence of HSC and Patrick Bayou	Grab Sample 0"-18" deep	3/28/00	Figure 3 Ref. 10, pp. 9, 11, 16 Photos #13, 14
MFHW69 FGW49	SE-05/HSC sample Confluence of HSC and Patrick Bayou	Composite 0"-20" deep	3/28/00	Figure 3 Ref. 10, pp. 9, 11, 17 Photo #15
MFHW70 FGW50	SE-06/HSC sample Duplicate sample of SE-05 for QA/QC requirements.	Same as SE-05	3/28/00	Figure 3 Ref. 10, pp. 9, 11, 18 Photo #16
MFHW71 FGW51	SE-07/HSC sample Down-channel sample 300' west of OxyVinyl outfall	Grab Sample 0"-16" deep	3/28/00	Figure 3 Ref. 10, pp. 9, 11, 19 Photos #9, 10
MFHW72 FGW52	SE-08/HSC sample Down-channel sample 300' west of OxyVinyl outfall	Composite 0"-18" deep	3/28/00	Figure 3 Ref. 10, pp. 9, 11, 20 Photo #12
MFHW73 FGW53	SE-09/HSC sample Duplicate sample of SE-08 for QA/QC requirements.	Same as SE-08	3/28/00	Figure 3 Ref. 10, pp. 9, 11, 21 Photo #12
MFHW78 FGW58	*SE-14/East Fork Tributary* Near the confluence of East Fork with Patrick Bayou	*Composite* 0"-14" deep	*3/30/00*	*Figure 3* Ref. 10, pp. 9, 11, 26 Photos #33, 34
Table 1 continued ...				

TABLE 1 (continued)

Source Description Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
CLP Sample	**Sample Location/Event**	**Sample Depth**	**Date Collected**	**Location Reference**
MFHW81 FGW61	SE-17/Patrick Bayou 40 meters downstream from Lubrizol/Deer Park Outfall	Composite 0"-6" deep	3/30/00	Figure 3 Ref. 10, pp. 9, 11, 29 Photo #30
MFHW82 FGW62	SE-18/Patrick Bayou 20 meters downstream from Shell Road Bridge/west bank	Composite 0"-8" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 30 Photo #32
MFHW83 FGW63	SE-19/Patrick Bayou approx. 800' north of confluence with East Fork	Composite 0"-18" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 31 Photo #39, 40
MFHW84 FGW64	SE-20/Patrick Bayou 60 meters N. Oxyvinyl #001 24 meters from E. shoreline	Composite 0"-20" deep	3/29/00	Figure 3 Ref. 10, pp. 10, 11, 32 Photo #17
MFHW85 FGW65	SE-21/Patrick Bayou Duplicate sample of SE-20 for QA/QC requirements.	Same as SE-20.	3/29/00	Figure 3 Ref. 10, pp. 10, 11, 33 Photo #18
MFHW86 FGW66	SE-22/Patrick Bayou 45 meters S. Oxyvinyl #003 21 meters from E. shoreline	Composite 0"-18" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 34 Photo #25
MFHW87 FGW67	SE-23/Wetland sample 700' north of East Fork Along edge of east bank	Composite 0"-20" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 35 Photos #37, 38
MFHW88 FGW68	SE-24/Patrick Bayou 83 meters south of island 17 meters from E. shoreline	Composite 0"-16" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 36 Photos #21, 22
MFHW89 FGW69	SE-25/Wetland sample approx. 60' N. of SE-14 Along edge of east bank	Composite 0"-22" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 37 Photos #35, 36
MFHW90 FGW70	SE-26/Patrick Bayou approx. 200' E. of bridge in lower bayou area	Grab Sample 0"-18" deep	3/28/00	Figure 3 Ref. 10, pp. 10, 11, 38 Photo #26 (not avail)
Table 1 continued				

TABLE 1 (continued)

Source Description Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
CLP Sample	**Sample Location/Event**	**Sample Depth**	**Date Collected**	**Location Reference**
MFHW91 FGW71	SE-27/Wetland sample Along NE shoreline of island in Patrick Bayou	Composite 0"-15" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 39 Photo #19

Notes: QA/QC = Quality Assurance/Quality Control CLP = Contract Laboratory Procedures

Source samples SE-04 thru SE-09 in the Houston Ship Channel, SE-14 near the confluence with the East Fork tributary and SE-19 thru SE-27 within Patrick Bayou were all collected with a stainless steel sediment coring device. In addition, dedicated decontaminated stainless steel screw-on tips were used to hold clean polyethylene zero-contamination tubes within the device. Source sample SE-17 and SE-18 in the upper portion of Patrick Bayou were collected using clean dedicated stainless steel bowls and spoons instead of the sediment coring device (Ref. 10, pp. 29-30). Since the upper portion of the East Fork tributary is shallow containing many small rocks and gravel and the upper portion of Patrick Bayou is mostly gunite or concrete lined, obtaining sufficient volume using the coring sampling tool was determined unsuitable (Ref. 10, pp. 16-21 and 31-40). The source samples exhibited elevated concentrations of both inorganic and organic constituents.

All samples were collected according to the EPA approved state Quality Assurance Project Plan and sample locations were approved by the EPA prior to sample collection (Ref. 8, pp. 1-52; Ref. 7, pp. 1-27).

2.2.3 Hazardous Substances Available to a Pathway

Because containment for this source is greater than 0, the following hazardous substances associated with the source can migrate via the surface water migration pathway:

Cadmium	Chromium	
Copper	Lead	
Manganese	Mercury	
Nickel	Silver	
Vanadium	Zinc	
Cyanide		
Carbon Disulfide	Cyclohexane	Benzene
Metylcyclohexane	Toluene	Chlorobenzene
Ethylbenzene	Xylenes (Total)	Isopropylbenzene
1,3-Dichlorobenzene	1,4-Dichlorobenzene	Hexachlorobutadiene
2-Methylnaphthalene	Hexachlorobenzene	Aldrin
Endosulfan I	Endrin	Aroclor 1248
Aroclor 1254	Aroclor 1260	

2.3 LIKELIHOOD OF RELEASE

Refer to Section 4.1.2.1 of this documentation record for specific information related to the Likelihood of Release to the Surface Water Pathway.

2.4 WASTE CHARACTERIZATION

2.4.1 Selection of Substance Potentially Posing Greatest Hazard

All of the hazardous substances listed above are associated with this source.

Specific toxicity factors, HRS Section 2.4.1.1 and selection of the hazardous substances with the highest factor values (toxicity, persistence, and bioaccumulation), HRS Section 2.4.1.2, are presented under the Surface Water Migration Pathway section of this documentation record report.

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Hazardous Constituent Quantity (Tier A) - Not Evaluated (NE)

The information available is not sufficient to evaluate Tier A, as required in Section 2.4.2.1.1 of the HRS Rule. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier B, hazardous waste stream quantity (Ref. 1).

2.4.2.1.2 Hazardous Wastestream Quantity (Tier B) - NE

The information available is not sufficient to evaluate Tier B, as required in Section 2.4.2.1.2 of the HRS Rule. Therefore, quantity is unknown, but greater than zero. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier C, volume (Ref. 1).

2.4.2.1.3 Volume (Tier C) - NE

The information available is not sufficient to evaluate Tier C, as required in Section 2.4.2.1.3 of the HRS Rule. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier D, area (Ref. 1).

2.4.2.1.4 Area (Tier D)

Tier D is not evaluated for source type "Other" (Ref. 1, Section 2.4.2.1.4, Table 2-5).

Although the source volume was not adequately determined and its extent is unknown, the value is greater than 0, but unknown.

Dimension of source (yds^3 or gallons): > 0, but unknown.
Reference(s): Ref. 1, Section 2.4.2.1.4, Table 2-5.
Volume Assigned Value: > 0, but unknown

2.4.2.1.5 Source Hazardous Waste Quantity Value

As described in the HRS Rule, the highest value assigned to a source from among the four tiers of hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C) or area (Tier D) shall be selected as the source hazardous waste quantity value. (Ref. 1, Sections 2.4.2.1.1-4).

TABLE 2

Source No. 1 - Other (Contaminated Sediments) Source Hazardous Waste Quantity	
Tier Measure	**Migration Pathway (Surface Water)**
Tier A, Constituent Quantity	NE
Tier B, Wastestream Quantity	NE
Tier C, Volume	> 0, but unknown
Tier D, Area	NE

NE = not evaluated.

Source Hazardous Waste Quantity Value: > 0, but unknown

SITE SUMMARY OF SOURCE DESCRIPTIONS

TABLE 3

Source Number	Source Hazardous Waste Quantity Value	Containment			
		Ground Water	Surface Water	Gas	Air Particulate
1	> 0	Not Evaluated	10	Not Evaluated	Not Evaluated
Total	> 0, but unknown				

The sum of the Source No. 1 hazardous waste quantity of > 0 is assigned as the Source Hazardous Waste Quantity Value (Ref. 1, Section 2.4.2.2). The sum of the source hazardous waste quantity values for Patrick Bayou site, rounded to the nearest integer is > 0, but unknown.

The Hazardous Waste Quantity Factor Value assigned to a Source Hazardous Waste Quantity Value of > 0, but unknown is 100 (Ref. 1, Section 2.4.2.2).

[Note: See discussion under Section 4.1.4.3.1 of this report for rationale used to determine a Hazardous Waste Quantity Factor Value when a pathway target is subjected to Level I or Level II concentrations].

Source Hazardous Waste Quantity Value: > 0, but unknown

Hazardous Waste Quantity Factor Value: 100

3.0 GROUND WATER MIGRATION PATHWAY

3.0.1 General Considerations

Since the "site" is defined as the accumulated contaminated sediments within Patrick Bayou, the Groundwater and Groundwater to Surface Water Pathways will not be evaluated. The drinking water threat was not evaluated due to lack of targets and because the inclusion of this threat would not significantly effect the site score. The Surface Water Pathway will be evaluated to assess potential contaminant migration.

4.0 SURFACE WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

There were no ground water to surface water migration components identified located within the watershed being evaluated. Therefore, only the Overland/Flood Migration to Surface Water Component will be evaluated for the watershed of concern (Ref. 1, Section 4.1).

4.1.1 General Considerations

Patrick Bayou drains north then northeast discharging to Stream Segment 1006 of the San Jacinto River Basin (Houston Ship Channel Tidal) with the widest portion of Patrick Bayou entering the Houston Ship Channel (HSC) as shown in Figures 1b and 2 (Ref. 10, pp. 6 and 8). Stream Segment 1006 extends 6 miles easterly from a point located immediately upstream of Green Bayou in Harris County to its confluence with the main fork of the San Jacinto River (Ref. 5, p. 5). The tidal portion of the HSC is highly developed, industrialized and has allowed the City of Houston to become an international port (Ref. 4, p. 7; Ref. 5, p. 3). See Figure 4 for the location of Patrick Bayou and the HSC within Stream Segment 1006.

Segment 1006 is classified "Water Quality Limited" due to numerous water quality standard violations with advanced wastewater treatment required prior to any other intended use. Designated uses include: industrial water supply and navigation. Along this segment there are 88 domestic outfalls and 35 industrial outfalls with a total average daily discharge of 273.33 million gallons (Ref. 5, p. 5). A restricted-consumption advisory (AD-3, issued September 19, 1990) for the general population and a no-consumption advisory for children and women of childbearing age have been issued for the Houston Ship Channel and all contiguous waters and Upper Galveston Bay area by the Texas Department of Health due to elevated levels of dioxin in blue crabs and all species of catfish (Ref. 4, p. 13; Ref. 5, pp. 3-5; Ref. 21, pp. 5-6).

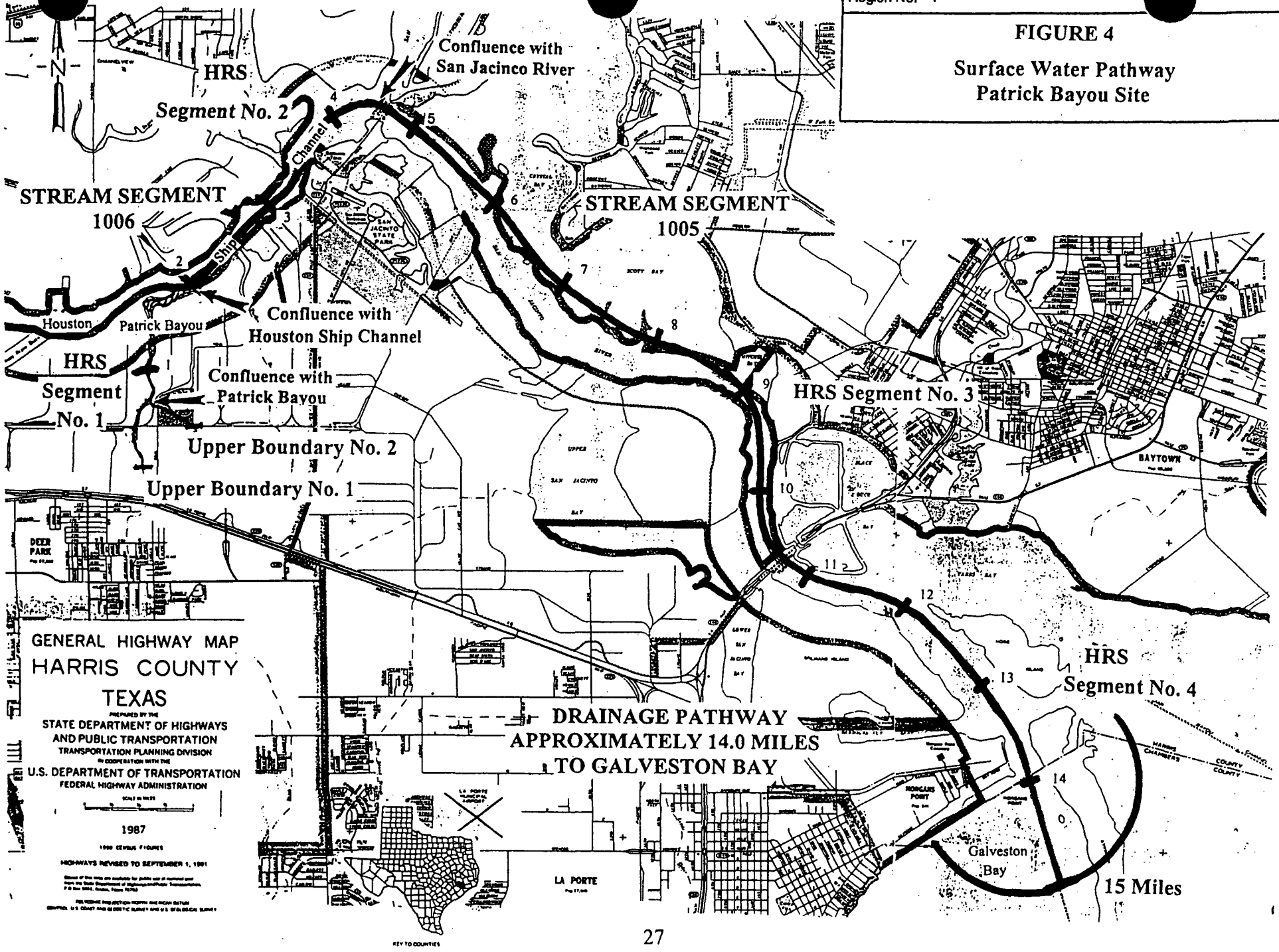
Segment 1006 drains east entering the lower portion of Stream Segment 1005 before discharging to Galveston Bay (Ref. 10, pp. 6 and 8). Segment 1005 begins upstream at a point located 100 meters (110 yds) downstream (south) of the Interstate Highway (IH) 10 bridge in Harris County and extends 12 miles southeast to its confluence with Galveston Bay at Morgan's Point located at the Harris/ Chambers County boundary line (Ref. 5, p. 7). See Figure 4 for the location of the lower portion of Stream Segment 1005.

Segment 1005 is also classified "Water Quality Limited" due to water quality standards violations with advanced waste treatment required. Designated water uses include: non-contact recreation and high aquatic life. Along this segment there is 1 domestic outfall and 14 industrial outfalls with a total average daily discharge of 37.14 million gallons (Ref. 5, p. 7). Segment 1005 has the same restricted-consumption advisory for the general population and a no-consumption advisory for children and women of childbearing age issued by the Texas Department of Health due to elevated levels of dioxin in blue crabs and all species of catfish (Ref. 5, p. 7; Ref. 21, pp. 5-6).

TEXAS NATURAL RESOURCE CONSERVAT COMMISSION
Region No. 4

FIGURE 4

Surface Water Pathway
Patrick Bayou Site



4.1.1.1 Definition of Hazardous Substance Migration Path for Overland/Flood Migration Component

Overland Segment, Probable Point of Entries (PPEs), Number of Watersheds

As described in the HRS Rule, Section 4.1.1.1, there is no overland segment for hazardous substance migration from a source area that consists of contaminated sediments with no identified source, and the hazardous substance migration path consists solely of the in-water segment (Ref. 1). For the Patrick Bayou site, the source area begins at the two farthest upstream sample locations and continues to the most distant downstream sample location meeting observed release criteria. Since, for this site, the release to surface water defines the source and there is no overland route, and because all PPEs to the bayou have not been identified. it was determined more important to use the phrase "upper boundary" for the area of contaminated sediments instead of Probable Point of Entry (PPE). There are two (2) Upper Boundaries for this site identified as the farthest upstream sample location in Patrick Bayou (SE -17) designated as Upper Boundary No. 1 and the farthest upstream sample location in the East Fork tributary (SE-14) designated as Upper Boundary No. 2. In addition, as specified by the HRS Rule, since the two hazardous substance migration pathways associated with the upper boundaries reach a common point within the target distance limit, only one watershed will be evaluated for this documentation record report (Ref. 1, Section 4.1.1.1).

4.1.1.2 Target Distance Limit

As specified in the HRS Rule, Section 4.1.1.2, for sites consisting of contaminated sediments with no identified source, the in-water segment is defined as located between the two furthest observed release criteria sample locations (Ref. 1). Additionally, the HRS Rule specifies the target distance limit (TDL) for this same site with a clearly defined flow direction as the in-water segment measured from the furthest sample location upstream meeting observed release criteria to the most distant downstream sample location also meeting observed release criteria, or to the 15-mile down-stream distance, whichever is greater (Ref. 1).

For the Patrick Bayou site, the target distance limit was determined from a review of observed release criteria for the two farthest sampling locations identified within the surface water hazardous substance migration pathway. The furthest distance was determined as between sample locations SE-17 (Upper Boundary No. 1) located at the box channel discharge point in the upper portion of Patrick Bayou extending to the 15- mile TDL arc within Galveston Bay as shown in Figure 4.

Definition of In-Water Segments/Target Distance Limit

The Target Distance Limit (TDL) for this site is comprised of four (4) Hazard Ranking System (HRS) In-Water Segments which are included within two (2) State of Texas Water Quality Stream Segments. The components of these HRS In-Water segments are discussed below:

(1) In-Water Segment No. 1 (Upper Patrick Bayou to Confluence with HSC) - Level II: (approximately 1.91 miles) is defined as the in-water distance from Upper Boundary No. 1

(sample location SE-17) along Patrick Bayou to its confluence with the HSC and includes a portion of the lower East Fork Tributary. The entire segment comprises the Patrick Bayou source ite and is located within Stream Segment 1006 (Houston Ship Channel Tidal) of the San Jacinto River Basin (Figure 4; Ref. 10, p. 8; Ref. 5, pp. 3-5).

(2) In-Water Segment No. 2 (Confluence with Patrick Bayou to Confluence with San Jacinto River) - Potential: (approximately 2.5 miles) is defined as the in-water distance along the HSC from the confluence with Patrick Bayou to the confluence with the main fork of the San Jacinto River. The entire segment is located within Stream Segment 1006 (HSC Tidal) of the San Jacinto River Basin (Figure 4; Ref. 10, p. 8; Ref. 5, pp. 3-5).

(3) In-Water Segment No. 3 (Confluence with San Jacinto River to Galveston Bay) - Potential: (approximately 9.5 miles) is defined as the in-water distance along the main fork of the San Jacinto River from its confluence with the HSC to Morgan's Point at the entrance to Galveston Bay. The entire segment is located within Stream Segment 1005 (HSC/San Jacinto River Tidal) of the San Jacinto River Basin (Figure 4; Ref. 10, p. 8; Ref. 5, pp. 3-5).

(4) In-Water Segment No. 4 (Galveston Bay to the 15-Mile Arc) - Potential: (approximately 1.0 miles) is defined as the in-water area within an arc extending past Morgan's Point into Galveston Bay (Figure 4; Ref. 10, p. 8; Ref. 5, pp. 3-5).

4.1.1.3 Evaluation of Overland/Flood Migration Component

As described in the HRS Rule, Section 4.1.1.3, since there is only one watershed area, the resulting score for that watershed will become the overland/flood migration component score for the site. In addition, since there were no drinking water targets identified within the defined TDL, the overland/flood migration component will be evaluated for human food chain and environmental threats based on three factor categories: likelihood of release, waste characteristics and targets. The resulting Overland/Flood Migration pathway score will be used to evaluate the Surface Water Migration Pathway site score (Ref. 1; Ref. 10, pp. 6 and 8).

4.1.2 Drinking Water Threat

The drinking water threat was not evaluated due to lack of significant drinking water targets located along the overland/flood migration pathway within the identified TDL. Documentation for an observed release follows, then evaluation will proceed to HRS Rule, Sections 4.1.3 and 4.1.4 for evaluation of the human food chain and environmental threats (Ref. 1).

4.1.2.1 Drinking Water Threat - Likelihood of Release

4.1.2.1.1 Observed Release

An observed release can be documented in the HRS system by two methods: (a) direct observation and (b) chemical analysis (Ref. 1). The chemical analysis method was used for this report.

Chemical Analysis

Establishing an observed release by chemical analysis requires attributing the hazardous substances to the site. First, naturally occurring background concentrations of the hazardous substances must be determined. Second, it must be demonstrated that the concentrations of the hazardous substances in a release sample are significantly above the highest identified background level and some portion of the significant increase must be attributed to the site. In order to document a significant increase above background levels, the hazardous substances must be present in concentrations of at least three times (3x) above the appropriate background level if the hazardous substances are present in the background sample. Or, if the hazardous substances have not been detected in the background samples, then the hazardous substances must be present at concentrations both above the release's and the highest background samples' laboratory Sample Quantitation Limit (SQL) (Ref. 1, Section 2.3).

Background Concentrations

A total of eight (8) background samples were collected at up-channel locations along the HSC, along Patrick Bayou and the East Fork Tributary upstream from known outfall locations for identification of site contaminants (Ref. 7, pp. 12, 18-19, 21, 23). Table 4 provides a summary of the background samples collected for the SSI and Table 5 indicates the highest designated background levels for the inorganic and organic hazardous substances of concern for the site. A variety of background locations were selected to adequately represent differing surface conditions and flow characteristics encountered at the site. These conditions included varying types of flow channels, sediment conditions and a wide range of surface water flow characteristics found within the East Fork Tributary, upper drainage area of Patrick Bayou and along the Houston Ship Channel. Another bayou was not selected for unaffected background sediment samples since previous studies conducted by the City of Houston within the HSC system indicated elevated toxic substances and water quality problems within all nine tributaries (Ref. 4, p. 1).

Background samples SE-01, SE-02 and SE-03 were selected to represent typical sediment locations identified within the Patrick Bayou-HSC confluence area with similar large tributary flow characteristics. Background samples were collected using a sediment coring sampling tool along the shoreline of the Houston Ship Channel in shallow areas where sediments would collect up-channel of the confluence with Patrick Bayou. SE-01 was a composite sample so that there would be sufficient volume for a requested split sample. The coring sampling tool was pushed as far as it could be pushed into the sediments to collect each sample (Ref. 10, pp. 13-15).

TABLE 4

Surface Water Pathway
Background Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou

CLP Sample ID	Sample Location/Event	Sample Depth	Date Collected	Location Reference
MFHW65 FGW45	SE-01/HSC sample HSC up-channel from Patrick Bayou	Composite 0"-18" deep	3/28/00	Figure 3, Ref. 10, pp. 9, 11, 13 Photo #6
MFHW66 FGW46	SE-02/HSC sample HSC up-channel from Patrick Bayou	Grab sample 0"-20" deep	3/28/00	Figure 3, Ref. 10, pp. 9, 11, 14 Photo #7
MFHW67 FGW47	SE-03/HSC sample HSC up-channel from Patrick Bayou	Grab sample 0"-18" deep	3/28/00	Figure 3, Ref. 10, pp. 9, 11, 15 Photo #8
MFHW74 FGW54	SE-10/East Fork sample Upstream from Praxair outfall entry to tributary	Grab sample 0"-8" deep	3/28/00	Figure 3, Ref. 10, pp. 9, 11, 22 Photo #49
MFHW75 FGW55	SE-11/East Fork sample Upstream from Praxair outfall entry to tributary	Grab sample 0"-8" deep	3/28/00	Figure 3, Ref. 10, pp. 9, 11, 23 Photo #48
MFHW76 FGW56	SE-12/East Fork sample Upstream from Praxair outfall entry to tributary	Grab sample 0"-10" deep	3/28/00	Figure 3, Ref. 10, pp. 9, 11, 24 Photo #47
MFHW79 FGW59	SE-15/Patrick Bayou Upstream from Deer Park wastewater discharge point	Composite 0"-4" deep	3/30/00	Figure 3 Ref. 10, pp. 9, 11, 27 Photo #27
MFHW80 FGW60	SE-16/Patrick Bayou Duplicate sample of SE-15 for QA/QC requirements.	Same as SE-15	3/30/00	Figure 3 Ref. 10, pp. 9, 11, 28 Photos #27

Notes: QA/QC = Quality Assurance/Quality Control

Background sample locations SE-10, SE-11 and SE-12 were selected along the upper portions of the East Fork Tributary upstream of any known outfall source in shallow intermittent low-flow locations typical of sediment locations noted located below outfall sources within the East Fork Tributary. Since the shallow stream channel contained many small rocks and gravel and the underlying soils

Background sample location SE-15 with duplicate sample SE-16 was selected within the concrete-lined upper portion of Patrick Bayou upstream of any know outfall source to represent typical gunite-lined lower portions of the bayou located between sampling Stations No. 9 and No. 6 illustrated in Figure 3 and shown in Photo #29. Background sediment samples SE-15 and SE-16 were collected using a dedicated stainless steel bowl and spoon since the channel was concrete lined and using the coring sampling tool was determined unsuitable. A composite sample was collected from deposits up to 4" thick of fine sediments lying within typical low-flow portions of the channel within an approximate 20' radius to obtain sufficient volume for the duplicate sample. Leaves, twigs and other organic matter were removed before collecting the sample (Ref. 10, pp. 27-28).

TABLE 5

Surface Water Pathway
Summary of Highest Inorganic and Organic Constituents Detected in Background Sediment Samples

Inorganic Constituent and Cyanide	Station ID/ CLP No.	Highest Concentration [SQL] mg/Kg	3 x Highest Background Concentration mg/Kg	Reference
Cadmium	SE-16/MFHW80	0.63 [1.3]	**1.89**	Ref. 12, pp. 1-7, 10-13, 17
Chromium	SE-16/MFHW80	12.4 [2.6]	**37.2**	Ref. 12, pp. 1-7, 10-13, 17
Copper	SE-16/MFHW80	17.7 [6.5]	**53.1**	Ref. 12, pp. 1-7, 10-13, 17
Lead	SE-15/MFHW79	38.6 [0.9]	**115.8**	Ref. 12, pp. 1-7, 10-13, 16
Manganese	SE-16/MFHW80	207 [3.9]	**621**	Ref. 12, pp. 1-7, 10-13, 17
Mercury	SE-01/MFHW65	0.56J* [0.12]	**1.68***	Ref. 12, pp. 1-7, 12-15, 26
Nickel	SE-11/MFHW75	11.5 [10.3]	**34.5**	Ref. 13, pp. 1-7, 12-15, 26

Table 5 continued ...

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source. J^ indicates a high bias and Jv indicates a low bias.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N/A = Not applicable.
* = Adjusted result. See Data Usability Table 7.

TABLE 5 (Continued)

Surface Water Pathway Summary of Highest Organic and Inorganic Constituents Detected in Background Sediment Samples				
Silver	SE-12/MFHW76	ND [0.33]	**N/A [0.33]**	Ref. 13, pp. 1-7, 12-15, 27
Vanadium	SE-16/MFHW80	27.7 [13.1]	**83.1**	Ref. 12, pp. 1-7, 10-13, 17
Zinc	SE-16/MFHW80	99.0 [5.2]	**297**	Ref. 12, pp. 1-7, 10-13, 17
Cyanide	SE-15/MFHW79	0.3Jv [1.45]	**0.9**	Ref. 12, pp. 1-7, 10-13, 16
Volatile Organic Constituent	**Station ID/ CLP No.**	**Highest Concentration [SQL] µg/Kg**	**3 x Highest Background Concentration µg/Kg**	**Reference**
Carbon Disulfide	SE-15/FGW59	NDMJ [35]	**N/A [35]**	Ref. 14, pp. 1-13, 26-34, 41-43
Cyclohexane	SE-12/FGW56	ND [19]	**N/A [19]**	Ref. 15, pp. 1-9, 23-30, 73-75
Benzene	SE-12/FGW56	ND [19]	**N/A [19]**	Ref. 15, pp. 1-9, 23-30, 73-75
Methylcyclohexane	SE-12/FGW56	ND [19]	**N/A [19]**	Ref. 15, pp. 1-9, 23-30, 73-75
Toluene	SE-12/FGW56	ND [19]	**N/A [19]**	Ref. 15, pp. 1-9, 23-30, 73-75
Chlorobenzene	SE-12/FGW56	ND [19]	**N/A [19]**	Ref. 15, pp. 1-9, 23-30, 73-75
Ethylbenzene	SE-12/FGW56	ND [19]	**N/A [19]**	Ref. 15, pp. 1-9, 23-30, 73-75
Xylenes (total)	SE-12/FGW56	ND [19]	**N/A [19]**	Ref. 15, pp. 1-9, 23-30, 73-75
Isopropylbenzene	SE-12/FGW56	ND [19]	**N/A [19]**	Ref. 15, pp. 1-9, 23-30, 73-75
1,3-Dichlorobenzene	SE-12/FGW56	ND [19]	**N/A [19]**	Ref. 15, pp. 1-9, 23-30, 73-75
1,4-Dichlorobenzene	SE-12/FGW56	ND [19]	**N/A [19]**	Ref. 15, pp. 1-9, 23-30, 73-75
Table 5 Continued ...				

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source. J^ indicates a high bias and Jv indicates a low bias.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N/A = Not applicable.
* = Adjusted result. See Data Usability Table 7.

TABLE 5 (Continued)

Surface Water Pathway Summary of Highest Organic and Inorganic Constituents Detected in Background Sediment Samples				
Semivolatile Organic Constituent	**Station ID/ CLP No.**	**Highest Concentration [SQL] µg/Kg**	**3 x Highest Background Concentration µg/Kg**	**Reference**
Hexachlorobutadiene	SE-12/FGW56	ND [610]	**N/A [610]**	Ref. 15, pp.1-9, 23-30, 120-124
2-Methylnaphthalene	SE-12/FGW56	ND [610]	**N/A [610]**	Ref. 15, pp.1-9, 23-30, 120-124
Hexachlorobenzene	SE-12/FGW56	ND [610]	**N/A [610]**	Ref. 15, pp.1-9, 23-30, 120-124
Pesticide/PCB Constituent	**Station ID/ CLP No.**	**Highest Concentration [SQL] µg/Kg**	**3 x Highest Background Concentration µg/Kg**	**Reference**
Aldrin	SE-12/FGW56	NDJv [3.1]	**N/A [3.1]**	Ref. 15, pp. 1-9, 23-30, 157
Endosulfan I	SE-12/FGW56	NDJv [3.1]	**N/A [3.1]**	Ref. 15, pp. 1-9, 23-30, 157
Endrin	SE-12/FGW56	ND [6.1]	**N/A [6.1]**	Ref. 15, pp. 1-9, 23-30, 157
Aroclor 1248	SE-12/FGW56	ND [61]	**N/A [61]**	Ref. 15, pp. 1-9, 23-30, 157
Aroclor 1254	SE-12/FGW56	ND [61]	**N/A [61]**	Ref. 15, pp. 1-9, 23-30, 157
Aroclor 1260	SE-12/FGW56	ND [61]	**N/A [61]**	Ref. 15, pp. 1-9, 23-30, 157

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source. J^ indicates a high bias and Jv indicates a low bias.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N/A = Not applicable.
* = Adjusted result. See Data Usability Table 7.

A complete listing of all background values is included as Reference 20.

All samples were collected according to the EPA approved state Quality Assurance Project Plan and sample locations were approved by the EPA prior to sample collection (Ref. 8, pp. 1-52; Ref. 7, pp. 1-27).

Contaminated Samples

The following samples meet the observed release criteria and are presented below indicating inorganic and organic hazardous substances with their concentrations and SQLs.

The following samples were qualified as "releases" based on the criteria outlined in the HRS Rule, Section 2.3 and Table 2-3 (Ref. 1).

TABLE 6

Surface Water Pathway
Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou

CLP Sample ID	Sample Location/Event	Sample Depth	Date Collected	Location Reference
MFHW68 FGW48	SE-04/HSC sample Confluence of HSC and Patrick Bayou	Grab Sample 0"-18" deep	3/28/00	Figure 3, Ref. 10, pp. 9, 11, 16 Photos #13, 14
MFHW69 FGW49	SE-05/HSC sample Confluence of HSC and Patrick Bayou	Composite 0"-20" deep	3/28/00	Figure 3, Ref. 10, pp. 9, 11, 17 Photo #15
MFHW70 FGW50	SE-06/HSC sample Duplicate sample of SE-05 for QA/QC requirements.	Same as SE-05	3/28/00	Figure 3, Ref. 10, pp. 9, 11, 18 Photo #16
MFHW71 FGW51	SE-07/HSC sample Down-channel sample 300' west of OxyVinyl outfall	Grab sample 0"-16" deep	3/28/00	Figure 3, Ref. 10, pp. 9, 11, 19 Photos #9, 10
MFHW72 FGW52	SE-08/HSC sample Down-channel sample 300' W. of OxyVinyl outfall	Composite 0"-18" deep	3/28/00	Figure 3, Ref. 10, pp. 9, 11, 20 Photo #12

Table 6 continued ...

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
CLP Sample ID	**Sample ID No./Location**	**Sample/Depth**	**Date Collected**	**Location Reference**
MFHW73 FGW53	SE-09/HSC sample Duplicate sample of SE-08 for QA/QC requirements.	Same as SE-08	3/28/00	Figure 3, Ref. 10, pp. 9, 11, 21 Photo #12
MFHW78 FGW58	SE-14/East Fork Tributary Near the confluence of East Fork with Patrick Bayou	Composite 0"-14" deep	3/30/00	Figure 3 Ref. 10, pp. 9, 11, 26 Photos #33, 34
MFHW81 FGW61	SE-17/Patrick Bayou 40 meters downstream from Lubrizol/Deer Park Outfall	Composite 0"-6" deep	3/30/00	Figure 3 Ref. 10, pp. 9, 11, 29 Photo #30
MFHW82 FGW62	SE-18/Patrick Bayou 20 meters downstream from Shell Road Bridge/west bank	Composite 0"-8" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 30 Photo #32
MFHW83 FGW63	SE-19/Patrick Bayou approx. 800' north of confluence with East Fork	Composite 0"-18" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 31 Photos #39, 40
MFHW84 FGW64	SE-20/Patrick Bayou 60 meters N. Oxyvinyl #001 24 meters from E. shoreline	Composite 0"-20" deep	3/29/00	Figure 3 Ref. 10, pp. 10, 11, 32 Photo #17
MFHW85 FGW65	SE-21/Patrick Bayou Duplicate sample of SE-20 for QA/QC requirements.	Same as SE- 20.	3/29/00	Figure 3 Ref. 10, pp. 10, 11, 33 Photo #18
MFHW86 FGW66	SE-22/Patrick Bayou 45 meters S. Oxyvinyl #003 21 meters from E. shoreline	Composite 0"-18" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 34 Photo #25
MFHW87 FGW68	SE-23/Wetland sample 700' north of East Fork Along edge of east bank	Composite 0"-20" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 35 Photo #37, 38
MFHW88 FGW68	SE-24/Patrick Bayou 83 meters south of island 17 meters from E. shoreline	Composite 0"-16" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 36 Photo #21, 22

Table 6 continued ...

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
CLP Sample ID	**Sample ID No./Location**	**Sample/Depth**	**Date Collected**	**Location Reference**
MFHW89 FGW69	SE-25/Wetland sample approx. 60' N. of SE-14 Along edge of east bank	Composite 0"-22" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 37 Photo #35, 36
MFHW90 FGW70	SE-26/Patrick Bayou approx. 200' E. of bridge in lower bayou area	Grab Sample 0"-18" deep	3/28/00	Figure 3 Ref. 10, pp. 10, 11, 38 Photo #26 (not avail)
MFHW91 FGW71	SE-27/Wetland sample Along NE shoreline of island in Patrick Bayou	Composite 0"-15" deep	3/30/00	Figure 3 Ref. 10, pp. 10, 11, 39 Photo #19
Table 6 continued ...				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-04 MFHW68 Inorganics	Cadmium	0.93L mg/Kg	[1.9]	Ref. 13, pp. 1-7, 12-15, 19
	Chromium	**183 mg/Kg**	**[3.8]**	**Ref. 13, pp. 1-7, 12-15, 19**
	Copper	**99.3 mg/Kg**	**[9.7]**	**Ref. 13, pp. 1-7, 12-15, 19**
	Lead	**117 mg/Kg**	**[1.2]**	**Ref. 13, pp. 1-7, 12-15, 19**
	Manganese	172 mg/Kg	[5.8]	Ref. 13, pp. 1-7, 12-15, 19
	Mercury	**11.31* mg/Kg**	**[0.19]**	**Ref. 13, pp. 1-7, 12-15, 19**
	Nickel	**51.2 mg/Kg**	**[15.5]**	**Ref. 13, pp. 1-7, 12-15, 19**
	Silver	ND	[3.8]	Ref. 13, pp. 1-7, 12-15, 19
	Vanadium	11.9L mg/Kg	[19.4]	Ref. 13, pp. 1-7, 12-15, 19
	Zinc	**334 mg/Kg**	**[7.8]**	**Ref. 13, pp. 1-7, 12-15, 19**
	Cyanide	ND	[1.9]	Ref. 13, pp. 1-7, 12-15, 19
SE-04 FGW48 Volatiles	Carbon Disulfide	59B µg/Kg	[20]	Ref. 15, pp. 1-9, 23-30, 43
	Cyclohexane	ND	[20]	Ref. 15, pp. 1-9, 23-30, 43
	Benzene	**170 µg/Kg**	**[20]**	**Ref. 15, pp. 1-9, 23-30, 43**
	Methylcyclohexane	**110 µg/Kg**	**[20]**	**Ref. 15, pp. 1-9, 23-30, 43**
	Toluene	**75 µg/Kg**	**[20]**	**Ref. 15, pp. 1-9, 23-30, 43**
	Chlorobenzene	**220 µg/Kg**	**[20]**	**Ref. 15, pp. 1-9, 23-30, 44**
	Ethylbenzene	**52 µg/Kg**	**[20]**	**Ref. 15, pp. 1-9, 23-30, 44**
	Xylenes (total)	**310 µg/Kg**	**[20]**	**Ref. 15, pp. 1-9, 23-30, 44**
	Isopropylbenzene	**290 µg/Kg**	**[20]**	**Ref. 15, pp. 1-9, 23-30, 44**
	1,3-Dichlorobenzene	**1,900 µg/Kg**	**[100]**	**Ref. 15, pp. 1-9, 23-30, 44**
	1,4-Dichlorobenzene	**260 µg/Kg**	**[20]**	**Ref. 15, pp. 1-9, 23-30, 44**

Table 6 continued ...

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-04 FGW48 Semivolatiles	**Hexachlorobutadiene**	**19,000 µg/Kg**	**[16,000]**	**Ref. 15, pp. 1-9, 23-30, 100**
	2-Methylnaphthalene	2,800LJ µg/Kg	[16,000]	Ref. 15, pp. 1-9, 23-30, 100
	Hexachlorobenzene	3,900J µg/Kg	[16,000]	Ref. 15, pp. 1-9, 23-30, 101
SE-04 FGW48 Pesticides/PCBs	Aldrin	NDMJ	[240]	Ref. 15, pp. 1-9, 23-30, 145
	Endrin	9.2J* µg/Kg	[66]	Ref. 15, pp. 1-9, 23-30, 145
	Aroclor-1248	**5,200 µg/Kg**	**[66]**	**Ref. 15, pp. 1-9, 23-30, 145**
	Aroclor-1254	ND	[660]	Ref. 15, pp. 1-9, 23-30, 145
	Aroclor-1260	ND	[660]	Ref. 15, pp. 1-9, 23-30, 145

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-05 MFHW69 Inorganics	Cadmium	1.5L mg/Kg	[2.0]	Ref. 13, pp. 1-7, 12-15, 20
	Chromium	**158 mg/Kg**	**[4.0]**	**Ref. 13, pp. 1-7, 12-15, 20**
	Copper	**69.7 mg/Kg**	**[10.4]**	**Ref. 13, pp. 1-7, 12-15, 20**
	Lead	85.9 mg/Kg	[1.2]	Ref. 13, pp. 1-7, 12-15, 20
	Manganese	166 mg/Kg	[6.2]	Ref. 13, pp. 1-7, 12-15, 20
	Mercury	**6.61J* mg/Kg**	**[0.2]**	**Ref. 13, pp. 1-7, 12-15, 20**
	Nickel	**38.3 mg/Kg**	**[16.6]**	**Ref. 13, pp. 1-7, 12-15, 20**
	Silver	ND	[4.0]	Ref. 13, pp. 1-7, 12-15, 20
	Vanadium	11.1L mg/Kg	[20.8]	Ref. 13, pp. 1-7, 12-15, 20
	Zinc	**307 mg/Kg**	**[8.3]**	**Ref. 13, pp. 1-7, 12-15, 20**
	Cyanide	ND	[2.1]	Ref. 13, pp. 1-7, 12-15, 20
SE-05 FGW49 Volatiles	Carbon Disulfide	NDM	[250]	Ref. 15, pp. 1-9, 23-30, 49
	Cyclohexane	ND	[110]	Ref. 15, pp. 1-9, 23-30, 49
	Benzene	68Jv µg/Kg	[110]	Ref. 15, pp. 1-9, 23-30, 49
	Methylcyclohexane	98Jv µg/Kg	[110]	Ref. 15, pp. 1-9, 23-30, 49
	Toluene	21Jv µg/Kg	[110]	Ref. 15, pp. 1-9, 23-30, 49
	Chlorobenzene	**200Jv µg/Kg**	**[110]**	**Ref. 15, pp. 1-9, 23-30, 50**
	Ethylbenzene	30Jv µg/Kg	[110]	Ref. 15, pp. 1-9, 23-30, 50
	Xylenes (total)	**110Jv µg/Kg**	**[110]**	**Ref. 15, pp. 1-9, 23-30, 50**
	Isopropylbenzene	**180Jv µg/Kg**	**[110]**	**Ref. 15, pp. 1-9, 23-30, 50**
	1,3-Dichlorobenzene	**1,300 µg/Kg**	**[110]**	**Ref. 15, pp. 1-9, 23-30, 50**
	1,4-Dichlorobenzene	**320Jv µg/Kg**	**[110]**	**Ref. 15, pp. 1-9, 23-30, 50**
SE-05 FGW49 Semivolatiles	**Hexachlorobutadiene**	**19,000 µg/Kg**	**[15,000]**	**Ref. 15, pp. 1-9, 23-30, 103**
	2-Methylnaphthalene	1,600LJ µg/Kg	[15,000]	Ref. 15, pp. 1-9, 23-30, 103
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-05 FGW49 Semivolatiles	Hexachlorobenzene	4,800J µg/Kg	[15,000]	Ref. 15, pp. 1-9, 23-30, 104
SE-05 FGW49 Pesticides/PCBs	Aldrin	NDM	[210]	Ref. 15, pp. 1-9, 23-30, 147
	Endosulfan I	3.3J µg/Kg	[3.9]	Ref. 15, pp. 1-9, 23-30, 147
	Endrin	ND	[75]	Ref. 15, pp. 1-9, 23-30, 147
	Aroclor-1248	**4,500 µg/Kg**	**[75]**	**Ref. 15, pp. 1-9, 23-30, 147**
	Aroclor-1254	ND	[750]	Ref. 15, pp. 1-9, 23-30, 147
	Aroclor-1260	**180J* µg/Kg**	**[75]**	**Ref. 15, pp. 1-9, 23-30, 147**

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-06 MFHW70 Inorganics	Cadmium	0.96L mg/Kg	[2.2]	Ref. 13, pp. 1-7, 12-15, 21
	Chromium	**164 mg/Kg**	**[4.4]**	**Ref. 13, pp. 1-7, 12-15, 21**
	Copper	**86.2 mg/Kg**	**[10.8]**	**Ref. 13, pp. 1-7, 12-15, 21**
	Lead	95.6 mg/Kg	[1.3]	Ref. 13, pp. 1-7, 12-15, 21
	Manganese	160 mg/Kg	[6.5]	Ref. 13, pp. 1-7, 12-15, 21
	Mercury	**22.68J* mg/Kg**	**[0.22]**	**Ref. 13, pp. 1-7, 12-15, 21**
	Nickel	**43.6 mg/Kg**	**[17.3]**	**Ref. 13, pp. 1-7, 12-15, 21**
	Silver	ND	[4.4]	Ref. 13, pp. 1-7, 12-15, 21
	Vanadium	13.7L mg/Kg	[21.6]	Ref. 13, pp. 1-7, 12-15, 21
	Zinc	**322 mg/Kg**	**[8.7]**	**Ref. 13, pp. 1-7, 12-15, 21**
	Cyanide	**ND**	**[2.2]**	**Ref. 13, pp. 1-7, 12-15, 21**
SE-06 FGW50 Volatiles	Carbon Disulfide	NDMJ	[180]	Ref. 15, pp. 1-9, 23-30, 52
	Cyclohexane	ND	[100]	Ref. 15, pp. 1-9, 23-30, 52
	Benzene	**147.2J^* µg/Kg**	**[100]**	**Ref. 15, pp. 1-9, 23-30, 52**
	Methylcyclohexane	**340J^ µg/Kg**	**[100]**	**Ref. 15, pp. 1-9, 23-30, 52**
	Toluene	92J^* µg/Kg	[100]	Ref. 15, pp. 1-9, 23-30, 52
	Chlorobenzene	**335J^* µg/Kg**	**[100]**	**Ref. 15, pp. 1-9, 23-30, 53**
	Ethylbenzene	15J^* µg/Kg	[100]	Ref. 15, pp. 1-9, 23-30, 53
	Xylenes (total)	78J^* µg/Kg	[100]	Ref. 15, pp. 1-9, 23-30, 53
	Isopropylbenzene	**680J^ µg/Kg**	**[100]**	**Ref. 15, pp. 1-9, 23-30, 53**
	1,3-Dichlorobenzene	**1,700 µg/Kg**	**[1,000]**	**Ref. 15, pp. 1-9, 23-30, 53**
	1,4-Dichlorobenzene	**820J^ µg/Kg**	**[110]**	**Ref. 15, pp. 1-9, 23-30, 53**

Table 6 (Continued)

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-06 FGW50 Semivolatiles	Hexachlorobutadiene	21,000 µg/Kg	[14,000]	Ref. 15, pp. 1-9, 23-30, 106
	2-Methylnaphthalene	1,800J µg/Kg	[14,000]	Ref. 15, pp. 1-9, 23-30, 106
	Hexachlorobenzene	4,800J µg/Kg	[14,000]	Ref. 15, pp. 1-9, 23-30, 107
SE-06 FGW50 Pesticides/PCBs	Aldrin	NDMJ	[170]	Ref. 15, pp. 1-9, 23-30, 149-50
	Endosulfan I	ND	[35]	Ref. 15, pp. 1-9, 23-30, 149-50
	Endrin	ND	[69]	Ref. 15, pp. 1-9, 23-30, 149-50
	Aroclor-1248	**380J* µg/Kg**	**[69]**	**Ref. 15, pp. 1-9, 23-30, 149-50**
	Aroclor-1254	ND	[690]	Ref. 15, pp. 1-9, 23-30, 149-50
	Aroclor-1260	**210J* µg/Kg**	**[69]**	**Ref. 15, pp. 1-9, 23-30, 149-50**

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-07 MFHW71 Inorganics	Cadmium	0.43L mg/Kg	[1.4]	Ref. 13, pp. 1-7, 12-15, 22
	Chromium	**48.8 mg/Kg**	**[2.8]**	**Ref. 13, pp. 1-7, 12-15, 22**
	Copper	25.2 mg/Kg	[7.0]	Ref. 13, pp. 1-7, 12-15, 22
	Lead	47.1 mg/Kg	[0.84]	Ref. 13, pp. 1-7, 12-15, 22
	Manganese	92.6 mg/Kg	[4.2]	Ref. 13, pp. 1-7, 12-15, 22
	Mercury	1.42J* mg/Kg	[0.14]	Ref. 13, pp. 1-7, 12-15, 22
	Nickel	29.2 mg/Kg	[11.2]	Ref. 13, pp. 1-7, 12-15, 22
	Silver	ND	[2.8]	Ref. 13, pp. 1-7, 12-15, 22
	Vanadium	9.7L mg/Kg	[14.0]	Ref. 13, pp. 1-7, 12-15, 22
	Zinc	123 mg/Kg	[5.6]	Ref. 13, pp. 1-7, 12-15, 22
	Cyanide	1.1 mg/Kg	[1.4]	Ref. 13, pp. 1-7, 12-15, 22
SE-07 FGW51 Volatiles	Carbon Disulfide	NDMJ	[80]	Ref. 15, pp. 1-9, 23-30, 58
	Cyclohexane	ND	[72]	Ref. 15, pp. 1-9, 23-30, 58
	Benzene	**150 µg/Kg**	**[72]**	**Ref. 15, pp. 1-9, 23-30, 58**
	Methylcyclohexane	9J µg/Kg	[72]	Ref. 15, pp. 1-9, 23-30, 58
	Toluene	22J µg/Kg	[72]	Ref. 15, pp. 1-9, 23-30, 58
	Chlorobenzene	**550J^* µg/Kg**	**[720]**	**Ref. 15, pp. 1-9, 23-30, 59**
	Ethylbenzene	7J µg/Kg	[72]	Ref. 15, pp. 1-9, 23-30, 59
	Xylenes (total)	34J µg/Kg	[72]	Ref. 15, pp. 1-9, 23-30, 59
	Isopropylbenzene	16J µg/Kg	[72]	Ref. 15, pp. 1-9, 23-30, 59
	1,3-Dichlorobenzene	**1,700 µg/Kg**	**[720]**	**Ref. 15, pp. 1-9, 23-30, 59**
	1,4-Dichlorobenzene	**1,400 µg/Kg**	**[72]**	**Ref. 15, pp. 1-9, 23-30, 59**
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-07 FGW51 Semivolatiles	Hexachlorobutadiene	71,000 µg/Kg	[19,000]	Ref. 15, pp. 1-9, 23-30, 109
	2-Methylnaphthalene	450LJ µg/Kg	[1,900]	Ref. 15, pp. 1-9, 23-30, 109
	Hexachlorobenzene	40,000 µg/Kg	[19,000]	Ref. 15, pp. 1-9, 23-30, 110
SE-07 FGW51 Pesticides/PCBs	Aldrin	ND	[2.5]	Ref. 15, pp. 1-9, 23-30, 151
	Endosulfan I	ND	[2.5]	Ref. 15, pp. 1-9, 23-30, 151
	Endrin	ND	[4.8]	Ref. 15, pp. 1-9, 23-30, 151
	Aroclor-1248	ND	[48]	Ref. 15, pp. 1-9, 23-30, 151
	Aroclor-1254	32J* µg/Kg	[48]	Ref. 15, pp. 1-9, 23-30, 151
	Aroclor-1260	ND	[48]	Ref. 15, pp. 1-9, 23-30, 151

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-08 MFHW72 Inorganics	Cadmium	0.50L mg/Kg	[1.5]	Ref. 13, pp. 1-7, 12-15, 23
	Chromium	**56.5 mg/Kg**	**[3.0]**	**Ref. 13, pp. 1-7, 12-15, 23**
	Copper	30.7 mg/Kg	[7.5]	Ref. 13, pp. 1-7, 12-15, 23
	Lead	54.3 mg/Kg	[0.9]	Ref. 13, pp. 1-7, 12-15, 23
	Manganese	107 mg/Kg	[4.5]	Ref. 13, pp. 1-7, 12-15, 23
	Mercury	1.58J* mg/Kg	[0.15]	Ref. 13, pp. 1-7, 12-15, 23
	Nickel	31.7 mg/Kg	[12.0]	Ref. 13, pp. 1-7, 12-15, 23
	Silver	ND	[3.0]	Ref. 13, pp. 1-7, 12-15, 23
	Vanadium	11.5L mg/Kg	[15.0]	Ref. 13, pp. 1-7, 12-15, 23
	Zinc	159 mg/Kg	[6.0]	Ref. 13, pp. 1-7, 12-15, 23
	Cyanide	ND	[1.5]	Ref. 13, pp. 1-7, 12-15, 23
SE-08 FGW52 Volatiles	Carbon Disulfide	NDMJ	[120]	Ref. 15, pp. 1-9, 23-30, 61
	Cyclohexane	ND	[75]	Ref. 15, pp. 1-9, 23-30, 61
	Benzene	48J µg/Kg	[75]	Ref. 15, pp. 1-9, 23-30, 61
	Methylcyclohexane	ND	[75]	Ref. 15, pp. 1-9, 23-30, 61
	Toluene	14J µg/Kg	[75]	Ref. 15, pp. 1-9, 23-30, 61
	Chlorobenzene	**780 µg/Kg**	**[75]**	**Ref. 15, pp. 1-9, 23-30, 62**
	Ethylbenzene	ND	[75]	Ref. 15, pp. 1-9, 23-30, 62
	Xylenes (total)	19J µg/Kg	[75]	Ref. 15, pp. 1-9, 23-30, 62
	Isopropylbenzene	17J µg/Kg	[75]	Ref. 15, pp. 1-9, 23-30, 62
	1,3-Dichlorobenzene	**1,100 µg/Kg**	**[75]**	**Ref. 15, pp. 1-9, 23-30, 62**
	1,4-Dichlorobenzene	**460 µg/Kg**	**[75]**	**Ref. 15, pp. 1-9, 23-30, 62**

Table 6 (Continued)

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-08 FGW52 Semivolatiles	Hexachlorobutadiene	95,000 µg/Kg	[25,000]	Ref. 15, pp. 1-9, 23-30, 115
	2-Methylnaphthalene	ND	[25,000]	Ref. 15, pp. 1-9, 23-30, 115
	Hexachlorobenzene	38,000 µg/Kg	[25,000]	Ref. 15, pp. 1-9, 23-30, 116
SE-08 FGW52 Pesticides/PCBs	Aldrin	1.12J* µg/Kg	[2.5]	Ref. 15, pp. 1-9, 23-30, 152
	Endosulfan I	ND	[2.5]	Ref. 15, pp. 1-9, 23-30, 152
	Endrin	ND	[4.9]	Ref. 15, pp. 1-9, 23-30, 152
	Aroclor-1248	ND	[49]	Ref. 15, pp. 1-9, 23-30, 152
	Aroclor-1254	37J* µg/Kg	[49]	Ref. 15, pp. 1-9, 23-30, 152
	Aroclor-1260	ND	[49]	Ref. 15, pp. 1-9, 23-30, 152

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-09 MFHW73 Inorganics	Cadmium	0.37L mg/Kg	[1.5]	Ref. 13, pp. 1-7, 12-15, 24
	Chromium	**42.5 mg/Kg**	**[3.0]**	**Ref. 13, pp. 1-7, 12-15, 24**
	Copper	26.4 mg/Kg	[7.7]	Ref. 13, pp. 1-7, 12-15, 24
	Lead	28.7 mg/Kg	[0.92]	Ref. 13, pp. 1-7, 12-15, 24
	Manganese	89.2 mg/Kg	[4.6]	Ref. 13, pp. 1-7, 12-15, 24
	Mercury	**1.75J* mg/Kg**	**[0.15]**	**Ref. 13, pp. 1-7, 12-15, 24**
	Nickel	25.5 mg/Kg	[12.3]	Ref. 13, pp. 1-7, 12-15, 24
	Silver	ND	[3.0]	Ref. 13, pp. 1-7, 12-15, 24
	Vanadium	8.1L mg/Kg	[15.4]	Ref. 13, pp. 1-7, 12-15, 24
	Zinc	116 mg/Kg	[6.2]	Ref. 13, pp. 1-7, 12-15, 24
	Cyanide	**1.5 mg/Kg**	**[1.5]**	**Ref. 13, pp. 1-7, 12-15, 24**
SE-09 FGW53 Volatiles	Carbon Disulfide	NDMJ	[130]	Ref. 15, pp. 1-9, 23-30, 64
	Cyclohexane	ND	[78]	Ref. 15, pp. 1-9, 23-30, 64
	Benzene	30J µg/Kg	[78]	Ref. 15, pp. 1-9, 23-30, 64
	Methylcyclohexane	ND	[78]	Ref. 15, pp. 1-9, 23-30, 64
	Toluene	11J µg/Kg	[78]	Ref. 15, pp. 1-9, 23-30, 64
	Chlorobenzene	**480 µg/Kg**	**[78]**	**Ref. 15, pp. 1-9, 23-30, 65**
	Ethylbenzene	ND	[78]	Ref. 15, pp. 1-9, 23-30, 65
	Xylenes (total)	12J µg/Kg	[78]	Ref. 15, pp. 1-9, 23-30, 65
	Isopropylbenzene	11J µg/Kg	[78]	Ref. 15, pp. 1-9, 23-30, 65
	1,3-Dichlorobenzene	**770 µg/Kg**	**[78]**	**Ref. 15, pp. 1-9, 23-30, 65**
	1,4-Dichlorobenzene	**310 µg/Kg**	**[78]**	**Ref. 15, pp. 1-9, 23-30, 65**

Table 6 (Continued)

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-09 FGW53 Semivolatiles	Hexachlorobutadiene	75,000 µg/Kg	[26,000]	Ref. 15, pp. 1-9, 23-30, 118
	2-Methylnaphthalene	ND	[26,000]	Ref. 15, pp. 1-9, 23-30, 118
	Hexachlorobenzene	32,000 µg/Kg	[26,000]	Ref. 15, pp. 1-9, 23-30, 119
SE-09 FGW53 Pesticides/PCBs	Aldrin	1.12J* µg/Kg	[2.7]	Ref. 15, pp. 1-9, 23-30, 153
	Endosulfan I	ND	[2.7]	Ref. 15, pp. 1-9, 23-30, 153
	Endrin	ND	[5.2]	Ref. 15, pp. 1-9, 23-30, 153
	Aroclor-1248	ND	[52]	Ref. 15, pp. 1-9, 23-30, 153
	Aroclor-1254	530 µg/Kg	[52]	Ref. 15, pp. 1-9, 23-30, 153
	Aroclor-1260	ND	[52]	Ref. 15, pp. 1-9, 23-30, 153

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-14 MFHW78 Inorganics	Cadmium	0.83L mg/Kg	[63.7]	Ref. 12, pp. 1-7, 10-13, 15
	Chromium	**56 mg/Kg**	**[3.4]**	**Ref. 12, pp. 1-7, 10-13, 15**
	Copper	**60.2 mg/Kg**	**[8.4]**	**Ref. 12, pp. 1-7, 10-13, 15**
	Lead	32.6 mg/Kg	[1.01]	Ref. 12, pp. 1-7, 10-13, 15
	Manganese	223 mg/Kg	[5.1]	Ref. 12, pp. 1-7, 10-13, 15
	Mercury	0.45 mg/Kg	[0.17]	Ref. 12, pp. 1-7, 10-13, 15
	Nickel	20.9 mg/Kg	[13.5]	Ref. 12, pp. 1-7, 10-13, 15
	Silver	ND	[3.4]	Ref. 12, pp. 1-7, 10-13, 15
	Vanadium	25.7 mg/Kg	[16.8]	Ref. 12, pp. 1-7, 10-13, 15
	Zinc	174 mg/Kg	[6.7]	Ref. 12, pp. 1-7, 10-13, 15
	Cyanide	0.43LJv mg/Kg	[1.7]	Ref. 12, pp. 1-7, 10-13, 15
SE-14 FGW58 Volatiles	Carbon Disulfide	NDMJ	[32]	Ref. 14, pp. 1-13, 26-34, 38
	Cyclohexane	ND	[16]	Ref. 14, pp. 1-13, 26-34, 38
	Benzene	ND	[16]	Ref. 14, pp. 1-13, 26-34, 38
	Methylcyclohexane	ND	[16]	Ref. 14, pp. 1-13, 26-34, 38
	Toluene	ND	[16]	Ref. 14, pp. 1-13, 26-34, 38
	Chlorobenzene	ND	[16]	Ref. 14, pp. 1-13, 26-34, 39
	Ethylbenzene	ND	[16]	Ref. 14, pp. 1-13, 26-34, 39
	Xylenes (total)	5LJ µg/Kg	[16]	Ref. 14, pp. 1-13, 26-34, 39
	Isopropylbenzene	**19 µg/Kg**	**[16]**	**Ref. 14, pp. 1-13, 26-34, 39**
	1,3-Dichlorobenzene	3LJ µg/Kg	[16]	Ref. 14, pp. 1-13, 26-34, 39
	1,4-Dichlorobenzene	ND	[16]	Ref. 14, pp. 1-13, 26-34, 39
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-14 FGW58 Semivolatiles	Hexachlorobutadiene	ND	[530]	Ref. 14, pp. 1-13, 26-34, 83
	2-Methylnaphthalene	ND	[530]	Ref. 14, pp. 1-13, 26-34, 83
	Hexachlorobenzene	ND	[530]	Ref. 14, pp. 1-13, 26-34, 84
SE-14 FGW58 Pesticides/PCBs	Aldrin	NDMJ	[6.5]	Ref. 14, pp. 1-13, 26-34, 129
	Endosulfan I	ND	[2.7]	Ref. 14, pp. 1-13, 26-34, 129
	Endrin	1.9LJ µg/Kg	[5.3]	Ref. 14, pp. 1-13, 26-34, 129
	Aroclor-1248	16J* µg/Kg	[53]	Ref. 14, pp. 1-13, 26-34, 129
	Aroclor-1254	ND	[53]	Ref. 14, pp. 1-13, 26-34, 129
	Aroclor-1260	ND	[53]	Ref. 14, pp. 1-13, 26-34, 129

ND = Not detected.
ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-17 MFHW81 Inorganics	Cadmium	1.1 mg/Kg	[1.4]	Ref. 12, pp. 1-7, 10-13, 18
	Chromium	**280 mg/Kg**	**[2.8]**	**Ref. 12, pp. 1-7, 10-13, 18**
	Copper	31.7 mg/Kg	[6.9]	Ref. 12, pp. 1-7, 10-13, 18
	Lead	34.5 mg/Kg	[0.8]	Ref. 12, pp. 1-7, 10-13, 18
	Manganese	**3,500 mg/Kg**	**[4.2]**	**Ref. 12, pp. 1-7, 10-13, 18**
	Mercury	0.17 mg/Kg	[0.14]	Ref. 12, pp. 1-7, 10-13, 18
	Nickel	14.1 mg/Kg	[11.1]	Ref. 12, pp. 1-7, 10-13, 18
	Silver	ND	[2.8]	Ref. 12, pp. 1-7, 10-13, 18
	Vanadium	**87.7 mg/Kg**	**[13.9]**	**Ref. 12, pp. 1-7, 10-13, 18**
	Zinc	225 mg/Kg	[5.6]	Ref. 12, pp. 1-7, 10-13, 18
	Cyanide	0.26LJv mg/Kg	[1.4]	Ref. 12, pp. 1-7, 10-13, 18
SE-17 FGW61 Volatiles	Carbon Disulfide	NDJ	[15]	Ref. 14, pp. 1-13, 26-34, 47
	Cyclohexane	ND	[13]	Ref. 14, pp. 1-13, 26-34, 47
	Benzene	4J µg/Kg	[13]	Ref. 14, pp. 1-13, 26-34, 47
	Methylcyclohexane	ND	[13]	Ref. 14, pp. 1-13, 26-34, 47
	Toluene	4J µg/Kg	[13]	Ref. 14, pp. 1-13, 26-34, 47
	Chlorobenzene	1J µg/Kg	[13]	Ref. 14, pp. 1-13, 26-34, 48
	Ethylbenzene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 48
	Xylenes (total)	2J µg/Kg	[13]	Ref. 14, pp. 1-13, 26-34, 48
	Isopropylbenzene	6J µg/Kg	[13]	Ref. 14, pp. 1-13, 26-34, 48
	1,3-Dichlorobenzene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 48
	1,4-Dichlorobenzene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 48
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-17 FGW61 Semivolatiles	Hexachlorobutadiene	ND	[860]	Ref. 14, pp. 1-13, 26-34, 95
	2-Methylnaphthalene	ND	[860]	Ref. 14, pp. 1-13, 26-34, 95
	Hexachlorobenzene	ND	[860]	Ref. 14, pp. 1-13, 26-34, 96
SE-17 FGW61 Pesticides/PCBs	Aldrin	ND	[2.2]	Ref. 14, pp. 1-13, 26-34, 132
	Endosulfan I	ND	[2.2]	Ref. 14, pp. 1-13, 26-34, 132
	Endrin	ND	[4.3]	Ref. 14, pp. 1-13, 26-34, 132
	Aroclor-1248	ND	[43]	Ref. 14, pp. 1-13, 26-34, 132
	Aroclor-1254	ND	[43]	Ref. 14, pp. 1-13, 26-34, 132
	Aroclor-1260	ND	[43]	Ref. 14, pp. 1-13, 26-34, 132

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
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Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-18 MFHW82 Inorganics	Cadmium	0.44 mg/Kg	[1.5]	Ref. 12, pp. 1-7, 10-13, 19
	Chromium	**96.5 mg/Kg**	**[2.9]**	**Ref. 12, pp. 1-7, 10-13, 19**
	Copper	23.7 mg/Kg	[7.3]	Ref. 12, pp. 1-7, 10-13, 19
	Lead	33.4 mg/Kg	[0.9]	Ref. 12, pp. 1-7, 10-13, 19
	Manganese	411 mg/Kg	[4.4]	Ref. 12, pp. 1-7, 10-13, 19
	Mercury	0.47 mg/Kg	[0.14]	Ref. 12, pp. 1-7, 10-13, 19
	Nickel	18.3 mg/Kg	[11.7]	Ref. 12, pp. 1-7, 10-13, 19
	Silver	ND	[2.9]	Ref. 12, pp. 1-7, 10-13, 19
	Vanadium	18.6 mg/Kg	[14.7]	Ref. 12, pp. 1-7, 10-13, 19
	Zinc	201mg/Kg	[5.9]	Ref. 12, pp. 1-7, 10-13, 19
	Cyanide	NDJv	[1.5]	Ref. 12, pp. 1-7, 10-13, 19
SE-18 FGW62 Volatiles	Carbon Disulfide	7.4J* µg/Kg	[74]	Ref. 14, pp. 1-13, 26-34, 50
	Cyclohexane	ND	[74]	Ref. 14, pp. 1-13, 26-34, 50
	Benzene	55J µg/Kg	[74]	Ref. 14, pp. 1-13, 26-34, 50
	Methylcyclohexane	**80 µg/Kg**	**[74]**	**Ref. 14, pp. 1-13, 26-34, 50**
	Toluene	ND	[74]	Ref. 14, pp. 1-13, 26-34, 50
	Chlorobenzene	ND	[74]	Ref. 14, pp. 1-13, 26-34, 51
	Ethylbenzene	10J µg/Kg	[74]	Ref. 14, pp. 1-13, 26-34, 51
	Xylenes (total)	44J µg/Kg	[74]	Ref. 14, pp. 1-13, 26-34, 51
	Isopropylbenzene	**2,200 µg/Kg**	**[74]**	**Ref. 14, pp. 1-13, 26-34, 51**
	1,3-Dichlorobenzene	ND	[74]	Ref. 14, pp. 1-13, 26-34, 51
	1,4-Dichlorobenzene	ND	[74]	Ref. 14, pp. 1-13, 26-34, 51
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-18 FGW62 Semivolatiles	Hexachlorobutadiene	ND	[970]	Ref. 14, pp. 1-13, 26-34, 98
	2-Methylnaphthalene	390J µg/Kg	[970]	Ref. 14, pp. 1-13, 26-34, 98
	Hexachlorobenzene	ND	[970]	Ref. 14, pp. 1-13, 26-34, 99
SE-18 FGW62 Pesticides/PCBs	Aldrin	NDMJ	[260]	Ref. 14, pp. 1-13, 26-34, 133
	Endosulfan I	**2.7J* µg/Kg**	**[2.5]**	**Ref. 14, pp. 1-13, 26-34, 133**
	Endrin	**48 µg/Kg**	**[4.9]**	**Ref. 14, pp. 1-13, 26-34, 133**
	Aroclor-1248	**330J* µg/Kg**	**[49]**	**Ref. 14, pp. 1-13, 26-34, 133**
	Aroclor-1254	ND	[49]	Ref. 14, pp. 1-13, 26-34, 133
	Aroclor-1260	29J* µg/Kg	[49]	Ref. 14, pp. 1-13, 26-34, 133

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
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CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
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Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-19 MFHW83 Inorganics	Cadmium	0.64 mg/Kg	[1.8]	Ref. 12, pp. 1-7, 10-13, 20
	Chromium	**78.5 mg/Kg**	**[3.6]**	**Ref. 12, pp. 1-7, 10-13, 20**
	Copper	43.7 mg/Kg	[8.9]	Ref. 12, pp. 1-7, 10-13, 20
	Lead	37.3 mg/Kg	[1.1]	Ref. 12, pp. 1-7, 10-13, 20
	Manganese	162 mg/Kg	[5.3]	Ref. 12, pp. 1-7, 10-13, 20
	Mercury	0.59 mg/Kg	[0.18]	Ref. 12, pp. 1-7, 10-13, 20
	Nickel	20.4 mg/Kg	[14.2]	Ref. 12, pp. 1-7, 10-13, 20
	Silver	0.73 mg/Kg	[3.6]	Ref. 12, pp. 1-7, 10-13, 20
	Vanadium	17.3 mg/Kg	[17.8]	Ref. 12, pp. 1-7, 10-13, 20
	Zinc	269 mg/Kg	[7.1]	Ref. 12, pp. 1-7, 10-13, 20
	Cyanide	0.75LJv mg/Kg	[1.8]	Ref. 12, pp. 1-7, 10-13, 20
SE-19 FGW63 Volatiles	Carbon Disulfide	NDJ	[58]	Ref. 14, pp. 1-13, 26-34, 56
	Cyclohexane	4J µg/Kg	[17]	Ref. 14, pp. 1-13, 26-34, 56
	Benzene	7J µg/Kg	[17]	Ref. 14, pp. 1-13, 26-34, 56
	Methylcyclohexane	6J µg/Kg	[17]	Ref. 14, pp. 1-13, 26-34, 56
	Toluene	ND	[17]	Ref. 14, pp. 1-13, 26-34, 56
	Chlorobenzene	ND	[17]	Ref. 14, pp. 1-13, 26-34, 57
	Ethylbenzene	ND	[17]	Ref. 14, pp. 1-13, 26-34, 57
	Xylenes (total)	**48 µg/Kg**	**[17]**	**Ref. 14, pp. 1-13, 26-34, 57**
	Isopropylbenzene	**100 µg/Kg**	**[17]**	**Ref. 14, pp. 1-13, 26-34, 57**
	1,3-Dichlorobenzene	3J µg/Kg	[17]	Ref. 14, pp. 1-13, 26-34, 57
	1,4-Dichlorobenzene	ND	[17]	Ref. 14, pp. 1-13, 26-34, 57
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-19 FGW63 Semivolatiles	Hexachlorobutadiene	ND	[11,000]	Ref. 14, pp. 1-13, 26-34, 101
	2-Methylnaphthalene	28,000 µg/Kg	[11,000]	Ref. 14, pp. 1-13, 26-34, 101
	Hexachlorobenzene	NDJv	[11,000]	Ref. 14, pp. 1-13, 26-34, 102
SE-19 FGW63 Pesticides/PCBs	Aldrin	NDM	[290]	Ref. 14, pp. 1-13, 26-34, 135
	Endosulfan I	0.99J* µg/Kg	[2.9]	Ref. 14, pp. 1-13, 26-34, 135
	Endrin	1.8J* µg/Kg	[5.6]	Ref. 14, pp. 1-13, 26-34, 135
	Aroclor-1248	460J^ µg/Kg	[56]	Ref. 14, pp. 1-13, 26-34, 135
	Aroclor-1254	ND	[56]	Ref. 14, pp. 1-13, 26-34, 135
	Aroclor-1260	250 µg/Kg	[56]	Ref. 14, pp. 1-13, 26-34, 135

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-20 MFHW84 Inorganics	Cadmium	1.7 mg/Kg	[3.5]	Ref. 13, pp. 1-7, 12-15, 29
	Chromium	**497 mg/Kg**	**[6.9]**	**Ref. 13, pp. 1-7, 12-15, 29**
	Copper	**122 mg/Kg**	**[17.2]**	**Ref. 13, pp. 1-7, 12-15, 29**
	Lead	101 mg/Kg	[2.1]	Ref. 13, pp. 1-7, 12-15, 29
	Manganese	155 mg/Kg	[10.3]	Ref. 13, pp. 1-7, 12-15, 29
	Mercury	**15.74J* mg/Kg**	**[0.34]**	**Ref. 13, pp. 1-7, 12-15, 29**
	Nickel	**47.4 mg/Kg**	**[27.6]**	**Ref. 13, pp. 1-7, 12-15, 29**
	Silver	1.7 mg/Kg	[6.9]	Ref. 13, pp. 1-7, 12-15, 29
	Vanadium	23.1 mg/Kg	[34.5	Ref. 13, pp. 1-7, 12-15, 29
	Zinc	**818 mg/Kg**	**[13.8]**	**Ref. 13, pp. 1-7, 12-15, 29**
	Cyanide	ND	[3.5]	Ref. 13, pp. 1-7, 12-15, 29
SE-20 FGW64 Volatiles	**Carbon Disulfide**	**420 µg/Kg**	**[38]**	**Ref. 15, pp. 1-9, 23-30, 79**
	Cyclohexane	**390J^ µg/Kg**	**[38]**	**Ref. 15, pp. 1-9, 23-30, 79**
	Benzene	**182.7J^* µg/Kg**	**[38]**	**Ref. 15, pp. 1-9, 23-30, 79**
	Methylcyclohexane	**540 µg/Kg**	**[38]**	**Ref. 15, pp. 1-9, 23-30, 79**
	Toluene	36.8J^* µg/Kg	[38]	Ref. 15, pp. 1-9, 23-30, 79
	Chlorobenzene	**49 µg/Kg**	**[38]**	**Ref. 15, pp. 1-9, 23-30, 80**
	Ethylbenzene	**49J^* µg/Kg**	**[38]**	**Ref. 15, pp. 1-9, 23-30, 80**
	Xylenes (total)	**140J^* µg/Kg**	**[38]**	**Ref. 15, pp. 1-9, 23-30, 80**
	Isopropylbenzene	**2,800 µg/Kg**	**[190]**	**Ref. 15, pp. 1-9, 23-30, 80**
	1,3-Dichlorobenzene	**320 µg/Kg**	**[38]**	**Ref. 15, pp. 1-9, 23-30, 80**
	1,4-Dichlorobenzene	**85 µg/Kg**	**[38]**	**Ref. 15, pp. 1-9, 23-30, 80**
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-20 FGW64 Semivolatiles	Hexachlorobutadiene	430J µg/Kg	[5,100]	Ref. 15, pp. 1-9, 23-30, 133
	2-Methylnaphthalene	880J µg/Kg	[5,100]	Ref. 15, pp. 1-9, 23-30, 133
	Hexachlorobenzene	270J µg/Kg	[5,100]	Ref. 15, pp. 1-9, 23-30, 134
SE-20 FGW64 Pesticides/PCBs	**Aldrin**	**230 µg/Kg**	**[65]**	**Ref. 15, pp. 1-9, 23-30, 159**
	Endosulfan I	0.78J* µg/Kg	[6.5]	Ref. 15, pp. 1-9, 23-30, 159
	Endrin	**72 µg/Kg**	**[13]**	**Ref. 15, pp. 1-9, 23-30, 159**
	Aroclor-1248	**4,300 µg/Kg**	**[130]**	**Ref. 15, pp. 1-9, 23-30, 159**
	Aroclor-1254	ND	[130]	Ref. 15, pp. 1-9, 23-30, 159
	Aroclor-1260	**160J* µg/Kg**	**[130]**	**Ref. 15, pp. 1-9, 23-30, 159**

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-21 MFHW85 Inorganics	Cadmium	1.4 mg/Kg	[3.2]	Ref. 13, pp. 1-7, 12-15, 30
	Chromium	**394 mg/Kg**	**[6.4]**	**Ref. 13, pp. 1-7, 12-15, 30**
	Copper	**99.3 mg/Kg**	**[15.9]**	**Ref. 13, pp. 1-7, 12-15, 30**
	Lead	84.9 mg/Kg	[1.9]	Ref. 13, pp. 1-7, 12-15, 30
	Manganese	124 mg/Kg	[9.6]	Ref. 13, pp. 1-7, 12-15, 30
	Mercury	**7.65J* mg/Kg**	**[0.32]**	**Ref. 13, pp. 1-7, 12-15, 30**
	Nickel	**41.1 mg/Kg**	**[25.5]**	**Ref. 13, pp. 1-7, 12-15, 30**
	Silver	1.5 mg/Kg	[6.4]	Ref. 13, pp. 1-7, 12-15, 30
	Vanadium	18.0 mg/Kg	[31.9]	Ref. 13, pp. 1-7, 12-15, 30
	Zinc	**673 mg/Kg**	**[12.7]**	**Ref. 13, pp. 1-7, 12-15, 30**
	Cyanide	ND	[3.5]	Ref. 13, pp. 1-7, 12-15, 30
SE-21 FGW65 Volatiles	Carbon Disulfide	ND	[330]	Ref. 15, pp. 1-9, 23-30, 85
	Cyclohexane	NDJv	[160]	Ref. 15, pp. 1-9, 23-30, 85
	Benzene	90Jv µg/Kg	[160]	Ref. 15, pp. 1-9, 23-30, 85
	Methylcyclohexane	**300 µg/Kg**	**[160]**	**Ref. 15, pp. 1-9, 23-30, 85**
	Toluene	19Jv µg/Kg	[160]	Ref. 15, pp. 1-9, 23-30, 85
	Chlorobenzene	24Jv µg/Kg	[160]	Ref. 15, pp. 1-9, 23-30, 86
	Ethylbenzene	53Jv µg/Kg	[160]	Ref. 15, pp. 1-9, 23-30, 86
	Xylenes (total)	**610 Jv µg/Kg**	**[160]**	**Ref. 15, pp. 1-9, 23-30, 86**
	Isopropylbenzene	**1,900 µg/Kg**	**[160]**	**Ref. 15, pp. 1-9, 23-30, 86**
	1,3-Dichlorobenzene	**200 µg/Kg**	**[160]**	**Ref. 15, pp. 1-9, 23-30, 86**
	1,4-Dichlorobenzene	55J µg/Kg	[160]	Ref. 15, pp. 1-9, 23-30, 86
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-21 FGW65 Semivolatiles	Hexachlorobutadiene	290J µg/Kg	[4,400]	Ref. 15, pp. 1-9, 23-30, 136
	2-Methylnaphthalene	450J µg/Kg	[4,400]	Ref. 15, pp. 1-9, 23-30, 136
	Hexachlorobenzene	300J µg/Kg	[4,400]	Ref. 15, pp. 1-9, 23-30, 137
SE-21 FGW65 Pesticides/PCBs	**Aldrin**	**170 µg/Kg**	**[57]**	**Ref. 15, pp. 1-9, 23-30, 161**
	Endosulfan I	1.4J* µg/Kg	[5.7]	Ref. 15, pp. 1-9, 23-30, 161
	Endrin	**66 µg/Kg**	**[11]**	**Ref. 15, pp. 1-9, 23-30, 161**
	Aroclor-1248	**3,400 µg/Kg**	**[5.7]**	**Ref. 15, pp. 1-9, 23-30, 161**
	Aroclor-1254	ND	[110]	Ref. 15, pp. 1-9, 23-30, 161
	Aroclor-1260	**1,100 µg/Kg**	**[110]**	**Ref. 15, pp. 1-9, 23-30, 161**

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-22 MFHW86 Inorganics	Cadmium	0.76 mg/Kg	[2.2]	Ref. 12, pp. 1-7, 10-13, 21
	Chromium	**188 mg/Kg**	**[4.5]**	**Ref. 12, pp. 1-7, 10-13, 21**
	Copper	**82.2 mg/Kg**	**[11.2]**	**Ref. 12, pp. 1-7, 10-13, 21**
	Lead	**151mg/Kg**	**[1.3]**	**Ref. 12, pp. 1-7, 10-13, 21**
	Manganese	276 mg/Kg	[6.7]	Ref. 12, pp. 1-7, 10-13, 21
	Mercury	**17.8 mg/Kg**	**[0.22]**	**Ref. 12, pp. 1-7, 10-13, 21**
	Nickel	**51 mg/Kg**	**[17.9]**	**Ref. 12, pp. 1-7, 10-13, 21**
	Silver	**62.8mg/Kg**	**[4.5]**	**Ref. 12, pp. 1-7, 10-13, 21**
	Vanadium	10.2 mg/Kg	[22.3]	Ref. 12, pp. 1-7, 10-13, 21
	Zinc	**337 mg/Kg**	**[8.9]**	**Ref. 12, pp. 1-7, 10-13, 21**
	Cyanide	1.01LJv mg/Kg	[2.2]	Ref. 12, pp. 1-7, 10-13, 21
SE-22 FGW66 Volatiles	Carbon Disulfide	31.0J* µg/Kg	[110]	Ref. 14, pp. 1-13, 26-34, 59
	Cyclohexane	ND	[110]	Ref. 14, pp. 1-13, 26-34, 59
	Benzene	**450 µg/Kg**	**[110]**	**Ref. 14, pp. 1-13, 26-34, 59**
	Methylcyclohexane	**390 µg/Kg**	**[110]**	**Ref. 14, pp. 1-13, 26-34, 59**
	Toluene	**950 µg/Kg**	**[110]**	**Ref. 14, pp. 1-13, 26-34, 59**
	Chlorobenzene	72J µg/Kg	[110]	Ref. 14, pp. 1-13, 26-34, 60
	Ethylbenzene	**360 µg/Kg**	**[110]**	**Ref. 14, pp. 1-13, 26-34, 60**
	Xylenes (total)	**1,400 µg/Kg**	**[110]**	**Ref. 14, pp. 1-13, 26-34, 60**
	Isopropylbenzene	**3,900 µg/Kg**	**[1,110]**	**Ref. 14, pp. 1-13, 26-34, 60**
	1,3-Dichlorobenzene	**1,300 µg/Kg**	**[110]**	**Ref. 14, pp. 1-13, 26-34, 60**
	1,4-Dichlorobenzene	**530 µg/Kg**	**[110]**	**Ref. 14, pp. 1-13, 26-34, 60**
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-22 FGW66 Semivolatiles	Hexachlorobutadiene	ND	[25,000]	Ref. 14, pp. 1-13, 26-34, 107
	2-Methylnaphthalene	20,000J µg/Kg	[25,000]	Ref. 14, pp. 1-13, 26-34, 107
	Hexachlorobenzene	ND	[25,000]	Ref. 14, pp. 1-13, 26-34, 108
SE-22 FGW66 Pesticides/PCBs	Aldrin	NDM	[390]	Ref. 14, pp. 1-13, 26-34, 137
	Endosulfan I	70JN µg/Kg	[4.2]	Ref. 14, pp. 1-13, 26-34, 137
	Endrin	**150 µg/Kg**	**[8.2]**	**Ref. 14, pp. 1-13, 26-34, 137**
	Aroclor-1248	**14,000 µg/Kg**	**[820]**	**Ref. 14, pp. 1-13, 26-34, 137**
	Aroclor-1254	ND	[820]	Ref. 14, pp. 1-13, 26-34, 137
	Aroclor-1260	**340J* µg/Kg**	**[82]**	**Ref. 14, pp. 1-13, 26-34, 137**

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-23 MFHW87 Inorganics	**Cadmium**	**1.8 mg/Kg**	**[1.6]**	**Ref. 12, pp. 1-7, 10-13, 22**
	Chromium	**77.5 mg/Kg**	**[3.3]**	**Ref. 12, pp. 1-7, 10-13, 22**
	Copper	39.2 mg/Kg	[8.2]	Ref. 12, pp. 1-7, 10-13, 22
	Lead	77.7 mg/Kg	[0.98]	Ref. 12, pp. 1-7, 10-13, 22
	Manganese	179 mg/Kg	[4.9]	Ref. 12, pp. 1-7, 10-13, 22
	Mercury	**6.5 mg/Kg**	**[0.16]**	**Ref. 12, pp. 1-7, 10-13, 22**
	Nickel	**35 mg/Kg**	**[13.1]**	**Ref. 12, pp. 1-7, 10-13, 22**
	Silver	ND	[3.3]	Ref. 12, pp. 1-7, 10-13, 22
	Vanadium	24.7 mg/Kg	[16.4]	Ref. 12, pp. 1-7, 10-13, 22
	Zinc	**483 mg/Kg**	**[6.6]**	**Ref. 12, pp. 1-7, 10-13, 22**
	Cyanide	0.71LJv mg/Kg	[1.6]	Ref. 12, pp. 1-7, 10-13, 22
SE-23 FGW67 Volatiles	Carbon Disulfide	NDJ	[54]	Ref. 14, pp. 1-13, 26-34, 65
	Cyclohexane	ND	[18]	Ref. 14, pp. 1-13, 26-34, 65
	Benzene	3J µg/Kg	[18]	Ref. 14, pp. 1-13, 26-34, 65
	Methylcyclohexane	7J µg/Kg	[18]	Ref. 14, pp. 1-13, 26-34, 65
	Toluene	2J µg/Kg	[18]	Ref. 14, pp. 1-13, 26-34, 65
	Chlorobenzene	16J µg/Kg	[18]	Ref. 14, pp. 1-13, 26-34, 66
	Ethylbenzene	4J µg/Kg	[18]	Ref. 14, pp. 1-13, 26-34, 66
	Xylenes (total)	**22 µg/Kg**	**[18]**	**Ref. 14, pp. 1-13, 26-34, 66**
	Isopropylbenzene	**26 µg/Kg**	**[18]**	**Ref. 14, pp. 1-13, 26-34, 66**
	1,3-Dichlorobenzene	**29 µg/Kg**	**[18]**	**Ref. 14, pp. 1-13, 26-34, 66**
	1,4-Dichlorobenzene	5J µg/Kg	[18]	Ref. 14, pp. 1-13, 26-34, 66
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-23 FGW67 Semivolatiles	Hexachlorobutadiene	ND	[18,000]	Ref. 14, pp. 1-13, 26-34, 110
	2-Methylnaphthalene	ND	[18,000]	Ref. 14, pp. 1-13, 26-34, 110
	Hexachlorobenzene	ND	[18,000]	Ref. 14, pp. 1-13, 26-34, 111
SE-23 FGW67 Pesticides/PCBs	Aldrin	NDMJ	[11,000]	Ref. 14, pp. 1-13, 26-34, 139
	Endosulfan I	270J µg/Kg	[310]	Ref. 14, pp. 1-13, 26-34, 139
	Endrin	1,000J µg/Kg	[600]	Ref. 14, pp. 1-13, 26-34, 139
	Aroclor-1248	**300,000 µg/Kg**	**[60,000]**	**Ref. 14, pp. 1-13, 26-34, 139**
	Aroclor-1254	ND	[6,000]	Ref. 14, pp. 1-13, 26-34, 139
	Aroclor-1260	ND	[6,000]	Ref. 14, pp. 1-13, 26-34, 139

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
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N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-24 MFHW88 Inorganics	Cadmium	1.4 mg/Kg	[2.2]	Ref. 12, pp. 1-7, 10-13, 23
	Chromium	**229 mg/Kg**	**[4.4]**	**Ref. 12, pp. 1-7, 10-13, 23**
	Copper	**104 mg/Kg**	**[11.1]**	**Ref. 12, pp. 1-7, 10-13, 23**
	Lead	**139 mg/Kg**	**[1.3]**	**Ref. 12, pp. 1-7, 10-13, 23**
	Manganese	221 mg/Kg	[6.7]	Ref. 12, pp. 1-7, 10-13, 23
	Mercury	**37.1 mg/Kg**	**[0.22]**	**Ref. 12, pp. 1-7, 10-13, 23**
	Nickel	**70 mg/Kg**	**[17.8]**	**Ref. 12, pp. 1-7, 10-13, 23**
	Silver	1.0 mg/Kg	[4.4]	Ref. 12, pp. 1-7, 10-13, 23
	Vanadium	18.0 mg/Kg	[22.2]	Ref. 12, pp. 1-7, 10-13, 23
	Zinc	**450mg/Kg**	**[8.9]**	**Ref. 12, pp. 1-7, 10-13, 23**
	Cyanide	0.40LJv mg/Kg	[2.2]	Ref. 12, pp. 1-7, 10-13, 23
SE-24 FGW68 Volatiles	Carbon Disulfide	ND	[1,100]	Ref. 14, pp.1-13, 26-34, 68
	Cyclohexane	ND	[1,100]	Ref. 14, pp.1-13, 26-34, 68
	Benzene	380J µg/Kg	[1,100]	Ref. 14, pp.1-13, 26-34, 68
	Methylcyclohexane	620J µg/Kg	[1,100]	Ref. 14, pp.1-13, 26-34, 68
	Toluene	660J µg/Kg	[1,100]	Ref. 14, pp.1-13, 26-34, 68
	Chlorobenzene	**2,200 µg/Kg**	**[1,100]**	**Ref. 14, pp.1-13, 26-34, 69**
	Ethylbenzene	650J µg/Kg	[1,100]	Ref. 14, pp.1-13, 26-34, 69
	Xylenes (total)	**3,500 µg/Kg**	**[1,100]**	**Ref. 14, pp.1-13, 26-34, 69**
	Isopropylbenzene	**9,600 µg/Kg**	**[1,100]**	**Ref. 14, pp.1-13, 26-34, 69**
	1,3-Dichlorobenzene	**33,000 µg/Kg**	**[2,100]**	**Ref. 14, pp.1-13, 26-34, 69**
	1,4-Dichlorobenzene	**3,700 µg/Kg**	**[1,100]**	**Ref. 14, pp.1-13, 26-34, 69**

Table 6 (Continued)

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-24 FGW68 Semivolatiles	Hexachlorobutadiene	7,700J µg/Kg	[21,000]	Ref. 14, pp.1-13, 26-34, 113
	2-Methylnaphthalene	4,000J µg/Kg	[21,000]	Ref. 14, pp.1-13, 26-34, 113
	Hexachlorobenzene	*2,200J µg/Kg*	*[21,000]*	*Ref. 14, pp.1-13, 26-34, 114*
SE-24 FGW68 Pesticides/PCBs	Aldrin	NDMJ	[420]	Ref. 14, pp. 1-13, 26-34, 142
	Endosulfan I	ND	[3.6]	Ref. 14, pp. 1-13, 26-34, 142
	Endrin	ND	[7.0]	Ref. 14, pp. 1-13, 26-34, 142
	Aroclor-1248	**19,000 µg/Kg**	**[700]**	**Ref. 14, pp. 1-13, 26-34, 142**
	Aroclor-1254	ND	[70]	Ref. 14, pp. 1-13, 26-34, 142
	Aroclor-1260	ND	[70]	Ref. 14, pp. 1-13, 26-34, 142

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-25 MFHW89 Inorganics	Cadmium	1.0 mg/Kg	[1.6]	Ref. 12, pp. 1-7, 10-13, 24
	Chromium	**76.5 mg/Kg**	**[3.3]**	**Ref. 12, pp. 1-7, 10-13, 24**
	Copper	**89.3 mg/Kg**	**[8.2]**	**Ref. 12, pp. 1-7, 10-13, 24**
	Lead	30.2 mg/Kg	[0.98]	Ref. 12, pp. 1-7, 10-13, 24
	Manganese	103 mg/Kg	[4.9]	Ref. 12, pp. 1-7, 10-13, 24
	Mercury	0.59 mg/Kg	[0.16]	Ref. 12, pp. 1-7, 10-13, 24
	Nickel	20.1 mg/Kg	[13.1]	Ref. 12, pp. 1-7, 10-13, 24
	Silver	ND	[3.3]	Ref. 12, pp. 1-7, 10-13, 24
	Vanadium	17.1 mg/Kg	[16.4]	Ref. 12, pp. 1-7, 10-13, 24
	Zinc	227 mg/Kg	[6.6]	Ref. 12, pp. 1-7, 10-13, 24
	Cyanide	0.34LJv mg/Kg	[1.6]	Ref. 12, pp. 1-7, 10-13, 24
SE-25 FGW69 Volatiles	Carbon Disulfide	63BJ µg/Kg	[16]	Ref. 14, pp. 1-13, 26-34, 74
	Cyclohexane	2J µg/Kg	[16]	Ref. 14, pp. 1-13, 26-34, 74
	Benzene	2J µg/Kg	[16]	Ref. 14, pp. 1-13, 26-34, 74
	Methylcyclohexane	3J µg/Kg	[16]	Ref. 14, pp. 1-13, 26-34, 74
	Toluene	ND	[16]	Ref. 14, pp. 1-13, 26-34, 74
	Chlorobenzene	ND	[16]	Ref. 14, pp. 1-13, 26-34, 75
	Ethylbenzene	ND	[16]	Ref. 14, pp. 1-13, 26-34, 75
	Xylenes (total)	**46 µg/Kg**	**[16]**	**Ref. 14, pp. 1-13, 26-34, 75**
	Isopropylbenzene	**48 µg/Kg**	**[16]**	**Ref. 14, pp. 1-13, 26-34, 75**
	1,3-Dichlorobenzene	5J µg/Kg	[16]	Ref. 14, pp. 1-13, 26-34, 75
	1,4-Dichlorobenzene	2J µg/Kg	[16]	Ref. 14, pp. 1-13, 26-34, 75
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-25 FGW69 Semivolatiles	Hexachlorobutadiene	35J µg/Kg	[520]	Ref. 14, pp. 1-13, 26-34, 116
	2-Methylnaphthalene	100J µg/Kg	[520]	Ref. 14, pp. 1-13, 26-34, 116
	Hexachlorobenzene	ND	[520]	Ref. 14, pp. 1-13, 26-34, 117
SE-25 FGW69 Pesticides/PCBs	Aldrin	NDM	[110]	Ref. 14, pp. 1-13, 26-34, 143
	Endosulfan I	0.99J µg/Kg	[2.7]	Ref. 14, pp. 1-13, 26-34, 143
	Endrin	**12 µg/Kg**	**[5.2]**	**Ref. 14, pp. 1-13, 26-34, 143**
	Aroclor-1248	**1,400 µg/Kg**	**[52]**	**Ref. 14, pp. 1-13, 26-34, 143**
	Aroclor-1254	ND	[52]	Ref. 14, pp. 1-13, 26-34, 143
	Aroclor-1260	ND	[52]	Ref. 14, pp. 1-13, 26-34, 143

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-26 MFHW90 Inorganics	Cadmium	0.89 mg/Kg	[1.7]	Ref. 13, pp. 1-7, 12-15, 31
	Chromium	**84.4 mg/Kg**	**[3.4]**	**Ref. 13, pp. 1-7, 12-15, 31**
	Copper	47.2 mg/Kg	[8.5]	Ref. 13, pp. 1-7, 12-15, 31
	Lead	49.8 mg/Kg	[1.0]	Ref. 13, pp. 1-7, 12-15, 31
	Manganese	111 mg/Kg	[5.1]	Ref. 13, pp. 1-7, 12-15, 31
	Mercury	**2.84J* mg/Kg**	**[0.17]**	**Ref. 13, pp. 1-7, 12-15, 31**
	Nickel	20.5 mg/Kg	[13.6]	Ref. 13, pp. 1-7, 12-15, 31
	Silver	0.41 mg/Kg	[3.4]	Ref. 13, pp. 1-7, 12-15, 31
	Vanadium	11.9 mg/Kg	[17.0]	Ref. 13, pp. 1-7, 12-15, 31
	Zinc	238 mg/Kg	[6.8]	Ref. 13, pp. 1-7, 12-15, 31
	Cyanide	ND	[1.7]	Ref. 13, pp. 1-7, 12-15, 31
SE-26 FGW70 Volatiles	Carbon Disulfide	220B µg/Kg	[88]	Ref. 15, pp. 1-9, 23-30, 88
	Cyclohexane	ND	[88]	Ref. 15, pp. 1-9, 23-30, 88
	Benzene	25J µg/Kg	[88]	Ref. 15, pp. 1-9, 23-30, 88
	Methylcyclohexane	69J µg/Kg	[88]	Ref. 15, pp. 1-9, 23-30, 88
	Toluene	38J µg/Kg	[88]	Ref. 15, pp. 1-9, 23-30, 88
	Chlorobenzene	**1,700 µg/Kg**	**[88]**	**Ref. 15, pp. 1-9, 23-30, 89**
	Ethylbenzene	21J µg/Kg	[88]	Ref. 15, pp. 1-9, 23-30, 89
	Xylenes (total)	**91 µg/Kg**	**[88]**	**Ref. 15, pp. 1-9, 23-30, 89**
	Isopropylbenzene	**120 µg/Kg**	**[88]**	**Ref. 15, pp. 1-9, 23-30, 89**
	1,3-Dichlorobenzene	**500 µg/Kg**	**[88]**	**Ref. 15, pp. 1-9, 23-30, 89**
	1,4-Dichlorobenzene	**470 µg/Kg**	**[88]**	**Ref. 15, pp. 1-9, 23-30, 89**

Table 6 (Continued)

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-26 FGW70 Semivolatiles	Hexachlorobutadiene	30,000 µg/Kg	[12,000]	Ref. 15, pp. 1-9, 23-30, 139
	2-Methylnaphthalene	ND	[12,000]	Ref. 15, pp. 1-9, 23-30, 139
	Hexachlorobenzene	8,500J µg/Kg	[12,000]	Ref. 15, pp. 1-9, 23-30, 140
SE-26 FGW70 Pesticides/PCBs	Aldrin	ND	[3.0]	Ref. 15, pp. 1-9, 23-30, 163
	Endosulfan I	ND	[3.0]	Ref. 15, pp. 1-9, 23-30, 163
	Endrin	ND	[5.8]	Ref. 15, pp. 1-9, 23-30, 163
	Aroclor-1248	ND	[58]	Ref. 15, pp. 1-9, 23-30, 163
	Aroclor-1254	ND	[58]	Ref. 15, pp. 1-9, 23-30, 163
	Aroclor-1260	ND	[58]	Ref. 15, pp. 1-9, 23-30, 163

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-27 MFHW91 Inorganics	Cadmium	ND	[1.3]	Ref. 12, pp. 1-7, 10-13, 25
	Chromium	13.3 mg/Kg	[2.7]	Ref. 12, pp. 1-7, 10-13, 25
	Copper	10.7 mg/Kg	[6.7]	Ref. 12, pp. 1-7, 10-13, 25
	Lead	13.6 mg/Kg	[0.80]	Ref. 12, pp. 1-7, 10-13, 25
	Manganese	72.6 mg/Kg	[4.0]	Ref. 12, pp. 1-7, 10-13, 25
	Mercury	0.53 mg/Kg	[0.13]	Ref. 12, pp. 1-7, 10-13, 25
	Nickel	8.8 mg/Kg	[10.7]	Ref. 12, pp. 1-7, 10-13, 25
	Silver	ND	[2.7]	Ref. 12, pp. 1-7, 10-13, 25
	Vanadium	10.1 mg/Kg	[13.3]	Ref. 12, pp. 1-7, 10-13, 25
	Zinc	47.6 mg/Kg	[5.3]	Ref. 12, pp. 1-7, 10-13, 25
	Cyanide	NDJv	[1.3]	Ref. 12, pp. 1-7, 10-13, 25
SE-27 FGW71 Volatiles	Carbon Disulfide	ND	[13]	Ref. 14, pp. 1-13, 26-34, 77
	Cyclohexane	ND	[13]	Ref. 14, pp. 1-13, 26-34, 77
	Benzene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 77
	Methylcyclohexane	ND	[13]	Ref. 14, pp. 1-13, 26-34, 77
	Toluene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 77
	Chlorobenzene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 78
	Ethylbenzene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 78
	Xylenes (total)	ND	[13]	Ref. 14, pp. 1-13, 26-34, 78
	Isopropylbenzene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 78
	1,3-Dichlorobenzene	7J µg/Kg	[13]	Ref. 14, pp. 1-13, 26-34, 78
	1,4-Dichlorobenzene	2J µg/Kg	[13]	Ref. 14, pp. 1-13, 26-34, 78
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-27 FGW71 Semivolatiles	Hexachlorobutadiene	1,300 µg/Kg	[430]	Ref. 14, pp. 1-13, 26-34, 122
	2-Methylnaphthalene	ND	[430]	Ref. 14, pp. 1-13, 26-34, 122
	Hexachlorobenzene	2,500J µg/Kg	[430]	Ref. 14, pp. 1-13, 26-34, 123
SE-27 FGW71 Pesticides/PCBs	Aldrin	NDMJ	[17]	Ref. 14, pp. 1-13, 26-34, 145
	Endosulfan I	ND	[2.2]	Ref. 14, pp. 1-13, 26-34, 145
	Endrin	ND	[4.3]	Ref. 14, pp. 1-13, 26-34, 145
	Aroclor-1248	**57J* µg/Kg**	**[43]**	**Ref. 14, pp. 1-13, 26-34, 145**
	Aroclor-1254	ND	[43]	Ref. 14, pp. 1-13, 26-34, 145
	Aroclor-1260	ND	[43]	Ref. 14, pp. 1-13, 26-34, 145

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration**	**[SQL]**	**Reference**
SE-28 MFHW71 Inorganics	Cadmium	ND	[1.3]	Ref. 12, pp. 1-7, 10-13, 14
	Chromium	9.8 mg/Kg	[2.6]	Ref. 12, pp. 1-7, 10-13, 14
	Copper	10.1 mg/Kg	[6.5]	Ref. 12, pp. 1-7, 10-13, 14
	Lead	13.5 mg/Kg	[0.78]	Ref. 12, pp. 1-7, 10-13, 14
	Manganese	74.5 mg/Kg	[3.9]	Ref. 12, pp. 1-7, 10-13, 14
	Mercury	0.8 mg/Kg	[0.13]	Ref. 12, pp. 1-7, 10-13, 14
	Nickel	7.4 mg/Kg	[10.4]	Ref. 12, pp. 1-7, 10-13, 14
	Silver	ND	[2.6]	Ref. 12, pp. 1-7, 10-13, 14
	Vanadium	10.6 mg/Kg	[13.0]	Ref. 12, pp. 1-7, 10-13, 14
	Zinc	48.5 mg/Kg	[5.2]	Ref. 12, pp. 1-7, 10-13, 14
	Cyanide	NDJv	[1.3]	Ref. 12, pp. 1-7, 10-13, 14
SE-28 FGA73 Volatiles	Carbon Disulfide	8J µg/Kg	[13]	Ref. 14, pp. 1-13, 26-34, 35
	Cyclohexane	ND	[13]	Ref. 14, pp. 1-13, 26-34, 35
	Benzene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 35
	Methylcyclohexane	ND	[13]	Ref. 14, pp. 1-13, 26-34, 35
	Toluene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 35
	Chlorobenzene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 36
	Ethylbenzene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 36
	Xylenes (total)	ND	[13]	Ref. 14, pp. 1-13, 26-34, 36
	Isopropylbenzene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 36
	1,3-Dichlorobenzene	2J µg/Kg	[13]	Ref. 14, pp. 1-13, 26-34, 36
	1,4-Dichlorobenzene	ND	[13]	Ref. 14, pp. 1-13, 26-34, 36
Table 6 (Continued)				

TABLE 6 (Continued)

Surface Water Pathway Contaminated Sediment Samples Collected from the Houston Ship Channel, East Fork Tributary and Patrick Bayou				
SE-28 FGA73 Semivolatiles	Hexachlorobutadiene	1,400 µg/Kg	[430]	Ref. 14, pp. 1-13, 26-34, 80
	2-Methylnaphthalene	ND	[430]	Ref. 14, pp. 1-13, 26-34, 80
	Hexachlorobenzene	3,100J µg/Kg	[430]	Ref. 14, pp. 1-13, 26-34, 80
SE-28 FGA73 Pesticides/PCBs	Aldrin	NDMJ	[9.6]	Ref. 14, pp. 1-13, 26-34, 128
	Endosulfan I	ND	[2.2]	Ref. 14, pp. 1-13, 26-34, 128
	Endrin	ND	[4.3]	Ref. 14, pp. 1-13, 26-34, 128
	Aroclor-1248	29J* µg/Kg	[43]	Ref. 14, pp. 1-13, 26-34, 128
	Aroclor-1254	ND	[43]	Ref. 14, pp. 1-13, 26-34, 128
	Aroclor-1260	ND	[43]	Ref. 14, pp. 1-13, 26-34, 128

ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples.
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.
IDL = Instrument detection limit.
L = Reported concentration is between the IDL and CRDL.
CRDL = Contract required detection limit.
M = Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.
N = Identification is tentative.
T = Identification is questionable because of absence of other commonly coexisting pesticides.
Shaded samples = The sample met observed release criteria for that hazardous substance.
* = Adjusted result. See Data Usability Table 7.

TABLE 7

Surface Water Pathway Data Usability for Sediment Samples						
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration [SQL] mg/Kg or µg/Kg**	**Bias***	**Bias Correction Calculation***	**Release Concentration Corrected for Bias**	**Usable as a Release Value?**
INORGANICS (mg/Kg)						
SE-01/ MFHW65 (Bkgd)	Mercury	0.31J [0.12]	UNK	x 1.83	0.56J	YES
SE-03/ MFHW67 (Bkgd)	Sodium	1,730Jv [1,235]	LOW	x 25.43	43,993.9Jv	YES
SE-04/ MFHW68	Mercury	20.7J [0.19]	UNK	÷ 1.83	11.31J	YES
SE-05/ MFHW69	Mercury	12.1J [0.2]	UNK	÷ 1.83	6.61J	YES
SE-06/ MFHW70	Mercury	41.5J [0.22]	UNK	÷ 1.83	22.68J	YES
SE-07/ MFHW71	Mercury	2.6J [0.14]	UNK	÷ 1.83	1.42J	NO
SE-08/ MFHW72	Mercury	2.9J [0.15]	UNK	÷ 1.83	1.58J	NO
SE-09/ MFHW73	Mercury	3.2J [0.15]	UNK	÷ 1.83	1.75J	YES
SE-20/ MFHW84	Mercury	28.8J [0.34]	UNK	÷ 1.83	15.74J	YES
SE-21/ MFHW85	Mercury	14J [0.32]	UNK	÷ 1.83	7.65J	YES
SE-26/ MFHW90	Mercury	5.2J [0.17]	UNK	÷ 1.83	2.84J	YES
ORGANICS (µg/Kg)						
SE-15/ FGW59 (Bkgd)	Phenanthrene	8,500J [450]	UNK	x 10	85,000J	YES

Table 7 continued ...

TABLE 7 (Continued)

Surface Water Pathway Data Usability for Sediment Samples						
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration [SQL] mg/Kg or µg/Kg**	**Bias***	**Bias Correction Calculation***	**Release Concentration Corrected for Bias**	**Usable as a Release Value?**
ORGANICS (µg/Kg)						
SE-15/ FGW59 (Bkgd)	Pyrene	16,000J [450]	UNK	x 11.86	189,760J	YES
SE-18/ FGW62	Carbon Disulfide	74J [74]	UNK	÷ 10	7.4J	NO
SE-22/ FGW66	Carbon Disulfide	310J [110]	UNK	÷ 10	31.0J	NO
SE-20/ FGW64	Cyclohexane	390J^ [38]	HIGH	NA	NA	YES
SE-06/ FGW50	Benzene	290J^ [100]	HIGH	÷ 1.97	147.2J^	YES
SE-20/ FGW64	Benzene	360J^ [38]	HIGH	÷ 1.97	182.7J^	YES
SE-06/ FGW50	Methylcyclohexane	340J^ [100]	HIGH	NA	NA	YES
SE-20/ FGW64	Methylcyclohexane	540J^ [38]	HIGH	NA	NA	YES
SE-06/ FGW50	Toluene	150J^ [100]	HIGH	÷ 1.63	92.0J^	NO
SE-20/ FGW64	Toluene	60J^ [38]	HIGH	÷ 1.63	36.8J^	NO
SE-05/ FGW49	Chlorobenzene	200Jv [110]	LOW	None Required	----------	YES
SE-06/ FGW50	Chlorobenzene	670J^ [100]	HIGH	÷ 2.0	335J^	YES
SE-07/ FGW51	Chlorobenzene	1,100J^ [720]	HIGH	÷ 2.0	550J^	YES

Table 7 continued ...

TABLE 7 (Continued)

Surface Water Pathway Data Usability for Sediment Samples						
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration [SQL] mg/Kg or µg/Kg**	**Bias***	**Bias Correction Calculation***	**Release Concentration Corrected for Bias**	**Usable as a Release Value?**
SE-06/ FGW50	Ethylbenzene	150J^ [100]	HIGH	÷ 10.0	15J^	NO
SE-20/ FGW64	Ethylbenzene	490J^ [38]	HIGH	÷ 10.0	49J^	YES
SE-05/ FGW49	Xylenes	110Jv [110]	LOW	None Required	---------	YES
SE-06/ FGW50	Xylenes	780J^ [100]	HIGH	÷ 10.0	78J^	NO
SE-20/ FGW64	Xylenes	1,400J^ [38]	HIGH	÷ 10	140J^	YES
SE-21/ FGW65	Xylenes	610Jv [38]	LOW	None Required	----------	YES
SE-05/ FGW49	Isopropylbenzene	180Jv [110]	LOW	None Required	----------	YES
SE-06/ FGW50	Isopropylbenzene	680J^ [100]	HIGH	NA	NA	YES
SE-05/ FGW49	1,4-Dichlorobenzene	360Jv [110]	LOW	None Required	----------	YES
SE-24/ FGW68	Acenaphthylene	21,000J [21,000]	UNK	÷ 10	2,100J	NO
SE-06/ FGW50	delta-BHC	16J [3.5]	UNK	÷ 10	1.6J	NO
SE-04/ FGW48	gamma-BHC (Lindane)	10J [3.4]	UNK	÷ 11.79	0.85J	NO
SE-19/ FGW63	Heptachlor	19J [2.9]	UNK	÷ 7.88	2.4J	NO
SE-23/ FGW67	Heptachlor	1,100J [310]	UNK	÷ 7.88	139.6J	NO

Table 7 continued ...

TABLE 7 (Continued)

Surface Water Pathway Data Usability for Sediment Samples						
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration [SQL] mg/Kg or µg/Kg**	**Bias***	**Bias Correction Calculation***	**Release Concentration Corrected for Bias**	**Usable as a Release Value?**
SE-25/ FGW69	Heptachlor	4.9J [2.7]	UNK	÷ 7.88	0.62J	NO
SE-08/ FGW52	Aldrin	16J [2.5]	UNK	÷ 14.26	1.12J	NO
SE-09/ FGW53	Aldrin	16J [2.7]	UNK	÷ 14.26	1.12J	NO
SE-18/ FGW62	Endosulfan I	27J [2.5]	UNK	÷ 10.0	2.7J	YES
SE-19/ FGW63	Endosulfan I	9.9J [2.9]	UNK	÷ 10.0	0.99J	NO
SE-20/ FGW64	Endosulfan I	7.8J [6.5]	UNK	÷ 10.0	0.78J	NO
SE-21/ FGW65	Endosulfan I	14J [5.7]	UNK	÷ 10.0	1.4J	NO
SE-04/ FGW48	Endrin	130J [66]	UNK	÷ 14.13	9.2J	NO
SE-19/ FGW63	Endrin	25J [5.6]	UNK	÷ 14.13	1.8J	NO
SE-04/ FGW48	Endosulfan II	12J [6.6]	UNK	÷ 10.0	1.2J	NO
SE-04/ FGW48	4,4'-DDD	15J [6.6]	UNK	÷ 10.0	1.5J	NO
SE-05/ FGW49	4,4'-DDD	12J [7.5]	UNK	÷ 10.0	1.2J	NO
SE-24/ FGW68	alpha-Chlordane	5.5J [3.6]	UNK	÷ 10.0	0.55J	NO
SE-06/ FGW50	Aroclor-1248	3,800J [69]	UNK	÷ 10.0	380J	YES

Table 7 continued ...

TABLE 7 (Continued)

Surface Water Pathway Data Usability for Sediment Samples						
Sample Location/ CLP ID	**Hazardous Substance**	**Concentration [SQL] mg/Kg or µg/Kg**	**Bias***	**Bias Correction Calculation***	**Release Concentration Corrected for Bias**	**Usable as a Release Value?**
SE-14/ FGW58	Aroclor-1248	160J [53]	UNK	÷ 10.0	16J	NO
SE-18/ FGW62	Aroclor-1248	3,300J [49]	UNK	÷ 10.0	330J	YES
SE-19/ FGW63	Aroclor-1248	4,600J [49]	UNK	÷ 10.0	460J	YES
SE-27/ FGW71	Aroclor-1248	570J [43]	UNK	÷ 10.0	57J	YES
SE-28/ FGW73	Aroclor-1248	290J [43]	UNK	÷ 10.0	29J	NO
SE-07/ FGW51	Aroclor-1254	320J [48]	UNK	÷ 10.0	32J	NO
SE-08/ FGW52	Aroclor-1254	370J [49]	UNK	÷ 10.0	37J	NO
SE-05/ FGW49	Aroclor-1260	1,800J [75]	UNK	÷ 10.0	180J	YES
SE-06/ FGW50	Aroclor-1260	2,100J [69]	UNK	÷ 10.0	210J	YES
SE-18/ FGW62	Aroclor-1260	290J [49]	UNK	÷ 10.0	29J	NO
SE-20/ FGW64	Aroclor-1260	1,600J [130]	UNK	÷ 10.0	160J	YES
SE-22/ FGW66	Aroclor-1260	3,400J [82]	UNK	÷ 10.0	340J	YES

* Ref. 9, pp. 1-18.
NA = Not available. UNK = Unknown
[SQL] = The sample quantitation limit. SQL for metals is mg/Kg and the SQL for organics is µg/Kg. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
J, J^, Jv = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample. J^ indicates a high bias and Jv indicates a low bias.

Hazardous Substances Released

The Source No. 1 samples collected during the SSI sampling event were analyzed for Organic Target Compound List (TCL) and Inorganic Target Analyte List (TAL) constituents following EPA Contract Laboratory Program (CLP) protocol and analytical methodology (see References 12-15, Analytical Data). The analytical results documented organic and inorganic concentrations greater than or equal to the background sample(s) quantitation limit, if not detected in background. Using the chemical analysis method, sample results revealed elevated concentrations of the following constituents qualifying as observed releases to the surface water migratory pathway (Ref. 1, Section 2.3):

Cadmium	Chromium
Copper	Lead
Manganese	Mercury
Nickel	Silver
Vanadium	Zinc
Cyanide	

Carbon Disulfide	Cyclohexane	Benzene
Methylcyclohexane	Toluene	Chlorobenzene
Ethylbenzene	Xylenes (Total)	Isopropylbenzene
1,3-Dichlorobenzene	1,4-Dichlorobenzene	Hexachlorobutadiene
2-Methylnaphthalene	Hexachlorobenzene	Aldrin
Endosulfan I	Endrin	Aroclor-1248
Aroclor-1254	Aroclor-1260	

Since **cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, vanadium, zinc, cyanide, carbon disulfide, cyclohexane, benzene, methylcyclohexane, toluene, chlorobenzene, ethylbenzene, xylenes (total), isopropylbenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, hexachlorobutadiene, 2-methylnaphthalene, hexachlorobenzene, aldrin, endosulfan I, endrin, aroclor 1248, aroclor 1254** and **aroclor 1260** have previously been documented to be present in the site source, Source No. 1 - Other (Contaminated Sediments) associated with the HSC, East Fork Tributary and Patrick Bayou and are available to a pathway as specified in HRS Rule Section 2.2.3, the detected contaminants as listed above (and shown in Tables 6 and 7) indicate an observed release to the surface water migratory pathway in the watershed being evaluated (Ref. 1, Section 2.3).

Since an observed release has been established for the watershed, an Observed Release Factor Value of 550 is assigned to the watershed (Ref. 1, Section 4.1.2.1.1).

Observed Release Factor Value: 550

Potential Sources of the Sediment Contamination in Patrick Bayou

As previously stated in Section 2.2.1 of this HRS Documentation Record, specific sources for the contaminants of concern could not be sufficiently identified, but most likely occurred from historical accumulation from a multitude of discharge sources surrounding the site. The surrounding area includes several major petrochemical companies and large-scale manufacturing facilities that discharge large quantities of industrial wastewater under permit to Patrick Bayou and the East Fork Tributary (Ref. 4, pp. 3 and 4). A brief summary of these facilities is included below indicating the type of facility and nature/composition of wastes generated. Although these facilities generate wastes similar to those identified within Patrick Bayou and HSC, attribution to any specific facility/ source has not been definitively established:

- An adjacent facility consisting of oil refinery and chemical manufacturing units. The refinery has been operational since 1929 and produces gasoline, fuels, lubricants, waxes and feed stock for the chemical plant. The chemical plant produces a variety of products including chlorinated organics, plastics, resins and solvents. The facility applied for and maintains wastewater and air discharge permits. The facility lists a total of 92 active hazardous, class 1 and class 2 waste streams from manufacturing and on-site waste treatment processes. Wastes include: spent acetonitrile (methyl cyanide) from recovery units, spent catalyst wastes from cracker units, polybutadiene and butadiene heavy ends, phenol distillation still bottoms, spent sulfolane sludge containing benzene, bis-phenol acetone wastes, spent acids and caustics, chrome wastes from cooling towers/filters, lead/inorganic contaminated media from on-site processes, tank bottom solids from production units, PCB oil/wastes from electrical equipment and oil-water emulsions, concentrated organic aqueous skimmings, sludge w/toxic organics and discharged wastewater from the on-site wastewater treatment processes (Ref. 17, pp. 1-5, 10 and 19-41).

- An adjacent facility that manufactures additives for oil, greases and fuels. The plant has been in operation since 1952. The facility lists a total of 39 active hazardous, class 1 and class 2 waste streams from manufacturing and on-site waste management activities which include: spent acid and caustic aqueous solutions, barium and arsenic filter cake, oily clarifier sludges, reactive aqueous sulfide wastes and waste oils from on-site processes/air pollution control devices; mercury contaminated debris and phosphorus pentasulfide from on-site process units and spill cleanups, and residues and light organic (chlorinated polyisobutylene) liquid wastes from by-product processing (Ref. 18, pp. 3-4 and 17-24).

- An adjacent facility that manufactures vinyl chloride monomer (VCM) for the production of polyvinyl chloride (PVC) products. The facility also incinerates wastes piped from an adjacent facility. The plant has conducted independent operations since 1987 and lists 43 active hazardous, class 1 and class 2 waste streams. Wastes include: PCB contaminated liquids/absorbent from on-site transformers/capacitors, cooling tower sludge, heavy end halogenated solvents and waste lubricant oils from distillation/process equipment and organic/oil contaminated soils from spill cleanups (Ref. 19, pp. 1-3 and 6-16).

In addition to the potential sources described above, runoff also may have occurred from properties upgradient from the bayou.

4.1.3 Human Food Chain Threat

As described in the HRS Rule, the human food chain threat for the watershed of concern will be evaluated based on three factor categories: likelihood of release, waste characteristics and targets (Ref. 1, Section 4.1.3).

4.1.3.1 Human Food Chain Threat - Likelihood of Release

Since an observed release has been documented to the surface water pathway, the same Likelihood of Release Factor Category Value of 550 established for the Drinking Water Threat is also assigned for the Human Food Chain Threat - Likelihood of Release Factor Category Value (Ref. 1, Section 4.1.3.1).

4.1.3.2 Human Food Chain Threat - Waste Characteristics

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

The following Human Food Chain Toxicity, Persistence and Bioaccumulation Potential Factor Values have been assigned to those substances associated with Source No. 1 and qualifying as an observed release, which have a containment factor greater than 0.

TABLE 8

Surface Water Pathway
Hazardous Substance Toxicity, Persistence and Bioaccumulation Potential

Hazardous Substance	Food Chain Toxicity Factor Value [1]	Persistence Factor Value	Food Chain Bioaccumulation Potential Factor [2]	Tox/Per/Bio Factor Value	Reference
Cadmium	10,000	1.0	5,000	5.0E+07	Ref. 2, pp. 6, 15, 65
Chromium	10,000	1.0	5.0	5.0E+04	Ref. 2, pp. 6, 15, 97
Copper	---	1.0	50,000	0	Ref. 2, pp. 6, 15, 104
Lead	10,000	1.0	50	5.0E+05	Ref. 2, pp. 6, 15, 237
Manganese	10,000	1.0	0.5	5.0E+03	Ref. 2, pp. 6, 15, 244
Mercury	10,000	0.4	50,000	2.0E+08	Ref. 2, pp. 6, 15, 246
Nickel	10,000	1.0	0.5	5.0E+03	Ref. 2, pp. 6, 15, 268
Silver	120	1.0	50	6.0E+03	Ref. 2, pp. 6, 15, 343
Vanadium	100	1.0	0.5	5.0E+01	Ref. 2, pp. 6, 15, 410
Zinc	10	1.0	500	5.0E+03	Ref. 2, pp. 6, 15, 418
Cyanide	100	0.4	0.5	2.0E+01	Ref. 2, pp. 6, 15, 113
Carbon Disulfide	10	0.4	500	2.0E+03	Ref. 2, pp. 6, 15, 72
Cyclohexane	1	0.4	500	2.0E+02	Ref. 2, pp. 6, 15, 116
Benzene	100	0.4	5,000	2.0E+05	Ref. 2, pp. 6, 15, 37

Table 8 (Continued)

TABLE 8 (Continued)

Surface Water Pathway Hazardous Substance Toxicity, Persistence and Bioaccumulation Potential					
Hazardous Substance	**Food Chain Toxicity Factor Value [1]**	**Persistence Factor Value**	**Food Chain Bioaccumulation Potential Factor [2]**	**Tox/Per/Bio Factor Value**	**Reference**
Methylcyclohexane	NA	NA	NA	NA	NA
Toluene	10	0.4	50	2.0E+02	Ref. 2, pp. 6, 15, 378
Chlorobenzene	100	0.0007	50	3.5E-00	Ref. 2, pp. 6, 15, 86
Ethylbenzene	10	0.4	50	2.0E+02	Ref. 2, pp. 6, 15, 184
Xylenes (Total)	10	0.4	50	2.0E+02	Ref. 2, pp. 6, 15, 415
Isopropylbenzene	1,000	0.4	500	2.0E+05	Ref. 2, pp. 6, 15, 111
1,3-dichlorobenzene	---	0.4	50	0	Ref. 2, pp. 6, 15, 134
1,4-dichlorobenzene	10	0.4	50	2.0E+02	Ref. 2, pp. 6, 15, 135
Hexachlorobutadiene	10,000	1.0	50	5.0E+05	Ref. 2, pp. 6, 15, 217
2-Methylnaphthalene	---	0.4	5,000	0	Ref. 2, pp. 6, 15, 260
Hexachlorobenzene	1,000	1.0	5,000	5.0E+06	Ref. 2, pp. 6, 15, 216
Aldrin	10,000	1.0	50,000	**5.0E+08**	Ref. 2, pp. 6, 15, 14
Endosulfan I	100	1.0	500	5.0E+04	Ref. 2, pp. 6, 15, 176
Endrin	10,000	1.0	5,000	5.0E+07	Ref. 2, pp. 6, 15, 179
Aroclor 1248	10,000	1.0	50,000	**5.0E+08**	Ref. 2, pp. 6, 15, 293
Aroclor 1254	10,000	1.0	50,000	**5.0E+08**	Ref. 2, pp. 6, 15, 293
Aroclor 1260	10,000	1.0	50,000	**5.0E+08**	Ref. 2, pp. 6, 15, 293

Notes: **Bold** = indicates the highest toxicity/persistence/bioaccumulation factor value.
[1] "Very large river" was the predominant surface water body used for factor value determination along the target distance limit where human food chain threat targets were identified.
[2] The higher value for salt water or fresh water was used for the human food chain bioaccumulation factor value.

Since prior water quality studies conducted within Patrick Bayou and the nearby HSC indicated brackish water within the HSC (salinity 10.3 ppt at Stations 1 and 2), the higher human food chain bioaccumulation potential factor was used as specified in the HRS Guidance Manual to evaluate human food chain targets located in brackish waters subjected to potential contamination (Ref. 4 p. 11, Table 3; Ref. 3, pp. 239-41).

A review of Table 8 reveals the hazardous substances with the highest Human Food Chain Toxicity/ Persistence/Bioaccumulation Factor Value are **Aldrin**, **Aroclor-1248**, **-1254** and **-1260** with a value of 5.0×10^8 (Ref. 1, Section 4.1.3.2.1.4, Table 4-16; Ref. 2, pp. 2, 6, 14 and 293).

Human Food Chain Threat - Observed Release Factor Value: 550

Toxicity/Persistence/Bioaccumulation Factor Value: 5.0×10^8

4.1.3.2.2 Hazardous Waste Quantity

TABLE 9

Surface Water Pathway Hazardous Waste Quantity		
Source Number	**Source Hazardous Waste Quantity Value (HRS Rule, Section 2.4.2.1.5)**	**Is Source Hazardous Constituent Quantity data complete? (Yes/No)**
1	> 0, but unknown	No
Sum of Values:	> 0, but unknown	

As described in the HRS Rule, Section 2.4.2.2, if the hazardous waste constituent quantity is not adequately determined for the source, and any target for a migration pathway is subject to Level I or Level II concentrations, then assign the greater of either value from HRS Rule Table 2.6 or a value of 100, whichever is greater, as the Hazardous Waste Quantity Factor Value for that pathway (Ref 1, pp. 51592 and 51602).

Based on the Source Hazardous Waste Quantity Value shown in Table 9 above and HRS Rule, Section 2.4.2.2 guidelines, a Hazardous Waste Quantity Factor Value of 100 is assigned for the surface water migration pathway (Ref. 1).

[Note: See discussion under Section 4.1.4.3.1 of this report for rationale used to determine a Hazardous Waste Quantity Factor Value when a pathway target is subjected to Level I or Level II concentrations].

Hazardous Waste Quantity Factor Value: 100

4.1.3.2.3 Waste Characteristics Factor Category Value

The Human Food Chain Threat - Waste Characteristics Factor Category Value is based on the Waste Characteristics Product. The Waste Characteristics Product is the product of the Toxicity/Persistence Factor Value, the Hazardous Waste Quantity Factor Value and the Bioaccumulation Potential Factor Value, subject to maximum values (Ref 1 p. 51620), i.e.,

Where for the Patrick Bayou Site:

Toxicity/Persistence Factor Value = 10,000 x 1.0 = 1.0×10^4
Hazardous Waste Quantity Factor Value = 100

And:

(Toxicity/Persistence) x Hazardous Waste Quantity =
$(1.0 \times 10^{4)} \times 100 = 1.0 \times 10^6$

Where for the Patrick Bayou Site:

(Toxicity/Persistence) x Hazardous Waste Quantity = 1.0×10^6
Bioaccumulation Potential Factor Value = 50,000

Therefore:

(Toxicity/Persistence x Hazardous Waste Quantity) x Bioaccumulation Potential =
$1.0 \times 10^6 \times 50{,}000 = \underline{5.0 \times 10^{10}}$

Based on a Waste Characteristics Product of 5.0×10^{10}, a Waste Characteristics Factor Category Value of 320 is assigned from the HRS Rule, Table 2-7 (Ref. 1, Section 2.4.3.1).

Waste Characteristics Factor Category Value: 320

4.1.3.3 Human Food Chain Threat - Targets

No Level I or Level II observed releases were documented in the Houston Ship Channel fishery.

4.1.3.3.1 Food Chain Individual

Since the industries located along the shoreline of Patrick Bayou generally restrict public access for safety reasons requiring escorts while on-site and there are several above-ground industrial pipelines crossing the bayou near the north entrance restricting access by boat, public fishing within Patrick Bayou is not likely to occur (Ref. 10, p. 9). Since consumption of human food chain organisms could not be documented within Patrick Bayou, the potential or actual human food chain threat exposure factor values were not evaluated for the bayou.

Since an observed release to the watershed has been documented (see Section 4.1.2.1.1 of this report), potential exposure to a food chain individual within the target distance limit (TDL) for the watershed can be evaluated. During the 27-30 March, 2000 SSI sampling event, fishermen were observed catching human food chain organisms (blue crabs) in two locations as shown in photos #1, 2 and 4 along the Houston Ship Channel within the surface water pathway 15-mile TDL (Ref. 10, pp. 6 and 12).

As a result, a food chain individual factor value of 20 is assigned based on the observed release of a hazardous substance with a bioaccumulation potential factor value greater than 500 to the watershed and a fishery present within the TDL as specified in the HRS Rule, Section 4.1.3.3 (Ref. 1).

Food Chain Individual Factor Value: 20

4.1.3.3.2. Population

The Population Factor Value was not scored because of its minimal impact on the site score. The population is therefore unknown, but greater 0.

4.1.3.3.3 Calculation of Human Food Chain Threat - Targets Factor Category Value

As described in the HRS Rule, the Human Food Chain (HFC) Threat - Targets Factor Category Value is calculated by summing the Food Chain Individual and Population Factor Values. The resulting value is assigned as the HFC Threat - Targets Factor Category Value (Ref. 1), i.e.,

Where for the Patrick Bayou Site:

Food Chain Individual Factor Value = 20
Population Factor Value = 0

Therefore:

Food Chain Individual Factor Value + Population Factor Value =
Target Factor Category Value = 20 + 0 = 20

4.1.3.4 Calculation of Human Food Chain Threat Score

As described in the HRS Rule, the Human Food Chain (HFC) Threat Score is calculated by multiplying the HFC Threat Factor Category Values for Likelihood of Release, Waste Characteristics and Targets. The product of these values is then rounded to the nearest integer and divide by 82,500. The resulting value, subject a maximum of 100, is assigned as the Human Food Chain Threat Score for the watershed (Ref.1, p. 51621), i.e.,

Where for the Patrick Bayou Site:

Food Chain Threat Likelihood of Release Factor Category Value = 550
Food Chain Waste Characteristics Factor Category Value = 320
Food Chain Target Factor Category Value = 20

Therefore:

$$\text{Human Food Chain Threat Score} = \frac{(550) \times (320) \times (20)}{82{,}500} = 42.67$$

Targets Factor Category Value: 20

Human Food Chain Threat Score: 42.67

4.1.4 Environmental Threat

As described in the HRS Rule, the environmental threat will be evaluated based on three factor categories: likelihood of release, waste characteristics and targets (Ref. 1).

4.1.4.1 Environmental Threat - Likelihood of Release

Since an observed release has been documented to the surface water pathway, the same Likelihood of Release Factor Category Value of 550 established for the Drinking Water Threat is also assigned for the Environmental Threat - Likelihood of Release Factor Category Value (Ref. 1).

4.1.4.2 Environmental Threat - Waste Characteristics

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

TABLE 10

Surface Water Pathway
Hazardous Substance Toxicity, Persistence and Bioaccumulation Potential

Hazardous Substance	Ecosystem Toxicity Factor Value [1]	Persistence Factor Value	Ecosystem Bioaccumulation Potential Factor [2]	Ecosystem Tox/Per/Bio Factor Value	Reference
Cadmium	1,000	1.0	5,000	5.0E+06	Ref. 2, pp. 6, 15, 65
Chromium	100	1.0	5.0	5.0E+02	Ref. 2, pp. 6, 15, 97
Copper	---	1.0	50,000	0	Ref. 2, pp. 6, 15, 104
Lead	1,000	1.0	5,000	5.0E+06	Ref. 2, pp. 6, 15, 237
Manganese	---	1.0	50,000	0	Ref. 2, pp. 6, 15, 244
Mercury	10,000	0.4	50,000	2.0E+08	Ref. 2, pp. 6, 15, 246
Nickel	10	1.0	500	5.0E+03	Ref. 2, pp. 6, 15, 268
Silver	10,000	1.0	50	5.0E+05	Ref. 2, pp. 6, 15, 343
Vanadium	---	1.0	0.5	0	Ref. 2, pp. 6, 15, 410
Zinc	10	1.0	500	5.0E+03	Ref. 2, pp. 6, 15, 418
Cyanide	1,000	0.4	0.5	2.0E+02	Ref. 2, pp. 6, 15, 113
Carbon Disulfide	100	0.4	500	2.0E+04	Ref. 2, pp. 6, 15, 72
Cyclohexane	100	0.4	500	2.0E+04	Ref. 2, pp. 6, 15, 116
Benzene	100	0.4	500	2.0E+04	Ref. 2, pp. 6, 15, 37
Methylcyclohexane	NA	NA	NA	NA	NA
Toluene	100	0.4	50	2.0E+03	Ref. 2, pp. 6, 15, 378
Chlorobenzene	1,000	0.0007	50	3.5E+01	Ref. 2, pp. 6, 15, 86
Ethylbenzene	100	0.4	50	2.0E+03	Ref. 2, pp. 6, 15, 184
Xylenes (Total)	10	0.4	50	2.0E+02	Ref. 2, pp. 6, 15, 415
Isopropylbenzene	100	0.4	500	2.0E+04	Ref. 2, pp. 6, 15, 111
1,3-dichlorobenzene	100	0.4	50	2.0E+03	Ref. 2, pp. 6, 15, 134

Table 10 Continued

TABLE 10 (Continued)

Surface Water Pathway Hazardous Substance Toxicity, Persistence and Bioaccumulation Potential					
Hazardous Substance	**Ecosystem Toxicity Factor Value[1]**	**Persistence Factor Value**	**Ecosystem Bioaccumulation Potential Factor[2]**	**Ecosystem Tox/Per/Bio Factor Value**	**Reference**
1,4-dichlorobenzene	100	0.4	50	2.0E+03	Ref. 2, pp. 6, 15, 135
Hexachlorobutadiene	10,000	1.0	5,000	5.0E+07	Ref. 2, pp. 6, 15, 217
2-Methylnaphthalene	1,000	0.4	5,000	2.0E+06	Ref. 2, pp. 6, 15, 260
Hexachlorobenzene	10	1.0	50,000	5.0E+05	Ref. 2, pp. 6, 15, 216
Aldrin	10,000	1.0	50,000	**5.0E+08**	Ref. 2, pp. 6, 15, 14
Endosulfan I	10,000	1.0	50,000	**5.0E+08**	Ref. 2, pp. 6, 15, 176
Endrin	10,000	1.0	50,000	**5.0E+08**	Ref. 2, pp. 6, 15, 179
Aroclor 1248	10,000	1.0	50,000	**5.0E+08**	Ref. 2, pp. 6, 15, 293
Aroclor 1254	10,000	1.0	50,000	**5.0E+08**	Ref. 2, pp. 6, 15, 293
Aroclor 1260	10,000	1.0	50,000	**5.0E+08**	Ref. 2, pp. 6, 15, 293

Notes: **Bold** = indicates the highest toxicity/persistence/bioaccumulation factor value.
[1] "Very large river" was the predominant surface water body used for factor value determination along the target distance limit where sensitive environmental targets were identified.
[2] The lower value for salt water or fresh water was used for the ecosystem factor value determination.

Ecosystem Toxicity Factor Values for the hazardous substances documented as observed releases were derived from the EPA Superfund Chemical Data Matrix (SCDM) 1996 associated with the surface water migratory pathway (Ref. 2). Since prior water quality studies within Patrick Bayou indicated varying salinity ranging from fresh water (salinity 0.0 ppt at Stations 8 and 9) to brackish water (ranging from 1.2 ppt at Station 10 to 12.4 ppt at Station 4), the lower ecosystem bioaccumulation potential factor value was used as specified in the HRS Guidance Manual to evaluate targets located in brackish waters subject to actual contamination (Ref. 4. p. 11, Table 3; Ref. 3, p. 239-41).

Ecosystem Persistence Factor Values were also derived using SCDM values associated with the surface water migratory pathway using persistence values for a river as the predominant water category (Ref. 2). As specified in the HRS Rule, Section 4.1.4.2.1.2, for contaminated sediments with no identified source, the furthest upstream location with an observed release is to be used at the point of measurement to determine predominant water category (Ref. 1). Since the majority of sensitive environments being evaluated are located within the upper portions of Patrick Bayou, the predominant body of water is more like a river than a tidal basin as shown in Photos #33, 35, 37 and 42 (Ref. 4, p. 11; Ref. 10 pp. 26, 31, 35 and 37).

A review of Table 10 reveals the hazardous substances with the highest Ecosystem Toxicity/ Persistence/Bioaccumulation Factor Value are **Aldrin**, **Endosulfan I**, **Endrin** and **Aroclor-1248**, **-1254** and **-1260** with a value of 5.0×10^8 (Ref. 1, Section 4.1.4.2.1.4, Table 4-20; Ref. 2, pp. 2, 6, 14, 179 and 293).

Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^8

4.1.4.2.2 Hazardous Waste Quantity

TABLE 11

Surface Water Pathway Hazardous Waste Quantity		
Source Number	**Source Hazardous Waste Quantity Value (HRS Rule, Section 2.4.2.1.5)**	**Is Source Hazardous Constituent Quantity data complete? (Yes/No)**
1	> 0, but unknown	No
Sum of Values:	> 0, but unknown	

As described in the HRS Rule, Section 2.4.2.2, if the hazardous waste constituent quantity is not adequately determined for the source, and any target for a migration pathway is subject to Level I or Level II concentrations, then assign the greater of either value from HRS Rule Table 2.6 or a value of 100, whichever is greater, as the Hazardous Waste Quantity Factor Value for that pathway (Ref 1).

Based on the Source Hazardous Waste Quantity Value shown in Table 11 above and HRS Rule, Section 2.4.2.2 guidelines, a Hazardous Waste Quantity Factor Value of 100 is assigned for the surface water migration pathway (Ref. 1).

[Note: See discussion under Section 4.1.4.3.1 of this report for rationale used to determine a Hazardous Waste Quantity Factor Value when a pathway target is subjected to Level I or Level II concentrations].

Hazardous Waste Quantity Factor Value: 100

4.1.4.2.3 Waste Characteristics Factor Category Value

The Environmental Threat - Waste Characteristics Factor Category Value is based on the Waste Characteristics Product. The Waste Characteristics Product is the product of the Ecosystem Toxicity/Persistence Factor Value, the Hazardous Waste Quantity Factor Value and the Ecosystem Bioaccumulation Potential Factor Value, subject to maximum values (Ref. 1).

Where for the Patrick Bayou Site:

Ecosystem Toxicity/Persistence Factor Value = 10,000 x 1.0 = 1.0×10^4
Hazardous Waste Quantity Factor Value = 100

And:

(Ecosystem Toxicity/Persistence) x Hazardous Waste Quantity =
$(1.0 \times 10^4) \times 100 = 1.0 \times 10^6$

Where for the Patrick Bayou Site:

(Ecosystem Toxicity/Persistence) x Hazardous Waste Quantity = 1×10^6
Ecosystem Bioaccumulation Potential Factor Value = 50,000

Therefore:

(Ecosystem Toxicity/Persistence x Hazardous Waste Quantity)
x Ecosystem Bioaccumulation Potential =
$1.0 \times 10^6 \times 50{,}000 = \underline{5.0 \times 10^{10}}$

Based on a Waste Characteristics Product of 5.0×10^{10}, an Environmental Threat - Waste Characteristics Factor Category Value of 320 is assigned from the HRS Rule, Table 2-7 (Ref. 1, Section 2.4.3.1).

Environmental Threat - Waste Characteristics Factor Category Value: 320

4.1.4.3 Environmental Threat - Targets

4.1.4.3.1 Sensitive Environments

During the SSI reconnaissance, there were several sensitive areas identified as wetlands located near the confluence of the East Fork tributary and along several small islands located in the lower delta portion of Patrick Bayou (Ref. 10, pp. 35, 37 and 39-40). A total of four (4) wetland sediment samples, SE-23 (MFHW87/FGW67), SE-25 (MFHW89/FGW69), SE-27 (MFHW91/FGW71) and its duplicate SE-28 (MFHW71/FGA73) were collected within these locations during the March 27-30, 2000 SSI. Two of these wetland areas within Patrick Bayou will be evaluated in this section.

4.1.4.3.1.1 Level I Concentrations

Since no surface water samples were collected during the SSI, a Level I Concentrations Factor Value cannot be assigned and the Level I Concentrations Factor Value is assigned a value of 0 (Ref. 1).

Level I Concentrations Factor Value: 0

4.1.4.3.1.2 Level II Concentrations

As described in the HRS Rule, Section 4.1.4.3.1.2, if a hazardous substance is present and meets the observed release criteria, but does not meet or exceed relevant ecological-based benchmarks listed in HRS Rule, Table 4-22, it is considered a Level II concentration (Ref. 1). Table 12 below identifies the sediment samples and hazardous substance identified by chemical analysis that qualify as Level II concentrations with detected levels below applicable ambient aquatic life advisory (AALAC) or ambient water quality screening (AWQC) concentrations (Ref. 1):

TABLE 12

Surface Water Pathway
Environmental Threat - Targets - Level II Concentrations

Sample Designation/ Identification No./ Location	Hazardous Substance	Concentration (mg/Kg or µg/Kg) [SQL] - Level I, II	Ambient Aquatic Life Advisory Conc. (µg/L)[1]	In-Water Distance (miles)[2]	Reference
SE-23 FGW67 MFHW87 Wetland Sample within Patrick Bayou	Cadmium	1.8 mg/Kg [1.6] - II	1.0E+00	0.70 mi.	Ref. 12, p. 22 Ref. 14, pp. 65-67 and 139
	Chromium	77.5 mg/Kg [3.3] - II	1.10E+01		
	Mercury	6.5 mg/Kg [0.16] - II	1.20E-02		
	Nickel	35 mg/Kg [13.1] - II	1.60E+02		
	Zinc	483 mg/Kg [6.6] - II	1.10E+02		
	Xylenes	22 µg/Kg [110] - II	NA		
	Isopropylbenzene	26 µg/Kg [18] - II	NA		
	1,3-Dichlorobenzene	29 µg/Kg [18] - II	NA		
	Aroclor 1248	300,000 µg/Kg - II [60,000]	1.40E-02		
SE-25 FGW69 MFHW89 Wetland Sample within Patrick Bayou	Chromium	76.5 mg/Kg [3.3] - II	1.10E+01	0.59 mi.	Ref. 12, p. 24 Ref. 14, pp. 68-69 and 143
	Copper	89.3 mg/Kg [8.2] - II	1.20E+01		
	Xylenes	46 µg/Kg [16] - II	NA		
	Isopropylbenzene	48 µg/Kg [16] - II	NA		
	Endrin	12 µg/Kg [5.2] - II	2.30E-03		
	Aroclor 1248	1,400 µg/Kg [52] - II	1.40E-02		
SE-27 FGW71~~/73~~ MFHW91~~/71~~ Wetland Samples within Patrick Bayou	Aroclor 1248	57J* µg/Kg [43] - II	1.40E-02	1.50 mi.	Ref. 14, p. 145

Notes: mg/Kg = milligrams per kilogram (parts per million). µg/Kg = micrograms per kilogram (parts per billion).
[SQL] = Sample Quantitation Limit. SQL = (CRQL/CRDL) x (df) / % solids, where % solids = [100 - % moisture] / 100
NA = Not available.
[1] Acute concentrations (in µg/L) used for fresh water inhabitants.
[2] As measured from the furtherest upstream release sample location (Ref. 3, p. 216, Highlight 8-14).
* = Adjusted result. See Data Usability Table 7.

Wetlands Frontage:

As specified in the HRS Rule, Section 4.1.4.3.1.2, when measuring the affected length for a wetland area in rivers, use the length of the wetlands contiguous to the in-water segment of the hazardous substance migration path, i.e., wetland frontage of that portion subject to Level II concentrations as the value for length. For an isolated wetland, use the perimeter of that portion of the wetland subject to Level II concentrations as the length (Ref. 1). Distances were measured using an Alvin No. 1112 map wheel from the La Port Texas, 7.5 Minute Series Topographic National Wetlands Inventory (NWI) Map (Ref. 16). A total of five separate US Fish & Wildlife Service (USFWS) wetlands were identified within Patrick Bayou and along the East Fork Tributary; however, only two were evaluated for HRS purposes located within areas of Level II contamination (Ref. 1; Ref.16 and Ref. 3, p. A-20).

The first wetland segment begins at sample location SE-14/MFHW78/FGW58 located just west of the bridge crossing the East Fork Tributary near the confluence area in the upper portion of Patrick Bayou (see Figure 3), continues north along the east bank of Patrick Bayou beyond sample location SE-19/MFHW83/FGW63 and returns along the west bank to the segment origin. The segment includes wetland sediment sample locations SE-23/MFHW87/FGW67 and SE-25/MFHW89/ FGW69 (shown in Figure 3 and photos #35-38). Approximately 0.70 miles of HRS qualifying wetlands (PUSLx - palustraine unconsolidated shore subtidal excavated) as shown on the LaPort, Texas National Wetlands Inventory map lie along the hazardous substance migration pathway/Level II segment (Ref. 3, p. 216, p. 338-339, Highlight 8-66, Highlight 8-14, p. A-22, Highlight A-8; Ref. 16, p. 1).

The second wetland segment begins near Station No. 4 below the Oxy-Vinyls, LP Outfall No. 001 location in the north central portion of Patrick Bayou (see Figure 3), continues north along the east bank of the bayou to include sample location SE-22/MFHW86/FGW66 located along the east bank and returns to the segment origin. Approximately 0.31 miles of HRS qualifying wetlands (PEM1Cx-palustraine emergent persistent seasonally flooded excavated) as shown on the LaPort, Texas National Wetlands Inventory map lie along the hazardous substance migration pathway/Level II segment (Ref. 3, p. 216, Highlight 8-14, p. A-22, Highlight A-8; Ref. 16, p. 1).

Wetland Description	Wetland Location	Wetland Frontage	Wetland Concentration	Level of Reference(s)
Confluence Area	N. of East Fork	3,700' (0.70 mi.)	Level II	Ref. 10, pp. 6, 8, 35, 37
N. Central	Along islands, banks	1,650' (0.31 mi.)	Level II	Ref. 10, pp. 6, 8, 39-40

Based on the sample results indicated in Table 12, both wetland areas located in the upper portion of Patrick Bayou and East Fork Tributary confluence area were identified to contain Level II concentrations based on EPA referenced Ambient Aquatic Life Advisory Concentration (AALAC) values. Therefore, using the criteria described in HRS Rule, Section 4.1.4.3.1.2, the Level II Concentrations Factor Value for the surface water drainage pathway is assigned a value of 50 (Ref. 1).

The Environmental Threat - Level II Concentrations Factor Value is based on the sum of the Sensitive Environments Rating Values (HRS Table 4-23) and Wetlands Rating Values (HRS Table 4-24), excluding Level I concentrations (Ref. 1, Section 4.1.4.3.1.1), i.e.,

Where for the Patrick Bayou Site:

Sensitive Environments Rating Value = Not Evaluated
Wetlands Rating Value = 50

Therefore:

Sensitive Environments Rating Value + Wetlands Rating Value =
Level II Concentrations Factor Value = 0 + 50 = 50

4.1.4.3.1.3 Potential Contamination

Since Level II concentrations have been documented above, any value for potential wetland contamination would not significantly affect the site score. Therefore, potential contamination is not evaluated.

Level II Concentrations Factor Value: 50

4.1.4.3.1.3 Potential Contamination

Since Level II concentrations have been documented above, any value for potential wetland contamination would not significantly affect the site score. Therefore, potential contamination is not evaluated.

Potential Contamination Factor Value (Not Evaluated): 0

4.1.4.3.1.4 Calculation of Environmental Threat - Targets Factor Category Value

As described in the HRS Rule, Section 4.1.4.3.1.4, the Environmental Threat - Targets Factor Category Value for the watershed is the sum of the values for the Level I (0), Level II (50) and Potential Contamination (0) Factor Values. The resulting sum value of 50 is assigned as the Environmental Threat - Target Factor Category Value (Ref. 1).

4.1.4.4 Calculation of Environmental Threat Score for a Watershed

As described in the HRS Rule, the Environmental Threat Score is calculated by multiplying the Environmental Threat Factor Category Values for Likelihood of Release, Waste Characteristics and Targets. The product of these values is then rounded to the nearest integer and divide by 82,500. The resulting value, subject a maximum of 60, is assigned as the Environmental Threat Score for the watershed (Ref.1, p. 51626), i.e.,

Where for the Patrick Bayou Site:

Environmental Threat - Likelihood of Release Factor Category Value = 550
Environmental Threat - Waste Characteristics Factor Category Value = 320
Environmental Threat - Target Factor Category Value = 50

Therefore:

$$\text{Environmental Threat Score} = \frac{(550) \times (320) \times (50)}{82{,}500} = 106.67 \text{ (rounded to 60, maximum value)}$$

Environmental Threat-Target Factor Category Value: 50

Environmental Threat Score: 60

4.1.5 Calculation of Overland/Flood Migration Component Score for a Watershed

As described in the HRS Rule, Section 4.1.5, the Overland/Flood Migration Component Score for the watershed is calculated by summing the scores for the Drinking Water Threat (0), Human Food Chain Threat (42.67) and Environmental Threat (60). The resulting score of 102.67, subject to a maximum value of 100, is assigned as the Surface Water Overland/Flood Migration Component Score for the watershed (Ref. 1).

4.1.6 Calculation of Overland/Flood Migration Component Score

As described in the HRS Rule, Section 4.1.6, the highest surface water Overland/Flood Migration Component Score from the watersheds evaluated (only one watershed was evaluated for this documentation record) is selected and assigned as the Surface Water Overland/Flood Migration Component Score for the site, subject to a maximum of 100. The Surface Water Overland/Flood Migration Component Score is assigned a value of 100 (Ref.1).

Surface Water Overland/Flood Migration Component Score: 100

4.2 GROUND WATER TO SURFACE WATER MIGRATION COMPONENT

The Ground Water to Surface Water Component was not evaluated because the Surface Water Pathway was maximized at 100 in evaluating the overland/flood component of the surface water pathway.

4.3 CALCULATION OF SURFACE WATER MIGRATION PATHWAY SCORE

Only the Overland/Flood Migration Component (100) was scored. This value of 100 is assigned as the Surface Water Migration Pathway Score.

Surface Water Migration Pathway Score: 100

5.0 SOIL EXPOSURE PATHWAY

5.0.1 General Considerations

The Soil Exposure Pathway was not evaluated due to the lack of targets and because the inclusion of this pathway would not significantly affect the site score.

6.0 AIR MIGRATION PATHWAY

6.1.1 Observed Release

The air migration pathway was not evaluated since a release to the air pathway has not been documented and inclusion of this pathway would not significantly affect the site score.

Reference 1

U.S. Environmental Protection Agency, 40 CFR Part 300, Hazardous Ranking System, Appendix A, 55 FR 51583, December 14, 1990.

Federal Register

Friday
December 14, 1990

Part II

Environmental Protection Agency

40 CFR Part 300
Hazard Ranking System; Final Rule

Reference 2

U.S. Environmental Protection Agency, Superfund Chemical Data Matrix (SCDM). June 1996.

United States
Environmental Protection
Agency

Office of Emergency and
Remedial Response
Washington, DC 20460

Publication 9345.1-21
EPA/540/R-96/028
PB96-963509
June 1996

Superfund

EPA

Superfund Chemical Data Matrix

02 001

Reference 3

U.S. Environmental Protection Agency. Hazard Ranking System Guidance Manual, Office of Solid Waste and Emergency Response, Publication 9345.1-07, November 1992. 431 pages.

United States
Environmental Protection
Agency

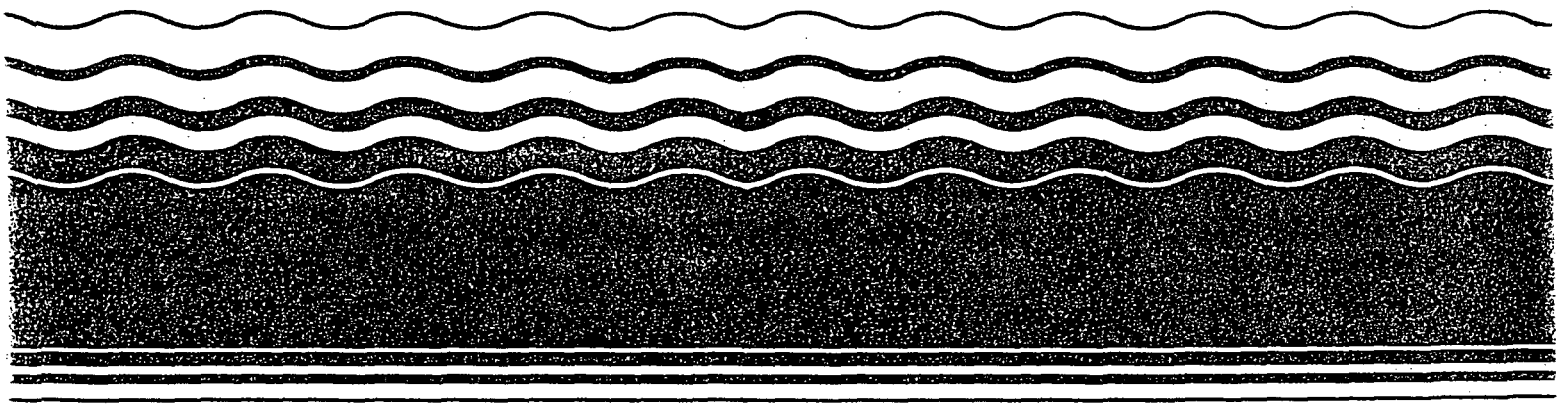
Office of Solid Waste
and Emergency
Response

Publication 9345.1-07
PB92-963377
EPA 540-R-92-026
November 1992

Superfund

EPA

Hazard Ranking System Guidance Manual



03 001

Reference 4

Reference 4

Containment Assessment
of Patrick Bayou

CONTAMINANT ASSESSMENT OF PATRICK BAYOU

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December 1996

04 001

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ABSTRACT

In July 1994, the Texas Natural Resource Conservation Commission (TNRCC) and United States Environmental Protection Agency (EPA) Region 6 conducted an ambient toxicity and water and sediment quality survey of Patrick Bayou, a small tributary of Segment 1006 of the Houston Ship Channel (HSC). Patrick Bayou is bounded by and receives effluent from several industrial dischargers and one municipal wastewater treatment plant. This area was investigated because a recent HSC study found ambient water and sediment toxicity and elevated levels of several priority pollutants in Patrick Bayou. The primary objective of this study was to collect water and sediment samples in Patrick Bayou to provide information on the magnitude and spatial distribution of contamination and toxicity in this small bayou.

Ten stations were chosen for priority pollutant analyses and a TNRCC routine monitoring station was also sampled during the survey. Several stations were selected for water and/or sediment toxicity testing. Out of five stations tested, water from four was toxic to *Mysidopsis bahia* and one of those was also toxic to *Menidia beryllina*. Significant mortality to *Cyprinodon variegatus* was observed in two of five sediment elutriate tests. State water quality standards were exceeded in Patrick Bayou for dissolved copper (8 sites), dissolved lead (3 sites), total mercury (1 site), carbon tetrachloride (1 site), and water temperature (4 sites), although a few of these exceedances were inside mixing zones. Three Patrick Bayou stations had unionized ammonia values that exceeded the EPA chronic criteria for saltwater. More than 40 percent of the sediment samples in Patrick Bayou exceeded TNRCC sediment screening levels (85th percentiles) for Cr, Cu, Pb, Hg, Ni, Se, Zn, hexachlorobenzene, total polychlorinated biphenyls (PCBs), and bis(2-ethylhexyl) phthalate. Very high levels of mercury (8.3 ppm), hexachlorobenzene (83,900 ppb), hexachlorobutadiene (138,000 ppb), PCBs (4,150 ppb), polynuclear aromatic hydrocarbons (total PAHs 233,700 ppb), and lead (269 ppm) were found in Patrick Bayou sediments. State screening levels were not available for the remaining 24 organic compounds found in the sediments. Lead, mercury, PCBs, acenapthene, acenaphthylene, anthracene, fluorene, naphthalene, 2-methylnaphthalene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, pyrene, and total PAHs all exceeded the effects range median levels developed by the National Oceanic and Atmospheric Administration.

Overall, Patrick Bayou showed a significant accumulation of many priority pollutants in sediments, exceedances of several water quality standards, and ambient toxicity in both water and sediment. The specific distribution of the contaminants in the sediments gave some information on their potential sources. The major dischargers along Patrick Bayou have proposed to sample their effluents for the compounds found in the bayou to further pinpoint the sources.

ACKNOWLEDGEMENTS

This study was conducted and funded by the TNRCC and EPA - Region 6. Appreciation is extended to the following people who assisted in the sample collection: Terry Hollister, EPA; Mark Luedke, TNRCC; and Greg Conley, TNRCC. Several other TNRCC personnel assisted in follow up visits to Patrick Bayou, including Richard Sankar, Jason Maldonado, and Raphael Calvino. Michelle Ruckstuhl provided information on the various permits. Terry Hollister and Roman Stanley conducted the ambient water and sediment toxicity tests. Charles Bland (Shell), Don Meyers (Oxychem), and Doug Boutros and Norman Mollard, III (Lubrizol) assisted in gaining access to the bayou, provided information about their facilities, and reviewed the draft report.

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INTRODUCTION

Houston is the nation's third largest port. The Houston Ship Channel (HSC) connects the Port of Houston, located along its 25-mile long inland reach, with the Gulf of Mexico via Galveston Bay, bringing much commerce and industry to the city of Houston. The inland portion of the channel is heavily industrialized and has historically had many water quality problems. Initial studies focused on low dissolved oxygen (DO) and high bacteria levels found in this reach of the channel (TDH 1968; TWQB 1974; TDWR 1984; Kirkpatrick 1981; Kirkpatrick 1986). Limits were established for oxygen demanding substances in discharges (TWQB 1974; TDWR 1984) and recent information indicates that dissolved oxygen has improved at the stations where it had been the most affected (Guillen 1993; Crocker et al. 1992). Other studies have found that concentrations of toxic substances are also a problem affecting the HSC (GBF 1992), particularly in some of its tributaries (Crocker et al. 1991; Warshaw 1977). The inland portion of the channel is divided into three principal segments (1005, 1006, and 1007; Figure 1) that receive wastes from 295 industrial and 150 domestic discharges (sum for segments 1005, 1006, 1007, and 2426 - 2430 from TNRCC 1994a). A compilation of the toxics release inventory data and discharge data for the inland portion of the HSC showed that segment 1006 received the largest amount of toxic substances in 1988: an estimated 711,316 pounds of toxics were reported for segment 1006 compared with 183,832 pounds of toxics reported for segment 1007 for the same year (GBF 1992).

In 1993 and 1994, the City of Houston sponsored a large study to investigate toxic substances in the HSC system, including nine tributaries (ENSR 1995). The most contaminated of these was Patrick Bayou, a small bayou that drains into Segment 1006. In water, ammonia was elevated and levels of 1,1-dichloro-2,2 *bis*(*p*-chlorophenyl)ethane (known as DDD), 1,1,1-trichloro-2,2-*bis*(*p*-chlorophenyl)ethane (known as DDT), and some other pesticides exceeded state water quality standards (WQS) (TNRCC 1995). In sediment, several polynuclear aromatic hydrocarbons (PAHs) were detected at high levels at the upper station and at lower levels at the middle station. At this middle station, elevated levels of chromium, zinc, and polychlorinated biphenyls (PCBs) were also found. In sediments near the mouth of the bayou, cadmium, chromium, nickel, and mercury were slightly elevated and a few PAHs were detected. High levels of dioxin were also found in the sediments from the middle station on Patrick Bayou and lower levels were found near the mouth. Ambient toxicity was also documented several times in Patrick Bayou water and sediments (ENSR 1995).

In 1993, the Texas Natural Resource Conservation Commission (TNRCC) began monitoring a station near the mouth of Patrick Bayou in response to two unexplainable fish kills in 1990; one was in the lower portion of the bayou between Occidental Chemical and Shell Refining and the other was in the east fork of the bayou. The elutriate from one TNRCC sediment sample, taken in October 1993, was toxic to sheepshead minnow (*Cyprinodon variegatus*) larvae, however, the next sample taken in April 1994, had no significant effect on the test organisms (TNRCC files). Two industrial facilities along the upper part of the bayou are currently involved in toxicity reduction evaluations in order to reduce the unacceptable levels of toxicity in their effluents, which have been attributed at both facilities to high levels of calcium.

The data gathered thus far indicate not only significant contamination of Patrick Bayou sediments, but also ambient toxicity in water and sediment. The main purpose of this study was to collect water and sediment samples to elucidate the magnitude and spatial distribution of the contamination and toxicity in the bayou in relation to the several point sources. This is a first step in deducing the sources of the pollutants measured. The water and sediment data together should yield information on the efficacy of current controls for the different facilities and aid in the development of water quality-based permit limits. This water body was targeted for investigation based on the high concentration of discharges, past fish kills, and data indicating a high degree of sediment contamination (TNRCC unpublished data; ENSR 1995).

STUDY AREA

Patrick Bayou is a small tidal tributary of the Houston Ship Channel (HSC) that flows through a heavily industrialized area (Figure 2). This 3-mile (4.8 km) long, shallow bayou is on the south side of the HSC (Segment 1006) about 2.3 miles (3.7 km) upstream of its confluence with the San Jacinto River (Figure 1). The study area included Patrick Bayou from the HSC to just upstream of State Highway 225 (Figure 2). The upper portion (upstream of SH 225) is concrete-lined and flows through the urban area of Deer Park. Downstream of SH 225, Patrick Bayou flows through an entirely industrial area. A portion of the bayou (0.6 km) is enclosed in a concrete box culvert starting on the south side of SH 225 and continuing under the boundary between Shell Chemical and Lubrizol. An additional 0.7 km just downstream of the box culverts is gunite-lined. The lower portion of the bayou has earthen banks with a soft mud bottom. The east fork of Patrick Bayou flows through a golf course owned by Oxychem. The east fork of the bayou is more stream-like in contour and has more riparian vegetation than the main bayou.

Patrick Bayou is bounded by and receives discharges from Occidental Chemical (Oxychem), Shell Refinery, Shell Chemical, and Lubrizol. It also receives effluent via ditches from the City of Deer Park wastewater treatment plant (WWTP) and an air separation plant, Praxair. Oxychem and Rohm & Haas both have outfalls that flow into the HSC near the mouth of the bayou. Patrick Bayou is permitted to receive 140 million gallons per day (mgd) of treated wastewater and/or cooling water from eight outfalls (not including outfalls carrying stormwater only). The locations of these facilities and their main outfalls are shown in Figure 2 and their TNRCC permit numbers and respective permitted volumes are listed in Table 1.

Oxychem, a chemical manufacturing facility, has three cooling water outfalls (001, 002, 003) which discharge to the lower portion of Patrick Bayou. Outfall 001 also carries treated wastewater from their mercury cell process area, which passes through an internal outfall (101). Outfall 002, the largest cooling water outfall, also carries treated process wastewater from another internal outfall (201). Oxychem outfall 003 carries cooling water, utility wastewaters, and stormwater. In 1993, Oxychem installed a groundwater retaining wall 60 feet deep along Patrick Bayou from just south of outfall 003 to their bridge, west of the mouth of Patrick Bayou. Shell's Deer Park Manufacturing Complex includes both a chemical manufacturing facility and a refinery, each of which has a separate TNRCC permit. Shell Chemical's outfall 001 contains both industrial and domestic wastewater and the chemical plant has two additional outfalls for stormwater. All three of the Shell Chemical outfalls discharge to the gunite-lined portion of Patrick Bayou above the Shell Co. bridge. The Shell Refinery outfall 001 carries boiler blowdown water and stormwater into the gunite-lined portion also. Shell Refinery has four additional stormwater outfalls to Patrick Bayou. The main process outfall for the Shell Refinery (007) goes directly into the HSC, 2 km upstream of Patrick Bayou.

Lubrizol has one outfall to Patrick Bayou that carries treated process water, contaminated groundwater and stormwater from their lubricant manufacturing facility. This outfall (001) enters Patrick Bayou inside the box culvert. Lubrizol has six other outfalls for stormwater.

The other two outfalls to Patrick Bayou, one from the City of Deer Park WWTP and the other from Praxair, enter the bayou via ditches. For Praxair, the ditch is along a railroad track and it drains into the East Fork of Patrick Bayou. Praxair's effluent is composed of cooling tower and boiler blowdown water, domestic wastewater, and process area washwater from their air separation plant. The City of Deer Park's effluent (treated municipal wastewater) flows into a ditch along SH 225, which empties into Patrick Bayou just upstream of the box culvert (Figure 2).

Because this area is tidally influenced with some upstream flows, this study also considered possible effects on Patrick Bayou from the nearby outfalls in the HSC. The nearest point source outfall is a ditch along the Oxychem property which empties into the HSC just downstream of the mouth of Patrick Bayou (Figure 2). This ditch carries effluent from Oxychem outfalls 004 and 005. Outfall 004 is basically a stormwater outfall while outfall 005 discharges treated process, utility, and domestic wastewaters, and groundwater contaminated with chlorinated solvents. Several hundred meters downstream of the Oxychem ditch, a Rohm & Haas outfall (001) also empties into the south side of the HSC. This outfall carries treated process wastewater from their chemical manufacturing facility.

Station Locations

This study included water and sediment samples for priority pollutants at 10 stations (Figure 2) and toxicity samples at selected stations. The TNRCC routine station was also sampled at the same time. Station locations (Table 2) were chosen to bracket the different point sources. Stations 1 and 2 were in the HSC on the south side in one meter of water. Station 1 was 200 ft (65 m) from Rohm & Haas' outfall 001. Station 2 was in the HSC at the mouth of the ditch carrying effluent from Oxychem's 004 and 005 outfalls. The TNRCC station (Station 2.5) is just inside the mouth of the bayou, near the Oxychem bridge that connects the main plant with the cooling water intake and dock facilities on the main channel (Figure 2). Stations 3 and 4 were near the Oxychem facility and cooling water outfalls and station 5 was near the Shell Refinery shoreline across from the Oxychem cooling water outfalls. Stations 6 and 7 were in the narrower portion of the bayou, between Shell Chemical and Lubrizol. Station 6 was at the Shell company bridge, below the Shell Chemical 001 and Shell Refinery 001 outfalls. Station 7 was in the gunite-lined portion of the bayou where the box culverts ended, below Lubrizol's main process outfall. Stations 8 and 9 were in the concrete-lined portion of the bayou, upstream of SH 225. Station 8 was at SH 225, downstream of the ditch carrying the effluent from the WWTP. Station 9 was upstream of all the permitted point sources. Station 10 was on the East Fork of Patrick Bayou, downstream of the ditch carrying the effluent from Praxair.

Uses of Patrick Bayou

The designated uses for segment 1006, which includes Patrick Bayou, are industrial water supply and navigation. Although segment 1006 does not have a designated aquatic life use, the acute and chronic standards for the protection of aquatic life still apply and, as a tidal segment, it is considered to have a sustainable fishery, thus the human health standards for toxic substances also apply (TNRCC 1995). A recent Use Attainability Analysis by TNRCC personnel assigned the concrete-lined portion of Patrick Bayou an aquatic life use no greater than limited, based on the limited habitat (Tiemann 1995). This does not apply to the lower portion, which is not channelized or concrete-lined. A significant population of nektonic species has been documented near the mouth of Patrick Bayou in all seasons (Seiler 1994; TNRCC data) and several species of fish and birds were observed using the bayou during this study; this information indicates a current aquatic life use which is protected under the Texas Surface WQS. There is also a recreational fishery in the HSC downstream of Patrick Bayou in spite of an existing consumption advisory that was issued by the Texas Department of Health due to dioxin contamination in crabs and fish.

METHODS

Sampling and Analysis

Sampling was conducted by TNRCC and EPA personnel on July 26, 1994, at the 11 stations listed in Table 2. Samples were collected and preserved in accordance with TNRCC monitoring procedures (TNRCC 1994b). Particular care was taken to avoid contamination of the samples in the field. For the metals in water samples, unpowdered latex gloves were worn and samples were filtered on-site through nitric acid-cleaned silicone tubing and a cartridge filter (0.45 μm) into precleaned plastic containers that contained metals-grade nitric acid for preservative. Containers and filters were certified clean for metals analysis by the supplier. The other sample containers were filled directly from the bayou or from buckets that were washed between stations with soap and water and then rinsed with ambient water before use. The Ekman dredge used to collect sediment samples was also washed between stations. Field blanks and blind duplicates were collected for dissolved metals and organics in water. A blind duplicate for sediment priority pollutants was also collected.

At the 10 study stations, samples were collected for routine water chemistry and priority pollutants in water and sediment (Appendices 1 and 2). At the TNRCC station (2.5), only routine water chemistry and priority pollutants in sediment were collected. Dissolved oxygen, temperature, pH, conductivity, and salinity were measured at each site with a Hydrolab Surveyor II or H20 sonde.

Conventional water quality parameters were measured at the TNRCC laboratory in Houston. Priority pollutants in water and sediment for the 10 study stations were analyzed at the EPA laboratory in Houston. Appendix 2 gives the analytical methods used and the detection limits achieved for the 10 samples analyzed at the EPA laboratory, which form the basis of this report. For the routine TNRCC station (2.5), organics in sediment were analyzed at the Texas Department of Health laboratory in Austin and metals in sediment were measured at the TNRCC laboratory in Houston. Slightly different detection limits were achieved for the 10 main stations compared with station 2.5 because of the different laboratories, however, the results are included for comparison purposes. All sediment chemistry results are reported on a dry weight basis.

Water and Sediment Toxicity Tests

Toxicity tests were conducted on the water and the sediment elutriate at selected stations. Ambient water from stations 3, 6, 7, 8, and 10 was tested for toxicity using two standard marine short-term chronic tests (Weber et al. 1988) incorporating mysid shrimp (*Mysidopsis bahia*) and inland silversides (*Menidia beryllina*). These tests on ambient water were conducted at the EPA Environmental Research Laboratory in Gulf Breeze, Florida. Sediments from stations 2, 2.5, 3, 7, and 10 were collected for toxicity testing. The sediment elutriate was obtained by mixing the sediment with dilution water (4:1 ratio) for 24 hours and then allowing the solids to settle. The

resulting supernatant was used in a 9-day embryo/larval survival and teratogenicity test on sheepshead minnows (*C. variegatus*) at the EPA Laboratory in Houston (Method #1005; Weber et al. 1988). As specified in the test protocols, several water quality parameters were measured in the test waters, including pH, temperature, DO, and ammonia. Statistical significance of toxicity test results was determined at the laboratory.

Macrobenthic Community

Samples for macrobenthic organisms were collected at the stations in the lower portion of the bayou (stations 1 - 5). Quantitative benthic samples could not be collected at the other stations because of the substrate. Benthic communities at each station were collected with a 232 cm^2 Ekman dredge (4 replicates per site). In the field, the sediment was washed through a #30 sieve (0.59 mm openings) and the organisms were preserved in a 10% formaldehyde solution. After 24 hours, the samples were transferred to 70% ethanol with rose bengal stain. Once stained, the organisms were picked out of the debris, identified to the lowest possible taxon, and counted.

Several metrics were computed from the benthic data, including total number of individuals/m^2, total taxa, total polychaete taxa, diversity, and a benthic index score. This benthic index was computed from the diversity, percent tubificid oligochaetes, and percent bivalves (Engle et al. 1994). The expected diversity, expected number of taxa, and the expected number of polychaete taxa were also computed for each station using the salinity and formulas developed by Engle et al. (1994).

Data Analysis

Water chemistry data collected during this study were compared with the appropriate standards from 30 Texas Admistrative Code, Chapter 307 (TNRCC 1995), including the marine acute and marine chronic standards for the protection of aquatic life (acute WQS and the chronic WQS) and the human health standards for saltwater (human health WQS). Unionized ammonia levels were compared to the EPA criteria for saltwater (USEPA 1989). Parameters that do not have established standards were compared to state screening levels for estuarine waters (TNRCC 1994a).

Sediment chemistry data were compared to several different types of screening values. When available, National Oceanic and Atmospheric Administration (NOAA) effects-range median (ERM) values were used. These are published levels for certain contaminants in sediments that have shown adverse effects on the biota in other areas (Long & Morgan 1990; Long et al. 1995). The NOAA ERM values have been developed for metals and certain organics, mostly PAHs. In this report, the updated values from 1995 were used (Long et al. 1995). The data were also compared to the proposed USEPA sediment criteria for acenaphthene, fluoranthene, and phenanthrene (USEPA 1991a, 1991b, 1991c). TNRCC screening levels (TNRCC 1994a) were also used in the evaluation of the sediment data, although these are also not available for all

organic compounds. The TNRCC sediment screening level is the level of that compound that is higher than 85% of the values in the TNRCC database for similar areas. For this study, the screening levels for tidal streams in Texas were used (TNRCC 1994a). The state screening level represents a relatively high amount of a particular contaminant in the sediment but does not necessarily have any toxicological significance. In this report, sediments with values over this state screening level are termed "elevated." Another screening tool is USEPA's draft Sediment Quality Guidelines (SQG) (USEPA 1994). These are computed based on water column criteria and the chemical properties of the contaminants. These SQGs are listed with the results for those organic compounds for which no other screening information was available although the significance of these values is not discussed.

Data collected by industries on a routine basis for their discharge permits was used in evaluating potential sources of specific contaminants to Patrick Bayou. These self-reported data are the most direct and recent information about what is entering Patrick Bayou through permitted discharges. This information is limited in that many variables of interest are only monitored in a few outfalls or not at all. The monitoring requirements for the outfalls to Patrick Bayou are listed in Appendix 3 (excluding the stormwater-only outfalls). Another source of effluent data is a set of four samples collected for six metals in July 1992 at all of the outfalls (Appendices 4 and 5). These samples were collected by the dischargers and submitted to USEPA and the TNRCC to assist in developing a total maximum daily loading estimate for the HSC. The results in Appendix 4 are presented in pounds per day, based on the flow. Appendix 5 gives the average concentrations measured in the effluents. These values were used to compute the loading estimates in Appendix 4. For example, even though the concentrations in Oxychem's 002 outfall are the same as or lower than those in the other Patrick Bayou outfalls, the total loading values for all six metals in the Oxychem 002 outfall are high because of its high flow (77 mgd). In contrast, Praxair, which had high concentrations for several metals, shows a very low total metals load, because of its much lower flow (0.094 mgd).

QUALITY ASSURANCE/ QUALITY CONTROL

All priority pollutant data for stations 1 - 10 were validated at the USEPA laboratory. Field blanks were collected for dissolved metals and volatile organic compounds in water; no analytes were detected in the blanks. A second sediment sample was collected at station 3 as a blind replicate for priority pollutant analyses. The data for the replicate are presented in the tables as a second sample from station 3, but included in the graphs as an average of the two samples from station 3. The second sample from station 3 was lower for all the analytes, except for arsenic. The coefficient of variation (CV) for the two samples from station 3 averaged 14.2% for organics and 14.1% for metals. The priority pollutant metal with the highest variation was lead (31.3%) and the lowest was nickel (7.7%). The CV averaged 6.9% for the ions. For organics, the highest CV was hexachlorobutadiene (26.2%) and the lowest was benzo(k)fluoranthene (6.2%).

To minimize the dilution of the test waters, the water toxicity tests were run at salinities (8 - 13 ppt) below the range specified for *Mysidopsis bahia* toxicity tests. The salinities used were within the range specified for tests using *Menidia beryllina*. For the tests, brine made from artificial sea salts was used to raise the salinity of the samples from stations 7, 8, and 10 to 12 ± 1 ppt. The resulting volume of the original samples in the test waters for these three stations was 80%. Because the salinities at stations 6 (8 ppt) and 3 (10 ppt) were close to the chosen range, those test waters were not adjusted. The control salinity was also in the 12 ± 1 ppt range. Survival in the controls was 100% for the mysids and 93% for the silversides, so the reduced salinity should not have affected the outcome of most of the tests. Since station 6 was tested at 8 ppt, those mysids could have been physiologically stressed, although estimates from other tests indicate that one-week-old mysids should survive a test at 8 ppt with about 20% mortality in seven days (McKenney 1994).

RESULTS AND DISCUSSION

This study found several issues of concern in Patrick Bayou: metals contamination of sediments (Hg, Pb, Cr, Zn, Cu, As, Mn, Ni, and Se) and water (Cu, Pb, Ni, and Hg), organic contamination of sediments (PAHs, PCBs, hexachlorobenzene, phthalates, etc.), ambient toxicity in water and sediment, high water temperatures, high ammonia levels, and high calcium values. In general, the results from this study corroborate and expand on the information gathered on Patrick Bayou in the study sponsored by the City of Houston (ENSR 1995), which had three stations on this bayou. They also found ambient toxicity in water and sediment, high PAHs, PCBs, Hg, Cr, and Zn in sediment, and high levels of ammonia in the water. In addition, they found high levels of dioxin in Patrick Bayou sediments near the Shell Company bridge (station 6 in this study), and lower levels of dioxin near the mouth of Patrick Bayou. They also found levels of four pesticides in the water over WQS (ENSR 1995).

This study was conducted during summer low flow conditions to focus on contamination originating from permitted point sources. Because the entire bayou from station 8 to the HSC is lined by the industries listed, with no public access, the compounds found in this portion of the bayou likely originated from one or more of these point sources. Station 9 is the only station upstream of all of the permitted discharges. During this study there was little, if any, natural flow to the bayou, therefore our objective to sample during critical conditions was achieved. Sediment samples, collected from the top 5 - 10 cm of several grabs, should be indicative of recent conditions, although the length of time represented would depend on sedimentation and erosion rates at the different sites. Station 8 was so scoured that we could not obtain any sediment for chemical analysis or toxicity tests. Even though stations 6 and 7 were also scoured, enough sediment was obtained from station 7 for all tests, but at station 6, we could not collect enough sediment for toxicity tests or even grain size analysis.

Field and Conventional Parameters

Water Temperature

Field measurements showed temperatures from 36.1°C (97.0°F) to 38.3°C (100.9°F) at stations 2.5, 3, 4, and 5 (Table 3). These values exceed the segment criterion of 35°C (95°F). These four stations are in the lower part of the bayou near the three cooling water outfalls of Oxychem. The highest temperature recorded (38.3°C) on the day of sampling was at the TNRCC station (2.5) near the Oxychem bridge. The temperature in the HSC was 31.9°C. According to the self-reported data, the maximum temperature water discharged from the adjacent cooling water outfalls in July 1994 was 39°C (102°F), 41°C (105°F), and 36°C (96°F) for outfalls 001, 002, and 003, respectively. While these levels are not a violation of the Oxychem permit, they could easily explain the high water temperatures in this shallow bayou.

Dissolved Oxygen and pH

The WQSs for dissolved oxygen (DO) and pH were not violated during our sampling (Table 3). The lowest DO found was 2.7 mg/l at station 4 (near Oxychem 001) and the highest was 14.0 mg/l at station 9 (upstream) where there was an obvious algal bloom (chlorophyll *a* + pheophytin *a* = 64.7 μg/l). At station 9, the pH was also correspondingly high, at 9.0 s.u., which is the upper limit allowed for the segment. The lowest pH (6.7) was found at station 8, which was dominated by the effluent from the City of Deer Park WWTP.

Salinity and Ions

The salinity data indicated that only stations 8, 9, and 10 were freshwater (salinity < 2 ppt). The remaining stations were brackish with salinities between 7.2 ppt and 12.4 ppt (Table 3). The salinity of the HSC was 10.3 ppt. Most of the ions (Table 4) tended to follow the salinity trends, except for high calcium values at stations 6 and 7, downstream of Shell Chemical and Lubrizol, respectively. Calcium is not a priority pollutant and water quality standards have not been developed for this parameter. However, it is mentioned here as a possible contributor to the in-stream water toxicity observed at these two stations. Both Shell Chemical and Lubrizol are involved in toxicity reduction evaluations to reduce the toxicity in their effluents, which both facilities attribute to excess calcium and subsequent ion imbalances. The calcium comes from the limestone used to neutralize their wastewater. In water, the calcium at stations 6 and 7 was about 3 times the value found at the nearest downstream station (station 5), while the sodium and chloride values were both higher at station 5. The calcium concentration in the sediments was also higher (6-10 times) at stations 6 and 7 compared with station 5 (Table 5). Thus, if the calcium is indeed causing the toxicity in these two discharges, based on the limited instream dilution, there is a high likelihood that it is also contributing to the ambient toxicity observed in the bayou.

Nutrients

Data from the grab samples for routine water chemistry variables are shown in Table 4. The total ammonia was 16.7, 14.1, and 3.24 mg/l at stations 8, 7, and 6, respectively. Taking the pH, temperature, and salinity into account, the unionized portion of the ammonia was 0.0745 mg/l (station 8), 0.106 mg/l (station 7), and 0.0454 mg/l (station 6). These values are above the USEPA chronic criterion (0.035 mg/l) for unionized ammonia in saltwater, although they do not exceed the acute criterion of 0.233 mg/l (USEPA 1989). The effluent data from the City of Deer Park WWTP could explain the high ammonia values at these stations. For July 1994, the daily average total ammonia concentration in the effluent was 15.5 mg/l, while the daily maximum was 19.9 mg/l. Although these values represent violations of their permit, recent self-reported data show that this WWTP is now discharging effluent with much lower ammonia levels (less than 1 mg/l, daily average) due to a changeover to a new system (TNRCC files).

Sediment Variables

Sediment grain size distributions ranged from 78% silt at station 2.5 to 95% sand + gravel at station 9 (Table 5; Figure 3). Finer sediments were found in the lower portion of the bayou. Stations 1, 2.5, 4, and 5 were predominantly silt, while stations 7, 9, and 10 were predominantly sand and gravel. Total organic carbon (TOC) in sediment was low in Patrick Bayou. The highest value measured in this study was 1.17% at station 5. The lowest TOC values were measured at stations 10 and 9 (0.2% and 0.3%). Carr (1993) and Morse et al. (1993) also found relatively low TOC values in Galveston Bay sediments. The average Galveston Bay sediment TOC value was 0.87% (range: 0.2% to 2.1%) in Carr (1993) and 0.42% (range: 0.05% to 1.18%) in Morse et al. (1993). In Patrick Bayou, TOC was strongly correlated with percent fines (silt + clay; $r = .87$; $p < 0.01$).

Metals

In water, several of the metals exceeded WQS (Table 6). Dissolved copper exceeded the chronic WQS (4.37 ppb) at seven stations, and it exceeded the acute WQS (16.2 ppb) at station 10. Dissolved lead exceeded the human health WQS of 3.85 ppb at three stations. Dissolved nickel exceeded the chronic WQS (13.2 ppb) at station 6. Total mercury exceeded the human health WQS (0.025 ppb) at station 4 with a value of 0.79 ppb.

Several metals were elevated in Patrick Bayou sediments (Table 7) compared to state screening levels (TNRCC 1994a) or to ERM values (Long et al. 1995). Arsenic, chromium, copper, lead, manganese, mercury, nickel, selenium, and zinc were above state screening levels at one or more of the 10 sediment stations in Patrick Bayou. Lead exceeded the ERM (Long et al. 1995) at station 9 and mercury exceeded the ERM at six sites (stations 1-5; Figure 4).

Mercury

Mercury was extremely high in the sediments of the lower portion of Patrick Bayou (stations 1-5), exceeding the ERM by as much as 10 times. Mercury was only detected in the water at station 4, but the detection limit (0.2 μg/l) was above the human health WQS (0.025 μg/l). Mercury is of particular concern because of its tendency to bioaccumulate and its known serious health effects on humans. It can also be toxic to aquatic organisms and the toxicity and bioaccumulation rate increase with increased temperature (Eisler 1987a).

In Lavaca Bay (a national priority list superfund site) the United States Food and Drug Administration action level for mercury in tissue continues to be exceeded in several species, with mercury levels in sediments averaging about 1.0 ppm (Evans and Engel 1994). The highest single value collected by the TNRCC during the past 15 years in Lavaca Bay sediments is 1.7 ppm (TNRCC database). Some sediment mercury levels in Patrick Bayou were higher than 7.0 ppm. Even in the HSC outside the mouth of Patrick Bayou the sediment mercury was 1.7 to 2.5 ppm (stations 1 and 2).

Sediment mercury at stations 3, 4, and 2.5 was higher than any values reported for the 212 NOAA Status and Trends (NS&T) stations evaluated by Long and Morgan (1990). The highest Patrick Bayou value (8.3 ppm; station 3) also exceeds most values reported in the literature for other mercury contaminated sites worldwide (Al-Madfa et al. 1994; Beck et al. 1990; Glass et al. 1990). For comparison, Minimata Bay, Japan, which was heavily polluted with mercury from industrial sources until 1968, had sediment mercury concentrations over 30 ppm in 1985 (Nakamura et al. 1988b), although, in 1973, mercury levels there were reported to have reached 262 ppm (Nakamura et al. 1988a).

An examination of the 1992 metals in effluent data (Appendix 4) shows two potential point sources of mercury to this system. Oxychem's 002 and 001 outfalls (near stations 3 and 4) together had an average of 0.0555 lb/day of mercury entering Patrick Bayou in July 1992. Rohm & Haas' 001 effluent data showed an average of 0.0375 lb/day of mercury entering the HSC near the mouth of Patrick Bayou during the same time period. This information fits the sediment distribution of mercury found in this study (Figure 4). The highest concentration of mercury was at stations 3 and 4, downstream of Oxychem's 002 and 001 outfalls, respectively. Stations 2.5 and 2 were progressively lower than station 3, and the mercury at station 1 (near Rohm & Haas' 001) was 50% higher than that at station 2, although the grain size at station 1 was considerably finer than that at station 2. None of the external outfalls considered in this study measures mercury routinely, although it is measured in one of Oxychem's internal outfalls (101) twice a week (Appendix 3). Their self-reported data show the average mercury loading in this internal outfall to be 0.012 lb/day for the year preceding this study. Even if all of the mercury found in outfall 001 in July 1992 (0.022 lb/day) had come through the internal outfall (101), the permit limit for that outfall (0.036 lb/day) would not have been exceeded.

Lead

Dissolved lead was found at levels slightly above the human health WQS (3.85 μg/l) at stations 1, 2 and 10 (Table 6). An examination of the 1992 data (Appendix 5) for the nearby outfalls shows an average effluent concentration of total lead at Rohm & Haas (near station 1) of 139 μg/l, at Oxychem 004 and 005 (near station 2) of 11 μg/l, and 33μg/l at Praxair (near station 10). Stations 1 and 2 were in the main channel, which provides more dilution, while station 10 was in the East Fork of Patrick Bayou, which has almost no dilution in dry weather. Currently, lead is only measured routinely in Shell Chemical's 001 outfall and Oxychem's internal outfall 201 (Appendix 3), which are not near the areas where lead was found in water.

In sediments, lead was quite elevated at stations 9 and 3, and slightly elevated at stations 4 and 1 (Figure 4; Table 7). In 1992, the highest average lbs/day of lead was found in Rohm & Haas' 001 effluent (station 1) and in Oxychem's 002 effluent (station 3). Station 9 was upstream of all the point sources, so the source of contamination to this site is unknown. It is notable, however, because, not only did the value at station 9 (269 ppm) exceed the ERM, but it also exceeded all values in the NS&T database (Long and Morgan 1990), although sediments near lead-containing industrial discharges have had lead concentrations exceeding 1,000 ppm in Sweden, Norway, and Big River, Missouri (Eisler 1988).

Copper

In sediment, copper was elevated at all stations except 7 and 9, with all eight of those stations in the same range (43 ppm to 60 ppm; Table 7). Stations 7 and 9 were upstream of all of the stations that had elevated copper values in sediments. Dissolved copper exceeded the chronic WQS (4.37 μg/l) in water samples from all stations except 6, 7 and 9 (Table 6). The East Fork of Patrick Bayou (station 10) had the highest dissolved copper value (22 μg/l), which exceeded the acute WQS (16.2 μg/l). The Praxair effluent had an average concentration of 271 μg/l total copper in July 1992 (Appendix 5). This value is consistent with 1994 effluent data, which shows similar values for total flow and total lbs/day of copper, although concentrations are not given. Currently, copper is measured routinely in five of the outfalls in the study area: Praxair, Rohm & Haas 001, Oxychem's internal outfall 201, Shell Chemical 001 and Shell Refinery 001 (Appendix 3). In 1992, Oxychem's 002 outfall had the highest copper load of all discharges, at 19.9 lbs/day (Appendix 4), although current data on outfall 201 (which combines with cooling water before it exits through outfall 002) shows a much lower copper load. The highest monthly average for copper from August 1993 to July 1994 was 0.22 lb/day, which is only 1.1% of the July 1992 level. Either Oxychem has effected a drastic reduction in copper loading in one year, or the majority of the copper discharged through outfall 002 is not coming through the internal outfall, but is coming into the cooling water somewhere else. An additional monitoring point at the external outfall may be appropriate in this case.

Zinc

Dissolved zinc did not exceed the WQS at any station, but zinc in sediment was elevated at five stations (1, 2.5, 4, 5 and 6), with the highest value (318 ppm) at station 4 (Figure 4). From the sediment data (Table 7), zinc appears to be coming into the bayou at stations 6 and 4 and possibly at station 1. According to the 1992 effluent data, Shell Chemical (station 6) and Rohm & Haas (station 1) were discharging more than 4 lbs/day each (Appendix 4). Oxychem's cooling water outfalls were discharging more than 40 lbs/day, but mostly through outfall 002 (station 3) rather than 001 (station 4). Current effluent data are available only for Rohm & Haas and Lubrizol; zinc is not routinely measured in the other outfalls (Appendix 3). Lubrizol 001 and Oxychem outfall 005 had the highest concentration of zinc in their discharges in 1992, but due to the higher flow, loading rates were highest from the Oxychem outfall 002 (Appendices 4 and 5).

Nickel

Dissolved nickel exceeded the chronic WQS (13.2 μg/l) at station 6 with a value of 18 μg/l, but only Rohm & Haas and Oxychem 002 routinely measure nickel in their effluents (Appendix 3). In sediments, nickel was elevated in the entire bayou below the Shell outfalls (stations 1 - 6) but the ERM was not exceeded. The highest value for nickel in sediment (42 ppm) was at stations 4 and 1 (Table 7).

Chromium

Dissolved chromium was not detected in the water samples, but sediment chromium was elevated at seven sites (Table 7; Figure 4). The highest values were 129, 89, and 88 ppm, found at stations 4, 5 and 1, respectively. During this study chromium was only measured as a permit parameter by Rohm & Haas. In July 1994, they were discharging 3.05 lbs/day of chromium (daily average).

Selenium

Selenium was also not detected in the water samples. In sediment, selenium (Table 7) was quite elevated at stations 1 and 5 (6.8 ppm) and somewhat elevated at stations 2, 3, 6 and 7 (Se > 2.8 ppm). The state screening level is 1.25 ppm (TNRCC 1994a). There is no ERM for selenium, but the US Fish & Wildlife Service lists the level of concern for fish and waterfowl to be 4 ppm in sediments (Lemly and Smith 1987) because selenium is bioaccumulated readily and causes toxicity and reproductive failure in fish and birds (Presser and Ohlendorf 1987; Gillespie and Baumann 1986; Eisler 1985).

Organic Compounds

A few organic compounds were detected in the water samples (Table 6), but only carbon tetrachloride exceeded the human health WQS and that was at station 4, which was only 50' from the Oxychem outfall 001 (inside the mixing zone). Semi-volatile organic compounds were detected in all sediment samples except for station 10. Because station 9 is the most upstream station, undetected organics values for station 10 are not included in the graphs. Volatile organics and pesticides were not detected in any of the sediment samples, except for station 2.5, which was analyzed at a separate laboratory and had lower detection limits than the other sediment samples.

Self monitoring data for organics are limited (Appendix 3). Priority pollutant organics are not routinely analyzed in the facility discharges, with the exception of Oxychem outfall 005, where 10 chlorinated volatile organic compounds are regularly monitored. Some of those 10 compounds were found at very low levels in the water at station 2, but not in the sediments.

Polynuclear Aromatic Hydrocarbons (PAHs)

Sixteen PAHs were detected in Patrick Bayou sediments (Table 8). Twelve of those have ERM levels established (Long et al. 1995) and all 12 exceeded those ERM values at one or more sites in Patrick Bayou. The ERM value for total PAHs was also exceeded at two sites in Patrick Bayou. There are no state screening levels established for any of the PAHs. The highest PAH values were found at stations 3 and 9 (Figure 5). All three PAH compounds that have draft USEPA criteria exceeded those criteria at both stations 3 and 9 (Figure 6). Acenaphthene was 2.7 times the computed site-specific criteria at both stations (USEPA 1991a). Fluoranthene was 3.7 times higher than the proposed federal criterion at station 3 and 49 times the proposed federal criterion at station 9 (USEPA 1991b). Phenanthrene was 7.7 times higher than the draft USEPA criterion at station 3 and 75 times higher than the draft USEPA criterion at station 9 (USEPA 1991c).

Nine different PAHs are more than four times higher in Patrick Bayou than the highest NS&T station values reported in Long and Morgan (1990). Total PAHs at station 9 exceeded the highest NS&T value by eight times. PAH levels at station 9 in Patrick Bayou also exceed the levels found at many PAH contaminated sites worldwide (Eisler 1987b).

Most of the PAH contamination in Patrick Bayou was found at stations 3 and 9 (Figure 5). Stations 4, 5 and 6 had the lowest PAH levels of the 10 sites, so the PAHs at station 3 are probably not from the same source as those at station 9, the upstream station. The combination of PAHs found at the two stations is also somewhat different. In general, the lower molecular weight PAHs (< 4 rings) were higher at station 3, and the higher molecular weight PAHs were higher at station 9. Acenaphthene, acenaphthylene, fluorene, 2-methyl naphthalene, and naphthalene were all highest at station 3, while the other 10 PAHs were highest at station 9. At station 3, nine different PAH compounds exceeded the ERM levels, several by more than an order of magnitude (Table 8). Station 3 is nearest the Oxychem cooling water outfalls 002 and 003. Station 3 is also near two Shell Refinery stormwater outfalls, 004 and 009. Oil & grease is measured in those two stormwater outfalls, whenever they have flow. For the six months prior to our sampling, the monthly daily maximum oil & grease values averaged 6.1 mg/l for the 004 (34 discharge days) and 3.9 mg/l for the 009 (22 discharge days). These values do not seem excessively high compared with other stormwater outfalls (Lubrizol's and Rohm & Haas'). Groundwater migration could also be a source for these PAHs.

Since station 9 is upstream of all of the permitted point sources, the source of these PAHs is unknown. ENSR (1995) found elevated PAH levels in Patrick Bayou at SH 225, which corresponds to our station 8. When we sampled, the bayou at SH 225 was so scoured that we could not obtain enough sediment for analysis. However, since our values at station 9 were 10 times the ENSR values at station 8, an upstream source is most likely for these PAHs, rather than the WWTP, upstream flow from Lubrizol, or something else at SH 225. Information collected by Lubrizol indicated that the PAHs at this site may be a result of chronic dumping of used motor oil into the storm drains by an auto shop (D. Boutros, pers comm.). Sediment at station 9 was high in chrysene and benzo(a)pyrene, which are found at high levels in used motor oils (Eisler 1987b).

The rate at which hydrocarbons degrade in the environment is strongly correlated with their structure (Heitkamp and Cerniglia 1987). Larger PAHs like benzo(a)pyrene are slower to degrade (half lives > 200 weeks) than lower molecular weight PAHs like phenanthrene (half life 4 weeks) or naphthalene (2.4 wks; Heitkamp and Cerniglia 1987). The rate of degradation of PAHs is strongly affected by sediment pH and redox potential where mineralization is fastest in aerobic sediments (DeLaune et al. 1990). The sediments at stations 2.5, 3, 4, and 5 appear to be more reduced (less aerobic) than those at station 9. High temperatures also speed degradation (Lee and Ryan 1983). The lower molecular weight PAHs are at station 3 where temperatures are high, but the sediments appear to be quite reduced, which would slow degradation. The larger molecular weight PAHs are at station 9, but the sediment and temperature regimes should allow some degradation.

Polychlorinated Biphenyls (PCBs)

PCBs were detected in the sediments at five stations in Patrick Bayou as Aroclor 1248 (Table 8). All detected values exceeded the ERM for total PCBs (180 ppb; Long et al. 1995) and the state screening level for total PCBs (18.7 ppb; TNRCC 1994a). The detected values for Aroclor 1248 in Patrick Bayou ranged from 806 ppb at station 1 to 4,150 ppb at station 7. Only one of the 212 NS&T sites exceeded this value (Long and Morgan 1990). In Texas, one station near Lubbock also had high PCB levels in sediments (6,500 - 8,900 ppb; Dick 1982). Station 7 is below Lubrizol and the City of Deer Park outfalls. A smaller peak for PCBs was found at stations 3, 4 and 5 (Figure 7) near the Oxychem cooling water outfalls. ENSR (1995) found Aroclor 1248 at the Shell bridge (station 6) at 1,200 ppb. Their samples were collected at our stations 8, 6, and near 2.5. In our study, stations 2, 2.5, 6, and 9 had no detected PCBs (Figure 7; Table 8), although our detection limit was very high.

PCBs were used in high temperature applications such as transformers, capacitors, and some lubricants. These compounds are very persistent in the environment and they tend to bioaccumulate and biomagnify because of their high fat solubility. Because of their toxicity, carcinogenicity, and adverse effects on reproduction, the manufacture of PCBs in the United States was banned in 1979, except for special applications (Eisler 1986).

Chlorinated Hydrocarbons

Hexachlorobenzene (HCB) was found in the lower portion of Patrick Bayou (below station 3), along with hexachlorobutadiene (HCBD) and hexachloroethane (HCE). All three compounds were markedly higher at station 2 than at the other stations (Table 9; Figure 8). These three compounds are measured once per year in the Oxychem 005 effluent. Values for each of these three compounds found at station 2 were 25 times (HCE) to 52 times (HCB) higher than the USEPA draft sediment quality guidelines (SQG; USEPA 1994) for each compound. The highest value for HCB found in Patrick Bayou (83,900 ppb) is six orders of magnitude higher than the state screening level (0.60 ppb; TNRCC 1994a). This value is in the high part of the range of values found near hazardous waste sites (Research Triangle Institute 1994). HCBD and HCE data in sediments are sparse (Life Systems, Inc. 1994a,b), although HCBD has been found in Great Lakes sediment at up to 120 ppb (Life Systems, Inc. 1994a). HCB and HCBD were detected at concentrations ranging from not detected to 470,000 ppb and 630,000 ppb, respectively in the Calcasieu Estuary, Louisiana (Redmond et al. 1996). HCB is of concern because it is accumulated by organisms exposed to contaminated sediment (Schuytema et al. 1988) and research indicates that it could be a human carcinogen. HCB has been detected in fish tissue collected near the San Jacinto State Park, 1.5 miles (2.4 km) downchannel from Patrick Bayou (TNRCC 1994a).

Seven other semivolatile organic compounds were detected in Patrick Bayou sediments (Table 9), including bis-2-ethylhexyl phthalate, which was greater than the state screening level (894 ppb) at five sites. The highest value (2,300 ppb) was found at station 2.5 near the mouth of the bayou. In addition, there were between eight and 24 other tentatively identified compounds in Patrick Bayou sediments (Appendix 6).

Toxicity Tests

Ambient toxicity in Patrick Bayou water was evaluated at five stations: 3, 6, 7, 8, and 10 (Table 10). All five of the water samples had an adverse effect on either the mysids or the inland silversides. Water from stations 3, 6, 7, and 8 caused a significant decrease in survival of *Mysidopsis bahia* in a 7-day chronic toxicity test (Table 10; Figure 9). Mysids in water from station 7 also had significantly reduced growth compared with the control. Fecundity was also markedly lower at stations 7 and 8 than the control. Mysid growth and fecundity could not be evaluated at station 6 because of the lethality. All 40 test organisms in the water from station 6 were dead by the end of the first day of testing (Figure 9). Water from station 6 also significantly reduced the survival of inland silversides (Table 10; Figure 10). In addition, inland silversides in water from both stations 6 and 10 showed significantly reduced growth compared with the control (Table 10).

Water from station 6 had the most extreme effect on the mysids and the silversides. This station had the highest concentration of sulfate, calcium, nickel, acetone, isophorone, TOC, and COD. The toxicity test for this sample was conducted at the lowest salinity of the five samples. It also had a low level of magnesium and potassium relative to the salinity, which studies by Shell Chemical and Lubrizol have shown to contribute to toxicity test failures (Charles Bland, pers. comm.). Therefore, it is difficult to determine the compound or combination of compounds responsible for the observed toxicity.

A significant effect on the sheepshead minnow (*Cyprinodon variegatus*) was observed in the sediment elutriate from stations 2 and 7, but not at stations 2.5, 3, or 10 (Table 10). The observed effect was on the embryo hatching success, since no mortality occurred in larvae after hatching. In the elutriates, DO, salinity, pH, alkalinity, total ammonia, and total chlorine were also measured. Total ammonia in the five sediment elutriates ranged from 9.6 to 19.2 ppm compared with < 0.1 ppm ammonia in the control (Table 10). The highest mortality (70%) was found in the sediment elutriate from station 7, which had a very high level of unionized ammonia (0.596 ppm). Chlorine was detected at 0.1 ppm in the elutriate from station 2, which had 53% mortality. The TNRCC station (2.5) has been tested several times for sediment toxicity, and elutriate from station 2.5 had shown toxicity to *C. variegatus* in October 1993 (100% mortality), but not in April 1994, nor during this study. ENSR (1995) also found temporal variability in toxicity.

Macrobenthic Community Assessment

Benthic macroinvertebrates were collected at six Patrick Bayou stations (1-5). Benthic samples were evaluated based on several metrics, including total number of individuals/m^2, total taxa, total polychaete taxa, diversity, and a benthic index score (Table 11). For this benthic index, the break point between degraded and undegraded sites is 4.1 (Engle et al. 1994). Because the methods used to derive this score were slightly different from those used in this study (4 - 232 cm^2 Ekman

replicates cf. 3 - 440 cm^2 Van Veen replicates), TNRCC data from other comparable benthic stations are listed in Appendix 7 for comparison, including the various metrics. These other data are from two reference stations in oligohaline areas of Galveston Bay sampled on July 13, 1994 (two weeks prior to the Patrick Bayou samples) and from two benthic samples collected elsewhere in the HSC system (San Jacinto Bay) in August 1992. Using a benthic index value of 4.1 as the break point, all six of the Patrick Bayou sites and one of the San Jacinto Bay sites would be considered degraded, based on the benthic community (Table 11).
Twenty benthic species were identified from the Patrick Bayou samples, including nemerteans, mollusks, oligochaetes, polychaetes, crustaceans and a chironomid (Table 11). Number of species per station ranged from a low of two taxa at stations 4 and 5 to a high of 13 taxa at station 2. There were fewer than seven taxa per station inside Patrick Bayou (stations 2.5 to 5), where 14 would be expected based on salinity (Engle et al. 1994). Numbers of polychaete species were also reduced at the four sites inside Patrick Bayou. Where seven polychaete taxa per site were expected, station 2.5 had four, station 3 had one, and stations 4 and 5 had none. Engle et al. (1994) found the percent of expected polychaete taxa correlated strongly with degraded vs. undegraded areas.

Opportunistic fauna dominated Patrick Bayou, including *Streblospio benedicti*, oligochaetes, and a chironomid. These three species reached high numbers at several stations in Patrick Bayou. *S. benedicti* was very high at station 2.5 and somewhat high at station 2, the oligochaetes were dominant at stations 2 and 1, and the chironomid was very high at station 5. Marks (1994) also found high numbers of oligochaetes and *S. benedicti* at a station downstream of Patrick Bayou in the HSC near the monument. A benthic sample where one species dominates by a large margin indicates a disturbed community (Gray et al. 1990; Grassle and Grassle 1974). Swartz' dominance index (SDI) is a measure of this (PTI 1993). The SDI values are relatively low in Patrick Bayou compared with the Galveston Bay samples (Appendix 8), indicating that a few species are dominating the community in Patrick Bayou.

The benthic index in Patrick Bayou generally increased from a low of 0.14 at station 5 to a high of 2.85 in the HSC, except for station 3, which had a benthic index value of 3.64 (Table 11). The benthic indices for the reference stations were 5.25 and 5.75 (Appendix 7). Taking all of the indices and the overall community structure into account, the most impaired sites are stations 4 and 5, with only two very tolerant species. Stations 1 and 2, in the HSC, had the most diversity and included all the major taxa, although both of these sites had an unusually high proportion of oligochaetes for estuarine samples. *Mysidopsis bahia*, the species used for the water toxicity testing, was found at these two stations. Although station 3 had a relatively high diversity and the highest benthic index score, the community was primarily composed of mollusks (86%), with only one polychaete species and no crustaceans or nemerteans. Station 3 also had the lowest number of individuals of the six samples.

Of the six stations that were sampled for benthic macroinvertebrates, stations 2, 2.5, and 3 were also tested for sediment toxicity. Of those three stations, only sediment elutriate from station 2 showed a significant adverse effect on the test organism, *Cyprinodon variegatus*. Station 2 did have an impaired benthic community, but stations 2.5 and 3 did also. This indicates that analysis

of the benthic community is a more sensitive indicator of sediment effects than the toxicity test that was performed on the sediment elutriate, or that factors other than strictly toxicity are influencing the benthos.

Station Summary

Station 1 - Houston Ship Channel at Rohm & Haas

Station 1 was more than 200' from the Rohm & Haas 001 outfall in the HSC. Since it is in the HSC, this station should have a great deal of dilution available and ship traffic is constantly mixing the water. This station had the highest nitrate+nitrite levels in the water and it was one of two stations with the highest selenium (6.8 ppm) and nickel (42 ppm) in sediment. There was a strong increase in sediment chromium, lead, mercury, selenium, and zinc at this station compared to station 2 (Table 7). There is a difference in grain size between stations 1 and 2 also, however. Station 1 was only 18% sand, while station 2 was 56% sand, probably because station 2 was much closer to the shoreline than station 1.

The benthic community at station 1 had the highest diversity (H'=1.39) of all the Patrick Bayou samples (Table 11). This station had 11 species, including nemerteans, mollusks, oligochaetes, polychaetes, and crustaceans. The benthic index still indicates an impaired community, however, because of the high proportion of oligochaetes found at this site (compare with Appendix 7).

Station 2 - HSC at Oxychem

This station was in the HSC near the mouth of the ditch carrying effluent from the Oxychem outfalls 004 and 005. In water, copper and lead were slightly above the WQS and a few volatile organic compounds were detected at low levels (Table 6). In the sediment, this station had, by far, the highest levels of hexachlorobenzene (HCB), hexachloroethane, and hexachlorobutadiene (Table 9; Figure 8); HCB exceeded the state screening level by several orders of magnitude. Sediment elutriate from this station had a significant adverse effect on the sheepshead minnow, reducing the hatching success to 47% (Table 10). In the elutriate, chlorine was detected (0.1 mg/l), along with a total ammonia level of 15.6 mg/l (0.081 mg/l unionized ammonia). TOC in the sediments was very low (0.38%) and the average grain size was high (57% sand + gravel). In the macrobenthic samples, station 2 had the highest number of species (13) per station found in this study. The average taxa per replicate for station 2 (8.5) was significantly higher than the other five Patrick Bayou stations (Figure 11). Despite the high number of taxa, this station was dominated by opportunistic species (56% oligochaetes and 31% *S. benedicti*). The number of individuals per replicate at station 2 was significantly higher than at the reference stations (Figure 12). The high number of oligochaetes caused the benthic index to be low, indicating degraded conditions.

Station 2.5 - Patrick Bayou Mouth

This is the routine TNRCC station where samples are collected every three months for conventional water quality parameters and either sediment or water toxicity. This station is inside the mouth of Patrick Bayou, just downstream of an Oxychem bridge that blocks boat access to the remainder of the bayou. The water temperature was highest here (38.3°C; 100.9°F), exceeding the segment WQS by 3.3°C. The levels of toxic substances in the sediment at this station were intermediate; it was second highest in HCB, third highest in mercury, and fourth highest in total PAHs. The mercury and HCB levels were still well above the relevant screening levels, as were several of the individual PAHs. No sediment toxicity was found in this sample, although sediment from this station was toxic to sheepshead minnows in an earlier sample. The benthic community at this station had significantly more organisms per replicate than all of the other sites (Figure 12). The high level of *S. benedicti* (94%) gave this station a very low diversity (H' = 0.29) although it had the same number of species per replicate as station 1 (Figure 11). There were only seven benthic species total, however, with no nemerteans or mollusks. The benthic index was quite low due to the lack of bivalve mollusks and the low diversity.

Station 3 - Patrick Bayou below Oxychem 003

Station 3 was inside Patrick Bayou at least 200' downstream of Oxychem's outfall 003. Duplicate sediment samples were collected at this site. In sediment, this station had the highest mercury levels (8.3 ppm, 7.0 ppm; Table 7) and the highest acenaphthene, acenaphthylene, fluorene, and 2-methyl naphthalene (Table 8) in Patrick Bayou. Station 3 also had the second highest level of total PAHs (Figure 5), lead (Table 7), and Aroclor 1248 (Table 8) in sediment. Mercury, pyrene, fluoranthene and all of the low molecular weight PAHs exceeded the ERM. Acenaphthene, fluoranthene, and phenanthrene also exceeded their proposed USEPA sediment criteria. Water temperature violated the WQS at 38.2°C. Mysid survival was significantly reduced in the water from station 3, but the sediment elutriate did not have a significant adverse effect on *C. variegatus* (Table 10). The benthic community was composed of five species, only one of which was a polychaete, *Laeonereis culveri* (Table 11). Fourteen total species (7 polychaete species) would be expected at an estuarine site of this salinity (Engle et al. 1994). The benthic community was mostly mollusks (*Texadina sphinctostoma*, *Mulinia lateralis*, and *Mytilopsis leucophaeta*) with no nemerteans or crustaceans. Because the organisms that were found were somewhat evenly distributed, the diversity was relatively high (H' = 1.27), although it was still lower than the comparable stations elsewhere (Appendix 7).

Station 4 - Patrick Bayou at Oxychem 001

Station 4 was 50' to 60' from Oxychem's 001 outfall, inside the mixing zone, but outside of the ZID (zone of initial dilution) for this outfall. At stations this close to an outfall, some of the WQSs do not apply, however, in this report they are used for comparison purposes without regard to their legal application. Total mercury in water was 0.79 µg/l, well above the human health WQS of 0.025µg/l. Carbon tetrachloride at 202 µg/l also exceeded the human health WQS (121 µg/l). Low levels of chloroform, bromodichloromethane and isophorone were detected in this water sample (Table 6). Water temperature exceeded the WQS (Table 3) and DO was lowest

at this site (2.7 mg/l) but still above the segment minimum WQS. Chromium, zinc, and benzo(k)fluoranthene in sediment were highest at this station, and mercury was the second highest, but still 10 times the ERM (Table 7). Nickel was highest at stations 4 and 1. Chromium, copper, nickel, and zinc all exceeded both the state screening level and the ERL at this station. Aroclor 1248 exceeded the ERM at this site also (Table 8). Benthic samples showed a very impaired community, with only 495 individuals/m^2 from two tolerant species. No nemerteans, mollusks, polychaetes, or crustaceans were found at this site (Table 11).

Station 5 - Patrick Bayou between Oxychem and Shell Refinery

This station was across the bayou from station 4, about 50' from the Shell Refinery shoreline. It was placed here to check for a gradient in sediment contamination across the bayou between Shell and Oxychem. In sediment, along with station 1, station 5 had the highest selenium (6.8 ppm), which was not detected at station 4 (< 2.9 ppm). At station 5, mercury still exceeded the ERM, but at a lower level (3 ppm vs. 7.1 ppm at station 4). Chromium, copper, zinc, and nickel all exceeded both the ERL and the state screening level (Table 7). The benthic community was composed of the same two species found at station 4, but the chironomids were found in much higher numbers (Table 11). Because of this, this station had the lowest diversity (H' = 0.06) and the lowest benthic index (0.14). This station also had no nemerteans, mollusks, polychaetes, or crustaceans.

Station 6 - Patrick Bayou at Shell Bridge

Station 6 is on the downstream side of a bridge that connects a Shell gate to the rest of the refinery. This station is 250' downstream of the Shell Refinery 001 (R001) outfall and 500' downstream of the Shell Chemical 001 (C001) outfall. Water from station 6 was acutely toxic to mysid shrimp and it caused significant mortality and reduced growth in *M. beryllina* (Figures 9 and 10). Shell Chemical has been involved in a toxicity reduction evaluation because of the toxicity of their effluent to mysids. They have identified calcium as the source of the toxicity in their effluent. Calcium at station 6 was much higher than at the other sites in both water and sediment (Tables 4 and 5). There is some dispute as to whether the water at station 6 is ambient water (i.e., not in a mixing zone), because it is 250' from the R001 outfall; however, according to their self-reported data, the R001 outfall had not had any reportable flow in the five months before our sampling. (In estuarine areas, the mixing zone extends 300' downstream from the point of discharge). The C001 outfall, where the calcium is being discharged is 500' upstream of this station.

Dissolved nickel exceeded the chronic WQS and isophorone was elevated (3,590 μg/l) at this site. Although there are no state WQS for isophorone, the USEPA criterion is 2,600 μg/l. Unionized ammonia at station 6 (0.0454 mg/l) exceeded the USEPA chronic criterion for ammonia in saltwater. In sediments, arsenic, barium, chromium, copper, manganese, mercury, nickel, selenium, and zinc all exceeded the state screening level. In addition, barium, copper, manganese, mercury, nickel, selenium, and zinc were all much higher at station 6 than at the stations upstream of 6 (7 and 9). Station 6 had about twice the amount of iron in the sediments as would be

expected from the aluminum concentration (Hansen et al. 1993).

Station 7 - Patrick Bayou below Lubrizol

Station 7 was at the upper end of the gunite-lined portion of Patrick Bayou, just below where the bayou exits the box culverts. This is about 800' below the Lubrizol outfall 001. Water from this station showed chronic toxicity to mysids and reduced their growth (Table 10; Figure 9). Calcium (Table 4) and unionized ammonia (0.106 mg/l) in water were both elevated. (Lubrizol has also been involved in a toxicity reduction evaluation because of calcium toxicity in their effluent). The sediment elutriate had significant adverse effects on sheepshead minnows. The unionized ammonia in the sediment elutriate (0.596 mg/l) was above the USEPA acute criterion for saltwater (0.233 mg/l). Calcium in sediments was also high (Table 5). Aroclor 1248 was extremely high in the sediments (4,150 ppb), more than 20 times higher than the ERM for total PCBs (180 ppb; Long et al. 1995). Because we could not get sediment at station 8, these PCBs could be from any source between stations 7 and 9.

Station 8 - Patrick Bayou at SH 225

Station 8 was at SH 225, between a railroad bridge and the entrance to the box culverts. This station corresponds to station 14 in ENSR (1995). This station was 30' - 40' below the ditch carrying effluent from the City of Deer Park WWTP, which enters the ditch 300' upstream of Patrick Bayou. The flow from this ditch had scoured this part of the bayou to bare concrete and cobbles. Arrowhead (*Sagittaria graminea*) was growing in the cobbles. We were unable to collect any sediment for chemical analysis at this station. In water, this station had the highest ammonia and the lowest pH. Like stations 7 and 6, the unionized ammonia (0.0745 mg/l) here exceeded the USEPA chronic criterion. Ambient toxicity to mysids was found at this station also (Table 10; Figure 9). Under the conditions of the toxicity test (lab temperature, pH, and salinity), the unionized ammonia fraction would have been much higher (0.754 mg/l) than it was in the field, well above the USEPA acute criterion (0.233 mg/l).

Station 9 - Patrick Bayou Upstream

This was the upstream-most station in Patrick Bayou, in the concrete-lined portion above all of the permitted discharges. At the time of our sampling, this water was quiet and slow moving, with an obvious algal bloom. The DO was 14 mg/l, the pH was 9.0 s.u., and the chlorophyll *a* (52.8 μg/l) and pheophytin *a* (11.9 μg/l) were high also. The sediment at this station was very high in PAHs and lead, even though the sediment was 94% sand and gravel. Lead and nine of the PAHs were above the ERM (Tables 7 and 8). Total PAHs exceeded the ERM by more than five times. Phenanthrene exceeded the ERM by 35 times. Acenaphthene, fluoranthene, and phenanthrene all exceeded their site-specific proposed USEPA criteria (Table 8; Figure 6). Station 9 was the highest in Patrick Bayou for the high molecular weight PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, pyrene) phenanthrene, anthracene, and total PAHs. The values at this site exceed all but a small percentage of PAH contaminated sites worldwide (Eisler

1987b; Alden and Butt 1987; Long and Morgan 1990). The source of this contamination is unknown. Upstream of this site is an urban area, including homes, schools, and small businesses. These higher molecular weight PAHs are much slower to degrade and are more carcinogenic than the lower molecular weight PAHs (Lee and Ryan 1983; Heitkamp and Cerniglia 1987), which tend to be more toxic (Eisler 1987b).

Station 10 - East Fork Patrick Bayou

Station 10 was on the East Fork of Patrick Bayou at a bridge in the Oxychem golf course. This station is downstream of the ditch that carries effluent from Praxair. Water from this station was not toxic to mysids or silversides, but it significantly reduced the growth of the silversides (Table 10). Sheepshead minnow survival in the sediment elutriate was somewhat low (70%), although it did not differ significantly from the control (93%). No organics were detected, but several metals were elevated. This station had the highest levels of dissolved arsenic, copper, manganese, iron, and lead found in this study, although only copper and lead exceeded the WQS. Dissolved copper (22 μg/l) exceeded the acute WQS (16.27 μg/l) and dissolved lead (5.1 μg/l) exceeded the human health WQS of 3.85 μg/l. In sediment, arsenic, copper, and selenium exceeded the state screening level and nickel equaled the screening level. Iron in sediment was about twice as high as would be expected from the aluminum concentration (Hansen et al. 1993).

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Table 1. Point source outfalls to Patrick Bayou and the nearby HSC. Twelve outfalls carrying stormwater only have been excluded from this listing.

Receiving Water	Permit #	Outfall	Permitted Flow (mgd)	Permittee
Houston	00458	001	5.76	Rohm & Haas
Ship	00305	005	1.75	Occidental Chemical
Channel	00305	004		Occidental Chemical
Patrick	00305	003	8.0	Occidental Chemical
Bayou	00305	002	105	Occidental Chemical
I	00305	001	8.0	Occidental Chemical
I	00403	001	2.3	Shell Refinery
I	00402	001	9.9	Shell Chemical
I	00639	001	1.0	Lubrizol Corp.
V	10519	001	6.0	City of Deer Park
East Fork Patrick B.	01173	001	0.43	Praxair

Table 2. Stations sampled in/near Patrick Bayou on 7-26-94

#	Station Description	Latitude	Longitude
1	HSC, 200' downstream of Rohm & Haas outfall 001	29°44'25"	95°06'19"
2	HSC at mouth of ditch that carries wastewater from Oxychem outfall 005	29°44'19"	95°06'28"
2.5	Patrick Bayou 100' downstream of Oxychem bridge (TNRCC Station 1006.9150)	29°44'15"	95°06'45"
3	Patrick Bayou, below Oxychem outfalls 001, 002, and 003 (200' from 003)	29°43'55"	95°06'52.5"
4	Patrick Bayou, 50' downstream of Oxychem outfall 001	29°43'42.5"	95°06'49"
5	Patrick Bayou, across from station 4, 50' from the Shell Refinery shoreline	29°43'42"	95°06'52.5"
6	Patrick Bayou, at Shell Co. bridge, 250' below Shell Refinery outfall 001 and 500' downstream of Shell Chemical outfall 001	29°43'16"	95°07'00"
7	Patrick Bayou, at the lower end of the box culvert, 800' below Lubrizol outfall 001	29°42'56"	95°06'55"
8	Patrick Bayou at SH 225 (below ditch that receives effluent from City of Deer Park WWTP)	29°42'37"	95°06'53"
9	Patrick Bayou 200' upstream of Station 8	29°42'34"	95°06'54"
10	East Fork Patrick Bayou at the golf course bridge, downstream of ditch carrying effluent from Praxair 001	29°43'20"	95°06'41"

Table 3. Physicochemical water quality variables measured in and near Patrick Bayou on 7–26–94. The standards given are for segment 1006. Shaded values exceeded the applicable standard.

		Station										
Field Measurements	Standard	1	2	2.5	3	4	5	6	7	8	9	10
Water Temperature (C)	< 35	31.9	32.8	38.3	38.2	36.1	37.5	31.5	29.3	31	31.7	26.3
Dissolved Oxygen (mg/l)	> 2.0	3.4	4.7	7.3	6	2.7	9.8	5.3	5.3	8.8	14	3.9
Conductivity (uS/cm)		17700	17700	18300	18000	21000	18100	14500	13000	882	785	2320
Salinity (ppt)		10.3	10.3	10.8	10.7	12.4	10.7	8.1	7.2	0	0	1.2
pH (su)	6.5 – 9	7.3	7.4	7.6	7.5	7.2	7.9	7.2	7	6.7	9	7.3
Time		1540	1510	1440	1052	950	1225	1041	850	1245	1210	845

04 040

Table 4. Water quality data for conventional water quality parameters and inorganic ions taken from Patrick Bayou on 7–26–94. Screening levels given are for estuarine waters. Shaded values indicate exceedances of the screening levels. Blank spaces indicate that a sample was not analyzed for that variable.

	Screening	Station										
Variable (mg/l)	Level	1	2	2.5	3	4	5	6	7	8	9	10
Ammonia	0.4	0.08	0.07	0.08	0.09	0.04	0.18	3.24	14.1	16.7	0.07	0.36
Nitrate + Nitrite	0.4	1.66	1.61	1.45	1.48	0.2	1.34	0.19	0.2	0.32	0.02	0.95
TKN		0.8	0.82	0.82	0.84	1.2	0.98	4.16	9.2	19.5	3.52	2.53
Orthophosphorus	0.2	0.38	0.38	0.35	0.38	0.37	0.38	0.42	1.88	2.07	0.28	2.85
Total phosphorus	0.4	0.51	0.54	0.5	0.5	0.66	0.51	0.79	2.43	2.64	0.8	3.53
TOC		< 1	< 1	< 1	1	1	1	29	15	13	22	26
BOD5		< 3	< 3		< 3	7	3	10	6	6	31	< 3
COD		48	50		53	70	50	108	56	41	84	62
VSS		8	7	4	7	10	11	7	9	7	27	13
TSS		67	36	19	24	31	33	14	15	9	44	105
Sulfides		0.03	0.04		0.04	0.03	0.03	0.05	0.04	0.03	0.05	0.09
Chloride		5560	5630	5840	5930	6810	5930	4140	1350	90	94	250
Sulfate		817	824	857	810	805	820	1010	76	49	43	560
Calcium		140	136		138	123	160	586	461	45.6	40	73.6
Magnesium		336	308		314	234	282	6.92	4.72	5.89	11.2	14.2
Potassium		114	125		133	106	103	11.4	11.6	10.9	4.56	44.9
Sodium		2980	2670		2870	3490	2770	1770	1540	57.4	67.6	279
Total Dissolved Solids		10600	9850	10900	11000	12700	10800	9230	3900	392	412	1440
Oil & Grease		< 5			< 5	< 5	< 5					< 5
Chlorophyll a (ug/l)	30	5.39	4.2	5.19	5.33	8.62	10.8	1.6	2	9.28	52.6	2.94
Pheophytin a (ug/l)		0	0	0	< 1	0	0	< 1	< 1	< 1	11.9	21.7

04 041

Table 5. Conventional sediment characteristics and major sediment ions for samples collected from Patrick Bayou on 7–26–94. All sediment variables are reported on a dry weight basis. Blank spaces indicate that a sample was not analyzed for that variable.

	Station									
Sediment Variable (ppm)	1	2	2.5	3	4	5	6	7	9	10
Total Org. Carbon	8730	3800	10520	9110	9970	11660	6800	3680	2990	2250
Acid Volatile Sulfide	23	51	12	37	263	28	132	7	3	10
Nitrogen (TKN)	1310	429	692	1015	1359	2315	827	520	377	530
Total Phosphorus	885	324	845	1534	1659	1625	549	805	404	1024
Volatile Solids	2100	1100	1400	1400	1000	2100	1900	69100	600	69400
% Solids	37.2	60.2	34.7	50.3	38.6	32.6	60.1	72.3	67.6	62.8
Grain Size										
% Gravel	< 1	1	< 1	< 1	1	< 1		34	24	1
% Sand	18	56	17	52	38	24		48	71	73
% Silt	75	39	78	45	54	70		16	4	18
% Clay	7	4	5	3	6	6		2	2	8
Ions (ppm)										
Aluminum	30500	9030	14700	15300	18200	23400	26000	10600	3290	12700
Iron	19800	7000		10400	11500	12800	34000	12100	2680	20400
Calcium	23000	13800		65200	13300	14600	142000	90500	79900	33600
Magnesium	6450	2280		3450	3240	3800	5390	3870	2430	2360
Potassium	4270	1170		2070	2210	2780	2520	1220	306	1390
Sodium	5740	2500		3740	5010	5550	4030	1510	422	412

04 042

Table 6. Results of priority pollutant analyses of water samples taken on 7–26–94 from Patrick Bayou and the nearby Houston Ship Channel. Only detected values are included. For a complete list of organic compounds measured and their detection limits, see Appendix 2. Shaded values exceeded one or more of the standards.

Standards*			Dissolved	Detection	Station											
HH	Acute	Chronic	Metals (ug/l)	Limit	1	2	3	3	4	5	6	7	8	9	10	Blank
	149	78	Arsenic	5											30	**ND
			Barium	10	92	88	96	80	92	102	172	606	17	70	92	ND
	45.6	10.0	Cadmium	0.5												ND
	1100	50	Chromium	10												ND
	16.2	4.37	Copper	5	8.3	7	8.7	5.8	6.7	7.6			11		22	ND
			Iron	25								28	51		109	ND
3.85	140	5.6	Lead	2.5	3.9	5	2.5		2.6		2.5		2.7	2.8	5.1	ND
			Manganese	5	85	82	85	79	111	74	50	29	39	19	247	ND
0.025			Mercury (Total)	0.2					0.79							
	119	13.2	Nickel	10–20							18					ND
	564	136	Selenium	12												ND
	2.3		Silver	0.5												ND
	98	89	Zinc	20								43				ND
			Organics (ug/l)													
			Acetone								15.8			5.8		ND
			Bromodichloromethane						2.7							ND
121			Carbon Tetrachloride				7.4	7.9	202	21.4						ND
8087			Chloroform			2.9	2.7	2.7	14.3	3.3	2.6	2.4	3.5			ND
1196			1,2–dichloroethane				3.5	3.6								ND
			cis–1,2–dichloroethene			5.2										ND
1221			Tetrachloroethene			4.6										ND
			Trichloroethene			2.5										ND
			Isophorone						34	45.9	3590					
			Benzyl Alcohol									4.9		13.		

* HH = water quality standard for human health protection in saltwater; Acute / Chronic = standards for protection of aquatic life (TNRCC 1995)
**ND = not detected in blank

Table 7. Metals in Patrick Bayou sediments collected on 7–26–94. Only detected values are given. All sediment results are reported on a dry weight basis. Shaded values exceeded the ERM or the 85th percentile.

Screening Levels*				Station										
85th	ERL	ERM	METALS (ppm)	1	2	2.5	3	3	4	5	6	7	9	10
6.9	8.2	70	Arsenic	4.4		2.72	3.2	5.3	5.8	3.7	10	10	4.8	13
297			Barium	231	104	201	332	196	196	242	371	144	70	94
1.5	1.2	9.6	Cadmium			0.33								
44	81	370	Chromium	88	39	51	64	38	129	89	76	28	72	35
40	34	270	Copper	52	43	55	50	35	60	55	52	9	7	43
95	46.7	218	Lead	50	23	45	128	67	55	39	41	26	269	22
489			Manganese	274	121	190	316	231	114	89	1420	596	241	257
0.22	0.15	0.71	Mercury	2.5	1.7	3.98	8.3	7	7.1	3	0.23			
19	20.9	51.6	Nickel	42	34	27	28	24	42	28	36	11	4	19
1.25			Selenium	6.8	2.8	0.95	3.4			6.8	2.8			2.9
1.6			Silver			0.9								
			Vanadium	48	18		30	25	27	31	111	49	29	59
170	150	410	Zinc	224	146	219	169	139	318	290	238	95	89	126
			Aluminum	30500	9030	14700	15300	11700	18200	23400	26000	10600	3290	12700
			Iron	19800	7000		10400	8780	11500	12800	34000	12100	2680	20400

* 85th = TNRCC 85th percentile for tidal streams (TNRCC 1994a); ERL / ERM = Effects Range Low and Median (Long et al. 1995)

0 4 0 4 4

Table 8. Sediment levels of Polynuclear Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs) detected in Patrick Bayou. All sediment results are reported on a dry weight basis. Shaded values exceeded either the ERM or the proposed EPA criterion.

			Station										
SQG**	ERM	PAHs (ppb)	1	2	2.5	3	3	4	5	6	7	9	10
1300	500	Acenaphthene	765	980	980	6860	4530					1860	
71000	640	Acenaphthylene	1370	1970	1700	7890	5480						
41	1100	Anthracene	529	469	590	2580	2240				264	3410	
1700	540	Fluorene	560	922	660	4100	3200					2860	
11000	2100	Naphthalene	513	801	760	7930	5260						
670	670	2-Methylnaphthalene		546	400	2650	2050					232	
1800	1500	Phenanthrene	1620	2460	2400	20500	13000			305	2920	53600	
1400	1600	Benzo(a)anthracene			630						1950	14200	
45000	1600	Benzo(a)pyrene			870	1580	1320				1830	14500	
11000		Benzo(b)fluoranthene			1100						3330	33000	
210000		Benzo(ghi)perylene				2650	2030				1010	7020	
3800		Benzo(k)fluoranthene			850	1740	1970	2680	2440				
45000	2800	Chrysene			910						2560	17100	
6200	5100	Fluoranthene	2850	2680	3400	11100	9010	1720	1370	1180	4890	44100	
6500		Indeno(123cd)pyrene										8350	
590	2600	Pyrene	6600	5030	5800	27800	24200	2380	1680	716	3960	33500	
	44792	Total PAHs	14807	15858	21050	97380	74290	6780	5490	2201	22714	233732	
		Proposed EPA Criteria											
		Acenaphthene (230ug/gOC)	2008	874	2420	2095	2095	2293	2682	1564	846	688	518
		Fluoranthene (300ug/gOC)	2619	1140	3156	2733	2733	2991	3498	2040	1104	897	675
		Phenanthrene (240ug/gOC)	2095	912	2525	2186	2186	2393	2798	1632	883	718	540
		PCBs (ppb)											
0.14	180	Aroclor 1248	806			2130	1460	1520	1350		4150		

** SQG = draft Sediment Quality Guidelines (USEPA 1994); ERM = Effects Range Median (Long et al. 1995)

04 045

Table 9. Other organic compounds detected in Patrick Bayou sediments (excluding PAHs and PCBs). All sediment values are reported on a dry weight basis. Detection limits are given in Appendix 2.

		Station										
SQG**	Organics (ppb)	1	2	2.5	3	3	4	5	6	7	9	10
1.6E8	bis(2ethylhexyl)phthalate	1250	1570	2300	833	881	1930	1240		519		
	Carbazole										6010	
30000	Dibenzofuran										1670	
26000	Dichlorobenzene 1,3	2320		3700	6610	4940						
180	Dichlorobenzene 1,4			940	1520	1150						
54000	Di−n−butylphthalate									281	233	
1600	Hexachlorobenzene	3690	83900	9900	8100	5310						
3100	Hexachlorobutadiene	11100	138000	24000	54000	31600						
600	Hexachloroethane	1220	15000	1800	1360							
7700	1,2,4−Trichlorobenzene		809									

** draft Sediment Quality Guidelines (USEPA 1994)

04 0046

Table 10. Toxicity test results for Patrick Bayou ambient water and sediment elutriate samples.

	Control	Station 2	2.5	3	6	7	8	10
Ambient Water – 7 day test								
Mysidopsis bahia								
% Survival	100			85 *	0 *	38 *	43 *	98
Growth (mg dry wt)	0.27			0.26		0.2 *	0.26	0.28
Menidia beryllina								
% Survival	93			100	80 *	87	83	100
Growth (mg dry wt)	1.2			1.14	0.94 *	1.17	1.28	1.02 *
Sediment Elutriate – 9 day test								
Cyprinodon variegatus								
% Survival	93	47 *	90	87		30 *		70
Total Ammonia (mg/l)	< 0.1	15.6	9.6	19.2		14.4		12
Unionized Ammonia (mg/l)		0.081	0.063	0.126		0.596		0.063
Total Chlorine (mg/l)	< 0.1	0.1	< 0.1	< 0.1		< 0.1		< 0.1

* –Significant difference from control ($p < 0.05$)

04 0427

Table 11. Benthic species collected in Patrick Bayou on 7-26-94. Abundance is given in number per square meter.

	Patrick Bayou Stations					
Species	1	2	2.5	3	4	5
Nemertea	226	172				
Mollusca						
Gastropoda (2sc)	11					
Texadina sphinctostoma		11		118		
Mytilopsis leucophaeta		22		129		
Mulinia lateralis	43	118		22		
Macoma		11				
Oligochaeta	462	2882	183	11	204	54
Polychaeta						
Mediomastus		22				
Capitella capitata		43				
Streblospio benedicti	22	1602	16108			
Polydora ligni			22			
Eteone heteropoda		22				
Laeonereis culveri	11		65	32		
Neanthes succinea	22	32				
Hesionidae	11					
Hobsonia florida	11	161	237			
Crustacea						
Callianassa jamaicense	11					
Callinectes juv.			32			
Mysidopsis bahia	22	11				
Chironomidae			441		290	5140
Community Parameters						
Total individuals	849	5108	17086	312	495	5194
Total taxa	11	13	7	5	2	2
Total Polychaete taxa	5	6	4	1	0	0
Diversity (H')	1.39	1.18	0.29	1.27	0.68	0.06
EMAP Indicators**						
Expected diversity	0.89	0.89	0.90	0.90	0.94	0.90
Expected #spp	14	14	14	14	16	14
Expected # polychaete spp	6	6	7	7	7	7
EMAP score	2.85	2.24	0.75	3.64	1.04	0.14
Salinity	*10.3*	*10.3*	*10.8*	*10.7*	*12.4*	*10.7*

** formulas are in Engle, Summers, and Gaston 1994

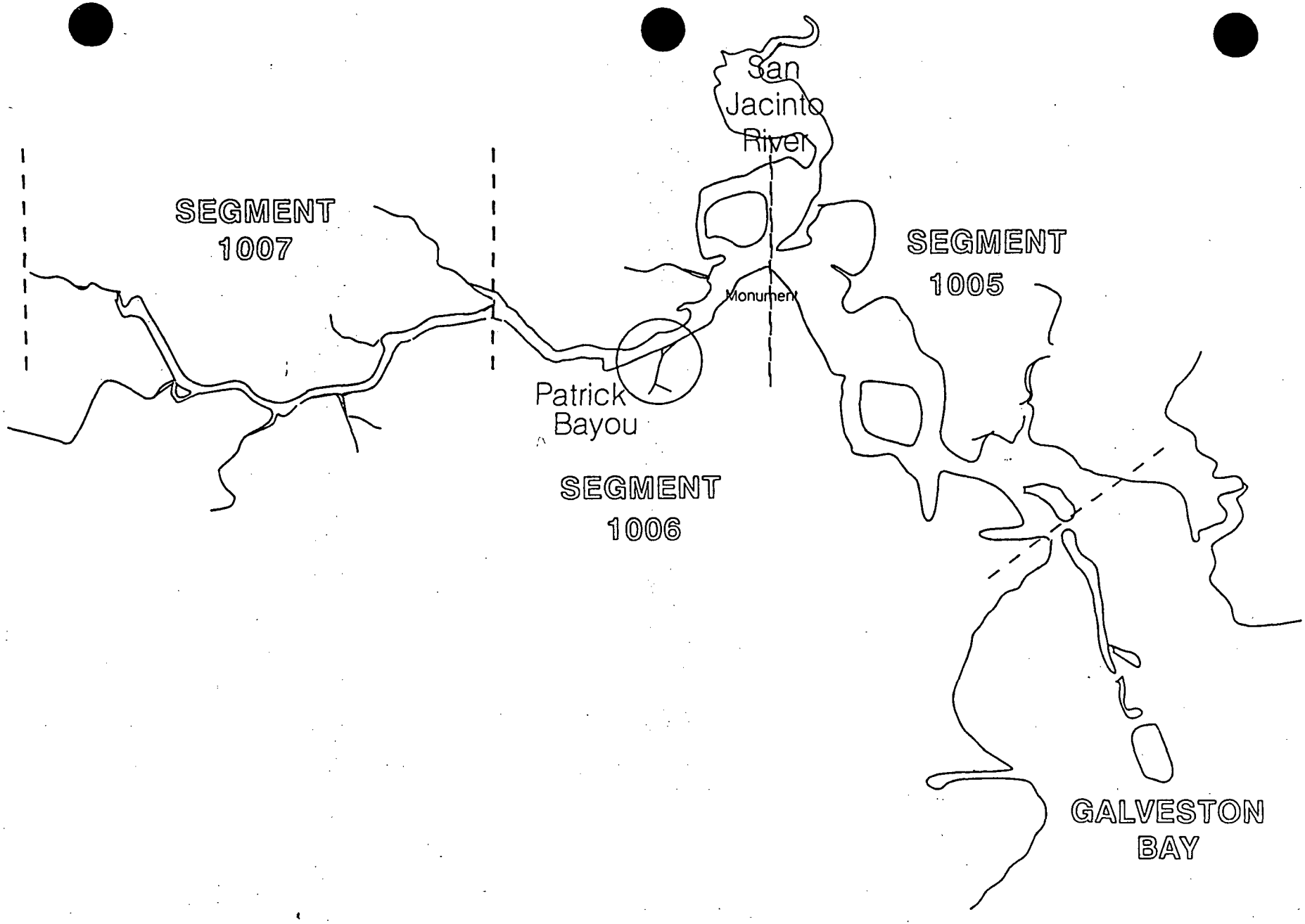


Figure 1. Map of the Houston Ship Channel system with segments labeled.

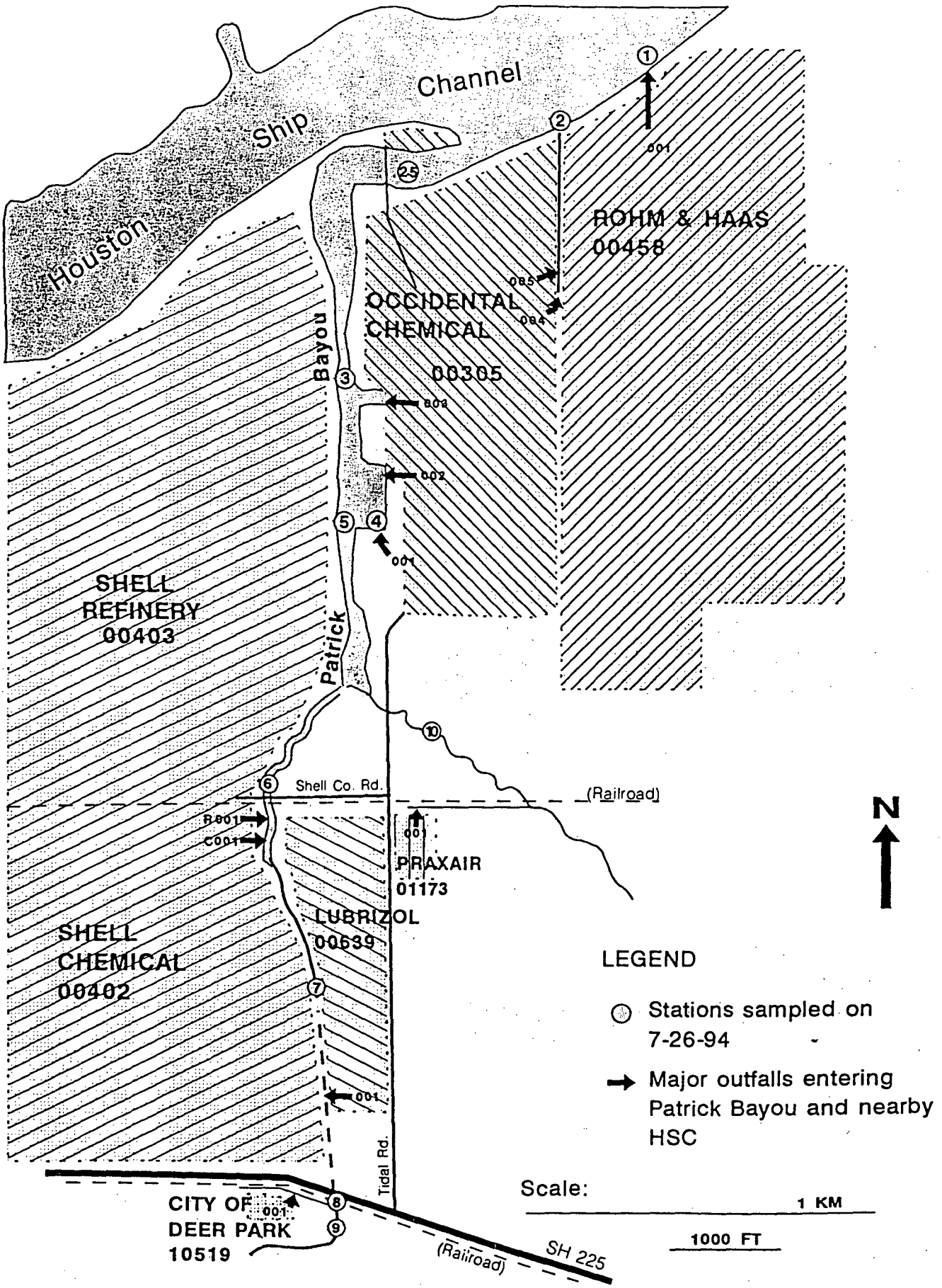


Figure 2. Map of Patrick Bayou showing the locations of the dischargers, major outfalls (excludes stormwater outfalls), and sampling stations.

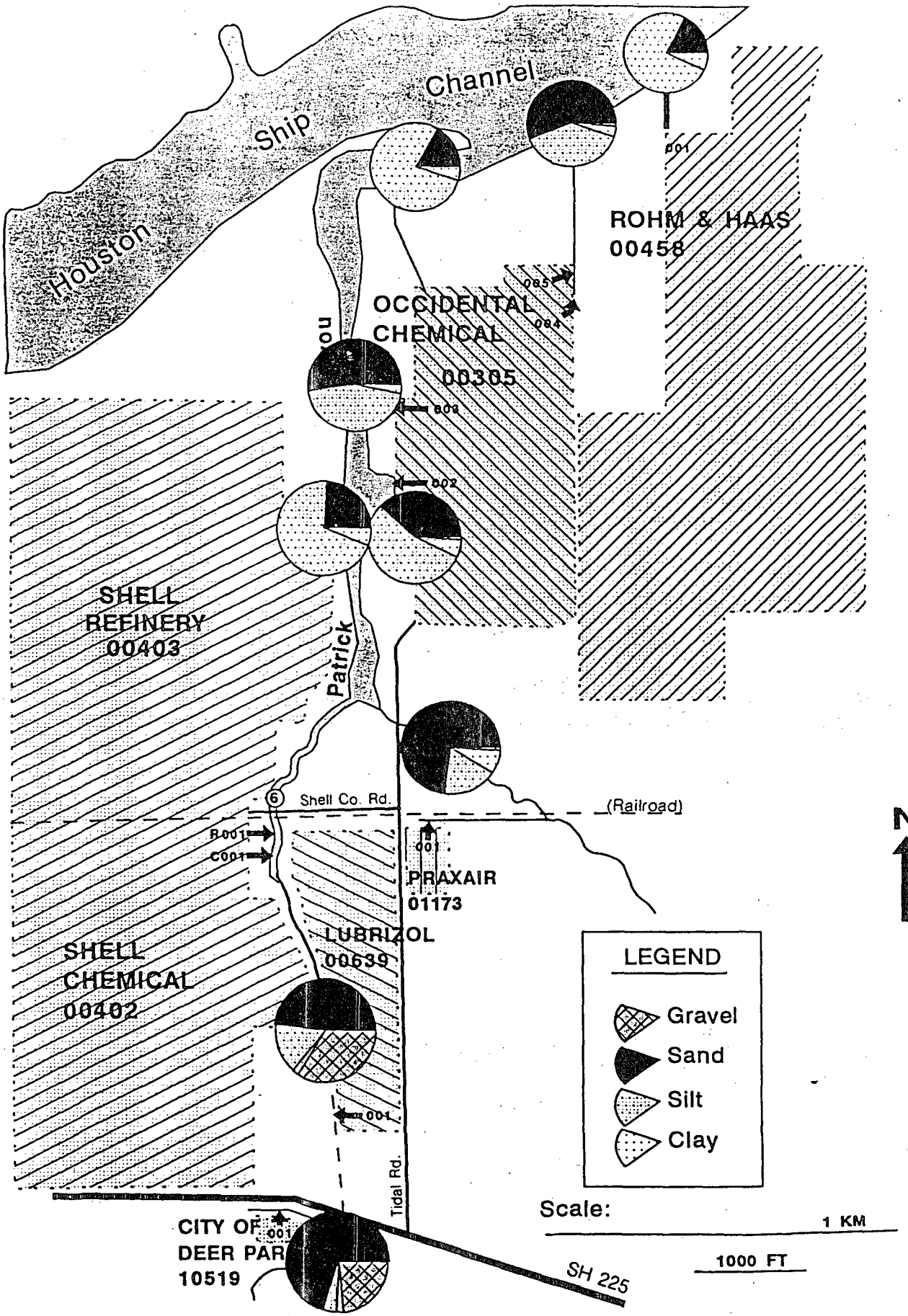


Figure 3. Sediment grain size distribution in Patrick Bayou.

SEDIMENT METALS

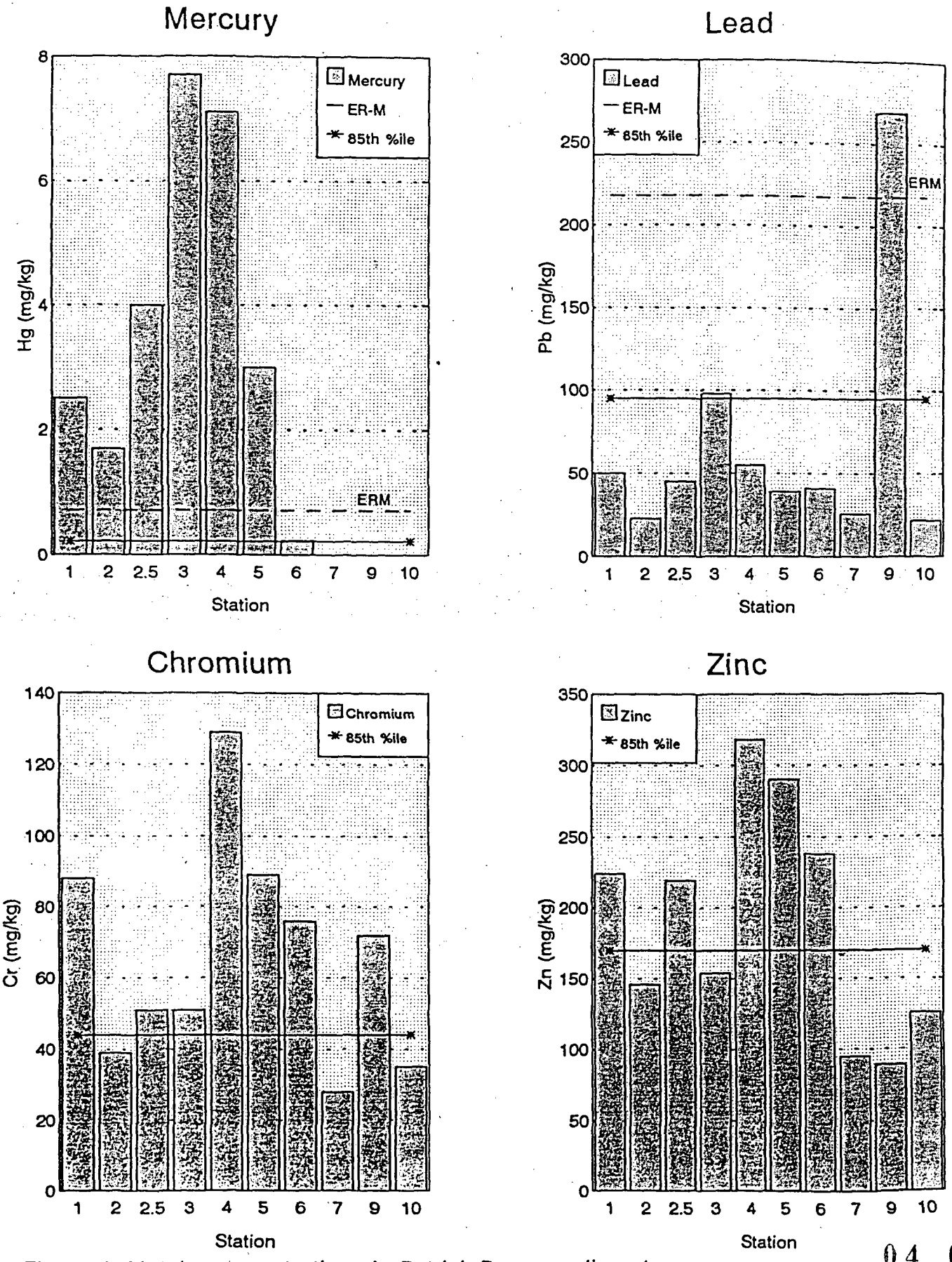


Figure 4. Metals concentrations in Patrick Bayou sediments.

SEDIMENT PAHs

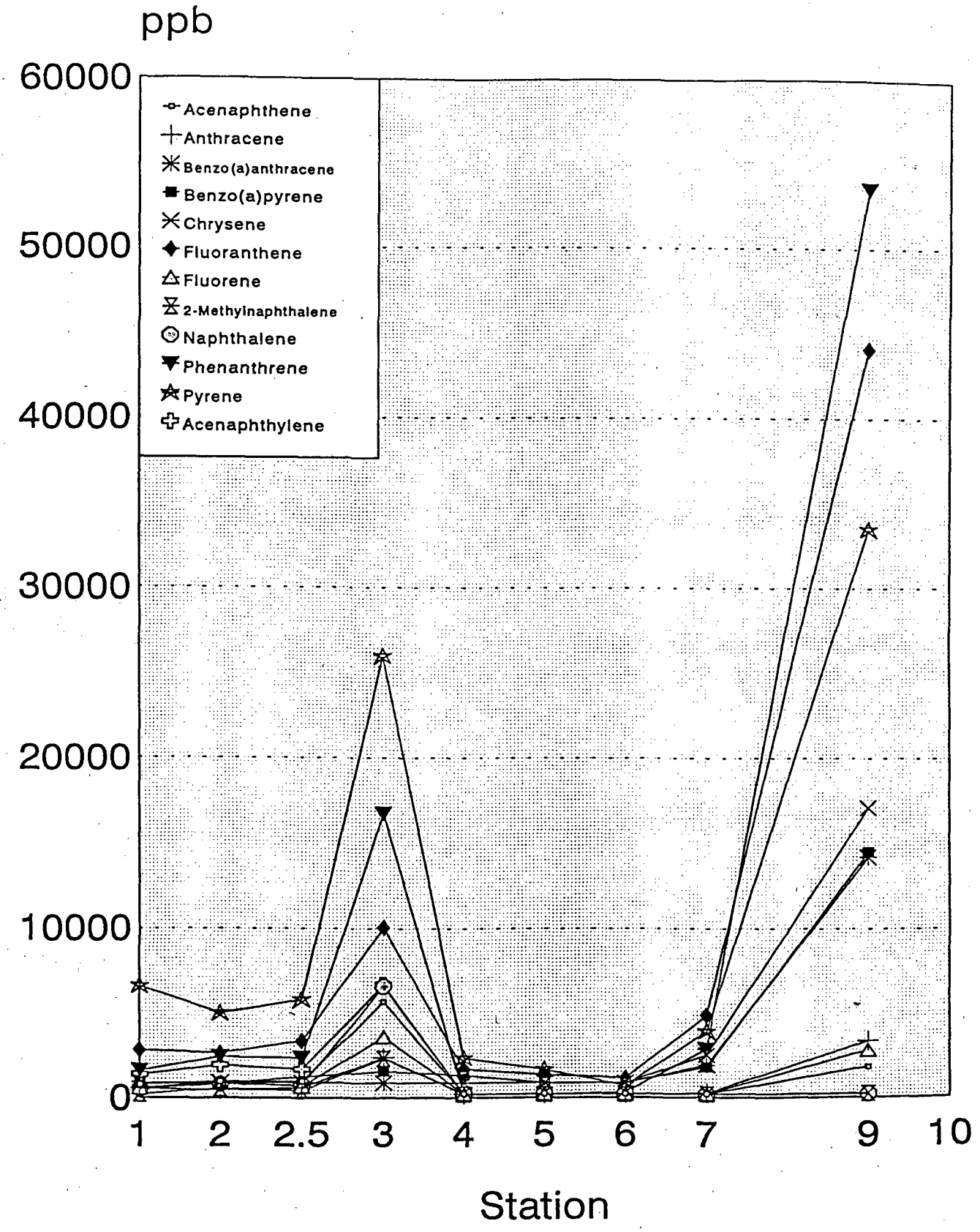
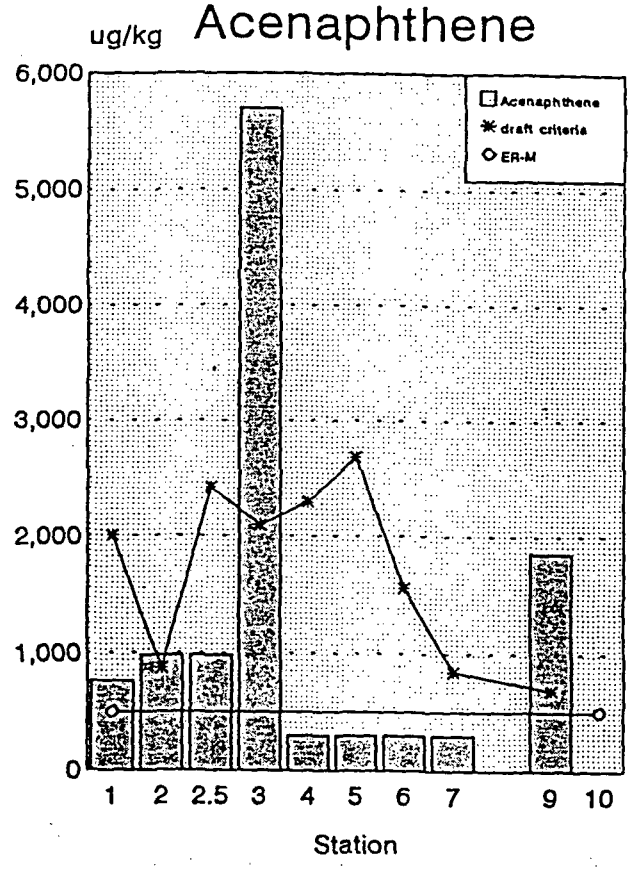
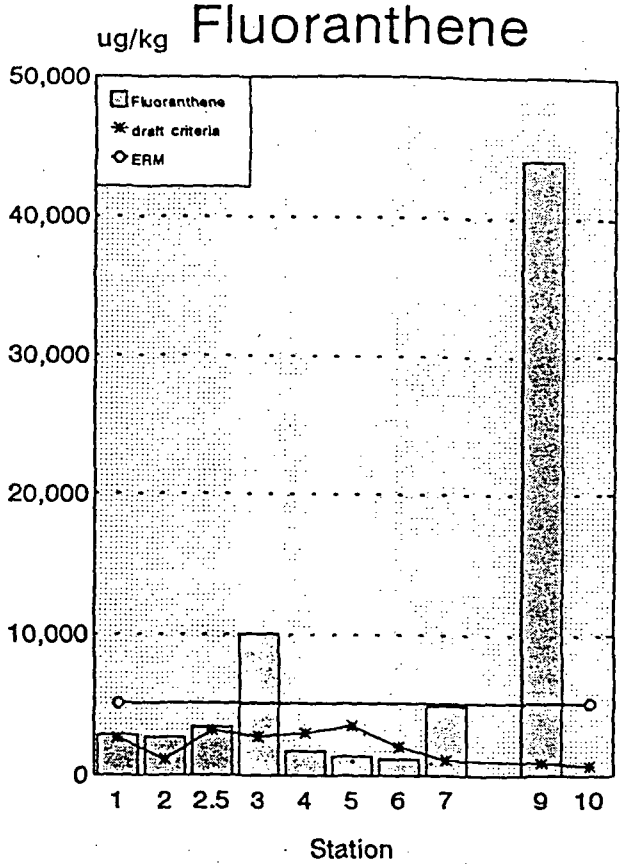


Figure 5. Levels of twelve PAH compounds found in Patrick Bayou sediments on 7-26-94. (No organic compounds were detected at station 10.)

SEDIMENT





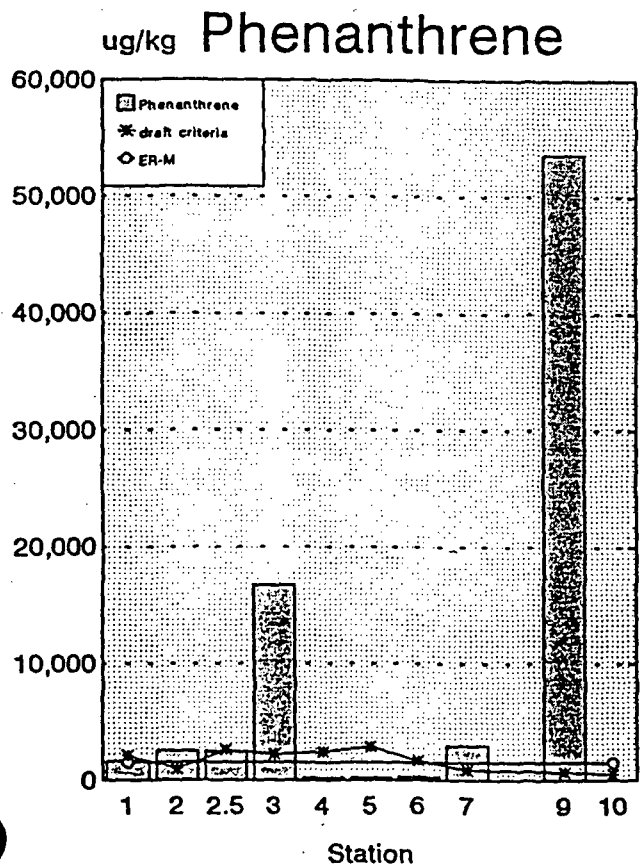


Figure 6. Comparison of Patrick Bayou PAH levels to proposed federal criteria. Nondetected values are graphed at the lowest detection limit for that compound found in Appendix 2.

SEDIMENT PCBs

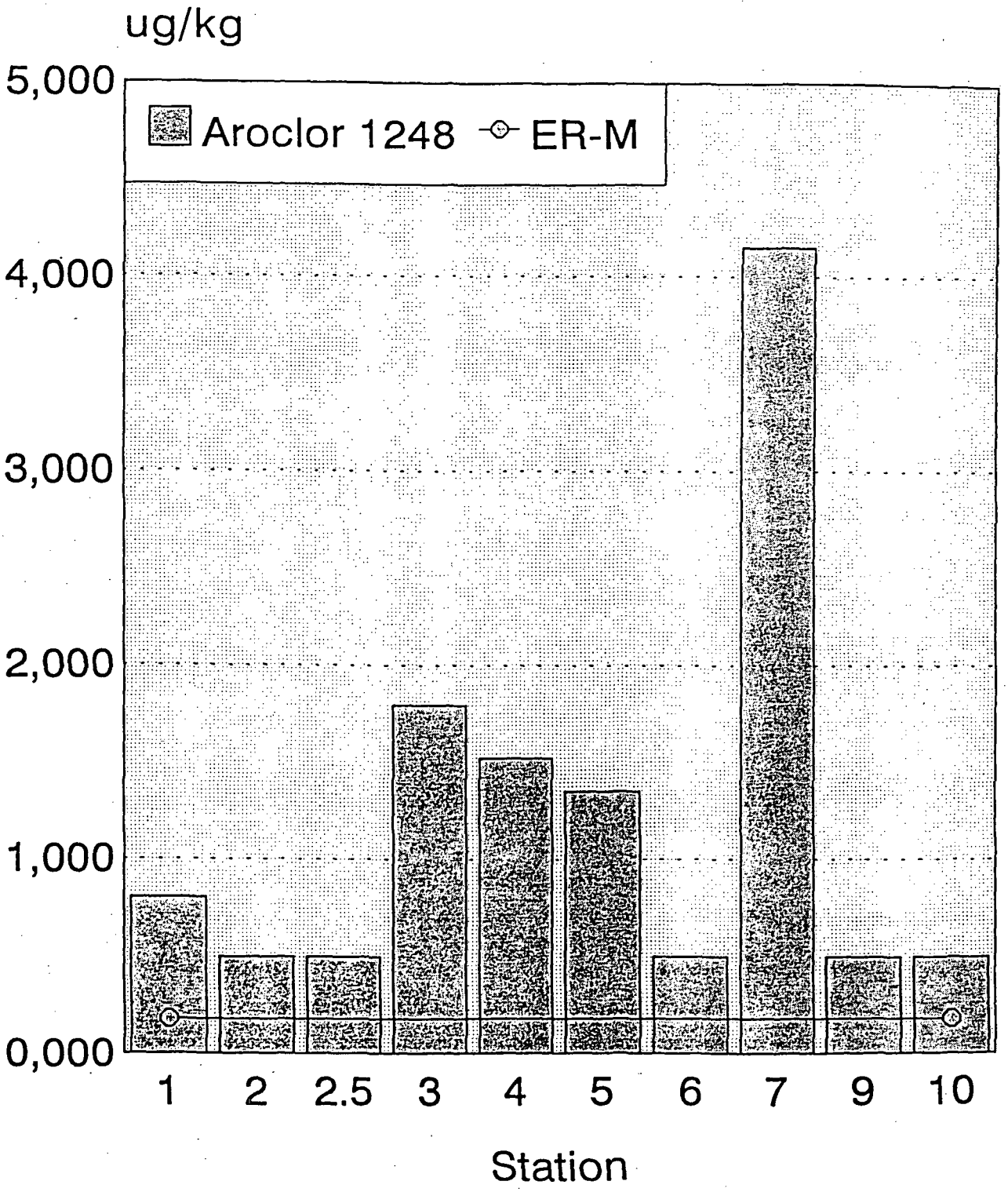


Figure 7. PCBs in Patrick Bayou sediments. Nondetected values are graphed at the detection limit (500 ppb).

Hexachlorobenzene

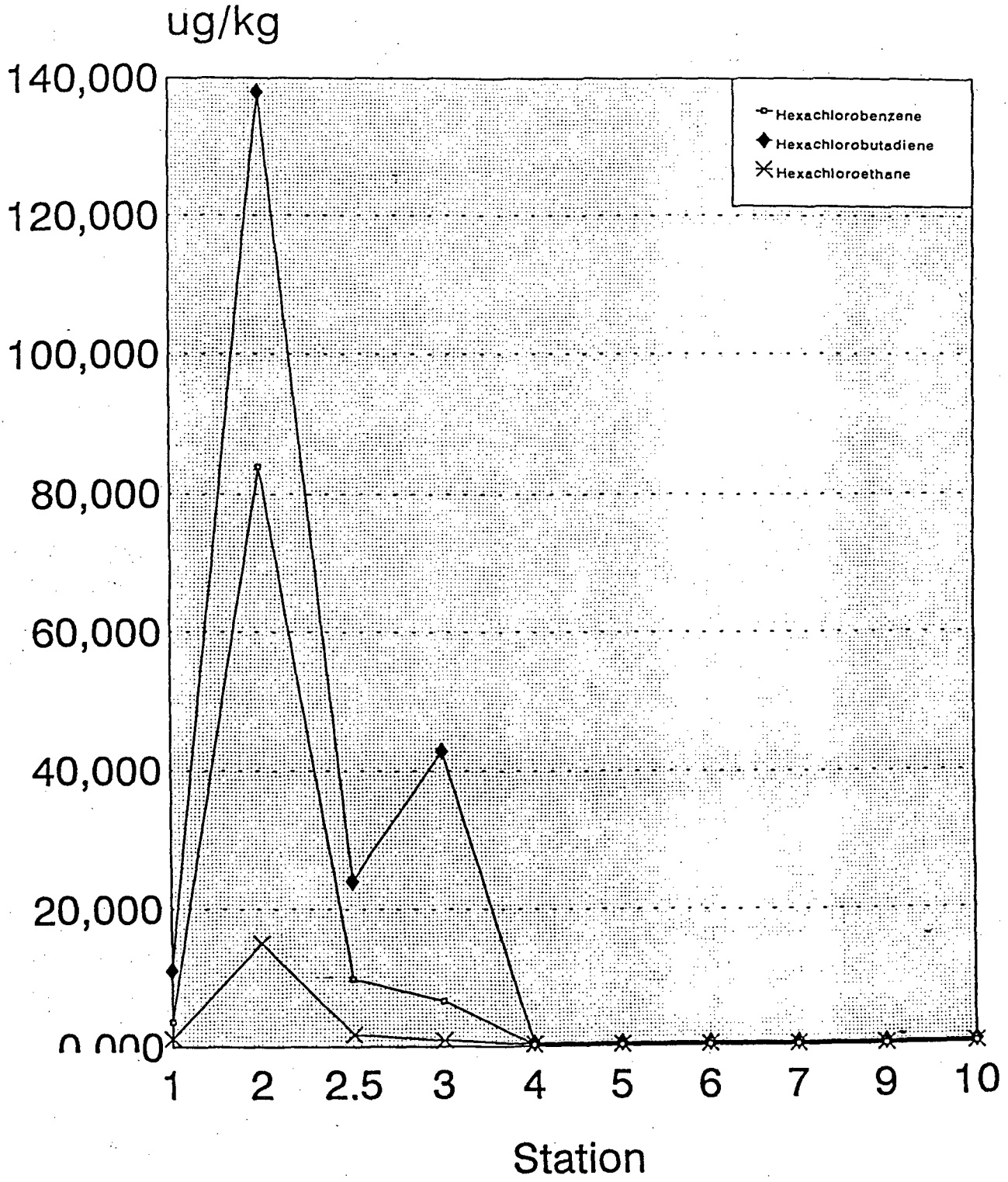


Figure 8. Hexachlorobenzene, hexachlorobutadiene, and hexachloroethane levels in Patrick Bayou sediments on 7-26-94.

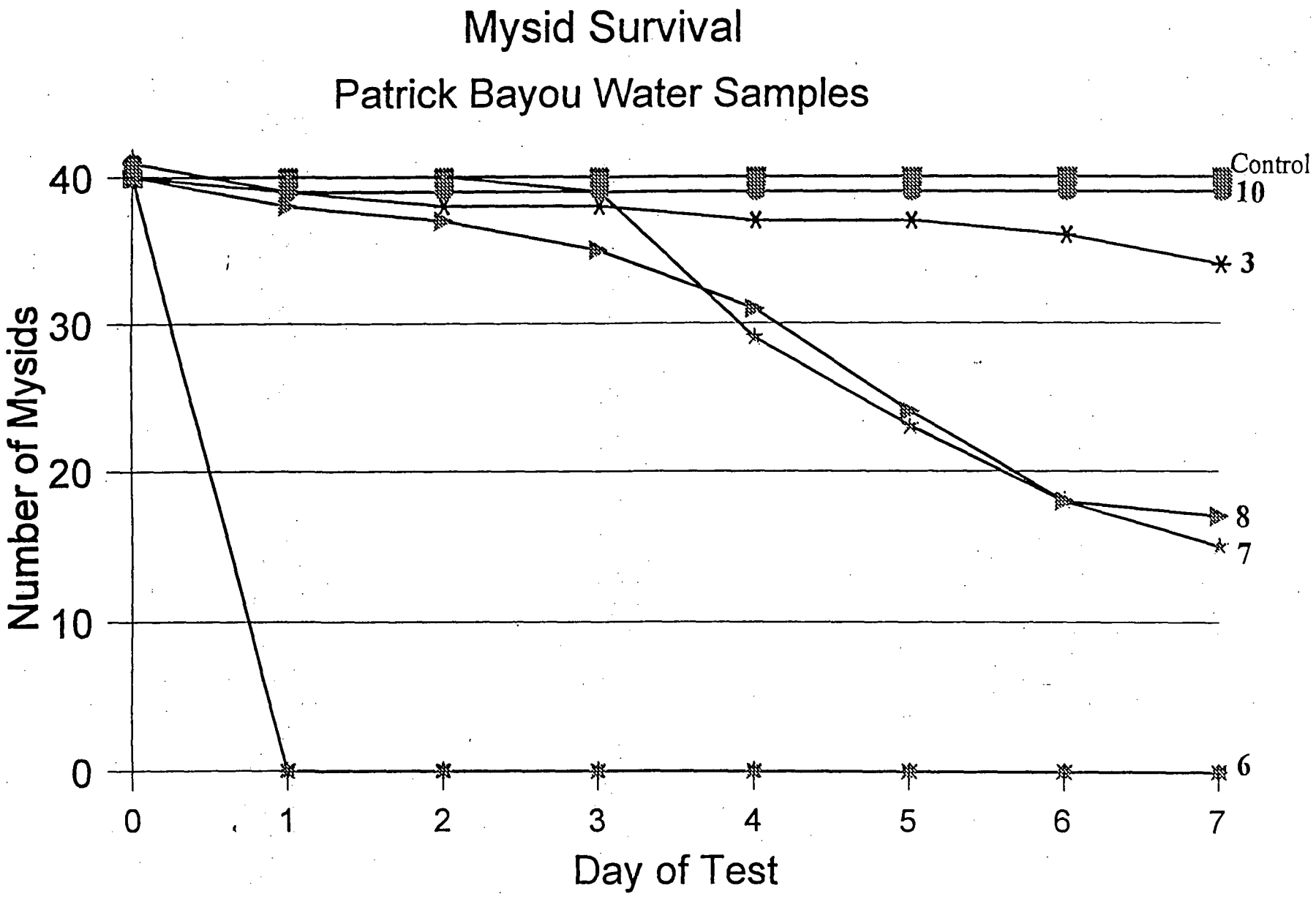


Figure 9. Survival of *Mysidopsis bahia* in 7-day chronic toxicity tests. Numbers at end of lines are station/sample numbers.

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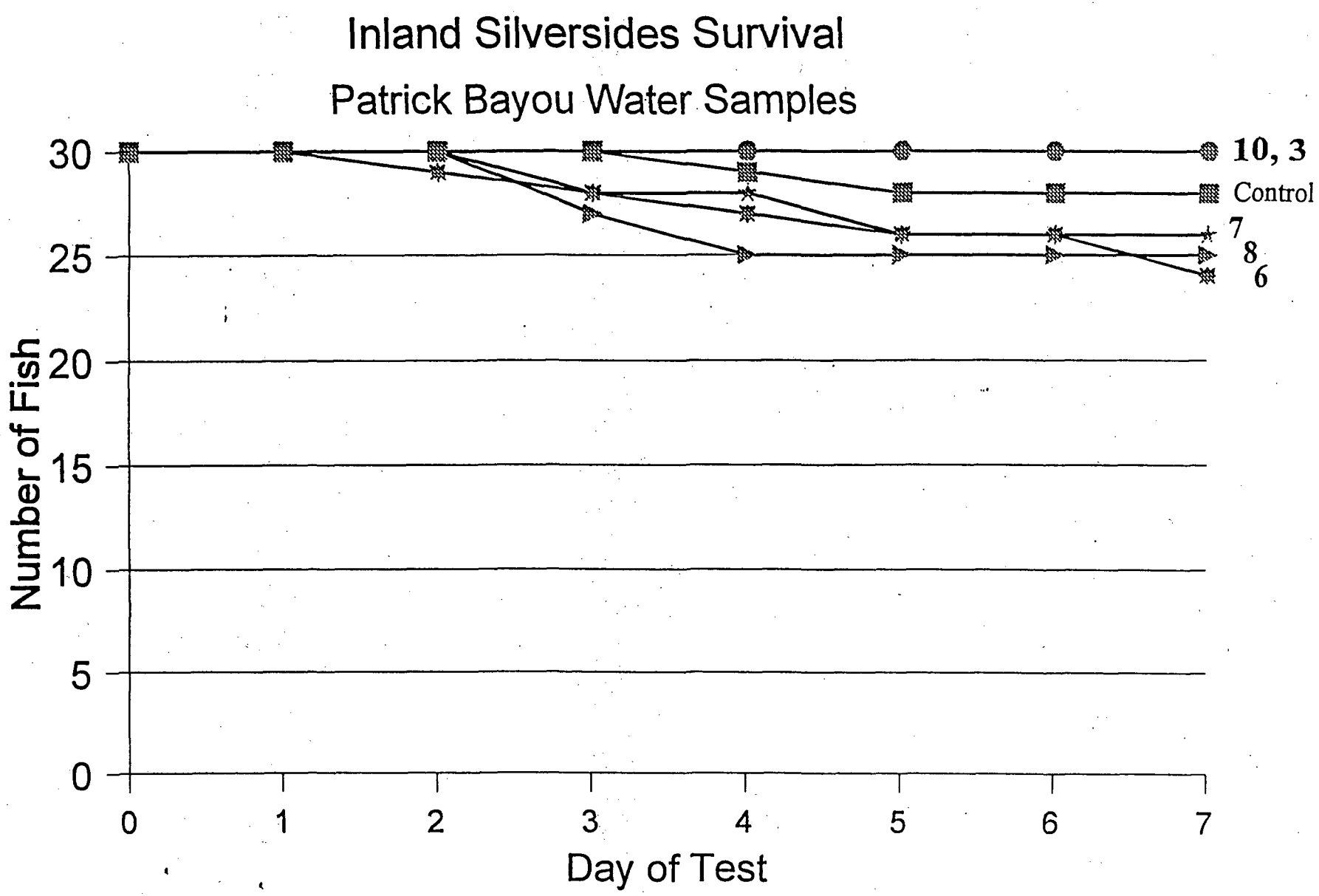

Figure 10. Survival of *Menidia beryllina* in 7-day chronic toxicity tests. Numbers at end of lines are station/sample numbers.

0 4 0 0 5 8

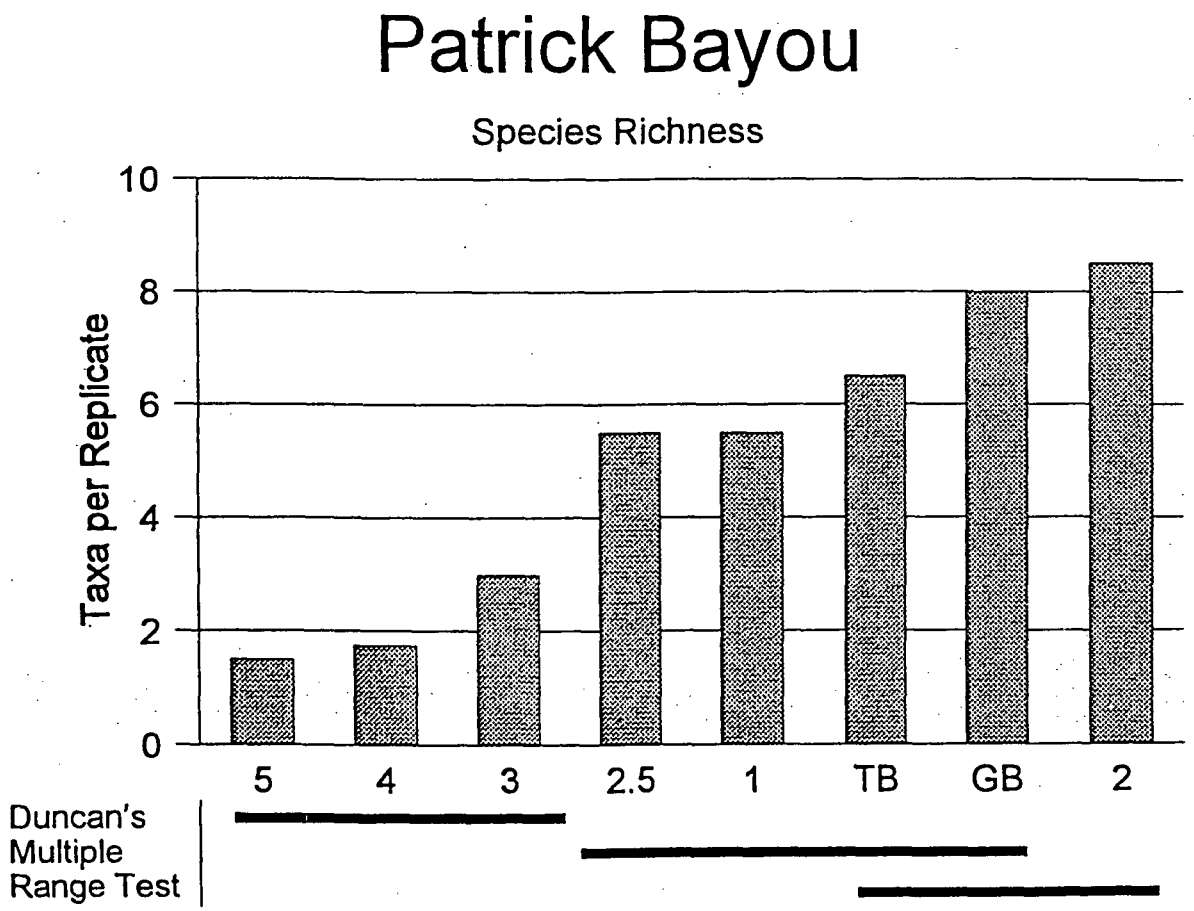

Figure 11. Average number of species per replicate in Patrick Bayou benthic samples and two reference samples. Solid bars below station numbers indicate samples which are not significantly different from one another by Duncan's Multiple Range Test at a 95% confidence level.

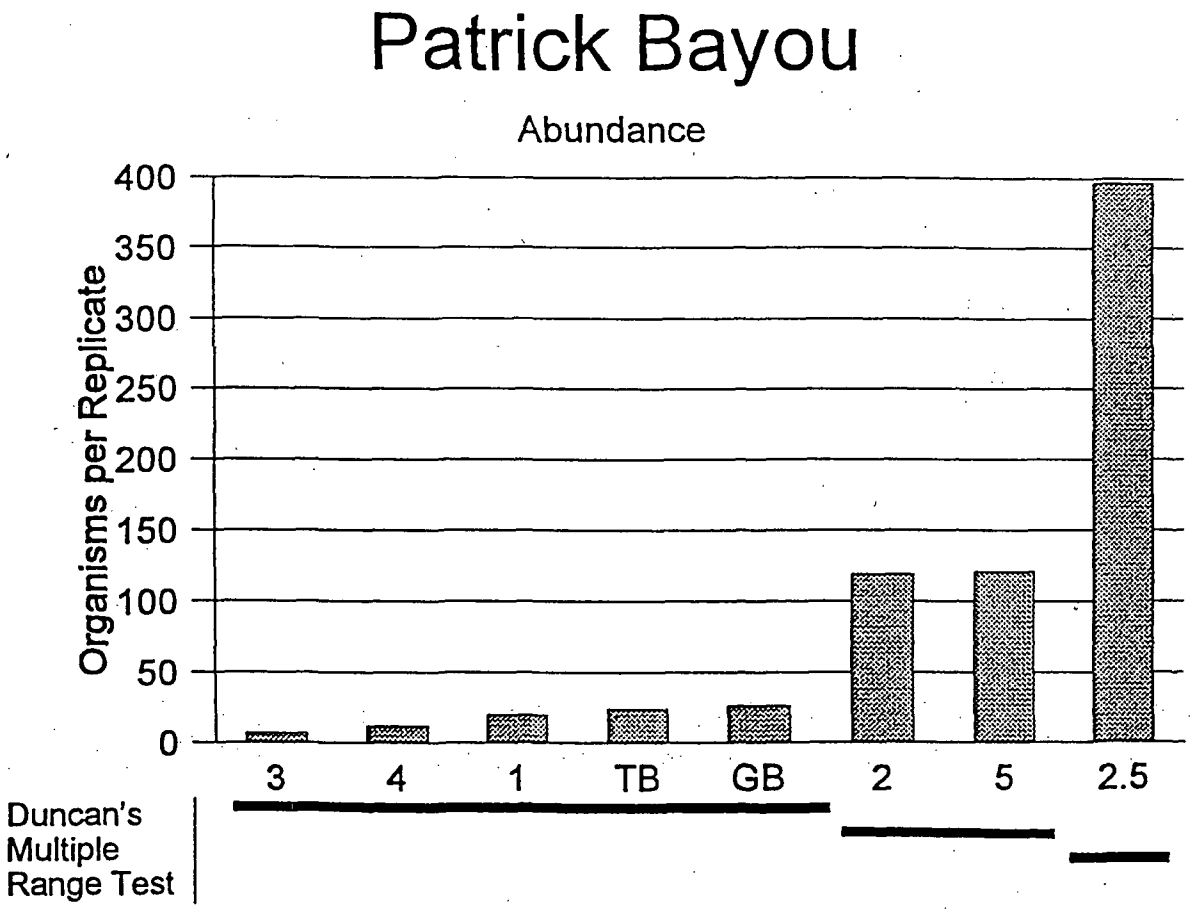

Figure 12. Average number of individuals per replicate in Patrick Bayou benthic samples and two reference samples. Solid bars below station numbers indicate samples which are not significantly different from one another by Duncan's Multiple Range Test at a 95% confidence level.

Appendix 1. Conventional water and sediment quality parameters analyzed for this study.

Water Chemistry (TNRCC Houston Laboratory)

- Biochemical Oxygen Demand, Five Day (BOD_5)
- Chemical Oxygen Demand (COD)
- Total Suspended Solids (TSS)
- Volatile Suspended Solids (VSS)
- Total Dissolved Solids (TDS)
- Ammonia Nitrogen (NH_3-N)
- Nitrite Nitrogen (NO_2-N)
- Nitrate Nitrogen (NO_3-N)
- Sulfides
- Total Organic Carbon (TOC)
- Total Hardness
- Total Alkalinity
- Chloride (Cl^-)
- Sulfate (SO_4)
- Chlorophyll *a*
- Pheophytin *a*
- Total Phosphorus (T-P)
- Orthophosphorus (O-P)
- Oil & Grease

Sediment Chemistry (Texas Department of Health Lab in Austin)

- Acid Volatile Sulfides
- Total Organic Carbon
- Sediment Grain Size
- Kjeldahl Nitrogen
- Total Phosphorus
- Volatile Solids

Appendix 2. Priority pollutant parameters, methods, and detection limits for the water and sediment samples analyzed at the USEPA Laboratory in Houston. Sediment for metals analysis was prepared by method 3050.

METALS		Detection Limits	
	Method	Water (μg/l)	Sediment (mg/kg)
Aluminum	200.7 (ICP)	100	13-29
Barium	200.7	10	1-3
Cadmium	200.7	0.5	1
Chromium	200.7	10	1-3
Copper	200.7	5	3-6
Iron	200.7	25	3-7
Manganese	200.7	5	1
Nickel	200.7	10-20	3-6
Silver	200.7	0.5	1-3
Zinc	200.7	20	3-6
Arsenic	200.9 (GFAA)	5	1.6-3.4
Lead	200.9	2.5	4-9
Selenium	200.9	12	1.6-3.4
Mercury	245.1	0.2	0.1-0.3
Calcium	200.7	150	20-43
Magnesium	200.7	150	20-43
Sodium	200.7	500	65-143
Potassium	200.7	1000	130-285

Appendix 2 (cont.). Priority pollutant parameters, methods, and detection limits.

VOLATILE COMPOUNDS by Method 624	Detection Limit Water (ug/l)	Sediment (ug/kg)	PESTICIDES/PCBs modification of Method 608	Det. Limit Water (ug/l)	Sediment (ug/kg)
acetone	5	250	alpha-BHC	0.05	40
acrolein	100	5000	beta-BHC	0.05	60
acrylonitrile	100	5000	delta-BHC	0.05	50
benzene	2	100	gamma-BHC	0.05	30
bromodichloromethane	2	100	Heptachlor	0.05	40
bromoform	2	100	Aldrin	0.05	40
bromomethane	5	250	Heptachlor epoxide	0.05	40
2-butanone	5	250	Endosulfan I	0.05	40
carbon disulfide	5	250	Dieldrin	0.10	40
carbon tetrachloride	2	100	4,4'-DDE	0.10	40
chlorobenzene	2	100	Endrin	0.10	50
chloroethane	5	250	Endosulfan II	0.10	40
chloroform	2	100	4,4'-DDD	0.10	50
chloromethane	5	250	Endrin aldehyde	0.10	50
dibromochloromethane	2	100	Endrin ketone	0.10	60
1,1-dichloroethane	2	100	Endosulfan sulfate	0.10	60
1,2-dichloroethane	2	100	4,4'-DDT	0.10	40
1,1-dichloroethene	2	100	Methoxychlor	0.50	100
cis - 1,2-dichloroethene	2	100	alpha-Chlordane	0.05	60
trans - 1,2-dichloroethene	2	100	gamma-Chlordane	0.05	60
1,2-dichloropropane	2	100	Toxaphene	5.0	2000
cis - 1,3-dichloropropene	2	100	Aroclor-1016	1.0	500
trans - 1,3-dichloropropene	2	100	Aroclor-1221	2.0	3000
ethylbenzene	5	250	Aroclor-1232	1.0	500
2-hexanone	5	250	Aroclor-1242	1.0	500
methylene chloride	5	250	Aroclor-1248	1.0	500
4-methyl-2-pentanone	5	250	Aroclor-1254	1.0	500
styrene	5	250	Aroclor-1260	1.0	500
1,1,2,2-tetrachloroethane	2	100			
tetrachloroethene	2	100			
toluene	5	250			
1,1,1-trichloroethane	2	100			
1,1,2-trichloroethane	2	100			
trichloroethene	2	100			
vinyl chloride	5	250			
m- and/or p-xylene	5	250			
o-xylene	5	250			

Appendix 2 (cont.). Priority pollutant parameters, methods, and detection limits.

SEMI-VOLATILE COMPOUNDS by Method 625

Compound Name	Detection Limits Water (ug/l)	Sediment (ug/kg)*	Compound Name	Det. Limits Water (ug/l)	Sediment (ug/kg)
acenaphthene	2	220 - 590	2,4-dinitrophenol	30	3300 - 8850
acenaphthylene	2	220 - 590	2,4-dinitrotoluene	6	660 - 1770
anthracene	2	220 - 590	2,6-dinitrotoluene	6	660 - 1770
benzidine	20	2200 - 5900	4,6-dinitro-2-methylphenol	20	2200 - 5900
benzoic acid	10	1100 - 2950	di-n-butylphthalate	2	220 - 590
benzo(a)anthracene	8	880 - 2360	di-n-octyl phthalate	4	440 - 1180
benzo(a)pyrene	8	880 - 2360	fluoranthene	2	220 - 590
benzo(b)fluoranthene	8	880 - 2360	fluorene	2	220 - 590
benzo(g,h,i)perylene	8	880 - 2360	hexachlorobenzene	2	220 - 590
benzo(k)fluoranthene	8	880 - 2360	hexachlorobutadiene	5	550 - 1475
benzyl alcohol	4	440 - 1180	hexachlorocyclopentadiene	10	1100 - 2950
bis (2-chloroethoxy) methane	2	220 - 590	hexachloroethane	3	330 - 885
bis (2-chloroethyl) ether	2	220 - 590	indeno (1,2,3-cd) pyrene	8	880 - 2360
bis (2-chloroisopropyl) ether	2	220 - 590	isophorone	4	440 - 1180
bis- (2-ethylhexyl) phthalate	4	440 - 1180	2-methyl naphthalene	2	220 - 590
4-bromophenylphenyl ether	8	880 - 2360	2-methyl phenol	6	660 - 1770
butylbenzylphthalate	4	440 - 1180	4-methyl phenol	6	660 - 1770
carbazole	10	1100 - 2950	naphthalene	2	220 - 590
4-chloroaniline	4	440 - 1180	2-nitroaniline	8	880 - 2360
2-chloronaphthalene	2	220 - 590	3-nitroaniline	8	880 - 2360
2-chlorophenol	4	440 - 1180	4-nitroaniline	8	880 - 2360
4-chlorophenylphenyl ether	8	880 - 2360	nitrobenzene	2	220 - 590
4-chloro - 3-methylphenol	8	880 - 2360	2-nitrophenol	10	1100 - 2950
chrysene	8	880 - 2360	4-nitrophenol	13	1430 - 3835
dibenzofuran	2	220 - 590	N-nitrosodiphenylamine	4	440 - 1180
dibenzo(a,h) anthracene	8	880 - 2360	N-nitroso-di-n-propylamine	6	660 - 1770
1,2-dichlorobenzene	3	330 - 885	pentachlorophenol	15	1650 - 4425
1,3-dichlorobenzene	3	330 - 885	phenanthrene	2	220 - 590
1,4-dichlorobenzene	3	330 - 885	phenol	4	440 - 1180
3,3'-dichlorobenzidine	10	1100 - 2950	pyrene	2	220 - 590
2,4-dichlorophenol	6	660 - 1770	pyridine	20	2200 - 5900
diethylphthalate	2	220 - 590	1,2,4-trichlorobenzene	3	330 - 885
2,4-dimethylphenol	6	660 - 1770	2,4,5-trichlorophenol	6	660 - 1770
dimethylphthalate	2	220 - 590	2,4,6-trichlorophenol	6	660 - 1770

* Detection limits for sediment varied with each sample. Numbers given are the ranges for all 10 samples.

Appendix 3. Frequency of self–monitoring data collected at the various discharges into Patrick Bayou and the nearby HSC. Numbers given are the required number of samples per week unless otherwise specified.

	Outfalls												
	00458	00305							00403	00402	00639	10519	01173
Variables	001	005	004	003	002	*201*	001	*101*	001	001	001	001	001
Flow (mgd)	5.76	1.75	R	8	105	R	8	R	2.3	9.9	1	4.5	0.43
Temperature			C	C	C		C		C	C	3/d		C
pH	C	1/d	1/d	1/d	1/d		1/d		C	C	3/d	1	7
Chlorine Residual					1/d	1	1/d	2				7	
TOC		3	1				1/d		1	3	2		
O&G			1						1		2		2
BOD (5–day)	3	3								3	2		4/yr
CBOD												2	
TSS	3	3				2		2		3	2	2	2
COD	1												2
Ammonia	3									3		2	
TKN												2	
Phenols	1												
Chromium	1												
Copper	1/mo					1			1	1			2
Copper, dissolved	1												
Lead						1				1			
Mercury								2					
Nickel	1/mo				3	1							
Nickel, diss	1												
Zinc	1/mo										2		
Zinc, diss	1												
Cyanide	1												
P.P. Organics (56 cpds)	1/yr	1/yr								1/yr			
Total chlorinated hydrocarbons			1	1									
Chlorinated Organics (10 cpds)*		3	S	S									
Biomonitoring		Y		Y	Y								

Notes: R = Report; C = Continuous; S = Sample only when stormwater is being discharged

* Carbon Tetrachloride, Chloroform, Vinyl Chloride, Trichloroethylene, 1,2–Dichloroethane, Tetrachloroethylene, Methyl Chloride, Methylene Chloride, Chloroethane, 1,1,1–Trichloroethane

Appendix 4. Selected metals data collected by the dischargers in July 1992 for the total maximum daily loading study of the HSC. Values are the average of four 24h composite samples taken in one month. Undetected variables are not included in the total.

			Effluent Load (lbs/day)					
Discharger Name	Outfall #	Flow (mgd)	As	Cu	Pb	Hg	Ag	Zn
Rohm&Haas	00458–001	5.064	<0.330	2.320	5.925	0.0375	0.6485	4.120
Oxychem	00305–004	0.210	0.026	0.024	0.031	<0.0004	0.0007	0.147
Oxychem	00305–005	0.613	0.012	0.105	0.061	<0.0010	0.0047	1.193
Total –– HSC near Patrick Bayou		5.887	0.038	2.449	6.017	0.0375	0.6539	5.459
Oxychem	00305–003	5.175	0.092	1.429	0.091	<0.0086	0.3325	1.655
Oxychem	00305–002	77.125	7.338	19.908	3.858	0.0335	0.7750	42.750
Oxychem	00305–001	4.425	0.488	1.174	0.365	0.0220	0.1789	1.605
Shell Refinery	00403–001	0.232	0.009	0.027	0.001	<0.0003	<0.0003	0.337
Shell Chemical	00402–001	6.311	0.065	0.114	<0.053	<0.0103	<0.0103	4.923
Lubrizol	00639–001	0.844	<0.037	0.003	0.011	<0.0014	<0.0070	1.081
City of Deer Park	10519–001	2.864	0.213	0.059	0.028	<0.0048	0.0233	0.712
Praxair	01173–001	0.094	0.030	0.213	0.025	<0.0001	0.0024	0.077
Total –– Patrick Bayou		97.069	8.234	22.926	4.379	0.0555	1.3121	53.139

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Appendix 5. Metals concentration data collected by the dischargers in July 1992 for the total maximum daily loading study of the HSC. Values are the average of four 24h composite samples taken in one month. Undetected variables were considered zero when computing average concentrations.

			Average Effluent Concentration (ug/l)					
Discharger	Outfall #	Flow (mgd)	As	Cu	Pb	Hg	Ag	Zn
Rohm & Haas	001	5.064	<10	54.3	139.2	0.93	15.35	97
Oxychem	004	0.210	14	19.6	9.1	<0.2	0.50	94
Oxychem	005	0.613	3.3	19.2	10.6	<0.2	0.95	247
Oxychem	003	5.175	2.1	33.1	2.1	<0.2	7.48	39
Oxychem	002	77.125	11.6	31.6	5.9	0.05	1.23	67
Oxychem	001	4.425	12.4	31.9	10.5	0.59	4.48	43
Shell Refinery	001	0.232	5	13.5	0.5	<0.2	<0.2	165
Shell Chemical	001	6.311	1.3	2.3	<1	<0.2	<0.2	94
Lubrizol	001	0.844	<5	0.4	1.6	<0.2	<1	154
City of Deer Park	001	2.864	8.7	2.6	1.2	<0.2	0.94	30
Praxair	001	0.094	39.5	271.3	33.3	<0.1	3.15	97

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Appendix 6. Tentatively identified compounds from Patrick Bayou sediment samples. Concentrations are estimates based on a response factor of 1.0 to the internal standard. Concentrations are presented on a dry weight basis.

	Station										
Compound (ppb)	1	2	2.5	3	3	4	5	6	7	9	10
Pentachloro-1,3-butadiene		3700		1100							
Sulfur, (molecular)	40000	8200	120000	2900			51000	14000		980	14700
1,1'-oxybis-benzene	2000	5100	2600	5200		4500					
Pentachlorobenzene		5300									
1,1-Biphenyl		1600		5600	2200						
Dodecane				1800	2800						
Pentadecane							5800				
Tetradecane				4900							
Other Semivolatile Cmpds	27790	20940	7700	49100	71000	40600	121900	13700	10100	11070	10044
(#)	(16)	(15)	(7)	(14)	(16)	(15)	(13)	(10)	(7)	(11)	(9)
Volatile Compounds				1620	2140		1600		350		
(#)				(4)	(4)		(1)		(1)		

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Appendix 7. Selected benthic samples collected in other studies. Routine from Upper Galveston Bay and Trinity Bay were collected on 7-13-94. Jacinto Bay was sampled on 8-3-92. Abundance is in organisms per sq meter.

	Routine Stations		San Jacinto B	
Species	U. Galv.	Trinity Bay	S	N
Nemertea	172	22	34	26
Mollusca				
Texadina sphinctostoma	22	204	9	
Rangia flexuosa			43	9
Mulinia lateralis	65	333		17
Macoma	97		17	43
Oligochaeta			9	
Polychaeta				
Mediomastus	398	301	404	267
Capitella capitata	108		34	9
Streblospio benedicti	43	75	86	9
Polydora			43	
Glycinde solitaria		11		
Nereidae			9	
Hesionidae			26	
Parandalia	129	22	17	9
Sigambra	22			
Hobsonia florida		32		
Crustacea				
Callianassa jamaicense			17	
Mysidopsis bahia	54			
Chironomidae		43		9
Community Parameters				
Total individuals	1108	1043	748	396
Total taxa	10	9	13	9
Total Polychaete taxa	5	5	7	4
Diversity (H')	1.94	1.68	1.72	1.24
EMAP Indicators**				
Expected diversity	0.82	0.80	0.90	0.87
Expected #spp	11	11	14	13
Expected # polychaete spp	5	5	7	6
EMAP score	5.75	5.25	4.59	3.50
Salinity	*6.8*	*5.4*	*10.8*	*9.6*

* San Jacinto Bay samples included five Ekman replicates.

** formulas are in Engle, Summers, and Gaston 1994

Appendix 8. Some common indices applied to Patrick Bayou benthic data and other comparable data sets.

Index/Indicator	Patrick Bayou Stations						Routine Stations		San Jacinto Bay**	
	1	2	2.5	3	4	5	U. Galv.	Trinity Bay	S	N
Total individuals *	849	5108	17086	312	495	5194	1108	1043	748	396
Total taxa	11	13	7	5	2	2	10	9	13	9
Diversity (H')	1.39	1.18	0.29	1.27	0.68	0.06	1.94	1.68	1.72	1.24
Evenness (J')	0.58	0.46	0.15	0.79	0.98	0.08	0.84	0.76		
Swartz' dominance index	1.77	1.59	0.8	1.88	1.39	0.76	4.25	2.72	3.65	1.7

* individuals/square meter

** San Jacinto Bay samples included 5 replicates instead of 4.

040070

Reference 5

Texas Water Quality Inventory
Vol 2 - Basin Summaries

The State of Texas Water Quality Inventory 96

SURFACE WATER QUALITY MONITORING PROGRAM

13th Edition, 1996 • Prepared Pursuant to Section 305(b) Federal Clean Water Act

Basin Summaries, Basin Maps, Graphical Basin Summaries, Segment Fact Sheets, and Water Quality Status Tables (Basins 1 - 10)

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VOLUME TWO

SFR-50 ◆ 12/96

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02

SAN JACINTO RIVER BASIN

The East and West Forks of the San Jacinto River merge in the headwaters of Lake Houston. The San Jacinto River flows approximately 20 miles from Lake Houston to its confluence with the Houston Ship Channel. The river flows another 10 miles to Galveston Bay. This basin includes the Houston Ship Channel and its tributaries. Total basin drainage area is 5,600 square miles. There are approximately 1,750 square miles in the West Fork drainage area, and 1,050 square miles in the East Fork drainage area. Buffalo Bayou, a major tributary to the Houston Ship Channel, has a drainage area of 1,034 square miles.

Approximately 92 percent of the basin population resides in Harris County. The city of Houston is the largest city in the basin. Other principal cities in the basin include Pasadena and Bellaire in Harris County and Conroe in Montgomery County.

The basin has been divided into 17 segments consisting of 517 stream miles and two reservoirs covering 51.9 square miles surface area. There are presently 70 sites monitored throughout the basin.

The San Jacinto River Basin exhibits wide variations in water quality. As the Houston metroplex expands to the north, numerous wastewater treatment plants and urban runoff increase the organic and nutrient loading and fecal coliform bacteria levels in all major tributaries to Lake Houston. Dissolved oxygen deficiencies can also occur in these streams. The Houston metropolitan area is drained almost entirely by Buffalo Bayou, which has been channelized to form the Houston Ship Channel in its lower reach. Buffalo Bayou receives heavy municipal, industrial and urban stormwater runoff loadings. During periods of low flow, low dissolved oxygen and elevated fecal coliform levels are common. The lower portion of Buffalo Bayou and the San Jacinto River were channelized in 1915, which opened the Houston area to ship traffic. Today, the port of Houston is the third leading shipping terminal in the United States. Oil and petrochemical industries along the channel make it one of the most highly industrialized areas of the world. The area from the Houston Ship Channel at the San Jacinto River confluence to Buffalo Bayou at US Highway 59 has been deemed desirable for navigation and industrial water use only. Over the past several years, water quality in the Houston Ship Channel has improved due to advanced wastewater treatment and reduced wasteloads. Aquatic and/or marine organisms are inhabiting areas where few had previously been found.

SAN JACINTO RIVER BASIN SUMMARY

San Jacinto River Basin Segments	Segment 1001	Segment 1002	Segment 1003	Segment 1004	Segment 1005	Segment 1006	Segment 1007	Segment 1008	Segment 1009	Segment 1010	Segment 1011	Segment 1012	Segment 1013	Segment 1014
DESIGNATED USE SUPPORT														
Contact Recreation	♦	♦	♦	♦	○	○	○	☒	☒	♦	☒	♦	☒	☒
Public Water Supply	○	♦	♦	♦	○	○	○	♦	♦	♦	♦	♦	○	○
Oyster Waters	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Fish Consumption	♦	♦	♦	♦	☒	☒	☒	♦	♦	♦	♦	♦	♦	♦
AQUATIC LIFE														
Dissolved Oxygen	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Water Toxics	♦	☒	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
CRITERIA SUPPORT														
Water Temperature	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
pH	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Chloride	♦	♦	♦	♦	○	○	○	♦	♦	♦	♦	♦	○	♦
Sulfate	♦	♦	♦	♦	○	○	○	♦	♦	♦	♦	♦	○	♦
Total Dissolved Solids	♦	♦	♦	♦	○	○	○	♦	♦	♦	♦	♦	○	♦
CONCERNS														
Ammonia	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Nitrite + Nitrate	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Total Phosphorus	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Orthophosphorus	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Chlorophyll *a*	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
SEDIMENT	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
FISH TISSUE	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦

♦=SUPPORT ☒=NONSUPPORT ♦= NO CONCERN ♦=CONCERN ○= DOES NOT APPLY

SEGMENT 1006 OF THE SAN JACINTO RIVER BASIN

NAME: Houston Ship Channel Tidal

DESCRIPTION: from the confluence with the San Jacinto River in Harris County to a point immediately upstream of Greens Bayou in Harris County, including tidal portions of tributaries

LENGTH/SURFACE AREA: 6 miles (10 kilometers)

SEGMENT CLASSIFICATION: Water Quality Limited
Cause: Water Quality Standards Violations
Advanced Waste Treatment Required

DESIGNATED WATER USES: Industrial Water Supply
Navigation

USE ATTAINABILITY ANALYSIS: As a result of a March 1984 use attainability analysis the upstream boundary of this segment was moved downstream to the confluence of Greens Bayou.

STATIONS MONITORED IN THE LAST FOUR YEARS ON SEGMENT: 3 OFF SEGMENT: 1

PUBLISHED STUDIES:

14 Aug 1978	Q,F,C	IS-26	(Kirkpatrick: Mar 1982)
24 Oct 1979	Q,D,F,C,R	IS-31	(Ottmers: Apr 1982) Halls Bayou
03 Aug 1982	Q,F,C,L	IS-86-10	(Kirkpatrick: Dec 1986)
09 Jul 1984	Q,F,C,	IS-87-06	(Kirkpatrick: Apr 1987)
25 Feb 1985	Q,F,C,L,S	IS-87-09	(Kirkpatrick: Jul 1987)
1969-90	F	AS-09	(Guillen: Aug 1993)
Jul 91, Jan 92	F,N	AS-26/SR	(Luedke: Jun 1994)
1977-92	F,I,S	AS-33/SR	(Marks: Sep 1994)

AMBIENT TOXICITY MONITORING STATIONS: 2
ON SEGMENT: 1
OFF SEGMENT: 1

SUMMARY OF FISH KILLS: 3

Water Body	Date	Cause	Size of Kill
Patrick Bayou	09/10/90	Unknown	1,060
Houston Ship Channel	08/09/93	Unknown	Unknown

FISH CONSUMPTION ADVISORIES AND/OR CLOSURES: A restricted-consumption advisory for the general population and a no- consumption advisory for children and women of childbearing age have been issued by the Texas Department of Health due to elevated levels of dioxin in blue crabs and catfish. Six miles of the segment have been affected by these advisories. A paper mill is listed as the source of dioxin.

PERMITTED FACILITIES (FINAL):

Domestic	88 outfalls	74.71 MGD
Industrial	35 outfalls	198.62 MGD
Agricultural	0 outfalls	0.00 MGD
Total	123 outfalls	273.33 MGD

SEGMENT SUMMARY:

Ammonia nitrogen, nitrite plus nitrate nitrogen, total phosphorus and orthophosphorus in water are elevated. Copper and nickel in water exceeded the chronic criteria. Mercury, manganese, barium, cadmium, chromium, copper, nickel, and hexachlorobenzene concentrations in sediment are elevated. PCBs in fish tissue are elevated. Total maximum daily loads for arsenic, copper, lead, mercury, nickel, and zinc are being developed by the TNRCC. Fecal coliform levels are chronically elevated in this segment. The bacteriological indicator has been changed from fecal coliform to enterococci. The data analysis was done using fecal coliform data. This segment is affected by urban stormwater runoff in addition to major point source discharges.

SEGMENT 1005 OF THE SAN JACINTO RIVER BASIN

NAME: Houston Ship Channel/San Jacinto River Tidal

DESCRIPTION: from the confluence with Galveston Bay at Morgan's Point in Harris/Chambers County to a point 100 meters (110 yards) downstream of IH 10 in Harris County

LENGTH/SURFACE AREA: 12 miles (19 kilometers)

SEGMENT CLASSIFICATION: Water Quality Limited
Cause: Water Quality Standards Violations
Advanced Waste Treatment Required

DESIGNATED WATER USES: Noncontact Recreation
High Aquatic Life

USE ATTAINABILITY ANALYSIS: None

STATIONS MONITORED IN THE LAST FOUR YEARS ON SEGMENT: 2 OFF SEGMENT: 0

PUBLISHED STUDIES:

14 Aug 1978	Q,F,C,L	IS-26	(Kirkpatrick: Mar 1982)
03 Aug 1982	Q,F,C,L	IS-86-10	(Kirkpatrick: Dec 1986)
09 Jul 1984	Q,F,C,L	IS-87-06	(Kirkpatrick: Apr 1987)
25 Feb 1985	Q,F,C,L	IS-87-09	(Kirkpatrick: Jul 1987)
1969-90	F	AS-09	(Guillen: Aug 1993)
1977-92	F,I,S	AS-33/SR	(Marks: Sep 1994)

AMBIENT TOXICITY MONITORING STATIONS: 2
ON SEGMENT: 2
OFF SEGMENT: 0

SUMMARY OF FISH KILLS: None

FISH CONSUMPTION ADVISORIES AND/OR CLOSURES: A restricted-consumption advisory for the general population and a no-consumption advisory for children and women of childbearing age have been issued by the Texas Department of Health due to elevated levels of dioxin in blue crabs and catfish. Twelve miles of the segment have been affected by these advisories. A paper mill is listed as the source of dioxin.

PERMITTED FACILITIES (FINAL):

Domestic	1 outfall	0.01 MGD
Industrial	14 outfalls	37.13 MGD
Agricultural	0 outfalls	0.00 MGD
Total	15 outfalls	37.14 MGD

SEGMENT SUMMARY:

Fecal coliform levels are moderately elevated, causing partial support of the noncontact recreation use. Elevated total phosphorus, orthophosphorus, and nitrite plus nitrate nitrogen levels are a concern in this segment. Elevated concentrations of nickel and manganese in sediment are a concern. Nickel in water concentrations exceeded the chronic criterion, causing nonsupport for the high aquatic life use. A TMDL for heavy metals is being developed by the TNRCC. This segment is affected by urban stormwater runoff in addition to point source discharges.

Reference 6

U.S. Geological Survey,
La Porte Quadrangle, Texas, 7.5 Minute Series.
Topographic Map.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

LA PORTE QUADRANGLE
TEXAS
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1976. Field checked 1976. Map edited 1982
Selected hydrographic data compiled from NOS/NOAA Charts 11327, 11328, and 11329 (1980)
This information not intended for navigational purposes

Projection and 10,000-foot grid ticks: Texas coordinate system, south central zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 15
1927 North American datum
To place on the predicted North American Datum 1983 move the projection lines 20 meters south and 21 meters east as shown by dashed corner ticks

Fine red dashed lines indicate selected fence lines

Red tint indicated areas in which only landmark buildings are shown

UTM GRID AND 1982 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

A portion of this map lies within a subsidence area
Contouring based on 1973 adjustment of vertical control

Water stages in this area vary with meteorological conditions
Approximate limits of occasional inundation shown by dashed blue lines
Where mean high water is undetermined for lack of visual evidence
Dotted blue lines indicate the approximate limits of low water

There may by private inholdings within the boundaries of the National or State reservations shown on this map

SCALE 1:24 000

CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET-GULF COAST LOW WATER DATUM
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS NEGLIGIBLE

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION
Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route

TEXAS
QUADRANGLE LOCATION

2995-414

LA PORTE, TEX.
N2937.5-W9500/7.5
1982

DMA 6943 II NE-SERIES V882

ISBN 0-607-01435-1

Reference 7

Screening Site Inspection Work Plan

TNRCC

Protecting Texas by Reducing and Preventing Pollution

Screening Site Inspection Work Plan

Patrick Bayou
Deer Park, Harris County, Texas
TX0 000 605 329

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI

Prepared in cooperation with the U.S. Environmental Protection Agency

March 2000

07 001

PRELIMINARY ASSESSMENT/
SCREENING SITE INSPECTION WORK PLAN

Patrick Bayou

Deer Park, Texas

TXD Pending

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U.S. Environmental Protection Agency

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Preliminary Assessment/
Screening Site Inspection Work Plan

Patrick Bayou
Deer Park, Texas
TXD Pending

Prepared in cooperation with the

Texas Natural Resource Conservation Commission
and
U.S. Environmental Protection Agency

Prepared by

Texas Natural Resource Conservation Commission
Site Assessment and Management Section
Site Discovery and Assessment Program
Site Investigation Manager - J. D. Thompson
Austin, Texas

March 2000

The preparation of this report was financed through grants from the U.S. Environmental Protection Agency administered through the Texas Natural Resource Conservation Commission.

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NOTE

The State predecessor agencies: Texas Water Quality Board (TWQB), Texas Department of Water Resources (TDWR), Texas Water Commission (TWC), and Texas Air Control Board (TACB), referred to throughout this report are now known as the Texas Natural Resource Conservation Commission (TNRCC). The new agency, TNRCC, became effective September 1, 1993, as mandated under State Senate Bill 2 of the 73rd Regular Legislative Session.

07 010

SECTION 1

INTRODUCTION

The Texas Natural Resource Conservation Commission (TNRCC) has been requested by the U.S. Environmental Protection Agency (EPA) Region VI to conduct a Preliminary Assessment/Screening Site Inspection (PA/SSI) at the Patrick Bayou (PB) site (EPA Identification No. TXD Pending; TNRCC Solid Waste Registration (SWR) No. None) located south of the Houston Ship Channel (HSC) and north of Deer Park, Texas, Harris County. The site is located along the property boundaries of three petrochemical industries that discharge treated plant wastes and cooling tower wastewater under permit into the bayou. In addition, Patrick Bayou receives effluent discharges from the City of Deer Park wastewater treatment plant (WWTP) and discharges from an air separation plant located along the East Fork tributary. Prior investigations conducted by the City of Houston in 1993 and 1994 along the HSC and its tributaries indicated high to moderate levels of DDD, DDT, polynuclear aromatic hydrocarbons (PAHs), cadmium, chromium, mercury, nickel, zinc, polychlorinated biphenyls (PCBs) and dioxin accumulating in Patrick Bayou. These investigations were based on sediment samples collected from three routine HSC ambient stream monitoring locations (Stations 014, 015 and 016) located within Patrick Bayou (ref 5, pg 1). Subsequent investigations in July 1994 during a joint-TNRCC/USEPA Ambient Toxicity and Water and Sediment Quality Survey using sediment sample results collected from 10 sample locations selected along Patrick Bayou revealed moderate heavy metals, elevated petroleum hydrocarbon contamination and PCBs accumulating within the bayou requiring further investigation (ref 5, pgs 1-2, 4 and 6-8).

The "site" consists of a small bayou tributary influenced by tidal action from Galveston Bay and the HSC. Patrick Bayou begins at the end of a series of concrete/gunite-lined storm water discharge channels/culverts for the City of Deer Park, Texas draining north to the HSC approximately 2.1 miles as measured from the State Highway (SH) 225 bridge (ref 5, pg 3). The bayou is approximately 600 feet wide within the last 0.25 mile before entering the HSC and is nearly 500 feet wide at its widest point adjacent to the OxyVinyls, LP chemical plant. The bayou contains wetland vegetation and is a natural habitat for waterfowl. A significant population of nektonic species has been documented near the mouth of Patrick Bayou (ref 5, pg 5). Human consumption of blue crabs and catfish along the HSC has been restricted by the Texas Department of Health for high levels of dioxin reportedly originating from discharged pulp mill wastes. A fish kill of 101-1,000 was reported on March 21, 1990 in the East Fork Patrick Bayou and a second fish kill of 1,060 was reported on September 10, 1990 in Patrick Bayou between the OxyVinyl, LP and Shell Refining plants from unknown causes (ref 8, pg 698).

This SSI will focus on previously identified areas where sediment samples have indicated moderate to high levels of organic, heavy metal, pesticide and PCB concentrations determined during the July 26, 1994 joint-TNRCC Region 12/USEPA sampling event. In addition, historical levels of contamination that have been documented from a series of TNRCC routine stream monitoring station sampling events will be evaluated. These areas include several industrial outfalls located along Patrick Bayou and the East Fork tributary as well as locations downstream from the City of

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Deer Park WWTP discharge point. These areas of interest include:

(1) the OxyVinyls, LP Outfalls No. 003, 002 and 001 (Permit No. 00305) located approximately 0.4 mi., 0.6 mi. and 0.85 mi. respectively south of the bayou's convergence with the Houston Ship Channel;

(2) the Shell Refinery and Shell Chemical Company Outfalls No. R001 and C001 (Permits No. 00403 and 00402) both located approximately 1.5 mi. south of the convergence with the HSC;

(3) the Lubrizol Corporation Outfall No. 001 (Permit No. 00639) located approximately 1.8 mi. south of the convergence with the HSC;

(4) the City of Deer Park WWTP discharge point (Permit No. 10519) located approximately 2.3 mi. south of the convergence with the HSC; and finally,

(5) the Praxair discharge point (Permit No. 01173) that discharges to a drainage channel along a railroad track and then to the East Fork of Patrick Bayou entering Patrick Bayou at approximately 1.13 mi. south of the convergence with the HSC.

The primary contaminants of concern include pesticides, polynuclear aromatic hydrocarbons (PAHs), heavy metals, PCBs and dioxin that may have originated from industrial wastewater discharge outfalls, storm water runoff discharge points and/or municipal wastewater discharging to the bayou. These discharge areas will be investigated and sampled during the SSI to further characterize accumulating hazardous substances and determine the extend of contaminant migration. In addition, unaffected background levels for the contaminants of concern will be obtained by collecting representative sediment samples.

The primary constituents of concern include: two pesticides DDD, DDT; sixteen PAHs acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, 2-methylnaphthalene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzp(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(123cd)pyrene and pyrene; three chlorinated hydrocarbons hexachlorobenzene (HBC), hexachlorobutadiene (HCBD) and hexachloroethane (HCE); seven semi-volatile organic compounds bis(2ethylhexyl)phthalate, carbazole, dibenzpfuran, 1,3-dichlorobenzene, 1,4-dichlorobenzene, di-n-butylphthalate, and 1,2,4-trichlorobenzene; nine priority pollutant metals arsenic, chromium, copper, lead, manganese, mercury, nickel, selenium and zinc; one PCB Aroclor 1248, and dioxin.

This work plan was prepared to describe the reconnaissance and sampling activities which are planned on and around the area of the Patrick Bayou Site to determine if further action is required as described below.

WORK PLAN OVERVIEW

The purpose of this investigation is to document the release(s) or potential release(s) of hazardous substances from identifiable sources which may have migrated off-site. This work plan was

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developed using available information obtained primarily through a review of TNRCC Central Office files located in Austin, Texas, TNRCC Region 12 and Region 4 files located in Houston and Arlington, Texas and a review of the TNRCC/USEPA Containment Assessment of Patrick Bayou report dated December 1996. The information collected from the review of records was evaluated for data gaps and additional information needs were incorporated into the work plan. This plan will be modified as necessary based on actual site conditions encountered.

Section 1 is the introduction, Section 2 is the site background and description and Section 3 describes the field work to be conducted. The TNRCC/USEPA Containment Assessment of Patrick Bayou report narrative, Supplemental Maps, Patrick Bayou Site Health and Safety Plan, TNRCC FY 2000-2001 Quality Assurance Project Plan (QAPP) document and the Site Reconnaissance Checklist are presented as appendices A through E, respectively.

SITE OBJECTIVE WITH RESPECT TO THE PREREMEDIAL PROCESS

The preremedial stage of the Superfund process involves a PA and a site inspection (SI) stage consisting of a SSI and, if necessary, a listing site inspection (LSI). This PA/SSI is being conducted to determine if the Patrick Bayou Site is eligible for proposal to the National Priorities List (NPL) under the Federal Superfund Program. The PA/SSI will concentrate on assessing on-site sources and threats along the surface water exposure pathway.

A TNRCC/USEPA containment assessment report has already been completed identifying specific areas within Patrick Bayou requiring further investigation. This PA/SSI will build upon existing data by obtaining additional background information relevant to the Patrick Bayou Site through a file review and collecting environmental samples to further characterize conditions at the site. Sampling conducted during the field work will attempt to document hazardous substance migration to and from the Patrick Bayou Site from potential sources and look for evidence of actual human and environmental exposure to contaminants.

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PROJECT CONTACTS

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07 014

SECTION 2

SITE BACKGROUND AND DESCRIPTION

SITE INFORMATION

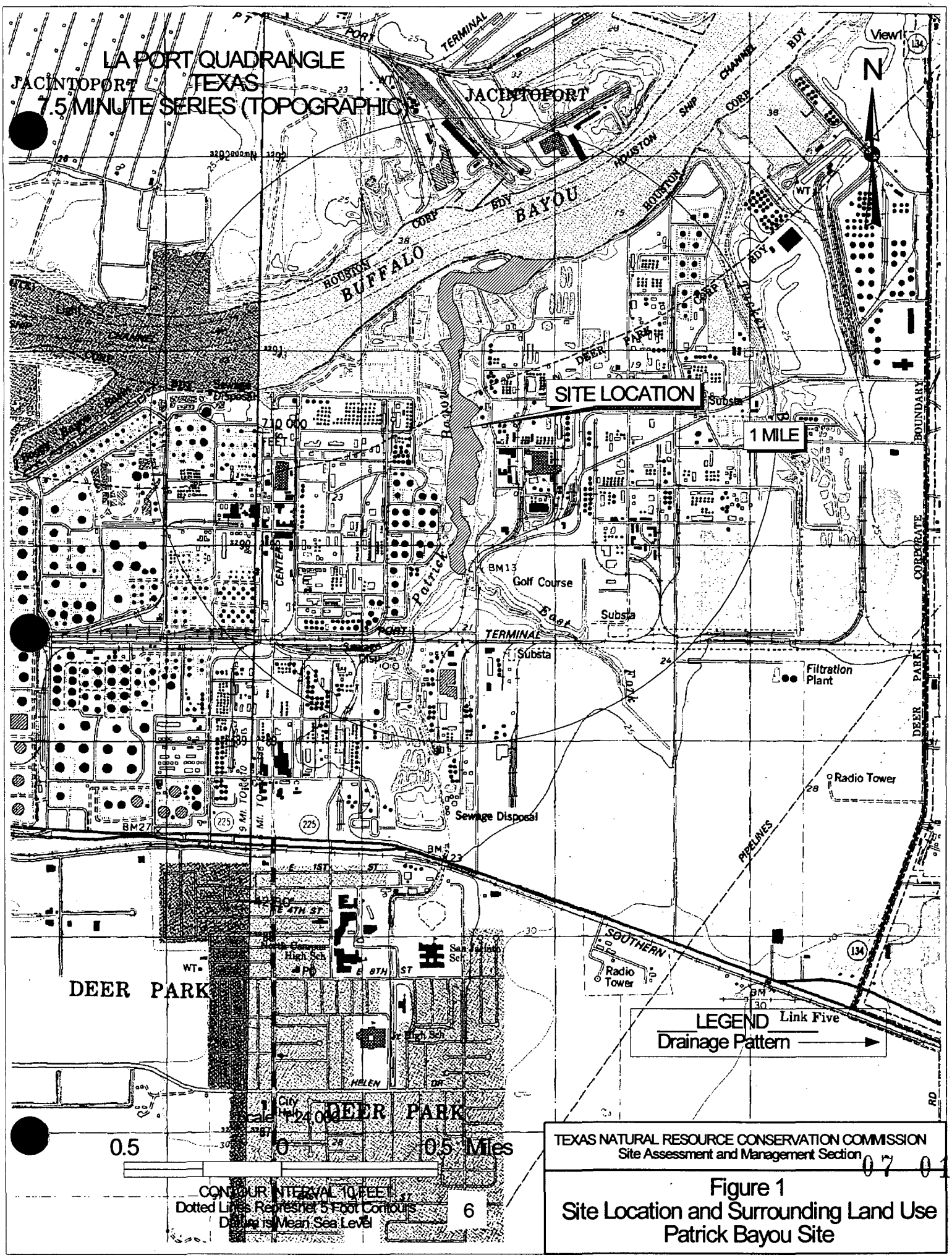
Patrick Bayou is one of several small bayou tributaries of the Houston Ship Channel located within the lower portion of the San Jacinto River Basin. The Houston Ship Channel (HSC) is the channelized portion of Buffalo Bayou that flows 10 miles east to Galveston Bay and the Gulf of Mexico permitting shipping traffic to enter the Port of Houston (ref 8, pg 507). As a result, Patrick Bayou is influenced by tidal action from Galveston Bay and the HSC. Patrick Bayou begins within the city limits of Deer Park, Texas, however most of the upper portion consists of a series of concrete/gunite-lined storm water discharge channels/culverts installed by the city for runoff control and several adjacent petrochemical facilities for a distance of approximately 0.4 miles south of State Highway (SH) 225. Patrick Bayou drains north to the HSC a total distance of 2.85 miles with the lower portion of the bayou containing earthen banks and a soft mud bottom (ref 5, pg 3). The bayou is approximately 600 feet wide within the last 0.25 mile before entering the HSC and is nearly 500 feet wide at its widest point adjacent to the OxyVinyls, LP chemical plant. The bayou contains wetland vegetation and is a natural habitat for waterfowl (ref 5, pg 5). The "site" is defined as the bounds of Patrick Bayou originating below the concrete/gunite box cover 0.4 miles below SH 225 extending north to its entry point at the HSC. The center of the site is located at Latitude 29° 43' 55" North, Longitude 95° 06' 52.5" West as shown in Figure 1. The site elevation is 0' mean sea level (ref 5, pg 31 and ref 6, pg 1).

The site is located in a mixed urban/highly developed industrial/petrochemical area in southeast Harris County north of Deer Park, Texas (population 27,652 - 1990 Census). The site is bordered to the north by navigable water, the Houston Ship Channel, to the east and west by major petrochemical companies and by the City of Deer Park to the south. Surrounding land use, the surface water drainage pathway to the confluence with the HSC and prominent land features are shown in Figure 1.

As depicted in Figure 2, the area of concern includes the in-water portion of Patrick Bayou that has received for a number of years an accumulation of permitted industrial wastewater discharges, municipal wastewater treatment plant effluent and storm water discharges from adjacent industrial sites and nearby urban/residential areas. Hazardous substances may have originated from these discharges or from spilled material transported along the surface water pathway that will be the focus of this investigation (ref 5, pages 3-5).

Access to the site is limited and restricted since the shoreline surrounding the bayou is privately owned by three petrochemical companies. Each facility limits personnel access and requires entry through a visitor's gate and registration. The only access to the bayou from the north is by a shallow draft boat entering from the HSC (ref 5, pg 3).

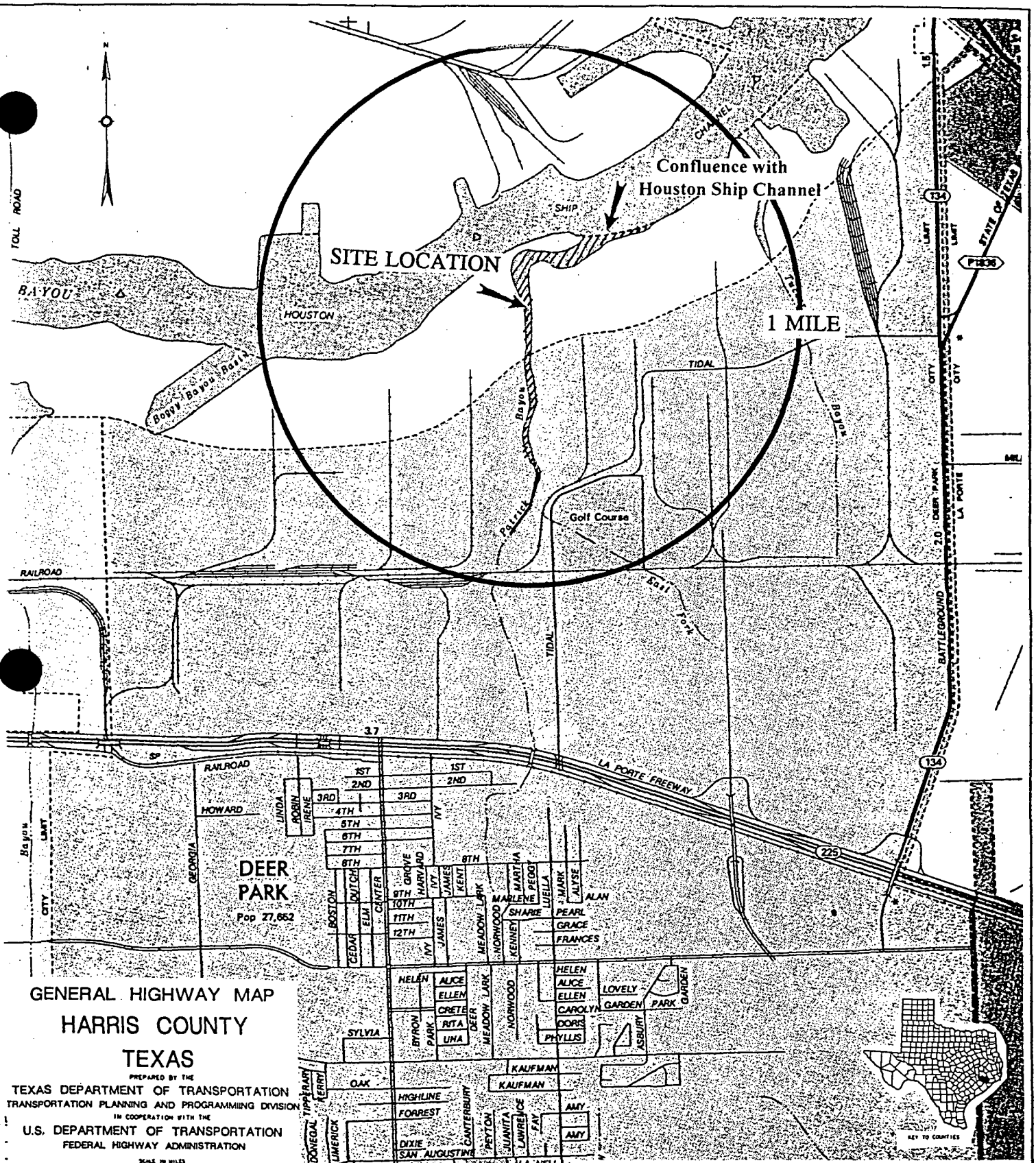
07 015



TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Site Assessment and Management Section

07 016

Figure 1
Site Location and Surrounding Land Use
Patrick Bayou Site



GENERAL HIGHWAY MAP

HARRIS COUNTY

TEXAS

PREPARED BY THE

TEXAS DEPARTMENT OF TRANSPORTATION

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION

IN COOPERATION WITH THE

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

SCALE IN MILES

0 1/4 1/2 1

1992

HIGHWAYS REVISED TO JANUARY 1, 1994

1990 CENSUS FIGURES

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Region No. 4

FIGURE 2

Site Features Map
Patrick Bayou Site

07 017

The joint-TNRCC/USEPA Containment Assessment of Patrick Bayou, dated December 1996 (see Appendix A), identifies the surface water pathway as the primary pathway of concern. Discussion of this pathway is summarized in the following sections.

WASTE CONTAINMENT/HAZARDOUS SUBSTANCE IDENTIFICATION

Characteristics

The information used to identify the waste characteristics at the Patrick Bayou Site was obtained from a review of TNRCC central office and regional records. The site was identified to have multiple waste source discharges entering along the surface water pathway where a multitude of hazardous substances may have been released and as a result, the site may contain sediments that have become contaminated from hazardous substance migration. A record review identified DDD, DDT, acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, 2-methylnaphthalene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzp(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(123cd)pyrene, pyrene, hexachlorobenzene (HBC), hexachlorobutadiene (HCBD), hexachloroethane (HCE), bis(2ethylhexyl)phthalate, carbazole, dibenzpfuran, 1,3-dichlorobenzene, 1,4-dichlorobenzene, di-n-butylphthalate, 1,2,4-trichlorobenzene, arsenic, chromium, copper, lead, manganese, mercury, nickel, selenium, zinc, PCB Aroclor 1248 and dioxin as the potentially hazardous substances within the site. These wastes may have originated from numerous discharge sources entering Patrick Bayou.

During the July 26, 1994, jointly-sponsored TNRCC Region 12/USEPA Containment Assessment of Patrick Bayou, multiple waste sources were identified discharging to Patrick Bayou either under industrial wastewater or municipal wastewater treatment discharge permits or from storm water runoff collection system discharge outfalls. A record review identified the following areas of interest where hazardous substances may have originated. Approximate locations of these sources are shown in Appendix A, Figure 2 and a list indicating the assigned TNRCC permit number, outfall identification number, permitted wastewater discharge in million gallons per day (mgd) and owner are provided in Table 1, Appendix A. Specific areas that will be investigated during the SSI include (ref 5, pgs 3-4, 42 and 30):

(1) the OxyVinyls, LP Outfalls No. 003, 002 and 001 (Permit No. 00305) located approximately 0.4 mi., 0.6 mi. and 0.85 mi. respectively south of the bayou's convergence with the Houston Ship Channel. OxyVinyls, LP is a chemical manufacturing facility with three cooling water outfalls. Outfall 001 carries treated wastewater from their mercury cell process area. Outfall 002 is the largest with a daily discharge of 105 mgd and outfall 003 carries cooling water, utility wastewater and accumulated storm water. In 1993, OxyVinyls, LP installed a retaining wall 60' deep along the east side of Patrick Bayou beginning just south of outfall 003 extending north to a bridge near the mouth of the bayou;

(2) the Shell Refinery and Shell Chemical Company Outfalls No. R001 and C001 (Permits No. 00403 and 00402) located approximately 1.5 mi. south of the convergence with the HSC. The Shell Chemical Company outfall C001 contains both industrial and domestic wastewater discharges plus there are two additional outfalls installed nearby for storm water discharge. All three of these outfalls discharge to the gunite-lined portion of upper Patrick Bayou in an

area located south the Shell Company Road bridge as shown in Figure 2, Appendix A. The Shell Refinery (separate company) outfall R001 carries boiler blowdown wastewater and accumulated storm water discharging to the same gunite-lined portion of upper Patrick Bayou approximately 250' north of the Shell Chemical Company outfall C001. In addition, Shell Refinery has four other storm water collection outfalls discharging to Patrick Bayou. It was noted the main process outfall for Shell Refinery (outfall 007) discharges to the HSC and is located up-channel from the HSC convergence with Patrick Bayou;

(3) the Lubrizol Corporation Outfall No. 001 (Permit No. 00639) located approximately 1.8 mi. south of the convergence with the HSC. The outfall carries treated process water, contaminated ground water and storm water from their lubricant manufacturing facility. The outfall enters the upper gunite-lined portion of Patrick Bayou inside a box culvert and is not readily accessible. Lubrizol has a total of six other storm water collection system discharge outfalls that drain to Patrick Bayou;

(4) the City of Deer Park WWTP discharge point (Permit No. 10519) located approximately 2.3 mi. south of the convergence with the HSC. The Deer Park discharge consists of treated municipal wastewater which flows east along a ditch located north of and along SH 225 (the LaPorte Freeway) entering the gunite-lined portion of upper Patrick Bayou just south of the highway; and finally,

(5) the Praxair discharge point (Permit No. 01173) located approximately 1,500' east of outfalls R001 and C001 for the Shell's Deer Park Manufacturing Complex. The outfall discharges from the plant east to a drainage channel flowing north along a railroad track towards the East Fork tributary of Patrick Bayou. The discharge contains cooling tower wastewater, boiler blowdown, domestic wastewater and process wastewater from their air separation plant. The discharge enters Patrick Bayou at approximately 1.13 mi. south of the HSC convergence.

A summary of waste characteristics, sample location Identification No. and detected contaminants are provided in Appendix A, Table 6 - Water Sample Results, Table 7 - Sediment Sample Results for Metals, Table 8 - Sediment Sample Results for Organics and Table 9 - Sediment Sample Results for Other Organic Compounds (ref 5, pgs 36-38).

Required Information (Data Gaps)

- Field verify site features and locations as depicted in Figure 2.
- Field verify the location of the discharge areas identified as possible sources of the contaminants entering the bayou. Note any evidence of a chemical release, i.e., stains or stressed vegetation and obtain soil/sediment samples to confirm the release of contaminants.
- Field verify previous/current waste management activities conducted adjacent to the site and obtain information on hazardous substances related to these activities through observation and interviews with nearby industrial representatives, municipal wastewater treatment operators and/or nearby residents.

07 019

- Obtain, as a minimum, three background sediment samples to determine the naturally occurring levels for the contaminants of concern from unaffected areas located adjacent to the site.

GROUND WATER PATHWAY AND TARGETS

GROUNDWATER TO SURFACE WATER PATHWAY AND TARGETS

The Groundwater and Groundwater to Surface Water Pathways for the Patrick Bayou Site will not be evaluated since the "site" is defined as the accumulated contaminated sediments within Patrick Bayou that may have originated from multiple discharge sources. The Surface Water Pathway will be explored initially to evaluate those sources and assess potential contaminant migration.

SURFACE WATER PATHWAY AND TARGETS

Characteristics

Patrick Bayou is a small tidal tributary of the Houston Ship Channel (HSC) located along the lower portion of the San Jacinto River Basin (Segment 1006) that flows through a heavy petrochemical industrial area located on the south side of the HSC. Patrick Bayou originates approximately 3.0 miles upstream within the city limits of Deer Park, Texas. A small tributary, East Fork, drains to Patrick Bayou entering 1.3 miles from the convergence with the HSC as shown in Figures 1 and 2. The designated uses for Segment 1006 are industrial water supply and navigation. A restricted-consumption advisory for the general population and a no-consumption advisory for children and women of childbearing age have been issued for a six-mile section of the stream segment by the Texas Department of Health due to elevated levels of dioxin in blue crabs and catfish. A paper mill is listed as the source of dioxin (ref 5, pg 3 and ref 8, pg 659 and 698).

The majority of the upper portion of Patrick Bayou beginning at a storm water discharge channel box located 1.7 miles from the confluence at the HSC is entirely enclosed or lined with gunite/concrete installed by the City of Deer Park and adjacent industries for storm water runoff control. The lower portion of the bayou has earthen banks and a soft mud bottom. The delta portion of the lower bayou is approximately 600 feet wide within the last 0.25 mile before entering the HSC and is nearly 500 feet wide at its widest point adjacent to the OxyVinyls, LP chemical plant. The bayou contains wetland vegetation and is a natural habitat for waterfowl. The East Fork tributary is more stream-like in contour and has more riparian vegetation than the main bayou (ref 5, pgs 3 and 5).

The 2-year 24-hour rainfall for the area of the site is approximately 5.0 inches (ref 9, page 95).

Targets

Since the site is defined as the contaminated sediments accumulating within Patrick Bayou which is a body of water, it has not been necessary to designated a Point of Probable Entry (PPE). The 15-mile surface water drainage pathway from Patrick Bayou to Galveston Bay shown in Figure 3 is provided as a reference. It has not been determined whether there are any surface water users along the 15-mile target distance limit for Patrick Bayou.

07 020

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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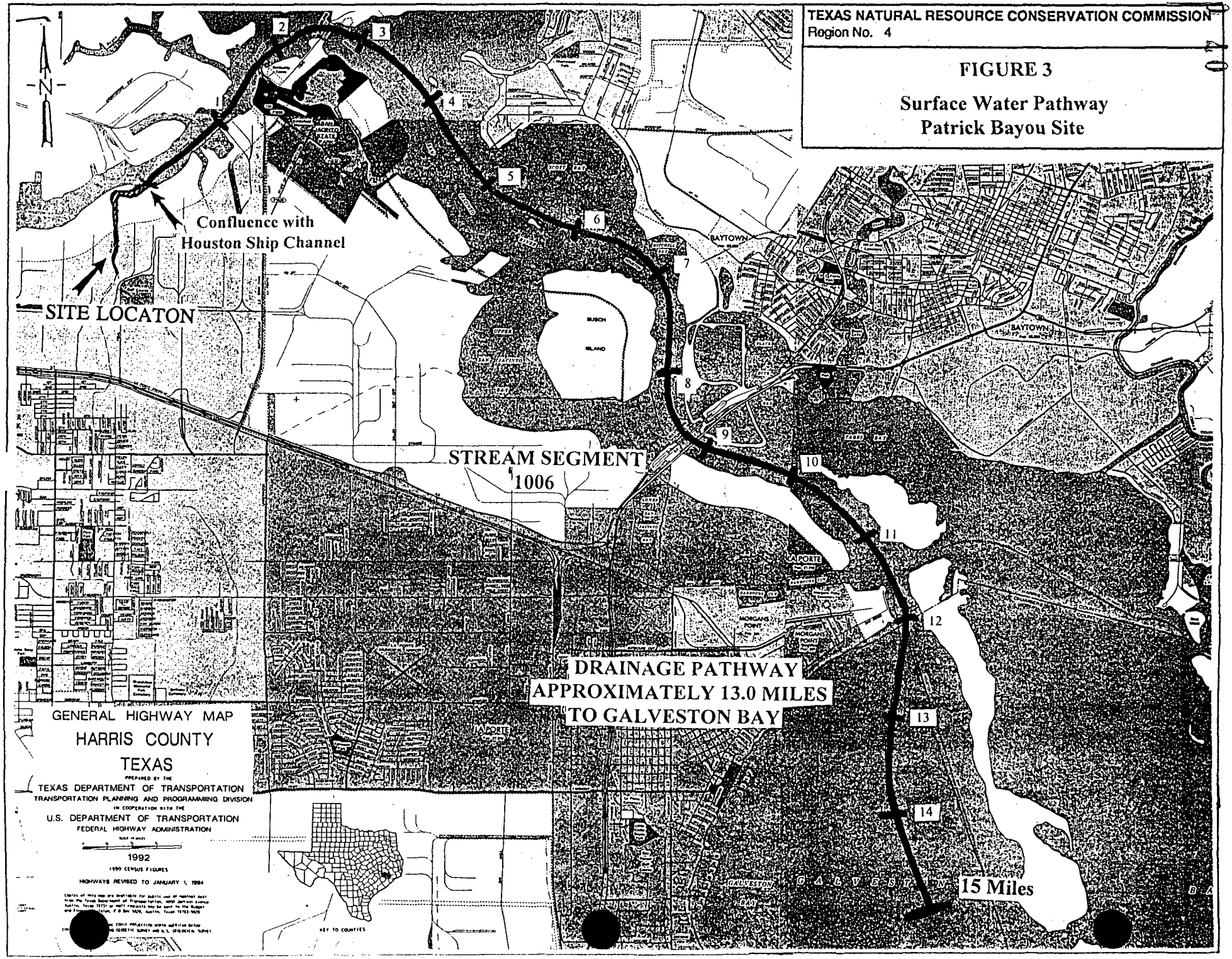
FIGURE 3

Surface Water Pathway
Patrick Bayou Site



It has not been determined if there are any wetland areas, sensitive environments or endangered species within a 4-mile radius of the site.

A file review revealed that part of the joint-TNRCC/USEPA Containment Assessment of Patrick Bayou included ambient water and sediment toxicity evaluations to typical aquatic habitants and sediment samples were collected from the bayou for quantitative macrobenthic organism counts. Results indicated significant adverse effects from all five of the ambient water toxicity evaluations and because of the number of contaminants detected, it was difficult to determine the single compound or combination of compounds responsible for the observed toxicity. Results of the macrobenthic community assessment indicated degraded conditions based on similar oligohaline areas of Galveton Bay and from two benthic samples collected elsewhere in the HSC system (San Jacinto Bay) (ref 5, pgs 18-19).

Required Information (Data Gaps)

- Field verification to determine the location of drainage channels, outfalls and overland flow drainage patterns to Patrick Bayou and its triburaty.

- Collect sample data to substantiate whether contaminants may have migrated along these surface water pathway to the bayou.

- Field verification to determine if there are any sensitive environments, endangered species or wetlands located within the bayou. Determine if the bayou is used as a fishery.

- Field verification to determine if there are any surface water users within the 15-mile target distance limit and determine the use of the surface water.

- Obtain, as a minimum, three background sediment samples to determine the naturally occurring levels for the contaminants of concern from unaffected surface water pathway areas located adjacent to the site.

SOIL EXPOSURE PATHWAY AND TARGETS

The Soil Exposure Pathway will not be evaluated since there are no on-site residents, workers or schools/day care centers being exposed to remaining site contamination and controlled access by the adjacent property owners precludes inadvertent entry/exposure. Sediment samples collected to verify accumulated source contaminants for the surface water drainage pathway will be used to assess the soil exposure pathway.

Required Information (Data Gaps)

- Determine adequacy of site security, i.e., gates, fences, locks and warning signs, to preclude inadvertent entry to the bayou sediments.

- Substantiate that there are no on-site residents, workers, schools, day care centers or other resources that may be exposed to source contaminants.

07 022

AIR PATHWAY AND TARGETS

The Air Pathway will not evaluated due to the lack of an observed and documented air release.

Required Information (Data Gaps)

- Field verification of the distance to the nearest resident subject to exposure from a release of hazardous substances through the air.
- Field verification of potential targets in the target distance radii.

07 023

SECTION 3

SITE NONSAMPLING DATA COLLECTION AND FIELD WORK

The Texas Natural Resource Conservation Commission (TNRCC) will perform the activities described in this section to provide site background information and analytical data that can be used by the EPA to evaluate the Patrick Bayou site using the Hazard Ranking System (HRS). This information will be presented in a documentation report that includes source and sediment sampling as discussed below.

All field work will be conducted in accordance with the Patrick Bayou Site health and safety plan (HSP) and the TNRCC-approved quality assurance project plan (QAPP). The HSP and QAPP are in appendices C and D, respectively. These plans will be reviewed by all personnel upon arrival at the site..

PERSONNEL REQUIREMENTS AND RESPONSIBILITIES

The TNRCC Central Office Technical Director for this preliminary assessment/screening site inspection (PA/SSI) is Mr. Wesley Newberry and the TNRCC Program Manager is Mr. Allan Seils. The TNRCC Site Investigation Manager is Mr. J. D. Thompson, Region 4 Office, Arlington, Texas. Other team members will be identified prior to the sampling event. The TNRCC's Central Office mailing address is the Remediation Division, Site Assessment and Management Section (SAM)/MC 142, P.O. Box 13087, Austin, Texas 78711-3087, (telephone no. (512) 239-2514, FAX No. (512) 239-4814). The TNRCC Region 4 Office mailing address is 1101 East Arkansas Lane, Arlington, Texas 76106, (Telephone No. (817) 469-6750, FAX No. (817) 795-2519).

The TNRCC Central Office Program Manager and Site Investigation Manager are responsible for identifying, assigning and organizing the staff to execute the activities required to complete the PA/SSI. The Site Investigation Manager is responsible for completing the activities described in this plan and adhering to the sampling activities and report schedule. The planned field schedule for activities at the Patrick Bayou Site is listed in Table 1.

The TNRCC Technical Director and Program Manager will review all major reports and provide technical and administrative support to the Site Investigation Manager. The TNRCC Technical Director will review the work plan and final report and will approve the final versions. In addition, the TNRCC Technical Director and Program Manager will provide oversight for the field activities during the investigation. The EPA Region VI site assessment manager (SAM) is responsible for approving the sampling activity's work plan and reviewing the final report.

07 024

Table 1. Patrick Bayou Site Field Schedule

Time	Activity
	Day 1 - Travel Day/On- and Off-Site Reconnaissance
1400	Arrive at the site. Meet adjacent property owners for property access, obtain company safety briefs and verify site specific data. Establish staging area and identify bayou access points.
1530	Conduct site reconnaissance to verify planned sample locations. Locate appropriate on- and off-site sample locations. Modify sampling plan (if required).
1700	Return to motel. Prepare shipping and sampling labels. Prepare the field logbook.
1800	End of day.
	Day 2 - Collect Deep Water Sediment and Background Samples
0800	Meet at the Channelview boat launch area. Review the health and safety plan and conduct daily safety meeting. Review sampling strategy and prepare/load sampling equipment.
0830	Crew #1 - Obtain deep water boat and launch to site from Channelview. Crew #2 - Depart for site by van and begin collecting background sediment samples in East Fork tributary.
0900	Crews #1 - Begin collecting up- and downstream sediment samples beginning with the most downstream sample first. Crew #2 - Begin collecting upstream background sediment samples in the East Fork tributary. Record applicable sampling data.
1200	Lunch break.
1300	Continue collecting up- and downstream sediment samples. Record applicable sampling data. Document sample locations with photographs and GPS data.
1530	Complete collecting sediment samples. Meet at pre-designated location, decon all non-dedicated sampling equipment and collect a final rinsate sample (if required).
1600	Complete sample packaging and prepare CLP lab documentation.
1800	Deliver samples for overnight shipping. End of day.
	Day 3 - Collect Remaining Sediment and On-Site Source Samples
0700	Meet at on-site staging area. Review health and safety plan and conduct daily safety meeting. Review/modify sampling strategy and prepare sampling equipment.
0800	Begin collecting off-site source/outfall area sediment samples. Record applicable sampling data in logbook documenting sampling locations with photographs/applicable GPS data.
1200	Lunch break.
1300	Continue on-site source/outfall area sampling. Load sampling equipment in shallow draft skiff for collecting in-bayou samples. Record applicable sampling data in the logbook documenting sampling locations with photographs and applicable GPS data.
1530	Complete collecting on-site source/outfall area samples.
1600	Complete sample packaging and prepare CLP lab documentation.
1800	Deliver samples for overnight shipping. End of day.
	Day 4 - Return Travel Day

07 025

COMMUNITY RELATIONS

Prior to the start of any work at the Patrick Bayou Site, TNRCC will inform the appropriate Harris County and City of Houston authorities of the sampling event as applicable. Property owners in the immediate area where samples will be collected will be contacted by letter from the TNRCC or during the initial off-site reconnaissance visit. Requests for information will be made during the interview process or identified in the letter from the TNRCC. The TNRCC will make no other formal notifications of the PA/SSI sampling events. Sample results will be sent to each property owner, for their property only, upon completion of the data quality assurance process. Any requests for information before or after the planned screening site inspection which the TNRCC receives from the above will be referred through the PA/SI Program Manager for an appropriate response. Any requests for information by the news media or parties not associated with Patrick Bayou Site will be directed through the TNRCC Technical Director or his designee to the TNRCC Central Office Media Relations Office, P.O. Box 13087, Austin, TX 78711, telephone (512) 239-5000.

The TNRCC Program Manager will provide each member of the TNRCC inspection team and the Site Investigation Manager with letters of introduction stating the purpose of the investigation and authorization to conduct appropriate field activities. The TNRCC will send notification letters to the appropriate property owners informing them of the impending sampling activities and requesting access authorization for TNRCC inspectors. The TNRCC will make arrangements for the property visit only after receiving written or verbal access authorization from the property owner or their representatives.

WORK PLAN ACTIVITIES

Task 1: Nonsampling and Sampling Activities and Rationale

The field team will first meet (if specifically requested) with property owner representatives at a suitable location for required plant safety briefings or at the site staging area. The purpose of the meeting will be to conduct an initial safety briefing and review the intended sampling work schedule. Information concerning past and current site conditions outlined in the PA/SSI work plan will be discussed and verified. The Site Investigation Manager will record significant comments in the field logbook pertaining to site and property history and current/past operations.

After the initial meeting, an off-site reconnaissance inspection will be completed by designated team members. Information will be logged in the field logbook to include names of individuals interviewed, physical/mailing addresses, date and time of interviews and observations noted. Information outlined in the Site Reconnaissance Checklist (Appendix E) applicable to off-site requirements will be obtained during the inspection. The off-site reconnaissance will be conducted at level D (Modified) protection.

During the initial reconnaissance inspection of the Patrick Bayou Site, the sampling team may be accompanied by the current property owner or their designated representative to assist in identifying potential hazards. Appropriate safety equipment will be required by each team member, which may include steel toed chest-high waders. Personnel protective equipment will initially be modified level D.

07 026

Each waste management area will initially be approached to detect and identify any physical hazards that may be present and to identify evidence of contaminant migration. Any visual evidence of a release of hazardous substances will be noted to ascertain whether additional protective equipment will be required for the sampling events. In general, personnel safety requirements will be identified and assessed during the initial site reconnaissance inspection. In addition, safe entry and exit points will be identified for each proposed sampling event.

Upon completion of the site reconnaissance activities, the field team will again review the sampling plan. Sample locations will be adjusted as necessary to ensure that the samples provide sufficient data to properly evaluate the site. Photographs will be taken as required to document site and property conditions and support observations recorded in the field logbook. Photographs will require at a minimum, the following information for each photograph:

- Site name
- Location
- Name of photographer
- Date and time of photograph
- Description of situation/scene photographed.
- Type of camera, film, and lens setting (Must be 50mm).

The following section describes the proposed sampling plan for the Patrick Bayou Site. This plan may be modified as a result of the on-site reconnaissance and/or noted property access constraints. The samples to be collected and sample rationale are listed in Table 2. Proposed sample analyses, containers, and preservation requirements for the sediment and decontamination rinsate samples are shown in Table 3 and 4, respectively. Sample locations will be confirmed during the site reconnaissance inspection and noted in the field logbook. A field copy of this work plan will be annotated by the Site Investigation Manager to reflect actual sample locations.

07 027

Table 2. Proposed Samples to be Collected

Sample Matrix	Sample ID	Sample Location	Rationale
Sediment Samples	SE-01	Unaffected upstream sediment sample collected from Houston Ship Channel at depth 0"to 24".	Obtain upstream **background** sediment sample for attribution of contaminants.
	SE-02	Unaffected upstream sediment sample collected from Houston Ship Channel at depth 0"to 24".	Obtain upstream **background** sediment sample for attribution of contaminants.
	SE-03	Unaffected upstream sediment sample collected from Houston Ship Channel at depth 0"to 24".	Obtain upstream **background** sediment sample for attribution of contaminants.
	SE-04	Sediment sample collected from the **confluence** at the Houston Ship Channel.	Assess site contamination migrating along the surface water pathway.
	SE-05	Second sediment sample collected from the **confluence** at the Houston Ship Channel.	Assess site contamination migrating along the surface water pathway.
	SE-06	Quality Assurance/Quality Control (QA/QC).	**Duplicate** sediment sample collected at the same location as SE-05.
	SE-07	Sediment sample collected **beyond the confluence** and before the industrial outfall at Sta 02.	Assess site contamination migrating along the surface water pathway.
	SE-08	Second sediment sample collected **beyond the confluence** and before the industrial outfall at Sta 02.	Assess site contamination migrating along the surface water pathway.
	SE-09	Quality Assurance/Quality Control (QA/QC).	**Duplicate** sediment sample collected at the same location as SE-08.
	SE-10	Unaffected upstream sediment sample collected from the East Fork tributary at depth 0"to 24".	Obtain upstream **background** levels for attribution of site contaminants.
	SE-11	Unaffected upstream sediment sample collected from the East Fork tributary at depth 0"to 24".	Obtain upstream **background** levels for attribution of site contaminants.
	SE-12	Unaffected upstream sediment sample collected from the East Fork tributary at depth 0"to 24".	Obtain upstream **background** levels for attribution of site contaminants.
	SE-13	Sediment sample collected downstream from the Praxair permitted outfall 001 (Replicating Sta 10).	Assess site contamination migrating along the surface water pathway.
	SE-14	Sediment sample collected downstream from the OxyVinyl Golf Course at the Patrick Bayou entry.	Assess site contamination migrating along the surface water pathway.
	SE-15	Sediment sample collected upstream from the Deer Park WWTP permitted outfall. (Replicating Sta 09).	Determine **background** levels upstream from the Deer Park WWTP outfall.
	SE-16	Quality Assurance/Quality Control (QA/QC).	**Duplicate** sediment sample collected at the same location as SE-14.
	SE-17	Sediment sample collected downstream from the combined Lubrizol Corp. outfall 001 and WWTP outfall 001 discharge point. (Replicating Sta 07).	Assess site contamination migrating along the surface water pathway.

07 028

Sample Matrix	Sample ID	Sample Location	Rationale
	SE-18	Sediment sample collected downstream from the Shell Oil Company/Shell Refinery outfalls C001 and R001. (Replicating Sta 06)	Assess site contamination migrating along the surface water pathway.
	SE-19	Sediment sample collected from the in-water segment of Patrick Bayou downstream of East Fork.	Assess site contamination migrating along the surface water pathway.
	SE-20	Sediment sample collected downstream from the OxyVinyl permitted outfall 001. (Replicating Sta 04).	Assess site contamination migrating along the surface water pathway.
	SE-21	Quality Assurance/Quality Control (QA/QC).	**Duplicate** sediment sample collected at the same location as SE-19.
	SE-22	Sediment sample collected downstream from the OxyVinyl permitted outfall 002.	Assess site contamination migrating along the surface water pathway.
	SE-23	Sediment sample collected downstream from the OxyVinyl permitted outfall 003 in a wetland area.	Assess site contamination that may be impacting a wetland habitat
	SE-24	Sediment sample collected downstream from the OxyVinyl permitted outfall 003. (Replicating an area further downstream from Sta 03).	Assess site contamination migrating along the surface water pathway.
	SE-25	Sediment sample collected from a wetland area within the bayou as it turns east towards the HSC.	Assess site contamination that may be impacting a wetland habitat
	SE-26	Sediment sample collected in the widest portion of lower Patrick Bayou. (Replicating Sta 2.5).	Assess site contamination migrating along the surface water pathway.
	SE-27	Sediment sample collected from the south shoreline of Patrick Bayou in a wetland area.	Assess site contamination that may be impacting a wetland habitat
Rinsate Samples	GW-01	Quality Assurance/Quality Control (QA/QC).	Final **equipment rinsate** sample obtained before conducting sediment sampling (as required).
	GW-02	Quality Assurance/Quality Control (QA/QC).	Final **equipment rinsate** sample after final sampling if used more than once (as required).
	GW-03	Quality Assurance/Quality Control (QA/QC).	**Field Blank** for VOA analysis of before equipment rinsate sample.
	GW-04	Quality Assurance/Quality Control (QA/QC).	**Field Blank** for VOA analysis of after equipment rinsate sample.

07 029

Table 3. Sample Containers, Methods, Preservatives, and Holding Times for Soil/Sediment

Parameters	Sample Container	Preservative	Holding Time
Volatile Organic	Two 4-ounce wide mouth glass jars with Teflon-lined septa	Cool to 4°C	14 days
Semivolatile Organic	Two 4-ounce wide mouth glass jars with Teflon-lined lids	Cool to 4°C	Extract within 14 days of collection and analyze within 40 days of extraction.
Pesticides/ PCBs	Two 4-ounce wide mouth glass jars with Teflon-lined lids	Cool to 4°C	Extract within 14 days of collection and analyze within 40 days of extraction.
Metals/Cyanide	Two 4-ounce wide mouth glass jars with Teflon-lined lids	Cool to 4°C	180 days after collection for metals and 14 days for cyanide

Table 4. Sample Containers, Methods, Preservatives, and Holding Times for Aqueous Samples

Parameters	Sample Container	Preservative	Holding Time
Volatile organics	Two 40-ml wide mouth glass vials with Teflon-lined septa	Cool to 4°C	7 days
Semivolatile organics	Two 1-liter amber glass bottles with Teflon-lined lids	Cool to 4°C	Extract within 7 days of collection and analyze within 40 days of extraction.
Pesticides/PCBs	Two 1-liter amber glass bottles with Teflon-lined lids	Cool to 4°C	Extract within 7 days of collection and analyze within 40 days of extraction.
Metals/Cyanide	Two 1-liter polyethylene bottles with Teflon-lined caps	HNO_3 to pH<2 /NaOH to pH>12 Cool to 4°C	6 months (except mercury*) and 14 days for cyanide

* Reference: EPA Contract Laboratory Program Statement of Work for Organics Analysis (March 1990) and Statement of Work for Inorganic Analysis (March 1990).

07 030

Waste Containment/Hazardous Substance Identification

Based on existing site characterization data, the primary contaminants of concern already documented within Patrick Bayou may have originated from a multitude of waste producing sources that are currently permitted to discharge to the bayou. These potential sources include seven industrial process and wastewater discharge outfalls and a municipal wastewater treatment plant outfall. In addition, there are numerous storm water collection system discharge outfalls located along the surface water drainage pathway that may be potential sources for the detected contaminants. To obtain legally defensible site characterization data, a laboratory will be designated to perform EPA-stipulated Contract Laboratory Program (CLP) analytical methods on all samples collected from the Patrick Bayou Site to adequately document current site conditions. The specific analytical methods for this sampling event are those listed under the CLP routine analytical services (RAS) contract.

Nonsampling data to be collected include:

- Verify the Patrick Bayou Site's boundary features and approximate source areas through direct field observation and/or interviews with adjacent property owners.

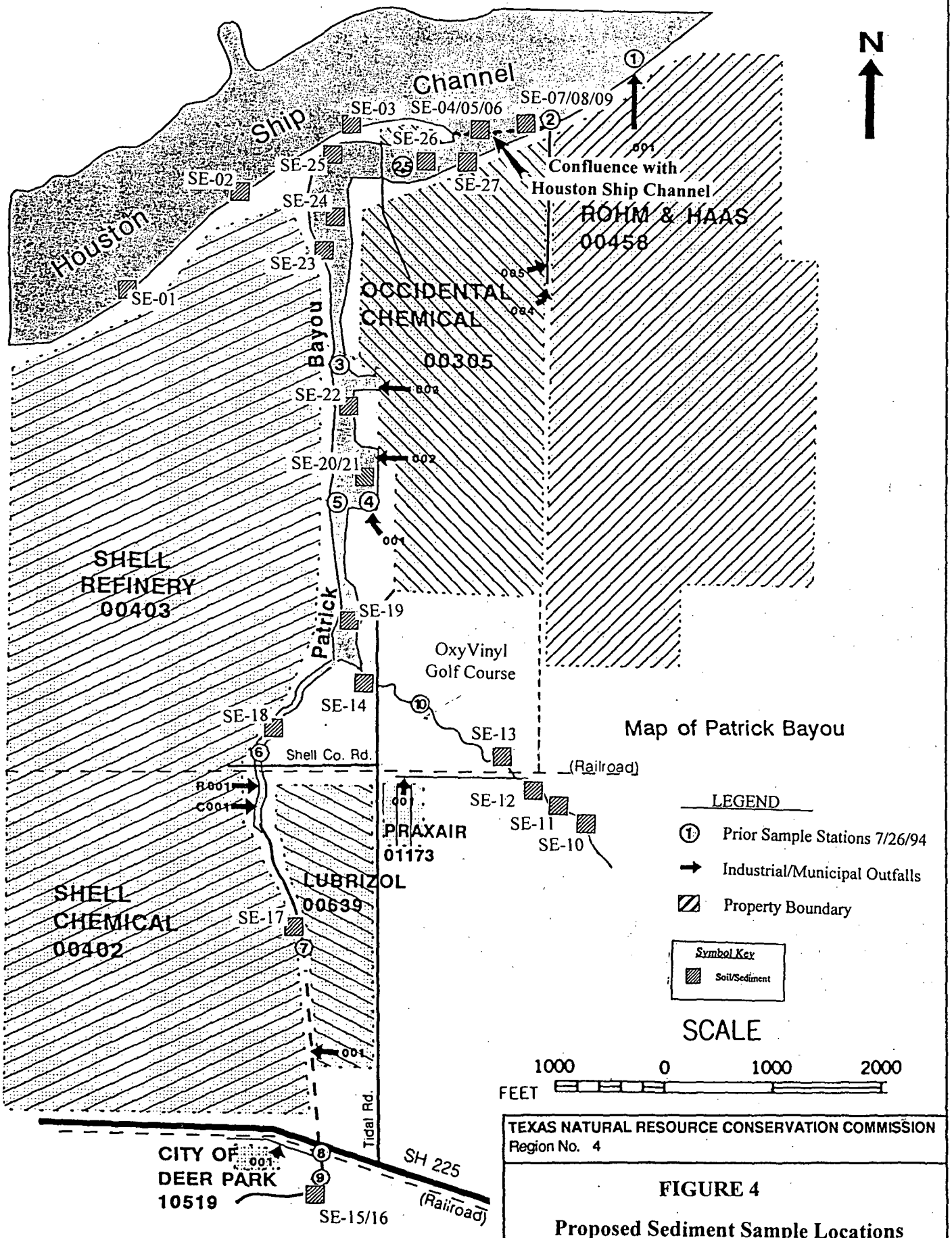
- Approximate the volume and type of waste material being discharged to the bayou by inspection or through interviews with adjacent property owners.

Samples will be collected from on-site areas to characterize the site and to assess the potential migration of accumulating contamination along the surface water pathway. In addition, sediment samples will be collected to determine the natural occurring background levels of inorganics (metals), organics (volatiles, semi-volatiles, PCBs and pesticides) and cyanide in unaffected off-site locations for attribution of detected contaminants.

For the purpose of this PA/SSI, a total of ten (10) sediment (SE) samples to include a duplicate will be collected to substantiate the release of contaminants to the bayou and to further characterize source wastes. An additional five (5) off-site background sediment samples (SE-10, -11, -12 and SE-15, -16) will be collected from unaffected upstream locations as determined by a field inspection. Actual background sample locations will be determined during the off-site reconnaissance where areas of natural undisturbed sediments can be visually assessed.

The sampling locations may be adjusted so that observed areas of contamination, as identified by potential soil/sediment contamination, visible soil/sediment staining or visible leachate collecting at the surface, are sampled. Sample identification, location and sample rationale are provided in Table 2 and approximate sample locations are illustrated in Figure 4.

07 031



TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Region No. 4

FIGURE 4

Proposed Sediment Sample Locations
Patrick Bayou Site

07 032

Surface Water Pathway

Nonsampling data to be collected include:

- Verify location of on-site drainage features, embankments and man-made flow containment features through visual observations made during the site reconnaissance survey.

- Verify potential wetland areas and determine whether the bayou may be considered a fishery through interviews with knowledgeable local residents, industrial representatives and obtain estimated annual human fish consumption data.

- Field verification of potential sensitive environments or endangered species within a 4-mile radius of the site.

For the purposes of the PA/SSI, a total nine (9) sediment (SE) samples including two duplicates will be collected to substantiate the release of on-site contaminants to the surface water pathway. Results will be used to document the potential for releases of contaminants to the adjacent Houston Ship Channel and the 15-mile stream segment as measured from its confluence with Patrick Bayou and to potential wetland areas identified within the bayou. Sediment samples will be collected along identified surface water drainage pathways and at the confluence with the HSC to establish that contaminants may have migrated from on-site sources.

Three (3) background sediment samples (SE-01 through SE-03) will be used for attribution of site contaminants that may be migrating along the surface water pathway. These background sediment samples will be collected at depths 0" to 24" along the Houston Ship Channel located upstream of its confluence with Patrick Bayou and upstream of the flow direction considering tidal influences. Sediment sample identification, location and sampling rationale are provided in Table 2. Approximate sample locations are shown in Figure 4.

These sediment samples will be collected in moderately quiescent areas where finer materials normally would settle. These areas include the outside bends of drainage channels, smaller side channels and areas where natural deposition would occur. Sediment samples for VOA analysis will be collected first, metals second and non-volatiles last. Rocks and twigs will be removed as much as possible before placing each sample in the jar.

As specified by the QAPP, sediment samples will be placed in glass jars and sealed with Teflon-lined lids. Each of the sediment samples will be placed in 4-ounce, wide mouth glass jars marked for the appropriate analysis. No head space will be left in the VOA sample jars. Sample jars will be marked for identification and placed on ice for preservation. Identification markings will include: facility location, sample number, type (composite or grab), date and time of collection, concentration (low, medium or high), analysis parameters requested and names of samplers.

To avoid cross contamination of samples, dedicated sampling equipment will be used, wherever possible. Equipment and personnel decontamination procedures are described in the QAPP (Appendix D). Proper sample containers, preservation and holding times for CLP soil/sediment samples are presented in Table 3.

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Soil Exposure Pathway

The Soil Exposure Pathway will not be evaluated for lack of on-site targets and present site security precludes inadvertent public entry for possible exposure to remaining source contaminants. Samples collected to verify remaining source contamination and evaluate the surface water exposure pathway will be used to assess the potential for release to the soil exposure pathway.

Nonsampling data to be collected include:

- Determine adequacy of site security, i.e., gates, fencing and locks.
- Verify site drainage patterns and likely soil exposure pathways by direct observation during the site reconnaissance inspection.
- Determine if sensitive environments or endangered species habitats exist within or along identified off-site migration pathways by visual inspection or interviews with knowledgeable local personnel.
- Verify the distance to the nearest residence, nearby schools, day care center, park or recreational area through observation.

Air Pathway

The Air Pathway will not be evaluated due to the lack of an observed release; however, result of source characterization samples will be used to assess the potential for releases to the air pathway.

Nonsampling data to be collected include:

- Verify the location of the nearest resident and occupied building by observation during the off-site reconnaissance inspection.
- Confirm that there have been no reports of adverse health effects due to releases of hazardous substances to the air by interviews with nearby long-term residents and a review of Public Health Department records.
- Verify the existence of sensitive environments or endangered species within a 4-mile radius of the site through consultation with Texas Department of Parks and Wildlife (TDPW) staff or by observation during the off-site reconnaissance inspection.

Quality Assurance/Quality Control Samples

Four types of QA/QC samples will be used in this sampling inspection. Duplicate samples will be taken at the rate of one (1) duplicate per matrix (sediments) and one (1) duplicate for every ten (10) samples collected or one (1) per day, whichever is greater. Field blanks will be collected and accompany each ice chest containing ground water samples shipped for volatile organic analysis. Equipment rinsate samples will be collected to establish that proper field decontamination procedures

have been employed for sampling equipment which is used more than once in the field. In addition, temperature blanks will accompany each ice chest to the respective laboratories.

Volatile organics samples are susceptible to contamination by diffusion of organic contaminants through the Teflon-lined septum of the sample vial; therefore, a VOA field blank will be analyzed to monitor for possible sample contamination. The field blank also serves to detect contaminants in the sample bottles. Each field blank will be prepared by filling two VOA vials with CLP-specified grade water and shipping the blanks with the sample bottles. Field blanks accompany the sample bottles through collection and shipment to the laboratory and are stored with the samples. The field blanks will be analyzed for VOAs, total metals and cyanides. Results of field blank analyses will be maintained with the corresponding sample analytical data in the project file.

Organic contaminates and some inorganic contaminates may volatilize during collection and subsequent shipment to the laboratory due to warming temperatures in the shipping container; therefore, a temperature blank will be monitored to insure that samples are properly cooled during shipment. One temperature blank per ice cooler will accompany the sample containers to the laboratory. Each temperature blank will be prepared by filling one VOA vial with deionized water; enclosing it in a bubble bag; taping the package to the interior of the ice cooler and clearly marking it as the "temperature blank." Temperature blanks accompany the sample containers through collection and shipment to the laboratory and are stored with the samples. Results of shipment temperatures will be maintained with the corresponding sample analytical data in the project file.

An equipment rinsate sample(s) will be analyzed to detect possible sample contamination resulting from the use of non-dedicated sampling equipment and poor field decontamination procedures. Each equipment blank will be prepared by filling one 1-gallon amber glass bottle and two 1-liter polyethylene bottles with CLP-specified grade water collected from the final rinse of the decontaminated equipment and the sample is shipped with the other samples. The equipment rinsate sample(s) will be analyzed for volatiles, semi-volatiles, pesticides/PCBs, metals and cyanides. Results of equipment rinsate sample(s) analyses will be maintained with the corresponding sample analytical data in the project file.

Task 2: Decontamination Procedures

Equipment Decontamination

Proper decontamination procedures will aid in preserving the representativeness of the samples collected. Dedicated sampling equipment will normally be used to collect each sediment sample at the site. Dedicated plastic zero contamination tubes will be used to collect sediment samples not easily accessible. The dedicated sampling equipment will have been decontaminated prior to arrival at the site and sealed in plastic sealable bags in accordance with the QAPP. After sampling, gross contamination (visible) will be removed from the surface of the sampling equipment and it will be placed back in its original plastic bag. Further decontamination will be accomplished by a detergent scrub and distilled water rinse at a location away from the investigation location in accordance with the QAPP. To minimize cross contamination during processing and handling, the outside of each sample container will be wiped clean with clean paper towels prior to placing the container into a clean plastic bag and bubble-wrapping it for shipment. An effort will be made to keep the outside of sample containers free of gross contamination.

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If sampling equipment (non-dedicated) must be used more than once in the field, then the decontamination procedures for sample equipment will be followed and an equipment rinsate sample collected in the field at the end of each sampling day and/or between each sample matrix type sampled, whichever is greater.

Decontamination fluids used to clean equipment will be disposed of in the approximate area of the sampling location in accordance with investigation derived waste (IDW) guidelines.

Personal Decontamination

All disposable clothing (i.e., Tyvek, gloves, etc.) will be rendered unusable prior to disposal to prevent inadvertent reuse. Boots will be scrubbed with detergent and rinsed with distilled water that will be disposed of on-site. Decontamination fluids from the non-dedicated equipment rinse (if used) will also be disposed of on-site. Locations for IDW disposal will be noted in the field log book.

Task 3: Sample Shipping

During sampling activities, samples will be packed and preserved according to procedures described in the QAPP. Excess soil or liquid will be removed from the outside of each sample prior to placing it in a sealable plastic bag and placing it into an ice cooler packed with sealed ice bags. The Site Investigation Manager will assure that all appropriate paperwork necessary to ship samples to CLP laboratories for analysis is completed. Normally, a 21-day turnaround time for RAS will be requested. Details of the sample handling and chain-of-custody (COC) requirements are discussed in greater detail in the attached QAPP.

Samples collected each day will be shipped and delivered daily to the designated CLP laboratory for analysis using an overnight courier. The overnight freight courier pickup point and office schedule in the area of the facility is:

Airborne Express
5048 Timber Creek Drive
Houston, Texas 77536
Office hours - 8:00 a.m. to 7:00 p.m. M - F; 8:00 a.m. to 12:00 p.m. on Sat and closed Sun.
Call 1-(800)-247-2676 (1-800-AIR-BORN) to arrange for scheduled pickups.

The chain-of-custody forms will be checked, signed and placed in a sealable plastic bag and taped to the inside lid of the cooler. The outside of the cooler will be sealed with tamper-resistant tape which cannot be removed without tearing it. The sample custodian will sign across the seal prior to shipping the samples. In the event the shipper has to remove the cooler seal, the receiving laboratory will verify and record that the individual container, bottle or vial sample seals are still intact.

During sampling and sample shipment, the Site Investigation Manager (or his designee) will contact the CLP sample management office (SMO) representative, as designated on the CLP RAS Lab Assignment, each day that a shipment is sent. If there are any significant changes to the CLP analytical requirements, contact the TNRCC, Allan Seils, PA/SI Program Manager at (512) 239-2514, FAX (512) 239-4814 or his designee to coordinate and obtain approval for additional analytical requirements.

07 036

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9. U. S. Department of Commerce, Weather Bureau. Rainfall Frequency Atlas of the United States. Technical Paper No. 40. May 1961. 130 pages (Appendix C - 2-Year 24-Hour Rainfall in Inches, page C-6).

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APPENDIX A

TNRCC/USEPA Containment Assessment of Patrick Bayou

CONTAMINANT ASSESSMENT OF PATRICK BAYOU

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December 1996

07 039

ABSTRACT

In July 1994, the Texas Natural Resource Conservation Commission (TNRCC) and United States Environmental Protection Agency (EPA) Region 6 conducted an ambient toxicity and water and sediment quality survey of Patrick Bayou, a small tributary of Segment 1006 of the Houston Ship Channel (HSC). Patrick Bayou is bounded by and receives effluent from several industrial dischargers and one municipal wastewater treatment plant. This area was investigated because a recent HSC study found ambient water and sediment toxicity and elevated levels of several priority pollutants in Patrick Bayou. The primary objective of this study was to collect water and sediment samples in Patrick Bayou to provide information on the magnitude and spatial distribution of contamination and toxicity in this small bayou.

Ten stations were chosen for priority pollutant analyses and a TNRCC routine monitoring station was also sampled during the survey. Several stations were selected for water and/or sediment toxicity testing. Out of five stations tested, water from four was toxic to *Mysidopsis bahia* and one of those was also toxic to *Menidia beryllina*. Significant mortality to *Cyprinodon variegatus* was observed in two of five sediment elutriate tests. State water quality standards were exceeded in Patrick Bayou for dissolved copper (8 sites), dissolved lead (3 sites), total mercury (1 site), carbon tetrachloride (1 site), and water temperature (4 sites), although a few of these exceedances were inside mixing zones. Three Patrick Bayou stations had unionized ammonia values that exceeded the EPA chronic criteria for saltwater. More than 40 percent of the sediment samples in Patrick Bayou exceeded TNRCC sediment screening levels (85th percentiles) for Cr, Cu, Pb, Hg, Ni, Se, Zn, hexachlorobenzene, total polychlorinated biphenyls (PCBs), and bis(2-ethylhexyl) phthalate. Very high levels of mercury (8.3 ppm), hexachlorobenzene (83,900 ppb), hexachlorobutadiene (138,000 ppb), PCBs (4,150 ppb), polynuclear aromatic hydrocarbons (total PAHs 233,700 ppb), and lead (269 ppm) were found in Patrick Bayou sediments. State screening levels were not available for the remaining 24 organic compounds found in the sediments. Lead, mercury, PCBs, acenapthene, acenaphthylene, anthracene, fluorene, naphthalene, 2-methylnaphthalene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, pyrene, and total PAHs all exceeded the effects range median levels developed by the National Oceanic and Atmospheric Administration.

Overall, Patrick Bayou showed a significant accumulation of many priority pollutants in sediments, exceedances of several water quality standards, and ambient toxicity in both water and sediment. The specific distribution of the contaminants in the sediments gave some information on their potential sources. The major dischargers along Patrick Bayou have proposed to sample their effluents for the compounds found in the bayou to further pinpoint the sources.

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INTRODUCTION

Houston is the nation's third largest port. The Houston Ship Channel (HSC) connects the Port of Houston, located along its 25-mile long inland reach, with the Gulf of Mexico via Galveston Bay, bringing much commerce and industry to the city of Houston. The inland portion of the channel is heavily industrialized and has historically had many water quality problems. Initial studies focused on low dissolved oxygen (DO) and high bacteria levels found in this reach of the channel (TDH 1968; TWQB 1974; TDWR 1984; Kirkpatrick 1981; Kirkpatrick 1986). Limits were established for oxygen demanding substances in discharges (TWQB 1974; TDWR 1984) and recent information indicates that dissolved oxygen has improved at the stations where it had been the most affected (Guillen 1993; Crocker et al. 1992). Other studies have found that concentrations of toxic substances are also a problem affecting the HSC (GBF 1992), particularly in some of its tributaries (Crocker et al. 1991; Warshaw 1977). The inland portion of the channel is divided into three principal segments (1005, 1006, and 1007; Figure 1) that receive wastes from 295 industrial and 150 domestic discharges (sum for segments 1005, 1006, 1007, and 2426 - 2430 from TNRCC 1994a). A compilation of the toxics release inventory data and discharge data for the inland portion of the HSC showed that segment 1006 received the largest amount of toxic substances in 1988: an estimated 711,316 pounds of toxics were reported for segment 1006 compared with 183,832 pounds of toxics reported for segment 1007 for the same year (GBF 1992).

In 1993 and 1994, the City of Houston sponsored a large study to investigate toxic substances in the HSC system, including nine tributaries (ENSR 1995). The most contaminated of these was Patrick Bayou, a small bayou that drains into Segment 1006. In water, ammonia was elevated and levels of 1,1-dichloro-2,2 *bis*(*p*-chlorophenyl)ethane (known as DDD), 1,1,1-trichloro-2,2-*bis*(*p*-chlorophenyl)ethane (known as DDT), and some other pesticides exceeded state water quality standards (WQS) (TNRCC 1995). In sediment, several polynuclear aromatic hydrocarbons (PAHs) were detected at high levels at the upper station and at lower levels at the middle station. At this middle station, elevated levels of chromium, zinc, and polychlorinated biphenyls (PCBs) were also found. In sediments near the mouth of the bayou, cadmium, chromium, nickel, and mercury were slightly elevated and a few PAHs were detected. High levels of dioxin were also found in the sediments from the middle station on Patrick Bayou and lower levels were found near the mouth. Ambient toxicity was also documented several times in Patrick Bayou water and sediments (ENSR 1995).

In 1993, the Texas Natural Resource Conservation Commission (TNRCC) began monitoring a station near the mouth of Patrick Bayou in response to two unexplainable fish kills in 1990; one was in the lower portion of the bayou between Occidental Chemical and Shell Refining and the other was in the east fork of the bayou. The elutriate from one TNRCC sediment sample, taken in October 1993, was toxic to sheepshead minnow (*Cyprinodon variegatus*) larvae, however, the next sample taken in April 1994, had no significant effect on the test organisms (TNRCC files). Two industrial facilities along the upper part of the bayou are currently involved in toxicity reduction evaluations in order to reduce the unacceptable levels of toxicity in their effluents, which have been attributed at both facilities to high levels of calcium.

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The data gathered thus far indicate not only significant contamination of Patrick Bayou sediments, but also ambient toxicity in water and sediment. The main purpose of this study was to collect water and sediment samples to elucidate the magnitude and spatial distribution of the contamination and toxicity in the bayou in relation to the several point sources. This is a first step in deducing the sources of the pollutants measured. The water and sediment data together should yield information on the efficacy of current controls for the different facilities and aid in the development of water quality-based permit limits. This water body was targeted for investigation based on the high concentration of discharges, past fish kills, and data indicating a high degree of sediment contamination (TNRCC unpublished data; ENSR 1995).

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STUDY AREA

Patrick Bayou is a small tidal tributary of the Houston Ship Channel (HSC) that flows through a heavily industrialized area (Figure 2). This 3-mile (4.8 km) long, shallow bayou is on the south side of the HSC (Segment 1006) about 2.3 miles (3.7 km) upstream of its confluence with the San Jacinto River (Figure 1). The study area included Patrick Bayou from the HSC to just upstream of State Highway 225 (Figure 2). The upper portion (upstream of SH 225) is concrete-lined and flows through the urban area of Deer Park. Downstream of SH 225, Patrick Bayou flows through an entirely industrial area. A portion of the bayou (0.6 km) is enclosed in a concrete box culvert starting on the south side of SH 225 and continuing under the boundary between Shell Chemical and Lubrizol. An additional 0.7 km just downstream of the box culverts is gunite-lined. The lower portion of the bayou has earthen banks with a soft mud bottom. The east fork of Patrick Bayou flows through a golf course owned by Oxychem. The east fork of the bayou is more stream-like in contour and has more riparian vegetation than the main bayou.

Patrick Bayou is bounded by and receives discharges from Occidental Chemical (Oxychem), Shell Refinery, Shell Chemical, and Lubrizol. It also receives effluent via ditches from the City of Deer Park wastewater treatment plant (WWTP) and an air separation plant, Praxair. Oxychem and Rohm & Haas both have outfalls that flow into the HSC near the mouth of the bayou. Patrick Bayou is permitted to receive 140 million gallons per day (mgd) of treated wastewater and/or cooling water from eight outfalls (not including outfalls carrying stormwater only). The locations of these facilities and their main outfalls are shown in Figure 2 and their TNRCC permit numbers and respective permitted volumes are listed in Table 1.

Oxychem, a chemical manufacturing facility, has three cooling water outfalls (001, 002, 003) which discharge to the lower portion of Patrick Bayou. Outfall 001 also carries treated wastewater from their mercury cell process area, which passes through an internal outfall (101). Outfall 002, the largest cooling water outfall, also carries treated process wastewater from another internal outfall (201). Oxychem outfall 003 carries cooling water, utility wastewaters, and stormwater. In 1993, Oxychem installed a groundwater retaining wall 60 feet deep along Patrick Bayou from just south of outfall 003 to their bridge, west of the mouth of Patrick Bayou. Shell's Deer Park Manufacturing Complex includes both a chemical manufacturing facility and a refinery, each of which has a separate TNRCC permit. Shell Chemical's outfall 001 contains both industrial and domestic wastewater and the chemical plant has two additional outfalls for stormwater. All three of the Shell Chemical outfalls discharge to the gunite-lined portion of Patrick Bayou above the Shell Co. bridge. The Shell Refinery outfall 001 carries boiler blowdown water and stormwater into the gunite-lined portion also. Shell Refinery has four additional stormwater outfalls to Patrick Bayou. The main process outfall for the Shell Refinery (007) goes directly into the HSC, 2 km upstream of Patrick Bayou.

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Lubrizol has one outfall to Patrick Bayou that carries treated process water, contaminated groundwater and stormwater from their lubricant manufacturing facility. This outfall (001) enters Patrick Bayou inside the box culvert. Lubrizol has six other outfalls for stormwater.

The other two outfalls to Patrick Bayou, one from the City of Deer Park WWTP and the other from Praxair, enter the bayou via ditches. For Praxair, the ditch is along a railroad track and it drains into the East Fork of Patrick Bayou. Praxair's effluent is composed of cooling tower and boiler blowdown water, domestic wastewater, and process area washwater from their air separation plant. The City of Deer Park's effluent (treated municipal wastewater) flows into a ditch along SH 225, which empties into Patrick Bayou just upstream of the box culvert (Figure 2).

Because this area is tidally influenced with some upstream flows, this study also considered possible effects on Patrick Bayou from the nearby outfalls in the HSC. The nearest point source outfall is a ditch along the Oxychem property which empties into the HSC just downstream of the mouth of Patrick Bayou (Figure 2). This ditch carries effluent from Oxychem outfalls 004 and 005. Outfall 004 is basically a stormwater outfall while outfall 005 discharges treated process, utility, and domestic wastewaters, and groundwater contaminated with chlorinated solvents. Several hundred meters downstream of the Oxychem ditch, a Rohm & Haas outfall (001) also empties into the south side of the HSC. This outfall carries treated process wastewater from their chemical manufacturing facility.

Station Locations

This study included water and sediment samples for priority pollutants at 10 stations (Figure 2) and toxicity samples at selected stations. The TNRCC routine station was also sampled at the same time. Station locations (Table 2) were chosen to bracket the different point sources. Stations 1 and 2 were in the HSC on the south side in one meter of water. Station 1 was 200 ft (65 m) from Rohm & Haas' outfall 001. Station 2 was in the HSC at the mouth of the ditch carrying effluent from Oxychem's 004 and 005 outfalls. The TNRCC station (Station 2.5) is just inside the mouth of the bayou, near the Oxychem bridge that connects the main plant with the cooling water intake and dock facilities on the main channel (Figure 2). Stations 3 and 4 were near the Oxychem facility and cooling water outfalls and station 5 was near the Shell Refinery shoreline across from the Oxychem cooling water outfalls. Stations 6 and 7 were in the narrower portion of the bayou, between Shell Chemical and Lubrizol. Station 6 was at the Shell company bridge, below the Shell Chemical 001 and Shell Refinery 001 outfalls. Station 7 was in the gunite-lined portion of the bayou where the box culverts ended, below Lubrizol's main process outfall. Stations 8 and 9 were in the concrete-lined portion of the bayou, upstream of SH 225. Station 8 was at SH 225, downstream of the ditch carrying the effluent from the WWTP. Station 9 was upstream of all the permitted point sources. Station 10 was on the East Fork of Patrick Bayou, downstream of the ditch carrying the effluent from Praxair.

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Uses of Patrick Bayou

The designated uses for segment 1006, which includes Patrick Bayou, are industrial water supply and navigation. Although segment 1006 does not have a designated aquatic life use, the acute and chronic standards for the protection of aquatic life still apply and, as a tidal segment, it is considered to have a sustainable fishery, thus the human health standards for toxic substances also apply (TNRCC 1995). A recent Use Attainability Analysis by TNRCC personnel assigned the concrete-lined portion of Patrick Bayou an aquatic life use no greater than limited, based on the limited habitat (Tiemann 1995). This does not apply to the lower portion, which is not channelized or concrete-lined. A significant population of nektonic species has been documented near the mouth of Patrick Bayou in all seasons (Seiler 1994; TNRCC data) and several species of fish and birds were observed using the bayou during this study; this information indicates a current aquatic life use which is protected under the Texas Surface WQS. There is also a recreational fishery in the HSC downstream of Patrick Bayou in spite of an existing consumption advisory that was issued by the Texas Department of Health due to dioxin contamination in crabs and fish.

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METHODS

Sampling and Analysis

Sampling was conducted by TNRCC and EPA personnel on July 26, 1994, at the 11 stations listed in Table 2. Samples were collected and preserved in accordance with TNRCC monitoring procedures (TNRCC 1994b). Particular care was taken to avoid contamination of the samples in the field. For the metals in water samples, unpowdered latex gloves were worn and samples were filtered on-site through nitric acid-cleaned silicone tubing and a cartridge filter (0.45 μm) into precleaned plastic containers that contained metals-grade nitric acid for preservative. Containers and filters were certified clean for metals analysis by the supplier. The other sample containers were filled directly from the bayou or from buckets that were washed between stations with soap and water and then rinsed with ambient water before use. The Ekman dredge used to collect sediment samples was also washed between stations. Field blanks and blind duplicates were collected for dissolved metals and organics in water. A blind duplicate for sediment priority pollutants was also collected.

At the 10 study stations, samples were collected for routine water chemistry and priority pollutants in water and sediment (Appendices 1 and 2). At the TNRCC station (2.5), only routine water chemistry and priority pollutants in sediment were collected. Dissolved oxygen, temperature, pH, conductivity, and salinity were measured at each site with a Hydrolab Surveyor II or H20 sonde.

Conventional water quality parameters were measured at the TNRCC laboratory in Houston. Priority pollutants in water and sediment for the 10 study stations were analyzed at the EPA laboratory in Houston. Appendix 2 gives the analytical methods used and the detection limits achieved for the 10 samples analyzed at the EPA laboratory, which form the basis of this report. For the routine TNRCC station (2.5), organics in sediment were analyzed at the Texas Department of Health laboratory in Austin and metals in sediment were measured at the TNRCC laboratory in Houston. Slightly different detection limits were achieved for the 10 main stations compared with station 2.5 because of the different laboratories, however, the results are included for comparison purposes. All sediment chemistry results are reported on a dry weight basis.

Water and Sediment Toxicity Tests

Toxicity tests were conducted on the water and the sediment elutriate at selected stations. Ambient water from stations 3, 6, 7, 8, and 10 was tested for toxicity using two standard marine short-term chronic tests (Weber et al. 1988) incorporating mysid shrimp (*Mysidopsis bahia*) and inland silversides (*Menidia beryllina*). These tests on ambient water were conducted at the EPA Environmental Research Laboratory in Gulf Breeze, Florida. Sediments from stations 2, 2.5, 3, 7, and 10 were collected for toxicity testing. The sediment elutriate was obtained by mixing the sediment with dilution water (4:1 ratio) for 24 hours and then allowing the solids to settle. The

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resulting supernatant was used in a 9-day embryo/larval survival and teratogenicity test on sheepshead minnows (*C. variegatus*) at the EPA Laboratory in Houston (Method #1005; Weber et al. 1988). As specified in the test protocols, several water quality parameters were measured in the test waters, including pH, temperature, DO, and ammonia. Statistical significance of toxicity test results was determined at the laboratory.

Macrobenthic Community

Samples for macrobenthic organisms were collected at the stations in the lower portion of the bayou (stations 1 - 5). Quantitative benthic samples could not be collected at the other stations because of the substrate. Benthic communities at each station were collected with a 232 cm^2 Ekman dredge (4 replicates per site). In the field, the sediment was washed through a #30 sieve (0.59 mm openings) and the organisms were preserved in a 10% formaldehyde solution. After 24 hours, the samples were transferred to 70% ethanol with rose bengal stain. Once stained, the organisms were picked out of the debris, identified to the lowest possible taxon, and counted.

Several metrics were computed from the benthic data, including total number of individuals/m^2, total taxa, total polychaete taxa, diversity, and a benthic index score. This benthic index was computed from the diversity, percent tubificid oligochaetes, and percent bivalves (Engle et al. 1994). The expected diversity, expected number of taxa, and the expected number of polychaete taxa were also computed for each station using the salinity and formulas developed by Engle et al. (1994).

Data Analysis

Water chemistry data collected during this study were compared with the appropriate standards from 30 Texas Admistrative Code, Chapter 307 (TNRCC 1995), including the marine acute and marine chronic standards for the protection of aquatic life (acute WQS and the chronic WQS) and the human health standards for saltwater (human health WQS). Unionized ammonia levels were compared to the EPA criteria for saltwater (USEPA 1989). Parameters that do not have established standards were compared to state screening levels for estuarine waters (TNRCC 1994a).

Sediment chemistry data were compared to several different types of screening values. When available, National Oceanic and Atmospheric Administration (NOAA) effects-range median (ERM) values were used. These are published levels for certain contaminants in sediments that have shown adverse effects on the biota in other areas (Long & Morgan 1990; Long et al. 1995). The NOAA ERM values have been developed for metals and certain organics, mostly PAHs. In this report, the updated values from 1995 were used (Long et al. 1995). The data were also compared to the proposed USEPA sediment criteria for acenaphthene, fluoranthene, and phenanthrene (USEPA 1991a, 1991b, 1991c). TNRCC screening levels (TNRCC 1994a) were also used in the evaluation of the sediment data, although these are also not available for all

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organic compounds. The TNRCC sediment screening level is the level of that compound that is higher than 85% of the values in the TNRCC database for similar areas. For this study, the screening levels for tidal streams in Texas were used (TNRCC 1994a). The state screening level represents a relatively high amount of a particular contaminant in the sediment but does not necessarily have any toxicological significance. In this report, sediments with values over this state screening level are termed "elevated." Another screening tool is USEPA's draft Sediment Quality Guidelines (SQG) (USEPA 1994). These are computed based on water column criteria and the chemical properties of the contaminants. These SQGs are listed with the results for those organic compounds for which no other screening information was available although the significance of these values is not discussed.

Data collected by industries on a routine basis for their discharge permits was used in evaluating potential sources of specific contaminants to Patrick Bayou. These self-reported data are the most direct and recent information about what is entering Patrick Bayou through permitted discharges. This information is limited in that many variables of interest are only monitored in a few outfalls or not at all. The monitoring requirements for the outfalls to Patrick Bayou are listed in Appendix 3 (excluding the stormwater-only outfalls). Another source of effluent data is a set of four samples collected for six metals in July 1992 at all of the outfalls (Appendices 4 and 5). These samples were collected by the dischargers and submitted to USEPA and the TNRCC to assist in developing a total maximum daily loading estimate for the HSC. The results in Appendix 4 are presented in pounds per day, based on the flow. Appendix 5 gives the average concentrations measured in the effluents. These values were used to compute the loading estimates in Appendix 4. For example, even though the concentrations in Oxychem's 002 outfall are the same as or lower than those in the other Patrick Bayou outfalls, the total loading values for all six metals in the Oxychem 002 outfall are high because of its high flow (77 mgd). In contrast, Praxair, which had high concentrations for several metals, shows a very low total metals load, because of its much lower flow (0.094 mgd).

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QUALITY ASSURANCE/ QUALITY CONTROL

All priority pollutant data for stations 1 - 10 were validated at the USEPA laboratory. Field blanks were collected for dissolved metals and volatile organic compounds in water; no analytes were detected in the blanks. A second sediment sample was collected at station 3 as a blind replicate for priority pollutant analyses. The data for the replicate are presented in the tables as a second sample from station 3, but included in the graphs as an average of the two samples from station 3. The second sample from station 3 was lower for all the analytes, except for arsenic. The coefficient of variation (CV) for the two samples from station 3 averaged 14.2% for organics and 14.1% for metals. The priority pollutant metal with the highest variation was lead (31.3%) and the lowest was nickel (7.7%). The CV averaged 6.9% for the ions. For organics, the highest CV was hexachlorobutadiene (26.2%) and the lowest was benzo(k)fluoranthene (6.2%).

To minimize the dilution of the test waters, the water toxicity tests were run at salinities (8 - 13 ppt) below the range specified for *Mysidopsis bahia* toxicity tests. The salinities used were within the range specified for tests using *Menidia beryllina*. For the tests, brine made from artificial sea salts was used to raise the salinity of the samples from stations 7, 8, and 10 to 12 ± 1 ppt. The resulting volume of the original samples in the test waters for these three stations was 80%. Because the salinities at stations 6 (8 ppt) and 3 (10 ppt) were close to the chosen range, those test waters were not adjusted. The control salinity was also in the 12 ± 1 ppt range. Survival in the controls was 100% for the mysids and 93% for the silversides, so the reduced salinity should not have affected the outcome of most of the tests. Since station 6 was tested at 8 ppt, those mysids could have been physiologically stressed, although estimates from other tests indicate that one-week-old mysids should survive a test at 8 ppt with about 20% mortality in seven days (McKenney 1994).

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RESULTS AND DISCUSSION

This study found several issues of concern in Patrick Bayou: metals contamination of sediments (Hg, Pb, Cr, Zn, Cu, As, Mn, Ni, and Se) and water (Cu, Pb, Ni, and Hg), organic contamination of sediments (PAHs, PCBs, hexachlorobenzene, phthalates, etc.), ambient toxicity in water and sediment, high water temperatures, high ammonia levels, and high calcium values. In general, the results from this study corroborate and expand on the information gathered on Patrick Bayou in the study sponsored by the City of Houston (ENSR 1995), which had three stations on this bayou. They also found ambient toxicity in water and sediment, high PAHs, PCBs, Hg, Cr, and Zn in sediment, and high levels of ammonia in the water. In addition, they found high levels of dioxin in Patrick Bayou sediments near the Shell Company bridge (station 6 in this study), and lower levels of dioxin near the mouth of Patrick Bayou. They also found levels of four pesticides in the water over WQS (ENSR 1995).

This study was conducted during summer low flow conditions to focus on contamination originating from permitted point sources. Because the entire bayou from station 8 to the HSC is lined by the industries listed, with no public access, the compounds found in this portion of the bayou likely originated from one or more of these point sources. Station 9 is the only station upstream of all of the permitted discharges. During this study there was little, if any, natural flow to the bayou, therefore our objective to sample during critical conditions was achieved. Sediment samples, collected from the top 5 - 10 cm of several grabs, should be indicative of recent conditions, although the length of time represented would depend on sedimentation and erosion rates at the different sites. Station 8 was so scoured that we could not obtain any sediment for chemical analysis or toxicity tests. Even though stations 6 and 7 were also scoured, enough sediment was obtained from station 7 for all tests, but at station 6, we could not collect enough sediment for toxicity tests or even grain size analysis.

Field and Conventional Parameters

Water Temperature

Field measurements showed temperatures from 36.1°C (97.0°F) to 38.3°C (100.9°F) at stations 2.5, 3, 4, and 5 (Table 3). These values exceed the segment criterion of 35°C (95°F). These four stations are in the lower part of the bayou near the three cooling water outfalls of Oxychem. The highest temperature recorded (38.3°C) on the day of sampling was at the TNRCC station (2.5) near the Oxychem bridge. The temperature in the HSC was 31.9°C. According to the self-reported data, the maximum temperature water discharged from the adjacent cooling water outfalls in July 1994 was 39°C (102°F), 41°C (105°F), and 36°C (96°F) for outfalls 001, 002, and 003, respectively. While these levels are not a violation of the Oxychem permit, they could easily explain the high water temperatures in this shallow bayou.

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Dissolved Oxygen and pH

The WQSs for dissolved oxygen (DO) and pH were not violated during our sampling (Table 3). The lowest DO found was 2.7 mg/l at station 4 (near Oxychem 001) and the highest was 14.0 mg/l at station 9 (upstream) where there was an obvious algal bloom (chlorophyll *a* + pheophytin *a* = 64.7 μg/l). At station 9, the pH was also correspondingly high, at 9.0 s.u., which is the upper limit allowed for the segment. The lowest pH (6.7) was found at station 8, which was dominated by the effluent from the City of Deer Park WWTP.

Salinity and Ions

The salinity data indicated that only stations 8, 9, and 10 were freshwater (salinity < 2 ppt). The remaining stations were brackish with salinities between 7.2 ppt and 12.4 ppt (Table 3). The salinity of the HSC was 10.3 ppt. Most of the ions (Table 4) tended to follow the salinity trends, except for high calcium values at stations 6 and 7, downstream of Shell Chemical and Lubrizol, respectively. Calcium is not a priority pollutant and water quality standards have not been developed for this parameter. However, it is mentioned here as a possible contributor to the in-stream water toxicity observed at these two stations. Both Shell Chemical and Lubrizol are involved in toxicity reduction evaluations to reduce the toxicity in their effluents, which both facilities attribute to excess calcium and subsequent ion imbalances. The calcium comes from the limestone used to neutralize their wastewater. In water, the calcium at stations 6 and 7 was about 3 times the value found at the nearest downstream station (station 5), while the sodium and chloride values were both higher at station 5. The calcium concentration in the sediments was also higher (6-10 times) at stations 6 and 7 compared with station 5 (Table 5). Thus, if the calcium is indeed causing the toxicity in these two discharges, based on the limited instream dilution, there is a high likelihood that it is also contributing to the ambient toxicity observed in the bayou.

Nutrients

Data from the grab samples for routine water chemistry variables are shown in Table 4. The total ammonia was 16.7, 14.1, and 3.24 mg/l at stations 8, 7, and 6, respectively. Taking the pH, temperature, and salinity into account, the unionized portion of the ammonia was 0.0745 mg/l (station 8), 0.106 mg/l (station 7), and 0.0454 mg/l (station 6). These values are above the USEPA chronic criterion (0.035 mg/l) for unionized ammonia in saltwater, although they do not exceed the acute criterion of 0.233 mg/l (USEPA 1989). The effluent data from the City of Deer Park WWTP could explain the high ammonia values at these stations. For July 1994, the daily average total ammonia concentration in the effluent was 15.5 mg/l, while the daily maximum was 19.9 mg/l. Although these values represent violations of their permit, recent self-reported data show that this WWTP is now discharging effluent with much lower ammonia levels (less than 1 mg/l, daily average) due to a changeover to a new system (TNRCC files).

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Sediment Variables

Sediment grain size distributions ranged from 78% silt at station 2.5 to 95% sand + gravel at station 9 (Table 5; Figure 3). Finer sediments were found in the lower portion of the bayou. Stations 1, 2.5, 4, and 5 were predominantly silt, while stations 7, 9, and 10 were predominantly sand and gravel. Total organic carbon (TOC) in sediment was low in Patrick Bayou. The highest value measured in this study was 1.17% at station 5. The lowest TOC values were measured at stations 10 and 9 (0.2% and 0.3%). Carr (1993) and Morse et al. (1993) also found relatively low TOC values in Galveston Bay sediments. The average Galveston Bay sediment TOC value was 0.87% (range: 0.2% to 2.1%) in Carr (1993) and 0.42% (range: 0.05% to 1.18%) in Morse et al. (1993). In Patrick Bayou, TOC was strongly correlated with percent fines (silt + clay; $r = .87$; $p < 0.01$).

Metals

In water, several of the metals exceeded WQS (Table 6). Dissolved copper exceeded the chronic WQS (4.37 ppb) at seven stations, and it exceeded the acute WQS (16.2 ppb) at station 10. Dissolved lead exceeded the human health WQS of 3.85 ppb at three stations. Dissolved nickel exceeded the chronic WQS (13.2 ppb) at station 6. Total mercury exceeded the human health WQS (0.025 ppb) at station 4 with a value of 0.79 ppb.

Several metals were elevated in Patrick Bayou sediments (Table 7) compared to state screening levels (TNRCC 1994a) or to ERM values (Long et al. 1995). Arsenic, chromium, copper, lead, manganese, mercury, nickel, selenium, and zinc were above state screening levels at one or more of the 10 sediment stations in Patrick Bayou. Lead exceeded the ERM (Long et al. 1995) at station 9 and mercury exceeded the ERM at six sites (stations 1-5; Figure 4).

Mercury

Mercury was extremely high in the sediments of the lower portion of Patrick Bayou (stations 1-5), exceeding the ERM by as much as 10 times. Mercury was only detected in the water at station 4, but the detection limit (0.2 μg/l) was above the human health WQS (0.025 μg/l). Mercury is of particular concern because of its tendency to bioaccumulate and its known serious health effects on humans. It can also be toxic to aquatic organisms and the toxicity and bioaccumulation rate increase with increased temperature (Eisler 1987a).

In Lavaca Bay (a national priority list superfund site) the United States Food and Drug Administration action level for mercury in tissue continues to be exceeded in several species, with mercury levels in sediments averaging about 1.0 ppm (Evans and Engel 1994). The highest single value collected by the TNRCC during the past 15 years in Lavaca Bay sediments is 1.7 ppm (TNRCC database). Some sediment mercury levels in Patrick Bayou were higher than 7.0 ppm. Even in the HSC outside the mouth of Patrick Bayou the sediment mercury was 1.7 to 2.5 ppm (stations 1 and 2).

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Sediment mercury at stations 3, 4, and 2.5 was higher than any values reported for the 212 NOAA Status and Trends (NS&T) stations evaluated by Long and Morgan (1990). The highest Patrick Bayou value (8.3 ppm; station 3) also exceeds most values reported in the literature for other mercury contaminated sites worldwide (Al-Madfa et al. 1994; Beck et al. 1990; Glass et al. 1990). For comparison, Minimata Bay, Japan, which was heavily polluted with mercury from industrial sources until 1968, had sediment mercury concentrations over 30 ppm in 1985 (Nakamura et al. 1988b), although, in 1973, mercury levels there were reported to have reached 262 ppm (Nakamura et al. 1988a).

An examination of the 1992 metals in effluent data (Appendix 4) shows two potential point sources of mercury to this system. Oxychem's 002 and 001 outfalls (near stations 3 and 4) together had an average of 0.0555 lb/day of mercury entering Patrick Bayou in July 1992. Rohm & Haas' 001 effluent data showed an average of 0.0375 lb/day of mercury entering the HSC near the mouth of Patrick Bayou during the same time period. This information fits the sediment distribution of mercury found in this study (Figure 4). The highest concentration of mercury was at stations 3 and 4, downstream of Oxychem's 002 and 001 outfalls, respectively. Stations 2.5 and 2 were progressively lower than station 3, and the mercury at station 1 (near Rohm & Haas' 001) was 50% higher than that at station 2, although the grain size at station 1 was considerably finer than that at station 2. None of the external outfalls considered in this study measures mercury routinely, although it is measured in one of Oxychem's internal outfalls (101) twice a week (Appendix 3). Their self-reported data show the average mercury loading in this internal outfall to be 0.012 lb/day for the year preceding this study. Even if all of the mercury found in outfall 001 in July 1992 (0.022 lb/day) had come through the internal outfall (101), the permit limit for that outfall (0.036 lb/day) would not have been exceeded.

Lead

Dissolved lead was found at levels slightly above the human health WQS (3.85 μg/l) at stations 1, 2 and 10 (Table 6). An examination of the 1992 data (Appendix 5) for the nearby outfalls shows an average effluent concentration of total lead at Rohm & Haas (near station 1) of 139 μg/l, at Oxychem 004 and 005 (near station 2) of 11 μg/l, and 33μg/l at Praxair (near station 10). Stations 1 and 2 were in the main channel, which provides more dilution, while station 10 was in the East Fork of Patrick Bayou, which has almost no dilution in dry weather. Currently, lead is only measured routinely in Shell Chemical's 001 outfall and Oxychem's internal outfall 201 (Appendix 3), which are not near the areas where lead was found in water.

In sediments, lead was quite elevated at stations 9 and 3, and slightly elevated at stations 4 and 1 (Figure 4; Table 7). In 1992, the highest average lbs/day of lead was found in Rohm & Haas' 001 effluent (station 1) and in Oxychem's 002 effluent (station 3). Station 9 was upstream of all the point sources, so the source of contamination to this site is unknown. It is notable, however, because, not only did the value at station 9 (269 ppm) exceed the ERM, but it also exceeded all values in the NS&T database (Long and Morgan 1990), although sediments near lead-containing industrial discharges have had lead concentrations exceeding 1,000 ppm in Sweden, Norway, and Big River, Missouri (Eisler 1988).

07 059

Copper

In sediment, copper was elevated at all stations except 7 and 9, with all eight of those stations in the same range (43 ppm to 60 ppm; Table 7). Stations 7 and 9 were upstream of all of the stations that had elevated copper values in sediments. Dissolved copper exceeded the chronic WQS (4.37 μg/l) in water samples from all stations except 6, 7 and 9 (Table 6). The East Fork of Patrick Bayou (station 10) had the highest dissolved copper value (22 μg/l), which exceeded the acute WQS (16.2 μg/l). The Praxair effluent had an average concentration of 271 μg/l total copper in July 1992 (Appendix 5). This value is consistent with 1994 effluent data, which shows similar values for total flow and total lbs/day of copper, although concentrations are not given. Currently, copper is measured routinely in five of the outfalls in the study area: Praxair, Rohm & Haas 001, Oxychem's internal outfall 201, Shell Chemical 001 and Shell Refinery 001 (Appendix 3). In 1992, Oxychem's 002 outfall had the highest copper load of all discharges, at 19.9 lbs/day (Appendix 4), although current data on outfall 201 (which combines with cooling water before it exits through outfall 002) shows a much lower copper load. The highest monthly average for copper from August 1993 to July 1994 was 0.22 lb/day, which is only 1.1% of the July 1992 level. Either Oxychem has effected a drastic reduction in copper loading in one year, or the majority of the copper discharged through outfall 002 is not coming through the internal outfall, but is coming into the cooling water somewhere else. An additional monitoring point at the external outfall may be appropriate in this case.

Zinc

Dissolved zinc did not exceed the WQS at any station, but zinc in sediment was elevated at five stations (1, 2.5, 4, 5 and 6), with the highest value (318 ppm) at station 4 (Figure 4). From the sediment data (Table 7), zinc appears to be coming into the bayou at stations 6 and 4 and possibly at station 1. According to the 1992 effluent data, Shell Chemical (station 6) and Rohm & Haas (station 1) were discharging more than 4 lbs/day each (Appendix 4). Oxychem's cooling water outfalls were discharging more than 40 lbs/day, but mostly through outfall 002 (station 3) rather than 001 (station 4). Current effluent data are available only for Rohm & Haas and Lubrizol; zinc is not routinely measured in the other outfalls (Appendix 3). Lubrizol 001 and Oxychem outfall 005 had the highest concentration of zinc in their discharges in 1992, but due to the higher flow, loading rates were highest from the Oxychem outfall 002 (Appendices 4 and 5).

Nickel

Dissolved nickel exceeded the chronic WQS (13.2 μg/l) at station 6 with a value of 18 μg/l, but only Rohm & Haas and Oxychem 002 routinely measure nickel in their effluents (Appendix 3). In sediments, nickel was elevated in the entire bayou below the Shell outfalls (stations 1 - 6) but the ERM was not exceeded. The highest value for nickel in sediment (42 ppm) was at stations 4 and 1 (Table 7).

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Chromium

Dissolved chromium was not detected in the water samples, but sediment chromium was elevated at seven sites (Table 7; Figure 4). The highest values were 129, 89, and 88 ppm, found at stations 4, 5 and 1, respectively. During this study chromium was only measured as a permit parameter by Rohm & Haas. In July 1994, they were discharging 3.05 lbs/day of chromium (daily average).

Selenium

Selenium was also not detected in the water samples. In sediment, selenium (Table 7) was quite elevated at stations 1 and 5 (6.8 ppm) and somewhat elevated at stations 2, 3, 6 and 7 (Se > 2.8 ppm). The state screening level is 1.25 ppm (TNRCC 1994a). There is no ERM for selenium, but the US Fish & Wildlife Service lists the level of concern for fish and waterfowl to be 4 ppm in sediments (Lemly and Smith 1987) because selenium is bioaccumulated readily and causes toxicity and reproductive failure in fish and birds (Presser and Ohlendorf 1987; Gillespie and Baumann 1986; Eisler 1985).

Organic Compounds

A few organic compounds were detected in the water samples (Table 6), but only carbon tetrachloride exceeded the human health WQS and that was at station 4, which was only 50' from the Oxychem outfall 001 (inside the mixing zone). Semi-volatile organic compounds were detected in all sediment samples except for station 10. Because station 9 is the most upstream station, undetected organics values for station 10 are not included in the graphs. Volatile organics and pesticides were not detected in any of the sediment samples, except for station 2.5, which was analyzed at a separate laboratory and had lower detection limits than the other sediment samples.

Self monitoring data for organics are limited (Appendix 3). Priority pollutant organics are not routinely analyzed in the facility discharges, with the exception of Oxychem outfall 005, where 10 chlorinated volatile organic compounds are regularly monitored. Some of those 10 compounds were found at very low levels in the water at station 2, but not in the sediments.

Polynuclear Aromatic Hydrocarbons (PAHs)

Sixteen PAHs were detected in Patrick Bayou sediments (Table 8). Twelve of those have ERM levels established (Long et al. 1995) and all 12 exceeded those ERM values at one or more sites in Patrick Bayou. The ERM value for total PAHs was also exceeded at two sites in Patrick Bayou. There are no state screening levels established for any of the PAHs. The highest PAH values were found at stations 3 and 9 (Figure 5). All three PAH compounds that have draft USEPA criteria exceeded those criteria at both stations 3 and 9 (Figure 6). Acenaphthene was 2.7 times the computed site-specific criteria at both stations (USEPA 1991a). Fluoranthene was 3.7 times higher than the proposed federal criterion at station 3 and 49 times the proposed federal criterion at station 9 (USEPA 1991b). Phenanthrene was 7.7 times higher than the draft USEPA criterion at station 3 and 75 times higher than the draft USEPA criterion at station 9 (USEPA 1991c).

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Nine different PAHs are more than four times higher in Patrick Bayou than the highest NS&T station values reported in Long and Morgan (1990). Total PAHs at station 9 exceeded the highest NS&T value by eight times. PAH levels at station 9 in Patrick Bayou also exceed the levels found at many PAH contaminated sites worldwide (Eisler 1987b).

Most of the PAH contamination in Patrick Bayou was found at stations 3 and 9 (Figure 5). Stations 4, 5 and 6 had the lowest PAH levels of the 10 sites, so the PAHs at station 3 are probably not from the same source as those at station 9, the upstream station. The combination of PAHs found at the two stations is also somewhat different. In general, the lower molecular weight PAHs (< 4 rings) were higher at station 3, and the higher molecular weight PAHs were higher at station 9. Acenaphthene, acenaphthylene, fluorene, 2-methyl naphthalene, and naphthalene were all highest at station 3, while the other 10 PAHs were highest at station 9. At station 3, nine different PAH compounds exceeded the ERM levels, several by more than an order of magnitude (Table 8). Station 3 is nearest the Oxychem cooling water outfalls 002 and 003. Station 3 is also near two Shell Refinery stormwater outfalls, 004 and 009. Oil & grease is measured in those two stormwater outfalls, whenever they have flow. For the six months prior to our sampling, the monthly daily maximum oil & grease values averaged 6.1 mg/l for the 004 (34 discharge days) and 3.9 mg/l for the 009 (22 discharge days). These values do not seem excessively high compared with other stormwater outfalls (Lubrizol's and Rohm & Haas'). Groundwater migration could also be a source for these PAHs.

Since station 9 is upstream of all of the permitted point sources, the source of these PAHs is unknown. ENSR (1995) found elevated PAH levels in Patrick Bayou at SH 225, which corresponds to our station 8. When we sampled, the bayou at SH 225 was so scoured that we could not obtain enough sediment for analysis. However, since our values at station 9 were 10 times the ENSR values at station 8, an upstream source is most likely for these PAHs, rather than the WWTP, upstream flow from Lubrizol, or something else at SH 225. Information collected by Lubrizol indicated that the PAHs at this site may be a result of chronic dumping of used motor oil into the storm drains by an auto shop (D. Boutros, pers comm.). Sediment at station 9 was high in chrysene and benzo(a)pyrene, which are found at high levels in used motor oils (Eisler 1987b).

The rate at which hydrocarbons degrade in the environment is strongly correlated with their structure (Heitkamp and Cerniglia 1987). Larger PAHs like benzo(a)pyrene are slower to degrade (half lives > 200 weeks) than lower molecular weight PAHs like phenanthrene (half life 4 weeks) or naphthalene (2.4 wks; Heitkamp and Cerniglia 1987). The rate of degradation of PAHs is strongly affected by sediment pH and redox potential where mineralization is fastest in aerobic sediments (DeLaune et al. 1990). The sediments at stations 2.5, 3, 4, and 5 appear to be more reduced (less aerobic) than those at station 9. High temperatures also speed degradation (Lee and Ryan 1983). The lower molecular weight PAHs are at station 3 where temperatures are high, but the sediments appear to be quite reduced, which would slow degradation. The larger molecular weight PAHs are at station 9, but the sediment and temperature regimes should allow some degradation.

07 062

Polychlorinated Biphenyls (PCBs)

PCBs were detected in the sediments at five stations in Patrick Bayou as Aroclor 1248 (Table 8). All detected values exceeded the ERM for total PCBs (180 ppb; Long et al. 1995) and the state screening level for total PCBs (18.7 ppb; TNRCC 1994a). The detected values for Aroclor 1248 in Patrick Bayou ranged from 806 ppb at station 1 to 4,150 ppb at station 7. Only one of the 212 NS&T sites exceeded this value (Long and Morgan 1990). In Texas, one station near Lubbock also had high PCB levels in sediments (6,500 - 8,900 ppb; Dick 1982). Station 7 is below Lubrizol and the City of Deer Park outfalls. A smaller peak for PCBs was found at stations 3, 4 and 5 (Figure 7) near the Oxychem cooling water outfalls. ENSR (1995) found Aroclor 1248 at the Shell bridge (station 6) at 1,200 ppb. Their samples were collected at our stations 8, 6, and near 2.5. In our study, stations 2, 2.5, 6, and 9 had no detected PCBs (Figure 7; Table 8), although our detection limit was very high.

PCBs were used in high temperature applications such as transformers, capacitors, and some lubricants. These compounds are very persistent in the environment and they tend to bioaccumulate and biomagnify because of their high fat solubility. Because of their toxicity, carcinogenicity, and adverse effects on reproduction, the manufacture of PCBs in the United States was banned in 1979, except for special applications (Eisler 1986).

Chlorinated Hydrocarbons

Hexachlorobenzene (HCB) was found in the lower portion of Patrick Bayou (below station 3), along with hexachlorobutadiene (HCBD) and hexachloroethane (HCE). All three compounds were markedly higher at station 2 than at the other stations (Table 9; Figure 8). These three compounds are measured once per year in the Oxychem 005 effluent. Values for each of these three compounds found at station 2 were 25 times (HCE) to 52 times (HCB) higher than the USEPA draft sediment quality guidelines (SQG; USEPA 1994) for each compound. The highest value for HCB found in Patrick Bayou (83,900 ppb) is six orders of magnitude higher than the state screening level (0.60 ppb; TNRCC 1994a). This value is in the high part of the range of values found near hazardous waste sites (Research Triangle Institute 1994). HCBD and HCE data in sediments are sparse (Life Systems, Inc. 1994a,b), although HCBD has been found in Great Lakes sediment at up to 120 ppb (Life Systems, Inc. 1994a). HCB and HCBD were detected at concentrations ranging from not detected to 470,000 ppb and 630,000 ppb, respectively in the Calcasieu Estuary, Louisiana (Redmond et al. 1996). HCB is of concern because it is accumulated by organisms exposed to contaminated sediment (Schuytema et al. 1988) and research indicates that it could be a human carcinogen. HCB has been detected in fish tissue collected near the San Jacinto State Park, 1.5 miles (2.4 km) downchannel from Patrick Bayou (TNRCC 1994a).

Seven other semivolatile organic compounds were detected in Patrick Bayou sediments (Table 9), including bis-2-ethylhexyl phthalate, which was greater than the state screening level (894 ppb) at five sites. The highest value (2,300 ppb) was found at station 2.5 near the mouth of the bayou. In addition, there were between eight and 24 other tentatively identified compounds in Patrick Bayou sediments (Appendix 6).

07 063

Toxicity Tests

Ambient toxicity in Patrick Bayou water was evaluated at five stations: 3, 6, 7, 8, and 10 (Table 10). All five of the water samples had an adverse effect on either the mysids or the inland silversides. Water from stations 3, 6, 7, and 8 caused a significant decrease in survival of *Mysidopsis bahia* in a 7-day chronic toxicity test (Table 10; Figure 9). Mysids in water from station 7 also had significantly reduced growth compared with the control. Fecundity was also markedly lower at stations 7 and 8 than the control. Mysid growth and fecundity could not be evaluated at station 6 because of the lethality. All 40 test organisms in the water from station 6 were dead by the end of the first day of testing (Figure 9). Water from station 6 also significantly reduced the survival of inland silversides (Table 10; Figure 10). In addition, inland silversides in water from both stations 6 and 10 showed significantly reduced growth compared with the control (Table 10).

Water from station 6 had the most extreme effect on the mysids and the silversides. This station had the highest concentration of sulfate, calcium, nickel, acetone, isophorone, TOC, and COD. The toxicity test for this sample was conducted at the lowest salinity of the five samples. It also had a low level of magnesium and potassium relative to the salinity, which studies by Shell Chemical and Lubrizol have shown to contribute to toxicity test failures (Charles Bland, pers. comm.). Therefore, it is difficult to determine the compound or combination of compounds responsible for the observed toxicity.

A significant effect on the sheepshead minnow (*Cyprinodon variegatus*) was observed in the sediment elutriate from stations 2 and 7, but not at stations 2.5, 3, or 10 (Table 10). The observed effect was on the embryo hatching success, since no mortality occurred in larvae after hatching. In the elutriates, DO, salinity, pH, alkalinity, total ammonia, and total chlorine were also measured. Total ammonia in the five sediment elutriates ranged from 9.6 to 19.2 ppm compared with < 0.1 ppm ammonia in the control (Table 10). The highest mortality (70%) was found in the sediment elutriate from station 7, which had a very high level of unionized ammonia (0.596 ppm). Chlorine was detected at 0.1 ppm in the elutriate from station 2, which had 53% mortality. The TNRCC station (2.5) has been tested several times for sediment toxicity, and elutriate from station 2.5 had shown toxicity to *C. variegatus* in October 1993 (100% mortality), but not in April 1994, nor during this study. ENSR (1995) also found temporal variability in toxicity.

Macrobenthic Community Assessment

Benthic macroinvertebrates were collected at six Patrick Bayou stations (1-5). Benthic samples were evaluated based on several metrics, including total number of individuals/m^2, total taxa, total polychaete taxa, diversity, and a benthic index score (Table 11). For this benthic index, the break point between degraded and undegraded sites is 4.1 (Engle et al. 1994). Because the methods used to derive this score were slightly different from those used in this study (4 - 232 cm^2 Ekman

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replicates cf. 3 - 440 cm^2 Van Veen replicates), TNRCC data from other comparable benthic stations are listed in Appendix 7 for comparison, including the various metrics. These other data are from two reference stations in oligohaline areas of Galveston Bay sampled on July 13, 1994 (two weeks prior to the Patrick Bayou samples) and from two benthic samples collected elsewhere in the HSC system (San Jacinto Bay) in August 1992. Using a benthic index value of 4.1 as the break point, all six of the Patrick Bayou sites and one of the San Jacinto Bay sites would be considered degraded, based on the benthic community (Table 11).
Twenty benthic species were identified from the Patrick Bayou samples, including nemerteans, mollusks, oligochaetes, polychaetes, crustaceans and a chironomid (Table 11). Number of species per station ranged from a low of two taxa at stations 4 and 5 to a high of 13 taxa at station 2. There were fewer than seven taxa per station inside Patrick Bayou (stations 2.5 to 5), where 14 would be expected based on salinity (Engle et al. 1994). Numbers of polychaete species were also reduced at the four sites inside Patrick Bayou. Where seven polychaete taxa per site were expected, station 2.5 had four, station 3 had one, and stations 4 and 5 had none. Engle et al. (1994) found the percent of expected polychaete taxa correlated strongly with degraded vs. undegraded areas.

Opportunistic fauna dominated Patrick Bayou, including *Streblospio benedicti*, oligochaetes, and a chironomid. These three species reached high numbers at several stations in Patrick Bayou. *S. benedicti* was very high at station 2.5 and somewhat high at station 2, the oligochaetes were dominant at stations 2 and 1, and the chironomid was very high at station 5. Marks (1994) also found high numbers of oligochaetes and *S. benedicti* at a station downstream of Patrick Bayou in the HSC near the monument. A benthic sample where one species dominates by a large margin indicates a disturbed community (Gray et al. 1990; Grassle and Grassle 1974). Swartz' dominance index (SDI) is a measure of this (PTI 1993). The SDI values are relatively low in Patrick Bayou compared with the Galveston Bay samples (Appendix 8), indicating that a few species are dominating the community in Patrick Bayou.

The benthic index in Patrick Bayou generally increased from a low of 0.14 at station 5 to a high of 2.85 in the HSC, except for station 3, which had a benthic index value of 3.64 (Table 11). The benthic indices for the reference stations were 5.25 and 5.75 (Appendix 7). Taking all of the indices and the overall community structure into account, the most impaired sites are stations 4 and 5, with only two very tolerant species. Stations 1 and 2, in the HSC, had the most diversity and included all the major taxa, although both of these sites had an unusually high proportion of oligochaetes for estuarine samples. *Mysidopsis bahia*, the species used for the water toxicity testing, was found at these two stations. Although station 3 had a relatively high diversity and the highest benthic index score, the community was primarily composed of mollusks (86%), with only one polychaete species and no crustaceans or nemerteans. Station 3 also had the lowest number of individuals of the six samples.

Of the six stations that were sampled for benthic macroinvertebrates, stations 2, 2.5, and 3 were also tested for sediment toxicity. Of those three stations, only sediment elutriate from station 2 showed a significant adverse effect on the test organism, *Cyprinodon variegatus*. Station 2 did have an impaired benthic community, but stations 2.5 and 3 did also. This indicates that analysis

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of the benthic community is a more sensitive indicator of sediment effects than the toxicity test that was performed on the sediment elutriate, or that factors other than strictly toxicity are influencing the benthos.

Station Summary

Station 1 - Houston Ship Channel at Rohm & Haas

Station 1 was more than 200' from the Rohm & Haas 001 outfall in the HSC. Since it is in the HSC, this station should have a great deal of dilution available and ship traffic is constantly mixing the water. This station had the highest nitrate+nitrite levels in the water and it was one of two stations with the highest selenium (6.8 ppm) and nickel (42 ppm) in sediment. There was a strong increase in sediment chromium, lead, mercury, selenium, and zinc at this station compared to station 2 (Table 7). There is a difference in grain size between stations 1 and 2 also, however. Station 1 was only 18% sand, while station 2 was 56% sand, probably because station 2 was much closer to the shoreline than station 1.

The benthic community at station 1 had the highest diversity (H'=1.39) of all the Patrick Bayou samples (Table 11). This station had 11 species, including nemerteans, mollusks, oligochaetes, polychaetes, and crustaceans. The benthic index still indicates an impaired community, however, because of the high proportion of oligochaetes found at this site (compare with Appendix 7).

Station 2 - HSC at Oxychem

This station was in the HSC near the mouth of the ditch carrying effluent from the Oxychem outfalls 004 and 005. In water, copper and lead were slightly above the WQS and a few volatile organic compounds were detected at low levels (Table 6). In the sediment, this station had, by far, the highest levels of hexachlorobenzene (HCB), hexachloroethane, and hexachlorobutadiene (Table 9; Figure 8); HCB exceeded the state screening level by several orders of magnitude. Sediment elutriate from this station had a significant adverse effect on the sheepshead minnow, reducing the hatching success to 47% (Table 10). In the elutriate, chlorine was detected (0.1 mg/l), along with a total ammonia level of 15.6 mg/l (0.081 mg/l unionized ammonia). TOC in the sediments was very low (0.38%) and the average grain size was high (57% sand + gravel). In the macrobenthic samples, station 2 had the highest number of species (13) per station found in this study. The average taxa per replicate for station 2 (8.5) was significantly higher than the other five Patrick Bayou stations (Figure 11). Despite the high number of taxa, this station was dominated by opportunistic species (56% oligochaetes and 31% *S. benedicti*). The number of individuals per replicate at station 2 was significantly higher than at the reference stations (Figure 12). The high number of oligochaetes caused the benthic index to be low, indicating degraded conditions.

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Station 2.5 - Patrick Bayou Mouth

This is the routine TNRCC station where samples are collected every three months for conventional water quality parameters and either sediment or water toxicity. This station is inside the mouth of Patrick Bayou, just downstream of an Oxychem bridge that blocks boat access to the remainder of the bayou. The water temperature was highest here (38.3°C; 100.9°F), exceeding the segment WQS by 3.3°C. The levels of toxic substances in the sediment at this station were intermediate; it was second highest in HCB, third highest in mercury, and fourth highest in total PAHs. The mercury and HCB levels were still well above the relevant screening levels, as were several of the individual PAHs. No sediment toxicity was found in this sample, although sediment from this station was toxic to sheepshead minnows in an earlier sample. The benthic community at this station had significantly more organisms per replicate than all of the other sites (Figure 12). The high level of *S. benedicti* (94%) gave this station a very low diversity (H' = 0.29) although it had the same number of species per replicate as station 1 (Figure 11). There were only seven benthic species total, however, with no nemerteans or mollusks. The benthic index was quite low due to the lack of bivalve mollusks and the low diversity.

Station 3 - Patrick Bayou below Oxychem 003

Station 3 was inside Patrick Bayou at least 200' downstream of Oxychem's outfall 003. Duplicate sediment samples were collected at this site. In sediment, this station had the highest mercury levels (8.3 ppm, 7.0 ppm; Table 7) and the highest acenaphthene, acenaphthylene, fluorene, and 2-methyl naphthalene (Table 8) in Patrick Bayou. Station 3 also had the second highest level of total PAHs (Figure 5), lead (Table 7), and Aroclor 1248 (Table 8) in sediment. Mercury, pyrene, fluoranthene and all of the low molecular weight PAHs exceeded the ERM. Acenaphthene, fluoranthene, and phenanthrene also exceeded their proposed USEPA sediment criteria. Water temperature violated the WQS at 38.2°C. Mysid survival was significantly reduced in the water from station 3, but the sediment elutriate did not have a significant adverse effect on *C. variegatus* (Table 10). The benthic community was composed of five species, only one of which was a polychaete, *Laeonereis culveri* (Table 11). Fourteen total species (7 polychaete species) would be expected at an estuarine site of this salinity (Engle et al. 1994). The benthic community was mostly mollusks (*Texadina sphinctostoma*, *Mulinia lateralis*, and *Mytilopsis leucophaeta*) with no nemerteans or crustaceans. Because the organisms that were found were somewhat evenly distributed, the diversity was relatively high (H' = 1.27), although it was still lower than the comparable stations elsewhere (Appendix 7).

Station 4 - Patrick Bayou at Oxychem 001

Station 4 was 50' to 60' from Oxychem's 001 outfall, inside the mixing zone, but outside of the ZID (zone of initial dilution) for this outfall. At stations this close to an outfall, some of the WQSs do not apply, however, in this report they are used for comparison purposes without regard to their legal application. Total mercury in water was 0.79 μg/l, well above the human health WQS of 0.025μg/l. Carbon tetrachloride at 202 μg/l also exceeded the human health WQS (121 μg/l). Low levels of chloroform, bromodichloromethane and isophorone were detected in this water sample (Table 6). Water temperature exceeded the WQS (Table 3) and DO was lowest

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at this site (2.7 mg/l) but still above the segment minimum WQS. Chromium, zinc, and benzo(k)fluoranthene in sediment were highest at this station, and mercury was the second highest, but still 10 times the ERM (Table 7). Nickel was highest at stations 4 and 1. Chromium, copper, nickel, and zinc all exceeded both the state screening level and the ERL at this station. Aroclor 1248 exceeded the ERM at this site also (Table 8). Benthic samples showed a very impaired community, with only 495 individuals/m^2 from two tolerant species. No nemerteans, mollusks, polychaetes, or crustaceans were found at this site (Table 11).

Station 5 - Patrick Bayou between Oxychem and Shell Refinery

This station was across the bayou from station 4, about 50' from the Shell Refinery shoreline. It was placed here to check for a gradient in sediment contamination across the bayou between Shell and Oxychem. In sediment, along with station 1, station 5 had the highest selenium (6.8 ppm), which was not detected at station 4 (< 2.9 ppm). At station 5, mercury still exceeded the ERM, but at a lower level (3 ppm vs. 7.1 ppm at station 4). Chromium, copper, zinc, and nickel all exceeded both the ERL and the state screening level (Table 7). The benthic community was composed of the same two species found at station 4, but the chironomids were found in much higher numbers (Table 11). Because of this, this station had the lowest diversity (H' = 0.06) and the lowest benthic index (0.14). This station also had no nemerteans, mollusks, polychaetes, or crustaceans.

Station 6 - Patrick Bayou at Shell Bridge

Station 6 is on the downstream side of a bridge that connects a Shell gate to the rest of the refinery. This station is 250' downstream of the Shell Refinery 001 (R001) outfall and 500' downstream of the Shell Chemical 001 (C001) outfall. Water from station 6 was acutely toxic to mysid shrimp and it caused significant mortality and reduced growth in *M. beryllina* (Figures 9 and 10). Shell Chemical has been involved in a toxicity reduction evaluation because of the toxicity of their effluent to mysids. They have identified calcium as the source of the toxicity in their effluent. Calcium at station 6 was much higher than at the other sites in both water and sediment (Tables 4 and 5). There is some dispute as to whether the water at station 6 is ambient water (i.e., not in a mixing zone), because it is 250' from the R001 outfall; however, according to their self-reported data, the R001 outfall had not had any reportable flow in the five months before our sampling. (In estuarine areas, the mixing zone extends 300' downstream from the point of discharge). The C001 outfall, where the calcium is being discharged is 500' upstream of this station.

Dissolved nickel exceeded the chronic WQS and isophorone was elevated (3,590 μg/l) at this site. Although there are no state WQS for isophorone, the USEPA criterion is 2,600 μg/l. Unionized ammonia at station 6 (0.0454 mg/l) exceeded the USEPA chronic criterion for ammonia in saltwater. In sediments, arsenic, barium, chromium, copper, manganese, mercury, nickel, selenium, and zinc all exceeded the state screening level. In addition, barium, copper, manganese, mercury, nickel, selenium, and zinc were all much higher at station 6 than at the stations upstream of 6 (7 and 9). Station 6 had about twice the amount of iron in the sediments as would be

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expected from the aluminum concentration (Hansen et al. 1993).

Station 7 - Patrick Bayou below Lubrizol

Station 7 was at the upper end of the gunite-lined portion of Patrick Bayou, just below where the bayou exits the box culverts. This is about 800' below the Lubrizol outfall 001. Water from this station showed chronic toxicity to mysids and reduced their growth (Table 10; Figure 9). Calcium (Table 4) and unionized ammonia (0.106 mg/l) in water were both elevated. (Lubrizol has also been involved in a toxicity reduction evaluation because of calcium toxicity in their effluent). The sediment elutriate had significant adverse effects on sheepshead minnows. The unionized ammonia in the sediment elutriate (0.596 mg/l) was above the USEPA acute criterion for saltwater (0.233 mg/l). Calcium in sediments was also high (Table 5). Aroclor 1248 was extremely high in the sediments (4,150 ppb), more than 20 times higher than the ERM for total PCBs (180 ppb; Long et al. 1995). Because we could not get sediment at station 8, these PCBs could be from any source between stations 7 and 9.

Station 8 - Patrick Bayou at SH 225

Station 8 was at SH 225, between a railroad bridge and the entrance to the box culverts. This station corresponds to station 14 in ENSR (1995). This station was 30' - 40' below the ditch carrying effluent from the City of Deer Park WWTP, which enters the ditch 300' upstream of Patrick Bayou. The flow from this ditch had scoured this part of the bayou to bare concrete and cobbles. Arrowhead (*Sagittaria graminea*) was growing in the cobbles. We were unable to collect any sediment for chemical analysis at this station. In water, this station had the highest ammonia and the lowest pH. Like stations 7 and 6, the unionized ammonia (0.0745 mg/l) here exceeded the USEPA chronic criterion. Ambient toxicity to mysids was found at this station also (Table 10; Figure 9). Under the conditions of the toxicity test (lab temperature, pH, and salinity), the unionized ammonia fraction would have been much higher (0.754 mg/l) than it was in the field, well above the USEPA acute criterion (0.233 mg/l).

Station 9 - Patrick Bayou Upstream

This was the upstream-most station in Patrick Bayou, in the concrete-lined portion above all of the permitted discharges. At the time of our sampling, this water was quiet and slow moving, with an obvious algal bloom. The DO was 14 mg/l, the pH was 9.0 s.u., and the chlorophyll *a* (52.8 μg/l) and pheophytin *a* (11.9 μg/l) were high also. The sediment at this station was very high in PAHs and lead, even though the sediment was 94% sand and gravel. Lead and nine of the PAHs were above the ERM (Tables 7 and 8). Total PAHs exceeded the ERM by more than five times. Phenanthrene exceeded the ERM by 35 times. Acenaphthene, fluoranthene, and phenanthrene all exceeded their site-specific proposed USEPA criteria (Table 8; Figure 6). Station 9 was the highest in Patrick Bayou for the high molecular weight PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, pyrene) phenanthrene, anthracene, and total PAHs. The values at this site exceed all but a small percentage of PAH contaminated sites worldwide (Eisler

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1987b; Alden and Butt 1987; Long and Morgan 1990). The source of this contamination is unknown. Upstream of this site is an urban area, including homes, schools, and small businesses. These higher molecular weight PAHs are much slower to degrade and are more carcinogenic than the lower molecular weight PAHs (Lee and Ryan 1983; Heitkamp and Cerniglia 1987), which tend to be more toxic (Eisler 1987b).

Station 10 - East Fork Patrick Bayou

Station 10 was on the East Fork of Patrick Bayou at a bridge in the Oxychem golf course. This station is downstream of the ditch that carries effluent from Praxair. Water from this station was not toxic to mysids or silversides, but it significantly reduced the growth of the silversides (Table 10). Sheepshead minnow survival in the sediment elutriate was somewhat low (70%), although it did not differ significantly from the control (93%). No organics were detected, but several metals were elevated. This station had the highest levels of dissolved arsenic, copper, manganese, iron, and lead found in this study, although only copper and lead exceeded the WQS. Dissolved copper (22 μg/l) exceeded the acute WQS (16.27 μg/l) and dissolved lead (5.1 μg/l) exceeded the human health WQS of 3.85 μg/l. In sediment, arsenic, copper, and selenium exceeded the state screening level and nickel equaled the screening level. Iron in sediment was about twice as high as would be expected from the aluminum concentration (Hansen et al. 1993).

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07 075

Table 1. Point source outfalls to Patrick Bayou and the nearby HSC. Twelve outfalls carrying stormwater only have been excluded from this listing.

Receiving Water	Permit #	Outfall	Permitted Flow (mgd)	Permittee
Houston	00458	001	5.76	Rohm & Haas
Ship	00305	005	1.75	Occidental Chemical
Channel	00305	004		Occidental Chemical
Patrick	00305	003	8.0	Occidental Chemical
Bayou	00305	002	105	Occidental Chemical
I	00305	001	8.0	Occidental Chemical
I	00403	001	2.3	Shell Refinery
I	00402	001	9.9	Shell Chemical
I	00639	001	1.0	Lubrizol Corp.
V	10519	001	6.0	City of Deer Park
East Fork Patrick B.	01173	001	0.43	Praxair

07 076

Table 2. Stations sampled in/near Patrick Bayou on 7-26-94

#	Station Description	Latitude	Longitude
1	HSC, 200' downstream of Rohm & Haas outfall 001	29°44'25"	95°06'19"
2	HSC at mouth of ditch that carries wastewater from Oxychem outfall 005	29°44'19"	95°06'28"
2.5	Patrick Bayou 100' downstream of Oxychem bridge (TNRCC Station 1006.9150)	29°44'15"	95°06'45"
3	Patrick Bayou, below Oxychem outfalls 001, 002, and 003 (200' from 003)	29°43'55"	95°06'52.5"
4	Patrick Bayou, 50' downstream of Oxychem outfall 001	29°43'42.5"	95°06'49"
5	Patrick Bayou, across from station 4, 50' from the Shell Refinery shoreline	29°43'42"	95°06'52.5"
6	Patrick Bayou, at Shell Co. bridge, 250' below Shell Refinery outfall 001 and 500' downstream of Shell Chemical outfall 001	29°43'16"	95°07'00"
7	Patrick Bayou, at the lower end of the box culvert, 800' below Lubrizol outfall 001	29°42'56"	95°06'55"
8	Patrick Bayou at SH 225 (below ditch that receives effluent from City of Deer Park WWTP)	29°42'37"	95°06'53"
9	Patrick Bayou 200' upstream of Station 8	29°42'34"	95°06'54"
10	East Fork Patrick Bayou at the golf course bridge, downstream of ditch carrying effluent from Praxair 001	29°43'20"	95°06'41"

07 077

Table 3. Physicochemical water quality variables measured in and near Patrick Bayou on 7–26–94. The standards given are for segment 1006. Shaded values exceeded the applicable standard.

		Station										
Field Measurements	Standard	1	2	2.5	3	4	5	6	7	8	9	10
Water Temperature (C)	< 35	31.9	32.8	38.3	38.2	36.1	37.5	31.5	29.3	31	31.7	26.3
Dissolved Oxygen (mg/l)	> 2.0	3.4	4.7	7.3	6	2.7	9.8	5.3	5.3	8.8	14	3.9
Conductivity (uS/cm)		17700	17700	18300	18000	21000	18100	14500	13000	882	785	2320
Salinity (ppt)		10.3	10.3	10.8	10.7	12.4	10.7	8.1	7.2	0	0	1.2
pH (su)	6.5 – 9	7.3	7.4	7.6	7.5	7.2	7.9	7.2	7	6.7	9	7.3
Time		1540	1510	1440	1052	950	1225	1041	850	1245	1210	845

07 078

Table 4. Water quality data for conventional water quality parameters and inorganic ions taken from Patrick Bayou on 7–26–94. Screening levels given are for estuarine waters. Shaded values indicate exceedances of the screening levels. Blank spaces indicate that a sample was not analyzed for that variable.

	Screening	Station										
Variable (mg/l)	Level	1	2	2.5	3	4	5	6	7	8	9	10
Ammonia	0.4	0.08	0.07	0.08	0.09	0.04	0.18	3.24	14.1	16.7	0.07	0.36
Nitrate + Nitrite	0.4	1.66	1.61	1.45	1.48	0.2	1.34	0.19	0.2	0.32	0.02	0.95
TKN		0.8	0.82	0.82	0.84	1.2	0.98	4.16	9.2	19.5	3.52	2.53
Orthophosphorus	0.2	0.38	0.38	0.35	0.38	0.37	0.38	0.42	1.88	2.07	0.28	2.85
Total phosphorus	0.4	0.51	0.54	0.5	0.5	0.66	0.51	0.79	2.43	2.64	0.8	3.53
TOC		< 1	< 1	< 1	1	1	1	29	15	13	22	26
BOD5		< 3	< 3		< 3	7	3	10	6	6	31	< 3
COD		48	50		53	70	50	108	56	41	84	62
VSS		8	7	4	7	10	11	7	9	7	27	13
TSS		67	36	19	24	31	33	14	15	9	44	105
Sulfides		0.03	0.04		0.04	0.03	0.03	0.05	0.04	0.03	0.05	0.09
Chloride		5560	5630	5840	5930	6810	5930	4140	1350	90	94	250
Sulfate		817	824	857	810	805	820	1010	76	49	43	560
Calcium		140	136		138	123	160	586	461	45.6	40	73.6
Magnesium		336	308		314	234	282	6.92	4.72	5.89	11.2	14.2
Potassium		114	125		133	106	103	11.4	11.6	10.9	4.56	44.9
Sodium		2980	2670		2870	3490	2770	1770	1540	57.4	67.6	279
Total Dissolved Solids		10600	9850	10900	11000	12700	10800	9230	3900	392	412	1440
Oil & Grease		< 5			< 5	< 5	< 5					< 5
Chlorophyll a (ug/l)	30	5.39	4.2	5.19	5.33	8.62	10.8	1.6	2	9.28	52.8	2.94
Pheophytin a (ug/l)		0	0	0	< 1	0	0	< 1	< 1	< 1	11.9	21.7

070 029

Table 5. Conventional sediment characteristics and major sediment ions for samples collected from Patrick Bayou on 7–26–94. All sediment variables are reported on a dry weight basis. Blank spaces indicate that a sample was not analyzed for that variable.

	Station									
Sediment Variable (ppm)	1	2	2.5	3	4	5	6	7	9	10
Total Org. Carbon	8730	3800	10520	9110	9970	11660	6800	3680	2990	2250
Acid Volatile Sulfide	23	51	12	37	263	28	132	7	3	10
Nitrogen (TKN)	1310	429	692	1015	1359	2315	827	520	377	530
Total Phosphorus	885	324	845	1534	1659	1625	549	805	404	1024
Volatile Solids	2100	1100	1400	1400	1000	2100	1900	69100	600	69400
% Solids	37.2	60.2	34.7	50.3	38.6	32.6	60.1	72.3	67.6	62.8
Grain Size										
% Gravel	< 1	1	< 1	< 1	1	< 1		34	24	1
% Sand	18	56	17	52	38	24		48	71	73
% Silt	75	39	78	45	54	70		16	4	18
% Clay	7	4	5	3	6	6		2	2	8
Ions (ppm)										
Aluminum	30500	9030	14700	15300	18200	23400	26000	10600	3290	12700
Iron	19800	7000		10400	11500	12800	34000	12100	2680	20400
Calcium	23000	13800		65200	13300	14600	142000	90500	79900	33600
Magnesium	6450	2280		3450	3240	3800	5390	3870	2430	2360
Potassium	4270	1170		2070	2210	2780	2520	1220	306	1390
Sodium	5740	2500		3740	5010	5550	4030	1510	422	412

07 080

Table 6. Results of priority pollutant analyses of water samples taken on 7–26–94 from Patrick Bayou and the nearby Houston Ship Channel. Only detected values are included. For a complete list of organic compounds measured and their detection limits, see Appendix 2. Shaded values exceeded one or more of the standards.

Standards*			Dissolved	Detection	Station											
HH	Acute	Chronic	Metals (ug/l)	Limit	1	2	3	3	4	5	6	7	8	9	10	Blank
	149	78	Arsenic	5											30	**ND
			Barium	10	92	88	96	80	92	102	172	606	17	70	92	ND
	45.6	10.0	Cadmium	0.5												ND
	1100	50	Chromium	10												ND
	16.2	4.37	Copper	5	8.3	7	8.7	5.8	6.7	7.6			11		22	ND
			Iron	25								28	51		109	ND
3.85	140	5.6	Lead	2.5	3.9	5	2.5		2.6		2.5		2.7	2.8	5.1	ND
			Manganese	5	85	82	85	79	111	74	50	29	39	19	247	ND
0.025			Mercury (Total)	0.2					0.79							
	119	13.2	Nickel	10–20							18					ND
	564	136	Selenium	12												ND
	2.3		Silver	0.5												ND
	98	89	Zinc	20								43				ND
			Organics (ug/l)													
			Acetone								15.8			5.8		ND
			Bromodichloromethane						2.7							ND
121			Carbon Tetrachloride				7.4	7.9	202	21.4						ND
8087			Chloroform			2.9	2.7	2.7	14.3	3.3	2.6	2.4	3.5			ND
1196			1,2–dichloroethane				3.5	3.6								ND
			cis–1,2–dichloroethene			5.2										ND
1221			Tetrachloroethene			4.6										ND
			Trichloroethene			2.5										ND
			Isophorone						34	45.9	3590					
			Benzyl Alcohol									4.9		13.		

* HH = water quality standard for human health protection in saltwater; Acute / Chronic = standards for protection of aquatic life (TNRCC 1995)
**ND = not detected in blank

07 0810

Table 7. Metals in Patrick Bayou sediments collected on 7–26–94. Only detected values are given. All sediment results are reported on a dry weight basis. Shaded values exceeded the ERM or the 85th percentile.

Screening Levels*				Station										
85th	ERL	ERM	METALS (ppm)	1	2	2.5	3	3	4	5	6	7	9	10
6.9	8.2	70	Arsenic	4.4		2.72	3.2	5.3	5.8	3.7	10	10	4.8	13
297			Barium	231	104	201	332	196	196	242	371	144	70	94
1.5	1.2	9.6	Cadmium			0.33								
44	81	370	Chromium	88	39	51	64	38	129	89	76	28	72	35
40	34	270	Copper	52	43	55	50	35	60	55	52	9	7	43
95	46.7	218	Lead	50	23	45	128	67	55	39	41	26	269	22
489			Manganese	274	121	190	316	231	114	89	1420	596	241	257
0.22	0.15	0.71	Mercury	2.5	1.7	3.98	8.3	7	7.1	3	0.23			
19	20.9	51.6	Nickel	42	34	27	28	24	42	28	36	11	4	19
1.25			Selenium	6.8	2.8	0.95	3.4			6.8	2.8			2.9
1.6			Silver			0.9								
			Vanadium	48	18		30	25	27	31	111	49	29	59
170	150	410	Zinc	224	146	219	169	139	318	290	238	95	89	126
			Aluminum	30500	9030	14700	15300	11700	18200	23400	26000	10600	3290	12700
			Iron	19800	7000		10400	8780	11500	12800	34000	12100	2680	20400

* 85th = TNRCC 85th percentile for tidal streams (TNRCC 1994a); ERL / ERM = Effects Range Low and Median (Long et al. 1995)

07 082

Table 8. Sediment levels of Polynuclear Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs) detected in Patrick Bayou. All sediment results are reported on a dry weight basis. Shaded values exceeded either the ERM or the proposed EPA criterion.

			Station										
SQG**	ERM	PAHs (ppb)	1	2	2.5	3	3	4	5	6	7	9	10
1300	500	Acenaphthene	765	980	980	6860	4530					1860	
71000	640	Acenaphthylene	1370	1970	1700	7890	5480						
41	1100	Anthracene	529	469	590	2580	2240				264	3410	
1700	540	Fluorene	560	922	660	4100	3200					2860	
11000	2100	Naphthalene	513	801	760	7930	5260						
670	670	2-Methylnaphthalene		546	400	2650	2050					232	
1800	1500	Phenanthrene	1620	2460	2400	20500	13000			305	2920	53600	
1400	1600	Benzo(a)anthracene			630						1950	14200	
45000	1600	Benzo(a)pyrene			870	1580	1320				1830	14500	
11000		Benzo(b)fluoranthene			1100						3330	33000	
210000		Benzo(ghi)perylene				2650	2030				1010	7020	
3800		Benzo(k)fluoranthene			850	1740	1970	2680	2440				
45000	2800	Chrysene			910						2560	17100	
6200	5100	Fluoranthene	2850	2680	3400	11100	9010	1720	1370	1180	4890	44100	
6500		Indeno(123cd)pyrene										8350	
590	2600	Pyrene	6600	5030	5800	27800	24200	2380	1680	716	3960	33500	
	44792	Total PAHs	14807	15858	21050	97380	74290	6780	5490	2201	22714	233732	
		Proposed EPA Criteria											
		Acenaphthene (230ug/gOC)	2008	874	2420	2095	2095	2293	2682	1564	846	688	518
		Fluoranthene (300ug/gOC)	2619	1140	3156	2733	2733	2991	3498	2040	1104	897	675
		Phenanthrene (240ug/gOC)	2095	912	2525	2186	2186	2393	2798	1632	883	718	540
		PCBs (ppb)											
0.14	180	Aroclor 1248	806			2130	1460	1520	1350		4150		

** SQG = draft Sediment Quality Guidelines (USEPA 1994); ERM = Effects Range Median (Long et al. 1995)

07 089

Table 9. Other organic compounds detected in Patrick Bayou sediments (excluding PAHs and PCBs). All sediment values are reported on a dry weight basis. Detection limits are given in Appendix 2.

		Station										
SQG**	Organics (ppb)	1	2	2.5	3	3	4	5	6	7	9	10
1.6E8	bis(2ethylhexyl)phthalate	1250	1570	2300	833	881	1930	1240		519		
	Carbazole										6010	
30000	Dibenzofuran										1670	
26000	Dichlorobenzene 1,3	2320		3700	6610	4940						
180	Dichlorobenzene 1,4			940	1520	1150						
54000	Di–n–butylphthalate									281	233	
1600	Hexachlorobenzene	3690	83900	9900	8100	5310						
3100	Hexachlorobutadiene	11100	138000	24000	54000	31600						
600	Hexachloroethane	1220	15000	1800	1360							
7700	1,2,4–Trichlorobenzene		809									

** draft Sediment Quality Guidelines (USEPA 1994)

07 084

Table 10. Toxicity test results for Patrick Bayou ambient water and sediment elutriate samples.

	Control	Station 2	2.5	3	6	7	8	10
Ambient Water – 7 day test								
Mysidopsis bahia								
% Survival	100			85 *	0 *	38 *	43 *	98
Growth (mg dry wt)	0.27			0.26		0.2 *	0.26	0.28
Menidia beryllina								
% Survival	93			100	80 *	87	83	100
Growth (mg dry wt)	1.2			1.14	0.94 *	1.17	1.28	1.02 *
Sediment Elutriate – 9 day test								
Cyprinodon variegatus								
% Survival	93	47 *	90	87		30 *		70
Total Ammonia (mg/l)	< 0.1	15.6	9.6	19.2		14.4		12
Unionized Ammonia (mg/l)		0.081	0.063	0.126		0.596		0.063
Total Chlorine (mg/l)	< 0.1	0.1	< 0.1	< 0.1		< 0.1		< 0.1

* –Significant difference from control ($p < 0.05$)

070085

Table 11. Benthic species collected in Patrick Bayou on 7-26-94. Abundance is given in number per square meter.

	Patrick Bayou Stations					
Species	1	2	2.5	3	4	5
Nemertea	226	172				
Mollusca						
Gastropoda (2sc)	11					
Texadina sphinctostoma		11		118		
Mytilopsis leucophaeta		22		129		
Mulinia lateralis	43	118		22		
Macoma		11				
Oligochaeta	462	2882	183	11	204	54
Polychaeta						
Mediomastus		22				
Capitella capitata		43				
Streblospio benedicti	22	1602	16108			
Polydora ligni			22			
Eteone heteropoda		22				
Laeonereis culveri	11		65	32		
Neanthes succinea	22	32				
Hesionidae	11					
Hobsonia florida	11	161	237			
Crustacea						
Callianassa jamaicense	11					
Callinectes juv.			32			
Mysidopsis bahia	22	11				
Chironomidae			441		290	5140
Community Parameters						
Total individuals	849	5108	17086	312	495	5194
Total taxa	11	13	7	5	2	2
Total Polychaete taxa	5	6	4	1	0	0
Diversity (H')	1.39	1.18	0.29	1.27	0.68	0.06
EMAP Indicators**						
Expected diversity	0.89	0.89	0.90	0.90	0.94	0.90
Expected #spp	14	14	14	14	16	14
Expected # polychaete spp	6	6	7	7	7	7
EMAP score	2.85	2.24	0.75	3.64	1.04	0.14
Salinity	*10.3*	*10.3*	*10.8*	*10.7*	*12.4*	*10.7*

** formulas are in Engle, Summers, and Gaston 1994

07 086

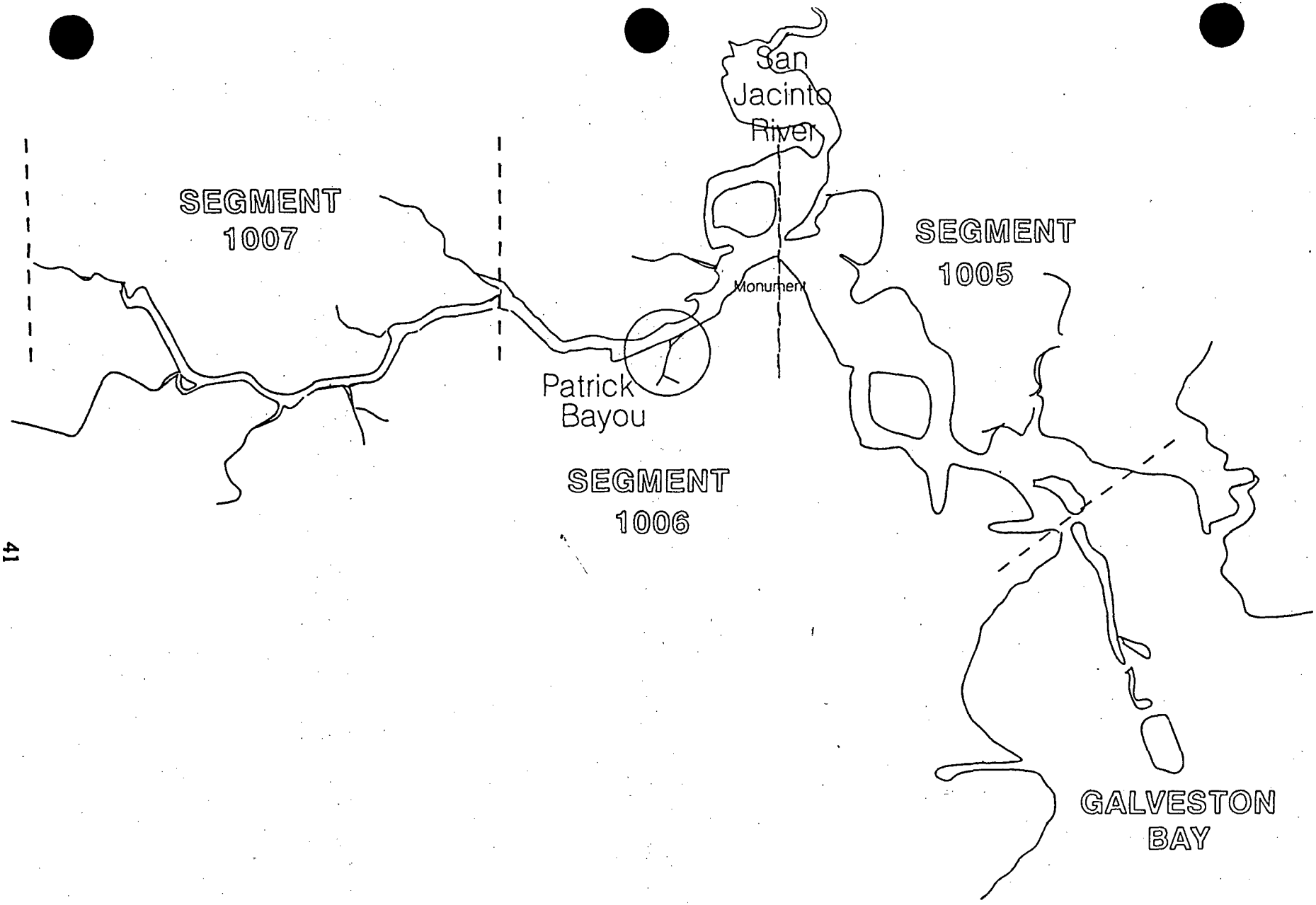


Figure 1. Map of the Houston Ship Channel system with segments labeled.

07 087 20

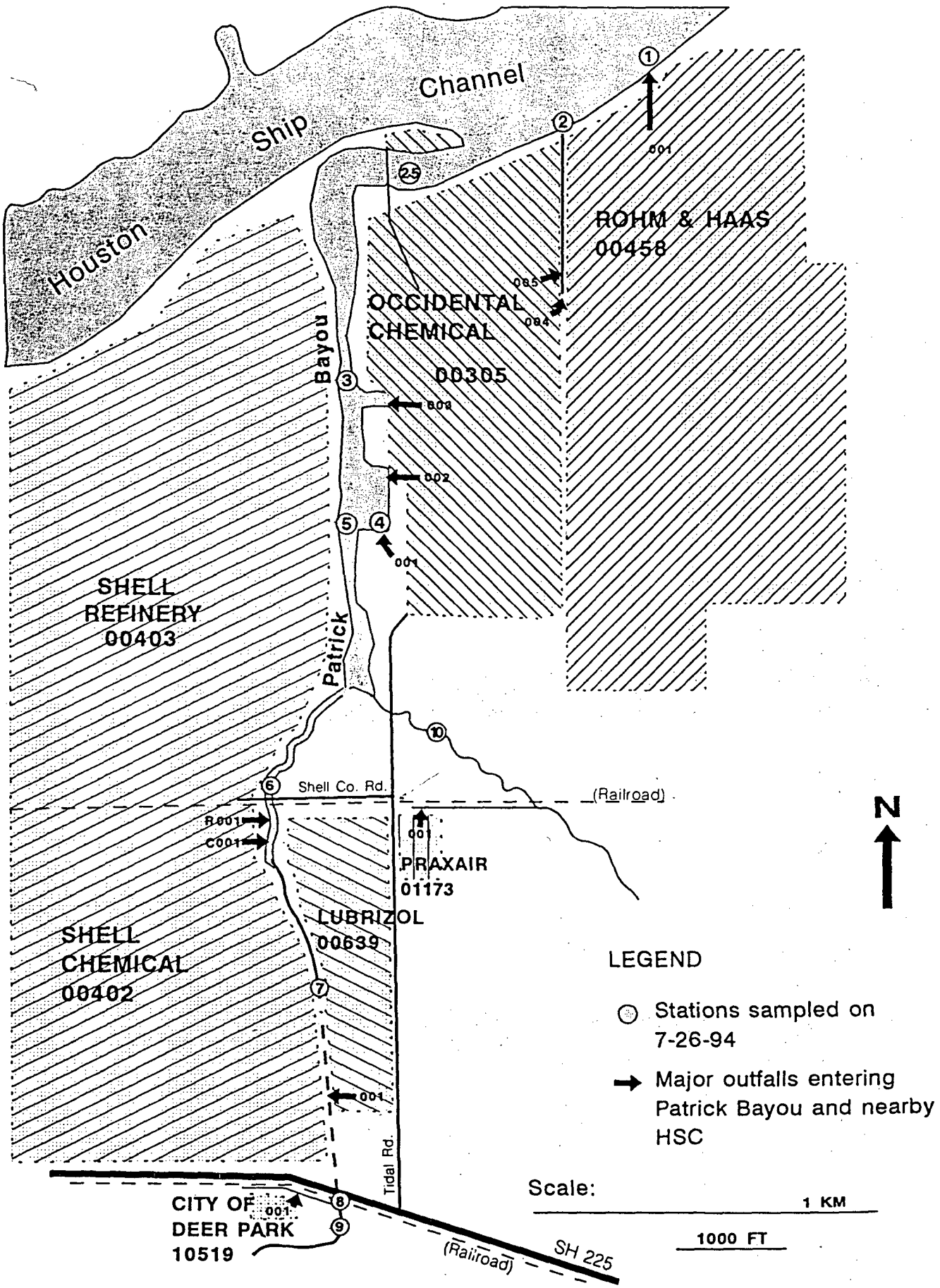


Figure 2. Map of Patrick Bayou showing the locations of the dischargers, major outfalls (excludes stormwater outfalls), and sampling stations.

07 088

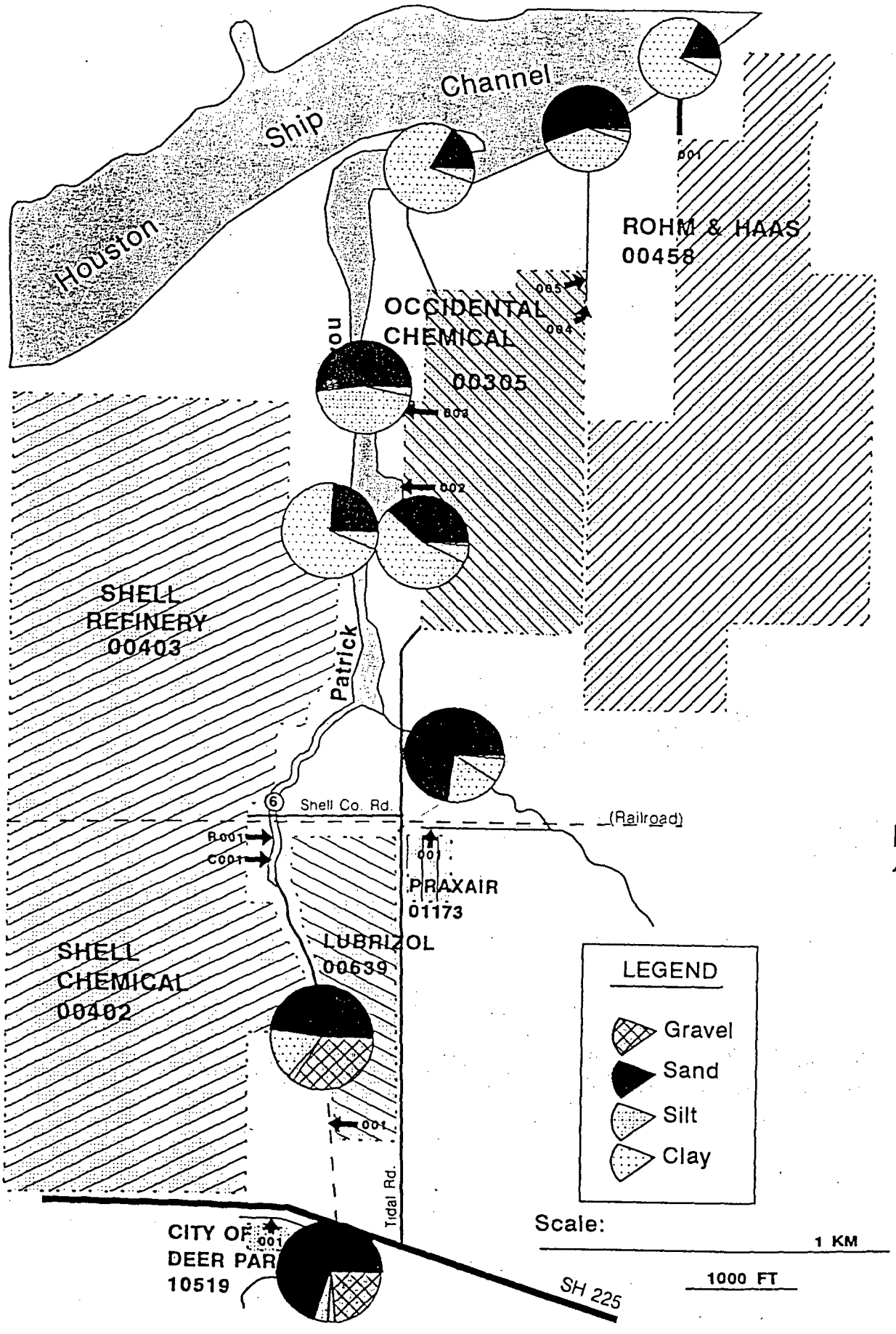


Figure 3. Sediment grain size distribution in Patrick Bayou.

07 089

SEDIMENT METALS

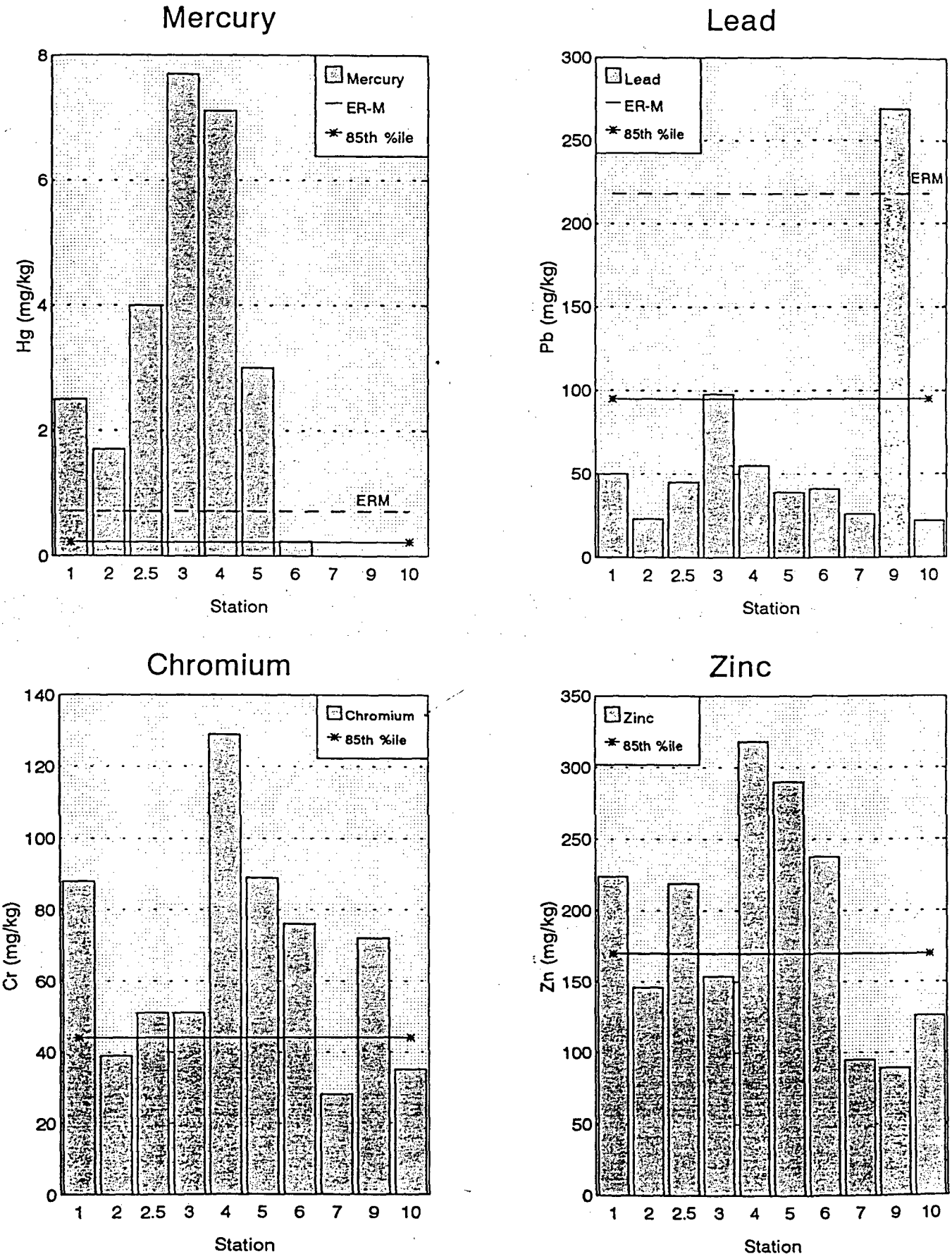


Figure 4. Metals concentrations in Patrick Bayou sediments.

SEDIMENT PAHs

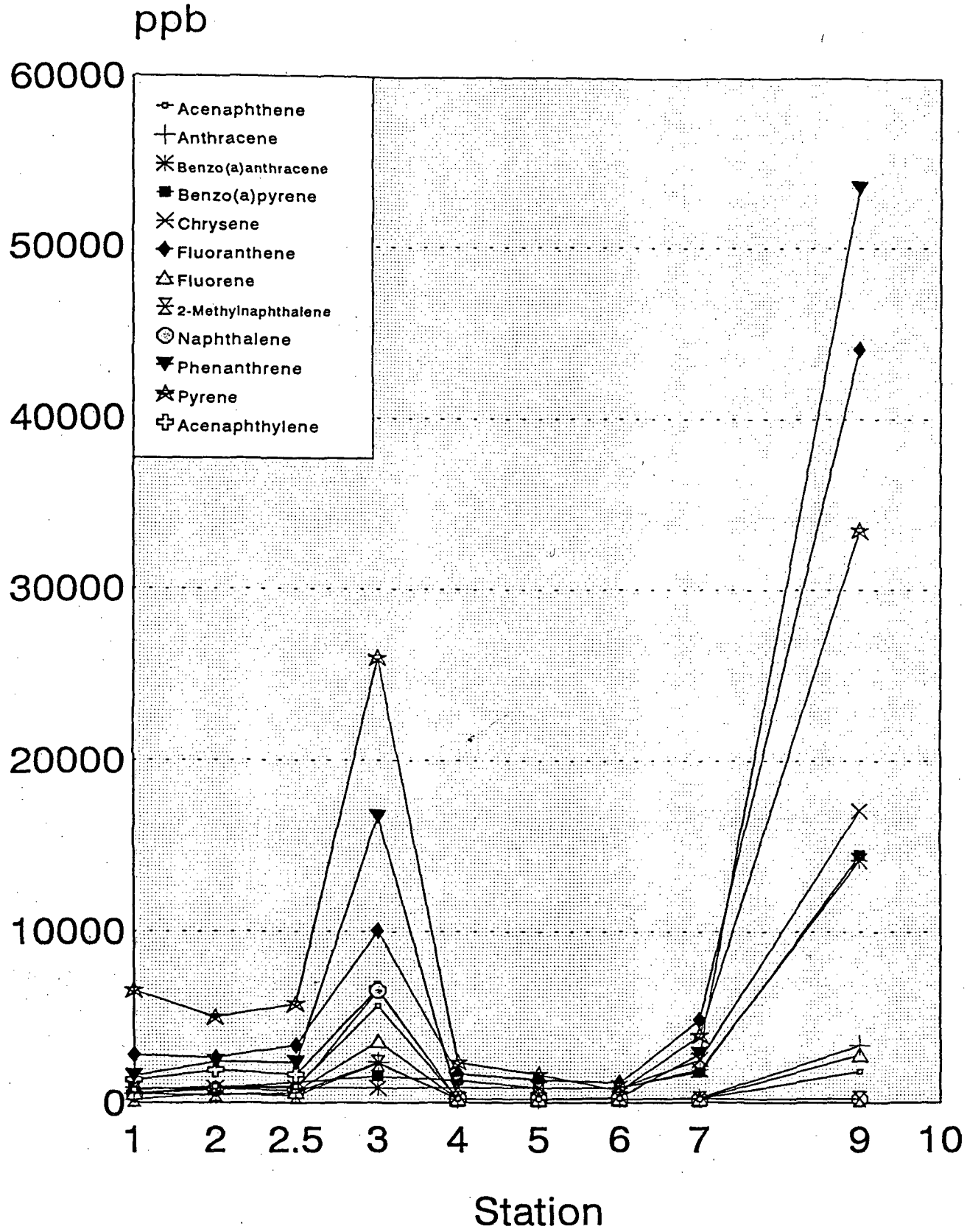
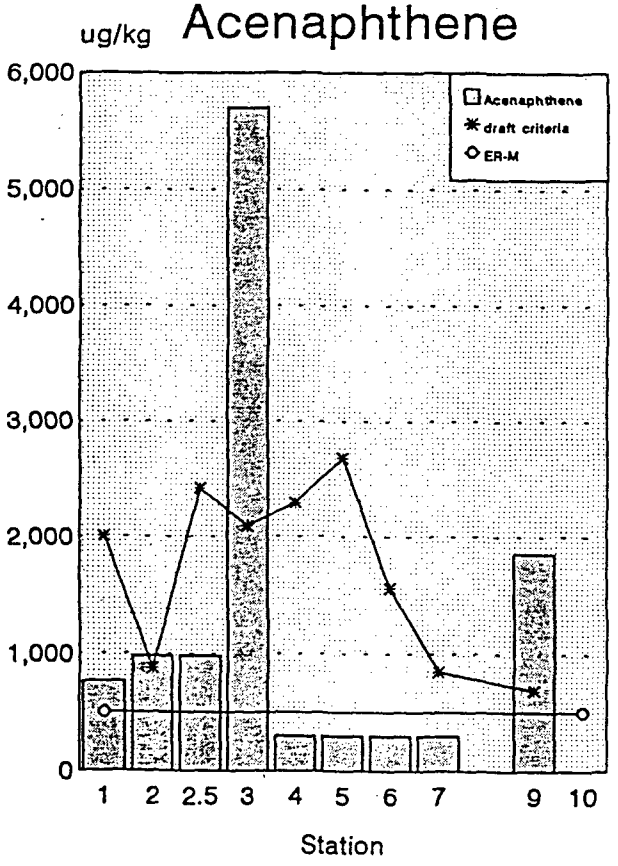
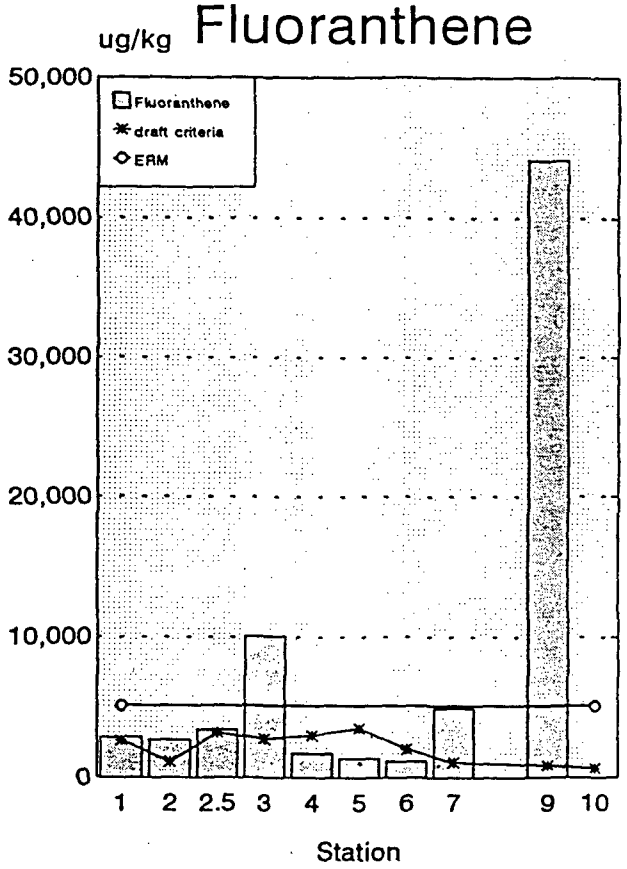


Figure 5. Levels of twelve PAH compounds found in Patrick Bayou sediments on 7-26-94. (No organic compounds were detected at station 10.)

07 091

SEDIMENT





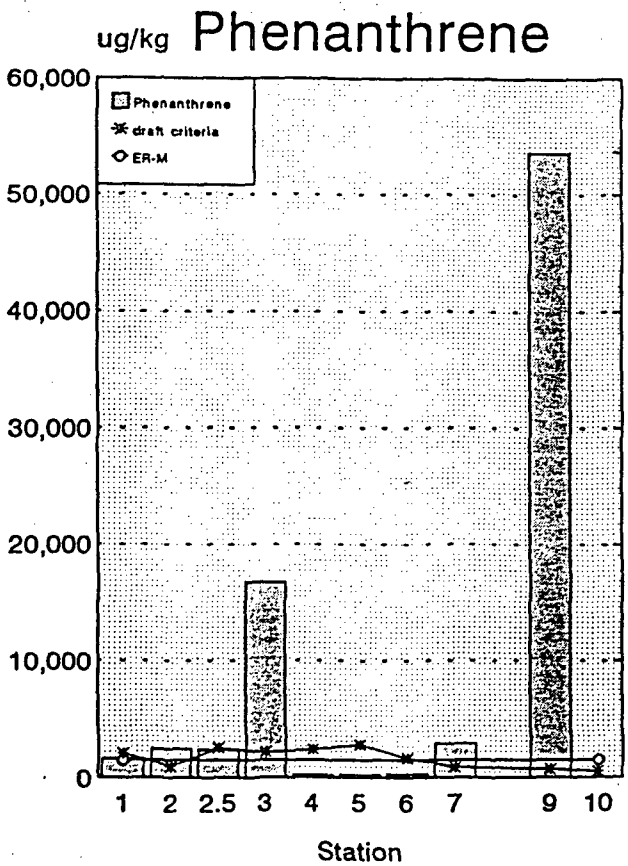


Figure 6. Comparison of Patrick Bayou PAH levels to proposed federal criteria. Nondetected values are graphed at the lowest detection limit for that compound found in Appendix 2.

07 092

SEDIMENT PCBs

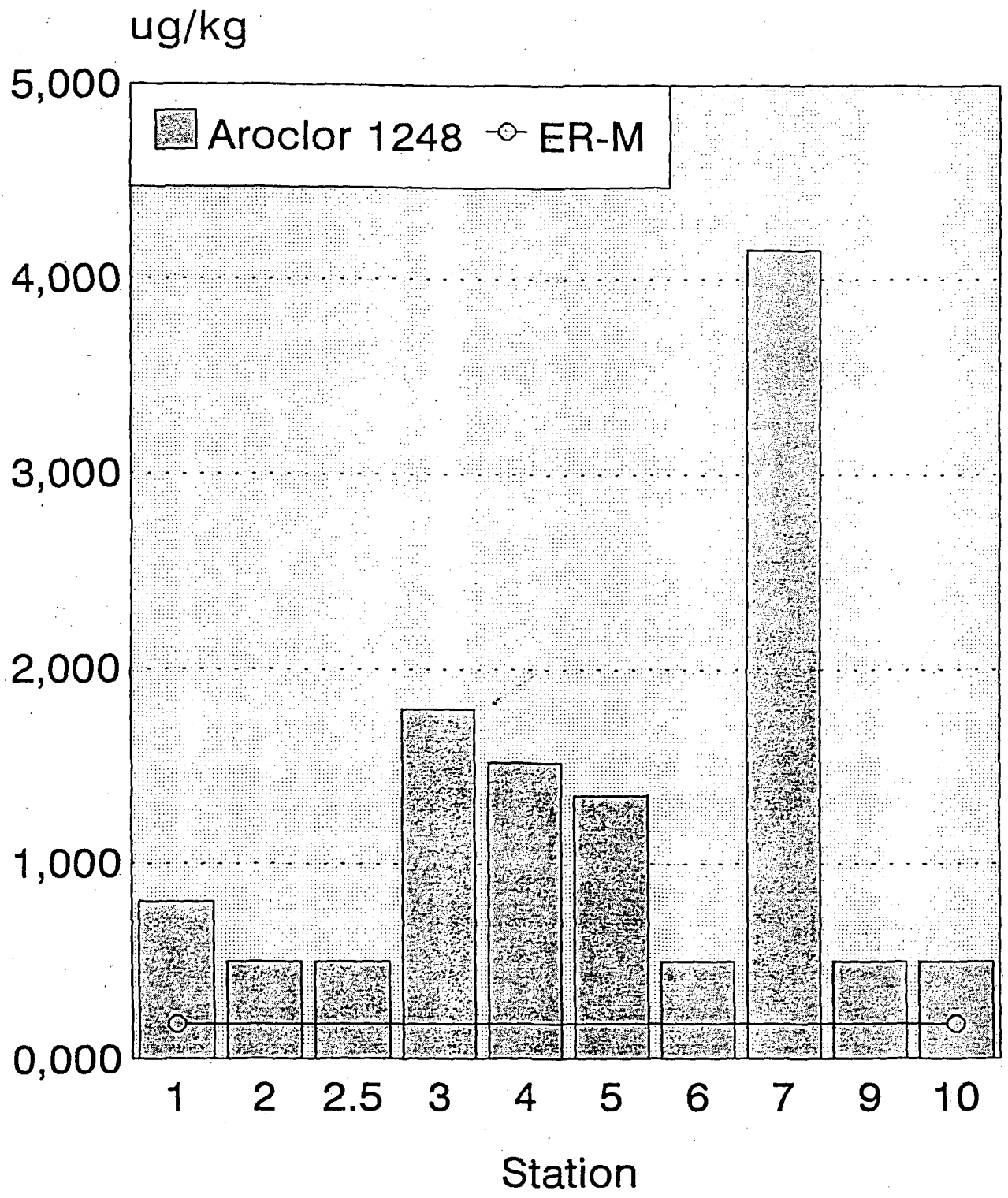


Figure 7. PCBs in Patrick Bayou sediments. Nondetected values are graphed at the detection limit (500 ppb).

07 093

Hexachlorobenzene

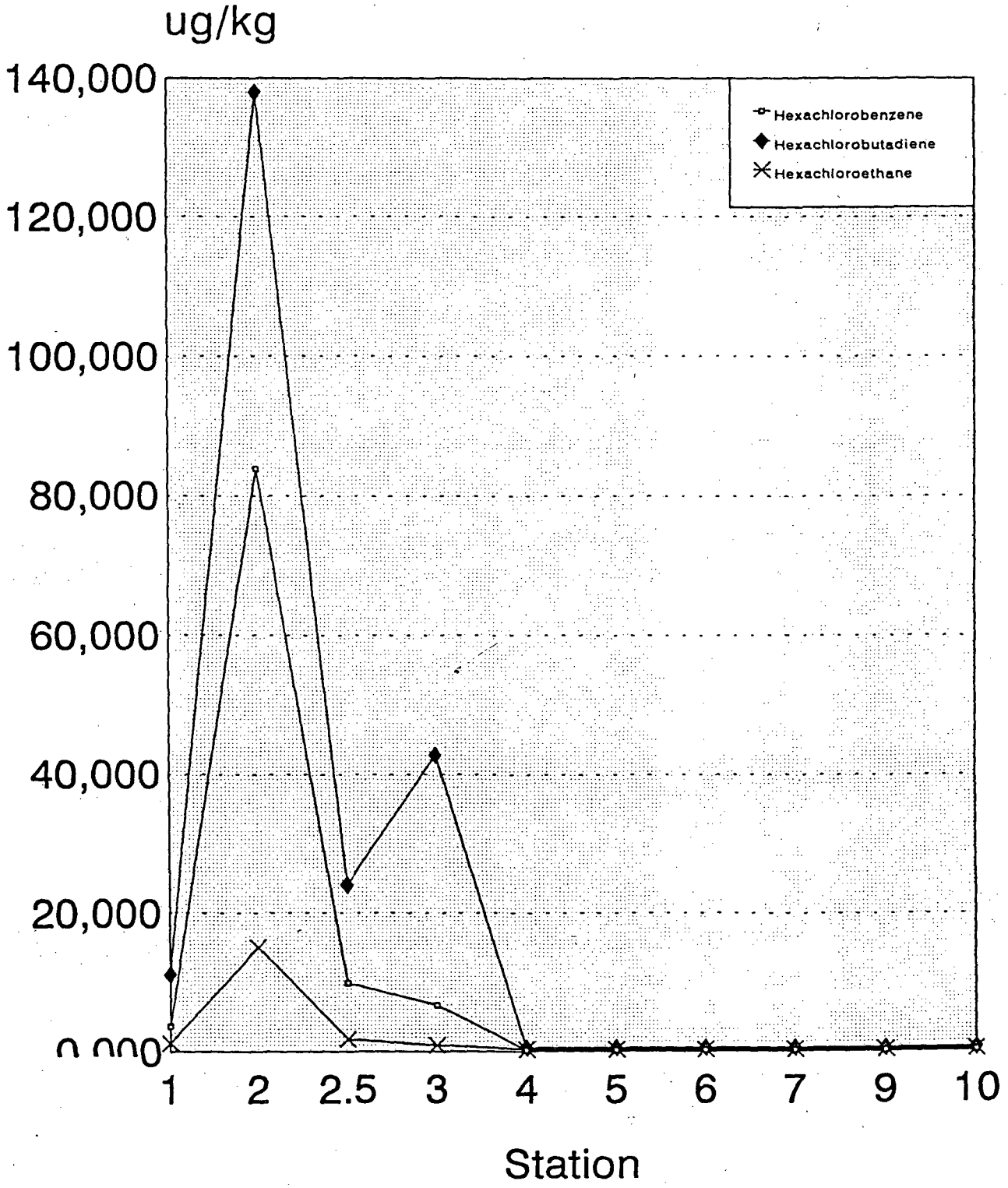


Figure 8. Hexachlorobenzene, hexachlorobutadiene, and hexachloroethane levels in Patrick Bayou sediments on 7-26-94.

07 094

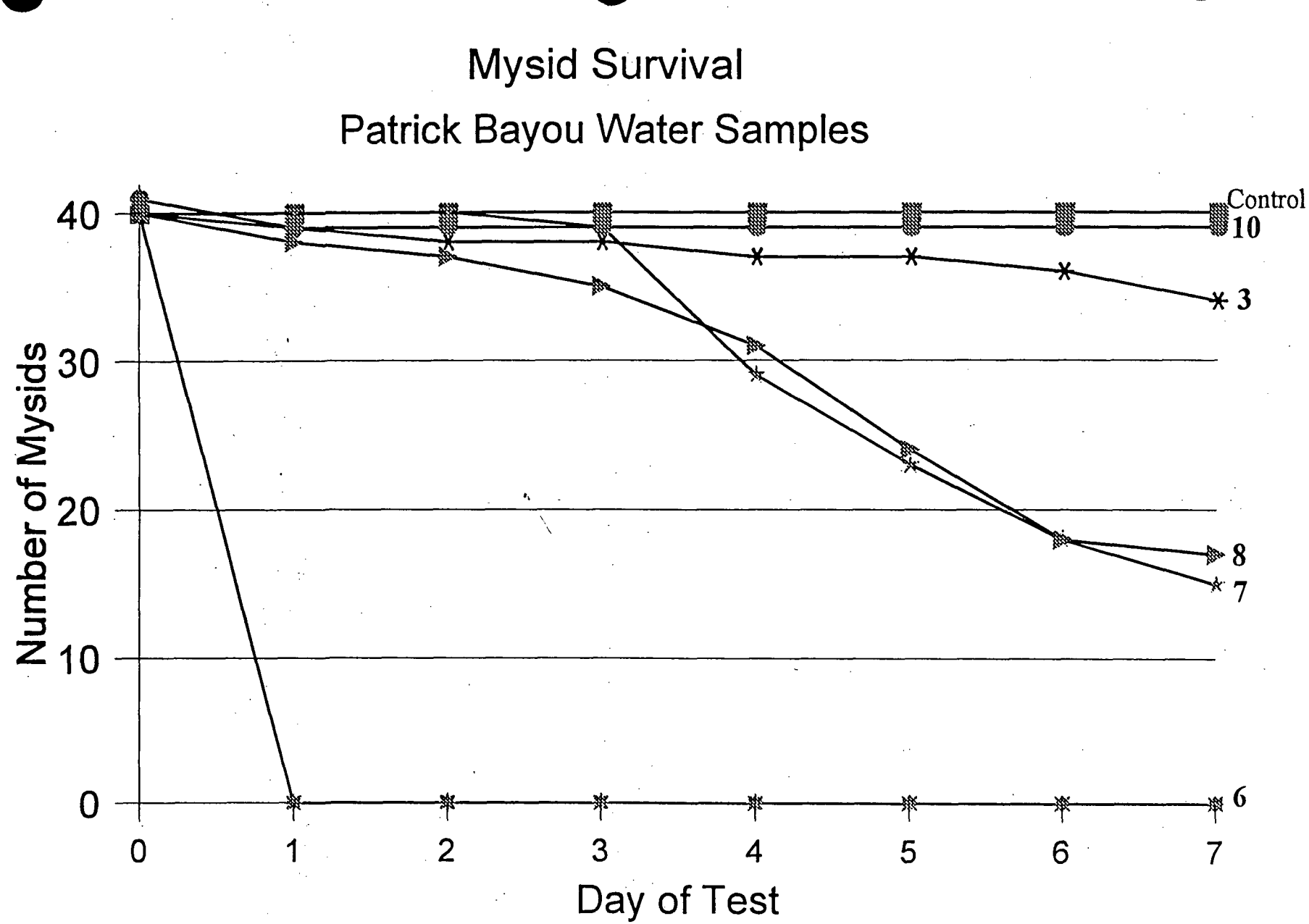


Figure 9. Survival of *Mysidopsis bahia* in 7-day chronic toxicity tests. Numbers at end of lines are station/sample numbers.

07 095

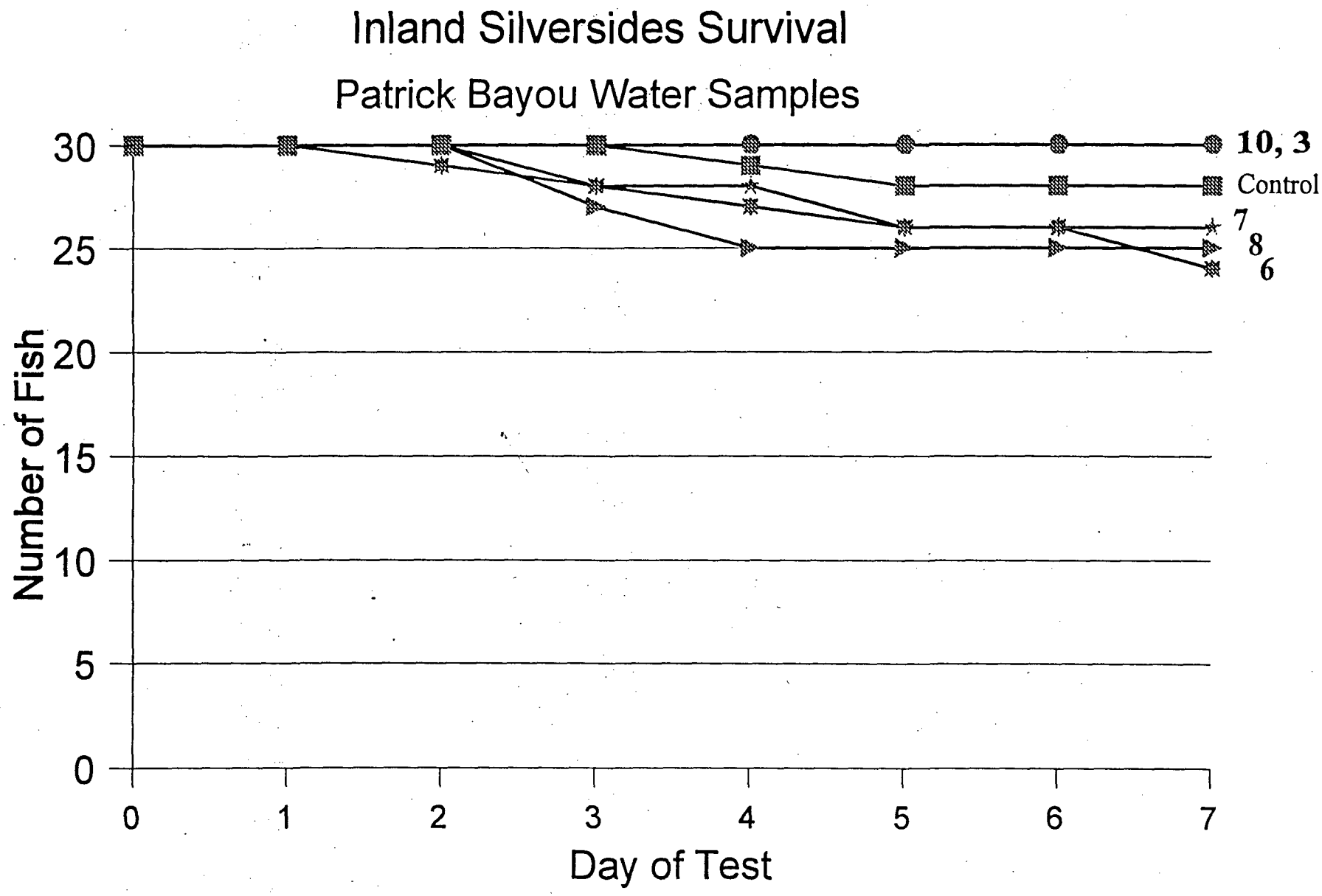


Figure 10. Survival of *Menidia beryllina* in 7-day chronic toxicity tests. Numbers at end of lines are station/sample numbers.

960 07

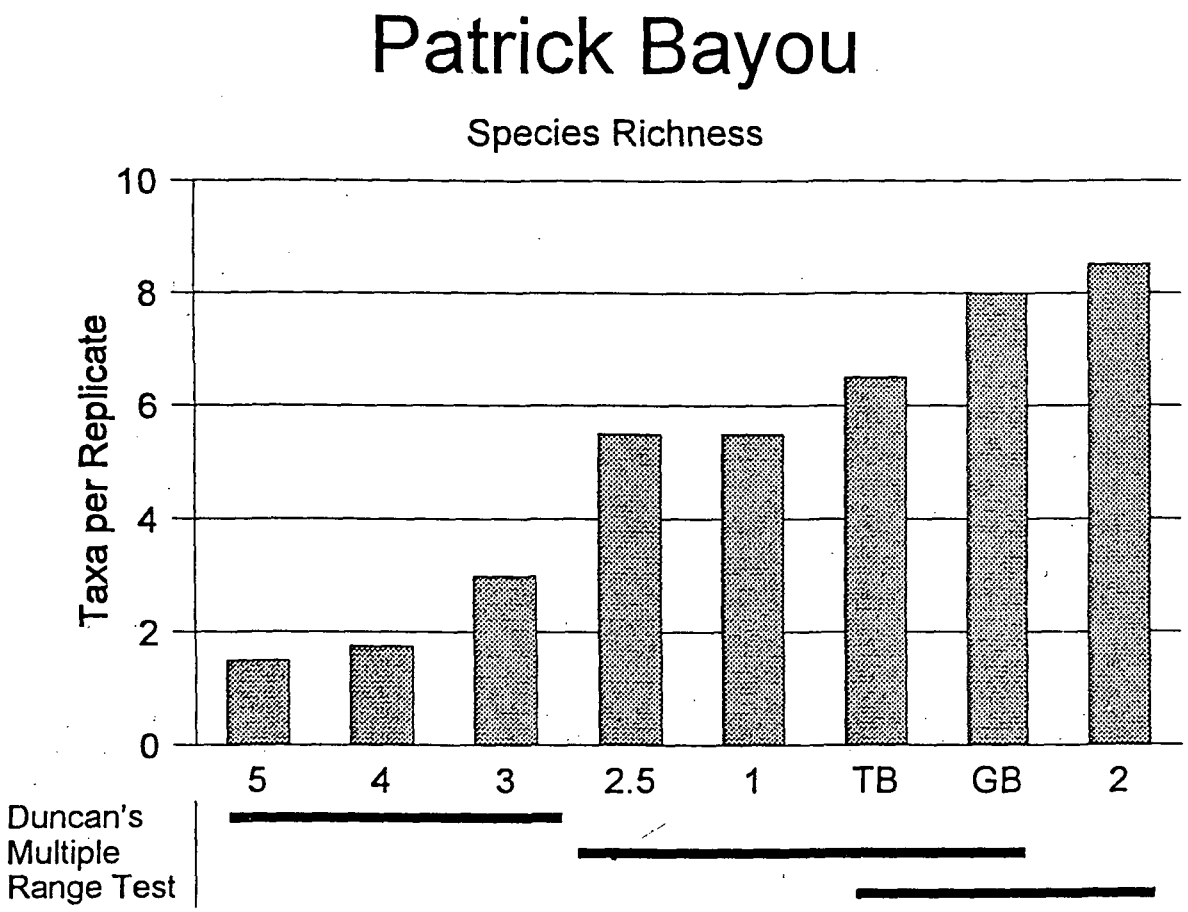


Figure 11. Average number of species per replicate in Patrick Bayou benthic samples and two reference samples. Solid bars below station numbers indicate samples which are not significantly different from one another by Duncan's Multiple Range Test at a 95% confidence level.

07 097

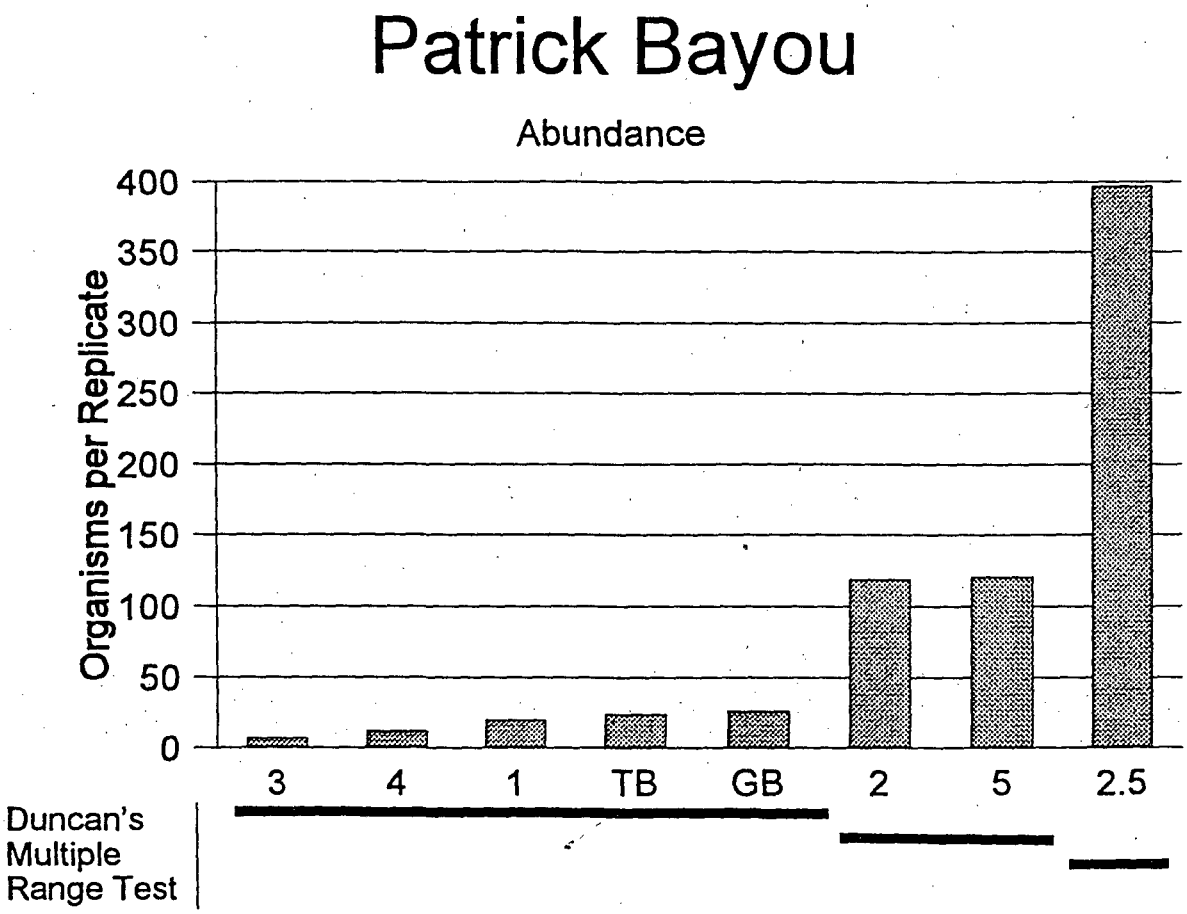


Figure 12. Average number of individuals per replicate in Patrick Bayou benthic samples and two reference samples. Solid bars below station numbers indicate samples which are not significantly different from one another by Duncan's Multiple Range Test at a 95% confidence level.

07-098

Appendix 1. Conventional water and sediment quality parameters analyzed for this study.

Water Chemistry (TNRCC Houston Laboratory)

- Biochemical Oxygen Demand, Five Day (BOD_5)
- Chemical Oxygen Demand (COD)
- Total Suspended Solids (TSS)
- Volatile Suspended Solids (VSS)
- Total Dissolved Solids (TDS)
- Ammonia Nitrogen (NH_3-N)
- Nitrite Nitrogen (NO_2-N)
- Nitrate Nitrogen (NO_3-N)
- Sulfides
- Total Organic Carbon (TOC)
- Total Hardness
- Total Alkalinity
- Chloride (Cl^-)
- Sulfate (SO_4)
- Chlorophyll *a*
- Pheophytin *a*
- Total Phosphorus (T-P)
- Orthophosphorus (O-P)
- Oil & Grease

Sediment Chemistry (Texas Department of Health Lab in Austin)

- Acid Volatile Sulfides
- Total Organic Carbon
- Sediment Grain Size
- Kjeldahl Nitrogen
- Total Phosphorus
- Volatile Solids

07 099

Appendix 2. Priority pollutant parameters, methods, and detection limits for the water and sediment samples analyzed at the USEPA Laboratory in Houston. Sediment for metals analysis was prepared by method 3050.

METALS		Detection Limits	
	Method	Water (μg/l)	Sediment (mg/kg)
Aluminum	200.7 (ICP)	100	13-29
Barium	200.7	10	1-3
Cadmium	200.7	0.5	1
Chromium	200.7	10	1-3
Copper	200.7	5	3-6
Iron	200.7	25	3-7
Manganese	200.7	5	1
Nickel	200.7	10-20	3-6
Silver	200.7	0.5	1-3
Zinc	200.7	20	3-6
Arsenic	200.9 (GFAA)	5	1.6-3.4
Lead	200.9	2.5	4-9
Selenium	200.9	12	1.6-3.4
Mercury	245.1	0.2	0.1-0.3
Calcium	200.7	150	20-43
Magnesium	200.7	150	20-43
Sodium	200.7	500	65-143
Potassium	200.7	1000	130-285

67 100

Appendix 2 (cont.). Priority pollutant parameters, methods, and detection limits.

VOLATILE COMPOUNDS by Method 624	Detection Limit Water (ug/l)	Sediment (ug/kg)	PESTICIDES/PCBs modification of Method 608	Det. Limit Water (ug/l)	Sediment (ug/kg)
acetone	5	250	alpha-BHC	0.05	40
acrolein	100	5000	beta-BHC	0.05	60
acrylonitrile	100	5000	delta-BHC	0.05	50
benzene	2	100	gamma-BHC	0.05	30
bromodichloromethane	2	100	Heptachlor	0.05	40
bromoform	2	100	Aldrin	0.05	40
bromomethane	5	250	Heptachlor epoxide	0.05	40
2-butanone	5	250	Endosulfan I	0.05	40
carbon disulfide	5	250	Dieldrin	0.10	40
carbon tetrachloride	2	100	4,4'-DDE	0.10	40
chlorobenzene	2	100	Endrin	0.10	50
chloroethane	5	250	Endosulfan II	0.10	40
chloroform	2	100	4,4'-DDD	0.10	50
chloromethane	5	250	Endrin aldehyde	0.10	50
dibromochloromethane	2	100	Endrin ketone	0.10	60
1,1-dichloroethane	2	100	Endosulfan sulfate	0.10	60
1,2-dichloroethane	2	100	4,4'-DDT	0.10	40
1,1-dichloroethene	2	100	Methoxychlor	0.50	100
cis - 1,2-dichloroethene	2	100	alpha-Chlordane	0.05	60
trans - 1,2-dichloroethene	2	100	gamma-Chlordane	0.05	60
1,2-dichloropropane	2	100	Toxaphene	5.0	2000
cis - 1,3-dichloropropene	2	100	Aroclor-1016	1.0	500
trans - 1,3-dichloropropene	2	100	Aroclor-1221	2.0	3000
ethylbenzene	5	250	Aroclor-1232	1.0	500
2-hexanone	5	250	Aroclor-1242	1.0	500
methylene chloride	5	250	Aroclor-1248	1.0	500
4-methyl-2-pentanone	5	250	Aroclor-1254	1.0	500
styrene	5	250	Aroclor-1260	1.0	500
1,1,2,2-tetrachloroethane	2	100			
tetrachloroethene	2	100			
toluene	5	250			
1,1,1-trichloroethane	2	100			
1,1,2-trichloroethane	2	100			
trichloroethene	2	100			
vinyl chloride	5	250			
m- and/or p-xylene	5	250			
o-xylene	5	250			

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Appendix 2 (cont.). Priority pollutant parameters, methods, and detection limits.

SEMI-VOLATILE COMPOUNDS by Method 625

Compound Name	Detection Limits Water (ug/l)	Sediment (ug/kg)*	Compound Name	Det. Limits Water (ug/l)	Sediment (ug/kg)
acenaphthene	2	220 - 590	2,4-dinitrophenol	30	3300 - 8850
acenaphthylene	2	220 - 590	2,4-dinitrotoluene	6	660 - 1770
anthracene	2	220 - 590	2,6-dinitrotoluene	6	660 - 1770
benzidine	20	2200 - 5900	4,6-dinitro-2-methylphenol	20	2200 - 5900
benzoic acid	10	1100 - 2950	di-n-butylphthalate	2	220 - 590
benzo(a)anthracene	8	880 - 2360	di-n-octyl phthalate	4	440 - 1180
benzo(a)pyrene	8	880 - 2360	fluoranthene	2	220 - 590
benzo(b)fluoranthene	8	880 - 2360	fluorene	2	220 - 590
benzo(g,h,i)perylene	8	880 - 2360	hexachlorobenzene	2	220 - 590
benzo(k)fluoranthene	8	880 - 2360	hexachlorobutadiene	5	550 - 1475
benzyl alcohol	4	440 - 1180	hexachlorocyclopentadiene	10	1100 - 2950
bis (2-chloroethoxy) methane	2	220 - 590	hexachloroethane	3	330 - 885
bis (2-chloroethyl) ether	2	220 - 590	indeno (1,2,3-cd) pyrene	8	880 - 2360
bis (2-chloroisopropyl) ether	2	220 - 590	isophorone	4	440 - 1180
bis- (2-ethylhexyl) phthalate	4	440 - 1180	2-methyl naphthalene	2	220 - 590
4-bromophenylphenyl ether	8	880 - 2360	2-methyl phenol	6	660 - 1770
butylbenzylphthalate	4	440 - 1180	4-methyl phenol	6	660 - 1770
carbazole	10	1100 - 2950	naphthalene	2	220 - 590
4-chloroaniline	4	440 - 1180	2-nitroaniline	8	880 - 2360
2-chloronaphthalene	2	220 - 590	3-nitroaniline	8	880 - 2360
2-chlorophenol	4	440 - 1180	4-nitroaniline	8	880 - 2360
4-chlorophenylphenyl ether	8	880 - 2360	nitrobenzene	2	220 - 590
4-chloro - 3-methylphenol	8	880 - 2360	2-nitrophenol	10	1100 - 2950
chrysene	8	880 - 2360	4-nitrophenol	13	1430 - 3835
dibenzofuran	2	220 - 590	N-nitrosodiphenylamine	4	440 - 1180
dibenzo(a,h) anthracene	8	880 - 2360	N-nitroso-di-n-propylamine	6	660 - 1770
1,2-dichlorobenzene	3	330 - 885	pentachlorophenol	15	1650 - 4425
1,3-dichlorobenzene	3	330 - 885	phenanthrene	2	220 - 590
1,4-dichlorobenzene	3	330 - 885	phenol	4	440 - 1180
3,3'-dichlorobenzidine	10	1100 - 2950	pyrene	2	220 - 590
2,4-dichlorophenol	6	660 - 1770	pyridine	20	2200 - 5900
diethylphthalate	2	220 - 590	1,2,4-trichlorobenzene	3	330 - 885
2,4-dimethylphenol	6	660 - 1770	2,4,5-trichlorophenol	6	660 - 1770
dimethylphthalate	2	220 - 590	2,4,6-trichlorophenol	6	660 - 1770

* Detection limits for sediment varied with each sample. Numbers given are the ranges for all 10 samples.

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Appendix 3. Frequency of self–monitoring data collected at the various discharges into Patrick Bayou and the nearby HSC. Numbers given are the required number of samples per week unless otherwise specified.

	Outfalls												
	00458	00305							00403	00402	00639	10519	01173
Variables	001	005	004	003	002	*201*	001	*101*	001	001	001	001	001
Flow (mgd)	5.76	1.75	R	8	105	R	8	R	2.3	9.9	1	4.5	0.43
Temperature			C	C	C		C		C	C	3/d		C
pH	C	1/d	1/d	1/d	1/d		1/d		C	C	3/d	1	7
Chlorine Residual					1/d	1	1/d	2				7	
TOC		3	1				1/d		1	3	2		
O&G			1						1		2		2
BOD (5–day)	3	3								3	2		4/yr
CBOD												2	
TSS	3	3				2		2		3	2	2	2
COD	1												2
Ammonia	3									3		2	
TKN												2	
Phenols	1												
Chromium	1												
Copper	1/mo					1			1	1			2
Copper, dissolved	1												
Lead						1				1			
Mercury								2					
Nickel	1/mo				3	1							
Nickel, diss	1												
Zinc	1/mo										2		
Zinc, diss	1												
Cyanide	1												
P.P. Organics (56 cpds)	1/yr	1/yr								1/yr			
Total chlorinated hydrocarbons			1	1									
Chlorinated Organics (10 cpds)*		3	S	S									
Biomonitoring		Y		Y	Y								

Notes: R = Report; C = Continuous; S = Sample only when stormwater is being discharged

* Carbon Tetrachloride, Chloroform, Vinyl Chloride, Trichloroethylene, 1,2–Dichloroethane, Tetrachloroethylene, Methyl Chloride, Methylene Chloride, Chloroethane, 1,1,1–Trichloroethane

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Appendix 4. Selected metals data collected by the dischargers in July 1992 for the total maximum daily loading study of the HSC. Values are the average of four 24h composite samples taken in one month. Undetected variables are not included in the total.

			Effluent Load (lbs/day)					
Discharger Name	Outfall #	Flow (mgd)	As	Cu	Pb	Hg	Ag	Zn
Rohm&Haas	00458–001	5.064	<0.330	2.320	5.925	0.0375	0.6485	4.120
Oxychem	00305–004	0.210	0.026	0.024	0.031	<0.0004	0.0007	0.147
Oxychem	00305–005	0.613	0.012	0.105	0.061	<0.0010	0.0047	1.193
Total –– HSC near Patrick Bayou		5.887	0.038	2.449	6.017	0.0375	0.6539	5.459
Oxychem	00305–003	5.175	0.092	1.429	0.091	<0.0086	0.3325	1.655
Oxychem	00305–002	77.125	7.338	19.908	3.858	0.0335	0.7750	42.750
Oxychem	00305–001	4.425	0.488	1.174	0.365	0.0220	0.1789	1.605
Shell Refinery	00403–001	0.232	0.009	0.027	0.001	<0.0003	<0.0003	0.337
Shell Chemical	00402–001	6.311	0.065	0.114	<0.053	<0.0103	<0.0103	4.923
Lubrizol	00639–001	0.844	<0.037	0.003	0.011	<0.0014	<0.0070	1.081
City of Deer Park	10519–001	2.864	0.213	0.059	0.028	<0.0048	0.0233	0.712
Praxair	01173–001	0.094	0.030	0.213	0.025	<0.0001	0.0024	0.077
Total –– Patrick Bayou		97.069	8.234	22.926	4.379	0.0555	1.3121	53.139

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Appendix 5. Metals concentration data collected by the dischargers in July 1992 for the total maximum daily loading study of the HSC. Values are the average of four 24h composite samples taken in one month. Undetected variables were considered zero when computing average concentrations.

			Average Effluent Concentration (ug/l)					
Discharger	Outfall #	Flow (mgd)	As	Cu	Pb	Hg	Ag	Zn
Rohm & Haas	001	5.064	<10	54.3	139.2	0.93	15.35	97
Oxychem	004	0.210	14	19.6	9.1	<0.2	0.50	94
Oxychem	005	0.613	3.3	19.2	10.6	<0.2	0.95	247
Oxychem	003	5.175	2.1	33.1	2.1	<0.2	7.48	39
Oxychem	002	77.125	11.6	31.6	5.9	0.05	1.23	67
Oxychem	001	4.425	12.4	31.9	10.5	0.59	4.48	43
Shell Refinery	001	0.232	5	13.5	0.5	<0.2	<0.2	165
Shell Chemical	001	6.311	1.3	2.3	<1	<0.2	<0.2	94
Lubrizol	001	0.844	<5	0.4	1.6	<0.2	<1	154
City of Deer Park	001	2.864	8.7	2.6	1.2	<0.2	0.94	30
Praxair	001	0.094	39.5	271.3	33.3	<0.1	3.15	97

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Appendix 6. Tentatively identified compounds from Patrick Bayou sediment samples. Concentrations are estimates based on a response factor of 1.0 to the internal standard. Concentrations are presented on a dry weight basis.

	Station										
Compound (ppb)	1	2	2.5	3	3	4	5	6	7	9	10
Pentachloro-1,3-butadiene		3700		1100							
Sulfur, (molecular)	40000	8200	120000	2900			51000	14000		980	14700
1,1'-oxybis-benzene	2000	5100	2600	5200		4500					
Pentachlorobenzene		5300									
1,1-Biphenyl		1600		5600	2200						
Dodecane				1800	2800						
Pentadecane							5800				
Tetradecane				4900							
Other Semivolatile Cmpds	27790	20940	7700	49100	71000	40600	121900	13700	10100	11070	10044
(#)	(16)	(15)	(7)	(14)	(16)	(15)	(13)	(10)	(7)	(11)	(9)
Volatile Compounds				1620	2140		1600		350		
(#)				(4)	(4)		(1)		(1)		

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Appendix 7. Selected benthic samples collected in other studies. Routine from Upper Galveston Bay and Trinity Bay were collected on 7-13-94. Jacinto Bay was sampled on 8-3-92. Abundance is in organisms per sq meter.

	Routine Stations		San Jacinto B	
Species	U. Galv.	Trinity Bay	S	N
Nemertea	172	22	34	26
Mollusca				
Texadina sphinctostoma	22	204	9	
Rangia flexuosa			43	9
Mulinia lateralis	65	333		17
Macoma	97		17	43
Oligochaeta			9	
Polychaeta				
Mediomastus	398	301	404	267
Capitella capitata	108		34	9
Streblospio benedicti	43	75	86	9
Polydora			43	
Glycinde solitaria		11		
Nereidae			9	
Hesionidae			26	
Parandalia	129	22	17	9
Sigambra	22			
Hobsonia florida		32		
Crustacea				
Callianassa jamaicense			17	
Mysidopsis bahia	54			
Chironomidae		43		9
Community Parameters				
Total individuals	1108	1043	748	396
Total taxa	10	9	13	9
Total Polychaete taxa	5	5	7	4
Diversity (H')	1.94	1.68	1.72	1.24
EMAP Indicators**				
Expected diversity	0.82	0.80	0.90	0.87
Expected #spp	11	11	14	13
Expected # polychaete spp	5	5	7	6
EMAP score	5.75	5.25	4.59	3.50
Salinity	*6.8*	*5.4*	*10.8*	*9.6*

* San Jacinto Bay samples included five Ekman replicates.

** formulas are in Engle, Summers, and Gaston 1994

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Appendix 8. Some common indices applied to Patrick Bayou benthic data and other comparable data sets.

Index/Indicator	Patrick Bayou Stations						Routine Stations		San Jacinto Bay**	
	1	2	2.5	3	4	5	U. Galv.	Trinity Bay	S	N
Total individuals *	849	5108	17086	312	495	5194	1108	1043	748	396
Total taxa	11	13	7	5	2	2	10	9	13	9
Diversity (H')	1.39	1.18	0.29	1.27	0.68	0.06	1.94	1.68	1.72	1.24
Evenness (J')	0.58	0.46	0.15	0.79	0.98	0.08	0.84	0.76		
Swartz' dominance index	1.77	1.59	0.8	1.88	1.39	0.76	4.25	2.72	3.65	1.7

* individuals/square meter

** San Jacinto Bay samples included 5 replicates instead of 4.

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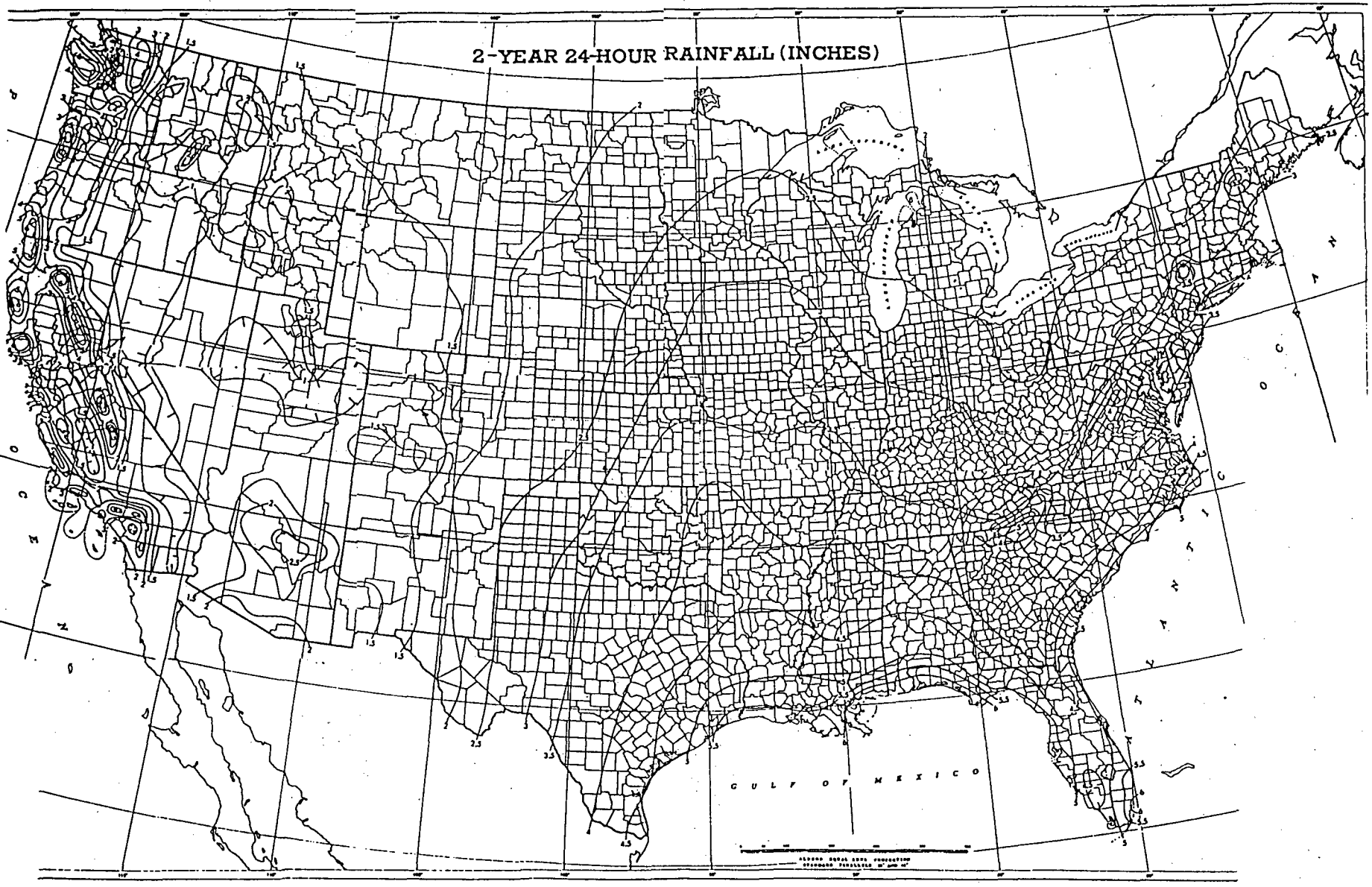
APPENDIX B

Supplemental Maps


2-YEAR 24-HOUR RAINFALL (INCHES)
GULF OF MEXICO

APPENDIX C

Patrick Bayou Site
Health and Safety Plan

HEALTH AND SAFETY PLAN
FOR
PRELIMINARY ASSESSMENT/
SCREENING SITE INSPECTION FIELD WORK
PATRICK BAYOU SITE

Prepared by

Texas Natural Resource Conservation Commission
Superfund Site Discovery and Assessment Program
Austin, Texas

Reviewed and approved by

Site Safety Officer:	_____ Name	_____ Date
Site Investigation: Manager	James D. Lyon Name	3/20/00 Date
PA/SI Program Manager Representative:	Allen M. Gelis Name	3/20/00 Date
TNRCC Central Office Health & Safety Representative:	John Lyon Name	3/20/00 Date

March 2000

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APPENDICES

Attachment A: Plan Acceptance Form, TNRCC Reporting Procedures Memo, Employee's Packet, Employee Rights & Responsibilities, Authorization for Release of Information, Employee's Report of Injury Report, Witness Statement and Employee's Election Regarding Utilization of Sick Leave

Attachment B: Chemical Information Sheets for Cadmium, Chromium, Copper, Dioxane, Lead, Mercury, Nickel, Polychlorinated Biphenyls (PCBs), Selenium and Zinc

Attachment C: Site Safety Briefing Form, Health and Safety Checklist

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EMERGENCY CONTACTS

In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact(s) should be made from the list below. For emergency situations contact the appropriate response teams:

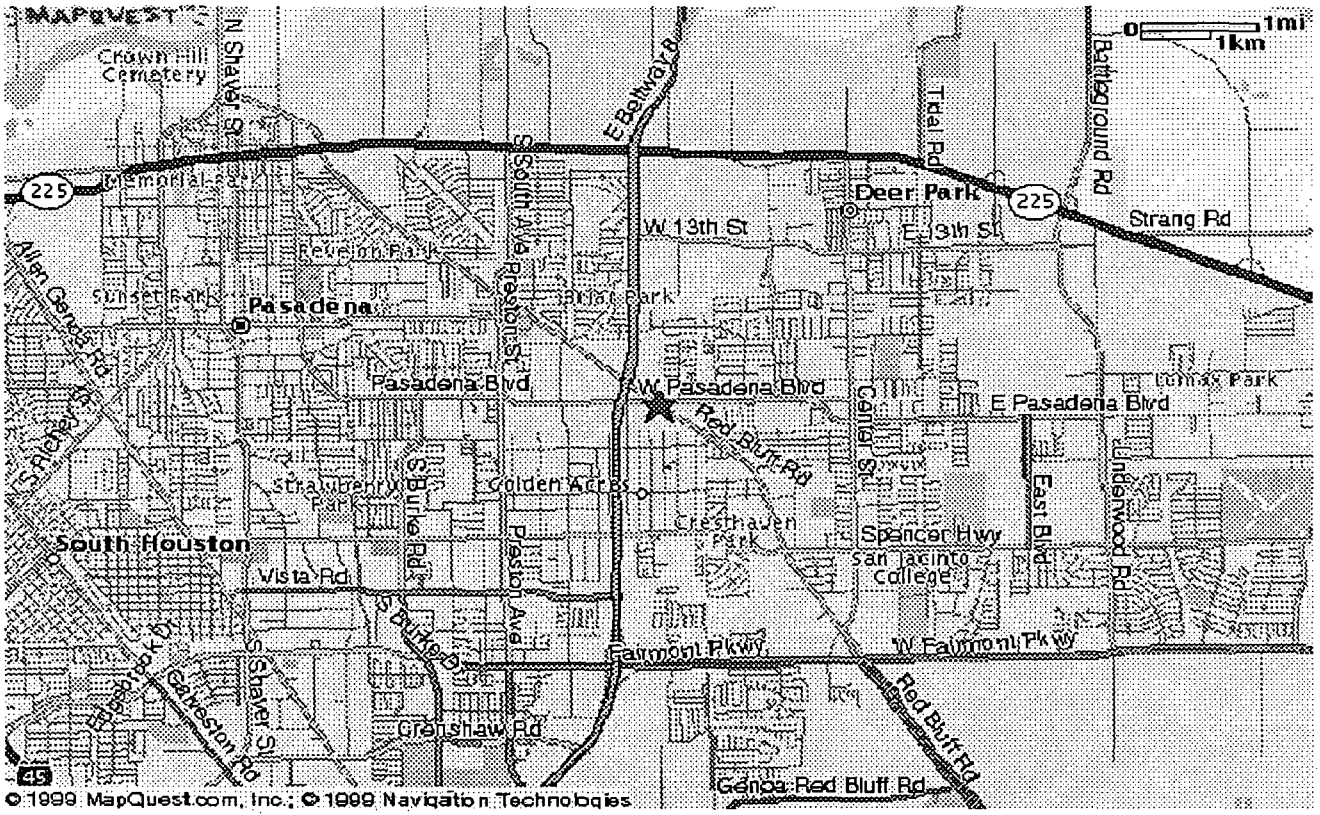
Site Location: **Latitude 29^0 43' 55" N** **Longitude 95° 06' 52.5" W**

Contingency Contacts	Phone Number
Fire Department	911
Police	911
Sheriff's Department	911
Ambulance	911
Medical Emergency	
Hospital Name	TriCity Regional Hospital
Hospital Phone No.	(713) 473-3311 (Information)
Hospital Address	4040 Red Bluff Road Deer Park , TX 77536
Map to Hospital (see next page)	
TNRCC Contacts	
TNRCC PA/SI Program Manager:	Allan M. Seils - Austin, Texas Phone: Work (512) 239-2514 Pager: (512) 875-5108
TNRCC Central Office Health & Safety Representative:	John Syer - Austin, Texas Phone: Work (512) 239-4136
TNRCC Field Health & Safety Representative:	To Be Determined Phone: To Be Determined Pager: To Be Determined

Figure 1.1 - Map to Nearest Hospital

4040 Red Bluff Rd, Pasadena, TX New Search

Tri City Regional Hospital
4040 Red Bluff Rd, Pasadena, TX 77503
(713) 473-3311



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SECTION 1

INTRODUCTION

PURPOSE AND POLICY

The purpose of this health and safety plan is to establish personnel protection standards and mandatory safety practices and procedures for work conducted for preliminary assessments/screening site inspections (PA/SSI) under the Texas Natural Resource Conservation Commission (TNRCC) Preliminary Assessment/Site Investigation (PA/SI) program. The plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while field work is being conducted at the Patrick Bayou Site in Harris County, Texas.

All personnel who engage in field project activities at the site must be familiar with this plan and comply with its requirements. The provisions of the plan are mandatory for all TNRCC field personnel on this project.

PROGRAM DESCRIPTION

This preliminary assessment/screening site inspection will be conducted in conformance with the requirements of the revised Hazard Ranking System (HRS) 40 CFR Part 300; Final Rule, dated December 14, 1990. TNRCC Central Office staff recently completed collecting information needed to prepare a work plan and this health and safety plan. TNRCC Central Office staff personnel may visit the site to assist in executing the work plan and/or conduct inspection activities. Activities that will be conducted during the site visit include: site reconnaissance, interviews with any site personnel, and collection of sediment samples. The anticipated time frame for the execution of all the field work is March 2000. This health and safety plan pertains to activities performed while executing the work plan.

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SECTION 2

SITE INFORMATION

GENERAL INFORMATION

Site: Patrick Bayou Site, TXD Pending, SW Registration No. None

Location: Patrick Bayou is one of several small tributaries of the Houston Ship Channel (HSC) located within the lower portion of the San Jacinto River Basin (Segment 1006) influenced by tidal action from Galveston Bay and the HSC. Patrick Bayou begins at the end of a series of concrete/ gunite-lined storm water discharge channels/culverts for the City of Deer Park, Texas draining north to the HSC approximately 2.1 miles as measured from the State Highway (SH) 225 bridge.

The "site" is defined as the bounds of Patrick Bayou originating below the concrete/gunite box cover 0.4 miles below SH 225 extending north entering the HSC. The center of the site is located at Latitude 29°43' 55" North, Longitude 95° 06' 52.5" West. The site is located in a mixed urban/highly developed industrial/petrochemical area in southeast Harris County north of Deer Park, Texas (population 27,652 - 1990 Census). The site is bordered to the north by navigable water, the Houston Ship Channel, to the east and west by major petrochemical companies and by the City of Deer Park to the south. Access to the site is limited and restricted since the shoreline surrounding the bayou is privately owned by three petrochemical companies. Each facility limits personnel access and requires entry through a visitor's gate and registration. The only access to the bayou from the north is by a shallow draft boat entering from the HSC

Mailing Address: For the site: None
Adjacent Property Owners:

OxyVinyls, LP, P.O. Box 500, 1000 Tidal Road, Deer Park, Texas 77536
Telephone: (281) 476-2692 FAX: (281) 476-2149

Lubrizol Corporation, P.O. Box 158, 41 Tidal Road, Deer Park, Texas 77536
Telephone: (281) 479-2851 FAX: (281) 884-5308

Shell Chemical Company, P.O. Box 100, 5900 SH 225, ECB Annnex B15
Deer Park, Texas 77536
Telephone : (713) 246-1068 FAX: (713) 246-6707

Proposed date of field work: March, 2000

Hazard Assessment: __ High ✓ Medium __ Low

__ None __ Unknown

Site description: The "site" includes the in-water portion of Patrick Bayou that has received for a number of years an accumulation of permitted industrial wastewater discharges, municipal wastewater treatment plant effluent and storm water discharges from adjacent industrial sites and nearby urban/residential areas. Hazardous substances may have originated from these discharges or from spilled material transported along the surface water pathway and subsequently deposited within the bayou.

Prior investigations conducted by the City of Houston in 1993 and 1994 along the HSC and its tributaries indicated high to moderate levels of DDD, DDT, polynuclear aromatic hydrocarbons (PAHs), cadmium, chromium, mercury, nickel, zinc, polychlorinated biphenyls (PCBs) and dioxin accumulating within Patrick Bayou. A subsequent investigation conducted in December 1994 during a joint-TNRCC/USEPA Containment Assessment of Patrick Bayou documented moderate to high levels of organic, heavy metal, pesticide and PCB concentrations from hazardous substances migrating to the bayou.

SCOPE OF WORK SUMMARY

The field team will collect sediment samples to characterize remaining wastes. A total of 27 sediment samples are planned to be collected including duplicate samples plus two (2) rinsates and two (2) field blanks if field decontamination is required for non-dedicated sampling equipment. These samples will include seven (7) background sediment samples collected from unaffected upstream locations within a 1-mile radius of the site. In addition, three (3) of the sediment samples will be collected to determine if contaminants may have migrated to wetland areas within Patrick Bayou. A duplicate sample will be collected for each 10 samples collected for each day.

All samples will be collected according to the procedures outlined in the QAPP (Appendix D).

No ground water, soil or air samples are planned to assess releases to their respective pathways. Sediment samples collected to document and characterize remaining source contaminants within the bayou will be used to assess the soil exposure pathway.

SITE/CHEMICAL CHARACTERISTICS

Chemical type(s): ✓ Liquid ✓ Solid ✓ Sludge ___ Gas

Characteristic(s): ___ Corrosive ___ Ignitable ___ Radioactive

___ Volatile ✓ Toxic ___ Reactive

___ Unknown ✓ Other

Summary of known wastes: See below.

List of hazardous substances detected on site: A record review has identified DDD, DDT, acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, 2-methylnaphthalene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzp(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(123cd)pyrene, pyrene, hexachlorobenzene (HBC), hexachlorobutadiene (HCBD), hexachloroethane (HCE), bis(2ethylhexyl)phthalate, carbazole, dibenzpfuran, 1,3-dichlorobenzene, 1,4-dichlorobenzene, di-n-butylphthalate, 1,2,4-trichlorobenzene, arsenic, chromium, copper, lead, manganese, mercury, nickel, selenium, zinc, PCB Aroclor 1248 and dioxin as the potentially hazardous substances within the site. These wastes may have originated from numerous discharge sources entering Patrick Bayou.

Description of all known waste disposal areas on site: Know waste disposal areas to date include only those areas where prior sediment and surface water samples have been collected revealing elevated levels of hazardous substances documented during previous investigations.

Site waste management history: Based on a review of available records, Patrick Bayou has been receiving industrial process wastewaters, municipal wastewater treatment plant effluent and storm water collection system outfall discharges for an undetermined period. The first sampling event to document accumulating wastes within Patrick Bayou was a study conducted by the City of Houston investigating wastes within the Houston Ship Channel in 1993 and 1994. Surface water samples were collected since there are three routine ambient stream monitoring locations (Stations 014, 015 and 016) located within the bayou. To date, there have been no attempted remediation efforts and wastes continue to accumulate along the surface water migratory pathway.

Unusual features (storage areas, shop, surrounding terrain, etc.): The site is located in a highly industrialized area and surrounded by three major petrochemical companies owning the properties along the east and west perimeters of the bayou. Since the "site" is defined as the contaminated sediments within the bayou, there are no on-site workers, residents, schools or day care centers located within the site boundaries. As a result, the primary health concern is an individual who may come in contact with the sediments by wading along the shoreline or by ingesting the fish, shellfish, crabs or crayfish that may inhabit the bayou and become exposed to the contamination.

Site access can only be gained by entering private property which is surrounded by high-security fences with manned entry gates. Visitors must register and be escorted within each of the company areas; therefore, inadvertent entry to the site is unlikely. The site may be accessed from the Houston Ship Channel, but by only using a shallow draft boat or raft.

Current status of site: The site is a bayou tributary influenced by tidal action from the Houston Ship Channel and Galveston Bay containing contaminated sediments from an unknown source. The depth and full extent of the contamination has not been determined.

Summary of the regulatory history of the site: A record review reveals there has been no enforcement action taken to date since the source of the detected hazardous substances has not been clearly determined.

SECTION 3

PROJECT TEAM ORGANIZATION

Table 3.1 describes the responsibilities of all staff and on-site personnel associated with this project. The names of individuals associated with this project are listed below:

TNRCC PA/SI Program Manager:	Allan M. Seils, Austin, Texas
Staff Safety Officer:	John Syer, Austin, Texas
Site Investigation Manager:	James D. Thompson Arlington, Texas
Assistant:	Judie Mattocks
Site Safety Officer:	To Be Determined.

Personnel - The Site Investigation Manager designates the Site Health and Safety Officer who will be responsible to see that the site work is performed in a manner consistent with the Health and Safety Plan (HASP). The Site Health and Safety Officer will be responsible for Health and Safety briefings before each daily on-site inspection.

NOTE

The Site Investigation Manager or the Site Health and Safety Officer may temporarily suspend field activities if health and safety of personnel are endangered. The Site Investigation Manager or the Site Health and Safety Offer may temporarily suspend an individual from the field activities for infractions of the HASP.

Table 3.1
Staff and On-site Personnel

Title	General Description	Responsibilities
PA/SI Program Manager/ Deputy	Reports to upper-level management. Has authority to direct site investigation activities. Assumes responsibility of meeting all PA/SI program goals/objectives.	Prepares, organizes, and provides program support material. Reviews/approves the project Work Plan, Health and Safety Plan, and the Quality Assurance Project Plan. Appoints field team members for the field work. Briefs the Site Investigation Manager on his specific duties. Ensures, through the Staff Safety Officer, that safety and health requirements are met. Serves as the liaison with the Region VI EPA Representative.
Staff Safety Officer	Advises the PA/SI Program Manager on all aspects of health and safety. Reviews Health and Safety Plans submitted to Central Office.	Advises the PA/SI Program Manager on all health and safety issues. Reviews all project Health and Safety Plans to assure proper clothing and protective equipment are identified. Ensures that the proper protective clothing and safety equipment are available for the field investigation efforts.
Site Safety Officer	Advises the Site Investigation Manager on all aspects of health and safety. Assures proper field safety is implemented according to the project Health and Safety Plan.	Ensures that entry and exit controls at the site access control points are in place and maintained. Periodically inspects protective clothing and equipment. Confirms each team member's suitability for work based on a physician's recommendation. Monitors the work parties for signs of stress, such as cold exposure, heat stress, and fatigue. Implements the health and safety plan. Conducts periodic inspections to determine if the project Health and Safety Plan is being followed. Enforces the buddy system.

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Table 3.1
Staff and On-site Personnel
(Continued)

Title	General Description	Responsibilities
Site Safety Officer (Continued)		Notifies, when necessary, local public emergency officials in coordination with on-site representatives. Coordinates emergency medical care. Ensures setup of decontamination lines and solutions appropriate for the type of chemical contamination on the site. Controls decontamination of all equipment, personnel, and samples from the contaminated areas. Ensures proper disposal of contaminated clothing and materials. Advises medical personnel of potential exposures and consequences. Notifies emergency response personnel by telephone or radio in the event of an emergency. Ensures that all personnel can appropriately use the equipment.
Site Investigation Manager	Prepares Work Plan, and Health and Safety Plan for review/approval. Responsible for field investigation phase of the project.	Obtains permission for site access from the property owners or their representatives. Coordinates all field activities with the appropriate local community officials. Prepares the Work Plan and Health and Safety Plan for Central Office review/approval. Ensures that the work plan is complete and submitted to meet schedule requirements. Executes the Work Plan, Health and Safety Plan, and assures QAPP requirements are met according to the project schedule. Enforces safety procedures through the Site Safety Officer. Documents field activities and sample collection efforts. Serves as a liaison with the on-site client representative.

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Table 3.1
Staff and On-site Personnel
(Continued)

Title	General Description	Responsibilities
Site Investigation Manager (Continued)		Prepares and submits the final report and required support documentation for Central Office approval.
Field Team Members	Perform field activities as instructed by Site Investigation Manager.	Safely complete the on-site tasks required to fulfill the work plan. Notify Site Safety Officer or supervisor immediately of suspected or noted unsafe conditions observed in the field. Take precautions necessary to prevent injury to themselves and other employees. Read, sign-off, and comply with the project Health and Safety Plan before entering the site for field activities. Maintain visual contact between partners (buddy system). Perform only those tasks they believe they can do safely. Immediately report to the field team leader any accidents and/or unsafe conditions, or any deviations from the Health and Safety Plan.

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SECTION 4

SAFETY AND HEALTH RISK ANALYSIS

RESPIRATORY HAZARDS

Respiratory hazards should not be a health concern at the site since volatile organic compounds were not reportedly detected at the site and sediment samples are to be collected only.

CHEMICAL HAZARDS

Chemical hazards can exist when liquid, vapors, or soil samples contact human tissue. Every effort will be made to avoid inadvertent contact with the chemical media at the site. Since only sediment samples will be collected, protective equipment will be used to avoid any physical contact. The chemical hazards at the site include any sediments which may contain hazardous substances detected during previous investigations.

Information on the contaminants that may be encountered at the site is presented in Section 2 and Attachment B. The site may contain other hazardous chemicals that may release hazardous or toxic vapors. The site will be approached with caution, and any moving or handling of waste material, residue, containers or equipment will be avoided.

ROUTES OF EXPOSURE

The field team may be exposed to contaminated materials through eye and/or skin contact and ingestion.

- Eye contact with sediment samples that are contaminated can occur when a worker does not wear safety glasses while samples are being taken or handled.

- Skin contact with contaminated solid or liquid samples can occur when a worker does not wear gloves and protective clothing during sampling activities.

- Gastrointestinal system contact with samples can occur when workers do not observe personal hygiene rules designed to reduce the chance of ingesting site contaminants (i.e., wash hands before smoking, eating, or drinking).

PHYSICAL HAZARDS

Shoreline Activities

The site is a large shallow water bayou with contaminated sediments. There may be unknown physical hazards encountered during site sampling events that could cause physical injury. Physical

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hazards include, but are not limited to debris, rocks and other obstacle located along the shoreline that may be encountered while collecting sediment samples. Field work should be performed using all normal safety precautions. The Health and Safety Plan guidelines concerning avoiding physical hazards will be followed, as a minimum. In addition,

- Walking in tall grassy area with limited forward visibility will be avoided;
- The "buddy" system will be used at all times;

Heat Stress

If elevated temperatures are encountered, heat stress may occur. Field work may be performed when daytime temperatures are often high. Water will be available on site, and the Site Safety Officer will encourage workers to drink frequently to prevent dehydration and stay in shaded areas whenever possible. In addition, workers should adhere to the recommended work/rest schedule determined by the Site Safety Officer. Depending on work levels and outside temperatures, each individual should monitor his body temperature and note indications of heat stress as they onset. The "buddy" system will be used at all times to check each other for the first symptoms of heat stress.

Heat stress/stroke control. The TNRCC Site Safety Officer will set work and break schedules depending on the outside temperature. General guidelines for heat stress control while sampling include rest breaks in the shade for at least 10 minutes out of every hour during elevated temperatures. Rest time shall also include fluid replacement with water or electrolytes fluids.

Heat stress/stroke monitoring. The TNRCC Site Safety Officer will monitor workers who are performing strenuous activities in elevated temperatures for heat stress/ stroke. Monitoring will be conducted at the Site Safety Officers discretion, worker's request, or at the beginning of a rest period. The monitoring shall also be conducted when workers performance or mental status significantly changes. The heat stress monitoring plan may include:

- Measurement of worker heart rate, OR
- Measurement of body temperature, and
- Observation of the field team members for signs and symptoms of heat injury.

Heart rate (HR) will be measured by the radial pulse for 30 seconds as early as possible during the resting period. The HR at the beginning of the rest period should **not exceed 100 beats per minute**. If the HR exceeds 100 beats per minute, the next work period will be shortened by one third while the length of the rest period remains the same.

Body temperature will be measured using an oral thermometer. Worker **body temperature should not exceed 99.6°F**. If the worker's body temperature exceeds this, the work period will be shortened by one third while the length of the rest period remains the same. No person will be permitted to wear a semipermeable or impermeable garment **when body temperature exceeds 100.6°F**.

Table 4.1 presents suggested frequencies for heat monitoring. Heat stress monitoring will be performed by a person with a current first-aid certification. Workers that exhibit signs of heat injury will be allowed to rest until the signs are no longer observable. The signs of heat stress/stroke are depicted in Figures 4.1 and 4.2. Suggested emergency medical procedures for treating heat exhaustion and heat stroke are also provided.

Cold Injury

Although the planned field sampling activities will occur during mild spring months, all field personnel should be especially alert to the possibility of cold injuries, which are most likely to occur when an unprotected individual is exposed to prolonged cold temperatures. Temperature, humidity, precipitation, and wind all play roles in the development of cold injuries. The most serious cold injuries are hypothermia and frostbite. Dehydration can also occur if insufficient fluids are not taken as in hot weather. In cold weather, the individual may not be as aware of the problem since perspiration evaporates rapidly or is absorbed by layers of heavy clothing.

Individuals with a history of cold injuries (i.e., frostbite) have a higher-than-normal risk of recurrence, not necessarily involving the part previously injured. Individuals with prior cold injuries should notify the Health and Safety Officer and use the "buddy" system to monitor early detection of cold injury symptoms.

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53 Heat Exhaustion/ Heat Cramps

Signs & Symptoms: cool, pale, clammy skin / fatigue and faintness/headache/ heavy sweating/ weak pulse/near-normal body temperature/ nausea. Onset is gradual.

If person is unconscious, see *Heatstroke*, p. 54.

Calm the person by talking while attending to the problem. Explain what you are doing. Try not to show anxiety; act with confidence. Your calm behavior can help to reassure the sick person.

If possible, bring person indoors to a cool room. (Use air conditioner or electric fan or open windows and fan vigorously.) Outdoors, move person to a shaded area.

Have the person lie down. Elevate legs and feet with pillows or rolled blankets.

Loosen or remove clothing. Cool the skin with cool, wet sponges or cloths applied to forehead, arms, and legs

See illustration on opposite page

If the person has *no* heart problems or high blood pressure and is fully conscious, give sips of a salt solution (1 teaspoon salt to 16 oz. — 2 cups — water) every 15 minutes for about one hour. Check body temperature every 5 minutes and continue to cool with wet cloths.

If the person complains of muscle cramps, do not massage cramped muscles. This may increase pain.

Does temperature suddenly rise? Are there convulsions, stupor, or unconsciousness?

Yes

If any of these occur, see *Heatstroke*, p. 54.

No

Does the person begin to feel better after one hour?

Yes

Keep person out of the sun and as cool and comfortable as possible.

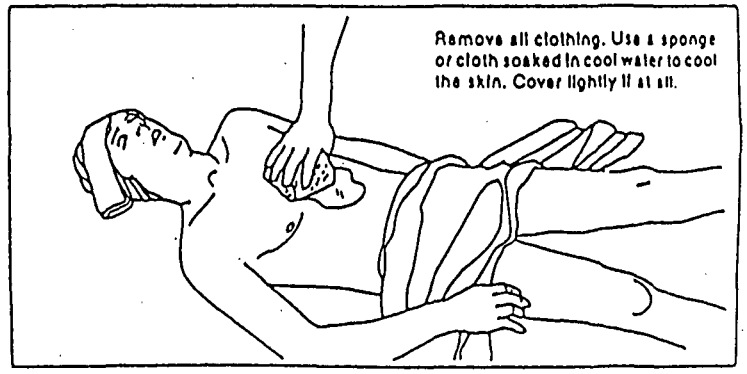
Person should be checked by a doctor as a precaution. Discourage unnecessary exercise; this person may now be more susceptible to heat. If symptoms reappear, repeat process and call a physician.

No

Seek medical care immediately. While awaiting assistance, continue cooling with wet cloths and checking body temperature frequently.

Smelling salts, held briefly under the nose, may help to stimulate the person.

If the temperature suddenly rises or convulsions, stupor, or unconsciousness develop, see *Heatstroke*, p. 54.



Remove all clothing. Use a sponge or cloth soaked in cool water to cool the skin. Cover lightly if at all.

Figure 4.1

Reproduced from *Emergency Medical Procedures for the Home, Auto & Workplace*, revised edition, by The Deltakron Institute. New York: Prentice-Hall Press, 1987.

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54 Heatstroke

Signs & Symptoms: *red, hot, dry skin/no perspiration/body temperature around 106°F (or very warm to the touch)/strong rapid pulse/stupor or unconsciousness*

If there are two or more rescuers, one should obtain emergency assistance while the other is following the procedures outlined below.

Calm the person by talking while attending to the problem. Explain what you are doing. Try not to show anxiety; act with confidence. Your calm behavior can help to reassure the sick person.

If possible, bring person indoors to a cool room. (Use air conditioner or electric fan or open windows and fan vigorously.) Outdoors, move person to a shaded area.

Remove all clothing. Use a sponge, cloth, or sheet soaked in cool water to cool the skin, wetting the material often, or immerse the person in a bathtub filled with cool water.

See illustration on opposite page

Do convulsions occur?

No

Yes

Remove objects that may cause injury and place pillows or rolled blankets around head to prevent injury. Do not try to hold person down. Do not place anything between teeth.

Watch for breathing problems. If breathing stops, see *Artificial Respiration*, p. 4.

Check temperature every 5-10 minutes until it drops to 100-102°F, then discontinue sponging or immersion. If you have no thermometer, continue cooling process until person feels cool.

Is there a history of heart problems?

No

Yes

Have the person lie flat. *Do not* cover unless chilled. Then cover lightly.

Have the person sit or lie in a comfortable position with a pillow behind head and shoulders.

If emergency assistance has not been summoned, obtain help now.

While awaiting assistance, keep person as cool and comfortable as possible and continue to watch for breathing problems. Check temperature frequently.

If temperature begins to rise again repeat the cooling process

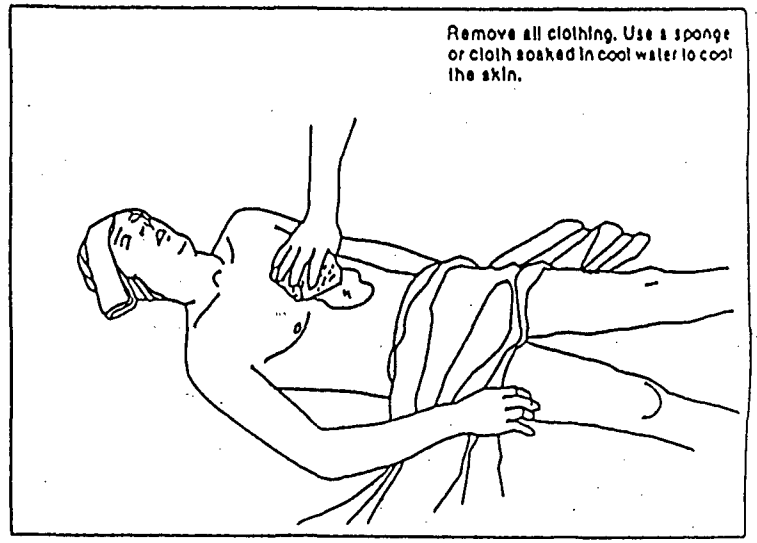

Figure 4.2

Reproduced from *Emergency Medical Procedures for the Home, Auto & Workplace*, revised edition, by The Deltakron Institute. New York: Prentice-Hall Press, 1987.

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Table 4.1 - Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers[1]

Temperature	Normal Work Ensemble[2]	Impermeable Ensemble
90°F (32.2°C) or above	After each 45 minute work period	After each 15 minutes work period
87.5-90°F (30.8-32.2°C)	After each 60 minutes work period	After each 30 minutes work period
82.5-87.5°F (28.1-30.8°C)	After each 90 minutes work period	After each 60 minutes work period
77.5-82.5°F (25.3-28.1°C)	After each 90 minutes work period	After each 90 minutes work period
72.5-77.5°F (22.5-25.3°C)	After each 150 minutes work period	After each 120 minutes work period

[1] For moderate work, e.g. walking about with moderate lifting and pushing.
[2] A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

Noise

It is not anticipated that the field team will be exposed to excessive noise levels from equipment or vehicles being operating at the site. However, hearing protection will be available for use as appropriate.

Snake Hazards

It is unlikely that snakes will be encountered at the site or while collecting background or sediment samples. However, it is recommended that long pants and high boots or snake guards be worn during shoreline activities to avoid a snake hazard. Never reach into a bushy area before checking for snakes by probing the area with a stick and listening for movement in the brush. Field team members will use caution when in areas where snakes may be present.

If a worker is bitten by a poisonous snake, the following steps should be taken:

- Attempt to identify the type of snake and its location,

- Keep the victim calm and minimize movement,
- Apply ice to the area bitten, and
- Transport victim to the nearest medical facility.

SAFE WORK PRACTICES

To ensure a strong safety awareness program during the sampling inspection, personnel must have adequate training. The Health and Safety Plan must be read by each member of the field team before conducting field activities and briefed to the field team at the beginning of each sampling day. A safety awareness must be developed and communicated to all members of the field team. All members of the field team will adhere to the following safety requirements while conducting field work for this sampling effort:

- No smoking, eating, or drinking carbonated beverages while at the site.
- Do not carry matches, lighters, or other ignition sources on the site.
- Facial hair will not be allowed where respirators contact the face.
- Contact lenses will not be worn during field work.
- Alcoholic beverages will not be permitted in state vehicles.
- Always use the "buddy" system while performing field work.
- Avoid walking through puddles or stained soil.
- Discovery of unusual or unexpected conditions will result in immediate evaluation and reassessment of site conditions and health and safety practices.
- A safety briefing will be performed each day prior to on-site work beginning.
- Other safety meetings may be conducted, as necessary.
- Take precautions to reduce injuries from field equipment and other tools.

All personnel will check their equipment at least two weeks before going into the field in case replacements are necessary. For respirator users, the correct corresponding cartridge or canister for the user's respirator will be verified before entering the site.

Tyvek coveralls, neoprene or nitrile gloves, hard hats, and rubber steel-toed boots or steel-toed shoes or boots will be worn by all personnel performing sampling activities. Safety glasses will be worn at all times to prevent eye irritation from particulate matter.

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SECTION 5

PERSONNEL PROTECTION EQUIPMENT AND MONITORING

RESPIRATORY PROTECTION

The chemicals that may be present at the site, as listed in Section 2, List of Chemicals Used On Site, do not include volatile organics. As a precaution to avoid respiratory exposure to unknown on-site chemical vapors, initial air monitoring will be performed during the PA/SSI on-site reconnaissance inspection as specified in Section 7. In addition, visual inspection will be used to detect the presence of any unknown chemicals by noting stained or vegetation stressed areas during the initial walk through. As a final precaution, during sample collection efforts, warning symptoms such as headaches and nausea and observations of unusual vapors, mists, or clouds, will require using readily available respiratory protective equipment or immediate evacuation of the area.

PERSONAL PROTECTION

The required personal protection clothing will be worn during on-site inspections, especially during all sampling events, except where down-grades are acceptable:

Level C (Modified)

- Coveralls (i.e., Tyvek), neoprene, PVC, or rubber boots (steel toe), inner vinyl or latex surgical gloves, outer neoprene work gloves, full-face respirator with organic and particulate filters.

- Coveralls will be taped at wrists and ankles. Respirator cartridges to be used will bear NIOSH/MSHA approvals. Respirator cartridges will be changed once daily or when recommended exposure is reached to minimize the potential for break-through. If break-through occurs, cartridges must be changed.

If a down-grade is deemed acceptable:

Level D

- Tyvek (non-chemical resistant) coveralls, neoprene, PVC, rubber, or leather work boots (steel toe), optional inner vinyl or latex surgical gloves, outer neoprene work glove, optional goggles or face masks, and a hard hat.

MEDICAL SURVEILLANCE

Each field member must be a current participant in the TNRCC Health Monitoring Program, and must have already had their initial physical examination prior to entering this or any site where a potential exists for exposure to hazardous chemicals.

Each team member will acknowledge that they have had a current annual physical by signature on the Plan Acceptance Form and that they are medically fit to perform team tasks as assigned. If there are any medical restrictions on a team member's utilization, these restrictions must be provided in writing to the Site Safety Officer as noted by a physician as soon as possible before the field work begins. These restrictions will be complied with at all times while performing team tasks. If the team member cannot perform the task as required, another team member will be selected to perform the task.

SITE SPECIFIC TRAINING

The Site Safety Officer will be responsible for developing a hazard awareness briefing for all TNRCC personnel that are to perform team member tasks on the site, and other visiting personnel, as necessary. If other personnel visit the site during the sampling inspection and wish to participate, they will be required to review the Health and Safety Plan and/or receive a hazard awareness briefing from the Site Safety Officer before entering the site. This training will be acknowledged by signature of the visiting personnel on the Plan Acceptance Form (Attachment A). A daily safety meeting will be held prior to entering the site each day and a Site Safety Briefing Form completed (See Attachment C). The safety meeting will consist of the following topics:

SITE SAFETY BRIEFING (Held Each Day)

- Roll call - identify the team member responsible for site safety and health. Assure the Plan Acceptance Form has been signed by each team member.
- Assign a 2-way radio Home Base (staging area) Monitor.
- Discuss safety, health and other issues that may effect the tasks assigned.
- Discuss/review proper use of personal protective equipment.
- Review work practices by which the employee can minimize risk from hazards.
- Discuss safe operation of engineering controls and equipment used on the site.
- Review potential chemicals and acute effects of the chemicals at the site.

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- Review evacuation routes, signals, and emergency evacuation procedures.
- Review decontamination procedures, assign decontamination tasks.
- Assign designated area to meet in case work area must be evacuated.
- Review "buddy" system procedures.

The Site Safety Officer shall be familiar with the operation, calibration, and limitations of all field monitoring equipment. In addition, the field team should have the following health and safety items readily available:

- Copy of the Health and Safety Plan,
- Cellular Phone & Emergency Numbers,
- 2-way communication radio set,
- First aid and snake bite kits, including ice,
- Emergency eyewash bottle,
- Air sampling/monitoring equipment (photoionization detector, etc,),
- Oxygen/combustible gas indicator (as required),
- Fire extinguisher, and
- Distilled water (for eyewash bottle refill and decontamination procedures).

SECTION 6

FREQUENCY AND TYPES OF AIR MONITORING

If the Site Investigation Manager determines that air monitoring is necessary, two types will be performed at this site: monitoring for combustible hydrocarbon emissions and for volatile organic vapors. The first instrument to be used on site is the O_2/combustible gas indicator (CGI), or explosimeter. The lower explosive limit (LEL) for combustible gases will be monitored initially before any other instruments are employed, since volatile ignitable gases are of highest concern. Dangers from these gases also include asphyxiation to entering a potentially explosive atmosphere. The **action level** for LEL is established as **>20% LEL**. Therefore, LELs of 20% or greater are cause to stop work and evacuate the area upwind until levels are determined below this action level.

If the LEL is established as < 20%, monitoring for organic vapors/gases will be conducted as the second type of air monitoring using a photoionization detector (PID) instrument. Field instruments must be calibrated prior to use at the site according to the manufacturer's specifications and as outlined in the QAPP. Monitoring of the potential breathing zone around the sampling areas will be performed during the sampling activities as well as periodically during other on-site activities. An **action level** of **10 ppm above background** will be used for **volatile organics** at all sampling areas because of the potential for encountering unknown chemicals. If 10 ppm above background is encountered on the air monitoring equipment at a sampling location, the Site Safety Officer will be immediately contacted to reevaluate safety equipment requirements or whether the site will be evacuated until the vapors are identified or dissipate.

The need for air monitoring equipment and frequency will be determined on a site-specific basis by anticipated respiratory concerns at the area (i.e., background samples taken off-site may not need air monitoring equipment). Table 6.1 lists the chemicals known to exist at the Patrick Bayou site and the TLV, PEL, and other pertinent information for each chemical. Table 6.2 lists the same information for the decontamination and preservation chemicals which may be used at this site.

AIR MONITORING EQUIPMENT CALIBRATION AND MAINTENANCE

All monitoring instruments will be calibrated daily in accordance with the QAPP. Calibration data/time/equipment comments will be noted in the project field notebook.

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Table 6.1 Chemicals that may be present at the Patrick Bayou Site (From NIOSH & ACGIH Pocket Guides)

Chemical	**NIOSH REL** (Recommended exposure level for 10 hr wk day/40 hr week) ST (short term exposure level/15 min)	**PEL** b/ (Permissible exposure limit for 8-hr days in a 40 hr week) ST (short term exposure level/15 min)	**TLV** a/ (Threshold Limit Values for 8 hours) **only listed if more stringent than PEL	**IDLH** c/ (Immediate dangerous to life or health concentrations	**Symptoms of Exposure** (inhalation, skin absorption)
lead	0.15 mg/m^3	0.15 mg/m^3	---	100 mg/m^3	Bluish-gray soft metal. Poison by ingestion. Affects eyes, GI tract, CNS, kidneys and blood. Symptoms: feel weak, facial pallor, abdominal pain, anemia, eye irritation.
cadmium (dust)	0.005 mg/m^3	0.005 mg/m^3	---	9 mg/m^3 as dust	Silver-white, blue tinged, lustrous odorless metal. Possible carcinogen. Affects respi. system, kidneys, prostrate and blood. Symptoms: cough, tight chest, chills, nausea, vomiting, mild anemia.
chromium	0.5 mg/m^3	0.5 mg/m^3	1.0 mg/m^3	250 mg/m^3	Blue-white to steel-gray lustrous, brittle odorless metal. Affects eyes, skin and resp. system. Symptoms: eye, skin, nose and lung irritations.
copper (dust)	1.0 mg/m^3	1.0 mg/m^3	1.0 mg/m^3	100 mg/m^3	Reddish, lustrous, malleable, odorless metal. Affects eyes, skin, respiratory system, liver and kidney. Symptoms: eye, nose, pharynx and skin irritations; metallic taste. Anemia.
dioxane	3.6 mg/m^3 (30 min)	100 ppm (skin)	25 ppm (skin)	500 ppm	Colorless liquid or solid (below 53°F) with a mild ether-like odor. Irritates eyes, skin, nose. Symptoms: vomit, liver damage, kidney failure.
mercury (metal)	0.05 mg/m^3 (skin)	—	---	10 mg/m^3	Metal: silver-white heavy, odorless liquid. Irritates eyes, skin; cough. Chest pain, dysp, bron, pneutis.
nickel (metal)	0.015 mg/m^3	—	1.0 mg/m^3	10 mg/m^3 (as Ni)	Metal: lustrous, silvery odorless solid. Symptoms: sensitive skin, allergic asthma, pneuitis. Affects nasal cavities, lings, skin (cancer).
PCBs	0.001 mg/m^3	—	—	—	Mixtures from oily liquids to white crystalline solids and noncrystalline resins. Toxic by ingestion, skin contact. Suspected human carcinogen.
zinc (oxide)	5.0 mg/m^3 ST 15.0 mg/m^3 (dust)	5.0 mg/m^3 ST 15.0 mg/m^3 (dust)	5.0 mg/m3	500 mg/m^3	White odorless metal oxide. Affects respiratory system. Symptoms: eye irritation.

ppm = Parts per million ca = Carcinogen © = denotes Ceiling limit ST = Short Term mg = milligrams m^3 = cubic meters.

a/TLV-TWA = Threshold limit value, time weighted average. OSHA-enforced average air concentration to which a worker may be exposed for an 8-hour workday without harm.

b/PEL = Permissible exposure limit. Average air concentration (same definition as TLV, above) as recommended by the American Conference of Governmental and Industrial Hygienists (ACGIH).

c/IDLH = Immediately dangerous to life or health. Air concentration at which an unprotected worker can escape without debilitating injury or health effects. Expressed as ppm unless noted otherwise.

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Table 6.2 Chemicals of Record Used for Field Investigations

Chemical	TLV a/	(OSHA) PEL b/	Odor Threshold (ppm)	IDLH c/ (ppm)	Comments
Hexane	50	500	---	500	Calibration for HNU PI-101 photoionization detector. No anticipated problems since hexane in cylinder is only 0.14% by volume with air.
Nitric Acid	2	2	---	100	Very corrosive sample preservative agent. Avoid contact with skin, eyes, and clothing. Store bottle in an upright secure position. Do not preserve water samples suspected of containing cyanide compounds.
Hydrochloric Acid	(C),5	(C),5	1-5	100	Very corrosive sample preservative agent. Avoid contact with skin, eyes, and clothing. Store bottle in an upright secure position. Do not preserve water samples suspected of containing cyanide compounds.
Isopropanol	400		---	12,000	Decontamination fluid. Wear gloves when cleaning equipment.

ppm = Parts per million ca = Carcinogen © = denotes Ceiling limit

a/TLV-TWA = Threshold limit value, time weighted average. OSHA-enforced average air concentration to which a worker may be exposed for an 8-hour workday without harm.

b/PEL = Permissible exposure limit. Average air concentration (same definition as TLV, above) as recommended by the American Conference of Governmental and Industrial Hygienists (ACGIH).

c/IDLH = Immediately dangerous to life or health. Air concentration at which an unprotected worker can escape without debilitating injury or health effects. Expressed as ppm unless noted otherwise.

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HNU Photoionization Analyzer Model PI-101

The HNU Systems, Inc. Model PI-101 Photoionization Detector (PID) must be kept hooked up to the battery charger overnight before use. A spare battery is kept in the carrying case and should be kept charged so a backup battery is available.

The HNU may be calibrated with a calibration gas of known contents by connecting the probe to a sampling source using flexible tubing. The HNU requires a "zero" adjustment to background levels. Start-up procedures are provided with the instrument and may be referred to for correct equipment operation. A review of the operating considerations are provided below:

Check the function switch on the control panel to make sure it is in the OFF position. Attach the probe to the readout unit. Match the alignment key, and twist the connector clockwise until it locks. Turn the function switch to the BATTERY CHECK position and check that the indicator is in the "green." Turn the function switch to STANDBY to zero the instrument. Rotate the ZERO POTENTIOMETER until the meter reads "zero." Wait 15 to 20 seconds to confirm that the zero adjustment is stable. If not, then readjust. Check to see that the SPAN POTENTIOMETER is set to the appropriate setting for the probe being used (5.0 or 10.2). Set the function switch to the desired ppm range. Listen for the fan operation to verify the fan function. Check operation of the sensor using an organic source, such as a "magic marker" to verify instrument function.

MONITORING REQUIREMENTS AND INSTRUMENT LIMITATIONS

The TNRCC Site Safety Officer will periodically perform and maintain calibration and on-site maintenance records for the direct-reading instruments.

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SECTION 7

ACCIDENT PREVENTION AND CONTINGENCY PLAN

ACCIDENT PREVENTION

All field personnel will receive health and safety training prior to the initiation of any site activities. On a day-to-day basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. Before beginning the site investigation, a meeting will be held to discuss accident prevention (see Section 5, Site Safety Briefing). The discussion should cover but not be limited to:

- Tasks to be performed; time constraints (e.g., rest breaks);
- Hazards that may be encountered, including their effects, how to recognize symptoms or monitor them, concentration limits, or other danger signals; and emergency medical procedures.
- Emergency evacuation procedures.

Buddy System

The "buddy" system will be used at all times by all TNRCC field personnel while performing work related tasks on site. All activities must be conducted with a partner (buddy) who can:

- Provide his or her partner with assistance;
- Observe his or her partner for signs of chemical or weather exposure; and
- Notify the Site Safety Officer or others if emergency help is needed.

CONTINGENCY PLAN

Emergency Procedures

In the event that an emergency develops on site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on site, or

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- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

Chemical Exposure

If a member of the field crew demonstrates symptoms of chemical exposure, the procedures outlined below should be followed:

- Another team member (buddy) should remove the individual from the immediate area of contamination. The buddy should then notify the Site Safety Officer of the chemical exposure. The Site Investigation Manager should contact the appropriate emergency response agency.

- If the chemical is on the individual's clothing, the chemical should be neutralized or removed (if it is safe to do so).

- If the chemical has contacted the skin, the skin should be washed immediately with copious amounts of water.

- In case of eye contact, the emergency eye-wash solution should be used. Eyes should be washed for at least 15 minutes using available distilled water.

- All chemical exposure incidents must be reported to the Region/Central Office Staff Safety Offices. The Site Investigation Manager is responsible for reporting the chemical exposure incident and assist the individual's supervisor in submitting written reports (see Attachment A).

Personal Injury

In case of personal injury at the site, the following procedures should be followed:

- A team member should signal the other team member that an injury has occurred.

- A field team member trained in first aid can administer immediate treatment to the injury.

- The victim should then be transported (if applicable) to the nearest hospital or medical center, or stabilized so that further injury does not occur.

- The Site Investigation Manager is responsible for making certain that an accident report form is completed and submitted to the Region and Central Office Staff Safety Offices. Follow-up action should be taken to correct the situation that caused the accident.

Evacuation Procedures

- The Site Safety Officer will determine whether an evacuation is necessary.
- All personnel in the work area should evacuate the area and meet in the predesignated area.
- Account for all personnel. Wait for further instructions from the Site Safety Officer.

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SECTION 8

SITE-SPECIFIC DECONTAMINATION PROCEDURES

Prior to leaving the site, personnel protective and sampling equipment will be decontaminated. Decontamination procedures will be conducted as follows:

- Remove and wash goggles or safety glasses (if used),
- Remove and wash chemical protective boots, gloves,
- Wash sampling equipment to remove gross contamination, and
- Wash hands and face.

Protective gloves will be placed in garbage bags and disposed of appropriately at the conclusion of site activities. Sampling equipment will be placed in plastic bags for final decontamination at the conclusion of site activities.

PERSONNEL DECONTAMINATION PROCEDURES

The TNRCC field team will establish an on-site decontamination station. An area will be set up during initial field activities prior to any sampling event. The decontamination station will have provisions for collecting disposable protective equipment; for washing boots, gloves, field instruments, sampling tools (if required); and for washing hands, face, and other exposed body parts. Investigation derived waste (IDW) from decontamination will be properly disposed in accordance with EPA guidelines outlined in the EPA/540/G-91/009, May 1991 handbook.

Decontamination equipment will include, as necessary:

- Plastic buckets, pails, and scrub brushes
- Non-phosphate detergent
- Isopropyl alcohol
- Paper towels
- Plastic garbage bags, sheets of plastic
- Deionized and potable water.

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SECTION 9

DOCUMENTATION AND NOTIFICATION

LOGBOOK DOCUMENTATION REQUIREMENTS

Implementation of the provisions of the Health and Safety Plan will be recorded in the field log book. Information to be recorded shall include:

- Weather conditions at the time of the inspection (daily entry),
- Names of the personnel on-site (daily entry),
- Levels of personal protective equipment worn by the field personnel (specifically note conditions or rational for down- or up-grading PPE),
- Monitoring instrument readings,
- Subjects discussed during site health and safety briefings, and
- All safety violations.

A Health and Safety Checklist has been included in Attachment C to assist the Site Safety Officer in assuring that appropriate safety consideration have been covered in the daily safety briefing.

EPA NOTIFICATION OF IMMINENT DANGER TO THE GENERAL PUBLIC

If there is an imminent danger that the general public may come into direct contact with hazardous substances or wastes, which are readily accessible on-site, the Site Investigation Manager will notify the Project Manager who will notify the EPA no later than one (1) day after the inspection team returns from the site. Written notification will follow any verbal communication in regard.

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SECTION 10

CONFINED SPACE ENTRY

A "Confined Space" means that a space:

1) is large enough and so configured that an employee can bodily enter and perform assigned work;
2) has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
3) is not designed for continuous employee occupancy.

Should confined spaces be required to be inspected for a SSI, the Site Project Manager will be responsible for evaluating the site to determine if any confined spaces meet the definition of a permit-required confined space. "Permit-required confined space" means a confined space that has one or more of the following characteristics:

1) contains or has a potential to contain a hazardous atmosphere;
2) contains material that has the potential for engulfing an entrant;
3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
4) contains any other recognized serious safety or health hazard.

If permit-required confined spaces are observed on site and are required to be investigated, the Site Project Manager, or any other team member, will not enter these spaces and will notify the Staff Health and Safety Officer, who will arrange for certified personnel who can work in permit-required confined spaces.

A DIGEST OF THE TEXAS WATER SAFETY ACT

THIS DIGEST IS NOT VALID AFTER AUGUST 31, 1997

Information in this digest may change due to Legislative, Commission or USCG action.

TEXAS REGISTRATION AND TITLE

[redacted]boats regardless of length and sailboats 14 feet in length or over [redacted]registered and titled, and outboard motors must be titled. Title applications and manufacturers statement of origin must accompany a request for boat registration for new boats and outboard motors.

Exemptions—All canoes, kayaks, punts, rowboats or rubber rafts when paddled, poled, oared, or windblown. Also exempt are any other vessels under 14 feet in length when paddled, poled, oared, or windblown.

TEXAS CERTIFICATE OF NUMBER

When your motorboat or registered vessel is in operation, your certificate of number (registration) or facsimile thereof must always be aboard and available for inspection by an enforcement officer. Your certificate is valid until the expiration date shown thereon. When you renew your certificate the same number shall be reissued, if you apply to this Department within the 90 day period preceding the expiration date. All motorboats regardless of length or horsepower are required by law to be registered.

DISPLAY OF YOUR NUMBER

The number awarded to your motorboat or registered vessel must be painted, decaled, or otherwise affixed to both sides of the bow of the boat in such position as to provide easy identification. The number shall read from left to right, must be in block characters of good proportion not less than three inches in height, and must be of a color that contrasts with the background. The numerals must be separated from the prefix and the suffix by hyphens or equivalent spaces such as the following example: **TX 0123 AB** and TX-0123-AB. Federal and State law prohibits any other number from being displayed on either side of the bow of your boat. The validation decal must be affixed on a line and three (3) inches AFT of the registration number.

HOMEMADE BOATS APPLICATION FOR TITLE

Requires affidavit of the person as to the origin of the boat, proof of the materials used in the construction of the boat (i.e., bills from marine and hardware dealers for parts, etc.), and requires each homemade boat to be inspected and certified by a peace officer. Inspection fee – $25.00.

TRANSFER OF OWNERSHIP

The seller must: (1) Execute notarized tax affidavits (Forms PWD 143/ PWD 144) if titles for boat and outboard motor **have not been issued** and properly assign titles (with notary) to purchaser if titles **have been issued**; (2) Licensed Marine Dealers use dealer assignments and show current dealer number.

The purchaser must: (1) Execute applications for registration and titles (boat and motor); (2) Mail applications, assigned titles or bills of sale with required fees (title fee – $10.00 for each boat or outboard motor). Registration transfer fee – $3.00 plus new registration fee if applicable; (3) Application

forms may be obtained from Parks and Wildlife offices or Marine Dealers and must be completed by purchaser and seller with applicable sales tax if boat/motor is purchased after October 1, 1991; (4) Applications for transfer of title and ownership must be filed not later than 20 days from date of purchase.

LOST OR DESTROYED CERTIFICATE

Fill out Form PWD-143, check the space marked "Duplicate," and mail to this Department together with the statutory fee of $3.00. You cannot legally operate your motorboat without a certificate of number on board; therefore, you should exercise care so as not to lose your certificate.

SCHEDULE OF FEES

TEXAS CERTIFICATE OF NUMBER
(MOTORBOAT/SAILBOAT REGISTRATION–TX NUMBER)

IF BOAT IS ...	THEN FEE IS ...
Class A Motorboat	
Less than 16 feet in length	$18.00
Sailboat	
14 feet but less than 16 feet in length	18.00
Class 1 Motorboat or Sailboat	
16 feet but less than 26 feet in length	27.00
Class 2 Motorboat or Sailboat	
26 feet but less than 40 feet in length	36.00
Class 3 Motorboat or Sailboat	
40 feet in length and over	45.00
Livery boat (less than 16 feet in length)	9.00
IF THE TRANSACTION IS A ...	**THEN FEE IS ...**
Correction	$ 3.00
Transfer of ownership (currently registered motorboat)	3.00
Duplicate TX Certificate of NO. (plastic card)	3.00
State assigned Serial/Hull I.D. No. (PWD Form 504)	3.00

TEXAS CERTIFICATE OF TITLE FOR A MOTORBOAT OR A SAILBOAT 14 FEET IN LENGTH OR OVER

IF FOR ...	THEN FEE IS ...
Original title, transfer of title, or duplicate title	$10.00
Correction (Return present title)	10.00
"Quick" Title (in addition to above fees)	15.00

NOTE: If boat/motor is purchased after October 1, 1991, sales tax is due!

OPERATING YOUR BOAT IN ANOTHER STATE

Most other states recognize the validity of your Texas Certificate of Number for the operation of your vessel for a period of at least 60 consecutive days.

PRODUCTION OF A CERTIFICATE

No one other than this Department is authorized to produce, by any means whatsoever, a Texas Certificate of Number.

ABANDONMENT OR DESTRUCTION OF BOAT

You must report such fact within 15 days to this Department, and you must surrender your Certificate of Number and if applicable, the title, with such notice.

REQUIRED SAFETY EQUIPMENT

LIFESAVING DEVICES

All children under 13 years of age in motorboats under 26 feet in length must wear a U.S. Coast Guard approved personal flotation device while underway. Underway means not at anchor, made fast to the shore or aground.

ALL vessels under 16 feet in length (including canoes and kayaks) must be equipped with one Type I, II, III or V (Type V device acceptable only if used in accordance with special instructions on the device) Personal Flotation Device in good and serviceable condition on board for each person.

Vessels 16 feet and longer, in addition to the Type I, II, III or V for each person on board, will be required to be equipped with one Type IV Personal Flotation Device which must be readily accessible. Canoes and kayaks over 16 feet in length are exempt from the Type IV requirement.

NOTE: All PFD's must be readily accessible, appropriate size for intended user and U.S. Coast Guard approved.

LIGHTS REQUIRED

All vessels including motorboats, canoes, kayaks, punts, rowboats, rubber rafts, or other vessels when not at dock must have and exhibit at least one bright light, lantern or flashlight from sunset to sunrise in all weather and during restricted visibility.

Figure 1

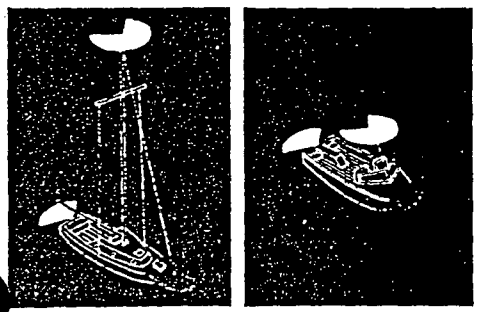
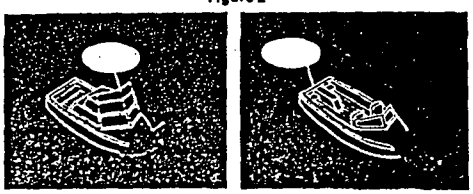


Figure 2



Navigation Lights

Power Driven Vessels: Power driven vessels of less than 20 meters (65.6 ft.) but more than 12 meters (39.4 ft.) shall exhibit navigation lights as shown in Figure 1. Vessels of less than 12 meters in length, shall show the lights in either Figure 1 or Figure 2.

Manually Driven Vessels: Manually driven vessels when paddled, poled, oared, or windblown;

- A sailing vessel of less than 20 meters (65.6 ft.), while underway shall exhibit sidelights and a sternlight which may be combined in one lantern carried at or near the top of the mast where it can best be seen.
- A sailing vessel of less than 7 meters (23 ft.) shall, if practicable, exhibit the sidelights and a sternlight, or shall exhibit at least one bright light, lantern or flashlight from sunset to sunrise when not at dock.
- All other manually driven vessels may exhibit sidelights and a sternlight, or shall exhibit at least one bright light, lantern, or flashlight from sunset to sunrise when not at dock.

Any vessel shall carry and exhibit lights required by the Federal Regulations for Preventing Collisions at Sea, 1948, Federal Act of October 11, 1951 (33 USC 142-147d) as amended.

Every white light prescribed shall be of such character as to be visible at a distance of at least two (2) miles. Every colored light prescribed shall be of such character as to be visible at a distance of at least one (1) mile. The word "visible" when applied to lights, shall mean visible on dark nights with clear atmosphere.

SOUND PRODUCING DEVICES

Vessels 12 meters (39.4 ft.) or more in length are required to carry on board a whistle or horn, and a bell. Any vessel less than 12 meters in length is required to carry whistle or horn, or some other means to make an efficient sound signal to signal intentions and to signal position in periods of reduced visibility.

MIRRORS REQUIRED

Every motorboat towing a person or persons on water skis, aquaplane or similar device must have an observer other than the operator 13 years of age or older or be equipped with a rearview mirror of a size no less than four inches (4") in measurement from bottom to top and across from one side to the other. Such mirror shall be mounted firmly so as to give the boat operator a full and complete view beyond the rear of his boat at all times.

PERSONAL WATERCRAFT

(Personal watercraft is defined as a type of motorboat which is specifically designed to be operated by a person or persons **sitting, standing,** or **kneeling ON** the vessel rather than **INSIDE** the vessel. Includes jet skis, wet bikes, etc.)

Requirements: Coast Guard approved Type I, II, III, or V must be worn by each person on or being towed by personal watercraft. Requires cut-off or kill switch be attached to operator or operator's clothing if the vessel

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is equipped with this device. All equipment requirements for regular motorboats also apply to personal watercraft. See "OPERATION OF YOUR BOAT" for additional personal watercraft regulations.

FIRE EXTINGUISHERS REQUIRED

Fire extinguishers approved for motorboats are hand-portable, of either B-1 or B-11 classification.

Classification (Type-size)	Foam (minimum gallons)	Carbon Dioxide (minimum pounds)	Dry Chemical (minimum pounds)
B-1	1¼	4	2
B-11	2½	15	10

The number of approved extinguishers required depends upon the class of the motorboat. When the engine compartment of the motorboat is equipped with a fixed (built-in) extinguishing system of an approved type, one less B-1 extinguisher is required.

Class of motorboat	Without fixed system in machinery space	With fixed system in machinery space
A	1 B-1	None
1	1 B-1	None
2	2 B-1 or 1 B-11	1 B-1
3	3 B-1 or 1 B-11 and 1 B-1	2 B-1 or 1 B-11

Outboard motorboats less than 26 feet in length, of open construction, not carrying passengers for hire, are not required to carry fire extinguishers; however, a fire extinguisher is required if one or more of the following conditions exist: (1) Closed compartment under thwarts and seats wherein portable fuel tanks may be stored. (2) Double bottoms not sealed to the hull or which are not completely filled with flotation material. (3) Closed living spaces. (4) Closed storage compartments in which combustible or flammable materials are stored. (5) Permanently installed fuel tanks.

Approved types of fire extinguishers are identified by any of the following:

a) Make and model number. Check markings on nameplate against listing under company's name in the Coast Guard Equipment Lists Booklet, CG-190.
b) "Marine Type" marking. Check nameplate for Underwriters' Laboratories, Inc., marking "Marine Type USCG" followed by the Coast Guard classification of "B-1 or B-11."
c) Coast Guard approval number. Check for marking of Coast Guard approval number on nameplates.

NOTE: All fire extinguishers must be readily accessible and in condition for immediate and effective use at all times.

FLAME ARRESTERS REQUIRED

All gasoline inboard engines must have a Coast Guard approved backfire flame arrester fitted to the carburetor, except certain engines that are labeled, "Model DU Engine accepted for use without an external backfire flame arrester." Approved types of backfire flame arresters are identified by make and model number, and are listed in the Coast Guard Equipment Lists Booklet, CG-190. If in doubt, you should check your make and model number against this equipment list.

EXHAUST WATER MANIFOLD; MUFFLER

A motorboat must have an exhaust water manifold or a factory-type muffler installed on the engine.

BOATING REGULATIONS

STOP AND RENDER AID

The operator of any vessel involved in a boating accident must stop and render whatever assistance is necessary unless such action would endanger his own vessel, crew or passengers. The operator must give his name, address and vessel identification number in writing to any injured person and to the owner of any damaged property.

ACCIDENTS AND CASUALTIES

Operators of vessels involved in any collision, accident or other casualty that results in death or injury to any person or property damage exceeding $500 must file a complete report of the accident within 30 days in accordance with Department regulations. These accident reports are confidential and are not admissible in court as evidence. Report forms may be obtained from Texas Parks and Wildlife offices or Game Wardens.

POLICE BOARDING YOUR BOAT

All peace officers and game wardens are given authority as enforcement officers for the purpose of this Act. (Section 31.121 and 31.124 of the State Parks and Wildlife Code.)

OPERATION OF YOUR BOAT

It shall be unlawful for any person to:

(1) Operate any motorboat or vessel at a rate of speed greater than is reasonable and prudent or greater than will permit him to bring such boat to a stop within the assured clear distance ahead.
(2) Operate any motorboat so as to cause a hazardous wake or wash.
(3) Operate any motorboat in a circular course around another boat whose occupant is fishing or around any person swimming.
(4) Moor or attach any boat to any buoy, beacon, light marker, stake, flag or other aid to safe operation placed on the public waters of this State by proper authorities, or to move, remove, displace, tamper with, damage or destroy the same.
(5) Anchor any boat in the traveled portion of any river or channel so as to prevent, impede, or interfere with safe passage of any other boat.

(6) Operate a boat within a water area which has been clearly marked by buoys or some other distinguishing device as a bathing, fishing, swimming, or otherwise restricted area by a political subdivision of the State; provided, that this shall not apply to patrol or rescue craft.
(7) Operate a vessel towing a person or persons on water skis, surfboards, or similar devices nor shall any person engage in water skiing, surfboarding or other similar activity at any time between the hours from one-half hour after sunset to one-half hour before sunrise; provided that this shall not apply to motorboats or vessels used in recognized water ski tournaments, competitions, exhibitions or trials therefore, provided that the water area is adequately lighted.
(8) Operate any watercraft, vessel, one or more skis, an aquaplane or similar device, upon the waters of this State while such person is intoxicated. (First offense shall be punishable, upon conviction, by a fine not to exceed $2,000, confinement in jail not to exceed 180 days or both; second offense a fine not to exceed $4,000, confinement not to exceed one year or both; third offense a fine not to exceed $10,000, imprisonment for not more than 10 years or less than 2 years.)
(9) Operate any vessel or manipulate any water skis, aquaplane or similar device, in a willful or wanton disregard of the rights or safety of others and at a speed or in a manner so as to endanger or be likely to endanger any person or property. (Violation of this provision shall be punishable, upon conviction, by a fine of not less than $200 nor more than $1,000 or by confinement in county jail not to exceed 180 days or both.)
(10) Swim or dive within two hundred yards of any sight-seeing or excursion boat except for maintenance purposes or unless within an enclosed area.
(11) Operate a motorboat within 50 feet of a Diver Down Flag or operate a boat within 150 feet of a Diver Down Flag except at Headway/Steerage Speed.
(12) Operate any motorboat over 15 hp if under 13 years of age unless accompanied by a person 16 years of age or older or operator under 13 has passed a boater education course prescribed by the Department.
(13) Operate any personal watercraft under 13 years of age unless accompanied by a person 17 years of age or older.
(14) Operate personal watercraft at night. (Sunset until sunrise.) See page 3.
Operate personal watercraft except at headway speed within 50 feet of another motorboat, vessel, platform, person, object or shore.
Fail to comply with the U.S. Coast Guard Inland Rules of the Road.
Operate a personal watercraft and jump the wake of another vessel recklessly or unnecessarily close.

PENALTIES

Every person who violates or fails to comply with any provision of this Act, shall be guilty of a Parks and Wildlife Code

(2) Every person convicted of a Parks and Wildlife Code misdemeanor for which another penalty is not provided shall be punished by a fine of not less than $25 nor more than $500.
(3) A person who violates or fails to comply with the reckless operation/excessive speed or the duties of operators involved in an accident provisions of the Parks and Wildlife Code is guilty of a Class B Parks and Wildlife Code misdemeanor and upon conviction is punishable by confinement in jail for a term not to exceed 180 days and a fine not to exceed $1,000 or both. These rules are subject to change by Legislative action.

For further information contact your local Game Warden or write:
TEXAS PARKS & WILDLIFE DEPARTMENT
4200 Smith School Road • Austin, Texas 78744
Toll-free phones:
1-800-792-1112 - Boater Education
1-800-262-8755 - Boat Registration
1-800-792-1112 - Boat Information

Equal opportunity to participate and benefit from the Texas Parks and Wildlife Department's recreational boating safety program is available to all individuals regardless of race, color, national origin, sex, age or disability. Discrimination inquiries or complaints should be sent to General Counsel, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744 or the Office of Civil Rights, U.S. Coast Guard (G-HPE), Washington, D.C. 20593-0001.

Visit the outdoors each month
through the full-color pages of
TEXAS PARKS & WILDLIFE
...a magazine that takes you on an outing 12 times a year. We'll bring you stories on state parks, fishing in our many freshwater lakes and saltwater bays, Texas' abundant wildlife and anything else to do with the outdoors. Call 1-800-937-9393, Mon. thru Fri., between 8:00 a.m. and 5:00 p.m.

TEXAS PARKS & WILDLIFE
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Tips for Safe Boating

No matter how many years you've been around boats, please take just five minutes to scan this quick reading booklet. People who hunt or fish from boats have one of the highest boat fatality rates. More die from falling off boats 16 feet and smaller than larger boats, and most boats are anchored at the time.

☐ *Be weather wise. Sudden wind shifts, lightning flashes and choppy water all can mean a storm is brewing. Bring a portable radio to regularly check weather reports.*

☐ **Bring extra gear you may need.** A *flashlight, extra batteries, matches, a map of where you are, flares, sun tan lotion, first aid kit, extra sunglasses.* Put those that need to be protected in a watertight pouch or a container that floats.

☐ *Tell someone where you're going, who is with you, and how long you'll be away.* Then check your boat, equipment, boat balance, engine and fuel supply before leaving.

☐ **Ventilate after fueling.** Open hatches, run blower, and most important, carefully sniff for gasoline fumes in the fuel and engine areas before starting your engine.

☐ Stay dry and warm. Wear several layers of light clothing; bring rainproof covering. *Never wear hip waders in a small boat.*

☐ Keep fishing & hunting gear clean and well packed. A loose fish hook can cause a lot of pain and ruin a great outing. Bring an extra length of line to secure boat or equipment.

☐ *When changing seats, stay low and near center line of a small boat.*

☐ *Be ready for trouble when a powerboat passes you in a narrow channel.* As the lead boat (which always has the right of way) stay on your side of the channel and maintain a steady speed so that the overtaking vessel can pass you safely. Use your radio to discuss this with the passing boat.

☐ Anchor from bow, not stern. Use anchor line length at least five times longer than water depth.

☐ **Take a safe boating course.** As an extra benefit, you may earn lower boat insurance costs. (See back cover.)

Distress Signals.

This illustrates the variety and combinations of distress signals which can be carried in order to meet Coast Guard requirements (the arm signals are shown for information only – they are an internationally recognized sign of distress, but are not "required distress signals"). *All signals, except for the distress flag and light must show the words "Coast Guard Approved" and be marked with the service life of the signal.* The distress flag and light must *carry the manufacturer's certification that they meet Coast Guard requirements.*

Visual Distress Signals

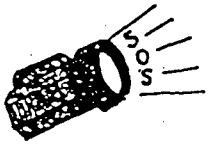
Orange Flag
use day only

Arm Signals (Use Bright Cloth)

Red Distress Flare (Hand)
use day and night
(minimum of 3 required)

Orange Smoke Signal (Hand)
use day only
(minimum of 3 required)

Red Meteor
use day, night
(minimum of 3 required)



use night only

Orange Smoke Signal (Floating)
use day only
(minimum of 3 required)

How you Board and Load Your Boat is Important.

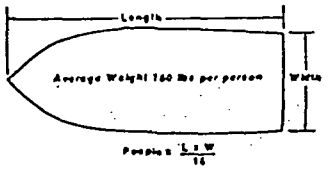
Be sure you know your boat's capacity. Look at the Capacity Plate. Don't overload it or put an oversize motor on it. On boats with no capacity plate, use the formula in the sketch at right to determine the maximum number of persons you can carry.

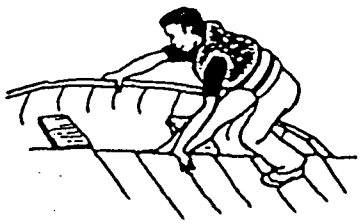
Be sure the dock lines are tied securely before you put gear aboard or go aboard yourself. Don't wind up straddling from dock to boat. If the boat is small, step as near the centerline as possible, and stay low in the boat. As you load, look at how much distance there is between the water and the top edge of your boat (freeboard). Waves, or wakes from passing boats, can easily swamp a small boat with low freeboard. Don't overload. Don't load heavy gear to one side.

Remember: When you overload, you are asking for trouble. Even with flotation a swamped boat is dangerous. Capsizing and falls overboard account for 70% of boating fatalities.

LOADING YOUR BOAT

Passenger Capacity Calculation





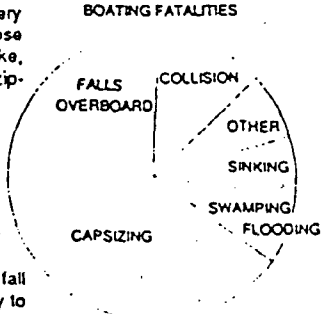
Some Sobering Facts about Alcohol

Over 1,000 people die in boating accidents every year. *Nine out of ten of them drown.* About half those deaths involve alcohol. It's a tragic fact and not a joke, but 50% of drunk men who drown have their fly unzipped. Enough said?

Four hours of exposure to powerboat noise, vibration, sun, glare, wind and motion produces a kind of "boater's hypnosis". This slows reactions almost as much as being legally drunk. Adding alcohol to this sun exposure intensifies the effects. As the chart shows, sometimes just a couple of beers are too many.

When you're "tipsy", you're much more likely to fall overboard. Alcohol also reduces your body's ability to protect against cold water. So within minutes you may not be able to call for help, or swim to safety. Actually, [illegible] is immersed can be

BOATING FATALITIES



TYPE OF ACCIDENT
50% ALCOHOL RELATED

Blood Alcohol Content Chart

Body Weight in Pounds	Number of Drinks in a Two Hour Period. 12 oz. beer = 5 oz. wine = 1 oz. 80 proof liquor.						
100	1	2	3				
120	1	2	3	4			
140	1	2	3	4	5		
160	1	2	3	4	5		
180	1	2	3	4	5		
200	1	2	3	4	5	6	
220	1	2	3	4	5	6	
240	1	2	3	4	5	6	

BAC to .05%	BE CAREFUL - Loss of judgment and coordination
BAC .05% to .10%	ABILITIES IMPAIRED - Chance of accident increased
	DO NOT OPERATE A BOAT - High risk of accident

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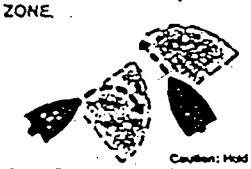
Federal Law Says You MUST Have This Aboard

Equipment	Less than 16 feet	Less than 26 feet
Life Jackets (PFDs)	One Type I, II, III, IV, or Hybrid Type V for each person. Hybrid Type V must be worn at all times to meet Coast Guard regulations	One Type I, II, III, or Hybrid Type V for each person on board or being towed on water skis, etc., plus 1 Type IV available to be thrown. Hybrid Type V must be worn at all times to meet Coast Guard regulations
Fire Extinguishers	At least one B-1 Coast Guard approved type hand portable fire extinguisher. Not required on outboard motorboats less than 26 feet in length if the construction of such motorboats will not permit the entrapment of flammable gases or vapors. NOTE: When Coast Guard approved fixed fire extinguishing system is installed in machinery space(s), no hand portable extinguisher is required.	
Ventilation	At least 2 ventilator ducts fitted with cowls for the purpose of properly and efficiently ventilating the bilges of every inboard engine and fuel tank compartment of boats constructed or decked over after 25 April 1940, using gasoline or other fuel having a flashpoint less than 110°F. Boats built after 31 July 1980 must have operable power blowers.	
Whistle, Bell, or Horn	Any device capable of making an "efficient sound signal" audible for 1/2 mile.	
Backfire Flame Arrester	One Coast Guard approved device on each carburetor of all gasoline engines installed after 25 April 1940, except outboard motors.	
Visual Distress Signals - for coastal waters, Great Lakes or high seas.	Required only when operating at night (N). Same night equipment choices as for larger boats as shown at right.	Orange flag with black square-and-disc (D); and an S-O-S electric light (N); or 3 orange smoke signals, hand held or floating (D); or 3 red flares of handheld, meteor, or parachute type (D/N).

Operating Rules

You are legally responsible for the safety of those on your boat, any damage your boat causes to other boats and property, and all others injured by any damage you cause. Just like driving a car, if you don't know and obey the rules, the fact that you didn't know them is NOT a valid defense. Important: The law also says you're GUILTY if you cause an accident because you're "right" and therefore elect not to prevent the accident. These drawings show some (but not all) "right of way" rules. (Horn signals and navigation lights are not covered here.)

CROSSING: Every boat has a DANGER ZONE from straight in front (the bow) to past the middle of its right side. Like when meeting another car at a street intersection, the one on the RIGHT has the RIGHT OF WAY. You must YIELD to boats in your DANGER ZONE.



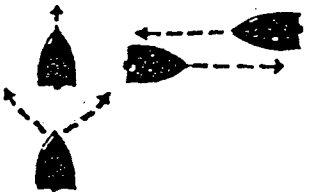
Danger Zone: Must give way! Stop, let other boat pass, or turn away in plenty of time.

Caution: Hold course but watch approaching boat carefully. Prepare to "give way" if other boat does not.

POWERBOATS MUST YIELD TO SAILBOATS and boats being rowed or paddled, except in a narrow channel. Stay well clear of all big vessels.

OVERTAKING: Be ready for trouble when a power boat passes you in a narrow waterway. As the lead boat (which always has the right of way) stay on your side of the channel and maintain a steady speed so that the overtaking vessel can pass you safely. Use your radio to discuss this with the passing boat.

MEETING: As in a car, both stay to your right & as far apart as practical, so its easier & safer to cross each other's wake. (Okay to pass left, if both know the plan.) Give notice by steering to right or left while still far apart. Then stay with that plan unless the other boat indicates otherwise. If you have a CB or VHF, use it. Be careful.



Take A Boating Course

This pamphlet funded through a grant from the United States Coast Guard with additional support from the USPS Educational Fund..

UNITED SAFE BOATING INSTITUTE
1504 Blue Ridge Road, Raleigh, NC 27622, (919) 821-0281
For info on boating classes call: 1-800-336-BOAT.

UNITED STATES POWER SQUADRONS

Take the public Boating Course to learn the basics of safer and more enjoyable boating, whether you own a boat, are thinking of buying one, or enjoy boating with friends. All instruction is free; there is a nominal charge to cover costs including a 150 page student workbook & chart. The course is offered as a public service to adults and teenagers in over 500 local areas throughout the U.S.A. Instructors are volunteer USPS members with advanced training, who have taught 2-1/2 million students.

UNITED STATES COAST GUARD AUXILIARY

Coast Guard Auxiliary, created by Act of Congress in 1939, is the Volunteer Civilian Arm of the United States Coast Guard. In promoting safe boating in the U.S.A., it performs these non-profit services: ■ Teaches several public boating courses. ■ Examines recreational boats for proper safety equipment. ■ Assists regular Coast Guard in search & rescue, and patrols navigable and state waterways.

For more free info on boating safety (including safety recalls) call: 1-800-368-5647.

AMERICAN RED CROSS

By congressional charter, the ARC is responsible for relieving and preventing accidents and suffering. The aim of the organization is to improve the quality of human life and to enhance individual self reliance and concern for others. It provides standards, courses, and materials in first aid, CPR, swimming, lifesaving, lifeguarding, and boating safety (canoeing, kayaking, sailing.)

UNITED STATES YACHT RACING UNION

National governing body for sailing. USYRU is also a membership organization of 25,000 active sailor and sailing groups. Programs include instructor training, sailing safety, and services to sailing groups. Membership benefits include discounts on sailing publications, videos, and travel; monthly "American Sailor" magazine. For information call (401) 849-5200 or write USYRU, Box 209, Newport, RI 02840

For information on Boating Classes in Canada call 1-800-268-3579

The information herein is furnished as a public service by United Safe Boating Institute (USBI), which disclaims any liability from the use thereof.

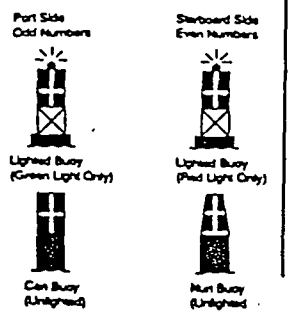
Federal Aids to Navigation.

(State waterway aids not shown)

Federal Waterway Marking System

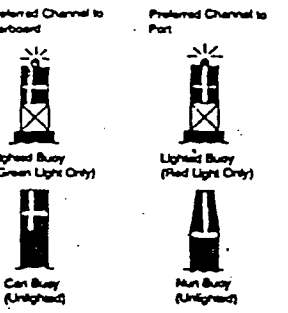
- Keep RED aids on your RIGHT coming upstream (& in from seaward).
- Keep marked channels clear. Don't anchor in a channel or to a navigational aid.

Lateral Aids Marking the sides of channels as seen when entering from seaward



Safe Water Aids marking mid-channels and fairways

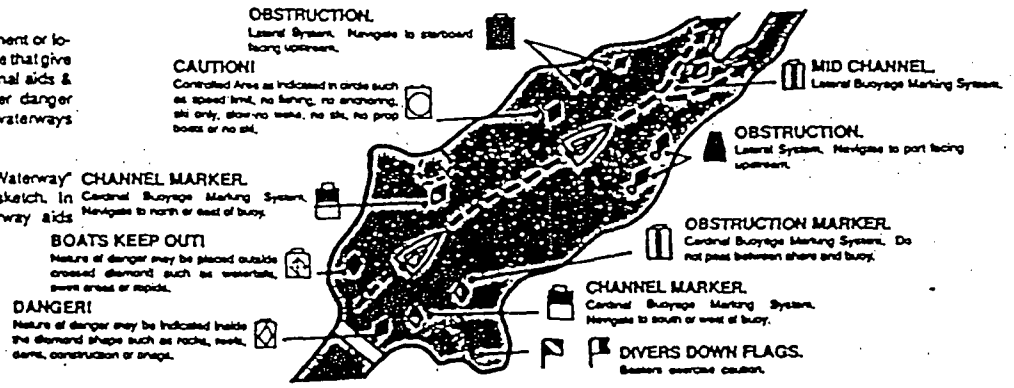
Preferred Channel Aids (Mark bifurcations. No numbers. May be lettered.)



Charts — Your "Road Maps"

Most areas have government or locally prepared charts available that give water depth, show navigational aids & major landmarks, underwater danger areas, as well as shorelines, waterways and harbor areas.

Some "Uniform State Waterway" aids are shown in the chart sketch. In most areas, Federal waterway aids also would be shown.



Life Jackets (PFDs) - The Choice Is Yours

- ☐ Get and wear a Coast Guard approved Personal Flotation Device (PFD) that fits well; make sure it is the proper type and approved for your specific usage. Actually put it on, adjust it and test it in the water, so you'll know how it will feel when needed. Do the same for all family members - especially children. Knowing what to expect in the water can prevent panic. Non-swimmers should wear a PFD on any small boat.
- ☐ Never leave PFDs sealed in plastic wrapping. They must be ready to put on fast.
- ☐ Whenever water conditions or weather cause concern, have everybody aboard immediately put on a PFD.
- ☐ And if you fall in the water, stay with the boat.

Offshore Life Jackets (Type I): Bulky; but floats you the best; best for open, rough, or remote water. Turns most unconscious persons face-up in the water. Not pictured here.

Near shore buoyant vests (Type II): Yoke-type, less bulky than Type I and more comfortable to wear. Will hold head of many unconscious persons out of water.

Flotation Aids (Type III): Vest style; popular among recreational boaters. Only designed for calm water with good chance of fast rescue. Wearer may have to hold head back to keep face out of water, which can contribute to exhaustion and hypothermia. May not hold face of unconscious wearer out of water.

Throwable Devices (Type IV): Life rings and floating cushions.

Special Use Devices (Type V): Approved only for the activities listed on the label. Some are approved specifically for white water rafting, board sailing, etc. Also includes new Hybrid PFDs with foam flotation and an inflatable chamber. Type V Hybrid PFDs are as comfortable to wear as a Type III, but when fully inflated have the flotation performance of a Type II or better.

First Aid Emergency Measures

Be boatwise. Take a first aid and CPR course.

FIRST AID EMERGENCY MEASURES		
INJURY	SIGNS	TREATMENT
Broken Bones	Pain, swelling, deformity, discoloration and possible bleeding.	Keep broken bone ends and adjacent joints from moving; control bleeding, treat for shock
Burns	DEGREE: 1st - Skin is pink or reddish (sunburn) 2nd - Skin is blistered. 3rd - Skin may be red and raw; possibly black charred areas.	Pain of 1st degree and small 2nd degree burns can be relieved by excluding air. Three ways to exclude air from 1st or 2nd degree burns are: 1.) Submerge in cold water; 2.) Apply a cold pack; 3.) Cover with a thick dressing or unused plastic. For a 3rd degree burn, cover with dry clean cloth and call for medical help. If the victim's face is burned, he may stop breathing. Be ready to give artificial respiration.
Sunburn	Red, painful skin and chills. Fever and shock occasionally accompany severe sunburns.	Apply cold water. Do not re-expose burned area to sun until completely healed. Get medical attention.
Heart Failure - Epilepsy	Victim is ill with no apparent external injury. Clutching chest, extreme shortness of breath, convulsions.	Place the victim in a comfortable position, usually sitting up. Call for medical help and give prescribed heart medicine if available. If not breathing, give artificial respiration. Victims with convulsions should be laid down in a cleared, open area. Never place anything in the person's mouth.
Shock	Pale, clammy skin, irregular breathing, fast, weak pulse.	Keep person lying down and prevent loss of body heat. Do not give fluids if victim is unconscious. Get medical help as soon as possible.

Hypothermia - Here's How To Fight This Killer

Exposure causes loss of body heat. This is called hypothermia. Hypothermia can kill. Defense against hypothermia is to avoid exposure to cold. Do this by staying dry and avoiding the wind. Put on rain gear before you get wet. If you fall into cold water, do NOT discard clothing; it will help trap heat. Avoid moving as much as possible. A life jacket helps in two ways: it reduces the need to move, and it helps insulate against heat loss. When you wear a life jacket, draw knees up into a H.E.L.P. (Heat Escape Lessening Position). If several persons are in the water, huddle together so you can conserve heat and stay alive.

Treatment involves getting the victim out of cold producing environment. Strip off all wet clothing and get person into a warm sleeping bag. Try to keep person awake. Do NOT give alcohol or massage vigorously. Giving the person warm drinks or food is not a good idea. They don't help rewarm the person and they can pose a choking hazard. Transport the victim to a hospital as soon as possible.

If the Water Temp. (F) is...	Exhaustion or Unconsciousness	Expected Time of Survival is...
32.5	Under 15 Min.	Under 15-45 Min.
32.5-40.0	15-30 Min.	30-90 Min.
40-50	30-60 Min.	1-3 Hr.
50-60	1-2 Hr.	1-6 Hr.
60-70	2-7 Hr.	2-40 Hr.
70-80	3-12 Hr.	3-Indefinitely
over 80	Indefinitely	

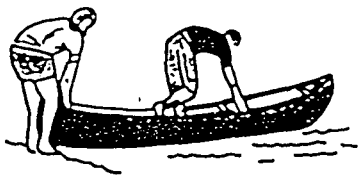
Canoeing

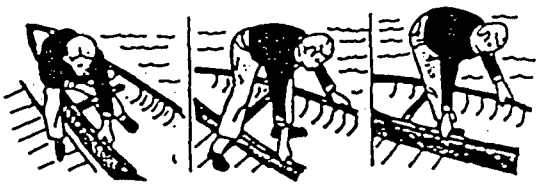
You can quickly and easily master getting into and out of a canoe without getting wet if you remember the following important points:

- Keep your center of gravity low, and move slowly and deliberately.
- Transfer your weight slowly from shore to the bottom center of the canoe.
- Board your canoe directly into your paddling position whenever possible.
- For maximum control and stability always kneel in canoes, even though some canoes have seats.

To get out of a canoe, simply reverse the steps described above.

Canoe capsizing: Once you have capsized, relax and make contact with the canoe with your hands, if you have not already done so. Stay upside down long enough to extract feet and legs from the canoe. *Then surface, maintaining* contact with the canoe. Keep your eyes open.





FISHERMEN, HUNTERS & CAMPERS

Tips for safe boating

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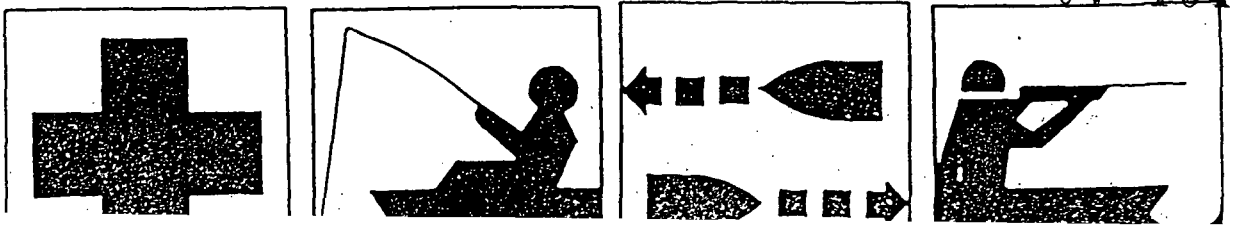

Before Casting Off

Get in the habit of performing these brief steps:

1. "Sniff" your bilges. Usually your nose is the best fuel/vapor detector. It'll mean getting down on your hands and knees, but it's the best way to do it.

2. Operate the bilge blower for at least FOUR MINUTES before starting an inboard engine. If you still smell fumes, try to find what is causing them and make repairs before starting the engine.

3. Make sure the location of your fire extinguishers is known to all passengers.

4. When refueling, close all hatches, ports and other openings; shut off all engines and motors; and refrain from smoking. Fill all portable tanks on the dock.

5. After refueling, wipe up or wash off any excess or spilled fuel; open all hatches and ports; and let the boat air out. "Sniff" your bilges. Operate the bilge blower for at least four minutes before starting an inboard engine.

U.S. Department of Transportation
United States Coast Guard

Call the Boating Safety Hotline:

800-368-5647

(Toll Free!)

- For Boating-Safety-Recall Information.
- To Report Possible Safety Defects in Boats.
- For Answers to Boating Safety Questions.

Shipshape

is Firesafe

Shipshape is Firesafe

A shipshape boat is a safe boat. Firesafety is something that everyone who owns or operates a boat should practice.

Each year, boating fires and explosions injure hundreds of Americans and cause millions of dollars in property damage. While there is a greater chance for a fire or explosion on a boat than on land, many of these accidents can be prevented.

Fuel and fuel vapors are two of the leading ingredients in all boating accidents involving fires and explosions. Keep fuel and vapors in their proper places and make all of your boating trips **firesafe.**

The United States Coast Guard and the National Fire Protection Association offer the following helpful reminders:

In General or Seasonal

1. Be alert for damage to your boat's fuel system. Over a period of time, **fuel fittings and fuel hoses** wear out. Inspect these fittings and hoses regularly, especially near the engine where engine heat can accelerate deterioration.

2. Inspect **fuel tanks** annually. Pay particular attention to bottom surfaces which may have been in contact with bilge water and any part of the tank which touches the boat structure. The tank could have rusted or been damaged due to rubbing and abrasion. Permanently installed fuel tanks should be vented to the outside of the hull as well as closed compartments.

3. Be sure the **fuel pipe** is tightly fitted to fill the plate and located outside closed compartments. The fill pipe should also be located where any spilled fuel will be directed overboard. Look for fuel fill hoses that are dry and cracked or soft and mushy. Such hoses should be replaced with marine fuel hoses immediately.

4. **If a hose or fuel tank is leaking, replace it before using your boat.**

5. On a boat with **portable fuel tanks,** make sure the vents can be closed and that the tanks have a vapor-tight, leak-proof cap. The vent on a protable tank should be open when the motor is running, but when the tank is not in use, the vent and the cap should be tightly closed.

6. If the boat has powered ventilation **(a bilge blower),** make sure the blower operates.

7. Be sure **heating and cooking appliances** on board are secured and operate properly. Refer to the owner's manual for the appliance for guidance on inspecting for leaks in valves and connections; **never use a match.**

8. Make sure that **flammable items** are stowed safely and cannot come into contact with cooking or heating appliances or hot engine parts.

9. Make sure Coast Guard Approved **fire extinguishers** on board are in working order - that gauges register and that nozzels are clear. Take a boating safety course that teaches the correct use of a fire extinguisher aboard a boat. The time to learn is **before** a fire occurs.

10. Look for bare wires or loose **electrical connections.** They might cause a short in your boat's electrical system, which could start a fire.

11. Do not store small disposable propane cylinders or charcoal lighting fluid on board.

12. Conduct a bow to stern inspection checking for loose fuel, gas fumes and any malfunctioning instruments.

ATTACHMENT A

Plan Acceptance Form, TNRCC Reporting Procedures Memo, Employee's Packet, Employee Rights & Responsibilities, Authorization for Release of Information, Employee's Report of Injury Report, Witness Statement and Employee's Election Regarding Utilization of Sick Leave

Texas Natural Resource Conservation Commission

INTEROFFICE MEMORANDUM

To: Date:

From: Cora Gratten
Claims Coordinator
Support Services Division

Subject: Employee's Packet, Workers' Compensation Claims
(wcpro#1)

It has been brought to my attention that you may have been injured on the job or experienced a job related illness. I hope the injury is not serious and that you fully recover soon. Our goal as an agency is to ensure you receive proper medical care for your injury/illness and that you fully recover so that you can return to work as quickly as possible.

My responsibilities as the TNRCC Claims Coordinator is to work with you and your supervisor to ensure your claim is processed in accordance with the law. As a TNRCC employee part of your responsibilities are to fill out certain forms that are necessary to process the claim. These forms are required as part of the Workers' Compensation Claims process which is administered by the Office of the Attorney General.

Attached is a packet of material that provides some basic information regarding the Workers' Compensation and more detail about your responsibilities regarding this matter. The forms that you must fill out are included in this packet. There are also instructions provided that should be followed in completing the forms. I am also available should you need assistance in completing the forms. It is critical that these forms be completed and submitted to me in accordance with the instructions and time frames that are identified.

Your supervisor also has responsibilities regarding this claim, and will be sent information about your injury/illness and about their responsibilities. They will work with you to ensure you receive medical attention (if necessary) and that you return to work as quickly as possible if you miss time from work.

Again, if you need assistance at anytime regarding this incident, you may contact me at (512) 239-0245.

Attachments

cc: Employee's Supervisor

V. EMPLOYEE'S PACKET

Forms to be completed by the injured employee are:

Form #	Form Title
Pub. No. PI96-007A (03-96)	Employee Rights & Responsibilities
WCD-16	Authorization for Release of Information
WCD-29	Employee's Report of Injury
WCD-74	Witness Statement
WCD-80	Employee's Election Regarding Utilization of Sick Leave

Employee Responsibilities

1. Report job related injury/illness, accident/incident to their supervisor or the TNRCC Claims Coordinator immediately, or as soon as possible after medical attention is received.

2. Complete all forms in accordance with the instructions outlined in the Workers' Compensation Claims Handbook.

3. Sign all forms in accordance with the instructions when required.

4. Keep their supervisor updated on the status of medical services received, lost time from work, and workers compensation benefits received as a result of the injury or illness.

5. Return to work as soon as possible after a lost time injury/illness. Provide original of physicians release to return to work.

6. Provide original of any and all documentation related to medical expenses and physicians statements relating to the injury/illness.

TNRCC INSTRUCTIONS FOR Pub. No. PI96-007A (3-96)

EMPLOYEE RIGHTS & RESPONSIBILITIES

Required:

See attached TWCC Advisory 96-03 for specific information and requirements regarding this form.

Filing Deadline:

Not Applicable

Completed By:

Not Applicable

Instructions:

A copy of this form must be provided to the injured Employee with the Employee's Packet at the same time the Employer's First Report of Injury is filed with the OAG.

BROWN
VE DIRECTOR

TEXAS
WORKERS' COMPENSATION COMMISSION
SOUTHFIELD BUILDING, 4000 SOUTH IH-35, AUSTIN, TEXAS 78704-7491
(512)448-7900

TWCC ADVISORY 96-03

SUBJECT: EMPLOYEE RIGHTS AND RESPONSIBILITIES FORM

Rule 120.2(e) requires employers to provide injured workers with a summary of their rights and responsibilities at the same time that the Employer's First Report of Injury is filed with the insurance carrier. The Rule provides that the English and Spanish text provided by the Commission must be used without any changes or additional words.

The "Employee Rights And Responsibilities Under The Texas Workers' Compensation System" form published by the Commission (Pub. No. PI96-007A) must be used by employers to comply with the requirements of Rule 120.2(e). This form must be provided in the exact format and text as published by the Commission. The use of published brochures or other information is not a substitute for this form. Failure to use the published form will constitute non-compliance with this Rule.

While the employer may include other information or brochures, this form must be provided to the injured worker. Effective May 1, 1996, the most current version of this form published by the Commission must be used to comply with the provisions of Rule 120.2(e).

Signed this 28th day of March, 1996

Todd K. Brown, Executive Director

Attachment:

Employee Rights And Responsibilities Under the Texas Workers' Compensation System [Pub. No. PI96-007A (3-96)]

Distribution:
Austin Carrier Representatives
TWCC Staff
Public Information List.

PUB NO. P196-007A (3-96)

Employee Rights and Responsibilities under the Texas Workers' Compensation System

is information describes your rights and responsibilities under the Texas workers' compensation system. For more information or for assistance, please call the Texas Workers' Compensation Commission field office handling your claim, or call 1-800-252-7031.

Your rights under the Texas workers' compensation system

You may have the right to receive benefits.

You may receive benefits regardless of who caused or helped cause your injury. You may not receive benefits if your injury occurred while you were intoxicated, you injured yourself intentionally or while unlawfully attempting to injure someone else, you were injured by another person for personal reasons, you were injured while voluntarily participating in an off-work activity, you were injured by an act of God, or your injury occurred during horseplay.

You have the right to receive the medical care reasonable and necessary to treat your work-related injury or illness for the rest of your life.

You have the right to the initial choice of doctor.

You may not change doctors except with the approval of the Commission. You do not need to get approval to go to a different doctor for emergency treatment, if you or your doctor moves, or if your doctor is unable to continue treating you.

You have the right to hire an attorney to help you get benefits or to help you resolve disputes.

You have the right to receive assistance from appropriate, qualified Commission staff and, in the event of a dispute resolution proceeding, from a Commission ombudsman free of charge. To request assistance, contact the field office handling your claim, or call 1-800-252-7031.

You have the right to receive information and assistance regarding your claim. Commission staff will explain your rights and responsibilities under the Texas Workers' Compensation Act. Additionally, you have the right to be assisted by a Commission ombudsman in informal dispute resolutions and in administrative proceedings if you are not represented. However, an ombudsman cannot serve as a legal representative or attorney for you.

You have the right to confidentiality.

Only people who need to know—such as your doctor, your employer, or your employer's insurance carrier—may see information in the Commission's files. A prospective employer may get limited information from the Commission about your claims. If you wish someone who is assisting you to have access to your file, you must provide written approval for them to do so.

Your responsibilities under the Texas workers' compensation system

❶ ***You have the responsibility to tell your employer about your injury or illness.***

You must tell your employer *within 30 days* of the date you were injured, or *within 30 days* of the date you first knew your illness might be work-related. You, or someone helping you, may either talk with or write your employer or any supervisor where you work.

If you do not tell your employer within 30 days, you could lose your right to get benefits.

❷ ***You have the responsibility to fill out a claim form and send it to the Commission.***

You must send a completed claim form, called a TWCC-41, to the Commission *within one year* of the date you were injured, or *within one year* of the date you first knew your illness might be work-related. Send the completed claim form to the Commission even if you are already getting benefits.

If you do not send the form within one year, you could lose your right to get benefits. For a copy of the form, call the field office handling your claim, or call 1-800-252-7031.

❸ ***You have the responsibility to tell the Commission and the insurance carrier any time your income changes.***

If you are *not* getting benefits and you have changed employers since your injury, tell the Commission if your injury causes you to miss work or lose income. Call 1-800-252-7031.

If you *are* getting benefits and you have changed employers since your injury, tell the Commission and the insurance carrier paying your benefits if your income changes. Tell the Commission and the insurance carrier regardless of whether your income went up or down. If you have stopped working since your injury, tell the Commission and the insurance carrier if you start working again or if you have a job offer.

❹ ***You have the responsibility to tell your doctor how you were injured and if you believe it may be work-related.***

If possible, tell the doctor before the doctor treats you.

❺ ***You have the responsibility to tell the Commission and the insurance carrier how to contact you.***

You should contact the Commission and the insurance carrier if your home address, work address, or phone number changes, so the Commission and the insurance carrier will be able to contact you when necessary.

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mployers: You must provide this information to the injured worker at the same time you report the injury to your insurance carrier. If your insurance carrier has agreed ide this information to the worker for you, you still have the ultimate responsibility to ensure that the worker receives it. This information must be provided in English

TNRCC INSTRUCTIONS FOR WCD-16

Authorization for Release of Information

Required:

Immediately after sustaining a work-related injury, the claimant should fill out this release form so that the Workers' Compensation Division (WCD) can obtain from providers copies of relevant medical documents which will assist in the handling of the claim.

Filing Deadline:

The form must be received by the TNRCC Claims Coordinator no later than three days after the supervisor is notified of the injury.

Completed By:

The claimant must complete this form.

Instructions:

1. The claimant must type or clearly print his/her name on the patient line and the second line.

2. The claimant must date and sign the form.

Distribution:

It is the TNRCC Claims Coordinator's responsibility to make distribution as indicated below.

Mail original to: Office of the Attorney General
Workers Compensation Division

Mail a copy to the claimant.

Send a copy to: TNRCC Claim File

AUTHORIZATION FOR RELEASE OF INFORMATION
(WCD-16)

Patient:_____

TO WHOM IT MAY CONCERN:

You are hereby expressly authorized to release and furnish to the Workers' Compensation Division of the Office of the Attorney General of Texas, and/or any associate, assistant, representative, agent, or employee thereof, any and all desired information, (including, but not limited to, office records, medical reports, memos, hospital records, laboratory reports, including results of any and all tests including alcohol and/or drug tests, X-rays, X-ray reports, including copies thereof) pertaining to the physical and/or mental condition which is the basis of my workers' compensation claim. This includes not only all current and/or future information, but also all past medical information which is related to the injury or injuries which form the basis of my claim.

(Print name)_____

Photostatic copies of this signed authorization will be considered as valid as the original.

This is not a release of claims for damages.

DATED:_____ SIGNED:_____

PLEASE SIGN THE ABOVE MEDICAL AUTHORIZATION AND RETURN IT, SO THAT WE MAY SECURE RELEASE OF YOUR MEDICAL RECORDS.

THANK YOU.

OFFICE OF THE ATTORNEY GENERAL
WORKERS' COMPENSATION DIVISION

TNRCC INSTRUCTIONS FOR WCD-29

Employee's Report of Injury

Required:

This form should always be filled out by the injured employee and filed with the Workers' Compensation Division (WCD). This will help to expedite benefits in a more timely manner.

Filing Deadline:

The form must be received by the TNRCC Claims Coordinator no later than one week after the First Report of Injury or Illness (TWCC-1S) is filed with the TNRCC Claims Coordinator.

Completed By:

The claimant is responsible for completion of this form, with the assistance from the supervisor and TNRCC Claims Coordinator.

Instructions:

All fields should be completed and printed legibly. Make sure that the claimant signs and dates the bottom of the form.

Distribution:

It is the TNRCC Claims Coordinator's responsibility to make distribution as indicated below.

Mail original to: Office of the Attorney General
Workers Compensation Division

Mail a copy to the claimant.

Send a copy to: TNRCC Claim File
TNRCC Safety Manager

(PLEASE USE WITH ALL SUBMISSIONS TO EXPEDITE HANDLING)

EMPLOYEE'S REPORT OF INJURY

Dear Claimant:

[redacted] have received a report that you were injured in the course of your employment. In order for us to process your claim efficiently, please fill in all lines completely and print legibly. **Attach additional sheets if necessary.**

1. Name: _____ Social Security: _____
   LAST FIRST MI MAIDEN
2. Give your current home address: _____
3. By whom are you employed? _____
4. What is your job title/description? _____
5. What are your monthly wages? _____ 6. How many days per week do you work? _____
7. *On what date were you injured?* _____
8. What was the exact location of the accident (street address if possible)? _____
   _____
9. How did the accident happen? _____
   _____
   _____
10. What part of your body was injured? _____
11. When did you report this accident? _____
12. To whom did you make your accident report? _____
13. List name(s), address(es), and telephone number(s) of witness or witnesses: _____
    _____
14. Name, address, and telephone number of physician who provided treatment: _____
    _____
15. When did you first receive treatment? _____
16. When did you stop working as a result of your accident? _____
17. Name, address, and telephone number of doctor presently treating you: _____
18. When were you last treated? _____
19. Have you returned to work? _____ If so, when? _____
20. Have you lost any wages on account of your accident? _____
21. Have you ever had a previous injury claim? _____ If so, describe: _____
    _____

(dated) _____ (signed) _____

Form No. WCD-29 Rev. 9-95

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TNRCC INSTRUCTIONS FOR WCD-74

Witness Statement

Required:

Immediately after receiving notice of any injury, the Employee's Supervisor should determine the names, addresses, and telephone numbers of all witnesses to the incident. A statement should be taken from each witness and forwarded to the TNRCC Claims Coordinator.

Filing Deadline:

The form must be received by the TNRCC Claims Coordinator no later than the fifth calendar day after the first notice of injury is reported to the supervisor.

Completed By:

The person giving the statement is responsible for completing this form, with assistance from the TNRCC Claims Coordinator.

Instructions:

1. The form should be typewritten or hand printed.

2. The witness may have actually seen the accident, or may have acquired knowledge about the accident from some other source. The witness's information may relate to how the accident occurred, or to something else that is relevant. Check the first or second box, as appropriate. Be specific. Sometimes you will be given someone's name as being a witness, who when asked claims to know nothing about the accident. In such a case, the third box should be checked.

3. If the space provided on the form is insufficient, attach additional sheets.

Distribution:

It is the TNRCC Claims Coordinator's responsibility to make distribution as indicated below.

Mail original to: Office of the Attorney General
Workers Compensation Division

Send a copy to: TNRCC Claim File
TNRCC Safety Manager

CLAIM NUMBER_____
(If Known)

WITNESS STATEMENT
(WCD-74)

MUST BE TYPED
OR PRINTED

Claimant_____
Employer_____
Date of Injury_____
Statement Taken by _____

Name:_____Age:_____
Residence Address: _____.
Home Telephone:_____Work Telephone: _____
Employer: _____
On _____, 19_____, at about _____p.m./a.m., I was in or at (clearly state your own location) _____
_____
when an accident involving the above employee is alleged to have occurred.

(check only one box)

☐ I saw the accident.
The accident occurred in the following manner: _____
_____
_____
_____
_____
_____
Other pertinent information and source:_____
_____
_____

☐ I did not see the accident.
Information given me by (name of person) _____
indicates it occurred as follows:_____
_____
_____
_____
_____
_____
Other pertinent information and source:_____
_____
_____

☐ I know nothing whatsoever about the occurrence.

_____ _____
Signature Date

Form No. WCD-74 Rev. 9-93

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TNRCC INSTRUCTIONS FOR WCD-80

Employee's Election Regarding Utilization of Sick Leave

Required:

The injured employee must choose whether or not they will utilize sick leave before receiving workers' compensation income benefits.

Filing Deadline:

The form must be received by the WCD no later than the second calendar day after the first day of lost time has occurred.

Completed By:

It is the supervisor's responsibility to ensure this form is completed and signed by the employee. The employee must sign the form if physically able to do so.

Instructions:

1. If an employee chooses to use no sick leave at all, even during the seven day waiting period, the WCD-80 form still must be completed and the second box must be checked under "Election 2".

2. If an employee chooses to use sick leave until it is exhausted, instead of receiving workers' compensation benefits during that period, fill out and sign Election I.

3. If an employee chooses to use sick leave only during the seven-day waiting period, and wants to begin receiving compensation payments thereafter, fill out and sign Election 2.

4. Be sure to fill in the amount of sick leave available to the claimant at the time of injury. Also fill in the claim number, if known.

5. Employee must sign the form before making distribution.

Distribution:

It is the TNRCC Claims Coordinator's responsibility to make distribution as indicated below.

Mail original to: Office of the Attorney General
Workers Compensation Division

Send a copy to: TNRCC Claim File
Payroll/Time & Attendance
Human Resources & Staff Development
TNRCC Safety Manager

CLAIM NUMBER _____
(If Known)

EMPLOYEE'S ELECTION REGARDING UTILIZATION OF SICK LEAVE (WCD-80) (Texas Labor Code, Sec. 501.044)

ELECTION 1

I hereby elect to use sick leave until it is exhausted before receiving weekly payments of workers' compensation. By making this election, I understand that I am not entitled to weekly payments of compensation until my sick or emergency leave is exhausted.

(Type Employee's Name as Shown on Payroll)	(Hours of Sick Leave Available as of Date of Injury)
(Employee's Social Security Number)	(Name of Agency)
(Employee's Signature/Date)	(Claims Coordinator's Signature/Date)

ELECTION 2

I hereby elect to receive weekly payments of workers' compensation after the seven (7) day waiting period. I understand that I may use sick or emergency leave for the seven (7) day waiting period, but that I may not use sick or emergency leave after that time. I understand that I may not receive weekly payments of compensation and sick or emergency leave at the same time.

I ☐ do ☐ do not desire to use sick leave for the waiting period.

(Type Employee's Name as Shown on Payroll)	(Name of Agency)
(Employee's Social Security Number)	(Claims Coordinator's Signature/Date)
(Employee's Signature/Date)	

Form No. WCD-80 9-93

PLAN ACCEPTANCE FORM

SUMMARY OF ACTIVITIES

1. Initial on- and off-site reconnaissance, designating sample locations, verifying location of target and background drinking water wells.

2. Equipment decontamination, groundwater sampling.

3. Background and target soil/sediment sampling.

4. Equipment decontamination, sample packaging/shipping.

ACCEPTANCE

I have read the Health and Safety plan (or been briefed on the hazards) for the Preliminary Assessment/Screening Site Inspection (PA/SSI) field work to be conducted at the Patrick Bayou Site located south of the Houston Ship Channel and north of Deer Park, Texas in Harris County, and agree to abide by the rules and guidelines contained therein. I acknowledge that I have had a current annual physical within the last 12-month period from the date signed below, and am medically cleared to perform my tasks as outlined.

Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

ATTACHMENT B

Chemical Information Sheets for Cadmium, Chromium
Copper, Dioxane, Lead, Mercury, Nickel, PCBs, Selenium and Zinc

TOXICITY DATA:
Currently tested by NTP for carcinogenesis by standard bioassay protocol as of December 1980.
THR: No data. Under CARC test.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

CADMIUM

CAS RN: 7440439 NIOSH #: EU 9800000
mf: Cd; mw: 112.40

Hexagonal crystals, silver-white malleable metal. mp: 320.9°, bp: 767 ± 2°, d: 8.642, vap. press: 1 mm @ 394°.

SYNS:
C.I. 77180 KADMIUM (GERMAN)

TOXICITY DATA: 3	CODEN:
ivn-rat TDLo:1250 ug/kg/(9D preg):TER	EVHPAZ 28,245,79
ipr-mus TDLo:2248 ug/kg/(8D preg):TER	TJADAB 13,33A,76
ivn-ham TDLo:2 mg/kg/(8D preg):TER	EXPEAM 25,56,69
ims-rat TDLo:45 mg/kg/4W-I:NEO	NCIUS* PH-43-64-886,SEPT,71
ims-rat TD:70 mg/kg:ETA	BJCAAI 18,124,64
ims-rat TD:63 mg/kg:ETA	NATUAS 193,592,62
ihl-man TCLo:88 ug/m3/8.6Y:SYS	AEHLAU 28,147,74
ihl-hmn LCLo:39 mg/m3/20M	AIHAAP 31,180,70
unk-man LDLo:15 mg/kg	85DCAI 2,73,70
orl-rat LD50:225 mg/kg	TXAPA9 41,667,77
ipr-rat LD50:4 mg/kg	TXAPA9 41,667,77
scu-rat LD50:9 mg/kg	TXAPA9 41,667,77
ivn-rat LD50:3 mg/kg	TXAPA9 41,667,77
unk-rat LD50:712 mg/kg	GTPZAB 22(5),6,78
unk-mus LD50:636 mg/kg	GTPZAB 22(5),6,78
orl-rbt LDLo:70 mg/kg	AMPMAR 34,127,73
scu-rbt LDLo:6 mg/kg	PROTA* -,-,55
ims-ham LDLo:25 mg/kg	NCIUS* PH-43-64-886
cyt-ham:ovr 1 umol/L	CGCGBR 26,251,80
ipr-rat TDLo:1124 ug/kg (1D male)	TXAPA9 41,194,77
scu-rat TDLo:250 ug/kg (19D preg)	APTOD9 19,A122,80
orl-mus TDLo:448 mg/kg (MGN)	AEHLAU 23,102,71

Carcinogenic Determination: Animal Positive IARC** 2,74,73.
TLV: Air: 0.05 mg/m3 DTLVS* 4,59,80; TRBMAV 33(1),85,75; JDSCAE 58(12),1767,75; JFDSAZ 39,321,74; AMBOCX 3(2),55,74; QURBAW 7(1), 75,74; AEMBAP 40,239,73; NTIS** PB-221,198; KOTTAM 11(11),1300,75; FOREAE 7,313,42; STEVA8 2(4),341,74; FCTXAV 9,105,71; AJMEAZ 38,409,65; ENVRAL 4,71,71; 85CVA2 5,63,70; PEXTAR 12,102,69; PDTNBH 6,204,77; BNYMAM 54,413,78; AMTODM 3,209,77; GSAMAQ 123, 109,71. OSHA Standard: Air: TWA 200 ug/m3; CL 600 (SCP-W) FEREAC 39,23540,74. Occupational Exposure to Cadmium recm std: Air: TWA 40 ug/m3; CL 200 ug/m3/15M NTIS**. "NIOSH Manual of Analytical Methods" VOL 1 191,223,224, VOL 3 S312, S313, VOL 5 173#. Reported in EPA TSCA Inventory, 1980.
THR: MUT data. An exper TER, NEO, ETA, CARC. A human SYS. HIGH hmn ihl, unk. HIGH orl, ipr, scu, ivn, ims. MOD unk. See also cadmium compounds.
Fire Hazard: Mod, in the form of dust when exposed to heat or flame or by chemical reaction with oxidizing agents, metals, HN_3, Zn, Se and Te.
Explosion Hazard: Mod, in the form of dust when exposed to flame.
Disaster Hazard: Dangerous; cadmium dust can react vigorously with oxidizing materials.
For further information see Vol. 1, No. 1 and Vol. 3, No. 5 of *DPIM Report.*

CADMIUM (II) ACETATE

CAS RN: 543908 NIOSH #: EU 9810000
mf: $C_2H_4O_2 \cdot 1/2Cd$; mw: 116.25

Monoclinic colorless crystals, odor of acetic acid. mp: 256°, bp: decomp, d: 2.341.

SYNS:
BIS(ACETOXY)CADMIUM C.I. 77185
CADMIUM DIACETATE

TOXICITY DATA: 3	CODEN:
otr-ham:emb 1 umol/L	CNREA8 39,193,79
dnd-ham:emb 1 umol/L	CNREA8 39,193,79
ipr-mus LD50:14 mg/kg	TXAPA9 49,41,79
cyt-hmn:lym 10 nmol/L	MUREAV 85,236,81
ipr-rat TDLo:2371 ug/kg (14D preg)	BECTA6 20,206,78
ipr-rat TDLo:1 mg/kg (14D preg)	BECTA6 23,25,79
ipr-rat TDLo:2 mg/kg (20D preg)	BECTA6 23,25,79

Reported in EPA TSCA Inventory, 1980.
THR: MUT data. HIGH ipr. See also cadmium compounds.
Disaster Hazard: When heated to decomp it emits tox fumes of Cd.

CADMIUM BIS(2-ETHYLHEXYL) PHOSPHITE

CAS RN: 7495934 NIOSH #: TG 6475000
mf: $C_{32}H_{68}O_6P_2 \cdot Cd$; mw: 723.34

SYN: PHOSPHORUS ACID, BIS(2-ETHYLHEXYL) ESTER, CADMIUM SALT

TOXICITY DATA: 3	CODEN:
ipr-mus LDLo:250 mg/kg	CBCCT* 7,790,55

Occupational Exposure to Cadmium recm std: Air: TWA 40 ug/m3; CL 200 ug/m3/15M NTIS**.
THR: HIGH ipr. See also cadmium compounds.
Disaster Hazard: When heated to decomp it emits tox fumes of PO_x and Cd.

CADMIUM CAPRYLATE

CAS RN: 2191108 NIOSH #: RH 0370000
mf: $C_{16}H_{30}O_4 \cdot Cd$; mw: 398.86

SYN: OCTANOIC ACID, CADMIUM SALT (2:1)

TOXICITY DATA: 3-2	CODEN:
orl-rat LD50:950 mg/kg	JHEMA2 18,144,74
itr-rat LDLo:10 mg/kg	JHEMA2 18,144,74
orl-mus LD50:300 mg/kg	JHEMA2 18,144,74

Occupational Exposure to Cadmium recm std: Air: TWA 40 ug/m3; CL 200 ug/m3/15M NTIS**. Reported in EPA TSCA Inventory, 1980.

CHROMIC ACID

CAS RN: 7738945 NIOSH #: GB 2450000
mf: CrH_2O_4; mw: 118.02

SYNS:
ACIDE CHROMIQUE (FRENCH) CHROMIC (VI) ACID

TOXICITY DATA: CODEN:
mmo-sat 80 ug/plate MUREAV 54,139,78

Aquatic Toxicity Rating: TLm96:000-under 1 ppm WQCHM* 2,-,74. Criteria Document: Occupational Exposure to Cr(VI) rec std: Air: TWA 25 ug (Cr (VI))/m3; CL 50 ug/m3/15M NTIS**.

Standards and Regulations: OSHA Standard Air: CL 100 ug(CrO_3/m3 (SCP-0) FEREAC 39,23540,74. NIOSH Manual of Analytical Methods VOL. 1 152,169, VOL. 3 S317. Reported in EPA TSCA Inventory, 1980.

THR: MUT data. See also chromium compounds. A poison.

Disaster Hazard: When heated to decomp it emits smoke and irr fumes.

Incomp: Acetone.

For further information see Vol. 2, No. 2 and Vol. 3, No. 3 of *DPIM Report.*

CHROMIC ACID (MIXTURE)

NIOSH #: GB 2650000
mf: CrO_3; mw: 100.01

mp: 196°; d: 2.70; dark red cryst; decomp @ 250° to $Cr_2O_3 + O_2$; a powerful oxidizer. Water sol.

SYNS:
CHROMIUM TRIOXIDE CHROMIC ANHYDRIDE

TOXICITY DATA: CODEN:

DOT: Oxidizer, Label: Oxidizer FEREAC 41,57018,76. Occupational Exposure to Cr(VI) recm std: Air: TWA 25 ug(Cr(VI))/m3;CL 50 ug/m3/15M NTIS**.

THR: A poison. See also chromium compounds and chromates. A powerful irr of skn, eyes and mu mem; can cause a dermatitis, bronchoasthma, "chrome holes," damage to the eyes.

Disaster Hazard: May explode in a fire.

Incomp: Acetic acid; acetic anhydride; tetrahydronaphthalene; acetone; alcohols; alkali metals; ammonia; arsenic; bromine penta fluoride; butyric acid; n,n-dimethylformamide; hydrogen sulfide; peroxyformic acid; phosphorus; potassium hexacyanoferrate; pyridine; selenium; sodium; sulfur.

CHROMIC ACID (SOLUTION)

NIOSH #: GB 2670000

SYN: CHROMIC ACID SOLUTION (DOT)

TOXICITY DATA: 3 CODEN:

DOT: Corrosive Material, Label: Corrosive FEREAC 41,57018,76. Occupational Exposure to Cr(VI) recm std: Air: TWA 25 ug(Cr(VI))/m3;CL 50 ug/m3/15M NTIS**.

THR: See chromic acid, dry. See also chromium compounds.

SYNS:
CHROMIC ACID, CHROMIUM (3+) SALT (3:2) CHROMIUM CHROMATE

TOXICITY DATA: 3 CODEN:
imp-rat TDLo:112 mg/kg:NEO AIHAAP 20,274,59

Carcinogenic Determination: Animal Positive IARC** 2,100,73. Occupational Exposure to Chromium(VI) recm std: Air: CL 1 ug(Cr(VI))/m3 NTIS**. Reported in EPA TSCA Inventory, 1980.

THR: An exper NEO, CARC. See also chromium compounds. Very powerful oxidizer.

CHROMITE (MINERAL)

CAS RN: 1308312 NIOSH #: GB 4000000
mf: Cr_2FeO_4; mw: 223.85

SYNS:
CHROME ORE IRON CHROMITE
CHROMITE ORE

TOXICITY DATA: 3 CODEN:

Carcinogenic Determination: Indefinite IARC** 23,-205,80.

THR: See also chromium compounds and iron. An exper ± CARC.

CHROMIUM

CAS RN: 7440473 NIOSH #: GB 4200000
Af: Cr; Aw: 52.0

SYN: CHROME

TOXICITY DATA: CODEN:
ivn-rat TDLo:2160 ug/kg/6W-I TFX:ETA JNCIAM 16,447,55
imp-rat TDLo:1200 ug/kg/6W-I TFX:ETA JNCIAM 16,447,55
imp-rbt TDLo:75 mg/kg:ETA ZEKBAI 52,425,42

Carcinogenic Determination: Animal Suspected IARC** 2,100,73; Animal Indefinite IARC** 23,205,80. TLV-TWA 500 ug/m3 DTLVS* 4,98,80. *Toxicology Review:* 85CVA2 5,63,70; KOTTAM 11(11),1300,75; FOREAE 7,313,42; MIBUBI 9(4),321,75; FCTXAV 9,105,71; PEXTAR 12,102,69; 85DHAX Cr,22,74; BNYMAM 54,413,78; NTIS** Conf-691001. OSHA Standard: Air: TWA 1 mg/m3 (SCP-0) FEREAC 39,23540,74. "NIOSH Manual of Analytical Methods" VOL 1 152,182, VOL 3; S323,352, VOL 5 173#. NIOSH Current Intelligence Bulletin 4, 1975. Reported in EPA TSCA Inventory, 1980. Proposed OSHA Medical Records Rules FEREAC 47,30420,82.

THR: An exper ETA, CARC.

Disaster Hazard: Powder will explode spont in air.

Incomp: Oxidants.

For further information see Vol. 3, No. 3 of *DPIM Report.*

CHROMIUM ACETATE HYDRATE

CAS RN: 628524 NIOSH #: AG 3000000
mf: $C_4H_6CrO_4 \cdot H_2O$; mw: 188.12

Red crystals.

ivn-mus LDLo:2290 mg/kg	EQSSDX 1,1,75
ivn-rbt LDLo:1604 mg/kg	EQSSDX 1,1,75
ivn-frg LDLo:6185 mg/kg	AIPTAK 62,330,39

Chromium and its compounds are on the Community Right To Know List. IARC Cancer Review: Animal Inadequate Evidence IMEMDT 2,100,73; IMEMDT 23,205,80. Reported in EPA TSCA Inventory.

OSHA PEL: CL 0.5 mg(Cr)/m^3
ACGIH TLV: TWA 0.5 mg(Cr)/m^3

DOT Classification: ORM-E; Label: None

THR: An experimental tumorigen and suspected carcinogen. Moderately toxic by intravenous route. Human mutagenic data. See also CHROMIUM COMPOUNDS. When heated to decomposition it emits acrid smoke and irritating fumes. For further information, see Vol. 5, No. 6 of *DPIM Report*.

CMH250 ***HR: 3***
CHROMIC ACID
CAS: 7738-94-5 NIOSH: GB 2450000
mf: CrH_2O_4 mw: 118.02

SYNS:
ACIDE CHROMIQUE (FRENCH) CHROMIC(VI) ACID

TOXICITY DATA:	CODEN:
mmo-sat 80 µg/plate	MUREAV 54,139,78
dnr-smc 1200 nmol/L	CNJGA8 24,771,82
dnr-ssp 1200 nmol/L	CNJGA8 24,771,82
scu-dog LDLo:320 mg/kg	EQSSDX 1,1,75

Reported in EPA TSCA Inventory. Chromium and its compounds are on the Community Right To Know List.

OSHA PEL: CL 0.1 mg(CrO_3/m^3
ACGIH TLV: TWA 0.05 mg(Cr)/m^3
NIOSH REL: TWA 0.025 mg(Cr(VI))/m^3; CL 0.05/15M

THR: Poison by subcutaneous route. Mutagenic data. A powerful oxidizer. A storage hazard; it may burst a sealed container due to carbon dioxide release. Potentially explosive reactions with oxidizable materials. May ignite on contact with acetone or alcohols. When heated to decomposition it emits acrid smoke and irritating fumes. See also CHROMIUM COMPOUNDS. For further information, see Vol. 3, No. 3 of *DPIM Report*.

CMH500 ***HR: 3***
CHROMIC ACID (MIXTURE)
NIOSH: GB 2650000

DOT: 1463
mf: CrO_3 mw: 99.98

PROP: Dark red crystals. Mp: 196°, d: 2.70, decomp @ 250° to Cr_2O_3 + O_2, a powerful oxidizer. Water-sol.

SYN: CHROMIC ACID MIXTURE, DRY (DOT)

Chromium and its compounds are on the Community Right To Know List.

OSHA PEL: CL 0.1 mg(CrO_3)/m^3
ACGIH TLV: TWA 0.05 mg(Cr)/m^3
NIOSH REL: TWA 0.025 mg(Cr(VI))/m^3; CL 0.05 mg/m^3/15M

DOT Classification: Oxidizer; Label: Oxidizer

THR: A poison. A powerful irritant of skin, eyes, and mucous membranes; can cause a dermatitis, bronchoasthma, "chrome holes," damage to the eyes. Dangerously reactive. Incompatible with acetic acid; acetic anhydride; tetrahydronaphthalene; acetone; alcohols; alkali metals; ammonia; arsenic; bromine penta fluoride; butyric acid; n;n-dimethylformamide; hydrogen sulfide; peroxyformic acid; phosphorus; potassium hexacyanoferrate; pyridine; selenium; sodium; sulfur and many other materials. See also CHROMIC ACID; CHROMIUM COMPOUNDS; and CHROMATES.

CMH750 ***HR: 3***
CHROMIC ACID (SOLUTION)
CAS: 1308-14-1 NIOSH: GB 2670000
mf: CrH_3O_3 mw: 103.03

SYN: CHROMIC (III) HYDROXIDE

Reported in EPA TSCA Inventory. Chromium and its compounds are on the Community Right To Know List.

OSHA PEL: CL 0.1 mg(CrO_3)/m^3
ACGIH TLV: TWA 0.05 mg(Cr)/m^3
NIOSH REL: TWA 0.025 mg(Cr(VI))/m^3; CL 0.05 mg/m^3/15M

THR: A poison by many routes. Dangerously reactive. See also CHROMIC ACID and CHROMIUM COMPOUNDS.

CMI250 ***HR: 3***
CHROMIC CHROMATE
CAS: 24613-89-6 NIOSH: GB 2850000
mf: Cr_3O_{12}•2Cr mw: 452.00

SYNS:
CHROMIC ACID, CHROMIUM (3+) SALT (3:2) CHROMIUM CHROMATE

TOXICITY DATA:	CODEN:
imp-rat TDLo:112 mg/kg:NEO	AIHAAP 20,274,59

IARC Cancer Review: Animal Sufficient Evidence IMEMDT 2,100,73. Reported in EPA TSCA Inventory. Chromium and its compounds are on the Community Right To Know List.

OSHA PEL: CL 0.1 mg(CrO_3)/m^3
ACGIH TLV: TWA 0.05 mg(Cr)/m^3
NIOSH REL: TWA 0.001 mg(Cr(VI))/m^3

CNH785 **HR: 3**

CONVALLATOXOL

CAS: 3253-62-1 NIOSH: FH 4900000

mf: $C_{29}H_{44}O_{10}$ *mw:* 552.73

SYNS:

CONVALLOTOXOL
CONVALOTOXOL
COVALLATOXOL
α-l-STROPHANTHIDOL-3,6-DEOXY-MANNOPYRANOSIDE

TOXICITY DATA:

ivn-cat LD50:87 μg/kg
ivn-rat LD50:56 mg/kg
ipr-mus LD50:30 mg/kg
ipr-cat LD50:130 μg/kg

CODEN:

JPETAB 111,365,54
AIPTAK 155,165,65
AIPTAK 155,165,65
AIPTAK 155,165,65

THR: Poison by intravenous and intraperitoneal routes. When heated to decomposition it emits acrid smoke and fumes.

CNH789 **HR: 3**

COONTIE

PROP: The coontie looks like a low palm with a short trunk and a few 2-foot long pinnate leaves. It produces seed cones. It grows on the southeastern coast of Georgia, Florida, the Bahamas, the northwestern coast of Jamaica, the Dominican Republic and Puerto Rico.

SYNS:

BAY BUSH (BAHAMAS)
COMPTIE
FLORIDA ARROWROOT
GUAYIGA (DOMINICAN REPUBLIC)
MARUNGUEY (PUERTO RICO)
PALMITA de JARDIN (PUERTO RICO)
SAGO CYCAS
SEMINOLE BREAD
YUGILLA (CUBA)
ZAMIA PUMILA

THR: The roots and trunk contain the poison cycasin. Ingestion of these plant parts may cause persistent vomiting, diarrhea, colic, depression and muscular paralysis. Washing the grated root with water renders it edible. See also CYCASIN.

CNH800 **HR: 2**

COPIAMYCIN

CAS: 11078-23-2 NIOSH: GL 5300000

mf: $C_{55}H_{97}NO_{22}$ *mw:* 1124.53

SYN: NSC-110326

TOXICITY DATA:

orl-mus LD50:1030 mg/kg
ipr-mus LD50:1200 mg/kg
scu-mus LD50:1050 mg/kg

CODEN:

85GDA2 7,53,81
85GDA2 7,53,81
85GDA2 7,53,81

THR: Moderately toxic by ingestion, subcutaneous and intraperitoneal routes. When heated to decomposition it emits toxic fumes of NO_x.

CNI000 **HR: 3**

COPPER

CAS: 7440-50-8 NIOSH: GL 5325000

af: Cu *aw:* 63.54

PROP: A metal with a distinct reddish color. Mp: 1083° bp: 2324°, d: 8.92, vap press: 1 mm @ 1628°.

SYNS:

ALLBRI NATURAL COPPER
ANAC 110
ARWOOD COPPER
BRONZE POWDER
CDA 101
CDA 102
CDA 110
CDA 122
C.I. 77400
C.I. PIGMENT METAL 2
COPPER-AIRBORNE
COPPER BRONZE
COPPER-MILLED
COPPER SLAG-AIRBORNE
COPPER SLAG-MILLED
1721 GOLD
GOLD BRONZE
KAFAR COPPER
M1 (COPPER)
M2 (COPPER)
OFHC Cu
RANEY COPPER

TOXICITY DATA:

orl-rat TDLo:152 mg/kg (22W pre):TER
iut-rat TDLo:250 μg/kg (1D pre):REP
ipl-rat TDLo:100 mg/kg:ETA
orl-hmn TDLo:120 μg/kg:GIT

CODEN:

GISAAA 45(3),8,80
IJEBA6 19,1124.81
AIHAAP 41,836,80
PHRPA6 73,910,58

Reported in EPA TSCA Inventory. Copper and its compounds are on the Community Right To Know List.

ACGIH TLV: TWA (dust, mist) 1 mg(Cu)/m^3; (fume) 0.2 mg/m^3

DFG MAK: (dust) 1 mg/m^3; (fume) 0.1 mg/m^3

THR: An experimental tumorigen and teratogen. Other experimental reproductive effects. Human systemic effects by ingestion: nausea and vomiting. See also COPPER COMPOUNDS. Liquid copper explodes on contact with water. Potentially explosive reaction with actylenic compounds; 3-bromopropyne; ethylene oxide; lead azide; and ammonium nitrate. Ignites on contact with chlorine; chlorine trifluoride; fluorine (above 121°C); and hydrazinium nitrate (above 70°C). Reacts violently with C_2H_2; bromates; chlorates; iodates; (Cl_2 + OF_2); dimethyl sulfoxide + trichloroacetic acid; ethylene oxide; H_2O_2; hydrazine mononitrate; hydrazoic acid; H_2S + air, $Pb(N_3)_2$; K_2O_2; NaN_3; Na_2O_2; sulfuric acid. Incandescent reaction with potassium dioxide. Incompatible with 1-bromo-2-propyne. For further information, see Vol. 1, No. 5 of *DPIM Report*.

CNI250 **HR: 3**

COPPER ACETATE

CAS: 142-71-2 NIOSH: AG 3480000

DOT: 9106

mf: $C_4H_6O_4 \cdot Cu$ *mw:* 181.64

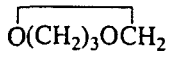
PROP: Greenish-blue powder or small crystals.

DVP600 *HR: 3*

DIOXAN

CAS: 505-22-6

mf: $C_4H_8O_2$ mw: 88.12



PROP: Flash p: 33.8°F. lel: 2%, uel: 22%.

SYN: 1,3-DIOXANE

THR: A very dangerous fire and explosion hazard when exposed to heat or flame; can react with oxidizing materials. Can form dangerous peroxides when exposed to air. When heated to decomposition it emits acrid smoke and fumes.

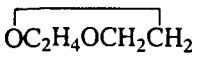
DVQ000 *HR: 3*

p-DIOXANE

CAS: 123-91-1 NIOSH: JG 8225000

DOT: 1165

mf: $C_4H_8O_2$ mw: 88.11



PROP: Colorless liquid, pleasant odor. Mp: 12°, bp: 101.1°, lel: 2.0%, uel: 22.2%, flash p: 54°F (CC), d: 1.0353 @ 20°/4°, autoign temp: 356°F, vap press: 40 mm @ 25.2°, vap d: 3.03.

SYNS:

DIETHYLENE DIOXIDE
1,4-DIETHYLENE DIOXIDE
DIETHYLENE ETHER
DI(ETHYLENE OXIDE)
DIOKAN
DIOKSAN (POLISH)
DIOSSANO-1,4 (ITALIAN)
DIOXAAN-1,4 (DUTCH)
1,4-DIOXACYCLOHEXANE
DIOXAN-1,4 (GERMAN)
p-DIOXAN (CZECH)
1,4-DIOXANE
DIOXANE (ACGIH, DOT)
DIOXANNE (FRENCH)
DIOXYETHYLENE ETHER
GLYCOL ETHYLENE ETHER
NCI-C03689
RCRA WASTE NUMBER U108
TETRAHYDRO-p-DIOXIN
TETRAHYDRO-1,4-DIOXIN

TOXICITY DATA:	CODEN:
eye-hmn 300 ppm/15M	JIHTAB 28,262,46
skn-rbt 515 mg open MLD	UCDS** 12/17/71
eye-rbt 21 mg	AJOPAA 29,1363,46
eye-gpg 10 µg MOD	JPPMAB 11,150,59
dnd-rat:lvr 300 µmol/L	SinJF# 26OCT82
oms-rat-ivn 50 mg/kg	ARTODN 49,29,81
dns-rat-orl 20 mg/kg	TXAPA9 60,287,81
osm-rat-ivn 50 mg/kg	ARTODN 49,29,81
orl-rat TDLo:10 g/kg (6-15D preg):TER	TOLED5 26,85,85
orl-rat TDLo:185 g/kg/2Y-C:CAR	NCITR* NCI-CG-TR-80,78
ihl-rat TCLo:111 ppm/7H/2Y-C:ETA	TXAPA9 30,287,74
orl-mus TDLo:239 g/kg/90W-C:CAR	NCITR* NCI-CG-TR-80,78
skn-mus TDLo:14 g/kg/60W-I:ETA	EVHPAZ 5,163,73
ipr-mus TDLo:12 g/kg/8W-I:NEO	TXAPA9 82,19,86
orl-rat TD:416 g/kg/57W-C:ETA	BJCAAI 24,164,70
orl-rat TD:408 g/kg/2Y-C:CAR	NCITR* NCI-CG-TR-80,78
orl-mus TD:523 g/kg/90W-C:CAR	NCITR* NCI-CG-TR-80,78
orl-rat TD:416 g/kg/57W-C:CAR	BJCAAI 24,164,70
orl-rat TD:528 g/kg/63W-I:ETA	JNCIAM 35,949,65
ihl-hmn TCLo:470 ppm:CNS,CVS,GIT	AMIHAB 20,445,59
ihl-hmn TCLo:5500 ppm/1M:EYE,PUL	PHRPA6 45,2023,30
ipr-mus LD50:790 mg/kg	FEPRA7 6,342,47
orl-cat LD50:2000 mg/kg	JIHTAB 21,173,39
ihl-cat LCLo:44 g/m³/7H	KDPU -,-,37
orl-rbt LD50:2000 mg/kg	JIHTAB 21,173,39
skn-rbt LD50:7600 mg/kg	UCDS** 12/17/71
ivn-rbt LDLo:1500 mg/kg	JOHYAY 35,540,35
orl-gpg LD50:3150 mg/kg	JIHTAB 23,259,41

IARC Cancer Review: Animal Sufficient Evidence IMEMDT 11,247,76. NCI Carcinogenesis Bioassay (oral); Clear Evidence: mouse, rat NCITR* NCI-CG-TR-80,78. EPA Genetic Toxicology Program. Glycol ether compounds are on the Community Right To Know List. Reported in EPA TSCA Inventory.

OSHA PEL: TWA 100 ppm (skin)
ACGIH TLV: TWA 25 ppm (skin)
NIOSH REL: CL (Dioxane) 1 ppm/30M

DOT Classification: Flammable Liquid, Label: Flammable Liquid

THR: Poison by intraperitoneal route. Moderately toxic by ingestion and inhalation. Mildly toxic by skin contact. An experimental carcinogen, neoplastigen, teratogen and tumorigen. Human systemic effects by inhalation: lachrimation, conjunctiva irritation, convulsions, high blood pressure, unspecified respiratory and gastrointestinal system effects. Experimental reproductive effects. Mutagenic data. An eye and skin irritant. The irritant effects probably provide sufficient warning, in acute exposures, to enable the worker to leave exposure before he is seriously affected. Repeated exposure to low concentrations has resulted in human fatalities, the organs chiefly affected being the liver and kidneys. A very dangerous fire and explosion hazard when exposed to heat or flame; can react vigorously with oxidizing materials. Violent reaction with (H_2 + Raney Ni), $AgClO_4$. Can form dangerous peroxides when exposed to air. Potentially explosive reaction with nitric acid + perchloric acid; Raney nickel catalyst (above 210°C). Forms explosive mixtures with decaborane (impact-sensitive); triethynylaluminum (sensitive to heating or drying). Violent reaction with sulfur trioxide. Incompatible with sulfur trioxide. To fight fire, use alcohol foam, CO_2, dry chemical. When heated to decomposition it emits acrid smoke and irritating fumes. See also GLYCOL ETHERS. For further information, see Dioxane, Vol. 8, No. 1 of *DPIM Report*.

LEAD

CAS RN: 7439921 NIOSH #: OF 7525000
mf: Pb; mw: 207.19

Bluish-gray, soft metal. mp: 327.43°, bp: 1740°, d: 11.34 @ 20°/4°. vap. press: 1 mm @ 973°.

SYNS:

C.I. 77575
LEAD FLAKE
LEAD S2
OLOW (POLISH)

TOXICITY DATA: 3	CODEN:
orl-rat TDLo:790 mg/kg (MGN)	AEHLAU 23,102,71
orl-rat TDLo:1140 mg/kg (14D pre-21D post)	PHMCAA 20,201,78
orl-mus TDLo:1120 mg/kg (MGN)	AEHLAU 23,102,71
orl-mus TDLo:6300 mg/kg (1-21D preg)	EXPEAM 31,1312,75
orl-mus TDLo:12600 mg/kg (1-21D preg)	EXPEAM 31,1312,75
orl-mus TDLo:4800 mg/kg (1-16D preg)	BECTA6 18,271,77
ivn-ham TDLo:50 mg/kg/(8D preg):TER	EXPEAM 25,56,69
orl-dom TDLo:662 mg/kg (1-21W preg)	TXAPA9 25,466,73
ivn-ham TDLo:50 mg/kg/(8D preg):TER	EXPEAM 25,56,69
orl-wmn TDLo:450 mg/kg/6Y:CNS	JAMAAP 237,2627,77
ipr-rat LDLo:1000 mg/kg	EQSSDX 1,1,75
orl-pgn LDLo:160 mg/kg	HBAMAK 4,1289,35

Carcinogenic Determination: Indefinite IARC** 23, 325,80.

TLV: AIR: 0.15 mg/m3 DTLVS* 4,243,80; *Toxicology Review:* TRBMAV 33(1),85,75; PGMJAO 51(601),783,75; JDSCAE 58(12),1767,75; IRXPAT 12,1,73; CTPHBG 55,147,71; CTOXAO 6(3),377,73; QURBAW 7(1),75,74; RREVAH 54,55,75; JAVMA4 164(3),277,74; AEMBAP 40,239,73; CTOXAO 5(2),151,72; FOREAE 7,313,42; KOTTAM 11(11),1300,75; GEIGAI 20(3),291,73; STEVA8 2(4),341,74; CLCHAU 19,361,73; AJMEAZ 38,409,65; 85DHAX PB,254,72; PDTNBH 6,204,77; AMTODM 3,209,77. OSHA Standard: Air: TWA 200 ug/m3 (SCP-O) FEREAC 39,23540,74. Occupational Exposure to Inorganic Lead recm std: Air: TWA 0.10 mg(Pb)/m3 NTIS**. "NIOSH Manual of Analytical Methods" VOL 1 102,191,195,200,208,214,262, VOL 3 S341. Reported in EPA TSCA Inventory, 1980.

THR: See lead compounds. A hmn CNS. HIGH orl; MOD irr. A common air contaminant. It is a ± CAR of the lungs and kidney and an exper TER.

Fire Hazard: Mod, in the form of dust when exposed to heat or flame. See also powdered metals.

Explosion Hazard: Mod, in the form of dust when exposed to heat or flame.

Incomp: NH_4NO_3, ClF_3, H_2O_2, NaN_3, Na_2C_2, Zr. disodium acetylide; oxidants.

Disaster Hazard: Dangerous; when heated, emits highly tox fumes; can react vigorously with oxidizing materials.

For further information see Vol. 1, No. 1 of *DPIM Report.*

LEAD ACETATE

CAS RN: 301042 NIOSH #: AI 5250000
mf: $C_4H_6O_4 \cdot Pb$; mw: 325.29

Trihydrate, colorless crystals or white granules or powder. Slightly acetic odor; slowly effloresces; d: 2.55; mp: 75° when rapidly heated. Decomp above 200°; very sol in glycerol. Keep well closed.

SYNS:

ACETIC ACID LEAD (2+) SALT
ACETATE DE PLOMB (FRENCH)
BLEIACETAT (GERMAN)
LEAD (2+) ACETATE
LEAD(II) ACETATE
LEAD DIACETATE
LEAD DIBASIC ACETATE
NORMAL LEAD ACETATE
PLUMBOUS ACETATE
SALT OF SATURN
SUGAR OF LEAD

TOXICITY DATA: 3	CODEN:
dns-rat-ipr 50 ug/kg	PSEBAA 143,446,73
spm-mus-par 1 gm/kg	ARTODN 46,159,80
orl-rat TDLo:7854 mg/kg (6-16D preg)	FCTXAV 13,629,75
orl-rat TDLo:1800 mg/kg (1-22D preg/14D post)	TOLED5 7,373,80
orl-rat TDLo:113 gm/kg (70D pre-21D post)	PBBHAU 8,347,78
orl-mus TDLo:3150 mg/kg (1-21D preg)	CRSBAW 170,1319,76
orl-mus TDLo:4800 mg/kg (1-8D preg)	CRSBAW 172,1037,78
orl-mus TDLo:9 gm/kg (7-21D preg)	CRSBAW 170,1319,76
ipr-mus TDLo:35 mg/kg (8D preg)	BIMDB3 30,223,79
ivn-ham TDLo:50 mg/kg/(8D preg):TER	EXMPA6 7,208,67
ivn-ham TDLo:50 mg/kg (8D preg)	EXPEAM 25,56,69
ipr-pgn LDLo:150 mg/kg	ARTODN 46,265,80
cyt-hmn:lym 1 mmol/L/24H	TXCYAC 10,67,78
cyt-mus-orl 16800 mg/kg/4W	JTEHD6 2,619,77
cyt-mky-orl 5760 mg/kg/64W	MUREAV 45,77,77
ipr-mus TDLo:15 mg/kg/(8D preg):TER	BIMDB3 30,223,79
ivn-ham TDLo:50 mg/kg/(8D preg):TER	EXMPA6 7,208,67
orl-rat TDLo:250 gm/kg/47W-C:ETA	BJCAAI 16,283,62
ipr-rat LDLo:204 mg/kg	JPETAB 38,161,30
ipr-mus LD50:120 mg/kg	COREAF 256,1043,63
orl-dog LDLo:300 mg/kg	HBAMAK 4,1289,35
scu-dog LDLo:80 mg/kg	HBAMAK 4,1289,35
ivn-dog LDLo:300 mg/kg	EQSSDX 1,1,75
scu-cat LDLo:100 mg/kg	HBAMAK 4,1289,35
scu-rbt LDLo:300 mg/kg	HBAMAK 4,1289,35
ivn-rbt LDLo:50 mg/kg	EQSSDX 1,1,75
scu-frg LDLo:1600 mg/kg	HBAMAK 4,1289,35

Carcinogenic Determination: Animal Positive IARC** 23,325,80; Human Suspected IARC** 23,325,80. *Toxicology Review:* ADTEAS 5,51,72; ENVRAL 13,36,77; 85DHAX Pb,256,72. OSHA Standard: Air: TWA 200 ug(Pb)/m3 (SCP-O) FEREAC 29,23540,74. Occupational Exposure to Inorganic Lead recm std: Air: TWA 0.10 mg(Pb)/m3 NTIS**. Reported in EPA TSCA Inventory, 1980.

THR: MUT data. An exper + CARC, TER, ETA. A susp hmn CARC; HIGH ipr, orl, scu, ivn. See also lead compounds. A poison. An insecticide.

MERCURY

CAS RN: 7439976 NIOSH #: OV 4550000
af: Hg; aw: 200.59

Silvery liquid, metallic element. mp: −38.89°, bp: 356.9°, d: 13.546, vap. press: 1 mm @ 126.2°. vap press: @ 25° = 2×10^{-3} mm.

SYNS:

COLLOIDAL MERCURY
KWIK (DUTCH)
MERCURE (FRENCH)
MERCURIO (ITALIAN)
MERCURY, METALLIC (DOT)
NCI-C60399
QUECKSILBER (GERMAN)
QUICK SILVER
RTEC (POLISH)

TOXICITY DATA: 3

	CODEN:
ihl-rat TCLo:890 ng/m3/24H (16W male)	GISAAA 45(3),72,80
ihl-rat TCLo:7440 ng/m3/24H (16W male)	GISAAA 45(3),72,80
ipr-rat TDLo:400 mg/kg/14D-I:ETA	ZEKBAI 61,511,57
ihl-wmn TCLo:150 ug/m3/46D:GIT	AEHLAU 33,186,78
ihl-wmn TCLo:150 ug/m3/46D:CNS	AEHLAU 33,186,78
ihl-rbt LCLo:29 mg/m3/30H	AMIHBC 7,19,53

TLV: Air: 0.05 mg(Hg)/m3 (skin) DTLVS* 4,254,80. *Toxicology Review:* AJOGAH 126(3),390,76; JTEHD6 2(3),491,77; TRBMAV 33(1),85,75; PHJOAV 213(5781),159,74; JDSCAE 58(12),1767,75; CPEDAM 13,783,74; QURBAW 7(1),75,74; AEMBAP 48,463,74; JAVMA4 164(3),277,74; 31ZNAA 2,365,73; AEMBAP 40,239,73; CTOXAO 5(2),151,72; BIOGAL 41(7),208,75; ADTEAS 5,51,72; RREVAH 42,103,72; FOREAE 7,313,42; NISIA9 27(9),942,74; MIBUBI 9(4),321,75; STEVA8 2(4),341,74; ENVRAL 13,36,77; 85CVA2 5,63,70; JOCMA7 2,337,60; PEXTAR 12,102,69; PDTNBH 6,204,77.

OSHA Standard: Air: CL 1 mg/10m3 (SCP-N) FEREAC 39,23540,74. DOT: ORM-B, Label: None FEREAC 41,57018,76. Occupational Exposure to Inorganic Mercury recm std: Air: TWA 0.05 mg(Hg)/m3 NTIS**. "NIOSH Manual of Analytical Methods" VOL 1 145,165,167, VOL 4 S199*, VOL 5 175#. Reported in EPA TSCA Inventory, 1980.

THR: A hmn GIT, CNS. An exper ETA. HIGH ihl. See also mercury compounds. Reacts violently with acetylene, NH_3, BPI_2, Cl_2, ClO_2, CH_3N_3, Na_2C_2, nitromethane, (butyne diol + acid).

Incomp: Acetylenic compounds; ammonia; boron diiodophosphide; ethylene oxide; metals; methyl azide; methylsilane, oxygen; oxidants; tetracarbonylnickel, oxygen.

For further information see Vol. 1, No. 3 of *DPIM Report.*

MERCURY AMIDE CHLORIDE

CAS RN: 10124488 NIOSH #: OV 7020000
mf: ClH_2HgN; mw: 252.07

White pulverulent lumps or powder.

SYNS:

AMINOMERCURIC CHLORIDE
MERCURIC AMMONIUM CHLORIDE, SOLID
MERCURIC CHLORIDE, AMMONIATED
MERCURY AMINE CHLORIDE
MERCURY AMMONIATED
WHITE MERCURY PRECIPITATED
WHITE PRECIPITATE

TOXICITY DATA:

Aquatic Toxicity Rating: TLm96:under 1 ppm WQCHM* 3,-,74. *Toxicology Review:* SDGTB3 1(2),177,71; 27ZTAP 3,15,69. DOT: Poison B, Label: Poison FEREAC 41,57018,76. Occupational Exposure to Inorganic Mercury recm std: Air: TWA 0.05 mg(Hg)/m3 NTIS**. Reported in EPA TSCA Inventory, 1980.

THR: A poison. See also mercury compounds.

Disaster Hazard: When heated to decomp it emits very tox fumes of Cl^-, NO_x and Hg.

MERCURY(II)-o-ARSENATE

CAS RN: 7784374 NIOSH #: OV 7040000
mf: $AsHO_4 \cdot Hg$; mw: 340.52

Yellow powder; mp: decomp. Insol in H_2O, sol in HCl or HNO_3.

SYN: MERCURIC ARSENATE

TOXICITY DATA: 3

Aquatic Toxicity Rating: TLm96:under 1 ppm WQCHM* 3,-,74. Occupational Exposure to Inorganic Mercury recm std: Air: TWA 0.05 mg(Hg)/m3 NTIS**. Occupational Exposure to Inorganic Arsenic recm std: Air: CL 2 ug/m3/15M NTIS**.

THR: A poison. See also mercury and arsenic compounds.

Disaster Hazard: When heated to decomp it emits very tox fumes of Hg and As.

MERCURY(I) AZIDE

mf: Hg_2N_6; mw: 485.22

THR: Explodes on heating in air. HIGH tox. See also azides, mercury compounds.

Disaster Hazard: When heated to decomp it emits very tox fumes of NO_x and Hg.

MERCURY(II) AZIDE

mf: HgN_6; mw: 284.65

THR: High friction sensitivity; brisance on explosion. HIGH tox. See also mercury compounds, azides.

Disaster Hazard: When heated to decomp it emits very tox fumes of Hg and NO_x.

MERCURY(II) BENZOATE

CAS RN: 583153 NIOSH #: OV 7060000
mf: $C_{14}H_{10}O_4 \cdot Hg$; mw: 442.83

White crystalline powder; odorless. mp: 165°. Very sol in NaCl soln; slightly sol in alc. Protect from light.

SYNS:

MERCURIC BENZOATE
MERCURIC BENZOATE, SOLID (DOT)

TOXICITY DATA: 3

Aquatic Toxicity Rating: TLm96:under 1 ppm WQCHM* 3,-,74. DOT: Poison B, Label: Poison FEREAC 41,57018,76. Occupational Exposure to Inorganic Mercury recm std: Air: TWA 0.05 mg(Hg)/m3 NTIS**.

NICKEL

CAS RN: 7440020 NIOSH #: QR 5950000
af: Ni; aw: 58.71

A silvery-white, hard, malleable and ductile metal. d: 8.90 @ 25°, vap. press: 1 mm @ 1810°. Crystallizes as metallic cubes; mp: 1455°; bp: 2730°; Stable in air @ room temp.

SYNS:
C.I. 77775
NICKEL CATALYST, WET (DOT)
NICHEL (ITALIAN)
NICKEL SPONGE
PULVERIZED NICKEL
RANEY ALLOY
RANEY NICKEL

TOXICITY DATA: 3	CODEN:
otr-ham:emb 5 umol/L	TOXID9 1,132,81
orl-rat TDLo:158 mg/kg (MGN)	AEHLAU 23,102,71
scu-rat TDLo:3000 mg/kg/6W-I:ETA	JNCIAM 16,55,55
ims-rat TDLo:1000 mg/kg/17W-I:CAR	PAACA3 9,28,68
ipl-rat TDLo:1250 mg/kg/17W-I:ETA	TRBMAV 10,167,52
par-rat TDLo:40 mg/kg/52W-I:ETA	AEHLAU 5,445,62
imp-rat TDLo:250 mg/kg:CAR	JNCIAM 16,55,55
ims-mus TDLo:200 mg/kg:NEO	NCIUS* PH 43-64-886, SEPT,70
imp-rbt TDLo:165 mg/kg/2Y-I:NEO	JNCIAM 16,55,55
ihl-gpg TCLo:15 mg/m3/91W-I:ETA	AMPLAO 65,600,58
ims-ham TDLo:200 mg/kg/21W-I:ETA	PWPSA8 14,68,71
ims-rat TD:58 mg/kg:ETA	PAACA3 17,11,76
imp-rat TD:23 mg/kg:ETA	JNCIAM 16,55,55
ims-rat TD:125 mg/kg/13W-I:NEO	NCIUS* PH 43-64-886, JUL,68
ims-mus TD:800 mg/kg/13W-I:NEO	NCIUS* PH 43-64-886, JUL,68
ims-rat TD:90 mg/kg/18W-I:ETA	NCIUS* PH 43-64-886, AUG,69
ims-rat TD:889 ug/kg:ETA	JPTLAS 97,375,69
ims-rat TD:200 mg/kg/21W-I:NEO	PWPSA8 14,68,71
itr-rat LDLo:12 mg/kg	NTIS** AEC-TR-6710
ivn-mus LDLo:50 mg/kg	FATOAO 23,549,60
ivn-dog LDLo:10 mg/kg	14CYAT 2,1120,63
orl-gpg LDLo:5 mg/kg	AMPMAR 25,247,64
scu-gpg LDLo:500 mg/kg	MELAAD 37,140,46

Carcinogenic Determination: Animal Positive IARC** 11,75,76.

TLV: Air: 1.0 mg/m3 DTLVS* 4,295,80. *Toxicology Review:* ACLSCP 3(3),156,73; KOTTAM 11(11),1300,75; MIBUBI 9(4),321,75; FCTXAV 9,105,71; 85DHAX Ni,168,75; 85CVA2 5,63,70; 31BYAP -,93,74; NTIS** CONF-691001; GSAMAQ 123,109,71; PEXTAR 12,102,69; DICHAK 54,527,68; AMTODM 3,209,77. OSHA Standard: Air: TWA 1 mg/m3 (skin) (SCP-N) FEREAC 39,23540,74. DOT: Flammable Solid, Label: Flammable Solid FEREAC 41,57018,76. Occupational Exposure to Inorganic Nickel recm std: Air: TWA 15 ug(Ni)/m3 NTIS**. "NIOSH Manual of Analytical Methods" VOL 3 S206, VOL 5 173#, 298#. Reported in EPA TSCA Inventory, 1980. EPA TSCA 8E No: 09880246—File closed as of April, 1979.

THR: An exper CARC, ETA, NEO; HIGH acute itr, ivn, orl. Reacts violently with F_2, NH_4NO_3, hydrazine, NH_3, (H_2 + dioxane), performic acid, P, Se, S, (Ti + $KClO_3$).

Incomp: Aluminium; aluminium trichloride, ethylene; p-dioxan; hydrogen; methanol; non-metals; oxidants; sulfur compounds.

Caution: May cause dermatitis in sensitive individuals. Ingestion of sol salts causes nausea, vomiting, diarrhea.

For further information see Vol. 1, No. 1 and Vol. 3, No. 3 of *DPIM Report.*

NICKEL COMPOUNDS

THR: Nickel and most salts of nickel are generally considered not to cause systemic poisoning. Ingestion of large doses of nickel as nickel compounds (1-3 mg/kg) has been shown to cause intestinal disorders, convulsions and asphyxia in dogs. Nickel has been found in the hair of persons exposed to nickel oxide dust. Many Ni compounds are exper CARC and some are hmn CARC via inhl route. All airborne Ni contaminating dusts are regarded as CARC via inhal. Use personal hygiene to minimize worker contact with Ni; eliminate wound contamination by Ni. The most common effect resulting from exposure to nickel compounds is the development of the "nickel itch." This form of dermatitis occurs chiefly in persons doing nickel-plating. There is marked variation in individual susceptability to the dermatitis. It occurs more frequently under conditions of high temp, and humidity, when the skn is moist, and chiefly affects the hands and arms. Nickel carbonyl is a CARC and a high irr to the lungs and also can produce asphyxia by decomp with the formation of carbon monoxide. These compounds are common air contaminants.

NICKEL CYANIDE, (SOLID)

CAS RN: 557197 NIOSH #: QR 6495000
mf: C_2N_2Ni; mw: 110.75

Apple-green plates or powder.

SYN: NICKEL CYANIDE, SOLID (DOT)

TOXICITY DATA: 3

DOT: Poison B, Label: Poison FEREAC 41,57018,76. Occupational Exposure to Inorganic Nickel recm std: Air: TWA 15 ug(Ni)/m3 NTIS**. Reported in EPA TSCA Inventory, 1980.

THR: A poison. See cyanides and nickel compounds. Reacts violently with Mg.

Disaster Hazard: When heated to decomp it emits very tox fumes of CN^-.

Incomp: Magnesium.

NICKEL(II) FLUOBORATE

CAS RN: 14708146 NIOSH #: QR 6650000

SYN: TL 1091

TOXICITY DATA: 3-2	CODEN:
orl-rat LDLo:500 mg/kg	NCNSA6 5,28,53
ihl-mus LCLo:530 mg/m3/10M	NDRC** No.9-4-1-19,44

Occupational Exposure to Inorganic Nickel recm std: Air: TWA 15 ug(Ni)/m3 NTIS**. Reported in EPA TSCA Inventory, 1980.

THR: MOD oral. HIGH inhal. See also fluorides, boron and nickel compounds.

PJL750 **HR: 3**

POLYCHLORINATED BIPHENYLS

CAS: 1336-36-3 NIOSH: TQ 1350000

DOT: 2315

PROP: Bp: 340-375°, flash p: 383°F (COC), d: 1.44 @ 30°. A series of technical mixtures consisting of many isomers and compounds that vary from mobile oily liquids to white crystalline solids and hard noncrystalline resins. Technical products vary in composition, in the degree of chlorination and possibly according to batch (IARC** 7,262,74).

SYNS:

AROCLOR
CHLOPHEN
CHLOREXTOL
CHLORINATED BIPHENYL
CHLORINATED DIPHENYL
CHLORINATED DIPHENYLENE
CHLORO BIPHENYL
CHLORO-1,1-BIPHENYL
CLOPHEN
DYKANOL
FENCLOR
INERTEEN
KANECHLOR
MONTAR
NOFLAMOL
PCB (DOT)
PHENOCHLOR
POLYCHLORINATED BIPHENYL
POLYCHLOROBIPHENYL
PYRALENE
PYRANOL
SANTOTHERM
SOVOL
THERMINOL FR-1

TOXICITY DATA:	CODEN:
orl-mam TDLo:325 mg/kg (30D pre/1-36D preg):REP	AMBOCZ 6,239,77
orl-rat TDLo:16800 mg/kg/2Y-C:ETA	TOERD9 1,159,78
orl-mus TDLo:1250 mg/kg/25W-I:CAR	FCTOD7 21,688,83
orl-rat TD :1250 mg/kg/25W-I:CAR	FCTOD7 21,688,83
orl-mus LD50:1900 mg/kg	FKIZA4 60,544,69

IARC Cancer Review: Human Limited Evidence IMEMDT 18,43,78. EPA Extremely Hazardous Substances List. Reported in EPA TSCA Inventory.

NIOSH REL: TWA (Polychlorinated Biphenyls) 0.001 mg/m^3

DOT Classification: ORM-E; Label: None

THR: Moderately toxic by ingestion. Some are poisons by other routes. Suspected human carcinogens. Experimental carcinogens and tumorigens. Experimental reproductive effects. Like the chlorinated naphthalenes, the chlorinated diphenyls have two distinct actions on the body, namely, a skin effect and a toxic action on the liver. This hepatotoxic action of the chlorinated diphenyls appears to be increased if there is exposure to carbon tetrachloride at the same time. The higher the chlorine content of the diphenyl compound, the more toxic is it liable to be. Oxides of chlorinated diphenyls are more toxic than the unoxidized materials. In persons who have suffered systemic intoxication, the usual signs and symptoms are nausea, vomiting, loss of weight, jaundice, edema and abdominal pain. Where the liver damage has been severe the patient may pass into coma and die. Combustible when exposed to heat or flame. When heated to decomposition they emit highly toxic fumes of Cl^-. Used in heat transfer, hydraulic fluids, lubricants, and insecticides. See also specific compounds. For further information, see PCB's, Vol. 3, No. 4 of *DPIM Report*.

PJN250 **HR: 3**

POLYCHLORINATED BIPHENYL (AROCLOR 1260)

CAS: 11096-82-5 NIOSH: TQ 1362000

PROP: Composed of 12% penta-, 38% hexa-, 41% hepta-, 8% octa- and 1% nonachlorobiphenyls (FCTXAV 12,-63,74).

SYNS:

AROCHLOR 1260
AROCLOR 1260
CHLORODIPHENYL (60% Cl)
CLOPHEN A60
PHENOCLOR DP6

TOXICITY DATA:	CODEN:
cyt-rat-orl 1080 mg/kg/26W-C	APTOD9 19,A16,80
orl-rat TDLo:1675 mg/kg (MGN):REP	FCTXAV 12,63,74
scu-mus TDLo:143 mg/kg (21D post):REP	ENPBBC 5,54,75
orl-rat TDLo:4380 mg/kg/83W-C:CAR	JNCIAM 55,1453,75
orl-rat TD :4992 mg/kg/2Y-C:CAR	TXAPA9 75,278,84
orl-rat LD50:1315 mg/kg	FCTXAV 12,63,74
skn-rbt LDLo:2000 mg/kg	ARVPAX 14,139,74

IARC Cancer Review: Animal Limited Evidence IMEMDT 18,43,78; Human Limited Evidence IMEMDT 18,43,78.

NIOSH REL: TWA (Polychlorinated Biphenyls) 0.001 mg/m^3

THR: Moderately toxic by ingestion and skin contact. A suspected human carcinogen. An experimental carcinogen. Experimental reproductive effects. Mutagenic data. When heated to decomposition it emits highly toxic fumes of Cl^-. Used in heat transfer, hydraulic fluids, lubricants, and insecticides. See also POLYCHLORINATED BIPHENYLS. For further information, see Chlorinated Diphenyls, Vol. 1, No. 3 of *DPIM Report*.

PJN500 **HR: 3**

POLYCHLORINATED BIPHENYL (AROCLOR 1262)

CAS: 37324-23-5 NIOSH: TQ 1364000

SYNS:

AROCLOR 1262
CHLORODIPHENYL (62% Cl)

TOXICITY DATA:	CODEN:
orl-rat LD50:11300 mg/kg	ARVPAX 14,139,74
skn-rbt LDLo:3160 mg/kg	ARVPAX 14,139,74

IARC Cancer Review: Human Limited Evidence IMEMDT 18,43,78.

NIOSH REL: TWA 1.0 $\mu g/m^3$

THR: Moderately toxic by skin contact. A suspected human carcinogen. When heated to decomposition it emits toxic fumes of Cl^-. Used in heat transfer, hydraulic fluids, lubricants, and insecticides. See also POLYCHLORINATED BIPHENYLS. For further information, see Chlorinated Diphenyls, Vol. 1, No. 3 of *DPIM Report*.

SBO500 *HR: 3*

SELENIUM

CAS: 7782-49-2 NIOSH: VS 7700000
DOT: 2658
af: Se aw: 78.96

PROP: Steel gray, non-metallic element. Mp: 170-217°, bp: 690°, d: 4.81-4.26, vap press: 1 mm @ 356°. Insol in H_2O and alc; very sltly sol in ether.

SYNS:

C.I. 77805	SELENIUM DUST
COLLOIDAL SELENIUM	SELENIUM ELEMENTAL
ELEMENTAL SELENIUM	SELENIUM HOMOPOLYMER
SELEN (POLISH)	SELENIUM METAL POWDER, NON-PYROPHORIC (DOT)
SELENIUM ALLOY	VANDEX
SELENIUM BASE	

TOXICITY DATA:	CODEN:
orl-mus TDLo:134 mg/kg (MGN):TER	AEHLAU 23,102,71
orl-mus TDLo:480 mg/kg/60D-C:ETA	YMBUA7 11,368,60
orl-rat LD50:6700 mg/kg	TXAPA9 20,89,71
ihl-rat LDLo:33 mg/kg/8H	AMIHBC 4,458,51
ivn-rat LD50:6 mg/kg	AMIHBC 4,458,51
ivn-rbt LDLo:2500 µg/kg	JOGBAS 35,693,28
unr-frg LDLo:3 mg/kg	PHREA7 23,305,43

Selenium and its compounds are on the Community Right To Know List. Reported in EPA TSCA Inventory.

OSHA PEL: TWA 0.2 mg(Se)/m^3
ACGIH TLV: TWA 0.2 mg/m^3
DFG MAK: 0.1 mg/m^3

DOT Classification: Poison B, Label: St. Andrews Cross

THR: Poison by inhalation, intravenous and possibly other routes. An experimental tumorigen and teratogen. Experimental reproductive effects. Occupational exposure has caused pallor, nervousness, depression, garlic odor of breath and sweat, gastrointestinal disturbances and dermatitis. Liver damage in experimental animals. Chronic ingestion of 5 mg of selenium per day resulted in 49% morbidity in 5 Chinese villages. The main symptoms were brittle hair with intact follicles, new hair with no pigment, brittle nails with spots and streaks, skin lesions, peripheral anesthesia, acroparaesthesia, pain, and hyperreflexia. Similar effects have been seen in populations with selenium blood levels of 800 µg/L. In cattle, "alkali disease" is associated with consumption of grain or plants containing 5-25 mg/kg of selenium. The symptoms are lack of vitality, loss of appetite, emaciation, deformation and shedding of hoofs, loss of hair, and erosion of joints. Consumption of plants grown in seleniferous areas can cause effects in humans and animals. Selenosis in humans has occurred from ingestion of 3.2 mg selenium per day. Selenium is an essential trace element for many species.

Reacts to form explosive products with metal amides. Can react violently with barium carbide; bromine pentafluoride; calcium carbide; chlorates; chlorine trifluoride; chromic oxide (CrO_3); fluorine; lithium carbide; lithium silicon ($Li_6 Si_2$); metals; nickel; nitric acid; sodium; nitrogen trichloride; oxygen; potassium; potassium bromate; rubidium carbide; zinc; silver bromate; strontium carbide; thorium carbide; uranium. When heated to decomposition it emits toxic fumes of Se. See also SELENIUM COMPOUNDS. For further information, see Vol. 1, No. 3 of *DPIM Report*.

SBP000 *HR: 3*

SELENIUM (COLLOIDAL)

CAS: 7782-49-2 NIOSH: VS 8310000
af: Se aw: 78.96

TOXICITY DATA:	CODEN:
ivn-rat LDLo:6 mg/kg	JPETAB 33,270,28

Selenium and its compounds are on the Community Right To Know List. Reported in EPA TSCA Inventory.

OSHA PEL: TWA 0.2 mg(Se)/m^3
ACGIH TLV: TWA 0.2 mg(Se)/m^3

THR: Poison by intravenous route. When heated to decomposition it emits toxic fumes of Se. See also SELENIUM and SELENIUM COMPOUNDS.

SBP500 *HR: 3*

SELENIUM COMPOUNDS

Selenium and its compounds are on the Community Right To Know List.

OSHA PEL: TWA 0.2 mg(Se)/m^3
ACGIH TLV: TWA 0.2 mg(Se)/m^3

THR: Poison by inhalation and intravenous routes. Considered to be experimental carcinogens. Selenium in small amounts is essential for normal growth of some animals. Deficiency or excess is associated with serious disease in livestock. Long-term exposure may be a cause of amyotrophic lateral sclerosis in humans, just as it may cause "blind staggers" in cattle. Elemental selenium has low acute systemic toxicity, but dust or fumes can cause serious irritation of the respiratory tract. Hydrogen selenide resembles other hydrides in being highly toxic, and selenium oxychloride is a vesicant. Some organoselenium compounds have the high toxicity of other organometals. Inorganic selenium compounds can cause dermatitis. Garlic odor of breath is a common symptom. Pallor, nervousness, depression, digestive disturbances and death have been reported in cases of chronic exposure. Selenium compounds are common air contaminants. When heated to decomposition it emits toxic fumes of Se. See also SELENIUM and specific compounds.

ZINC

CAS RN: 7440-66-6 NIOSH #: ZG 8600000
af: Zn; aw: 65.37

Bluish-white, lustrous metal. mp: 419.8°; bp: 908°; d: 7.14 @ 25°; vap. press: 1 mm @ 487°.

SYNS:

BLUE POWDER	GRANULAR ZINC
C.I. 77945	ZINC DUST
C.I. PIGMENT BLACK 16	ZINC POWDER

SKIN AND EYE IRRITATION DATA: 2 CODEN:
skn-hmn 300 ug/3D-I:MLD 85DKA8 -,127,77

TOXICITY DATA: CODEN:
ihl-hmn TCLo:124 mg/M³/50M:PUL AHYGAJ 72,358,10

Toxicology Review: QURBAW 7(1),75,74; ADTEAS 5,51,72; FOREAE 7,313,42; KOTTAM 11(11),1300,7; AMTODM 3,209,77.

"NIOSH Manual of Analytical Methods" VOL 5 173# NIAMAM*. Reported in EPA TSCA Inventory, 1980. Meets Criteria for Proposed OSHA Medical Records Rule FEREAC 47,30420,82.

THR: A hmn skn irr and PUL. See also zinc compounds. Pure zinc powder, dust, fume is relatively non-tox to humans via irr or ihl. The difficulty arises from oxidation of zinc fumes prior to ihal or presence of impurities such as Cd, Sb, As, Pb.

Fire Hazard: Mod, in the form of dust when exposed to heat or flame.

Spontaneous Heating: No.

Explosion Hazard: In the form of dust when reacted with acids.

Incomp: NH_4NO_3; BaO_2; $Ba(NO_3)_2$; Cd; CS_2; chlorates; Cl_2, ClF_3; CrO_3; (ethyl acetoacetate + tribromoneopentyl alcohol); F_2; hydrazine mononitrate; hydroxylamine; $Pb(N_3)_2$; (Mg + $Ba(NO_3)_2$ + BaO_2); $MnCl_2$; HNO_3; performic acid; $KClO_3$; KNO_3; K_2O_2; Se; $NaClO_3$; Na_2O_2; S; Te; H_2O; $(NH_4)_2S$; As_2O_3; CS_2; $CaCl_2$; NaOH; chlorinated rubber; catalytic metals; halocarbons; o-nitroanisole; nitrobenzene; non-metals; oxidants; paint primer base; pentacarbonyliron; transition metal halides; seleninyl bromide.

To Fight Fire: Special mixtures of dry chemical.

For further information see Vol. 1, No. 7 of *DPIM Report.*

ZINC COMPOUNDS

THR: Variable, generally of low toxicity. Zinc is not inherently a tox element. However, when heated, it evolves a fume of zinc oxide which, when inhaled fresh, can cause a disease known as "brass founders" "ague," or "brass chills," sweet taste, throat dryness, cough, weakness, generalized aching, fever, nausea, vomiting. It is possible for people to become immune to it, but this immunity can be broken by cessation of exposure of only a few days. Zinc oxide dust which is not freshly formed is virtually innocuous. There is no cumulative effect to the inhal of zinc fumes. Fatalities however, have resulted from lung damage caused by the inhal of zinc chloride fumes. Sol salts of zinc have a harsh metallic taste; small doses can cause nausea and vomiting, while larger doses cause violent vomiting and purging. So far as can be determined, the continued administration of zinc salts in small doses has no effect in man except those of disordered digestion and constipation. Exposure to zinc chloride fumes can cause damage to the mu mem of the nasopharnyx and respiratory tract and give rise to a pale gray cyanosis. Workers in zinc refining have been reported as suffering from a variety of non-specific intestinal, respiratory and nervous symptoms. Ulceration of the nasal septum and eczematous dermatosis are also reported.

It has been stated that zinc oxide or zinc stearate dust can block the ducts of the sebaceous glands and give rise to a papular, pustular eczema in men engaged in packing these compounds into barrels. Sensitivity to zinc oxide in man is extremely rare. Zinc chloride and zinc sulfate, because of caustic action, can cause ulceration of the fingers, hands and forearms of those who use them as a flux in soldering or other industrial use. This condition has even been observed in men who handle railway ties which have been impregnated with this material. Zn salts, such as chromates and arsenates are exper CARC. Common air contaminants.

Treatment and antidotes: Personnel exposed to zinc chloride fumes should immediately wash the area of contact with copious quantities of warm water and soap. Remove all contaminated clothing at once and if the area of contact is large, subject patient to a deluge-type of shower as quickly as possible. If the eyes are involved in exposure to zinc chloride fumes, they should be irrigated for at least 15 min with warm water.

ZINC CYANIDE

CAS RN: 557211 NIOSH #: ZH 1575000
mf: C_2N_2Zn; mw: 117.41

Rhombic colorless crystals; mp: decomp @ 800°. Insol in water; sol in solns of alkali cyanides; decomp by dil mineral acid.

SYNS:

ZINC DICYANIDE	CYANURE DE ZINC (FRENCH)

TOXICITY DATA: 3 CODEN:
ipr-rat LDLo:100 mg/kg NCNSA6 5,28,53

DOT: Poison B, Label: Poison FEREAC 41,57018,76. Reported in EPA TSCA Inventory, 1980.

THR: HIGH ipr. A deadly poison. See also cyanides and zinc compounds. Can react violently with Mg.

Disaster Hazard: When heated to decomp it emits tox fumes of CN^-, Zn and NO_x.

ZINC DIHYDRAZIDE

mf: H_6N_4Zn; mw: 127.45

THR: No tox data. See also zinc compounds, azides. Explodes.

Disaster Hazard: When heated to decomp it emits tox fumes of NO_x and ZnO.

ATTACHMENT C

Site Safety Brief Form
Health and Safety Checklist

SITE SAFETY BRIEFING

Job Number (Site) Patrick Bayou Site Number TXD Pending
Date _____ Start Time _____ Completed _____
Site Location South of the Houston Ship Channel and North of Deer Park, Harris County, Texas
Type of Work (General) _____

****

SAFETY ISSUES

Tasks (this shift) _____

Protective Clothing/Equipment _____

Physical Hazards Slip, trip, fall potential along the shoreline and in the boat

Control Methods Buddy system, hand signals, evacuation procedures, situation awareness, identification of hot zones, entry/exit areas.
Chemical Hazards Organic and heavy metal contaminated soils, sample preservation chemicals.

Decontamination Procedures/Tasks _____

Evacuation Procedures/Route/Signals _____

Evacuation Meeting Area Staging area located along the east side of bayou.
Nearest Phone Mobile phone
Hospital Name/Address _____
Special Topics (incidents, actions taken, etc.) _____

****

ATTENDEES

Print Name	Sign Name

Meeting conducted by: _____

07 182

HEALTH AND SAFETY CHECKLIST

_ 1. Conduct safety briefing (each day).

_ 2. Conduct initial site survey (first day).

_ 3. Personal Protective Equipment: Tyvek (or chemical resistant suit) coveralls, boots, inner and outer gloves, respirator and matching organic and particulate filter canisters, hard hat, and goggles.

_ 4. Copy of HASP.

_ 5. First aid and snakebite kits, including ice.

_ 6. Calibrated air monitoring devices.

_ 7. Water (drinking and eyewash).

_ 8. Emergency contact list and map to hospital (or mark in HASP). Mobile phone.

_ 9. Appropriate weather gear (i.e., rain gear, cold weather clothing, etc.)

_ 10. Copy of SSI Work Plan

APPENDIX D

TNRCC FY2000-2001
Quality Assurance Project Plan

APPENDIX E

Site Reconnaissance Checklist

SITE RECONNAISSANCE CHECKLIST

I. General
   1. Name and title of site contact.
   2. Telephone number.
   3. Site address.
   4. Mailing address (if different).
   5. Name of owner and/or operator.
   6. Mailing address.

II. Site History
   1. How long has current owner/operator been at site?
   2. What were previous uses of site? Who were previous owners?
   3. Size of site (acres).
   4. Is any other property used that is not contiguous with site?
   5. Permits (RCRA, TDH, etc.)
   6. Any past spills or other environmental or accident problems.
   7. What were previous waste management practices?

III. Current Operations
   1. What is currently being done at facility?
   2. What are waste management practices?
   3. What are hazardous chemical management practices?
   4. List major hazardous chemicals/constituents present and past.
   5. Discuss sources (e.g., tanks, impoundments, containers, etc.).
   6. Number of employees - current, peak.

IV. Source Characteristics
   1. Identify type of wastes and quantities disposed of at site.
      a. Identify source of information.
      b. Photograph.
      c. Dimension (quantity, volume, area) of waste locations.
      d. Containment controls (clay cap, clay liner, vegetative cover, etc.)
      e. Existing data.
      f. Condition/integrity of storage/disposal units.

Site Reconnaissance Checklist, continued

V. Groundwater Pathway
1. Distance from source to nearest well. Identify name and address of well owner, if possible - and estimate well usage (number of people served, irrigation, supplemental, etc.).
2. Verify wells within range of site. Indicate depth to water for each well and number of people served. Identify as many owners and addresses as practically feasible.
   a. 0 - 0.25 mile
   b. 0.25 - 0.50 mile
   c. 0.50 - 1.00 mile
   d. 1.00 - 2.00 mile
   e. 2.00 - 3.00 mile
   f. 3.00 - 4.00 mile
3. Aquifer nearest wells are screened in, and water quality.

VI. Surface Water Pathway
1. Identify the TNRCC Basin and Stream Segment where the site is located.
2. Describe surface water quality including:
   a. average discharge,
   b. total basin drainage area,
   c. TNRCC surface water quality monitoring stations.
3. Are there surface water bodies within 2 miles of site?
4. Provide sketch of surface water runoff and flow patterns for 15 stream-miles downstream.
5. identify intakes along surface water route within 15 stream-miles downstream.
6. What is water use at each intake.
7. Identify fisheries along the 15 stream-mile downstream pathway.
8. Identify sensitive environments along the 15 stream-mile downstream pathway (see attached list).
9. Identify downstream recreational uses.
10. Estimate approximate flow rates for each water body within the 15 stream-mile target distance (i.e., <10 cfs, 10-100 cfs, 100-1,000 cfs, 1,000- 10,000 cfs, etc.). Estimate length of each stream segment.
11. Identify the annual rainfall and net rainfall at the site.
12. Is site in flood plain (10 year, 100 year, 500 year)?
13. Estimate upgradient drainage area limits (watershed).
14. Draw a sketch of drainage from site to nearest surface water including any other contributing tributaries.
15. Identify recreational uses downstream (15 miles).

VII. Soil Exposure Pathway
1. Describe status of site access, fencing, gates, locks, condition of security controls.
2. Describe adjacent land use.
3. Describe off-site runoff patterns.

4. Describe number of people with residence, school, or day care on-site or within 200 yds.
5. Locate nearest school or day care.
6. Number of workers on-site (include maximum number to cover work on-site).
7. Evidence of recent human activity at the site.
8. Identify sensitive environments, (see list end of checklist).
9. Describe any off-site runoff pattern existing at the site.

VIII. Air Pathway

1. Estimate number of people within 4 miles (city or county records).
   a. 0 - 0.25 mile
   b. 0.25 - 0.50 mile
   c. 0.50 - 1.00 mile
   d. 1.00 - 2.00 mile
   e. 2.00 - 3.00 mile
   f. 3.00 - 4.00 mile
2. Shortest distance from source to occupied building.
3. Identify known releases to air.
4. Identify reports of adverse health effects.
5. Identify existence of sensitive environments within 4 miles (see end of checklist for list).

Miscellaneous Inquiries

1. Are any additional aerial photographs depicting site history available?
2. Meteorological data.
3. Nearest recreational area? Hospital?
4. Local water supply sources?

Site Sketches to Include

1. Date(s) of visit.
2. Well locations (including nearest to site).
3. Storage areas (past and present).
4. UST and above ground storage tanks.
5. Waste Areas.
6. Buildings
7. Access roads.
8. Areas of ponded water, or depressions in surface.
9. Drainage direction.
10. Photograph locations and directions.
11. Vegetation and significant landscaped features.
12. Any irregular appearance for soil, vegetation, tanks, etc. such as may result from spill, backfill operation, recent dirt moving work, etc.

Reference 8

Quality Assurance Project Plan for Texas Natural Resource Conservation Commission Preliminary Assessment/Site Inspection Program (FY 2000 and 2001)

TNRCC

Protecting Texas by Reducing and Preventing Pollution

Quality Assurance Project Plan

for

Texas Natural Resource Conservation Commission Preliminary Assessment/Site Inspection Program

(FY 2000-2001)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

October 1999

Quality Assurance Project Plan

Texas Natural Resource Conservation Commission
Preliminary Assessment/Site Inspection
Program (FY 2000-2001)

Prepared in cooperation with the

U.S. Environmental Protection Agency

October 1999

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QTRACK # TQ-99-012

QUALITY ASSURANCE PROJECT PLAN
FOR
TNRCC PRELIMINARY ASSESSMENT AND SCREENING SITE INSPECTION PROGRAM

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Appendix A - Preliminary Assessment/Site Inspection Program Fiscal Year 2000 Schedule

Appendix B - Sampler's Guide to the Contract Laboratory Program

Appendix C - Multi-Media, Multi-Concentration, Organic Analytical Service for Superfund Quick Reference Fact Sheet, August 1999

Appendix D - Multi-Media, Multi-Concentration, Inorganic Analytical Service for Superfund Quick Reference Fact Sheet, August 1999

Appendix E - Low Concentration Organic Analytical Service for Superfund (Water Matrix) Quick Reference Fact Sheet, August 1999

REFERENCES

Interim Draft EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, May 1994

EPA Data Quality Objectives Process for Superfund, EPA QA/G-4, September 1994.

USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Document No. ILM04.0

USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Revision No. OLM03.1, August, 1994

USEPA National Functional Guidelines for Inorganic Data Review, EPA 540/R-94/013, February 1994.

USEPA National Functional Guidelines for Organic Data Review, EPA 540/R-94/012, February 1994.

QAPP DISTRIBUTION LIST

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SECTION A

PROJECT MANAGEMENT

(A4) PROJECT ORGANIZATION and (A6) PROJECT DESCRIPTION

This document is a Quality Assurance Project Plan (QAPP) for the planning and implementation by the Texas Natural Resource Conservation Commission (TNRCC) of the Preliminary Assessments (PA) and Site Inspections (SI) in Texas for the U.S. Environmental Protection Agency (EPA) Superfund program. This QAPP has been prepared in accordance with the "External Review Draft Final EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations", EPA QA/R-5, October 1998; "EPA Guidance for Quality Assurance Project Plans", EPA QA/G-5, February 1998; "Guidance for the Data Quality Objectives Process", EPA QA/G-4, Final - EPA/600/R-96/055, September 1994. The site assessment process begins with site discovery, or notification to EPA or the TNRCC of possible releases of hazardous substances. The sites are evaluated using a phased investigation consisting of the PA and, if necessary, the SI. The PA is a limited scope investigation based primarily on available information. Samples are not collected during a PA. The PA distinguishes sites that pose no threat to human health and the environment from sites that may pose a significant threat. Sites that may pose a threat receive a further action recommendation after the PA and undergo an SI, where investigators collect sufficient waste and environmental media samples to identify sites that have a high probability of qualifying for the National Priorities List (NPL). This QAPP serves as a controlling mechanism to ensure that all data collected are of satisfactory quality.

A Regional EPA site assessment representative may accompany TNRCC personnel on the PA site visit and based solely on the field findings an immediate decision will be made on whether to proceed with preparation of an Screening Site Inspections (SSI) Work Plan. On those occasions when no EPA site assessment representative is present, the TNRCC PA/SI Program Manager, Technical Director and designated Site Investigation Manager (with EPA follow up concurrence) will decide if the site should proceed to the SSI stage. The TNRCC Site Investigation Managers will be responsible for collecting the samples defined in the SSI or Expanded Site Investigation (ESI) Work Plan (WP), initiating the proper chain-of-custody, health and safety, and quality assurance procedures. The TNRCC Site Investigation Managers will also be responsible for making any field sampling determinations as dictated by site conditions. Samples from the sites will be analyzed for semivolatiles, volatiles, metals, cyanide, pesticides and Polychlorinated Biphenyls (PCBs) and, if required, dioxins/furans.

If, considering site conditions, there is an imminent danger that the general public may come into direct contact with hazardous substances or wastes which are readily accessible on-site, the EPA will be notified no later than one (1) day after the inspection team returns from the site visit. Written notification will follow any verbal communication in this regard. The EPA will determine the course of action.

The Preliminary Assessments and Site Investigation (PA/SI) program organization chart, Figure 1.1, identifies the key individuals who will be primarily responsible for performance of the project. This organizational structure forms a management team of professionals to oversee the technical aspects of the project, supported by an administrative team who will ensure that personnel and equipment are available to the project when required.

Allan M. Seils, will function as TNRCC Program Manager. Mr. Seils will be responsible for overall coordination of project activities. He also will serve as primary TNRCC contact for the EPA. The Technical Director, Wesley G. Newberry, will review the SSI work plans, Preliminary Assessment (PA) and SSI reports, and progress reports. The Quality Assurance Specialist will be responsible for reviewing data in accordance with the procedures outlined in this QAPP, and will complete associated data assessment reports. The Quality Assurance Specialist will function independently of the Program Manager and will assure that project quality control is maintained. The Quality Assurance Specialist will audit the field work at 20% of the SSI/ESI sites. The Health and Safety Officer, will function independently of the Program Manager. As such, he, or his designee will be responsible for ensuring that all on-site activities comply with the approved site specific Health and Safety Plan.

A generic Health and Safety Plan (H&SP) will be followed during performance of each PA site visit. Individual site H&SPs will be prepared for all SSI sites as part of the work plan development. All H&SPs will be based on TNRCC's health and safety program and TNRCC's understanding of current health and safety regulations.

During Fiscal Years 2000 and 2001, the TNRCC will complete twenty-four (24) Preliminary Assessments (PAs), including early Potentially Responsible Party (PRP) searches, and twenty-eight (28) Screening Site Inspections (SSIs) in Texas in accordance with the Cooperative Agreement (CA) with the U.S. Environmental Protection Agency (EPA). A minimum of two (2) persons per PA and four (4) persons per SSI/ESI will be used to conduct field activities. At these sites, one TNRCC staff person will be designated as the lead Site Investigation Manager and will have the on-site responsibility for ensuring that the HS&P and QAPP are followed, and that appropriate data are collected to allow for preparation of site-specific SSI/ESI WP. The Site Investigation Manager also will be responsible for planning and conducting the site visit and preparing the final PA, SSI report including PREScore calculations and/or Documentation Record for the site.

Figure 1.1 Preliminary Assessments and Site Investigation Program Organization Chart

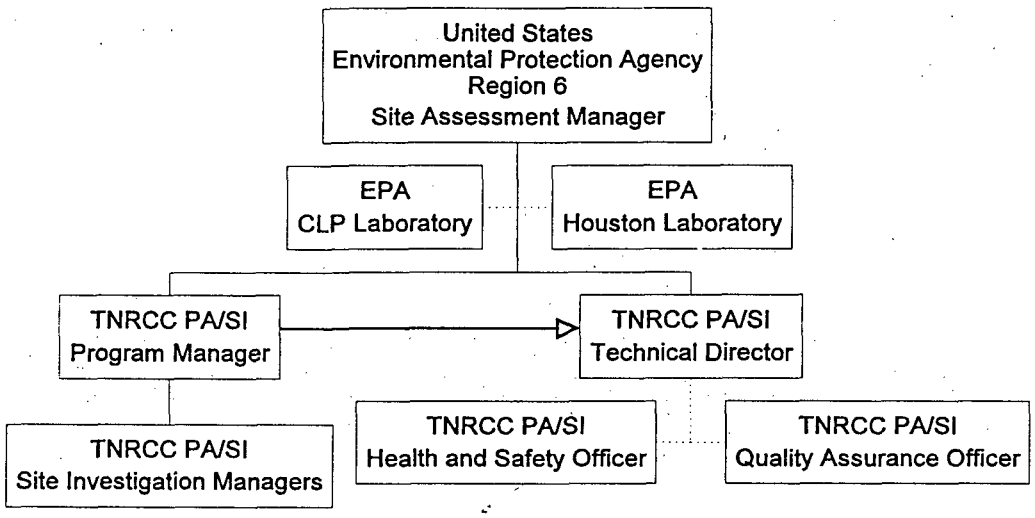

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Table 1.2 Schedule of Preliminary Assessments

PA Activity Schedule	Technical Work Hours After Site Assignment
Site Assignment to TNRCC	0
PA Background Research	60
PA Site Reconnaissance	12
Draft PA Report Complete	38
Final PA Report Complete	10
Total Hours:	120

Table 1.3 Schedule of Site Inspections

SSI Activity Schedule	Technical Work Hours After Site Assignment
Site Assignment to TNRCC	0
SSI Background Research	60
Prepare SSI Work Plan	70
Prepare Health & Safety Plan	40
Execute SSI Work Plan (includes acquiring site access)	137
Validate Data	40
Draft PRESCORE Calculation	11
Draft SSI Report Complete	125
Final PRESCORE Report	1
Final SSI Report Complete	16
Total Hours:	500

It is anticipated the TNRCC Program Manager will issue site assignments such that the majority of PAs are completed within the first six (6) months of the fiscal year. See Appendix A - Preliminary Assessment/Site Inspection Program Fiscal Year 2000 Schedule. This will allow those sites which progress directly to an SSI Work Plan to be completed within the final six months of the fiscal year. The total anticipated time to complete each PA is 120 hours and each SSI is 500 hours. A detailed schedule for the completion of PAs and SSIs is presented in Tables 1.2 and 1.3, respectively. In the event an expanded SSI (ESI) is warranted, the total anticipated time to complete the ESI is 600 hours from site assignment. If the site is to be proposed for the NPL, a Hazard Ranking System (HRS) package may be warranted, and the total anticipated time to complete the HRS is 700 hours from completion of the ESI. These schedules may be adjusted to meet specific requirements of the EPA guidance. This guidance currently includes the following references: (1) *Federal Register,* 40 CFR Part 300, December 14, 1990; (2) "Guidance for Performing Preliminary Assessments Under Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA)" September, 1991; 3) "Guidance for Performing Site Inspections Under CERCLA", September, 1992; 4) "Regional Quality Control Guidance for NPL Candidate Sites", December, 1991; 5) "Region 6 CLP Training Manual", October, 1993; 6) "Management of Investigation-Derived Wastes During Site Inspections", May, 1991; and 7) Sampler's Guide to the Contract Laboratory Program, 1996.

The TNRCC Site Investigation Manager designated to lead investigations at the SSI/ESI site will develop a WP and sampling strategy for the site. The information gained from the PA, tentative disposition, and other timely information will be used in determining tentative numbers, nature, and location of samples collected. The WP consists of (1) a list of project contacts; (2) data quality objectives, and a site background review including site history, descriptions of the site including geology, hydrology, soil conditions, site map(s), and waste handling practices including types and quantities of wastes generated (if known); (3) a WP summary including field personnel, site reconnaissance plan, sampling strategy, sampling locations and map(s), and QA/QC sample protocols and decontamination procedures. The WP will also identify potential targets for the groundwater, surface water, soil exposure, and air pathways; (4) a health and safety plan to describe potential hazards and necessary site specific precautions and preparations for completing the field work described in the sampling plan; and (5) general project requirements such as a schedule, equipment needed, and mobilization/demobilization procedures.

The TNRCC Site Investigation Managers will prepare the WP according to the format agreed to by the EPA for use on the FY2000 and 2001 Multi-Site PA/SI Scope of Work. Revisions to this format will be determined by the EPA and TNRCC project managers prior to preparing the first documents. The EPA will be responsible for approving each work plan; however, the

decision to proceed with WP implementation may be delegated by the EPA Site Assessment Manager (SAM) to the TNRCC Program Manager, as appropriate.

EPA shall choose a laboratory to be used for this project under its Contract Laboratories Program (CLP) and shall incur all costs for sample analyses. A CLP laboratory or the EPA Houston's Laboratory shall provide analytical support for drinking water samples. The sample analyses shall include analysis for all constituents listed on the CLP Routine Analytical Services (RAS) Organic Target Compound List (TCL) and Inorganic Target Analyte List (TAL).

(A5) PROJECT DEFINITION/BACKGROUND

The major objective of this project is to perform and complete Preliminary Assessments and Screening Site Inspections at sites judged to be potentially hazardous because of current and past operational and waste disposal activities. The PA and SSI reports will provide technical information and data that can be used to determine the score of each respective site according to the Hazard Ranking System (HRS). The HRS is the primary means by which EPA evaluates sites for Superfund's National Priorities List (NPL).

Preliminary Assessments (PA) and Screening Site Inspections (SSI) will be conducted in conformance with the requirements of the revised Hazard Ranking System (HRS), Final Rule, dated December 14, 1990. The EPA furnished guidance for performance of these tasks and it will be used as reference material in collecting data, planning, and conducting on-site activities, and in preparation of the reports for each site. This guidance currently includes the following references: (1) *Federal Register,* 40 CFR Part 300, December 14, 1990; (2) "Guidance for Performing Preliminary Assessments Under CERCLA" September, 1991; 3) "Guidance for Performing Site Inspections Under CERCLA", September, 1992; 4) "Regional Quality Control Guidance for NPL Candidate Sites", December, 1991; 5) "Region 6 CLP Training Manual", October, 1993; 6) "Management of Investigation-Derived Wastes During Site Inspections", May, 1991; and 7) Sampler's Guide to the Contract Laboratory Program, 1996.

Initial preparations for each PA, SSI and ESI site visit will involve obtaining information for preparation of the Health and Safety Plan and SSI/ESI WP. This task also includes obtaining access to the sites and the site inspection visit. Prior to any on-site inspections, the project staff and the TNRCC Program Manager will review the results of the preliminary assessment and/or available EPA and/or TNRCC files to address any health and safety risk concerns, and to assess the level of effort necessary to perform the site visit.

The TNRCC project staff will conduct a detailed background study for each PA/SSI/ESI site prior to any field activities. The purpose of this study is to collect available file information concerning activities at the site, hydrogeologic, photographic and topographic in formation pertinent to the site (to be used in pathway evaluation), and population and ecological information available for the area surrounding the site (to be used in a target evaluation).

Site activities information to be collected during this background study will be primarily the EPA, TNRCC, and other State and Federal agency records on the site. Hydrogeologic and topographic information will be collected at this time primarily from USGS topographic maps, city and county maps, county and regional water reports, county and regional geologic cross sections, state well construction records, soil maps, etc. Population and ecological information will be collected primarily from census figures, USGS topographic maps, public school records, the Texas Manufacturers Index, U.S. Fish and Wildlife and Texas Parks and Wildlife endangered species publications, and additional information if available. Aerial photography, as available from the Texas Natural Resources Information System, Texas Department of Transportation, and other sources, will also be examined for additional information about the site.

The data collected will, whenever possible, be selected to meet the requirements of the HRS model. It is understood that, at the level of effort appropriate for a PA, it may not be possible at some sites to collect "HRS quality" data to fulfill every requirement of the model. The TNRCC will make every reasonable effort to collect "HRS quality" data for every site, within the limits of the project schedule, budget, and the available information. Every effort will be made to collect the best available information during the performance of each PA. In addition, all SSI/ESI information will be collected in accordance with applicable SI guidance.

The level of effort required for the SSI background research may be greater than that normally required. This increased effort is necessary because the PAs for some of the sites may not have been prepared prior to publication of the current HRS guidance and do not contain complete HRS information. Therefore, this additional PA information may need to be collected during the background study task of the SSI/ESI.

In most cases, it will be necessary to obtain advance permission to inspect the sites. The TNRCC will obtain access agreements for each site. The designated TNRCC Site Investigation Manager for each site will prepare a written notification to the site owner/operator of the impending site visit, followed by telephone confirmation by the TNRCC Site Investigation Manager. The TNRCC Site Investigation Manager will also be responsible for notifying the local TNRCC Regional Office of the impending site visit. The TNRCC Program Manager will provide each member of the TNRCC project staff with written credentials describing the nature of the project and the authority under which it is conducted.

Upon arrival at a site, the inspection team will conduct an initial survey of the site to ensure adequate safety precautions are in place during site activities. The Site Investigation Manager will, when possible, conduct a detailed interview with site representatives. Where operator records are present, these will be reviewed for an indication of the type and quantity of materials disposed of at a given site. Where possible, the party responsible for waste disposal will be determined. Interviews with other individuals familiar with the site will be conducted as appropriate before, during, or after on-site reconnaissance activities.

In addition, a thorough site reconnaissance, if possible, will be conducted at each site. The inspection team will visually survey and document the location of the site relative to any roads or other access, drainage systems, surface waters, nearby structures, drums, tanks, monitoring wells, facility boundaries, unique geological features, and other factors which may affect pollutant migration pathways. These factors will be recorded, to the extent practical, on a field site sketch which will be prepared during the site visit. The facility sketch also will document the location of sensitive environmental receptors such as on-site and off-site homes and public building, natural areas, and drinking water supplies. Residences within 400 yards of the site will be included in the site sketch. Indicators of existing problems, such as areas of diseased, dying, or distressed vegetation or discolored soil, also will be noted on the site sketch. Photographs will be taken as necessary to document observations and on-site activities. Generalized population information, including collection of environmental equality data, will be based on the number and types of surrounding homes and businesses.

For each PA, initial activities will involve the collection of site background information and completion of a site visit. A Regional EPA site assessment representative may accompany TNRCC personal on the PA site visit and based solely on the field findings an immediate decision will be made on whether to proceed with preparation of an SSI Work Plan. On those occasions when no EPA site assessment representative is present, the TNRCC PA/SI Program Manager, Technical Director and designated Site Investigation Manager (with EPA follow up concurrence) will decide if the site should proceed to the SSI stage.

If a site is designated to proceed to the SSI phase, then an SSI Work Plan and final SSI Report will be prepared for submission to the EPA. A complete PA will not be prepared for these sites. An abbreviated PA Report will be prepared for those PA candidate sites which are determined ineligible for CERCLA response by the EPA site assessment representative.

For SSI/ESI visits, environmental samples will be collected in accordance with the approved WP to provide site-specific data on the hazardous substances present as well as pollutant dispersal pathways. The samples collected during the SSIs and ESIs typically will be from the following sources:

- o On-site and off-site soils;
- o Groundwater from existing potable or agricultural water or monitoring wells;
- o Water or waste from open drums, surface impoundments, or evaporation pits;
- o Point of entry into receiving waters in the runoff pathway(s) from the site;
- o Environmentally sensitive areas near the site.

For each SSI, field activities will be conducted in two steps. TNRCC will collect information needed to prepare a work plan before the site visit. Following approval of the work plan, TNRCC will visit the site to execute the work plan, including sampling activities. The collected information, including sample results, will be compiled into a final SSI Report for the site.

(A7) DQO for MEASUREMENT DATA

A quality assurance (QA) program is essential to assure the quality, controllability, accountability, and traceability of the work being performed for the TNRCC PA/SI Program. Quality assurance encompasses all actions taken by TNRCC and its subcontractors to achieve results which are accurate, reliable, and legally defensible for all aspects of the project. TNRCC and its subcontractors will adhere to the quality assurance procedures outlined herein and will rigorously implement the QA program throughout the duration of the project.

The primary goal of this QA program is to ensure the accuracy and completeness of the data which ultimately will be used to score and to determine the status of the sites that are investigated. In order to achieve this accuracy and completeness, it is necessary that all sampling, analysis, and data management activities be conducted in accordance with preset standards, and that these activities be reviewed regularly to maintain full compliance with the standards. This program has been designed so that corrective action can be implemented quickly if necessary without causing undue expense or delay to the project. The standards and review procedures which TNRCC will use to attain optimum accuracy and completeness of data are outlined in this plan. All subcontractors to TNRCC will be required to follow these standards and procedures, at a minimum.

The quality assurance objectives for all measurement data include considerations of precision, accuracy, completeness, representativeness, and comparability. Compliance with the QA objectives will be judged individually for each site. QC objectives stated in the EPA CLP Statements Of Work (SOW):

CLP analytical services are defined in Statements of Work (SOWs). The following SOWs provide the technical and contractual framework for commercial environmental testing laboratories to apply EPA CLP analytical methods for the preparation/isolation, detection, and quantitative measurement of organic target compounds and inorganic target analytes in water and soil/sediment environmental samples.

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Each SOW includes a summary of general requirements; reporting and deliverable requirements; target compound or target analyte list and contract required quantitation/detection limits; specific analytical methods; quality assurance/quality control requirements; chain-of-custody and sample documentation requirements; a glossary of terms; and specifications for reporting data in computer-readable format, when applicable.

1. USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, OLM03.0 (Revisions OLM03.1 and OLM03.2)

This document defines the analytical methods accepted by the CLP for the isolation, detection, and quantitative measurement of 33 volatile, 64 semivolatile, and 28 pesticide/Aroclor target compounds in water and soil/sediment environmental samples.

2. USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, ILM04.0

This document defines the analytical methods accepted by the CLP for the preparation, detection, and quantitation of 23 inorganic target analytes and cyanide in water and soil/sediment environmental samples.

3. USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Low Concentration Water, OLC02.1

This document defines the analytical methods accepted by the CLP for the isolation, detection, and quantitative measurement of 41 volatile, 59 semivolatile, and 28 pesticide/Aroclor target compounds in low concentration groundwater and drinking water type samples.

PRECISION

The precision of a measurement is an expression of mutual agreement of multiple measurement values of the same property conducted under prescribed similar conditions. Precision is evaluated most directly by recording and comparing multiple measurements of the same parameter on the same exact sample under the same conditions or a matrix spike and matrix spike duplicate. It is usually expressed in terms of the relative percent difference (RPD). The RPD can be evaluated both internally (laboratory duplicates) and externally (field duplicates) to the laboratory. Laboratory duplicate control limits for organics are method and laboratory specific, and will be evaluated as part of the EPA-CLP data validation. For metals analysis, a control limit of 20 percent RPD will be used for matrix spike and matrix spike duplicate sample values greater than or equal to 5 times the contract required detection limit. For field duplicates, a RPD of ±50% percent will be used as the objective of precision.

Field measurements may be taken of pH, conductivity, temperature, water level, and organic vapor concentration based on systems photo ionization detector (HNU) or organic vapor analyzer (OVA) readings. The objective for precision of field data collection methods is to achieve and maintain the factory specifications for the field equipment. For the pH meter, precision will be tested by multiple readings in the medium concerned. The readings will be within 0.1 pH standard units after the instrument has been field calibrated with standard buffer solutions.

The water level indicator readings will be precise within 0.1 foot for duplicate measurements. The HNU or OVA will be calibrated each day prior to field use. If calibration readings deviate 15 percent or more from the concentration of the calibration gas, the instrument will be recalibrated.

ACCURACY

The degree of accuracy of a measurement is based on a comparison of the measured value with the actual true value. Accuracy of an analytical procedure is best determined based on the recoveries of matrix spike, matrix spike duplicate, and surrogate compounds.

The degree of accuracy and the recovery of analyte to be expected for the analyses of QC samples and spiked samples is dependent on the matrix, method of analysis, and the compound or element being determined. The concentration of the analyte relative to the method detection limit is also a major factor in determining the accuracy of the measurement. For metals analysis, spike recovery limits of 75-125 percent will be used. The QC acceptance ranges and limits for GC/MS organic analyses used to assess the accuracy of the data according to CLP protocol stated in stated in the EPA CLP Statements Of Work. These QC acceptance ranges and limits will be used as part of the EPA-CLP data validation.

The objective for accuracy of field measurements is to achieve and maintain factory specifications for the field equipment. The pH meter is calibrated with standard buffer solutions. The HNU or OVA will be calibrated daily with calibration gas.

REPRESENTATIVENESS

Samples taken must be representative of the population. Because uncontrolled hazardous waste sites vary greatly in size and complexity, specific SI sampling guidelines that apply to all sites are not possible. Site-specific sampling plans are located in the workplan developed for each site.

COMPARABILITY

Consistency in the acquisition, handling, and analysis of samples is necessary so the results may be compared with previous and future studies. Concentrations will be reported in a manner consistent with general practices. Standard EPA analytical methods and quality control will be used to support the comparability of analytical results with those obtained in other testing. Calibrations will be performed in accordance with EPA or manufacturer's specifications and will be checked with the frequency specified in the EPA CLP Statements Of Work.

COMPLETENESS

The completeness of the data is measured as the amount of valid data obtained from the measurement system (field and laboratory) versus the amount of data expected from the system. The EPA-CLP data validation will determine the amount of valid data obtained from each site inspection. At the end of each SSI, completeness of data will be assessed and, if any data omissions are apparent, an attempt will be made to re-sample the parameters in question. The specific objective for the completeness of this project will be greater than or equal to 90 percent for field and laboratory data for each site.

ANALYTICAL PARAMETERS AND QUANTITATION LIMITS

The analytical parameters and their quantitation limits for use on this project are determined under the EPA's Contract Laboratories Program (CLP). All samples will be analyzed by CLP methods. Quantitation limits are determined by the Contract Required Quantitation Limit (CRQL) and the Contract Required Detection Limit (CRDL) which is the minimum level of detection acceptable. See Appendices C, D, E.

HOLDING TIMES

Holding times specified by EPA protocols will be set for samples collected under this program. See Appendix B, p. 14.

(A9) TRAINING

A large percentage of TNRCC Site Investigation Managers have prior experience in conducting site investigations; however, all inspectors will undergo a formal training program. Major areas covered during the formal training project will be the objectives of the PA and SSI, preparation for inspection, legal ramifications, health and safety considerations, use of monitoring and sampling equipment in the field, sample shipment and chain-of-custody

procedures, the appropriate procedures to be followed relative to any denial-of-entry problems encountered, and other aspects of the work to be performed under this project.

Each TNRCC employee involved in sample collection will be trained on how to collect representative samples from every medium which might be encountered. Project personnel will receive additional training in proper field documentation and in health and safety procedures. All training will be documented, and records will be maintained by the Program Manager.

(A10) DOCUMENTATION and RECORDS

Documentation Records will include documentation for all HRS factors evaluated. All assertions of fact will be referenced in the record. All reports will be submitted to the EPA as they are completed. Any corrections or additions to the submitted material that the EPA deems necessary and appropriate will be made by the TNRCC within budget constraints. A PA, SSI/ESI WP, SSI Report, and Documentation Record will be deemed complete and final when the EPA approval is received, or within six (6) months of submittal, whichever comes first.

Following the site visits and completion of analytical work, the TNRCC will prepare a PA or a PA (Abbreviated) and/or SSI report or Documentation Record (for ESI sites only) highlighting significant findings for each site. The abbreviated PA Reports will be prepared in accordance with the requirements stated in the "Guidance for Performing Preliminary Assessments Under CERCLA", September 1991, Section 4.4 Abbreviated Reporting. The final SSI reports will be prepared in accordance with the report outlines approved by the EPA. Documentation Records will be prepared in accordance with current guidance and by using the companion WordPerfect® version of the Documentation Record. Should additional guidance become available prior to completion of this project, the TNRCC will evaluate the effect that conformance to this guidance will have on the schedule and budget, and will submit a revised schedule and budget to the EPA for approval.

The SSI reports will contain a description of the site, the operating history and nature of waste handling at the site, and a discussion of waste sources, pathway characteristics, and identification and description of potential human and environmental targets. In addition, the SSI report will contain a description of the data collected, analytical results, and QA/QC data. Supporting documents will be included in the SSI report as appendices and will consist of stratigraphic, hydrogeologic, and topographic information; a site sketch and other pertinent maps; laboratory and chain-of-custody report originals; photographs; field notes; and reports from previous investigations at the site. All data collected during each SSI/ESI visit will be validated using the most current EPA data validation guidelines and any EPA Regional instructions.

QUALITY ASSURANCE REPORT

A summary of all QA activities and findings during the course of this project will be reported to the EPA on a site specific basis with the final site inspection reports. Other project-related quality assurance items and corrective actions will be discussed in the monthly progress reports. These may include the following items:

1. Summary of QA management, including any changes;
2. Measures of data quality from the project;
3. Significant problems related to work quality, and the status of any corrective actions implemented;
4. Results of QA performance audits;
5. Results of QA systems audits;
6. Assessment of data quality in terms of precision, accuracy, completeness, representativeness, and comparability; and
7. Quality-assurance-related training.

RECORD KEEPING

All information pertinent to PA site visits and SSI sampling activities will be recorded in a logbook. This book will be bound and have consecutively numbered pages. Entries in the logbook will be made in ink and will include, at a minimum, a description of all activities, the names of all individuals involved (sampling and oversight), date and time of sampling, weather conditions, any problems, and all field measurements.

08 023

SECTION B

MEASUREMENT/DATA ACQUISITION

(B1) SAMPLING PROCESS DESIGN

After approval of the SSI work plan, the field activities will be executed. At each site, these activities may include soil sampling, sediment sampling, surface water sampling, and groundwater sampling.

Detailed reports on all PA and SSI non-sampling data collection and SSI sampling activities will be kept in field logbooks. In this book will be noted the date, time, location, and identification of each sample, along with the collector's name, a description of all equipment used and any problems encountered, and general comments of the inspection team. Logbooks also are used to record pertinent information regarding the site itself, including date, time, location, and identification of all photographs taken during the site visit.

Proper identification and labeling of samples is crucial to an effective sampling program. Immediately upon collection, each sample must be sealed and tagged. The tag should be marked with a sample identification number, station location, type (composite or grab), concentration (low, medium, or high), the parameters requested, collector's name, and the date and time of sample collection.

For many of the SSIs, the determining factor of hazard evaluation will be the data provided by sampling and analytical activities. Thus, it is important that QA/QC be maintained for each sample. The purpose of this Section is to outline specific procedures for inspectors to use while acquiring and handling samples during an inspection to ensure that quality data are obtained.

Certified clean sample bottles will be used for sample collection. Custody of these bottles will be maintained by documenting the batch number of the sealed box, documenting opening of the box, and keeping the bottles locked up at all times. If returned to the office, the bottles will be placed in a sealable container and secured with custody seals.

08 024

(B2) SAMPLE METHODS REQUIREMENTS

This Section discusses the standard sampling procedures. Other sampling procedures may be used as determined necessary by the lead Site Investigation Manager and with approval of the Technical Director or Program Manager.

Regardless of sample type, the following principles and procedures should be adhered to during the sample collection phase of a site inspection:

1. Obtain ice before visiting a site where sample collection is involved.

2. Add appropriate preservatives to the sample bottles at the time of sample collection. See Appendix B, p. 14. The bottles required for each analysis are shown in Appendix B, p. 9-10.

3. If there is reason to suspect the presence of toxic vapors, precede sampling activities by an initial survey of suspect areas, using appropriate safety gear and a photoionization detector (or equivalent). The potential use of air monitoring equipment should have been specified in the SSI Work Plan. If it was not, and if organic vapor presence is possible, contact the Program Manager and Project Safety Officer for possible changes in safety procedures.

4. If possible, collect background samples first, then proceed from the probable least contaminated to most contaminated sampling points.

5. Change disposable gloves between sampling points, placing used gloves in a plastic bag for disposal.

6. If it is necessary to reuse sampling devices, use the specified decontamination procedures between sampling points.

7. At each sampling location,
   a. Photograph the collection of samples.
   b. Record in the logbook:
   - Sample number;
   - Photo number;
   - Location (show on site sketch);
   - Type of sample;
   - Date and Time; and
   - Relevant observations.

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8. If a facility representative requests, they will be allowed the opportunity to collect split samples. If these are desired, place samples directly in different containers at the sampling point rather than splitting them at a later time. In the event there may not be enough soil, sediment, and/or groundwater volume to provide split samples, collect the SSI required sample first and than provide the remaining volume to the facility representative.

9. Before placing samples in the iced cooler:

   a. Complete the sample tags and labels, and place clear tape over the sample labels on the sample containers to protect the writing from moisture.

   b. Check the pH of all preserved water samples (exclusive of VOA samples).

   c. Place a custody seal around the bottle cap.

   d. Wrap the sample containers with plastic foam, bubble pack, or equivalent to protect against breakage.

   e. The TNRCC will include in each ice chest with samples to be shipped for analysis, a temperature blank taped to the side of the chest prior to shipping.

   f. Place the sample containers in plastic Ziploc® bags or equivalent to prevent melted ice from contacting the container.

   g. Place wrapped sample containers into ice chests filled with 2 to 3 inches of vermiculite.

10. Remove water from melted ice frequently, and replace with fresh ice. Place ice in plastic Ziploc® or sealable bags to minimize water leakage during shipment.

GROUNDWATER WELL SAMPLING PROCEDURES

General

The primary consideration is to obtain a representative sample of the groundwater zone of interest without mixing the sample with stagnant (standing) water in the well casing.

To safeguard against collecting nonrepresentative stagnant water in a sample, the following guidelines and techniques will be adhered to during sample withdrawal:

1. As a general rule, all monitoring wells shall be pumped or bailed a minimum of three volumes of water in the well casing with three (3) consecutive consistent readings within 10% RPD for conductivity, ± 1°C for temperature, and within ± 0.5 pH units before representative samples are withdrawn.

2. For wells that can be pumped or bailed to dryness with the sampling equipment, the well should be evacuated and allowed to recover to 85 percent of original water level before sample withdrawal. In the event the well has not recovered to 85 percent after 24 hours, a sample may be drawn from the well. Enter the well volume recovered into the field logbook.

3. The purge waters will be managed according to guidance provided in the "Management of Investigation-Derived Wastes During Site Inspections", May 1991. The preference is to leave both RCRA hazardous and non-hazardous investigation-derived wastes on-site whenever it complies with regulations and does not pose any immediate threat to human health and the environment.

Sampling, Monitoring, and Evacuation Equipment

Sample containers will conform to EPA regulations for the appropriate constituents.

The following equipment should be on hand when sampling wells:

1. Coolers for sample shipping and cooling, chemical preservatives, and appropriate packing materials.

08 027

2. Camera and film, labels, appropriate keys (for locked wells), tape measure, water level indicators, and pH/temperature/specific-conductivity meter.

3. Pumps. Pumps will normally be used to obtain samples, although samples may be obtained directly from the pump discharge line for high yielding monitoring wells and wells with dedicated pumps.

4. Bailers and monofilament line with tripod-pulley assembly (if necessary).

5. Decontamination solutions--tap water, distilled water, Alconox, isopropanol, CLP specified grade water.

Ideally, sample withdrawal equipment should be completely inert, economical to manufacture, easily cleaned, and reused, able to operate at remote sites in the absence of power resources, and capable of delivery variable rates for well flushing and sample collection.

Calculation of Well Volume

Calculations are to be made according to the following steps:

1. Obtain all available information on well construction (casing, screens, etc.).

2. Determine well or casing diameter.

3. Determine static water level (feet below top of casing).

4. Determine depth of well from top of casing.

5. Calculate number of linear feet of static water (total depth minus the static water level).

6. Calculate one well volume in gallons: $V = Tr^2 (0.163)$, where T is linear feet of static water, and r is the inside radius of the well of casing in inches.

7. Determine the well volumes in gallons to be evacuated before sampling.

If possible, a number of observations will be made when groundwater sampling is to take place. Some of the information can be gained from file review prior to a site inspection.

1. Note if monitoring wells are locked. Arrangements must be made to secure keys or to remove locks by other means and re-secure the wells.

2. Note the condition of the monitoring wells (i.e. casing, concrete pad, etc.).

3. Note well diameters to ensure that a pump and/or bailer of the proper size will be available. The diameter is also necessary for calculating the wells' static water volume.

4. Note the type of casing materials--PVC, steel, etc.

5. Note any observable physical characteristics of the groundwater as it is being sampled--color, odor, turbidity, etc.

6. Measure the static water level of each well before sampling, if possible. This is best accomplished with an electronic water level indicator. Similarly, determine the total depth of the well before sampling. Obtain these measurements whether or not well logs are available, since the measurements are required in calculating the static water volume of the well.

7. Measure the pH, temperature, and specific conductivity of the groundwater being sampled. To avoid possible contamination problems, measure temperature, pH, and specific conductivity on a portion of groundwater which is not in a sample container to be sent out for analysis.

SURFACE WATER SAMPLING PROCEDURES

Surface water sampling locations will be selected according to the probability that they will show contaminants migrating from a site. In general, samples will be taken from streams running through or adjacent to a site, including those bodies of water which may receive surface runoff or leachate from a site. Samples will only be collected where it can be shown that the site provides the only source of contaminants to the surface water body. Care will be taken in sampling leachate breakouts, which may have high concentrations of contaminants. Surface water will also be sampled from any adjacent standing bodies of water such as ponds, lakes, or swamps which might be receiving contaminants.

08 029

Grab samples will be collected using a pond sampler. The pond sampler, described in "Samplers and Sampling Procedures for Hazardous Waste Streams," EPA 1980 (EPA-600/2-80-018), consists of a beaker attached with a clamp to a telescoping aluminum pole. This sampler allows a sample to be collected several feet from the bank or berm.

TAP WATER SAMPLING PROCEDURES

Well depth, casing size, and holding-tank volume will be obtained, if possible to calculate the volume of the system, and the system will be evacuated by removing three to five volumes by letting a tap run. If the well depth, casing size, or holding-tank volume is not readily available or is unknown, a tap will be opened and allowed to run at highest flow for at least 15 minutes. Well purging well be considered complete after three consistent readings of pH, temperature and conductivity. These readings can be obtained within the 15 minutes the tap is allowed to run. The well evacuation strategy will be documented in the field book.

Samples will be collected in containers in accordance with the sampling guidelines from a point as close to the well as possible and before the water is processed through any water treatment devices (e.g., softeners or filters). In many cases this may not be possible. When samples must be collected after the filtration or softener system, the situation will be documented in the logbook. The exact type of filtration system or softener in use will be recorded. To determine whether desorption of the filters is occurring, samples may be collected after water has passed through treatment devices. When possible, do not collect samples through a water hose. Samples should be collected directly from the spout.

If samples are taken from direct water main connections, the spigot will be flushed for 2 to 3 minutes (15 to 30 minutes is not necessary) to clear the service line. Water parameters (conductivity, temperature, and pH) will be measured. Well purging will be considered complete after three (3) consistent readings of pH, temperature and conductivity. Samples will *not* be collected from spigots after treatment (except as noted above) or from spigots that leak around their stems **or that** contain aeration devices or screens within the faucet.

For private wells equipped with hand or mechanical pumps, the water will be pumped for 5 minutes before the sample is collected directly from the spout.

SURFACE SOIL SAMPLING PROCEDURES

Areas selected for sampling will be located in order to collect a representative fraction of the soils with the minimum of samples. A surface inspection of the subject area will be made to locate pertinent features (e.g., rock outcrops, drainage patterns, surface runoff, erosion areas, etc.) and to evaluate the relationship among these features and potential sources of pollution. The locations of sediment deposition areas are good indicators of surface runoff direction.

A method of obtaining a shallow soil sample is to use stainless steel spoon or shovel. When deemed appropriate, a deeper soil sample may be obtained through the use of a soil corer. After collection, the soil sample will then be placed in the appropriate glass bottle. After the sample has been collected, the top of the bottle and lid will be wiped with a clean paper towel to ensure a tight seal. Samples for VOA analysis will be collected first, followed by samples for BNA's, metals and pesticides/PCBs. If metals are the primary concern at a site, the metals sample will be collected second. Care will be taken to fill the 120 mL VOA sample as full as possible to eliminate headspace. A decontaminated shovel or spade can be used to uncover the top 6 inches of soil so the sample can be collected from beneath the surface.

Sampling equipment such as stainless steel scoops and spoons, and shovels or spades must be decontaminated according to the specified procedures between sampling locations to avoid cross contamination. Dedicated sampling equipment will normally be used. If dedicated equipment are not used, then an equipment rinsate sample shall be collected at the end of each sampling day to demonstrate decontamination efficiency by TNRCC field personnel.

SEDIMENT SAMPLING PROCEDURES

Areas selected for sampling will be located in order to collect a representative fraction of the sediments with the minimum of samples. The primary consideration in sample site selection will be to choose an area of quiescent settling with low hydrologic activity or energy, and to evaluate these areas and potential sources of pollution. For example, areas that are: 1) inside the bend of channels; 2) backwater areas or side channels; and 3) of heavy shoaling and deposition. Quiescent areas are conducive to the settling of finer materials.

Sediment samples will be collected by use of a stainless steel spoon; or for samples greater than six (6) inches beneath the water surface, samples will be collected using either an Ekman dredge or sediment corer. When using a dredge, it will be lowered to the bottom of the water body with a minimum of substrate disturbance. Once the dredge jaws have been triggered, the closed dredge will be retrieved at a moderate speed of less than two (2) feet/second. Water overlying the sediment in the dredge will be gently decanted by slightly tipping the dredge until the water runs out the top. The decanting process will be completed in a manner to avoid

the removal of surficial sediments. In order to avoid contamination from material on the dredge walls, a stainless steel spoon will be used to remove sediments to a depth of one inch and no closer than 0.75 inches to the wall of the dredge. The sediment sample will then be placed in the appropriate glass bottle. Pebbles and sticks will not be transferred to the sample bottle. Additional dredge samples will be collected as needed to fill the sample bottle. After the sample has been collected, the top of the bottle and lid will be wiped with a clean paper towel to ensure a tight seal. Samples for VOA analysis will be collected first, followed by samples for BNA's, metals and pesticides/PCBs.

If metals are the primary concern at a site, the metals sample will be collected second. Care will be taken to fill the 120 mL VOA sample as full as possible to eliminate headspace. The Ekman dredge and stainless steel spoons must be decontaminated according to the specified procedures between sampling locations to avoid cross contamination. Dedicated sampling equipment will normally be used.

DECONTAMINATION PROCEDURES

To prevent contamination of samples by materials originating from the variety of on-site sampling tools and equipment, all sampling equipment (sample scoops, bailers, surface water dippers) will be decontaminated. Dedicated sampling equipment will be available for each sample planned. All equipment to be used at one site will be decontaminated in one batch prior to initiating any sampling. Each sampling tool will be placed in an individual sealable plastic bag or wrapped in a large plastic trash bag and closed with a custody seal. In the event that additional sampling is required or a sampling tool's integrity is questionable, then that tool will go through a decontamination process. The decontamination procedures are as follows:

1. Rinse equipment with tap (potable) water.

2. Clean the equipment with a brush in a solution of laboratory-grade detergent (Liquinox, Alconox, or equivalent) and potable water.

3. Rinse with tap water.

4. Rinse with 10 percent nitric acid solution, (trace metals grade) if analyzing for metals.

5. Rinse with distilled or deionized water.

6. If analyzing for organics, rinse with reagent-grade isopropanol.

7. Rinse with deionized water.

8. Air dry.

9. Place in plastic sealable bag if immediate use is not expected.

The sampling equipment will be cleaned as described above before its use for collecting each sample. After sampling is complete, each sample tool will be cleaned with a detergent wash and rinsed with distilled water to remove any potential contamination.

(B3) SAMPLE HANDLING/CUSTODY REQUIREMENTS

Sample custody is an integral part of any sample collection and analysis plan. Several steps for maintaining sample custody apply to field sample custody versus laboratory sample custody. First, in the field, the appropriate collection, identification, preservation, and shipment of the samples will ensure sample integrity. The second step is correct sample bottle identification and preparation. Lastly, when samples reach the laboratory, they are assigned a laboratory number and maintained at 4°C until sample preparation and analyses can be performed.

FIELD SAMPLE CUSTODY

Sample custody and documentation procedures described in this Section will be followed throughout all sample collection for all TNRCC SSIs. Components of sample custody are field logbooks, sample labels, sample tags, and chain-of-custody forms. CLP Organic and Inorganic Traffic Report (TR) forms will serve as chain-of-custody forms for this project. When Dioxin samples are to be collected the PCDD/PCDF Traffic Report (For Dioxin CLP Analysis) form will be used for this project.

FIELD LOGBOOKS

Bound field logbooks will be maintained by the Site Investigation Manager and other team members to provide a daily record of significant events, observations, and measurements during the field investigation. Each page in the logbook will be initialed by the author and signed after the last entry of each day. All entries by persons other than the author will be initialed or signed. All entries will be signed and dated.

All information pertinent to the field survey and sampling will be recorded in the logbooks. The logbooks will be bound books with consecutively numbered pages that are at least 4 ½ inches by 7 inches in size. Waterproof ink will be used in making all entries. Entries in the logbook will include, at the minimum, the following:

· General information:

- Names and titles of author and assistant, date and time of entry, and physical/environmental conditions during field activity
- Location of sampling activity
- Name and title of field crew.

· Sampling documentation:

- Sample medium (e.g., soil)
- Description of sampling point(s)
- Date and time of collection
- Sample identification number(s).
- Photographs

· Other information:

- Names and titles of any site visitors or interviewees
- Field observations and unusual field conditions
- Any field measurements made (such as pH, conductivity, temperature) including specific calibration data and documentation of field equipment (serial number, decontamination, etc.)
- Modifications to the work plan
- Sample handling (e.g., preservation with ice).

None of the field logbooks or chain-of-custody documents will be destroyed or discarded, even if they are illegible or contain inaccuracies that require a replacement document. If a previously recorded value is discovered to be incorrect, the wrong information will be crossed out in such manner that it is still legible, the correct value written in, and the change initialed and dated. If the change is made by someone other than the original author or if the change is made on a subsequent day, a reason for the change will be recorded at the then-current active location in the logbook, with cross-references.

08 034

SAMPLE TAGS

All samples collected at the site will be placed in an appropriate sample container for preservation and shipment to the designated laboratory. Each sample will be identified with a separate identification label and tag. The bottles and ice chests will be sealed with custody seals. Sample identification tags and custody seals will be provided by the CLP Sample Management Office. The tag will indicate if the sample is a split sample. The label will contain the sample number. The following information will be recorded on the tag:

- Analyses to be performed
- Sample identification number
- Source/location of sample
- Type of sample (composite or grab)
- Preservatives used (ice)
- Date
- Time (a four-digit number indicating the 24-hr clock time collection; for example, 1430 for 2:30 PM)
- Sampler's signature
- CLP case number.

Once the tag is complete, a custody seal will be placed over the lid of the bottle. The custody seal will show the date and sampler's signature.

TRAFFIC REPORT FORMS

Introduction - Samples and Sample Numbers

The CLP organic and inorganic multi-sample Traffic Reports/Chain-of-Custody forms (TRs) document samples shipped to CLP laboratories. They also enable the Sample Management Office (SMO) and the Region to track samples and ensure that the samples are shipped to the appropriate contract laboratory. TRs will be used each time Routine Analytical Services (RAS) samples are shipped to a CLP laboratory. The TRs may document up to ten samples shipped to one CLP laboratory under one case number and RAS analytical program.

The TR includes a chain-of-custody record which is located at the bottom of the form. The form is used as physical evidence of sample custody. According to EPA enforcement requirements, official custody of samples must be maintained and documented from the time of collection until the time the samples are introduced as evidence in the event of litigation. The lead Site Investigation Manager is responsible for the care and custody of the sample until sample shipment.

A sample is considered to be in custody if any of the following criteria are met:

1. The sample is in possession of the sampling team or is in view after being in possession.

2. The sample was in possession and then locked up or sealed to prevent tampering.

3. The sample is in a secured area, and security is documented.

CLP sample types are defined by the RAS analytical program. Under the RAS Protocol (SOW), a RAS sample consists of a low or medium concentration water matrix or a soil/sediment matrix that is single phase and homogeneous. No oily sample, nor a multi-phasic sample can be shipped to a CLP laboratory operating under the RAS contract. Such high concentration samples are handled only by Special Analytical Services (SAS) CLP laboratories. The collection and management of high concentration samples will be conducted in accordance with the requirements outlined in the "Region 6 CLP Training Manual", August 1996.

Low concentration samples are samples collected from off-site areas, where hazards are thought to be significantly reduced by normal environmental processes. Medium concentration samples are those where a compound or element may comprise as much as 15% of the total sample.

Low/medium concentration inorganic, low to medium concentration organic, and high concentration organic. Low/medium inorganic samples may be analyzed for total metals, cyanide, or both. Low/medium organic samples may be analyzed for VOAs, base/neutral/acid (BNAs), pesticide/PCBs, or any combination of these. High concentration organic samples may be analyzed for VOAs, BNA, and pesticide/PCBs. Inorganic samples are documented on Inorganic TRs. Organic and high concentration samples are documented on Organic TRs.

A CLP sample is one matrix - water or soil - never both. The CLP sample is further defined as consisting of all the sample aliquots from one station location, for each matrix and RAS analytical program.

The CLP generates unique sample numbers that must be assigned to each organic and inorganic sample. The unique CLP sample numbers are printed at SMO on adhesive labels and distributed to the region as requested. The field team leader will be responsible for assigning this critical sample number correctly and transcribing it accurately on the TR.

Organic sample numbers are in the format XX123, and have ten labels per strip four for extractables, two for VOAs, and four blank (extra). **UNUSED LABELS will be destroyed to prevent duplication of sample numbers.**

Inorganic sample numbers are in the format MXX123 and have seven labels per strip-- two for total metals, two for cyanide, and three extra (see Attachment 1). Remember that the unique sample number must only be used once. **EXTRA LABELS must be destroyed.**

Use only the labels provided by EPA Region 6. CLP sample numbers are alphabetically coded to correspond with each region as follows:

Table 2.3 EPA Region Sample Letter Codes

Letter Code			Letter Code		
Organic	Inorganic	Region	Organic	Inorganic	Region
A	MA	I	F	MF	VI
B	MB	II	G	MG	VII
C	MC	III	H	MH	VIII
D	MD	IV	Y	MY	IX
E	ME	V	J	MJ	X

Remember:

- TRs must be used for each case number with every shipment of samples to each CLP laboratory.
- Organic samples, high concentration samples, and inorganic samples are assigned separate, unique sample numbers. Each sample consists of all the sample aliquots from a sample station location for analysis in one of the three analytical programs.
- A CLP RAS sample will be analyzed as either a water or a soil sample.
- Prevent accidental duplication of sample numbers by destroying unused labels.
- Use the sample numbers specific to EPA Region 6.

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· Contact the Program Manager or Technical Director at telephone number 512/239-2514 or 512/239-2512 if you need to collect more than the previously approved number of samples or a high concentration sample.

· Call Regional Sample Control Center (RSCC) at telephone number 281/983-2130 or 281/983-2137 if you have any questions about using TRs.

Forms Completion - Case Documentation

Instructions for filling out the Organic and Inorganic Traffic Report/Chain of Custody forms are as follows:

Top of Form
· SAS Number

· Enter this number only if explicitly told to do so by the RSCC.

· Case Number

· Enter this number.

Box No. 1

· Project code/site information:

· Leave the Project Code, Account Code, Regional Information and Non-Superfund Program fields blank.

· Enter the Site name, City/State and Site Spill ID in the designated spaces.

Box No. 2

· Regional information:

· Enter the EPA Region number (6), the name of your Sampling Company (TNRCC), and your name and signature in the designated spaces.

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Box No. 3

· Type of activity:

· Check funding level for sampling. Next, check the code which describes the task of the sampling mission:

Funding Level

SF - Superfund
PRP - Potential responsible party
ST - State
FED - Federal

Pre-Remedial

PA - Preliminary Assessment
SSI - Screening Site Investigation
LSI - Listing Site Investigation

Remedial

RIFS - Remedial investigation feasibility study
RD - Remedial design
O&M - Operations and maintenance
NPLD - National priorities list delete

Removal

CLEM - Classic emergency
REMA - Removal assessment
REM - Removal
Oil - Oil response
UST - Underground storage tank response

Box No. 4

· Shipping Information:

· Enter the Date Shipped, the Carrier (i.e. Federal Express, Purolator, Airborne) and the Airbill Number in the appropriate spaces.

Box No. 5

· Ship to:

· Enter the name of the CLP laboratory contact (sample custodian) and its full address in the box.

Box No. 6

· Preservative:

· This box provides a list of commonly-used preservatives. Please enter the appropriate preservative used in Column D.

Box No. 7

· Sample description:

· This box provides a list of the description/matrices of samples that are collected. Please enter the appropriate description in Column A.

Completing the Form - Sample Documentation

· Carefully transcribe the CLP Sample Number(s) from the printed sample labels on the TR in the space provided.

Note: If you have made a mistake, do NOT attempt to erase or write over your mistake. Draw a single line through the mistake and initial and date it. Then, enter the correct information on the next line.

Complete columns A through G to describe the sample.

Column A, Sample Description

Enter the appropriate sample description code from Box No. 7.

When out in the field:

If sampling groundwater or surface water, describe both VOA TRIP BLANKS and EQUIPMENT RINSATE SAMPLES as No. 1 "Surface Water or Groundwater"

If sampling only soil/sediment, describe both the EQUIPMENT RINSATE SAMPLE and the FIELD BLANK SAMPLE as No. 4 "Field QC".

When conducting a laboratory decontamination event:

Describe both the EQUIPMENT RINSATE SAMPLE and the ULTRA DI SAMPLE as No. 4 "Field QC".

Note: Item No. 6 "Oil" and item No. 7 "Waste" are for SAS projects only. DO NOT SHIP OILY SAMPLES OR WASTE SAMPLES WITHOUT MAKING PRIOR ARRANGEMENTS WITH THE PROJECT MANAGER AND RSCC.

Column B, Concentration

Organic--If sample is estimated to be low or medium concentration, enter "L." When shipping SAS high concentration samples (previously arranged with Program Manager and RSCC), enter"H."

Inorganic--Enter "L" for low concentration, "M" for medium concentration, and "H" for high concentration (under previous SAS arrangement).

Note: Ship medium and high concentration organic and inorganic samples in metal cans.

Column C, Sample Type

Please enter which type of sample (composite or grab) was collected.

Column D, Preservation

Please enter preservation used (i.e., HCL, NaOH, HNO_3, H_2SO_4) refer to Box No. 6 or the reference number of the preservation (1-7, N). Always include ice as a preservative in addition to any chemical preservative used.

Column E, RAS Analysis

Check the analytical fractions requested for each sample, for example, VOAs, SVs, and pesticides are for low/medium concentration organics. Request only total metals and cyanide for RAS low/medium concentration inorganics.

Note: Aroclors/Toxaphenes may be requested, when using the High Concentration SOW, in a SAS Request.

Note: Either total or dissolved metals can be requested for each individual inorganic sample assigned a unique sample number, but not both analyses. A unique number must be assigned for each, even though they are from the same station location.

Column F, Regional Specific Tracking Number or Tag Number

Enter the Region specific tracking number or tag number(s) in the space provided. Since space is limited try to use tag numbers in a sequential order.

Column G, Station Location Number

Enter the Station Location Number in the space provided.

Column H, Month/Day/Year/Time of Sample Collection

Record the month, day, year, and time in military time (e.g., 1600 hours = 4:00 P.M.) of sample collection.

Column I, Sampler Initials

Enter the samplers initials.

Column J, Corresponding CLP Organic/Inorganic- Sample No.

Enter the corresponding CLP sample number for organic or inorganic analysis.

Column K, Designated Field QC

Enter the appropriate qualifier for "Blind" Field QC samples in this column.

Note: All samples must have a qualifier.

Blind Field QC	Qualifier
Blank	B
Duplicate	D
Rinsate	R
Performance Evaluation Samples	PE
Not a QC sample	---------

Note: **This information will be entered into EPA Headquarters database to track QC sample data. Please complete this Section carefully and accurately.**

Box Titled, "Shipment for Case Complete (Y/N)"

This should reflect the status of the samples scheduled at a lab for a specific case. When ALL samples scheduled/collected for shipment to a lab for a specific case have been shipped, the case is complete.

Box Titled, "Page 1 of "

Please enter the number of TRs per shipment.

Box Titled, "Sample Used for Spike and/or Duplicate"

Please enter sample number to be used for matrix spike and/or duplicate sample (internal lab QC). One per twenty/matrix/concentration/lab. See back of TR form.

Box Titled, "Additional Sampler Signatures"

Please record any additional sampler signatures you are unable to record in box 2.

Box Titled, "Chain-of-Custody Seal Number"

Leave the Chain-of-Custody Seal Number blank (Not used in Region 6).

Box Titled, "Split Samples Accepted/Declined"

Sampler should ask sight owner, PRP, etc. whether they want split samples taken. The split samples are either accepted or declined. Sampler should record their signature if split samples are collected and check the appropriate box.

How and When to Separate and Send Traffic Report/Chain-of-Custody Form Copies

When all paperwork has been completed by the sampler and samples are ready to be shipped:

Bottom 2 copies (white and yellow) of the traffic report/chain-of-custody forms should be placed in a plastic bag and taped to the inside of the cooler.

Top Blue/Green copy - Send to Region within five (5) working days from date of sample shipment. On this copy indicate in Column K the duplicate sample number.

Myra Perez
USEPA Region 6
10625 Fallstone Road
Houston, Texas 77099

Pink copy - Retain copy for files.

08 044

Instructions on the Reverse

Instructions summarizing CLP sample volumes, packaging, and shipment reporting requirements are printed on the back of the TRs.

SHIPPING OF SAMPLES

Samples will be shipped and delivered to the designated laboratory for analysis daily. During sampling and sample shipment, the lead Site Investigation Manager (or designee) will contact the SMO (designated on the CLP RAS Lab Assignment information facsimile) to inform them of shipments. **TNRCC WILL NOT CONTACT THE RECEIVING LABORATORY!!**

The samples will be shipped in ice chests by an overnight carrier such as Airborne Express. The TR forms (white and yellow) will be placed within the ice chest, which will be sealed with custody seals and/or tamper-resistant tape. Custody seals will be signed by the sample custodian shipping the samples. The air bill number will be noted on the chain-of-custody form. In addition the Airbill and TR form(s), each ice chest will contain an additional Airbill to provide for return of the ice chest to Judie Mattocks MC-142, Pollution Cleanup Division, TNRCC, Technical Park Center, Building D, 12100 Park 35 Circle, Austin, Texas 78753.

(B4) ANALYTICAL PROCEDURES and (B10) DATA MANAGEMENT

All analytical procedures will conform to analytical methods specified in the Routine Analytical Services (RAS) contract with the EPA. All data is managed by EPA in accordance with the USEPA Contract Laboratory Program Statement of Works for Organic and Inorganic Analyses. Data received by TNRCC in accordance with the 2000 and 2001 Cooperative Agreement is returned to EPA after validation for use in the SSI reports. EPA maintains full control of record-keeping procedures, receipt of data from the laboratory, and for detecting/correcting laboratory errors.

As per the EPA-CLP Statement of Work for Organic Analysis (including February 1994 revision), laboratories are required to perform any method specified in Exhibit D for volatile organic compounds (CLP-VOA), semivolatile organic compounds (CLP-SV), and pesticide/PCB compounds (CLP-PEST). As per the EPA-CLP Statement of Work for inorganic analysis (including February 1994 revision), laboratories are required to perform methods specified in Exhibit D. Metals will be analyzed using the 200 series, CLP-modified, methods as specified in Exhibit D. Cyanide will be analyzed by method 335.2 CLP-modified. Table 2.3 list the methods to be performed during this project under the RAS contract.

Table 2.4 Analytical Procedures for USEPA-CLP

Parameters	Method
Organics	
Volatile organics (VOA)	CLP-VOA
Semivolatile organics (BNA)	CLP-SV
Pesticides/PCBs	CLP-PEST
Inorganics	
Cyanides	335.2 CLP-M*
Metals	
Aluminum	202.2 CLP-M or 202.1 CLP-M
Antimony	204.2 CLP-M
Arsenic	206.2 CLP-M
Barium	208.2 CLP-M or 202.1 CLP-M
Beryllium	210.2 CLP-M
Cadmium	213.2 CLP-M
Calcium	218.2 CLP-M
Chromium	215.1 CLP-M
Cobalt	219.2 CLP-M or 219.1 CLP-M
Copper	220.2 CLP-M or 220.1 CLP-M
Iron	236.2 CLP-M or 236.1 CLP-M
Lead	239.2 CLP-M
Magnesium	242.1 CLP-M
Manganese	243.2 CLP-M or 243.1 CLP-M
Mercury	245.1 CLP-M, 245.2 CLP-M, or 245.5 CLP-M
Nickel	249.2 CLP-M or 249.1 CLP-M
Potassium	258.1 CLP-M
Selenium	270.2 CLP-M
Silver	272.2 CLP-M
Sodium	273.1 CLP-M
Thallium	279.2 CLP-M
Vanadium	286.2 CLP-M or 286.1 CLP-M
Zinc	289.2 CLP-M or 289.1 CLP-M

* CLP-M modified for the Contract Laboratory Program

(B5) QUALITY CONTROL REQUIREMENTS

Quality assurance for analytical work on this project will involve analysis of blank samples, spiked samples, and duplicate samples. For each group of 20 samples (or less if fewer than 20 samples are collected) of similar matrix (i.e., groundwater/surface water, soil/sediment) collected at each site, CLP internal laboratory QA/QC analysis will be conducted on one blank, one spiked, and one duplicate spiked sample. Field duplicates will be collected at a rate of 10% for each matrix and/or one per day, whichever is greater. Also, the TNRCC will include in each ice chest with samples to be shipped for analysis a temperature blank taped to the side of the chest prior to shipping.

LABORATORY QUALITY CONTROL BLANKS, SPIKED BLANKS, AND MATRIX SPIKES

Analysis of blank samples verifies that the analytical method does not introduce contaminants. The spiked blank is generated by addition of standard solutions to the blank water. The matrix spike will be generated by the CLP laboratory through the addition of standard solutions to a randomly selected field sample. Extra volume (triple volume) for a matrix spike and matrix spike duplicate will be collected for one water sample (groundwater or surface water, but not both) by the field team and sent to the assigned CLP Laboratory for internal quality control. In addition, one soil sample (no extra volume) will be designated on the TR by the field team and sent to the designated CLP laboratory for internal quality control.

FIELD QUALITY CONTROL SAMPLES

All samples will be collected with dedicated equipment, if possible. All sampling equipment will be decontaminated prior to initiating sampling activities. Three types of blanks will be taken in the field. The first type, **field blanks**, are blanks that are exposed to the same contamination as the field samples (e.g., airborne contaminants that are not from the waste being sampled). The second type, **trip blanks**, are collected for volatiles only. Volatile organics samples are susceptible to contamination by diffusion of organic contaminants through the Teflon-lined septum of the sample vial; therefore, a VOA **trip blank** will be analyzed to monitor for possible sample contamination. The trip blank also serves to detect contaminants in the sample bottles. These blanks are similar to field blanks with the exception that they are not exposed to field conditions. They allow evaluation of contamination generated from sample containers and changes occurring during the shipping and laboratory storage process. The third type, **equipment rinsate** blanks, will consist of CLP-specified grade water that has been poured over the equipment after completion of decontamination. The number of blanks collected in the field will be specified by the work plans for each site. The blanks collected in the field will not be counted for the laboratory's quality control protocol for matrix spikes or duplicate samples.

FIELD DUPLICATES

For samples collected for laboratory analysis, field duplicates will be collected at a rate of 10 percent of the total number of samples collected during each day of sampling for each sample matrix type at every site. The number of samples collected will be rounded up to the next increment of ten, such that twenty-one samples would require collection of three duplicates, if collected within three days. At least one field duplicate will be collected per day of sampling and will be packaged and sent to the laboratory for analysis with the other samples of the same sample matrix type.

EQUIPMENT RINSATE SAMPLES

Equipment rinsate samples will be collected to establish that proper sample bottle preparation, decontamination and handling techniques have been employed. Dedicated sample equipment will be used at each site for each sample station. All sample equipment will be decontaminated in the field and carefully packaged for return to the TNRCC Central Office. The decontaminated equipment will be taken to the TNRCC Region 11 Austin Office laboratory where one equipment blank will be collected and shipped to the assigned CLP laboratory for analysis. The equipment rinsate sample will be prepared by collecting CLP-specified grade water from the final rinse of the sampling equipment. Finally, the sample equipment will be placed in individual dated plastic bags, including chain-of-custody seals.

If sample equipment must be used more than once in the field, then the decontamination procedures for sample equipment will be followed and a rinsate sample collected in the field at the end of each sampling day and/or between each sample matrix type sampled, whichever is greater, and shipped to the assigned CLP laboratory with the associated sample matrix type. The number and type of QA samples at each site will be estimated in the SSI work plan. Modifications to the plan may be deemed necessary by the site investigation manager depending on field conditions, the on-site determination of additions or removals of sample locations, and the number of days required to complete the site sampling investigation.

(B7) CALIBRATION PROCEDURES AND FREQUENCY

Calibration of field instruments and equipment will be performed at approved intervals as specified by the manufacturer or more frequently as conditions dictate. Calibrations also may be performed at the start and completion of each test run. However, such calibrations will be re-initiated after any delay caused by meals, work shift change, or damage incurred. Standards will be used and duplicate samples analyzed in the field to verify pH and specific conductance data.

Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the EPA-CLP specifications. Calibration of laboratory equipment will be based on approved written procedures. It is the responsibility of the EPA data validators to ensure that the proper calibration protocols specified in the CLP statement of work were used. These calibration procedures and frequencies are included in the EPA Contract Laboratory Program, "Statement of Work for Organic Analysis" including revisions through August, 1994 and in the EPA Contract Laboratory Program, "Statement of Work for Inorganic Analysis" including revisions through February, 1994.

Records of calibration, repair, or replacement will be filed and maintained by the designated laboratory personnel performing quality control activities in accordance with EPA-CLP requirements. Calibration records of assigned laboratories will be filed and maintained at the laboratory location where the work is performed and will be subject to QA audit.

(B6 and B8) INSTRUMENT/EQUIPMENT TESTING, INSPECTION, PREVENTIVE MAINTENANCE PROCEDURES

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedures developed by the operators.

SCHEDULES

Manufacturer's procedures identify the schedule for servicing critical items in order to minimize the downtime of the measurement system. It will be the responsibility of the operator to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. Service to the equipment, instruments, tools and gauges shall be performed by qualified personnel.

In the absence of any manufacturer's recommended maintenance criteria, a maintenance procedure will be developed by the operator based on experience and previous use of the equipment.

RECORDS

Logs will be established to record maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced will be reviewed, maintained, and filed by the operator when equipment, instruments, tools, and gauges are used at the sites. The Program Quality Assurance Specialist will audit these records to verify complete adherence to these procedures. Any deviations from these procedures will be reported to the Program Technical Director.

SECTION C

ASSESSMENT/OVERSIGHT

(C1) ASSESSMENT AND RESPONSE

QA audits are performed by the Program Quality Assurance Specialist. Functioning as an independent agent, the Program Quality Assurance Specialist will plan, schedule, and approve system and process audits according to procedures determined by the Program Technical Director, customized to specific project requirements. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, activities, and documentation of the measurement system(s), including subcontractor activities.

The Program Quality Assurance Specialist will report directly to the Technical Director. The Program Quality Assurance Specialist will coordinate and monitor the overall QA program, including all on-site activities and the quality control programs of the laboratories. Implementing prompt, effective, and accurate corrective action in response to noncompliance that may occur on projects is absolutely essential in assuring the quality of the end product.

QUALITY SYSTEM AUDIT

A quality system audit refers to a detailed evaluation of the Project's Quality Assurance Program to determine its conformance to the Multi-Site Cooperative Agreement commitments and standard TNRCC procedures. Such an audit includes preparation of formal plans and a checklist based on established requirements. A copy of a field audit checklist is at the end of this section. Audits will be performed on TNRCC work.

(C2) REPORTS TO MANAGEMENT

Audit reports will be written by the Program Quality Assurance Specialist after gathering and evaluating all available data. Items, activities, and documents determined by the Program Quality Assurance Specialist to be non-compliant will be identified at interviews conducted with the Technical Director and Program Manager. Non-compliant elements will be logged, documented, and controlled through audit findings, which are attached to the audit report. These audit findings are directed to the Program Manager to resolve the noncompliance satisfactorily in a specified and timely manner.

08 050

All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the Program QA/QC Officer prior to issue. QA verification of acceptable resolutions may be determined by re-audit for documented surveillance of the item or activity. Upon verification acceptance, the Program QA/QC Officer will close out the audit report and findings.

It is the Program Manager's overall responsibility to ensure that all corrective actions to resolve audit findings are acted upon promptly and satisfactorily by project personnel.

08 051

FIELD AUDIT CHECKLIST

Project No. _____

Project Name _____

Site Investigation Manager _____

Auditor _____

Dates of Field Audit _/__/__ - _/__/__

A: Health and Safety

1. The Site-Specific Health and Safety Plan has been prepared by the TNRCC Site Investigation Manager and subsequently approved by the TNRCC Program Manager and TNRCC Health and Safety Officer prior to arrival to the site.

Yes ___ No ___

Comments_____

_____

2. The Site-Specific Health and Safety Plan has been signed by all who intend to enter within the site boundaries prior to entry onto the site.

Yes ___ No ___

Comments_____

_____

B: Project Organization Adequate ___ Marginal ___ Failed ___

1. Did the Site Investigation Manager hold a briefing with each participant to go over any concerns or questions for project organization?

Yes ___ No ___

Comments_____

_____

08 052

2. Did the Site Investigation Manager provide appropriate number and types of material supplies necessary to collect samples (jars, bottles, gloves, pens, coolers, coolant, preservatives, protective gear, Work Plan, Health and Safety Plan, CLP, QAPP or other reference material)?

Yes ___ No ___

Comments_____

_____

3. Were additional instructions given to each participant not otherwise found in the preliminary written material, such as the Site-Specific Work Plan, Health and Safety Plan, CLP or QAPP?

Not Applicable ___

Additional Instructions_____

_____

C: Sample Collection Procedures

1a. Did the Site Investigation Manager ensure that the sampler collected adequate volumes of sample to allow for the planned sample analyses and field duplicates, plus any laboratory QC blanks and laboratory QC duplicates/spikes, as applicable?

Yes ___ No ___

Comments_____

_____

1b. Did the Site Investigation Manager provide a supply of the appropriate type of sample containers for the samples collected?

Yes ___ No ___ No Modifications ___ Modifications ___

Comments_____

_____

08 053

2. Were samples collected as stated in the Site-Specific Work Plan (number, frequency, and type)?

Yes ___ No ___ No Modifications ___ Modifications ___

Sample Modifications_____

_____

D: Chain of Custody

1a. Did the Site Investigation Manager ensure that the sample tags were properly completed and attached to each sample container?

Yes ___ No ___

Comments_____

_____

1b. Did the Site Investigation Manager ensure that the custody seals were properly completed and attached to each sample container in unbroken condition?

Yes ___ No ___

Comments_____

_____

1c. Did the Site Investigation Manager ensure that each sample container was labeled with the sample number and protected with clear tap?

Yes ___ No ___

Comments_____

_____

08 05

2. Was each completed traffic report , faxed to EPA, original copy mailed to EPA, and copies corrected as necessary?

Yes ___ No ___

Comments_____

_____

3. Did the traffic report accompany each shipment to the correct EPA contract lab?

Yes ___ No ___

Comments_____

_____

E: Field Observations Adequate ___ Marginal ___ Failed ___

1. Were field observations written in ink and presented accurately in the field logbook, and was each page signed and dated?

Yes ___ No ___

Comments_____

_____

2. Were photographs logged in the logbook with the date, time, location, name of person taking the picture, type of sample, sample number, and the photo number?

Yes ___ No ___

Comments_____

_____

3. Prior to use, did the Site Investigation Manager ensure that the measuring equipment was calibrated to standard procedures as presented in accompanied documents written specifically for the instrument?

Yes ___ No ___

Comments_____

_____

4. Have any accountable documents been lost?

Not Applicable ___

Documents Lost_____

_____

General Comments or Concerns Regarding the Sampling Procedures, Organization, and Site Investigation Management:

_____

_____

_____

Printed Name of Auditor_____

Signature of Auditor _____ Date_____

SECTION D

DATA VALIDATION AND USABILITY

(D1 and D2) DATA REVIEW, VALIDATION, VERIFICATION METHODS

FIELD MEASUREMENT DATA

Field measurements will be made by field geologists and engineers, environmental analysts, and technicians. The following standard reporting units will be used during all phases of the project:

- pH will be reported to 0.1 standard units.
- Specific conductance will be reported to two significant figures below 100 umhos per centimeter (umhos/cm) and three significant figures above 100 umhos/cm.
- Temperature will be reported to the nearest 0.5° Celsius (°C).
- Water levels measured in wells will be reported to the nearest 0.1 foot.
- Soil sampling depths will be reported to the nearest 0.5 foot.

Field data will be validated using different procedures.

- Checklists will be used during the processing of data that will identify errors - for example, identifying errors in identification codes.
- Checks may be made for consistency with parallel data sets (data sets obtained presumably from the same population) - for example, from the same region of the aquifer or volume of soil.

The purpose of these validation checks and tests is to identify outliers, i.e., observations that do not conform to the pattern established by other observations. Outliers may be the result of transcription error or instrumental breakdowns. Outliers may also be manifestations of a greater degree of spatial or temporal variability than expected.

08 058

If an outlier is identified, a decision concerning its fate will be rendered. Obvious mistakes in data will be corrected when possible, and the correct value will be inserted. If the correct value cannot be obtained, the data may be excluded. An attempt will be made to explain the existence of the outlier. If no plausible explanation can be found for the outlier, it may be excluded, but a note to that effect will be included in the report. Also, an attempt will be made to determine the effect of the outlier when both included and excluded in the data set.

LABORATORY DATA

The procedures used for calculations and data reduction are specified in each method referenced previously. It will be the responsibility of the laboratory to follow these procedures.

VALIDATION

The laboratory data will be validated by EPA according to the following EPA documents:

- National Functional Guidelines for Organic Data Review (August 1994)
- National Functional Guidelines for Evaluating Inorganics Analyses (February 1994).

REPORTING

The project analytical report from the CLP laboratory will contain data sheets and the results of analysis of QC samples. Analytical reports may also contain the following items:

- Project identification
- Field sample number
- Laboratory sample number
- Sample matrix description
- Date of sample collection
- Analytical method description and reference citation
- Individual parameter results
- Date of analysis (extraction, first run, and subsequent runs)
- Quantitation limits achieved
- Dilution or concentration factors
- Corresponding QC report (including duplicates and spikes).

Matrix interferences on some of the samples, particularly the waste samples, may result in increased detection limits. Matrix interference will be reported as the cause of increased detection limits.

(D3) RECONCILIATION WITH DQO

The following procedures have been established to assure that conditions adverse to quality--malfunctions, deficiencies, deviations, and errors--are promptly investigated, evaluated, and corrected.

INITIATION OF CORRECTIVE ACTION

When a condition adverse to quality is noted at the project site, laboratory, or subcontractor locations, the cause of the condition will be determined and corrective action taken to preclude repetition. All project personnel have the responsibility, as part of normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality.

Corrective actions may be initiated at a minimum:

- When predetermined acceptance standards--objectives for precision, accuracy, and completeness--are not attained.
- When procedures or data compiled are determined to be faulty.
- When equipment or instrumentation is found faulty.
- When samples and test results cannot be traced with certainty.
- When quality assurance requirements have been violated.
- When designated approvals have been circumvented
- As a result of an audit.

PROCEDURE DESCRIPTION

Project management and staff, including field investigation teams, sample control personnel, and laboratory groups, monitor ongoing work performance in the normal course of daily responsibilities.

Following identification of an adverse condition or quality assurance problem, notification of the deficiency will be made to the project manager and senior individual in charge of the activity found to be deficient, along with recommendations for correction. Following implementation of corrective action, the senior individual in charge will report actions taken and results to the Program Manager and Program QA/QC Officer.

08 060

EQUATIONS FOR PRECISION, ACCURACY, AND COMPLETENESS

Planned procedures used to assess data precision and accuracy are in accordance with 44 FR 69533, "Guidelines Establishing Test Procedures for the Analyses of Pollutants", and appendix III, "Example Quality Assurance and Quality Control Procedures for Organic Priority Pollutants", December 3, 1979. Completeness is recorded by comparing the number of parameters initially analyzed with the number of parameters successfully completed and validated.

PRECISION

Relative percent difference (RPD) is calculated as:

$$RPD = \frac{|x_1 - x_2|}{x} \times 100\%$$

where:
x_1 = analyte concentration of first duplicate
x_2 = analyte concentration of second duplicate
x = average analyte concentration of duplicates 1 and 2.

ACCURACY

Accuracy is expressed as a percent recovery (PR), calculated by:

$$PR = \frac{(A-B)}{C} \times 100\%$$

where:
A = spiked sample result (SSR)
B = sample result (SR)
C = spike added (SA).

08 061

COMPLETENESS

The completeness of the data will be determined by:

$$PC = \frac{N_a}{N_t} \times 100\%$$

where:
PC = percent complete
N_a = number of actual valid results
N_t = number of theoretical results obtainable.

08 062

APPENDIX A

Preliminary Assessment/Site Inspection Program Fiscal Year 2000 Schedule

The Preliminary Assessment/Site Inspection Program Fiscal Year 2000 Schedule will be inserted as soon as it becomes available

APPENDIX B

Sampler's Guide to the Contract Laboratory Program

United States
Environmental Protection
Agency

Office of
Solid Waste and
Emergency Response

9240.0-30
EPA/540/R-96/032
PB96-963511

Superfund

SAMPLER'S GUIDE TO THE CONTRACT LABORATORY PROGRAM

08 069

9240.0-30
EPA/540/R-96/032
PB96-963511

Sampler's Guide to the Contract Laboratory Program

Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Washington, DC 20460

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NOTICE

The policies and procedures set forth here are intended as guidance to Agency and other government employees. They do not constitute rulemaking by the Agency, and may not be relied on to create a substantive or procedural right enforceable by any other person. The Government may take action that is at variance with the policies and procedures in this manual.

For further information on the Contract Laboratory Program (CLP) or to obtain a copy of the *User's Guide to the Contract Laboratory Program*, contact the National Technical Information Service (NTIS) of the United States Department of Commerce at (703) 487-4650. In addition, the entire current Superfund bibliography may be purchased from NTIS at (703) 487-4650.

Additional copies of this manual can be obtained from:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

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PREFACE

The *Sampler's Guide to the Contract Laboratory Program* has been prepared by the U.S. Environmental Protection Agency Analytical Operations Center. It is specifically designed for samplers to help clarify sampling procedures necessary to submit samples for CLP analysis. The *Sampler's Guide to the Contract Laboratory Program* acts as a reference for the Regions and sampling contractors to promote consistency in sampling procedures throughout the Regions and to ensure the proper adherence to CLP requirements. This document is intended to be used as a supplement to, not as a replacement for, existing Regional sampling instructions.

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1.0 THE CLP NETWORK

The Contract Laboratory Program (CLP) is a national program of commercial contractor laboratories supporting the Environmental Protection Agency's (EPA's) Superfund nationwide effort to clean up designated hazardous waste sites. Superfund was originally established under the 1980 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and presently exists under the 1986 Superfund Amendments and Reauthorization Act (SARA).

The CLP provides chemical analytical services using state-of-the-art technology for the ten EPA Regions. The program is structured to provide data of known and documented quality for use in supporting EPA enforcement actions or other user needs. To achieve this goal, the CLP has established strict quality assurance procedures and detailed documentation requirements.

The CLP is directed by the Analytical Operations Center (AOC) in the Office of Emergency and Remedial Response (OERR) in the Office of Solid Waste and Emergency Response (OSWER). AOC includes the Organic and Inorganic Program Coordinators and the Administrative Project Officers (APOs) for the CLP laboratories, the Project Officer for the Contract Laboratory Analytical Services Support (CLASS) contract, the Project Officer for the Quality Assurance Technical Support (QATS) contract, the National Automated Data Processing (ADP) Manager, and the Quality Assurance Coordinator. AOC responsibilities include the following:

- Development of analytical methods;
- Development of the Statements of Work (these documents define required analytical methods, quality control, detection/quantitation limits and holding times) for the analytical services procured under the CLP;
- Development of and implementing policies and budgets for Superfund analytical operations;
- Development of information management policies and products for analytical data;
- Management of the CLASS and QATS contracts;
- National administration, evaluation, and management of the CLP; and
- Direction of CLP quality assurance activities in coordination with overall OSWER quality assurance activities.

In coordinating Superfund sampling efforts, AOC is supported by the APOs, the contractor-operated CLASS office, the Regional Technical Project Officers (TPOs), the Regional Sample Control Centers (RSCCs), and the Regional Site Managers (Site Assesssment Managers, On-Scene Coordinators and Remedial Project Managers). See Exhibit 1-1 for a generalized organization chart (functions may vary by Regions).

Currently, AOC is allowing other Agencies/Departments the opportunity to "buy-into" the CLP. This is being done on a cost-reimbursable basis through Interagency Agreements.

Administrative Project Officer

The APO is responsible for monitoring laboratory performance, initiating contract action, and funding laboratory contracts. The APO works closely with the TPOs and laboratories to resolve problems. The APO is also responsible for developing analytical methods and designing new CLP services.

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Contract Laboratory Analytical Services Support

The CLASS contractor provides management, operations, and administrative support to the CLP. The CLASS contractor routinely receives Regional analytical requests, coordinates and schedules sample analyses, tracks sample shipments and analyses, receives and checks data for completeness and compliance, processes laboratory invoices, and maintains a repository of sampling records and program data.

Regional Technical Project Officer

The TPO monitors the technical performance of the contract laboratories in his or her Region. The TPO works closely with the APOs in responding to laboratory technical problems and leads laboratory on-site evaluations. The TPO is the sole Regional official who may contact the CLP laboratories.

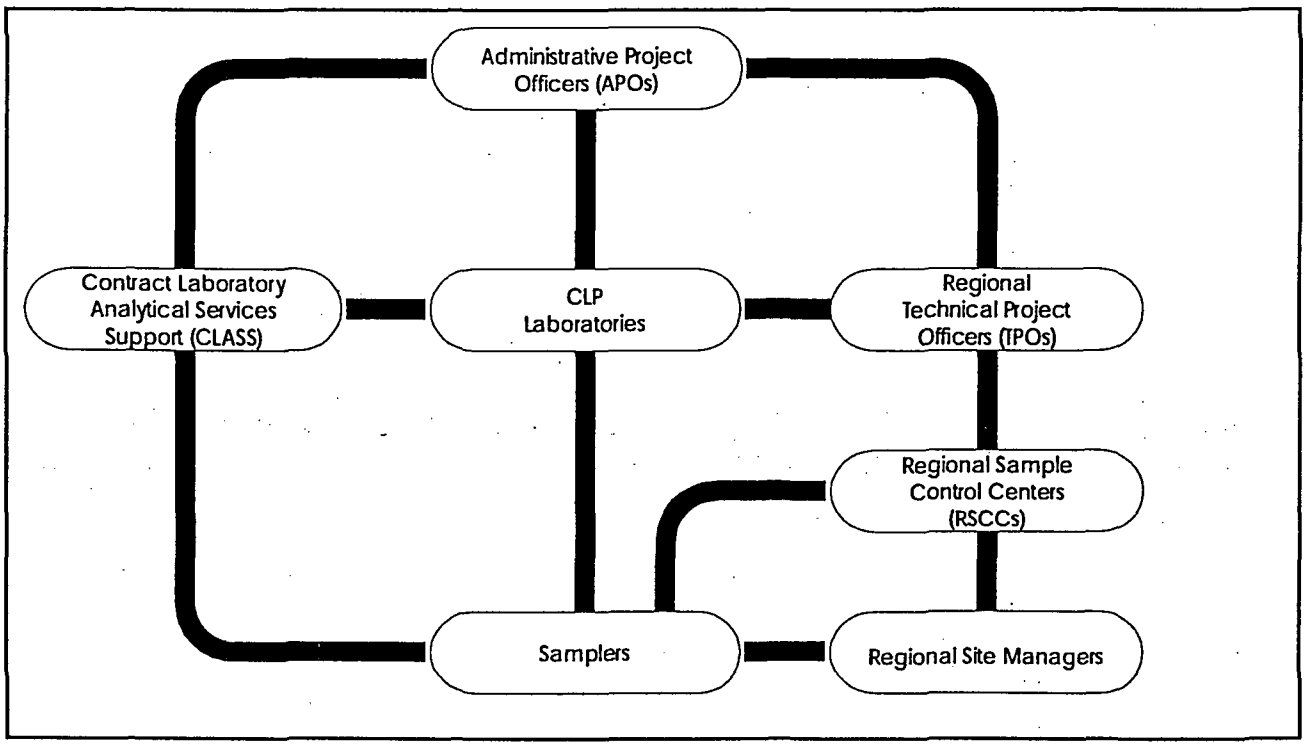
Regional Sample Control Center

In most Regions, the RSCC coordinates the sampling efforts and serves as the central point of contact for sampling questions and problems. The RSCC assists in coordinating the level of Regional sampling activities to correspond with the monthly projected demand for analytical services.

Regional Site Manager

The Regional Site Manager (Site Assessment Manager, On-Scene Coordinator or Remedial Project Manager) is responsible for coordinating the development of data quality objectives and for overseeing project-specific remedial contractors, state officials, or private parties conducting site sampling efforts.

Exhibit 1-1. CLP Organization Chart



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1.1. PROCUREMENT OF CONTRACT LABORATORY SERVICES

1.1.1. Procedures for requesting/scheduling analytical services.

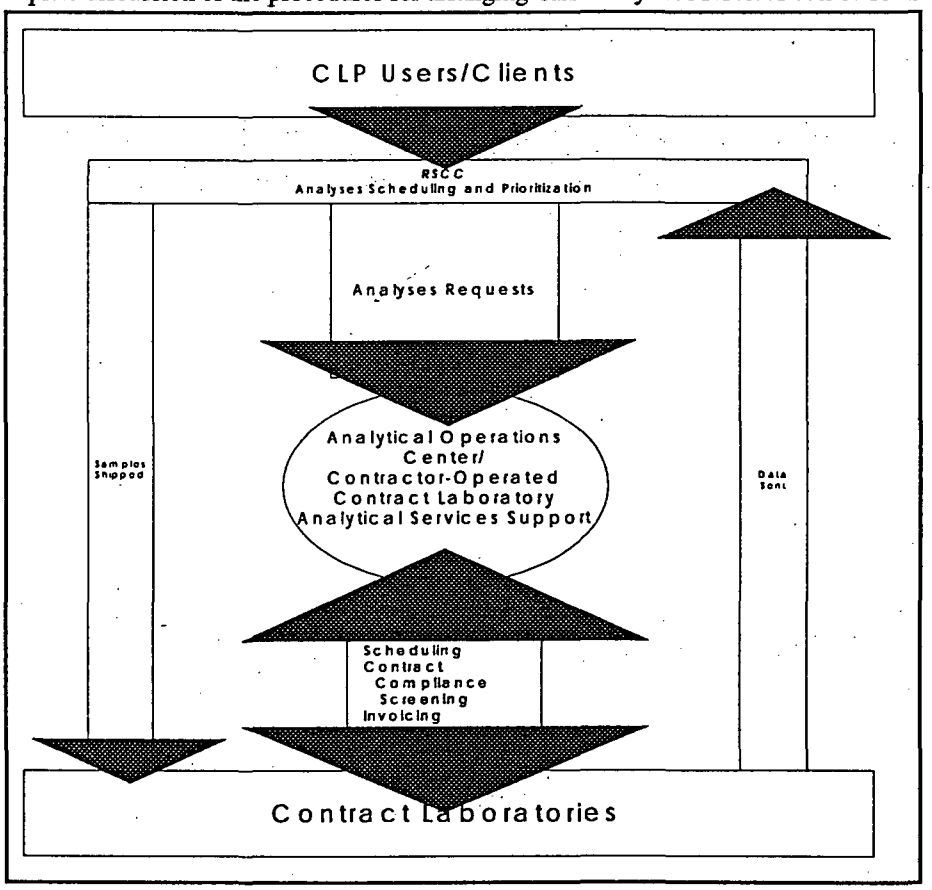
To initiate a CLP Analytical Services (CLPAS) request, the RSCC or Regional/Agency designee contacts the appropriate CLASS Coordinator by telephone or fax and provides a complete description of the analytical requirement. The information required to initiate a CLPAS request includes the sampler's name, sampler's phone number, site name, city and state where the site is located, site spill identification number, expected date of sample shipment, number of samples, type of analyses, turn-around-time, fractions to be analyzed, and sample matrix.

1.1.1. Timing and scheduling

By noon eastern time on the Wednesday of the week prior to the scheduled start of a planned sampling activity, the RSCC or Regional/Agency designee contacts the CLASS Coordinator to place a CLPAS request and to provide scheduling information to the CLASS contractor. This lead-time enables the laboratories to prepare for EPA samples, and to provide for resolution of sampling questions. It also allows the sampler time to prepare the required sample documentation prior to field activity, if appropriate. Late scheduling requests (i.e., requests received between Wednesday noon and the date of sampling) are accommodated with available laboratory capacity. To avoid possible shortfalls, Regions are strongly encouraged to submit all CLPAS scheduling requests prior to Wednesday noon, when possible. A more complete discussion of the procedures for arranging CLP analytical services can be found in the User's Guide to the Contract Laboratory Program.

1.1.2. Chain of Communication within the CLP

Exhibit 1-2.



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2.0 CONTRACT LABORATORY ANALYTICAL SERVICCES SUPPORT

The CLP provides the user community with a wide range of Contract Laboratory Program Analytical Services (CLPAS) through laboratories that have been awarded government contracts under the CLP.

CLPAS services generally apply to the analysis of water and soil/sediment samples for specific target organic and inorganic analytes, and are performed under firm, fixed-price, standardized contracts that include standard analytical methodologies, quality assurance and quality control (QA/QC) procedures, and data reporting formats. The CLP analytical services are shown with their corresponding fractions and concentrations in Exhibit 2-1.

EPA Regions may request a portion of the analytical services provided under the CLP. For example, CLP Analytical Services-volatile analysis may be ordered without CLP Analytical Services-semi-volatile analysis or CLP Analytical Services-pesticide/Aroclor analysis. However, CLP Analytical Services-pesticide analysis may not be ordered without CLP Analytical Services-Aroclor analysis, since fractions may not be split.

Exhibit 2-1. Contract Laboratory Program Analytical Services

STATUS OF SERVICE	ANALYTICAL SERVICES	FRACTIONS	CONCENTRATION[1]	MATRIX	TURN-AROUND TIMES[2]
Available	Multi-Media, Multi-Concentration Organics (Low/Medium)	Volatiles, Semivolatiles, Pesticides/Aroclors	Low, Medium	Water, Soil/ Sediment	14 or 35 days, depending on contract requirements
	Multi-Media, Multi-Concentration Inorganics (Low/Medium)	Total Metals, Dissolved Metals, Cyanide	Low, Medium	Water, Soil/ Sediment	14 or 35 days, depending on contract requirements
Future	Low Concentration Organics	Volatiles, Semivolatiles, Pesticides/Aroclors	Low[3]	Water	14 days
	Water Quality/ Wet Chemistry	Alkalinity, Ammonia, Total Organic Carbon, Chemical Oxygen Demand, Chloride, Nitrate/Nitrite, Phosphorus, Total Dissolved Solids, Total Suspended Solids, Sulfate	Low, Medium, High	Water	14 days

[1] See Section 3.1, CLPAS Sample Definition, for the definitions of low, medium, and high concentrations.

[2] Turnaround times are the maximum time allowed under the CLPAS contracts for laboratory submission of all reporting and deliverable requirements. Turnaround times for each sample are calculated from the day on which the sample is received at the CLP laboratory, as recorded on the shipper's delivery receipt and traffic report/chain-of-custody form.

[3] Low concentration for these services refers to the analytical quantitation limits for drinking water samples.

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3.0 SAMPLE COLLECTION

3.1 Sample Definition

A CLP Analytical Services sample is defined by one sample matrix at one concentration level from one station location for each individual or set of analytical fraction(s), provided the fractions are all requested from the same CLP Analytical Service. CLP Analytical Services are generally used to analyze low and medium concentration samples. Low concentration samples are considered to be those samples collected in areas where immediate hazards are thought to be significantly reduced either by normal environmental processes or because of limited contamination. Medium concentration samples are most often those collected on-site in areas of moderate dilution by normal environmental processes. High concentration samples are considered to be those collected directly from drums, pits, ponds, lagoons, or areas where no dilution of waste is evident [these sample analyses are not available under current CLP Statements of Work]. For the most current definition of low or medium concentration please refer to the current CLP Statements of Work. The sampler must identify low, medium, and high concentration samples in the field in order to determine sample collection volume, packaging, and shipping procedures. CLP Analytical Services matrices can be water, soil or sediment. In some instances a mixed-matrix sample may be collected which contains either a supernatant (for a sediment/soil sample) or a precipitate (for a water sample). In those instances, it is best to discuss the required procedures with the TPO or APO. In general, two individual samples should be collected by separating the aqueous layer from the solid/precipitate layer at the point of collection is preferable.

A CLP Analytical Services sample consists of all sample aliquots (portions) from one station location, for one matrix, for one analytical program, for one laboratory necessary to collect appropriate volumes needed for the analysis of each fraction. One CLP Analytical Services sample may be contained in several bottles and vials. For example for the Low/Medium Organics CLP Analytical Service, one water sample might consist of all of the containers needed for the three analytical fractions available under this service (i.e., volatile fraction, semi-volatile fraction, and pesticide/Aroclor fraction), even though the fractions will be collected in separate containers. Therefore, the fractions of the CLP Analytical Service, along with the type of matrix and the expected concentration level (low/medium or high level), determine container type and volume.

As an example, let's say you are sampling at Leroy's Pond (see Exhibits 3.1 and 3.2). *You are instructed to collect one low/medium concentration water sample and one low/medium concentration soil/sediment sample, each to be analyzed for all of the low/medium organic and inorganic fractions available through CLP Analytical Service.* According to CLP guidelines, each individual inorganic sample may be analyzed for total metals or dissolved metals, but not both. If you want data for both dissolved metals and total metals from the same station location, you must collect two separate samples and assign them each unique CLP sample numbers.

For the CLP Analytical Services Multi-Media, Multi-Concentration Inorganics (Low/Medium) contract, the analytical fractions of interest are total metals and cyanide. For the CLP Analytical Services Multi-Media, Multi-Concentration Organics (Low/Medium) contract, the analytical fractions of interest are volatiles, semivolatiles, and pesticides/Aroclors. In the future it will be possible to consider the Organic Low Concentration (water only) service.

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Exhibit 3-1. Sampling at Leroy's Pond

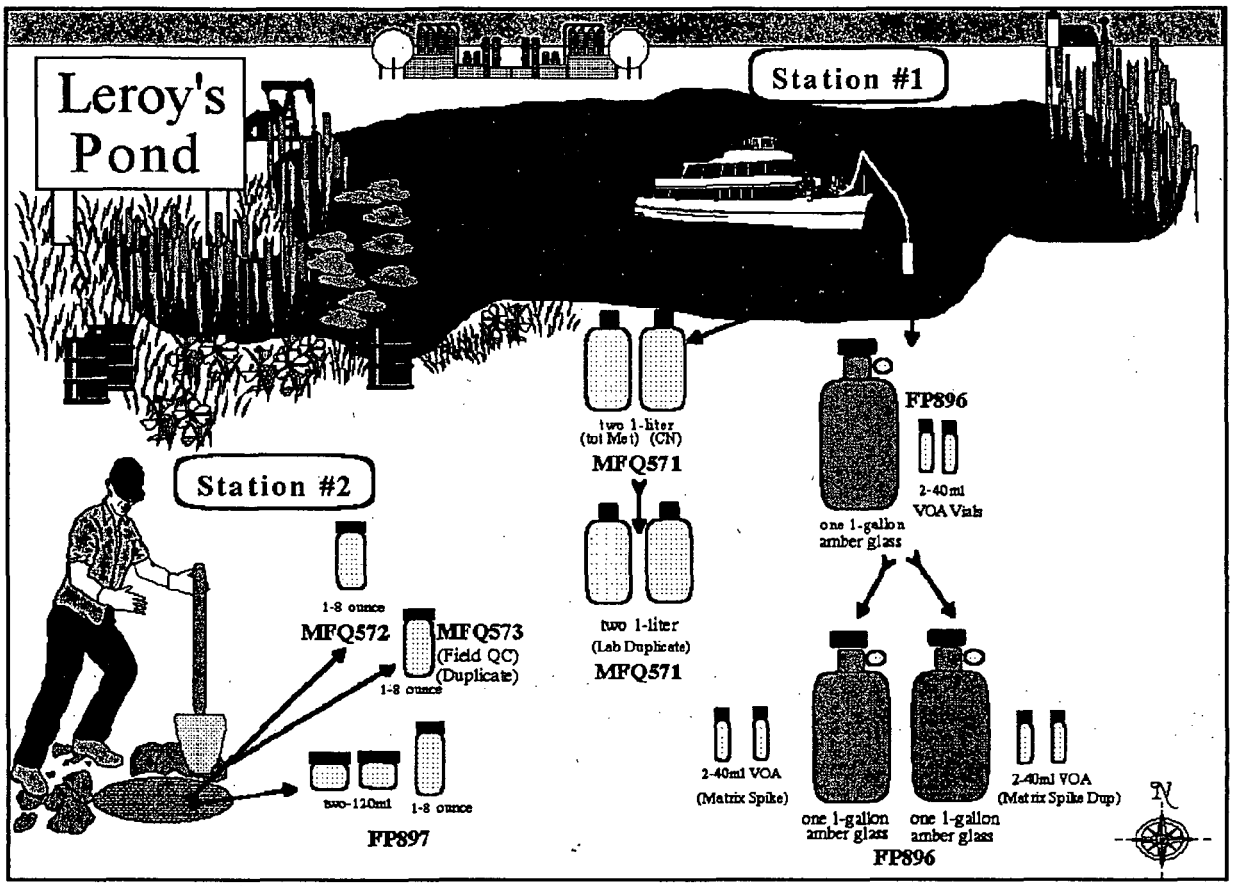

Exhibit 3-2. Table of Sampling at Leroy's Pond

MATRIX	LOW/MEDIUM ORGANICS	LOW/MEDIUM INORGANICS
Water	Volatiles Semivolatiles Pesticides/Aroclors	Total Metals Cyanide
Soil/Sediment	Volatiles Semivolatiles Pesticides/Aroclors	Total Metals Cyanide
Total number of samples collected = 4	2 organic samples (1 water + 1 soil/sediment)	2 inorganic samples (1 water + 1 soil/sediment)

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Because you are collecting samples from two matrices for two analytical services, you must collect four separate samples: one water sample and one soil/sediment sample to be analyzed for CLP Analytical Services organics and one water sample and one soil/sediment sample to be analyzed for CLP Analytical Services inorganics. Note that a single sample may consist of several containers because each fraction and each concentration category require a certain volume for analysis.

3.2 CLP Analytical Services and Project Data Quality Objectives

Before requesting CLP Analytical Services, project managers should evaluate whether the services offered under the CLP are appropriate to meet the Data Quality Objectives (DQOs) [1] established for their project. This evaluation should take place during the planning stages of a sampling project and be documented in the Quality Assurance Project Plan (QAPP)[1] and/or the Sampling and Analysis Plan (SAP) [1].

The following specifications/features of CLP Analytical Services (this information is generally found in the Statement of Work for the analytical service) should be evaluated to determine the adequacy of the standardized services to meet the project DQOs:

- list of included target analytes/compounds
- sample concentrations covered
- required minimum sample volumes
- laboratory subsample size
- sample preparation and digestion methods
- analytical methods
- turnaround times
- Instrument Detection Limits
- Contract Required Quantitation/Detection Limits
- QA/QC requirements (e.g., identity, frequency, and acceptance criteria for laboratory QC samples)
- laboratory sample receipt and custody requirements
- data package deliverables (reporting requirements)

For example, the detection limits required to meet the project DQOs for some risk assessments might be lower than the Contract Required Detection Limits offered by the CLP. The standard CLP digestion and analytical methods might not be suitable for the sample matrix of interest. The CLP data turnaround times might be too long for some emergency response sampling projects. For situations such as the emergency response scenario, it is possible that a combination of CLP Analytical Services for the non time-critical analytes and alternative fast-turnaround services (14-day turn around time) for the time-critical analytes would be adequate to meet the project DQOs.

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[1]For more information regarding QA and SAP planning and the DQO process, consult the documents listed in Section 9.0 of this guide.

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If it is determined that CLP Analytical Services will not be adequate for all or some of the samples to be collected, alternatives should be explored. Each EPA Region may have developed analytical services options to supplement the laboratory services available nationally through the CLP. Contact the appropriate Regional analytical services representatives (usually the personnel listed in Section 7.0, Communications Network) for guidance in obtaining analytical services that will meet project DQOs.

3.3 References to CLP Laboratory Services in QAPPs and SAPs

QAPPs and SAPs typically contain sections describing analytical laboratory services. Standard, or boiler-plate, language is often used to describe laboratory requirements for procedures such as sample receipt and notification and laboratory participation in analyzing Performance Evaluation Samples (PESs). CLP contract specifications are designed to incorporate many of the most common good laboratory practice requirements, such as the requirement for laboratory Quality Management Plans (QMPs for further information see Section 9.0). If CLP Analytical Services will be requested for all or some of the samples covered in a QAPP and/or SAP, care should be taken to ensure that the QAPP/SAP descriptions of laboratory services for the CLP-destined samples are compatible with the CLP contract specifications. For example, CLP contracts do not allow CLP laboratories to contact samplers directly regarding problems with sample receipt. (Note that only the EPA Contracting Officer for the CLP has the authority to modify CLP contract specifications.) **It is generally the responsibility of the project manager to make sure that the project laboratory services requirements are communicated to the Regional analytical services representatives.**

QAPPs and/or SAPs also typically include standard operating procedures (SOPs) for procedures such as completing chain-of-custody forms, sample identification, and sample packaging and shipment. SOPs that will be used when collecting samples for analysis through the CLP should be reviewed before use to ensure that CLP requirements are accommodated. Many consultants' SOPs call for the site name to be provided on the form. However, for CLP Analytical Services samples, Case Numbers, rather than site names are used. SOPs associated with the collection of CLP samples should be reviewed before use to ensure that CLP requirements are accommodated.

In addition, QAPPs and SAPs specify such information as the analytical methods and laboratory QC requirements that will be used for samples. When CLP Analytical Services will be requested for samples, it is common for the QAPP or SAP to reference the appropriate CLP Statement of Work (SOW) for details such as the laboratory QC sample frequencies. There is often confusion regarding how to reference CLP SOWs, because several versions of a SOW for a particular analytical service, such as "Low/Medium Organics," may be active under contracts at the same time. Also QAPP and SAP authors do not control CLP laboratory assignments and will not know in advance which laboratory and corresponding SOW version will be assigned for their samples. Therefore, QAPP and SAP authors should refer to CLP SOWs as in the following example:

> "Low/medium concentration soil samples will be analyzed according to the specifications of the current EPA Superfund Contract Laboratory Program Statement of Work for Multi-Media, Multi-Concentrations Organics."

3.4 Sample Volume

The collection of proper sample volume is imperative to the success of sample analysis. If sufficient sample volume is not collected, the analysis of all required parameters and complete quality control determinations may not be possible. (See Section 3.6, Quality Control Samples.) Therefore, it is especially important to note the volume requirements for each specified. If adequate sample volume cannot be collected, notify the authorized RSCC or CLP Analytical Services Support personnel sample immediately. Note that more than one container may be required to provide the total volume of sample needed (e.g., two-40-ml glass vials for one volatile organic compound [VOC] analysis). Exhibits 3-3 and 3-4 specify the required sample volume and container type for each CLP Analytical Services fraction. Container type codes are detailed in Section 3.5, Sample Containers, and in Exhibit 3-5.

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Exhibit 3-3. Low/Medium Organics Sample Volume

SAMPLE MATRIX	CONCENTRATION	FRACTION	LABORATORY QC SAMPLE VOLUME	MINIMUM SAMPLE VOLUME	CONTAINER TYPE[1]
Water	Low/Medium	Volatiles	4 each (40 mL)	2 each (40 mL)	B or D
		Semivolatiles	4 L	2 L	A,E,F,G,H,J, or K
		Pesticides/Aroclors	4 L	2 L	A,E,F,G,H,J, or K
Soil/ Sediment	Low/Medium [2]	Volatiles	4 each (40 mL)	2 each (40 mL)	D or B
		Semivolatiles	4 oz.	4 oz.	A,E,F,G,H,J, or K
		Pesticides/Aroclors	4 oz.	4 oz.	A,E,F,G,H,J, or K

[1] Some sample containers may have small neck sizes and inhibit sampling efforts. See Exhibit 3.4 for container types.

[2] All medium soil/sediment sample containers should be double contained before shipment (e.g., sample bottle/jar/vial placed in clean, lidded metal paint can). Consult DOT regulations for applicable shipping requirements.

Exhibit 3-4. Low/Medium Inorganics Sample Volume

SAMPLE MATRIX	CONCENTRATION	FRACTION	LABORATORY QC SAMPLE VOLUME	MINIMUM SAMPLE VOLUME	CONTAINER TYPE[1]
Water	Low/Medium	Total Metals	1L	1 L	A,C,E,F,G,H,J,K, or L
		Dissolved Metals	1L	1 L	A,C,E,F,G,H,J,K, or L
		Cyanide	1.5 L	1 L	A,C,E,F,G,H,J,K, or L
Soil/ Sediment	Low/Medium [2]	Total Metals	6 oz.	6 oz.	A,C,E,F,G,H,J,K, or L
		Cyanide	6 oz.	6 oz.	A,C,E,F,G,H,J,K, or L

[1] Some sample containers may have small neck sizes and inhibit sampling efforts. See Exhibit 3.4 for container types

[2] All medium concentration soil/sediment sample containers should be double contained before shipping (e.g., sample bottle/jar/vial placed in clean, lidded metal paint can). Consult DOT regulations for applicable shipping requirements.

3.5 Sample Containers

Exhibit 3-4 lists sample containers generally used during sample collection. Always use clean sample containers of an assured quality. For container cleaning procedures and additional container information, refer to the current iteration of *Specifications and Guidance for Contaminant-Free Sample Containers*, December 1992, OSWER Directive 92.0-05A. See Exhibits 3-3 and 3-4 for sample volume requirements. Samplers may wish to purchase pre-cleaned/quality assured bottles in lieu of cleaning their own bottles.

3.6 Quality Control Samples

QC samples are used to estimate the precision and accuracy of analytical results and to examine sources of error introduced by field and laboratory practices. A designated number of field QC samples may be included in each batch of samples which are sent to the CLP laboratory, as specified by the Sampling and Analysis Plan. A designated number of laboratory QC samples must be included in each batch of samples which are sent to the laboratory, as specified by

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Exhibit 3-5 Sample Container Types

CONTAINER TYPE	SPECIFICATIONS
A	**Container:** 80-oz. amber glass, ring handle bottle/jug, 38-mm neck finish. **Closure:** Polypropylene or phenolic cap, 38-430 size; 0.015-in Teflon liner.
B	**Container:** 40-mL glass vial, 24-mm neck finish. **Closure:** Polypropylene or phenolic, open-top, screw cap, 15-cm opening, 24-400 size. **Septum:** 24-mm disc of 0.005-in Teflon bonded to 0.120-in silicon for total thickness of 0.125-in.
C	**Container:** 1-L high density polyethylene, cylinder-round bottle, 28-mm neck finish. **Closure:** Polyethylene cap, ribbed, 28-410 size; F217 polyethylene liner.
D	**Container:** 120-mL wide mouth glass vial, 48-mm neck finish. **Closure:** Polypropylene cap, 48-400 size; 0.015-in Teflon liner.
E	**Container:** 16 oz. tall, wide mouth, straight-sided, flint glass jar, 63-mm neck finish. **Closure:** Polypropylene or phenolic cap, 63-400 size; 0.015-in Teflon liner.
F	**Container:** 8-oz. short, wide mouth, straight-sided, flint glass jar, 70-mm neck finish. **Closure:** Polypropylene or phenolic cap, 70-400 size; 0.015-in Teflon liner.
G	**Container:** 4-oz. tall, wide mouth, straight-sided, flint glass jar, 48-mm neck finish. **Closure:** Polypropylene or phenolic cap, 48-400 size; 0.015-in Teflon liner.
H	**Container:** 1-L amber, Boston round, glass bottle, 33-mm pour-out neck finish. **Closure:** Polypropylene or phenolic cap, 33-430 size; 0.015-in Teflon liner.
J	**Container:** 32-oz. tall, wide mouth, straight-sided, flint glass, 89-mm neck finish. **Closure:** Polypropylene or phenolic cap, 89-400 size; 0.015-in Teflon liner.
K	**Container:** 4-L amber glass, ring handle bottle/jug, 38-mm neck finish. **Closure:** Polypropylene or phenolic cap, 38-430 size; 0.015-in Teflon liner.
L	**Container:** 500-mL high-density polyethylene, cylinder-round bottle, 28-mm neck finish. **Closure:** Polypropylene cap, ribbed, 28-410 size; F217 polyethylene liner.
M	**Container:** 120-mL wide mouth glass vial, 48-mm neck finish. **Closure:** Polypropylene cap, 48-400 size; 0.015-in Teflon liner.

the CLP contract. Because the amount and type of QC samples collected vary between Regions, always refer to Regional guidance. Note that the types and frequencies of field QC samples should always meet project DQOs.

Field QC samples may include field duplicate samples, trip blanks, equipment blanks, and field blanks. The field QC samples should be prepared (i.e., labeled, packaged, preserved, and shipped to the assigned laboratory) identically to the primary field samples, and should remain "blind" to the laboratory to ensure indiscriminate handling. Each *field* QC sample receives a separate sample number. See Section 5.0, Sample Documentation.

Laboratory QC samples include matrix spikes and matrix spike duplicates for organic samples and matrix spike and sample duplicates for inorganic samples. The laboratory QC sample is an additional volume of an existing sample required by the laboratory's contract; the additional volume must be supplied by the sampler (see exhibits 3-3 and 3-4). Samplers **should designate one sample per matrix per 20 samples as a "laboratory QC" sample.** If the sampler does not designate a sample as the "laboratory QC," then it is possible that the laboratory could select the blank as the QC or use the primary field samples to meet contract QC requirements. The laboratory use of primary field samples for QC analysis can detract from data quality and useability. For example, if a laboratory requires two liters of field sample to perform a requested analysis without QC, and the laboratory receives two liters of field sample to perform the requested analysis along with matrix spike and duplicate analyses, the laboratory may split the field sample using

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one liter for the required analysis and one half liter each for the matrix spike and duplicate analyses. In doing so, the laboratory will double the achievable sample quantitation limits, and possibly fail to meet project DQOs. Samplers should label the laboratory QC sample containers and corresponding paperwork as "lab QC" as described in Section 5.4, Traffic Report/Chain-of-Custody Forms. Remember that the laboratory QC sample is not an additional sample and does not receive its own unique sample number. Exhibit 3-6 explains some of the types of QC samples that may be collected. Follow volume requirements as specified in Section 3.4, Sample Volume.

3.7 Duplicate and Split Samples

Duplicate samples may be collected to determine the variability of the sampling process. Duplicate samples should be collected simultaneously from the same source and under identical conditions as the original sample. Aqueous duplicate samples are collected from successive volumes from the same sample source and device (e.g., bailers). Soil duplicates are collected from the same sample source and device.

Split samples may be collected to measure the variability between laboratories. The sample should be collected by separating one sample into two or more sample containers. Aqueous split samples should be collected by either obtaining consecutive sample volumes from the same bailer or mixing the volumes in a large intermediate vessel, as appropriate, depending on the nature of contaminants and Regional guidance. When collecting aqueous samples with devices, such as a bailer, for example, the following guidance should be followed. If more than one bailer is required to obtain the required sample volume, the first half volume of the first bailer should be poured into the first container, and the second half volume of the first bailer should be poured into the second container.

The first half volume of the second bailer should be poured into the second container, and the second half volume of the second bailer should be poured into the first container. This filling sequence should continue until both containers are filled. Please note that when sampling for VOC analysis, more than one bailer should not be used and sample mixing should be avoided because these procedures may increase analyte loss due to evaporation. Refer to Section 4.2.1, Volatile Organic Compound Collection, for guidelines on collecting samples for VOC analysis. When split samples are collected using an intermediate vessel, continually stir the contents of the intermediate vessel with a clean pipette or precleaned Teflon rod, and allow the contents to be alternately siphoned into respective sample containers using Teflon tubing. Any device used for stirring, or tubing used for siphoning, must be cleaned in the same manner as other equipment. Since a true split for sediment, sludge, and soil samples is not feasible under field conditions, a split soil sample should be considered a duplicate.

3.8 Performance Evaluation Samples

A Performance Evaluation Sample (PES) is a specially prepared Quality Control sample which is used to evaluate a laboratory's analytical proficiency. Most of the Organic PESs are supplied in ampules while most of the Inorganic PESs are supplied in plastic bottles. The frequency of use and the type(s) of PES(s) to be used during a sampling event should be specifically addressed in the Sampling and Analysis Plan. The availability and use of PESs should be coordinated through the Regional RSCC and/or TPO contact.

3.9 Recommendations for CLP Analytical Services Sample Preservation and Holding Times

Sample Preservation

Some water samples must be chemically preserved before shipment to the laboratory. All low concentration samples should be cooled to 4 ° ± 2 °C. Samples should be preserved and cooled immediately upon sample collection. Preservation techniques vary among the Regions; so use the information in Exhibit 3-7 as general guidance for properly preserving samples. Contact your RSCC for Region-specific instructions.

Exhibit 3-6 QC Samples

QC SAMPLE	SAMPLE TYPE	PURPOSE	COLLECTION[1]	SAMPLE NUMBER
Field QC Samples	Field Duplicate[2]	To check reproducibility of laboratory and field procedures. To indicate matrix non-homogeneity.	Collect from areas that are known or suspected to be contaminated. Collect one sample per week or 10% (Regions may vary) of all field samples per matrix, whichever is greater.	Assign two separate (unique) CLP sample numbers (i.e., one number to the primary sample and one to the duplicate). Submit blind to the lab.
	Field Blank	To check cross-contamination during sample collection, sample shipment, and in the laboratory. Also to check sample containers.	Collect for each group of samples of similar matrix per each day of sampling. Use water (demonstrated to be free of the contaminants of concern) for organics; use metal-free (deionized or distilled) water for inorganics.	Assign separate CLP sample numbers to the field blanks. Submit blind to the lab.
	Volatiles Trip Blank	To check contamination during sample handling and shipment from field to laboratory.	Collect one sample (water demonstrated to be free of the contaminants of concern) per each day of organics sampling. This sample is prepared off-site, before sampling commences, and placed in the cooler used to ship volatile samples.	Assign separate CLP sample numbers to the trip blanks. Submit blind to the lab.
	Equipment Blank or Rinse Blank	To check field decontamination procedures.	Collect when sampling equipment is decontaminated and reused in the field or when a sample collection vessel (bailer or beaker) will be used. Use blank water (water demonstrated to be organic-free, deionized or distilled for inorganics) to rinse the equipment, and collect this rinse water into the sample containers.	Assign separate CLP sample numbers to the equipment blanks. Submit blind to the lab.
Laboratory QC Samples[3]	Matrix Spike and Matrix Spike Duplicate	Required by laboratory's contract to check accuracy and precision of organic analyses.	Collect triple volume for one water sample per 20 water samples. The triple volume water sample should be collected in the first shipment of organics samples.	Assign the primary sample, extra volume, matrix spike and matrix spike duplicate the same CLP sample number. Label the extra volume "Lab QC."
	Matrix Spike and Lab Duplicate	Required by laboratory's contract to check accuracy and precision of inorganic analyses.	Collect double volume for one water sample per 20 water samples. The double water volume sample should be collected in the first shipment of inorganic samples.	Assign the primary sample, extra volume, spike and duplicate the same CLP sample number. Label the extra volume "Lab QC."

[1] Consult Regional guidance for field QC sample frequencies, laboratory QC sample frequencies are fixed in the CLP contracts.
[2] A true split for sediment, sludge, and soil samples (and other heterogeneous samples such as highly turbid waters) is typically not feasible under field conditions. A split of this type of sample should generally be considered a duplicate.
[3] No extra volume is required for the soil/sediment matrix; however, the sample to be used for laboratory QC must be designated on the TR/COC.

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Holding Times

Samples should be shipped to scheduled CLP laboratories as soon as possible after collection. Daily shipment of samples to CLP laboratories is very important, whenever possible, because many samples are stable only for a short period of time following collection. The technical holding times listed in Exhibit 3-7 are the maximum lengths of time that samples may be held from the time of collection to the time of analysis and still be considered valid. Samples that exceed these holding times may not be valid, and re-sampling may be necessary. The contractual holding times in Exhibit 3-8 are holding times that the CLP laboratory must follow to comply with the terms of the contract and are described in the CLP Analytical Services SOW. Contractual holding times are the same or shorter than the technical holding times to allow for sample packaging and shipping.

08 093

Exhibit 3-7 Recommendations for Sample Preservation and Technical Holding Times

PARAMETER TYPE	MEASUREMENT	PRESERVATIVE	TECHNICAL HOLDING TIME	CONTRACT MANDATED HOLDING TIME
Metals	Dissolved	Filter on-site, HNO_3 to pH<2, Cool, 4 °C	6 Months [1]	180 Days[4]
	Suspended	Filter on-site, Cool, 4 °C	6 Months	180 Days[4]
	Total	HNO_3 to pH<2, Cool 4 °C	6 Months	180 Days[4]
	Chromium^{6+}	Cool, 4 °C	24 Hours	180 Days[4]
	Mercury Dissolved	Filter, HNO_3 to pH<2, Cool, 4 °C	28 Days	26 Days[4]
	Mercury Total	HNO_3 to pH<2, Cool, 4 °C	28 Days	26 Days[4]
Inorganics, Non-Metals	Alkalinity	Cool, 4 °C	14 Days	14 Days
	Carbon, Total Organic	Cool, 4 °C, H_2SO_4 to pH<2	28 Days	28 Days
	Chemical Oxygen Demand	Cool, 4 °C, H_2SO_4 to pH<2	28 Days	28 Days
	Chloride	None Required	28 Days	28 Days
	Cyanide	Cool, 4 °C, NaOH to pH>12, 0.6 g ascorbic acid [2]	14 Days [3]	12 Days
	Nitrogen Ammonia	Cool, 4 °C, H_2SO_4 to pH<2	28 Days	28 Days
	Nitrate plus Nitrite	Cool, 4 °C, H_2SO_4 to pH<2	28 Days	28 Days
	Phosphorus	Cool, 4 °C, H_2SO_4 to pH<2	28 Days	28 Days
	Solids, Total Dissolved	Cool, 4 °C	7 Days	7 Days
	Solids, Total Suspended	Cool, 4 °C	7 Days	7 Days
	Sulfate	Cool, 4 °C	28 Days	28 Days
	Anions by Ion Chromatography	Cool, 4 °C	28 Days	28 Days
Organics	Pesticides/Aroclors	Cool, 4 °C, pH 5-9	14 Days	Extract in 10 Days
	Semivolatiles	Cool, 4 °C, store in dark	Extract in 7 days	Extract in 10 Days
	Volatiles (preserved)	Cool, 4 °C, HCl to pH<2	14 Days	10 Days[4]

'Source: Adapted from EPA-600/4-82-055, Technical Additions to Methods for Chemical Analysis of Water and Wastes and *40 Code of Federal Regulations § 136. Table II --Required Containers, Preservation Techniques, and Holding Times. 1995.*

* These are recommendations for sample preservation and holding times for aqueous samples. No official technical holding times are specified for soils/sediments under Superfund. However, EPA-specified contractual holding times do apply to soil/sediments. See Section 4.2.1, Volatile Organic Compound Collection for recommended procedures for the collection, handling, and preservation of soil samples to minimize the loss of volatile compounds. Please check your CLP Analytical Services SOW for required preservatives and holding times.

1 Samples should be filtered immediately on-site before adding a preservative.

2 Only use ascorbic acid in the presence of residual chloride. See section 4.2.1.

3 Maximum holding time is 24 hours when sulfide is present. Optionally, all samples may be tested with lead acetate paper before the pH adjustment to determine if sulfide is present. If sulfide is present, it can be removed by adding cadmium nitrate powder until a negative spot test is obtained using lead acetate paper. The sample is filtered and then NaOH is added to pH>12.

4 Analysis Start Date minus Laboratory Receive Date .

08 094

4.0 GENERAL SAMPLING TECHNIQUES AND CONSIDERATIONS

4.1 General Sampling Techniques

This section provides information on guidance documents available for collecting CLP Analytical Services samples. Samples should be collected according to the approved site specific Quality Assurance Project Plan and the Sampling Analysis Plan (EPA QA/R-5 "*EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations*" and EPA Order 5360.1). This document does not define specific sampling procedures for the CLP Analytical Services because specific sampling protocols depend on individual site conditions, Regional requirements, and DQOs. Regions may have their own specific requirements for individual sampling programs, the Regions are responsible for generating Region-specific sampling SOPs. Information regarding surface water, sediment, soil and groundwater sampling can be found in many documents including the following sources:

- *Compendium of ERT Surface Water and Sediment Sampling Procedures*, EPA/540/P-91/005.
- *Compendium of ERT Soil Sampling and Surface Geophysics Procedures*, EPA/540/P-91/006.
- *Compendium of ERT Groundwater Sampling Procedures*, EPA/540/P-91/007
- *Quality Assurance Sampling Plan for Environmental Response (QASPER) software, Version 4.1, ERT.*
- *Requirements for the Preparation of Sampling and Analysis Plans*, Draft, US Army Corps of Engineers. June 30, 1994. EM 200-1-3.

Other sources are available. This list is not exhaustive.

These documents, along with appropriate Regional guidance and procedures, should be consulted for detailed sample collection, preservation, handling and storing, equipment decontamination, and quality assurance/quality control procedures. When working with potentially hazardous materials, follow U.S. EPA and OSHA requirements, specific health and safety procedures, and Department of Transportation (DOT) requirements.

Regional sampling protocols and Regional QA guidelines should be consulted. Proper procedures for insuring good sampling results should be followed.

4.2 Special Sampling Considerations

This section provides general guidance for VOC, low concentration contaminant, and duplicate and split sample collection, along with procedures for sample compositing and mixing. The guidance provided in this section may be useful and appropriate for the collection of CLP Analytical Services samples.

The Regions should have developed specific SOPs to address the procedures for preserving samples in the field.

Testing and amelioration of carbonates, residual chlorine or oxidants in VOC samples and sulfides and residual chlorine in extractable fractions should be included in Regional guidance.

4.2.1 Volatile Organic Compound Collection

When collecting samples for VOC analysis, care should be taken to prevent analyte loss by evaporation. The following procedures are designed to minimize sample contamination and analyte loss during aqueous and non-aqueous VOC sample collection. Also, be sure to follow Regional guidance to ensure that proper prepreservation treatment is accomplished (e.g., residual chlorine). See Technical Notes on Drinking Water Methods, EPA/600/R-94/173, page 53.

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Aqueous VOC Sample Collection

- Rinse the vial with sample water prior to actual sample collection and preservation. See Section 3.8, Sample Preservation and Holding Times, and Exhibit 3-7.
- Avoid excessive aeration and agitation of the sample by pouring the sample slowly down the edge of the sample vial.
- Fill vial so that a reverse (convex) meniscus is present (in the case of water in a glass container).
- Place septum on the vial so that the Teflon side is in contact with the sample and then tighten the cap.
- Immediately invert the vial and lightly tap to locate air bubbles.
- If air bubbles are present, discard the sample and recollect the sample. Check the recollected sample for air bubbles. If air bubbles are present, additional sample water may be added to the vial in an attempt to eliminate the air bubbles. The presence of air bubbles after three consecutive attempts to rid the sample of the condition should result in the use of a new sample container and recollection of the sample. Regions vary in their approach to rinsing the sampling vial and recollecting the sample in the same vial. BE SURE TO FOLLOW REGIONAL GUIDANCE.
- Do NOT mix or composite samples.
- Immediately transfer the vial to the sample shuttle [device which contains a "set" of VOC vials] once it has been collected. Do not allow ice to touch the vials.

Solid VOC Sample Collection

- Minimize headspace as much as possible.
- Pack sample lightly with either a glass rod, Teflon spatula, or stainless steel spatula.
- Secure cap with Teflon-side of septum in contact with sample.
- Do NOT mix or composite samples.
- Immediately transfer the vial to the sample shuttle once it has been collected. Do not allow ice to touch the vials.
- Wipe outside of sample container to remove excess sample from threads to ensure a tight lid fit.

4.2.2 Contaminant Sampling

Some compounds can be detected in the ppb and/or ppt range. Extreme care must be taken to prevent cross-contamination of these samples. The following precautions should be taken when trace contaminants are of concern:

- Disposable gloves should be worn each time a different location is sampled.
- When collecting both surface water and sediments samples, surface water samples should be collected first. This reduces the chance of sediment dispersal into surface water, and the resulting loss of surface water sample integrity.

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- Sampling should occur in a progression from the least to most contaminated area, if this information is known.

- Samplers should use equipment constructed of Teflon, stainless steel, or glass that has been properly precleaned for collecting samples for trace organics compound analyses. (A set of procedures for cleanin g sampling equipment may be found in Regional guidance. Equipment constructed of plastic or PVC should not be used to collect samples for trace organic compounds analyses.

4.2.3 Sample Compositing and Mixing

When compositing solid samples, (i.e., sediment, soil, sludge) for analysis of compounds present in trace quantities, a stainless steel or Teflon bowl and spatula should be used. Samples for VOC analysis should not be composited to minimize evaporation. The sample should be thoroughly mixed and divided into subsections in the compositing container. The procedure for sectioning is as follows:

- Roll the contents of the compositing container to the middle of the container and mix.

- Quarter the sample and move to the sides of the container.

- Mix each quarter individually and roll to the middle of the compositing container.

- Mix the sample once more, composite quarter subsamples, place in container.

The approximate quantity of each subsection should be recorded in the field logbook.

08 097

5.0 SAMPLE DOCUMENTATION

Each sample processed by the CLP must be properly documented to ensure timely analysis of all parameters requested and to support the use of the sample data in potential enforcement actions. **It is the sampler's responsibility to fill out all appropriate paperwork completely and correctly.** This section provides instructions for completing all CLP forms and other sample documentation. Each EPA Region may require additional documentation. It is important to follow both the national guidelines and Regional guidelines for CLP Analytical Services samples. Contact your RSCC for Region-specific instructions and guidance prior to the sampling activity. Contact the Region VII RSCC for informatio n regarding sample documentation for the Rapid Turnaround Dioxin Analytical Service.

5.1 Case Number/Sample Delivery Group

A Case number is assigned by the CLASS contractor to CLP Analytical Services sampling events and is five digits in length. Each CLP Analytical Services sampling event receives a distinct Case number which helps maintain sit e confidentiality. (Contract laboratories should not know the site name for the samples they are analyzing in order to avoid potential conflict of interest problems.) The Case number also enables the CLASS contractor and the Region to easily track CLP Analytical Services sampling events. The Sample Delivery Group (SDG) is a unit within a Case that is used to identify a group of samples for delivery. An SDG is defined as one of the following, whichever comes first: all samples with a Case, or every set of 20 field samples within a Case, or the field samples in a Case which are received at a laboratory during a specified period of time, beginning with receipt of the first sample in the Case or SDG. Note : Laboratory QC sample frequencies are based on the SDG.

5.2 Sample Number

The CLP sample number is a unique number that identifies each sample under a CLP Analytical Services analytical program. A CLP Analytical Services sample is defined by one sample matrix at one concentration level from one station location for each individual or set of analytical fraction(s), provided the fractions are all requested from the same CL P Analytical Service. The sample number is preprinted on adhesive labels and is provided by your RSCC, who routinel y orders them from the CLASS contractor. Exhibit 5-1 shows examples of CLP Analytical Service sample labels. Sample numbers are comprised of a Regional letter code and sequential sample numbering. Regional letter codes are listed i n Exhibit 5-2. Use only the labels provided to the Region in which you are sampling. **It is your responsibility to assign this critical sample number correctly and to transcribe it accurately on the appropriate documentation.** Place the label on the appropriate sample container and transcribe the sample number onto the sample tag and TR/COC (Tracking Report/Chain of Custody) form. The unique sample number must only be used for one sample. Destroy all unused labels to prevent duplication of sample numbers. Do not add digits or hyphens to the CLP sample numbers. If additional sample numbers are needed in the field, contact your RSCC. The sampler should consider placing clear tape over the adhesive labels as this procedure will help preserve the information on the adhesive labels. Samplers should attempt to use the provided CLP sample numbers in numerical order [as much as possible]. All samples must have sample numbers on the label and tag, if tags are used. The use of sample tags is highly recommended (see Section 5-3).

Organic Sample Numbers

Organic sample numbers are five characters long and have the format XXXXX. The first letter indicates the Region, the remaining letters and numbers are used for sequential sample numbering (see Exhibits 5-1 and 5-2). Organic sample numbers are preprinted on labels. For the organic fractions, there are ten labels four for semivolatiles (labeled extractables), two for volatiles, and four are blank (for pesticides/Aroclors and extra sample volume). Remember that the unique sample number must only be used for one sample. Destroy all unused labels to prevent duplication of sample numbers.

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Inorganic Sample Numbers

Inorganic sample numbers are six characters long and have the format MXXXXX. The "M" indicates that this sample is inorganic, the second letter indicates the Region, and the remaining letters and numbers are used for sequential sample numbering (see Exhibits 5-1 and 5-2). Inorganic sample numbers are preprinted on labels, seven labels per strip. Tw o labels are for total metals, two for cyanide and three blanks (for extra sample volume). According to CLP guidelines, each individual inorganic sample may be analyzed for total metals or dissolved metals, but not both. That is, sample s collected for total metal and dissolved metal analyses must receive separate (unique) sample numbers. Remember that the unique sample number must only be used for one sample. Destroy all unused sample labels.

Exhibit 5-1. CLP Analytical Services Sample Labels

Organic

BLH01 - Semivolatile
BLH01 - Semivolatile
BLH01 - Semivolatile
BLH01 - Semivolatile
BLH01 - VOA
BLH01 - VOA
BLH01 - Pesticide/Aroclor
BLH01 -
BLH01
[Blanks may be included]

Inorganic

MBJT01 - Total Metals
MBJT01 - Total Metals
MBJT01 - Cyanide
MBJT01 - Cyanide
MBJT01
MBJT01
MBJT01

[Blanks may be included]

Exhibit 5-2. CLP Analytical Services Regional Letter Codes

	LETTER CODE	
REGION	ORGANIC	INORGANIC
I	A	MA
II	B	MB
III	C	MC
IV	D	MD
V	E	ME
VI	F	MF
VII	G	MG
VIII	H	MH
IX	Y	MY
X	J	MJ

08 099

5.3 Sample Tag

To support the use of sample data in potential enforcement actions, samples should be identified according to EPA National Enforcement Investigations Center (NEIC) sample control guidelines. NEIC recommends that samples other than *in situ* measurements (e.g., pH, temperature, conductivity) be identified with a sample tag. Each sample aliquo t removed from a hazardous waste site to be transferred to a laboratory for analysis should, therefore, be identified with a sample tag. The sample tag is returned to the Region by the laboratory along with the corresponding data package as physical evidence of sample receipt and analysis.

Check with your authorized requestor (RSCC or Project Manager, it will vary among the Regions) to determine th e availability of and the specific requirements for sample tags. Tie a sample tag on each sample container. (See Section 6.0, Sample Packaging and Shipping for tying procedures.) Exhibit 5-3 is an example of a sample tag. Exhibit 5-4 contains instructions for completing a sample tag.
Section 6.1, Sample Packaging, contains additional information on sample tags

Exhibit 5-3. Sample Tag

Project Code 2	Station No. 3	Mo./Day/Year 4	Time 5	Designate: 6	
ZA5M10.0	26	8/9/91	10:07	Comp.	Grab x

Tag No. 7712

Station Location 7: MONITORING WELL #26 SPLIT SPOON #11

Sampler's (Signatures) 8: John James

Lab. Sample No.	Remarks:	Pesticides	VOA organics	ABN	Cyanide	Metals	Phenolics	COD, TOC, Nutrients	BOD Anions Solids (TSS) (TDS) (SS)	ANALYSES 10	Preservative: Y☒ N☐ 9
1	CASE NO. 11746 SAMPLE NO. MB501				x						

0

08 100

Exhibit 5-4. Sample Tag Instructions

STEPS	INSTRUCTIONS
STEP 1	Under the "Remarks" heading, record the CLP Case number and sample number.
STEP 2	Record the project code (e.g., contract number, work assignment number, Interagency Agreement number, etc.) assigned by EPA.
STEP 3	Enter the station number assigned by the sampling team coordinator.
STEP 4	Record the month, day, and year of sample collection.
STEP 5	Enter the military time of sample collection, e.g., 13:01 for 1:01 p.m.
STEP 6	Place an "X" to indicate composite or grab sample.
STEP 7	Record the station location (description) as specified in the project plan.
STEP 8	Sign the sample tag with your name.
STEP 9	Place an "X" in the box next to "yes" or "no" to indicate if a preservative was added to the sample.
STEP 10	Under "analyses," place an "X" in the box next to the parameters for which the sample is to be analyzed.
Note: Leave the box for "laboratory sample number" blank.	

5.4 Traffic Report/Chain-of-Custody Forms

The organic and inorganic traffic report/chain-of-custody (TR/COC) forms enable the CLASS contractor and the Region to track CLP Analytical Services samples and ensure that the samples are shipped to the appropriate contract laboratory. **The TR/COC form is functionally similar to a packing slip that accompanies a shipment of goods.** The TR/COC form includes a chain-of-custody record located at the bottom of the form. The form is used as physical evidence of sample custody. EPA-NEIC guidelines specify that official custody of samples must be maintained and documented from the time of collection until the time the samples are introduced as evidence in the event of litigation. **The sampler is responsible for the care and custody of the sample until sample shipment.** A sample is considered to be in you r custody if any of the following criteria are met:

- The sample is in your possession or is in your view after being in your possession;
- The sample was in your possession and then locked up or sealed to prevent tampering; or
- You have placed the sample in a secured area.

Document CLP Analytical Services organic, inorganic samples on separate CLP TR/COC forms. TR/COC forms must be completed for every shipment of CLP Analytical Services samples to a contract laboratory. **Use indelible ink only, no pencil (a ball point pen is best)!** Make corrections by drawing a line through and initialing and dating the error, then enter the correct information. **Erasures are not allowed!** Each TR/COC form should be imprinted. Each TR/COC form documents up to 10 samples per Case number and sample shipment.

A separate TR/COC form must accompany each cooler for each daily shipment. The TR/COC forms must address al l samples in that cooler, but not address samples in any other cooler. This practice maintains the chain-of-custody for all samples in case of mis-shipment.

Instructions summarizing CLP sample volumes, packaging and reporting requirements are printed on the back of th e TR/COC forms.

Any errors on the TR/COC forms should be immediately reported to the authorized RSCC or CLASS personnel who can then inform the laboratory. The faster such problems are identified, the faster they can be corrected and critical delays in sample analysis may be avoided. See Section 7.0, Communication Network.

Exhibits 5-5, and 5-6 are examples of completed TR/COC forms. Exhibit 5-7 provides step-by-step instructions for filling out the organic and inorganic TR/COC forms. Exhibit 5-8 provides purpose codes for the forms. Samplers may find it helpful to carry these instructions to the field. Site managers should consider appending these instructions to the SAP.

After you have properly completed the TR/COC form, place the **bottom** two copies (white and yellow for organic and inorganic samples) in a plastic bag, then tape the bag to the inside of the sample cooler lid. The second copy (pink for organic and inorganic samples) must be returned to the CLASS contractor within five days of sample shipment. The address of the CLASS contractor is provided in Exhibit 7-3. The top copy (blue for organic and green for inorganic) should be sent to designated Regional personnel.

Note: **All samples in a cooler must be recorded on a TR/COC form inside the cooler and each unique sample number should be listed on only one TR/COC form.** (In the case where aliquots of the same sample are collected at different times [as may occur when well development is very slow] and shipped sequentially, fractions may be given different sample numbers. If fractions are given unique sample numbers, it will be necessary for the Region to track the fractions and maintain the knowledge that the fractions are from the same sample.) If all containers necessary for the analysis of 10 samples cannot fit into one cooler, divide samples into more coolers, making sure that all containers for each sample are in the same cooler. Place corresponding sample documentation into each cooler. **IF MORE THAN ONE TR/COC FORM IS USED FOR THE SAMPLES IN ONE COOLER**, then all of the forms must have complete header information and signatures.

5.5 Field Operations Records Management System

In an effort to streamline the resource intensive field documentation functions that occur during sampling activities, EPA-NEIC, at the request of the AOC, developed the Field Operations Records Management System II (FORMS II). FORMS II is software that facilitates the capture of field information during sampling events, and automates the production of bottle labels, sample tags, bottle-specific custody seals, chain-of-custody records, cooler seals, PRP sample receipt records, and field reports. FORMS II enables field personnel to download data to the laboratory, RSCC, and Regional users. FORMS II design features include the following:

Hardware portability/compatibility/versatility

Because field samplers cannot guarantee access to an AC power source or a stable computer working environment, FORMS II is compatible with existing portable hardware including portable computers, portable printers, and portable bar code scanning devices. While FORMS II is mouse-compatible, unknown field conditions prohibit FORMS II reliance on a mouse; but other pointing devices may be useful.

FORMS II uses hardware units specially selected to minimize the likelihood of failure or downtime as a result of adverse field conditions.

Bar code application

FORMS II uses bar code technology to accelerate the sample packing process for sample shipment to CLP laboratories. In addition, laboratory personnel may use the sample bottle bar codes to facilitate receipt and associated records management activities.

Flexibility for multiple samplers/samples

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Field samplers and field sampling organizations often use unique numbering and identification schemes in addition to the CLP sample numbers when collecting samples. They also vary in their approach to many other activities. For that reason, FORMS II design includes choices for: identification scheme, activity names, labeling information, and number and types of labels/tags/seals.

Sample Definitions

FORMS II design is based on field sample, QC sample, and analytical fraction definitions that are consistent with those provided in Section 3.0, Sample Collection. FORMS II improves field time management, standardizes information management, and captures collection information in an electronic format early in the field sampling process. Estimated training time for new FORMS II users is less than two hours. FORMS II is currently managed by AOC. If you are interested in using FORMS II, please contact AOC at (703) 603-8870.

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Exhibit 5-5. Organic TR/COC Form Example

EPA United States Environmental Protection Agency Contract Laboratory Program

Organic Traffic Report & Chain of Custody Record

(For Organic CLP Analysis)

SAS No. (If applicable) 1

Case No. 18025 2

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
21SM100	41502	1	ACE	8/10/92	FFDX 6

Regional Information 3

Sampler (Name) JOHN SMITH 4

Airbill Number 123-455-7890 25

Non Superfund Program

Sampler Signature John Smith

Site Name SAM'S DUMP

City, State BOSTON, MA

Site Spill ID ZZ

3. Purpose* 5 — Lead: [X] SF, [ ] PRP, [ ] ST, [ ] FED; Early Action: [ ] CLEM, [ ] PA, [ ] REM, [ ] RI, [X] SI, [ ] ESI; Long-Term Action: [ ] FS, [ ] FD, [ ] RA, [ ] O&M, [ ] NPLD

5. Ship To 7
LAB A
100 ARROW WAY
HOME, VA 22141
ATTN: SAMPLE CUSTODIAN

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaHSO4
4. H2SO4
5. Ice only
6. Other (Specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) Other	B Conc. Low Med High	C Sample Type Comp./Grab	D Preservative (from Box 7) Other	E RAS Analysis VOA	BNA	Pest/PCB	High only ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank, D = Duplicate, R = Rinsate, PS = Performance Sample, ... = Name of Sample)
AFR23	2	L	G	1	X				A7712-A7713	MCL-MW-01	8/9/92 13:30	MACC22	gd	-
AFR24	2	L	G		X	X	X		A7714-A7717	MCL-SW-02	8/9/92 13:45	MACC23	gd	-
AFR25	4	L	G		X	X	X		A7718-A7721	MCL-SSR-04	8/9/92 14:00	MACC24	gd	D
AFR26	2	L	G	1	X				A7722-A7723	MCL-MW-02	8/9/92 14:50	MACC25	gd	-
8	9	10	11	12		13			14	15	16	17	18	19

Shipment for Case Complete? (Y/N) Y 20

Page 21 1 of 1

Sample(s) to be Used for Laboratory QC AFR24; AFR25 22

Additional Sampler Signatures 23

Chain of Custody Seal Number(s) 874327 24

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
26 John Smith	8/9/92 16:35				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - SMO Copy; Yellow - Lab Copy for Return to SMO

EPA Form 9110-3

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

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Exhibit 5-5. Organic TR/COC Form Example (Continued)

Organic Traffic Report/Chain of Custody Form Instructions

This form replaces both the individual Traffic Report and EPA Chain of Custody Record.

Water Samples	Required Volume	Container Type
Extractable Analysis (Low Level)	1 Gallon	1 X 4-Liter Amber Glass Bottle OR 2 X 80 oz. Amber Glass Bottle OR 4 X 1 Liter Amber Glass Bottles
Extractable Analysis	1 Gallon	32 oz. Wide-Mouth Glass Jars
Volatile Analysis (Low Level*)	80 mL	2 X 40-ml Glass Vials

*All Medium and High Level Samples Must be Sealed in Metal Can for Shipment

Soil/Sediment Samples	Required Volume	Container Type
Extractable Analysis (Low or Medium Level*)	5 oz	1 X 8-oz. Wide Mouth Glass Jar OR 2 X 4-oz. Wide-Mouth Glass Jars
Volatile Analysis (Low or Medium Level*)	240 mL	2 X 120 mL Wide-Mouth Glass Vials

*Soil VOA Vials under study, subject to change, check to ensure proper sealing

HIGH CONCENTRATION SAMPLE COLLECTION REQUIREMENTS

Liquid or Solid Samples	Required Volume	Container Type
Extractable and Volatile Analysis	8 oz	1 X 8-oz. Wide-Mouth Glass Jar

1. **Organic Sample Collection Requirements**
   - Please indicate which sample(s) are to be used for laboratory QC (Matrix Spike/Matrix Spike Duplicate).
   - Ship medium and high concentration samples in metal cans.
   - Aqueous samples require one triple-volume sample per twenty for Matrix Spike/Matrix Spike Duplicate.
   - Oily samples can not be analyzed under the Contract Laboratory Program Analytical Services (CLPAS) program.
2. **Cooler and Sample Documentation**
   - Complete all sections of the Traffic Report/Chain of Custody Form - Press firmly with a ball point pen to ensure that carbon copies are legible. Check the information and correct any errors.
   - Please remember to complete the Chain of Custody information on the form.
   - Seal the two sets of laboratory Traffic Report/Chain of Custody Form copies in a plastic bag. Include a return address and a method for returning the cooler. Tape bag under cooler lid.
   - Seal each container in a plastic bag.
   - Pack medium and high concentration samples in metal cans.
   - Cool low waters to 4° C. Cooling of low soils is optional. Do not cool medium or high concentration waters and soils.
   - Separate and surround cooler contents with vermiculite or equivalent packaging.
   - Seal the cooler, overlapping the lid and body with custody seals.
   - Mail CLASS the pink copy of the Traffic Report/Chain of Custody Form within 5 days.
3. **Sample Shipment and Reporting**
   - All relevent Department of Transportation regulations must be followed when shipping samples.
   - PHONE IN ALL SHIPMENTS IMMEDIATELY TO CLASS (or to RSCC, if instructed)

     Required information:
     - Case Number
     - Date shipped
     - Number of samples by concentration, matrix and analyses.
     - Carrier and airbill number
     - Next planned shipment

     Leave your name and a number where you can be reached.
   - Information for SATURDAY DELIVERIES must be phoned in by 3:00 PM (Eastern) the preceding FRIDAY.
   - Report any delays or changes of scope (i.e., changes in number of samples to be collected, matrix changes, etc.)
   - CALL IF YOU HAVE ANY QUESTIONS

     Contract Laboratory Analytical Services Support
     300 North Lee Street
     Alexandria, VA 22314
     Phone: (703) 519-1200
     FAX: (703) 519-8626

Purpose Codes

Lead		Early Action				Long-Term Action	
SF	= Superfund	CLEM	= Classical Emergency	SI	= Site Inspection	FS	= Feasibility Study
PRP	= Commercial Potentially Responsible Party	PA	= Early Action Preliminary Assessment	ESI	= Expanded Site Inspection	RD	= Remedial Design
ST	= State	REM	= Removal	RI	= Remedial Investigation	RA	= Remedial Action
FED	= Federal Facility					O&M	= Operation & Maintenance
						NPLD	= National Priorities List Deletion

★ U.S. GPO: 1995-864-731

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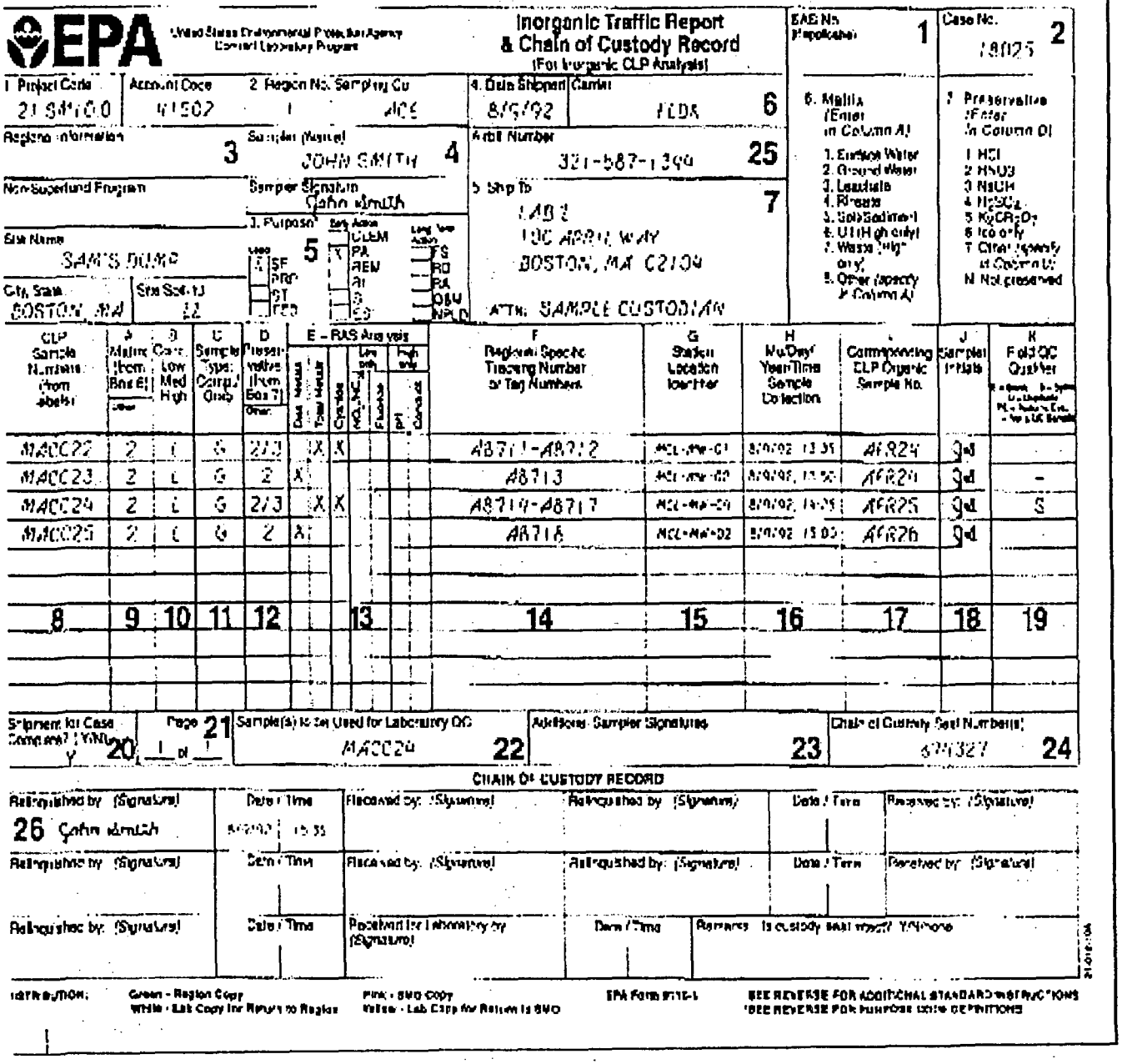
Exhibit 5-6. Inorganic TR/COC Form Example



EPA — United States Environmental Protection Agency, Contract Laboratory Program

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

1 Project Code: 21 SM100	Account Code: 41502	2 Region No. Sampling Co: 1 ACE	4 Date Shipped: 8/5/92	Carrier: FEDX 6	EAS No. If Applicable: 1
Region Information: 3	Sampler (Name): JOHN SMITH 4		Airbill Number: 321-567-1390 25		Case No.: 18025 2
Non-Superfund Program	Sampler Signature: John Smith		5 Ship To: LAB 1, 100 APPLE WAY, BOSTON, MA 02104, ATTN: SAMPLE CUSTODIAN 7		6. Matrix (Enter in Column A): 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil/Sediment, 6. Oil (High only), 7. Waste (High only), 8. Other (specify in Column A); N. Not preserved
Site Name: SAMS DUMP	7. Purpose: Use: X SF, PRP, ST, FED; Sel. Action: X CLEM, PA, REM, RI, S, ES; Long Term Action: FS, RD, RA, O&M, NPLD				7 Preservative (Enter in Column D): 1 HCl, 2 HNO3, 3 NaOH, 4 H_2SO_4, 5 $K_2CR_2O_7$, 6 Ice only, 7 Other (specify in Column D)
City, State: BOSTON, MA	Site Spill ID: 22				

CLP Sample Numbers (from label)	A Matrix (from Box 6)	B Conc. Low Med High	C Sample Type: Comp/Grab	D Preservatives (from Box 7)	E – RAS Analysis: Dual Method, Total Metals, Cyanides, ICP/AA, Furnace, Low only, High only, Full, Complete	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier
MACC22	2	L	G	2/3	X X	A8711-A8712	MCL-MW-01	8/5/92 13:35	AFR24	JWS	-
MACC23	2	L	G	2	X	A8713	MCL-MW-02	8/5/92 13:50	AFR25	JWS	-
MACC24	2	L	G	2/3	X X	A8714-A8717	MCL-MW-03	8/5/92 14:05	AFR25	JWS	S
MACC25	2	L	G	2	X	A8718	MCL-MW-02	8/5/92 15:00	AFR26	JWS	-
8	9	10	11	12	13	14	15	16	17	18	19

Shipment for Case Complete? Y/N: Y 20 — Page: 1 of 1 21 — Sample(s) to be Used for Laboratory QC: MACC24 22 — Additional Sampler Signature(s): 23 — Chain of Custody Seal Number(s): 677327 24

CHAIN OF CUSTODY RECORD

Relinquished by (Signature)	Date / Time	Received by (Signature)	Relinquished by (Signature)	Date / Time	Received by (Signature)
26 John Smith	8/5/92 15:35				
Relinquished by (Signature)	Date / Time	Received by (Signature)	Relinquished by (Signature)	Date / Time	Received by (Signature)
Relinquished by (Signature)	Date / Time	Received for Laboratory by (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - SMO Copy; Yellow - Lab Copy for Return to SMO

EPA Form 9315-1

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
SEE REVERSE FOR Purpose Code DEFINITIONS

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Exhibit 5-6. Inorganic TR/COC Form Example (Continued)

Inorganic Traffic Report/Chain of Custody Form Instructions

This form replaces both the individual Traffic Report and EPA Chain of Custody Record.

Water Samples	Required Volume	Container Type
Metals Analysis (Low Level)	1 Liter	1 X 1-Liter Polyethylene Bottle OR 2 X 500-ml. Polyethylene Bottle
Metals Analysis (Medium Level*)	16 oz.	1 X 16-oz Wide-Mouth Glass Jar
Cyanide Analysis (Low Level)	1 Liter	1 X 1-Liter Polyethylene Bottle OR 2 X 500-ml. Polyethylene Bottle
Cyanide Analysis (Medium Level*)	16 oz.	1 X 16-oz Wide-Mouth Glass Jar

Soil/Sediment Samples	Required Volume	Container Type
Metals and Cyanide (CN) Analysis (Low or Medium Level*)	8 oz.	1 X 8-oz Wide-Mouth Glass Jar OR 2 X 4-oz. Wide-Mouth Glass Jars

HIGH CONCENTRATION SAMPLE COLLECTION REQUIREMENTS

Liquid or Solid Samples	Required Volume	Container Type
Metals and Cyanide* Analysis	8 oz.	1 X 8-oz Wide-Mouth Glass Jar

*All Medium and High Level Samples Must be Sealed in Metal Can for Shipment

1. Inorganic Sample Collection Requirements

- Please indicate which sample(s) are to be used for laboratory QC (Matrix Spike/Duplicate).
- Aqueous samples require one double-volume sample per twenty for laboratory Matrix/Spike Duplicate.
- Preserve low level water samples:
  - Total metals — Preserve with HNO_3 to pH ≤ 2
  - Dissolve metals — Preserve with HNO_3 to pH ≤ 2 after filtering through a 0.45 µm filter.
  - Cyanide — Preserve with 10 N NaOH to pH > 12
- Oily samples can not be analyzed under the Contract Laboratory Program Analytical Services (CLPAS) program.
- Ship medium and high concentration samples in metal cans.

2. Cooler and Sample Documentation

- Complete all sections of the Traffic Report/Chain of Custody Form - Press firmly with a ball point pen to ensure that carbon copies are legible. Check the information and correct any errors.
- Please remember to complete the Chain of Custody information on the form.
- Seal the two sets of laboratory Traffic Report/Chain of Custody Form copies in a plastic bag. Include a return address and a method for returning the cooler. Tape bag under cooler lid.
- Seal each container in a plastic bag.
- Pack medium and high concentration samples in metal cans.
- Cool low waters to 4° C. Cooling of low soils is optional. Do not cool medium or high concentration waters and soils.
- Separate and surround cooler contents with vermiculite or equivalent packaging.
- Seal the cooler, overlapping the lid and body with custody seals.
- Mail CLASS the pink copy of the Traffic Report/Chain of Custody Form within 5 days.

3. Sample Shipment and Reporting

- All relevent Department of Transportation regulations must be followed when shipping samples.
- PHONE IN ALL SHIPMENTS IMMEDIATELY TO CLASS (or to RSCC, if instructed)

  Required information:
  - Case Number
  - Date shipped
  - Number of samples by concentration, matrix and analyses.
  - Carrier and airbill number
  - Next planned shipment

  Leave your name and a number where you can be reached.
- Information for SATURDAY DELIVERIES must be phoned in by 3:00 PM (Eastern) the preceding FRIDAY.
- Report any delays or changes of scope (i.e., changes in number of samples to be collected, matrix changes, etc.)
- CALL IF YOU HAVE ANY QUESTIONS

  Contract Laboratory Analytical Services Support
  300 North Lee Street
  Alexandria, VA 22314
  Phone: (703) 519-1200
  FAX: (703) 519-8626

Purpose Codes

Lead		Early Action				Long-Term Action	
SF	= Superfund	CLEM	= Classical Emergency	SI	= Site Inspection	FS	= Feasibility Study
PRP	= Commercial Potentially Responsible Party	PA	= Early Action Preliminary Assessment	ESI	= Expanded Site Inspection	RD	= Remedial Design
ST	= State	REM	= Removal	RI	= Remedial Investigation	RA	= Remedial Action
FED	= Federal Facility					O&M	= Operation & Maintenance
						NPLD	= National Priorities List Deletion

★ U.S. GPO: 1995-394-780

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Exhibit 5-7. Organic and Inorganic Traffic Report/Chain-of-Custody Forms Instructions

STEP	INSTRUCTIONS
STEP 1	The SAS Order number is no longer applicable. Leave this box blank.
STEP 2	Record the Case number that has been assigned to the sampling event.
STEP 3	Transcribe the project codes and site information. Enter the project and account codes assigned to the project by the RSCCs or EPA Site Managers. Record the site name, city, state, and site spill ID (assigned by your Region). This part of the form is desensitized and will not print on the laboratory copies. All site information must be kept confidential.
STEP 4	Record your Region number and the name of your sampling company. Print your name and include your signature in the space following. Additional space for sampler signatures is provided for in the area designated as Step 23.
STEP 5	Place a check mark in the appropriate box for funding lead under the column labeled "Lead." Place another check mark under either the "Early Action" or "Long-Term Action" columns for sampling effort. Two boxes must be checked in this area. Note that RCRA is an example of a federal lead sampling activity. Purpose codes are described in Exhibit 5-8.
STEP 6	Record the date shipped, the carrier name (e.g., Federal Express, Purolator or Airborne) and the air bill number.
STEP 7	Record the name and full address of the contract laboratory. Enter the name of the sample custodian or CLP contact. If contact name is unknown, write "CLP Sample Custodian."
STEP 8	Transcribe the CLP sample number from the preprinted sample labels exactly as it appears. Do not add hyphens, extra zeros, characters, or digits.
STEP 9	Record the appropriate matrix code from the choices listed in box number 6 on the form. If the Region is shipping a quality control (QC) sample such as a field blank, coolant blank, trip blank, spike, duplicate, or performance evaluation sample, then "Field QC" should be entered as the matrix for that sample. *However, if the Region wishes to keep the QC sample blind to the laboratory [this is recommended], then the sampler should enter either "1," "2," or "3" for water QC samples, and "5" for soil/sediment QC samples as the matrix code in Column A, "Matrix."*
STEP 10	Enter the estimated sample concentration. For organic samples, enter "L" for low/medium aqueous samples, "L" for low concentration solid samples, and "M" for medium concentration solid samples. For inorganics, enter "L" for low concentration samples, "M" for medium concentration, and "H" for high concentration.
STEP 11	Enter the sample type, either composite or grab.
STEP 12	Record the type of preservative, using the codes from box number 7 on the form.
STEP 13	In the analysis columns, make a check mark for each fraction to be analyzed. (It is not necessary to write the number of sample containers used.) Organics fractions are volatiles, semivolatiles, and pesticides/Aroclors; Inorganic fractions are total metals, dissolved metals, and cyanide. For each individual inorganic sample, you may request either total metal or dissolved metal analyses, but not both. That is, samples collected for total metal and dissolved metal analyses must receive separate (unique) sample numbers. Note: Your form may also contain future or recently discontinued fraction analyses.
STEP 14	Transcribe the Region-specific tracking numbers or tag numbers designated by the RSCC. If possible, all tag numbers for each CLP sample should be on one line. If several tags with consecutive numbers are used for one sample, the first number must be completely transcribed. Remaining tag numbers in the sequence can either be represented by including only those numbers that are unique (separated by commas) or by listing the first and last numbers of the sequence, separated by a dash. The TR/COC form entries should make it clear which tag number corresponds to which fraction.
STEP 15	Enter the station location number.
STEP 16	Record the month, day, year, and time, in military style (e.g., 1600 hours = 4:00 p.m.), of sample collection. This may make field QC samples (e.g., duplicates) non-blind to the laboratory.
STEP 17	Enter the corresponding organic or inorganic CLP sample number, if applicable.
STEP 18	Enter your initials.

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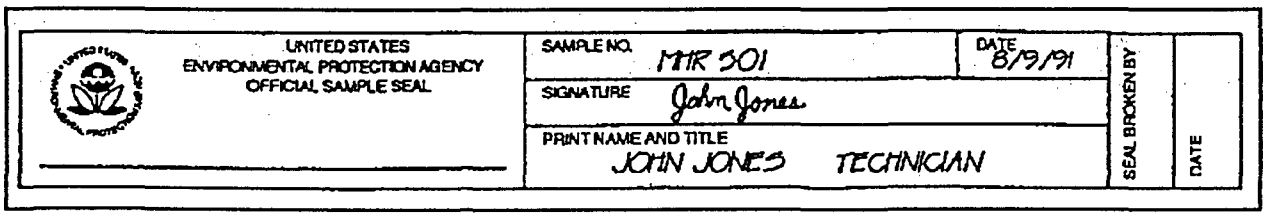
Exhibit 5-8. Purpose Codes

FUNDING ACTIVITY	CODE	DEFINITION
Funding Lead	SF	Superfund
	PRP	Potentially Responsible Party
	ST	State
	FED	Federal
Early Action	CLEM	Classic Emergency
	PA	Preliminary Assessment
	REM	Removal
	RI	Remedial Investigation
	SI	Site Inspection
	ESI	Expanded Site Inspection
Long-Term Action	FS	Feasibility Study
	RD	Remedial Design
	RA	Remedial Action
	O&M	Operations and Maintenance
	NPLD	National Priorities List Delete

5.6 Custody Seal

The custody seal is used to seal sample containers before they are placed into the cooler. Custody seals are also placed across the cooler opening after the cooler has been properly secured. The purpose of a custody seal is to indicate that the sample has not been tampered with prior to analysis. Therefore, for potential litigation purposes, you must sign and date the custody seal. It is a good practice to place the seal so that it is the signature that would be broken if the sample/cooler were opened (e.g., place the signature across the cooler/sample opening). Contact your authorized requestor or RSCC to obtain custody seals. Note: The space for "Sample No." does not need to be filled out on custody seals placed across the cooler opening. An example of a signed custody seal is shown in Exhibit 5-9. Because the use of custody seals varies between Regions, always refer to Regional guidance.

Exhibit 5-9. Custody Seal



6.0 SAMPLE PACKAGING AND SHIPPING

6.1 Sample Packaging

Follow all state and Federal regulations governing environmental sample packaging and shipment. Ship according to U.S. Department of Transportation (DOT) and International Air Transportation Association (IATA) regulations. The following sample packaging and shipping procedures need to be considered as minimum requirements. For some samples and shipping situations, these requirements may need to be exceeded.

- The site name should not appear on any documentation sent to the CLP laboratory.
- Aqueous samples for inorganic samples and volatile organic analysis may require chemical preservation. Note that the Regions may have slightly different requirements for the preservation of samples for volatile analysis, so Regional requirements should be consulted. Refer to Section 3.8, Sample Preservation and Holding Times, for these techniques before packaging.
- Check all lids/caps to make sure they are tight and will not leak. Place a completed custody seal over each container lid/cap, except for vials for volatile samples where the custody seal must be wrapped around the lid. (Note that the Regions may have slightly different requirements for placing custody seals and using tags, so Regional requirements should also be consulted. For custody seals, the objective is to place the seals in such a way that sample containers cannot be opened or tampered with without breaking the seal).
- Make sure sample labels are intact and covered with a piece of clear tape for protection. Tie on completed sample tags. Although there are no procedural requirements for tying on sample tags, a recommended approach is to tie the tag onto the sample bottle with a string by wrapping the string around the neck of the sample bottle and then tying the string into a knot.
- Enclose the sample container in clear plastic bag and seal the bag. Make sure the sample tags and labels are visible. See Exhibit 6-1. Note that if bubble wrap or other wrapping material will be placed around the labeled and tagged containers, write the sample number and fraction (e.g., "BLH01-VOCs") so that it is visible on the outside of the wrap, and then place the wrapped container in a clear plastic bag and seal the bag.
- Make sure that all samples that need to be kept cold (4+/-2°C) have been thoroughly cooled before placing in packing material so that the packing material serves to insulate the cold. Change the ice prior to shipment as needed. Ideally, pack the cooled samples into shipping containers that have already been chilled.
- Any soil/sediment samples suspected to be of medium/high concentration or containing dioxin must be enclosed in a metal can with a clipped or sealable lid (e.g., paint cans) to achieve double containment of those samples. Place suitable absorbent packing material around the sample container in the can. Make sure sample is securely stored in can and the lid is sealed. Label the outer metal container with the sample number and fraction of the sample inside. See Exhibit 6-1.
- Use a CLEAN waterproof metal or hard plastic ice chests or coolers in good repair for shipping samples. Remove the inapplicable previous shipping labels. Make sure any drain plugs are shut and seal plugs shut on the inside and outside with a suitable tape such as duct tape. Line the cooler with plastic (e.g., large heavy-duty garbage bag) before inserting samples.
- Ship samples at 4° +/- 2°C, place double-bagged ice on top of samples. Ice must be sealed in double plastic bags to prevent melting ice from soaking the packing material. Loose ice must <u>not</u> be poured into the cooler.

- It is good practice to conduct an inventory of sample numbers, fractions, and containers when placing samples into the coolers, and then check the inventory against the corresponding TR/COC form before sealing the cooler to make sure that all samples and containers are present.

- Pack the lined shipping containers with noncombustible, absorbent packing material such as vermiculite or rock wool. Place the packing material on the bottom of the shipping container (inside the plastic liner) and around sample bottles or metal cans to avoid breakage during shipment. Never use earth, ice, paper, or styrofoam to pack samples. Earth is a contaminant, melted ice may cause complications and allow the sample containers to bang together when the shipping container is moved, and styrofoam presents a disposal problem (it also may easily blow out of the shipping container at the site).

- For samples that need to be shipped at 4° +/-2°C, place double-bagged ice on top of samples and fill remaining space with packing material. Note that if sample bottles have been protected with packaging material such as bubble wrap, then some double-bagged ice or ice packs may also be placed between samples.

- Use tape to securely fasten the top of the plastic used to line the shipping container. It is a good idea to then place a completed custody seal around the top of the bag which contains the sample in case the outer seals placed across the cooler lid are inadvertently damaged during shipment.

- Enclose all sample documentation (i.e., TR/COC, other chain-of-custody forms, and cooler return shipping documents) in a waterproof plastic bag, and tape the bag to the underside of the cooler lid. See Exhibit 6-2. This documentation should address all samples in the cooler, but not address samples in any other cooler. If more than one cooler is being used, place separate sample documentation in each cooler.

- Instructions for returning the cooler should be documented inside the cooler lid. Write a return name and address for the sample cooler on the inside of the cooler lid in permanent ink to ensure return of the cooler.

- Tape the cooler shut using strapping tape over the hinges. Place completed custody seals across the top and sides of the cooler lid so that lid cannot be opened without breaking the seal. See Exhibit 6-3.

- Place clear tape over the seal to prevent inadvertent damage to the seal during shipment. Do not place clear tape over the seals in a manner that would allow the seals to be lifted off with the tape and then reaffixed without breaking the seal.

Exhibit 6-1. Sample Packaging

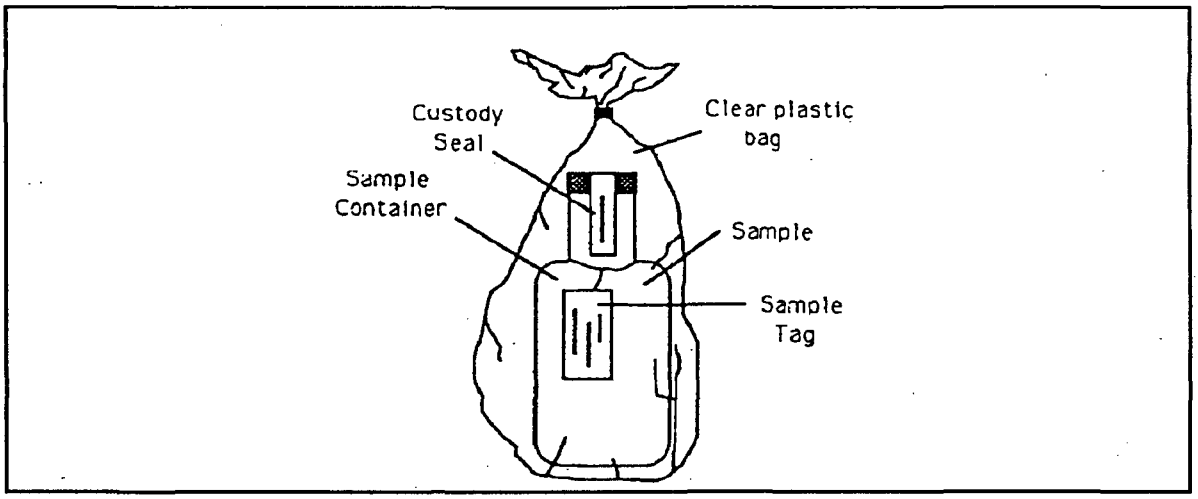


Exhibit 6-1a. Sample Packaging

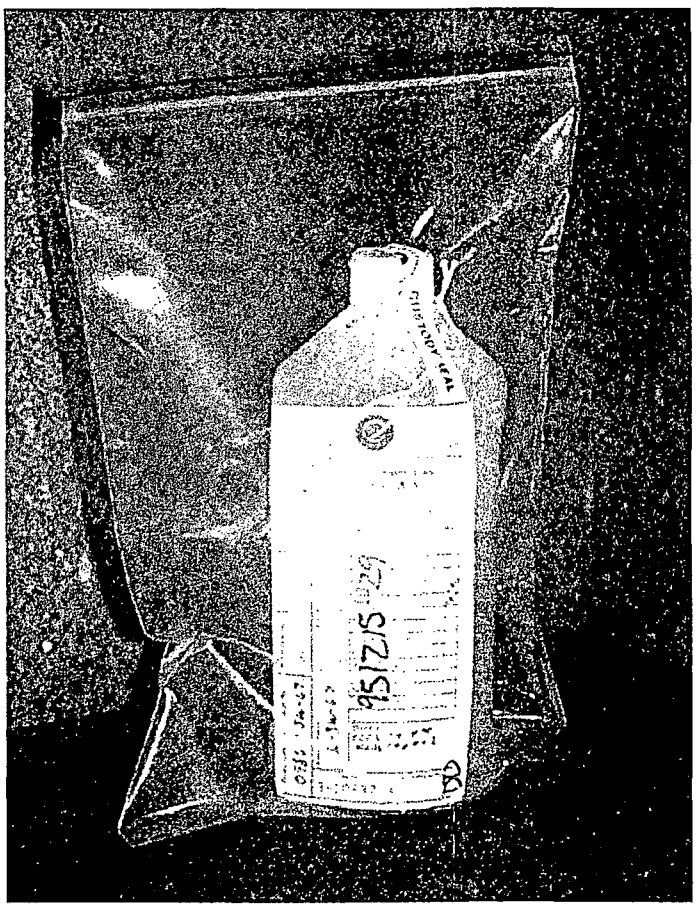


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Exhibit 6-2. Sample Cooler With Documentation

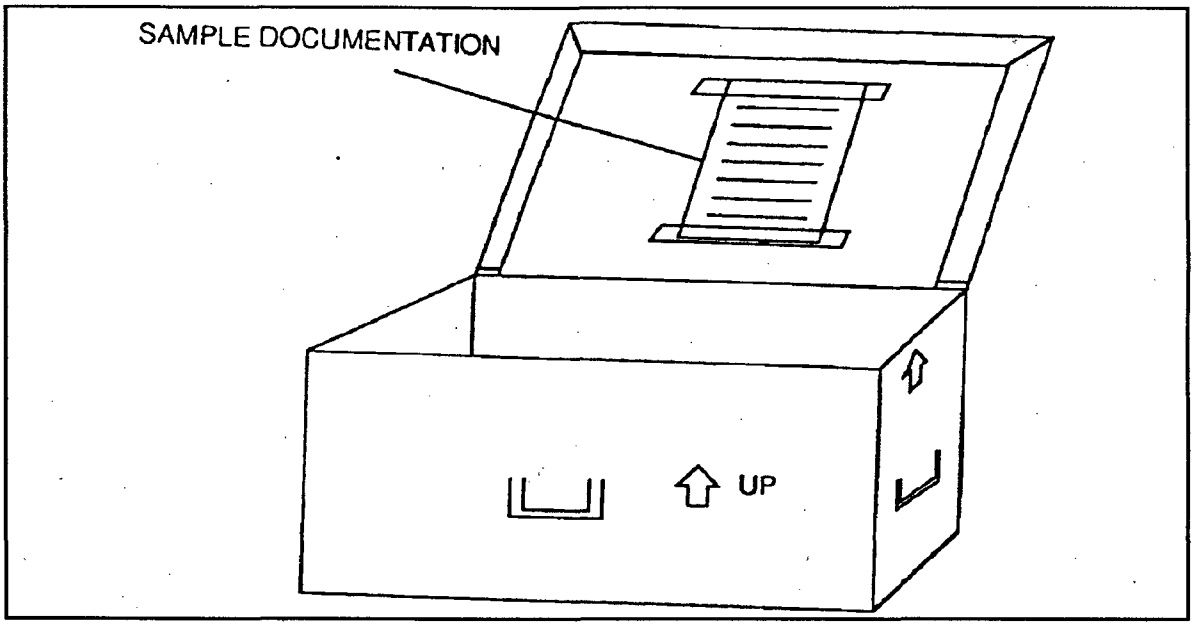

Exhibit 6-2a. Sample Cooler With Documentation

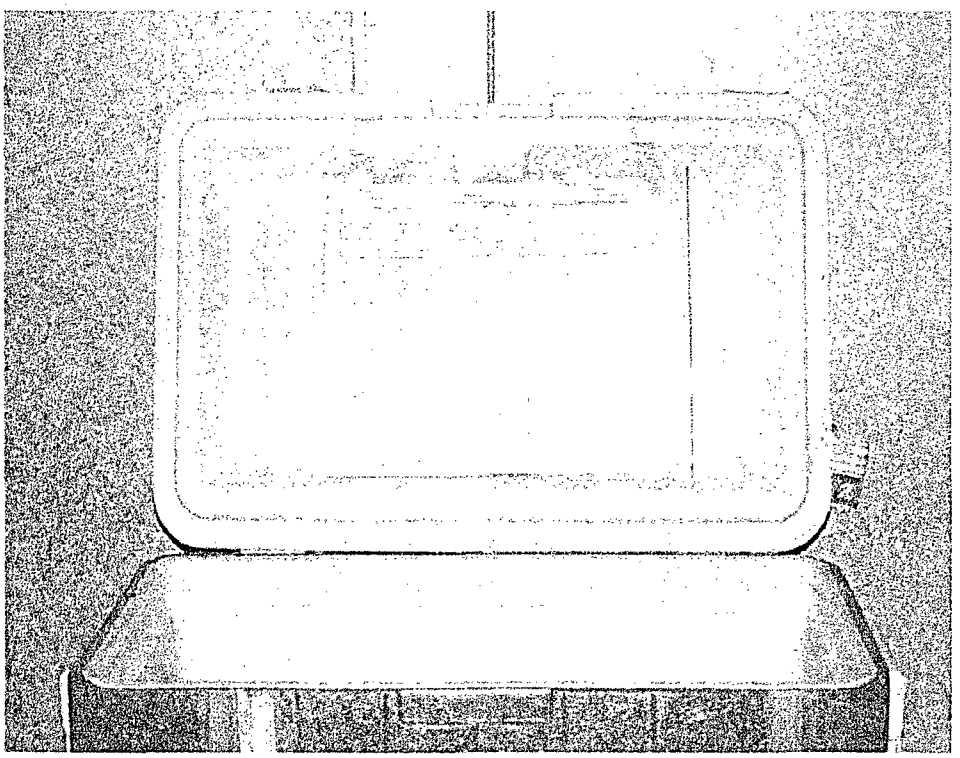

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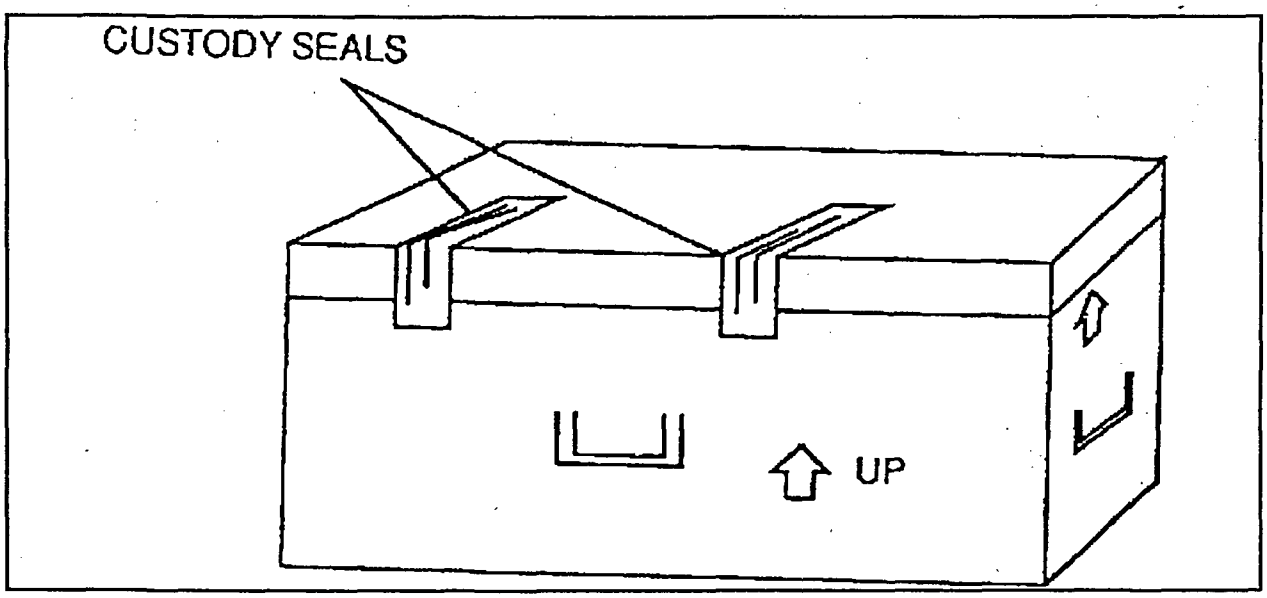
Exhibit 6-3. Sealed Cooler



6.2 Sample Shipping

Clearly label cooler and fill out appropriate shipping papers. Exhibit 6-4 shows the top of a cooler ready to be shipped.

- Place return address labels clearly on the outside of the cooler.
- If more than one cooler is being delivered to a laboratory, mark each cooler as "1 of 2," "2 of 2," etc. An air bill should be filled out for each cooler being shipped. When addressing the air bill to ship samples, identify the recipient as the "sample custodian."
- Ship samples through a commercial carrier, such as Federal Express, Purolator, or equivalent.
- Fill out all required government and commercial carrier shipping papers according to DOT and IAT A commercial carrier regulations.
- Ship all samples by overnight delivery, in accordance with DOT and IATA regulations.

6.3 Potential Sampling Problems

Sometimes problems arise during sampling from improper sampling practices or other reasons. Some common problems to watch out for are:

- Filling out paperwork incorrectly or incompletely.
- Using the wrong Case number.
- Collecting less than the required sample volume.

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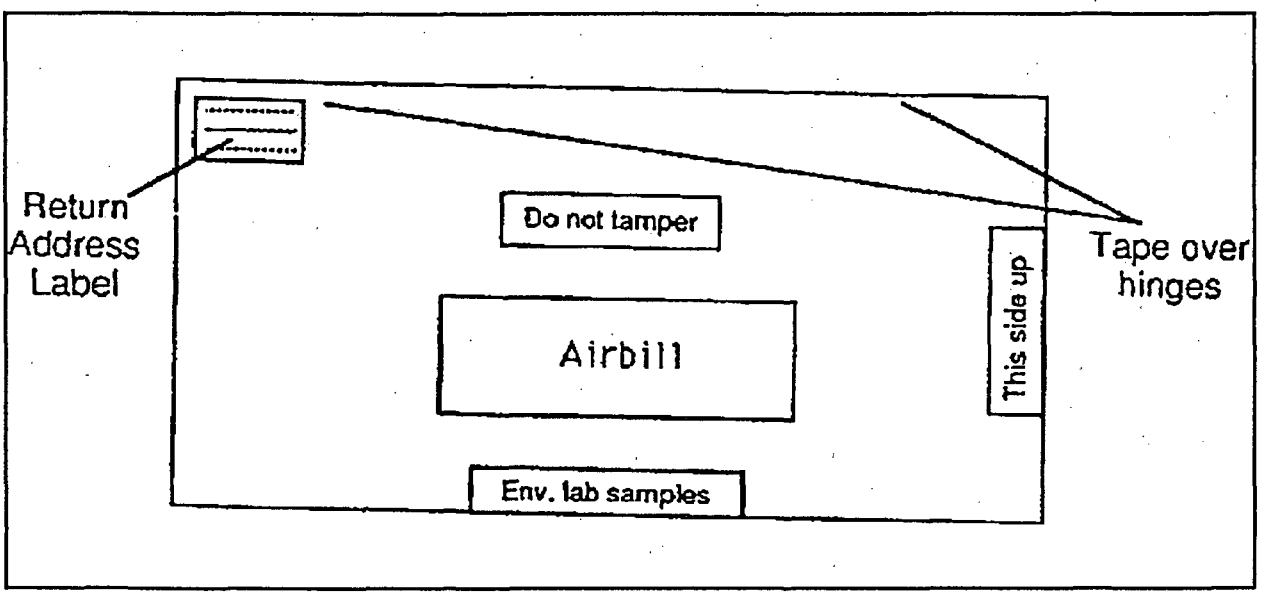
- Shipping samples to the wrong laboratory.

Exhibit 6-4. Top of Cooler



- Assigning the same CLP sample number to dissolved and total metals water samples collected from the same location.
- Using incorrect sample containers.
- Improperly filling or packing sample containers.
- Preserving sample with incorrect preservative.
- Improperly labeling cooler.

These problems may delay sample analysis. If any of these problems occur, contact your RSCC or CLASS Coordinator immediately for instructions.

6.4 Reporting Sample Shipment

Notify the authorized RSCC or CLASS personnel, as directed, of all sample shipments on the day of shipment. This notification enables the CLASS contractor to track the shipment of samples from the field to the laboratory and ensures timely laboratory receipt of samples. When calling the CLASS contractor [General number: (703) 519-1200], provide the following information:

- Your name, phone number, and Region.
- Case number of the project.

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- Exact number(s) of samples (not number of containers), matrix(ces) and concentration(s) of samples shipped. Type of analysis required.
- Laboratory(ies) to which samples were shipped.
- Carrier name and air bill number(s) for the shipment.
- Method of shipment (e.g., overnight, two day).
- Date of shipment.
- Suspected contaminants associated with the samples or site (e.g., dioxin, radio chemicals).
- Information on completions, changes, delays, continuations, etc., pertinent to the Case and sampling project.

Sample shipments made after 5 p.m. EST should be scheduled with the CLASS contractor at the start of business the next day (8 a.m. EST). **You must notify the CLASS contractor by 3 p.m. EST Friday for sample shipments that will be delivered on Saturday.** If the CLASS contractor cannot notify the laboratory of a Saturday delivery, there may not be anyone present at the CLP laboratory to receive samples until Monday.

6.5 Sample Cooler Returns

Regional and Regional Support Contractor Responsibilities

The EPA Regions and their support contractors are responsible for providing a mechanism for shipping empty sampl e coolers from the CLP laboratories back to the originating sampling office. AOC provides the following suggestions to maintain consistency among cooler transportation programs:

- Sampling contractors should include a completed shipping label in the cooler, which can have any code d information for tracking purposes.
- The label should consist of multi-copies so the laboratory and the sampling contractors can each retain one for their records.
- The label should be designed so that the laboratory can simply place the already-completed label on the cooler for shipment purposes.
- The label should include third-party billing information so that the transportation carrier is able to invoice the correct sampling contractor. The laboratory should be informed of the identity of the carrier.
- To avoid confusion, each Region should attempt to use only a minimum number of different carriers.
- Sufficient information should be included on the label to enable the sampling contractor to track use of the billing number.
- The process should be as easy as possible for the laboratories.

Laboratory Responsibilities

The laboratory is required to return sample coolers to the appropriate sampling office within 14 calendar days following shipment receipt. The laboratory should ensure that the account numbers provided by the Region are used only for the return of Government-owned shipping containers.

Laboratories are required to remove packing and other materials from the coolers before each pick-up and are required to ensure that the coolers are clean. Laboratories can determine from visual inspection if the coolers are clean. An authorized laboratory official is required to sign and telefax the pick-up records to the designated transportation contractor or sampler within two calendar days of cooler pick-up for return.

If laboratories do not follow the procedures, notify the TPO listed in Exhibit 7-1 for the Region where the laboratory is located.

7.0 COMMUNICATION NETWORK

This section provides Regional contacts for questions or concerns regarding CLP Analytical Services sampling and analysis. Exhibit 7-1 lists names and telephone numbers for Regional Technical Project Officers, who serve as the first line of contact for the laboratory for all technical problem resolution. Exhibit 7-2 gives names, addresses, and telephone numbers of Regional primary RSCCs. These contacts are available for CLP Analytical Services analytical requests and serve as the first contact for information regarding sampling. Exhibit 7-3 gives names, addresses, and telephone numbers of the CLASS Regional CLP Analytical Service contacts, who serve as a second contact for information regarding sampling. The RSCCs and CLASS coordinators can advise samplers regarding problems that occur in the field.

Exhibit 7-1. Regional Technical Project Officers

Region	Technical Project Officer	Telephone Number
Region I	Deb Szaro, Moira Lataille	(617) 860-4312
Region II	Pat Sheridan	(908) 906-6169
Region III	Stevie Wilding	(410) 573-6833
Region IV	Gary Bennett	(706) 546-3287
Region V	Brian Freeman	(312) 353-2720
Region VI	Ray Flores	(713) 983-2139
Region VII	Larry Marchin	(913) 551-5170
Region VIII	Steve Callio	(303) 312-7290
Region IX	Steve Remaley	(415) 744-1496
Region X	Bruce Woods	(206) 553-1193

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Exhibit 7-2. RSCC Addresses and Contacts

Regional Sample Control Centers	Primary RSCC*
USEPA Region I, WMD 60 Westvoew Street Lexington, MA 02173	Christine Clark (617) 860-4615
USEPA Region II, ESD 2890 Woodbridge Ave. Bldg. 209, MS220 Edison, NJ 08837	Phil Guarraia (908) 321-6697
USEPA Region III, CRL 201 Defense Highway, Suite 200 Annapolis, MD 21401	Carolyn Sierra (410) 573-2755
USEPA Region IV, ESD Env. Compliance Branch College Station Road Athens, GA 30613	Bill Bokey (706) 546-3299
USEPA Region V, WMD 77 W. Jackson Blvd. (HSMC-5J) Chicago, IL 60604	Cecilia Luckett (312) 886-1488
USEPA Region VI, Laboratory 10625 Fallstone Road Houston, TX 77099	Myra Perez (713) 983-2130
USEPA Region VII, ESD 25 Funston Rd. Kansas City, KS 66115	Nicole Roblez (913) 551-5130
USEPA Region VIII, 8ES-MEB 999 18th St. 5th Floor Denver, CO 80202	Carol Beard (303) 312-6047
USEPA Region IX, OPM, P-3-2 75 Hawthorne St. San Francisco, CA 94105	Gail Jones (415) 744-1498
USEPA Region X, ESD 1200 Sixth Ave. (M/S ES-095) Seattle, WA 98101	Laura Castrilli (206) 553-4323/1795

* Primary RSCC assignments are subject to change.

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Exhibit 7-3. CLASS CLP Analytical Services Coordinators [1]

Region	CLASS Regional Coordinator [2]	Telephone Number
Region I	Neil Rogers	(703) 519-1019
Region II	Neil Rogers	(703) 519-1019
Region III	Carol Shaeffer	(703) 519-1461
Region IV	Carol Shaeffer	(703) 519-1461
Region V	Mistie Llewellyn	(703) 519-1084
Region VI	Mistie Llewellyn	(703) 519-1084
Region VII	Mistie Llewellyn	(703) 519-1084
Region VIII	Carol Shaeffer	(703) 519-1461
Region IX	Neil Rogers	(703) 519-1019
Region X	Neil Rogers	(703) 519-1019

[1] The address for CLASS is Contract Laboratory Analytical Services Support, P.O. Box 818, Alexandria, VA, 22313. The phone number for CLASS is (703) 519-1200.
[2] The coordinator assignment is subject to change.

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8.0 GLOSSARY

AOC: Analytical Operations Center. The U.S. EPA Center which directs the national Contract Laboratory Program.

APO: Administrative Project Officer. The APOs are part of AOC and monitor laboratory performance, initiate contract action and laboratory funding, help resolve problems, and develop and design analytical services and methods.

Aliquot: A measured portion of a sample taken for analysis. One or more aliquots make up a sample.

Case: A finite, usually predetermined number of samples collected over a given time period from a particular site. A Case consists of one or more sample delivery groups (SDGs). See sample delivery group.

Case number: Number assigned to a set of CLP Analytical Services samples by the CLASS contractor for trackin g purposes.

CLASS: Contract Laboratory Analytical Services Support. The contractor-operated CLASS office provides management, operations, and administrative support to the CLP. The CLASS contractor schedules sample shipment for CLP Analytical Services requests.

CLP: Contract L aboratory Program. The CLP provides analytical services to the 10 EPA Regions through contracte d commercial laboratories.

CLPAS: Routine CLP Analytical Services performed by laboratories that have been awarded CLP government contracts.

Concentration: Defined as high, medium, or low and used to determine how much volume is collected or the analytical protocol to be followed.

Data turnaround time: The maximum length of time allowed for laboratories to submit analytical data to EPA in order to avoid liquidated damages. Data turnaround time begins at the validated time of sample receipt (VTSR) at the laboratory.

DOT: Department of Transportation.

Fraction: A specific subunit of an analytical protocol. For example, for low/medium organics, the fractions are volatiles, semivolatiles, and pesticides/Aroclors.

FORMS II: FORMS II is software that facilitates the capture of field information during sampling events, and automates the production of bottle labels, sample tags, bottle-specific custody seals, chain-of-custody records, cooler seals, PRP sample receipt records, and field reports.

Headspace: Air pocket in a VOA vial.

Holding time: The maximum amount of time a sample may be stored before analysis.

IATA: International Air Transportation Association.

Matrix: The principal material of which the sample is composed of, usually water or soil/sediment for CLP Analytica l Services samples.

NEIC: National Enforcement Investigations Center, a part of EPA, which is supporting the Agency's enforcement program, located in Denver, Colorado.

Preservative: A chemical added to inorganic and volatile water samples to maintain the integrity of the sample. Some common preservatives include nitric acid, hydrochloric acid, and sodium hydroxide.

QC Samples: Samples used to estimate the precision and accuracy of analytical results in the field and in the laboratory.

RSCC: Regional Sample Control Center. The RSCC coordinates Regional sampling efforts.

Sample: A single, discrete portion of the environment collected from a specified physical location at a specific time. The single sample may be placed in multiple vessels. The aliquots are identified by the same sample number.

Sample container: The individual bottle that contains the sample or an aliquot of the sample. The type of sample container varies for different sample fractions and concentrations.

Sample custody: Legal possession of and responsibility for an EPA sample. Documentation of sample custody is maintained on the chain-of-custody part of the traffic report or packing list. The sample is in your custody if any of the following criteria are met: 1) the sample is in your possession or is in your view after being in your possession, 2) the sample was in your possession and then locked up or sealed to prevent tampering, or 3) you have placed the sample in a secured area.

Sample label: Adhesive labels distributed by the RSCC that provide the sample numbers to be assigned to the samples.

Sample number: The sample number from the sample label that identifies the sample or an aliquot of the sample.

SDG: The sample delivery group (SDG) is a unit within a Case that is used to identify a group of samples for delivery. An SDG is defined as one of the following, whichever comes first:

- all samples within a Case, or
- every set of 20 field samples within a Case, or
- all field samples in a Case which are received at a laboratory during a specified period of time, beginning with receipt of the first sample in the Case or SDG.

SOW: Statement of work. This document specifies how laboratories analyze samples under a particular CLP analytical program.

Station location: The specific location where samples are collected on a site.

TAL: Target Analyte List. TALs list the target analytes to test for in inorganic analyses.

TCL: Target Compound List. TCLs list the target compounds to test for in organic analyses.

TPO: Regional Technical Project Officer. The TPO monitors the activities of the contract laboratories located in his or her Region.

TR/COC: CLP Analytical Services Traffic Report/Chain of Custody form. This form is used to track CLP Analytical Services samples from sample collection to sample receipt by the laboratory.

Volume: The amount of sample collected. Volume requirements differ between CLP Analytical Services programs, matrices, fractions, and concentrations.

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VOA: Volatile Organic compound Analysis. Used synonymously with VOC.

VOC: Volatile Organic Compound.

VTSR: Verified Time of Sample Receipt.

9.0 EPA REFERENCE DOCUMENTS

Copies of the EPA Reference documents may be obtained from:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

U.S. EPA, "The Data Quality Objectives process for Environmental Decisions," QAMS EPA QA/G4.

U.S. EPA, "The Data Quality Objectives process for Superfund," EPA540-R-93-071.

U.S. EPA, "EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations," EPA QA/R5, Draft Interim Final, August 1994.

U.S. EPA, "EPA Requirements for Quality Management Plans," QAMS Interim Final, 8/94.

U.S. EPA, "User's Guide to the Contract Laboratory Program," EPA/540/P-91/002, 1991.

U.S. EPA, Compendium of ERT Surface Water and Sediment Sampling Procedures, EPA/540/P-91/005.

U.S. EPA, Compendium of ERT Soil Sampling and Surface Geophysics Procedures, EPA/540/P-91/006.

U.S. EPA, Compendium of ERT Groundwater Sampling Procedures, EPA/540/P-91/007.

U.S. EPA, Soil Sampling and Analysis for Volatile Organic Compounds, EPA/540/4-91/001.

U.S. EPA, Technical Notes on Drinking Water Methods, EPA/600/R-94/173.

Specifications and Guidance for Contaminant-Free Sample Containers, December 1992, OSWER Directive 92.0-05A.

Current CLP Statements of Work are available through NTIS and the CLU-IN Bulletin Board [System Operator at (301) 589-8368] on the Internet (via telnet) at CLU-IN.EPA.GOV.

US Army Corps of Engineers. Requirements for the Preparation of Sampling and Analysis Plans, Draft, June 30, 1994. EM 200-1-3.

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APPENDIX C

Multi-Media, Multi-Concentration, Organic Analytical Service
for Superfund
Quick Reference Fact Sheet, August 1999

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response | Publication 9240.0-08FSC August 1999

EPA

Multi-Media, Multi-Concentration, Organic Analytical Service for Superfund (OLM03.2)

Office of Emergency and Remedial Response
Analytical Operations\Data Quality Center (5204G)

Quick Reference Fact Sheet

Under the legislative authority granted to the U.S. Environmental Protection Agency (EPA) under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), EPA develops standardized analytical methods for the measurement of various pollutants in environmental samples from known or suspected hazardous waste sites. Among the pollutants that are of concern to the EPA at such sites, are a series of volatile, semivolatile, and pesticide/Aroclor (pesticide/PCB) compounds that are analyzed using gas chromatography coupled with mass spectrometry (GC/MS) and gas chromatography with an electron capture detector (GC/ECD). The Analytical Operations\Data Quality Center (AOC) of the Office of Emergency and Remedial Response (OERR) offers an analytical service that provides data from the analysis of water and soil/sediment samples for organic compounds for use in the Superfund decision-making process. Through a series of standardized procedures and a strict chain-of-custody, the organic analytical service produces data of known and documented quality. This service is available through the Superfund Contract Laboratory Program (CLP).

DESCRIPTION OF SERVICES

The organic analytical service provides a technical and contractual framework for laboratories to apply EPA/CLP analytical methods for the isolation, detection, and quantitative measurement of 33 volatile, 64 semivolatile, and 28 pesticide/Aroclor (pesticide/PCB) target compounds in water and soil/sediment environmental samples. The CLP provides the methods to be used and the specific technical, reporting, and contractual requirements, including quality assurance, quality control, and standard operating procedures, by which EPA evaluates the data. This service uses GC/MS and GC/ECD methods to analyze the target compounds. Two data delivery turnarounds are available to CLP customers: 35-day turnaround and 14-day turnaround after laboratory receipt of the last sample in the set.

DATA USES

This analytical service provides data which EPA uses for a variety of purposes, such as determining the nature and extent of contamination at a hazardous waste site, assessing priorities for response based on risks to human health and the environment, determining appropriate cleanup actions, and determining when remedial actions are complete. The data may be used in all stages in the investigation of a hazardous waste site including site inspections, Hazard Ranking System scoring, remedial investigations/feasibility studies, remedial design, treatability studies, and removal actions. In addition, this service provides data that are available for use in Superfund enforcement/litigation activities.

TARGET COMPOUNDS

The compounds for which this service is applicable and the corresponding quantitation limits are listed in **Table 1**. For water samples, the lowest quantitation limits reportable are 10 ppb for the volatile compounds, 10 ppb for the semivolatile compounds, and 0.05 ppb for the pesticide/Aroclor (pesticide/PCB) compounds. For soil samples, the lowest quantitation limits reportable are 10 ppb for the volatile compounds, 330 ppb for the semivolatile compounds, and 1.7 ppb for the pesticide/Aroclor (pesticide/PCB) compounds. Specific sample quantitation limits are highly matrix dependent. Compounds identified with concentrations below the quantitation limit are reported as estimated concentration values.

Table 1. Target Compound List and Contract Required Quantitation Limits (CRQLs) For OLM03.2*

		Quantitation Limits	
		Water (ug/L)	Low Soil (ug/Kg)
VOLATILES			
1.	Chloromethane	10	10
2.	Vinyl Chloride	10	10
3.	Bromomethane	10	10
4.	Chloroethane	10	10
5.	1,1-Dichloroethene	10	10
6.	Acetone	10	10
7.	Carbon Disulfide	10	10
8.	Methylene Chloride	10	10
9.	1,2-Dichloroethene (total)	10	10
10.	1,1-Dichloroethane	10	10
11.	2-Butanone	10	10
12.	Chloroform	10	10
13.	1,1,1-Trichloroethane	10	10
14.	Carbon Tetrachloride	10	10
15.	Benzene	10	10
16.	1,2-Dichloroethane	10	10
17.	Trichloroethene	10	10
18.	1,2-Dichloropropane	10	10
19.	Bromodichloromethane	10	10
20.	cis-1,3-Dichloropropene	10	10
21.	4-Methyl-2-pentanone	10	10
22.	Toluene	10	10
23.	trans-1,3-Dichloropropene	10	10
24.	1,1,2-Trichloroethane	10	10
25.	Tetrachloroethene	10	10
26.	2-Hexanone	10	10
27.	Dibromochloromethane	10	10
28.	Chlorobenzene	10	10
29.	Ethylbenzene	10	10
30.	Xylenes (total)	10	10
31.	Styrene	10	10
32.	Bromoform	10	10
33.	1,1,2,2-Tetrachloroethane	10	10
SEMIVOLATILES			
34.	Phenol	10	330
35.	bis-(2-Chloroethyl)ether	10	330
36.	2-Chlorophenol	10	330
37.	1,3-Dichlorobenzene	10	330
38.	1,4-Dichlorobenzene	10	330
39.	1,2-Dichlorobenzene	10	330
40.	2-Methylphenol	10	330
41.	2,2'-oxybis (1-Chloropropane)	10	330
42.	4-Methylphenol	10	330
43.	N-Nitroso-di-n-propylamine	10	330
44.	Hexachloroethane	10	330
45.	Nitrobenzene	10	330
46.	Isophorone	10	330
47.	2-Nitrophenol	10	330
48.	2,4-Dimethylphenol	10	330
49.	bis-(2-Chloroethoxy)methane	10	330
50.	2,4-Dichlorophenol	10	330
51.	1,2,4-Triclorobenzene	10	330
52.	Naphthalene	10	330
53.	4-Chloroaniline	10	330
54.	Hexachlorobutadiene	10	330
55.	4-Chloro-3-methylphenol	10	330
56.	2-Methylnaphthalene	10	330
57.	Hexachlorocyclopentadiene	10	330
58.	2,4,6-Trichlorophenol	10	330
59.	2,4,5-Trichlorophenol	25	830
60.	2-Chloronaphthalene	10	330
61.	2-Nitroaniline	25	830
62.	Dimethylphthalate	10	330
63.	Acenaphthylene	10	330
64.	2,6-Dinitrotoluene	10	330
65.	3-Nitroaniline	25	830
66.	Acenaphthene	10	330
67.	2,4-Dinitrophenol	25	830
68.	4-Nitrophenol	25	830
69.	Dibenzofuran	10	330
70.	2,4-Dinitrotoluene	10	330
71.	Fluorene	10	330
72.	Diethylphthalate	10	330
73.	4-Chlorophenyl-phenylether	10	330
74.	4-Nitroaniline	25	830
75.	4,6-Dinitro-2-methylphenol	25	830
76.	N-Nitrosodiphenylamine	10	330
77.	4-Bromophenyl-phenylether	10	330
78.	Hexachlorobenzene	10	330
79.	Pentachlorophenol	25	830
80.	Phenanthrene	10	330
81.	Anthracene	10	330
82.	Carbazole	10	330
83.	Di-n-butylphthalate	10	330
84.	Fluoranthene	10	330
85.	Pyrene	10	330
86.	Butylbenzylphthalate	10	330
87.	3,3'-Dichlorobenzidine	10	330
88.	Benzo(a)anthracene	10	330
89.	Chrysene	10	330
90.	bis-(2-Ethylhexyl)phthalate	10	330
91.	Di-n-octylphthalate	10	330
92.	Benzo(b)fluoranthene	10	330
93.	Benzo(k)fluoranthene	10	330
94.	Benzo(a)pyrene	10	330
95.	Indeno(1,2,3-cd)pyrene	10	330
96.	Dibenz(a,h)anthracene	10	330
97.	Benzo(g,h,i)perylene	10	330

		Quantitation Limits	
		Water (ug/L)	Soil (ug/Kg)
PESTICIDES/AROCLORS (PESTICIDES/PCBs)			
98.	alpha-BHC	0.05	1.7
99.	beta-BHC	0.05	1.7
100.	delta-BHC	0.05	1.7
101.	gamma-BHC (Lindane)	0.05	1.7
102.	Heptachlor	0.05	1.7
103.	Aldrin	0.05	1.7
104.	Heptachlor epoxide	0.05	1.7
105.	Endosulfan I	0.05	1.7
106.	Dieldrin	0.10	3.3
107.	4,4'-DDE	0.10	3.3
108	Endrin	0.10	3.3
109.	Endosulfan II	0.10	3.3
110.	4,4'-DDD	0.10	3.3
111.	Endosulfan sulfate	0.10	3.3
112.	4,4'-DDT	0.10	3.3
113.	Methoxychlor	0.50	17
114.	Endrin ketone	0.10	3.3
115.	Endrin aldehyde	0.10	3.3
116.	alpha-Chlordane	0.05	1.7
117.	gamma-Chlordane	0.05	1.7
118.	Toxaphene	5.0	170
119.	Aroclor-1016	1.0	33
120.	Aroclor-1221	2.0	67
121.	Aroclor-1232	1.0	33
122.	Aroclor-1242	1.0	33
123.	Aroclor-1248	1.0	33
124.	Aroclor-1254	1.0	33
125.	Aroclor-1260	1.0	33

* For volatiles, quantitation limits for medium soils are approximately 120 times the quantitation limits for low soils. For semivolatile medium soils, quantitation limits are approximately 30 times the quantitation limits for low soils.

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The list of target compounds for this service was originally derived from the EPA Priority Pollutant List of 129 compounds. In the years since the inception of the CLP, compounds have been added to and deleted from the Target Compound List (TCL), based on advances in analytical methods, evaluation of method performance data, and the needs of the Superfund program.

For drinking water and groundwater type samples, use of the low concentration organic analytical service is recommended.

METHODS AND INSTRUMENTATION

For semivolatile and pesticide/Aroclor (pesticide/PCB) water samples, a 1-L aliquot is extracted with methylene chloride using a continuous liquid-liquid extractor or separatory funnel (for pesticides/Aroclors (pesticides/PCBs) only)). For low level semivolatile soil and pesticide/Aroclor (pesticide/PCB) soil samples, a 30-g soil sample is extracted with methylene chloride/acetone. For medium level semivolatile soil samples, a 1-g soil sample is extracted with methylene chloride using sonication. For both water and soil samples, the extract is concentrated, subjected to fraction-specific cleanup procedures, and analyzed by GC/MS for semivolatiles or GC/ECD for pesticides/Aroclors (pesticides/PCBs).

For volatile water samples, 5 mL of water is added to a purge and trap device and purged with an inert gas at room temperature. For volatile low level soil samples, a 5-g aliquot of soil is added to a purge and trap device with 5 mL of reagent water and purged with an inert gas at 40°C. For volatile medium level soil samples, 4 g are extracted with methanol and an aliquot is added to reagent water. For both water and soil samples, the volatiles purged from the sample are trapped on a solid sorbent. They are subsequently desorbed by rapidly heating the sorbent and then introduced into a GC/MS system. **Table 2** summarizes the methods and instruments used in this analytical service.

DATA DELIVERABLES

Data deliverables for this service include both hardcopy/ electronic data reporting forms and supporting raw data. The laboratory must submit data to EPA within 35 days (or 14 days for 14-day contracts) after laboratory receipt of the last sample in the set. EPA then processes the data through an automated Data Assessment Tool. DAT is a complete CLP data assessment package. DAT incorporates Contract Compliance Screening (CCS) and Computer-Aided Data Review and Evaluation (CADRE) review to provide EPA Regions with PC-compatible reports, spreadsheets, and electronic files within 24 to 48 hours from the receipt of the data for data validation. This automated tool facilitates the transfer of analytical data into Regional databases. In addition to the Regional electronic reports, the CLP laboratories are provided with a data assessment report that documents the instances of noncompliance. The laboratory has 10 days to reconcile defective data and resubmit the data to EPA. EPA then reviews the data for noncompliance and sends a final data assessment report to the CLP laboratory and the Region.

QUALITY ASSURANCE

The quality assurance (QA) process consists of management review and oversight at the planning, implementation, and completion stages of the environmental data collection activity. This process ensures that the data provided are of the quality required. During the implementation of the data collection effort, QA activities ensure that the quality control (QC) system is functioning effectively and that the deficiencies uncovered by the QC system are corrected. After environmental data are collected, QA activities focus on assessing the quality of data to determine its suitability to support enforcement or remedial decisions.

Each contract laboratory prepares a quality assurance plan (QAP) with the objective of providing sound analytical chemical measurements. The QAP must specify the policies, organization, objectives, and functional guidelines, as well as the QA and QC activities designed to achieve the data quality requirements for this analytical service.

QUALITY CONTROL

The QC process includes those activities required during analytical data collection to produce data of known and documented quality. The analytical data acquired from QC procedures are used to estimate and evaluate the analytical results and to determine the necessity for or the effect of corrective action procedures. The QC procedures required for this analytical service are shown in **Table 3**.

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Table 2. Methods and Instruments

Fraction	Water	Soil
Volatiles	Purge and trap followed by GC/MS analysis	Purge and trap followed by GC/MS analysis
Semivolatiles	Continuous liquid-liquid extraction followed by GC/MS analysis	Sonication followed by GC/MS analysis
Pesticides/Aroclors (Pesticides/PCBs)	Continuous liquid-liquid or separatory funnel extraction followed by dual column GC/ECD analysis	Sonication followed by dual column GC/ECD analysis

Table 3. Quality Control

QC Operation	Frequency
System Monitoring Compounds (volatiles)	Added to each sample, standard, and blank
Surrogates (for semivolatiles and pesticides/Aroclors (pesticides/PCBs))	Added to each sample, standard, and blank
Method Blanks (volatiles)	Analyzed at least every 12 hours for each matrix and level
Method Blanks (semivolatiles and pesticides/Aroclors (pesticides/PCBs))	Prepared with each group of 20 samples or less of the same matrix and level, or each time samples are extracted
Instrument Blank (volatiles)	Analyzed after a sample which contains compounds at concentrations greater than the calibration range
Instrument Blank (pesticides/Aroclors (pesticides/PCBs))	Every 12 hours on each GC column used for analysis
Storage Blanks (volatiles)	Prepared and stored with each set of samples
GC/MS mass calibration and ion abundance patterns (volatiles and semivolatiles)	Every 12 hours for each instrument used for analysis
GC Resolution Check (pesticides/Aroclors (pesticides/PCBs))	Prior to initial calibration, on each instrument used for analysis
Initial Calibration	Upon initial set up of each instrument, and each time continuing calibration fails to meet the acceptance criteria
Continuing Calibration	Every 12 hours for each instrument used for analysis
Internal Standards (volatiles and semivolatiles)	Added to each sample, standard, and blank
Matrix Spike and Matrix Spike Duplicate	Once every 20 or fewer samples of same fraction, matrix, and level

PERFORMANCE MONITORING ACTIVITIES

Laboratory performance monitoring activities are provided primarily by AOC and the Regions to ensure that contract laboratories are producing data of the appropriate quality. EPA performs on-site laboratory audits, data package audits, and GC/MS tape audits, and evaluates laboratory performance through the use of blind performance evaluation samples.

For more information, or for suggestions to improve this analytical service, please contact:

Terry Smith
Organic Program Manager
USEPA/AOC
401 M Street, SW (5204G)
Washington, DC 20460
703-603-8849
FAX: 703-603-9112

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APPENDIX D

Multi-Media, Multi-Concentration, Inorganic Analytical Service
for Superfund
Quick Reference Fact Sheet, August 1999

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response | Publication 9240.0-09FSC August 1999

EPA

Multi-Media, Multi-Concentration, Inorganic Analytical Service for Superfund (ILM04.0)

Office of Emergency and Remedial Response
Analytical Operations\Data Quality Center (5204G)

Quick Reference Fact Sheet

Under the legislative authority granted to the U.S. Environmental Protection Agency (EPA) under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), EPA develops standardized analytical methods for the measurement of various pollutants in environmental samples from known or suspected hazardous waste sites. Among the pollutants that are of concern to the EPA at such sites, are a series of inorganic analytes and cyanide that are analyzed using inductively coupled plasma (ICP), atomic absorption (AA), and colorimetric techniques. The Analytical Operations\Data Quality Center (AOC) of the Office of Emergency and Remedial Response (OERR) offers an analytical service that provides data from the analysis of water and soil/sediment samples for inorganic analytes for use in the Superfund decision-making process. Through a series of standardized procedures and a strict chain-of-custody, the inorganic analytical service produces data of known and documented quality. This service is available through the Superfund Contract Laboratory Program (CLP).

DESCRIPTION OF SERVICES

The inorganic analytical service provides a technical and contractual framework for laboratories to apply EPA/CLP analytical methods for the preparation, detection, and quantitative measurement of 23 inorganic target analytes and cyanide in water and soil/sediment environmental samples. The CLP provides the methods to be used and the specific technical, reporting, and contractual requirements, including quality assurance, quality control, and standard operating procedures, by which EPA evaluates the data. This service uses inductively coupled plasma, atomic absorption, and colorimetric methods to analyze the inorganic target analytes and cyanide. Two data delivery turnarounds are available to CLP customers: 35-day turnaround and 14-day turnaround after laboratory receipt of the last sample in the set.

DATA USES

This analytical service provides data which EPA uses for a variety of purposes, such as determining the nature and extent of contamination at a hazardous waste site, assessing priorities for response based on risks to human health and the environment, determining appropriate cleanup actions, and determining when remedial actions are complete. The data may be used in all stages in the investigation of a hazardous waste site including site inspections, Hazard Ranking System scoring, remedial investigations/feasibility studies, remedial design, treatability studies, and removal actions. In addition, this service provides data that are available for use in Superfund enforcement/litigation activities.

TARGET ANALYTES

The analytes and detection limits for which this service is applicable are listed in **Table 1**. The list of target analytes for this service was originally derived from the EPA Priority Pollutant List of 129 compounds. In the years since the inception of the CLP, analytes have been added to and deleted from the Target Analyte List, based on advances in analytical methods, evaluation of method performance data, and the needs of the Superfund program. Specific detection limits are highly matrix dependent.

METHODS AND INSTRUMENTATION

Table 2 summarizes the methods and instruments used in this analytical service.

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Table 1
Target Analyte List and Contract Required Detection Limits (CRDLs) (ILM04.0)

Abbreviation	Analyte	Contract Required Detection Limit[1] (ug/L)
Al	Aluminum	200
Sb	Antimony	60
As	Arsenic	10
Ba	Barium	200
Be	Beryllium	5
Cd	Cadmium	5
Ca	Calcium	5000
Cr	Chromium	10
Co	Cobalt	50
Cu	Copper	25
Fe	Iron	100
Pb	Lead	3
Mg	Magnesium	5000
Mn	Manganese	15
Hg	Mercury	0.2
Ni	Nickel	40
K	Potassium	5000
Se	Selenium	5
Ag	Silver	10
Na	Sodium	5000
Tl	Thallium	10
V	Vanadium	50
Zn	Zinc	20
Cn	Cyanide	10

Sample concentration exceeding five times the detection limit of the instrument or method in use may be reported even though the instrument or method detection limit is greater than the CRDL. This is illustrated in the following example:

For lead:
Method in use = ICP
Instrument Detection Limit (IDL) = 40
Sample Concentration = 220
Contract Required Detection Limit (CRDL) = 3

[1]The Contract Required Detection Limit is the instrument detection limit obtained in pure water.

DATA DELIVERABLES

Data deliverables for this service include both hardcopy/ electronic data reporting forms and supporting raw data. The laboratory must submit data to EPA within 35 days (or 14 days for 14-day contracts) after laboratory receipt of the last sample in the set. EPA then processes the data through an automated Data Assessment Tool. DAT is a complete CLP data assessment package. DAT incorporates Contract Compliance Screening (CCS) and Computer-Aided Data Review and Evaluation (CADRE) review to provide EPA Regions with PC-compatible reports, spreadsheets, and electronic files within 24 to 48 hours from the receipt of the data for data validation. This automated tool facilitates the transfer of analytical data into Regional databases. In addition to the Regional electronic reports, the CLP laboratories are provided with a data assessment report that documents the instances of noncompliance. The laboratory has 10 days to reconcile defective data and resubmit the data to EPA. EPA then reviews the data for noncompliance and sends a final data assessment report to the CLP laboratory and the Region.

QUALITY ASSURANCE

The quality assurance (QA) process consists of management review and oversight at the planning, implementation, and completion stages of the environmental data collection activity. This process ensures that the data provided are of the quality required. During the data collection effort, QA activities ensure that the quality control (QC) system is functioning effectively and that the deficiencies uncovered by the QC system are corrected. After environmental data are collected, QA activities focus on assessing the quality of data to determine its suitability to support enforcement or remedial decisions.

Each contract laboratory prepares a quality assurance plan (QAP) with the objective of providing sound analytical chemical measurements. The QAP must specify the policies, organization, objectives, and functional guidelines, as well as the QA and QC activities designed to achieve the data quality requirements for this analytical service.

QUALITY CONTROL

The QC process includes those activities required during analytical data collection to produce data of known and documented quality. The analytical data acquired from QC procedures are used to estimate and evaluate the analytical results and to determine the necessity for or the effect of corrective action procedures. The QC procedures required for this analytical service are shown in **Table 3.**

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Table 2. Methods and Instruments

Analyte	Instrument	Method
Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Ni, K, Se, Ag, Na, Tl, V, Zn	Inductively Coupled Plasma (ICP)	Acid digestion followed by ICP analysis
As, Pb, Tl, Se	Graphite Furnace Atomic Absorption (GFAA)	Acid digestion followed by GFAA analysis
Ca, Mg, Na, K	Flame Atomic Absorption (FAA)	Acid digestion followed by FAA analysis
Hg	Cold Vapor Atomic Absorption (CVAA)	Acid and permanganate oxidation followed by CVAA analysis
CN	Manual and Semi-automated Colorimetric	Distillation followed by colorimetric analysis

Table 3. Quality Control

QC Operation	Frequency
Instrument Calibration	Daily or each time instrument is set up
Initial Calibration Verification	Following each instrument calibration
Initial Calibration Blank	Following each instrument calibration
Continuing Calibration Verification	Every ten analytical samples or every two hours during a run and at the beginning and end of each run
Continuing Calibration Blank	Every ten analytical samples or every two hours during a run and at the beginning and end of each run
Interference Check Sample	Every twenty analytical samples and at the beginning and end of each run
CRDL Standard for ICP	Every twenty analytical samples and at the beginning and end of each run
CRDL Standard for AA	At the beginning of each AA analytical run
Serial Dilution	For each matrix type and concentration for each sample delivery group (SDG)
Preparation Blank	For each sample preparation, analysis, and matrix per batch of prepared samples
Laboratory Control Sample	For each sample preparation and analysis procedure for each batch
Matrix Spike Sample Analysis	For each matrix type, concentration level, and method for each SDG
Duplicate Sample Analysis	For each matrix type, concentration level, and method for each SDG
Post Digestion Spike	Each time matrix spike recovery is outside QC limits
Analytical Spike	For each analytical sample analyzed by furnace AA
Method of Standard Addition	When the analytical spike recovery is outside QC limits
Instrument Detection Limit Determination	Quarterly
Interelement Corrections	Annually for ICP instruments only
Linear Range Analysis	Quarterly for ICP instruments only

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PERFORMANCE MONITORING ACTIVITIES

Laboratory performance monitoring activities are provided primarily by AOC and the Regions to ensure that contract laboratories are producing data of the appropriate quality. EPA performs on-site laboratory audits, data package audits, and evaluates laboratory performance through the use of blind performance evaluation samples.

For more information, or for suggestions to improve this analytical service, please contact:

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APPENDIX E

Low Concentration Organic Analytical Service for Superfund
(Water Matrix)
Quick Reference Fact Sheet, August 1999

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response | Publication 9240.0-32FSA August 1999

EPA

Low Concentration Organic Analytical Service for Superfund (Water Matrix) (OLC02.1)

Office of Emergency and Remedial Response
Analytical Operations\Data Quality Center (5204G)

Quick Reference Fact Sheet

Under the legislative authority granted to the U.S. Environmental Protection Agency (EPA) under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), EPA develops standardized analytical methods for the measurement of various pollutants in environmental samples from known or suspected hazardous waste sites. Among the pollutants that are of concern to the EPA at such sites, are a series of volatile, semivolatile, and pesticide/Aroclor (pesticide/PCB) compounds that are analyzed using gas chromatography coupled with mass spectrometry (GC/MS) and gas chromatography with an electron capture detector (GC/ECD). The Analytical Operations\Data Quality Center (AOC) of the Office of Emergency and Remedial Response (OERR) offers an analytical service that provides data from the analysis of groundwater and drinking water type samples for organic compounds for use in the Superfund decision-making process. Through a series of standardized procedures and a strict chain-of-custody, the low concentration organic analytical service produces data of known and documented quality. This service is available through the Superfund Contract Laboratory Program (CLP).

DESCRIPTION OF SERVICES

The low concentration organic analytical service provides a technical and contractual framework for laboratories to apply EPA/CLP analytical methods for the isolation, detection, and quantitative measurement of 41 volatile, 59 semivolatile, and 28 pesticide/Aroclor (pesticide/PCB) target compounds in low concentration groundwater and drinking water type samples. The CLP provides the methods to be used and the specific technical, reporting, and contractual requirements, including quality assurance, quality control, and standard operating procedures, by which EPA evaluates the data. The data turnaround time for this contract is 14 days after laboratory receipt of the last sample in the set.

DATA USES

This analytical service provides data which EPA uses for a variety of purposes, such as determining the nature and extent of contamination at a hazardous waste site, assessing priorities for response based on risks to human health and the environment, determining appropriate cleanup actions, and determining when remedial actions are complete. The data may be used in all stages of a hazardous waste site including site inspections, Hazard Ranking System scoring, remedial investigations/ feasibility studies, remedial design, treatability studies, and removal actions. In addition, this service provides data that are available for use in Superfund enforcement/litigation activities.

TARGET COMPOUNDS

The compounds and quantitation limits for which this service is applicable are listed in **Table 1**. The lowest quantitation limits reportable are 1 ppb for the volatile compounds, 5 ppb for the semivolatile compounds, and 0.01 ppb for the pesticide/Aroclor (pesticide/PCB) compounds. Specific sample quantitation limits are highly matrix dependent. The list of target compounds for this service was originally derived from the EPA Priority Pollutant List of 129 compounds. In the years since the inception of the CLP, compounds have been added to and deleted from the Target Compound List (TCL), based on advances in analytical methods, evaluation of method performance data, and the needs of the Superfund program.

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Table 1. Target Compound List and Contract Required Quantitation Limits (CRQLs) in ug/L (OLC02.1)

VOLATILES		
1.	Chloromethane	1
2.	Bromomethane	1
3.	Vinyl Chloride	1
4.	Chloroethane	1
5.	Methylene Chloride	2
6.	Acetone	5
7.	Carbon Disulfide	1
8.	1,1-Dichloroethene	1
9.	1,1-Dichloroethane	1
10.	cis-1,2-Dichloroethene	1
11.	trans-1,2-Dichloroethene	1
12.	Chloroform	1
13.	1,2-Dichloroethane	1
14.	2-Butanone	5
15.	Bromochloromethane	1
16.	1,1,1-Trichloroethane	1
17.	Carbon Tetrachloride	1
18.	Bromodichloromethane	1
19.	1,2-Dichloropropane	1
20.	cis-1,3-Dichloropropene	1
21.	Trichloroethene	1
22.	Dibromochloromethane	1
23.	1,1,2-Trichloroethane	1
24.	Benzene	1
25.	trans-1,3-Dichloropropene	1
26.	Bromoform	1
27.	4-Methyl-2-pentanone	5
28.	2-Hexanone	5
29.	Tetrachloroethene	1
30.	1,1,2,2-Tetrachloroethane	1
31.	1,2-Dibromoethane	1
32.	Toluene	1
33.	Chlorobenzene	1
34.	Ethylbenzene	1
35.	Styrene	1
36.	Xylenes (total)	1
37.	1,3-dichlorobenzene	1
38.	1,4-Dichlorobenzene	1
39.	1,2-Dichlorobenzene	1
40.	1,2-dibromo-3-chloropropane	1
41.	1,2,4-Triclorobenzene	1
SEMIVOLATILES		
42.	Phenol	5
43.	bis-(2-Chloroethyl)ether	5
44.	2-Chlorophenol	5
45.	2-Methylphenol	5
46.	2,2'-oxybis(1-Chloropropane)	5
47.	4-Methylphenol	5
48.	N-Nitroso-di-n-propylamine	5
49.	Hexachloroethane	5
50.	Nitrobenzene	5
51.	Isophorone	5
52.	2-Nitrophenol	5
53.	2,4-Dimethylphenol	5
54.	bis-(2-Chloroethoxy)methane	5
55.	2,4-Dichlorophenol	5
56.	Naphthalene	5
57.	4-Chloroaniline	5
58.	Hexachlorobutadiene	5
59.	4-Chloro-3-methylphenol	5
60.	2-Methylnaphthalene	5
61.	Hexachlorocyclopentadiene	5
62.	2,4,6-Trichlorophenol	5
63.	2,4,5-Trichlorophenol	20
64.	2-Chloronaphthalene	5
65.	2-Nitroaniline	20
66.	Dimethylphthalate	5
67.	Acenaphthylene	5
68.	2,6-Dinitrotoluene	5
69.	3-Nitroaniline	20
70.	Acenaphthene	5
71.	2,4-Dinitrophenol	20
72.	4-Nitrophenol	20
73.	Dibenzofuran	5
74.	2,4-Dinitrotoluene	5
75.	Diethylphthalate	5
76.	4-Chlorophenyl-phenylether	5
77.	Fluorene	5
78.	4-Nitroaniline	20
79.	4,6-Dinitro-2-methylphenol	20
80.	N-Nitrosodiphenylamine	5
81.	4-Bromophenyl-phenylether	5
82.	Hexachlorobenzene	5
83.	Pentachlorophenol	20
84.	Phenanthrene	5
85.	Anthracene	5
86.	Di-n-butylphthalate	5
87.	Fluoranthene	5
88.	Pyrene	5
89.	Butylbenzylphthalate	5
90.	3,3'-Dichlorobenzidine	5
91.	Benzo(a)anthracene	5
92.	Chrysene	5
93.	bis-(2-Ethylhexyl)phthalate	5
94.	Di-n-octylphthalate	5
95.	Benzo(b)fluoranthene	5
96.	Benzo(k)fluoranthene	5
97.	Benzo(a)pyrene	5
98.	Indeno(1,2,3-cd)pyrene	5
99.	Dibenz(a,h)anthracene	5
100.	Benzo(g,h,i)perylene	5
PESTICIDES/AROCLORS (PESTICIDES/PCBs)		
101.	alpha-BHC	0.01
102.	beta-BHC	0.01
103.	delta-BHC	0.01
104.	gamma-BHC (Lindane)	0.01
105.	Heptachlor	0.01
106.	Aldrin	0.01
107.	Heptachlor epoxide	0.01
108	Endosulfan I	0.01
109.	Dieldrin	0.02
110.	4,4'-DDE	0.02
111.	Endrin	0.02
112.	Endosulfan II	0.02
113.	4,4'-DDD	0.02
114.	Endosulfan sulfate	0.02
115.	4,4'-DDT	0.02
116.	Methoxychlor	0.10
117.	Endrin ketone	0.02
118.	Endrin aldehyde	0.02
119.	alpha-Chlordane	0.01
120.	gamma-Chlordane	0.01
121.	Toxaphene	1.0
122.	Aroclor-1016	0.20
123.	Aroclor-1221	0.40
124.	Aroclor-1232	0.20
125.	Aroclor-1242	0.20
126.	Aroclor-1248	0.20
127.	Aroclor-1254	0.20
128.	Aroclor-1260	0.20

If the compound concentration for water samples other than low concentration groundwater and drinking are suspected of containing higher than 25 ug/L, then it is recommended that the sampler use the multi-media, multi-concentration organic analytical service.

PREPARATION METHODS AND INSTRUMENTATION

For semivolatile and pesticide/Aroclor (pesticide/PCB) water samples, a 1-L aliquot is extracted with methylene chloride using continuous liquid-liquid extraction or separatory funnel (for pesticides/Aroclors (pesticides/PCBs) only). The extract is concentrated, subjected to fraction-specific cleanup procedures, and analyzed by GC/MS for semivolatiles or GC/ECD for pesticides/Aroclors (pesticides/PCBs). For volatiles, 25 mL of water is added to a purge and trap device and purged with an inert gas at room temperature. The volatiles purged from the sample are trapped on a solid sorbent. They are subsequently desorbed by rapidly heating the sorbent and then introduced into a GC/MS system. **Table 2** summarizes the preparation methods and instruments used in this analytical service.

DATA DELIVERABLES

Data deliverables for this service include both hardcopy data reporting forms and supporting raw data. The laboratory must submit data to EPA within 14 days after laboratory receipt of the last sample in the set. EPA then checks the data for compliance with contract requirements. A report of instances of noncompliance is distributed to the

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laboratory and the Region within 10 days from the receipt of the data. The laboratory has 10 days to reconcile defective data and resubmit the data to EPA. EPA then screens the data and sends a final data assessment report to the laboratory and the Region.

QUALITY ASSURANCE

The quality assurance (QA) process consists of management review and oversight at the planning, implementation, and completion stages of the environmental data collection activity. This process ensures that the data provided are of the quality required. During the implementation of the data collection effort, QA activities ensure that the quality control (QC) system is functioning effectively and that the deficiencies uncovered by the QC system are corrected. After environmental data are collected, QA activities focus on assessing the quality of data to determine its suitability to support enforcement or remedial decisions.

Each contract laboratory prepares a quality assurance plan (QAP) with the objective of providing sound analytical chemical measurements. The QAP must specify the policies, organization, objectives, and functional guidelines, as well as the QA and QC activities designed to achieve the data quality requirements for this analytical service.

QUALITY CONTROL

The QC process includes those activities required during analytical data collection to produce data of known and documented quality. The analytical data acquired from QC procedures are used to estimate and evaluate the analytical results and to determine the necessity for or the effect of corrective action procedures. The QC requirements for this analytical service are shown in **Table 3**.

Table 2. Preparation Methods and Instruments

Fraction	Preparation Method	Analytical Instrument
Volatiles	Purge and trap	GC/MS analysis
Semivolatiles	Continuous liquid-liquid extraction	GC/MS analysis
Pesticides/Aroclors (Pesticides/PCBs)	Continuous liquid-liquid or separatory funnel extraction	GC/ECD analysis

Table 3. Quality Control

QC Operation	Frequency
System Monitoring Compound (volatiles)	Added to each sample, standard, and blank
Method Blanks (volatiles)	Analyzed at least every 12 hours
Method Blanks (semivolatiles and pesticides/Aroclors (pesticides/PCBs))	Prepared with each group of 20 samples or less, or each time samples are extracted
Instrument Blank (volatiles)	Analyzed after a sample which contains compounds at concentrations greater than the calibration range
Surrogates (semivolatiles and pesticides/Aroclors (pesticides/PCBs))	Added to each sample, standard, and blank
Instrument Blank (pesticides/Aroclors (pesticides/PCBs))	Every 12 hours on each GC column used for analysis
Storage Blank (volatiles)	Prepared and stored with each group of samples
GC/MS mass calibration and ion abundance patterns (volatiles and semivolatiles)	Every 12 hours for each instrument used for analysis
GC Resolution Check (pesticides/Aroclors (pesticides/PCBs))	Prior to initial calibration on each GC column used for analysis
Initial Calibration	Upon initial set up of each instrument, and each time continuing calibration fails to meet the acceptance criteria

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Table 3. Quality Control (Continued)

QC Operation	Frequency
Continuing Calibration	Every 12 hours for each instrument used for analysis
Internal Standards (volatiles and semivolatiles)	Added to each sample, standard, and blank
Laboratory Control Sample (LCS)	Prepared and analyzed with each group of 20 samples or less
Laboratory Evaluation Sample	Prepared and analyzed (if provided) with each set of 20 samples or less

PERFORMANCE MONITORING ACTIVITIES

Laboratory performance monitoring activities are provided primarily by AOC and the Regions to ensure that contract laboratories are producing data of the appropriate quality. EPA performs on-site laboratory audits, data package audits, and GC/MS tape audits, and evaluates laboratory performance through the use of blind performance evaluation samples.

For more information, or for suggestions to improve this analytical service, please contact:

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Reference 9

Using Qualified Data to Document an Observed Release and Observed Contamination

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response | EPA 540-F-95-033 OSWER 9285.7-14FS PB95-963320 November 1996

EPA Using Qualified Data to Document an Observed Release and Observed Contamination

Office of Emergency and Remedial Response (5204G) — Quick Reference Fact Sheet

This fact sheet discusses the use of the U.S. Environmental Protection Agency's (EPA) Contract Laboratory Program (CLP) data and other sources of data qualified with a "*J*", "*U*", or "*UJ*" qualifier or flag. This guidance provides a management decision tool for the optional use of qualified data to document an observed release and observed contamination by chemical analysis under EPA's Hazard Ranking System (HRS). The analyte and sample matrix (i.e., soil or water) specific adjustment factors given in this fact sheet allow biased CLP and non-CLP data to be adjusted to meet the HRS criteria for documenting an observed release and observed contamination with data that are of known and documented quality. This fact sheet does not address using qualified data for identifying hazardous substances in a source.

INTRODUCTION

The EPA established the HRS to rank hazardous waste sites for National Priorities List (NPL) purposes under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). This fact sheet was developed in response to a need to determine the usability of qualified data for site assessment and HRS scoring purposes. This fact sheet illustrates that qualified data are often of sufficiently known and documented quality, and may be used in establishing an observed release and observed contamination. This fact sheet explains the rationale for why some qualified data may be used for HRS purposes; presents the background information needed to use qualified data with and without adjustment factors; provides examples of how qualified data can be used; and discusses issues raised during the development of the adjustment factor approach.

Under the HRS, chemical analytical data are often used to demonstrate an observed release and observed contamination when the release sample concentration is three times the background concentration and background levels are greater than or equal to the appropriate detection limit; or if the release sample concentration is greater than or equal to the appropriate quantitation limit when background levels are below the appropriate detection limit. The release must also be at least partially attributable to the site under investigation (*Hazard Ranking System, Final Rule*, 40 CFR Part 300, App. A). The data used to establish the release must be of known and documented quality. (*Hazard Ranking System Guidance Manual*, Interim Final, November 1992, OSWER Directive 9345.1-07). Data that can not be validated may not be of known and documented quality. For more information on observed release and observed contamination, refer to the fact sheets *Establishing an Observed Release*, September 1995, PB94-963314; *Establishing Areas of Observed Contamination*, September 1995, PB94-963312; and *Establishing Background Levels*, September 1995, PB94-963313. The factor of three represents the minimum difference in sample results that demonstrate an increase in contaminant concentration above background levels, with reasonable confidence.

Although much of the analytical data used for identifying an observed release are generated under EPA's CLP, this fact sheet applies to all data regardless of the source

of the data (non-CLP data). EPA procedures require that CLP analytical data be reviewed, or validated by EPA or third party reviewers, to ensure the data are of known and documented quality and that the determination be discussed in a data validation report that accompanies the analytical results. Based on this data validation, CLP data are classified into three categories: (1) data for which all quality control (QC) requirements have passed contract-required acceptance criteria; (2) data for which at least one QC requirement has not met acceptance criteria; and (3) data for which most or all QC requirements have not met acceptance criteria. Data in the first category typically are not qualified. Data in the second category are often qualified with a "J" qualifier and, as discussed in this fact sheet, are usually usable for HRS purposes. Data in the third category are usually qualified by an "R" qualifier and are not usable for HRS purposes.

Whether data are placed into the second or third category is determined by the amount of bias associated with the analytical results. Data validation evaluates biases resulting from laboratory analytical deficiencies or sample matrices to determine whether the data are usable. Bias indicates that the reported concentration is either higher or lower than the true concentration, and the data validation report identifies the direction of the bias or if the bias is unknown.

The EPA CLP also sets minimum quantitation limits for all analytes; the Contract Required Quantitation Limit (CRQL) for organic analytes and the Contract Required Detection Limit (CRDL) for inorganic analytes. For HRS purposes and for this fact sheet, the term CRQL refers to both the contract required quantitation limit and the contract required detection limit. (40 CFR Part 300, App. A). The CRQLs are substance specific levels that a CLP laboratory must be able to routinely and reliably detect in specific sample matrices (i.e., soil, water, sediment). The CRQLs are usually set above most instrument detection limits (IDLs) and method detection limits (MDLs).

CONSIDERATIONS FOR NON-CLP DATA

Because various laboratories and analytical methods may be used to develop non-CLP data, the following list provides the general information sufficient for determining whether non-CLP data are usable for HRS purposes.

(1) Identification of the method used for analysis. Methods include RCRA methods, SW-846, EPA methods, etc.
(2) Quality control (QC) data. Check each method of analysis to determine if specific QC requirements are defined. If not, seek out another method.
(3) Instrument-generated data sheets for sample results. These data sheets would be the equivalent of Form I's in CLP data.
(4) MDLs and sample quantitation limits (SQLs). The analytical method should provide the MDL. The SQL is an adjusted MDL using sample specific measurements such as percent moisture and weight.
(5) Data validation report.

USE OF BIASED QUALIFIED DATA

In the past, all qualified data have been inappropriately perceived by some people as data of low confidence or poor quality and have not been used for HRS evaluation. With careful assessment of the nature of the analytical biases or QC deficiencies in the data on a case-by-case basis, qualified data can represent an additional resource of data for establishing an observed release. Further, the D.C. District Court of Appeals in 1996 upheld EPA's case-by-case approach to assess data quality. In reviewing the use of qualified data to identify an observed release, the Court stated that if there are deficiencies in the data, "...the appropriate response is to review the deficiencies on a 'case-by-case basis' to determine their impact on 'usability of the data.'" The Court also stated with regards to data quality that, "...EPA does not face a standard of absolute perfection....Rather, it is statutorily required to 'assure, to the maximum extent *feasible*, that it 'accurately assesses the relative degree of risk' posed by sites" *Board of Regents of the University of Washington, et al., v. EPA*, No. 95-1324, slip op. at 8-10 (D.C. Cir. June 25, 1996).

As discussed in this fact sheet, the application of adjustment factors to "J" qualified data can serve as a management decision tool to "adjust", or take into account, the analytical uncertainty in the data indicated by the qualifier, thereby making qualified data usable for HRS evaluation. The use of adjustment factors to account for the larger uncertainty in "J" qualified data is a conservative approach enabling a quantitative comparison of the data for use in documenting an observed release. It should be noted that the use of

adjustment factors only addresses analytical variability and does not take into account variabilities which may be introduced during field sampling. Some guidelines for using the adjustment factor approach are discussed in Exhibit 1.

CLP QA/QC PROCEDURES

CLP qualifiers are applied to analytical data based on the results of various Quality Assurance/Quality Control (QA/QC) procedures used at the laboratory. EPA analytical methods use a number of QA/QC mechanisms during sample analysis in order to assess qualitative and quantitative accuracy (*Contract Laboratory Program Statement of Work for Inorganic Analyses*, Document No. ILM02.0; *Contract Laboratory Program Statement of Work for Organic Analyses*, Document No. OLM1.8; *Quality Assurance/Quality Control Samples*, Environmental Response Team Quality Assurance Technical Information Bulletin; *Test Methods for Evaluating Solid Waste (SW-846): Physical and Chemical Methods*, Document No. SW-846). To assess data quality, the laboratory uses matrix spikes, matrix spike duplicates, laboratory control samples, surrogates, blanks, laboratory duplicates, and quarterly blind performance evaluation (PE) samples. The Agency assumes that if biases are found in the QA/QC samples, the field sample concentrations may also be biased.

Surrogates are chemically similar to the analytes of interest. They are added or "spiked" at a known concentration into the field samples before analysis. Also, selected target analytes are "spiked" into samples at a specified frequency to assess potential interferences from the sample matrix. These samples are called matrix spikes. Comparison of the known concentration of the surrogates and matrix spikes with their actual analytical results reflects the analytical accuracy. Because the surrogates are expected to behave similarly to the target analytes, they may indicate bias caused by interferences from the sample matrices. These types of interferences from the sample matrix are known as matrix effects (*CLP National Functional Guidelines for Inorganic Data Review*, Publication 9240.1-05-01; *CLP National Functional Guidelines for Organic Data Review*, Publication 9240.1-05; *Test Methods for Evaluating Solid Waste (SW-846): Physical and Chemical Methods*, Document No. SW-846).

Laboratory control samples are zero blind samples which contain known concentrations of specific analytes and are analyzed in the same batch as field samples. Their results are used to measure laboratory accuracy. Blanks are analyzed to detect any extraneous contamination introduced either in the field or in the laboratory.

Laboratory duplicates are created when one sample undergoes two separate analyses. The duplicate results are compared to determine laboratory precision. Quarterly blind PE samples are single blind samples that evaluate the laboratory's capability of performing the specified analytical protocol.

CLP and other EPA analytical methods include specifications for acceptable analyte identification, target analytes, and minimum and maximum percent recovery of the QA/QC compounds. Data are validated according to guidelines which set performance criteria for instrument calibration, analyte identification, and identification and recovery of QA/QC compounds (*CLP Statement of Work and SW-846*). The *National Functional Guidelines for Data Review*, used in EPA validation, were designed for the assessment of data generated under the CLP organic and inorganic analytical protocols (*CLP Statement of Work; National Functional Guidelines for Data Review*). The guidelines do not preclude the validation of field and other non-CLP data. Thus, many EPA Regions have also adapted the *National Functional Guidelines for Data Review* to validate non-CLP data. Data which do not meet the guidelines' performance criteria are qualified to indicate bias or QA/QC deficiencies. The data validation report usually explains why the data were qualified and indicates the direction of bias when it can be determined. Validated data that are not qualified are considered unbiased and can be used at their reported numerical value for HRS evaluation.

QUALIFIER DEFINITIONS

Most EPA validation guidelines use the data qualifiers presented in Exhibit 2 (*CLP National Functional Guidelines for Data Review*). Other qualifiers besides these may be in use; the validation report should always be checked for the exact list of qualifiers and their meanings.

It should be emphasized that not meeting one or some of the contract required QA/QC acceptance criteria is often an indication that the sample was difficult to analyze, not that there is low confidence in the analysis (i.e., the

EXHIBIT 1 GUIDELINES FOR THE USE OF ADJUSTMENT FACTORS
• The use of adjustment factors identified in this fact sheet is a management tool for the optional use of "J" qualified data generated under CLP or other sources of data to document an observed release.
• Adjusted qualified data should be used in conjunction with non-qualified data whenever possible.
• EPA maintains a "worst sites first" policy for placing sites on the NPL (*Additional Guidance on "Worst Sites" and "NPL Caliber Sites" to assist in SACM Implementation*, OSWER Directive 9320.2-07).
• EPA Regions should use adjustment factors with discretion on a case-by-case basis and should always carefully consider the use of qualified data in borderline cases.
• Re-sampling and/or reanalysis may be warranted if qualified data do not appear adequate to document an observed release.
• EPA Regions may substitute higher adjustment factors based on documented, justifiable reasons but may never use a lower adjustment factor value.
• The adjustment factors should only be applied to analytes listed in the tables. These adjustment factors should not be interpolated or extrapolated to develop factors for analytes not listed in the tables.
• The adjustment factors apply only to "J" qualified data above the CRQL.
• Detection below the CRQL is treated as non-quantifiable for HRS purposes.
• "UJ" data may be used under strict circumstances as explained in this fact sheet.
• The adjustment factors only apply to biased "J" qualified data, not to other "J" qualified data.
• The adjustment factors do not apply to "N", "NJ", or "R" qualified data. These data can not be used to document an observed release for HRS purposes.

analysis is "under control" and can be adequate for HRS decision making). Often "J", "U", and "UJ" qualified data fall into this category.

There are instances when qualified data cannot be used since the uncertainty of the results is unknown. For example, violations of laboratory instrument calibration and tuning requirements, and gross violations of holding times reflect the possibility that the results are of unknown quality (i.e., the analysis is "out of control"). Most often these data would be qualified with an "R" or an "N" (not usable for HRS purposes).

USING "U" QUALIFIED DATA

The "U" qualifier simply means that the reported concentration of the analyte was at or below the CRQL--there can be confidence that the true concentration is at or below the quantitation limit. Therefore, "U" qualified data can be used for establishing background levels. If the release sample concentration is above this level, as specified in the HRS, an observed release can be established. The quantitation limit for that analyte could be used as a maximum background concentration if a more conservative background level seems appropriate.

USING "J" QUALIFIED DATA

As discussed previously, some "J" qualified data can be used in establishing an observed release if the uncertainty in the reported values is documented. Qualified data should always be carefully examined by the Regions to determine the reasons for qualification before use in HRS evaluation. Re-sampling and/or re-analysis may be warranted if qualified data only marginally document an observed release. Whenever possible, qualified data should be used in conjunction with non-qualified data.

As described in Exhibit 2, "J" qualified data indicates that bias has been detected in the sample analysis and although the analyte is definitively present, the reported concentration is an estimate. Depending on the reasons and the direction of bias, with the use of adjustment factors, "J" qualified data can represent data of known and documented quality sufficient for use in establishing an observed release and observed contamination under the HRS.

USING "UJ" QUALIFIED DATA

A combination of the "U" and "J" qualifiers indicates that the reported value may not accurately represent the concentration necessary to positively detect the analyte in the sample. Under limited conditions, "UJ" qualified data can be used to represent background concentrations when establishing an observed release. These conditions are: instances when there is confidence that the background concentration is not detectable above the CRQL, the background concentration is biased high, and the sample measurement establishing the observed release equals or exceeds the CRQL.

DIRECTION OF BIAS IN "J" QUALIFIED DATA

It is important to understand the direction of bias associated with "J" qualified data before using the data to document an observed release. Qualified data may have high, low, or unknown bias. A low bias means that the reported concentration is most likely an underestimate of the true concentration. For example, data may be biased low when sample holding times for volatile organic compounds (VOCs) are moderately exceeded or when recovery of QA/QC compounds is significantly less than the amount introduced into the sample. Low surrogate recovery would also indicate a low bias. A high bias means the reported concentration is most likely an overestimate of the true concentration. For example, data may be biased high when recovery of QA/QC compounds is significantly higher than the amount in the sample. A bias is unknown when it is impossible to ascertain whether the concentration is an overestimate or an underestimate. For example, an unknown bias could result when surrogate recoveries exceed method recovery criteria and matrix spike/matrix spike duplicate compounds are below method recovery criteria and fail the relative percent difference (RPD) criteria in the same sample.

Despite the presence of bias in reported concentrations, certain qualified data may be used without the application of adjustment factors for determining an observed release under certain circumstances. The following are examples of using "J" qualified data without adjustment factors:

- Low bias release samples are likely to be underestimates of true concentrations. If the reported concentration of a low bias release sample is three times above unbiased background levels, these release samples would still meet the HRS criteria. The true concentrations would still be three times above the background level.

- High bias background samples are likely to be overestimates of true concentrations. If the reported concentration of unbiased release samples are three times above the reported background concentration, they would still meet the HRS observed release criteria because they would still be three times above the true background concentration.

The above examples show that both low bias "J" qualified release samples at their reported concentrations and high bias "J" qualified background samples may be used at their reported concentrations in these situations.

High bias release samples may not be used at their reported concentrations because they are an overestimate of true concentrations in this situation; resampling and/or re-analysis of the release samples should be considered. The true difference in the background and release concentrations may be less than the HRS criteria for establishing an observed release. The reported concentration for low bias background concentrations may not be compared to release samples because it is most likely an underestimate of background level; the release sample concentration may not significantly exceed the true background concentration. However, in lieu of re-sampling and/or re-analysis, high bias release data and low bias background data may be used with adjustment factors which compensate for the probable uncertainty in the analyses.

ADJUSTMENT FACTORS FOR BIASED "J" QUALIFIED DATA

Applying adjustment factors to "J" qualified data will enable EPA to be more confident that the increase in contaminant concentrations between the background and

EXHIBIT 2
EPA CLP DATA QUALIFIERS AND THEIR USABILITY FOR DOCUMENTING AN OBSERVED RELEASE

Usable*		Not Usable	
"U"	The substance or analyte was analyzed for, but no quantifiable concentration was found at or above the CRQL (*CLP National Functional Guidelines for Data Review*).	"N"	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification" *(CLP National Functional Guidelines for Data Review).*
"J"	The analyte was positively identified--the associated numerical value is the approximate concentration of the analyte in the sample. The "J" qualifier indicates that one or more QA/QC requirements have not met contract required acceptance criteria, but the instrumentation was functioning properly during the analysis. For example, a "J" qualifier may indicate that the sample was difficult to analyze or that the value may lay near the low end of the linear range of the instrument. "J" data are considered biased, but provide definitive analyte identification *(CLP National Functional Guidelines for Data Review).*	"R"	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte can not be verified and the result has been rejected. A sample result may be qualified with an "R" qualifier when the instrument did not remain "in control" or the stability or sensitivity of the instrument were not maintained during the analysis *(CLP National Functional Guidelines for Data Review).*
"UJ"	The analyte was not quantifiable at or above the CRQL. In addition to not being quantifiable, one or more QA/QC requirements have not met contract acceptance criteria *(CLP National Functional Guidelines for Data Review).*	"NJ"	The analysis indicates the presence of the analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration *(CLP National Functional Guidelines for Data Review).*

* Usable under certain circumstances as explained in this fact sheet.

release samples is due to a release. The adjustment factors are applied as "safety factors" to compensate for analytical uncertainty, allowing biased data to be used for determining an observed release. Dividing the high bias result by an adjustment factor deflates it from the high end of the acceptable range towards a low bias value. Multiplying a low bias concentration by an adjustment factor inflates it to the high end of the acceptable range.

Tables 1 through 4 (pages 11 - 18) present analyte and matrix-specific adjustment factors to address the analytical uncertainty when determining an observed release using high bias release samples and low bias background data. The factors are derived from percent recoveries of matrix spikes, surrogates, and laboratory control samples in the CLP Analytical Results Database (CARD) from January 1991 to March 1996. A total of 32,447 samples were reviewed for volatile organic analytes; 32,913 samples for semivolatile organic analytes; 59,508 samples for pesticides/PCB analytes; and 5,954 samples for inorganic analytes.

The range of CARD data for each analyte includes 97 percent of all percent recoveries in the database, discarding outliers. The adjustment factors are ratios of percent recovery values at the 98.5 and 1.5 percentiles. The ratios generally show a consistent pattern.

Adjustment factors have been determined for all analytes in the CLP Target Compound List (organic analytes) and Target Analyte List (inorganic analytes). A tiered approach was used to derive the organic adjustment factors. If available, percent recoveries for surrogates

were examined first, followed by matrix spike recoveries. When both matrix spike and surrogate data were available for the same analyte, the larger adjustment factor (representing more extreme high and low percent recoveries) was used. Laboratory control samples were used to calculate the inorganic adjustment factors. Quarterly blind sample data were not used to determine adjustment factors because of the small data set available. A default adjustment factor of 10 was used for analytes when percent recovery data were unavailable.

The adjustment factors do not correct the biased sample concentration to its true value. Such a "correction" is not possible. CARD data do not differentiate and quantify individual sources of variation. Instead, the ratio of percentile used to develop the adjustment factors represents a "worst-case" scenario. The adjustment factors either inflate the background values to the high end of the range or deflate the release data to the low end. Therefore, adjustment factors compensate or adjust for the apparent analytical variability when comparing a high bias value to a low bias value (see Exhibit 3).

USING THE ADJUSTMENT FACTORS

This section of the fact sheet demonstrates how the adjustment factors can be used with "J" qualified data for HRS scoring purposes including documentation and detection limit issues.

Documentation Requirements for Use of Qualified Data

When using "J" qualified data to determine an observed release, include a discussion of "J" qualifiers from the data validation report and cite it as a reference in the site assessment report or HRS documentation record. If adjustment factors are applied to "J" qualified data, reference and cite this fact sheet. These steps will ensure that the direction of bias is documented and will demonstrate how the biases have been adjusted.

Detection Limit Restrictions

Adjustment factors may only be applied to "J" qualified data with concentrations above the CLP CRQL for organics or CRDL for inorganics. "J" qualified data with concentrations below the CRQL can not be used to document an observed release except as specified in the previous section entitled "Using "UJ" Qualified Data."

Application of Factors

Exhibit 3 shows how to apply the factors to "J" qualified data. Multiply low bias background sample results by the analyte-specific adjustment factor or the default factor of 10 when an analyte-specific adjustment factor is not available. The resulting new background value effectively becomes a high bias value that may be used to determine an observed release. Divide high bias release sample data by the analyte-specific adjustment factor or the default factor of 10 when an analyte-specific adjustment factor is not available. The resulting new release sample value effectively becomes a low bias value that may be used to determine an observed release.

Note: High bias background data, low bias release data, and unbiased data may be used at their reported concentrations.

Note: Adjusted release and background values must still meet HRS criteria (e.g., release concentration must be at least three times above background level) to determine an observed release.

Examples Using Trichloroethene in Soil and Water

1. *Release water sample is unbiased, background water sample is unbiased but all data are qualified with a "J" due to an contractual laboratory error not analytical error.*

Background sample value: 12 µg/L (J) *no bias*
Release sample value: 40 µg/L (J) *no bias*

The CRQL for trichloroethene is 10 µg/Kg for soil and 10 µg/L for water.

In this example, it was determined that the qualification of the data is not related to bias in the reported concentrations. Thus, use of adjustment factors is not needed and an observed release is established if all other criteria are met.

2. *Release soil sample data is biased low, background soil sample data is biased high.*

Background sample value: 12 µg/Kg (J) *high bias*
Release sample value: 40 µg/Kg (J) *low bias*

In this example, the direction of bias indicates that the true release value may be higher and the true background value may be lower than the reported values. In any event, the release sample concentration still exceeds background by more than three times, so an observed release is established, provided all other HRS

EXHIBIT 3 USE OF ADJUSTMENT FACTORS FOR "J" QUALIFIED DATA		
Type of Sample	**Type of Bias**	**Action Required**
Background Sample	No Bias	None: Use concentration without factor
	Low Bias	Multiply concentration by factor
	High Bias	None: Use concentration without factor
	Unknown Bias	Multiply concentration by factor
Release Sample	No Bias	None: Use concentration without factor
	Low Bias	None: Use concentration without factor
	High Bias	Divide concentration by factor
	Unknown Bias	Divide concentration by factor

criteria are met. Use of the adjustment factors is not needed.

3. *Release soil sample data is unbiased, background soil sample is biased low.*

Background sample value: 12 µg/Kg (J) *low bias*
Release sample value: 30 µg/Kg *no bias*

In this example, the true background value is assumed to be less than the reported value; however, an observed release may still be possible. To use the data to establish an observed release, multiply the background sample data value by the adjustment factor given for trichloroethene in soil (2.11). No adjustment factor is needed for the release sample.

New background sample value:
(12 µg/Kg) x (2.11) = 25.32 µg/Kg (J) *high bias*

The release sample concentration does not meet or exceed the new background level by three times, so an observed release is not established.

4. *Release water sample data is biased high, background water sample data is unbiased.*

Background sample value: 15 µg/L *no bias*
Release sample value: 70 µg/L (J) *high bias*

In this example, the true release value may be lower than the reported value; however, an observed release may still be possible. To use the data to establish an observed release, divide the release sample by the adjustment factor for trichloroethene in water (1.66). No adjustment factor is needed for the background sample.

New release sample value:
(70 µg/L) ÷ (1.66) = 42.17 µg/L (J) *low bias*

The new release sample concentration does not meet or exceed the background level by three times, so an observed release is not established.

5. *Release soil sample data has unknown bias, background soil sample data has unknown bias.*

The following example is the most conservative approach to using adjustment factors with qualified data.

Background sample value: 20 µg/Kg (J) *unknown bias*
Release sample value: 325 µg/Kg (J) *unknown bias*

In this example, it is not possible to determine from the reported values if an observed release is possible. To use the data to establish an observed release, divide the release sample value and multiply the background sample value by the adjustment factor given for trichloroethene in soil (2.11).

New release sample value:
(325 µg/Kg) ÷ (2.11) = 154.03 µg/Kg (J) *low bias*

New background sample value:
(20 µg/Kg) x (2.11) = 42.2 µg/Kg (J) *high bias*

The new release sample is at least three times the new background concentration, so an observed release is established, provided all other HRS criteria are met.

ISSUES WITH THE USE OF THE ADJUSTMENT FACTOR APPROACH

Some issues were raised regarding the application of adjustment factors to qualified data during the Agency's internal review process.

One issue is that "J" qualifiers are added to analytical results for many reasons that may or may not have an effect on the accuracy and precision of the analytical result. The application of an adjustment factor to "J" qualified data in which bias is not affected could be considered overly conservative.

All qualified data should be carefully evaluated to determine if the data are biased. Based on the reasons for bias, the use of an adjustment factor should only be considered as a management tool that provides a quick screening of the data for site assessment, not a means for correcting the biased value to a true value. Application of adjustment factors are intended for use with qualified data reported at or above the CRQL and may not be applicable to data which are qualified but technically sound. As stated previously, qualified data should always be carefully reviewed on a case-by-case basis prior to use in HRS evaluation.

Another issue is the validity of "10" as a default adjustment factor. A default adjustment factor of 10 was a policy decision based on the range of adjustment factors and an industry approach. The default was chosen in order to account for the maximum variability regardless of the direction of the bias. Therefore, the default value of 10 is generally considered to be a conservative adjustment factor. EPA reviewed the use of the default value of 10 and determined that this value was conservative.

Even if use of the adjustment factors are sometimes overly conservative, this approach is preferable to not using the data at all. EPA maintains a "worst sites first" policy that only the sites considered most harmful to human health and/or the environment should be listed. EPA considers the use of adjustment factors appropriate as a management decision tool. However, discretion is needed when applying adjustment factors. The use of adjustment factors may not be appropriate in all cases.

USE OF OTHER ADJUSTMENT FACTORS

EPA Regions may substitute higher, but never lower, adjustment factor values for the ones listed in this fact sheet on a case-by-case basis when technically justified. For example, other adjustment factors may be applied to conform with site-specific Data Quality Objectives (DQOs) or with Regional Standard Operating Procedures (SOPs) (*Data Quality Objectives Process for Superfund*, Publication 9355.9-01).

SUMMARY

EPA Regions should not automatically discard "J" qualified data for site assessment purposes. However, site-specific data usability determinations may result in it not being used.

Data qualified under the EPA's CLP or from other sources of validated data may be used to demonstrate an observed release if certain measures are taken to ensure that the bias of the data qualifier is adjusted using the factor approach specified in this fact sheet. This fact sheet provides a management decision tool for making qualified data usable for documenting an observed release. The analyte and matrix-specific adjustment factors provided in Tables 1 through 4 of this fact sheet present these adjustment factors.

The scope of this fact sheet is limited to the situations described in Exhibit 1. The use of qualified analytical data without the adjustment factors presented in this fact sheet is limited. Higher adjustment factors may be substituted by EPA Regions on a case-by-case basis when technically justified by site-specific DQOs or SOPs.

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TABLE 1
FACTORS FOR VOLATILE ORGANIC ANALYTES

VOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
1,1,1-TRICHLOROETHANE	---	10.0	---	10.0
1,1,2,2-TETRACHLOROETHANE	---	10.0	---	10.0
1,1,2-TRICHLOROETHANE	---	10.0	---	10.0
1,1-DICHLOROETHANE	---	10.0	---	10.0
1,1-DICHLOROETHENE	7,031	2.71	5,015	2.35
1,2-DICHLOROETHANE-D4	32,446	1.52	25,516	1.38
1,2-DICHLOROETHENE (TOTAL)	---	10.0	---	10.0
1,2-DICHLOROPROPANE	---	10.0	---	10.0
2-BUTANONE	---	10.0	---	10.0
2-HEXANONE	---	10.0	---	10.0
4-METHYL-2-PENTANONE	---	10.0	---	10.0
ACETONE	---	10.0	---	10.0
BENZENE	7,024	1.97	5,001	1.64
BROMODICHLOROMETHANE	---	10.0	---	10.0
BROMOFORM	---	10.0	---	10.0
BROMOFLUOROBENZENE	32,444	1.7	25,518	1.26
BROMOMETHANE	---	10.0	---	10.0
CARBON DISULFIDE	---	10.0	---	10.0

TABLE 1
FACTORS FOR VOLATILE ORGANIC ANALYTES

VOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
CARBON TETRACHLORIDE	---	10.0	---	10.0
CHLOROBENZENE	7,018	2.0	5,015	1.54
CHLOROETHANE	---	10.0	---	10.0
CHLOROFORM	---	10.0	---	10.0
CHLOROMETHANE	---	10.0	---	10.0
CIS-1,3-DICHLOROPROPENE	---	10.0	---	10.0
DIBROMOCHLOROMETHANE	---	10.0	---	10.0
ETHYLBENZENE	---	10.0	---	10.0
METHYLENE CHLORIDE	---	10.0	---	10.0
STYRENE	---	10.0	---	10.0
TETRACHLOROETHENE	---	10.0	---	10.0
TOLUENE-D8	32,447	1.63	25,526	1.21
TRANS-1,3-DICHLOROPROPENE	---	10.0	---	10.0
TRICHLOROETHENE	6,988	2.11	4,938	1.66
VINYL CHLORIDE	---	10.0	---	10.0
XYLENE (TOTAL)	---	10.0	---	10.0

TABLE 2
FACTORS FOR SEMIVOLATILE ORGANIC ANALYTES

SEMIVOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
1,2,4-TRICHLOROBENZENE	6,792	4.83	4,605	3.71
1,2-DICHLOROBENZENE-D4	32,848	4.22	21,506	3.0
1,3-DICHLOROBENZENE	---	10.0	---	10.0
1,4-DICHLOROBENZENE	6,796	6.0	4,599	3.85
2,2'-OXYBIS(1-CHLOROPROPANE)	---	10.0	---	10.0
2,4,6-TRIBROMOPHENOL	32,605	9.38	21,509	3.57
2,4,5-TRICHLOROPHENOL	---	10.0	---	10.0
2,4,6-TRICHLOROPHENOL	---	10.0	---	10.0
2,4-DICHLOROPHENOL	---	10.0	---	10.0
2,4-DIMETHYLPHENOL	---	10.0	---	10.0
2,4-DINITROPHENOL	---	10.0	---	10.0
2,4-DINITROTOLUENE	6,798	4.88	4,623	3.52
2,6-DINITROTOLUENE	---	10.0	---	10.0
2-CHLORONAPHTHALENE	---	10.0	---	10.0
2-CHLOROPHENOL-D4	32,798	4.08	21,506	2.92
2-FLUOROBIPHENYL	32,913	3.38	21,532	2.84
2-FLUORPHENOL	32,781	5.05	21,511	3.34
2-METHYLNAPHTHALENE	---	10.0	---	10.0
2-METHYLPHENOL	---	10.0	---	10.0
2-NITROANILINE	---	10.0	---	10.0
2-NITROPHENOL	---	10.0	---	10.0
3,3'-DICHLOROBENZIDINE	---	10.0	---	10.0
3-NITROANILINE	---	10.0	---	10.0
4,6-DINITRO-2-METHYLPHENOL	---	10.0	---	10.0
4-BROMOPHENYL-PHENYLETHER	---	10.0	---	10.0

TABLE 2
FACTORS FOR SEMIVOLATILE ORGANIC ANALYTES

SEMIVOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
4-CHLORO-3-METHYLPHENOL	6,715	6.26	4,609	4.46
4-CHLOROANILINE	---	10.0	---	10.0
4-CHLOROPHENYL-PHENYLETHER	---	10.0	---	10.0
4-METHYLPHENOL	---	10.0	---	10.0
4-NITROANILINE	---	10.0	---	10.0
4-NITROPHENOL	6,627	9.33	4,586	5.96
ACENAPHTHENE	6,773	4.68	4,600	3.63
ACENAPHTHYLENE	---	10.0	---	10.0
ANTHRACENE	---	10.0	---	10.0
BENZO(A)ANTHRACENE	---	10.0	---	10.0
BENZO(A)PYRENE	---	10.0	---	10.0
BENZO(B)FLUORANTHENE	---	10.0	---	10.0
BENZO(G,H,I)PERYLENE	---	10.0	---	10.0
BENZO(K)FLUORANTHENE	---	10.0	---	10.0
BIS(2-CHLOROETHOXY)METHANE	---	10.0	---	10.0
BIS(2-CHLOROETHYL)ETHER	---	10.0	---	10.0
BIS(2-ETHYLHEXYL)PHTHALATE	---	10.0	---	10.0
BUTYLBENZYLPHTHALATE	---	10.0	---	10.0
CARBAZOLE	---	10.0	---	10.0
CHRYSENE	---	10.0	---	10.0
DI-N-BUTYLPHTHALATE	---	10.0	---	10.0
DI-N-OCTYLPHTHALATE	---	10.0	---	10.0
DIBENZ(A,H)ANTHRACENE	---	10.0	---	10.0
DIBENZOFURAN	---	10.0	---	10.0
DIETHYLPHTHALATE	---	10.0	---	10.0

TABLE 2
FACTORS FOR SEMIVOLATILE ORGANIC ANALYTES

SEMIVOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
DIMETHYLPHTHALATE	—	10.0	—	10.0
FLUORANTHENE	—	10.0	—	10.0
FLUORENE	—	10.0	—	10.0
HEXACHLOROBENZENE	—	10.0	—	10.0
HEXACHLOROBUTADIENE	—	10.0	—	10.0
HEXACHLOROCYCLOPENTADIENE	—	10.0	—	10.0
HEXACHLOROETHANE	—	10.0	—	10.0
INDENO(1,2,3-CD)PYRENE	—	10.0	—	10.0
ISOPHORONE	—	10.0	—	10.0
N-NITROSO-DI-N-PROPYLAMINE	6,725	4.92	4,513	4.0
N-NITROSODIPHENYLAMINE(1)	—	10.0	—	10.0
NAPHTHALENE	—	10.0	—	10.0
NITROBENZENE-D5	32,867	3.96	21,533	2.73
PENTACHLOROPHENOL	6,597	72.5	4,550	10.12
PHENANTHRENE	—	10.0	—	10.0
PHENOL-D5	32,855	3.85	21,489	3.53
PYRENE	6,543	11.86	4,612	5.67
TERPHENYL-D14	32,899	4.35	21,541	6.32

TABLE 3
FACTORS FOR PESTICIDES/PCB ANALYTES

VOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
4,4'-DDD	---	10.0	---	10.0
4,4'-DDE	---	10.0	---	10.0
4,4'-DDT	5,343	12.82	3,850	7.14
ALDRIN	5,526	14.26	3,829	6.63
ALPHA-BHC	---	10.0	---	10.0
ALPHA-CHLORDANE	---	10.0	---	10.0
AROCLOR-1016	---	10.0	---	10.0
AROCLOR-1221	---	10.0	---	10.0
AROCLOR-1232	---	10.0	---	10.0
AROCLOR-1242	---	10.0	---	10.0
AROCLOR-1248	---	10.0	---	10.0
AROCLOR-1254	---	10.0	---	10.0
AROCLOR-1260	---	10.0	---	10.0
BETA-BHC	---	10.0	---	10.0
DECACHLOROBIPHENYL	57,315	17.79	33,592	10.0
DELTA-BHC	---	10.0	---	10.0
DIELDRIN	5,539	11.93	3,861	4.87

TABLE 3
FACTORS FOR PESTICIDES/PCB ANALYTES

VOLATILE ORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
ENDOSULFAN I	---	10.0	---	10.0
ENDOSULFAN II	---	10.0	---	10.0
ENDOSULFAN SULFATE	---	10.0	---	10.0
ENDRIN	5,521	14.13	3,850	5.33
ENDRIN ALDEHYDE	---	10.0	---	10.0
ENDRIN KETONE	---	10.0	---	10.0
GAMMA-BHC (LINDANE)	5,545	11.79	3,832	10.0
GAMMA-CHLORDANE	---	10.0	---	10.0
HEPTACHLOR	5,548	7.88	3,836	5.26
HEPTACHLOR EPOXIDE	---	10.0	---	10.0
METHOXYCHLOR	---	10.0	---	10.0
TETRACHLORO-M-XYLENE	59,508	8.5	33,787	5.29
TOXAPHENE	---	10.0	---	10.0

TABLE 4
FACTORS FOR INORGANIC ANALYTES

INORGANIC ANALYTES	SOIL MATRIX		WATER MATRIX	
	Number of CARD Samples Reviewed	Factor	Number of CARD Samples Reviewed	Factor
ALUMINUM	5387	1.66	6208	1.30
ANTIMONY	5392	1.98	6170	1.27
ARSENIC	5675	1.74	6303	1.35
BARIUM	5360	3.99	6201	1.25
BERYLLIUM	5399	1.28	6208	1.25
CADMIUM	5385	1.41	6166	1.29
CALCIUM	5383	1.28	6201	1.24
CHROMIUM	5389	1.29	6210	1.30
COBALT	5392	1.25	6212	1.27
COPPER	5394	1.22	6205	1.25
CYANIDE	3281	1.55	225	1.36
IRON	5391	1.34	6216	1.27
LEAD	5982	1.44	6384	1.31
MAGNESIUM	5397	1.23	6210	1.24
MANGANESE	5395	1.24	6214	1.28
MERCURY	5954	1.83	256	1.50
NICKEL	5400	1.35	6210	1.29
POTASSIUM	3874	17.49	6175	1.24
SELENIUM	5620	2.38	6278	1.41
SILVER	5392	1.74	6215	1.42
SODIUM	5024	25.43	6195	1.26
THALLIUM	5621	1.86	6253	1.37
VANADIUM	5393	1.34	6212	1.25
ZINC	5404	1.50	6224	1.29

TNRCC

HRS DOC RECORD

Patick Bayou Site

Deer Park
Harris County, Texas

Volume II of II

November 2000

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Reference 10

Screening Site Inspection
Field Log Book Notes & Photographs

National Brand
43-571
Made in USA

Field Log Book for SSI
Patrick Bayou Site

TXD Pending, SWR No. None
Screening Site Inspection (SSI)

Monday 3/27/00 Day 01 - Arrived at the R12 office and met Johnny Kennedy & Linda Broach. Discussed logistics and equipment requirements for Patrick Bayou SSI.

Day 01 12:30 pm - Departed R12 office for meeting at Shell Chemical Co. facility, Bldg 100, Center Road. Deer Park, TX. Other field team members arrived.

	Field Team Members	TITLE	Phone No.
1.	JAMES D. THOMPSON / R4	CAS III	(817) 469-6750
2.	Judie MATTOCKS / CO	Admin Spec	(512) 239-5674
3.	John Syer / CE	Asst Proj Mgr	(512) 239-4136
4.	Johnny Kennedy / R12	Proj Mgr	(713) 767-3552
5.	Linda BROACH / R12		(713) 767-[illegible]

Initial Safety Brief / Plant Orientation Briefings

Monday 3/27/00 Day 01 13:15 pm - Met company representatives and team members from Austin arrived. Signed/notarized access agreements for Shell Chemical Company and Shell Refinery. All other access agreements had been signed by TNRCC/Companies. Accesses granted for all areas surrounding Patrick Bayou.

Monday 3/27/00 Day 01 13:30 pm - Lubrizol Corporation presented 10-min safety movie and briefed company safety policy.

13:45 pm Oxyvinyl LP presented 10-min safety movie and issued cards. Will provide gain escape kits for chlorine gas to all TNRCC field team members.

3/27/00 [signature]

2

(continued from page 1)

OxyVinlys™
Houston Operations

James D. Thompson
Print Visitors Name

VISITOR

1 year from issue
Date of Expiration

LUBRIZOL

James Thompson
Name

TNRCC
Company Name

has viewed the Visitor Orientation Program on 3/27/00 (Date). This card is valid for 1 year from date of issue. HAZARD PREVENTION DEPT.

14:10 pm - Shell Dal Carry over/safety brief.
14:30 pm - Proceeded to site and identified sample locations within Patrick Bayou and near the Deer Park WWTP. Identified possible staging location for boat launch. Company reps accompanied us on tour identifying hazardous areas. We

Table 1. Point source outfalls to Patrick Bayou and the nearby HSC. Twelve outfalls carrying stormwater only have been excluded from this listing. note

Receiving Water	Permit #	Outfall	Permitted Flow (mgd)	Permittee
Houston	00458	001	5.76	Rohm & Haas
Ship	00305	005	1.75	Occidental Chemical
Channel	00305	004		Occidental Chemical
Patrick	00305	003 ✓	8.0	Occidental Chemical
Bayou	00305	002 ✓	105	Occidental Chemical
I	00305	001 ✓	8.0	Occidental Chemical
I	00403	001 ✓	2.3	Shell Refinery
I	00402	001	9.9	Shell Chemical
I	00639	001 ✓	1.0	Lubrizol Corp.
V	10519	001 ✓	6.0	City of Deer Park
East Fork Patrick B.	01173	001 ✓	0.43	Praxair

Listed Outfalls to Patrick Bayou

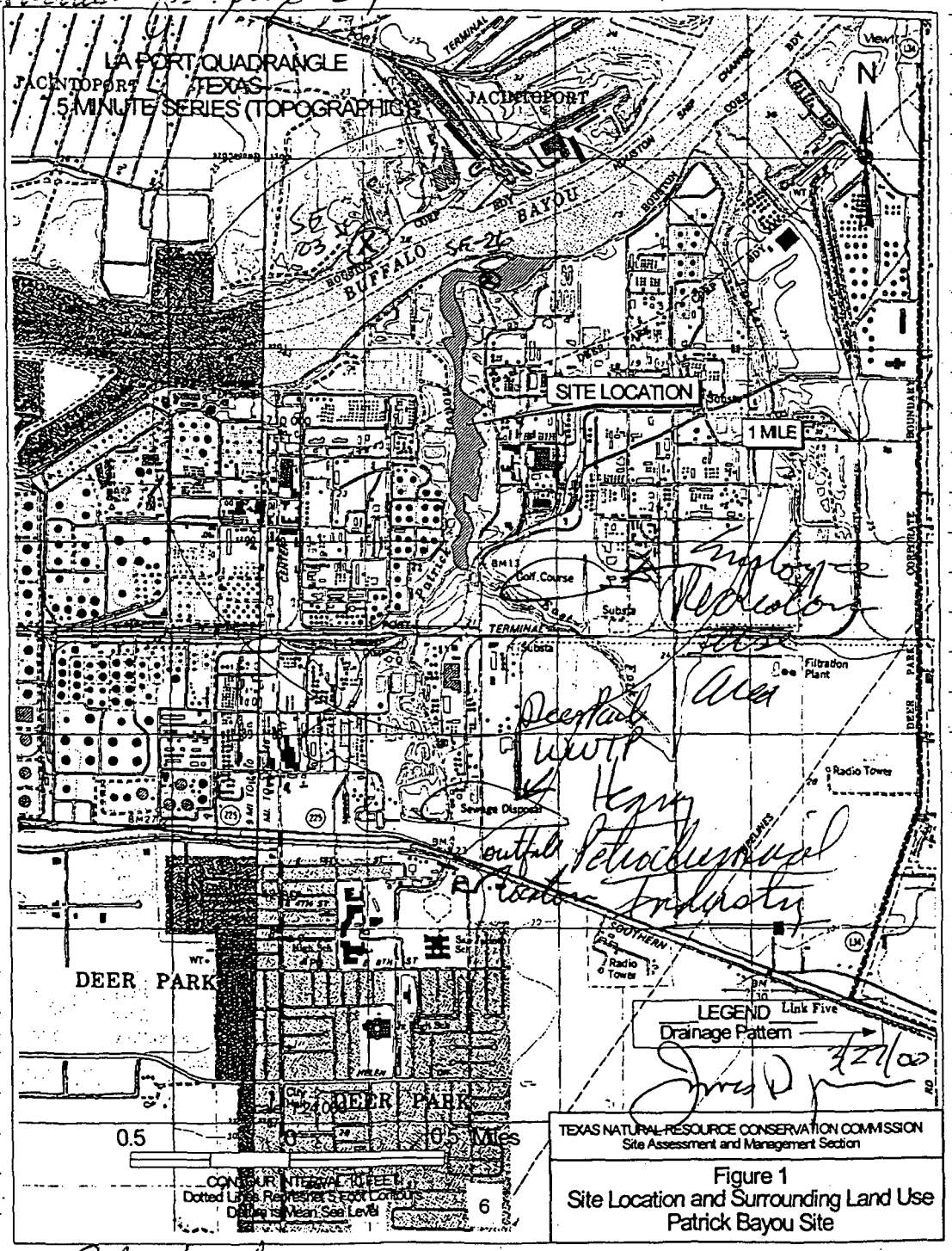
see map on page 11 for locations

went inside gate to observe outfall location

were informed we would need escorts most of the time while on company property near industrialized areas.

[signature] 4/27/00

(continued from page 2)



Site Location Map - Adjacent Land Use - 1 mile
Patrick Bayou Surface Water Pathway

4

(Continued from page 3)

OXYVINYLS

Scott Peters
Environmental Engineer

Oxy Vinyls, LP
Houston Operations
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Deer Park, Texas 77536-0500
281 476-2011 FAX: 281/476-2016
Internet Address: Howard_S._Peters@oxy.com

PARSONS

9906 Gulf Freeway, Suite 100
Houston, Texas 77034
Direct: (713) 943-5443
Fax: (713) 943-5427
srinivasulu.jalla@parsons.com

Consultant who received split samples

Srinivas Jalla, E.I.T.
~~Environmental Consultant~~
Parsons Engineering Science, Inc.
A Unit of Parsons Infrastructure & Technology Group

Shell Chemicals

Janice M. Wendel
Staff Environmental Specialist
Environmental Compliance

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LUBRIZOL

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Environmental Engineer

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LUBRIZOL

JULIUS REXER
Sr. Environmental Control Engineer

THE LUBRIZOL CORPORATION
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PASADENA, TEXAS 77507
PHONE: 281/884-5284, FAX: 281/884-5232
Internet: jare@lubrizol.com

3/27/00

SITE RECONNAISSANCE CHECKLIST

I. General
1. Name and title of site contact. (see cards)
2. Telephone number.
3. Site address.
4. Mailing address (if different).
5. Name of owner and/or operator.
6. Mailing address.

II. Site History
1. How long has current owner/operator been at site?
2. What were previous uses of site? Who were previous owners?
3. Size of site (acres).
4. Is any other property used that is not contiguous with site?
5. Permits (RCRA, TDH, etc.) (see page 2)
6. Any past spills or other environmental or accident problems. (Check RCRA folders)
7. What were previous waste management practices?

III. Current Operations
1. What is currently being done at facility? absent
2. What are waste management practices?
3. What are hazardous chemical management practices?
4. List major hazardous chemicals/constituents present and past.
5. Discuss sources (e.g., tanks, impoundments, containers, etc.).
6. Number of employees - current, peak.

IV. Source Characteristics
1. Identify type of wastes and quantities disposed of at site.
   a. Identify source of information.
   b. Photograph.
   c. Dimension (quantity, volume, area) of waste locations.
   d. Containment controls (clay cap, clay liner, vegetative cover, etc.)
   e. Existing data.
   f. Condition/integrity of storage/disposal units.

see outfall data

V. ~~Groundwater~~ Pathway
1. Distance from source to nearest well. Identify name and address of well owner, if possible - and estimate well usage (number of people served, irrigation, supplemental, etc.).
2. Verify wells within range of site. Indicate depth to water for each well and number of people served. Identify as many owners and addresses as practically feasible.
   a. 0 - 0.25 mile
   b. 0.25 - 0.50 mile
   c. 0.50 - 1.00 mile
   d. 1.00 - 2.00 mile
   e. 2.00 - 3.00 mile
   f. 3.00 - 4.00 mile
3. Aquifer nearest wells are screened in, and water quality.

not extended

Site Reconnaissance Checklist
for Off-Site and On-Site Reconnaissance

James Dipp 5/27/00

Site Reconnaissance Checklist, continued

VI. Surface Water Pathway

1. Identify the TNRCC Basin and Stream Segment where the site is located.
2. Describe surface water quality including:
   a. average discharge,
   b. total basin drainage area,
   c. TNRCC surface water quality monitoring stations.
3. Are there surface water bodies within 2 miles of site?
4. Provide sketch of surface water runoff and flow patterns for 15 stream-miles downstream.
5. identify intakes along surface water route within 15 stream-miles downstream. none identified for drinking water
6. What is water use at each intake. industrial use only
7. Identify fisheries along the 15 stream-mile downstream pathway. HSC and Chamdoun Park downstream
8. Identify sensitive environments along the 15 stream-mile downstream pathway (see attached list).
9. Identify downstream recreational uses.
10. Estimate approximate flow rates for each water body within the 15 stream-mile target distance (i.e., <10 cfs, 10-100 cfs, 100-1,000 cfs, 1,000- 10,000 cfs, etc.). Estimate length of each stream segment.
11. Identify the annual rainfall and net rainfall at the site.
12. Is site in flood plain (10 year, 100 year, 500 year)?
13. Estimate upgradient drainage area limits (watershed).
14. Draw a sketch of drainage from site to nearest surface water including any other contributing tributaries.
15. Identify recreational uses downstream (15 miles). fishy, boaty

VII. Soil Exposure Pathway

1. Describe status of site access, fencing, gates, locks, condition of security controls.
2. Describe adjacent land use.
3. Describe off-site runoff patterns.
4. Describe number of people with residence, school, or day care on-site or within 200 yds.
5. Locate nearest school or day care.
6. Number of workers on-site (include maximum number to cover work on-site).
7. Identify sensitive environments, (see list end of checklist).
8. Describe any off-site runoff pattern existing at the site. Stormwater retention tanks / discharges

VIII. Air Pathway

1. Estimate number of people within 4 miles (city or county records)
   a. 0.25 mile
   b. 0.25 - 0.50 mile
   c. 0.50 - 1.00 mile
   d. 1.00 - 2.00 mile
   e. 2.00 - 3.00 mile
   f. 3.00 - 4.00 mile
2. Shortest distance from source to occupied building.
3. Identify known releases to air.

not watershed

Site Reconnaissance Checklist (continued)

James Dupuy 3/30/00

Site Reconnaissance Checklist, continued

NA
4. Identify reports of adverse health effects.
5. Identify existence of sensitive environments within 4 miles (see end of checklist for list).

Miscellaneous Inquiries

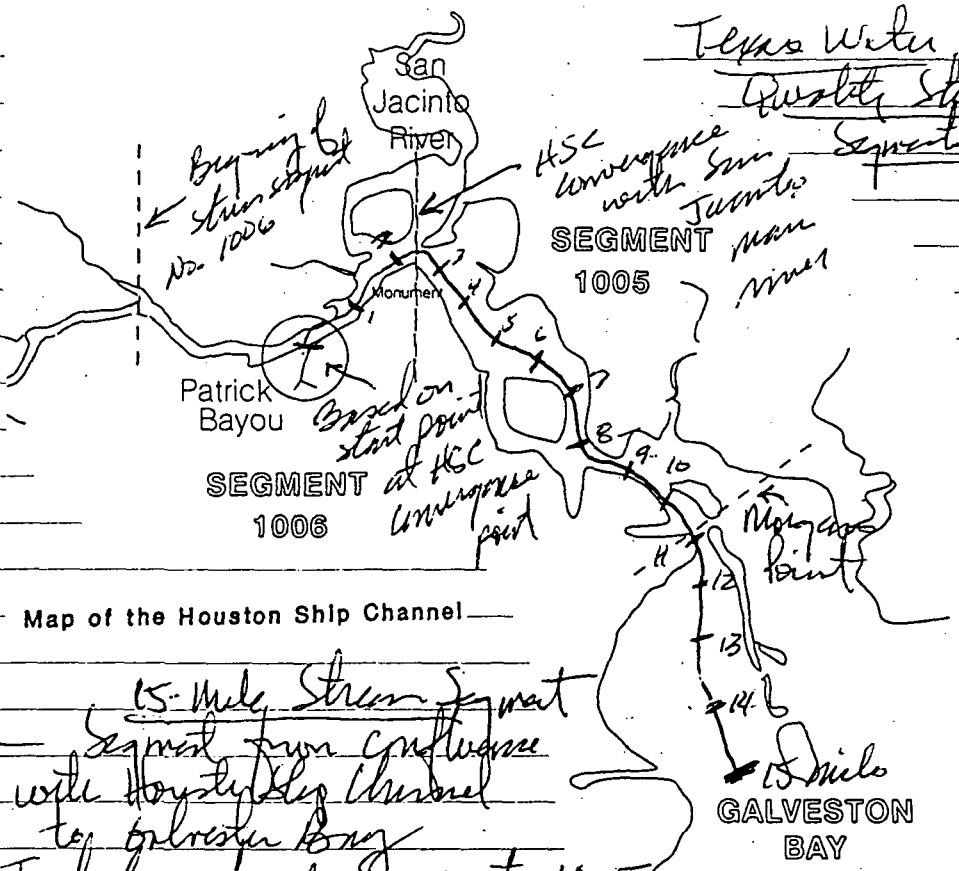
1. Are any additional aerial photographs depicting site history available?
2. Meteorological data.
3. Nearest recreational area? Hospital?
4. Local water supply sources?

Site Sketches to Include

1. Date(s) of visit.
2. Well locations (including nearest to site).
3. Storage areas (past and present).
4. UST and above ground storage tanks.
5. Waste Areas.
6. Buildings (See Page 3)
7. Access roads.
8. Areas of ponded water, or depressions in surface.
9. Drainage direction.
10. Photograph locations and directions.
11. Vegetation and significant landscaped features.
12. Any irregular appearance for soil, vegetation, tanks, etc. such as may result from spill, backfill operation, recent dirt moving work, etc.

3/16/00

Texas Water Quality Stream Segments



Map of the Houston Ship Channel

15-Mile Stream Segment
- Segment from confluence with Houston Ship Channel to Galveston Bay
- Includes portion of Segment 1005

Identified Targets within In-Water Segment

Surface Water Intakes - no drinking water intakes located within Patrick Bayou based on visual inspection and interview with knowledgable Company representatives. Surface water is used for process water (industrial use) withdrawn from surface impoundments within property boundaries. There are process water intakes along the HSC outside the site boundary. Residences, Schools, Day Care Centers - none within Patrick Bayou.

Sensitive Environments - wetlands located along SE shoreline adjacent to confluence of East Fork.

3/2/00

Table 2. Proposed Samples to be Collected

Sample Matrix	Sample ID	Sample Location	Rationale
Sediment Samples	SE-01	Unaffected upstream sediment sample collected from Houston Ship Channel at depth 0"to 24".	Obtain upstream background sediment sample for attribution of contaminants.
	SE-02	Unaffected upstream sediment sample collected from Houston Ship Channel at depth 0"to 24".	Obtain upstream background sediment sample for attribution of contaminants.
	SE-03	Unaffected upstream sediment sample collected from Houston Ship Channel at depth 0"to 24".	Obtain upstream background sediment sample for attribution of contaminants.
	SE-04	Sediment sample collected from the confluence at the Houston Ship Channel.	Assess site contamination migrating along the surface water pathway.
	SE-05	Second sediment sample collected from the confluence at the Houston Ship Channel.	Assess site contamination migrating along the surface water pathway.
	SE-06	Quality Assurance/Quality Control (QA/QC).	Duplicate sediment sample collected at the same location as SE-05.
	SE-07	Sediment sample collected beyond the confluence and before the industrial outfall at Sta 02.	Assess site contamination migrating along the surface water pathway.
	SE-08	Second sediment sample collected beyond the confluence and before the industrial outfall at Sta 02.	Assess site contamination migrating along the surface water pathway.
	SE-09	Quality Assurance/Quality Control (QA/QC).	Duplicate sediment sample collected at the same location as SE-08.
	SE-10	Unaffected upstream sediment sample collected from the East Fork tributary at depth 0"to 24".	Obtain upstream background levels for attribution of site contaminants.
	SE-11	Unaffected upstream sediment sample collected from the East Fork tributary at depth 0"to 24".	Obtain upstream background levels for attribution of site contaminants.
	SE-12	Unaffected upstream sediment sample collected from the East Fork tributary at depth 0"to 24".	Obtain upstream background levels for attribution of site contaminants.
	SE-13	Sediment sample collected downstream from the Praxair permitted outfall 001 (Replicating Sta 10).	Assess site contamination migrating along the surface water pathway.
	SE-14	Sediment sample collected downstream from the OxyVinyl Golf Course at the Patrick Bayou entry.	Assess site contamination migrating along the surface water pathway.
	SE-15	Sediment sample collected upstream from the Deer Park WWTP permitted outfall. (Replicating Sta 09).	Determine background levels upstream from the Deer Park WWTP outfall.
	SE-16	Quality Assurance/Quality Control (QA/QC).	Duplicate sediment sample collected at the same location as SE-14.
	SE-17	Sediment sample collected downstream from the combined Lubrizol Corp. outfall 001 and WWTP outfall 001 discharge point. (Replicating Sta 07).	Assess site contamination migrating along the surface water pathway.

Fishery Targets - Tox Work Segment / Patrick Bayou

Fishery Targets - Patrick Bayou - Since industries along shoreline restrict access to public and pipelines cross the bayou in the water section, fishing is not likely to occur within the bayou. Some it is not easily accessible to the general public. 4/27/00

Sample Matrix	Sample ID	Sample Location	Rationale
	SE-18	Sediment sample collected downstream from the Shell Oil Company/Shell Refinery outfalls C001 and R001. (Replicating Sta 06)	Assess site contamination migrating along the surface water pathway.
	SE-19	Sediment sample collected from the in-water segment of Patrick Bayou downstream of East Fork.	Assess site contamination migrating along the surface water pathway.
	SE-20	Sediment sample collected downstream from the OxyVinyl permitted outfall 001. (Replicating Sta 04).	Assess site contamination migrating along the surface water pathway.
	SE-21	Quality Assurance/Quality Control (QA/QC).	**Duplicate** sediment sample collected at the same location as SE-19.
	SE-22	Sediment sample collected downstream from the OxyVinyl permitted outfall 002.	Assess site contamination migrating along the surface water pathway.
	SE-23	Sediment sample collected downstream from the OxyVinyl permitted outfall 003 in a wetland area.	Assess site contamination that may be impacting a wetland habitat
	SE-24	Sediment sample collected downstream from the OxyVinyl permitted outfall 003. (Replicating an area further downstream from Sta 03).	Assess site contamination migrating along the surface water pathway.
	SE-25	Sediment sample collected from a wetland area within the bayou as it turns east towards the HSC.	Assess site contamination that may be impacting a wetland habitat
	SE-26	Sediment sample collected in the widest portion of lower Patrick Bayou. (Replicating Sta 2.5).	Assess site contamination migrating along the surface water pathway.
	SE-27	Sediment sample collected from the south shoreline of Patrick Bayou in a wetland area.	Assess site contamination that may be impacting a wetland habitat
Rinsate Samples	GW-01	Quality Assurance/Quality Control (QA/QC).	**Final equipment rinsate** sample *obtained before conducting sediment* sampling (as required).
	GW-02	Quality Assurance/Quality Control (QA/QC).	**Final equipment rinsate** sample after final sampling if used more than once (as required).
	GW-03	Quality Assurance/Quality Control (QA/QC).	**Field Blank** for VOA analysis of before equipment rinsate sample.
	GW-04	Quality Assurance/Quality Control (QA/QC).	**Field Blank** for VOA analysis of after equipment rinsate sample.

3/28/06

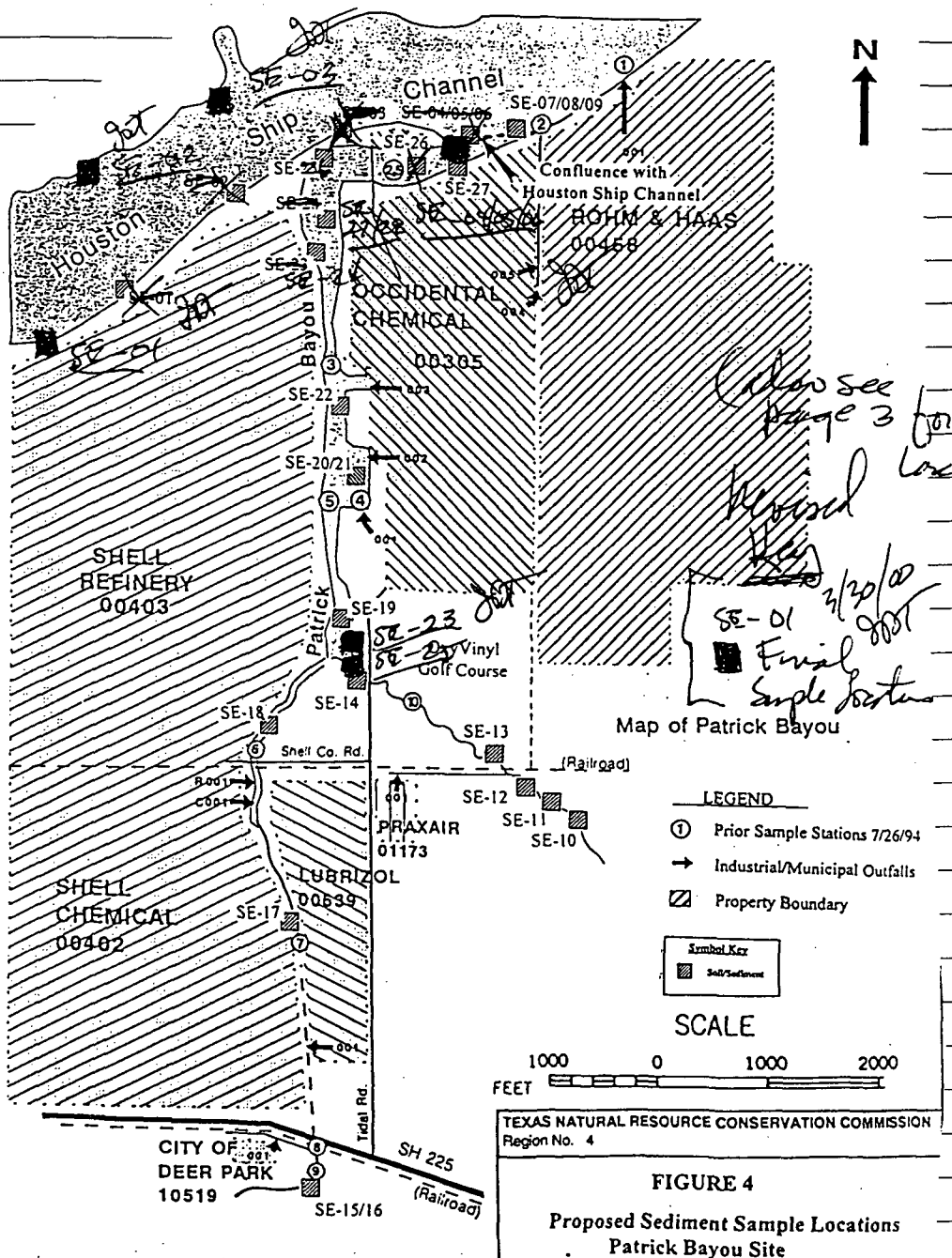


FIGURE 4

Proposed Sediment Sample Locations
Patrick Bayou Site

— Sample locations were adjusted in the field based on visual inspection of vegetation indicative of wetland areas and shoreline with Patrick Bayou (see above). 3/28/00

3/22/00 Day 02 - River Terrace Park, Channelview

Fishery Documentation - Houston Ship Channel downstream from Patrick Bayou.

Tuesday
8:55 hrs Photo #1 ✓ - Blue Crab fishing in River Terrace Park, Channelview, TX.

8:50 Am Photo #2 ✓ - Blue crab fishing along pier using bait-line and net.

9:00 Am Photo #3 - Boat launch from River Terrace Park, Channelview TX to collect HSC background samples.

9:05 hrs Photo #4 - San Jacinto Monument Park Crab Fishing along HSC using bait-line and net.

Forward: Observed local residents harvesting blue crabs at the River Terrace Park thoroughfare, TX while touring the TNRCC boat and along the Houston Ship Channel western the San Jacinto Monument Park (adjacent to the Battleship Texas) while proceeding to the upstream single locations (SE-01, SE-02 and SE-03).

Fishermen described using raw chicken placed on a string sunk to the bottom. When a crab starts to pull the chicken, the fishermen would slowly extract the bait and use a net to capture the crab as it comes to the surface. Personally observed a blue crab caught using this technique.

Jason Ryan 3/28/00

Sediment Sample Table

SE-01 – Background Sediment HSC

Station Location: SE-01 *

(*) split with Oxygen Consultant

	Sample ID#	C.O.C. Tag#
VOA	FGW45	6-209007
VOA	FGW45	6-209008
EXT	FGW45	6-209009
EXT	FGW45	6-209010
TOT	MFHW65	6-209011
CYN	MFHW65	6-209012

Date: 3/28/00

Time: 10:30 AM

Sampled by: L. BROACH

Description: Sediment sample along S. Shore, HSC

Decon Hit # 2000-2

Location: Point of Land Downstream Battery & Bridge/South shoreline.

Water Depth: 2 ft Sample depth: 0"–18" deep

Type Sample: Composite sample

Sediment Description: Sand with tan to black color

GPS Coordinates: F032816A

Converted Position
LAT: —
LONG: — GPS data lost JOT

Photo #5 @ 10:25 AM facing SW. Photo by: J.D. Thompson

Photo #6 @ 10:30 facing South. photo by: JD Thompson

James D. [illegible] 3/28/00

SE-02 - Background Sediment for HSC

Station Location: SE-02

	Sample ID#	C.O.C. Tag#
VOA	FGW46	6-209013
VOA	FGW46	6-209014
EXT	FGW46	6-209015
EXT	FGW46	6-209016
TOT	MFHW66	6-209017
CYN	MFHW66	6-209018

Date: 3/28/00

Time: 10:40 Am

Sampled by:

L. Brouch

Description: Sediment sample N. Shore HSC Decon Kit # 2000-2

Location: 1/4 mile east of HW 8 Bridge on north shore of HSC in beach area.

Water Depth: 1 ft.

Type Sample: Grab Sample Sample Depth: 0"-20" deep

Sediment Description: tan to black fine sand. small pieces of organic matter (ie leaves)

GPS Coordinates:

F032816B

Converted Position

LAT: —

LONG: —

GPS data lost

Photo #7 @ 10:40 AM facing north. Photo by J.D. Thompson

James D. Jim 3/28/00

SE-03 - Background Sediment for HSC

Station Location: SE-03

	Sample ID#	C.O.C. Tag#
VOA	FGW47	6-209019
VOA	FGW47	6-209020
EXT	FGW47	6-209021
EXT	FGW47	6-209022
TOT	MFHW67	6-209023
CYN	MFHW67	6-209024

Date: 3/28/00

Time: 10:55 Am

Sampled by:

L. BROWN

Description: Sediment sample N. shore HSC

Accon Kit # 2000-2

Location: 3/4 mile upchannel from Patrick Bayou (See map page 3) along beach.

Water Depth: 1 ft

Type Sample: Grab Sample Sample Depth: 0"-18" deep

Sediment Description: brown to to tan sand slight organic matter (leaves)

GPS Coordinates:

F032816C

Corrected Position

LAT: —

LONG: — GPS data lost SDT

Photo # 8 @ 10:55 - facing North. Photo by J.D. Thompson.

[signature] 3/28/00

SE-04 – Confluence @ HSC

Station Location: SE-04

	Sample ID#	C.O.C. Tag#
VOA	FGW48	6-209025
VOA	FGW48	6-209026
EXT	FGW48	6-209027
EXT	FGW48	6-209028
TOT	MFHW68	6-209029
CYN	MFHW68	6-209030

Date: 3/28/00

Time: 11:35 Am

Sampled by: L. Broach

Description: Sediment sample at confluence

Decon Hit #
bowl 2000-2
tap 2000-1

Location: Confluence of Palmetto Bayou and HSC

Water Depth: 2½ ft

Type Sample: Grab sample

Sample Depth: 0-18" deep

Sediment Description: Brown sand 4" deep to black mud. Definite sheen in water in bowl

GPS Coordinates:

F032817B

Corrected Position
LAT: —
LONG: — GPS data lost JDT

Photo # 13 JDT @ 11:30 fry north. Photo by J.D. Thompson
Photo # 14 JDT @ 11:35 fry south. photo by J.D. Thompson
Photo # 15 JDT @ 11:36 fry south. photo by J.D. Thompson

James D. Jr
3/28/00

SE-05 - 2ND Sediment Sample / Confluence @ HSC

Station Location: SE-05

	Sample ID#	C.O.C. Tag#
VOA	FGW49	6-209031
VOA	FGW49	6-209032
EXT	FGW49	6-209033
EXT	FGW49	6-209034
TOT	MFHW69	6-209035
CYN	MFHW69	6-209036

Date: 7/28/00

Time: 1:45 Am

Sampled by:

L. Broach

Description: (Same as SE-04) Decon Kit #

Location: (Same as SE-04)

Water Depth: (Same as SE-04)
Type Sample: (Composite sample)
Sample Depth: 0"-20" deep
Sediment Description: Clay silt some brown sand at top 2½", black mud, sheen on water.

GPS Coordinates: (Same as SE-04)

Corrected Position
LAT: —
LONG: —

Photo #~~15~~ 16 JDT @ 11:40 facing south. Photo by J.D. Thompson.

James D. Jones 3/28/00

SE-06 - Duplicate Sample SE-05

Station Location: SE-06

	Sample ID#	C.O.C. Tag#
VOA	FGW50	6-209037
VOA	FGW50	6-209038
EXT	FGW50	6-209039
EXT	FGW50	6-209040
TOT	MFHW70	6-209041
CYN	MFHW70	6-209042

Date: 3/28/00

Time: 11:50 Am

Sampled by:

Description:

Same parameters as SE-05

Location:

Water Depth:

Tide Stage:

Sample Depth:

Sediment Description:

GPS Coordinates:

(Same)

Corrected Position

LAT:

LONG:

James D. Jones 3/28/00

SE-07 - Downstream Sediment Sample from Confluence with HSC

Station Location: SE-07

	Sample ID#	C.O.C. Tag#
VOA	FGW51	6-209043
VOA	FGW51	6-209044
EXT	FGW51	6-209045
EXT	FGW51	6-209046
TOT	MFHW71	6-209047
CYN	MFHW71	6-209048

Date: 3/28/00

Time: 11:10 Am

Sampled by: L. BROACH

Description: Downstream sediment sample from Patrick Bayou

Decon Hit #
bowl 2000-2
Tips 2000-1

Location: 300' west of outfall

Water Depth: 2" 2 feet

Type Sample: Grab Sample

Sample Depth: 0"-16" deep

Sediment Description: Black sand and mud
sand on top 6", rest dark mud

Note: Sample slid out of tube into bowl.

GPS Coordinates:

F032817A

Corrected Position

LAT: —

LONG: — GPS data Cost

[signature] 3/28/00

Photo #9 @ 11:10 Am fwy south. Photo by J.D. Thompson.

Photo #10 @ 11:12 Am fwy south. photo by J.D. Thompson

Photo #11 @ 11:18 Am fwy west. photo by J.D. Thompson

SE-08 - 2ND Sediment Sample Downstream for Confluence With HSC

Station Location: SE-08

	Sample ID#	C.O.C. Tag#
VOA	FGW52	6-209049
VOA	FGW52	6-209050
EXT	FGW52	6-209051
EXT	FGW52	6-209052
TOT	MFHW72	6-209053
CYN	MFHW72	6-209054

Date: 03/28/00

Time: 11:20 Am

Sampled by:

L. Broach

Description: (Same as SE-07)

Decon Hat #
bowl 2000-2
top 2000-1

Location: (Same as SE-07)

Water Depth: 2½ ft

Sample Depth: 0"-18" (Composite Sample)

Sediment Description: Black sand and mud; Sand on top 6", rest dark mud.

GPS Coordinates:

(Same as SE-07)

Corrected Position:

LAT: ——

LONG: ——

Photo # 12 @ 11:20 Am facing South. Photo by J. D. Thompson

James D. Jones 3/28/00

SE-09 – Duplicate Sample for SE-08

Station Location: SE-09

	Sample ID#	C.O.C. Tag#
VOA	FGW53	6-209055
VOA	FGW53	6-209056
EXT	FGW53	6-209057
EXT	FGW53	6-209058
TOT	MFHW73	6-209059
CYN	MFHW73	6-209060

Date: 03/28/00

Time: 11:25

Sampled by:

L. Bennett

Description: (Duplicate Sample) Decon Hot *

Location: Same parameters as SE-08

Water Depth:

Sample Depth:

Sediment Description:

GPS Coordinates: Corrected Position:

(Same as SE-07) LAT:

LONG:

James D. Jones 3/28/00

SE-10 - Background Sediment East Fork Tributary

Station Location: SE-10

	Sample ID#	C.O.C. Tag#
VOA	FGW54	6-209261
VOA	FGW54	6-209262
EXT	FGW54	6-209263
EXT	FGW54	6-209264
TOT	MFHW74	6-209265
CYN	MFHW74	6-209266

Date: 03/28/00

Time: 12:35 pm

Sampled by:

J. Soyer

Description: Sediment from East Fork Tributary

Area Ref # 2000-2

Location: Approximately 500' upstream at access road from SE-11

Water Depth:

Type sed: Grab sample Sple depth: 0"-6" deep

Sediment Description: grey fine fan sediments with organic materials

GPS Coordinates: (would not lock on to satellites)

Corrected Position:

LAT: N/A

LONG: N/A

Photo #49 OK @ 1230 pm from SW. Photo by J. Soyer.

upstream mouth

Photo #50 OK @ 12:40 pm from SW. Photo by J. Soyer.

3/28/00

SE-11 – 2nd Background Sediment East Fork Tributary

Station Location: SE-11

	Sample ID#	C.O.C. Tag#
VOA	FGW55	6-209267
VOA	FGW55	6-209268
EXT	FGW55	6-209269
EXT	FGW55	6-209270
TOT	MFHW75	6-209271
CYN	MFHW75	6-209272

Date: 03/28/00

Time: 12:10 pm

Sampled by:

J. Syer

Description: Sediment Sample from East Fork Tributary Decon Hit # 2000-2

Location: Approximately 250 yds upstream of SE-12

Water Depth: 0 No water on surface.

Sample Depth: 0"-8" Typ. Wet sample for Strambal.

Sediment Description: Tan to gray heavy clay with orange material at surface. Roots and bones removed from sample (Grab sample.)

GPS Coordinates: (would not lock on to satellites)

Converted Position

LAT: N/A

LONG: N/A

Photo #(48) OK @ 12:16 pm facing East. Photo by J. Syer.

James D. Syer 3/28/00

SE-12 - 3RD Background Sediment East Fork Tributary

Station Location: SE-12

	Sample ID#	C.O.C. Tag#
VOA	FGW56	6-209273
VOA	FGW56	6-209274
EXT	FGW56	6-209275
EXT	FGW56	6-209276
TOT	MFHW76	6-209277
CYN	MFHW76	6-209278

Date: 03/28/00

Time: 11:59 AM

Sampled by: J. Sayer

Description: Sediment sample from East Fork Tributary. Decon Hit # bed: 2000-2

Location: Approximately 120 ft upstream from Bravaia outfall

Water Depth: No water on surface. Wet sample collected from stream bed.

Sediment Description: very fine gray silt with organic matter

Type sample: Grab sample Sample depth: 0"-10" deep

GPS Coordinates: (would not lock on to satellites)

Corrected Position: LAT: N/A LONG: N/A

✓ Photo # 47 OK @ 11:59 AM facing SE. Photo by J. Mattocks

James D. [illegible] 3/30/00

SE-13 – Praxair Outlet Downstream Sample

Station Location: SE-13

	Sample ID#	C.O.C. Tag#
VOA	FGW57	6-209279
VOA	FGW57	6-209280
EXT	FGW57	6-209281
EXT	FGW57	6-209282
TOT	MFHW77	6-209283
CYN	MFHW77	6-209284

Date: 03/28/00

Time: 11:32 Am

Sampled by: J. Syer

Description: Sediment sample downstream from Praxair outlet in East Fork Tributary

Decon Hut # 2000-2

Location: 100 yds downstream from Praxair outlet

Water Depth: 6" deep

Sample Depth: 0" to 6" deep below WL.

Sample Type: Grab sample

Sediment Description: Gray sandy loam with some organic matter

[transcribed from field notes] James D. [illegible] 3/30/00

GPS Coordinates: Corrected Position:

LAT: N/A

LONG: N/A

R032817A (no locations) PDOP = 8.18 (no data points) JDT 3/28/00

downstream up ✓ Photo # 46 OK @ 11:40 facing ~~NNW~~ SSE. photo by J. Mattocks.

outfall ✓ Photo # 44 OK @ 11:37 Am facing West. Photo by J. Mattocks.

upstream down ✓ Photo # 45 OK @ 11:39 facing NNW. Photo by J. Mattocks.

JDT

LOC ✓ Photo # 43 OK @ 11:32 facing east. Photo by J. Syer.

SE-14 - East Fork Confluence With Patrick Bayou

Station Location: SE-14

	Sample ID#	C.O.C. Tag#
VOA	FGW58	6-209285
VOA	FGW58	6-209286
EXT	FGW58	6-209287
EXT	FGW58	6-209288
TOT	MFHW78	6-209289
CYN	MFHW78	6-209290

Date: 3/30/00

Time: 14:30 pm

Sampled by: L. BROACH

Description: Sediment sample from Patrick Bayou near East Fork tributary entry

Recon Hit# 2000-2

TIP: 2000-1

Location: 40 meters west of RR bridge across East Fork Tributary entry

Water Depth: 1/2 ft (6")

Sample Depth: approx 14" deep

Sample type: Composite sample - two tubes

Sediment Description: Black muddy clay organic odor.

GPS Coordinates:

R033020A

Corrected Position:

LAT: 29° 43' 26.48" N

LONG: 95° 06' 51.20 W

Photo # 33 OK JDT @ 14:30 facing west. Photo by: J.D. Thompson

Photo # 34 OK JDT @ 14:32 facing South. Photo by: J.D. Thompson

Note: Sample location west of RR bridge (not pictured).

[signature] 3/30/00

SE-15 – Background Sample Upstream

Station Location: SE-15

	Sample ID#	C.O.C. Tag#
VOA	FGW59	6-209291
VOA	FGW59	6-209292
EXT	FGW59	6-209293
EXT	FGW59	6-209294
TOT	MFHW79	6-209295
CYN	MFHW79	6-209296

Date: 3/30/00

Time: 11:55 Am

Sampled by: J. Hendy

Description: Sediment sample for background values upstream Location Patrick Bayou

Decon Hut: PAN: 2000-2

Location: 150' upstream from WWTP outfall in concrete-lined SW lunge channel

Water Depth: 1 ft

Sample Depth: 0"-4" deep

Type Sample: Composite sample – used paint spoon ~~[illegible]~~ JPT

Sediment Description: Sand and gravel with leaves twigs and debris. No odor.

GPS Coordinates: Corrected Position ✓

LAT: 29° 42' 35.48 N

R033 0 KA LONG: 95° 06' 54.13 W

Photo # ~~29~~ OK JPT @ 11:50 Am Taken from ~~South~~ north JPT. Photo by J. D. Thompson

WWTP outfall Photo # ~~28~~ OK JPT @ 11:52 from ~~South~~ north JPT. Photo by J. D. Thompson

[signature] 3/30/00

SE-16 - Duplicate Sample SE-15

Station Location: SE-16

	Sample ID#	C.O.C. Tag#
VOA	FGW60	6-209297
VOA	FGW60	6-209298
EXT	FGW60	6-209299
EXT	FGW60	6-209300
TOT	MFHW80	6-209301
CYN	MFHW80	6-209302

Date: 3/30/00

Time: 12:00 PM

Sampled by:

J. Kennedy

Description:

Decon Lot:

Same Parameters as SE-15

Location:

Water Depth:

Sediment Description:

GPS Coordinates:

Same as SE-15

Corrected Position:

LAT:

LONG: Same as SE-15

3/30/00

SE-17 – Combined Deer Park WWTP/ Lubrizol O/F

Station Location: SE-17

	Sample ID#	C.O.C. Tag#
VOA	FGW61	6-209303
VOA	FGW61	6-209304
EXT	FGW61	6-209305
EXT	FGW61	6-209306
TOT	MFHW81	6-209307
CYN	MFHW81	6-209308

Date: 3/30/00

Time: 1325 pm

Sampled by: L. BROACH

Description: Sediment sample from drainage channel downstream from Deer Park WWTP/ Lubrizol Outfalls

Decon Kit: 2000-2

Location: 40 meters north of Lubrizol outfall No. 1 in granite-lined channel.

Water Depth: 1/2 ft (6")

Sample Depth: 0"-6" deep in channel bed

Composite sample placed in bowl

Sediment Description: Brownish-~~black~~ sand and gravel with some sludge. (Sample collected with clean SS spoon and bowl – too much gravel.) JDT

GPS Coordinates

Corrected Position:

LAT: 29° 42' 56.28 N ✓

LONG: 95° 06' 55.87 W

R033019A

Lubrizol 001 outfall discharge point

Photo # ~~28~~ 29 OK JDT @ 13:25 pm facing north. Photo by J.D. Thompson

Photo # ~~30~~ 30 OK JDT @ 13:30 pm facing north. Photo by J.D. Thompson

[signature] 3/30/00

SE-18 – Shell Outfall Sample

Station Location: SE-18

	Sample ID#	C.O.C. Tag#	
VOA	FGW62	6-209309	Date: 3/30/00
VOA	FGW62	6-209310	Time: 13:55 pm
EXT	FGW62	6-209311	
EXT	FGW62	6-209312	Sampled by:
TOT	MFHW82	6-209313	
CYN	MFHW82	6-209314	L. BROACH

Description: Sediment sample below Decon Hut: C001/R001 outfalls in pan: 2000-2 Patrick Bayou.

Location: 20 meters downstream from Shell Road Bridge along west bank in shallow eddy area

Water Depth: 6" (1/2 foot)

Sample Depth: 0"-8" deep

Type Sample: 4-part (Composite Sample)

Sediment Description: brown sandy clay. Sample collected with clean SS spoon and placed in clean SS pan. Too much small gravel for sediment sampler.

GPS Coordinates: Corrected Position

LAT: 29° 43' 16.44" W

RD330198 LONG: 95° 07' 01.32 W

Shell outfalls R001 C001 position

OK JOT

Photo #31 @ 13:55 fwy south. Photo by J.D. Thompson.

Photo #32 JOT @ 13:58 fwy north. Photo by J.D. Thompson.

OK

[signature] 3/30/00

SE-19 – Patrick Bayou Sediment Sample

Station Location: SE-19

	Sample ID#	C.O.C. Tag#
VOA	FGW63	6-209315
VOA	FGW63	6-209316
EXT	FGW63	6-209317
EXT	FGW63	6-209318
TOT	MFHW83	6-209319
CYN	MFHW83	6-209320

Date: 3/30/00

Time: 15:30pm

Sampled by:

L. BROACH

Description: Sediment sample from Patrick Bayou below East Fork tributary.

Location: Upper portion Patrick Bayou approx 800' north of confluence East Fork tributary. north of SE-23 sample location (≈ 200') Composite sample

Water Depth: 1' deep

Sample Depth: 0" - 18" deep

Sediment Description: Black muddy clay. no odor or sheen.

Dozon Unit:
bowl: 2000-2
tip: 2000-1

GPS Coordinates: RO330210

Corrected Position:
LAT: 29° 43' 29.50 N
LONG: 95° 06' 51.18 W

Photo # 38 OK @ 15:30 facing South. Photo by J.D. Thompson

Photo # 40 OK @ 15:32 facing South. Photo by J.D. Thompson

Photo # 41 OK @ 15:35 facing North. photo by J.D. Thompson.

Photo # 42 OK @ 15:38 facing South. photo by J.D. Thompson.

James D. Jr 3/30/00

SE-20 - Oxy Vinyl Outfall Sample 001

Station Location: SE-20

	Sample ID#	C.O.C. Tag#
VOA	FGW64	6-209321
VOA	FGW64	6-209322
EXT	FGW64	6-209323
EXT	FGW64	6-209324
TOT	MFHW84	6-209325
CYN	MFHW84	6-209326

Date: 03/29/00

Time: 9:35 Am

Sampled by: L. BROACH

*Split Sample with Consultant

Description: Sediment from Patrick Bayou downstream from Oxyvinyl outfall 001.

Decon Hit: 2000-2 bowl, 2000-1 tip

Location: 60 meters north outfall No. 1, 24 meters from near shore (east)

Water Depth: 2 ft

Sample Depth: 0"-26" deep

Composite ~~Sample~~ Sample

dup sample collected + split

Sediment Description: Black mud with sheen in water. Slight organic odor.

GPS Coordinates: R032915A

Corrected Position: LAT: 29° 43' 43.52" N, LONG: 95° 06' 49.74" W

Photo #17 @ 9:30 Am from SE. Photo by J.D. Thompson.

Photo #18 @ 9:35 Am from West. Photo by J.D. Thompson.

James Dufrene 3/29/00

SE-21 - Duplicate Sample SE-20

Station Location: SE-21

	Sample ID#	C.O.C. Tag#
VOA	FGW65	6-209327
VOA	FGW65	6-209328
EXT	FGW65	6-209329
EXT	FGW65	6-209330
TOT	MFHW85	6-209331
CYN	MFHW85	6-209332

Date: 03/29/00

Time: 9:40 Am

Sampled by:

L BROKETT

Description:

Decon Pit:

Location:

Same Parameters as SE-20

Water Depth:

Sample Depth:

Type Sample:

Sediment Description:

GPS Coordinates:

(Same as SE-20)

Corrected Position:

LAT: Same as SE-20

LONG:

3/29/00

SE-22 – Oxyvinyl Outfall Sample 002

Station Location: SE-22 *

* Split sample with Oxyvinyl consultant

	Sample ID#	C.O.C. Tag#
VOA	FGW66	6-209333
VOA	FGW66	6-209334
EXT	FGW66	6-209335
EXT	FGW66	6-209336
TOT	MFHW86	6-209337
CYN	MFHW86	6-209338

Date: 3/30/00

Time: 10:45 Am

Sampled by: L. BROACH

Description: Sediment from Patrick Bayou downstream from Oxyvinyl outfall 002

Decon Kit: Gal: 2000-2 Tip: 2000-1

Location: 45 meters upstream of outfall 003 (South) 21 meters from east shoreline

Water Depth: 1 ft

Sample Depth: 0"-18" deep

Sample Type: Composite sample (two tubes)

Sediment Description: black mud with odor.

GPS Coordinates: R033016A

Corrected Position: LAT: 29° 43' 52.83 N LONG: 95° 06' 52.54 W

outfall #2 Photo # 24 (JDT OK) @ 10:40 am from east. Photo by: J.D. Thompson

Photo # 25 (JDT OK) @ 10:45 from SW. Photo by: J.D. Thompson

~~Photo # 26~~ @ not taken/changed film from [signature] 3/30/00

JDT 3/30/00

SE-23 – Wetland Area Sediment Sample

Station Location: SE-23

3/30/00 JDT

	Sample ID#	C.O.C. Tag#
VOA	FGW67	6-209339
VOA	FGW67	6-209340
EXT	FGW67	6-209341
EXT	FGW67	6-209342
TOT	MFHW87	6-209343
CYN	MFHW87	6-209344

Date: ~~1510 hrs~~

Time: 1510 hrs

Sampled by:

L. BRAECH

Description: Sediment sample from depression in Patrick Bayou with wetland vegetation

Decon Kit: Basic: 2000-2 Trip: 2000-2

Location: 80' east of East Fork tributary and ≈700' northwest of confluence with Patrick Bayou (SE-14).

Water Depth: 1" water depth

Sample Depth: 0"-20" deep Composite sample from two holes

Sediment Description: black muddy clay slight odor organic

GPS Coordinates: R033021A

Corrected Position: ✓

LAT: 29° 43' 28.33" N

LONG: 95° 06' 51.10" W

OK JDT

✓ Photo # ~~39~~ @ 1512 from South. Photo by J.D. Thayer.

✓ Photo # ~~38~~ @ 1515 from west. Photo by J.D. Thayer.

OK JDT

3/30/00

SE-24 – Oxymyl Outfall Sample 003

Station Location: SE-24 (A)

(A) Split sample with consultant 4 jars

	Sample ID#	C.O.C. Tag#
VOA	FGW68	6-209345
VOA	FGW68	6-209346
EXT	FGW68	6-209347
EXT	FGW68	6-209348
TOT	MFHW88	6-209349
CYN	MFHW88	6-209350

Date: 3/30/00

Time: 10:00 Am

Sampled by: L. BROACH

Description: Sediment sample from Petrole Acorn Dist: Bayou downstream from Oxymyl outfall 003 [Gov'l: 2000-2 tip: 2000-1

Location: 83 meters upstream from tip of island; 17 meters from E. Shoreline

Water Depth: 1' water

Sample Depth: 0"-16" deep

Sample Type: 2-part composite sample

Sediment Description: 12" sediment sample, tan to brown sand 2" black mud remainder. odor from sediment sample.

GPS Coordinates: Corrected Position: ✓

LAT: 29° 44' 08.21" N

R033015B LONG: 95° 06' 53.07 W

OK ✓ 21 gpt

Photo # ~~19~~ @ 10:05 from north. Photo by J. Hennessy.

OK ✓ 22 gpt

Photo # ~~20~~ @ 10:10 Am from NW. Photo by J.D. Thompson.

OK ✓ 23 gpt

Outfall #3 Photo # ~~21~~ @ 10:30 Am from west. Photo by J.D. Thompson

OK

James D. Jones 3/30/00

SE-25 – Wetland Area Sediment Sample

Station Location: SE-25

	Sample ID#	C.O.C. Tag#
VOA	FGW69	6-209351
VOA	FGW69	6-209352
EXT	FGW69	6-209353
EXT	FGW69	6-209354
TOT	MFHW89	6-209355
CYN	MFHW89	6-209356

Date: 3/30/00

Time: 14:55 pm

Sampled by: L. BROACH

Description: Sediment Sample from shoreline in Patrick Bayou with wetland vegetation

Decon Unit: bowl: 2000-2 tip: 2000-2

Location: 60' North of SE-14 Location in wetland vegetation east side East Fork entry

Water Depth: 1" water

Sample Depth: 0"-22" deep Composite sample - 2 tubes

Sediment Description: gray to black muddy clay, no organic odor. Roots and grass removed before plug in jar.

GPS Coordinates:

R0330208

Corrected Position: ✓

LAT: 29° 43' 26.88" N

LONG: 95° 06' 51.27" W

✓ Photo # ~~35~~ OK JDT @ 14:55 for north. Photo by J.D. Thompson

✓ Photo # ~~36~~ OK JDT @ 15:00 pm for ~~South~~ north. Photo by J.D. Thompson

JDT 3/30/00

[signature] 3/30/00

SE-26 - ~~Upstream~~ Downstream JDT 3/28/00 sample Patrick Bayou

Station Location: SE-26

	Sample ID#	C.O.C. Tag#
VOA	FGW70	6-209357
VOA	FGW70	6-209358
EXT	FGW70	6-209359
EXT	FGW70	6-209360
TOT	MFHW90	6-209361
CYN	MFHW90	6-209362

Date: 3/28/00

Time: 12:05 pm

Sampled by: L. Broach

Description: Sediment sample in ~~upstream~~ lower of Patrick Bayou JDT 3/28/00 N. of pipeline bridge

Accon Hit#
bowl: 2000-2
tip: 2000-1

Location: 200' east of pipeline bridge within Patrick Bayou (see map page 3)

Water Depth: 1 ft

Sample Depth: 0"-18" deep

Sample Type: Grab sample

Sediment Description: Sandy brown to black mud. Slight sheen in sample bowl.

GPS Coordinates: Corrected Position

LAT: ——

LONG: ——

F032818A

GPS data lost JDT

no photo #26 JDT

~~photo #16~~ @ 12:05 pm fwy north. Photo by: J.D. Thompson

photo not taken. JDT

Shutter must not have advanced? James D. [illegible] 3/28/00

SE-27 – Wetland Area Sediment Sample

Station Location: SE-27 (x)

(x) Split sample with Consultant Parsons

	Sample ID#	C.O.C. Tag#
VOA	FGW71	6-209363
VOA	FGW71	6-209364
EXT	FGW71	6-209365
EXT	FGW71	6-209366
TOT	MFHW91	6-209367
CYN	MFHW91	6-209368

Date: 3/30/00

Time: 9:05 AM

Sampled by: L. BROACH

Description: Sediment sample from shoreline in Patrick Bayou with wetland vegetation

Decon Hat: Bowl: 200-2 Top: 200-1

Location: Northeast side of island in upper portion of Patrick Bayou

Water Depth: 1 ft Sample Depth: 0"-15 deep

Sample Type: Composite sample

Sediment Description: Sandy brown to gray 8" sands to grayish clay.

GPS Coordinates: R033815A

Corrected Position: ✓

LAT: 29° 44' 12.53" N

LONG: 95° 06' 53.32" W

Photo # ~~17~~ of 19 JDT ✓ @ 9:05 AM facing North. Photo by J. Hendy.

Photo # ~~18~~ of 20 JDT ✓ @ 908 AM facing north. Photo by J. Hendy.

James D. [signature] 3/30/00

SE-28 – Duplicate Sample SE-27

Sample ID: SE-28

VOA	FGA73	6-209203	Date: 3/30/00
VOA	FGA73	6-209204	
EXT	FGA73	6-209205	Time: 9:10 Am
EXT	FGA73	6-209206	
TOT	MFHW71	6-209207	Sampled by:
CYN	MFHW71	6-209208	L. BROACH

Description: Acron Hit*

Location:

Duplicate
Same parameters as SE-27

Water Depth:
Sample Depth:
Type Sample:
Sediment Description:

GPS Coordinates:

Same as SE-27

Corrected Position:
LAT: same as SE-27
LONG:

[signature]
3/30/00

PLAN ACCEPTANCE FORM

SUMMARY OF ACTIVITIES

1. Initial on- and off-site reconnaissance, designating sample locations, verifying location of target and background drinking water wells.

2. Equipment decontamination, groundwater sampling.

3. Background and target soil/sediment sampling.

4. Equipment decontamination, sample packaging/shipping.

ACCEPTANCE

I have read the Health and Safety plan (or been briefed on the hazards) for the Preliminary Assessment/Screening Site Inspection (PA/SSI) field work to be conducted at the Patrick Bayou Site located south of the Houston Ship Channel and north of Deer Park, Texas in Harris County, and agree to abide by the rules and guidelines contained therein. I acknowledge that I have had a current annual physical within the last 12-month period from the date signed below, and am medically cleared to perform my tasks as outlined.

Name	Signature	Date
James D. Thompson		3/27/00
Johnny Kennedy		3/27/00
Judith Mattocks		3/27/00
John Syer		3/27/00
Linda Broach		3-27-00

Day 01 Monday

SITE SAFETY BRIEFING

Job Number (Site) Patrick Bayou Site Number TXD Pending
Date 3/27/00 Start Time 13:15 pm Completed 14:30 pm
Site Location South of the Houston Ship Channel and North of Deer Park, Harris County, Texas
Type of Work (General) Safety briefings access agreements, off site reconnaissance, identify staging area.

****

SAFETY ISSUES

Tasks (this shift) Safety briefings, off-site reconnaissance, on-site sample location identification.

Protective Clothing/Equipment Level D (mod)

Physical Hazards Slip, trip, fall potential along the shoreline and in the boat

Control Methods Buddy system, hand signals, evacuation procedures, situation awareness, identification of hot zones, entry/exit areas.

Chemical Hazards Organic and heavy metal contaminated soils, sample preservation chemicals.

Decontamination Procedures/Tasks wash boots, dispose of gloves (if used)

Evacuation Procedures/Route/Signals Use hand, voice to alert. Proceed to safe area upwind.

Evacuation Meeting Area Staging area located along the east side of bayou.

Nearest Phone Mobile phone

Hospital Name/Address Tri-Cities Regional Hospital

Special Topics (incidents, actions taken, etc.) Plant personnel will escort team members when on-property and alert team members of hazardous/unsafe conditions.

****

ATTENDEES

Print Name	Sign Name
James D. Thompson	[signature]
Julius Rexer (Lubrizol)	[signature]
Scott Peters (Oxy Vinyls)	[signature]
John Syer	[signature]
Norman Mollard	[signature]
Linda Broach	LINDA BROACH
Janice Wendel	Janice Wendel

Meeting conducted by: J.D. Thompson + Srinivas Jalla

Safety Maps for each copy

10 042

42

DAY 02 Tuesday

SITE SAFETY BRIEFING

Job Number (Site) Patrick Bayou Site Number TXD Pending
Date 3/28/00 Start Time 13:45 Completed 14:30
Site Location South of the Houston Ship Channel and North of Deer Park, Harris County, Texas
Type of Work (General) Safety brief - Houston Ship Channel upstream samples in deep water boat and confluence with Patrick Bayou. Off site upstream samples from East Fork Tributary. Seal, package samples for shipment.

****

SAFETY ISSUES

Tasks (this shift) Collect deep water background samples in Houston Ship Channel & off site sediment samples (background) in East Fork Tributary and Patrick Bayou confluence with HSC sediment samples.
Protective Clothing/Equipment Level D, boat equipment sediment samples/tubes/tape, gloves
Physical Hazards Slip, trip, fall potential along the shoreline and in the boat
Control Methods Buddy system, hand signals, evacuation procedures, situation awareness, identification of hot zones, entry/exit areas.
Chemical Hazards Organic and heavy metal contaminated soils, sample preservation chemicals.
Decontamination Procedures/Tasks remove sediment/dirt from contact area, Wash with water, rinse.
Evacuation Procedures/Route/Signals Move away from area.
Evacuation Meeting Area ~~Staging area located along the east side of bayou.~~ Meet at boat launch area.
Nearest Phone Mobile phone
Hospital Name/Address Bayshore Regional Hospital (see map in H&S plan)
Special Topics (incidents, actions taken, etc.) Boating safety, snakes along shore and in East Fork Tributary.

****

ATTENDEES

Print Name	Sign Name
James D. Thompson	
John Sjer	
Judie Mattocks	
JOHNNY KENNEDY	
LINDA BROACH	

Meeting conducted by: J.D. Thompson

10 04

Day 03 Wednesday

SITE SAFETY BRIEFING

Job Number (Site) Patrick Bayou Site Number TXD Pending
Date 3/29/00 Start Time 8:20 Completed 8:25
Site Location South of the Houston Ship Channel and North of Deer Park, Harris County, Texas
Type of Work (General) Sediment samples on-site in Patrick Bayou and adjacent areas. Package, seal samples and ship to labs.

****

SAFETY ISSUES

Tasks (this shift) Collect Patrick Bayou sediment samples near outfalls and upstream samples. Package samples and ship to lab.
Protective Clothing/Equipment Level D. Chlorine escape kit (supplied by company, if required). Waders if entry bayou.
Physical Hazards Slip, trip, fall potential along the shoreline and in the boat
Control Methods Buddy system, hand signals, evacuation procedures, situation awareness, identification of hot zones, entry/exit areas.
Chemical Hazards Organic and heavy metal contaminated soils, sample preservation chemicals.
Decontamination Procedures/Tasks Wash, tools, equip. Use soap, clean water for rinse. Brush off boots. Dispose of gloves.
Evacuation Procedures/Route/Signals Follow company instructions while escated, meet at assembly area. Use walkie talkies, phones.
Evacuation Meeting Area Staging area located along the east side of bayou.
Nearest Phone Mobile phone
Hospital Name/Address Tri Cities Regional Hospital
Special Topics (incidents, actions taken, etc.) Boating safety, snakes along shoreline. Slip, trip, fall.

****

ATTENDEES

Print Name	Sign Name
James D. Thopson	
LINDA BROACH	
JOHNNY KENNEDY	
John Syer	
Judie Mattocks	

Meeting conducted by: Scott Peters / J.D. Thopson

Day 04 Thursday

SITE SAFETY BRIEFING

Job Number (Site) Patrick Bayou Site Number TXD Pending
Date 3/30/00 Start Time 8:15 Completed 5:20
Site Location South of the Houston Ship Channel and North of Deer Park, Harris County, Texas
Type of Work (General) Complete sediment sampling. Ship coolers.

****

SAFETY ISSUES

Tasks (this shift) Collect remaining sediment samples near outfalls, wetland areas and upstream locations within Patrick Bayou.

Protective Clothing/Equipment Level D. Chlorine gas escape kits (supplied by company, if required). Waders in bayou area.

Physical Hazards Slip, trip, fall potential along the shoreline and in the boat

Control Methods Buddy system, hand signals, evacuation procedures, situation awareness, identification of hot zones, entry/exit areas.

Chemical Hazards Organic and heavy metal contaminated soils, sample preservation chemicals.

Decontamination Procedures/Tasks wash hands, equipt, boots. Use soap, rinse water. Dispose of gloves and paper towels.

Evacuation Procedures/Route/Signals Follow company instructions while evacuated, meet at assembly area. Use walkie talkies, phones.

Evacuation Meeting Area Staging area located along the east side of bayou.

Nearest Phone Mobile phone

Hospital Name/Address Tri Cities Regional Hospital, Pasadena

Special Topics (incidents, actions taken, etc.) Boating safety / snakes along shoreline. Slip, trip, fall.

****

ATTENDEES

Print Name	Sign Name
James D Thompson	
Linda Broach	
Johnny Kennedy	
John Syer	
Judie Matthocks	

Meeting conducted by: John Syer / J. D. Thompson

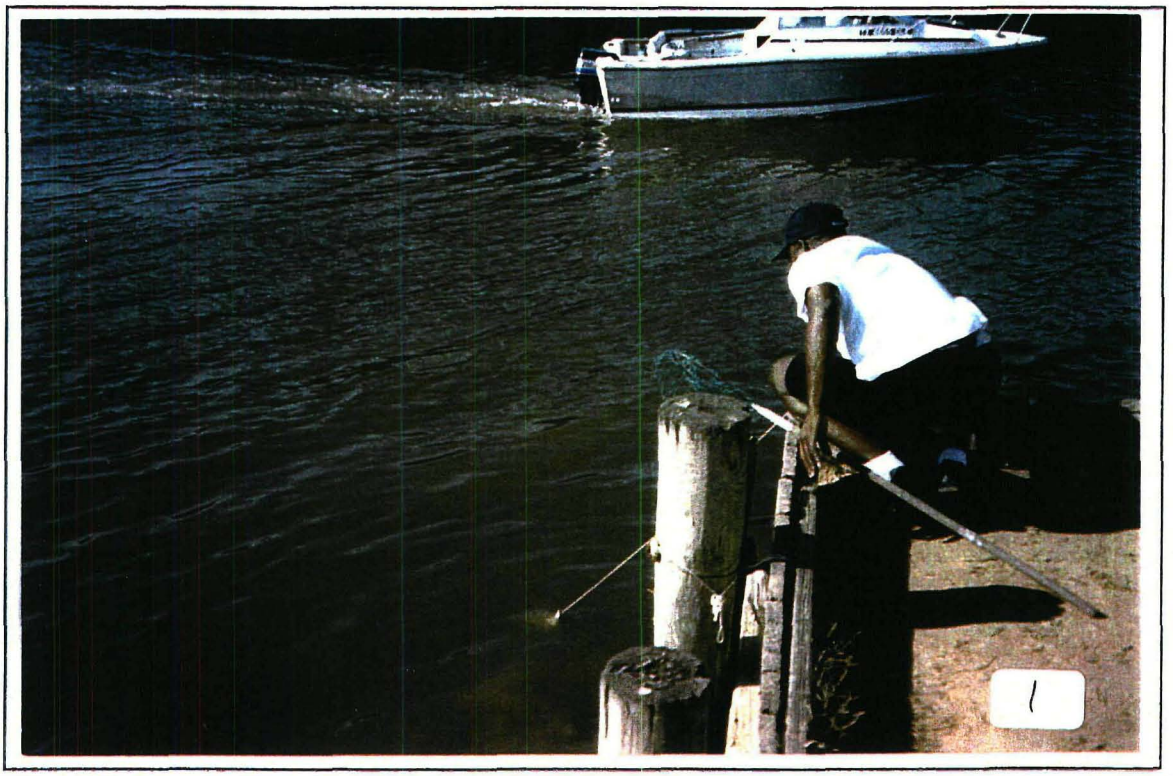


Photo #1 - (08:55 am) - Documented blue crab fishing in the Houston Ship Channel. Observed a fisherman catch a blue crab using a baited line and net as shown above at the River Terrace Park, Channelview, TX.

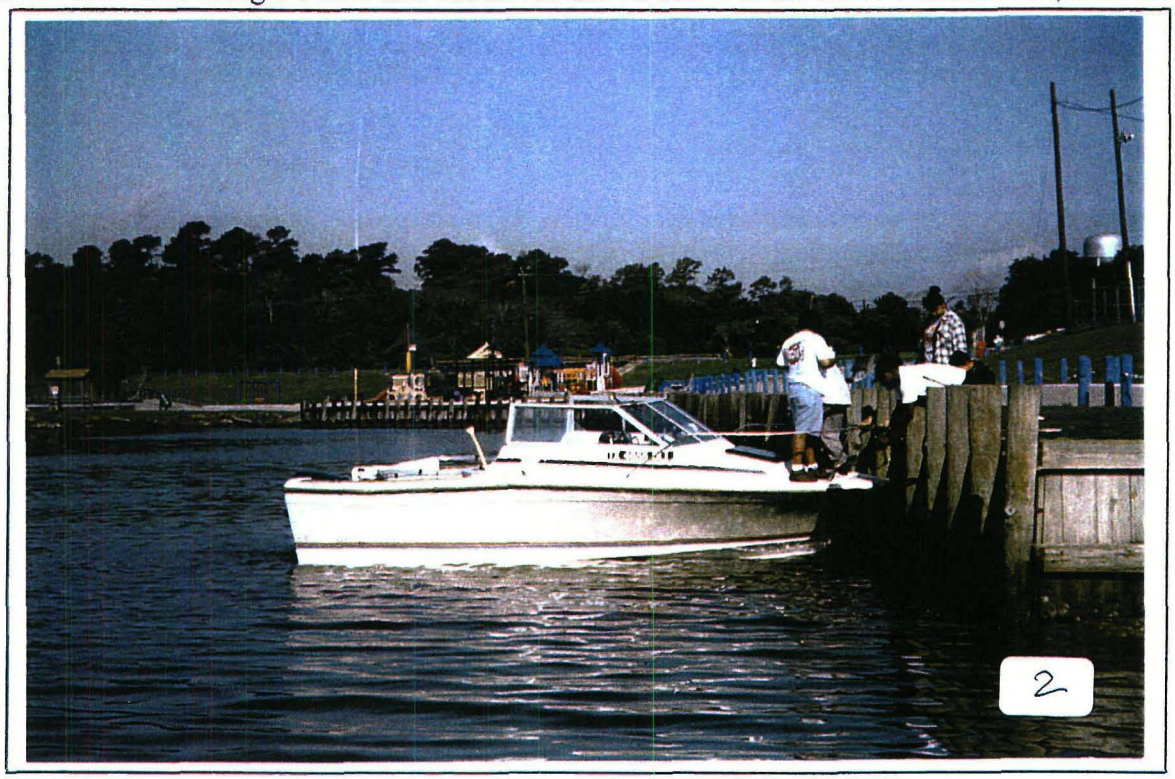


Photo # 2 - (08:58 am) - Other people were also observed fishing along the boat pier at the River Terrace Park as shown above using bait poles and nets. Photo taken from the boat launch area facing north.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Region No. 4

Patrick Bayou Screening Site Inspection (SSI)
Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/28/00
Site Photographer: J. D. Thompson, Field Investigator

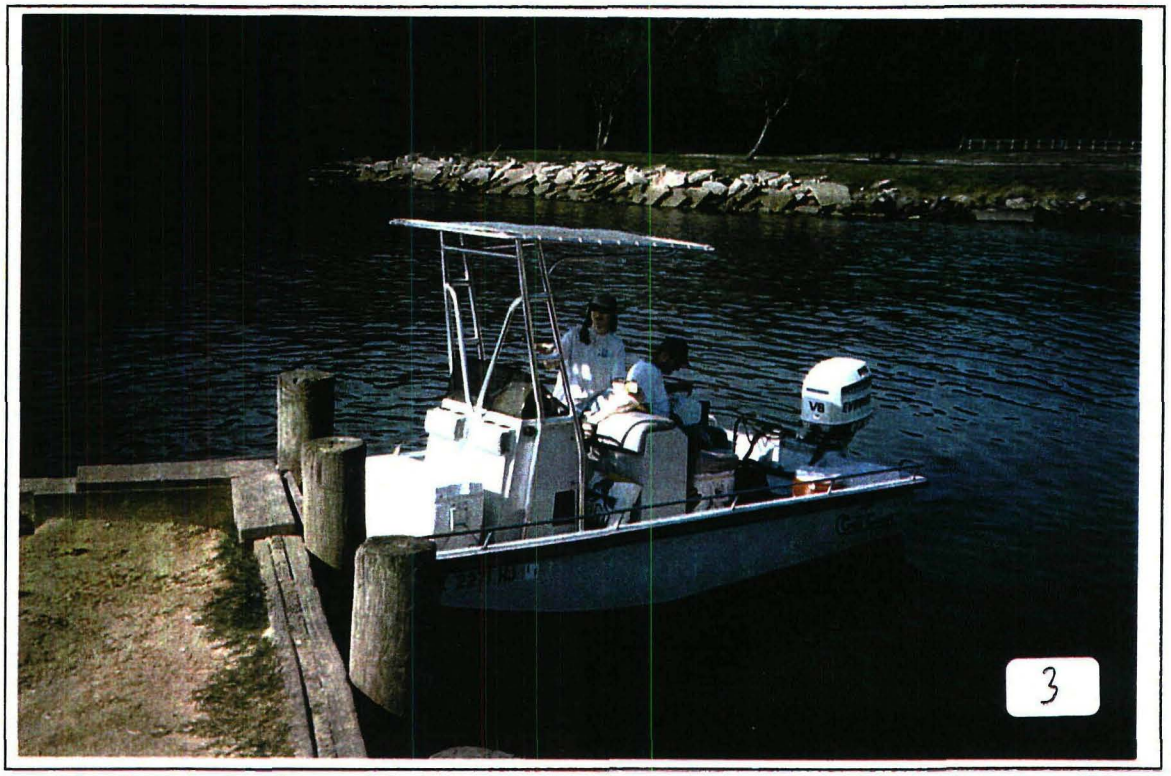


Photo #3 - (9:00 am) - Photo of the boat launch area used by the TNRCC Region 12 staff located at the River Terrace Park, a public access and recreation area. Photo taken facing west.

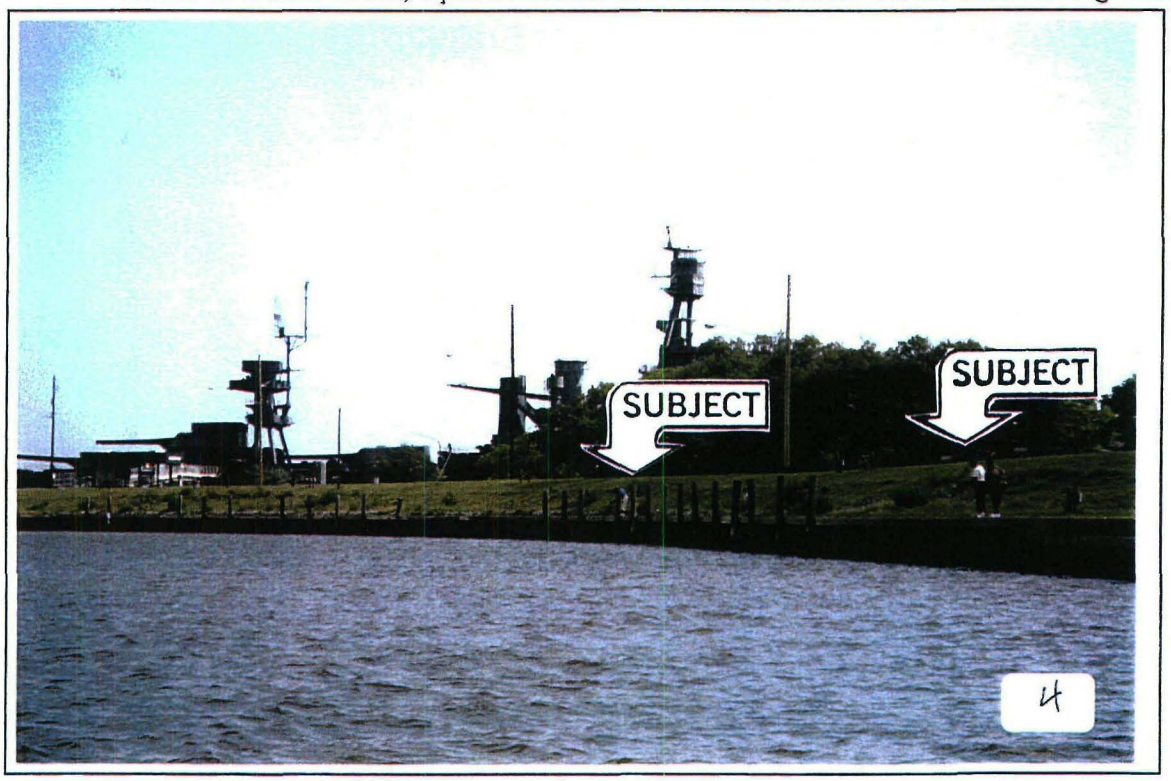


Photo # 4 - (9:15 am) - Photo of crab fishers along the pier located at the Jan Jacincto Monument Park. The park is located along the south bank of the Houston Ship Channel located approximately 2.1 miles down-stream from the convergence with Patrick Bayou. Photo taken from the boat facing southeast.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Region No. 4

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Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/28/00
Site Photographer: J. D. Thompson, Field Investigator

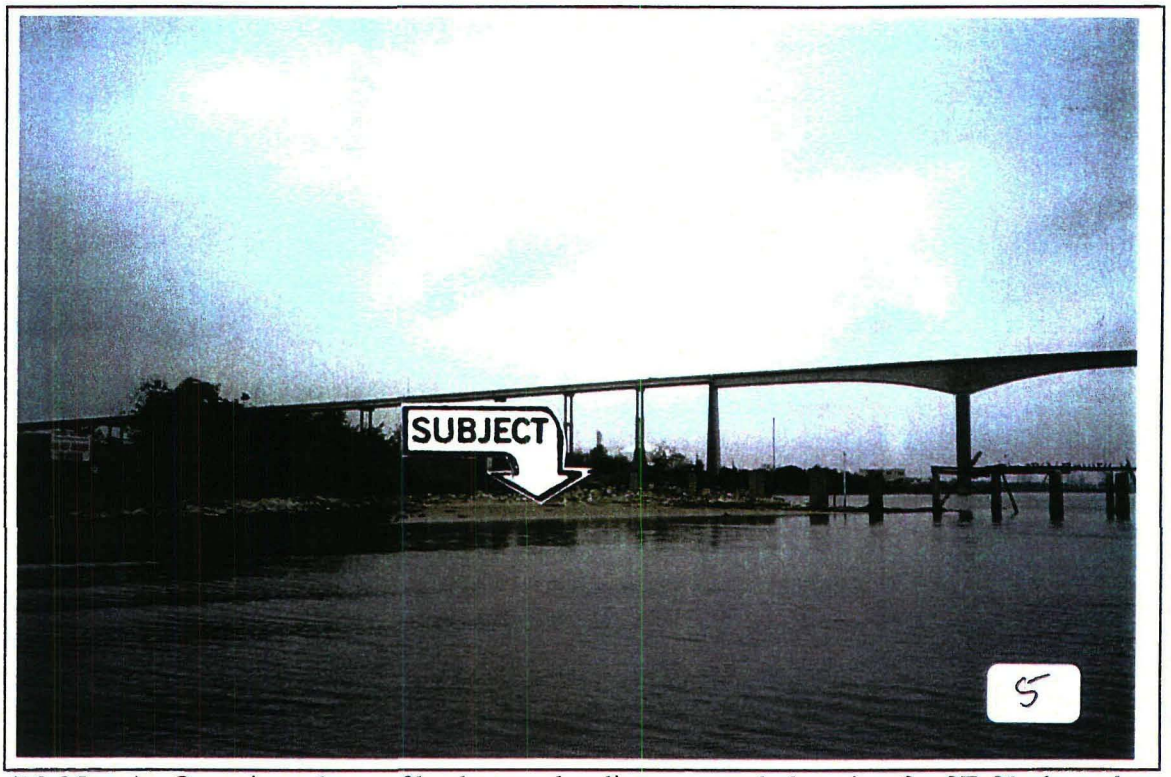

Photo #5 - (10:25 am) - Overview photo of background sediment sample location for SE-01 along the south shore of the Houston Ship Channel downstream of the Beltway 8 highway bridge. Photo taken facing southwest.

Photo # 6 - (10:30 am) - SE-01 was collected using the sediment coring tool, placed in a clean dedicated stainless steel bowl, mixed with a clean dedicated stainless steel spoon and place in the sample jars as shown above. Split samples were provided to the environmental consultant for Oxyvinyl LP as requested. Photo taken facing south.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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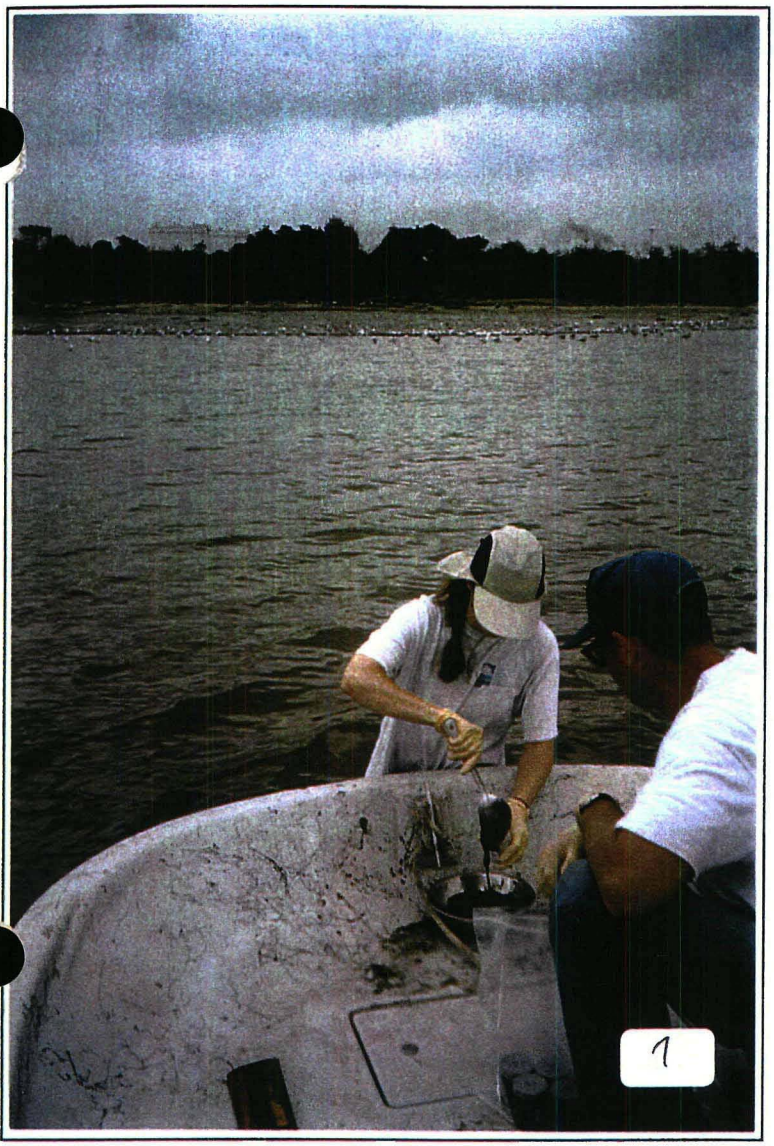
Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/28/00
Site Photographer: J. D. Thompson, Field Investigator

10 6-15



TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Region No. 4

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Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/28/00
Site Photographer: J. D. Thompson, Field Investigator

Photo #7 - (10:40 am) - Background sediment sample SE-02 was collected off-shore along the north bank of the Houston Ship Channel approximately 0.25 miles east of the HW 8 bridge as shown at the left. Photo taken facing north.

Photo #8 - (10:55 am) - Background sediment sample SE-03 was collected off-shore along the north bank of the Houston Ship Channel approximately 0.75 miles upstream from the convergence with Patrick Bayou as shown below. Photo taken facing north.

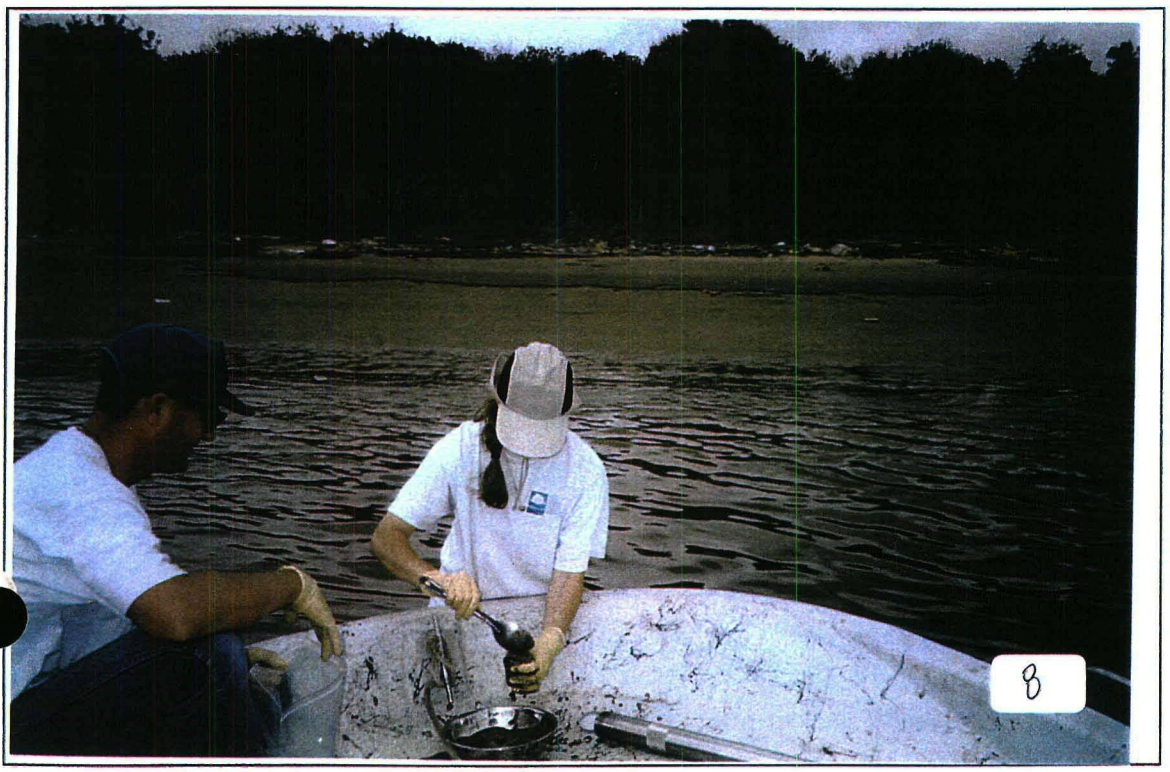

Photo #09 - (11:10 am) - Sediment sample SE-07 was collected approximately 300' up-channel from the Oxy Vinyl Outfall No. 2 within the Houston Ship Channel as shown above. Photo taken facing south.

Photo # 10 - (11:12 am) - Sediment sample SE-07 consisted of a black sand and mud slurry as shown above. The sample slid out of the clean 2" plastic tube into the bowl.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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Site Visit: 03/28/00
Site Photographer: J. D. Thompson, Field Investigator

10 05

Photo #11 - (11:18 am) - The rock-lined south shoreline of the Houston Ship Channel along the convergence area with Patrick Bayou is shown above. Photo taken facing south towards the bayou.

Photo # 12 - (11:20 am) - Sediment sample SE-08 as shown above and duplicate sample SE-09 were collected from the same area as SE-07 for representativeness. Photo taken facing south.

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Site Photographer: J. D. Thompson, Field Investigator

Photo #13 - (11:30 am) - Sediment sample SE-04 was collected at the Houston Ship Channel convergence with Patrick bayou as shown above. Water depth was estimated at 2.5'. Photo taken facing north.

Photo # 14 - (11:35 am) - Sediment sample SE-04 was collected using a clean 2" plastic tube and the sediment coring tool as shown above. Photo taken facing south. Sheen was noted in the sample with a slight organic odor.

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Site Photographer: J. D. Thompson, Field Investigator

Photo #15 - (11:36 am) - Sediment sample SE-05 was collected from the same area as SE-04 for representativeness using the sediment coring tool as shown above. Photo taken facing south.

Photo # 16 - (11:40 am) - A duplicate sample (SE-06) was collected from the same sediments as SE-05 for laboratory QA/QC requirements as shown above. Photo taken facing south.

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Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/28/00
Site Photographer: J. D. Thompson, Field Investigator

Photo #17 - (9:30 am) - Sediment sample SE-20 was collected approximately 60 meters north (downstream) from the Oxyvinyl Outfall No. 1 as shown above. Photo taken from east shore facing southwest.

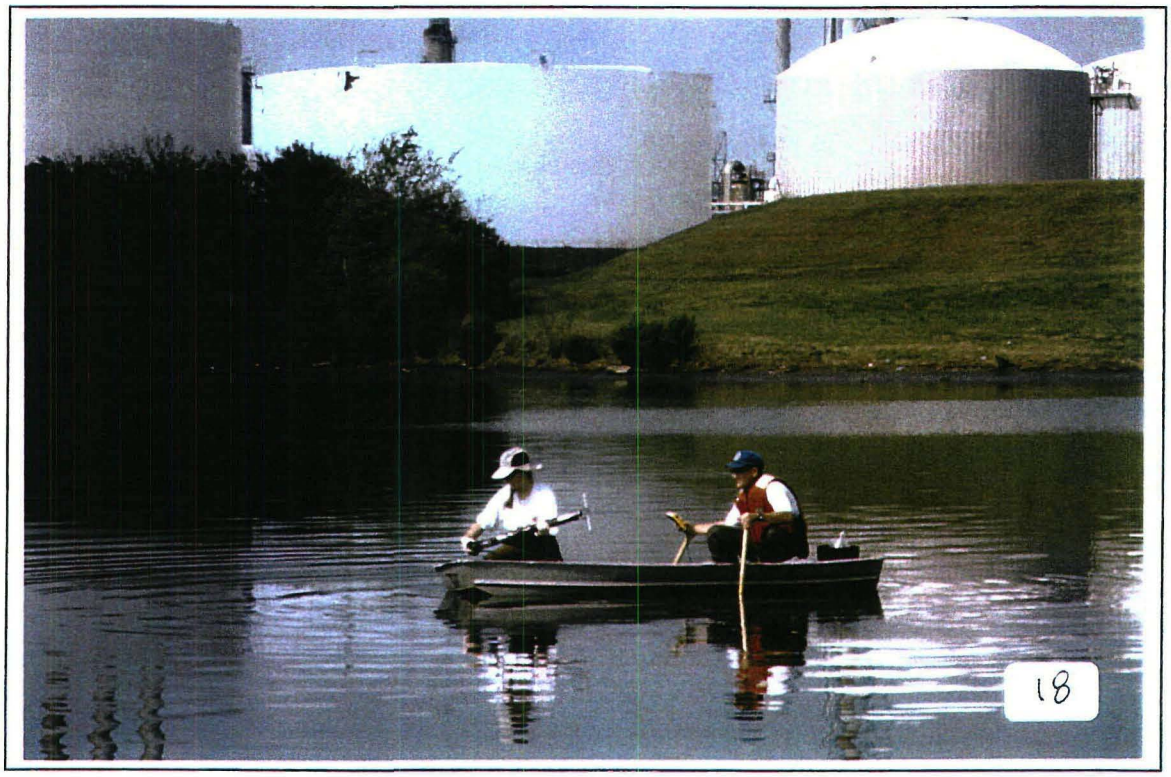

Photo # 18 - (9:35 am) - A duplicate sediment sample (SE-21) was obtained from the same composite sample as SE-20 for laboratory QA/QC requirements. Water depth estimated 2' at the sample location. Photo taken facing southwest.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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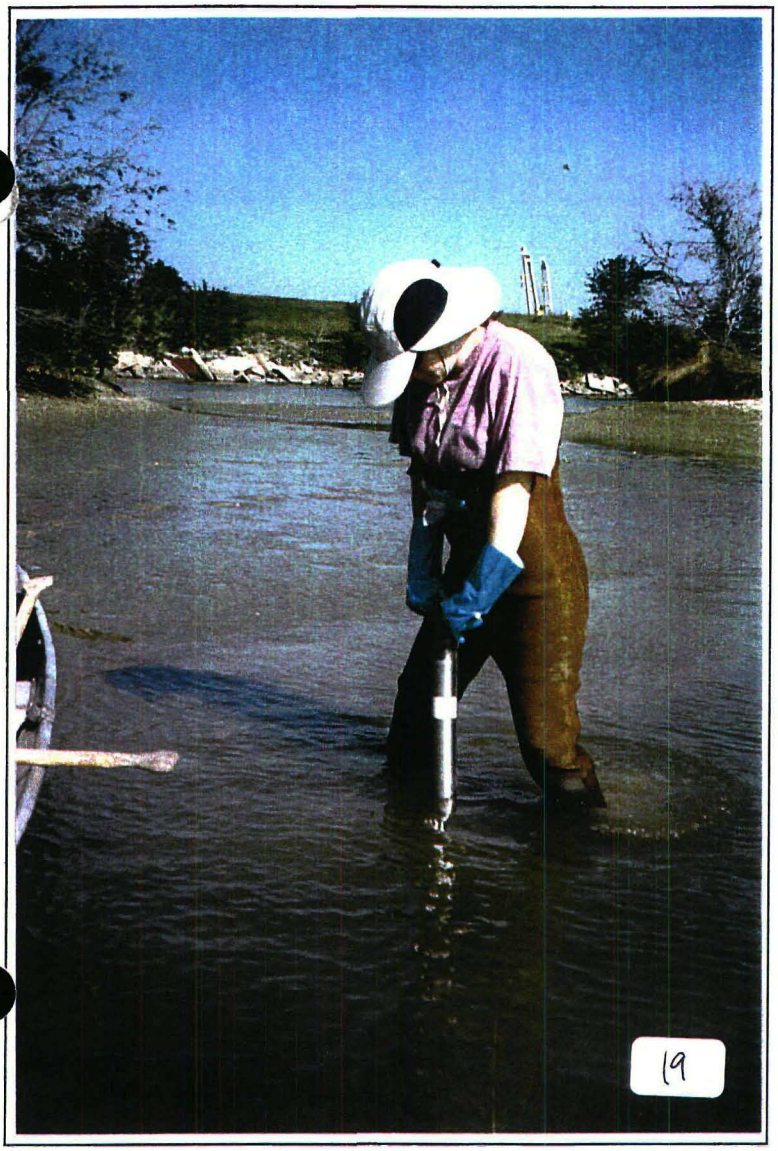
Site Visit: 03/29/00
Site Photographer: J. D. Thompson, Field Investigator



TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Region No. 4

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Deer Park, Harris County, TX
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Site Visit: 03/30/00
Site Photographer: J. D. Thompson, Field Investigator

Photo #19 - (9:05 am) - Sediment sample SE-27 was collected in a wetland area along the northeast shore of a small island located in the upper middle section of Patrick Bayou as shown at the left. Photo taken facing north.

Photo # 20 - (9:08 am) - A duplicate sediment sample (SE-28) was obtained from the 2-part composite sample SE-27 for laboratory QA/QC requirements as shown below. A spilt sample was prepared and provided to the Oxyvinyl consultant as requested. Photo taken facing north.

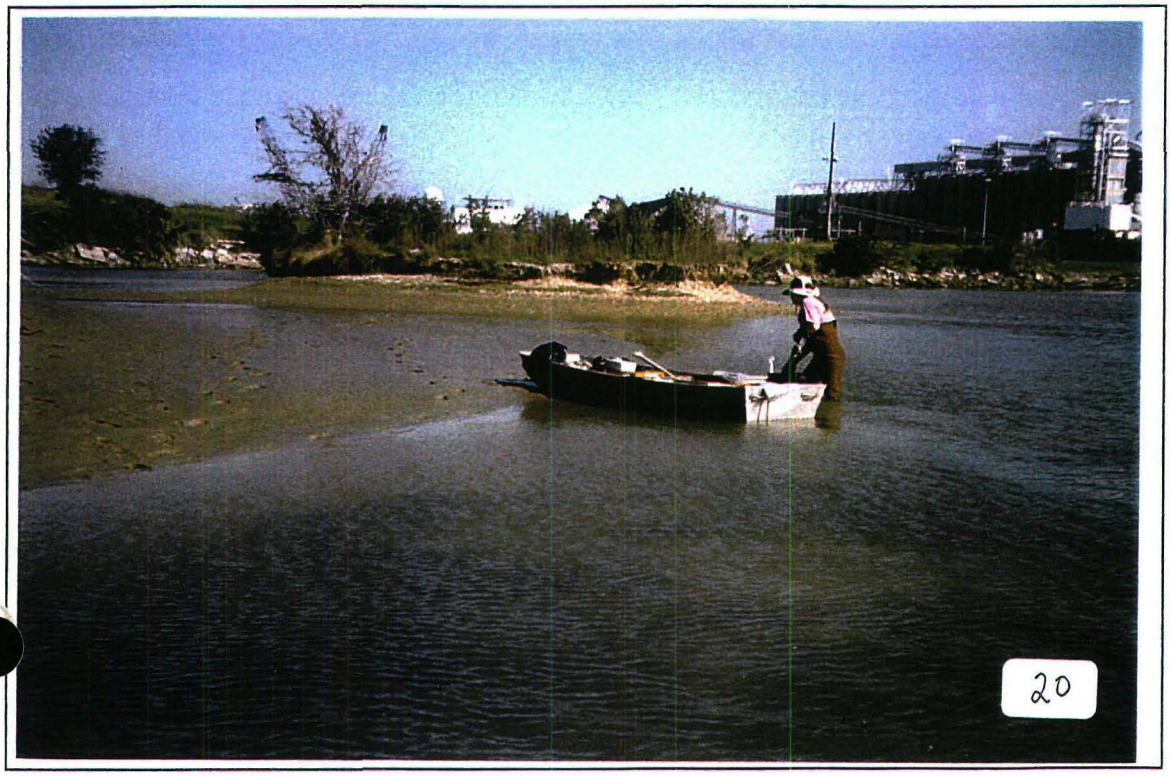

Photo #21 - (10:05 am) - Sediment sample SE-24 was collected approximately 83 meters south (upstream) from the south tip of the island and downstream from the Oxyvinyl Outfall No. 3. Photo taken facing north.

Photo # 22 - (10:10 am) - Sediment sample SE-24 was a two-part composite sample collected approximately 12" deep consisting of 2" of tan to brown sand on top of a layer of black mud as shown above. Slight organic odor noted.

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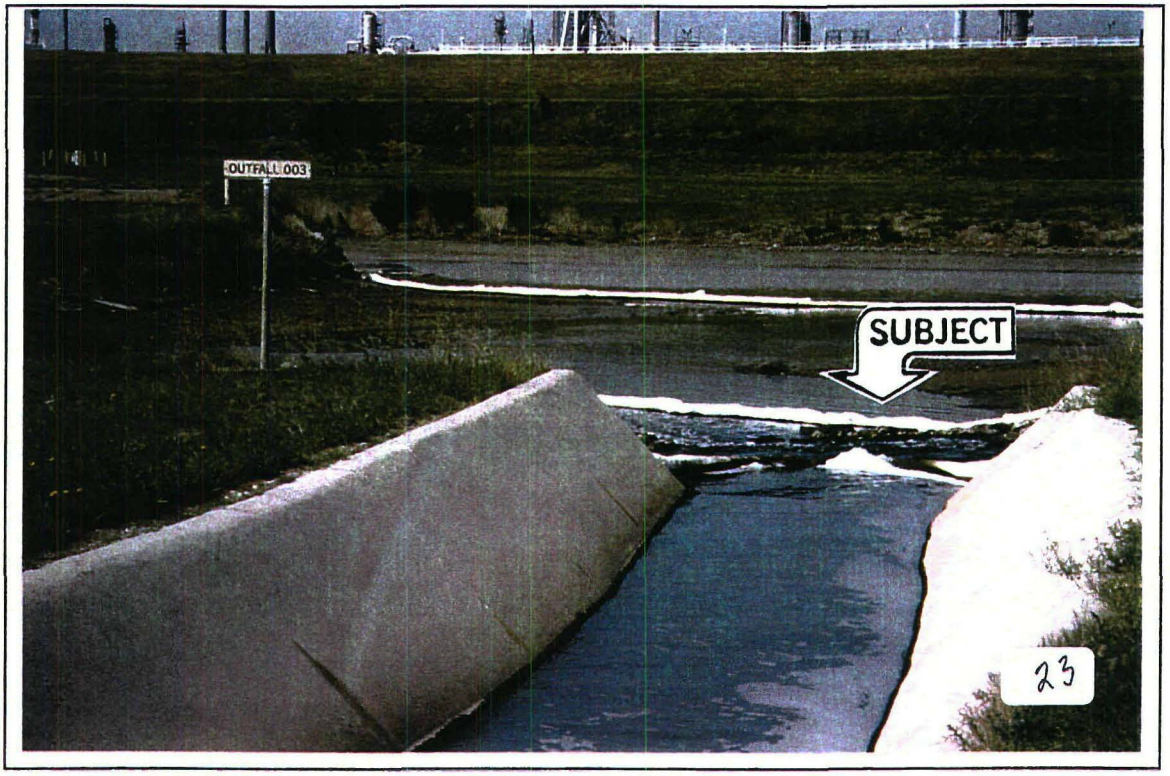

Photo #23 - (10:30 am) - Overview photo of the Oxyvinyl Outfall No. 3 discharge area to Patrick Bayou. A series of floating skimmers was noted along the discharge outlet area. Photo taken facing west.

Photo # 24 - (10:40 am) - Overview photo of the Oxyvinyl Outfall No. 2 showing the large volume of water discharged to Patrick Bayou. Photo taken facing east from the north bank of the outlet channel.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/30/00
Site Photographer: J. D. Thompson, Field Investigator

Photo #25 - (10:45 am) - Sediment sample SE-22 was collected downstream (north) from Oxyvinyl Outfall No. 2 approximately 45 meters south of Oxyvinyl Outfall No. 3 as shown above. Photo taken facing SW.

Photo # 26 - Photo
logged but not taken.

Photo # 26 - Not taken.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/30/00
Site Photographer: J. D. Thompson, Field Investigator

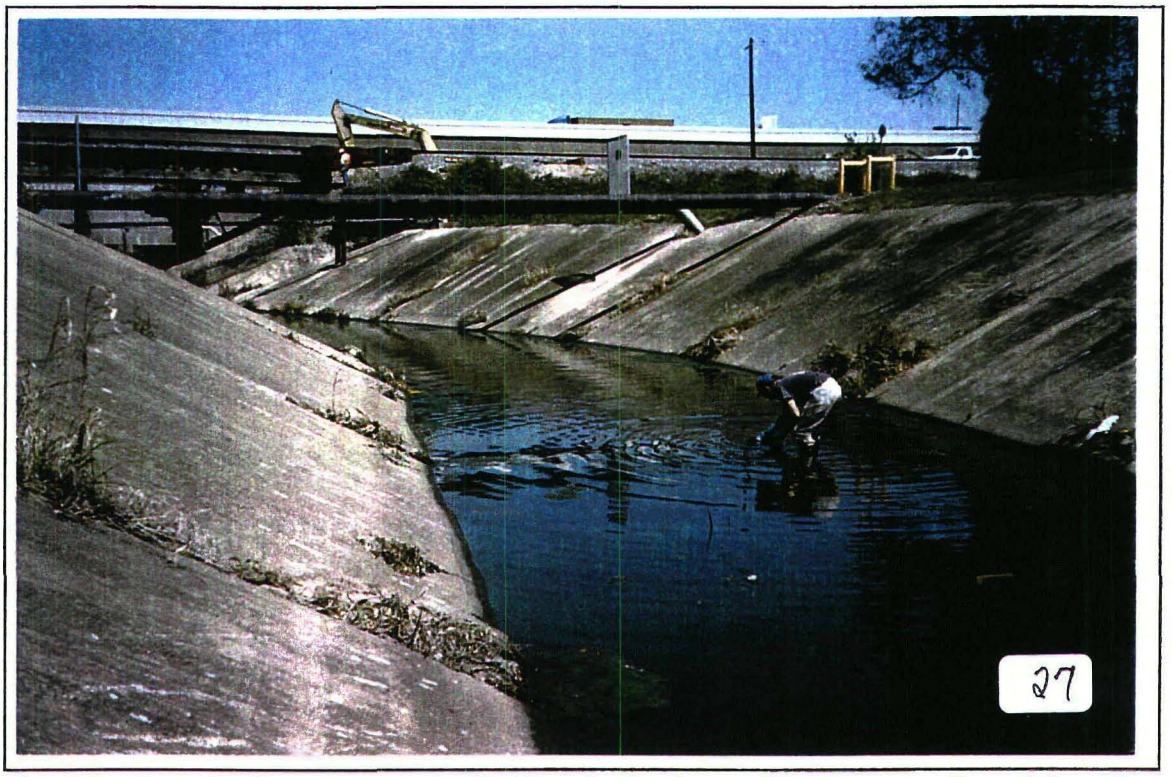

Photo #27 - (11:55 am) - A background sample SE-15 and a duplicate (SE-16) were collected from the concrete-lined drainage channel comprising the upper portion of Patrick Bayou as shown above. Photo taken facing north.

Photo # 28 - (11:52 am) - Sediment samples SE-15/16 were collected approximately 150' upstream from the Deer Park municipal wastewater treatment plant (WWTP) discharge point indicated above by the arrow above. Photo taken facing north. Note train passing across bridge.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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TXD Pending, SWR # None
Site Visit: 03/30/00
Site Photographer: J. D. Thompson, Field Investigator

Photo #29 - (13:25 pm) - Overview photo of the outlet area discharging from the covered gunite-lined portion of Patrick Bayou terminating on the Lubrizol LP property. Photo taken facing north.

Photo # 30 - (13:30 pm) - Sediment sample SE-17 was collected approximately 40 meters downstream (north) from the combined Deer Park municipal wastewater treatment plant (WWTP) and Lubrizol Outfall No. 1 discharge point as shown above. Photo taken facing north.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Region No. 4

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Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/30/00
Site Photographer: J. D. Thompson, Field Investigator

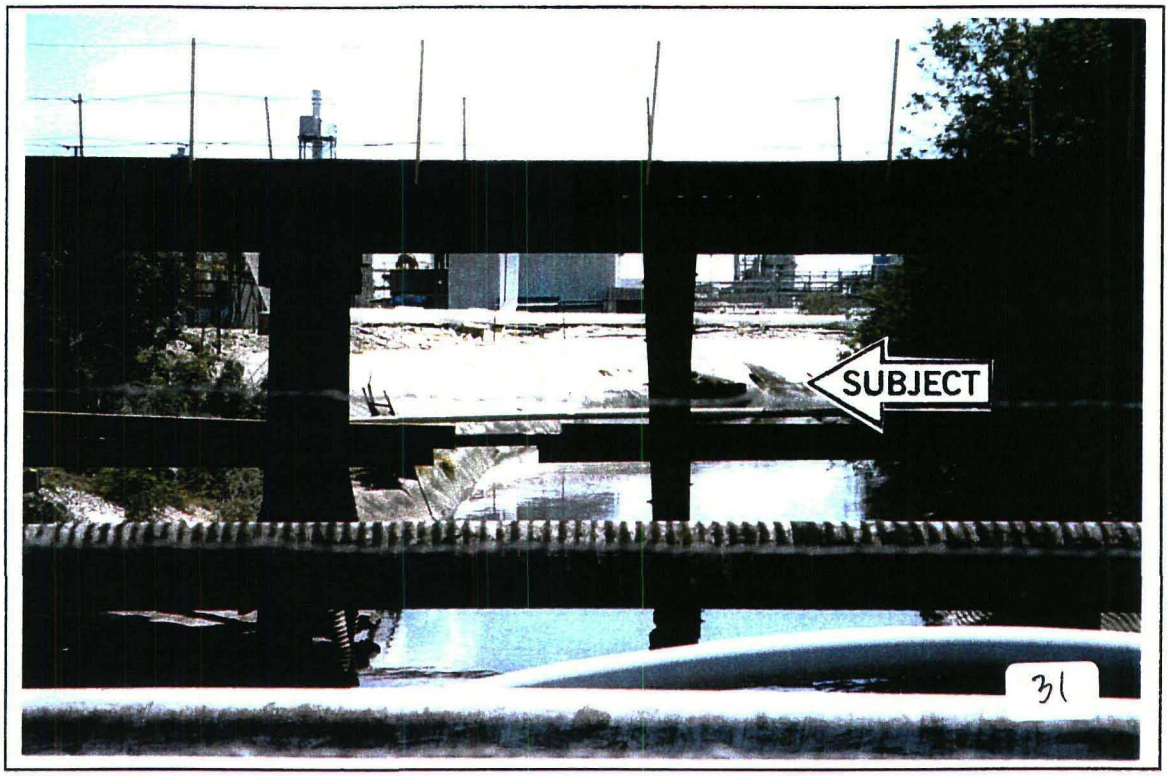

Photo #31 - (13:55 pm) - Overview photo of the Shell Oil Refinery/Shell Chemical Company outfall area along the upper gunite-lined portion of Patrick Bayou. Photo taken from the Shell Company Road facing south.

Photo # 32 - (13:58 pm) - Sediment sample SE-18 was collected approximately 20 meters downstream (north) from the Shell Company Road bridge along the west bank as shown above. Photo taken facing south.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/30/00
Site Photographer: J. D. Thompson, Field Investigator

Photo #33 - (14:30 pm) - Sediment sample SE-14 was collected from the north bank of the lower portion of East Fork Tributary near the confluence with Patrick Bayou as shown above. Photo taken facing west.

Photo # 34 - (14:32 pm) - Sediment sample SE-14 was collected using the coring sampling tool, mixed in a dedicated stainless steel bowl and placed in sample jars as shown above. The black muddy clay had a slight organic odor.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Region No. 4

Patrick Bayou Screening Site Inspection (SSI)
Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/30/00
Site Photographer: J. D. Thompson, Field Investigator

Photo #35 - (14:55 pm) - Sediment sample SE-25 was collected from a wetland area along the east bank of the lower portion of Patrick Bayou as shown above. Photo taken facing north.

Photo # 36 - (15:00 pm) - Sediment sample SE-25 was collected using the coring sampling tool, mixed in a dedicated stainless bowl and placed in sample jars as shown above. Grass and roots removed. Photo taken facing north.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Region No. 4

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Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/30/00
Site Photographer: J. D. Thompson, Field Investigator

Photo #37 - (16:00 pm) - A second wetland sediment sample SE-23 was collected further downstream (north) along the east bank of Patrick Bayou as shown above. Photo taken facing south.

Photo # 38 - (15:15 pm) - Sediment sample SE-23 was collected using the coring sampling tool, mixed in a dedicated stainless steel bowl and placed in sample jars. Photo taken facing west.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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TXD Pending, SWR # None
Site Visit: 03/30/00
Site Photographer: J. D. Thompson, Field Investigator

Photo #39 - (15:30 pm) - Sediment sample SE-19 was collected within Patrick Bayou approximately 800' downstream (north) of the confluence with the East Fork Tributary as shown above. Photo taken facing south.

Photo # 40 - (15:32 pm) - Sediment sample SE-19 was collected using the coring sampling tool, mixed in a dedicated stainless steel bowl and placed in the sample jars as shown above. Photo taken facing south.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/30/00
Site Photographer: J. D. Thompson, Field Investigator

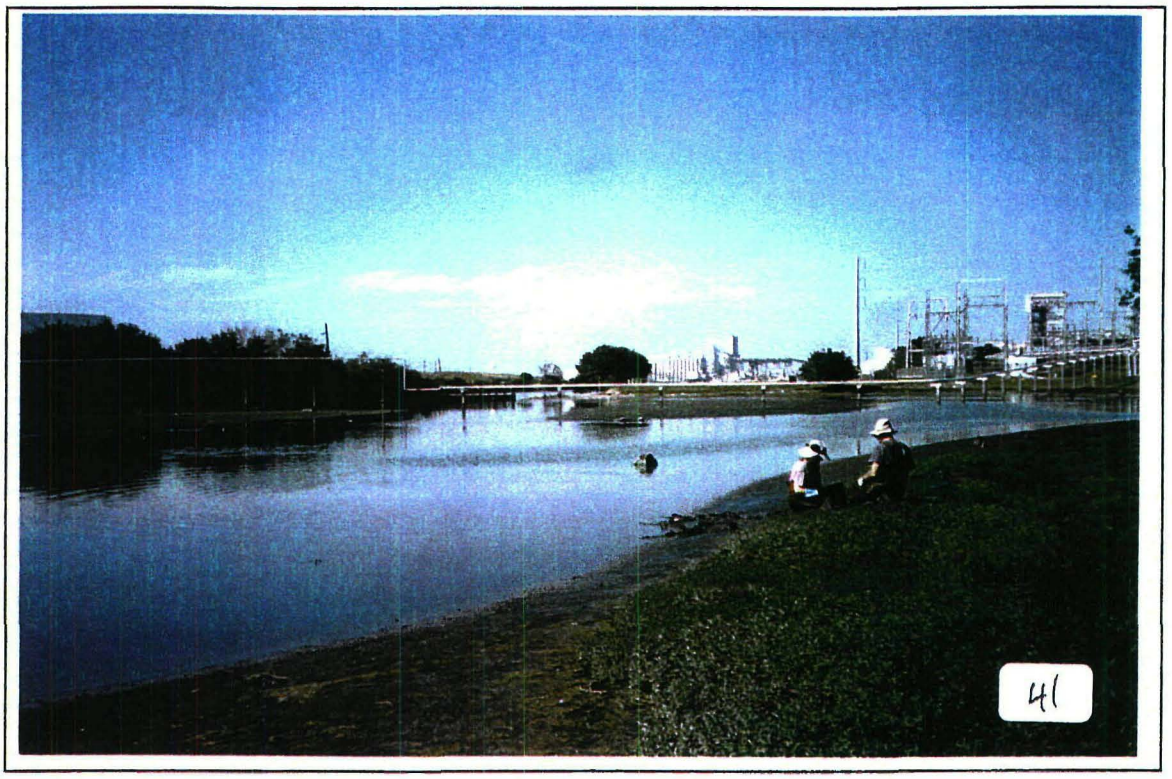

Photo #41 - (15:35 pm) - Overview photo of the eastern shoreline of Patrick Bayou showing typical vegetation north of the confluence with the East Fork Tributary. Photo taken facing north.

Photo # 42 - (15:38 pm) - Overview photo of the southern portion of Patrick Bayou and the confluence with the East Fork Tributary (indicated by the arrow). Tidal influence and storm water runoff influence water depth. Photo taken facing south from the east bank of the bayou.

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Site Photographer: J. D. Thompson, Field Investigator

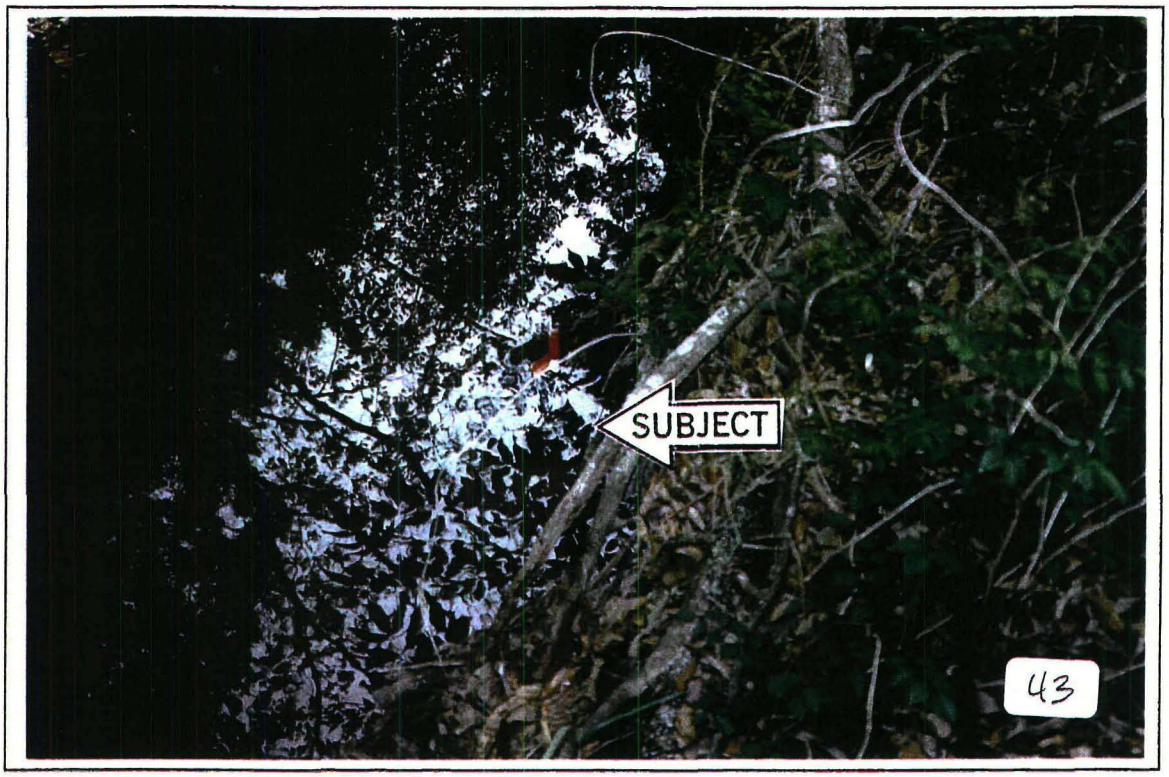

Photo #43 - (11:32 am) - Sediment sample SE-13 was collected along the south bank of the drainage ditch located downstream from the Praxair Outlet No. 1 as shown above. Photo taken facing east.

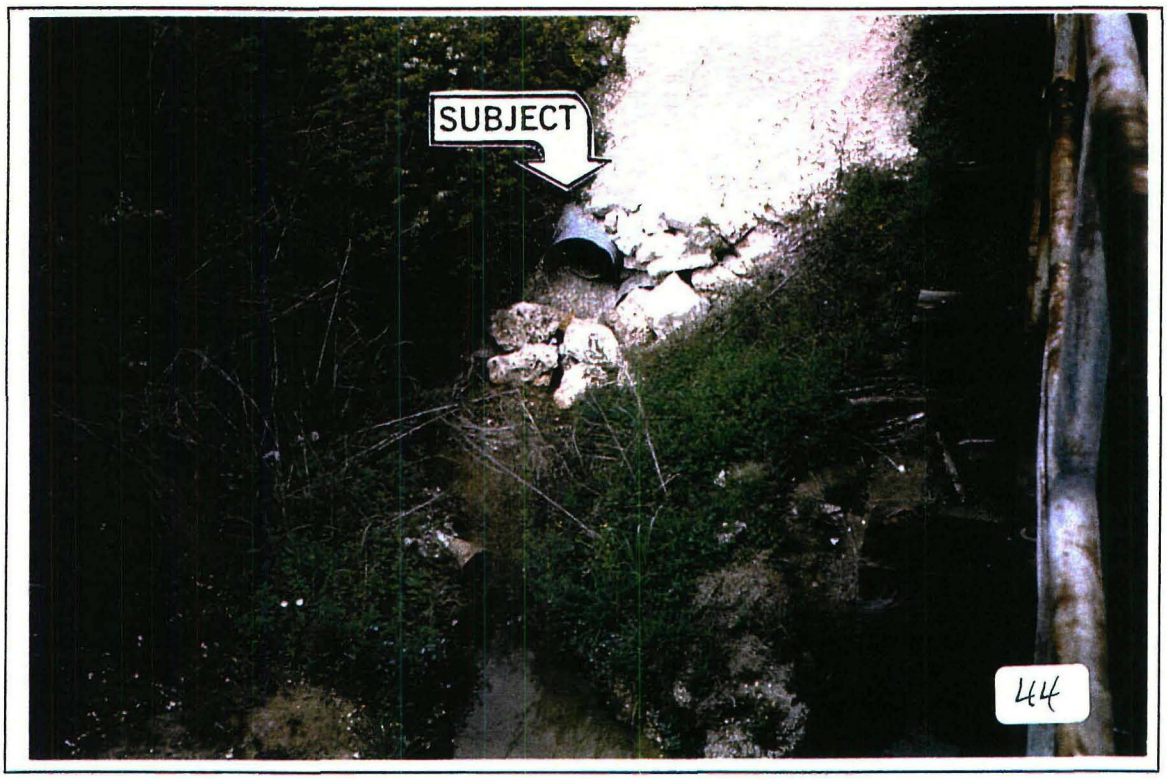

Photo # 44 - (11:37 am) - Overview photo of the culvert discharge area along the drainage ditch from the Praxair outfall area. Photo taken facing west.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Region No. 4

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Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/28/00
Site Photographers: John Syer/Judie Mallocks

Photo #45 - (11:39 am) - Overview photo of the downstream portion of the drainage ditch leading from the Praxair Outlet No. 1. Photo taken facing NNW.

Photo # 46 - (11:40 am) - Overview photo of the downstream drainage area from the Praxair Outfall No. 1. Photo taken along the south side of the railroad tracks facing SSE.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Region No. 4

Patrick Bayou Screening Site Inspection (SSI)
Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/28/00
Site Photographer: Judie Mattocks

Photo #47 - (11:59 am) - Background sediment sample SE-12 was collected approximately 120 feet upstream from the Praixair Outfall No. 1. Photo taken facing southeast.

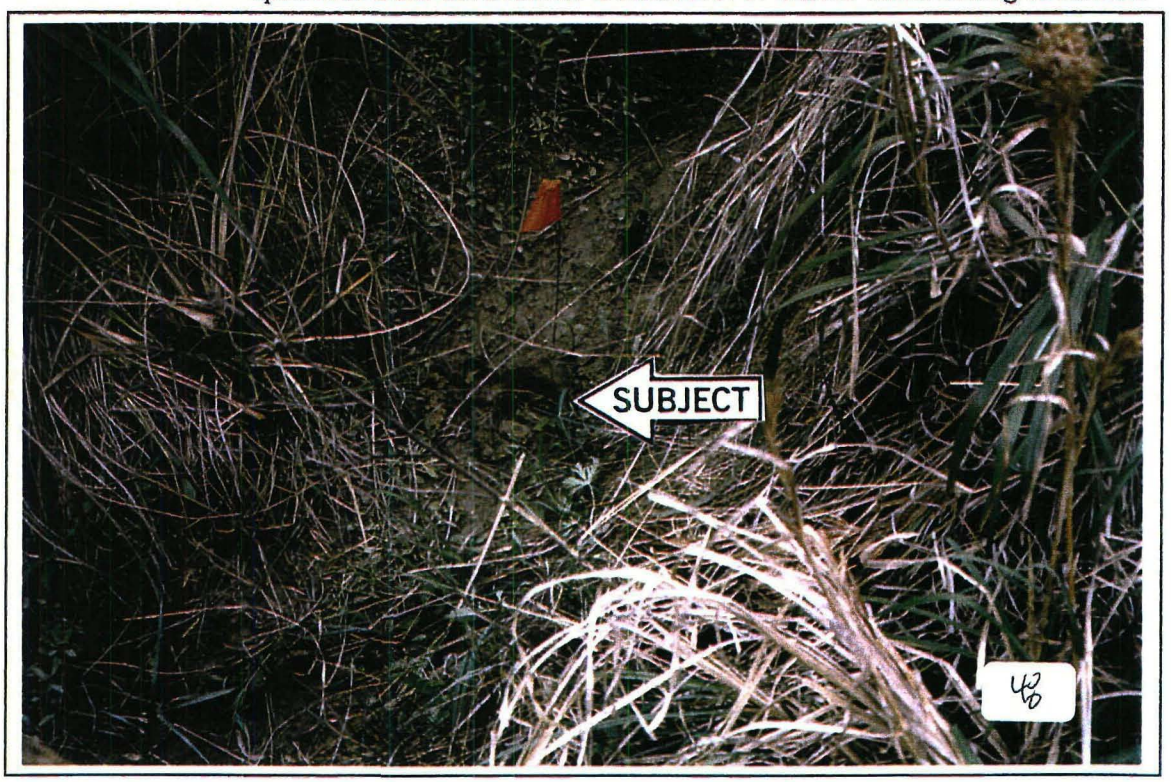

Photo # 48 - (12:16 pm) - Background sediment sample SE-11 was collected approximately 250 yds upstream from SE-12 along the upland portion of the East Fork Tributary. Photo taken facing east

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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Site Visit: 03/28/00
Site Photographers: Judie Mattocks/John Syer

Photo #49 - (12:30 pm) - Background sediment sample SE-10 was collected approximately 500 feet upstream from SE-11 along the upland portion of the East Fork Tributary. Photo taken facing southwest.

Photo # 50 - (12:40 pm) - Overview photo of the upstream portion of the East Fork Tributary. Photo taken facing southwest.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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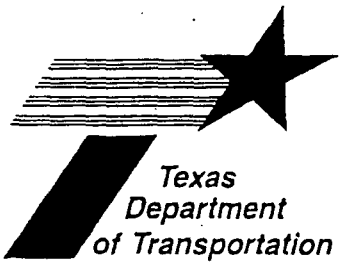
Patrick Bayou Screening Site Inspection (SSI)
Deer Park, Harris County, TX
TXD Pending, SWR # None
Site Visit: 03/28/00
Site Photographer: John Syer, Field Investigator

Reference 11

County Maps of Texas

COUNTY MAPS OF TEXAS



1994

PREPARED BY THE

TEXAS DEPARTMENT

OF TRANSPORTATION

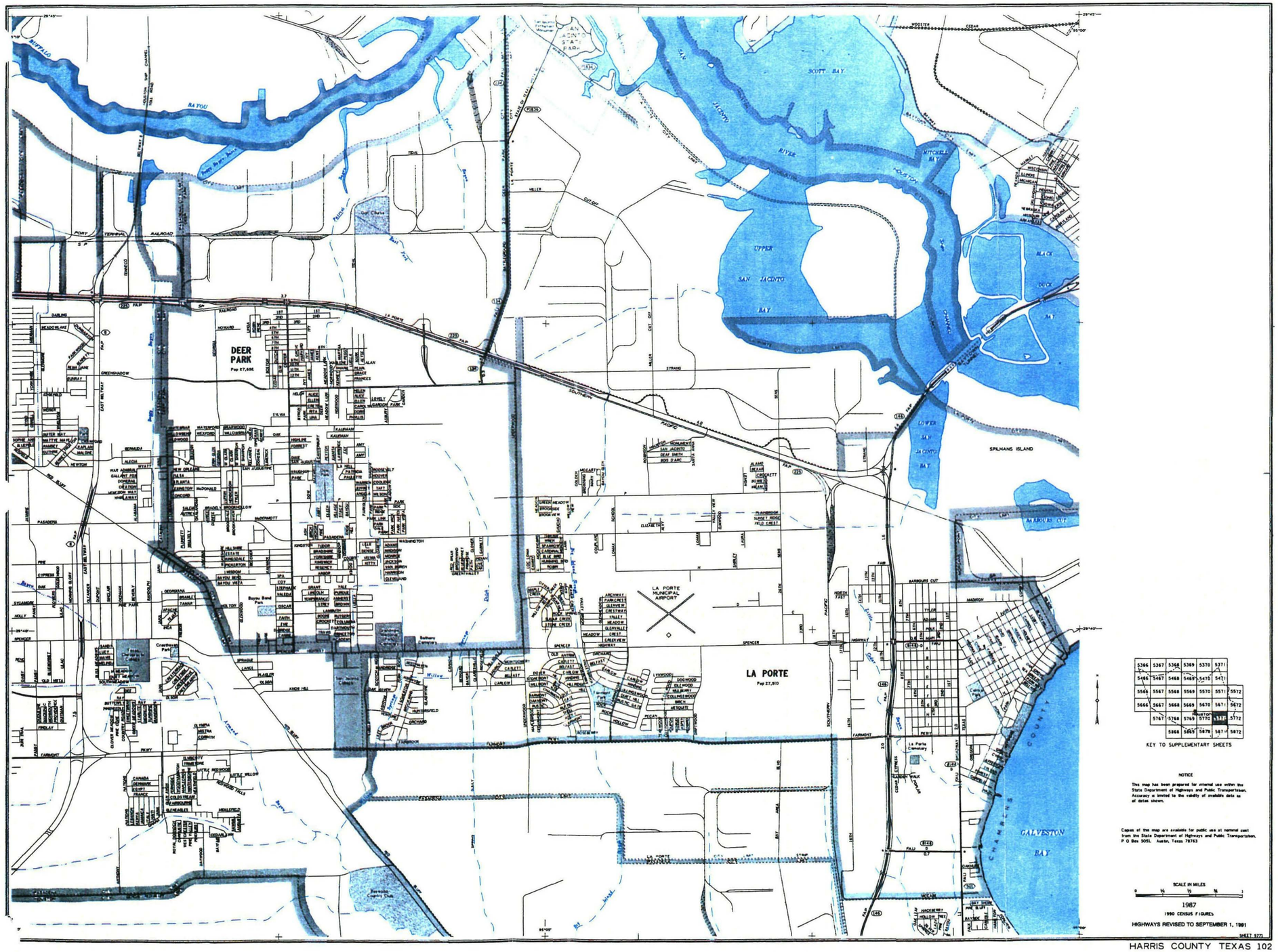
TRANSPORTATION PLANNING AND PROGRAMMING DIVISION

IN COOPERATION WITH THE

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

11 001



HARRIS COUNTY TEXAS 102

11 002

Reference 12

SDG MFHM71, CLP Data Review
and Inorganic Regional Data
Assessment Package

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEMORANDUM

Date: May 25, 2000

Subject: Contract Laboratory Program Data Review

From: Marvelyn Humphrey, Alternate ESAT RPO, 6MD-HC

To: B. Rhotenberry, 6SF-RA

Site : PATRICK BAYOU

Case#: 27912

SDG# : MFHM71

The EPA Region 6 Houston Branch ESAT data review team has completed a review of the submitted Contract Laboratory Program (CLP) data package for the referenced site. The samples analyzed and reviewed are detailed in the attached Regional data review report.

The data package is acceptable for regional use. Problems, if any, are listed in the report narrative.

If you have any questions regarding the data review report, please call me at (281) 983-2140.

Attachments
cc: R. Flores, Region 6 CLP/TPO
M. El-Feky, Region 6 Data Coordinator
Files (2)

LOCKHEED MARTIN SERVICES GROUP
ESAT REGION VI
10101 SOUTHWEST FREEWAY, SUITE 500
HOUSTON, TEXAS 77074

MEMORANDUM

DATE: May 23, 2000

TO: Melvin Ritter/Marvelyn Humphrey, ESAT RPO/Alternate RPO, Region VI

FROM: Tom Chiang, ESAT Team Manager, Region VI

SUBJECT: CLP Data Review

REF: TDF #6-0328A ESAT File No. I2417
ESAT Contract No. 68-D6-0005

Attached is the data review summary for Case # 27912
SDG # MFHM71
Site Patrick Bayou

COMMENTS:

I. CONTRACTUAL ASSESSMENT OF DATA PACKAGE:

Hard copy review found the package contractually compliant. CCS stated compliance could not be determined because of missing raw data.

II. TECHNICAL/USABILITY ASSESSMENT OF DATA PACKAGE:

A total of 288 results were reviewed for this data package. Some results have been qualified because of technical problems. The significant problems are stated below.

A. The antimony and cyanide matrix spike recoveries were below 75 percent.

B. Some antimony results were affected by laboratory blank concentrations.

C. One selenium analysis had inconsistent replicate instrument readings.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 27912 SITE Patrick Bayou
LABORATORY AATS NO. OF SAMPLES 12
CONTRACT# 68-W0-0086 MATRIX Soil
SDG# MFHM71 REVIEWER (IF NOT ESD) ESAT
SOW# ILM04.1 REVIEWER'S NAME S. Meekins
ACCT# 050102DJN60 SF# 50102DZZ COMPLETION DATE May 23, 2000

SAMPLE NO.					
	MFH-M71	MFH-W81	MFH-W87		
	MFH-W78	MFH-W82	MFH-W88		
	MFH-W79	MFH-W83	MFH-W89		
	MFH-W80	MFH-W86	MFH-W91		

DATA ASSESSMENT SUMMARY

	ICP	HG	CYANIDE
1. HOLDING TIMES	O	O	O
2. CALIBRATIONS	O	O	O
3. BLANKS	M	O	O
4. MATRIX SPIKES	M	O	M
5. DUPLICATE ANALYSIS	O	O	O
6. ICP QC	M		
7. FAA QC			
8. LCS	O	O	O
9. SAMPLE VERIFICATION	O	O	O
10. OTHER QC	O	O	O
11. OVERALL ASSESSMENT	M	O	M

O = Data had no problems.
M = Data qualified because of major or minor problems.
Z = Data unacceptable.
N/A= Not applicable

ACTION ITEMS:

AREAS OF CONCERN: Some antimony and cobalt results were affected by blank concentrations. The antimony and cyanide matrix spike recoveries were below 75 percent. One selenium analysis had a coefficient of variation above 20 percent.

NOTABLE PERFORMANCE: The laboratory submitted the package three calendar days early.

12 00

COMMENTS/CLARIFICATIONS
REGION 6 CLP QA REVIEW

Case 27912 SDG MFHM71 Site Patrick Bayou Lab AATS

COMMENTS: The SDG consisted of 12 soil samples for total metals and cyanide analyses by ILM04.1. The sampler designated sample MFH-W78 as the QC sample and samples MFH-M71/MFH-W91 and MFH-W79/MFH-W80 as field duplicate pairs. The laboratory met the 21-day data package turnaround time requirement, and the data package was contractually compliant.

Fifty-seven percent of the reported results were above the CRDL's. The laboratory diluted two mercury samples up to 10X because the mercury concentrations were above calibration range. Some results were qualified because of problems with laboratory blank concentrations, matrix spike recoveries, and inconsistent instrument readings. The technical usability of all reported results is indicated in the Data Summary Table (DST). An Evidence Audit was conducted for the Complete Sample Delivery Group File (CSF), and the results were recorded in the Evidence Inventory Checklist.

NOTE: THE FOLLOWING REVIEW NARRATIVE ADDRESSES BOTH CONTRACTUAL ISSUES (BASED ON THE STATEMENT OF WORK) AND TECHNICAL ISSUES (BASED ON THE NATIONAL FUNCTIONAL GUIDELINES). THE ASSESSMENT MADE FOR EACH QC PARAMETER IS SOLELY BASED ON THE TECHNICAL DATA USABILITY, WHICH MAY NOT NECESSARILY BE AFFECTED BY CONTRACTUAL PROBLEMS. THE ASSESSMENTS ARE DEFINED BELOW.

Acceptable = No results were qualified for any problems associated with this QC parameter.

Provisional = Some results were qualified because of problems associated with this QC parameter.

Unusable = All results are unusable because of major problems associated with this QC parameter.

1. **Holding Times:** Acceptable. All samples met contractual holding time criteria. Technical holding time criteria have not yet been established for soil samples. Sample preservation was acceptable.

2. **Calibrations:** Acceptable. All calibrations met contractual requirements. The CRDL standard recoveries indicated acceptable instrument performance near the CRDL's.

3. **Blanks:** Provisional. The preparation and calibration blanks met contractual requirements although the laboratory reported nine analytes in the blanks. The reviewer qualified the cobalt result for sample MFH-W79 and the antimony results for samples MFH-W78, MFH-W82, MFH-W83, MFH-W87, and MFH-W89 as undetected because of laboratory blank concentrations.

Case 27912 SDG MFHM71 Site Patrick Bayou Lab AATS

4. **Pre-digestion/Pre-distillation Matrix Spike Recovery:** Provisional. The reviewer qualified antimony and cyanide results as estimated and biased low because the associated matrix spike recoveries were below 75 percent.

5. **Duplicate Analysis:** Acceptable. Laboratory duplicate results met technical QC criteria.

6. **ICP Quality Control:**

   Serial Dilution: Acceptable. The laboratory reported acceptable serial dilution differences.

   Interference Check Sample (ICS): Acceptable. Acceptable ICS results indicated satisfactory interelement and background corrections.

   Coefficient of Variation: Provisional. The reviewer qualified as estimated the selenium result for sample MFH-W89 because replicate instrument readings were inconsistent.

7. **Furnace Atomic Absorption Quality Control:** Not Applicable.

8. **Laboratory Control Sample (LCS):** Acceptable. The laboratory reported a solid sodium LCS result that was outside the advisory QC limit. The high sodium LCS result indicated that the laboratory had difficulties conducting accurate analysis for sodium at a concentration far below the CRDL. (The true LCS concentration is 9% of the CRDL). Since the sodium concentrations in the samples were much higher (7X to 134X the true LCS concentration), the same problem may not exist for the samples. Therefore, it is the reviewer's opinion that the high sodium LCS result did not technically affect the sodium sample results.

9. **Sample Verification:** Acceptable. The laboratory correctly reported all sample results but was contacted about a minor reporting error (see FAX Record Log).

   The laboratory responded to CCS and resubmitted a revised Form 10 for cyanide IDL. The laboratory stated a corrected raw data page 260 was resubmitted. However, this page was not included with the resubmitted pages. The laboratory was contacted about this ommission. The resubmitted page, which should be used, was placed at the beginning of the data package.

12 00

Case 27912 SDG MFHM71 Site Patrick Bayou Lab AATS

10. **Other QC:**

Field duplicates: Acceptable. Field duplicate differences were consistent.

11. **Overall Assessment:** Sample result qualifications are summarized below.

The reviewer qualified one cobalt and five antimony results because of laboratory blank concentrations.

The reviewer qualified all antimony and cyanide results because of matrix related problems.

INORGANIC DATA QUALIFIER DEFINITIONS

The following definitions provide brief explanations of the ESAT-Region 6 qualifiers assigned to results in the inorganic data review process.

U Undetected at the laboratory reported detection limit (IDL).

L Reported concentration is between the IDL and the CRDL.

J Result is estimated because of outlying quality control parameters such as matrix spike, serial dilution, FAA spike recovery, etc.

R Result is unusable.

F A possibility of a false negative exists.

UC Reported concentration should be used as a raised detection limit because of apparent blank contamination.

^ High bias. Actual concentration may be lower than the concentration reported.

v Low bias. Actual concentration may be higher than the concentration reported.

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INORGANIC DATA SUMMARY

Case No.: 27912 SDG: MFHM71 Reviewer: S. Meekins

Laboratory: AATS Matrix: Soil Units: mg/Kg

EPA Sample #=>	MFH-M71	FLAG	MFH-W78	FLAG	MFH-W79	FLAG	MFH-W80	FLAG	MFH-W81	FLAG	MFH-W82	FLAG	MFH-W83	FLAG
ALUMINUM	3690		10400		3280		2490		4880		6950		7940	
ANTIMONY	0.52	U Jv	0.79	LUCJv	0.73	LJv	0.75	LJv	1.2	LJv	1.1	LUCJv	1.3	LUCJv
ARSENIC	2.0	L	5.7		2.3	L	6.0		9.7		4.1		4.2	
BARIUM	59.7		203		86.8		92.1		117		845		370	
BERYLLIUM	0.46	L	1.0	L	0.34	L	0.47	L	0.72	L	0.74	L	0.77	L
CADMIUM	0.26	U	0.83	L	0.39	L	0.63	L	1.1	L	0.44	L	0.64	L
CALCIUM	4730		16200		161000		96800		144000		67200		73400	
CHROMIUM	9.8		56.0		4.7		12.4		280		96.5		78.5	
COBALT	2.6	L	7.6	L	61.6	LUC	3.3	L	6.3	L	122	L	7.8	L
COPPER	10.1		60.2		11.5		17.7		31.7		23.7		43.7	
IRON	5160		12100		4050		8940		27900		8670		9290	
LEAD	13.5		32.6		38.6		33.8		34.5		33.4		37.3	
MAGNESIUM	1420		2030		6250		2930		8340		2240		1960	
MANGANESE	74.5		223		204		207		3500		411		162	
MERCURY	0.80		0.45	U	0.19		0.13		0.17		0.47		0.59	
NICKEL	7.4	L	20.9		3.1	L	8.8	L	14.1		18.3		20.4	
POTASSIUM	841	L	936	L	293		311	L	369	L	743	L	769	L
SELENIUM	0.78	U	1.0	U	0.85	U	0.78	U	1.0	L	0.85	U	1.1	U
SILVER	0.26	U	0.34	U	0.28	U	0.26	U	0.27	U	0.28	U	0.73	L
SODIUM	2190		2090		952	L	673	L	1840		2480		2780	
THALLIUM	1.0	L	1.3	U	1.1	U	1.0	U	1.1	L	1.1	U	1.4	U
VANADIUM	10.6	L	25.7		10.9	L	27.7		87.7		18.6		17.3	L
ZINC	48.5		174		74.4		99.0		225		201		269	
CYANIDE	0.06	U Jv	0.43	LJv	0.30	LJv	0.06	U Jv	0.26	LJv	0.07	U Jv	0.75	LJv
% Solids:	77.1		59.4		69.1		76.5		72.1		68.2		56.2	

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8

INORGANIC DATA SUMMARY

Case No.: 27912 SDG: MFHM71 Reviewer: S. Meekins

oratory: AATS Matrix: Soil Units: mg/Kg

EPA Sample #=>	MFH-W86	FLAG	MFH-W87	FLAG	MFH-W88	FLAG	MFH-W89	FLAG	MFH-W91	FLAG		FLAG		FLAG
ALUMINUM	5130		8490		9550		8670		3900					
ANTIMONY	0.87	U Jv	0.89	LUCJv	0.88	U Jv	0.66	LUCJv	0.53	U Jv				
ARSENIC	4.2	L	9.1		5.2		5.8		2.0					
BARIUM	403		125		331		151		53.6					
BERYLLIUM	0.53	L	0.74	L	0.82	L	0.76	L	0.44	L				
CADMIUM	0.76	L	1.8		1.4	L	1.0	L	0.27	U				
CALCIUM	232000		16200		78300		19200		4770					
CHROMIUM	188		77.5		229		76.5		13.3					
COBALT	14.2	L	4.9	L	14.0	L	6.0	L	3.1	L				
COPPER	82.2		39.2		104		89.3		10.7					
IRON	6240		11000		11100		8940		4940					
LEAD	151		77.7		139		30.2		13.6					
MAGNESIUM	6940		1380	L	4250		1940		1590					
MANGANESE	276		179		221		103		72.6					
MERCURY	17.8		6.5		37.1		0.59		0.53					
NICKEL	51.0		35.0		70.0		20.1		8.8	L				
POTASSIUM	1070	L	800	L	1530	L	901	L	985	L				
SELENIUM	1.3	U	0.98	U	1.3	U	1.2	LJ	0.80	U				
SILVER	62.8		0.33	U	1.0	L	0.33	U	0.27	U				
SODIUM	11400		2160		12500		2430		2610					
THALLIUM	1.7	U	1.3	U	1.8	U	1.3	U	1.1	U				
VANADIUM	10.2	L	24.7		18.0	L	17.1		10.1	L				
ZINC	337		483		450		227		47.6					
CYANIDE	1.0	LJv	0.71	LJv	0.40	LJv	0.34	LJv	0.07	U Jv				
% Solids:	44.8		61.1		45.0		61.1		75.0					

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INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No. 27912 SDG No. MFHM71 SDG Nos. To Follow _____ SAS No. _____ Date Rec 04/18/00

EPA Lab ID: AATS
Lab Location: Broken Arrow, OK
Region: 6 Audit No.: 27912/MFHM71
Re_Submitted CSF? Yes _____ No X
Box No(s): 1
COMMENTS:

Over for additional comments.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?	X		
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?	X		
FORM DC-1			
6. Present?	X		
7. Complete?	X		
8. Accurate?	X		
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?	X		
14. Signed?	X		
15. Dated?	X		
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a. If "NO", does the copy indicate where original documents are located?	X		

Audited by: Sonya Meekins / ESAT Data Reviewer Date 05/18/00
Audited by: _____ Date _____
Audited by: _____ Date _____
Signature Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: _____ Date Entered: _____ Date Reviewed: _____
Entered by: _____ _____
Reviewed by: _____ _____
Signature Printed Name/Title

In Reference to Case No(s):
27912 SDG: MFHM71 (I2417)

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
FAX Record Log

Laboratory Name: AATS
Lab Contact: Deborah Inman
Region: 6
Regional Contact: Mahmoud El-Feky - EPA
ESAT Data Reviewer: Sonya Meekins
FAX initiated by: Laboratory X Region

In reference to data for the following fractions:

CSF Deliverables Metals

Summary of Questions/Issues:

A. CSF Deliverables

The presence of the cooler temperature bottle was not reported on the Case Narrative (Summary of Changes ILM04.1, Page 1-2 of 12, Exhibit A, Section II, Task I, No. 5). Please make this required addition to the narrative and resubmit.

B. Metals

A corrected raw data page 260 was not submitted in the CCS resubmission response as indicated. Please resubmit this corrected page at this time.

NOTE: Any laboratory resubmission should be submitted either as an addendum to the original CSF with a revised Form DC-2 or submitted as a new CSF with a new Form DC-2 (ILM04.0, B-14), except those containing only replacement pages. Custody seals are required for all CSF resubmission shipments.

Please respond to the above items. Region 6 resubmissions may be included with CCS response or sent separately **within 4 days** to:

Mr. Mahmoud El-Feky
U.S. EPA Region 6 Laboratory
10625 Fallstone Road
Houston, TX 77099

If you have any questions, please contact me at (713) 988-2128.

M. El-Feky
Signature

5-24-00
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) ESAT Copy

12 011

#3

EPA — Inorganic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Inorganic CLP Analysis)

Case No. 27912

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	TNRCC	3/30/00	Airborne Express

Regional Information	Sampler (Name)	Airbill Number
	Linda Broach	2952402736

Non-Superfund Program	Sampler Signature	5. Ship To
	Linda Broach	AATS 1700 West Albany, Suite C Broken Arrow, OK 74012 ATTN: Deborah INMAN

Site Name: Patrick Bayou
City, State: Deer Park, TX
Site Spill ID:

3. Purpose*
- Lead: SF, PRP, [X] ST, FED
- Early Action: CLEM, PA, REM, RI, [X] SI, ESI
- Long-Term Action: FS, RD, RA, O&M, NPLD

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) / Other:	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct.	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform. Eval. — = Not a QC Sample)
MFHW78	5	L	C	6		X	X					6-209289-290	SE-14	3/30/00 1430	FGW58	LB	—
MFHW79	5	L	C	6		X	X					6-209295-296	SE-15	3/30/00 1155	FGW59	JK	—
MFHW80	5	L	C	6		X	X					6-209301-302	SE-16	3/30/00 1200	FGW60	JK	D (MFHW79)
MFHW81	5	L	C	6		X	X					6-209307-308	SE-17	3/30/00 1325	FGW61	LB	—
MFHW82	5	L	C	6		X	X					6-209313-314	SE-18	3/30/00 1355	FGW62	LB	—
MFHW83	5	L	C	6		X	X					6-209319-320	SE-19	3/30/00 1530	FGW63	LB	—
MFHW86	5	L	C	6		X	X					6-209337-338	SE-22	3/30/00 1045	FGW66	LB	—
MFHW87	5	L	C	6		X	X					6-209343-344	SE-23	3/30/00 1510	FGW67	LB	—
MFHW88	5	L	C	6		X	X					6-209349-350	SE-24	3/30/00 1000	FGW68	LB	—
MFHW89	5	L	C	6		X	X					6-209355-356	SE-25	3/30/00 1455	FGW69	LB	—

Shipment for Case Complete? (Y/N)	Page	Sample(s) to be Used for Laboratory QC	Additional Sampler Signatures	Chain of Custody Seal Number(s)
Yes	1 of 2	MFHW78		

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	3/30/00 1730				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

A21-012-13 REV.

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-1 (2/98)

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

12 01 21

EPA United States Environmental Protection Agency
Contract Laboratory Program

Inorganic Traffic Report & Chain of Custody Record
(For Inorganic CLP Analysis)

Case No. 27912

1. Project Code	Account Code	2. Region No. 6	Sampling Co. TNRCC	4. Date Shipped 3/30/00	Carrier Airborne Express
Regional Information		Sampler (Name) Linda Broach		Airbill Number 29524027736	
Non-Superfund Program		Sampler Signature Linda Broach		5. Ship To AATS 1700 West Albany, Suite C Broken Arrow, OK 74012 ATTN: Deborah Inman	
Site Name Patrick Bayou		3. Purpose* Lead: [ ] SF [ ] PRP [X] ST [ ] FED; Early Action: [ ] CLEM [ ] PA [ ] REM [ ] RI [X] SI [ ] ESI; Long-Term Action: [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD			
City, State Deer Park, TX	Site Spill ID				

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) / Other:	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct.	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform. Eval. – = Not a QC Sample)
MFHW91	5	L	C	6		X	X					6-209367-368	SE-27	3/30/00 0905	FGW71	LB	—
MFHW71	5	L	C	6		X	X					6-209207-208	SE-28	3/30/00 0910	FGA73	LB	D(MFHW91)

Shipment for Case Complete? (Y/N) YES
Page 2 of 2
Sample(s) to be Used for Laboratory QC: MFHW78
Additional Sampler Signatures:
Chain of Custody Seal Number(s):

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	3/30/00 1730				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

A21-012-13 REV.

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-1 (2/98)

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MFHM71

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__

Lab Code: AATS__ Case No.: 27912_ SAS No.: _____ SDG No.: MFHM71

Matrix (soil/water): SOIL_ Lab Sample ID: 42495.01

Level (low/med): LOW__ Date Received: 03/31/00

% Solids: _77.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3690			P
7440-36-0	Antimony	0.52	U	N	P
7440-38-2	Arsenic	2.0	B		P
7440-39-3	Barium	59.7			P
7440-41-7	Beryllium	0.46	B		P
7440-43-9	Cadmium	0.26	U		P
7440-70-2	Calcium	4730			P
7440-47-3	Chromium	9.8		*	P
7440-48-4	Cobalt	2.6	B		P
7440-50-8	Copper	10.1			P
7439-89-6	Iron	5160			P
7439-92-1	Lead	13.5		*	P
7439-95-4	Magnesium	1420			P
7439-96-5	Manganese	74.5			P
7439-97-6	Mercury	0.80			CV
7440-02-0	Nickel	7.4	B		P
7440-09-7	Potassium	841	B		P
7782-49-2	Selenium	0.78	U		P
7440-22-4	Silver	0.26	U		P
7440-23-5	Sodium	2190			P
7440-28-0	Thallium	1.0	B		P
7440-62-2	Vanadium	10.6	B		P
7440-66-6	Zinc	48.5			P
	Cyanide	0.06	U	N	CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MFHW78

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__

Lab Code: AATS__ Case No.: 27912_ SAS No.: _____ SDG No.: MFHM71

Matrix (soil/water): SOIL_ Lab Sample ID: 42495.02

Level (low/med): LOW__ Date Received: 03/31/00

% Solids: _59.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10400			P
7440-36-0	Antimony	0.79	B	N	P
7440-38-2	Arsenic	5.7			P
7440-39-3	Barium	203			P
7440-41-7	Beryllium	1.0	B		P
7440-43-9	Cadmium	0.83	B		P
7440-70-2	Calcium	16200			P
7440-47-3	Chromium	56.0		*	P
7440-48-4	Cobalt	7.6	B		P
7440-50-8	Copper	60.2			P
7439-89-6	Iron	12100			P
7439-92-1	Lead	32.6		*	P
7439-95-4	Magnesium	2030			P
7439-96-5	Manganese	223			P
7439-97-6	Mercury	0.45			CV
7440-02-0	Nickel	20.9			P
7440-09-7	Potassium	936	B		P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	0.34	U		P
7440-23-5	Sodium	2090			P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	25.7			P
7440-66-6	Zinc	174			P
	Cyanide	0.43	B	N	CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW79

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__

Lab Code: AATS__ Case No.: 27912_ SAS No.: _____ SDG No.: MFHM71

Matrix (soil/water): SOIL_ Lab Sample ID: 42495.03

Level (low/med): LOW__ Date Received: 03/31/00

% Solids: _69.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3280			P
7440-36-0	Antimony	0.73	B	N	P
7440-38-2	Arsenic	2.3	B		P
7440-39-3	Barium	86.8			P
7440-41-7	Beryllium	0.34	B		P
7440-43-9	Cadmium	0.39	B		P
7440-70-2	Calcium	161000			P
7440-47-3	Chromium	4.7		*	P
7440-48-4	Cobalt	1.6	B		P
7440-50-8	Copper	11.5			P
7439-89-6	Iron	4050			P
7439-92-1	Lead	38.6		*	P
7439-95-4	Magnesium	6250			P
7439-96-5	Manganese	204			P
7439-97-6	Mercury	0.19			CV
7440-02-0	Nickel	3.1	B		P
7440-09-7	Potassium	293	B		P
7782-49-2	Selenium	0.85	U		P
7440-22-4	Silver	0.28	U		P
7440-23-5	Sodium	952	B		P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	10.9	B		P
7440-66-6	Zinc	74.4			P
	Cyanide	0.30	B	N	CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW80

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__

Lab Code: AATS__ Case No.: 27912_ SAS No.: _____ SDG No.: MFHM71

Matrix (soil/water): SOIL_ Lab Sample ID: 42495.04

Level (low/med): LOW__ Date Received: 03/31/00

% Solids: _76.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2490			P
7440-36-0	Antimony	0.75	B	N	P
7440-38-2	Arsenic	6.0			P
7440-39-3	Barium	92.1			P
7440-41-7	Beryllium	0.47	B		P
7440-43-9	Cadmium	0.63	B		P
7440-70-2	Calcium	96800			P
7440-47-3	Chromium	12.4		*	P
7440-48-4	Cobalt	3.3	B		P
7440-50-8	Copper	17.7			P
7439-89-6	Iron	8940			P
7439-92-1	Lead	33.8		*	P
7439-95-4	Magnesium	2930			P
7439-96-5	Manganese	207			P
7439-97-6	Mercury	0.13			CV
7440-02-0	Nickel	8.8	B		P
7440-09-7	Potassium	311	B		P
7782-49-2	Selenium	0.78	U		P
7440-22-4	Silver	0.26	U		P
7440-23-5	Sodium	673	B		P
7440-28-0	Thallium	1.0	U		P
7440-62-2	Vanadium	27.7			P
7440-66-6	Zinc	99.0			P
	Cyanide	0.06	U	N	CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

12 017

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MFHW81

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__

Lab Code: AATS__ Case No.: 27912_ SAS No.: _____ SDG No.: MFHM71

Matrix (soil/water): SOIL_ Lab Sample ID: 42495.05

Level (low/med): LOW__ Date Received: 03/31/00

% Solids: _72.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4880			P
7440-36-0	Antimony	1.2	B	N	P
7440-38-2	Arsenic	9.7			P
7440-39-3	Barium	117			P
7440-41-7	Beryllium	0.72	B		P
7440-43-9	Cadmium	1.1	B		P
7440-70-2	Calcium	144000			P
7440-47-3	Chromium	280		*	P
7440-48-4	Cobalt	6.3	B		P
7440-50-8	Copper	31.7			P
7439-89-6	Iron	27900			P
7439-92-1	Lead	34.5		*	P
7439-95-4	Magnesium	8340			P
7439-96-5	Manganese	3500			P
7439-97-6	Mercury	0.17			CV
7440-02-0	Nickel	14.1			P
7440-09-7	Potassium	369	B		P
7782-49-2	Selenium	1.0	B		P
7440-22-4	Silver	0.27	U		P
7440-23-5	Sodium	1840			P
7440-28-0	Thallium	1.1	B		P
7440-62-2	Vanadium	87.7			P
7440-66-6	Zinc	225			P
	Cyanide	0.26	B	N	CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MFHW82

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__

Lab Code: AATS__ Case No.: 27912_ SAS No.: _____ SDG No.: MFHM71

Matrix (soil/water): SOIL_ Lab Sample ID: 42495.06

Level (low/med): LOW__ Date Received: 03/31/00

% Solids: _68.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6950			P
7440-36-0	Antimony	1.1	B	N	P
7440-38-2	Arsenic	4.1			P
7440-39-3	Barium	845			P
7440-41-7	Beryllium	0.74	B		P
7440-43-9	Cadmium	0.44	B		P
7440-70-2	Calcium	67200			P
7440-47-3	Chromium	96.5		*	P
7440-48-4	Cobalt	12.2	B		P
7440-50-8	Copper	23.7			P
7439-89-6	Iron	8670			P
7439-92-1	Lead	33.4		*	P
7439-95-4	Magnesium	2240			P
7439-96-5	Manganese	411			P
7439-97-6	Mercury	0.47			CV
7440-02-0	Nickel	18.3			P
7440-09-7	Potassium	743	B		P
7782-49-2	Selenium	0.85	U		P
7440-22-4	Silver	0.28	U		P
7440-23-5	Sodium	2480			P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	18.6			P
7440-66-6	Zinc	201			P
	Cyanide	0.07	U	N	CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW83

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__

Lab Code: AATS__ Case No.: 27912_ SAS No.: _____ SDG No.: MFHM71

Matrix (soil/water): SOIL_ Lab Sample ID: 42495.07

Level (low/med): LOW__ Date Received: 03/31/00

% Solids: _56.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7940			P
7440-36-0	Antimony	1.3	B	N	P
7440-38-2	Arsenic	4.2			P
7440-39-3	Barium	370			P
7440-41-7	Beryllium	0.77	B		P
7440-43-9	Cadmium	0.64	B		P
7440-70-2	Calcium	23400			P
7440-47-3	Chromium	78.5		*	P
7440-48-4	Cobalt	7.8	B		P
7440-50-8	Copper	43.7			P
7439-89-6	Iron	9290			P
7439-92-1	Lead	37.3		*	P
7439-95-4	Magnesium	1960			P
7439-96-5	Manganese	162			P
7439-97-6	Mercury	0.59			CV
7440-02-0	Nickel	20.4			P
7440-09-7	Potassium	769	B		P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	0.73	B		P
7440-23-5	Sodium	2780			P
7440-28-0	Thallium	1.4	U		P
7440-62-2	Vanadium	17.3	B		P
7440-66-6	Zinc	269			P
	Cyanide	0.75	B	N	CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW86

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__

Lab Code: AATS__ Case No.: 27912_ SAS No.: _____ SDG No.: MFHM71

Matrix (soil/water): SOIL_ Lab Sample ID: 42495.08

Level (low/med): LOW__ Date Received: 03/31/00

% Solids: _44.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5130			P
7440-36-0	Antimony	0.87	U	N	P
7440-38-2	Arsenic	4.2	B		P
7440-39-3	Barium	403			P
7440-41-7	Beryllium	0.53	B		P
7440-43-9	Cadmium	0.76	B		P
7440-70-2	Calcium	232000			P
7440-47-3	Chromium	188		*	P
7440-48-4	Cobalt	14.2	B		P
7440-50-8	Copper	82.2			P
7439-89-6	Iron	6240			P
7439-92-1	Lead	151		*	P
7439-95-4	Magnesium	6940			P
7439-96-5	Manganese	276			P
7439-97-6	Mercury	17.8			CV
7440-02-0	Nickel	51.0			P
7440-09-7	Potassium	1070	B		P
7782-49-2	Selenium	1.3	U		P
7440-22-4	Silver	62.8			P
7440-23-5	Sodium	11400			P
7440-28-0	Thallium	1.7	U		P
7440-62-2	Vanadium	10.2	B		P
7440-66-6	Zinc	337			P
	Cyanide	1.0	B	N	CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW87

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__

Lab Code: AATS__ Case No.: 27912_ SAS No.: _____ SDG No.: MFHM71

Matrix (soil/water): SOIL_ Lab Sample ID: 42495.09

Level (low/med): LOW__ Date Received: 03/31/00

% Solids: _61.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8490			P
7440-36-0	Antimony	0.89	B	N	P
7440-38-2	Arsenic	3.1	B		P
7440-39-3	Barium	125			P
7440-41-7	Beryllium	0.74	B		P
7440-43-9	Cadmium	1.8			P
7440-70-2	Calcium	16200			P
7440-47-3	Chromium	77.5		*	P
7440-48-4	Cobalt	4.9	B		P
7440-50-8	Copper	39.2			P
7439-89-6	Iron	11000			P
7439-92-1	Lead	77.7		*	P
7439-95-4	Magnesium	1380	B		P
7439-96-5	Manganese	179			P
7439-97-6	Mercury	6.5			CV
7440-02-0	Nickel	35.0			P
7440-09-7	Potassium	800	B		P
7782-49-2	Selenium	0.98	U		P
7440-22-4	Silver	0.33	U		P
7440-23-5	Sodium	2160			P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	24.7			P
7440-66-6	Zinc	483			P
	Cyanide	0.71	B	N	CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MFHW88

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__

Lab Code: AATS__ Case No.: 27912_ SAS No.: _____ SDG No.: MFHM71

Matrix (soil/water): SOIL_ Lab Sample ID: 42495.10

Level (low/med): LOW__ Date Received: 03/31/00

% Solids: _45.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9550			P
7440-36-0	Antimony	0.88	U	N	P
7440-38-2	Arsenic	5.2			P
7440-39-3	Barium	331			P
7440-41-7	Beryllium	0.82	B		P
7440-43-9	Cadmium	1.4	B		P
7440-70-2	Calcium	78300			P
7440-47-3	Chromium	229		*	P
7440-48-4	Cobalt	14.0	B		P
7440-50-8	Copper	104			P
7439-89-6	Iron	11100			P
7439-92-1	Lead	139		*	P
7439-95-4	Magnesium	4250			P
7439-96-5	Manganese	221			P
7439-97-6	Mercury	37.1			CV
7440-02-0	Nickel	70.0			P
7440-09-7	Potassium	1530	B		P
7782-49-2	Selenium	1.3	U		P
7440-22-4	Silver	1.0	B		P
7440-23-5	Sodium	12500			P
7440-28-0	Thallium	1.8	U		P
7440-62-2	Vanadium	18.0	B		P
7440-66-6	Zinc	450			P
	Cyanide	0.40	B	N	CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MFHW89

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__

Lab Code: AATS__ Case No.: 27912_ SAS No.: _____ SDG No.: MFHM71

Matrix (soil/water): SOIL_ Lab Sample ID: 42495.11

Level (low/med): LOW__ Date Received: 03/31/00

% Solids: _61.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8670			P
7440-36-0	Antimony	0.65	B	N	P
7440-38-2	Arsenic	5.8			P
7440-39-3	Barium	151			P
7440-41-7	Beryllium	0.76	B		P
7440-43-9	Cadmium	1.00	B		P
7440-70-2	Calcium	19200			P
7440-47-3	Chromium	76.5		*	P
7440-48-4	Cobalt	6.0	B		P
7440-50-8	Copper	89.3			P
7439-89-6	Iron	8940			P
7439-92-1	Lead	30.2		*	P
7439-95-4	Magnesium	1940			P
7439-96-5	Manganese	103			P
7439-97-6	Mercury	0.59			CV
7440-02-0	Nickel	20.1			P
7440-09-7	Potassium	901	B		P
7782-49-2	Selenium	1.2	B		P
7440-22-4	Silver	0.33	U		P
7440-23-5	Sodium	2430			P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	17.1			P
7440-66-6	Zinc	227			P
	Cyanide	0.34	B	N	CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW91

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__

Lab Code: AATS__ Case No.: 27912_ SAS No.: _____ SDG No.: MFHM71

Matrix (soil/water): SOIL_ Lab Sample ID: 42495.12

Level (low/med): LOW__ Date Received: 03/31/00

% Solids: _75.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3900			P
7440-36-0	Antimony	0.53	U	N	P
7440-38-2	Arsenic	2.0	B		P
7440-39-3	Barium	53.6			P
7440-41-7	Beryllium	0.44	B		P
7440-43-9	Cadmium	0.27	U		P
7440-70-2	Calcium	4770			P
7440-47-3	Chromium	13.3		*	P
7440-48-4	Cobalt	3.1	B		P
7440-50-8	Copper	10.7			P
7439-89-6	Iron	4940			P
7439-92-1	Lead	13.6		*	P
7439-95-4	Magnesium	1590			P
7439-96-5	Manganese	72.6			P
7439-97-6	Mercury	0.53			CV
7440-02-0	Nickel	8.8	B		P
7440-09-7	Potassium	985	B		P
7782-49-2	Selenium	0.80	U		P
7440-22-4	Silver	0.27	U		P
7440-23-5	Sodium	2610			P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	10.1	B		P
7440-66-6	Zinc	47.6			P
	Cyanide	0.07	U	N	CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

Reference 13

SDG MFHM65, CLP Data Review
and Inorganic Regional Data
Assessment Package

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

RECEIVED
JUN 12 2000
SITE ASSESSMENT & MANAGEMENT SECTION

MEMORANDUM

Date: June 8, 2000

Subject: Contract Laboratory Program Data Review

From: Marvelyn Humphrey, Alternate ESAT RPO, 6MD-HC

To: B. Rhotenberry, 6SF-RA

Site : PATRICK BAYOU

Case#: 27912

SDG# : MFHW65

The EPA Region 6 Houston Branch ESAT data review team has completed a review of the submitted Contract Laboratory Program (CLP) data package for the referenced site. The samples analyzed and reviewed are detailed in the attached Regional data review report.

The data package is acceptable for regional use. Problems, if any, are listed in the report narrative.

If you have any questions regarding the data review report, please call me at (281) 983-2140.

Attachments
cc: R. Flores, Region 6 CLP/TPO
M. El-Feky, Region 6 Data Coordinator
Files (2)

13 00

LOCKHEED MARTIN SERVICES GROUP
ESAT REGION VI
10101 SOUTHWEST FREEWAY, SUITE 500
HOUSTON, TEXAS 77074

MEMORANDUM

DATE: June 7, 2000

TO: Melvin Ritter/Marvelyn Humphrey, ESAT RPO/Alternate RPO, Region VI

FROM: Tom Chiang, ESAT Team Manager, Region VI

SUBJECT: CLP Data Review

REF: TDF #6-0349A ESAT File No. I2423
ESAT Contract No. 68-D6-0005

Attached is the data review summary for Case # 27912
SDG # MFHW65
Site Patrick Bayou

COMMENTS:

I. CONTRACTUAL ASSESSMENT OF DATA PACKAGE:

Hard copy and CCS reviews found the package contractually compliant.

II. TECHNICAL/USABILITY ASSESSMENT OF DATA PACKAGE:

A total of 384 results were reviewed for this data package. Some results have been qualified because of technical problems. The significant problem is addressed below.

Laboratory and field duplicate results were inconsistent for mercury.

III. OTHER AREAS OF CONCERN:

A cooler temperature indicator bottle was not included in the sample cooler.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 27912 SITE Patrick Bayou
LABORATORY AATS NO. OF SAMPLES 16
CONTRACT# 68-W0-0086 MATRIX Soil
SDG# MFHW65 REVIEWER (IF NOT ESD) ESAT
SOW# ILM04.1 REVIEWER'S NAME L. Hoffman
ACCT# 050102DJN60 SF# 50102DZZ COMPLETION DATE June 7, 2000

SAMPLE NO.				
MFH-W65	MFH-W69	MFH-W73	MFH-W77	
MFH-W66	MFH-W70	MFH-W74	MFH-W84	
MFH-W67	MFH-W71	MFH-W75	MFH-W85	
MFH-W68	MFH-W72	MFH-W76	MFH-W90	

DATA ASSESSMENT SUMMARY

	ICP	HG	CYANIDE
1. HOLDING TIMES	O	O	O
2. CALIBRATIONS	O	O	O
3. BLANKS	M	O	O
4. MATRIX SPIKES	O	O	O
5. DUPLICATE ANALYSIS	M	M	O
6. ICP QC	M		
7. FAA QC			
8. LCS	O	O	O
9. SAMPLE VERIFICATION	O	O	O
10. OTHER QC	O	M	O
11. OVERALL ASSESSMENT	M	M	O

O = Data had no problems.
M = Data qualified because of major or minor problems.
Z = Data unacceptable.
N/A= Not applicable

ACTION ITEMS:

AREAS OF CONCERN: Some copper and cobalt results were affected by blank concentrations. The aluminum and mercury laboratory duplicate differences were above the technical QC limits. The sodium serial dilution difference was above 10 percent. Mercury field duplicate results were inconsistent.

NOTABLE PERFORMANCE: The laboratory submitted the package two calendar days early.

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3

COMMENTS/CLARIFICATIONS
REGION 6 CLP QA REVIEW

Case 27912 SDG MFHW65 Site Patrick Bayou Lab AATS

COMMENTS: The SDG consisted of 16 soil samples for total metals and cyanide analyses by ILM04.1. The sampler designated sample MFH-W65 as the QC sample and samples MFH-W69/MFH-W70, MFH-W72/MFH-W73, and MFH-W84/MFH-W85 as field duplicate pairs. The laboratory met the 21-day data package turnaround time requirement, and the data package was contractually compliant.

Forty-nine percent of the reported results were above the CRDL's. The laboratory diluted five mercury samples up to 10X because the mercury concentrations were above the calibration range. Some results were qualified because of problems with laboratory blank concentrations, laboratory and field duplicate differences, and a serial dilution difference. The technical usability of all reported results is indicated in the Data Summary Table (DST). An Evidence Audit was conducted for the Complete Sample Delivery Group File (CSF), and the results were recorded in the Evidence Inventory Checklist.

NOTE: THE FOLLOWING REVIEW NARRATIVE ADDRESSES BOTH CONTRACTUAL ISSUES (BASED ON THE STATEMENT OF WORK) AND TECHNICAL ISSUES (BASED ON THE NATIONAL FUNCTIONAL GUIDELINES). THE ASSESSMENT MADE FOR EACH QC PARAMETER IS SOLELY BASED ON THE TECHNICAL DATA USABILITY, WHICH MAY NOT NECESSARILY BE AFFECTED BY CONTRACTUAL PROBLEMS. THE ASSESSMENTS ARE DEFINED BELOW.

Acceptable = No results were qualified for any problems associated with this QC parameter.

Provisional = Some results were qualified because of problems associated with this QC parameter.

Unusable = All results are unusable because of major problems associated with this QC parameter.

1. **Holding Times:** Acceptable. All samples met contractual holding time criteria. Technical holding time criteria have not yet been established for soil samples. Sample preservation was acceptable.

2. **Calibrations:** Acceptable. All calibrations met contractual requirements. The CRDL standard recoveries indicated acceptable instrument performance near the CRDL's.

3. **Blanks:** Provisional. The preparation and calibration blanks met contractual requirements although the laboratory reported seven analytes in the blanks. The reviewer qualified the cobalt results for samples MFH-W66 and MFH-W67 and the copper results for samples MFH-W65, MFH-W66, and MFH-W67 as undetected because of laboratory blank concentrations.

Case 27912 SDG MFHW65 Site Patrick Bayou Lab AATS

4. **Pre-digestion/Pre-distillation Matrix Spike Recovery:** Acceptable. The laboratory reported acceptable matrix spike recoveries.

5. **Duplicate Analysis:** Provisional. The reviewer qualified the aluminum and mercury results as estimated because the associated laboratory duplicate differences were outside the technical QC limits.

6. **ICP Quality Control:**

   Serial Dilution: Provisional. The laboratory reported an outlying serial dilution difference for sodium, so the reviewer qualified as estimated the sodium results. The serial dilution result was higher than the undiluted result, indicating that matrix interferences suppressed the signal for sodium. Therefore, the reviewer also qualified the sodium results as low biased.

   Interference Check Sample (ICS): Acceptable. Acceptable ICS results indicated satisfactory interelement and background corrections.

   Coefficient of Variation: Acceptable. Replicate instrument readings were consistent.

7. **Furnace Atomic Absorption Quality Control:** Not Applicable.

8. **Laboratory Control Sample (LCS):** Acceptable. The laboratory reported a solid sodium LCS result that was outside the advisory QC limit. The high sodium LCS result indicated that the laboratory had difficulties conducting accurate analysis for sodium at a concentration far below the CRDL. (The true LCS concentration is 9% of the CRDL). Since the sodium concentrations in the samples were much higher (5X to 128X the true LCS concentration), the same problem may not exist for the samples. Therefore, it is the reviewer's opinion that the high sodium LCS result did not technically affect the sodium sample results.

9. **Sample Verification:** Acceptable. The laboratory correctly reported all sample results but was contacted about some minor reporting errors (see FAX Record Log). The laboratory responded to CCS and resubmitted Forms 10 and a corrected Case Narrative. The Form 10's should be disregarded because they are the same as the ones originally submitted. The Case Narrative should be used to replace the one originally submitted. The resubmitted pages were placed at the beginning of the data package.

Case 27912 SDG MFHW65 Site Patrick Bayou Lab AATS

10. **Other QC:**

Field duplicates: Provisional. The reviewer qualified the mercury results for samples MFH-W69 and MFH-W70 because field duplicate results were inconsistent.

11. **Overall Assessment:** Sample result qualifications are summarized below.

The reviewer qualified two cobalt and three copper results because of laboratory blank concentrations.

The reviewer qualified the aluminum and mercury results because of poor laboratory precision.

The reviewer qualified all sodium results because of matrix related problems.

The reviewer qualified two mercury results because of inconsistent field duplicate results.

INORGANIC DATA QUALIFIER DEFINITIONS

The following definitions provide brief explanations of the ESAT-Region 6 qualifiers assigned to results in the inorganic data review process.

U Undetected at the laboratory reported detection limit (IDL).

L Reported concentration is between the IDL and the CRDL.

J Result is estimated because of outlying quality control parameters such as matrix spike, serial dilution, FAA spike recovery, etc.

R Result is unusable.

F A possibility of a false negative exists.

UC Reported concentration should be used as a raised detection limit because of apparent blank contamination.

^ High bias. Actual concentration may be lower than the concentration reported.

v Low bias. Actual concentration may be higher than the concentration reported.

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INORGANIC DATA SUMMARY

Case No. : 27912 SDG : MFHW65 Reviewer : L. Hoffman

Laboratory : AATS Matrix : Soil Units : mg/Kg

EPA Sample #=>	MFH-W65	FLAG	MFH-W66	FLAG	MFH-W67	FLAG	MFH-W68	FLAG	MFH-W69	FLAG	MFH-W70	FLAG	MFH-W71	FLAG
ALUMINUM	541	J	339	J	610	J	4500	J	4300	J	5040	J	2750	J
ANTIMONY	0.49	U	0.49	U	0.49	U	0.78	U	0.96	L	0.87	U	0.54	U
ARSENIC	0.75	L	0.95	L	0.85	L	5.8		4.9		6.0		3.4	
BARIUM	40.6	L	16.3	L	15.0	L	269		261		256		83.8	
BERYLLIUM	0.25	U	0.25	U	0.25	U	0.42	L	0.39	U	0.49	L	0.27	U
CADMIUM	0.25	U	0.25	U	0.25	U	0.93	L	1.5	L	0.96	L	0.43	L
CALCIUM	2330		3110		1220		72600		61600		55100		12300	
CHROMIUM	1.7	L	0.87	L	0.95	L	183		158		164		48.8	
COBALT	0.78	L	0.85	LUC	1.1	LUC	8.9	L	7.1	L	7.3	L	3.4	L
COPPER	1.3	LUC	1.3	LUC	1.6	LUC	99.3		69.7		86.2		25.2	
IRON	1130		1050		1050		6450		5980		7230		4180	
LEAD	2.1		3.6		2.5		117		85.9		95.6		47.1	
MAGNESIUM	348	L	388	L	477	L	3290		3020		3410		1660	
MANGANESE	24.9		40.9		20.3		172		166		160		92.6	
MERCURY	0.31	UJ	0.12	UJ	0.08	UJ	20.7	J	12.1	J	41.5	J	2.6	J
NICKEL	0.94	L	0.79	L	1.2	L	51.2		38.3		43.6		29.2	
POTASSIUM	170	L	166	L	238	L	970	L	947	L	1280	L	697	L
SELENIUM	0.74	U	0.74	U	0.74	U	1.2	U	1.2	U	1.3	U	0.82	U
SILVER	0.25	U	0.25	U	0.25	U	0.39	U	0.39	U	0.43	U	0.27	U
SODIUM	1040	LJv	1670	Jv	1730	Jv	5130	Jv	5350	Jv	6030	Jv	3000	Jv
THALLIUM	0.98	U	0.99	U	0.99	U	1.6	U	1.6	U	1.7	U	1.1	U
VANADIUM	2.5	L	2.2	L	2.7	L	11.9	L	11.1	L	13.7	L	9.7	L
ZINC	9.6		30.1		7.9		334		307		322		123	
CYANIDE	0.06	U	0.06	U	0.06	U	0.09	U	0.10	U	0.10	U	1.1	
% Solids :	80.6		79.4		81.0		51.6		48.3		46.2		71.3	

INORGANIC DATA SUMMARY

Case No.: 27912 SDG: MFHW65 Reviewer: L. Hoffman

Laboratory: AATS Matrix: Soil Units: mg/Kg

EPA Sample #=>	MFH-W72	FLAG	MFH-W73	FLAG	MFH-W74	FLAG	MFH-W75	FLAG	MFH-W76	FLAG	MFH-W77	FLAG	MFH-W84	FLAG
ALUMINUM	3170	J	2560	J	5320	J	6580	J	6090	J	5160	J	10000	J
ANTIMONY	0.64	L	0.59	U	0.56	U	0.82	L	0.66	U	0.71	L	1.4	U
ARSENIC	3.6		2.9	L	3.9		5.8		3.3	L	7.7		8.9	
BARIUM	105		87.4		121		215		159		176		338	
BERYLLIUM	0.30	U	0.29	U	0.58	L	0.71	L	0.57	L	0.69	L	0.69	U
CADMIUM	0.50	L	0.37	L	0.28	U	0.25	U	0.33	U	0.34	L	1.7	L
CALCIUM	13900		11900		12200		25500		12200		39800		34600	
CHROMIUM	56.5		42.5		8.4		8.0		7.4		16.4		497	
COBALT	3.6	L	2.8	L	6.4	L	7.7	L	4.0	L	6.6	L	10.6	L
COPPER	30.7		26.4		6.3	L	8.5		5.7	L	24.9		122	
IRON	4730		3800		8210		10600		7100		10700		11500	
LEAD	54.3		28.7		11.9		10.9		9.5		15.3		101	
MAGNESIUM	2100		1860		2240		1970		1850		2070		4560	
MANGANESE	107		89.2		248		449		201		313		155	
MERCURY	2.9	J	3.2	J	0.13	J	0.12	LJ	0.10	LJ	0.14	J	28.8	J
NICKEL	31.7		25.5		7.6	L	11.5		6.1	L	13.3		47.4	
POTASSIUM	791	L	680	L	459	L	587	L	465	L	801	L	1630	L
SELENIUM	0.90	U	0.88	U	0.83	U	0.74	U	0.99	U	0.81	U	2.1	U
SILVER	0.30	U	0.29	U	0.28	U	0.25	U	0.33	U	0.27	U	1.7	L
SODIUM	3520	Jv	3960	Jv	494	LJv	516	LJv	993	LJv	1110	LJv	11900	Jv
THALLIUM	1.2	U	1.2	U	1.1	U	0.98	U	1.3	U	1.1	U	2.8	U
VANADIUM	11.5	L	8.1	L	19.3		21.6		20.0		26.6		23.1	L
ZINC	159		116		30.4		25.5		20.3		124		818	
CYANIDE	0.07	U	1.5		0.17	L	0.06	U	0.08	U	0.07	U	0.16	U
% Solids:	66.7		65.0		71.9		77.7		60.4		73.0		29.0	

INORGANIC DATA SUMMARY

Case No. : 27912 SDG : MFHW65 Reviewer : L. Hoffman

Laboratory : AATS Matrix : Soil Units : mg/Kg

EPA Sample #=>	MFH-W85	FLAG	MFH-W90	FLAG		FLAG		FLAG		FLAG		FLAG
ALUMINUM	8140	J	4400	J								
ANTIMONY	1.2	U	0.92	L								
ARSENIC	7.7		4.3									
BARIUM	279		176									
BERYLLIUM	0.61	U	0.37	L								
CADMIUM	1.4	L	0.89	L								
CALCIUM	31200		26000									
CHROMIUM	394		84.4									
COBALT	10.1	L	5.0	L								
COPPER	99.3		47.2									
IRON	9350		6220									
LEAD	84.9		49.8									
MAGNESIUM	3680		2600									
MANGANESE	124		111									
MERCURY	14.0	J	5.2	J								
NICKEL	41.1		20.5									
POTASSIUM	1230	L	911	L								
SELENIUM	1.8	U	1.0	U								
SILVER	1.5	L	0.41	L								
SODIUM	9590	Jv	3980	Jv								
THALLIUM	2.4	U	1.4	U								
VANADIUM	18.0	L	11.9	L								
ZINC	673		238									
CYANIDE	0.15	U	0.08	U								
% Solids :	31.4		58.9									

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INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No. 27912 SDG No. MFHW65 SDG Nos. To Follow _____ SAS No. _____ Date Rec 04/19/00

Lab ID: AATS

Lab Location: Broken Arrow, OK

Region: 6 Audit No.: 27912/MFHW65

Re_Submitted CSF? Yes _____ No X

Box No(s): 1

COMMENTS:

8. Some of the information on one Form DC-1 does not agree with the information in the Record of Communication. The laboratory was contacted for clarification.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?	X		
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?	X		
FORM DC-1			
6. Present?	X		
7. Complete?	X		
8. Accurate?		X	
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?	X		
14. Signed?	X		
15. Dated?	X		
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a. If "NO", does the copy indicate where original documents are located?	X		

Over for additional comments.

Audited by: Linda Hoffman Linda Hoffman / ESAT Data Reviewer Date 05/31/00

Audited by: _____ _____ Date _____

Audited by: _____ _____ Date _____

Signature Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: _____ Date Entered: _____ Date Reviewed: _____

Entered by: _____ _____

Reviewed by: _____ _____

Signature Printed Name/Title

DC-2__

13 011

In Reference to Case No(s):
27912 SDG: MFHW65 (I2423)

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
FAX Record Log

Laboratory Name: AATS
Lab Contact: Deborah Inman

Region: 6
Regional Contact: Mahmoud El-Feky - EPA
ESAT Data Reviewer: Sonya Meekins

FAX initiated by: _____Laboratory ___X___Region

In reference to data for the following fractions:

CSF Deliverables Metals

Summary of Questions/Issues:

A. CSF Deliverables

1. The presence or absence of the cooler temperature indicator bottle was not reported on the Case Narrative (Summary of Changes ILM04.1, Page 1-2 of 12, Exhibit A, Section II, Task I, No. 5). Please add this required information to the narrative and resubmit.

2. Form DC-1 (p. 213) indicates a cooler temperature indicator bottle was present for the cooler associated with Airbill #2952398735. However, the Record of Communication on page 208 states there was no cooler temperature indicator bottle. Please resolve this discrepancy.

3. Sample MFH-W74 was listed three times on the Cover Page (p. 1). Please remove the extra sample numbers and resubmit this page.

B. Metals

The SOW requires that raw data be labeled with specific EPA samples numbers (ILM04.0, Exhibit B, B-9, d, last paragraph and B-10, Table 2). This requirement was not followed on mercury raw data page 173 or on the Inorganic Percent Solids worksheet on page 195. Please record the EPA sample numbers on these pages and resubmit.

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FAX COMMUNICATION LOG

Continuation Page 2
Laboratory/Contact Deborah Inman/AATS
In Reference To Case No.: 27912 **SDG:** MFHW65

NOTE: Any laboratory resubmission should be submitted either as an addendum to the original CSF with a revised Form DC-2 or submitted as a new CSF with a new Form DC-2 (ILM04.0, B-14), except those containing only replacement pages. Custody seals are required for all CSF resubmission shipments.

Please respond to the above items. Region 6 resubmissions may be included with CCS response or sent separately **within 4 days** (Summary of Changes ILM04.1, Page 1-5 of 12, Exhibit B, Section II) to:

Mr. Mahmoud El-Feky
U.S. EPA Region 6 Laboratory
10625 Fallstone Road
Houston, TX 77099

If you have any questions, please contact me at (713) 988-2128.

M. Elfeky
Signature

6-7-00
Date

13 01

EPA United States Environmental Protection Agency
Contract Laboratory Program

Inorganic Traffic Report & Chain of Custody Record
(For Inorganic CLP Analysis)

Case No. 27912

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	TNRCC		Airborne Express

Regional Information	Sampler (Name)	Airbill Number
	Linda Broach	295239873 5

Non-Superfund Program	Sampler Signature	5. Ship To
	Linda Broach	AATS 1700 West Albany, Suite C Broken Arrow, OK 74012 ATTN: Deborah Inman

Site Name	Site Spill ID	3. Purpose*
Patrick Bayou		Lead: [ ] SF [ ] PRP [X] ST [ ] FED; Early Action: [ ] CLEM [ ] PA [ ] REM [ ] RI [X] SI [ ] ESI; Long-Term Action: [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD

City, State	
Deer Park, TX	

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) / Other:	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct.	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform. Eval. — = Not a QC Sample)
MFHW65	5	L	G	6		X	X					6-209011-012	SE-1	3/28/00 1030	FGW45	LB	—
MFHW66	5	L	G	6		X	X					6-209017-018	SE-2	3/28/00 1040	FGW46	LB	—
MFHW67	5	L	G	6		X	X					6-209023-024	SE-3	3/28/00 1055	FGW47	LB	—
MFHW68	5	L	G	6		X	X					6-209029-030	SE-4	3/28/00 1135	FGW48	LB	—
MFHW69	5	L	C	6		X	X					6-209035-036	SE-5	3/28/00 1145	FGW49	LB	—
MFHW70	5	L	C	6		X	X					6-209041-042	SE-6	3/28/00 1150	FGW50	LB	D(MFHW69)
MFHW71	5	L	G	6		X	X					6-209047-048	SE-7	3/28/00 1110	FGW51	LB	—
MFHW72	5	L	C	6		X	X					6-209053-054	SE-8	3/28/00 1120	FGW52	LB	—
MFHW73	5	L	C	6		X	X					6-209059-060	SE-9	3/28/00 1125	FGW53	LB	D(MFHW72)
MFHW74	5	L	G	6		X	X					6-209265-266	SE-10	3/28/00 1235	FGW54	JS	—

Shipment for Case Complete? (Y/N)	Page	Sample(s) to be Used for Laboratory QC	Additional Sampler Signatures	Chain of Custody Seal Number(s)
NO	1 of 2	MFHW65		

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	3/29/00 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

A21-012-13 REV.

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-1 (2/98)

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

Page 13 of 14

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381312

EPA United States Environmental Protection Agency Contract Laboratory Program

Inorganic Traffic Report & Chain of Custody Record
(For Inorganic CLP Analysis)

Case No.: 27912

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	TNRCC		Airborne Express

Regional Information	Sampler (Name)	Airbill Number
	Linda Broach	795239873 5

Non-Superfund Program	Sampler Signature	5. Ship To
	Linda Broach	AATS 1700 West Albany, Suite C Broken Arrow, OK 74012 ATTN: Deborah Inman

Site Name	Site Spill ID	3. Purpose*	Early Action	Long-Term Action
Patrick Bayou		Lead: SF, PRP, X ST, FED	CLEM, PA, REM, RI, X SI, ESI	FS, RD, RA, O&M, NPLD
City, State: Deer Park, TX				

6. Matrix (Enter in Column A): 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Field QC, 5. Soil/Sediment, 6. Oil (High only), 7. Waste (High only), 8. Other (specify in Column A)

7. Preservative (Enter in Column D): 1. HCl, 2. HNO_3, 3. NaOH, 4. H_2SO_4, 5. $K_2CR_2O_7$, 6. Ice only, 7. Other (specify in Column D), N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) / Other:	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct.	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank, S = Spike, D = Duplicate, R = Rinsate, PE = Perform. Eval., — = Not a QC Sample)
MFHW75	5	L	G	6		X	X					6-209271 - 272	SE-11	3/28/00 12:10	FGW55	JS	—
MFHW76	5	L	G	6		X	X					6-209277 - 278	SE-12	3/28/00 11:59	FGW56	JS	—
MFHW77	5	L	G	6		X	X					6-209283 - 284	SE-13	3/28/00 11:32	FGW57	JS	—
MFHW90	5	L	G	6		X	X					6-209361 - 362	SE-26	3/28/00 1205	FGW70	LB	—
~~MFHW84~~	~~5~~	~~L~~	~~G~~	~~6~~		~~X~~	~~X~~					~~6-209325 - 326~~	~~SE-20~~	~~3/28/00~~	~~FGW64~~	~~LB~~	~~—~~
~~MFHW85~~	~~5~~	~~L~~	~~G~~	~~6~~		~~X~~	~~X~~					~~6-209331 - 332~~	~~SE-21~~	~~3/28/00~~	~~FGW65~~	~~LB~~	~~—~~
MFHW84	5	L	G	6		X	X					6-209325 - 326	SE-20	3/29/00	FGW64	LB	—
MFHW85	5	L	G	6		X	X					6-209331 - 332	SE-21	3/29/00	FGW65	LB	D (MFHW84)

Page 14 of 14

Shipment for Case Complete? (Y/N)	Page	Sample(s) to be Used for Laboratory QC	Additional Sampler Signatures	Chain of Custody Seal Number(s)
NO	2 of 2		John Ivey	

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	3/29/00 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-1 (2/98)

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

A21-012-13 REV.

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U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW65

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.01
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _80.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	541		*	P
7440-36-0	Antimony	0.49	U		P
7440-38-2	Arsenic	0.75	B		P
7440-39-3	Barium	40.6	B		P
7440-41-7	Beryllium	0.25	U		P
7440-43-9	Cadmium	0.25	U		P
7440-70-2	Calcium	2330			P
7440-47-3	Chromium	1.7	B		P
7440-48-4	Cobalt	0.78	B		P
7440-50-8	Copper	1.3	B		P
7439-89-6	Iron	1130		*	P
7439-92-1	Lead	2.1		*	P
7439-95-4	Magnesium	348	B		P
7439-96-5	Manganese	24.9			P
7439-97-6	Mercury	0.31		*	CV
7440-02-0	Nickel	0.94	B		P
7440-09-7	Potassium	170	B		P
7782-49-2	Selenium	0.74	U		P
7440-22-4	Silver	0.25	U		P
7440-23-5	Sodium	1040	B	E	P
7440-28-0	Thallium	0.98	U		P
7440-62-2	Vanadium	2.5	B		P
7440-66-6	Zinc	9.6			P
	Cyanide	0.06	U		CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW66

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.02
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _79.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	339		*	P
7440-36-0	Antimony	0.49	U		P
7440-38-2	Arsenic	0.95	B		P
7440-39-3	Barium	16.3	B		P
7440-41-7	Beryllium	0.25	U		P
7440-43-9	Cadmium	0.25	U		P
7440-70-2	Calcium	3110			P
7440-47-3	Chromium	0.87	B		P
7440-48-4	Cobalt	0.85	B		P
7440-50-8	Copper	1.3	B		P
7439-89-6	Iron	1050		*	P
7439-92-1	Lead	3.6			P
7439-95-4	Magnesium	388	B		P
7439-96-5	Manganese	40.9			P
7439-97-6	Mercury	0.12	B	*	CV
7440-02-0	Nickel	0.79	B		P
7440-09-7	Potassium	166	B		P
7782-49-2	Selenium	0.74	U		P
7440-22-4	Silver	0.25	U		P
7440-23-5	Sodium	1670		E	P
7440-28-0	Thallium	0.99	U		P
7440-62-2	Vanadium	2.2	B		P
7440-66-6	Zinc	30.1			P
	Cyanide	0.06	U		CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MFHW67

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.03
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _81.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	610		*	P
7440-36-0	Antimony	0.49	U		P
7440-38-2	Arsenic	0.85	B		P
7440-39-3	Barium	15.0	B		P
7440-41-7	Beryllium	0.25	U		P
7440-43-9	Cadmium	0.25	U		P
7440-70-2	Calcium	1220	B		P
7440-47-3	Chromium	0.95	B		P
7440-48-4	Cobalt	1.1	B		P
7440-50-8	Copper	1.6	B		P
7439-89-6	Iron	1050		*	P
7439-92-1	Lead	2.5			P
7439-95-4	Magnesium	477	B		P
7439-96-5	Manganese	20.3			P
7439-97-6	Mercury	0.08	B	*	CV
7440-02-0	Nickel	1.2	B		P
7440-09-7	Potassium	238	B		P
7782-49-2	Selenium	0.74	U		P
7440-22-4	Silver	0.25	U		P
7440-23-5	Sodium	1730		E	P
7440-28-0	Thallium	0.99	U		P
7440-62-2	Vanadium	2.7	B		P
7440-66-6	Zinc	7.9			P
	Cyanide	0.06	U		CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW68

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.04
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _51.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4500		*	P
7440-36-0	Antimony	0.78	U		P
7440-38-2	Arsenic	5.8			P
7440-39-3	Barium	269			P
7440-41-7	Beryllium	0.42	B		P
7440-43-9	Cadmium	0.93	B		P
7440-70-2	Calcium	72600			P
7440-47-3	Chromium	183			P
7440-48-4	Cobalt	8.9	B		P
7440-50-8	Copper	99.3			P
7439-89-6	Iron	6450		*	P
7439-92-1	Lead	117			P
7439-95-4	Magnesium	3290			P
7439-96-5	Manganese	172			P
7439-97-6	Mercury	20.7		*	CV
7440-02-0	Nickel	51.2			P
7440-09-7	Potassium	970	B		P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	0.39	U		P
7440-23-5	Sodium	5130		E	P
7440-28-0	Thallium	1.6	U		P
7440-62-2	Vanadium	11.9	B		P
7440-66-6	Zinc	334			P
	Cyanide	0.09	U		CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW69

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.05
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _48.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4300		*	P
7440-36-0	Antimony	0.96	B		P
7440-38-2	Arsenic	4.9			P
7440-39-3	Barium	261			P
7440-41-7	Beryllium	0.39	U		P
7440-43-9	Cadmium	1.5	B		P
7440-70-2	Calcium	61600			P
7440-47-3	Chromium	158			P
7440-48-4	Cobalt	7.1	B		P
7440-50-8	Copper	69.7			P
7439-89-6	Iron	5980		*	P
7439-92-1	Lead	85.9			P
7439-95-4	Magnesium	3020			P
7439-96-5	Manganese	166			P
7439-97-6	Mercury	12.1		*	CV
7440-02-0	Nickel	38.3			P
7440-09-7	Potassium	947	B		P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	0.39	U		P
7440-23-5	Sodium	5350		E	P
7440-28-0	Thallium	1.6	U		P
7440-62-2	Vanadium	11.1	B		P
7440-66-6	Zinc	307			P
	Cyanide	0.10	U		CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW70

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.06
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _46.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5040		*	P
7440-36-0	Antimony	0.87	U		P
7440-38-2	Arsenic	6.0			P
7440-39-3	Barium	256			P
7440-41-7	Beryllium	0.49	B		P
7440-43-9	Cadmium	0.96	B		P
7440-70-2	Calcium	55100			P
7440-47-3	Chromium	164			P
7440-48-4	Cobalt	7.3	B		P
7440-50-8	Copper	86.2			P
7439-89-6	Iron	7230		*	P
7439-92-1	Lead	95.6			P
7439-95-4	Magnesium	3410			P
7439-96-5	Manganese	160			P
7439-97-6	Mercury	41.5		*	CV
7440-02-0	Nickel	43.6			P
7440-09-7	Potassium	1280	B		P
7782-49-2	Selenium	1.3	U		P
7440-22-4	Silver	0.43	U		P
7440-23-5	Sodium	6030		E	P
7440-28-0	Thallium	1.7	U		P
7440-62-2	Vanadium	13.7	B		P
7440-66-6	Zinc	322			P
	Cyanide	0.10	U		CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW71

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.07
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _71.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2750		*	P
7440-36-0	Antimony	0.54	U		P
7440-38-2	Arsenic	3.4			P
7440-39-3	Barium	83.8			P
7440-41-7	Beryllium	0.27	U		P
7440-43-9	Cadmium	0.43	B		P
7440-70-2	Calcium	12300			P
7440-47-3	Chromium	48.8			P
7440-48-4	Cobalt	3.4	B		P
7440-50-8	Copper	25.2			P
7439-89-6	Iron	4180		*	P
7439-92-1	Lead	47.1			P
7439-95-4	Magnesium	1660			P
7439-96-5	Manganese	92.6			P
7439-97-6	Mercury	2.6		*	CV
7440-02-0	Nickel	29.2			P
7440-09-7	Potassium	697	B		P
7782-49-2	Selenium	0.82	U		P
7440-22-4	Silver	0.27	U		P
7440-23-5	Sodium	3000		E	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	9.7	B		P
7440-66-6	Zinc	123			P
	Cyanide	1.1			CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW72

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.08
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _66.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3170		*	P
7440-36-0	Antimony	0.64	B		P
7440-38-2	Arsenic	3.6			P
7440-39-3	Barium	105			P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.50	B		P
7440-70-2	Calcium	13900			P
7440-47-3	Chromium	56.5			P
7440-48-4	Cobalt	3.6	B		P
7440-50-8	Copper	30.7			P
7439-89-6	Iron	4730		*	P
7439-92-1	Lead	54.3			P
7439-95-4	Magnesium	2100			P
7439-96-5	Manganese	107			P
7439-97-6	Mercury	2.9		*	CV
7440-02-0	Nickel	31.7			P
7440-09-7	Potassium	791	B		P
7782-49-2	Selenium	0.90	U		P
7440-22-4	Silver	0.30	U		P
7440-23-5	Sodium	3520		E	P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	11.5	B		P
7440-66-6	Zinc	159			P
	Cyanide	0.07	U		CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW73

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.09
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _65.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2560		*	P
7440-36-0	Antimony	0.59	U		P
7440-38-2	Arsenic	2.9	B		P
7440-39-3	Barium	87.4			P
7440-41-7	Beryllium	0.29	U		P
7440-43-9	Cadmium	0.37	B		P
7440-70-2	Calcium	11900			P
7440-47-3	Chromium	42.5			P
7440-48-4	Cobalt	2.8	B		P
7440-50-8	Copper	26.4			P
7439-89-6	Iron	3800		*	P
7439-92-1	Lead	28.7			P
7439-95-4	Magnesium	1860			P
7439-96-5	Manganese	89.2			P
7439-97-6	Mercury	3.2		*	CV
7440-02-0	Nickel	25.5			P
7440-09-7	Potassium	680	B		P
7782-49-2	Selenium	0.88	U		P
7440-22-4	Silver	0.29	U		P
7440-23-5	Sodium	3960		E	P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	8.1	B		P
7440-66-6	Zinc	116			P
	Cyanide	1.5			CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

13-24024

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW74

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42496.01
Level (low/med): LOW__ Date Received: 03/31/00
% Solids: _71.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5320		*	P
7440-36-0	Antimony	0.56	U		P
7440-38-2	Arsenic	3.9			P
7440-39-3	Barium	121			P
7440-41-7	Beryllium	0.58	B		P
7440-43-9	Cadmium	0.28	U		P
7440-70-2	Calcium	12200			P
7440-47-3	Chromium	8.4			P
7440-48-4	Cobalt	6.4	B		P
7440-50-8	Copper	6.3	B		P
7439-89-6	Iron	8210		*	P
7439-92-1	Lead	11.9			P
7439-95-4	Magnesium	2240			P
7439-96-5	Manganese	248			P
7439-97-6	Mercury	0.13		*	CV
7440-02-0	Nickel	7.6	B		P
7440-09-7	Potassium	459	B		P
7782-49-2	Selenium	0.83	U		P
7440-22-4	Silver	0.28	U		P
7440-23-5	Sodium	494	B	E	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	19.3			P
7440-66-6	Zinc	30.4			P
	Cyanide	0.17	B		CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW75

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.11
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _77.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6580		*	P
7440-36-0	Antimony	0.82	B		P
7440-38-2	Arsenic	5.8			P
7440-39-3	Barium	215			P
7440-41-7	Beryllium	0.71	B		P
7440-43-9	Cadmium	0.25	U		P
7440-70-2	Calcium	25500			P
7440-47-3	Chromium	8.0			P
7440-48-4	Cobalt	7.7	B		P
7440-50-8	Copper	8.5			P
7439-89-6	Iron	10600		*	P
7439-92-1	Lead	10.9			P
7439-95-4	Magnesium	1970			P
7439-96-5	Manganese	449			P
7439-97-6	Mercury	0.12	B	*	CV
7440-02-0	Nickel	11.5			P
7440-09-7	Potassium	587	B		P
7782-49-2	Selenium	0.74	U		P
7440-22-4	Silver	0.25	U		P
7440-23-5	Sodium	516	B	E	P
7440-28-0	Thallium	0.98	U		P
7440-62-2	Vanadium	21.6			P
7440-66-6	Zinc	25.5			P
	Cyanide	0.06	U		CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW76

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.12
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _60.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6090		*	P
7440-36-0	Antimony	0.66	U		P
7440-38-2	Arsenic	3.3	B		P
7440-39-3	Barium	159			P
7440-41-7	Beryllium	0.57	B		P
7440-43-9	Cadmium	0.33	U		P
7440-70-2	Calcium	12200			P
7440-47-3	Chromium	7.4			P
7440-48-4	Cobalt	4.0	B		P
7440-50-8	Copper	5.7	B		P
7439-89-6	Iron	7100		*	P
7439-92-1	Lead	9.5			P
7439-95-4	Magnesium	1850			P
7439-96-5	Manganese	201			P
7439-97-6	Mercury	0.10	B	*	CV
7440-02-0	Nickel	6.1	B		P
7440-09-7	Potassium	465	B		P
7782-49-2	Selenium	0.99	U		P
7440-22-4	Silver	0.33	U		P
7440-23-5	Sodium	993	B	E	P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	20.0			P
7440-66-6	Zinc	20.3			P
	Cyanide	0.08	U		CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW77

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.13
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _73.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5160		*	P
7440-36-0	Antimony	0.71	B		P
7440-38-2	Arsenic	7.7			P
7440-39-3	Barium	176			P
7440-41-7	Beryllium	0.69	B		P
7440-43-9	Cadmium	0.34	B		P
7440-70-2	Calcium	39800			P
7440-47-3	Chromium	16.4			P
7440-48-4	Cobalt	6.6	B		P
7440-50-8	Copper	24.9			P
7439-89-6	Iron	10700		*	P
7439-92-1	Lead	15.3			P
7439-95-4	Magnesium	2070			P
7439-96-5	Manganese	313			P
7439-97-6	Mercury	0.14		*	CV
7440-02-0	Nickel	13.3			P
7440-09-7	Potassium	801	B		P
7782-49-2	Selenium	0.81	U		P
7440-22-4	Silver	0.27	U		P
7440-23-5	Sodium	1110	B	E	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	26.6			P
7440-66-6	Zinc	124			P
	Cyanide	0.07	U		CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW84

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__ SDG No.: MFHW65
Lab Code: AATS__ Case No.: 27912 SAS No.: _____
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.14
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _29.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10000		*	P
7440-36-0	Antimony	1.4	U		P
7440-38-2	Arsenic	8.9			P
7440-39-3	Barium	338			P
7440-41-7	Beryllium	0.69	U		P
7440-43-9	Cadmium	1.7	B		P
7440-70-2	Calcium	34600			P
7440-47-3	Chromium	497			P
7440-48-4	Cobalt	10.6	B		P
7440-50-8	Copper	122			P
7439-89-6	Iron	11500		*	P
7439-92-1	Lead	101			P
7439-95-4	Magnesium	4560			P
7439-96-5	Manganese	155			P
7439-97-6	Mercury	28.8		*	CV
7440-02-0	Nickel	47.4			P
7440-09-7	Potassium	1630	B		P
7782-49-2	Selenium	2.1	U		P
7440-22-4	Silver	1.7	B		P
7440-23-5	Sodium	11900		E	P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	23.1	B		P
7440-66-6	Zinc	818			P
	Cyanide	0.16	U		CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MFHW85

Lab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
Lab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
Matrix (soil/water): SOIL_ Lab Sample ID: 42468.15
Level (low/med): LOW__ Date Received: 03/30/00
% Solids: _31.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8140		*	P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	7.7			P
7440-39-3	Barium	279			P
7440-41-7	Beryllium	0.61	U		P
7440-43-9	Cadmium	1.4	B		P
7440-70-2	Calcium	31200			P
7440-47-3	Chromium	394			P
7440-48-4	Cobalt	10.1	B		P
7440-50-8	Copper	99.3			P
7439-89-6	Iron	9350		*	P
7439-92-1	Lead	84.9			P
7439-95-4	Magnesium	3680			P
7439-96-5	Manganese	124			P
7439-97-6	Mercury	14.0		*	CV
7440-02-0	Nickel	41.1			P
7440-09-7	Potassium	1230	B		P
7782-49-2	Selenium	1.8	U		P
7440-22-4	Silver	1.5	B		P
7440-23-5	Sodium	9590		E	P
7440-28-0	Thallium	2.4	U		P
7440-62-2	Vanadium	18.0	B		P
7440-66-6	Zinc	673			P
	Cyanide	0.15	U		CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MFHW90

ab Name: AMERICAN_ANALYTICAL_AND_T Contract: 68W00086__
ab Code: AATS__ Case No.: 27912 SAS No.: _____ SDG No.: MFHW65
atrix (soil/water): SOIL_ Lab Sample ID: 42468.16
evel (low/med): LOW__ Date Received: 03/30/00
Solids: _58.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4400		*	P
7440-36-0	Antimony	0.92	B		P
7440-38-2	Arsenic	4.3			P
7440-39-3	Barium	176			P
7440-41-7	Beryllium	0.37	B		P
7440-43-9	Cadmium	0.89	B		P
7440-70-2	Calcium	26000			P
7440-47-3	Chromium	84.4			P
7440-48-4	Cobalt	5.0	B		P
7440-50-8	Copper	47.2			P
7439-89-6	Iron	6220		*	P
7439-92-1	Lead	49.8			P
7439-95-4	Magnesium	2600			P
7439-96-5	Manganese	111			P
7439-97-6	Mercury	5.2		*	CV
7440-02-0	Nickel	20.5			P
7440-09-7	Potassium	911	B		P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	0.41	B		P
7440-23-5	Sodium	3980		E	P
7440-28-0	Thallium	1.4	U		P
7440-62-2	Vanadium	11.9	B		P
7440-66-6	Zinc	238			P
	Cyanide	0.08	U		CA

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts: _____

Comments:

Reference 14

SDG FGA73, CLP Data Review
and Organic Regional Data
Assessment Package

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEMORANDUM

Date: July 6, 2000

Subject: Contract Laboratory Program Data Review

From: Marvelyn Humphrey, Alternate ESAT RPO, 6MD-HC

To: B. Rhotenberry, 6SF-RA

Site : PATRICK BAYOU

Case#: 27912

SDG# : FGA73

The EPA Region 6 Houston Branch ESAT data review team has completed a review of the submitted Contract Laboratory Program (CLP) data package for the referenced site. The samples analyzed and reviewed are detailed in the attached Regional data review report.

The data package is acceptable for regional use. Problems, if any, are listed in the report narrative.

If you have any questions regarding the data review report, please call me at (281) 983-2140.

Attachments
cc: R. Flores, Region 6 CLP/TPO
M. El-Feky, Region 6 Data Coordinator
Files (2)

LOCKHEED MARTIN SERVICES GROUP
ESAT REGION VI
10101 SOUTHWEST FREEWAY, SUITE 500
HOUSTON, TX 77074

MEMORANDUM

DATE: July 6, 2000
TO: Melvin Ritter/Marvelyn Humphrey, ESAT RPO/Alternate RPO, Region VI
FROM: Tom C.H. Chiang, ESAT Team Manager, Region VI
SUBJECT: CLP Data Review
REF: TDF # 6-0373A ESAT # 0-2195
ESAT Contract No. 68-D6-0005

Attached is the data review summary for Case # 27912
SDG # FGA73
Site Patrick Bayou

COMMENTS:

I. CONTRACTUAL ASSESSMENT OF THE DATA PACKAGE

A. CCS and hardcopy reviews found the noncompliant items below. Several noncompliant items reported by the CCS could not be confirmed by the hardcopy review.

1. BNA samples FG-W66, FG-W66MS, FG-W66MSD, FG-W67, and FG-W68 were extracted 10 days past the contractual holding time limit (OLM04.2, D-18/ SVOA, 8.4.1). Positive hit results were qualified.

2. Pest/PCB samples FG-A73, FG-W58, FG-W58MS, FG-W58MSD, FG-W62, FG-W62DL, and FG-W71 were extracted eight days past the contractual holding time limit (OLM04.2, D-19/PEST, 8.4.1). Positive hit results were qualified.

3. VOA medium soil method blank VBLKBB contained methyl acetate at a concentration exceeding the contract-allowed limit (OLM04.2, D-50/VOA, 12.1.4.6). The methyl acetate quantitation limit was raised for VOA sample FG-W68.

4. The pesticide responses exceeded the initial calibration high point response on one column for heptachlor epoxide in sample FG-W59, heptachlor epoxide and dieldrin in sample FG-W60, γ-BHC in sample FG-W61, and methoxychlor and endrin ketone in sample FG-W68DL, but the laboratory failed to dilute and reanalyze the samples (OLM04.2, D-57/ PEST, 10.2.3.2). Since acceptable results were reported from the second column, no qualification was required.

14 00 2

LOCKHEED MARTIN SERVICES GROUP
ESAT REGION VI
10101 SOUTHWEST FREEWAY, SUITE 500
HOUSTON, TX 77074

MEMORANDUM

Attached is the data review summary for Case # 27912
SDG # FGA73
Site Patrick Bayou

COMMENTS (continued):

B. The reviewer found the noncompliant items below in the hardcopy package that were not reported by CCS.

1. The 20X dilution factor chosen by the laboratory was inappropriate for BNA samples FG-W59DL and FG-W60 (OLM04.2, p. D-42/SVOA, sec. 10.6.5.2 and 10.6.5.3). The target compound concentrations and sample chromatograms justified only a 5X dilution for these samples. The sample quantitation limits were raised much higher than necessary because of the over-dilution.

2. The laboratory failed to perform GC/MS confirmation for the AR1248 identification in Pest/PCB sample FG-W63 (OLM04.2, D-59/PEST, 11.1.2). Qualification of results was not required.

C. The reviewer found the noncompliant item below that CCS is not expected to detect.

The data package was 9 working days late for the 21-day turnaround requirement.

II. TECHNICAL USABILITY ASSESSMENT OF THE DATA PACKAGE

The total number of results reviewed was 1,692 for this data package. Some results were qualified for technical problems, and the significant problems are discussed below.

A. Coeluting Aroclor peaks obscured the detection and quantitation for aldrin in several samples.

B. Two BNA samples had low IS responses.

C. Aldrin had a high %RPD for the MS/MSD analyses.

III. OTHER AREAS OF CONCERN

14 00

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

ORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 27912 | SITE Patrick Bayou
LABORATORY CLAYTN | NO. OF SAMPLES 12
CONTRACT# 68-W-99-069 | MATRIX Soil
SDG# FGA73 | REVIEWER (IF NOT ESD) ESAT
SOW# SOW OLM04.2 | REVIEWER'S NAME Wallace Doong
ACCT#050102DJN60SF#50102DZZ | COMPLETION DATE July 6, 2000

SAMPLE NO.				
FG-A73	FG-W61	FG-W67		
FG-W58	FG-W62	FG-W68		
FG-W59	FG-W63	FG-W69		
FG-W60	FG-W66	FG-W71		

DATA ASSESSMENT SUMMARY

	VOA	BNA	PEST
1. HOLDING TIMES	O	M	M
2. GC/MS TUNE/INSTR. PERFORM.	O	O	M
3. CALIBRATIONS	M	M	O
4. BLANKS	M	O	O
5. SMC/SURROGATES	O	O	O
6. MATRIX SPIKE/DUPLICATE	O	O	M
7. OTHER QC	O	O	O
8. INTERNAL STANDARDS (IS)	O	M	N/A
9. COMPOUND ID/QUANTITATION	O	O	M
10. PERFORMANCE/COMPLETENESS	O	O	O
11. OVERALL ASSESSMENT	M	M	M

O = Data had no problems.
M = Data qualified due to major or minor problems.
Z = Data unacceptable.
NA = Not applicable.

ACTION ITEMS: Five BNA and seven Pest/PCB sample extractions exceeded contractual holding time limits. One VOA method blank had contamination exceeding the contract-allowed limit. The data package was nine working days late.
AREA OF CONCERN: Two BNA samples were over-diluted. Responses exceeded the calibration high point for four Pest/PCB samples that weren't diluted and reanalyzed. GC/MS confirmation was omitted for AR1248 in one sample. Excessive holding times caused data qualification for two BNA and four Pest/PCB samples. Two pesticides co-eluted on one column. Two BNA samples had low IS responses. Several analyte concentrations exceeded the calibration upper limits for one BNA sample. One BNA and three VOA analytes failed technical calibration criteria. Laboratory contamination caused raised quantitation limits for all VOA samples. Two column quantitation results were inconsistent for 10 Pest/PCB samples. Aldrin had a high %RPD for the MS/MSD analyses. Coeluting Aroclor peaks obscured aldrin detection in nine samples. Several commonly co-existing compounds were omitted.

COMMENTS/CLARIFICATIONS
REGION VI CLP QA REVIEW

CASE 27912 **SDG** FGA73 **SITE** Patrick Bayou **LAB** CLAYTN

The following is a summary of sample qualifiers used by Region 6 in reporting this CLP data:

No.	Acceptable	Provisional	Unacceptable
VOA		12	
BNA	7	5	
Pest/PCB	1	11	

COMMENTS: This SDG consisted of 12 soil samples for complete RAS organics analysis by CLP SOW OLM04.2. The OTR/COC records designated sample FG-W58 as the QC sample and samples FG-A73/FG-W71 and FG-W59/FG-W60 as field duplicate pairs. VOA sample FG-W68 and BNA samples FG-W66, FG-W67, and FG-W68 were analyzed at the medium level, and VOA samples FG-W62 and FG-W66 were analyzed at the low level followed by medium level reanalyses. All other VOA and BNA soil samples were analyzed at low levels. The CRQL's required %moisture correction for the soil samples and additional correction for the diluted samples. The corrected CRQL's are reported by the laboratory and are referred to as sample quantitation limits (SQL's) in this report. The data package contained the following contractually non-compliant items.

- BNA samples FG-W66, FG-W66MS, FG-W66MSD, FG-W67, and FG-W68 were extracted 10 days past the contractual holding time limit.
- Pest/PCB samples FG-A73, FG-W58, FG-W58MS, FG-W58MSD, FG-W62, FG-W62DL, and FG-W71 were extracted eight days past the contractual holding time limit.
- VOA medium soil method blank VBLKBB contained methyl acetate at a concentration exceeding the contract-allowed limit.
- The laboratory over-diluted BNA samples FG-W59DL and FG-W60.
- GC/MS confirmation was omitted for AR1248 in Pest/PCB sample FG-W63.
- Several pesticide responses exceeded the calibration high point responses in four Pest/PCB samples, but the laboratory failed to dilute and reanalyze the samples.
- The data package was 9 working days late for the 21-day turnaround requirement.

VOA Sample FG-W68 required a 2X dilution following a modified medium level method because of high concentrations of isopropylbenzenes, xylenes, and chlorobenzenes (33,000 µg/Kg for 1,3-dichlorobenzene). Samples FG-W62 and FG-W66 were analyzed at the low level with a reduced sample size (1 gm) followed by the modified medium level reanalyses because of high concentrations of isopropylbenzene (up to 3,900 µg/Kg). Other target analytes with concentrations above the SQL's in the samples included acetone, carbon disulfide, methylene chloride, methyl acetate, benzene, methylcyclohexane, toluene, and/or ethylbenzene. However, most of the acetone, methylene chloride, carbon disulfide, and methyl acetate concentrations were solely attributed to laboratory contamination.

ORGANIC QA REVIEW
CONTINUATION PAGE

CASE 27912 **SDG** FGA73 **SITE** Patrick Bayou **LAB** CLAYTN

COMMENTS: (continued)
BNA Because of high concentrations of polynuclear aromatic hydrocarbons (PAH's) (up to 98,000 µg/Kg for pyrene), samples FG-W66, FG-W67, and FG-W68 were analyzed at the medium level and samples FG-W59, FG-W60, FG-W61, FG-W62, and FG-W63 were initially analyzed or reanalyzed at 2X to 20X dilution. However, samples FG-W59DL and FG-W60 (both at 20X dilution) might have been over-diluted because no target analytes were detected at concentrations above the SQL's. Target analytes detected at concentrations above the SQL's in the other samples included hexachlorobutadiene and hexachlorobenzene in samples FG-A73 and FG-W71 and bis(2-ethylhexyl)phthalate in sample FG-W69. Samples FG-W63, FG-W69, and FG-W71 and their reanalyses had outlying internal standard (IS) responses, demonstrating matrix effect. The original analyses were recommended for use for these samples.

Pest/PCB Samples FG-W62, FG-W63, FG-W66, FG-W67, FG-W68, and FG-W69 required up to 1,000X dilution for analysis because target analyte responses exceeded the upper calibration limit on at least one column (up to 300,000 µg/Kg for AR1248 in sample FG-W67). AR1248 was reported in all samples, except samples FG-W59, FG-W60, and FG-W61, at concentrations above the SQL's. High concentrations of aldrin (up to 1,100 µg/Kg in sample FG-W67DL), endrin (1,000 µg/Kg in sample FG-W67), AR1248 (up to 300,000 µg/Kg in sample FG-W67DL), and/or AR1260 (up to 3,400 µg/Kg in sample FG-W66) were reported in most samples although the aldrin concentrations for samples FG-A73, FG-W58, FG-W62DL, FG-W63DL, FG-W66DL, FG-W67DL, FG-W68DL, FG-W69DL, and FG-W71 were attributed to Aroclor peaks. Other target analytes with concentrations above the SQL's in the samples included BHC's, heptachlor, heptachlor epoxide, endosulfan I, endosulfan II, DDE, DDD, DDT, endrin ketone, methoxychlor, and/or chlordanes.

Some data are provisional for all VOA, 5 BNA, and 11 Pest/PCB samples because of problems with holding times, instrument performance, calibration, laboratory contamination, MS/MSD performance, internal standard performance, compound identification, and/or compound quantitation.

The technical usability of all reported results is indicated by ESAT's final data qualifiers in the Data Summary Table. An Evidence Audit was conducted for the Complete Sample Delivery Group File (CSF), and the audit results were documented in the Evidence Inventory Checklist.

NOTE: THE FOLLOWING REVIEW NARRATIVE ADDRESSES BOTH CONTRACTUAL ISSUES (BASED ON THE STATEMENT OF WORK) AND TECHNICAL ISSUES (BASED ON THE NATIONAL FUNCTIONAL GUIDELINES). THE ASSESSMENT MADE FOR EACH QC PARAMETER IS SOLELY BASED ON THE TECHNICAL DATA USABILITY, WHICH MAY NOT NECESSARILY BE AFFECTED BY CONTRACTUAL PROBLEMS. THE ASSESSMENTS ARE DEFINED BELOW.

ORGANIC QA REVIEW
CONTINUATION PAGE

CASE 27912 **SDG** FGA73 **SITE** Patrick Bayou **LAB** CLAYTN

Acceptable = No results were qualified for any problem associated with this QC parameter.
Provisional = Some results were qualified because of problems associated with this QC parameter.
Unusable = All results are unusable because of major problems associated with this QC parameter.

1. **Holding Times:** Provisional. The extractions exceeded the contractual holding time limit (8 to 10 days) for BNA samples FG-W66, FG-W66MS, FG-W66MSD, FG-W67, and FG-W68 and Pest/PCB samples FG-A73, FG-W58, FG-W58MS, FG-W58MSD, FG-W62, FG-W62DL, and FG-W71. Technical holding time criteria have not yet been established for the soil samples. However, per Region 6 guidelines, the reviewer qualified as estimated the positive hit results (above SQL's) for BNA samples FG-W66 and FG-W68 and Pest/PCB samples FG-A73, FG-W58, FG-W62(DL), and FG-W71. All other samples met contractual holding time criteria.

2. **Tuning/Performance:** Provisional. BFB and DFTPP analyses met GC/MS tuning criteria. The Pest/PCB analyses met instrument performance guidelines although endosulfan I and α-chlordane coeluted on column DB5-MS. The reviewer qualified as tentative ("N") the identifications of endosulfan I and α-chlordane in sample FG-W66 because of this chromatographic problem. Several other pesticides also had overlapping retention time windows, but the sample results were not affected by the chromatographic problem.

3. **Calibrations:** Provisional. TCL compounds generally met contractual calibration criteria. Several VOA and BNA target analytes failed technical %RSD and/or %D criteria, but most of the analytes were not detected at concentrations above the SQL's in the associated samples. However, the reviewer qualified results as estimated for the following analytes because these compounds failed the technical criteria:

acetone and methylene chloride for VOA sample FG-A73;

acetone and carbon disulfide for VOA samples FG-W58 and FG-W69;

carbon disulfide for VOA sample FG-W61;

methylene chloride and carbon disulfide for VOA sample FG-W66;

methylene chloride for VOA sample FG-W71;

acetone, methylene chloride, and carbon disulfide for VOA samples FG-W59, FG-W60, FG-W62, FG-W63, and FG-W67;

CASE 27912 **SDG** FGA73 **SITE** Patrick Bayou **LAB** CLAYTN

3. **Calibrations:** (continued)

methyl acetate for VOA sample FG-W68; and

hexachlorobenzene for BNA sample FG-W71.

BNA sample FG-W59 was analyzed at a 20X dilution. However, in this reviewer's opinion, sample FG-W59DL was over-diluted because no target analytes were detected at concentrations above the SQL's and no apparent high level non-target compounds were present in the samples. The reviewer recommends using the results from the original analysis and qualified results as estimated for the following analytes in sample FG-W59 because their concentrations exceeded the calibration upper range: phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene.

4. **Blanks:** Provisional. One VOA method blank (VBLKBB) contained methyl acetate at a concentration exceeding the contract-allowed limit. The reported methyl acetate result with a concentration above the SQL should be used as a raised quantitation limit ("UM") for VOA sample FG-W68. Other method, instrument, and storage blanks met contractual requirements. No target compounds were detected in the Pest/PCB blanks.

VOA/BNA Target analytes detected at concentrations below the contractual limits included acetone, carbon disulfide, methylene chloride, 2-butanone, 1,2-dibromo-3-chloropropane, 1,2,4-trichlorobenzene, and/or bis(2-ethylhexyl)phthalate in the method and storage blanks. The effects of the laboratory contamination on results recommended for use are summarized below.

- The concentration above the SQL was qualified as biased high (reviewer "B" flag) for carbon disulfide in VOA sample FG-W69.
- The following results with concentrations above the SQL's were qualified as undetected ("U"), and the concentrations should be used as raised QL's ("M"):

  the acetone and methylene chloride results for VOA samples FG-A73 and FG-W62;

  the acetone and carbon disulfide results for VOA sample FG-W58;

  the carbon disulfide result for VOA sample FG-W61;

  the methylene chloride results for VOA samples FG-W66 and FG-W71;

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4. Blanks:

VOA/BNA (continued)

the acetone result for VOA sample FG-W69; and

the acetone, methylene chloride, and carbon disulfide results for VOA samples FG-W59, FG-W60, FG-W63, and FG-W67.

- Except the bis(2-ethylhexyl)phthalate results for BNA samples FG-W58, FG-W59, and FG-W62, all other results with laboratory "B" flags (concentrations below the SQL's) should be considered as undetected ("U").

The VOA instrument blank (VIBLKBB) contained acetone, carbon disulfide, and isopropylbenzene at concentrations below the CRQL's. The reviewer did not qualify the data for carryover contamination because the acetone and carbon disulfide were introduced during analysis and the sample analyzed after the instrument blank contained a very high concentration of isopropylbenzene which ruled out carryover contamination.

5. System Monitoring Compounds (SMC's)/Surrogates: Acceptable. SMC and surrogate recoveries were acceptable for all VOA and BNA samples.

Pest/PCB The laboratory failed to report several DCB recoveries from one column (DB5-MS) for samples FG-W60, FG-W61, FG-W62DL, and FG-W68. The laboratory was contacted for submission. Very high recoveries (up to 35,000 percent) or zero percent recoveries were reported on one or both columns for TCX and/or DCB in most other analyses, but these outlying results were caused by coeluting matrix interferences, in this reviewer's opinion.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD): Provisional. The MS/MSD results met QC guidelines for precision and %recovery with the following exceptions:

N-nitroso-di-n-propylamine and γ-BHC had low MS recoveries;

1,1-dichloroethene had high MS and MSD recoveries; and

acenaphthene, pyrene, aldrin, and γ-BHC had high %RPD's.

The reviewer qualified as estimated the aldrin result for Pest/PCB sample FG-W58. Since 1,1-dichloroethene, acenaphthene, pyrene, and γ-BHC were not detected in the unspiked samples at concentrations above the SQL's and N-nitroso-di-n-propylamine and γ-BHC had acceptable MSD recoveries, data qualification was unnecessary, in this reviewer's opinion.

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7. Other QC:

Field Duplicates: Acceptable. Results were generally consistent for the field duplicate samples.

8. Internal Standards (IS): Provisional. Internal standard performance met the QC criteria for VOA and BNA samples with a few exceptions.

BNA The IS responses exceeded the QC limits for sample FG-W69 and its reanalysis. Data qualification was unnecessary per Region 6 guidelines. Samples FG-W63 and FG-W71 and their reanalyses had low IS responses which demonstrated matrix effect. The original analysis results are recommended for use. The reviewer qualified the analyte results associated with the IS's listed below as estimated with a low bias for the QL's.

Sample	IS
FG-W63	IS4, IS5, and IS6
FG-W71	IS6

9. Compound Identity (ID)/Quantitation: Provisional. The reported analytes met compound identification criteria.

VOA High concentrations of chlorobenzene (up to 2,200 µg/Kg), total xylenes (up to 3,500 µg/Kg), isopropylbenzene (up to 9,600 µg/Kg), 1,3-dichlorobenzene (up to 33,000 µg/Kg), and/or 1,4-dichlorobenzene (up to 3,700 µg/Kg) were detected in samples FG-W62, FG-W66, and FG-W68. Other target analytes with concentrations above the SQL's in the samples included acetone, carbon disulfide, methylene chloride, benzene, methylcyclohexane, toluene, and/or ethylbenzene. However, eight acetone, eight methylene chloride, nine carbon disulfide, and one methyl acetate concentrations were solely attributed to laboratory contamination.

BNA Samples FG-A73, FG-W59, FG-W61, FG-W62, FG-W63, FG-W66, FG-W68, FG-W69, and FG-W71 contained high concentrations of hexachlorobutadiene (up to 1,400 µg/Kg), hexachlorobenzene (up to 3,100 µg/Kg), and/or PAH's (up to 98,000 µg/Kg for pyrene in sample FG-W68). Other target analytes detected at concentrations above the SQL's included bis(2-ethylhexyl)phthalate in sample FG-W69.

Samples FG-W66, FG-W67, and FG-W68 were analyzed at the medium level and samples FG-W59, FG-W60, FG-W61, FG-W62, and FG-W63 were initially analyzed or reanalyzed at 2X to 20X dilution. However, in this reviewer's opinion, samples FG-W59DL and FG-W60 (both at 20X dilution) were over-diluted because no target analytes were detected at concentrations above the SQL's and no apparent high level non-target compounds were present in the samples.

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9. Compound Identity (ID)/Quantitation:

BNA (continued) The reviewer recommends using the results from the original analysis for sample FG-W59. Target analyte quantitation limits were raised much higher than necessary for sample FG-W60 because of the over-dilution.

Pest/PCB High concentrations of aldrin (up to 1,100 µg/Kg in sample FG-W67DL), endrin (1,000 µg/Kg in sample FG-W67), AR1248 (up to 300,000 µg/Kg in sample FG-W67DL), and/or AR1260 (up to 3,400 µg/Kg in sample FG-W66) were reported in most samples. Other target analytes with concentrations above the SQL's in the samples included BHC's, heptachlor, heptachlor epoxide, endosulfan I, endosulfan II, DDE, DDD, DDT, endrin ketone, methoxychlor, and/or chlordanes. The laboratory performed the GC/MS confirmation for AR1248 in sample FG-W57(DL). However, the laboratory failed to perform the required GC/MC confirmation for AR1248 in sample FG-W63. The laboratory was contacted for this omission.

The laboratory failed to "E"-flag the endrin result in sample FG-W66 with a concentration exceeding the upper calibration range. The reviewer recommends using the endrin result from the diluted analysis FG-W66DL.

Peaks from AR1248 interfered with the detection of aldrin in several samples and were solely responsible for the aldrin concentrations reported in these samples. The reviewer qualified as undetected the aldrin results for samples FG-A73, FG-W58, FG-W62DL, FG-W63DL, FG-W66DL, FG-W67DL, FG-W68DL, FG-W69DL, and FG-W71, and the concentrations should be used as raised QL's ("UM").

All laboratory "P"-flagged results with concentrations above the SQL's were qualified as estimated because two column quantitation results differed by greater than 25 percent. The following results were qualified ("T") because their commonly coexisting pesticides were absent:

the β-BHC results for samples FG-W62 and FG-W63;

the DDD result for sample FG-W68; and

the endrin ketone results for samples FG-W59, FG-W60, and FG-W68.

10. Performance/Completeness: Acceptable. The data package was complete except for required Pest/PCB GC/MS confirmation data. The laboratory was contacted for the confirmation as well as some needed clarifications and corrections (see Fax Record Log).

ORGANIC QA REVIEW
CONTINUATION PAGE

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11. Overall Assessment: Data are acceptable for seven BNA samples and one Pest/PCB sample.

VOA Some results were qualified for all samples because of problems with calibration and laboratory contamination.

BNA Some results were qualified for samples FG-W59, FG-W63, FG-W66, FG-W68, and FG-W71 because of problems with holding time, calibration, and IS performance.

Pest/PCB Some results were qualified for all samples except sample FG-W61 because of problems with holding time, instrument performance, MS/MSD performance, compound identification, and/or compound quantitation.

ORGANIC DATA QUALIFIER DEFINITIONS

The following definitions provide brief explanations of the ESAT-Region 6 qualifiers assigned to results in the Data Summary Table.

U Not detected at reported quantitation limit.

N Identification is tentative.

J Estimated value.

L Reported concentration is below the CRQL.

M Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.

R Unusable.

^ High biased. Actual concentration may be lower than the concentration reported.

v Low biased. Actual concentration may be higher than the concentration reported.

F+ A false positive exists.

F- A false negative exists.

B This result may be high biased because of laboratory/field contamination. The reported concentration is above 5X or 10X the concentration reported in the method/field blank.

UJ Estimated quantitation limit.

T Identification is questionable because of absence of other commonly coexisting pesticides.

***** Result not recommended for use because of associated QA/QC performance inferior to that from other analysis.

ORGANIC DATA SUMMARY

Case No.: 27912 SDG: FGA73 Reviewer: W. Doong

Laboratory: CLAYTN Matrix: Soil Units: ug/Kg

VOLATILE EPA SAMPLE NUMBER:	FG-A73	FLAG	FG-W58	FLAG	FG-W59	FLAG	FG-W60	FLAG	FG-W61	FLAG	FG-W62	FLAG	FG-W62DL	FLAG
Dichlorodifluoromethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Chloromethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Vinyl Chloride	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Bromomethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Chloroethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Trichlorofluoromethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
1,1-Dichloroethene	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
1,1,2-Trichloro-1,2,2-trifluoroethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Acetone	13	UMJ	34	UMJ	17	UMJ	14	UMJ	13	U	85	UMJ	540	*
Carbon Disulfide	8	LJ	32	UMJ	35	UMJ	22	UMJ	15	UMJ	74	J	740	U*
Methyl Acetate	13	U	16	U	14	U	14	U	13	U	74	U	2500	*
Methylene Chloride	20	UMJ	16	U	28	UMJ	23	UMJ	13	U	160	UMJ	170	*
trans-1,2-Dichloroethene	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Methyl tert-Butyl Ether	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
1,1-Dichloroethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
cis-1,2-Dichloroethene	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
2-Butanone	13	U	7	LJ	14	U	14	U	13	U	74	U	740	U*
Chloroform	13	U	16	U	14	U	14	U	1	LJ	74	U	740	U*
1,1,1-Trichloroethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Cyclohexane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Carbon Tetrachloride	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Benzene	13	U	16	U	14	U	14	U	4	LJ	55	LJ	79	*
1,2-Dichloroethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Trichloroethene	13	U	16	U	1	LJ	2	LJ	1	LJ	74	U	740	U*
Methylcyclohexane	13	U	16	U	14	U	14	U	13	U	80		100	*
1,2-Dichloropropane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Bromodichloromethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
cis-1,3-Dichloropropene	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
4-Methyl-2-pentanone	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Toluene	13	U	16	U	8	LJ	14	U	4	LJ	74	U	740	U*
trans-1,3-Dichloropropene	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
1,1,2-Trichloroethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Tetrachloroethene	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
2-Hexanone	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Dibromochloromethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
1,2-Dibromoethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Chlorobenzene	13	U	16	U	14	U	14	U	1	LJ	74	U	740	U*
Ethylbenzene	13	U	16	U	14	U	14	U	13	U	10	LJ	740	U*
Xylenes (total)	13	U	5	LJ	3	LJ	14	U	2	LJ	44	LJ	220	*
Styrene	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Bromoform	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
Isopropylbenzene	13	U	19		14	U	14	U	6	LJ	1900	*	2200	
1,1,2,2-Tetrachloroethane	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
1,3-Dichlorobenzene	2	LJ	3	LJ	14	U	14	U	13	U	74	U	740	U*
1,4-Dichlorobenzene	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
1,2-Dichlorobenzene	13	U	16	U	14	U	14	U	13	U	74	U	740	U*
1,2-Dibromo-3-chloropropane	13	U	16	U	14	U	14	U	13	U	74	U	740	U
1,2,4-Trichlorobenzene	13	U	16	U	14	U	14	U	13	U	74	U	86	*
Sample wt (g):	5		5		5		5		5		1		5	
%Moisture:	23		38		27		27		23		32		32	
Dilution Factor:	1		1		1		1		1		1		1	
Level:	Low		Low		Low		Low		Low		Low		Med	
Number of TIC's:	2		6		5		4		30		25		9	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

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ORGANIC DATA SUMMARY

Case No.: 27912 SDG: FGA73 Reviewer: W. Doong

Laboratory: CLAYTN Matrix: Soil Units: ug/Kg

VOLATILE EPA SAMPLE NUMBER:	FG-W63	FLAG	FG-W66	FLAG	FG-W66DL	FLAG	FG-W67	FLAG	FG-W68	FLAG	FG-W68DL	FLAG	FG-W69	FLAG
Dichlorodifluoromethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Chloromethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Vinyl Chloride	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Bromomethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Chloroethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Trichlorofluoromethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
1,1-Dichloroethene	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
1,1,2-Trichloro-1,2,2-trifluoroethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Acetone	82	UMJ	110	U	1100	U*	50	UMJ	1100	U	980	*	55	UMJ
Carbon Disulfide	58	UMJ	310	J	1100	U*	54	UMJ	1100	U	2100	U*	63	BJ
Methyl Acetate	17	U	110	U	7200	*	18	U	8700	UMJ	5800	*	16	U
Methylene Chloride	25	UMJ	280	UMJ	160	*	29	UMJ	1100	U	340	*	16	U
trans-1,2-Dichloroethene	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Methyl tert-Butyl Ether	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
1,1-Dichloroethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
cis-1,2-Dichloroethene	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
2-Butanone	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	11	LJ
Chloroform	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
1,1,1-Trichloroethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Cyclohexane	4	LJ	110	U	1100	U*	18	U	1100	U	2100	U*	2	LJ
Carbon Tetrachloride	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Benzene	7	LJ	450		220	*	3	LJ	380	LJ	370	*	2	LJ
1,2-Dichloroethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Trichloroethene	2	LJ	110	U	1100	U*	2	LJ	1100	U	2100	U*	16	U
Methylcyclohexane	6	LJ	390		190	*	7	LJ	620	LJ	520	*	3	LJ
1,2-Dichloropropane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Bromodichloromethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
cis-1,3-Dichloropropene	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
4-Methyl-2-pentanone	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Toluene	17	U	950		550	*	2	LJ	660	LJ	680	*	16	U
trans-1,3-Dichloropropene	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
1,1,2-Trichloroethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Tetrachloroethene	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
2-Hexanone	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Dibromochloromethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
1,2-Dibromoethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Chlorobenzene	17	U	72	LJ	1100	U*	16	LJ	2200		2200	*	16	U
Ethylbenzene	17	U	360		250	*	4	LJ	650	LJ	610	*	16	U
Xylenes (total)	48		1400		930	*	22		3500		3500	*	46	
Styrene	17	U	86	LJ	1100	U*	18	U	1100	U	2100	U*	16	U
Bromoform	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Isopropylbenzene	100		5000	*	3900		26		9600		9700	*	48	
1,1,2,2-Tetrachloroethane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
1,3-Dichlorobenzene	3	LJ	1300		980	*	29		30000	*	33000		5	LJ
1,4-Dichlorobenzene	17	U	530		430	*	5	LJ	3700		4200	*	2	LJ
1,2-Dichlorobenzene	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
1,2-Dibromo-3-chloropropane	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
1,2,4-Trichlorobenzene	17	U	110	U	1100	U*	18	U	1100	U	2100	U*	16	U
Sample wt (g):	5		1		5		5		5		5		5	
%Moisture:	41		53		53		45		53		53		36	
Dilution Factor:	1		1		1		1		1		2		1	
Level:	Low		Low		Med		Low		Med		Med		Low	
Number of TIC's:	24		30		5		26		9		8		19	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

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ORGANIC DATA SUMMARY

Case No.: 27912 SDG: FGA73 Reviewer: W. Doong

boratory: CLAYTN Matrix: Soil Units: ug/Kg

VOLATILE EPA SAMPLE NUMBER:	FLAG FG-W71	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
Dichlorodifluoromethane	13 U						
Chloromethane	13 U						
Vinyl Chloride	13 U						
Bromomethane	13 U						
Chloroethane	13 U						
Trichlorofluoromethane	13 U						
1,1-Dichloroethene	13 U						
1,1,2-Trichloro-1,2,2-trifluoroethane	13 U						
Acetone	13 U						
Carbon Disulfide	13 U						
Methyl Acetate	13 U						
Methylene Chloride	24 UMJ						
trans-1,2-Dichloroethene	13 U						
Methyl tert-Butyl Ether	13 U						
1,1-Dichloroethane	13 U						
cis-1,2-Dichloroethene	13 U						
2-Butanone	13 U						
Chloroform	13 U						
1,1,1-Trichloroethane	13 U						
Cyclohexane	13 U						
Carbon Tetrachloride	13 U						
Benzene	13 U						
1,2-Dichloroethane	13 U						
Trichloroethene	13 U						
Methylcyclohexane	13 U						
1,2-Dichloropropane	13 U						
Bromodichloromethane	13 U						
cis-1,3-Dichloropropene	13 U						
4-Methyl-2-pentanone	13 U						
Toluene	13 U						
trans-1,3-Dichloropropene	13 U						
1,1,2-Trichloroethane	13 U						
Tetrachloroethene	13 U						
2-Hexanone	13 U						
Dibromochloromethane	13 U						
1,2-Dibromoethane	13 U						
Chlorobenzene	13 U						
Ethylbenzene	13 U						
Xylenes (total)	13 U						
Styrene	13 U						
Bromoform	13 U						
Isopropylbenzene	13 U						
1,1,2,2-Tetrachloroethane	13 U						
1,3-Dichlorobenzene	7 J						
1,4-Dichlorobenzene	2 J						
1,2-Dichlorobenzene	13 U						
1,2-Dibromo-3-chloropropane	13 U						
1,2,4-Trichlorobenzene	13 U						
Sample wt (g):	5						
%Moisture:	23						
Dilution Factor:	1						
Level:	Low						
Number of TIC's:	2						

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

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ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGA73 Reviewer : W. Doong

Laboratory : CLAYTN Matrix : Soil Units : ug/Kg

SEMIVOLATILE EPA SAMPLE NUMBER :	FG-A73	FLAG	FG-W58	FLAG	FG-W59	FLAG	FG-W59DL	FLAG	FG-W60	FLAG	FG-W61	FLAG	FG-W62	FLAG
Benzaldehyde	430	U	43	LJ	25	LJ	9000	U*	9000	U	860	U	970	U
Phenol	430	U	530	U	26	LJ	9000	U*	9000	U	67	LJ	970	U
bis-(2-Chloroethyl) ether	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
2-Chlorophenol	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
2-Methylphenol	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
2,2'-oxybis(1-Chloropropane)	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
Acetophenone	430	U	98	LJ	56	LJ	9000	U*	9000	U	57	LJ	970	U
4-Methylphenol	430	U	530	U	450	U	9000	U*	9000	U	290	LJ	970	U
N-Nitroso-di-n-propylamine	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
Hexachloroethane	270	LJ	530	U	450	U	9000	U*	9000	U	860	U	970	U
Nitrobenzene	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
Isophorone	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
2-Nitrophenol	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
2,4-Dimethylphenol	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
bis(2-Chloroethoxy)methane	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
2,4-Dichlorophenol	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
Naphthalene	70	LJ	530	U	450	U	9000	U*	9000	U	860	U	260	LJ
4-Chloroaniline	430	U	530	U	31	LJ	9000	U*	9000	U	860	U	970	U
Hexachlorobutadiene	1400		530	U	450	U	9000	U*	9000	U	860	U	970	U
Caprolactam	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
4-Chloro-3-methylphenol	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
2-Methylnaphthalene	430	U	530	U	28	LJ	9000	U*	9000	U	860	U	390	LJ
Hexachlorocyclopentadiene	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
2,4,6-Trichlorophenol	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
2,4,5-Trichlorophenol	1100	U	1300	U	1100	U	23000	U*	23000	U	2200	U	2400	U
1,1'-Biphenyl	58	LJ	530	U	450	U	9000	U*	9000	U	860	U	110	LJ
2-Chloronaphthalene	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
2-Nitroaniline	1100	U	1300	U	1100	U	23000	U*	23000	U	2200	U	2400	U
Dimethylphthalate	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
2,6-Dinitrotoluene	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
Acenaphthylene	180	LJ	530	U	47	LJ	9000	U*	9000	U	860	U	520	LJ
3-Nitroaniline	1100	U	1300	U	1100	U	23000	U*	23000	U	2200	U	2400	U
Acenaphthene	77	LJ	57	LJ	180	LJ	9000	U*	9000	U	110	LJ	3900	
2,4-Dinitrophenol	1100	U	1300	U	1100	U	23000	U*	23000	U	2200	U	2400	U
4-Nitrophenol	1100	U	1300	U	1100	U	23000	U*	23000	U	2200	U	2400	U
Dibenzofuran	430	U	530	U	130	LJ	9000	U*	9000	U	81	LJ	57	LJ
2,4-Dinitrotoluene	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
Diethylphthalate	430	U	43	LJ	450	U	9000	U*	9000	U	860	U	250	LJ
Fluorene	56	LJ	530	U	240	LJ	9000	U*	9000	U	100	LJ	1800	
4-Chlorophenyl-phenyl ether	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
4-Nitroaniline	1100	U	1300	U	1100	U	23000	U*	23000	U	2200	U	2400	U
4,6-Dinitro-2-methylphenol	1100	U	1300	U	1100	U	23000	U*	23000	U	2200	U	2400	U
N-Nitrosodiphenylamine	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
4-Bromophenyl-phenylether	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
Hexachlorobenzene	3100		530	U	450	U	9000	U*	9000	U	860	U	970	U
Atrazine	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
Pentachlorophenol	1100	U	1300	U	1100	U	23000	U*	23000	U	2200	U	2400	U
Phenanthrene	300	LJ	50	LJ	8500	J	5100	*	4000	LJ	1700		5200	
Anthracene	52	LJ	530	U	880		610	*	9000	U	260	LJ	1100	
Carbazole	430	U	530	U	1500		1000	*	950	LJ	200	LJ	70	LJ

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

14 017

ORGANIC DATA SUMMARY

Case No.: 27912 SDG: FGA73 Reviewer: W. Doong

Laboratory: CLAYTN Matrix: Soil Units: ug/Kg

SEMIVOLATILE EPA SAMPLE NUMBER:	FG-A73	FLAG	FG-W58	FLAG	FG-W59	FLAG	FG-W59DL	FLAG	FG-W60	FLAG	FG-W61	FLAG	FG-W62	FLAG
Di-n-butylphthalate	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
Fluoranthene	570		87	LJ	36000	J	8500	*	7600	LJ	2000		1300	
Pyrene	1200		58	LJ	16000	J	7000	*	6100	LJ	1600		1300	
Butylbenzylphthalate	430	U	530	U	190	LJ	9000	U*	9000	U	170	LJ	970	U
3,3'-Dichlorobenzidine	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
Benzo(a)anthracene	58	LJ	37	LJ	7700	J	3500	*	3200	LJ	890		500	LJ
Chrysene	96	LJ	60	LJ	11000	J	5300	*	4400	LJ	1200		580	LJ
bis(2-Ethylhexyl)phthalate	430	U	380	BLJ	380	BLJ	9000	U*	9000	U	860	U	800	BLJ
Di-n-octylphthalate	430	U	530	U	450	U	9000	U*	9000	U	860	U	970	U
Benzo(b)fluoranthene	93	LJ	47	LJ	9600	J	4400	*	4100	LJ	1100		440	LJ
Benzo(k)fluoranthene	73	LJ	33	LJ	9700	J	3800	*	3600	LJ	940		470	LJ
Benzo(a)pyrene	190	LJ	530	U	8000	J	3800	*	3900	LJ	960		570	LJ
Indeno(1,2,3-cd)pyrene	170	LJ	530	U	3800	J	2600	*	2600	LJ	600	LJ	280	LJ
Dibenzo(a,h)anthracene	430	U	530	U	1200		780	*	9000	U	230	LJ	970	U
Benzo(g,h,i)perylene	520		530	U	3200		2600	*	2500	LJ	580	LJ	340	LJ
Sample wt (g):	30		30		30		30		30		30		30	
%Moisture:	23		38		27		27		27		23		32	
Dilution Factor:	1		1		1		20		20		2		2	
Level:	Low		Low		Low		Low		Low		Low		Low	
Number of TIC's:	25		30		30		2		2		30		30	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

14 018

ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGA73 Reviewer : W. Doong

Laboratory : CLAYTN Matrix : Soil Units : ug/Kg

SEMIVOLATILE EPA SAMPLE NUMBER :	FG-W63	FLAG	FG-W63RE	FLAG	FG-W66	FLAG	FG-W67	FLAG	FG-W68	FLAG	FG-W69	FLAG	FG-W69RE	FLAG
Benzaldehyde	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Phenol	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
bis-(2-Chloroethyl) ether	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
2-Chlorophenol	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
2-Methylphenol	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
2,2'-oxybis(1-Chloropropane)	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Acetophenone	11000	U	11000	U*	25000	U	18000	U	21000	U	39	LJ	30	*
4-Methylphenol	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
N-Nitroso-di-n-propylamine	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Hexachloroethane	11000	U	11000	U*	25000	U	18000	U	1800	LJ	520	U	520	U*
Nitrobenzene	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Isophorone	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
2-Nitrophenol	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
2,4-Dimethylphenol	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
bis(2-Chloroethoxy)methane	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
2,4-Dichlorophenol	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Naphthalene	11000	U	11000	U*	17000	LJ	18000	U	7800	LJ	64	LJ	63	*
4-Chloroaniline	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Hexachlorobutadiene	11000	U	11000	U*	25000	U	18000	U	7700	LJ	35	LJ	39	*
Caprolactam	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
4-Chloro-3-methylphenol	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
2-Methylnaphthalene	28000		33000	*	20000	LJ	18000	U	4000	LJ	100	LJ	86	*
Hexachlorocyclopentadiene	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
2,4,6-Trichlorophenol	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
2,4,5-Trichlorophenol	28000	U	28000	U*	62000	U	45000	U	53000	U	1300	U	1300	U*
1,1'-Biphenyl	11000	U	11000	U*	12000	LJ	18000	U	4700	LJ	520	U	520	U*
2-Chloronaphthalene	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
2-Nitroaniline	28000	U	28000	U*	62000	U	45000	U	53000	U	1300	U	1300	U*
Dimethylphthalate	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
2,6-Dinitrotoluene	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Acenaphthylene	11000	U	11000	U*	10000	LJ	18000	U	21000	LJ	100	LJ	110	*
3-Nitroaniline	28000	U	28000	U*	62000	U	45000	U	53000	U	1300	U	1300	U*
Acenaphthene	6400	LJ	6900	*	11000	LJ	18000	U	2900	LJ	1000		1100	*
2,4-Dinitrophenol	28000	U	28000	U*	62000	U	45000	U	53000	U	1300	U	1300	U*
4-Nitrophenol	28000	U	28000	U*	62000	U	2600	LJ	53000	U	1300	U	1300	U*
Dibenzofuran	3300	LJ	3100	*	25000	U	18000	U	21000	U	520	U	520	U*
2,4-Dinitrotoluene	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Diethylphthalate	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Fluorene	3000	LJ	2900	*	21000	LJ	18000	U	8700	LJ	200	LJ	270	*
4-Chlorophenyl-phenyl ether	11000	U	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
4-Nitroaniline	28000	U	28000	U*	62000	U	45000	U	53000	U	1300	U	1300	U*
4,6-Dinitro-2-methylphenol	28000	UJv	28000	U*	62000	U	45000	U	53000	U	1300	U	1300	U*
N-Nitrosodiphenylamine	11000	UJv	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
4-Bromophenyl-phenylether	11000	UJv	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Hexachlorobenzene	11000	UJv	11000	U*	25000	U	18000	U	2200	LJ	520	U	520	U*
Atrazine	11000	UJv	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Pentachlorophenol	28000	UJv	28000	U*	62000	U	3100	LJ	53000	U	1300	U	1300	U*
Phenanthrene	4400	LJ	4900	*	45000	J	18000	U	41000	J	600		580	*
Anthracene	1500	LJ	1400	*	9800	LJ	18000	U	5400	LJ	180	LJ	220	*
Carbazole	11000	UJv	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

14 019

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ORGANIC DATA SUMMARY

Case No.: 27912 SDG: FGA73 Reviewer: W. Doong

Laboratory: CLAYTN Matrix: Soil Units: ug/Kg

SEMIVOLATILE EPA SAMPLE NUMBER:	FG-W63	FLAG	FG-W63RE	FLAG	FG-W66	FLAG	FG-W67	FLAG	FG-W68	FLAG	FG-W69	FLAG	FG-W69RE	FLAG
Di-n-butylphthalate	11000	UJv	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Fluoranthene	1600	LJ	1700	*	7800	LJ	18000	U	40000	J	1100		1200	*
Pyrene	2100	LJ	2700	*	17000	LJ	980	LJ	98000	J	440	LJ	400	*
Butylbenzylphthalate	11000	UJv	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
3,3'-Dichlorobenzidine	11000	UJv	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Benzo(a)anthracene	790	LJ	630	*	2800	LJ	18000	U	1200	LJ	180	LJ	160	*
Chrysene	1100	LJ	1300	*	3200	LJ	18000	U	1900	LJ	290	LJ	270	*
bis(2-Ethylhexyl)phthalate	11000	U	1700	*	1700	LJ	3000	LJ	3400	LJ	770		560	*
Di-n-octylphthalate	11000	UJv	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Benzo(b)fluoranthene	11000	UJv	730	*	25000	U	18000	U	1500	LJ	240	LJ	230	*
Benzo(k)fluoranthene	920	LJ	680	*	25000	U	18000	U	1100	LJ	180	LJ	190	*
Benzo(a)pyrene	11000	UJv	11000	U*	1600	LJ	18000	U	4400	LJ	140	LJ	180	*
Indeno(1,2,3-cd)pyrene	11000	UJv	11000	U*	25000	U	18000	U	3700	LJ	86	LJ	88	*
Dibenzo(a,h)anthracene	11000	UJv	11000	U*	25000	U	18000	U	21000	U	520	U	520	U*
Benzo(g,h,i)perylene	11000	UJv	11000	U*	25000	U	18000	U	14000	LJ	100	LJ	100	*
Sample wt (g):	30		30		1		1		1		30		30	
%Moisture:	41		41		60		45		53		36		36	
Dilution Factor:	20		20		1		1		1		1		1	
Level:	Low		Low		Med		Med		Med		Low		Low	
Number of TIC's:	28		30		30		0		13		30		30	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

14 020

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ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGA73 Reviewer : W. Doong

Laboratory : CLAYTN Matrix : Soil Units : ug/Kg

SEMIVOLATILE EPA SAMPLE NUMBER :	FG-W71	FLAG	FG-W71RE	FLAG		FLAG		FLAG		FLAG		FLAG
Benzaldehyde	430	U	430	U*								
Phenol	430	U	430	U*								
bis-(2-Chloroethyl) ether	430	U	430	U*								
2-Chlorophenol	430	U	430	U*								
2-Methylphenol	430	U	430	U*								
2,2'-oxybis(1-Chloropropane)	430	U	430	U*								
Acetophenone	430	U	29	*								
4-Methylphenol	430	U	430	U*								
N-Nitroso-di-n-propylamine	430	U	430	U*								
Hexachloroethane	270	LJ	260	*								
Nitrobenzene	430	U	430	U*								
Isophorone	430	U	430	U*								
2-Nitrophenol	430	U	430	U*								
2,4-Dimethylphenol	430	U	430	U*								
bis(2-Chloroethoxy)methane	430	U	430	U*								
2,4-Dichlorophenol	430	U	430	U*								
Naphthalene	40	LJ	37	*								
4-Chloroaniline	430	U	430	U*								
Hexachlorobutadiene	1300		1300	*								
Caprolactam	430	U	430	U*								
4-Chloro-3-methylphenol	430	U	430	U*								
2-Methylnaphthalene	430	U	430	U*								
Hexachlorocyclopentadiene	430	U	430	U*								
2,4,6-Trichlorophenol	430	U	430	U*								
2,4,5-Trichlorophenol	1100	U	1100	U*								
1,1'-Biphenyl	48	LJ	47	*								
2-Chloronaphthalene	430	U	430	U*								
2-Nitroaniline	1100	U	1100	U*								
imethylphthalate	430	U	430	U*								
.6-Dinitrotoluene	430	U	430	U*								
Acenaphthylene	120	LJ	130	*								
3-Nitroaniline	1100	U	1100	U*								
Acenaphthene	67	LJ	70	*								
2,4-Dinitrophenol	1100	U	1100	U*								
4-Nitrophenol	1100	U	1100	U*								
Dibenzofuran	430	U	430	U*								
2,4-Dinitrotoluene	430	U	430	U*								
Diethylphthalate	430	U	430	U*								
Fluorene	38	LJ	37	*								
4-Chlorophenyl-phenyl ether	430	U	430	U*								
4-Nitroaniline	1100	U	1100	U*								
4,6-Dinitro-2-methylphenol	1100	U	1100	U*								
N-Nitrosodiphenylamine	430	U	430	U*								
4-Bromophenyl-phenylether	430	U	430	U*								
Hexachlorobenzene	2500	J	2600	*								
Atrazine	430	U	430	U*								
Pentachlorophenol	1100	U	1100	U*								
Phenanthrene	220	LJ	220	*								
Anthracene	34	LJ	32	*								
Carbazole	430	U	430	U*								

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGA73 Reviewer : W. Doong

Laboratory : CLAYTN Matrix : Soil Units : ug/Kg

SEMIVOLATILE EPA SAMPLE NUMBER :	FG-W71	FLAG	FG-W71RE	FLAG		FLAG		FLAG		FLAG		FLAG
Di-n-butylphthalate	430	U	430	U*								
Fluoranthene	350	LJ	370	*								
Pyrene	830		890	*								
Butylbenzylphthalate	430	U	430	U*								
3,3'-Dichlorobenzidine	430	U	430	U*								
Benzo(a)anthracene	46	LJ	50	*								
Chrysene	99	LJ	90	*								
bis(2-Ethylhexyl)phthalate	430	U	170	*								
Di-n-octylphthalate	430	UJv	430	U*								
Benzo(b)fluoranthene	79	LJ	81	*								
Benzo(k)fluoranthene	69	LJ	76	*								
Benzo(a)pyrene	140	LJ	130	*								
Indeno(1,2,3-cd)pyrene	110	LJ	120	*								
Dibenzo(a,h)anthracene	430	UJv	430	U*								
Benzo(g,h,i)perylene	370	LJ	400	*								
Sample wt (g) :	30		30									
%Moisture :	23		23									
Dilution Factor :	1		1									
Level :	Low		Low									
Number of TIC's :	19		20									

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

14 022

22

ORGANIC DATA SUMMARY

Case No.: 27912 SDG: FGA73 Reviewer: W. Doong

Laboratory: CLAYTN Matrix: Soil Units: ug/Kg

PESTICIDES/PCBs EPA SAMPLE NUMBER:	FG-A73	FLAG	FG-W58	FLAG	FG-W59	FLAG	FG-W60	FLAG	FG-W61	FLAG	FG-W62	FLAG	FG-W62DL	FLAG
alpha-BHC	2.2	U	2.7	U	2.3	U	2.3	U	2.2	U	2.5	U	25	U*
beta-BHC	2.2	U	2.7	U	2.3	U	2.3	U	2.2	U	7.6	JT	12	*
delta-BHC	2.2	U	2.7	U	2.3	U	2.3	U	2.2	U	2.5	U	25	U*
gamma-BHC (Lindane)	2.2	U	2.7	U	2.3	U	2.3	U	0.86	LJ	2.5	U	25	U*
Heptachlor	2.2	U	2.7	U	1.9	LJ	1.6	LJ	1.4	LJ	2.5	U	25	U*
Aldrin	9.6	UMJ	6.5	UMJ	2.3	U	2.3	U	2.2	U	150	*	260	UMJ
Heptachlor epoxide	2.2	U	2.7	U	6.1	J	7.0	J	2.2	U	2.5	U	25	U*
Endosulfan I	2.2	U	2.7	U	2.3	U	2.3	U	2.2	U	27	J	33	*
Dieldrin	4.3	U	5.3	U	4.5	U	1.9	LJ	4.3	U	4.9	U	49	U*
4,4'-DDE	4.3	U	5.3	U	4.5	U	4.5	U	4.3	U	4.9	U	49	U*
Endrin	4.3	U	1.9	LJ	4.5	U	4.5	U	4.3	U	48		72	*
Endosulfan II	4.3	U	5.3	U	4.5	U	4.5	U	4.3	U	5.3	J	49	U*
4,4'-DDD	4.3	U	5.3	U	4.5	U	4.5	U	2.5	LJ	4.9	U	49	U*
Endosulfan sulfate	4.3	U	5.3	U	4.5	U	4.5	U	4.3	U	4.9	U	49	U*
4,4'-DDT	4.3	U	5.3	U	3.8	LJ	4.6	J	4.3	U	4.9	U	49	U*
Methoxychlor	22	U	27	U	41	J	58	J	22	U	25	U	250	U*
Endrin ketone	4.3	U	5.3	U	15	JT	21	JT	2.0	LJ	2.3	LJ	49	U*
Endrin aldehyde	4.3	U	5.3	U	4.5	U	4.5	U	4.3	U	4.9	U	49	U*
alpha-Chlordane	2.2	U	2.7	U	0.96	LJ	0.58	LJ	2.2	U	2.5	U	25	U*
gamma-Chlordane	2.2	U	2.7	U	4.5	J	3.7	J	2.2	U	2.5	U	25	U*
Toxaphene	220	U	270	U	230	U	230	U	220	U	250	U	2500	U*
Aroclor-1016	43	U	53	U	45	U	45	U	43	U	49	U	490	U*
Aroclor-1221	87	U	110	U	92	U	92	U	87	U	99	U	990	U*
Aroclor-1232	43	U	53	U	45	U	45	U	43	U	49	U	490	U*
Aroclor-1242	43	U	53	U	45	U	45	U	43	U	49	U	490	U*
Aroclor-1248	290	J	160	J	45	U	45	U	43	U	3300	J	5400	*
Aroclor-1254	43	U	53	U	45	U	45	U	43	U	49	U	490	U*
Aroclor-1260	43	U	53	U	45	U	45	U	43	U	290	J	490	U*
Sample wt (g):	30		30		30		30		30		30		30	
%Moisture:	23		38		27		27		23		32		32	
Dilution Factor:	1		1		1		1		1		1		10	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

14 023

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ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGA73 Reviewer : W. Doong

aboratory : CLAYTN Matrix : Soil Units : ug/Kg

PESTICIDES/PCBs EPA SAMPLE NUMBER :	FG-W63	FLAG	FG-W63DL	FLAG	FG-W66	FLAG	FG-W66DL	FLAG	FG-W67	FLAG	FG-W67DL	FLAG	FG-W68	FLAG
alpha-BHC	2.9	U	29	U*	4.2	U	42	U*	310	U	3100	U*	3.6	U
beta-BHC	6.9	JT	12	*	4.2	U	42	U*	310	U	3100	U*	3.6	U
delta-BHC	2.9	U	29	U*	4.2	U	42	U*	310	U	3100	U*	3.6	U
gamma-BHC (Lindane)	2.9	U	29	U*	4.2	U	42	U*	310	U	3100	U*	3.6	U
Heptachlor	19	J	44	*	4.2	U	42	U*	1100	J	1300	*	3.6	U
Aldrin	150	*	290	UM	230	*	390	UM	8200	*	11000	UMJ	240	*
Heptachlor epoxide	2.9	U	29	U*	4.2	U	42	U*	310	U	3100	U*	3.6	U
Endosulfan I	9.9	J	6.2	*	70	JN	60	*	270	LJ	3100	U*	3.6	U
Dieldrin	5.6	U	56	U*	8.2	U	82	U*	600	U	6000	U*	7.0	U
4,4'-DDE	5.6	U	56	U*	8.2	U	82	U*	600	U	6000	U*	7.0	U
Endrin	25	J	40	*	150	*	220	*	1000	J	890	*	7.0	U
Endosulfan II	2.9	LJ	56	U*	8.2	U	82	U*	150	LJ	6000	U*	7.0	U
4,4'-DDD	5.6	U	56	U*	8.2	U	82	U*	600	U	6000	U*	62	JT
Endosulfan sulfate	5.6	U	56	U*	8.2	U	82	U*	600	U	6000	U*	7.0	U
4,4'-DDT	5.6	U	56	U*	8.2	U	82	U*	600	U	6000	U*	7.0	U
Methoxychlor	27	LJ	290	U*	9.5	LJ	250	*	50	LJ	31000	U*	18	LJ
Endrin ketone	5.6	U	56	U*	8.2	J	82	U*	100	LJ	6000	U*	24	JT
Endrin aldehyde	5.6	U	56	U*	8.2	U	82	U*	600	U	6000	U*	7.0	U
alpha-Chlordane	2.9	U	29	U*	1.2	LJN	42	U*	310	U	3100	U*	5.5	J
gamma-Chlordane	2.9	U	29	U*	4.2	U	42	U*	310	U	3100	U*	3.6	U
Toxaphene	290	U	2900	U*	420	U	4200	U*	31000	U	310000	U*	360	U
Aroclor-1016	56	U	560	U*	82	U	820	U*	6000	U	60000	U*	70	U
Aroclor-1221	110	U	1100	U*	170	U	1700	U*	12000	U	120000	U*	140	U
Aroclor-1232	56	U	560	U*	82	U	820	U*	6000	U	60000	U*	70	U
Aroclor-1242	56	U	560	U*	82	U	820	U*	6000	U	60000	U*	70	U
Aroclor-1248	4600	J	7700	*	8600	*	14000		290000	*	300000		14000	*
Aroclor-1254	56	U	560	U*	182	U	820	U*	6000	U	60000	U*	70	U
Aroclor-1260	250		560	U*	3400	J	820	U*	6000	U	60000	U*	70	U
Sample wt (g) :	30		30		30		30		30		30		30	
%Moisture :	41		41		60		60		45		45		53	
Dilution Factor :	1		10		1		10		100		1000		1	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

14 024

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ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGA73 Reviewer : W. Doong

Laboratory : CLAYTN Matrix : Soil Units : ug/Kg

PESTICIDES/PCBs EPA SAMPLE NUMBER :	FG-W68DL	FLAG	FG-W69	FLAG	FG-W69DL	FLAG	FG-W71	FLAG		FLAG		FLAG
alpha-BHC	36	U*	2.7	U	27	U*	2.2	U				
beta-BHC	36	U*	2.7	U	27	U*	2.2	U				
delta-BHC	36	U*	2.7	U	27	U*	2.2	U				
gamma-BHC (Lindane)	36	U*	2.7	U	27	U*	2.2	U				
Heptachlor	36	U*	4.9	J	12	*	2.2	U				
Aldrin	420	UMJ	53	*	110	UM	17	UMJ				
Heptachlor epoxide	36	U*	2.7	U	27	U*	2.2	U				
Endosulfan I	36	U*	0.99	LJ	27	U*	2.2	U				
Dieldrin	70	U*	5.2	U	52	U*	4.3	U				
4,4'-DDE	70	U*	5.2	U	52	U*	4.0	LJ				
Endrin	70	U*	12		8.9		4.3	U				
Endosulfan II	70	U*	5.2	U	52	U*	4.3	U				
4,4'-DDD	55	*	5.2	U	52	U*	4.3	U				
Endosulfan sulfate	70	U*	5.2	U	52	U*	4.3	U				
4,4'-DDT	70	U*	5.2	U	52	U*	4.3	U				
Methoxychlor	16	*	27	U	270	U*	22	U				
Endrin ketone	30	*	2.5	LJ	52	U*	4.3	U				
Endrin aldehyde	70	U*	5.2	U	52	U*	4.3	U				
alpha-Chlordane	36	U*	2.7	U	27	U*	2.2	U				
gamma-Chlordane	36	U*	2.7	U	27	U*	2.2	U				
Toxaphene	3600	U*	270	U	2700	U*	220	U				
Aroclor-1016	700	U*	52	U	520	U*	43	U				
Aroclor-1221	1400	U*	100	U	1000	U*	87	U				
Aroclor-1232	700	U*	52	U	520	U*	43	U				
Aroclor-1242	700	U*	52	U	520	U*	43	U				
Aroclor-1248	19000		1400		2700	*	570	J				
Aroclor-1254	700	U*	52	U	520	U*	43	U				
Aroclor-1260	700	U*	52	U	520	U*	43	U				
Sample wt (g) :	30		30		30		30					
%Moisture :	53		36		36		23					
Dilution Factor :	10		1		10		1					

Note: *For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.*

14 025

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INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No. 27912 SDG No. FGA73 SDG Nos. To Follow SAS No. Date Rec 05/04/00

Lab ID: CLAYTN

Lab Location: 22345 Roethel Dr.. Novi, MI 48375

Region: 6 Audit No.: 27912/FGA73

Re_Submitted CSF? Yes _____ No X

Box No(s): 1

COMMENTS:

Item Description

Over for additional comments.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?	X		
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?	X		
FORM DC-1			
6. Present?	X		
7. Complete?	X		
8. Accurate?	X		
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?	X		
14. Signed?	X		
15. Dated?	X		
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a.If "NO", does the copy indicate where original documents are located?	X		

Audited by: Wallace Doong Wallace Doong / ESAT Data Reviewer Date 07/03/00

Audited by: _____ _____ Date _____

Audited by: _____ _____ Date _____

Signature Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: _____ Date Entered: _____ Date Reviewed: _____

Entered by: _____ _____

Reviewed by: _____ _____

Signature Printed Name/Title

DC-2

14 02(

In Reference to Case No(s):
27912 SDG: FGA73 (O-2195)

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
FAX Record Log

Laboratory Name: CLAYTN
Lab Contact: Krystal K. Swisher

Region: 6
Regional Contact: Mahmoud El-Feky - EPA
ESAT Reviewer: Wallace Doong - LMSG

FAX initiated by: ____Laboratory __X__Region

In reference to data for the following fractions:

VOA BNA Pest/PCB

Summary of Questions/Issues:

A. CSF Deliverables
For future cases, please submit the white copy (Region copy) of the TR/COC Records with the package instead of the yellow copy (CLASS copy).

B. VOA

1. Form III (pages 9 and 10) had the following errors that need to be corrected and resubmitted.

   a. The order of spike compounds did not agree with the order in the template Form III VOA-2 in the SOW OLM04.2, p. B-59, sec. 4.

   b. The RPD QC limit for 1,1-dichloroethene was incorrect.

   c. The MS/MSD recoveries were outside the QC limits for 1,1-dichloroethene, but the required "*" flag and number of spike recovery outside QC limits were omitted on page 9.

2. Form V's (pages 15 to 21): The beginning and the end of the statement immediately above the sample sequence table were not completed. The "Heated Purge" field should be removed from the header section. Please correct the format problems for future cases (OLM04.2, p. B-59, sec. 4, FORM V-VOA).

3. The formats of the submitted Forms VI and VII were not identical to those shown in the SOW (OLM04.2, p. B-28, sec. 3.2.2). Please ensure contractual compliance in the reporting format for future cases. Please report the %RSD and %D values to the first decimal place to be consistent with the criteria (OLM04.2, p. D-61/VOA, Table 5).

14 027

B. VOA (continued)

4. Form VIII's: Please report all retention times to the second decimal place to be consistent with the RT criteria (OLM04.2, p. B-51, sec. 3.15.2.4).

5. Forms 5, 6, 7, and 8 (pages 19, 21, 25, 612, 613, 659, and 660): The "Heated Purge" field should be "N" for medium level soil analysis (OLM04.2, B-44, Sec. 3.10.2.2). Please revise and resubmit these forms.

6. Medium soil method blank, VBLKBB, contained methyl acetate at a concentration exceeding the contract-allowed limit (OLM04.2, D-50/VOA, 12.1.4.6), but the contract-required reanalyses were omitted. Please comment and explain why the method-specified corrective action was not taken (OLM04.2, D-50/VOA, sec. 12.1.5.2).

7. It is required that all three xylene isomers be present in the initial and continuing calibration standards (OLM04.2, D-41/VOA, sec. 11.2.1.5). However, the submitted calibration data did not show the presence of all isomers. Please comment and/or make the necessary submission.

C. BNA

1. Form IV (pages 781 and 782): The Form title, "SEMIVOLATILE METHOD BLANK SUMMARY" was omitted. Please correct this omission for future cases.

2. The formats of the submitted Form VI and VII were not identical to those shown in the contract (OLM04.2, p. B-28, sec. 3.2.2). Please ensure contractual compliance in the format for future cases. Also, please report the %RSD and %D values to the first decimal place to be consistent with the criteria (OLM04.2, p. D-67/SVOA, Table 5).

3. Form V's (pages 783 to 787): The beginning and the end of the statement immediately above the sample sequence table were chopped off. Please correct this format problem for future cases (OLM04.2, p. B-59, sec. 4, FORM V-SV).

4. Form VIII (pages 788 to 793): Please report all retention times to the second decimal place to be consistent with the RT criteria (OLM04.2, p. B-51, sec. 3.15.2.4).

5. The 20X dilution factor chosen by the laboratory was inappropriate for BNA samples FG-W59DL and FG-W60 (OLM04.2, p. D-42/SVOA, sec. 10.6.5.2 and sec. 10.6.5.3). The target compound concentrations and sample chromatograms justified only a 5X dilution for these samples. Please comment.

FAX COMMUNICATION LOG

Continuation Page 3
Laboratory/Contact CLAYTN/Krystal K. Swisher
In Reference To Case No. 27912 **SDG:** FGA73

D. PEST/PCB

1. The "spike added" and "spike recovered" values reported on Forms 9B (pages 2121 and 2122) appear to be the concentrations rather than the total amount in "ng" (OLM04.2, B-54, 3.17.2.4 and 3.17.2.10). Please verify, revise, and resubmit these pages.

2. The AR1248 concentration in Pest/PCB sample FG-W63 was sufficient for GC/MS confirmation, but the required confirmation was not performed (OLM04.2, D-59/PEST, 11.1.2). Please provide the GC/MS confirmation data at this time.

3. Forms 6, pages 2082 and 2083: The CF's for the surrogates should be based on INDAM's, but the laboratory reported the CF's calculated from the INDBM's (OLM04.2, p. D-22/PEST, 9.2.4.5). Please revise and resubmit pages 2082 and 2083.

4. The reviewer was unable to reproduce the DCB2 recoveries reported on Forms 2 for samples FG-W63, FG-W66, FG-W69, and FG-W68DL. Please revise and resubmit pages 1821 and 1822 if the CF's from INDBM's were used for the surrogate recovery calculation.

5. The laboratory failed to report DCB1 recoveries for samples FG-W60, FG-W61, FG-W62DL, and FG-W68 based on the submitted quantitation data. Please revise and resubmit Form 2 (page 1822).

6. Form 9A (page 2120): The 2,4,5-trichlorophenol result was omitted from the check compound list (OLM04.2, p. D-51/PEST, 10.1.8.2.2.4.2). Please revise and resubmit page 2120.

7. The "DL, MS, and MSD" suffices were omitted for the raw data (quantitation reports and chromatograms) for all the diluted analyses, FG-W62DL, FG-W63DL, FG-W66DL, FG-W67DL, FG-W58MS, FG-W58MSD, FG-W68DL, and FG-W69DL. Please revise and resubmit.

8. The responses exceeded the initial calibration high point response on one column for heptachlor epoxide in sample FG-W59, heptachlor epoxide and dieldrin in sample FG-W60, and γ-BHC in sample FG-W61, but the laboratory failed to dilute and reanalyze the samples (OLM04.2, D-57/PEST, sec 10.2.3.2). Please comment and or make the necessary submission.

9. Sample FG-W66: The laboratory failed to "E"-flag the endrin result with a concentration exceeding the upper calibration range on the Form 1. Please revise and submit page 1949.

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FAX COMMUNICATION LOG

Continuation Page 4
Laboratory/Contact CLAYTN/Krystal K. Swisher
In Reference To Case No. 27912 **SDG:** FGA73

NOTE: Any laboratory resubmission should be submitted either as an addendum to the original CSF with a revised Form DC-2 or submitted as a new CSF with a new Form DC-2 (OLM04.2, p. B-26, 2.7.3), except those containing only replacement pages. Custody seals are required for all CSF resubmission shipments.

Please respond to the above items <u>within 7 days</u> to:

Mr. Mahmoud El-Feky
U.S. EPA Region 6 Laboratory
10625 Fallstone Road
Houston, TX 77099

If you have any questions, please contact me at (281) 983-2128.

Signature _____ Date 7/6/00

Distribution: (1) Lab Copy, (2) Region Copy, and (3) ESAT Copy

14 030

EPA United States Environmental Protection Agency Contract Laboratory Program

C nic Traffic Report & Chain of Custody Record
(For Organic CLP Analysis)

Case No. 27912

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	TNRCC	3/30/00	Airborne Express

Regional Information

Sampler (Name): Linda Broach

Airbill Number: 295240233

Non-Superfund Program

Sampler Signature: Linda Broach

5. Ship To: Clayton Env. Consultants, 22345 Roethel Dr., Novi, MI 48375

ATTN: Linda Michaels

Site Name: Patrick Bayou

City, State: Deer Park, TX

Site Spill ID:

3. Purpose*: Lead: [ ] SF [ ] PRP [X] ST [ ] FED; Early Action: [ ] CLEM [ ] PA [ ] REM [ ] RI [X] SI [ ] ESI; Long-Term Action: [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD

6. Matrix (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Field QC 5. Soil/Sediment 6. Oil (High only) 7. Waste (High only) 8. Other (Specify in Column A)

7. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaHSO4 4. H2SO4 5. Ice only 6. Other (Specify in Column D) N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) Other:	B Conc.: Low Med High	C Sample Type: Comp./Grab	D Preservative (from Box 7) Other:	E RAS Analysis: VOA	BNA	Pest/PCB	High only ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform. Eval. — = Not a QC Sample)
FGW71	5	L	C	5		X	X		6-209365-366	SE-27	3/30/00 0905	MFHW91	LB	—
FGA73	5	L	C	5		X	X		6-209205-206	SE-28	3/30/00 0910	MFHM71	LB	D(FGW71)

Shipment for Case Complete? (Y/N)	Page	Sample(s) to be Used for Laboratory QC	Additional Sampler Signatures	Chain of Custody Seal Number(s)
yes	2 of 2	FGW58	[signature]	

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	3/30/00 1730				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-2 (2/98)

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

A21-012-15 REV.

Page 30 of 33

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383015

EPA United States Environmental Protection Agency
Contract Laboratory Program

Organic Traffic Report & Chain of Custody Record
(For Organic CLP Analysis)

Case No. 27912

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	TNRCC	3/30/00	Airborne Express

Regional Information

Sampler (Name): LINDA BROACH

Airbill Number: 2952402331

Non-Superfund Program

Sampler Signature: Linda Broach

5. Ship To: Clayton Env. Consultants, 22345 Roethel Dr., Novi, MI 48375, ATTN: Linda Michaels

Site Name: Patrick Bayou

City, State: Deer Park, TX

Site Spill ID:

3. Purpose*: Lead: SF, PRP, ST, FED; Early Action: CLEM, PA, REM, RI, SI, ESI; Long-Term Action: FS, RD, RA, O&M, NPLD

6. Matrix (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Field QC 5. Soil/Sediment 6. Oil (High only) 7. Waste (High only) 8. Other (Specify in Column A)

7. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaHSO4 4. H2SO4 5. Ice only 6. Other (Specify in Column D) N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) Other:	B Conc.: Low Med High	C Sample Type: Comp./Grab	D Preservative (from Box 7) Other:	E RAS Analysis: VOA	BNA	Pest/PCB	High only ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform. Eval. — = Not a QC Sample)
FGW58	5	L	C	5		X	X		6-209287-288	SE-14	3/30/00 1430	MFHW78	LB	—
FGW59	5	L	C	5		X	X		6-209293-294	SE-15	3/30/00 1155	MFHW79	JK	—
FGW60	5	L	C	5		X	X		6-209299-300	SE-16	3/30/00 1200	MFHW80	JK	D(FGW59)
FGW61	5	L	C	5		X	X		6-209305-306	SE-17	3/30/00 1325	MFHW81	LB	—
FGW62	5	L	C	5		X	X		6-209311-312	SE-18	3/30/00 1355	MFHW82	LB	—
FGW63	5	L	C	5		X	X		6-209317-318	SE-19	3/30/00 1530	MFHW83	LB	—
FGW66	5	L	C	5		X	X		6-209335-336	SE-22	3/30/00 1045	MFHW86	LB	—
FGW67	5	L	C	5		X	X		6-209341-342	SE-23	3/30/00 1510	MFHW87	LB	—
FGW68	5	L	C	5		X	X		6-209347-348	SE-24	3/30/00 1000	MFHW88	LB	—
FGW69	5	L	C	5		X	X		6-209353-354	SE-25	3/30/00 1455	MFHW89	LB	—

Shipment for Case Complete? (Y/N): yes

Page 1 of 2

Sample(s) to be Used for Laboratory QC: FGW58

Additional Sampler Signatures: [signature]

Chain of Custody Seal Number(s):

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	3/30/00 1730				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

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EPA United States Environmental Protection Agency
Contract Laboratory Program

Organic Traffic Report & Chain of Custody Record
(Organic CLP Analysis)

Case No. 27912

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	TNRCC	3/30/00	Airborne Express

Regional Information	Sampler (Name)	Airbill Number
	Linda Broach	2952402530

Non-Superfund Program	Sampler Signature	5. Ship To
	Linda Broach	Clayton Env. Consultants

Site Name: Patrick Bayou
City, State: Deer Park, TX
Site Spill ID:

8. Purpose*
Lead: [ ] SF [ ] PRP [X] ST [ ] FED
Early Action: [ ] CLEM [ ] PA [ ] REM [ ] RI [X] SI [ ] ESI
Long-Term Action: [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD

22345 Roethel Dr.
Novi, MI 48375
ATTN: Linda Michaels

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaHSO4
4. H2SO4
5. Ice only
6. Other (Specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) Other:	B Conc.: Low Med High	C Sample Type: Comp. Grab	D Preservative (from Box 7) Other:	E RAS Analysis VOA	BNA	Pest/PCB	High only ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform. Eval. — = Not a QC Sample)
FGW71	5	L	C	5	X				6-209363-364	SE-27	3/30/00 0905	MFHW91	LB	—
FGA73	5	L	C	5	X				6-209203-204	SE-28	3/30/00 0910	MFHM71	LB	D(FGW71)

Shipment for Case Complete? (Y/N)	Page	Sample(s) to be Used for Laboratory QC	Additional Sampler Signatures	Chain of Custody Seal Number(s)
Yes	2 of 2	FGW58		

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	3/30/00 1730				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

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EPA United States Environmental Protection Agency Contract Laboratory Program

Organic Traffic Report & Chain of Custody Record
(For Organic CLP Analysis)

Case No. 27912

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	TNRCC	3/30/00	Airborne Express

Regional Information

Sampler (Name): Linda Branch

Airbill Number: 29524025 30

Non-Superfund Program

Sampler Signature: Linda Branch

5. Ship To: Clayton Env. Consultants, 22345 Roethel Dr., Novi, MI 48375, ATTN: Linda Michaels

Site Name: Patrick Bayou

City, State: Deer Park, TX

Site Spill ID.

3. Purpose*: Lead [ ] SF [ ] PRP [X] ST [ ] FED; Early Action [ ] CLEM [ ] PA [ ] REM [ ] RI [X] SI [ ] ESI; Long-Term Action [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD

6. Matrix (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Field QC 5. Soil/Sediment 6. Oil (High only) 7. Waste (High only) 8. Other (Specify in Column A)

7. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaHSO4 4. H2SO4 5. Ice only 6. Other (Specify in Column D) N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) Other:	B Conc.: Low Med High	C Sample Type: Comp. Grab	D Preservative (from Box 7) Other:	E RAS Analysis VOA	BNA	Pest/PCB	High only ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K Field QC Qualifier (B=Blank S=Spike D=Duplicate R=Rinsate PE=Perform. Eval. —=Not a QC Sample)
FGW58	5	L	C	5	X				6-209285 -286	SE-14	3/30/00 1430	MFHW78	LB	—
FGW59	5	L	C	5	X				6-209291 -292	SE-15	3/30/00 1155	MFHW79	JK	—
FGW60	5	L	C	5	X				6-209297 -298	SE-16	3/30/00 1200	MFHW80	JK	D (FGW59)
FGW61	5	L	C	5	X				6-209303 -304	SE-17	3/30/00 1325	MFHW81	LB	—
FGW62	5	L	C	5	X				6-209309 -310	SE-18	3/30/00 1355	MFHW82	LB	—
FGW63	5	L	C	5	X				6-209315 -316	SE-19	3/30/00 1530	MFHW83	LB	—
FGW66	5	L	C	5	X				6-209333 -334	SE-22	3/30/00 1045	MFHW86	LB	—
FGW67	5	L	C	5	X				6-209339 -340	SE-23	3/30/00 1510	MFHW87	LB	—
FGW68	5	L	C	5	X				6-209345 -346	SE-24	3/30/00 1000	MFHW88	LB	—
FGW69	5	L	C	5	X				6-209351 -352	SE-25	3/30/00 1455	MFHW89	LB	—

Shipment for Case Complete? (Y/N): Yes

Page: 1 of 2

Sample(s) to be Used for Laboratory QC: FGW58

Additional Sampler Signatures:

Chain of Custody Seal Number(s):

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	3/30/00 1730				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-2

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGA73

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 23

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (µL)

Lab Sample ID: 00040049-001A

Lab File ID: B9551.D

Date Received: 03/31/00

Date Analyzed: 04/04/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	13	U
74-87-3	Chloromethane	13	U
75-01-4	Vinyl Chloride	13	U
74-83-9	Bromomethane	13	U
75-00-3	Chloroethane	13	U
75-69-4	Trichlorofluoromethane	13	U
75-35-4	1,1-Dichloroethene	13	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	13	U
67-64-1	Acetone	13	B
75-15-0	Carbon Disulfide	8	J
79-20-9	Methyl Acetate	13	U
75-09-2	Methylene Chloride	20	B
156-60-5	trans-1,2-Dichloroethene	13	U
1634-04-4	Methyl tert-Butyl Ether	13	U
75-34-3	1,1-Dichloroethane	13	U
156-59-2	cis-1,2-Dichloroethene	13	U
78-93-3	2-Butanone	13	U
67-66-3	Chloroform	13	U
71-55-6	1,1,1-Trichloroethane	13	U
110-82-7	Cyclohexane	13	U
56-23-5	Carbon Tetrachloride	13	U
71-43-2	Benzene	13	U
107-06-2	1,2-Dichloroethane	13	U
79-01-6	Trichloroethene	13	U
108-87-2	Methylcyclohexane	13	U
78-87-5	1,2-Dichloropropane	13	U
75-27-4	Bromodichloromethane	13	U
10061-01-5	cis-1,3-Dichloropropene	13	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	13	U
10061-02-6	trans-1,3-Dichloropropene	13	U
79-00-5	1,1,2-Trichloroethane	13	U
127-18-4	Tetrachloroethene	13	U
591-78-6	2-Hexanone	13	U
124-48-1	Dibromochloromethane	13	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGA73

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 23

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (µL)

Lab Sample ID: 00040049-001A

Lab File ID: B9551.D

Date Received: 03/31/00

Date Analyzed: 04/04/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	13	U
108-90-7	Chlorobenzene	13	U
100-41-4	Ethylbenzene	13	U
1330-20-7	Xylene (total)	13	U
100-42-5	Styrene	13	U
75-25-2	Bromoform	13	U
98-82-8	Isopropylbenzene	13	U
79-34-5	1,1,2,2-Tetrachloroethane	13	U
541-73-1	1,3-Dichlorobenzene	2	J
106-46-7	1,4-Dichlorobenzene	13	U
95-50-1	1,2-Dichlorobenzene	13	U
96-12-8	1,2-Dibromo-3-chloropropane	13	U
120-82-1	1,2,4-Trichlorobenzene	13	U

EPA SAMPLE NO.
FGA73

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-001A

Sample wt/vol: 5 (g/mL) G Lab File ID: B9551.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: not dec. 23 Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 2 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.17	43	BNJ
2.		Unknown	21.81	7	BJ

14 037

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW58

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Lab Sample ID: 00040049-002A

Lab File ID: A8885.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 38

Date Analyzed: 04/07/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	16	U
74-87-3	Chloromethane	16	U
75-01-4	Vinyl Chloride	16	U
74-83-9	Bromomethane	16	U
75-00-3	Chloroethane	16	U
75-69-4	Trichlorofluoromethane	16	U
75-35-4	1,1-Dichloroethene	16	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	16	U
67-64-1	Acetone	34	B
75-15-0	Carbon Disulfide	32	B
79-20-9	Methyl Acetate	16	U
75-09-2	Methylene Chloride	11	BJ
156-60-5	trans-1,2-Dichloroethene	16	U
1634-04-4	Methyl tert-Butyl Ether	16	U
75-34-3	1,1-Dichloroethane	16	U
156-59-2	cis-1,2-Dichloroethene	16	U
78-93-3	2-Butanone	7	J
67-66-3	Chloroform	16	U
71-55-6	1,1,1-Trichloroethane	16	U
110-82-7	Cyclohexane	16	U
56-23-5	Carbon Tetrachloride	16	U
71-43-2	Benzene	16	U
107-06-2	1,2-Dichloroethane	16	U
79-01-6	Trichloroethene	16	U
108-87-2	Methylcyclohexane	16	U
78-87-5	1,2-Dichloropropane	16	U
75-27-4	Bromodichloromethane	16	U
10061-01-5	cis-1,3-Dichloropropene	16	U
108-10-1	4-Methyl-2-pentanone	16	U
108-88-3	Toluene	16	U
10061-02-6	trans-1,3-Dichloropropene	16	U
79-00-5	1,1,2-Trichloroethane	16	U
127-18-4	Tetrachloroethene	16	U
591-78-6	2-Hexanone	16	U
124-48-1	Dibromochloromethane	16	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW58

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 38

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (µL)

Lab Sample ID: 00040049-002A

Lab File ID: A8885.D

Date Received: 03/31/00

Date Analyzed: 04/07/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	16	U
108-90-7	Chlorobenzene	16	U
100-41-4	Ethylbenzene	16	U
1330-20-7	Xylene (total)	5	J
100-42-5	Styrene	16	U
75-25-2	Bromoform	16	U
98-82-8	Isopropylbenzene	19	
79-34-5	1,1,2,2-Tetrachloroethane	16	U
541-73-1	1,3-Dichlorobenzene	3	J
106-46-7	1,4-Dichlorobenzene	16	U
95-50-1	1,2-Dichlorobenzene	16	U
96-12-8	1,2-Dibromo-3-chloropropane	16	U
120-82-1	1,2,4-Trichlorobenzene	16	U

1F

EPA SAMPLE NO.

FGW58

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-002A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8885.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: not dec. 38 Date Analyzed: 04/07/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 6 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000075-07-0	Acetaldehyde	5.62	12	BNJ
2.		Unknown siloxane	18.69	54	J
3.	000095-49-8	Benzene, 1-chloro-2-methyl-	19.89	8	NJ
4.		Unknown (4)	23.28	17	BJ
5.		Unknown (5)	27.44	12	J
6.		Unknown (6)	27.94	21	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW59

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-003A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8870.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 27

Date Analyzed: 04/06/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	14	U
74-87-3	Chloromethane	14	U
75-01-4	Vinyl Chloride	14	U
74-83-9	Bromomethane	14	U
75-00-3	Chloroethane	14	U
75-69-4	Trichlorofluoromethane	14	U
75-35-4	1,1-Dichloroethene	14	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	14	U
67-64-1	Acetone	17	B
75-15-0	Carbon Disulfide	35	B
79-20-9	Methyl Acetate	14	U
75-09-2	Methylene Chloride	28	B
156-60-5	trans-1,2-Dichloroethene	14	U
1634-04-4	Methyl tert-Butyl Ether	14	U
75-34-3	1,1-Dichloroethane	14	U
156-59-2	cis-1,2-Dichloroethene	14	U
78-93-3	2-Butanone	14	U
67-66-3	Chloroform	14	U
71-55-6	1,1,1-Trichloroethane	14	U
110-82-7	Cyclohexane	14	U
56-23-5	Carbon Tetrachloride	14	U
71-43-2	Benzene	14	U
107-06-2	1,2-Dichloroethane	14	U
79-01-6	Trichloroethene	1	J
108-87-2	Methylcyclohexane	14	U
78-87-5	1,2-Dichloropropane	14	U
75-27-4	Bromodichloromethane	14	U
10061-01-5	cis-1,3-Dichloropropene	14	U
108-10-1	4-Methyl-2-pentanone	14	U
108-88-3	Toluene	8	J
10061-02-6	trans-1,3-Dichloropropene	14	U
79-00-5	1,1,2-Trichloroethane	14	U
127-18-4	Tetrachloroethene	14	U
591-78-6	2-Hexanone	14	U
124-48-1	Dibromochloromethane	14	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW59

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-003A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8870.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 27

Date Analyzed: 04/06/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	14	U
108-90-7	Chlorobenzene	14	U
100-41-4	Ethylbenzene	14	U
1330-20-7	Xylene (total)	3	J
100-42-5	Styrene	14	U
75-25-2	Bromoform	14	U
98-82-8	Isopropylbenzene	14	U
79-34-5	1,1,2,2-Tetrachloroethane	14	U
541-73-1	1,3-Dichlorobenzene	14	U
106-46-7	1,4-Dichlorobenzene	14	U
95-50-1	1,2-Dichlorobenzene	14	U
96-12-8	1,2-Dibromo-3-chloropropane	14	U
120-82-1	1,2,4-Trichlorobenzene	14	U

1F

EPA SAMPLE NO.

FGW59

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-003A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8870.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: not dec. 27 Date Analyzed: 04/06/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 5 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.71	37	NJ
2.	000611-14-3	Benzene, 1-ethyl-2-methyl-	19.75	23	NJ
3.	000526-73-8	Benzene, 1,2,3-trimethyl-	19.99	8	NJ
4.	000095-63-6	Benzene, 1,2,4-trimethyl-	20.97	20	NJ
5.		Unknown	23.32	14	BJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW60

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-004A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8871.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 27

Date Analyzed: 04/06/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	14	U
74-87-3	Chloromethane	14	U
75-01-4	Vinyl Chloride	14	U
74-83-9	Bromomethane	14	U
75-00-3	Chloroethane	14	U
75-69-4	Trichlorofluoromethane	14	U
75-35-4	1,1-Dichloroethene	14	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	14	U
67-64-1	Acetone	14	B
75-15-0	Carbon Disulfide	22	B
79-20-9	Methyl Acetate	14	U
75-09-2	Methylene Chloride	23	B
156-60-5	trans-1,2-Dichloroethene	14	U
1634-04-4	Methyl tert-Butyl Ether	14	U
75-34-3	1,1-Dichloroethane	14	U
156-59-2	cis-1,2-Dichloroethene	14	U
78-93-3	2-Butanone	14	U
67-66-3	Chloroform	14	U
71-55-6	1,1,1-Trichloroethane	14	U
110-82-7	Cyclohexane	14	U
56-23-5	Carbon Tetrachloride	14	U
71-43-2	Benzene	14	U
107-06-2	1,2-Dichloroethane	14	U
79-01-6	Trichloroethene	2	J
108-87-2	Methylcyclohexane	14	U
78-87-5	1,2-Dichloropropane	14	U
75-27-4	Bromodichloromethane	14	U
10061-01-5	cis-1,3-Dichloropropene	14	U
108-10-1	4-Methyl-2-pentanone	14	U
108-88-3	Toluene	14	U
10061-02-6	trans-1,3-Dichloropropene	14	U
79-00-5	1,1,2-Trichloroethane	14	U
127-18-4	Tetrachloroethene	14	U
591-78-6	2-Hexanone	14	U
124-48-1	Dibromochloromethane	14	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW60

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Lab Sample ID: 00040049-004A

Lab File ID: A8871.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 27

Date Analyzed: 04/06/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	14	U
108-90-7	Chlorobenzene	14	U
100-41-4	Ethylbenzene	14	U
1330-20-7	Xylene (total)	14	U
100-42-5	Styrene	14	U
75-25-2	Bromoform	14	U
98-82-8	Isopropylbenzene	14	U
79-34-5	1,1,2,2-Tetrachloroethane	14	U
541-73-1	1,3-Dichlorobenzene	14	U
106-46-7	1,4-Dichlorobenzene	14	U
95-50-1	1,2-Dichlorobenzene	14	U
96-12-8	1,2-Dibromo-3-chloropropane	14	U
120-82-1	1,2,4-Trichlorobenzene	14	U

EPA SAMPLE NO.
FGW60

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-004A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8871.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: not dec. 27 Date Analyzed: 04/06/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

CONCENTRATION UNITS:

Number TICs found: 4 (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	Unknown siloxane	18.71	24	BJ
2. 000611-14-3	Benzene, 1-ethyl-2-methyl-	19.75	9	NJ
3. 000095-63-6	Benzene, 1,2,4-trimethyl-	20.97	8	NJ
4.	Unknown	23.31	8	BJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW61

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-005A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8888.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 23

Date Analyzed: 04/07/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND (µg/L or µg/Kg)	UG/KG	Q
75-71-8	Dichlorodifluoromethane	13	U
74-87-3	Chloromethane	13	U
75-01-4	Vinyl Chloride	13	U
74-83-9	Bromomethane	13	U
75-00-3	Chloroethane	13	U
75-69-4	Trichlorofluoromethane	13	U
75-35-4	1,1-Dichloroethene	13	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	13	U
67-64-1	Acetone	6	BJ
75-15-0	Carbon Disulfide	15	B
79-20-9	Methyl Acetate	13	U
75-09-2	Methylene Chloride	6	BJ
156-60-5	trans-1,2-Dichloroethene	13	U
1634-04-4	Methyl tert-Butyl Ether	13	U
75-34-3	1,1-Dichloroethane	13	U
156-59-2	cis-1,2-Dichloroethene	13	U
78-93-3	2-Butanone	13	U
67-66-3	Chloroform	1	J
71-55-6	1,1,1-Trichloroethane	13	U
110-82-7	Cyclohexane	13	U
56-23-5	Carbon Tetrachloride	13	U
71-43-2	Benzene	4	J
107-06-2	1,2-Dichloroethane	13	U
79-01-6	Trichloroethene	1	J
108-87-2	Methylcyclohexane	13	U
78-87-5	1,2-Dichloropropane	13	U
75-27-4	Bromodichloromethane	13	U
10061-01-5	cis-1,3-Dichloropropene	13	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	4	J
10061-02-6	trans-1,3-Dichloropropene	13	U
79-00-5	1,1,2-Trichloroethane	13	U
127-18-4	Tetrachloroethene	13	U
591-78-6	2-Hexanone	13	U
124-48-1	Dibromochloromethane	13	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW61

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 23

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (µL)

Lab Sample ID: 00040049-005A

Lab File ID: A8888.D

Date Received: 03/31/00

Date Analyzed: 04/07/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	13	U
108-90-7	Chlorobenzene	1	J
100-41-4	Ethylbenzene	13	U
1330-20-7	Xylene (total)	2	J
100-42-5	Styrene	13	U
75-25-2	Bromoform	13	U
98-82-8	Isopropylbenzene	6	J
79-34-5	1,1,2,2-Tetrachloroethane	13	U
541-73-1	1,3-Dichlorobenzene	13	U
106-46-7	1,4-Dichlorobenzene	13	U
95-50-1	1,2-Dichlorobenzene	13	U
96-12-8	1,2-Dibromo-3-chloropropane	13	U
120-82-1	1,2,4-Trichlorobenzene	13	U

1F

EPA SAMPLE NO.

FGW61

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-005A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8888.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: not dec. 23 Date Analyzed: 04/07/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

CONCENTRATION UNITS:

Number TICs found: 30 (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	Unknown (28)	5.00	13	J
2.	Unknown (1)	5.41	36	J
3.	Unknown siloxane	18.68	35	J
4.	Unknown (3)	20.79	23	J
5.	Unknown (4)	21.12	18	J
6.	Unknown (5)	21.45	68	J
7.	Unknown (6)	21.80	42	J
8.	Unknown (7)	22.36	99	J
9.	Unknown (8)	22.49	67	J
10.	Unknown (9)	22.77	240	J
11.	Unknown (10)	22.98	47	J
12.	Unknown (11)	23.29	28	BJ
13.	Unknown (12)	23.52	170	J
14.	Unknown (13)	23.93	40	J
15.	Unknown (14)	24.17	39	J
16.	Unknown (29)	24.44	12	J
17.	Unknown (15)	24.67	20	J
18.	Unknown (16)	24.98	110	J
19.	Unknown (17)	25.23	61	J
20.	Unknown (30)	25.61	10	J
21.	Unknown (18)	26.77	16	J
22.	Unknown (19)	28.22	30	J
23.	Unknown (20)	28.70	22	J
24.	Unknown (21)	28.94	33	J
25.	Unknown (22)	29.07	32	J
26.	Unknown (23)	29.64	22	J
27.	Unknown (24)	30.13	16	J
28.	Unknown (25)	30.39	100	J
29.	Unknown (27)	30.66	15	J
30.	Unknown (26)	30.81	21	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW62

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 1 (g/mL) G

Lab Sample ID: 00040049-006A

Lab File ID: B9554.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 32

Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	74	U
74-87-3	Chloromethane	74	U
75-01-4	Vinyl Chloride	74	U
74-83-9	Bromomethane	74	U
75-00-3	Chloroethane	74	U
75-69-4	Trichlorofluoromethane	74	U
75-35-4	1,1-Dichloroethene	74	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	74	U
67-64-1	Acetone	85	B
75-15-0	Carbon Disulfide	74	
79-20-9	Methyl Acetate	74	U
75-09-2	Methylene Chloride	160	B
156-60-5	trans-1,2-Dichloroethene	74	U
1634-04-4	Methyl tert-Butyl Ether	74	U
75-34-3	1,1-Dichloroethane	74	U
156-59-2	cis-1,2-Dichloroethene	74	U
78-93-3	2-Butanone	74	U
67-66-3	Chloroform	74	U
71-55-6	1,1,1-Trichloroethane	74	U
110-82-7	Cyclohexane	74	U
56-23-5	Carbon Tetrachloride	74	U
71-43-2	Benzene	55	J
107-06-2	1,2-Dichloroethane	74	U
79-01-6	Trichloroethene	74	U
108-87-2	Methylcyclohexane	80	
78-87-5	1,2-Dichloropropane	74	U
75-27-4	Bromodichloromethane	74	U
10061-01-5	cis-1,3-Dichloropropene	74	U
108-10-1	4-Methyl-2-pentanone	74	U
108-88-3	Toluene	74	U
10061-02-6	trans-1,3-Dichloropropene	74	U
79-00-5	1,1,2-Trichloroethane	74	U
127-18-4	Tetrachloroethene	74	U
591-78-6	2-Hexanone	74	U
124-48-1	Dibromochloromethane	74	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW62

b Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-006A

Sample wt/vol: 1 (g/mL) G

Lab File ID: B9554.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 32

Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	74	U
108-90-7	Chlorobenzene	74	U
100-41-4	Ethylbenzene	10	J
1330-20-7	Xylene (total)	44	J
100-42-5	Styrene	74	U
75-25-2	Bromoform	74	U
98-82-8	Isopropylbenzene	1900	E
79-34-5	1,1,2,2-Tetrachloroethane	74	U
541-73-1	1,3-Dichlorobenzene	74	U
106-46-7	1,4-Dichlorobenzene	74	U
95-50-1	1,2-Dichlorobenzene	74	U
96-12-8	1,2-Dibromo-3-chloropropane	74	U
120-82-1	1,2,4-Trichlorobenzene	74	U

EPA SAMPLE NO.
FGW62

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-006A

Sample wt/vol: 1 (g/mL) G Lab File ID: B9554.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: not dec. 32 Date Analyzed: 04/04/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 5.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 25 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	4.74	49	J
2.		Unknown (2)	12.38	78	J
3.		Unknown (3)	13.65	200	J
4.		Unknown (4)	14.10	68	J
5.		Unknown (5)	14.43	63	J
6.	006236-88-0	Cyclohexane, 1-ethyl-4-methyl-, tra	14.59	93	NJ
7.		Unknown (6)	14.88	540	J
8.		Unknown (24)	15.14	43	J
9.		Unknown (7)	16.03	61	J
10.		Unknown (8)	16.69	97	J
11.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.11	110	BNJ
12.		Unknown (10)	18.22	95	J
13.		Unknown (11)	18.45	120	J
14.		Unknown (12)	19.06	270	J
15.	023973-54-8	2-Methyl-1-propene, 3,3'-thiobis	19.80	250	NJ
16.		Unknown (14)	20.39	150	J
17.	000527-84-4	Benzene, 1-methyl-2-(1-methylethyl)	21.48	78	NJ
18.		Unknown (16)	22.08	470	J
19.		Unknown (17)	22.32	350	J
20.	065051-83-4	Benzene, (1-methyl-2-cyclopropen-1-	23.37	330	NJ
21.		Unknown (19)	23.96	110	J
22.		Unknown (20)	24.54	150	J
23.		Unknown (21)	24.83	380	J
24.	054340-86-2	Benzene, 4-(2-butenyl)-1,2-dimethyl,-(E)-	25.36	380	NJ
25.	000091-57-6	Naphthalene, 2-methyl-	27.13	160	NJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW62DL

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-006A

Sample wt/vol: 5 (g/mL) G

Lab File ID: B9634.D

Level: (low/med) MED

Date Received: 03/31/00

% Moisture: not dec. 32

Date Analyzed: 04/10/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 50.00

Soil Extract Volume: 5000 (µL)

Soil Aliquot Volu 100 (µL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	740	U
74-87-3	Chloromethane	740	U
75-01-4	Vinyl Chloride	740	U
74-83-9	Bromomethane	740	U
75-00-3	Chloroethane	740	U
75-69-4	Trichlorofluoromethane	740	U
75-35-4	1,1-Dichloroethene	740	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	740	U
67-64-1	Acetone	540	DBJ
75-15-0	Carbon Disulfide	740	U
79-20-9	Methyl Acetate	2500	DB
75-09-2	Methylene Chloride	170	DJ
156-60-5	trans-1,2-Dichloroethene	740	U
1634-04-4	Methyl tert-Butyl Ether	740	U
75-34-3	1,1-Dichloroethane	740	U
156-59-2	cis-1,2-Dichloroethene	740	U
78-93-3	2-Butanone	740	U
67-66-3	Chloroform	740	U
71-55-6	1,1,1-Trichloroethane	740	U
110-82-7	Cyclohexane	740	U
56-23-5	Carbon Tetrachloride	740	U
71-43-2	Benzene	79	DJ
107-06-2	1,2-Dichloroethane	740	U
79-01-6	Trichloroethene	740	U
108-87-2	Methylcyclohexane	100	DJ
78-87-5	1,2-Dichloropropane	740	U
75-27-4	Bromodichloromethane	740	U
10061-01-5	cis-1,3-Dichloropropene	740	U
108-10-1	4-Methyl-2-pentanone	740	U
108-88-3	Toluene	740	U
10061-02-6	trans-1,3-Dichloropropene	740	U
79-00-5	1,1,2-Trichloroethane	740	U
127-18-4	Tetrachloroethene	740	U
591-78-6	2-Hexanone	740	U
124-48-1	Dibromochloromethane	740	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW62DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) MED

% Moisture: not dec. 32

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: 5000 (µL)

Lab Sample ID: 00040049-006A

Lab File ID: B9634.D

Date Received: 03/31/00

Date Analyzed: 04/10/00

Dilution Factor 50.00

Soil Aliquot Volu 100 (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	740	U
108-90-7	Chlorobenzene	740	U
100-41-4	Ethylbenzene	740	U
1330-20-7	Xylene (total)	220	DJ
100-42-5	Styrene	740	U
75-25-2	Bromoform	740	U
98-82-8	Isopropylbenzene	2200	D
79-34-5	1,1,2,2-Tetrachloroethane	740	U
541-73-1	1,3-Dichlorobenzene	740	U
106-46-7	1,4-Dichlorobenzene	740	U
95-50-1	1,2-Dichlorobenzene	740	U
96-12-8	1,2-Dibromo-3-chloropropane	740	U
120-82-1	1,2,4-Trichlorobenzene	86	DJ

1F

EPA SAMPLE NO.

FGW62DL

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-006A

Sample wt/vol: 5 (g/mL) G Lab File ID: B9634.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: not dec. 32 Date Analyzed: 04/10/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 50.00

Soil Extract Volume: 5000 (µl) Soil Aliquot Volume: 100 (µL)

Number TICs found: 9 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	20.48	460	J
2.		Unknown (2)	21.52	710	J
3.		Unknown (3)	21.75	400	J
4.		Unknown (4)	22.24	440	J
5.		Unknown (5)	22.60	880	J
6.	000767-59-9	1H-Indene, 1-methyl-	23.28	480	NJ
7.		Unknown (7)	24.74	750	J
8.	054340-86-2	Benzene, 4-(2-butenyl)-1,2-dimethyl	25.27	1200	NJ
9.	000000-00-0	7H-BENZOCYCLOHEPTENE	27.02	690	NJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW63

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 41

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (µL)

Lab Sample ID: 00040049-007A

Lab File ID: A8872.D

Date Received: 03/31/00

Date Analyzed: 04/06/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	17	U
74-87-3	Chloromethane	17	U
75-01-4	Vinyl Chloride	17	U
74-83-9	Bromomethane	17	U
75-00-3	Chloroethane	17	U
75-69-4	Trichlorofluoromethane	17	U
75-35-4	1,1-Dichloroethene	17	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	17	U
67-64-1	Acetone	82	B
75-15-0	Carbon Disulfide	58	B
79-20-9	Methyl Acetate	17	U
75-09-2	Methylene Chloride	25	B
156-60-5	trans-1,2-Dichloroethene	17	U
1634-04-4	Methyl tert-Butyl Ether	17	U
75-34-3	1,1-Dichloroethane	17	U
156-59-2	cis-1,2-Dichloroethene	17	U
78-93-3	2-Butanone	16	BJ
67-66-3	Chloroform	17	U
71-55-6	1,1,1-Trichloroethane	17	U
110-82-7	Cyclohexane	4	J
56-23-5	Carbon Tetrachloride	17	U
71-43-2	Benzene	7	J
107-06-2	1,2-Dichloroethane	17	U
79-01-6	Trichloroethene	2	J
108-87-2	Methylcyclohexane	6	J
78-87-5	1,2-Dichloropropane	17	U
75-27-4	Bromodichloromethane	17	U
10061-01-5	cis-1,3-Dichloropropene	17	U
108-10-1	4-Methyl-2-pentanone	17	U
108-88-3	Toluene	17	U
10061-02-6	trans-1,3-Dichloropropene	17	U
79-00-5	1,1,2-Trichloroethane	17	U
127-18-4	Tetrachloroethene	17	U
591-78-6	2-Hexanone	17	U
124-48-1	Dibromochloromethane	17	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW63

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 41

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (µL)

Lab Sample ID: 00040049-007A

Lab File ID: A8872.D

Date Received: 03/31/00

Date Analyzed: 04/06/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	17	U
108-90-7	Chlorobenzene	17	U
100-41-4	Ethylbenzene	17	U
1330-20-7	Xylene (total)	48	
100-42-5	Styrene	17	U
75-25-2	Bromoform	17	U
98-82-8	Isopropylbenzene	100	
79-34-5	1,1,2,2-Tetrachloroethane	17	U
541-73-1	1,3-Dichlorobenzene	3	J
106-46-7	1,4-Dichlorobenzene	17	U
95-50-1	1,2-Dichlorobenzene	17	U
96-12-8	1,2-Dibromo-3-chloropropane	17	U
120-82-1	1,2,4-Trichlorobenzene	17	U

1F

EPA SAMPLE NO.

FGW63

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-007A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8872.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: not dec. 41 Date Analyzed: 04/06/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 24 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	5.44	9	J
2.	000108-20-3	Propane, 2,2'-oxybis-	8.10	15	NJ
3.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.71	41	NJ
4.		Unknown (5)	19.75	21	J
5.		Unknown (6)	19.95	22	J
6.		Unknown (7)	20.55	23	J
7.	000620-14-4	Benzene, 1-ethyl-3-methyl-	20.97	41	NJ
8.		Unknown (9)	21.47	23	J
9.	000099-87-6	Benzene, 1-methyl-4-(1-methylethyl)	21.67	11	NJ
10.		Unknown (11)	22.38	13	J
11.		Unknown (12)	22.56	33	J
12.	000091-17-8	Naphthalene, decahydro-	22.69	20	NJ
13.		Unknown (14)	22.78	32	J
14.		Unknown (15)	23.31	39	BJ
15.		Unknown (16)	23.54	17	J
16.		Unknown (17)	23.74	12	J
17.		Unknown (18)	24.18	18	J
18.	002958-76-1	Naphthalene, decahydro-2-methyl-	24.70	11	NJ
19.		Unknown (20)	24.90	10	J
20.		Unknown (21)	27.46	36	J
21.		Unknown (22)	27.69	24	J
22.		Unknown (23)	27.96	110	J
23.		Unknown (24)	28.26	11	J
24.	000090-12-0	Naphthalene, 1-methyl-	30.81	23	NJ

1A

EPA SAMPLE NO.

FGW66

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-008A

Sample wt/vol: 1 (g/mL) G

Lab File ID: B9557.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 53

Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	110	U
74-87-3	Chloromethane	110	U
75-01-4	Vinyl Chloride	110	U
74-83-9	Bromomethane	110	U
75-00-3	Chloroethane	110	U
75-69-4	Trichlorofluoromethane	110	U
75-35-4	1,1-Dichloroethene	110	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	110	U
67-64-1	Acetone	110	U
75-15-0	Carbon Disulfide	310	
79-20-9	Methyl Acetate	110	U
75-09-2	Methylene Chloride	280	B
156-60-5	trans-1,2-Dichloroethene	110	U
1634-04-4	Methyl tert-Butyl Ether	110	U
75-34-3	1,1-Dichloroethane	110	U
156-59-2	cis-1,2-Dichloroethene	110	U
78-93-3	2-Butanone	110	U
67-66-3	Chloroform	110	U
71-55-6	1,1,1-Trichloroethane	110	U
110-82-7	Cyclohexane	110	U
56-23-5	Carbon Tetrachloride	110	U
71-43-2	Benzene	450	
107-06-2	1,2-Dichloroethane	110	U
79-01-6	Trichloroethene	110	U
108-87-2	Methylcyclohexane	390	
78-87-5	1,2-Dichloropropane	110	U
75-27-4	Bromodichloromethane	110	U
10061-01-5	cis-1,3-Dichloropropene	110	U
108-10-1	4-Methyl-2-pentanone	110	U
108-88-3	Toluene	950	
10061-02-6	trans-1,3-Dichloropropene	110	U
79-00-5	1,1,2-Trichloroethane	110	U
127-18-4	Tetrachloroethene	110	U
591-78-6	2-Hexanone	110	U
124-48-1	Dibromochloromethane	110	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW66

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-008A

Sample wt/vol: 1 (g/mL) G

Lab File ID: B9557.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 53

Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	110	U
108-90-7	Chlorobenzene	72	J
100-41-4	Ethylbenzene	360	
1330-20-7	Xylene (total)	1400	
100-42-5	Styrene	86	J
75-25-2	Bromoform	110	U
98-82-8	Isopropylbenzene	5000	E
79-34-5	1,1,2,2-Tetrachloroethane	110	U
541-73-1	1,3-Dichlorobenzene	1300	
106-46-7	1,4-Dichlorobenzene	530	
95-50-1	1,2-Dichlorobenzene	110	U
96-12-8	1,2-Dibromo-3-chloropropane	110	U
120-82-1	1,2,4-Trichlorobenzene	110	U

1F

EPA SAMPLE NO.

FGW66

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-008A

Sample wt/vol: 1 (g/mL) G Lab File ID: B9557.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: not dec. 53 Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 5.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

CONCENTRATION UNITS:

Number TICs found: 30 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	2.24	550	J
2.		Unknown (2)	5.04	480	J
3.		Unknown (3)	5.42	660	J
4.		Unknown (4)	5.83	300	J
5.		Unknown (5)	8.04	330	J
6.	004914-91-4	2-Pentene, 3,4-dimethyl-, (Z)-	10.07	130	NJ
7.		Unknown (6)	10.86	340	J
8.		Unknown (7)	11.13	210	J
9.	000598-96-9	2-Pentene, 3,4,4-trimethyl-	11.64	980	NJ
10.	000000-00-0	2-HEXENE, 3,4-DIMETHYL-	12.15	270	NJ
11.	000565-77-5	2-Pentene, 2,3,4-trimethyl-	12.41	940	NJ
12.		Unknown (11)	13.04	230	J
13.		Unknown (12)	13.20	240	J
14.		Unknown (13)	13.66	390	J
15.		Unknown (14)	14.91	750	J
16.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.12	160	BNJ
17.	000611-14-3	Benzene, 1-ethyl-2-methyl-	18.44	140	NJ
18.		Unknown (16)	19.08	170	J
19.		Unknown (17)	19.36	220	J
20.	000611-15-4	Benzene, 1-ethenyl-2-methyl-	20.31	130	NJ
21.		Unknown (18)	20.57	280	J
22.	000095-13-6	1H-Indene	21.00	810	NJ
23.		Unknown (20)	22.73	250	J
24.	000767-59-9	1H-Indene, 1-methyl-	23.37	260	NJ
25.	065051-83-4	Benzene, (1-methyl-2-cyclopropen-1-	23.59	180	NJ
26.		Unknown (23)	24.83	290	J
27.	054340-86-2	Benzene, 4-(2-butenyl)-1,2-dimethyl	25.36	180	NJ
28.		Unknown (25)	26.38	150	J
29.	000091-57-6	Naphthalene, 2-methyl-	26.74	170	NJ
30.	000090-12-0	Naphthalene, 1-methyl-	27.13	200	NJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW66DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-008A

Sample wt/vol: 5 (g/mL) G

Lab File ID: B9635.D

Level: (low/med) MED

Date Received: 03/31/00

% Moisture: not dec. 53

Date Analyzed: 04/10/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 50.00

Soil Extract Volume: 5000 (µL)

Soil Aliquot Volu 100 (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	1100	U
74-87-3	Chloromethane	1100	U
75-01-4	Vinyl Chloride	1100	U
74-83-9	Bromomethane	1100	U
75-00-3	Chloroethane	1100	U
75-69-4	Trichlorofluoromethane	1100	U
75-35-4	1,1-Dichloroethene	1100	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	1100	U
67-64-1	Acetone	1100	U
75-15-0	Carbon Disulfide	1100	U
79-20-9	Methyl Acetate	7200	DB
75-09-2	Methylene Chloride	160	DJ
156-60-5	trans-1,2-Dichloroethene	1100	U
1634-04-4	Methyl tert-Butyl Ether	1100	U
75-34-3	1,1-Dichloroethane	1100	U
156-59-2	cis-1,2-Dichloroethene	1100	U
78-93-3	2-Butanone	1100	U
67-66-3	Chloroform	1100	U
71-55-6	1,1,1-Trichloroethane	1100	U
110-82-7	Cyclohexane	1100	U
56-23-5	Carbon Tetrachloride	1100	U
71-43-2	Benzene	220	DJ
107-06-2	1,2-Dichloroethane	1100	U
79-01-6	Trichloroethene	1100	U
108-87-2	Methylcyclohexane	190	DJ
78-87-5	1,2-Dichloropropane	1100	U
75-27-4	Bromodichloromethane	1100	U
10061-01-5	cis-1,3-Dichloropropene	1100	U
108-10-1	4-Methyl-2-pentanone	1100	U
108-88-3	Toluene	550	DJ
10061-02-6	trans-1,3-Dichloropropene	1100	U
79-00-5	1,1,2-Trichloroethane	1100	U
127-18-4	Tetrachloroethene	1100	U
591-78-6	2-Hexanone	1100	U
124-48-1	Dibromochloromethane	1100	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW66DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-008A

Sample wt/vol: 5 (g/mL) G

Lab File ID: B9635.D

Level: (low/med) MED

Date Received: 03/31/00

% Moisture: not dec. 53

Date Analyzed: 04/10/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 50.00

Soil Extract Volume: 5000 (µL)

Soil Aliquot Volu 100 (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	1100	U
108-90-7	Chlorobenzene	1100	U
100-41-4	Ethylbenzene	250	DJ
1330-20-7	Xylene (total)	930	DJ
100-42-5	Styrene	1100	U
75-25-2	Bromoform	1100	U
98-82-8	Isopropylbenzene	3900	D
79-34-5	1,1,2,2-Tetrachloroethane	1100	U
541-73-1	1,3-Dichlorobenzene	980	DJ
106-46-7	1,4-Dichlorobenzene	430	DJ
95-50-1	1,2-Dichlorobenzene	1100	U
96-12-8	1,2-Dibromo-3-chloropropane	1100	U
120-82-1	1,2,4-Trichlorobenzene	1100	U

1F

EPA SAMPLE NO.

FGW66DL

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-008A

Sample wt/vol: 5 (g/mL) G Lab File ID: B9635.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: not dec. 53 Date Analyzed: 04/10/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 50.00

Soil Extract Volume: 5000 (µl) Soil Aliquot Volume: 100 (µL)

Number TICs found: 5 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000107-40-4	2-Pentene, 2,4,4-trimethyl-	11.55	700	NJ
2.	000565-77-5	2-Pentene, 2,3,4-trimethyl-	12.33	860	NJ
3.		Unknown (3)	13.59	730	J
4.		Unknown (4)	14.83	1400	J
5.		Unknown (5)	22.61	640	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW67

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-009A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8873.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 45

Date Analyzed: 04/06/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	18	U
74-87-3	Chloromethane	18	U
75-01-4	Vinyl Chloride	18	U
74-83-9	Bromomethane	18	U
75-00-3	Chloroethane	18	U
75-69-4	Trichlorofluoromethane	18	U
75-35-4	1,1-Dichloroethene	18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	18	U
67-64-1	Acetone	50	B
75-15-0	Carbon Disulfide	54	B
79-20-9	Methyl Acetate	18	U
75-09-2	Methylene Chloride	29	B
156-60-5	trans-1,2-Dichloroethene	18	U
1634-04-4	Methyl tert-Butyl Ether	18	U
75-34-3	1,1-Dichloroethane	18	U
156-59-2	cis-1,2-Dichloroethene	18	U
78-93-3	2-Butanone	7	BJ
67-66-3	Chloroform	18	U
71-55-6	1,1,1-Trichloroethane	18	U
110-82-7	Cyclohexane	18	U
56-23-5	Carbon Tetrachloride	18	U
71-43-2	Benzene	3	J
107-06-2	1,2-Dichloroethane	18	U
79-01-6	Trichloroethene	2	J
108-87-2	Methylcyclohexane	7	J
78-87-5	1,2-Dichloropropane	18	U
75-27-4	Bromodichloromethane	18	U
10061-01-5	cis-1,3-Dichloropropene	18	U
108-10-1	4-Methyl-2-pentanone	18	U
108-88-3	Toluene	2	J
10061-02-6	trans-1,3-Dichloropropene	18	U
79-00-5	1,1,2-Trichloroethane	18	U
127-18-4	Tetrachloroethene	18	U
591-78-6	2-Hexanone	18	U
124-48-1	Dibromochloromethane	18	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW67

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-009A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8873.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 45

Date Analyzed: 04/06/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	18	U
108-90-7	Chlorobenzene	16	J
100-41-4	Ethylbenzene	4	J
1330-20-7	Xylene (total)	22	
100-42-5	Styrene	18	U
75-25-2	Bromoform	18	U
98-82-8	Isopropylbenzene	26	
79-34-5	1,1,2,2-Tetrachloroethane	18	U
541-73-1	1,3-Dichlorobenzene	29	
106-46-7	1,4-Dichlorobenzene	5	J
95-50-1	1,2-Dichlorobenzene	18	U
96-12-8	1,2-Dibromo-3-chloropropane	18	U
120-82-1	1,2,4-Trichlorobenzene	18	U

1F

EPA SAMPLE NO.

FGW67

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-009A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8873.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: not dec. 45 Date Analyzed: 04/06/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

CONCENTRATION UNITS:

Number TICs found: 26 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	5.44	50	J
2.		Unknown (2)	17.00	14	J
3.		Unknown (3)	17.98	12	J
4.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.70	59	NJ
5.		Unknown (5)	19.30	11	J
6.		Unknown (6)	20.57	45	J
7.		Unknown (7)	21.46	48	J
8.		Unknown (8)	21.66	27	J
9.		Unknown (9)	22.38	48	J
10.		Unknown (10)	22.77	180	J
11.		Unknown (11)	23.13	56	J
12.		Unknown (12)	23.53	67	J
13.		Unknown (13)	23.74	80	J
14.		Unknown (14)	24.47	31	J
15.	000000-00-0	TRANS-ANTI-1-METHYL-DECAHYDRONA	24.69	22	NJ
16.		Unknown (16)	24.89	53	J
17.		Unknown (17)	25.29	17	J
18.	000767-59-9	1H-Indene, 1-methyl-	25.94	11	NJ
19.		Unknown (19)	26.49	14	J
20.		Unknown (20)	27.30	16	J
21.		Unknown (21)	27.46	34	J
22.		Unknown (22)	27.68	25	J
23.		Unknown (23)	27.96	93	J
24.		Unknown (24)	29.13	14	J
25.		Unknown (26)	30.41	10	J
26.	000090-12-0	Naphthalene, 1-methyl-	30.81	26	NJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW68

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Lab Sample ID: 00040049-010A

Lab File ID: B9636.D

Level: (low/med) MED

Date Received: 03/31/00

% Moisture: not dec. 53

Date Analyzed: 04/10/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 50.00

Soil Extract Volume: 5000 (µL)

Soil Aliquot Volu 100 (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	1100	U
74-87-3	Chloromethane	1100	U
75-01-4	Vinyl Chloride	1100	U
74-83-9	Bromomethane	1100	U
75-00-3	Chloroethane	1100	U
75-69-4	Trichlorofluoromethane	1100	U
75-35-4	1,1-Dichloroethene	1100	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	1100	U
67-64-1	Acetone	510	BJ
75-15-0	Carbon Disulfide	1100	U
79-20-9	Methyl Acetate	8700	B
75-09-2	Methylene Chloride	230	J
156-60-5	trans-1,2-Dichloroethene	1100	U
1634-04-4	Methyl tert-Butyl Ether	1100	U
75-34-3	1,1-Dichloroethane	1100	U
156-59-2	cis-1,2-Dichloroethene	1100	U
78-93-3	2-Butanone	1100	U
67-66-3	Chloroform	1100	U
71-55-6	1,1,1-Trichloroethane	1100	U
110-82-7	Cyclohexane	1100	U
56-23-5	Carbon Tetrachloride	1100	U
71-43-2	Benzene	380	J
107-06-2	1,2-Dichloroethane	1100	U
79-01-6	Trichloroethene	1100	U
108-87-2	Methylcyclohexane	620	J
78-87-5	1,2-Dichloropropane	1100	U
75-27-4	Bromodichloromethane	1100	U
10061-01-5	cis-1,3-Dichloropropene	1100	U
108-10-1	4-Methyl-2-pentanone	1100	U
108-88-3	Toluene	660	J
10061-02-6	trans-1,3-Dichloropropene	1100	U
79-00-5	1,1,2-Trichloroethane	1100	U
127-18-4	Tetrachloroethene	1100	U
591-78-6	2-Hexanone	1100	U
124-48-1	Dibromochloromethane	1100	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW68

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-010A

Sample wt/vol: 5 (g/mL) G

Lab File ID: B9636.D

Level: (low/med) MED

Date Received: 03/31/00

% Moisture: not dec. 53

Date Analyzed: 04/10/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 50.00

Soil Extract Volume: 5000 (µL)

Soil Aliquot Volu 100 (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	1100	U
108-90-7	Chlorobenzene	2200	
100-41-4	Ethylbenzene	650	J
1330-20-7	Xylene (total)	3500	
100-42-5	Styrene	1100	U
75-25-2	Bromoform	1100	U
98-82-8	Isopropylbenzene	9600	
79-34-5	1,1,2,2-Tetrachloroethane	1100	U
541-73-1	1,3-Dichlorobenzene	30000	E
106-46-7	1,4-Dichlorobenzene	3700	
95-50-1	1,2-Dichlorobenzene	1100	U
96-12-8	1,2-Dibromo-3-chloropropane	1100	U
120-82-1	1,2,4-Trichlorobenzene	1100	U

EPA SAMPLE NO.
FGW68

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-010A

Sample wt/vol: 5 (g/mL) G Lab File ID: B9636.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: not dec. 53 Date Analyzed: 04/10/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 50.00

Soil Extract Volume: 5000 (µl) Soil Aliquot Volume: 100 (µL)

Number TICs found: 9 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	5.29	2300	J
2.		Unknown (2)	13.58	530	J
3.		Unknown (3)	19.01	1100	J
4.		Unknown (4)	20.52	830	J
5.	000108-70-3	Benzene, 1,3,5-trichloro-	22.67	970	NJ
6.		Unknown (6)	24.75	2100	J
7.	054340-86-2	Benzene, 4-(2-butenyl)-1,2-dimethyl	25.28	550	NJ
8.	000090-12-0	Naphthalene, 1-methyl-	26.66	660	NJ
9.	063927-06-0	VINYLINDENE	27.04	560	NJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW68DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) MED

% Moisture: not dec. 53

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: 5000 (µL)

Lab Sample ID: 00040049-010A

Lab File ID: B9639.D

Date Received: 03/31/00

Date Analyzed: 04/10/00

Dilution Factor 100.00

Soil Aliquot Volu 50 (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	2100	U
74-87-3	Chloromethane	2100	U
75-01-4	Vinyl Chloride	2100	U
74-83-9	Bromomethane	2100	U
75-00-3	Chloroethane	2100	U
75-69-4	Trichlorofluoromethane	2100	U
75-35-4	1,1-Dichloroethene	2100	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	2100	U
67-64-1	Acetone	980	DBJ
75-15-0	Carbon Disulfide	2100	U
79-20-9	Methyl Acetate	5800	DB
75-09-2	Methylene Chloride	340	DJ
156-60-5	trans-1,2-Dichloroethene	2100	U
1634-04-4	Methyl tert-Butyl Ether	2100	U
75-34-3	1,1-Dichloroethane	2100	U
156-59-2	cis-1,2-Dichloroethene	2100	U
78-93-3	2-Butanone	2100	U
67-66-3	Chloroform	2100	U
71-55-6	1,1,1-Trichloroethane	2100	U
110-82-7	Cyclohexane	2100	U
56-23-5	Carbon Tetrachloride	2100	U
71-43-2	Benzene	370	DJ
107-06-2	1,2-Dichloroethane	2100	U
79-01-6	Trichloroethene	2100	U
108-87-2	Methylcyclohexane	520	DJ
78-87-5	1,2-Dichloropropane	2100	U
75-27-4	Bromodichloromethane	2100	U
10061-01-5	cis-1,3-Dichloropropene	2100	U
108-10-1	4-Methyl-2-pentanone	2100	U
108-88-3	Toluene	680	DJ
10061-02-6	trans-1,3-Dichloropropene	2100	U
79-00-5	1,1,2-Trichloroethane	2100	U
127-18-4	Tetrachloroethene	2100	U
591-78-6	2-Hexanone	2100	U
124-48-1	Dibromochloromethane	2100	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW68DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-010A

Sample wt/vol: 5 (g/mL) G

Lab File ID: B9639.D

Level: (low/med) MED

Date Received: 03/31/00

% Moisture: not dec. 53

Date Analyzed: 04/10/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 100.00

Soil Extract Volume: 5000 (µL)

Soil Aliquot Volu 50 (µL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	2100	U
108-90-7	Chlorobenzene	2200	D
100-41-4	Ethylbenzene	610	DJ
1330-20-7	Xylene (total)	3500	D
100-42-5	Styrene	2100	U
75-25-2	Bromoform	2100	U
98-82-8	Isopropylbenzene	9700	D
79-34-5	1,1,2,2-Tetrachloroethane	2100	U
541-73-1	1,3-Dichlorobenzene	33000	D
106-46-7	1,4-Dichlorobenzene	4200	D
95-50-1	1,2-Dichlorobenzene	2100	U
96-12-8	1,2-Dibromo-3-chloropropane	2100	U
120-82-1	1,2,4-Trichlorobenzene	2100	U

EPA SAMPLE NO.
FGW68DL

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-010A

Sample wt/vol: 5 (g/mL) G Lab File ID: B9639.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: not dec. 53 Date Analyzed: 04/10/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 100.00

Soil Extract Volume: 5000 (µl) Soil Aliquot Volume: 50 (µL)

CONCENTRATION UNITS:

Number TICs found: 8 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	5.14	2000	J
2.		Unknown (2)	12.16	1400	J
3.		Unknown (3)	13.87	2000	J
4.	000098-83-9	Benzene, (1-methylethenyl)-	18.82	1300	NJ
5.	000108-70-3	Benzene, 1,3,5-trichloro-	22.45	1300	NJ
6.		Unknown (6)	24.54	3000	J
7.	000090-12-0	Naphthalene, 1-methyl-	26.44	1400	NJ
8.	000091-57-6	Naphthalene, 2-methyl-	26.81	1500	NJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW69

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 36

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (µL)

Lab Sample ID: 00040049-011A

Lab File ID: A8889.D

Date Received: 03/31/00

Date Analyzed: 04/07/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	16	U
74-87-3	Chloromethane	16	U
75-01-4	Vinyl Chloride	16	U
74-83-9	Bromomethane	16	U
75-00-3	Chloroethane	16	U
75-69-4	Trichlorofluoromethane	16	U
75-35-4	1,1-Dichloroethene	16	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	16	U
67-64-1	Acetone	55	B
75-15-0	Carbon Disulfide	63	B
79-20-9	Methyl Acetate	16	U
75-09-2	Methylene Chloride	10	BJ
156-60-5	trans-1,2-Dichloroethene	16	U
1634-04-4	Methyl tert-Butyl Ether	16	U
75-34-3	1,1-Dichloroethane	16	U
156-59-2	cis-1,2-Dichloroethene	16	U
78-93-3	2-Butanone	11	J
67-66-3	Chloroform	16	U
71-55-6	1,1,1-Trichloroethane	16	U
110-82-7	Cyclohexane	2	J
56-23-5	Carbon Tetrachloride	16	U
71-43-2	Benzene	2	J
107-06-2	1,2-Dichloroethane	16	U
79-01-6	Trichloroethene	16	U
108-87-2	Methylcyclohexane	3	J
78-87-5	1,2-Dichloropropane	16	U
75-27-4	Bromodichloromethane	16	U
10061-01-5	cis-1,3-Dichloropropene	16	U
108-10-1	4-Methyl-2-pentanone	16	U
108-88-3	Toluene	16	U
10061-02-6	trans-1,3-Dichloropropene	16	U
79-00-5	1,1,2-Trichloroethane	16	U
127-18-4	Tetrachloroethene	16	U
591-78-6	2-Hexanone	16	U
124-48-1	Dibromochloromethane	16	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW69

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-011A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8889.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 36

Date Analyzed: 04/07/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	16	U
108-90-7	Chlorobenzene	16	U
100-41-4	Ethylbenzene	16	U
1330-20-7	Xylene (total)	46	
100-42-5	Styrene	16	U
75-25-2	Bromoform	16	U
98-82-8	Isopropylbenzene	48	
79-34-5	1,1,2,2-Tetrachloroethane	16	U
541-73-1	1,3-Dichlorobenzene	5	J
106-46-7	1,4-Dichlorobenzene	2	J
95-50-1	1,2-Dichlorobenzene	16	U
96-12-8	1,2-Dibromo-3-chloropropane	16	U
120-82-1	1,2,4-Trichlorobenzene	16	U

EPA SAMPLE NO.
FGW69

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-011A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8889.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: not dec. 36 Date Analyzed: 04/07/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

CONCENTRATION UNITS:

Number TICs found: 19 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	5.41	9	J
2.	000108-20-3	Propane, 2,2'-oxybis-	8.10	13	NJ
3.	000625-80-9	Propane, 2,2'-thiobis-	13.80	15	NJ
4.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.68	30	BNJ
5.		Unknown (5)	19.72	19	J
6.	000095-49-8	Benzene, 1-chloro-2-methyl-	19.89	12	NJ
7.		Unknown (7)	21.48	14	J
8.		Unknown (8)	22.54	40	J
9.		Unknown (9)	22.77	14	J
10.		Unknown (10)	23.09	9	J
11.		Unknown (11)	23.29	31	BJ
12.		Unknown (12)	23.51	10	J
13.		Unknown (13)	23.82	17	J
14.	002958-76-1	Naphthalene, decahydro-2-methyl-	24.15	14	NJ
15.		Unknown (15)	26.48	8	J
16.		Unknown (16)	27.44	19	J
17.		Unknown (17)	27.67	12	J
18.		Unknown (18)	27.94	41	J
19.		Unknown (19)	30.40	15	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW71

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-012A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8874.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 23

Date Analyzed: 04/06/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	13	U
74-87-3	Chloromethane	13	U
75-01-4	Vinyl Chloride	13	U
74-83-9	Bromomethane	13	U
75-00-3	Chloroethane	13	U
75-69-4	Trichlorofluoromethane	13	U
75-35-4	1,1-Dichloroethene	13	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	13	U
67-64-1	Acetone	8	BJ
75-15-0	Carbon Disulfide	9	BJ
79-20-9	Methyl Acetate	13	U
75-09-2	Methylene Chloride	24	B
156-60-5	trans-1,2-Dichloroethene	13	U
1634-04-4	Methyl tert-Butyl Ether	13	U
75-34-3	1,1-Dichloroethane	13	U
156-59-2	cis-1,2-Dichloroethene	13	U
78-93-3	2-Butanone	13	U
67-66-3	Chloroform	13	U
71-55-6	1,1,1-Trichloroethane	13	U
110-82-7	Cyclohexane	13	U
56-23-5	Carbon Tetrachloride	13	U
71-43-2	Benzene	13	U
107-06-2	1,2-Dichloroethane	13	U
79-01-6	Trichloroethene	13	U
108-87-2	Methylcyclohexane	13	U
78-87-5	1,2-Dichloropropane	13	U
75-27-4	Bromodichloromethane	13	U
10061-01-5	cis-1,3-Dichloropropene	13	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	13	U
10061-02-6	trans-1,3-Dichloropropene	13	U
79-00-5	1,1,2-Trichloroethane	13	U
127-18-4	Tetrachloroethene	13	U
591-78-6	2-Hexanone	13	U
124-48-1	Dibromochloromethane	13	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW71

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGA73

Matrix: (soil/water) SOIL

Lab Sample ID: 00040049-012A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8874.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 23

Date Analyzed: 04/06/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	13	U
108-90-7	Chlorobenzene	13	U
100-41-4	Ethylbenzene	13	U
1330-20-7	Xylene (total)	13	U
100-42-5	Styrene	13	U
75-25-2	Bromoform	13	U
98-82-8	Isopropylbenzene	13	U
79-34-5	1,1,2,2-Tetrachloroethane	13	U
541-73-1	1,3-Dichlorobenzene	7	J
106-46-7	1,4-Dichlorobenzene	2	J
95-50-1	1,2-Dichlorobenzene	13	U
96-12-8	1,2-Dibromo-3-chloropropane	13	U
120-82-1	1,2,4-Trichlorobenzene	13	U

1F

EPA SAMPLE NO.

FGW71

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-012A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8874.D ✓

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: not dec. 23 Date Analyzed: 04/06/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 2 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown siloxane	18.70	14	BJ
2.		Unknown	23.31	11	BJ

EPA SAMPLE NO.

FGA73

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-001B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1755.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 23 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/14/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.8 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	430	U
108-95-2	Phenol	430	U
111-44-4	bis(2-Chloroethyl)ether	430	U
95-57-8	2-Chlorophenol	430	U
95-48-7	2-Methylphenol	430	U
108-60-1	2,2´-oxybis(1-Chloropropane)	430	U
98-86-2	Acetophenone	430	U
106-44-5	4-Methylphenol	430	U
621-64-7	N-Nitroso-di-n-propylamine	430	U
67-72-1	Hexachloroethane	270	J
98-95-3	Nitrobenzene	430	U
78-59-1	Isophorone	430	U
88-75-5	2-Nitrophenol	430	U
105-67-9	2,4-Dimethylphenol	430	U
111-91-1	bis(2-Chloroethoxy)methane	430	U
120-83-2	2,4-Dichlorophenol	430	U
91-20-3	Naphthalene	70	J
106-47-8	4-Chloroaniline	430	U
87-68-3	Hexachlorobutadiene	1400	
105-60-2	Caprolactam	430	U
59-50-7	4-Chloro-3-methylphenol	430	U
91-57-6	2-Methylnaphthalene	430	U
77-47-4	Hexachlorocyclopentadiene	430	U
88-06-2	2,4,6-Trichlorophenol	430	U
95-95-4	2,4,5-Trichlorophenol	1100	U
92-52-4	1,1´-Biphenyl	58	J
91-58-7	2-Chloronaphthalene	430	U
88-74-4	2-Nitroaniline	1100	U
131-11-3	Dimethylphthalate	430	U
606-20-2	2,6-Dinitrotoluene	430	U
208-96-8	Acenaphthylene	180	J
99-09-2	3-Nitroaniline	1100	U
83-32-9	Acenaphthene	77	J
51-28-5	2,4-Dinitrophenol	1100	U
100-02-7	4-Nitrophenol	1100	U

EPA SAMPLE NO.

FGA73

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-001B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1755.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 23 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/14/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.8 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	430	U
121-14-2	2,4-Dinitrotoluene	430	U
84-66-2	Diethylphthalate	430	U
86-73-7	Fluorene	56	J
7005-72-3	4-Chlorophenyl-phenylether	430	U
100-01-6	4-Nitroaniline	1100	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
86-30-6	N-Nitrosodiphenylamine (1)	430	U
101-55-3	4-Bromophenyl-phenylether	430	U
118-74-1	Hexachlorobenzene	3100	
1912-24-9	Atrazine	430	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	300	J
120-12-7	Anthracene	52	J
86-74-8	Carbazole	430	U
84-74-2	Di-n-butylphthalate	430	U
206-44-0	Fluoranthene	570	
129-00-0	Pyrene	1200	
85-68-7	Butylbenzylphthalate	430	U
91-94-1	3,3'-Dichlorobenzidine	430	U
56-55-3	Benzo(a)anthracene	58	J
218-01-9	Chrysene	96	J
117-81-7	bis(2-Ethylhexyl)phthalate	110	BJ
117-84-0	Di-n-octylphthalate	430	U
205-99-2	Benzo(b)fluoranthene	93	J
207-08-9	Benzo(k)fluoranthene	73	J
50-32-8	Benzo(a)pyrene	190	J
193-39-5	Indeno(1,2,3-cd)pyrene	170	J
53-70-3	Dibenzo(a,h)anthracene	430	U
191-24-2	Benzo(g,h,i)perylene	520	

EPA SAMPLE NO.

FGA73

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-001B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1755.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 23 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/14/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.8 Extraction: (Type SONC

Number TICs found: 25 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	6.12	200	BJ
2.		Unknown (25)	6.65	130	BJ
3.	000541-73-1	Benzene, 1,3-dichloro-	7.09	340	NJ
4.		Unknown (3)	7.29	100	J
5.	000624-65-7	1-Propyne, 3-chloro-	12.67	400	NJ
6.		Unknown (5)	14.26	110	J
7.		Unknown (6)	15.25	110	J
8.	000101-76-8	Benzene, 1,1'-methylenebis(4-chloro	16.86	310	NJ
9.		Unknown PAH (8)	17.52	180	J
10.	000090-98-2	Methanone, bis(4-chlorophenyl)-	17.81	210	NJ
11.		Unknown (10)	18.24	130	J
12.		Unknown PAH (11)	18.71	160	J
13.		Unknown (12)	18.81	130	J
14.		Unknown (13)	18.89	140	J
15.		Unknown (14)	19.19	93	J
16.		Unknown (15)	19.41	250	J
17.		Unknown (16)	19.70	110	J
18.		Unknown (17)	19.81	180	J
19.		Unknown (18)	20.34	93	J
20.		Unknown (19)	20.78	340	J
21.		Unknown (20)	22.62	140	J
22.		Unknown (21)	25.19	160	J
23.		Unknown PAH (22)	25.32	240	J
24.		Unknown (23)	26.07	290	J
25.		Unknown (24)	29.32	160	J

1C

EPA SAMPLE NO.

FGW58

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-002D

Sample wt/vol: 30 (g/mL) G Lab File ID: I1756.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 38 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/14/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.4 Extraction: (Type SONC

CONCENTRATION UNITS:

CAS NO.	COMPOUND (µg/L or µg/Kg)	UG/KG	Q
100-52-7	Benzaldehyde	43	J
108-95-2	Phenol	530	U
111-44-4	bis(2-Chloroethyl)ether	530	U
95-57-8	2-Chlorophenol	530	U
95-48-7	2-Methylphenol	530	U
108-60-1	2,2´-oxybis(1-Chloropropane)	530	U
98-86-2	Acetophenone	98	J
106-44-5	4-Methylphenol	530	U
621-64-7	N-Nitroso-di-n-propylamine	530	U
67-72-1	Hexachloroethane	530	U
98-95-3	Nitrobenzene	530	U
78-59-1	Isophorone	530	U
88-75-5	2-Nitrophenol	530	U
105-67-9	2,4-Dimethylphenol	530	U
111-91-1	bis(2-Chloroethoxy)methane	530	U
120-83-2	2,4-Dichlorophenol	530	U
91-20-3	Naphthalene	530	U
106-47-8	4-Chloroaniline	530	U
87-68-3	Hexachlorobutadiene	530	U
105-60-2	Caprolactam	530	U
59-50-7	4-Chloro-3-methylphenol	530	U
91-57-6	2-Methylnaphthalene	530	U
77-47-4	Hexachlorocyclopentadiene	530	U
88-06-2	2,4,6-Trichlorophenol	530	U
95-95-4	2,4,5-Trichlorophenol	1300	U
92-52-4	1,1´-Biphenyl	530	U
91-58-7	2-Chloronaphthalene	530	U
88-74-4	2-Nitroaniline	1300	U
131-11-3	Dimethylphthalate	530	U
606-20-2	2,6-Dinitrotoluene	530	U
208-96-8	Acenaphthylene	530	U
99-09-2	3-Nitroaniline	1300	U
83-32-9	Acenaphthene	57	J
51-28-5	2,4-Dinitrophenol	1300	U
100-02-7	4-Nitrophenol	1300	U

EPA SAMPLE NO.

FGW58

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-002D

Sample wt/vol: 30 (g/mL) G Lab File ID: I1756.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 38 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/14/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.4 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	530	U
121-14-2	2,4-Dinitrotoluene	530	U
84-66-2	Diethylphthalate	43	J
86-73-7	Fluorene	530	U
7005-72-3	4-Chlorophenyl-phenylether	530	U
100-01-6	4-Nitroaniline	1300	U
534-52-1	4,6-Dinitro-2-methylphenol	1300	U
86-30-6	N-Nitrosodiphenylamine (1)	530	U
101-55-3	4-Bromophenyl-phenylether	530	U
118-74-1	Hexachlorobenzene	530	U
1912-24-9	Atrazine	530	U
87-86-5	Pentachlorophenol	1300	U
85-01-8	Phenanthrene	50	J
120-12-7	Anthracene	530	U
86-74-8	Carbazole	530	U
84-74-2	Di-n-butylphthalate	530	U
206-44-0	Fluoranthene	87	J
129-00-0	Pyrene	58	J
85-68-7	Butylbenzylphthalate	530	U
91-94-1	3,3'-Dichlorobenzidine	530	U
56-55-3	Benzo(a)anthracene	37	J
218-01-9	Chrysene	60	J
117-81-7	bis(2-Ethylhexyl)phthalate	380	BJ
117-84-0	Di-n-octylphthalate	530	U
205-99-2	Benzo(b)fluoranthene	47	J
207-08-9	Benzo(k)fluoranthene	33	J
50-32-8	Benzo(a)pyrene	530	U
193-39-5	Indeno(1,2,3-cd)pyrene	530	U
53-70-3	Dibenzo(a,h)anthracene	530	U
191-24-2	Benzo(g,h,i)perylene	530	U

1G

EPA SAMPLE NO.

FGW58

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-002D

Sample wt/vol: 30 (g/mL) G Lab File ID: I1756.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 38 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/14/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.4 Extraction: (Type SONC

Number TICs found: 30 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1		Unknown (1)	6.12	370	BJ
2	000142-62-1	Hexanoic acid	6.30	160	NJ
3		Unknown (30)	6.65	200	BJ
4		Unknown (2)	13.49	440	J
5		Unknown (3)	13.85	190	J
6		Unknown (26)	14.27	190	J
7		Unknown (4)	15.43	270	J
8		Unknown (5)	15.48	270	J
9		Unknown (6)	15.56	360	J
10		Unknown (7)	15.77	200	J
11		Unknown (27)	15.81	180	J
12		Unknown (8)	15.90	550	J
13		Unknown (9)	16.17	440	J
14		Unknown (28)	16.28	160	J
15		Unknown (10)	17.33	190	J
16		Unknown (11)	18.38	280	J
17		Unknown (12)	18.89	620	J
18		Unknown (13)	19.58	200	J
19		Unknown (14)	19.83	210	J
20		Unknown hydrocarbon	22.25	270	J
21		Unknown (16)	22.56	260	J
22		Unknown (17)	23.97	430	J
23		Unknown (18)	24.09	210	J
24		Unknown (19)	24.16	200	J
25		Unknown (20)	24.62	280	J
26		Unknown (21)	25.45	340	J
27		Unknown (22)	26.05	450	J
28		Unknown (23)	28.04	570	J
29		Unknown (24)	29.34	450	J
30		Unknown (25)	30.96	880	J

1C

EPA SAMPLE NO.

FGW59

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-003B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1759.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 27 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/14/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	25	J
108-95-2	Phenol	26	J
111-44-4	bis(2-Chloroethyl)ether	450	U
95-57-8	2-Chlorophenol	450	U
95-48-7	2-Methylphenol	450	U
108-60-1	2,2´-oxybis(1-Chloropropane)	450	U
98-86-2	Acetophenone	56	J
106-44-5	4-Methylphenol	450	U
621-64-7	N-Nitroso-di-n-propylamine	450	U
67-72-1	Hexachloroethane	450	U
98-95-3	Nitrobenzene	450	U
78-59-1	Isophorone	450	U
88-75-5	2-Nitrophenol	450	U
105-67-9	2,4-Dimethylphenol	450	U
111-91-1	bis(2-Chloroethoxy)methane	450	U
120-83-2	2,4-Dichlorophenol	450	U
91-20-3	Naphthalene	450	U
106-47-8	4-Chloroaniline	31	J
87-68-3	Hexachlorobutadiene	450	U
105-60-2	Caprolactam	450	U
59-50-7	4-Chloro-3-methylphenol	450	U
91-57-6	2-Methylnaphthalene	28	J
77-47-4	Hexachlorocyclopentadiene	450	U
88-06-2	2,4,6-Trichlorophenol	450	U
95-95-4	2,4,5-Trichlorophenol	1100	U
92-52-4	1,1´-Biphenyl	450	U
91-58-7	2-Chloronaphthalene	450	U
88-74-4	2-Nitroaniline	1100	U
131-11-3	Dimethylphthalate	450	U
606-20-2	2,6-Dinitrotoluene	450	U
208-96-8	Acenaphthylene	47	J
99-09-2	3-Nitroaniline	1100	U
83-32-9	Acenaphthene	180	J
51-28-5	2,4-Dinitrophenol	1100	U
100-02-7	4-Nitrophenol	1100	U

1D

EPA SAMPLE NO.

FGW59

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-003B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1759.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 27 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/14/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	130	J
121-14-2	2,4-Dinitrotoluene	450	U
84-66-2	Diethylphthalate	450	U
86-73-7	Fluorene	240	J
7005-72-3	4-Chlorophenyl-phenylether	450	U
100-01-6	4-Nitroaniline	1100	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
86-30-6	N-Nitrosodiphenylamine (1)	450	U
101-55-3	4-Bromophenyl-phenylether	450	U
118-74-1	Hexachlorobenzene	450	U
1912-24-9	Atrazine	450	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	8500	E
120-12-7	Anthracene	880	
86-74-8	Carbazole	1500	
84-74-2	Di-n-butylphthalate	450	U
206-44-0	Fluoranthene	36000	E
129-00-0	Pyrene	16000	E
85-68-7	Butylbenzylphthalate	190	J
91-94-1	3,3'-Dichlorobenzidine	450	U
56-55-3	Benzo(a)anthracene	7700	E
218-01-9	Chrysene	11000	E
117-81-7	bis(2-Ethylhexyl)phthalate	380	BJ
117-84-0	Di-n-octylphthalate	450	U
205-99-2	Benzo(b)fluoranthene	9600	E
207-08-9	Benzo(k)fluoranthene	9700	E
50-32-8	Benzo(a)pyrene	8000	E
193-39-5	Indeno(1,2,3-cd)pyrene	3800	E
53-70-3	Dibenzo(a,h)anthracene	1200	
191-24-2	Benzo(g,h,i)perylene	3200	

EPA SAMPLE NO.

FGW59

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-003B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1759.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 27 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/14/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

Number TICs found: 30 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000057-10-3	Hexadecanoic acid	17.11	1500	NJ
2.		Unknown PAH (2)	17.53	880	J
3.	000084-65-1	9,10-Anthracenedione	17.87	1600	NJ
4.		Unknown (4)	18.38	660	J
5.		NICKEL, CYCLOPENTADIENYL-(4,4-DIME	18.91	890	J
6.	001210-12-4	9-Anthracenecarbonitrile	19.23	680	NJ
7.	000243-17-4	11H-Benzo(b)fluorene (7)	19.49	840	NJ
8.	000243-17-4	11H-Benzo(b)fluorene (8)	19.59	710	NJ
9.	000082-05-3	7H-Benz(de)anthracen-7-one	20.44	1200	NJ
10.		Unknown (10)	20.67	1600	J
11.		Unknown PAH (11)	20.80	1000	J
12.	000205-43-6	Benzo(b)naphtho(1,2-d)thiophene	21.01	610	NJ
13.		Unknown (12)	21.51	1200	J
14.		Unknown (13)	21.63	2400	J
15.		Unknown (14)	21.76	2500	J
16.	001705-84-6	Triphenylene, 2-methyl-	22.18	1500	NJ
17.		Unknown (16)	22.35	2200	J
18.		Unknown (17)	22.63	1400	J
19.		Unknown (18)	23.17	1500	J
20.		Unknown (19)	23.80	1200	J
21.		Unknown (20)	24.12	1100	J
22.		Unknown (21)	24.56	880	J
23.	099131-96-1	13-Oxo-1,2,3,4,5,6-hexahydro-2,11-e	24.71	790	NJ
24.	000198-55-0	Perylene	25.43	6400	NJ
25.		Unknown PAH (24)	25.95	2700	J
26.		Unknown (25)	28.60	1300	J
27.		Unknown (26)	28.95	1400	J
28.		Unknown PAH (27)	30.22	880	J
29.		Unknown (28)	30.98	1200	J
30.		Unknown PAH (29)	31.35	930	J

1C

EPA SAMPLE NO.

FGW59DL

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-003B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1768.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 27 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	9000	U
108-95-2	Phenol	9000	U
111-44-4	bis(2-Chloroethyl)ether	9000	U
95-57-8	2-Chlorophenol	9000	U
95-48-7	2-Methylphenol	9000	U
108-60-1	2,2'-oxybis(1-Chloropropane)	9000	U
98-86-2	Acetophenone	9000	U
106-44-5	4-Methylphenol	9000	U
621-64-7	N-Nitroso-di-n-propylamine	9000	U
67-72-1	Hexachloroethane	9000	U
98-95-3	Nitrobenzene	9000	U
78-59-1	Isophorone	9000	U
88-75-5	2-Nitrophenol	9000	U
105-67-9	2,4-Dimethylphenol	9000	U
111-91-1	bis(2-Chloroethoxy)methane	9000	U
120-83-2	2,4-Dichlorophenol	9000	U
91-20-3	Naphthalene	9000	U
106-47-8	4-Chloroaniline	9000	U
87-68-3	Hexachlorobutadiene	9000	U
105-60-2	Caprolactam	9000	U
59-50-7	4-Chloro-3-methylphenol	9000	U
91-57-6	2-Methylnaphthalene	9000	U
77-47-4	Hexachlorocyclopentadiene	9000	U
88-06-2	2,4,6-Trichlorophenol	9000	U
95-95-4	2,4,5-Trichlorophenol	23000	U
92-52-4	1,1'-Biphenyl	9000	U
91-58-7	2-Chloronaphthalene	9000	U
88-74-4	2-Nitroaniline	23000	U
131-11-3	Dimethylphthalate	9000	U
606-20-2	2,6-Dinitrotoluene	9000	U
208-96-8	Acenaphthylene	9000	U
99-09-2	3-Nitroaniline	23000	U
83-32-9	Acenaphthene	9000	U
51-28-5	2,4-Dinitrophenol	23000	U
100-02-7	4-Nitrophenol	23000	U

EPA SAMPLE NO.

FGW59DL

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-003B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1768.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 27 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CONCENTRATION UNITS:

CAS NO.	COMPOUND (µg/L or µg/Kg)	UG/KG	Q
132-64-9	Dibenzofuran	9000	U
121-14-2	2,4-Dinitrotoluene	9000	U
84-66-2	Diethylphthalate	9000	U
86-73-7	Fluorene	9000	U
7005-72-3	4-Chlorophenyl-phenylether	9000	U
100-01-6	4-Nitroaniline	23000	U
534-52-1	4,6-Dinitro-2-methylphenol	23000	U
86-30-6	N-Nitrosodiphenylamine (1)	9000	U
101-55-3	4-Bromophenyl-phenylether	9000	U
118-74-1	Hexachlorobenzene	9000	U
1912-24-9	Atrazine	9000	U
87-86-5	Pentachlorophenol	23000	U
85-01-8	Phenanthrene	5100	DJ
120-12-7	Anthracene	610	DJ
86-74-8	Carbazole	1000	DJ
84-74-2	Di-n-butylphthalate	9000	U
206-44-0	Fluoranthene	8500	DJ
129-00-0	Pyrene	7000	DJ
85-68-7	Butylbenzylphthalate	9000	U
91-94-1	3,3'-Dichlorobenzidine	9000	U
56-55-3	Benzo(a)anthracene	3500	DJ
218-01-9	Chrysene	5300	DJ
117-81-7	bis(2-Ethylhexyl)phthalate	9000	U
117-84-0	Di-n-octylphthalate	9000	U
205-99-2	Benzo(b)fluoranthene	4400	DJ
207-08-9	Benzo(k)fluoranthene	3800	DJ
50-32-8	Benzo(a)pyrene	3800	DJ
193-39-5	Indeno(1,2,3-cd)pyrene	2600	DJ
53-70-3	Dibenzo(a,h)anthracene	780	DJ
191-24-2	Benzo(g,h,i)perylene	2600	DJ

1G

EPA SAMPLE NO.

FGW59DL

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-003B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1768.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 27 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/17/00

Injection Volume: 2 (µl) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

Number TICs found: 2 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown	23.58	1900	J
2.		Unknown PAH	25.25	2300	J

1C

EPA SAMPLE NO.

FGW60

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-004B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1769.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 27 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 7.8 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	9000	U
108-95-2	Phenol	9000	U
111-44-4	bis(2-Chloroethyl)ether	9000	U
95-57-8	2-Chlorophenol	9000	U
95-48-7	2-Methylphenol	9000	U
108-60-1	2,2´-oxybis(1-Chloropropane)	9000	U
98-86-2	Acetophenone	9000	U
106-44-5	4-Methylphenol	9000	U
621-64-7	N-Nitroso-di-n-propylamine	9000	U
67-72-1	Hexachloroethane	9000	U
98-95-3	Nitrobenzene	9000	U
78-59-1	Isophorone	9000	U
88-75-5	2-Nitrophenol	9000	U
105-67-9	2,4-Dimethylphenol	9000	U
111-91-1	bis(2-Chloroethoxy)methane	9000	U
120-83-2	2,4-Dichlorophenol	9000	U
91-20-3	Naphthalene	9000	U
106-47-8	4-Chloroaniline	9000	U
87-68-3	Hexachlorobutadiene	9000	U
105-60-2	Caprolactam	9000	U
59-50-7	4-Chloro-3-methylphenol	9000	U
91-57-6	2-Methylnaphthalene	9000	U
77-47-4	Hexachlorocyclopentadiene	9000	U
88-06-2	2,4,6-Trichlorophenol	9000	U
95-95-4	2,4,5-Trichlorophenol	23000	U
92-52-4	1,1´-Biphenyl	9000	U
91-58-7	2-Chloronaphthalene	9000	U
88-74-4	2-Nitroaniline	23000	U
131-11-3	Dimethylphthalate	9000	U
606-20-2	2,6-Dinitrotoluene	9000	U
208-96-8	Acenaphthylene	9000	U
99-09-2	3-Nitroaniline	23000	U
83-32-9	Acenaphthene	9000	U
51-28-5	2,4-Dinitrophenol	23000	U
100-02-7	4-Nitrophenol	23000	U

EPA SAMPLE NO.

FGW60

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-004B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1769.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 27 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 7.8 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	9000	U
121-14-2	2,4-Dinitrotoluene	9000	U
84-66-2	Diethylphthalate	9000	U
86-73-7	Fluorene	9000	U
7005-72-3	4-Chlorophenyl-phenylether	9000	U
100-01-6	4-Nitroaniline	23000	U
534-52-1	4,6-Dinitro-2-methylphenol	23000	U
86-30-6	N-Nitrosodiphenylamine (1)	9000	U
101-55-3	4-Bromophenyl-phenylether	9000	U
118-74-1	Hexachlorobenzene	9000	U
1912-24-9	Atrazine	9000	U
87-86-5	Pentachlorophenol	23000	U
85-01-8	Phenanthrene	4000	J
120-12-7	Anthracene	9000	U
86-74-8	Carbazole	950	J
84-74-2	Di-n-butylphthalate	9000	U
206-44-0	Fluoranthene	7600	J
129-00-0	Pyrene	6100	J
85-68-7	Butylbenzylphthalate	9000	U
91-94-1	3,3'-Dichlorobenzidine	9000	U
56-55-3	Benzo(a)anthracene	3200	J
218-01-9	Chrysene	4400	J
117-81-7	bis(2-Ethylhexyl)phthalate	500	BJ
117-84-0	Di-n-octylphthalate	9000	U
205-99-2	Benzo(b)fluoranthene	4100	J
207-08-9	Benzo(k)fluoranthene	3600	J
50-32-8	Benzo(a)pyrene	3900	J
193-39-5	Indeno(1,2,3-cd)pyrene	2600	J
53-70-3	Dibenzo(a,h)anthracene	9000	U
191-24-2	Benzo(g,h,i)perylene	2500	J

1G

EPA SAMPLE NO.

FGW60

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-004B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1769.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 27 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/17/00

Injection Volume: 2 (µl) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 7.8 Extraction: (Type SONC

Number TICs found: 2 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	Unknown acid ester	23.58	2100	J
2.	Unknown PAH	25.24	3900	J

0999
14 094

1C

EPA SAMPLE NO.

FGW61

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-005B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1770.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 23 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 2.00

GPC Cleanup: (Y/N) Y pH: 7.9 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	860	U
108-95-2	Phenol	67	J
111-44-4	bis(2-Chloroethyl)ether	860	U
95-57-8	2-Chlorophenol	860	U
95-48-7	2-Methylphenol	860	U
108-60-1	2,2´-oxybis(1-Chloropropane)	860	U
98-86-2	Acetophenone	57	J
106-44-5	4-Methylphenol	290	J
621-64-7	N-Nitroso-di-n-propylamine	860	U
67-72-1	Hexachloroethane	860	U
98-95-3	Nitrobenzene	860	U
78-59-1	Isophorone	860	U
88-75-5	2-Nitrophenol	860	U
105-67-9	2,4-Dimethylphenol	860	U
111-91-1	bis(2-Chloroethoxy)methane	860	U
120-83-2	2,4-Dichlorophenol	860	U
91-20-3	Naphthalene	860	U
106-47-8	4-Chloroaniline	860	U
87-68-3	Hexachlorobutadiene	860	U
105-60-2	Caprolactam	860	U
59-50-7	4-Chloro-3-methylphenol	860	U
91-57-6	2-Methylnaphthalene	860	U
77-47-4	Hexachlorocyclopentadiene	860	U
88-06-2	2,4,6-Trichlorophenol	860	U
95-95-4	2,4,5-Trichlorophenol	2200	U
92-52-4	1,1´-Biphenyl	860	U
91-58-7	2-Chloronaphthalene	860	U
88-74-4	2-Nitroaniline	2200	U
131-11-3	Dimethylphthalate	860	U
606-20-2	2,6-Dinitrotoluene	860	U
208-96-8	Acenaphthylene	860	U
99-09-2	3-Nitroaniline	2200	U
83-32-9	Acenaphthene	110	J
51-28-5	2,4-Dinitrophenol	2200	U
100-02-7	4-Nitrophenol	2200	U

EPA SAMPLE NO.

FGW61

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-005B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1770.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 23 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 2.00

GPC Cleanup: (Y/N) Y pH: 7.9 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	81	J
121-14-2	2,4-Dinitrotoluene	860	U
84-66-2	Diethylphthalate	860	U
86-73-7	Fluorene	100	J
7005-72-3	4-Chlorophenyl-phenylether	860	U
100-01-6	4-Nitroaniline	2200	U
534-52-1	4,6-Dinitro-2-methylphenol	2200	U
86-30-6	N-Nitrosodiphenylamine (1)	860	U
101-55-3	4-Bromophenyl-phenylether	860	U
118-74-1	Hexachlorobenzene	860	U
1912-24-9	Atrazine	860	U
87-86-5	Pentachlorophenol	2200	U
85-01-8	Phenanthrene	1700	
120-12-7	Anthracene	260	J
86-74-8	Carbazole	200	J
84-74-2	Di-n-butylphthalate	860	U
206-44-0	Fluoranthene	2000	
129-00-0	Pyrene	1600	
85-68-7	Butylbenzylphthalate	170	J
91-94-1	3,3'-Dichlorobenzidine	860	U
56-55-3	Benzo(a)anthracene	890	
218-01-9	Chrysene	1200	
117-81-7	bis(2-Ethylhexyl)phthalate	500	BJ
117-84-0	Di-n-octylphthalate	860	U
205-99-2	Benzo(b)fluoranthene	1100	
207-08-9	Benzo(k)fluoranthene	940	
50-32-8	Benzo(a)pyrene	960	
193-39-5	Indeno(1,2,3-cd)pyrene	600	J
53-70-3	Dibenzo(a,h)anthracene	230	J
191-24-2	Benzo(g,h,i)perylene	580	J

EPA SAMPLE NO.

FGW61

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-005B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1770.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 23 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/17/00

Injection Volume: 2 (µl) Dilution Factor: 2.00

GPC Cleanup: (Y/N) Y pH: 7.9 Extraction: (Type SONC

Number TICs found: 30 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1		Unknown (1)	6.09	390	BJ
2		Unknown (2)	7.26	400	J
3		Unknown (3)	7.97	630	J
4		Unknown (4)	8.39	580	J
5	000541-02-6	Cyclopentasiloxane, decamethyl-	8.52	720	NJ
6		Unknown (6)	9.26	360	J
7		Unknown (7)	11.97	430	J
8		Unknown (8)	12.09	750	J
9		Unknown (9)	12.61	670	J
10		Unknown (29)	14.08	350	J
11		Unknown (30)	15.70	350	J
12		Unknown (10)	15.88	880	J
13		Unknown (11)	16.71	490	J
14		Unknown (12)	16.98	440	J
15		Unknown acid type	17.08	1900	J
16	000084-65-1	9,10-Anthracenedione	17.83	420	NJ
17		Unknown (15)	18.07	520	J
18		Unknown (16)	18.61	430	J
19		Unknown PAH (17)	19.56	370	J
20		Unknown (18)	20.39	400	J
21		Unknown aromatic (19)	20.61	2700	J
22		Unknown aromatic (20)	20.70	470	J
23		Unknown aromatic (21)	20.77	670	J
24		Unknown (22)	21.45	390	J
25		Unknown (23)	21.71	440	J
26		Unknown aromatic (24)	22.11	970	J
27		Unknown (25)	23.11	760	J
28		Unknown (26)	23.59	580	J
29		Unknown PAH (27)	25.26	640	J
30		Unknown (28)	27.92	950	J

1C

EPA SAMPLE NO.

FGW62

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-006B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1771.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 32 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 2.00

GPC Cleanup: (Y/N) Y pH: 8.9 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	970	U
108-95-2	Phenol	970	U
111-44-4	bis(2-Chloroethyl)ether	970	U
95-57-8	2-Chlorophenol	970	U
95-48-7	2-Methylphenol	970	U
108-60-1	2,2'-oxybis(1-Chloropropane)	970	U
98-86-2	Acetophenone	970	U
106-44-5	4-Methylphenol	970	U
621-64-7	N-Nitroso-di-n-propylamine	970	U
67-72-1	Hexachloroethane	970	U
98-95-3	Nitrobenzene	970	U
78-59-1	Isophorone	970	U
88-75-5	2-Nitrophenol	970	U
105-67-9	2,4-Dimethylphenol	970	U
111-91-1	bis(2-Chloroethoxy)methane	970	U
120-83-2	2,4-Dichlorophenol	970	U
91-20-3	Naphthalene	260	J
106-47-8	4-Chloroaniline	970	U
87-68-3	Hexachlorobutadiene	970	U
105-60-2	Caprolactam	970	U
59-50-7	4-Chloro-3-methylphenol	970	U
91-57-6	2-Methylnaphthalene	390	J
77-47-4	Hexachlorocyclopentadiene	970	U
88-06-2	2,4,6-Trichlorophenol	970	U
95-95-4	2,4,5-Trichlorophenol	2400	U
92-52-4	1,1'-Biphenyl	110	J
91-58-7	2-Chloronaphthalene	970	U
88-74-4	2-Nitroaniline	2400	U
131-11-3	Dimethylphthalate	970	U
606-20-2	2,6-Dinitrotoluene	970	U
208-96-8	Acenaphthylene	520	J
99-09-2	3-Nitroaniline	2400	U
83-32-9	Acenaphthene	3900	
51-28-5	2,4-Dinitrophenol	2400	U
100-02-7	4-Nitrophenol	2400	U

EPA SAMPLE NO.

FGW62

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-006B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1771.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 32 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 2.00

GPC Cleanup: (Y/N) Y pH: 8.9 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	57	J
121-14-2	2,4-Dinitrotoluene	970	U
84-66-2	Diethylphthalate	250	J
86-73-7	Fluorene	1800	
7005-72-3	4-Chlorophenyl-phenylether	970	U
100-01-6	4-Nitroaniline	2400	U
534-52-1	4,6-Dinitro-2-methylphenol	2400	U
86-30-6	N-Nitrosodiphenylamine (1)	970	U
101-55-3	4-Bromophenyl-phenylether	970	U
118-74-1	Hexachlorobenzene	970	U
1912-24-9	Atrazine	970	U
87-86-5	Pentachlorophenol	2400	U
85-01-8	Phenanthrene	5200	
120-12-7	Anthracene	1100	
86-74-8	Carbazole	70	J
84-74-2	Di-n-butylphthalate	970	U
206-44-0	Fluoranthene	1300	
129-00-0	Pyrene	1300	
85-68-7	Butylbenzylphthalate	970	U
91-94-1	3,3'-Dichlorobenzidine	970	U
56-55-3	Benzo(a)anthracene	500	J
218-01-9	Chrysene	580	J
117-81-7	bis(2-Ethylhexyl)phthalate	800	BJ
117-84-0	Di-n-octylphthalate	970	U
205-99-2	Benzo(b)fluoranthene	440	J
207-08-9	Benzo(k)fluoranthene	470	J
50-32-8	Benzo(a)pyrene	570	J
193-39-5	Indeno(1,2,3-cd)pyrene	280	J
53-70-3	Dibenzo(a,h)anthracene	970	U
191-24-2	Benzo(g,h,i)perylene	340	J

EPA SAMPLE NO.

FGW62

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-006B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1771.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 32 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/17/00

Injection Volume: 2 (µl) Dilution Factor: 2.00

GPC Cleanup: (Y/N) Y pH: 8.9 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 30 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	9.67	1200	J
2.		Unknown (2)	10.28	1100	J
3.	002613-76-5	1H-Indene, 2,3-dihydro-1,1,3-trimet	10.82	1600	NJ
4.	000090-12-0	Naphthalene, 1-methyl-	11.69	2200	NJ
5.	000101-84-8	Benzene, 1,1'-oxybis-	12.65	14000	NJ
6.		Unknown (6)	13.21	2100	J
7.		Unknown (7)	13.47	6200	J
8.		Unknown (8)	13.83	2000	J
9.	000108-43-0	Phenol, 3-chloro-	14.09	1000	NJ
10.		Unknown (10)	14.23	2400	J
11.	000086-73-7	9H-Fluorene	15.08	1400	NJ
12.	021725-46-2	Propanenitrile, 2-((4-chloro-6-(eth	15.24	2900	NJ
13.		Unknown aromatic	17.32	1300	J
14.	032690-93-0	Biphenyl, 2,4,4',5-tetrachloro-	17.44	3500	NJ
15.		Unknown PCB	17.51	1800	J
16.	026914-33-0	TETRACHLOROBIPHENYL	17.77	2300	NJ
17.		Unknown (17)	17.82	1200	J
18.		Unknown (18)	17.94	2200	J
19.	032598-11-1	1,1'-Biphenyl, 2,3',4',5-tetrachlor	18.36	1400	NJ
20.		Unknown (20)	18.60	1000	J
21.		Unknown (21)	19.38	1200	J
22.	025429-29-2	1,1'-Biphenyl, pentachloro-	19.49	1000	NJ
23.		Unknown (23)	19.56	1100	J
24.		Unknown (30)	19.80	1000	J
25.		Unknown (24)	19.95	1200	J
26.	002425-54-9	Tetradecane, 1-chloro-	20.33	1600	NJ
27.		Unknown (26)	20.58	1200	J
28.		Unknown (27)	23.51	1300	J
29.		Unknown (28)	23.92	1200	J
30.		Unknown (29)	30.86	1700	J

14 100 100

1C

EPA SAMPLE NO.

FGW63

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1772.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 41 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	11000	U
108-95-2	Phenol	11000	U
111-44-4	bis(2-Chloroethyl)ether	11000	U
95-57-8	2-Chlorophenol	11000	U
95-48-7	2-Methylphenol	11000	U
108-60-1	2,2´-oxybis(1-Chloropropane)	11000	U
98-86-2	Acetophenone	11000	U
106-44-5	4-Methylphenol	11000	U
621-64-7	N-Nitroso-di-n-propylamine	11000	U
67-72-1	Hexachloroethane	11000	U
98-95-3	Nitrobenzene	11000	U
78-59-1	Isophorone	11000	U
88-75-5	2-Nitrophenol	11000	U
105-67-9	2,4-Dimethylphenol	11000	U
111-91-1	bis(2-Chloroethoxy)methane	11000	U
120-83-2	2,4-Dichlorophenol	11000	U
91-20-3	Naphthalene	11000	U
106-47-8	4-Chloroaniline	11000	U
87-68-3	Hexachlorobutadiene	11000	U
105-60-2	Caprolactam	11000	U
59-50-7	4-Chloro-3-methylphenol	11000	U
91-57-6	2-Methylnaphthalene	28000	
77-47-4	Hexachlorocyclopentadiene	11000	U
88-06-2	2,4,6-Trichlorophenol	11000	U
95-95-4	2,4,5-Trichlorophenol	28000	U
92-52-4	1,1´-Biphenyl	11000	U
91-58-7	2-Chloronaphthalene	11000	U
88-74-4	2-Nitroaniline	28000	U
131-11-3	Dimethylphthalate	11000	U
606-20-2	2,6-Dinitrotoluene	11000	U
208-96-8	Acenaphthylene	11000	U
99-09-2	3-Nitroaniline	28000	U
83-32-9	Acenaphthene	6400	J
51-28-5	2,4-Dinitrophenol	28000	U
100-02-7	4-Nitrophenol	28000	U

EPA SAMPLE NO.

FGW63

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1772.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 41 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	3300	J
121-14-2	2,4-Dinitrotoluene	11000	U
84-66-2	Diethylphthalate	11000	U
86-73-7	Fluorene	3000	J
7005-72-3	4-Chlorophenyl-phenylether	11000	U
100-01-6	4-Nitroaniline	28000	U
534-52-1	4,6-Dinitro-2-methylphenol	28000	U
86-30-6	N-Nitrosodiphenylamine (1)	11000	U
101-55-3	4-Bromophenyl-phenylether	11000	U
118-74-1	Hexachlorobenzene	11000	U
1912-24-9	Atrazine	11000	U
87-86-5	Pentachlorophenol	28000	U
85-01-8	Phenanthrene	4400	J
120-12-7	Anthracene	1500	J
86-74-8	Carbazole	11000	U
84-74-2	Di-n-butylphthalate	11000	U
206-44-0	Fluoranthene	1600	J
129-00-0	Pyrene	2100	J
85-68-7	Butylbenzylphthalate	11000	U
91-94-1	3,3'-Dichlorobenzidine	11000	U
56-55-3	Benzo(a)anthracene	790	J
218-01-9	Chrysene	1100	J
117-81-7	bis(2-Ethylhexyl)phthalate	1600	BJ
117-84-0	Di-n-octylphthalate	11000	U
205-99-2	Benzo(b)fluoranthene	11000	U
207-08-9	Benzo(k)fluoranthene	920	J
50-32-8	Benzo(a)pyrene	11000	U
193-39-5	Indeno(1,2,3-cd)pyrene	11000	U
53-70-3	Dibenzo(a,h)anthracene	11000	U
191-24-2	Benzo(g,h,i)perylene	11000	U

1G

EPA SAMPLE NO.

FGW63

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1772.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 41 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/17/00

Injection Volume: 2 (µl) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 28 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000090-12-0	Naphthalene, 1-methyl-	11.69	12000	NJ
2.		Unknown aromatic (2)	12.64	5700	J
3.	000582-16-1	Naphthalene, 2,7-dimethyl- (3)	12.76	7300	NJ
4.	000582-16-1	Naphthalene, 2,7-dimethyl- (4)	12.94	9600	NJ
5.		Unknown aromatic (5)	12.99	4600	J
6.		Unknown aromatic (6)	13.17	2400	J
7.		Unknown aromatic (7)	13.36	2500	J
8.		Unknown (8)	13.46	4700	J
9.	002131-42-2	Naphthalene, 1,4,6-trimethyl-	13.79	2600	NJ
10.		Unknown aromatic (10)	14.07	2700	J
11.		Unknown aromatic (11)	14.24	6400	J
12.		Unknown (12)	14.37	5900	J
13.		Unknown (13)	15.10	4100	J
14.		Unknown (14)	15.15	6600	J
15.		Unknown (15)	15.23	2500	J
16.		Unknown (16)	16.73	2500	J
17.		Unknown (17)	17.43	2300	J
18.		Unknown (18)	17.95	2900	J
19.		Unknown (19)	18.03	2700	J
20.		Unknown (20)	18.63	4500	J
21.		Unknown (21)	18.86	11000	J
22.		Unknown (22)	19.26	2700	J
23.		Unknown (23)	19.78	4500	J
24.		Unknown (24)	19.93	2800	J
25.		Unknown (25)	20.68	4000	J
26.		Unknown (26)	21.76	4100	J
27.		Unknown (27)	22.21	2700	J
28.		Unknown (28)	22.49	2800	J

1C

EPA SAMPLE NO.

FGW63RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1777.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 41 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	11000	U
108-95-2	Phenol	11000	U
111-44-4	bis(2-Chloroethyl)ether	11000	U
95-57-8	2-Chlorophenol	11000	U
95-48-7	2-Methylphenol	11000	U
108-60-1	2,2´-oxybis(1-Chloropropane)	11000	U
98-86-2	Acetophenone	11000	U
106-44-5	4-Methylphenol	11000	U
621-64-7	N-Nitroso-di-n-propylamine	11000	U
67-72-1	Hexachloroethane	11000	U
98-95-3	Nitrobenzene	11000	U
78-59-1	Isophorone	11000	U
88-75-5	2-Nitrophenol	11000	U
105-67-9	2,4-Dimethylphenol	11000	U
111-91-1	bis(2-Chloroethoxy)methane	11000	U
120-83-2	2,4-Dichlorophenol	11000	U
91-20-3	Naphthalene	11000	U
106-47-8	4-Chloroaniline	11000	U
87-68-3	Hexachlorobutadiene	11000	U
105-60-2	Caprolactam	11000	U
59-50-7	4-Chloro-3-methylphenol	11000	U
91-57-6	2-Methylnaphthalene	33000	
77-47-4	Hexachlorocyclopentadiene	11000	U
88-06-2	2,4,6-Trichlorophenol	11000	U
95-95-4	2,4,5-Trichlorophenol	28000	U
92-52-4	1,1´-Biphenyl	11000	U
91-58-7	2-Chloronaphthalene	11000	U
88-74-4	2-Nitroaniline	28000	U
131-11-3	Dimethylphthalate	11000	U
606-20-2	2,6-Dinitrotoluene	11000	U
208-96-8	Acenaphthylene	11000	U
99-09-2	3-Nitroaniline	28000	U
83-32-9	Acenaphthene	6900	J
51-28-5	2,4-Dinitrophenol	28000	U
100-02-7	4-Nitrophenol	28000	U

EPA SAMPLE NO.

FGW63RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1777.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 41 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	3100	J
121-14-2	2,4-Dinitrotoluene	11000	U
84-66-2	Diethylphthalate	11000	U
86-73-7	Fluorene	2900	J
7005-72-3	4-Chlorophenyl-phenylether	11000	U
100-01-6	4-Nitroaniline	28000	U
534-52-1	4,6-Dinitro-2-methylphenol	28000	U
86-30-6	N-Nitrosodiphenylamine (1)	11000	U
101-55-3	4-Bromophenyl-phenylether	11000	U
118-74-1	Hexachlorobenzene	11000	U
1912-24-9	Atrazine	11000	U
87-86-5	Pentachlorophenol	28000	U
85-01-8	Phenanthrene	4900	J
120-12-7	Anthracene	1400	J
86-74-8	Carbazole	11000	U
84-74-2	Di-n-butylphthalate	11000	U
206-44-0	Fluoranthene	1700	J
129-00-0	Pyrene	2700	J
85-68-7	Butylbenzylphthalate	11000	U
91-94-1	3,3´-Dichlorobenzidine	11000	U
56-55-3	Benzo(a)anthracene	630	J
218-01-9	Chrysene	1300	J
117-81-7	bis(2-Ethylhexyl)phthalate	1700	BJ
117-84-0	Di-n-octylphthalate	11000	U
205-99-2	Benzo(b)fluoranthene	730	J
207-08-9	Benzo(k)fluoranthene	680	J
50-32-8	Benzo(a)pyrene	11000	U
193-39-5	Indeno(1,2,3-cd)pyrene	11000	U
53-70-3	Dibenzo(a,h)anthracene	11000	U
191-24-2	Benzo(g,h,i)perylene	11000	U

EPA SAMPLE NO.

FGW63RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1777.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 41 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/17/00

Injection Volume: 2 (µl) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 30 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000090-12-0	Naphthalene, 1-methyl-	11.69	14000	NJ
2.		Unknown aromatic (2)	12.64	5800	J
3.	000582-16-1	Naphthalene, 2,7-dimethyl- (3)	12.76	7700	NJ
4.	000582-16-1	Naphthalene, 2,7-dimethyl- (4)	12.94	10000	NJ
5.		Unknown aromatic (5)	12.99	4700	J
6.		Unknown (6)	13.29	2700	J
7.		Unknown (7)	13.37	2800	J
8.		Unknown (8)	13.46	5300	J
9.		Unknown aromatic (9)	13.79	2900	J
10.		Unknown (30)	13.82	2300	J
11.	002131-42-2	Naphthalene, 1,4,6-trimethyl-	14.07	2400	NJ
12.		Unknown (11)	14.24	7700	J
13.		Unknown (12)	14.37	4700	J
14.		Unknown (13)	15.23	2700	J
15.		Unknown (14)	15.43	3500	J
16.		Unknown (15)	15.74	2500	J
17.		Unknown (16)	16.73	3000	J
18.		Unknown (17)	17.13	2400	J
19.		Unknown (18)	17.31	2800	J
20.		Unknown (19)	17.43	2800	J
21.		Unknown (20)	17.95	2600	J
22.		Unknown (21)	18.04	3400	J
23.		Unknown (22)	18.35	3700	J
24.		Unknown (23)	18.63	3700	J
25.		Unknown (24)	19.26	2600	J
26.		Unknown (25)	19.57	3300	J
27.		Unknown (26)	20.10	6200	J
28.		Unknown (27)	20.31	3000	J
29.		Unknown (28)	20.67	7100	J
30.		Unknown (29)	22.49	3800	J

1C

EPA SAMPLE NO.

FGW66

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-008B

Sample wt/vol: 1 (g/mL) G Lab File ID: I1899.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: 60 Decanted: (Y/N) N Date Extracted: 04/20/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/25/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	25000	U
108-95-2	Phenol	25000	U
111-44-4	bis(2-Chloroethyl)ether	25000	U
95-57-8	2-Chlorophenol	25000	U
95-48-7	2-Methylphenol	25000	U
108-60-1	2,2'-oxybis(1-Chloropropane)	25000	U
98-86-2	Acetophenone	25000	U
106-44-5	4-Methylphenol	25000	U
621-64-7	N-Nitroso-di-n-propylamine	25000	U
67-72-1	Hexachloroethane	25000	U
98-95-3	Nitrobenzene	25000	U
78-59-1	Isophorone	25000	U
88-75-5	2-Nitrophenol	25000	U
105-67-9	2,4-Dimethylphenol	25000	U
111-91-1	bis(2-Chloroethoxy)methane	25000	U
120-83-2	2,4-Dichlorophenol	25000	U
91-20-3	Naphthalene	17000	J
106-47-8	4-Chloroaniline	25000	U
87-68-3	Hexachlorobutadiene	25000	U
105-60-2	Caprolactam	25000	U
59-50-7	4-Chloro-3-methylphenol	25000	U
91-57-6	2-Methylnaphthalene	20000	J
77-47-4	Hexachlorocyclopentadiene	25000	U
88-06-2	2,4,6-Trichlorophenol	25000	U
95-95-4	2,4,5-Trichlorophenol	62000	U
92-52-4	1,1'-Biphenyl	12000	J
91-58-7	2-Chloronaphthalene	25000	U
88-74-4	2-Nitroaniline	62000	U
131-11-3	Dimethylphthalate	25000	U
606-20-2	2,6-Dinitrotoluene	25000	U
208-96-8	Acenaphthylene	10000	J
99-09-2	3-Nitroaniline	62000	U
83-32-9	Acenaphthene	11000	J
51-28-5	2,4-Dinitrophenol	62000	U
100-02-7	4-Nitrophenol	62000	U

EPA SAMPLE NO.

FGW66

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-008B

Sample wt/vol: 1 (g/mL) G Lab File ID: I1899.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: 60 Decanted: (Y/N) N Date Extracted: 04/20/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/25/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	25000	U
121-14-2	2,4-Dinitrotoluene	25000	U
84-66-2	Diethylphthalate	25000	U
86-73-7	Fluorene	21000	J
7005-72-3	4-Chlorophenyl-phenylether	25000	U
100-01-6	4-Nitroaniline	62000	U
534-52-1	4,6-Dinitro-2-methylphenol	62000	U
86-30-6	N-Nitrosodiphenylamine (1)	25000	U
101-55-3	4-Bromophenyl-phenylether	25000	U
118-74-1	Hexachlorobenzene	25000	U
1912-24-9	Atrazine	25000	U
87-86-5	Pentachlorophenol	62000	U
85-01-8	Phenanthrene	45000	
120-12-7	Anthracene	9800	J
86-74-8	Carbazole	25000	U
84-74-2	Di-n-butylphthalate	25000	U
206-44-0	Fluoranthene	7800	J
129-00-0	Pyrene	17000	J
85-68-7	Butylbenzylphthalate	25000	U
91-94-1	3,3'-Dichlorobenzidine	25000	U
56-55-3	Benzo(a)anthracene	2800	J
218-01-9	Chrysene	3200	J
117-81-7	bis(2-Ethylhexyl)phthalate	1700	J
117-84-0	Di-n-octylphthalate	25000	U
205-99-2	Benzo(b)fluoranthene	25000	U
207-08-9	Benzo(k)fluoranthene	25000	U
50-32-8	Benzo(a)pyrene	1600	J
193-39-5	Indeno(1,2,3-cd)pyrene	25000	U
53-70-3	Dibenzo(a,h)anthracene	25000	U
191-24-2	Benzo(g,h,i)perylene	25000	U

1G

EPA SAMPLE NO.

FGW66

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-008B

Sample wt/vol: 1 (g/mL) G Lab File ID: I1899.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: 60 Decanted: (Y/N) N Date Extracted: 04/20/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/25/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.7 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 30 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	6.63	7600	J
2.		Unknown hydrocarbon (2)	7.88	7000	J
3.		Unknown (27)	10.24	6600	J
4.		Unknown (3)	10.34	11000	J
5.	002077-40-9	(Z)-2-(1'-PROPENYL)MESITYLENE	10.79	15000	NJ
6.		Unknown (5)	10.90	8900	J
7.		Unknown PAH (6)	11.23	6800	J
8.	000090-12-0	Naphthalene, 1-methyl-	11.66	25000	NJ
9.		Unknown hydrocarbon (8)	11.71	8900	J
10.	000101-84-8	Benzene, 1,1'-oxybis-	12.61	80000	NJ
11.	000571-61-9	Naphthalene, 1,5-dimethyl-	12.72	6600	NJ
12.	000581-42-0	Naphthalene, 2,6-dimethyl- (10)	12.90	16000	NJ
13.	000581-42-0	Naphthalene, 2,6-dimethyl- (11)	12.95	6800	NJ
14.		Unknown (12)	13.17	16000	J
15.		Unknown (13)	13.42	23000	J
16.	000644-08-6	1,1'-Biphenyl, 4-methyl-	13.51	7000	NJ
17.		Unknown (15)	13.77	12000	J
18.		Unknown (16)	14.20	16000	J
19.		Unknown (17)	14.30	7900	J
20.		Unknown (18)	14.34	19000	J
21.		Unknown (19)	14.46	8400	J
22.		Unknown (30)	14.94	6300	J
23.	000086-73-7	9H-Fluorene	15.03	8800	NJ
24.		Unknown (21)	15.20	24000	J
25.	001430-97-3	9H-Fluorene, 2-methyl-	15.70	9000	NJ
26.	000613-12-7	Anthracene, 2-methyl-	17.21	6600	NJ
27.	000779-02-2	Anthracene, 9-methyl-	17.27	8900	NJ
28.		Unknown PAH (24)	17.42	11000	J
29.		Unknown PAH (25)	17.46	11000	J
30.		Unknown (29)	18.82	6300	J

1C

EPA SAMPLE NO.

FGW67

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-009B

Sample wt/vol: 1 (g/mL) G Lab File ID: I1902.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: 45 Decanted: (Y/N) N Date Extracted: 04/20/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/25/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.8 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	18000	U
108-95-2	Phenol	18000	U
111-44-4	bis(2-Chloroethyl)ether	18000	U
95-57-8	2-Chlorophenol	18000	U
95-48-7	2-Methylphenol	18000	U
108-60-1	2,2´-oxybis(1-Chloropropane)	18000	U
98-86-2	Acetophenone	18000	U
106-44-5	4-Methylphenol	18000	U
621-64-7	N-Nitroso-di-n-propylamine	18000	U
67-72-1	Hexachloroethane	18000	U
98-95-3	Nitrobenzene	18000	U
78-59-1	Isophorone	18000	U
88-75-5	2-Nitrophenol	18000	U
105-67-9	2,4-Dimethylphenol	18000	U
111-91-1	bis(2-Chloroethoxy)methane	18000	U
120-83-2	2,4-Dichlorophenol	18000	U
91-20-3	Naphthalene	18000	U
106-47-8	4-Chloroaniline	18000	U
87-68-3	Hexachlorobutadiene	18000	U
105-60-2	Caprolactam	18000	U
59-50-7	4-Chloro-3-methylphenol	18000	U
91-57-6	2-Methylnaphthalene	18000	U
77-47-4	Hexachlorocyclopentadiene	18000	U
88-06-2	2,4,6-Trichlorophenol	18000	U
95-95-4	2,4,5-Trichlorophenol	45000	U
92-52-4	1,1´-Biphenyl	18000	U
91-58-7	2-Chloronaphthalene	18000	U
88-74-4	2-Nitroaniline	45000	U
131-11-3	Dimethylphthalate	18000	U
606-20-2	2,6-Dinitrotoluene	18000	U
208-96-8	Acenaphthylene	18000	U
99-09-2	3-Nitroaniline	45000	U
83-32-9	Acenaphthene	18000	U
51-28-5	2,4-Dinitrophenol	45000	U
100-02-7	4-Nitrophenol	2600	J

1D

EPA SAMPLE NO.

FGW67

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-009B

Sample wt/vol: 1 (g/mL) G Lab File ID: I1902.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: 45 Decanted: (Y/N) N Date Extracted: 04/20/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/25/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.8 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	18000	U
121-14-2	2,4-Dinitrotoluene	18000	U
84-66-2	Diethylphthalate	18000	U
86-73-7	Fluorene	18000	U
7005-72-3	4-Chlorophenyl-phenylether	18000	U
100-01-6	4-Nitroaniline	45000	U
534-52-1	4,6-Dinitro-2-methylphenol	45000	U
86-30-6	N-Nitrosodiphenylamine (1)	18000	U
101-55-3	4-Bromophenyl-phenylether	18000	U
118-74-1	Hexachlorobenzene	18000	U
1912-24-9	Atrazine	18000	U
87-86-5	Pentachlorophenol	3100	J
85-01-8	Phenanthrene	18000	U
120-12-7	Anthracene	18000	U
86-74-8	Carbazole	18000	U
84-74-2	Di-n-butylphthalate	18000	U
206-44-0	Fluoranthene	18000	U
129-00-0	Pyrene	980	J
85-68-7	Butylbenzylphthalate	18000	U
91-94-1	3,3'-Dichlorobenzidine	18000	U
56-55-3	Benzo(a)anthracene	18000	U
218-01-9	Chrysene	18000	U
117-81-7	bis(2-Ethylhexyl)phthalate	3000	J
117-84-0	Di-n-octylphthalate	18000	U
205-99-2	Benzo(b)fluoranthene	18000	U
207-08-9	Benzo(k)fluoranthene	18000	U
50-32-8	Benzo(a)pyrene	18000	U
193-39-5	Indeno(1,2,3-cd)pyrene	18000	U
53-70-3	Dibenzo(a,h)anthracene	18000	U
191-24-2	Benzo(g,h,i)perylene	18000	U

EPA SAMPLE NO.

FGW67

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-009B

Sample wt/vol: 1 (g/mL) G Lab File ID: I1902.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: 45 Decanted: (Y/N) N Date Extracted: 04/20/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/25/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.8 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 0 (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q

1C

EPA SAMPLE NO.

FGW68

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-010B

Sample wt/vol: 1 (g/mL) G Lab File ID: I1903.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: 53 Decanted: (Y/N) N Date Extracted: 04/20/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/25/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	21000	U
108-95-2	Phenol	21000	U
111-44-4	bis(2-Chloroethyl)ether	21000	U
95-57-8	2-Chlorophenol	21000	U
95-48-7	2-Methylphenol	21000	U
108-60-1	2,2'-oxybis(1-Chloropropane)	21000	U
98-86-2	Acetophenone	21000	U
106-44-5	4-Methylphenol	21000	U
621-64-7	N-Nitroso-di-n-propylamine	21000	U
67-72-1	Hexachloroethane	1800	J
98-95-3	Nitrobenzene	21000	U
78-59-1	Isophorone	21000	U
88-75-5	2-Nitrophenol	21000	U
105-67-9	2,4-Dimethylphenol	21000	U
111-91-1	bis(2-Chloroethoxy)methane	21000	U
120-83-2	2,4-Dichlorophenol	21000	U
91-20-3	Naphthalene	7800	J
106-47-8	4-Chloroaniline	21000	U
87-68-3	Hexachlorobutadiene	7700	J
105-60-2	Caprolactam	21000	U
59-50-7	4-Chloro-3-methylphenol	21000	U
91-57-6	2-Methylnaphthalene	4000	J
77-47-4	Hexachlorocyclopentadiene	21000	U
88-06-2	2,4,6-Trichlorophenol	21000	U
95-95-4	2,4,5-Trichlorophenol	53000	U
92-52-4	1,1'-Biphenyl	4700	J
91-58-7	2-Chloronaphthalene	21000	U
88-74-4	2-Nitroaniline	53000	U
131-11-3	Dimethylphthalate	21000	U
606-20-2	2,6-Dinitrotoluene	21000	U
208-96-8	Acenaphthylene	21000	
99-09-2	3-Nitroaniline	53000	U
83-32-9	Acenaphthene	2900	J
51-28-5	2,4-Dinitrophenol	53000	U
100-02-7	4-Nitrophenol	53000	U

1D

EPA SAMPLE NO.

FGW68

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

ıb Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-010B

Sample wt/vol: 1 (g/mL) G Lab File ID: I1903.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: 53 Decanted: (Y/N) N Date Extracted: 04/20/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/25/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	21000	U
121-14-2	2,4-Dinitrotoluene	21000	U
84-66-2	Diethylphthalate	21000	U
86-73-7	Fluorene	8700	J
7005-72-3	4-Chlorophenyl-phenylether	21000	U
100-01-6	4-Nitroaniline	53000	U
534-52-1	4,6-Dinitro-2-methylphenol	53000	U
86-30-6	N-Nitrosodiphenylamine (1)	21000	U
101-55-3	4-Bromophenyl-phenylether	21000	U
118-74-1	Hexachlorobenzene	2200	J
1912-24-9	Atrazine	21000	U
87-86-5	Pentachlorophenol	53000	U
85-01-8	Phenanthrene	41000	
120-12-7	Anthracene	5400	J
86-74-8	Carbazole	21000	U
84-74-2	Di-n-butylphthalate	21000	U
206-44-0	Fluoranthene	40000	
129-00-0	Pyrene	98000	
85-68-7	Butylbenzylphthalate	21000	U
91-94-1	3,3'-Dichlorobenzidine	21000	U
56-55-3	Benzo(a)anthracene	1200	J
218-01-9	Chrysene	1900	J
117-81-7	bis(2-Ethylhexyl)phthalate	3400	J
117-84-0	Di-n-octylphthalate	21000	U
205-99-2	Benzo(b)fluoranthene	1500	J
207-08-9	Benzo(k)fluoranthene	1100	J
50-32-8	Benzo(a)pyrene	4400	J
193-39-5	Indeno(1,2,3-cd)pyrene	3700	J
53-70-3	Dibenzo(a,h)anthracene	21000	U
191-24-2	Benzo(g,h,i)perylene	14000	J

EPA SAMPLE NO.

FGW68

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-010B

Sample wt/vol: 1 (g/mL) G Lab File ID: I1903.D

Level: (low/med) MED Date Received: 03/31/00

% Moisture: 53 Decanted: (Y/N) N Date Extracted: 04/20/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/25/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.7 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 13 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000095-50-1	Benzene, 1,2-dichloro-	7.03	25000	NJ
2.	000090-12-0	Naphthalene, 1-methyl-	11.65	4400	NJ
3.	000101-84-8	Benzene, 1,1'-oxybis-	12.60	9100	NJ
4.		1,1,3,6,8-PENTAMETHYL-1,2-DIHYDRONA	13.17	5000	J
5.		Unknown (5)	13.42	7800	J
6.		Unknown (6)	13.77	4900	J
7.		Unknown (7)	14.33	8700	J
8.		Unknown (8)	15.19	6500	J
9.		Unknown PAH (9)	17.45	23000	J
10.		Unknown (10)	18.17	6200	J
11.		Unknown PAH (11)	18.63	11000	J
12.	027208-37-3	Cyclopenta(cd)pyrene	20.69	12000	NJ
13.		Unknown PAH (13)	25.13	5700	J

1C

EPA SAMPLE NO.

FGW69

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-011B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1774.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 36 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	520	U
108-95-2	Phenol	520	U
111-44-4	bis(2-Chloroethyl)ether	520	U
95-57-8	2-Chlorophenol	520	U
95-48-7	2-Methylphenol	520	U
108-60-1	2,2´-oxybis(1-Chloropropane)	520	U
98-86-2	Acetophenone	39	J
106-44-5	4-Methylphenol	520	U
621-64-7	N-Nitroso-di-n-propylamine	520	U
67-72-1	Hexachloroethane	520	U
98-95-3	Nitrobenzene	520	U
78-59-1	Isophorone	520	U
88-75-5	2-Nitrophenol	520	U
105-67-9	2,4-Dimethylphenol	520	U
111-91-1	bis(2-Chloroethoxy)methane	520	U
120-83-2	2,4-Dichlorophenol	520	U
91-20-3	Naphthalene	64	J
106-47-8	4-Chloroaniline	520	U
87-68-3	Hexachlorobutadiene	35	J
105-60-2	Caprolactam	520	U
59-50-7	4-Chloro-3-methylphenol	520	U
91-57-6	2-Methylnaphthalene	100	J
77-47-4	Hexachlorocyclopentadiene	520	U
88-06-2	2,4,6-Trichlorophenol	520	U
95-95-4	2,4,5-Trichlorophenol	1300	U
92-52-4	1,1´-Biphenyl	520	U
91-58-7	2-Chloronaphthalene	520	U
88-74-4	2-Nitroaniline	1300	U
131-11-3	Dimethylphthalate	520	U
606-20-2	2,6-Dinitrotoluene	520	U
208-96-8	Acenaphthylene	100	J
99-09-2	3-Nitroaniline	1300	U
83-32-9	Acenaphthene	1000	
51-28-5	2,4-Dinitrophenol	1300	U
100-02-7	4-Nitrophenol	1300	U

EPA SAMPLE NO.

FGW69

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-011B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1774.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 36 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	520	U
121-14-2	2,4-Dinitrotoluene	520	U
84-66-2	Diethylphthalate	520	U
86-73-7	Fluorene	200	J
7005-72-3	4-Chlorophenyl-phenylether	520	U
100-01-6	4-Nitroaniline	1300	U
534-52-1	4,6-Dinitro-2-methylphenol	1300	U
86-30-6	N-Nitrosodiphenylamine (1)	520	U
101-55-3	4-Bromophenyl-phenylether	520	U
118-74-1	Hexachlorobenzene	520	U
1912-24-9	Atrazine	520	U
87-86-5	Pentachlorophenol	1300	U
85-01-8	Phenanthrene	600	
120-12-7	Anthracene	180	J
86-74-8	Carbazole	520	U
84-74-2	Di-n-butylphthalate	520	U
206-44-0	Fluoranthene	1100	
129-00-0	Pyrene	440	J
85-68-7	Butylbenzylphthalate	520	U
91-94-1	3,3'-Dichlorobenzidine	520	U
56-55-3	Benzo(a)anthracene	180	J
218-01-9	Chrysene	290	J
117-81-7	bis(2-Ethylhexyl)phthalate	770	B
117-84-0	Di-n-octylphthalate	520	U
205-99-2	Benzo(b)fluoranthene	240	J
207-08-9	Benzo(k)fluoranthene	180	J
50-32-8	Benzo(a)pyrene	140	J
193-39-5	Indeno(1,2,3-cd)pyrene	86	J
53-70-3	Dibenzo(a,h)anthracene	520	U
191-24-2	Benzo(g,h,i)perylene	100	J

EPA SAMPLE NO.

FGW69

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-011B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1774.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 36 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/17/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 30 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000090-12-0	Naphthalene, 1-methyl-	11.70	1900	NJ
2.	000571-61-9	Naphthalene, 1,5-dimethyl-	12.94	1500	NJ
3.		Unknown (3)	14.59	2200	J
4.		Unknown (4)	15.88	1100	J
5.		Unknown (5)	17.77	1500	J
6.		Unknown (30)	18.06	1000	J
7.		Unknown (6)	18.37	2300	J
8.	069139-20-4	2-Bis(2-methylbenzocyclobutenyliden	18.65	3600	NJ
9.	075933-59-4	9,9-(Ethylenedioxy)-exo-4-vinyl-end	18.82	2100	NJ
10.		Unknown (9)	19.19	1400	J
11.		Unknown (10)	19.42	3000	J
12.		Unknown (11)	19.45	1700	J
13.		Unknown (12)	19.68	1700	J
14.		Unknown (13)	19.82	4400	J
15.	005282-35-9	Trachylobane	19.97	2200	NJ
16.		Unknown (15)	20.14	2500	J
17.	075629-09-3	2,7,8-Trimethoxy-3-methyl-5,6-methy	21.64	2500	NJ
18.		Unknown (17)	21.74	1500	J
19.		Unknown (18)	21.81	5100	J
20.	073795-04-7	8-(1,1,2-Trimethyl-2-propenyl)-8H-c	22.34	10000	NJ
21.	063518-72-9	Androst-5-en-3_beta_-ol	22.59	10000	NJ
22.		Unknown (21)	23.17	2800	J
23.		Unknown (22)	23.56	1500	J
24.		Unknown (23)	23.98	1700	J
25.		Unknown (24)	24.50	1500	J
26.		Unknown (25)	25.49	1100	J
27.		Unknown (29)	28.08	1100	J
28.		(17_alpha_H,21_beta_H)-Hopane	29.39	1400	J
29.		Unknown (27)	30.99	1600	J
30.		Unknown (28)	35.40	1100	J

1C

EPA SAMPLE NO.

FGW69RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-011B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1780.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 36 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	520	U
108-95-2	Phenol	520	U
111-44-4	bis(2-Chloroethyl)ether	520	U
95-57-8	2-Chlorophenol	520	U
95-48-7	2-Methylphenol	520	U
108-60-1	2,2'-oxybis(1-Chloropropane)	520	U
98-86-2	Acetophenone	30	J
106-44-5	4-Methylphenol	520	U
621-64-7	N-Nitroso-di-n-propylamine	520	U
67-72-1	Hexachloroethane	520	U
98-95-3	Nitrobenzene	520	U
78-59-1	Isophorone	520	U
88-75-5	2-Nitrophenol	520	U
105-67-9	2,4-Dimethylphenol	520	U
111-91-1	bis(2-Chloroethoxy)methane	520	U
120-83-2	2,4-Dichlorophenol	520	U
91-20-3	Naphthalene	63	J
106-47-8	4-Chloroaniline	520	U
87-68-3	Hexachlorobutadiene	39	J
105-60-2	Caprolactam	520	U
59-50-7	4-Chloro-3-methylphenol	520	U
91-57-6	2-Methylnaphthalene	86	J
77-47-4	Hexachlorocyclopentadiene	520	U
88-06-2	2,4,6-Trichlorophenol	520	U
95-95-4	2,4,5-Trichlorophenol	1300	U
92-52-4	1,1'-Biphenyl	520	U
91-58-7	2-Chloronaphthalene	520	U
88-74-4	2-Nitroaniline	1300	U
131-11-3	Dimethylphthalate	520	U
606-20-2	2,6-Dinitrotoluene	520	U
208-96-8	Acenaphthylene	110	J
99-09-2	3-Nitroaniline	1300	U
83-32-9	Acenaphthene	1100	
51-28-5	2,4-Dinitrophenol	1300	U
100-02-7	4-Nitrophenol	1300	U

EPA SAMPLE NO.

FGW69RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-011B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1780.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 36 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	520	U
121-14-2	2,4-Dinitrotoluene	520	U
84-66-2	Diethylphthalate	520	U
86-73-7	Fluorene	270	J
7005-72-3	4-Chlorophenyl-phenylether	520	U
100-01-6	4-Nitroaniline	1300	U
534-52-1	4,6-Dinitro-2-methylphenol	1300	U
86-30-6	N-Nitrosodiphenylamine (1)	520	U
101-55-3	4-Bromophenyl-phenylether	520	U
118-74-1	Hexachlorobenzene	520	U
1912-24-9	Atrazine	520	U
87-86-5	Pentachlorophenol	1300	U
85-01-8	Phenanthrene	580	
120-12-7	Anthracene	220	J
86-74-8	Carbazole	520	U
84-74-2	Di-n-butylphthalate	520	U
206-44-0	Fluoranthene	1200	
129-00-0	Pyrene	400	J
85-68-7	Butylbenzylphthalate	520	U
91-94-1	3,3'-Dichlorobenzidine	520	U
56-55-3	Benzo(a)anthracene	160	J
218-01-9	Chrysene	270	J
117-81-7	bis(2-Ethylhexyl)phthalate	560	B
117-84-0	Di-n-octylphthalate	520	U
205-99-2	Benzo(b)fluoranthene	230	J
207-08-9	Benzo(k)fluoranthene	190	J
50-32-8	Benzo(a)pyrene	180	J
193-39-5	Indeno(1,2,3-cd)pyrene	88	J
53-70-3	Dibenzo(a,h)anthracene	520	U
191-24-2	Benzo(g,h,i)perylene	100	J

1G

EPA SAMPLE NO.

FGW69RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-011B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1780.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 36 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/17/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 30 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000090-12-0	Naphthalene, 1-methyl-	11.70	1200	NJ
2.	000581-42-0	Naphthalene, 2,6-dimethyl-	12.94	1400	NJ
3.		Unknown (3)	14.60	2300	J
4.		Unknown (4)	17.96	1000	J
5.		Unknown (5)	18.06	1200	J
6.		Unknown (6)	18.37	2200	J
7.		Unknown (7)	18.65	2200	J
8.	000080-05-7	Phenol, 4,4'-(1-methylethylidene)bi	18.89	4600	NJ
9.		Unknown (9)	19.18	1600	J
10.		Unknown aromatic	19.41	4600	J
11.		Unknown (11)	19.45	1900	J
12.		Unknown (30)	19.52	1000	J
13.		Unknown (12)	19.59	1300	J
14.		Unknown (13)	19.69	1600	J
15.		Unknown (14)	19.82	2700	J
16.		Unknown (15)	20.14	1800	J
17.		Unknown (16)	20.28	1400	J
18.		Unknown (17)	20.53	1400	J
19.		Unknown (18)	21.65	2900	J
20.		Unknown (19)	21.81	5800	J
21.		Unknown (20)	22.10	1100	J
22.	073795-04-7	8-(1,1,2-Trimethyl-2-propenyl)-8H-c	22.35	11000	NJ
23.		Unknown (22)	22.60	11000	J
24.		Unknown (23)	23.15	2700	J
25.		Unknown (24)	23.57	1500	J
26.		Unknown (25)	23.98	2000	J
27.		Unknown (26)	24.49	1100	J
28.		Unknown (27)	28.09	3600	J
29.		Unknown (28)	29.40	1700	J
30.		Unknown (29)	31.00	2100	J

1C

EPA SAMPLE NO.

FGW71

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-012B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1773.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 23 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.9 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	430	U
108-95-2	Phenol	430	U
111-44-4	bis(2-Chloroethyl)ether	430	U
95-57-8	2-Chlorophenol	430	U
95-48-7	2-Methylphenol	430	U
108-60-1	2,2´-oxybis(1-Chloropropane)	430	U
98-86-2	Acetophenone	430	U
106-44-5	4-Methylphenol	430	U
621-64-7	N-Nitroso-di-n-propylamine	430	U
67-72-1	Hexachloroethane	270	J
98-95-3	Nitrobenzene	430	U
78-59-1	Isophorone	430	U
88-75-5	2-Nitrophenol	430	U
105-67-9	2,4-Dimethylphenol	430	U
111-91-1	bis(2-Chloroethoxy)methane	430	U
120-83-2	2,4-Dichlorophenol	430	U
91-20-3	Naphthalene	40	J
106-47-8	4-Chloroaniline	430	U
87-68-3	Hexachlorobutadiene	1300	
105-60-2	Caprolactam	430	U
59-50-7	4-Chloro-3-methylphenol	430	U
91-57-6	2-Methylnaphthalene	430	U
77-47-4	Hexachlorocyclopentadiene	430	U
88-06-2	2,4,6-Trichlorophenol	430	U
95-95-4	2,4,5-Trichlorophenol	1100	U
92-52-4	1,1´-Biphenyl	48	J
91-58-7	2-Chloronaphthalene	430	U
88-74-4	2-Nitroaniline	1100	U
131-11-3	Dimethylphthalate	430	U
606-20-2	2,6-Dinitrotoluene	430	U
208-96-8	Acenaphthylene	120	J
99-09-2	3-Nitroaniline	1100	U
83-32-9	Acenaphthene	67	J
51-28-5	2,4-Dinitrophenol	1100	U
100-02-7	4-Nitrophenol	1100	U

EPA SAMPLE NO.

FGW71

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-012B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1773.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 23 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.9 Extraction: (Type SONC

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	430	U
121-14-2	2,4-Dinitrotoluene	430	U
84-66-2	Diethylphthalate	430	U
86-73-7	Fluorene	38	J
7005-72-3	4-Chlorophenyl-phenylether	430	U
100-01-6	4-Nitroaniline	1100	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
86-30-6	N-Nitrosodiphenylamine (1)	430	U
101-55-3	4-Bromophenyl-phenylether	430	U
118-74-1	Hexachlorobenzene	2500	
1912-24-9	Atrazine	430	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	220	J
120-12-7	Anthracene	34	J
86-74-8	Carbazole	430	U
84-74-2	Di-n-butylphthalate	430	U
206-44-0	Fluoranthene	350	J
129-00-0	Pyrene	830	
85-68-7	Butylbenzylphthalate	430	U
91-94-1	3,3'-Dichlorobenzidine	430	U
56-55-3	Benzo(a)anthracene	46	J
218-01-9	Chrysene	99	J
117-81-7	bis(2-Ethylhexyl)phthalate	170	BJ
117-84-0	Di-n-octylphthalate	430	U
205-99-2	Benzo(b)fluoranthene	79	J
207-08-9	Benzo(k)fluoranthene	69	J
50-32-8	Benzo(a)pyrene	140	J
193-39-5	Indeno(1,2,3-cd)pyrene	110	J
53-70-3	Dibenzo(a,h)anthracene	430	U
191-24-2	Benzo(g,h,i)perylene	370	J

EPA SAMPLE NO.

FGW71

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-012B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1773.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 23 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/17/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.9 Extraction: (Type SONC

Number TICs found: 19 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	6.10	180	BJ
2.		Unknown (2)	6.62	160	BJ
3.		Unknown (3)	7.27	130	J
4.	059817-14-0	CYCLOBUTA(1,2-D)BENZYNE	12.64	330	NJ
5.		Unknown (5)	15.05	130	J
6.		Unknown (6)	15.23	110	J
7.		Unknown aromatic	16.82	280	J
8.		Unknown (8)	17.50	150	J
9.	000090-98-2	Methanone, bis(4-chlorophenyl)-	17.79	210	NJ
10.		Unknown (10)	18.02	97	J
11.		Unknown (11)	18.21	200	J
12.		Unknown (12)	19.37	130	J
13.		Unknown PAH (13)	20.75	180	J
14.		Unknown (14)	23.59	130	J
15.		Unknown (15)	24.36	110	J
16.		Unknown (16)	25.12	200	J
17.		Unknown PAH (17)	25.26	150	J
18.		Unknown (18)	27.93	280	J
19.		Unknown (19)	31.34	130	J

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW71RE

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-012B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1778.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 23 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.9 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	430	U
108-95-2	Phenol	430	U
111-44-4	bis(2-Chloroethyl)ether	430	U
95-57-8	2-Chlorophenol	430	U
95-48-7	2-Methylphenol	430	U
108-60-1	2,2'-oxybis(1-Chloropropane)	430	U
98-86-2	Acetophenone	29	J
106-44-5	4-Methylphenol	430	U
621-64-7	N-Nitroso-di-n-propylamine	430	U
67-72-1	Hexachloroethane	260	J
98-95-3	Nitrobenzene	430	U
78-59-1	Isophorone	430	U
88-75-5	2-Nitrophenol	430	U
105-67-9	2,4-Dimethylphenol	430	U
111-91-1	bis(2-Chloroethoxy)methane	430	U
120-83-2	2,4-Dichlorophenol	430	U
91-20-3	Naphthalene	37	J
106-47-8	4-Chloroaniline	430	U
87-68-3	Hexachlorobutadiene	1300	
105-60-2	Caprolactam	430	U
59-50-7	4-Chloro-3-methylphenol	430	U
91-57-6	2-Methylnaphthalene	430	U
77-47-4	Hexachlorocyclopentadiene	430	U
88-06-2	2,4,6-Trichlorophenol	430	U
95-95-4	2,4,5-Trichlorophenol	1100	U
92-52-4	1,1'-Biphenyl	47	J
91-58-7	2-Chloronaphthalene	430	U
88-74-4	2-Nitroaniline	1100	U
131-11-3	Dimethylphthalate	430	U
606-20-2	2,6-Dinitrotoluene	430	U
208-96-8	Acenaphthylene	130	J
99-09-2	3-Nitroaniline	1100	U
83-32-9	Acenaphthene	70	J
51-28-5	2,4-Dinitrophenol	1100	U
100-02-7	4-Nitrophenol	1100	U

EPA SAMPLE NO.

FGW71RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-012B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1778.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 23 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/17/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.9 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	430	U
121-14-2	2,4-Dinitrotoluene	430	U
84-66-2	Diethylphthalate	430	U
86-73-7	Fluorene	37	J
7005-72-3	4-Chlorophenyl-phenylether	430	U
100-01-6	4-Nitroaniline	1100	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
86-30-6	N-Nitrosodiphenylamine (1)	430	U
101-55-3	4-Bromophenyl-phenylether	430	U
118-74-1	Hexachlorobenzene	2600	
1912-24-9	Atrazine	430	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	220	J
120-12-7	Anthracene	32	J
86-74-8	Carbazole	430	U
84-74-2	Di-n-butylphthalate	430	U
206-44-0	Fluoranthene	370	J
129-00-0	Pyrene	890	
85-68-7	Butylbenzylphthalate	430	U
91-94-1	3,3'-Dichlorobenzidine	430	U
56-55-3	Benzo(a)anthracene	50	J
218-01-9	Chrysene	90	J
117-81-7	bis(2-Ethylhexyl)phthalate	170	BJ
117-84-0	Di-n-octylphthalate	430	U
205-99-2	Benzo(b)fluoranthene	81	J
207-08-9	Benzo(k)fluoranthene	76	J
50-32-8	Benzo(a)pyrene	130	J
193-39-5	Indeno(1,2,3-cd)pyrene	120	J
53-70-3	Dibenzo(a,h)anthracene	430	U
191-24-2	Benzo(g,h,i)perylene	400	J

1G

EPA SAMPLE NO.

FGW71RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-012B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1778.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 23 Decanted: (Y/N) N Date Extracted: 04/07/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/17/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.9 Extraction: (Type SONC

Number TICs found: 20 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	6.09	160	BJ
2.		Unknown (19)	6.62	160	BJ
3.	000095-50-1	Benzene, 1,2-dichloro-	7.07	180	NJ
4.		Unknown (3)	7.27	120	J
5.	059817-14-0	CYCLOBUTA(1,2-D)BENZYNE	12.64	350	NJ
6.		Unknown (5)	15.05	130	J
7.		Unknown (6)	15.23	97	J
8.		Unknown aromatic (7)	16.83	280	J
9.		Unknown (8)	17.50	140	J
10.		Unknown aromatic (9)	17.79	110	J
11.		Unknown aromatic (10)	18.22	150	J
12.		Unknown (11)	19.38	140	J
13.		Unknown (20)	19.69	140	J
14.		Unknown PAH	20.75	160	J
15.		Unknown (13)	23.57	140	J
16.		Unknown (14)	24.77	190	J
17.		Unknown (15)	25.13	190	J
18.		Unknown (16)	26.00	160	J
19.		Unknown (17)	26.64	140	J
20.		Unknown (18)	27.93	400	J

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGA73

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: ____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-001B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes207.rst

% Moisture: 23 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/18/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/20/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.8 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	9.6	
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.3	U
72-55-9	4,4'-DDE	4.3	U
72-20-8	Endrin	4.3	U
33213-65-9	Endosulfan II	4.3	U
72-54-8	4,4'-DDD	4.3	U
1031-07-8	Endosulfan sulfate	4.3	U
50-29-3	4,4'-DDT	4.3	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.3	U
7421-93-4	Endrin aldehyde	4.3	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor 1016	43	U
11104-28-2	Aroclor 1221	87	U
11141-16-5	Aroclor 1232	43	U
53469-21-9	Aroclor 1242	43	U
12672-29-6	Aroclor 1248	290	
11097-69-1	Aroclor 1254	43	U
11096-82-5	Aroclor 1260	43	U

RH 4-29-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW58

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-002D

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes208.rst

% Moisture: 38 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/18/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/20/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.4 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.7	U
319-85-7	beta-BHC	2.7	U
319-86-8	delta-BHC	2.7	U
58-89-9	gamma-BHC (Lindane)	2.7	U
76-44-8	Heptachlor	2.7	U
309-00-2	Aldrin	6.5	
1024-57-3	Heptachlor epoxide	2.7	U
959-98-8	Endosulfan I	2.7	U
60-57-1	Dieldrin	5.3	U
72-55-9	4,4`-DDE	5.3	U
72-20-8	Endrin	1.9	J
33213-65-9	Endosulfan II	5.3	U
72-54-8	4,4`-DDD	5.3	U
1031-07-8	Endosulfan sulfate	5.3	U
50-29-3	4,4`-DDT	5.3	U
72-43-5	Methoxychlor	27	U
53494-70-5	Endrin ketone	5.3	U
7421-93-4	Endrin aldehyde	5.3	U
5103-71-9	alpha-Chlordane	2.7	U
5103-74-2	gamma-Chlordane	2.7	U
8001-35-2	Toxaphene	270	U
12674-11-2	Aroclor 1016	53	U
11104-28-2	Aroclor 1221	110	U
11141-16-5	Aroclor 1232	53	U
53469-21-9	Aroclor 1242	53	U
12672-29-6	Aroclor 1248	160	
11097-69-1	Aroclor 1254	53	U
11096-82-5	Aroclor 1260	53	U

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R#4-27-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW59

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: ____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-003B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes134.rst

% Moisture: 27 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q	
319-84-6	alpha-BHC	2.3	U	
319-85-7	beta-BHC	2.3	U	
319-86-8	delta-BHC	2.3	U	
58-89-9	gamma-BHC (Lindane)	2.3	U	
76-44-8	Heptachlor	1.9	PJ	✓
309-00-2	Aldrin	2.3	U	
1024-57-3	Heptachlor epoxide	6.1	P	✓
959-98-8	Endosulfan I	2.3	U	
60-57-1	Dieldrin	4.5	U	
72-55-9	4,4'-DDE	4.5	U	
72-20-8	Endrin	4.5	U	
33213-65-9	Endosulfan II	4.5	U	
72-54-8	4,4'-DDD	4.5	U	
1031-07-8	Endosulfan sulfate	4.5	U	
50-29-3	4,4'-DDT	3.8	PJ	✓
72-43-5	Methoxychlor	41	P	✓
53494-70-5	Endrin ketone	15	P	
7421-93-4	Endrin aldehyde	4.5	U	
5103-71-9	alpha-Chlordane	0.96	PJ	✓
5103-74-2	gamma-Chlordane	4.5	P	✓
8001-35-2	Toxaphene	230	U	
12674-11-2	Aroclor 1016	45	U	
11104-28-2	Aroclor 1221	92	U	
11141-16-5	Aroclor 1232	45	U	
53469-21-9	Aroclor 1242	45	U	
12672-29-6	Aroclor 1248	45	U	
11097-69-1	Aroclor 1254	45	U	
11096-82-5	Aroclor 1260	45	U	

RH 4-21-00

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW60

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-004B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes135.rst

% Moisture: 27 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.8 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.3	U
319-85-7	beta-BHC	2.3	U
319-86-8	delta-BHC	2.3	U
58-89-9	gamma-BHC (Lindane)	2.3	U
76-44-8	Heptachlor	1.6	PJ
309-00-2	Aldrin	2.3	U
1024-57-3	Heptachlor epoxide	7.0	P
959-98-8	Endosulfan I	2.3	U
60-57-1	Dieldrin	1.9	PJ
72-55-9	4,4`-DDE	4.5	U
72-20-8	Endrin	4.5	U
33213-65-9	Endosulfan II	4.5	U
72-54-8	4,4`-DDD	4.5	U
1031-07-8	Endosulfan sulfate	4.5	U
50-29-3	4,4`-DDT	4.6	P
72-43-5	Methoxychlor	58	P
53494-70-5	Endrin ketone	21	P
7421-93-4	Endrin aldehyde	4.5	U
5103-71-9	alpha-Chlordane	0.58	PJ
5103-74-2	gamma-Chlordane	3.7	P
8001-35-2	Toxaphene	230	U
12674-11-2	Aroclor 1016	45	U
11104-28-2	Aroclor 1221	92	U
11141-16-5	Aroclor 1232	45	U
53469-21-9	Aroclor 1242	45	U
12672-29-6	Aroclor 1248	45	U
11097-69-1	Aroclor 1254	45	U
11096-82-5	Aroclor 1260	45	U

RH4-29-00

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW61

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-005B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes136.rst

% Moisture: 23 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.9 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	0.86	PJ
76-44-8	Heptachlor	1.4	PJ
309-00-2	Aldrin	2.2	U
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.3	U
72-55-9	4,4`-DDE	4.3	U
72-20-8	Endrin	4.3	U
33213-65-9	Endosulfan II	4.3	U
72-54-8	4,4`-DDD	2.5	PJ
1031-07-8	Endosulfan sulfate	4.3	U
50-29-3	4,4`-DDT	4.3	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	2.0	PJ
7421-93-4	Endrin aldehyde	4.3	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor 1016	43	U
11104-28-2	Aroclor 1221	87	U
11141-16-5	Aroclor 1232	43	U
53469-21-9	Aroclor 1242	43	U
12672-29-6	Aroclor 1248	43	U
11097-69-1	Aroclor 1254	43	U
11096-82-5	Aroclor 1260	43	U

RH 4-29-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW62

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: ____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-006B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes211.rst

% Moisture: 32 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/18/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/20/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.8 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.5	U
319-85-7	beta-BHC	7.6	P
319-86-8	delta-BHC	2.5	U
58-89-9	gamma-BHC (Lindane)	2.5	U
76-44-8	Heptachlor	2.5	U
309-00-2	Aldrin	150	E
1024-57-3	Heptachlor epoxide	2.5	U
959-98-8	Endosulfan I	27	P
60-57-1	Dieldrin	4.9	U
72-55-9	4,4`-DDE	4.9	U
72-20-8	Endrin	48	
33213-65-9	Endosulfan II	5.3	P
72-54-8	4,4`-DDD	4.9	U
1031-07-8	Endosulfan sulfate	4.9	U
50-29-3	4,4`-DDT	4.9	U
72-43-5	Methoxychlor	25	U
53494-70-5	Endrin ketone	2.3	PJ
7421-93-4	Endrin aldehyde	4.9	U
5103-71-9	alpha-Chlordane	2.5	U
5103-74-2	gamma-Chlordane	2.5	U
8001-35-2	Toxaphene	250	U
12674-11-2	Aroclor 1016	49	U
11104-28-2	Aroclor 1221	99	U
11141-16-5	Aroclor 1232	49	U
53469-21-9	Aroclor 1242	49	U
12672-29-6	Aroclor 1248	3300	P
11097-69-1	Aroclor 1254	49	U
11096-82-5	Aroclor 1260	290	P

RH 4-27-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW62DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-006B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes216.rst

% Moisture: 32 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/18/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/20/00

Injection Volume: 1 (uL) Dilution Factor: 10.00

GPC Cleanup: (Y/N) N pH: 8.9 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	25	U
319-85-7	beta-BHC	12	DPJ
319-86-8	delta-BHC	25	U
58-89-9	gamma-BHC (Lindane)	25	U
76-44-8	Heptachlor	25	U
309-00-2	Aldrin	260	D
1024-57-3	Heptachlor epoxide	25	U
959-98-8	Endosulfan I	33	DP
60-57-1	Dieldrin	49	U
72-55-9	4,4'-DDE	49	U
72-20-8	Endrin	72	DP
33213-65-9	Endosulfan II	49	U
72-54-8	4,4'-DDD	49	U
1031-07-8	Endosulfan sulfate	49	U
50-29-3	4,4'-DDT	49	U
72-43-5	Methoxychlor	250	U
53494-70-5	Endrin ketone	49	U
7421-93-4	Endrin aldehyde	49	U
5103-71-9	alpha-Chlordane	25	U
5103-74-2	gamma-Chlordane	25	U
8001-35-2	Toxaphene	2500	U
12674-11-2	Aroclor 1016	490	U
11104-28-2	Aroclor 1221	990	U
11141-16-5	Aroclor 1232	490	U
53469-21-9	Aroclor 1242	490	U
12672-29-6	Aroclor 1248	5400	DP
11097-69-1	Aroclor 1254	490	U
11096-82-5	Aroclor 1260	490	U

RH4-29-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW63

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes138.rst

% Moisture: 41 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.2 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.9	U
319-85-7	beta-BHC	6.9	P
319-86-8	delta-BHC	2.9	U
58-89-9	gamma-BHC (Lindane)	2.9	U
76-44-8	Heptachlor	19	P
309-00-2	Aldrin	150	E
1024-57-3	Heptachlor epoxide	2.9	U
959-98-8	Endosulfan I	9.9	P
60-57-1	Dieldrin	5.6	U
72-55-9	4,4`-DDE	5.6	U
72-20-8	Endrin	25	P
33213-65-9	Endosulfan II	2.9	PJ
72-54-8	4,4`-DDD	5.6	U
1031-07-8	Endosulfan sulfate	5.6	U
50-29-3	4,4`-DDT	5.6	U
72-43-5	Methoxychlor	27	PJ
53494-70-5	Endrin ketone	5.6	U
7421-93-4	Endrin aldehyde	5.6	U
5103-71-9	alpha-Chlordane	2.9	U
5103-74-2	gamma-Chlordane	2.9	U
8001-35-2	Toxaphene	290	U
12674-11-2	Aroclor 1016	56	U
11104-28-2	Aroclor 1221	110	U
11141-16-5	Aroclor 1232	56	U
53469-21-9	Aroclor 1242	56	U
12672-29-6	Aroclor 1248	4600	E
11097-69-1	Aroclor 1254	56	U
11096-82-5	Aroclor 1260	250	

RH 4-29-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW63DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes153.rst

% Moisture: 41 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/18/00

Injection Volume: 1 (uL) Dilution Factor: 10.00

GPC Cleanup: (Y/N) N pH: 8.2 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	29	U
319-85-7	beta-BHC	12	DPJ
319-86-8	delta-BHC	29	U
58-89-9	gamma-BHC (Lindane)	29	U
76-44-8	Heptachlor	44	DP
309-00-2	Aldrin	290	D
1024-57-3	Heptachlor epoxide	29	U
959-98-8	Endosulfan I	6.2	DPJ
60-57-1	Dieldrin	56	U
72-55-9	4,4`-DDE	56	U
72-20-8	Endrin	40	DPJ
33213-65-9	Endosulfan II	56	U
72-54-8	4,4`-DDD	56	U
1031-07-8	Endosulfan sulfate	56	U
50-29-3	4,4`-DDT	56	U
72-43-5	Methoxychlor	290	U
53494-70-5	Endrin ketone	56	U
7421-93-4	Endrin aldehyde	56	U
5103-71-9	alpha-Chlordane	29	U
5103-74-2	gamma-Chlordane	29	U
8001-35-2	Toxaphene	2900	U
12674-11-2	Aroclor 1016	560	U
11104-28-2	Aroclor 1221	1100	U
11141-16-5	Aroclor 1232	560	U
53469-21-9	Aroclor 1242	560	U
12672-29-6	Aroclor 1248	7700	DP
11097-69-1	Aroclor 1254	560	U
11096-82-5	Aroclor 1260	560	U

RH 4-27-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW66

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-008B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes139.rst

% Moisture: 60 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/18/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	4.2	U
319-85-7	beta-BHC	4.2	U
319-86-8	delta-BHC	4.2	U
58-89-9	gamma-BHC (Lindane)	4.2	U
76-44-8	Heptachlor	4.2	U
309-00-2	Aldrin	230	PE
1024-57-3	Heptachlor epoxide	4.2	U
959-98-8	Endosulfan I	70	P
60-57-1	Dieldrin	8.2	U
72-55-9	4,4`-DDE	8.2	U
72-20-8	Endrin	150	E
33213-65-9	Endosulfan II	8.2	U
72-54-8	4,4`-DDD	8.2	U
1031-07-8	Endosulfan sulfate	8.2	U
50-29-3	4,4`-DDT	8.2	U
72-43-5	Methoxychlor	9.5	PJ
53494-70-5	Endrin ketone	8.2	P
7421-93-4	Endrin aldehyde	8.2	U
5103-71-9	alpha-Chlordane	1.2	PJ
5103-74-2	gamma-Chlordane	4.2	U
8001-35-2	Toxaphene	420	U
12674-11-2	Aroclor 1016	82	U
11104-28-2	Aroclor 1221	170	U
11141-16-5	Aroclor 1232	82	U
53469-21-9	Aroclor 1242	82	U
12672-29-6	Aroclor 1248	8600	PE
11097-69-1	Aroclor 1254	82	U
11096-82-5	Aroclor 1260	3400	P

RH 4-24-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW66DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-008B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes154.rst

% Moisture: 60 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/18/00

Injection Volume: 1 (uL) Dilution Factor: 10.00

GPC Cleanup: (Y/N) N pH: 8.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	42	U
319-85-7	beta-BHC	42	U
319-86-8	delta-BHC	42	U
58-89-9	gamma-BHC (Lindane)	42	U
76-44-8	Heptachlor	42	U
309-00-2	Aldrin	390	D
1024-57-3	Heptachlor epoxide	42	U
959-98-8	Endosulfan I	60	DP
60-57-1	Dieldrin	82	U
72-55-9	4,4'-DDE	82	U
72-20-8	Endrin	220	D
33213-65-9	Endosulfan II	82	U
72-54-8	4,4'-DDD	82	U
1031-07-8	Endosulfan sulfate	82	U
50-29-3	4,4'-DDT	82	U
72-43-5	Methoxychlor	250	DPJ
53494-70-5	Endrin ketone	82	U
7421-93-4	Endrin aldehyde	82	U
5103-71-9	alpha-Chlordane	42	U
5103-74-2	gamma-Chlordane	42	U
8001-35-2	Toxaphene	4200	U
12674-11-2	Aroclor 1016	820	U
11104-28-2	Aroclor 1221	1700	U
11141-16-5	Aroclor 1232	820	U
53469-21-9	Aroclor 1242	820	U
12672-29-6	Aroclor 1248	14000	D
11097-69-1	Aroclor 1254	820	U
11096-82-5	Aroclor 1260	820	U

RH 4-29-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW67

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-009B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes155.rst

% Moisture: 45 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/18/00

Injection Volume: 1 (uL) Dilution Factor: 100.00

GPC Cleanup: (Y/N) Y pH: 7.8 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	310	U
319-85-7	beta-BHC	310	U
319-86-8	delta-BHC	310	U
58-89-9	gamma-BHC (Lindane)	310	U
76-44-8	Heptachlor	1100	P
309-00-2	Aldrin	8200	PE
1024-57-3	Heptachlor epoxide	310	U
959-98-8	Endosulfan I	270	PJ
60-57-1	Dieldrin	600	U
72-55-9	4,4`-DDE	600	U
72-20-8	Endrin	1000	P
33213-65-9	Endosulfan II	150	PJ
72-54-8	4,4`-DDD	600	U
1031-07-8	Endosulfan sulfate	600	U
50-29-3	4,4`-DDT	600	U
72-43-5	Methoxychlor	50	PJ
53494-70-5	Endrin ketone	100	PJ
7421-93-4	Endrin aldehyde	600	U
5103-71-9	alpha-Chlordane	310	U
5103-74-2	gamma-Chlordane	310	U
8001-35-2	Toxaphene	31000	U
12674-11-2	Aroclor 1016	6000	U
11104-28-2	Aroclor 1221	12000	U
11141-16-5	Aroclor 1232	6000	U
53469-21-9	Aroclor 1242	6000	U
12672-29-6	Aroclor 1248	290000	EC
11097-69-1	Aroclor 1254	6000	U
11096-82-5	Aroclor 1260	6000	U

RA 4-29-00

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW67DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-009B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes157.rst

% Moisture: 45 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/18/00

Injection Volume: 1 (uL) Dilution Factor: 1.000.00

GPC Cleanup: (Y/N) N pH: 7.8 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	3100	U
319-85-7	beta-BHC	3100	U
319-86-8	delta-BHC	3100	U
58-89-9	gamma-BHC (Lindane)	3100	U
76-44-8	Heptachlor	1300	DPJ
309-00-2	Aldrin	11000	DP
1024-57-3	Heptachlor epoxide	3100	U
959-98-8	Endosulfan I	3100	U
60-57-1	Dieldrin	6000	U
72-55-9	4,4'-DDE	6000	U
72-20-8	Endrin	890	DPJ
33213-65-9	Endosulfan II	6000	U
72-54-8	4,4'-DDD	6000	U
1031-07-8	Endosulfan sulfate	6000	U
50-29-3	4,4'-DDT	6000	U
72-43-5	Methoxychlor	31000	U
53494-70-5	Endrin ketone	6000	U
7421-93-4	Endrin aldehyde	6000	U
5103-71-9	alpha-Chlordane	3100	U
5103-74-2	gamma-Chlordane	3100	U
8001-35-2	Toxaphene	310000	U
12674-11-2	Aroclor 1016	60000	U
11104-28-2	Aroclor 1221	120000	U
11141-16-5	Aroclor 1232	60000	U
53469-21-9	Aroclor 1242	60000	U
12672-29-6	Aroclor 1248	300000	DC
11097-69-1	Aroclor 1254	60000	U
11096-82-5	Aroclor 1260	60000	U

R#4-29-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW68

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-010B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes147.rst

% Moisture: 53 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/18/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	3.6	U
319-85-7	beta-BHC	3.6	U
319-86-8	delta-BHC	3.6	U
58-89-9	gamma-BHC (Lindane)	3.6	U
76-44-8	Heptachlor	3.6	U
309-00-2	Aldrin	240	PE
1024-57-3	Heptachlor epoxide	3.6	U
959-98-8	Endosulfan I	3.6	U
60-57-1	Dieldrin	7.0	U
72-55-9	4,4`-DDE	7.0	U
72-20-8	Endrin	7.0	U
33213-65-9	Endosulfan II	7.0	U
72-54-8	4,4`-DDD	62	P
1031-07-8	Endosulfan sulfate	7.0	U
50-29-3	4,4`-DDT	7.0	U
72-43-5	Methoxychlor	18	PJ
53494-70-5	Endrin ketone	24	P
7421-93-4	Endrin aldehyde	7.0	U
5103-71-9	alpha-Chlordane	5.5	P
5103-74-2	gamma-Chlordane	3.6	U
8001-35-2	Toxaphene	360	U
12674-11-2	Aroclor 1016	70	U
11104-28-2	Aroclor 1221	140	U
11141-16-5	Aroclor 1232	70	U
53469-21-9	Aroclor 1242	70	U
12672-29-6	Aroclor 1248	14000	E
11097-69-1	Aroclor 1254	70	U
11096-82-5	Aroclor 1260	70	U

RH 4-29-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW68DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: ____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-010B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes151.rst

% Moisture: 53 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/18/00

Injection Volume: 1 (uL) Dilution Factor: 10.00

GPC Cleanup: (Y/N) N pH: 8.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	36	U
319-85-7	beta-BHC	36	U
319-86-8	delta-BHC	36	U
58-89-9	gamma-BHC (Lindane)	36	U
76-44-8	Heptachlor	36	U
309-00-2	Aldrin	420	DP
1024-57-3	Heptachlor epoxide	36	U
959-98-8	Endosulfan I	36	U
60-57-1	Dieldrin	70	U
72-55-9	4,4'-DDE	70	U
72-20-8	Endrin	70	U
33213-65-9	Endosulfan II	70	U
72-54-8	4,4'-DDD	55	DPJ
1031-07-8	Endosulfan sulfate	70	U
50-29-3	4,4'-DDT	70	U
72-43-5	Methoxychlor	16	DPJ
53494-70-5	Endrin ketone	30	DPJ
7421-93-4	Endrin aldehyde	70	U
5103-71-9	alpha-Chlordane	36	U
5103-74-2	gamma-Chlordane	36	U
8001-35-2	Toxaphene	3600	U
12674-11-2	Aroclor 1016	700	U
11104-28-2	Aroclor 1221	1400	U
11141-16-5	Aroclor 1232	700	U
53469-21-9	Aroclor 1242	700	U
12672-29-6	Aroclor 1248	19000	D
11097-69-1	Aroclor 1254	700	U
11096-82-5	Aroclor 1260	700	U

RA 4-27-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW69

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: ____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-011B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes148.rst

% Moisture: 36 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/18/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.2 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.7	U
319-85-7	beta-BHC	2.7	U
319-86-8	delta-BHC	2.7	U
58-89-9	gamma-BHC (Lindane)	2.7	U
76-44-8	Heptachlor	4.9	P
309-00-2	Aldrin	53	E
1024-57-3	Heptachlor epoxide	2.7	U
959-98-8	Endosulfan I	0.99	PJ
60-57-1	Dieldrin	5.2	U
72-55-9	4,4'-DDE	5.2	U
72-20-8	Endrin	12	
33213-65-9	Endosulfan II	5.2	U
72-54-8	4,4'-DDD	5.2	U
1031-07-8	Endosulfan sulfate	5.2	U
50-29-3	4,4'-DDT	5.2	U
72-43-5	Methoxychlor	27	U
53494-70-5	Endrin ketone	2.5	PJ
7421-93-4	Endrin aldehyde	5.2	U
5103-71-9	alpha-Chlordane	2.7	U
5103-74-2	gamma-Chlordane	2.7	U
8001-35-2	Toxaphene	270	U
12674-11-2	Aroclor 1016	52	U
11104-28-2	Aroclor 1221	100	U
11141-16-5	Aroclor 1232	52	U
53469-21-9	Aroclor 1242	52	U
12672-29-6	Aroclor 1248	1400	
11097-69-1	Aroclor 1254	52	U
11096-82-5	Aroclor 1260	52	U

RH 4-27-00

1E

EPA SAMPLE NO.

FGW69DL

PESTICIDE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-011B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes152.rst

% Moisture: 36 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/08/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/18/00

Injection Volume: 1 (uL) Dilution Factor: 10.00

GPC Cleanup: (Y/N) N pH: 8.2 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	27	U
319-85-7	beta-BHC	27	U
319-86-8	delta-BHC	27	U
58-89-9	gamma-BHC (Lindane)	27	U
76-44-8	Heptachlor	12	DPJ
309-00-2	Aldrin	110	D
1024-57-3	Heptachlor epoxide	27	U
959-98-8	Endosulfan I	27	U
60-57-1	Dieldrin	52	U
72-55-9	4,4'-DDE	52	U
72-20-8	Endrin	8.9	DPJ
33213-65-9	Endosulfan II	52	U
72-54-8	4,4'-DDD	52	U
1031-07-8	Endosulfan sulfate	52	U
50-29-3	4,4'-DDT	52	U
72-43-5	Methoxychlor	270	U
53494-70-5	Endrin ketone	52	U
7421-93-4	Endrin aldehyde	52	U
5103-71-9	alpha-Chlordane	27	U
5103-74-2	gamma-Chlordane	27	U
8001-35-2	Toxaphene	2700	U
12674-11-2	Aroclor 1016	520	U
11104-28-2	Aroclor 1221	1000	U
11141-16-5	Aroclor 1232	520	U
53469-21-9	Aroclor 1242	520	U
12672-29-6	Aroclor 1248	2700	D
11097-69-1	Aroclor 1254	520	U
11096-82-5	Aroclor 1260	520	U

RH 4-27-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW71

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: ____ SDG No.: FGA73

Matrix: (soil/water) SOIL Lab Sample ID: 00040049-012B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes212.rst

% Moisture: 23 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/18/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/20/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.9 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	17	
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.3	U
72-55-9	4,4`-DDE	4.0	PJ
72-20-8	Endrin	4.3	U
33213-65-9	Endosulfan II	4.3	U
72-54-8	4,4`-DDD	4.3	U
1031-07-8	Endosulfan sulfate	4.3	U
50-29-3	4,4`-DDT	4.3	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.3	U
7421-93-4	Endrin aldehyde	4.3	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor 1016	43	U
11104-28-2	Aroclor 1221	87	U
11141-16-5	Aroclor 1232	43	U
53469-21-9	Aroclor 1242	43	U
12672-29-6	Aroclor 1248	570	
11097-69-1	Aroclor 1254	43	U
11096-82-5	Aroclor 1260	43	U

RH 4-29-00

Reference 15

SDG FGW45, CLP Data Review
and Organic Regional Data
Assessment Package

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEMORANDUM

Date: July 6, 2000

Subject: Contract Laboratory Program Data Review

From: Marvelyn Humphrey, Alternate ESAT RPO, 6MD-HC

To: B. Rhotenberry, 6SF-RA

Site : PATRICK BAYOU

Case#: 27912

SDG# : FGW45

The EPA Region 6 Houston Branch ESAT data review team has completed a review of the submitted Contract Laboratory Program (CLP) data package for the referenced site. The samples analyzed and reviewed are detailed in the attached Regional data review report.

The data package is acceptable for regional use. Problems, if any, are listed in the report narrative.

If you have any questions regarding the data review report, please call me at (281) 983-2140.

Attachments
cc: R. Flores, Region 6 CLP/TPO
M. El-Feky, Region 6 Data Coordinator
Files (2)

15 00

LOCKHEED MARTIN SERVICES GROUP
ESAT REGION VI
10101 SOUTHWEST FREEWAY, SUITE 500
HOUSTON, TX 77074

MEMORANDUM

DATE: July 6, 2000
TO: Melvin Ritter/Marvelyn Humphrey, ESAT RPO/Alternate RPO, Region VI
FROM: Tom C.H. Chiang, ESAT Team Manager, Region VI
SUBJECT: CLP Data Review
REF: TDF # 6-0370A ESAT # O-2199
ESAT Contract No. 68-D6-0005

Attached is the data review summary for Case # 27912
SDG # FGW45
Site Patrick Bayou

COMMENTS:

I. CONTRACTUAL ASSESSMENT OF THE DATA PACKAGE

A. CCS and hardcopy reviews found the noncompliant items below. Several noncompliant items reported by CCS could not be confirmed by the hardcopy review.

1. VOA sample FG-W56 was analyzed 15 days past the holding time limit (OLM04.2, D-19/VOA, 8.3). Positive hit results were qualified.
2. The reviewer could not assess storage contamination for VOA sample FG-W56 because the sample was analyzed 15 days after the storage blank was analyzed (OLM04.2, D-48/VOA, 12.1.2.3).
3. The laboratory failed to analyze an instrument blank or show in a subsequent analysis that carryover contamination did not occur from the analysis of VOA sample FG-W50 where 1,3-dichlorobenzene exceeded the calibration limit (OLM04.2, D-44/VOA to D-45/VOA, 11.3.9). Sample results were not technically affected.
4. All BNA samples were extracted 3 to 10 days past the holding time limit (OLM04.2, D-18/SVOA, 8.4.1). No results were qualified.
5. Pest/PCB sample FG-W48 was extracted 10 days past the holding time limit (OLM04.2, D-19/PEST, 8.4.1). Positive hit results were qualified.
6. The response exceeded the initial calibration high point response on one column for γ-BHC and endrin ketone in Pest/PCB samples FG-W48DL and FG-W51, respectively, but the laboratory failed to dilute and reanalyze the samples (OLM04.2, D-57/PEST, 10.2.3.2). Since acceptable results were reported from the second column, no qualification was required.

LOCKHEED MARTIN SERVICES GROUP
ESAT REGION VI
10101 SOUTHWEST FREEWAY, SUITE 500
HOUSTON, TX 77074

MEMORANDUM

Attached is the data review summary for Case # 27912
SDG # FGW45
Site Patrick Bayou

COMMENTS (continued):

B. The reviewer found the noncompliant items below in the hardcopy package that were not reported by CCS.

1. BNA samples FG-W51, FG-W52, and FG-W53 were medium level samples but were analyzed at the low level. The analyst diluted the samples 40X to 50X to bring analyte concentrations within the calibration ranges despite the fact that the contract permits a maximum dilution factor of only 30X for low level samples (OLM04.2, D-43/SVOA, 10.6.5.4). No results were qualified because of the wrong analysis levels.
2. The laboratory failed to perform GC/MS confirmation for AR1248 in Pest/PCB samples FG-W48 and FG-W49 (OLM04.2, D-59/PEST, 11.1.2). Result qualification was not required.

C. The reviewer found the noncompliant item below that CCS is not expected to detect.

The data package was 8 working days late for the 21-day turnaround requirement.

II. TECHNICAL USABILITY ASSESSMENT OF THE DATA PACKAGE

The total number of results reviewed was 2,256 for this data package. Some results were qualified for technical problems, and the significant problems are discussed below.

A. Excessive holding times caused data qualification for VOA sample FG-W56 and Pest/PCB sample FG-W48.
B. TCX recoveries were below the QC limit for Pest/PCB samples FG-W54, FG-W55, FG-W56, and FG-W57.
C. VOA and Pest/PCB field duplicate results were inconsistent.
D. AR1248 peaks interfered with aldrin detection in Pest/PCB samples FG-W48, FG-W49, and FG-W50.

III. OTHER AREAS OF CONCERN

No temperature blank was present for one shipping cooler.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

ORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 27912 SITE Patrick Bayou
LABORATORY CLAYTN NO. OF SAMPLES 16
CONTRACT# 68-W-99-069 MATRIX soil
SDG# FGW45 REVIEWER (IF NOT ESD) ESAT
SOW# SOW OLM04.2 REVIEWER'S NAME Mike Fertitta
ACCT#050102DJN60 SF#50102DZZ COMPLETION DATE July 6, 2000

SAMPLE NO.'s:

FG-W45	FG-W49	FG-W53	FG-W57	
FG-W46	FG-W50	FG-W54	FG-W64	
FG-W47	FG-W51	FG-W55	FG-W65	
FG-W48	FG-W52	FG-W56	FG-W70	

DATA ASSESSMENT SUMMARY

	VOA	BNA	PEST
1. HOLDING TIMES	M	O	M
2. GC/MS TUNE/INSTR. PERFORM.	O	O	M
3. CALIBRATIONS	M	O	O
4. BLANKS	M	M	O
5. SMC/SURROGATES	O	O	M
6. MATRIX SPIKE/DUPLICATE	M	M	O
7. OTHER QC	M	O	M
8. INTERNAL STANDARDS	O	O	N/A
9. COMPOUND ID/QUANTITATION	O	O	M
10. PERFORMANCE/COMPLETENESS	O	O	O
11. OVERALL ASSESSMENT	M	M	M

O = Data had no problems.
M = Data qualified due to major or minor problems.
Z = Data unacceptable.
NA = Not applicable.

ACTION ITEMS: The data package was 8 working days late for the 21-day turnaround requirement. One VOA analysis and one Pest/PCB extraction exceeded contractual holding time limits.
AREAS OF CONCERN: All BNA samples had excessive holding times. One VOA sample was analyzed 15 days after the storage blank. The absence of VOA carryover contamination was not demonstrated. Three BNA samples were analyzed at the wrong level. Pesticide responses were high for two samples that weren't diluted and reanalyzed. Two AR1248 results were not confirmed by GC/MS. Excessive holding times caused data qualification for one VOA and one Pest/PCB samples. Two pesticides coeluted on one column. Three VOA analytes failed technical calibration criteria. Laboratory contamination affected 1 BNA and 12 VOA samples. TCX recoveries were low for four samples. VOA and BNA MS/MSD results were outlying. VOA and Pest/PCB field duplicate results were inconsistent. Eight Pest/PCB samples had compound identification and/or quantitation problems.

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COMMENTS/CLARIFICATIONS
REGION VI CLP QA REVIEW

CASE 27912 **SDG** FGW45 **SITE** Patrick Bayou **LAB** CLAYTN

The following is a summary of sample qualifiers used by Region 6 in reporting this CLP data:

No.	Acceptable	Provisional	Unacceptable
VOA	3	13	
BNA	14	2	
PEST	4	12	

COMMENTS: This SDG consisted of 16 soil samples for complete RAS organics analyses by SOW OLM04.2. The OTR/COC Records designated sample FG-W45 as the laboratory QC sample and samples FG-W49/FG-W50, FG-W52/FG-W53, and FG-W64/FG-W65 as field duplicate pairs. The only medium level analyses were the reanalyses of VOA samples FG-W50 and FG-W51. The CRQL's required %moisture correction for the soil samples, and diluted samples required additional CRQL correction. The corrected CRQL's were reported by the laboratory and are referred to as sample quantitation limits (SQL's) in this report. CCS and/or hardcopy review found the contractually noncompliant items below.

- VOA sample FG-W56 was analyzed 15 days past the holding time limit and 15 days after the storage blank was analyzed.
- The absence of 1,3-dichlorobenzene carryover contamination was not demonstrated before VOA sample FG-W51 was analyzed.
- All BNA samples were extracted 3 to 10 days past the limit.
- BNA samples FG-W51, FG-W52, and FG-W53 were analyzed at the wrong levels.
- Pest/PCB sample FG-W48 was extracted 10 days past the limit.
- Responses exceeded the limits for γ-BHC and endrin ketone in Pest/PCB samples FG-W48DL and FG-W51, respectively, but the laboratory failed to dilute and reanalyze the samples.
- GC/MS confirmation was omitted for AR1248 in samples FG-W48 and FG-W49.
- The data package was 8 working days late for the 21-day turnaround requirement.

VOA Modified medium level reanalyses ("DL" suffices) were performed for samples FG-W50 and FG-W51 because of high concentrations of chlorobenzene (1,100 μg/Kg in sample FG-W51) and/or 1,3-dichlorobenzene (1,700 μg/Kg in both samples). High concentrations (up to 2,800 μg/Kg) of total xylenes, isopropylbenzene, and/or chlorinated benzenes required initial analyses or reanalyses at reduced sample volume (5X dilution) for low level samples FG-W48, FG-W49, FG-W52, FG-W53, FG-W64, FG-W65, and FG-W70. Other target analytes with concentrations above the SQL's in the samples included acetone, carbon disulfide, methylene chloride, cyclohexane, benzene, trichloroethene, methylcyclohexane, toluene, and/or ethylbenzene. However, some acetone, methylene chloride, and carbon disulfide concentrations

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CASE 27912 **SDG** FGW45 **SITE** Patrick Bayou **LAB** CLAYTN

COMMENTS (continued): were attributed to contamination.

BNA Samples FG-W48, FG-W49, FG-W50, FG-W51, FG-W52, FG-W53, and FG-W70 were initially analyzed or reanalyzed at 4X to 50X dilution because of high concentrations of hexachloroethane (up to 13,000 µg/Kg), hexachlorobutadiene (up to 95,000 µg/Kg), and/or PAH's (up to 70,000 µg/Kg pyrene). Acenaphthene or bis(2-ethylhexyl)phthalate were detected at concentrations above the SQL's in samples FG-W57, FG-W64, and FG-W65. These two samples were analyzed at 4X dilution because of high concentrations of non-target compounds.

Pest/PCB Samples FG-W48, FG-W49, FG-W50, FG-W53, FG-W64, and FG-W65 were reanalyzed at 10X dilution because target analyte responses exceeded the calibration limits on at least one column. A detailed recommendation for use of results appears in Section 9 below. High concentrations of aldrin (up to 240 µg/Kg), endrin (130 µg/Kg in sample FG-W48), AR1248 (up to 5,200 µg/Kg), and/or AR1260 (up to 2,100 µg/Kg) were reported in samples FG-W48, FG-W49, FG-W50, FG-W64, and FG-W65 although the aldrin concentrations for three samples were attributed to aroclor peaks. Other target analytes with concentrations above the SQL's in the samples included BHC's, heptachlor epoxide, endosulfan I, DDE, endosulfan II, DDD, endrin ketone, and/or AR1254.

Some data are provisional for 13 VOA, 2 BNA, and 12 Pest/PCB samples because of problems with holding times, instrument performance, calibration, laboratory contamination, MS/MSD performance, surrogate recovery, field duplicate inconsistencies, compound identification, and/or compound quantitation. The technical usability of all reported results is indicated by ESAT's final data qualifiers in the Data Summary Table. An Evidence Audit was conducted for the Complete Sample Delivery Group File (CSF), and the audit results were documented in the Evidence Inventory Checklist.

NOTE: THE FOLLOWING REVIEW NARRATIVE ADDRESSES BOTH CONTRACTUAL ISSUES (BASED ON THE STATEMENT OF WORK) AND TECHNICAL ISSUES (BASED ON THE NATIONAL FUNCTIONAL GUIDELINES). THE ASSESSMENT MADE FOR EACH QC PARAMETER IS SOLELY BASED ON THE TECHNICAL DATA USABILITY, WHICH MAY NOT NECESSARILY BE AFFECTED BY CONTRACTUAL PROBLEMS. THE ASSESSMENTS ARE DEFINED BELOW.

Acceptable	=	No results were qualified for any problem associated with this QC parameter.
Provisional	=	Some results were qualified because of problems associated with this QC parameter.
Unusable	=	All results are unusable because of major problems associated with this QC parameter.

ORGANIC QA REVIEW
CONTINUATION PAGE

CASE 27912 **SDG** FGW45 **SITE** Patrick Bayou **LAB** CLAYTN

1. **Holding Times:** Provisional. VOA sample FG-W56 was analyzed 15 days past the contractual holding time limit, and all BNA samples and Pest/PCB sample FG-W48 were extracted 3 to 10 days past the contractual limit. Technical holding time limits have not yet been established for soil samples. However, per Region 6 guidelines, the reviewer qualified as estimated the positive hit results for VOA sample FG-W56 and Pest/PCB sample FG-W48.

2. **Tuning/Performance:** Provisional. BFB and DFTPP analyses met GC/MS tuning criteria. The Pest/PCB analyses met instrument performance guidelines although endosulfan I and α-chlordane coeluted on column DB5-MS. The reviewer qualified as tentative ("N") the identifications of endosulfan I and α-chlordane in sample FG-W48 because of this chromatographic problem.

3. **Calibrations:** Provisional. TCL compounds generally met contractual calibration criteria. Several VOA and BNA target analytes failed technical %RSD and/or %D criteria, but most of the analytes were not detected at concentrations above the SQL's in the associated samples. However, the reviewer qualified as estimated the following VOA sample results because the analytes failed the technical criteria:

the acetone results for samples FG-W45, FG-W46, FG-W50, FG-W51, FG-W65, and FG-W70;

the carbon disulfide results for samples FG-W50, FG-W51, FG-W52, FG-W53, and FG-W57; and

the methylene chloride result for sample FG-W64.

4. **Blanks:** Provisional. The method and Pest/PCB instrument blanks met contractual QC guidelines. The reviewer could not assess storage contamination for VOA sample FG-W56 because the sample was analyzed 15 days after the storage blank was analyzed. No target analyte was detected in the Pest/PCB blanks.

VOA Target analytes detected at concentrations below the contractual limits included 1,1,2-trichloro-1,2,2-trifluoroethane, acetone, carbon disulfide, methylene chloride, and/or 2-hexanone in the method and storage blanks and methyl acetate in the storage blank. The effects of the laboratory contamination on results recommended for use are summarized below.

- The concentrations above the SQL's were qualified as biased high (reviewer "B" flag) for carbon disulfide in samples FG-W48 and FG-W70.

4. Blanks (continued):

- The following results with concentrations above the SQL's were qualified as undetected ("U"), and the concentrations should be used as raised QL's ("M"):

  the acetone results for samples FG-W45, FG-W46, FG-W48, FG-W49, FG-W50, FG-W51, FG-W57, FG-W64, FG-W65, and FG-W70;

  the carbon disulfide results for samples FG-W49, FG-W50, FG-W51, FG-W52, FG-W53, FG-W57, and FG-W65; and

  the methylene chloride results for samples FG-W50 and FG-W64.

- Except the carbon disulfide result for sample FG-W64, all other results with laboratory "B" flags (concentrations below the SQL's) should be considered as undetected ("U").

The laboratory failed to demonstrate with an instrument blank or other analysis that carryover contamination did not occur between the analyses of samples FG-W50 and FG-W51, in which the 1,3-dichlorobenzene concentrations exceeded the calibration limit. Since the 1,3-dichlorobenzene result for sample FG-W51 was not designated for use, result qualification was unnecessary.

BNA Method blanks SBLKS2HA and SBLKS2IA contained concentrations of bis(2-ethylhexyl)phthalate below the CRQL. The bis(2-ethylhexyl)phthalate concentration above the SQL for sample FG-W64 was qualified as biased high (reviewer "B" flag). Except for sample FG-W65, all other bis(2-ethylhexyl)phthalate results with laboratory "B" flags (concentrations below the SQL's) should be considered as undetected ("U").

5. System Monitoring Compounds (SMC's)/Surrogates: Provisional. SMC and surrogate recoveries were acceptable for all VOA and BNA samples.

Pest/PCB The reviewer qualified as estimated and biased low the results for the early eluting pesticides in samples FG-W54, FG-W55, FG-W56, and FG-W57 because poor extraction efficiency was indicated by TCX recoveries below the QC limit in these samples. Very high recoveries (up to 21,000 percent) or zero percent recoveries were reported on one or both columns for TCX and DCB in most other analyses, but these outlying results were caused by coeluting matrix interferences.

6. **Matrix Spike/Matrix Spike Duplicate (MS/MSD):** Provisional. The MS/MSD results met QC guidelines for precision and %recovery with the exceptions below.

VOA The reviewer qualified as estimated and biased high the chlorobenzene result for medium level sample FG-W51DL because MS/MSD recoveries for chlorobenzene exceeded the QC limits for the spiked analyses. MS/MSD recoveries for the low level soil matrix and the %RPD's for the low and medium level soil matrices exceeded the QC limits for 1,1-dichloroethene. Since 1,1-dichloroethene was not detected in the unspiked samples, qualification of results for that analyte was not required.

BNA The reviewer qualified as estimated and biased low the N-nitroso-di-n-propylamine result for sample FG-W45 because MS/MSD recoveries were below the QC limits for n-nitroso-di-n-propylamine in the spiked analyses. The MS recovery was only marginally below the QC limit for pentachlorophenol, so qualification of the unspiked sample result for pentachlorophenol was not required.

7. **Other QC:**

Field Duplicates: Provisional. BNA field duplicate results were consistent.

VOA Results were consistent for field duplicate samples FG-W52 and FG-W53. However, the reviewer qualified the results below as indicated because of field duplicate inconsistencies.

- Results for benzene, methylcyclohexane, toluene, ethylbenzene, chlorobenzene, total xylenes, isopropylbenzene, and 1,4-dichlorobenzene were qualified as estimated and biased low for sample FG-W49 and as estimated and biased high for sample FG-W50.

- Results for cyclohexane, benzene, toluene, ethylbenzene, and total xylenes were qualified as estimated and biased high for sample FG-W64 and as estimated and biased low for sample FG-W65.

PEST Results were generally consistent for field duplicate pairs FG-W49/FG-W50 and FG-W64/FG-W65. However, the reviewer qualified the heptachlor epoxide, DDE, and endrin ketone results as estimated and biased low for sample FG-W52 and as estimated and biased high for sample FG-W53 because of field duplicate inconsistencies.

CASE 27912 **SDG** FGW45 **SITE** Patrick Bayou **LAB** CLAYTN

8. Internal Standards (IS): Acceptable. IS performance was acceptable for the VOA and BNA analyses.

9. Compound Identity (ID)/Quantitation: Provisional. The reported analytes met compound identification criteria.

VOA High concentrations of chlorobenzene (up to 1,700 µg/Kg), total xylenes (up to 1,400 µg/Kg), isopropylbenzene (up to 2,800 µg/Kg), 1,3-dichlorobenzene (up to 1,900 µg/Kg), and/or 1,4-dichlorobenzene (up to 1,400 µg/Kg) were detected in samples FG-W48, FG-W49, FG-W50, FG-W51, FG-W52, FG-W53, FG-W64, FG-W65, and FG-W70. Other target analyte concentrations above the SQL's in the samples included acetone, carbon disulfide, methylene chloride, cyclohexane, benzene, trichloroethene, methylcyclohexane, toluene, and/or ethylbenzene. However, 10 acetone, 1 methylene chloride, and 7 carbon disulfide concentrations were solely attributed to laboratory contamination.

BNA Samples FG-W48, FG-W49, FG-W50, FG-W51, FG-W52, FG-W53, and FG-W70 contained high concentrations of hexachloroethane (up to 13,000 µg/Kg), hexachlorobutadiene (up to 95,000 µg/Kg), acenaphthylene (up to 12,000 µg/Kg), acenaphthene (up to 20,000 µg/Kg), fluorene (up to 6,300 µg/Kg), hexachlorobenzene (up to 40,000 µg/Kg), phenanthrene (up to 27,000 µg/Kg), fluoranthene (up to 30,000 µg/Kg), pyrene (up to 70,000 µg/Kg), and/or benzo(g,h,i)perylene (up to 11,000 µg/Kg). Target analytes detected at concentrations above the SQL's in the other samples included acenaphthene in sample FG-W57 and bis(2-ethylhexyl)-phthalate in samples FG-W64 and FG-W65.

Pest/PCB High concentrations of aldrin (up to 240 µg/Kg), endrin (130 µg/Kg in sample FG-W48), AR1248 (up to 5,200 µg/Kg), and/or AR1260 (up to 2,100 µg/Kg) were reported in samples FG-W48, FG-W49, FG-W50, FG-W64, and FG-W65. Other target analytes with concentrations above the SQL's in these samples as well as samples FG-W51, FG-W52, and FG-W53 included BHC's, aldrin, heptachlor epoxide, endosulfan I, DDE, endrin, endosulfan II, DDD, endrin ketone, and/or AR1254. The laboratory was contacted for GC/MS confirmation of AR1248 in samples FG-W48 and FG-W49.

Samples FG-W48, FG-W49, FG-W50, FG-W53, FG-W64, and FG-W65 were reanalyzed at 10X dilution because target analyte responses exceeded the upper calibration limit on at least one column. Because of matrix interferences and to favor positive hits, quantitation limits from the diluted analyses of samples FG-W48, FG-W49, FG-W50 and the endrin and methoxychlor results from sample FG-W48DL are also recommended for use. No results from sample FG-W53DL are recommended for use because all results

CASE 27912 **SDG** FGW45 **SITE** Patrick Bayou **LAB** CLAYTN

9. Compound ID/Quantitation (continued): reported for the undiluted sample were from a column with acceptable peak responses.

Peaks from AR1248 interfered with the detection of aldrin in several samples and were solely responsible for the aldrin concentrations reported in samples FG-W48, FG-W49, and FG-W50. The reviewer qualified as undetected ("U") the aldrin results for samples FG-W48, FG-W49, FG-W50, and the concentrations should be used as raised QL's ("M").

All laboratory "P"-flagged results with concentrations above the SQL's were qualified as estimated because two column quantitation results differed by greater than 25 percent. The following results were qualified ("T") because their commonly coexisting pesticides were absent:

the β-BHC results for samples FG-W51, FG-W52, and FG-W53;

the DDE result for sample FG-W53; and

the endrin ketone results for samples FG-W51, FG-W52, FG-W53, and FG-W65.

10. Performance/Completeness: Acceptable. The data package was complete except for required Pest/PCB GC/MS confirmation data. The laboratory was contacted for the confirmation as well as some needed clarifications and corrections (see Fax Record Log).

11. Overall Assessment: Data are acceptable for 3 VOA, 14 BNA, and 4 Pest/PCB samples.

VOA Some results were qualified for all samples except samples FG-W47, FG-W54, and FG-W55 because of problems with holding times, calibration, laboratory contamination, MS/MSD performance, and/or field duplicate inconsistencies.

BNA The n-nitroso-di-n-propylamine result for sample FG-W45 and the bis(2-ethylhexyl)phthalate result for sample FG-W64 were qualified because of problems with MS/MSD performance and laboratory contamination, respectively.

PEST Some results were qualified for all samples except samples FG-W45, FG-W46, FG-W47, and FG-W70 because of problems with holding times, instrument performance, surrogate recovery, field duplicate inconsistencies, compound identification, and/or compound quantitation.

ORGANIC DATA QUALIFIER DEFINITIONS

The following definitions provide brief explanations of the ESAT-Region 6 qualifiers assigned to results in the Data Summary Table.

U Not detected at reported quantitation limit.

N Identification is tentative.

J Estimated value.

L Reported concentration is below the CRQL.

M Reported concentration should be used as a raised quantitation limit because of interferences and/or laboratory contamination.

R Unusable.

^ High biased. Actual concentration may be lower than the concentration reported.

v Low biased. Actual concentration may be higher than the concentration reported.

F+ A false positive exists.

F- A false negative exists.

B This result may be high biased because of laboratory/field contamination. The reported concentration is above 5X or 10X the concentration reported in the method/field blank.

UJ Estimated quantitation limit.

T Identification is questionable because of absence of other commonly coexisting pesticides.

***** Result not recommended for use because of associated QA/QC performance inferior to that from other analysis.

ORGANIC DATA SUMMARY

Case No.: 27912 SDG: FGW45 Reviewer: Mike Fertitta

Laboratory: CLAYTN Matrix: Soil Units: ug/Kg

VOLATILE EPA SAMPLE NUMBER:	FG-W45	FLAG	FG-W46	FLAG	FG-W47	FLAG	FG-W48	FLAG	FG-W48DL	FLAG	FG-W49	FLAG	FG-W50	FLAG
Dichlorodifluoromethane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Chloromethane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Vinyl Chloride	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Bromomethane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Chloroethane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Trichlorofluoromethane	3	LJ	2	LJ	3	LJ	2	LJ	100	U *	20	LJ	100	U
1,1-Dichloroethene	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
1,1,2-Trichloro-1,2,2-trifluoroethane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Acetone	22	UMJ	16	UMJ	12	U	91	UM	240	*	360	UM	100	UMJ
Carbon Disulfide	13	U	12	U	12	U	59	B	250	*	250	UM	180	UMJ
Methyl Acetate	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Methylene Chloride	13	U	12	U	12	U	20	U	73	*	110	U	230	UM
trans-1,2-Dichloroethene	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Methyl tert-Butyl Ether	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
1,1-Dichloroethane	13	U	12	U	12	U	2	LJ	100	U *	110	U	100	U
cis-1,2-Dichloroethene	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
2-Butanone	13	U	12	U	12	U	11	LJ	16	*	23	LJ	13	LJ
Chloroform	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
1,1,1-Trichloroethane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Cyclohexane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Carbon Tetrachloride	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Benzene	13	U	12	U	12	U	170		170	*	68	LJv	290	J^
1,2-Dichloroethane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Trichloroethene	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Methylcyclohexane	13	U	12	U	12	U	110		200	*	98	LJv	340	J^
1,2-Dichloropropane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Bromodichloromethane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
cis-1,3-Dichloropropene	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Methyl-2-pentanone	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
oluene	13	U	12	U	12	U	75		65	*	21	LJv	150	J^
trans-1,3-Dichloropropene	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
1,1,2-Trichloroethane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Tetrachloroethene	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
2-Hexanone	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Dibromochloromethane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
1,2-Dibromoethane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Chlorobenzene	13	U	12	U	12	U	220		210	*	200	Jv	670	J^
Ethylbenzene	13	U	12	U	12	U	52		54	*	30	LJv	150	J^
Xylenes (total)	13	U	12	U	12	U	310		300	*	110	Jv	780	J^
Styrene	13	U	12	U	12	U	10	LJ	100	U *	110	U	23	LJ
Bromoform	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Isopropylbenzene	13	U	12	U	12	U	290		370	*	180	Jv	680	J^
1,1,2,2-Tetrachloroethane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
1,3-Dichlorobenzene	13	U	12	U	12	U	1500	*	1900		1300		4500	*
1,4-Dichlorobenzene	13	U	12	U	12	U	260		330	*	320	Jv	820	J^
1,2-Dichlorobenzene	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
1,2-Dibromo-3-chloropropane	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
1,2,4-Trichlorobenzene	13	U	12	U	12	U	20	U	100	U *	110	U	100	U
Sample wt (g):	5		5		5		5		1		1		1	
%Moisture:	21		19		18		50		50		56		52	
Dilution Factor:	1		1		1		1		1		1		1	
Level:	Low		Low		Low		Low		Low		Low		Low	
Number of TIC's:	3		2		2		30		30		30		30	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

15 013

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ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGW45 Reviewer : Mike Fertitta

Laboratory : CLAYTN Matrix : Soil Units : ug/Kg

VOLATILE EPA SAMPLE NUMBER :	FG-W50DL	FLAG	FG-W51	FLAG	FG-W51DL	FLAG	FG-W52	FLAG	FG-W53	FLAG	FG-W54	FLAG	FG-W55	FLAG
Dichlorodifluoromethane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Chloromethane	200	*	72	U	720	U *	75	U	78	U	14	U	13	U
Vinyl Chloride	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Bromomethane	430	*	72	U	580	*	75	U	78	U	14	U	13	U
Chloroethane	1000	U *	12	LJ	720	U *	75	U	78	U	14	U	13	U
Trichlorofluoromethane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
1,1-Dichloroethene	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
1,1,2-Trichloro-1,2,2-trifluoroethane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Acetone	350	*	120	UMJ	330	*	75	U	78	U	14	U	13	U
Carbon Disulfide	1000	U *	80	UMJ	720	U *	120	UMJ	130	UMJ	14	U	13	U
Methyl Acetate	910	*	72	U	2000	*	75	U	78	U	14	U	13	U
Methylene Chloride	140	*	72	U	120	*	75	U	78	U	14	U	13	U
trans-1,2-Dichloroethene	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Methyl tert-Butyl Ether	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
1,1-Dichloroethane	1000	U *	12	LJ	720	U *	75	U	78	U	14	U	13	U
cis-1,2-Dichloroethene	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
2-Butanone	1000	U *	20	LJ	720	U *	13	LJ	12	LJ	14	U	13	U
Chloroform	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
1,1,1-Trichloroethane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Cyclohexane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Carbon Tetrachloride	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Benzene	1000	U *	150		720	U *	48	LJ	30	LJ	14	U	13	U
1,2-Dichloroethane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Trichloroethene	1000	U *	72	U	720	U *	9	LJ	78	U	14	U	13	U
Methylcyclohexane	1000	U *	9	LJ	720	U *	75	U	78	U	14	U	13	U
1,2-Dichloropropane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Bromodichloromethane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
cis-1,3-Dichloropropene	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
-Methyl-2-pentanone	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
oluene	1000	U *	22	LJ	720	U *	14	LJ	11	LJ	14	U	13	U
trans-1,3-Dichloropropene	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
1,1,2-Trichloroethane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Tetrachloroethene	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
2-Hexanone	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Dibromochloromethane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
1,2-Dibromoethane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Chlorobenzene	140	*	1800	*	1100	JA	780		480		1	LJ	13	U
Ethylbenzene	1000	U *	7	LJ	720	U *	75	U	78	U	14	U	13	U
Xylenes (total)	210	*	34	LJ	720	U *	19	LJ	12	LJ	14	U	13	U
Styrene	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Bromoform	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Isopropylbenzene	250	*	16	LJ	720	U *	17	LJ	11	LJ	14	U	13	U
1,1,2,2-Tetrachloroethane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
1,3-Dichlorobenzene	1700		3800	*	1700		1100		770		5	LJ	2	LJ
1,4-Dichlorobenzene	330	*	1400		850	*	460		310		2	LJ	13	U
1,2-Dichlorobenzene	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
1,2-Dibromo-3-chloropropane	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
1,2,4-Trichlorobenzene	1000	U *	72	U	720	U *	75	U	78	U	14	U	13	U
Sample wt (g) :	5		1		5		1		1		5		5	
%Moisture :	52		31		31		33		36		26		21	
Dilution Factor :	1		1		1		1		1		1		1	
Level :	Med		Low		Med		Low		Low		Low		Low	
Number of TIC's :	4		30		3		25		18		2		2	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

15 014

ORGANIC DATA SUMMARY

Case No.: 27912 SDG: FGW45 Reviewer: Mike Fertitta

Laboratory: CLAYTN Matrix: Soil Units: ug/Kg

VOLATILE EPA SAMPLE NUMBER:	FG-W56	FLAG	FG-W57	FLAG	FG-W64	FLAG	FG-W64DL	FLAG	FG-W65	FLAG	FG-W70	FLAG	FLAG
Dichlorodifluoromethane	19	U	14	U	38	U	190	U*	160	U	88	U	
Chloromethane	19	U	14	U	38	U	190	U*	160	U	88	U	
Vinyl Chloride	2	LJ	14	U	38	U	190	U*	160	U	88	U	
Bromomethane	19	U	14	U	38	U	190	U*	160	U	88	U	
Chloroethane	19	U	14	U	38	U	190	U*	160	U	88	U	
Trichlorofluoromethane	19	U	14	U	4	LJ	190	U*	160	U	26	LJ	
1,1-Dichloroethene	19	U	14	U	38	U	190	U*	160	U	88	U	
1,1,2-Trichloro-1,2,2-trifluoroethane	19	U	14	U	38	U	190	U*	160	U	88	U	
Acetone	19	U	64	UM	250	UM	280	*	520	UMJ	280	UMJ	
Carbon Disulfide	2	LJ	17	UMJ	420		500	*	330	UM	220	B	
Methyl Acetate	19	U	14	U	38	U	190	U*	160	U	88	U	
Methylene Chloride	19	U	14	U	60	UMJ	90	*	160	U	88	U	
trans-1,2-Dichloroethene	19	U	14	U	38	U	190	U*	160	U	88	U	
Methyl tert-Butyl Ether	19	U	14	U	38	U	190	U*	160	U	88	U	
1,1-Dichloroethane	19	U	14	U	38	U	190	U*	160	U	88	U	
cis-1,2-Dichloroethene	6	LJ	14	U	38	U	190	U*	160	U	88	U	
2-Butanone	3	LJ	4	LJ	32	LJ	40	*	45	LJ	22	LJ	
Chloroform	19	U	14	U	38	U	190	U*	160	U	88	U	
1,1,1-Trichloroethane	19	U	14	U	38	U	190	U*	160	U	88	U	
Cyclohexane	19	U	14	U	390	J^	190	U*	160	UJv	88	U	
Carbon Tetrachloride	19	U	14	U	38	U	190	U*	160	U	88	U	
Benzene	19	U	14	U	360	J^	220	*	90	LJv	25	LJ	
1,2-Dichloroethane	19	U	14	U	38	U	190	U*	160	U	88	U	
Trichloroethene	230	J	14	U	38	U	190	U*	18	LJ	88	U	
Methylcyclohexane	19	U	14	U	540		470	*	300		69	LJ	
1,2-Dichloropropane	19	U	14	U	38	U	190	U*	160	U	88	U	
Bromodichloromethane	19	U	14	U	38	U	190	U*	160	U	88	U	
cis-1,3-Dichloropropene	19	U	14	U	38	U	190	U*	160	U	88	U	
4-Methyl-2-pentanone	19	U	14	U	38	U	190	U*	160	U	88	U	
Toluene	19	U	14	U	60	J^	52	*	19	LJv	38	LJ	
trans-1,3-Dichloropropene	19	U	14	U	38	U	190	U*	160	U	88	U	
1,1,2-Trichloroethane	19	U	14	U	38	U	190	U*	160	U	88	U	
Tetrachloroethene	19	U	14	U	38	U	190	U*	160	U	88	U	
2-Hexanone	19	U	14	U	38	U	190	U*	160	U	88	U	
Dibromochloromethane	19	U	14	U	38	U	190	U*	160	U	88	U	
1,2-Dibromoethane	19	U	14	U	38	U	190	U*	160	U	88	U	
Chlorobenzene	19	U	14	U	49		45	*	24	LJ	1700		
Ethylbenzene	19	U	14	U	490	J^	190	*	53	LJv	21	LJ	
Xylenes (total)	19	U	14	U	1400	J^	1500	*	610	Jv	91		
Styrene	19	U	14	U	38	U	190	U*	160	U	88	U	
Bromoform	19	U	14	U	38	U	190	U*	160	U	88	U	
Isopropylbenzene	19	U	14	U	2000	*	2800		1900		120		
1,1,2,2-Tetrachloroethane	19	U	14	U	38	U	190	U*	160	U	88	U	
1,3-Dichlorobenzene	19	U	2	LJ	320		380	*	200		500		
1,4-Dichlorobenzene	19	U	14	U	85		100	*	55	LJ	470		
1,2-Dichlorobenzene	19	U	14	U	38	U	190	U*	160	U	88	U	
1,2-Dibromo-3-chloropropane	19	U	14	U	38	U	190	U*	160	U	88	U	
1,2,4-Trichlorobenzene	19	U	14	U	38	U	190	U*	160	U	88	U	
Sample wt (g):	5		5		5		1		1		1		
%Moisture:	46		27		74		74		69		43		
Dilution Factor:	1		1		1		1		1		1		
Level:	Low		Low		Low		Low		Low		Low		
Number of TIC's:	3		21		30		30		29		30		

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

15 015 (2

ORGANIC DATA SUMMARY

Case No.: 27912 SDG: FGW45 Reviewer: Mike Fertitta

Laboratory: CLAYTN Matrix: Soil Units: ug/Kg

SEMIVOLATILE EPA SAMPLE NUMBER:	FLAG FG-W45	FLAG FG-W46	FLAG FG-W47	FLAG FG-W48	FLAG FG-W49	FLAG FG-W50	FLAG FG-W51
Benzaldehyde	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
Phenol	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
bis-(2-Chloroethyl) ether	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
2-Chlorophenol	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
2-Methylphenol	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
2,2'-oxybis(1-Chloropropane)	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
Acetophenone	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
4-Methylphenol	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
N-Nitroso-di-n-propylamine	420 UJv	410 U	400 U	16000 U	15000 U	14000 U	1900 U
Hexachloroethane	420 U	410 U	400 U	2600 UJ	2200 UJ	2600 UJ	7700
Nitrobenzene	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
Isophorone	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
2-Nitrophenol	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
2,4-Dimethylphenol	420 U	410 U	400 U	16000 U	15000 U	14000 U	340 UJ
bis(2-Chloroethoxy)methane	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
2,4-Dichlorophenol	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
Naphthalene	420 U	410 U	400 U	5000 UJ	2200 UJ	2300 UJ	190 UJ
4-Chloroaniline	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
Hexachlorobutadiene	420 U	410 U	400 U	19000	19000	21000	93000
Caprolactam	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
4-Chloro-3-methylphenol	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
2-Methylnaphthalene	420 U	410 U	400 U	2800 UJ	1600 UJ	1800 UJ	450 UJ
Hexachlorocyclopentadiene	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
2,4,6-Trichlorophenol	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
2,4,5-Trichlorophenol	1100 U	1000 U	1000 U	42000 U	38000 U	35000 U	4800 U
1,1'-Biphenyl	420 U	410 U	400 U	1300 UJ	970 UJ	1100 UJ	440 UJ
2-Chloronaphthalene	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
2-Nitroaniline	1100 U	1000 U	1000 U	42000 U	38000 U	35000 U	4800 U
Dimethylphthalate	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
2,6-Dinitrotoluene	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
Acenaphthylene	420 U	410 U	400 U	12000 UJ	7700 UJ	9400 UJ	650 UJ
3-Nitroaniline	1100 U	1000 U	1000 U	42000 U	38000 U	35000 U	4800 U
Acenaphthene	420 U	410 U	400 U	20000	11000 UJ	13000 UJ	430 UJ
2,4-Dinitrophenol	1100 U	1000 U	1000 U	42000 U	38000 U	35000 U	4800 U
4-Nitrophenol	1100 U	1000 U	1000 U	42000 U	38000 U	35000 U	4800 U
Dibenzofuran	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
2,4-Dinitrotoluene	420 U	410 U	400 U	16000 U	15000 U	14000 U	290 UJ
Diethylphthalate	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
Fluorene	420 U	410 U	400 U	6300 UJ	4100 UJ	4400 UJ	280 UJ
4-Chlorophenyl-phenyl ether	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
4-Nitroaniline	1100 U	1000 U	1000 U	42000 U	38000 U	35000 U	4800 U
4,6-Dinitro-2-methylphenol	1100 U	1000 U	1000 U	42000 U	38000 U	35000 U	4800 U
N-Nitrosodiphenylamine	420 U	410 U	400 U	16000 U	15000 U	14000 U	110 UJ
4-Bromophenyl-phenylether	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
Hexachlorobenzene	420 U	410 U	400 U	3900 UJ	4800 UJ	4800 UJ	73000
Atrazine	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U
Pentachlorophenol	1100 U	1000 U	1000 U	42000 U	38000 U	35000 U	4800 U
Phenanthrene	420 U	410 U	400 U	27000	15000	19000	1000 UJ
Anthracene	420 U	410 U	400 U	4500 UJ	2800 UJ	3500 UJ	180 UJ
Carbazole	420 U	410 U	400 U	16000 U	15000 U	14000 U	1900 U

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

15 016

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ORGANIC DATA SUMMARY

Case No.: 27912 SDG: FGW45 Reviewer: Mike Fertitta

Laboratory: CLAYTN Matrix: Soil Units: ug/Kg

SEMIVOLATILE EPA SAMPLE NUMBER:	FG-W45	FLAG	FG-W46	FLAG	FG-W47	FLAG	FG-W48	FLAG	FG-W49	FLAG	FG-W50	FLAG	FG-W51	FLAG
Di-n-butylphthalate	420	U	410	U	400	U	16000	U	15000	U	14000	U	1900	U
Fluoranthene	420	U	410	U	400	U	30000		18000		22000		1200	LJ
Pyrene	420	U	410	U	400	U	70000		42000		53000		2300	
Butylbenzylphthalate	420	U	410	U	400	U	16000	U	15000	U	14000	U	240	LJ
3,3'-Dichlorobenzidine	420	U	410	U	400	U	16000	U	15000	U	14000	U	1900	U
Benzo(a)anthracene	420	U	410	U	400	U	1500	LJ	1200	LJ	1600	LJ	130	LJ
Chrysene	420	U	410	U	400	U	2200	LJ	1700	LJ	2300	LJ	210	LJ
bis(2-Ethylhexyl)phthalate	50	LJ	27	LJ	400	U	16000	U	15000	U	14000	U	1900	U
Di-n-octylphthalate	420	U	410	U	400	U	16000	U	15000	U	14000	U	1900	U
Benzo(b)fluoranthene	420	U	410	U	400	U	1400	LJ	1000	LJ	1300	LJ	120	LJ
Benzo(k)fluoranthene	420	U	410	U	400	U	1100	LJ	830	LJ	1100	LJ	110	LJ
Benzo(a)pyrene	420	U	410	U	400	U	3900	LJ	2700	LJ	3300	LJ	270	LJ
Indeno(1,2,3-cd)pyrene	420	U	410	U	400	U	3100	LJ	2000	LJ	2500	LJ	170	LJ
Dibenzo(a,h)anthracene	420	U	410	U	400	U	16000	U	15000	U	14000	U	1900	U
Benzo(g,h,i)perylene	420	U	410	U	400	U	11000	LJ	7100	LJ	8500	LJ	730	LJ
Sample wt (g):	30		30		30		30		30		30		30	
%Moisture:	21		19		18		50		56		52		31	
Dilution Factor:	1		1		1		25		20		20		4	
Level:	Low		Low		Low		Low		Low		Low		Low	
Number of TIC's:	3		2		1		19		18		30		7	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

15 017

ORGANIC DATA SUMMARY

Case No.: 27912 SDG: FGW45 Reviewer: Mike Fertitta

oratory: CLAYTN Matrix: Soil Units: ug/Kg

SEMIVOLATILE EPA SAMPLE NUMBER:	FLAG FG-W51DL	FLAG FG-W52	FLAG FG-W53	FLAG FG-W54	FLAG FG-W55	FLAG FG-W56	FLAG FG-W57
Benzaldehyde	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
Phenol	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
bis-(2-Chloroethyl) ether	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2-Chlorophenol	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2-Methylphenol	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2,2'-oxybis(1-Chloropropane)	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
Acetophenone	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
4-Methylphenol	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
N-Nitroso-di-n-propylamine	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
Hexachloroethane	8800 *	13000 LJ	8400 LJ	450 U	420 U	610 U	450 U
Nitrobenzene	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
Isophorone	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2-Nitrophenol	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2,4-Dimethylphenol	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
bis(2-Chloroethoxy)methane	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2,4-Dichlorophenol	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
Naphthalene	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
4-Chloroaniline	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
Hexachlorobutadiene	71000	95000	75000	450 U	420 U	610 U	450 U
Caprolactam	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
4-Chloro-3-methylphenol	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2-Methylnaphthalene	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
Hexachlorocyclopentadiene	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2,4,6-Trichlorophenol	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2,4,5-Trichlorophenol	48000 U *	62000 U	65000 U	1100 U	1100 U	1500 U	1100 U
1,1'-Biphenyl	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2-Chloronaphthalene	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2-Nitroaniline	48000 U *	62000 U	65000 U	1100 U	1100 U	1500 U	1100 U
imethylphthalate	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2,6-Dinitrotoluene	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
Acenaphthylene	19000 U *	1900 LJ	1500 LJ	450 U	420 U	610 U	450 U
3-Nitroaniline	48000 U *	62000 U	65000 U	1100 U	1100 U	1500 U	1100 U
Acenaphthene	19000 U *	25000 U	26000 U	450 U	420 U	610 U	560
2,4-Dinitrophenol	48000 U *	62000 U	65000 U	1100 U	1100 U	1500 U	1100 U
4-Nitrophenol	48000 U *	62000 U	65000 U	1100 U	1100 U	1500 U	1100 U
Dibenzofuran	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
2,4-Dinitrotoluene	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
Diethylphthalate	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
Fluorene	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
4-Chlorophenyl-phenyl ether	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
4-Nitroaniline	48000 U *	62000 U	65000 U	1100 U	1100 U	1500 U	1100 U
4,6-Dinitro-2-methylphenol	48000 U *	62000 U	65000 U	1100 U	1100 U	1500 U	1100 U
N-Nitrosodiphenylamine	19000 U *	25000 U	26000 U	450 U	420 U	610 U	33 LJ
4-Bromophenyl-phenylether	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
Hexachlorobenzene	40000	38000	32000	450 U	420 U	610 U	450 U
Atrazine	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U
Pentachlorophenol	48000 U *	62000 U	65000 U	1100 U	1100 U	1500 U	1100 U
Phenanthrene	1400 *	3200 LJ	2300 LJ	450 U	420 U	51 LJ	36 LJ
Anthracene	19000 U *	25000 U	26000 U	450 U	420 U	610 U	31 LJ
Carbazole	19000 U *	25000 U	26000 U	450 U	420 U	610 U	450 U

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGW45 Reviewer : Mike Fertitta

Laboratory : CLAYTN Matrix : Soil Units : ug/Kg

SEMIVOLATILE EPA SAMPLE NUMBER :	FG-W51DL	FLAG	FG-W52	FLAG	FG-W53	FLAG	FG-W54	FLAG	FG-W55	FLAG	FG-W56	FLAG	FG-W57	FLAG
Di-n-butylphthalate	19000	U *	25000	U	26000	U	27	LJ	420	U	610	U	100	LJ
Fluoranthene	1700	*	3600	LJ	2500	LJ	450	U	420	U	110	LJ	180	LJ
Pyrene	3600	*	7500	LJ	5400	LJ	450	U	420	U	110	LJ	150	LJ
Butylbenzylphthalate	19000	U *	25000	U	26000	U	450	U	420	U	610	U	47	LJ
3,3'-Dichlorobenzidine	19000	U *	25000	U	26000	U	450	U	420	U	610	U	450	U
Benzo(a)anthracene	19000	U *	25000	U	26000	U	450	U	420	U	85	LJ	63	LJ
Chrysene	19000	U *	25000	U	26000	U	450	U	420	U	130	LJ	88	LJ
bis(2-Ethylhexyl)phthalate	1600	*	25000	U	26000	U	450	U	420	U	610	U	450	U
Di-n-octylphthalate	19000	U *	25000	U	26000	U	450	U	420	U	610	U	450	U
Benzo(b)fluoranthene	19000	U *	25000	U	26000	U	450	U	420	U	81	LJ	73	LJ
Benzo(k)fluoranthene	19000	U *	25000	U	26000	U	450	U	420	U	84	LJ	66	LJ
Benzo(a)pyrene	19000	U *	25000	U	26000	U	450	U	420	U	66	LJ	57	LJ
Indeno(1,2,3-cd)pyrene	19000	U *	25000	U	26000	U	450	U	420	U	36	LJ	37	LJ
Dibenzo(a,h)anthracene	19000	U *	25000	U	26000	U	450	U	420	U	610	U	450	U
Benzo(g,h,i)perylene	19000	U *	1400	LJ	26000	U	450	U	420	U	36	LJ	59	LJ
Sample wt (g) :	30		30		30		30		30		30		30	
%Moisture :	31		33		36		26		21		46		27	
Dilution Factor :	40		50		50		1		1		1		1	
Level :	Low		Low		Low		Low		Low		Low		Low	
Number of TIC's :	2		1		1		3		11		19		23	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

15 019

ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGW45 Reviewer : Mike Fertitta

Laboratory : CLAYTN Matrix : Soil Units : ug/Kg

SEMIVOLATILE EPA SAMPLE NUMBER :	FG-W64	FLAG	FG-W65	FLAG	FG-W70	FLAG		FLAG		FLAG		FLAG
Benzaldehyde	5100	U	4400	U	12000	U						
Phenol	5100	U	4400	U	12000	U						
bis-(2-Chloroethyl) ether	5100	U	4400	U	12000	U						
2-Chlorophenol	5100	U	4400	U	12000	U						
2-Methylphenol	5100	U	4400	U	12000	U						
2,2'-oxybis(1-Chloropropane)	5100	U	4400	U	12000	U						
Acetophenone	290	LJ	4400	U	12000	U						
4-Methylphenol	5100	U	4400	U	12000	U						
N-Nitroso-di-n-propylamine	5100	U	4400	U	12000	U						
Hexachloroethane	5100	U	4400	U	7100	LJ						
Nitrobenzene	5100	U	4400	U	12000	U						
Isophorone	5100	U	4400	U	12000	U						
2-Nitrophenol	5100	U	4400	U	12000	U						
2,4-Dimethylphenol	5100	U	4400	U	12000	U						
bis(2-Chloroethoxy)methane	5100	U	4400	U	12000	U						
2,4-Dichlorophenol	5100	U	4400	U	12000	U						
Naphthalene	260	LJ	4400	U	12000	U						
4-Chloroaniline	460	LJ	220	LJ	12000	U						
Hexachlorobutadiene	430	LJ	290	LJ	30000							
Caprolactam	5100	U	4400	U	12000	U						
4-Chloro-3-methylphenol	5100	U	4400	U	12000	U						
2-Methylnaphthalene	880	LJ	450	LJ	12000	U						
Hexachlorocyclopentadiene	5100	U	4400	U	12000	U						
2,4,6-Trichlorophenol	5100	U	4400	U	12000	U						
2,4,5-Trichlorophenol	13000	U	11000	U	29000	U						
1,1'-Biphenyl	5100	U	4400	U	12000	U						
2-Chloronaphthalene	5100	U	4400	U	12000	U						
2-Nitroaniline	13000	U	11000	U	29000	U						
Dimethylphthalate	5100	U	4400	U	12000	U						
2,6-Dinitrotoluene	5100	U	4400	U	12000	U						
Acenaphthylene	680	LJ	650	LJ	1600	LJ						
3-Nitroaniline	13000	U	11000	U	29000	U						
Acenaphthene	1900	LJ	540	LJ	920	LJ						
2,4-Dinitrophenol	13000	U	11000	U	29000	U						
4-Nitrophenol	13000	U	11000	U	29000	U						
Dibenzofuran	5100	U	4400	U	12000	U						
2,4-Dinitrotoluene	5100	U	4400	U	12000	U						
Diethylphthalate	5100	U	4400	U	12000	U						
Fluorene	1500	LJ	1000	LJ	800	LJ						
4-Chlorophenyl-phenyl ether	5100	U	4400	U	12000	U						
4-Nitroaniline	13000	U	11000	U	29000	U						
4,6-Dinitro-2-methylphenol	13000	U	11000	U	29000	U						
N-Nitrosodiphenylamine	470	LJ	4400	U	12000	U						
4-Bromophenyl-phenylether	5100	U	4400	U	12000	U						
Hexachlorobenzene	270	LJ	300	LJ	8500	LJ						
Atrazine	5100	U	4400	U	12000	U						
Pentachlorophenol	13000	U	11000	U	29000	U						
Phenanthrene	4200	LJ	3400	LJ	2600	LJ						
Anthracene	1100	LJ	1000	LJ	12000	U						
Carbazole	5100	U	4400	U	12000	U						

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

15 020

17

ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGW45 Reviewer : Mike Fertitta

Laboratory : CLAYTN Matrix : Soil Units : ug/Kg

SEMIVOLATILE EPA SAMPLE NUMBER :	FG-W64	FLAG	FG-W65	FLAG	FG-W70	FLAG		FLAG		FLAG		FLAG
Di-n-butylphthalate	330	LJ	310	LJ	12000	U						
Fluoranthene	2600	LJ	2000	LJ	3200	LJ						
Pyrene	2900	LJ	3500	LJ	6100	LJ						
Butylbenzylphthalate	5100	U	4400	U	12000	U						
3,3'-Dichlorobenzidine	5100	U	4400	U	12000	U						
Benzo(a)anthracene	1000	LJ	850	LJ	12000	U						
Chrysene	1500	LJ	1300	LJ	700	LJ						
bis(2-Ethylhexyl)phthalate	6400	B	5800		12000	U						
Di-n-octylphthalate	5100	U	4400	U	12000	U						
Benzo(b)fluoranthene	750	LJ	720	LJ	12000	U						
Benzo(k)fluoranthene	830	LJ	590	LJ	12000	U						
Benzo(a)pyrene	1000	LJ	820	LJ	600	LJ						
Indeno(1,2,3-cd)pyrene	460	LJ	510	LJ	12000	U						
Dibenzo(a,h)anthracene	5100	U	4400	U	12000	U						
Benzo(g,h,i)perylene	700	LJ	660	LJ	1100	LJ						
Sample wt (g) :	30		30		30							
%Moisture :	74		70		43							
Dilution Factor :	4		4		20							
Level :	Low		Low		Low							
Number of TIC's :	30		30		6							

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

15 021 13

ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGW45 Reviewer : Mike Fertitta

ratory : CLAYTN Matrix : Soil Units : ug/Kg

PESTICIDES/PCBs EPA SAMPLE NUMBER :	FG-W45	FLAG	FG-W46	FLAG	FG-W47	FLAG	FG-W48	FLAG	FG-W48DL	FLAG	FG-W49	FLAG	FG-W49DL	FLAG
alpha-BHC	2.2	U	2.1	U	2.1	U	3.4	U*	34	U	3.9	U*	39	U
beta-BHC	2.2	U	2.1	U	2.1	U	3.4	U*	34	U	3.9	U*	39	U
delta-BHC	2.2	U	2.1	U	2.1	U	3.4	U*	34	U	3.9	U*	39	U
gamma-BHC (Lindane)	2.2	U	2.1	U	2.1	U	10	J	15	*	3.9	U*	39	U
Heptachlor	2.2	U	2.1	U	2.1	U	3.4	U*	34	U	3.9	U*	39	U
Aldrin	2.2	U	2.1	U	2.1	U	130	*	240	UMJ	130	*	210	UM
Heptachlor epoxide	2.2	U	2.1	U	2.1	U	3.4	U*	34	U	3.9	U*	39	U
Endosulfan I	2.2	U	2.1	U	2.1	U	21	JN	34	U*	3.3	LJ	39	U*
Dieldrin	4.2	U	4.1	U	4.0	U	6.6	U*	66	U	7.5	U*	75	U
4,4'-DDE	4.2	U	4.1	U	4.0	U	6.6	U*	66	U	7.5	U*	75	U
Endrin	4.2	U	4.1	U	4.0	U	6.6	U*	130	J	7.5	U*	75	U
Endosulfan II	4.2	U	4.1	U	4.0	U	12	J	66	U*	7.5	U*	75	U
4,4'-DDD	4.2	U	4.1	U	4.0	U	15	J	66	U*	12	J	75	U*
Endosulfan sulfate	4.2	U	4.1	U	4.0	U	6.6	U*	66	U	7.5	U*	75	U
4,4'-DDT	4.2	U	4.1	U	4.0	U	6.6	U*	66	U	7.5	U*	75	U
Methoxychlor	22	U	21	U	21	U	34	U*	290	LJ	39	U*	390	U
Endrin ketone	4.2	U	4.1	U	4.0	U	11	J	7.5	*	30		36	*
Endrin aldehyde	4.2	U	4.1	U	4.0	U	6.6	U*	66	U	7.5	U*	75	U
alpha-Chlordane	2.2	U	2.1	U	2.1	U	1.5	LJN	34	U*	2.4	LJ	39	U*
gamma-Chlordane	2.2	U	2.1	U	2.1	U	3.4	U*	34	U	3.9	U*	39	U
Toxaphene	220	U	210	U	210	U	340	U*	3400	U	390	U*	3900	U
Aroclor-1016	42	U	41	U	40	U	66	U*	660	U	75	U*	750	U
Aroclor-1221	85	U	83	U	82	U	130	U*	1300	U	150	U*	1500	U
Aroclor-1232	42	U	41	U	40	U	66	U*	660	U	75	U*	750	U
Aroclor-1242	42	U	41	U	40	U	66	U*	660	U	75	U*	750	U
Aroclor-1248	42	U	41	U	40	U	5200	J	8700	*	4500		6500	*
Aroclor-1254	42	U	41	U	40	U	66	U*	660	U	75	U*	750	U
Aroclor-1260	42	U	41	U	40	U	66	U*	660	U	1800	J	2200	*
Sample wt (g) :	30		30		30		30		30		30		30	
%Moisture :	21		19		18		50		50		56		56	
Dilution Factor :	1		1		1		1		10		1		10	

Note: *For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.*

15 022 19

ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGW45 Reviewer : Mike Fertitta

Laboratory : CLAYTN Matrix : Soil Units : ug/Kg

PESTICIDES/PCBs EPA SAMPLE NUMBER :	FG-W50	FLAG	FG-W50DL	FLAG	FG-W51	FLAG	FG-W52	FLAG	FG-W53	FLAG	FG-W53DL	FLAG	FG-W54	FLAG
alpha-BHC	3.5	U *	35	U	2.5	U	2.5	U	2.7	U	27	U *	2.3	UJv
beta-BHC	3.5	U *	35	U	6.8	JT	6.1	JT	6.8	JT	5.1	*	2.3	UJv
delta-BHC	16	J	35	U *	2.5	U	2.5	U	2.7	U	27	U *	2.3	UJv
gamma-BHC (Lindane)	3.5	U *	35	U	2.5	U	2.5	U	2.7	U	27	U *	2.3	UJv
Heptachlor	3.5	U *	35	U	2.5	U	2.5	U	2.7	U	27	U *	2.3	UJv
Aldrin	110	*	170	UMJ	2.5	U	16	J	16	J	28	*	2.3	UJv
Heptachlor epoxide	3.5	U *	35	U	5.2	J	2.5	UJv	7.0	J^	27	U *	2.3	UJv
Endosulfan I	3.5	U *	35	U	2.5	U	2.5	U	2.7	U	27	U *	2.3	UJv
Dieldrin	6.9	U *	69	U	4.8	U	4.9	U	5.2	U	52	U *	4.5	UJv
4,4'-DDE	6.9	U *	69	U	4.8	U	4.9	UJv	11	J^T	52	U *	4.5	UJv
Endrin	6.9	U *	69	U	4.8	U	4.9	U	5.2	U	52	U *	4.5	U
Endosulfan II	6.9	U *	69	U	4.8	U	4.9	U	5.2	U	52	U *	4.5	U
4,4'-DDD	6.9	U *	69	U	4.8	U	4.9	U	5.2	U	52	U *	4.5	U
Endosulfan sulfate	6.9	U *	69	U	4.8	U	4.9	U	5.2	U	52	U *	4.5	U
4,4'-DDT	6.9	U *	69	U	4.8	U	4.9	U	5.2	U	52	U *	4.5	U
Methoxychlor	35	U *	350	U	25	U	25	U	27	U	270	U *	23	U
Endrin ketone	35	J	48	*	32	JT	13	JvT	70	J^T	90	*	4.5	U
Endrin aldehyde	6.9	U *	69	U	4.8	U	4.9	U	5.2	U	52	U *	4.5	U
alpha-Chlordane	3.5	U *	35	U	0.87	LJ	0.87	LJ	2.7	U	27	U *	2.3	UJv
gamma-Chlordane	3.5	U *	35	U	2.5	U	2.5	U	2.7	U	27	U *	2.3	UJv
Toxaphene	350	U *	3500	U	250	U	250	U	270	U	2700	U *	230	U
Aroclor-1016	69	U *	690	U	48	U	49	U	52	U	520	U *	45	U
Aroclor-1221	140	U *	1400	U	97	U	100	U	100	U	1000	U *	91	U
Aroclor-1232	69	U *	690	U	48	U	49	U	52	U	520	U *	45	U
Aroclor-1242	69	U *	690	U	48	U	49	U	52	U	520	U *	45	U
Aroclor-1248	3800	J	5300	*	48	U	49	U	52	U	520	U *	45	U
Aroclor-1254	69	U *	690	U	320	J	370	J	530		680	*	45	U *
Aroclor-1260	2100	J	2600	*	48	U	49	U	52	U	520	U *	45	U
Sample wt (g) :	30		30		30		30		30		30		30	
%Moisture :	52		52		31		33		36		36		26	
Dilution Factor :	1		10		1		1		1		10		1	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

15 023 20

ORGANIC DATA SUMMARY

Case No.: 27912 SDG: FGW45 Reviewer: Mike Fertitta

Laboratory: CLAYTN Matrix: Soil Units: ug/Kg

PESTICIDES/PCBs EPA SAMPLE NUMBER:	FG-W55	FLAG	FG-W56	FLAG	FG-W57	FLAG	FG-W64	FLAG	FG-W64DL	FLAG	FG-W65	FLAG	FG-W65DL	FLAG
alpha-BHC	2.2	UJv	3.1	UJv	2.3	UJv	6.5	U	65	U*	5.7	U	57	U*
beta-BHC	2.2	UJv	3.1	UJv	2.3	UJv	6.5	U	65	U*	5.7	U	57	U*
delta-BHC	2.2	UJv	3.1	UJv	2.3	UJv	6.5	U	65	U*	5.7	U	57	U*
gamma-BHC (Lindane)	2.2	UJv	3.1	UJv	2.3	UJv	6.5	U	65	U*	5.7	U	57	U*
Heptachlor	2.2	UJv	3.1	UJv	2.3	UJv	6.5	U	65	U*	5.7	U	57	U*
Aldrin	2.2	UJv	3.1	UJv	2.3	UJv	140	*	230	*	110	*	170	*
Heptachlor epoxide	2.2	UJv	3.1	UJv	2.3	UJv	6.5	U	65	U*	5.7	U	57	U*
Endosulfan I	2.2	UJv	3.1	UJv	2.3	UJv	7.8	J	65	U*	14	J	57	U*
Dieldrin	4.2	UJv	6.1	UJv	4.5	UJv	13	U	130	U*	11	U	110	U*
4,4'-DDE	4.2	UJv	6.1	UJv	4.5	UJv	13	U	130	U*	11	U	110	U*
Endrin	4.2	U	6.1	U	4.5	U	72	*	120	*	66	*	94	*
Endosulfan II	4.2	U	6.1	U	4.5	U	12	LJ	130	U*	11	U	110	U*
4,4'-DDD	4.2	U	6.1	U	4.5	U	13	U	130	U*	11	U	110	U*
Endosulfan sulfate	4.2	U	6.1	U	4.5	U	13	U	130	U*	11	U	110	U*
4,4'-DDT	4.2	U	6.1	U	4.5	U	13	U	130	U*	11	U	110	U*
Methoxychlor	22	U	31	U	23	U	65	U	650	U*	57	U	570	U*
Endrin ketone	4.2	U	6.1	U	4.5	U	13	U	130	U*	12	T	110	U*
Endrin aldehyde	4.2	U	6.1	U	4.5	U	13	U	130	U*	11	U	110	U*
alpha-Chlordane	2.2	UJv	3.1	UJv	2.3	UJv	6.5	U	65	U*	5.7	U	57	U*
gamma-Chlordane	2.2	UJv	3.1	UJv	2.3	UJv	6.5	U	65	U*	5.7	U	57	U*
Toxaphene	220	U	310	U	230	U	650	U	6500	U*	570	U	5700	U*
Aroclor-1016	42	U	61	U	45	U	130	U	1300	U*	110	U	1100	U*
Aroclor-1221	85	U	120	U	92	U	260	U	2600	U*	220	U	2200	U*
Aroclor-1232	42	U	61	U	45	U	130	U	1300	U*	110	U	1100	U*
Aroclor-1242	42	U	61	U	45	U	130	U	1300	U*	110	U	1100	U*
Aroclor-1248	42	U	61	U	45	U	4300		6100	*	3400		4800	*
Aroclor-1254	42	U	61	U	45	U	130	U	1300	U*	110	U	1100	U*
Aroclor-1260	42	U	61	U	45	U	1600	J	1800	*	1100		1200	*
Sample wt (g):	30		30		30		30		30		30		30	
%Moisture:	21		46		27		74		74		70		70	
Dilution Factor:	1		1		1		1		10		1		10	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

15 024 2(

ORGANIC DATA SUMMARY

Case No. : 27912 SDG : FGW45 Reviewer : Mike Fertitta

Laboratory : CLAYTN Matrix : Soil Units : ug/Kg

PESTICIDES/PCBs EPA SAMPLE NUMBER :	FLAG FG-W70	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
alpha-BHC	3.0 U						
beta-BHC	3.0 U						
delta-BHC	3.0 U						
gamma-BHC (Lindane)	3.0 U						
Heptachlor	3.0 U						
Aldrin	3.0 U						
Heptachlor epoxide	3.0 U						
Endosulfan I	3.0 U						
Dieldrin	5.8 U						
4,4'-DDE	5.8 U						
Endrin	5.8 U						
Endosulfan II	5.8 U						
4,4'-DDD	5.8 U						
Endosulfan sulfate	5.8 U						
4,4'-DDT	5.8 U						
Methoxychlor	30 U						
Endrin ketone	4.1 UJ						
Endrin aldehyde	5.8 U						
alpha-Chlordane	3.0 U						
gamma-Chlordane	3.0 U						
Toxaphene	300 U						
Aroclor-1016	58 U						
Aroclor-1221	120 U						
Aroclor-1232	58 U						
Aroclor-1242	58 U						
Aroclor-1248	58 U						
Aroclor-1254	58 U						
Aroclor-1260	58 U						
Sample wt (g) :	30						
%Moisture :	43						
Dilution Factor :	1						

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

15 025 2

INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No. 27912 SDG No. FGW45 SDG Nos. To Follow SAS No. Date Rec 05/03/00

EPA Lab ID: CLAYTN
Location: Novi, MI
Region: 6 Audit No.: 27912/FGW45
Re_Submitted CSF? Yes ____ No X
Box No(s): 1
COMMENTS:

7/8 Form DC-1 (page 3201): The airbill number should be 2952398536, not 2952398636. The reviewer made the correction on the Form.

20 The data for Pest/PCB samples FG-W45, FG-W46, FG-W47, FG-W48, and FG-W48DL (pages 2031 to 2084) were double-sided photocopies that were not labeled with the location of the originals.

Over for additional comments.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?	X		
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?	X		
FORM DC-1			
6. Present?	X		
7. Complete?		X	
8. Accurate?		X	
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?	X		
14. Signed?	X		
15. Dated?	X		
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a. If "NO", does the copy indicate where original documents are located?		X	

Audited by: Michael J. Fertitta — Michael J. Fertitta/ESAT Data Reviewer — Date 06/23/00
Audited by: ____ — ____ — Date ____
Audited by: ____ — ____ — Date ____
Signature — Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: ____ Date Entered: ____ Date Reviewed: ____
Entered by: ____ ____
Reviewed by: ____ ____
Signature — Printed Name/Title

DC-2___

15 026 v

In Reference to Case No(s):
27912 SDG: FGW45 (O-2199)

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

FAX Record Log

Laboratory Name: CLAYTN
Lab Contact: Krystel Swisher

Region: 6
Regional Contact: Mahmoud El-Feky - EPA
ESAT Reviewer: Michael J. Fertitta - ESAT

FAX initiated by: ____Laboratory __X__Region

In reference to data for the following fractions:

CSF Deliverables VOA PEST

Summary of Questions/Issues:

A. CSF Deliverables

1. For future cases, please submit the white copy (Region copy) of the TR/COC Records with the package instead of the yellow copy (CLASS copy).

2. Form DC-1 (page 3201): The airbill number should have been 2952398536, not 2952398636. For your information, the reviewer made the correction on the form.

3. The data for Pest/PCB samples FG-W45, FG-W46, FG-W47, and FG-W48, and FG-W48DL (pages 2031 to 2084) were double-sided photocopies that were not labeled with the location of the originals. Please submit the originals or identify their location.

B. VOA

1. Forms 2B: Method blank VBLKBW should be reported on page 8 with the medium level analyses and method blanks VBLKAV and VBLKBA, storage blank VHBLKBA, and sample FG-W56 should be reported on page 7 with the low level analyses. Please correct and resubmit pages 7 and 8.

2. The Forms 4, 5, 6, 7, and 8 for low level method blank VBLKAV and sample FG-W56 should say "Y", not "N", for heated purge. Please comment and/or correct and resubmit pages 14, 26, 27, 31, 970, 971, 1038, and 1039.

3. Instrument MS_HP2B: Analyses were performed on this instrument for medium and low (method blank VBLKBA and storage blank VHBLKBA) level matrices, but data for only one initial calibration (pages 990 to 1012) were submitted (OLM04.2, D-24/VOA, 9.3.3.4). Heated purge was indicated on all associated Forms 4, 5, 6, 7, and 8 (pages 15, 16, 17, 22, 23, 24, 25, 32, 33, 34, 990, 991, 1045, 1046, 1052, 1053, 1059, and 1060). Please and/or submit any omitted data and necessary corrections to resolve this problem.

4. The quantitation limits reported on the Forms 1 for samples FG-W50DL and FG-W51DL (pages 381, 382, 464, and 465) were not corrected for percent moisture. The quantitation limits for samples FG-W50DL and FG-W51DL should be 1,000 µg/Kg and 720 µg/Kg, respectively, not 500 µg/Kg. Please correct and resubmit pages 381, 382, 464, and 465.

C. PEST

1. The "spike added" and "spike recovered" values reported on Forms 9B (pages 2367 and 2368) appear to be the concentrations rather than the total amount in "ng" (OLM04.2, B-54, 3.17.2.4 and 3.17.2.10). Please verify, revise, and resubmit these pages.

2. The AR1248 concentrations in Pest/PCB samples FG-W48, FG-W49, and FG-W50 were sufficient for GC/MS confirmation, but the required confirmation was not performed (OLM04.2, D-59/PEST, 11.1.2). Please provide the GC/MS confirmation data at this time.

NOTE: Any laboratory resubmission should be submitted either as an addendum to the original CSF with a revised Form DC-2 or submitted as a new CSF with a new Form DC-2 (OLM04.2, p. B-26, 2.7.3), except those containing only replacement pages. Custody seals are required for all CSF resubmission shipments.

15 028 25

FAX COMMUNICATION LOG

Continuation Page: 3
Laboratory/Contact: CLAYTN/Krystel Swisher
In Reference to Case No. 27912 **SDG:** FGW45

Please respond to the above items **within 7 days** to:

Mr. Mahmoud El-Feky
U.S. EPA Region 6 Laboratory
10625 Fallstone Road
Houston, TX 77099

If you have any questions, please contact me at (281) 983-2128.

Signature Date 7/6/00

Distribution: (1) Lab Copy, (2) Region Copy, and (3) ESAT Copy

15 029

EPA United States Environmental Protection Agency
Contract Laboratory Program

& C[illegible] of Custody Record
(For Organic CLP Analysis)

2/912

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	TNRCC		Airborne Express

Regional Information	Sampler (Name)	Airbill Number
	Linda Broach	29523986 32

Non-Superfund Program	Sampler Signature	5. Ship To
	Linda Broach	Clayton ENV. Consult. 22345 Roethel Dr. Novi, MI 48375 ATTN: Linda Michaels

Site Name	3. Purpose*	Early Action	Long-Term Action
Patrick Bayou	Lead: [ ] SF [ ] PRP [X] ST [ ] FED	[ ] CLEM [ ] PA [ ] REM [ ] RI [X] SI [ ] ESI	[ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD

City, State	Site Spill ID
Deerpark, Tx	

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaHSO4
4. H2SO4
5. Ice only
6. Other (Specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) Other:	E RAS Analysis VOA	BNA	Pest/ PCB	High only ARO/ TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform Eval. — = Not a QC Sample)
FGW45	5	L	G	5	X				6-209007 - 008	SE-1	3/28/00 1030	MFHW65	LB	—
FGW46	5	L	G	5	X				6-209013 - 014	SE-2	3/28/00 1040	MFHW66	LB	—
FGW47	5	L	G	5	X				6-209019 - 020	SE-3	3/28/00 1055	MFHW67	LB	—
FGW48	5	L	G	5	X				6-209025 - 026	SE-4	3/28/00 1135	MFHW68	LB	—
FGW49	5	L	C	5	X				6-209031 - 032	SE-5	3/28/00 1145	MFHW69	LB	—
FGW50	5	L	C	5	X				6-209037 - 038	SE-6	3/28/00 1150	MFHW70	LB	D(FGW49)
FGW51	5	L	G	5	X				6-209043 - 044	SE-7	3/28/00 1110	MFHW71	LB	—
FGW52	5	L	C	5	X				6-209049 - 050	SE-8	3/28/00 1120	MFHW72	LB	—
FGW53	5	L	C	5	X				6-209055 - 056	SE-9	3/28/00 1125	MFHW73	LB	D(FGW52)
FGW54	5	L	G	5	X				6-209261 - 262	SE-10	3/28/00 1235	MFHW74	JS	—

Shipment for Case Complete? (Y/N)	Page	Sample(s) to be Used for Laboratory QC	Additional Sampler Signatures	Chain of Custody Seal Number(s)
NO	1 of 2	FGW45		

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	3/29/00 1702				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-2 (2/98)

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*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

A21-012-15 REV

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15 080 32

EPA United States Environmental Protection Agency Contract Laboratory Program

Organic Traffic Report & Chain of Custody Record (For Organic CLP Analysis)

Case No. 27912

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	TNRCC		Airborne Express

Regional Information

Sampler (Name): Linda Broach

Airbill Number: 2952398536

Non-Superfund Program

Sampler Signature: Linda Broach

5. Ship To: Clayton Envir. Consult. 22345 Roethel Dr. Novi, MI 48375 ATTN: Linda Michaels

Site Name: Patrick Bayou

City, State: Deer Park Tx

Site Spill ID

3. Purpose*: Lead: [ ] SF [ ] PRP [X] ST [ ] FED; Early Action: [ ] CLEM [ ] PA [ ] REM [ ] RI [X] SI [ ] ESI; Long-Term Action: [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD

6. Matrix (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Field QC 5. Soil/Sediment 6. Oil (High only) 7. Waste (High only) 8. Other (Specify in Column A)

7. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaHSO4 4. H2SO4 5. Ice only 6. Other (Specify in Column D) N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) Other:	B Conc.: Low Med High	C Sample Type: Comp./Grab	D Preservative (from Box 7) Other:	E RAS Analysis: VOA	BNA	Pest/PCB	High only ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform. Eval. — = Not a QC Sample)
FGW45	5	L	G	5		X	X		6-209009-010	SE-1	3/28/00 1030	MFHW65	LB	—
FGW46	5	L	G	5		X	X		6-209015-016	SE-2	3/28/00 1040	MFHW66	LB	—
FGW47	5	L	G	5		X	X		6-209021-022	SE-3	3/28/00 1055	MFHW67	LB	—
FGW48	5	L	G	5		X	X		6-209027-028	SE-4	3/28/00 1135	MFHW68	LB	—
FGW49	5	L	Comp	5		X	X		6-209033-034	SE-5	3/28/00 1145	MFHW69	LB	—
FGW50	5	L	Comp	5		X	X		6-209039-040	SE-6	3/28/00 1150	MFHW70	LB	D(FGW49)
FGW51	5	L	G	5		X	X		6-209045-046	SE-7	3/28/00 1110	MFHW71	LB	—
FGW52	5	L	Comp	5		X	X		6-209051-052	SE-8	3/28/00 1120	MFHW72	LB	—
FGW53	5	L	Comp	5		X	X		6-209057-058	SE-9	3/28/00 1125	MFHW73	LB	D(FGW52)
FGW54	5	L	G	5		X	X		6-209263-264	SE-10	3/28/00 1235	MFHW74	JS	—

Shipment for Case Complete? (Y/N)	Page	Sample(s) to be Used for Laboratory QC	Additional Sampler Signatures	Chain of Custody Seal Number(s)
No	1 of 2	FGW45	[signature]	

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	3/29/00 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

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15 031

28

EPA United States Environmental Protection Agency
Contract Laboratory Program

& Ch ... of Custody Record
Organic CLP Analysis)

a 1412

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	TNRCC		Airborne Express

Regional Information	Sampler (Name)	Airbill Number
	Linda Baach	795239863 2
Non-Superfund Program	Sampler Signature	5. Ship To
	Linda Baach	Clayton ENV. Consult.
Site Name	3. Purpose*	22345 Roethel Dr.
Patrick Bayou	Lead: [ ] SF [ ] PRP [X] ST [ ] FED; Early Action: [ ] CLEM [ ] PA [ ] REM [ ] RI [X] SI [ ] ESI; Long-Term Action: [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD	Novi, MI 48375
City, State	Site Spill ID	ATTN: Linda Michaels
Deer Park, TX		

6. Matrix (Enter In Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaHSO4
4. H2SO4
5. Ice only
6. Other (Specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) Other:	B Conc.: Low Med High	C Sample Type: Comp. Grab	D Preservative (from Box 7) Other:	E RAS Analysis VOA	BNA	Pest/PCB	High only ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform. Eval. — = Not a QC Sample)
FGW55	5	L	G	5	X				6-209267 - 268	SE-11	3/28/00 1210	MFHW75	JS	—
FGW56	5	L	G	5	X				6-209273 - 274	SE-12	3/28/00 1159	MFHW76	JS	—
FGW57	5	L	G	5	X				6-209279 - 280	SE-13	3/28/00 1132	MFHW77	JS	—
FGW70	5	L	G	5	X				6-209357 - 358	SE-26	3/28/00 1205	MFHW90	LB	—
FGW64	5	L	G	5	X				6-209321 - 322	SE-20	3/29/00 0935	MFHW84	LB	—
FGW65	5	L	G	5	X				6-209327 - 328	SE-21	3/29/00 0940	MFHW85	LB	D (FGW64)

Shipment for Case Complete? (Y/N)	Page	Sample(s) to be Used for Laboratory QC	Additional Sampler Signatures	Chain of Custody Seal Number(s)
NO	2 of 2			

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	3/29/00 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

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EPA United States Environmental Protection Agency Contract Laboratory Program

Organic Traffic Report & Chain of Custody Record

(For Organic CLP Analysis)

Case No.: 27912

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	TNRCC		Airborne Express

Regional Information	Sampler (Name)	Airbill Number
	Linda Broach	29523985360

Non-Superfund Program	Sampler Signature	5. Ship To
	Linda Broach	Clayton Env. Consult. 22345 Roethel Dr. Novi, MI 48375 ATTN: Linda Michaels

Site Name: Patrick Bayou

City, State: Deer Park, TX

Site Spill ID:

8. Purpose

Lead	Early Action	Long-Term Action
SF	CLEM	FS
PRP	PA	RD
X ST	REM	RA
FED	X SI	O&M
	ESI	NPLD

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaHSO4
4. H2SO4
5. Ice only
6. Other (Specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) Other:	B Conc.: Low Med High	C Sample Type: Comp. Grab	D Preservative (from Box 7) Other:	E RAS Analysis VOA	BNA	Pest/PCB	High only ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K Field QC Qualifier B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform. Eval. — = Not a QC Sample
FGW55	5	L	G	5		X	X		6-209269-270	SE-11	3/28/00 1210	MFHW75	JS	—
FGW56	5	L	G	5		X	X		6-209275-276	SE-12	3/28/00 1159	MFHW76	JS	—
FGW57	5	L	G	5		X	X		6-209281-282	SE-13	3/28/00 1132	MFHW77	JS	—
FGW70	5	L	G	5		X	X		6-209359-360	SE-26	3/28/00 1205	MFHW90	LB	—
FGW64	5	L	G	5		X	X		6-209323-324	SE-20	3/29/00 0935	MFHW84	LB	—
FGW65	5	L	G	5		X	X		6-209329-330	SE-21	3/29/00 0940	MFHW85	LB	—

Shipment for Case Complete? (Y/N)	Page	Sample(s) to be Used for Laboratory QC	Additional Sampler Signatures	Chain of Custody Seal Number(s)
NO	2 of 2		John Lyon	

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Linda Broach	3/29/00 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-2

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW45

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-001A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8814.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 21

Date Analyzed: 04/03/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	13	U
74-87-3	Chloromethane	13	U
75-01-4	Vinyl Chloride	13	U
74-83-9	Bromomethane	13	U
75-00-3	Chloroethane	13	U
75-69-4	Trichlorofluoromethane	3	J
75-35-4	1,1-Dichloroethene	13	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	13	U
67-64-1	Acetone	22	B
75-15-0	Carbon Disulfide	10	BJ
79-20-9	Methyl Acetate	13	U
75-09-2	Methylene Chloride	9	BJ
156-60-5	trans-1,2-Dichloroethene	13	U
1634-04-4	Methyl tert-Butyl Ether	13	U
75-34-3	1,1-Dichloroethane	13	U
156-59-2	cis-1,2-Dichloroethene	13	U
78-93-3	2-Butanone	13	U
67-66-3	Chloroform	13	U
71-55-6	1,1,1-Trichloroethane	13	U
110-82-7	Cyclohexane	13	U
56-23-5	Carbon Tetrachloride	13	U
71-43-2	Benzene	13	U
107-06-2	1,2-Dichloroethane	13	U
79-01-6	Trichloroethene	13	U
108-87-2	Methylcyclohexane	13	U
78-87-5	1,2-Dichloropropane	13	U
75-27-4	Bromodichloromethane	13	U
10061-01-5	cis-1,3-Dichloropropene	13	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	13	U
10061-02-6	trans-1,3-Dichloropropene	13	U
79-00-5	1,1,2-Trichloroethane	13	U
127-18-4	Tetrachloroethene	13	U
591-78-6	2-Hexanone	13	U
124-48-1	Dibromochloromethane	13	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW45

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-001A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8814.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 21

Date Analyzed: 04/03/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	13	U
108-90-7	Chlorobenzene	13	U
100-41-4	Ethylbenzene	13	U
1330-20-7	Xylene (total)	13	U
100-42-5	Styrene	13	U
75-25-2	Bromoform	13	U
98-82-8	Isopropylbenzene	13	U
79-34-5	1,1,2,2-Tetrachloroethane	13	U
541-73-1	1,3-Dichlorobenzene	13	U
106-46-7	1,4-Dichlorobenzene	13	U
95-50-1	1,2-Dichlorobenzene	13	U
96-12-8	1,2-Dibromo-3-chloropropane	13	U
120-82-1	1,2,4-Trichlorobenzene	13	U

1F

EPA SAMPLE NO.

FGW45

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-001A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8814.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 21 Date Analyzed: 04/03/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

CONCENTRATION UNITS:

Number TICs found: 3 (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	Unknown siloxane	18.74	67	BJ
2.	Unknown (2)	23.33	29	J
3.	Unknown (3)	27.73	8	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW46

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Lab Sample ID: 00031137-002A

Lab File ID: A8817.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 19

Date Analyzed: 04/03/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	12	U
74-87-3	Chloromethane	12	U
75-01-4	Vinyl Chloride	12	U
74-83-9	Bromomethane	12	U
75-00-3	Chloroethane	12	U
75-69-4	Trichlorofluoromethane	2	J
75-35-4	1,1-Dichloroethene	12	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	12	U
67-64-1	Acetone	16	B
75-15-0	Carbon Disulfide	7	BJ
79-20-9	Methyl Acetate	12	U
75-09-2	Methylene Chloride	7	BJ
156-60-5	trans-1,2-Dichloroethene	12	U
1634-04-4	Methyl tert-Butyl Ether	12	U
75-34-3	1,1-Dichloroethane	12	U
156-59-2	cis-1,2-Dichloroethene	12	U
78-93-3	2-Butanone	12	U
67-66-3	Chloroform	12	U
71-55-6	1,1,1-Trichloroethane	12	U
110-82-7	Cyclohexane	12	U
56-23-5	Carbon Tetrachloride	12	U
71-43-2	Benzene	12	U
107-06-2	1,2-Dichloroethane	12	U
79-01-6	Trichloroethene	12	U
108-87-2	Methylcyclohexane	12	U
78-87-5	1,2-Dichloropropane	12	U
75-27-4	Bromodichloromethane	12	U
10061-01-5	cis-1,3-Dichloropropene	12	U
108-10-1	4-Methyl-2-pentanone	12	U
108-88-3	Toluene	12	U
10061-02-6	trans-1,3-Dichloropropene	12	U
79-00-5	1,1,2-Trichloroethane	12	U
127-18-4	Tetrachloroethene	12	U
591-78-6	2-Hexanone	12	U
124-48-1	Dibromochloromethane	12	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW46

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 19

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-002A

Lab File ID: A8817.D

Date Received: 03/30/00

Date Analyzed: 04/03/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	12	U
108-90-7	Chlorobenzene	12	U
100-41-4	Ethylbenzene	12	U
1330-20-7	Xylene (total)	12	U
100-42-5	Styrene	12	U
75-25-2	Bromoform	12	U
98-82-8	Isopropylbenzene	12	U
79-34-5	1,1,2,2-Tetrachloroethane	12	U
541-73-1	1,3-Dichlorobenzene	12	U
106-46-7	1,4-Dichlorobenzene	12	U
95-50-1	1,2-Dichlorobenzene	12	U
96-12-8	1,2-Dibromo-3-chloropropane	12	U
120-82-1	1,2,4-Trichlorobenzene	12	U

1F

EPA SAMPLE NO.

FGW46

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-002A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8817.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 19 Date Analyzed: 04/03/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

CONCENTRATION UNITS:

Number TICs found: 2 (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	Unknown siloxane	18.74	26	BJ
2.	Unknown	23.33	8	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW47

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-003A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8818.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 18

Date Analyzed: 04/03/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	12	U
74-87-3	Chloromethane	12	U
75-01-4	Vinyl Chloride	12	U
74-83-9	Bromomethane	12	U
75-00-3	Chloroethane	12	U
75-69-4	Trichlorofluoromethane	3	J
75-35-4	1,1-Dichloroethene	12	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	12	U
67-64-1	Acetone	7	BJ
75-15-0	Carbon Disulfide	6	BJ
79-20-9	Methyl Acetate	12	U
75-09-2	Methylene Chloride	7	BJ
156-60-5	trans-1,2-Dichloroethene	12	U
1634-04-4	Methyl tert-Butyl Ether	12	U
75-34-3	1,1-Dichloroethane	12	U
156-59-2	cis-1,2-Dichloroethene	12	U
78-93-3	2-Butanone	12	U
67-66-3	Chloroform	12	U
71-55-6	1,1,1-Trichloroethane	12	U
110-82-7	Cyclohexane	12	U
56-23-5	Carbon Tetrachloride	12	U
71-43-2	Benzene	12	U
107-06-2	1,2-Dichloroethane	12	U
79-01-6	Trichloroethene	12	U
108-87-2	Methylcyclohexane	12	U
78-87-5	1,2-Dichloropropane	12	U
75-27-4	Bromodichloromethane	12	U
10061-01-5	cis-1,3-Dichloropropene	12	U
108-10-1	4-Methyl-2-pentanone	12	U
108-88-3	Toluene	12	U
10061-02-6	trans-1,3-Dichloropropene	12	U
79-00-5	1,1,2-Trichloroethane	12	U
127-18-4	Tetrachloroethene	12	U
591-78-6	2-Hexanone	12	U
124-48-1	Dibromochloromethane	12	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW47

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-003A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8818.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 18

Date Analyzed: 04/03/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	12	U
108-90-7	Chlorobenzene	12	U
100-41-4	Ethylbenzene	12	U
1330-20-7	Xylene (total)	12	U
100-42-5	Styrene	12	U
75-25-2	Bromoform	12	U
98-82-8	Isopropylbenzene	12	U
79-34-5	1,1,2,2-Tetrachloroethane	12	U
541-73-1	1,3-Dichlorobenzene	12	U
106-46-7	1,4-Dichlorobenzene	12	U
95-50-1	1,2-Dichlorobenzene	12	U
96-12-8	1,2-Dibromo-3-chloropropane	12	U
120-82-1	1,2,4-Trichlorobenzene	12	U

1F

EPA SAMPLE NO.

FGW47

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-003A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8818.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 18 Date Analyzed: 04/03/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 2 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	Unknown siloxane	18.73	61	BJ
2.	Unknown	23.33	16	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW48

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 50

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-004A

Lab File ID: A8819.D

Date Received: 03/30/00

Date Analyzed: 04/04/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	20	U
74-87-3	Chloromethane	20	U
75-01-4	Vinyl Chloride	20	U
74-83-9	Bromomethane	20	U
75-00-3	Chloroethane	20	U
75-69-4	Trichlorofluoromethane	2	J
75-35-4	1,1-Dichloroethene	20	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	20	U
67-64-1	Acetone	91	B
75-15-0	Carbon Disulfide	59	B
79-20-9	Methyl Acetate	20	U
75-09-2	Methylene Chloride	19	BJ
156-60-5	trans-1,2-Dichloroethene	20	U
1634-04-4	Methyl tert-Butyl Ether	20	U
75-34-3	1,1-Dichloroethane	2	J
156-59-2	cis-1,2-Dichloroethene	20	U
78-93-3	2-Butanone	11	J
67-66-3	Chloroform	20	U
71-55-6	1,1,1-Trichloroethane	20	U
110-82-7	Cyclohexane	20	U
56-23-5	Carbon Tetrachloride	20	U
71-43-2	Benzene	170	
107-06-2	1,2-Dichloroethane	20	U
79-01-6	Trichloroethene	20	U
108-87-2	Methylcyclohexane	110	
78-87-5	1,2-Dichloropropane	20	U
75-27-4	Bromodichloromethane	20	U
10061-01-5	cis-1,3-Dichloropropene	20	U
108-10-1	4-Methyl-2-pentanone	20	U
108-88-3	Toluene	75	
10061-02-6	trans-1,3-Dichloropropene	20	U
79-00-5	1,1,2-Trichloroethane	20	U
127-18-4	Tetrachloroethene	20	U
591-78-6	2-Hexanone	20	U
124-48-1	Dibromochloromethane	20	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW48

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 50

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-004A

Lab File ID: A8819.D

Date Received: 03/30/00

Date Analyzed: 04/04/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	20	U
108-90-7	Chlorobenzene	220	
100-41-4	Ethylbenzene	52	
1330-20-7	Xylene (total)	310	
100-42-5	Styrene	10	J
75-25-2	Bromoform	20	U
98-82-8	Isopropylbenzene	290	
79-34-5	1,1,2,2-Tetrachloroethane	20	U
541-73-1	1,3-Dichlorobenzene	1500	E
106-46-7	1,4-Dichlorobenzene	260	
95-50-1	1,2-Dichlorobenzene	20	U
96-12-8	1,2-Dibromo-3-chloropropane	20	U
120-82-1	1,2,4-Trichlorobenzene	20	U

EPA SAMPLE NO.
FGW48

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-004A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8819.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 50 Date Analyzed: 04/04/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: (µL)

Number TICs found: 30 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	5.45	490	J
2.	000563-47-3	1-Propene, 3-chloro-2-methyl-	8.03	110	NJ
3.		Unknown (26)	11.63	110	J
4.	000565-77-5	2-Pentene, 2,3,4-trimethyl-	12.84	130	NJ
5.		Unknown (3)	15.32	3100	J
6.		Unknown (30)	16.06	100	J
7.		Unknown (28)	16.21	110	J
8.		Unknown (4)	17.32	570	J
9.		Unknown (5)	18.00	340	J
10.		Unknown (6)	19.72	690	J
11.		Unknown (25)	19.99	110	J
12.		Unknown (7)	20.18	190	J
13.		Unknown (8)	20.36	250	J
14.		Unknown (9)	21.51	910	J
15.		Unknown (10)	22.41	120	J
16.		Unknown (11)	22.82	2000	J
17.		Unknown (12)	23.03	230	J
18.		Unknown (13)	23.17	530	J
19.		Unknown (14)	23.56	550	J
20.		Unknown (15)	23.77	370	J
21.		Unknown (16)	24.21	530	J
22.	000000-00-0	TRANS-ANTI-1-METHYL-DECAHYDRONA	24.73	150	NJ
23.		Unknown (18)	24.93	370	J
24.		Unknown (29)	25.05	110	J
25.		Unknown (19)	25.35	130	J
26.		Unknown (20)	25.90	120	J
27.		Unknown (21)	27.34	120	J
28.		Unknown (22)	27.73	120	J
29.		Unknown (23)	28.01	300	J
30.		Unknown (24)	28.31	160	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW48DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 1 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 50

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-004A

Lab File ID: A8838.D

Date Received: 03/30/00

Date Analyzed: 04/04/00

Dilution Factor 5.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	100	U
74-87-3	Chloromethane	100	U
75-01-4	Vinyl Chloride	100	U
74-83-9	Bromomethane	100	U
75-00-3	Chloroethane	100	U
75-69-4	Trichlorofluoromethane	100	U
75-35-4	1,1-Dichloroethene	100	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	100	U
67-64-1	Acetone	240	DB
75-15-0	Carbon Disulfide	250	DB
79-20-9	Methyl Acetate	100	U
75-09-2	Methylene Chloride	73	DBJ
156-60-5	trans-1,2-Dichloroethene	100	U
1634-04-4	Methyl tert-Butyl Ether	100	U
75-34-3	1,1-Dichloroethane	100	U
156-59-2	cis-1,2-Dichloroethene	100	U
78-93-3	2-Butanone	16	DJ
67-66-3	Chloroform	100	U
71-55-6	1,1,1-Trichloroethane	100	U
110-82-7	Cyclohexane	100	U
56-23-5	Carbon Tetrachloride	100	U
71-43-2	Benzene	170	D
107-06-2	1,2-Dichloroethane	100	U
79-01-6	Trichloroethene	100	U
108-87-2	Methylcyclohexane	200	D
78-87-5	1,2-Dichloropropane	100	U
75-27-4	Bromodichloromethane	100	U
10061-01-5	cis-1,3-Dichloropropene	100	U
108-10-1	4-Methyl-2-pentanone	100	U
108-88-3	Toluene	65	DJ
10061-02-6	trans-1,3-Dichloropropene	100	U
79-00-5	1,1,2-Trichloroethane	100	U
127-18-4	Tetrachloroethene	100	U
591-78-6	2-Hexanone	100	U
124-48-1	Dibromochloromethane	100	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW48DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 1 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 50

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-004A

Lab File ID: A8838.D

Date Received: 03/30/00

Date Analyzed: 04/04/00

Dilution Factor 5.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	100	U
108-90-7	Chlorobenzene	210	D
100-41-4	Ethylbenzene	54	DJ
1330-20-7	Xylene (total)	300	D
100-42-5	Styrene	100	U
75-25-2	Bromoform	100	U
98-82-8	Isopropylbenzene	370	D
79-34-5	1,1,2,2-Tetrachloroethane	100	U
541-73-1	1,3-Dichlorobenzene	1900	D
106-46-7	1,4-Dichlorobenzene	330	D
95-50-1	1,2-Dichlorobenzene	100	U
96-12-8	1,2-Dibromo-3-chloropropane	100	U
120-82-1	1,2,4-Trichlorobenzene	100	U

1F

EPA SAMPLE NO.

FGW48DL

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-004A

Sample wt/vol: 1 (g/mL) G Lab File ID: A8838.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 50 Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 5.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 30 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1	000115-11-7	1-Propene, 2-methyl-	5.45	400	NJ
2		Unknown (28)	6.38	140	J
3		Unknown (27)	8.03	140	J
4		Unknown (24)	10.91	170	J
5		Unknown (2)	11.63	230	J
6	000565-77-5	2-Pentene, 2,3,4-trimethyl-	12.84	250	NJ
7		Unknown (4)	15.30	4100	J
8		Unknown (5)	16.04	180	J
9		Unknown (6)	17.29	320	J
10		Unknown (7)	19.68	430	J
11		Unknown (8)	20.15	210	J
12		Unknown (9)	20.33	360	J
13		Unknown (10)	20.59	300	J
14		Unknown (11)	21.48	510	J
15		Unknown (12)	21.66	370	J
16		Unknown (25)	22.39	160	J
17		Unknown (29)	22.61	130	J
18		Unknown (13)	22.79	890	J
19		Unknown (30)	22.99	130	J
20		Unknown (14)	23.32	310	J
21		Unknown (15)	23.54	500	J
22		Unknown (16)	23.75	580	J
23		Unknown (17)	24.71	200	J
24		Unknown (18)	24.91	500	J
25		Unknown (19)	25.32	210	J
26		Unknown (20)	25.87	190	J
27	000275-51-4	Azulene	27.54	360	NJ
28		Unknown (22)	27.70	400	J
29		Unknown (23)	27.97	570	J
30		Unknown (26)	29.15	140	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW49

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 1 (g/mL) G

Lab Sample ID: 00031137-005A

Lab File ID: A8854.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 56

Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	110	U
74-87-3	Chloromethane	110	U
75-01-4	Vinyl Chloride	110	U
74-83-9	Bromomethane	110	U
75-00-3	Chloroethane	110	U
75-69-4	Trichlorofluoromethane	20	J
75-35-4	1,1-Dichloroethene	110	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	110	U
67-64-1	Acetone	360	B
75-15-0	Carbon Disulfide	250	B
79-20-9	Methyl Acetate	110	U
75-09-2	Methylene Chloride	74	BJ
156-60-5	trans-1,2-Dichloroethene	110	U
1634-04-4	Methyl tert-Butyl Ether	110	U
75-34-3	1,1-Dichloroethane	110	U
156-59-2	cis-1,2-Dichloroethene	110	U
78-93-3	2-Butanone	23	J
67-66-3	Chloroform	110	U
71-55-6	1,1,1-Trichloroethane	110	U
110-82-7	Cyclohexane	110	U
56-23-5	Carbon Tetrachloride	110	U
71-43-2	Benzene	68	J
107-06-2	1,2-Dichloroethane	110	U
79-01-6	Trichloroethene	110	U
108-87-2	Methylcyclohexane	98	J
78-87-5	1,2-Dichloropropane	110	U
75-27-4	Bromodichloromethane	110	U
10061-01-5	cis-1,3-Dichloropropene	110	U
108-10-1	4-Methyl-2-pentanone	110	U
108-88-3	Toluene	21	J
10061-02-6	trans-1,3-Dichloropropene	110	U
79-00-5	1,1,2-Trichloroethane	110	U
127-18-4	Tetrachloroethene	110	U
591-78-6	2-Hexanone	110	U
124-48-1	Dibromochloromethane	110	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW49

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-005A

Sample wt/vol: 1 (g/mL) G

Lab File ID: A8854.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 56

Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	110	U
108-90-7	Chlorobenzene	200	
100-41-4	Ethylbenzene	30	J
1330-20-7	Xylene (total)	110	
100-42-5	Styrene	110	U
75-25-2	Bromoform	110	U
98-82-8	Isopropylbenzene	180	
79-34-5	1,1,2,2-Tetrachloroethane	110	U
541-73-1	1,3-Dichlorobenzene	1300	
106-46-7	1,4-Dichlorobenzene	320	
95-50-1	1,2-Dichlorobenzene	110	U
96-12-8	1,2-Dibromo-3-chloropropane	110	U
120-82-1	1,2,4-Trichlorobenzene	110	U

1F

EPA SAMPLE NO.

FGW49

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-005A

Sample wt/vol: 1 (g/mL) G Lab File ID: A8854.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 56 Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 5.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 30 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	5.44	260	J
2.		Unknown (29)	8.02	68	J
3.		Unknown (2)	10.88	82	J
4.		Unknown (3)	11.25	100	J
5.		Unknown (4)	11.91	76	J
6.		Unknown (5)	12.16	440	J
7.	000000-00-0	2-HEXENE, 3,4-DIMETHYL-	12.61	81	NJ
8.	000565-77-5	2-Pentene, 2,3,4-trimethyl-	12.81	200	NJ
9.		Unknown (30)	13.80	64	J
10.		Unknown (8)	13.96	280	J
11.		Unknown (9)	15.28	290	J
12.		Unknown (10)	15.39	200	J
13.		Unknown (11)	17.28	88	J
14.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.69	220	NJ
15.		Unknown (13)	19.69	91	J
16.		Unknown (14)	20.12	80	J
17.		Unknown (15)	20.32	98	J
18.		Unknown (16)	20.80	97	J
19.		Unknown (27)	21.37	74	J
20.		Unknown (17)	21.45	100	J
21.		Unknown (18)	22.78	210	J
22.		Unknown (19)	23.29	77	J
23.		Unknown (20)	23.52	150	J
24.		Unknown (21)	23.74	170	J
25.		Unknown (22)	24.16	230	J
26.	000000-00-0	TRANS-ANTI-1-METHYL-DECAHYDRONA	24.69	73	NJ
27.		Unknown (23)	24.88	120	J
28.		Unknown (24)	27.46	89	J
29.		Unknown (25)	27.68	100	J
30.		Unknown (26)	27.95	240	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW50

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-006A

Sample wt/vol: 1 (g/mL) G

Lab File ID: A8855.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 52

Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	100	U
74-87-3	Chloromethane	100	U
75-01-4	Vinyl Chloride	100	U
74-83-9	Bromomethane	100	U
75-00-3	Chloroethane	100	U
75-69-4	Trichlorofluoromethane	100	U
75-35-4	1,1-Dichloroethene	100	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	100	U
67-64-1	Acetone	100	B
75-15-0	Carbon Disulfide	180	B
79-20-9	Methyl Acetate	100	U
75-09-2	Methylene Chloride	230	B
156-60-5	trans-1,2-Dichloroethene	100	U
1634-04-4	Methyl tert-Butyl Ether	100	U
75-34-3	1,1-Dichloroethane	100	U
156-59-2	cis-1,2-Dichloroethene	100	U
78-93-3	2-Butanone	13	J
67-66-3	Chloroform	100	U
71-55-6	1,1,1-Trichloroethane	100	U
110-82-7	Cyclohexane	100	U
56-23-5	Carbon Tetrachloride	100	U
71-43-2	Benzene	290	
107-06-2	1,2-Dichloroethane	100	U
79-01-6	Trichloroethene	100	U
108-87-2	Methylcyclohexane	340	
78-87-5	1,2-Dichloropropane	100	U
75-27-4	Bromodichloromethane	100	U
10061-01-5	cis-1,3-Dichloropropene	100	U
108-10-1	4-Methyl-2-pentanone	100	U
108-88-3	Toluene	150	
10061-02-6	trans-1,3-Dichloropropene	100	U
79-00-5	1,1,2-Trichloroethane	100	U
127-18-4	Tetrachloroethene	100	U
591-78-6	2-Hexanone	100	U
124-48-1	Dibromochloromethane	100	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW50

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-006A

Sample wt/vol: 1 (g/mL) G

Lab File ID: A8855.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 52

Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	100	U
108-90-7	Chlorobenzene	670	
100-41-4	Ethylbenzene	150	
1330-20-7	Xylene (total)	780	
100-42-5	Styrene	23	J
75-25-2	Bromoform	100	U
98-82-8	Isopropylbenzene	680	
79-34-5	1,1,2,2-Tetrachloroethane	100	U
541-73-1	1,3-Dichlorobenzene	4500	E
106-46-7	1,4-Dichlorobenzene	820	
95-50-1	1,2-Dichlorobenzene	100	U
96-12-8	1,2-Dibromo-3-chloropropane	100	U
120-82-1	1,2,4-Trichlorobenzene	100	U

1F

EPA SAMPLE NO.

FGW50

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-006A

Sample wt/vol: 1 (g/mL) G Lab File ID: A8855.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 52 Date Analyzed: 04/05/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 5.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 30 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000115-11-7	1-Propene, 2-methyl-	5.44	480	NJ
2.		Unknown (28)	10.87	280	J
3.		Unknown (26)	11.60	450	J
4.		Unknown (29)	11.92	280	J
5.	000565-77-5	2-Pentene, 2,3,4-trimethyl-	12.81	680	NJ
6.		Unknown (2)	13.82	510	J
7.		Unknown (3)	16.02	640	J
8.		Unknown (4)	16.17	620	J
9.		Unknown (30)	16.90	280	J
10.		Unknown (25)	17.01	460	J
11.		Unknown (5)	17.27	1500	J
12.		Unknown (6)	17.45	660	J
13.		Unknown (7)	17.95	1600	J
14.		Unknown (8)	18.29	740	J
15.		Unknown (9)	18.39	1300	J
16.		Unknown (10)	18.77	1400	J
17.		Unknown (11)	20.13	730	J
18.		Unknown (12)	20.32	910	J
19.		Unknown (13)	21.20	860	J
20.		Unknown (14)	22.67	3500	J
21.		Unknown (15)	22.78	1600	J
22.		Unknown (16)	23.06	1400	J
23.		Unknown (17)	23.51	1600	J
24.		Unknown (18)	23.73	950	J
25.		Unknown (27)	24.69	440	J
26.		Unknown (19)	24.88	1600	J
27.		Unknown (20)	26.77	780	J
28.		Unknown (21)	26.88	1000	J
29.		Unknown (22)	27.94	1300	J
30.		Unknown (23)	28.26	1100	J

1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

FGW50DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Lab Sample ID: 00031137-006A

Lab File ID: B9609.D

Level: (low/med) MED

Date Received: 03/30/00

% Moisture: not dec. 52

Date Analyzed: 04/07/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 50.00

Soil Extract Volume: 5000 (µL)

Soil Aliquot Volu 100 (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	500	U
74-87-3	Chloromethane	200	DJ
75-01-4	Vinyl Chloride	500	U
74-83-9	Bromomethane	430	DJ
75-00-3	Chloroethane	500	U
75-69-4	Trichlorofluoromethane	500	U
75-35-4	1,1-Dichloroethene	500	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	500	U
67-64-1	Acetone	350	DBJ
75-15-0	Carbon Disulfide	500	U
79-20-9	Methyl Acetate	910	DB
75-09-2	Methylene Chloride	140	DBJ
156-60-5	trans-1,2-Dichloroethene	500	U
1634-04-4	Methyl tert-Butyl Ether	500	U
75-34-3	1,1-Dichloroethane	500	U
156-59-2	cis-1,2-Dichloroethene	500	U
78-93-3	2-Butanone	500	U
67-66-3	Chloroform	500	U
71-55-6	1,1,1-Trichloroethane	500	U
110-82-7	Cyclohexane	500	U
56-23-5	Carbon Tetrachloride	500	U
71-43-2	Benzene	500	U
107-06-2	1,2-Dichloroethane	500	U
79-01-6	Trichloroethene	500	U
108-87-2	Methylcyclohexane	500	U
78-87-5	1,2-Dichloropropane	500	U
75-27-4	Bromodichloromethane	500	U
10061-01-5	cis-1,3-Dichloropropene	500	U
108-10-1	4-Methyl-2-pentanone	500	U
108-88-3	Toluene	500	U
10061-02-6	trans-1,3-Dichloropropene	500	U
79-00-5	1,1,2-Trichloroethane	500	U
127-18-4	Tetrachloroethene	500	U
591-78-6	2-Hexanone	500	U
124-48-1	Dibromochloromethane	500	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW50DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-006A

Sample wt/vol: 5 (g/mL) G

Lab File ID: B9609.D

Level: (low/med) MED

Date Received: 03/30/00

% Moisture: not dec. 52

Date Analyzed: 04/07/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 50.00

Soil Extract Volume: 5000 (µL)

Soil Aliquot Volu 100 (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	500	U
108-90-7	Chlorobenzene	140	DJ
100-41-4	Ethylbenzene	500	U
1330-20-7	Xylene (total)	210	DJ
100-42-5	Styrene	500	U
75-25-2	Bromoform	500	U
98-82-8	Isopropylbenzene	250	DJ
79-34-5	1,1,2,2-Tetrachloroethane	500	U
541-73-1	1,3-Dichlorobenzene	1700	D
106-46-7	1,4-Dichlorobenzene	330	DJ
95-50-1	1,2-Dichlorobenzene	500	U
96-12-8	1,2-Dibromo-3-chloropropane	500	U
120-82-1	1,2,4-Trichlorobenzene	500	U

1F

EPA SAMPLE NO.

FGW50DL

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-006A

Sample wt/vol: 5 (g/mL) G Lab File ID: B9609.D

Level: (low/med) MED Date Received: 03/30/00

% Moisture: not dec. 52 Date Analyzed: 04/07/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 50.00

Soil Extract Volume: 5000 (µl) Soil Aliquot Volume: 100 (µL)

Number TICs found: 4 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	Unknown (1)	13.54	390	J
2.	Unknown (2)	20.86	850	J
3.	Unknown (3)	22.62	640	J
4.	Unknown (4)	24.75	520	J

1A

EPA SAMPLE NO.

FGW51

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-007A

Sample wt/vol: 1 (g/mL) G

Lab File ID: A8856.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 31

Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	72	U
74-87-3	Chloromethane	72	U
75-01-4	Vinyl Chloride	72	U
74-83-9	Bromomethane	72	U
75-00-3	Chloroethane	12	J
75-69-4	Trichlorofluoromethane	72	U
75-35-4	1,1-Dichloroethene	72	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	72	U
67-64-1	Acetone	120	B
75-15-0	Carbon Disulfide	80	B
79-20-9	Methyl Acetate	72	U
75-09-2	Methylene Chloride	49	BJ
156-60-5	trans-1,2-Dichloroethene	72	U
1634-04-4	Methyl tert-Butyl Ether	72	U
75-34-3	1,1-Dichloroethane	12	J
156-59-2	cis-1,2-Dichloroethene	72	U
78-93-3	2-Butanone	20	J
67-66-3	Chloroform	72	U
71-55-6	1,1,1-Trichloroethane	72	U
110-82-7	Cyclohexane	72	U
56-23-5	Carbon Tetrachloride	72	U
71-43-2	Benzene	150	
107-06-2	1,2-Dichloroethane	72	U
79-01-6	Trichloroethene	72	U
108-87-2	Methylcyclohexane	9	J
78-87-5	1,2-Dichloropropane	72	U
75-27-4	Bromodichloromethane	72	U
10061-01-5	cis-1,3-Dichloropropene	72	U
108-10-1	4-Methyl-2-pentanone	72	U
108-88-3	Toluene	22	J
10061-02-6	trans-1,3-Dichloropropene	72	U
79-00-5	1,1,2-Trichloroethane	72	U
127-18-4	Tetrachloroethene	72	U
591-78-6	2-Hexanone	72	U
124-48-1	Dibromochloromethane	72	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW51

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 1 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 31

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-007A

Lab File ID: A8856.D

Date Received: 03/30/00

Date Analyzed: 04/05/00

Dilution Factor 5.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	72	U
108-90-7	Chlorobenzene	1800	E
100-41-4	Ethylbenzene	7	J
1330-20-7	Xylene (total)	34	J
100-42-5	Styrene	72	U
75-25-2	Bromoform	72	U
98-82-8	Isopropylbenzene	16	J
79-34-5	1,1,2,2-Tetrachloroethane	72	U
541-73-1	1,3-Dichlorobenzene	3800	E
106-46-7	1,4-Dichlorobenzene	1400	
95-50-1	1,2-Dichlorobenzene	72	U
96-12-8	1,2-Dibromo-3-chloropropane	72	U
120-82-1	1,2,4-Trichlorobenzene	72	U

EPA SAMPLE NO.
FGW51

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-007A

Sample wt/vol: 1 (g/mL) G Lab File ID: A8856.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 31 Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 5.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 30 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	5.01	99	J
2.	000115-11-7	1-Propene, 2-methyl-	5.43	380	NJ
3.		Unknown (3)	5.55	440	J
4.		Unknown (4)	6.37	66	J
5.	000563-47-3	1-Propene, 3-chloro-2-methyl-	8.02	270	NJ
6.		Unknown (6)	10.89	51	J
7.		Unknown (7)	14.06	77	J
8.		Unknown (8)	15.02	88	J
9.		Unknown (30)	17.97	25	J
10.		Unknown (9)	18.40	90	J
11.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.69	150	NJ
12.		Unknown (29)	19.29	36	J
13.		Unknown (11)	20.10	330	J
14.		Unknown (12)	20.30	540	J
15.		Unknown (13)	20.82	78	J
16.		Unknown (14)	21.45	64	J
17.		Unknown (15)	22.37	61	J
18.		Unknown (16)	22.50	74	J
19.		Unknown (17)	22.78	310	J
20.		Unknown (28)	22.99	37	J
21.		Unknown (18)	23.30	64	J
22.		Unknown (19)	23.52	190	J
23.		Unknown (20)	23.73	180	J
24.		Unknown (21)	24.16	290	J
25.		Unknown (22)	24.68	110	J
26.		Unknown (23)	25.01	93	J
27.		Unknown (24)	25.25	72	J
28.		Unknown (25)	25.85	49	J
29.		Unknown (26)	27.96	120	J
30.		Unknown (27)	29.13	100	J

1A

EPA SAMPLE NO.

FGW52

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-008A

Sample wt/vol: 1 (g/mL) G

Lab File ID: A8863.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 33

Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	75	U
74-87-3	Chloromethane	75	U
75-01-4	Vinyl Chloride	75	U
74-83-9	Bromomethane	75	U
75-00-3	Chloroethane	75	U
75-69-4	Trichlorofluoromethane	75	U
75-35-4	1,1-Dichloroethene	75	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	75	U
67-64-1	Acetone	74	BJ
75-15-0	Carbon Disulfide	120	B
79-20-9	Methyl Acetate	75	U
75-09-2	Methylene Chloride	31	BJ
156-60-5	trans-1,2-Dichloroethene	75	U
1634-04-4	Methyl tert-Butyl Ether	75	U
75-34-3	1,1-Dichloroethane	75	U
156-59-2	cis-1,2-Dichloroethene	75	U
78-93-3	2-Butanone	13	J
67-66-3	Chloroform	75	U
71-55-6	1,1,1-Trichloroethane	75	U
110-82-7	Cyclohexane	75	U
56-23-5	Carbon Tetrachloride	75	U
71-43-2	Benzene	48	J
107-06-2	1,2-Dichloroethane	75	U
79-01-6	Trichloroethene	9	J
108-87-2	Methylcyclohexane	75	U
78-87-5	1,2-Dichloropropane	75	U
75-27-4	Bromodichloromethane	75	U
10061-01-5	cis-1,3-Dichloropropene	75	U
108-10-1	4-Methyl-2-pentanone	75	U
108-88-3	Toluene	14	J
10061-02-6	trans-1,3-Dichloropropene	75	U
79-00-5	1,1,2-Trichloroethane	75	U
127-18-4	Tetrachloroethene	75	U
591-78-6	2-Hexanone	75	U
124-48-1	Dibromochloromethane	75	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW52

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 1 (g/mL) G

Lab Sample ID: 00031137-008A

Lab File ID: A8863.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 33

Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	75	U
108-90-7	Chlorobenzene	780	
100-41-4	Ethylbenzene	75	U
1330-20-7	Xylene (total)	19	J
100-42-5	Styrene	75	U
75-25-2	Bromoform	75	U
98-82-8	Isopropylbenzene	17	J
79-34-5	1,1,2,2-Tetrachloroethane	75	U
541-73-1	1,3-Dichlorobenzene	1100	
106-46-7	1,4-Dichlorobenzene	460	
95-50-1	1,2-Dichlorobenzene	75	U
96-12-8	1,2-Dibromo-3-chloropropane	75	U
120-82-1	1,2,4-Trichlorobenzene	75	U

EPA SAMPLE NO.
FGW52

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-008A

Sample wt/vol: 1 (g/mL) G Lab File ID: A8863.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 33 Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 5.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 25 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	5.00	49	J
2.	000115-11-7	1-Propene, 2-methyl-	5.42	180	NJ
3.		Unknown (3)	5.54	320	J
4.		Unknown (4)	8.01	96	J
5.		Unknown (5)	15.02	42	J
6.		Unknown (6)	15.28	69	J
7.		Unknown (7)	15.57	72	J
8.		Unknown (8)	17.29	49	J
9.		Unknown (9)	18.69	330	J
10.	002425-54-9	Tetradecane, 1-chloro-	19.68	78	NJ
11.		Unknown (11)	20.11	140	J
12.		Unknown (12)	20.32	180	J
13.		Unknown (13)	21.45	47	J
14.		Unknown (14)	22.51	47	J
15.		Unknown (15)	22.60	49	J
16.		Unknown (16)	22.78	210	J
17.		Unknown (17)	23.30	170	J
18.		Unknown (18)	23.53	99	J
19.	000000-00-0	TRANS-ANTI-1-METHYL-DECAHYDRONA	24.69	72	NJ
20.		Unknown (20)	24.89	44	J
21.		Unknown (21)	25.25	46	J
22.		Unknown (22)	26.78	40	J
23.		Unknown (23)	27.70	69	J
24.		Unknown (24)	27.96	110	J
25.		Unknown (25)	29.14	72	J

1A

EPA SAMPLE NO.

FGW53

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-009A

Sample wt/vol: 1 (g/mL) G

Lab File ID: A8861.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 36

Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND (µg/L or µg/Kg)	UG/KG	Q
75-71-8	Dichlorodifluoromethane	78	U
74-87-3	Chloromethane	78	U
75-01-4	Vinyl Chloride	78	U
74-83-9	Bromomethane	78	U
75-00-3	Chloroethane	78	U
75-69-4	Trichlorofluoromethane	78	U
75-35-4	1,1-Dichloroethene	78	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	78	U
67-64-1	Acetone	74	BJ
75-15-0	Carbon Disulfide	130	B
79-20-9	Methyl Acetate	78	U
75-09-2	Methylene Chloride	32	BJ
156-60-5	trans-1,2-Dichloroethene	78	U
1634-04-4	Methyl tert-Butyl Ether	78	U
75-34-3	1,1-Dichloroethane	78	U
156-59-2	cis-1,2-Dichloroethene	78	U
78-93-3	2-Butanone	12	J
67-66-3	Chloroform	78	U
71-55-6	1,1,1-Trichloroethane	78	U
110-82-7	Cyclohexane	78	U
56-23-5	Carbon Tetrachloride	78	U
71-43-2	Benzene	30	J
107-06-2	1,2-Dichloroethane	78	U
79-01-6	Trichloroethene	78	U
108-87-2	Methylcyclohexane	78	U
78-87-5	1,2-Dichloropropane	78	U
75-27-4	Bromodichloromethane	78	U
10061-01-5	cis-1,3-Dichloropropene	78	U
108-10-1	4-Methyl-2-pentanone	78	U
108-88-3	Toluene	11	J
10061-02-6	trans-1,3-Dichloropropene	78	U
79-00-5	1,1,2-Trichloroethane	78	U
127-18-4	Tetrachloroethene	78	U
591-78-6	2-Hexanone	78	U
124-48-1	Dibromochloromethane	78	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW53

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-009A

Sample wt/vol: 1 (g/mL) G

Lab File ID: A8861.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 36

Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	78	U
108-90-7	Chlorobenzene	480	
100-41-4	Ethylbenzene	78	U
1330-20-7	Xylene (total)	12	J
100-42-5	Styrene	78	U
75-25-2	Bromoform	78	U
98-82-8	Isopropylbenzene	11	J
79-34-5	1,1,2,2-Tetrachloroethane	78	U
541-73-1	1,3-Dichlorobenzene	770	
106-46-7	1,4-Dichlorobenzene	310	
95-50-1	1,2-Dichlorobenzene	78	U
96-12-8	1,2-Dibromo-3-chloropropane	78	U
120-82-1	1,2,4-Trichlorobenzene	78	U

1F

EPA SAMPLE NO.

FGW53

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-009A

Sample wt/vol: 1 (g/mL) G Lab File ID: A8861.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 36 Date Analyzed: 04/05/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 5.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 18 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000115-11-7	1-Propene, 2-methyl-	5.43	110	NJ
2.		Unknown (2)	5.56	180	J
3.	000563-52-0	1-Butene, 3-chloro-	8.03	68	NJ
4.		Unknown (4)	18.70	360	J
5.		Unknown (5)	19.67	55	J
6.		Unknown (6)	20.09	96	J
7.		Unknown (7)	20.32	120	J
8.		Unknown (8)	22.37	77	J
9.	000493-02-7	Naphthalene, decahydro-, trans-	22.68	56	NJ
10.		Unknown (10)	22.78	210	J
11.		Unknown (11)	23.30	290	J
12.		Unknown (12)	23.52	120	J
13.		Unknown (13)	23.74	110	J
14.		Unknown (14)	24.17	150	J
15.	002958-76-1	Naphthalene, decahydro-2-methyl-	24.69	51	NJ
16.		Unknown (16)	25.01	49	J
17.		Unknown (17)	27.69	50	J
18.		Unknown (18)	29.14	50	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW54

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 26

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-010A

Lab File ID: A8825.D

Date Received: 03/30/00

Date Analyzed: 04/04/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	14	U
74-87-3	Chloromethane	14	U
75-01-4	Vinyl Chloride	14	U
74-83-9	Bromomethane	14	U
75-00-3	Chloroethane	14	U
75-69-4	Trichlorofluoromethane	14	U
75-35-4	1,1-Dichloroethene	14	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	14	U
67-64-1	Acetone	7	BJ
75-15-0	Carbon Disulfide	4	BJ
79-20-9	Methyl Acetate	14	U
75-09-2	Methylene Chloride	7	BJ
156-60-5	trans-1,2-Dichloroethene	14	U
1634-04-4	Methyl tert-Butyl Ether	14	U
75-34-3	1,1-Dichloroethane	14	U
156-59-2	cis-1,2-Dichloroethene	14	U
78-93-3	2-Butanone	14	U
67-66-3	Chloroform	14	U
71-55-6	1,1,1-Trichloroethane	14	U
110-82-7	Cyclohexane	14	U
56-23-5	Carbon Tetrachloride	14	U
71-43-2	Benzene	14	U
107-06-2	1,2-Dichloroethane	14	U
79-01-6	Trichloroethene	14	U
108-87-2	Methylcyclohexane	14	U
78-87-5	1,2-Dichloropropane	14	U
75-27-4	Bromodichloromethane	14	U
10061-01-5	cis-1,3-Dichloropropene	14	U
108-10-1	4-Methyl-2-pentanone	14	U
108-88-3	Toluene	14	U
10061-02-6	trans-1,3-Dichloropropene	14	U
79-00-5	1,1,2-Trichloroethane	14	U
127-18-4	Tetrachloroethene	14	U
591-78-6	2-Hexanone	14	U
124-48-1	Dibromochloromethane	14	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW54

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-010A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8825.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 26

Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	14	U
108-90-7	Chlorobenzene	1	J
100-41-4	Ethylbenzene	14	U
1330-20-7	Xylene (total)	14	U
100-42-5	Styrene	14	U
75-25-2	Bromoform	14	U
98-82-8	Isopropylbenzene	14	U
79-34-5	1,1,2,2-Tetrachloroethane	14	U
541-73-1	1,3-Dichlorobenzene	5	J
106-46-7	1,4-Dichlorobenzene	2	J
95-50-1	1,2-Dichlorobenzene	14	U
96-12-8	1,2-Dibromo-3-chloropropane	14	U
120-82-1	1,2,4-Trichlorobenzene	14	U

EPA SAMPLE NO.
FGW54

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-010A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8825.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 26 Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 2 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1	Unknown siloxane	18.74	34	BJ
2	Unknown	23.33	17	J

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW55

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 21

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-011A

Lab File ID: A8826.D

Date Received: 03/30/00

Date Analyzed: 04/04/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	13	U
74-87-3	Chloromethane	13	U
75-01-4	Vinyl Chloride	13	U
74-83-9	Bromomethane	13	U
75-00-3	Chloroethane	13	U
75-69-4	Trichlorofluoromethane	13	U
75-35-4	1,1-Dichloroethene	13	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	13	U
67-64-1	Acetone	7	BJ
75-15-0	Carbon Disulfide	3	BJ
79-20-9	Methyl Acetate	13	U
75-09-2	Methylene Chloride	6	BJ
156-60-5	trans-1,2-Dichloroethene	13	U
1634-04-4	Methyl tert-Butyl Ether	13	U
75-34-3	1,1-Dichloroethane	13	U
156-59-2	cis-1,2-Dichloroethene	13	U
78-93-3	2-Butanone	13	U
67-66-3	Chloroform	13	U
71-55-6	1,1,1-Trichloroethane	13	U
110-82-7	Cyclohexane	13	U
56-23-5	Carbon Tetrachloride	13	U
71-43-2	Benzene	13	U
107-06-2	1,2-Dichloroethane	13	U
79-01-6	Trichloroethene	13	U
108-87-2	Methylcyclohexane	13	U
78-87-5	1,2-Dichloropropane	13	U
75-27-4	Bromodichloromethane	13	U
10061-01-5	cis-1,3-Dichloropropene	13	U
108-10-1	4-Methyl-2-pentanone	13	U
108-88-3	Toluene	13	U
10061-02-6	trans-1,3-Dichloropropene	13	U
79-00-5	1,1,2-Trichloroethane	13	U
127-18-4	Tetrachloroethene	13	U
591-78-6	2-Hexanone	13	U
124-48-1	Dibromochloromethane	13	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW55

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-011A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8826.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 21

Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	13	U
108-90-7	Chlorobenzene	13	U
100-41-4	Ethylbenzene	13	U
1330-20-7	Xylene (total)	13	U
100-42-5	Styrene	13	U
75-25-2	Bromoform	13	U
98-82-8	Isopropylbenzene	13	U
79-34-5	1,1,2,2-Tetrachloroethane	13	U
541-73-1	1,3-Dichlorobenzene	2	J
106-46-7	1,4-Dichlorobenzene	13	U
95-50-1	1,2-Dichlorobenzene	13	U
96-12-8	1,2-Dibromo-3-chloropropane	13	U
120-82-1	1,2,4-Trichlorobenzene	13	U

1F

EPA SAMPLE NO.

FGW55

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-011A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8826.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 21 Date Analyzed: 04/04/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

CONCENTRATION UNITS:

Number TICs found: 2 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.73	29	NJ
2.		Unknown	23.33	18	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW56

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-021A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A9078.D

Level: (low/med) LOW

Date Received: 03/31/00

% Moisture: not dec. 46

Date Analyzed: 04/25/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (µL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	19	U
74-87-3	Chloromethane	19	U
75-01-4	Vinyl Chloride	2	J
74-83-9	Bromomethane	19	U
75-00-3	Chloroethane	19	U
75-69-4	Trichlorofluoromethane	19	U
75-35-4	1,1-Dichloroethene	19	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	19	U
67-64-1	Acetone	14	BJ
75-15-0	Carbon Disulfide	2	J
79-20-9	Methyl Acetate	19	U
75-09-2	Methylene Chloride	8	BJ
156-60-5	trans-1,2-Dichloroethene	19	U
1634-04-4	Methyl tert-Butyl Ether	19	U
75-34-3	1,1-Dichloroethane	19	U
156-59-2	cis-1,2-Dichloroethene	6	J
78-93-3	2-Butanone	3	J
67-66-3	Chloroform	19	U
71-55-6	1,1,1-Trichloroethane	19	U
110-82-7	Cyclohexane	19	U
56-23-5	Carbon Tetrachloride	19	U
71-43-2	Benzene	19	U
107-06-2	1,2-Dichloroethane	19	U
79-01-6	Trichloroethene	230	
108-87-2	Methylcyclohexane	19	U
78-87-5	1,2-Dichloropropane	19	U
75-27-4	Bromodichloromethane	19	U
10061-01-5	cis-1,3-Dichloropropene	19	U
108-10-1	4-Methyl-2-pentanone	19	U
108-88-3	Toluene	19	U
10061-02-6	trans-1,3-Dichloropropene	19	U
79-00-5	1,1,2-Trichloroethane	19	U
127-18-4	Tetrachloroethene	19	U
591-78-6	2-Hexanone	19	U
124-48-1	Dibromochloromethane	19	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW56

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 46

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (µL)

Lab Sample ID: 00031137-021A

Lab File ID: A9078.D

Date Received: 03/31/00

Date Analyzed: 04/25/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	19	U
108-90-7	Chlorobenzene	19	U
100-41-4	Ethylbenzene	19	U
1330-20-7	Xylene (total)	19	U
100-42-5	Styrene	19	U
75-25-2	Bromoform	19	U
98-82-8	Isopropylbenzene	19	U
79-34-5	1,1,2,2-Tetrachloroethane	19	U
541-73-1	1,3-Dichlorobenzene	19	U
106-46-7	1,4-Dichlorobenzene	19	U
95-50-1	1,2-Dichlorobenzene	19	U
96-12-8	1,2-Dibromo-3-chloropropane	19	U
120-82-1	1,2,4-Trichlorobenzene	19	U

1F

EPA SAMPLE NO.

FGW56

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-021A

Sample wt/vol: 5 (g/mL) G Lab File ID: A9078.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: not dec. 46 Date Analyzed: 04/25/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

CONCENTRATION UNITS:

Number TICs found: 3 (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	Unknown siloxane	18.63	76	BJ
2.	Unknown (2)	23.24	82	J
3.	Unknown (3)	27.62	12	J

1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

FGW57

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-012A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8827.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 27

Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	14	U
74-87-3	Chloromethane	14	U
75-01-4	Vinyl Chloride	14	U
74-83-9	Bromomethane	14	U
75-00-3	Chloroethane	14	U
75-69-4	Trichlorofluoromethane	14	U
75-35-4	1,1-Dichloroethene	14	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	14	U
67-64-1	Acetone	64	B
75-15-0	Carbon Disulfide	17	B
79-20-9	Methyl Acetate	14	U
75-09-2	Methylene Chloride	9	BJ
156-60-5	trans-1,2-Dichloroethene	14	U
1634-04-4	Methyl tert-Butyl Ether	14	U
75-34-3	1,1-Dichloroethane	14	U
156-59-2	cis-1,2-Dichloroethene	14	U
78-93-3	2-Butanone	4	J
67-66-3	Chloroform	14	U
71-55-6	1,1,1-Trichloroethane	14	U
110-82-7	Cyclohexane	14	U
56-23-5	Carbon Tetrachloride	14	U
71-43-2	Benzene	14	U
107-06-2	1,2-Dichloroethane	14	U
79-01-6	Trichloroethene	14	U
108-87-2	Methylcyclohexane	14	U
78-87-5	1,2-Dichloropropane	14	U
75-27-4	Bromodichloromethane	14	U
10061-01-5	cis-1,3-Dichloropropene	14	U
108-10-1	4-Methyl-2-pentanone	14	U
108-88-3	Toluene	14	U
10061-02-6	trans-1,3-Dichloropropene	14	U
79-00-5	1,1,2-Trichloroethane	14	U
127-18-4	Tetrachloroethene	14	U
591-78-6	2-Hexanone	14	U
124-48-1	Dibromochloromethane	14	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW57

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-012A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8827.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 27

Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	14	U
108-90-7	Chlorobenzene	14	U
100-41-4	Ethylbenzene	14	U
1330-20-7	Xylene (total)	14	U
100-42-5	Styrene	14	U
75-25-2	Bromoform	14	U
98-82-8	Isopropylbenzene	14	U
79-34-5	1,1,2,2-Tetrachloroethane	14	U
541-73-1	1,3-Dichlorobenzene	2	J
106-46-7	1,4-Dichlorobenzene	14	U
95-50-1	1,2-Dichlorobenzene	14	U
96-12-8	1,2-Dibromo-3-chloropropane	14	U
120-82-1	1,2,4-Trichlorobenzene	14	U

1F

EPA SAMPLE NO.

FGW57

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-012A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8827.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 27 Date Analyzed: 04/04/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

CONCENTRATION UNITS:

Number TICs found: 21 (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	Unknown (1)	17.03	15	J
2.	Unknown siloxane	18.74	33	BJ
3.	Unknown (3)	19.59	11	J
4.	Unknown (4)	19.77	13	J
5.	Unknown (5)	20.85	27	J
6.	Unknown (6)	22.42	75	J
7.	Unknown (7)	22.53	56	J
8.	Unknown (8)	22.81	180	J
9.	Unknown (9)	23.33	26	J
10.	Unknown (10)	23.57	110	J
11. 006004-38-2	4,7-Methano-1H-indene, octahydro-	23.97	48	NJ
12.	Unknown (12)	24.23	28	J
13.	Unknown (13)	24.48	7	J
14.	Unknown (14)	24.73	10	J
15.	Unknown (15)	25.04	62	J
16.	Unknown (16)	25.28	32	J
17.	Unknown (17)	26.09	13	J
18.	Unknown (18)	28.29	10	J
19.	Unknown (19)	29.00	9	J
20.	Unknown (20)	29.14	10	J
21.	Unknown (21)	30.47	12	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW64

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 5 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 74

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-013A

Lab File ID: A8828.D

Date Received: 03/30/00

Date Analyzed: 04/04/00

Dilution Factor 1.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	38	U
74-87-3	Chloromethane	38	U
75-01-4	Vinyl Chloride	38	U
74-83-9	Bromomethane	38	U
75-00-3	Chloroethane	38	U
75-69-4	Trichlorofluoromethane	4	J
75-35-4	1,1-Dichloroethene	38	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	38	U
67-64-1	Acetone	250	B
75-15-0	Carbon Disulfide	420	B
79-20-9	Methyl Acetate	38	U
75-09-2	Methylene Chloride	60	B
156-60-5	trans-1,2-Dichloroethene	38	U
1634-04-4	Methyl tert-Butyl Ether	38	U
75-34-3	1,1-Dichloroethane	38	U
156-59-2	cis-1,2-Dichloroethene	38	U
78-93-3	2-Butanone	32	J
67-66-3	Chloroform	38	U
71-55-6	1,1,1-Trichloroethane	38	U
110-82-7	Cyclohexane	390	
56-23-5	Carbon Tetrachloride	38	U
71-43-2	Benzene	360	
107-06-2	1,2-Dichloroethane	38	U
79-01-6	Trichloroethene	38	U
108-87-2	Methylcyclohexane	540	
78-87-5	1,2-Dichloropropane	38	U
75-27-4	Bromodichloromethane	38	U
10061-01-5	cis-1,3-Dichloropropene	38	U
108-10-1	4-Methyl-2-pentanone	38	U
108-88-3	Toluene	60	
10061-02-6	trans-1,3-Dichloropropene	38	U
79-00-5	1,1,2-Trichloroethane	38	U
127-18-4	Tetrachloroethene	38	U
591-78-6	2-Hexanone	38	U
124-48-1	Dibromochloromethane	38	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW64

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-013A

Sample wt/vol: 5 (g/mL) G

Lab File ID: A8828.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 74

Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 1.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	38	U
108-90-7	Chlorobenzene	49	
100-41-4	Ethylbenzene	490	
1330-20-7	Xylene (total)	1400	
100-42-5	Styrene	38	U
75-25-2	Bromoform	38	U
98-82-8	Isopropylbenzene	2000	E
79-34-5	1,1,2,2-Tetrachloroethane	38	U
541-73-1	1,3-Dichlorobenzene	320	
106-46-7	1,4-Dichlorobenzene	85	
95-50-1	1,2-Dichlorobenzene	38	U
96-12-8	1,2-Dibromo-3-chloropropane	38	U
120-82-1	1,2,4-Trichlorobenzene	38	U

1F

EPA SAMPLE NO.

FGW64

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-013A

Sample wt/vol: 5 (g/mL) G Lab File ID: A8828.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 74 Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 30 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1	000115-11-7	1-Propene, 2-methyl-	5.47	270	NJ
2		Unknown (30)	8.51	170	J
3		Unknown (2)	9.43	280	J
4		Unknown (27)	11.30	180	J
5		Unknown (3)	11.65	270	J
6	000000-00-0	3-HEXENE, 3,4-DIMETHYL-	12.64	170	NJ
7	000565-77-5	2-Pentene, 2,3,4-trimethyl-	12.85	170	NJ
8		Unknown (4)	14.01	390	J
9		Unknown (5)	17.42	310	J
10	000095-47-6	Benzene, 1,2-dimethyl-	17.73	650	NJ
11		Unknown (7)	19.18	490	J
12		Unknown (8)	19.58	310	J
13		Unknown (9)	21.51	710	J
14		Unknown (10)	22.41	1300	J
15		Unknown (11)	22.57	1200	J
16		Unknown (12)	22.72	300	J
17		Unknown (13)	22.82	2900	J
18		Unknown (14)	23.03	550	J
19		Unknown (15)	23.17	2000	J
20		Unknown (16)	23.57	1300	J
21		Unknown (17)	23.78	1900	J
22	000000-00-0	TRANS-ANTI-1-METHYL-DECAHYDRONA	24.73	490	NJ
23	001467-36-3	Ethanone, 1-(2,3,4-trimethylphenyl)	24.94	560	NJ
24		Unknown (20)	25.05	520	J
25		Unknown (21)	25.36	830	J
26		Unknown (22)	25.90	290	J
27		Unknown (26)	26.82	230	J
28		Unknown (23)	27.51	290	J
29		Unknown (24)	27.73	350	J
30		Unknown (25)	28.01	1200	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW64DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 1 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 74

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-013A

Lab File ID: A8862.D

Date Received: 03/30/00

Date Analyzed: 04/05/00

Dilution Factor 5.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	190	U
74-87-3	Chloromethane	190	U
75-01-4	Vinyl Chloride	190	U
74-83-9	Bromomethane	190	U
75-00-3	Chloroethane	190	U
75-69-4	Trichlorofluoromethane	190	U
75-35-4	1,1-Dichloroethene	190	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	190	U
67-64-1	Acetone	280	DB
75-15-0	Carbon Disulfide	500	DB
79-20-9	Methyl Acetate	190	U
75-09-2	Methylene Chloride	90	DBJ
156-60-5	trans-1,2-Dichloroethene	190	U
1634-04-4	Methyl tert-Butyl Ether	190	U
75-34-3	1,1-Dichloroethane	190	U
156-59-2	cis-1,2-Dichloroethene	190	U
78-93-3	2-Butanone	40	DJ
67-66-3	Chloroform	190	U
71-55-6	1,1,1-Trichloroethane	190	U
110-82-7	Cyclohexane	190	U
56-23-5	Carbon Tetrachloride	190	U
71-43-2	Benzene	220	D
107-06-2	1,2-Dichloroethane	190	U
79-01-6	Trichloroethene	190	U
108-87-2	Methylcyclohexane	470	D
78-87-5	1,2-Dichloropropane	190	U
75-27-4	Bromodichloromethane	190	U
10061-01-5	cis-1,3-Dichloropropene	190	U
108-10-1	4-Methyl-2-pentanone	190	U
108-88-3	Toluene	52	DJ
10061-02-6	trans-1,3-Dichloropropene	190	U
79-00-5	1,1,2-Trichloroethane	190	U
127-18-4	Tetrachloroethene	190	U
591-78-6	2-Hexanone	190	U
124-48-1	Dibromochloromethane	190	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW64DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 1 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 74

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-013A

Lab File ID: A8862.D

Date Received: 03/30/00

Date Analyzed: 04/05/00

Dilution Factor 5.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	190	U
108-90-7	Chlorobenzene	45	DJ
100-41-4	Ethylbenzene	190	D
1330-20-7	Xylene (total)	1500	D
100-42-5	Styrene	190	U
75-25-2	Bromoform	190	U
98-82-8	Isopropylbenzene	2800	D
79-34-5	1,1,2,2-Tetrachloroethane	190	U
541-73-1	1,3-Dichlorobenzene	380	D
106-46-7	1,4-Dichlorobenzene	100	DJ
95-50-1	1,2-Dichlorobenzene	190	U
96-12-8	1,2-Dibromo-3-chloropropane	190	U
120-82-1	1,2,4-Trichlorobenzene	190	U

1F

EPA SAMPLE NO.

FGW64DL

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-013A

Sample wt/vol: 1 (g/mL) G Lab File ID: A8862.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 74 Date Analyzed: 04/05/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 5.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 30 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	5.44	240	J
2.		Unknown (2)	8.49	230	J
3.		Unknown (28)	8.79	150	J
4.		Unknown (3)	9.71	410	J
5.		Unknown (4)	11.63	210	J
6.		Unknown (5)	12.17	330	J
7.		Unknown (29)	12.61	150	J
8.		Unknown (6)	13.98	150	J
9.		Unknown (30)	15.40	140	J
10.	000095-47-6	Benzene, 1,2-dimethyl-	17.70	470	NJ
11.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.70	600	NJ
12.		Unknown (9)	20.81	280	J
13.		Unknown (10)	20.90	640	J
14.		Unknown (11)	21.37	190	J
15.		Unknown (12)	22.36	430	J
16.		Unknown (13)	22.54	540	J
17.		Unknown (14)	22.69	190	J
18.		Unknown (15)	22.98	150	J
19.		Unknown (16)	23.12	610	J
20.		Unknown (17)	23.29	680	J
21.		Unknown (18)	23.53	580	J
22.		Unknown (19)	23.73	690	J
23.		Unknown (20)	24.16	730	J
24.		Unknown (21)	24.69	220	J
25.	079597-71-0	2,3,4,4-Tetramethylbicyclo(3_2_1)oc	24.90	200	NJ
26.		Unknown (23)	25.00	160	J
27.		Unknown (24)	25.30	360	J
28.		Unknown (25)	27.45	410	J
29.		Unknown (26)	27.68	350	J
30.		Unknown (27)	27.95	1600	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW65

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 1 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 69

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-014A

Lab File ID: A8836.D

Date Received: 03/30/00

Date Analyzed: 04/04/00

Dilution Factor 5.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	160	U
74-87-3	Chloromethane	160	U
75-01-4	Vinyl Chloride	160	U
74-83-9	Bromomethane	160	U
75-00-3	Chloroethane	160	U
75-69-4	Trichlorofluoromethane	160	U
75-35-4	1,1-Dichloroethene	160	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	160	U
67-64-1	Acetone	520	B
75-15-0	Carbon Disulfide	330	B
79-20-9	Methyl Acetate	160	U
75-09-2	Methylene Chloride	140	BJ
156-60-5	trans-1,2-Dichloroethene	160	U
1634-04-4	Methyl tert-Butyl Ether	160	U
75-34-3	1,1-Dichloroethane	160	U
156-59-2	cis-1,2-Dichloroethene	160	U
78-93-3	2-Butanone	45	J
67-66-3	Chloroform	160	U
71-55-6	1,1,1-Trichloroethane	160	U
110-82-7	Cyclohexane	160	U
56-23-5	Carbon Tetrachloride	160	U
71-43-2	Benzene	90	J
107-06-2	1,2-Dichloroethane	160	U
79-01-6	Trichloroethene	18	J
108-87-2	Methylcyclohexane	300	
78-87-5	1,2-Dichloropropane	160	U
75-27-4	Bromodichloromethane	160	U
10061-01-5	cis-1,3-Dichloropropene	160	U
108-10-1	4-Methyl-2-pentanone	160	U
108-88-3	Toluene	19	J
10061-02-6	trans-1,3-Dichloropropene	160	U
79-00-5	1,1,2-Trichloroethane	160	U
127-18-4	Tetrachloroethene	160	U
591-78-6	2-Hexanone	160	U
124-48-1	Dibromochloromethane	160	U

1B

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW65

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-014A

Sample wt/vol: 1 (g/mL) G

Lab File ID: A8836.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 69

Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	160	U
108-90-7	Chlorobenzene	24	J
100-41-4	Ethylbenzene	53	J
1330-20-7	Xylene (total)	610	
100-42-5	Styrene	160	U
75-25-2	Bromoform	160	U
98-82-8	Isopropylbenzene	1900	
79-34-5	1,1,2,2-Tetrachloroethane	160	U
541-73-1	1,3-Dichlorobenzene	200	
106-46-7	1,4-Dichlorobenzene	55	J
95-50-1	1,2-Dichlorobenzene	160	U
96-12-8	1,2-Dibromo-3-chloropropane	160	U
120-82-1	1,2,4-Trichlorobenzene	160	U

1F

EPA SAMPLE NO.

FGW65

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-014A

Sample wt/vol: 1 (g/mL) G Lab File ID: A8836.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 69 Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 5.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 29 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	7.40	270	J
2.		Unknown (2)	8.50	130	J
3.		Unknown (28)	8.81	100	J
4.		Unknown (3)	9.72	320	J
5.		Unknown (4)	11.64	140	J
6.		Unknown (5)	12.19	220	J
7.	000000-00-0	2-HEXENE, 3,4-DIMETHYL-	12.64	95	NJ
8.		Unknown (6)	13.99	120	J
9.		Unknown (7)	15.41	120	J
10.	000095-47-6	Benzene, 1,2-dimethyl-	17.72	280	NJ
11.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.72	520	BNJ
12.		Unknown (10)	20.83	170	J
13.		Unknown (11)	20.92	380	J
14.		Unknown (12)	22.39	340	J
15.		Unknown (13)	22.57	450	J
16.		Unknown (14)	22.71	150	J
17.		Unknown (27)	23.00	110	J
18.		Unknown (15)	23.14	460	J
19.		Unknown (16)	23.31	500	J
20.		Unknown (17)	23.55	390	J
21.		Unknown (18)	23.75	470	J
22.		Unknown (19)	24.50	320	J
23.		Unknown (20)	24.71	140	J
24.		Unknown (21)	24.92	130	J
25.		Unknown (22)	25.02	130	J
26.		Unknown (23)	25.32	250	J
27.		Unknown (24)	27.48	270	J
28.		Unknown (25)	27.70	230	J
29.		Unknown (26)	27.98	880	J

1A

EPA SAMPLE NO.

FGW70

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Lab Sample ID: 00031137-015A

Sample wt/vol: 1 (g/mL) G

Lab File ID: A8837.D

Level: (low/med) LOW

Date Received: 03/30/00

% Moisture: not dec. 43

Date Analyzed: 04/04/00

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor 5.00

Soil Extract Volume: _____ (mL)

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	88	U
74-87-3	Chloromethane	88	U
75-01-4	Vinyl Chloride	88	U
74-83-9	Bromomethane	88	U
75-00-3	Chloroethane	88	U
75-69-4	Trichlorofluoromethane	26	J
75-35-4	1,1-Dichloroethene	88	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroeth	88	U
67-64-1	Acetone	280	B
75-15-0	Carbon Disulfide	220	B
79-20-9	Methyl Acetate	88	U
75-09-2	Methylene Chloride	73	BJ
156-60-5	trans-1,2-Dichloroethene	88	U
1634-04-4	Methyl tert-Butyl Ether	88	U
75-34-3	1,1-Dichloroethane	88	U
156-59-2	cis-1,2-Dichloroethene	88	U
78-93-3	2-Butanone	22	J
67-66-3	Chloroform	88	U
71-55-6	1,1,1-Trichloroethane	88	U
110-82-7	Cyclohexane	88	U
56-23-5	Carbon Tetrachloride	88	U
71-43-2	Benzene	25	J
107-06-2	1,2-Dichloroethane	88	U
79-01-6	Trichloroethene	88	U
108-87-2	Methylcyclohexane	69	J
78-87-5	1,2-Dichloropropane	88	U
75-27-4	Bromodichloromethane	88	U
10061-01-5	cis-1,3-Dichloropropene	88	U
108-10-1	4-Methyl-2-pentanone	88	U
108-88-3	Toluene	38	J
10061-02-6	trans-1,3-Dichloropropene	88	U
79-00-5	1,1,2-Trichloroethane	88	U
127-18-4	Tetrachloroethene	88	U
591-78-6	2-Hexanone	88	U
124-48-1	Dibromochloromethane	88	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW70

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No. _____ SDG No.: FGW45

Matrix: (soil/water) SOIL

Sample wt/vol: 1 (g/mL) G

Level: (low/med) LOW

% Moisture: not dec. 43

GC Column: DB-624 ID: 0.53 (mm)

Soil Extract Volume: _____ (mL)

Lab Sample ID: 00031137-015A

Lab File ID: A8837.D

Date Received: 03/30/00

Date Analyzed: 04/04/00

Dilution Factor 5.00

Soil Aliquot Volu (µL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
106-93-4	1,2-Dibromoethane	88	U
108-90-7	Chlorobenzene	1700	
100-41-4	Ethylbenzene	21	J
1330-20-7	Xylene (total)	91	
100-42-5	Styrene	88	U
75-25-2	Bromoform	88	U
98-82-8	Isopropylbenzene	120	
79-34-5	1,1,2,2-Tetrachloroethane	88	U
541-73-1	1,3-Dichlorobenzene	500	
106-46-7	1,4-Dichlorobenzene	470	
95-50-1	1,2-Dichlorobenzene	88	U
96-12-8	1,2-Dibromo-3-chloropropane	88	U
120-82-1	1,2,4-Trichlorobenzene	88	U

1F

EPA SAMPLE NO.

FGW70

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name Clayton Group Services Contract 68-W-99-069

Lab Code CLAYTN Case No. 27912 SAS No. _____ SDG No. FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-015A

Sample wt/vol: 1 (g/mL) G Lab File ID: A8837.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: not dec. 43 Date Analyzed: 04/04/00

GC Column DB-624 ID: 0.53 (mm) Dilution Factor: 5.00

Soil Extract Volume: (µl) Soil Aliquot Volume: 0 (µL)

Number TICs found: 30 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	5.45	180	J
2.		Unknown (2)	9.72	76	J
3.		Unknown (30)	10.90	48	J
4.		Unknown (3)	11.91	73	J
5.		Unknown (4)	12.19	420	J
6.		Unknown (5)	12.48	180	J
7.	000000-00-0	2-HEXENE, 3,4-DIMETHYL-	12.63	97	NJ
8.	000565-77-5	2-Pentene, 2,3,4-trimethyl-	12.83	240	NJ
9.		Unknown (8)	13.99	520	J
10.		Unknown (9)	14.40	130	J
11.		Unknown (10)	14.95	180	J
12.		Unknown (11)	16.03	120	J
13.		Unknown (12)	16.20	75	J
14.		Unknown (13)	17.30	190	J
15.		Unknown (14)	17.47	140	J
16.		Unknown (15)	17.82	50	J
17.		Unknown (16)	18.12	110	J
18.		Unknown (17)	18.41	71	J
19.	000556-67-2	Cyclotetrasiloxane, octamethyl-	18.71	210	BNJ
20.		Unknown (19)	19.71	160	J
21.		Unknown (20)	20.34	110	J
22.		Unknown (21)	20.50	230	J
23.		Unknown (22)	21.50	140	J
24.		Unknown (23)	22.79	230	J
25.		Unknown (24)	24.72	82	J
26.		Unknown (25)	24.90	190	J
27.		Unknown (26)	25.44	49	J
28.		Unknown (27)	26.79	130	J
29.		Unknown (28)	27.98	220	J
30.		Unknown (29)	28.28	120	J

EPA SAMPLE NO.

FGW45

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-001D

Sample wt/vol: 30 (g/mL) G Lab File ID: I1891.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 21 Decanted: (Y/N) N Date Extracted: 04/19/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/24/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.1 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	420	U
108-95-2	Phenol	420	U
111-44-4	bis(2-Chloroethyl)ether	420	U
95-57-8	2-Chlorophenol	420	U
95-48-7	2-Methylphenol	420	U
108-60-1	2,2´-oxybis(1-Chloropropane)	420	U
98-86-2	Acetophenone	420	U
106-44-5	4-Methylphenol	420	U
621-64-7	N-Nitroso-di-n-propylamine	420	U
67-72-1	Hexachloroethane	420	U
98-95-3	Nitrobenzene	420	U
78-59-1	Isophorone	420	U
88-75-5	2-Nitrophenol	420	U
105-67-9	2,4-Dimethylphenol	420	U
111-91-1	bis(2-Chloroethoxy)methane	420	U
120-83-2	2,4-Dichlorophenol	420	U
91-20-3	Naphthalene	420	U
106-47-8	4-Chloroaniline	420	U
87-68-3	Hexachlorobutadiene	420	U
105-60-2	Caprolactam	420	U
59-50-7	4-Chloro-3-methylphenol	420	U
91-57-6	2-Methylnaphthalene	420	U
77-47-4	Hexachlorocyclopentadiene	420	U
88-06-2	2,4,6-Trichlorophenol	420	U
95-95-4	2,4,5-Trichlorophenol	1100	U
92-52-4	1,1´-Biphenyl	420	U
91-58-7	2-Chloronaphthalene	420	U
88-74-4	2-Nitroaniline	1100	U
131-11-3	Dimethylphthalate	420	U
606-20-2	2,6-Dinitrotoluene	420	U
208-96-8	Acenaphthylene	420	U
99-09-2	3-Nitroaniline	1100	U
83-32-9	Acenaphthene	420	U
51-28-5	2,4-Dinitrophenol	1100	U
100-02-7	4-Nitrophenol	1100	U

EPA SAMPLE NO.

FGW45

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-001D

Sample wt/vol: 30 (g/mL) G Lab File ID: I1891.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 21 Decanted: (Y/N) N Date Extracted: 04/19/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/24/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.1 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	420	U
121-14-2	2,4-Dinitrotoluene	420	U
84-66-2	Diethylphthalate	420	U
86-73-7	Fluorene	420	U
7005-72-3	4-Chlorophenyl-phenylether	420	U
100-01-6	4-Nitroaniline	1100	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
86-30-6	N-Nitrosodiphenylamine (1)	420	U
101-55-3	4-Bromophenyl-phenylether	420	U
118-74-1	Hexachlorobenzene	420	U
1912-24-9	Atrazine	420	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	420	U
120-12-7	Anthracene	420	U
86-74-8	Carbazole	420	U
84-74-2	Di-n-butylphthalate	420	U
206-44-0	Fluoranthene	420	U
129-00-0	Pyrene	420	U
85-68-7	Butylbenzylphthalate	420	U
91-94-1	3,3'-Dichlorobenzidine	420	U
56-55-3	Benzo(a)anthracene	420	U
218-01-9	Chrysene	420	U
117-81-7	bis(2-Ethylhexyl)phthalate	50	J
117-84-0	Di-n-octylphthalate	420	U
205-99-2	Benzo(b)fluoranthene	420	U
207-08-9	Benzo(k)fluoranthene	420	U
50-32-8	Benzo(a)pyrene	420	U
193-39-5	Indeno(1,2,3-cd)pyrene	420	U
53-70-3	Dibenzo(a,h)anthracene	420	U
191-24-2	Benzo(g,h,i)perylene	420	U

EPA SAMPLE NO.

FGW45

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-001D

Sample wt/vol: 30 (g/mL) G Lab File ID: I1891.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 21 Decanted: (Y/N) N Date Extracted: 04/19/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/24/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.1 Extraction: (Type SONC

Number TICs found: 3 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	Unknown (1)	6.07	160	BJ
2.	Unknown (3)	6.61	170	J
3.	Unknown (2)	16.19	170	J

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW46

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-002B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1892.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 19 Decanted: (Y/N) N Date Extracted: 04/19/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/24/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.3 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	410	U
108-95-2	Phenol	410	U
111-44-4	bis(2-Chloroethyl)ether	410	U
95-57-8	2-Chlorophenol	410	U
95-48-7	2-Methylphenol	410	U
108-60-1	2,2´-oxybis(1-Chloropropane)	410	U
98-86-2	Acetophenone	410	U
106-44-5	4-Methylphenol	410	U
621-64-7	N-Nitroso-di-n-propylamine	410	U
67-72-1	Hexachloroethane	410	U
98-95-3	Nitrobenzene	410	U
78-59-1	Isophorone	410	U
88-75-5	2-Nitrophenol	410	U
105-67-9	2,4-Dimethylphenol	410	U
111-91-1	bis(2-Chloroethoxy)methane	410	U
120-83-2	2,4-Dichlorophenol	410	U
91-20-3	Naphthalene	410	U
106-47-8	4-Chloroaniline	410	U
87-68-3	Hexachlorobutadiene	410	U
105-60-2	Caprolactam	410	U
59-50-7	4-Chloro-3-methylphenol	410	U
91-57-6	2-Methylnaphthalene	410	U
77-47-4	Hexachlorocyclopentadiene	410	U
88-06-2	2,4,6-Trichlorophenol	410	U
95-95-4	2,4,5-Trichlorophenol	1000	U
92-52-4	1,1´-Biphenyl	410	U
91-58-7	2-Chloronaphthalene	410	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	410	U
606-20-2	2,6-Dinitrotoluene	410	U
208-96-8	Acenaphthylene	410	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	410	U
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U

EPA SAMPLE NO.

FGW46

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-002B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1892.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 19 Decanted: (Y/N) N Date Extracted: 04/19/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/24/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.3 Extraction: (Type SONC

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	410	U
121-14-2	2,4-Dinitrotoluene	410	U
84-66-2	Diethylphthalate	410	U
86-73-7	Fluorene	410	U
7005-72-3	4-Chlorophenyl-phenylether	410	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	410	U
101-55-3	4-Bromophenyl-phenylether	410	U
118-74-1	Hexachlorobenzene	410	U
1912-24-9	Atrazine	410	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	410	U
120-12-7	Anthracene	410	U
86-74-8	Carbazole	410	U
84-74-2	Di-n-butylphthalate	410	U
206-44-0	Fluoranthene	410	U
129-00-0	Pyrene	410	U
85-68-7	Butylbenzylphthalate	410	U
91-94-1	3,3´-Dichlorobenzidine	410	U
56-55-3	Benzo(a)anthracene	410	U
218-01-9	Chrysene	410	U
117-81-7	bis(2-Ethylhexyl)phthalate	27	J
117-84-0	Di-n-octylphthalate	410	U
205-99-2	Benzo(b)fluoranthene	410	U
207-08-9	Benzo(k)fluoranthene	410	U
50-32-8	Benzo(a)pyrene	410	U
193-39-5	Indeno(1,2,3-cd)pyrene	410	U
53-70-3	Dibenzo(a,h)anthracene	410	U
191-24-2	Benzo(g,h,i)perylene	410	U

EPA SAMPLE NO.

FGW46

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-002B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1892.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 19 Decanted: (Y/N) N Date Extracted: 04/19/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/24/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.3 Extraction: (Type SONC

Number TICs found: 2 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	6.07	200	BJ
2.		Unknown (2)	6.60	140	J

EPA SAMPLE NO.

FGW47

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-003B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1806.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 18 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/18/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.0 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	400	U
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)ether	400	U
95-57-8	2-Chlorophenol	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2´-oxybis(1-Chloropropane)	400	U
98-86-2	Acetophenone	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
105-60-2	Caprolactam	400	U
59-50-7	4-Chloro-3-methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
92-52-4	1,1´-Biphenyl	400	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
606-20-2	2,6-Dinitrotoluene	400	U
208-96-8	Acenaphthylene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	400	U
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U

1D

EPA SAMPLE NO.

FGW47

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-003B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1806.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 18 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/18/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.0 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
86-73-7	Fluorene	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
1912-24-9	Atrazine	400	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	400	U
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	400	U
85-68-7	Butylbenzylphthalate	400	U
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	400	U
117-81-7	bis(2-Ethylhexyl)phthalate	36	BJ
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	400	U
207-08-9	Benzo(k)fluoranthene	400	U
50-32-8	Benzo(a)pyrene	400	U
193-39-5	Indeno(1,2,3-cd)pyrene	400	U
53-70-3	Dibenzo(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	U

1G

EPA SAMPLE NO.

FGW47

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-003B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1806.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 18 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/18/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.0 Extraction: (Type SONC

Number TICs found: 1 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	Unknown	6.08	200	BJ

EPA SAMPLE NO.

FGW48

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-004B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1491.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 50 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 25.00

GPC Cleanup: (Y/N) Y pH: 8.3 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	16000	U
108-95-2	Phenol	16000	U
111-44-4	bis(2-Chloroethyl)ether	16000	U
95-57-8	2-Chlorophenol	16000	U
95-48-7	2-Methylphenol	16000	U
108-60-1	2,2'-oxybis(1-Chloropropane)	16000	U
98-86-2	Acetophenone	16000	U
106-44-5	4-Methylphenol	16000	U
621-64-7	N-Nitroso-di-n-propylamine	16000	U
67-72-1	Hexachloroethane	2600	J
98-95-3	Nitrobenzene	16000	U
78-59-1	Isophorone	16000	U
88-75-5	2-Nitrophenol	16000	U
105-67-9	2,4-Dimethylphenol	16000	U
111-91-1	bis(2-Chloroethoxy)methane	16000	U
120-83-2	2,4-Dichlorophenol	16000	U
91-20-3	Naphthalene	5000	J
106-47-8	4-Chloroaniline	16000	U
87-68-3	Hexachlorobutadiene	19000	
105-60-2	Caprolactam	16000	U
59-50-7	4-Chloro-3-methylphenol	16000	U
91-57-6	2-Methylnaphthalene	2800	J
77-47-4	Hexachlorocyclopentadiene	16000	U
88-06-2	2,4,6-Trichlorophenol	16000	U
95-95-4	2,4,5-Trichlorophenol	42000	U
92-52-4	1,1'-Biphenyl	1300	J
91-58-7	2-Chloronaphthalene	16000	U
88-74-4	2-Nitroaniline	42000	U
131-11-3	Dimethylphthalate	16000	U
606-20-2	2,6-Dinitrotoluene	16000	U
208-96-8	Acenaphthylene	12000	J
99-09-2	3-Nitroaniline	42000	U
83-32-9	Acenaphthene	20000	
51-28-5	2,4-Dinitrophenol	42000	U
100-02-7	4-Nitrophenol	42000	U

1D

EPA SAMPLE NO.

FGW48

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-004B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1491.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 50 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 25.00

GPC Cleanup: (Y/N) Y pH: 8.3 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	16000	U
121-14-2	2,4-Dinitrotoluene	16000	U
84-66-2	Diethylphthalate	16000	U
86-73-7	Fluorene	6300	J
7005-72-3	4-Chlorophenyl-phenylether	16000	U
100-01-6	4-Nitroaniline	42000	U
534-52-1	4,6-Dinitro-2-methylphenol	42000	U
86-30-6	N-Nitrosodiphenylamine (1)	16000	U
101-55-3	4-Bromophenyl-phenylether	16000	U
118-74-1	Hexachlorobenzene	3900	J
1912-24-9	Atrazine	16000	U
87-86-5	Pentachlorophenol	42000	U
85-01-8	Phenanthrene	27000	
120-12-7	Anthracene	4500	J
86-74-8	Carbazole	16000	U
84-74-2	Di-n-butylphthalate	16000	U
206-44-0	Fluoranthene	30000	
129-00-0	Pyrene	70000	
85-68-7	Butylbenzylphthalate	16000	U
91-94-1	3,3'-Dichlorobenzidine	16000	U
56-55-3	Benzo(a)anthracene	1500	J
218-01-9	Chrysene	2200	J
117-81-7	bis(2-Ethylhexyl)phthalate	6000	BJ
117-84-0	Di-n-octylphthalate	16000	U
205-99-2	Benzo(b)fluoranthene	1400	J
207-08-9	Benzo(k)fluoranthene	1100	J
50-32-8	Benzo(a)pyrene	3900	J
193-39-5	Indeno(1,2,3-cd)pyrene	3100	J
53-70-3	Dibenzo(a,h)anthracene	16000	U
191-24-2	Benzo(g,h,i)perylene	11000	J

1G

EPA SAMPLE NO.

FGW48

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-004B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1491.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 50 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/20/00

Injection Volume: 2 (µl) Dilution Factor: 25.00

GPC Cleanup: (Y/N) Y pH: 8.3 Extraction: (Type SONC

Number TICs found: 19 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000090-12-0	Naphthalene, 1-methyl-	11.32	6100	NJ
2.	000101-84-8	Benzene, 1,1'-oxybis-	12.28	12000	NJ
3.	000575-43-9	Naphthalene, 1,6-dimethyl-	12.58	6200	NJ
4.		Unknown (4)	12.87	4300	J
5.		Unknown hydrocarbon (5)	13.65	3500	J
6.		Unknown hydrocarbon (6)	13.90	6500	J
7.		Unknown (7)	14.02	9300	J
8.		Unknown (8)	14.89	5700	J
9.	000832-64-4	Phenanthrene, 4-methyl-	16.88	4800	NJ
10.	000203-64-5	4H-Cyclopenta(def)phenanthrene	17.12	20000	NJ
11.		Unknown PAH (11)	17.37	4800	J
12.		Unknown PAH (12)	17.85	6000	J
13.		Unknown PAH (13)	18.30	8300	J
14.		Unknown (14)	18.61	3400	J
15.		Unknown PAH (15)	19.07	8300	J
16.	027208-37-3	Cyclopenta(cd)pyrene	20.28	13000	NJ
17.		Unknown (17)	20.91	4000	J
18.	000192-97-2	Benzo(e)pyrene	24.30	5400	NJ
19.		1,2-BENZOPERYLENE	30.89	6400	J

EPA SAMPLE NO.

FGW49

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-005B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1492.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 56 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CONCENTRATION UNITS:

CAS NO.	COMPOUND (µg/L or µg/Kg)	UG/KG	Q
100-52-7	Benzaldehyde	15000	U
108-95-2	Phenol	15000	U
111-44-4	bis(2-Chloroethyl)ether	15000	U
95-57-8	2-Chlorophenol	15000	U
95-48-7	2-Methylphenol	15000	U
108-60-1	2,2´-oxybis(1-Chloropropane)	15000	U
98-86-2	Acetophenone	15000	U
106-44-5	4-Methylphenol	15000	U
621-64-7	N-Nitroso-di-n-propylamine	15000	U
67-72-1	Hexachloroethane	2200	J
98-95-3	Nitrobenzene	15000	U
78-59-1	Isophorone	15000	U
88-75-5	2-Nitrophenol	15000	U
105-67-9	2,4-Dimethylphenol	15000	U
111-91-1	bis(2-Chloroethoxy)methane	15000	U
120-83-2	2,4-Dichlorophenol	15000	U
91-20-3	Naphthalene	2200	J
106-47-8	4-Chloroaniline	15000	U
87-68-3	Hexachlorobutadiene	19000	
105-60-2	Caprolactam	15000	U
59-50-7	4-Chloro-3-methylphenol	15000	U
91-57-6	2-Methylnaphthalene	1600	J
77-47-4	Hexachlorocyclopentadiene	15000	U
88-06-2	2,4,6-Trichlorophenol	15000	U
95-95-4	2,4,5-Trichlorophenol	38000	U
92-52-4	1,1´-Biphenyl	970	J
91-58-7	2-Chloronaphthalene	15000	U
88-74-4	2-Nitroaniline	38000	U
131-11-3	Dimethylphthalate	15000	U
606-20-2	2,6-Dinitrotoluene	15000	U
208-96-8	Acenaphthylene	7700	J
99-09-2	3-Nitroaniline	38000	U
83-32-9	Acenaphthene	11000	J
51-28-5	2,4-Dinitrophenol	38000	U
100-02-7	4-Nitrophenol	38000	U

EPA SAMPLE NO.

FGW49

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-005B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1492.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 56 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	15000	U
121-14-2	2,4-Dinitrotoluene	15000	U
84-66-2	Diethylphthalate	15000	U
86-73-7	Fluorene	4100	J
7005-72-3	4-Chlorophenyl-phenylether	15000	U
100-01-6	4-Nitroaniline	38000	U
534-52-1	4,6-Dinitro-2-methylphenol	38000	U
86-30-6	N-Nitrosodiphenylamine (1)	15000	U
101-55-3	4-Bromophenyl-phenylether	15000	U
118-74-1	Hexachlorobenzene	4800	J
1912-24-9	Atrazine	15000	U
87-86-5	Pentachlorophenol	38000	U
85-01-8	Phenanthrene	15000	
120-12-7	Anthracene	2800	J
86-74-8	Carbazole	15000	U
84-74-2	Di-n-butylphthalate	15000	U
206-44-0	Fluoranthene	18000	
129-00-0	Pyrene	42000	
85-68-7	Butylbenzylphthalate	15000	U
91-94-1	3,3'-Dichlorobenzidine	15000	U
56-55-3	Benzo(a)anthracene	1200	J
218-01-9	Chrysene	1700	J
117-81-7	bis(2-Ethylhexyl)phthalate	5300	BJ
117-84-0	Di-n-octylphthalate	15000	U
205-99-2	Benzo(b)fluoranthene	1000	J
207-08-9	Benzo(k)fluoranthene	830	J
50-32-8	Benzo(a)pyrene	2700	J
193-39-5	Indeno(1,2,3-cd)pyrene	2000	J
53-70-3	Dibenzo(a,h)anthracene	15000	U
191-24-2	Benzo(g,h,i)perylene	7100	J

EPA SAMPLE NO.

FGW49

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-005B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1492.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 56 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/20/00

Injection Volume: 2 (µl) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.2 Extraction: (Type SONC

Number TICs found: 18 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000095-50-1	Benzene, 1,2-dichloro-	6.80	7500	NJ
2.		Unknown (2)	7.67	3300	J
3.	000090-12-0	Naphthalene, 1-methyl-	11.32	4500	NJ
4.	000101-84-8	Benzene, 1,1'-oxybis-	12.29	12000	NJ
5.		Unknown (5)	12.86	3600	J
6.		Unknown (6)	13.90	5100	J
7.		Unknown (7)	14.03	7600	J
8.		Unknown (8)	14.89	4500	J
9.	000832-64-4	Phenanthrene, 4-methyl-	16.88	3400	NJ
10.	000203-64-5	4H-Cyclopenta(def)phenanthrene	17.12	12000	NJ
11.		Unknown PAH (11)	17.37	3100	J
12.		Unknown (12)	17.86	3900	J
13.		Unknown PAH (13)	18.30	4500	J
14.	027208-37-3	Cyclopenta(cd)pyrene	20.28	9000	NJ
15.		Unknown (15)	20.91	4500	J
16.		Unknown (16)	21.89	3100	J
17.	000198-55-0	Perylene	24.30	3700	NJ
18.		1,2-BENZOPERYLENE	30.88	5200	J

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW50

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-006B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1493.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 52 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.1 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	14000	U
108-95-2	Phenol	14000	U
111-44-4	bis(2-Chloroethyl)ether	14000	U
95-57-8	2-Chlorophenol	14000	U
95-48-7	2-Methylphenol	14000	U
108-60-1	2,2'-oxybis(1-Chloropropane)	14000	U
98-86-2	Acetophenone	14000	U
106-44-5	4-Methylphenol	14000	U
621-64-7	N-Nitroso-di-n-propylamine	14000	U
67-72-1	Hexachloroethane	2600	J
98-95-3	Nitrobenzene	14000	U
78-59-1	Isophorone	14000	U
88-75-5	2-Nitrophenol	14000	U
105-67-9	2,4-Dimethylphenol	14000	U
111-91-1	bis(2-Chloroethoxy)methane	14000	U
120-83-2	2,4-Dichlorophenol	14000	U
91-20-3	Naphthalene	2300	J
106-47-8	4-Chloroaniline	14000	U
87-68-3	Hexachlorobutadiene	21000	
105-60-2	Caprolactam	14000	U
59-50-7	4-Chloro-3-methylphenol	14000	U
91-57-6	2-Methylnaphthalene	1800	J
77-47-4	Hexachlorocyclopentadiene	14000	U
88-06-2	2,4,6-Trichlorophenol	14000	U
95-95-4	2,4,5-Trichlorophenol	35000	U
92-52-4	1,1'-Biphenyl	1100	J
91-58-7	2-Chloronaphthalene	14000	U
88-74-4	2-Nitroaniline	35000	U
131-11-3	Dimethylphthalate	14000	U
606-20-2	2,6-Dinitrotoluene	14000	U
208-96-8	Acenaphthylene	9400	J
99-09-2	3-Nitroaniline	35000	U
83-32-9	Acenaphthene	13000	J
51-28-5	2,4-Dinitrophenol	35000	U
100-02-7	4-Nitrophenol	35000	U

EPA SAMPLE NO.

FGW50

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-006B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1493.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 52 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.1 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	14000	U
121-14-2	2,4-Dinitrotoluene	14000	U
84-66-2	Diethylphthalate	14000	U
86-73-7	Fluorene	4400	J
7005-72-3	4-Chlorophenyl-phenylether	14000	U
100-01-6	4-Nitroaniline	35000	U
534-52-1	4,6-Dinitro-2-methylphenol	35000	U
86-30-6	N-Nitrosodiphenylamine (1)	14000	U
101-55-3	4-Bromophenyl-phenylether	14000	U
118-74-1	Hexachlorobenzene	4800	J
1912-24-9	Atrazine	14000	U
87-86-5	Pentachlorophenol	35000	U
85-01-8	Phenanthrene	19000	
120-12-7	Anthracene	3500	J
86-74-8	Carbazole	14000	U
84-74-2	Di-n-butylphthalate	14000	U
206-44-0	Fluoranthene	22000	
129-00-0	Pyrene	53000	
85-68-7	Butylbenzylphthalate	14000	U
91-94-1	3,3'-Dichlorobenzidine	14000	U
56-55-3	Benzo(a)anthracene	1600	J
218-01-9	Chrysene	2300	J
117-81-7	bis(2-Ethylhexyl)phthalate	6500	BJ
117-84-0	Di-n-octylphthalate	14000	U
205-99-2	Benzo(b)fluoranthene	1300	J
207-08-9	Benzo(k)fluoranthene	1100	J
50-32-8	Benzo(a)pyrene	3300	J
193-39-5	Indeno(1,2,3-cd)pyrene	2500	J
53-70-3	Dibenzo(a,h)anthracene	14000	U
191-24-2	Benzo(g,h,i)perylene	8500	J

1G

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

FGW50

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-006B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1493.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 52 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/20/00

Injection Volume: 2 (µl) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.1 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 30 (µg/L or µg/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1. 000106-46-7	Benzene, 1,4-dichloro-	6.80	7700	NJ
2.	Unknown (2)	7.67	3700	J
3. 000090-12-0	Naphthalene, 1-methyl-	11.32	5600	NJ
4. 000101-84-8	Benzene, 1,1'-oxybis-	12.29	14000	NJ
5. 000575-43-9	Naphthalene, 1,6-dimethyl-	12.58	5100	NJ
6.	Unknown (6)	12.87	5500	J
7.	Unknown (7)	13.45	4000	J
8.	Unknown (8)	13.89	7400	J
9.	Unknown (9)	14.03	9700	J
10.	Unknown (10)	14.90	6900	J
11. 000832-64-4	Phenanthrene, 4-methyl-	16.88	4100	NJ
12. 000203-64-5	4H-Cyclopenta(def)phenanthrene	17.13	18000	NJ
13.	Unknown (13)	17.23	3200	J
14.	Unknown PAH (14)	17.37	4000	J
15. 029082-74-4	Benzene, pentachloro(trichloroethen +unknown 004-26-0	17.85	5100	NJ
16.	Unknown (16)	18.05	6700	J
17.	Unknown PAH (17)	18.29	5700	J
18.	Unknown (18)	18.60	3200	J
19.	Unknown PAH (19)	19.07	8000	J
20.	Unknown (20)	19.37	3000	J
21. 002381-21-7	Pyrene, 1-methyl-	19.43	3500	NJ
22. 027208-37-3	Cyclopenta(cd)pyrene	20.28	9200	NJ
23.	Unknown (23)	20.92	3800	J
24.	Unknown (24)	21.90	3900	J
25.	Unknown aromatic	24.30	5100	J
26.	Unknown (30)	25.53	2800	J
27.	Unknown (26)	25.78	3100	J
28.	Unknown (27)	26.68	3300	J
29.	Unknown (28)	28.06	3500	J
30. 000191-26-4	Dibenzo(def,mno)chrysene	30.88	6900	NJ

EPA SAMPLE NO.

FGW51

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1810.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 31 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/18/00

Injection Volume: 2 (µL) Dilution Factor: 4.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	1900	U
108-95-2	Phenol	1900	U
111-44-4	bis(2-Chloroethyl)ether	1900	U
95-57-8	2-Chlorophenol	1900	U
95-48-7	2-Methylphenol	1900	U
108-60-1	2,2´-oxybis(1-Chloropropane)	1900	U
98-86-2	Acetophenone	1900	U
106-44-5	4-Methylphenol	1900	U
621-64-7	N-Nitroso-di-n-propylamine	1900	U
67-72-1	Hexachloroethane	7700	
98-95-3	Nitrobenzene	1900	U
78-59-1	Isophorone	1900	U
88-75-5	2-Nitrophenol	1900	U
105-67-9	2,4-Dimethylphenol	340	J
111-91-1	bis(2-Chloroethoxy)methane	1900	U
120-83-2	2,4-Dichlorophenol	1900	U
91-20-3	Naphthalene	190	J
106-47-8	4-Chloroaniline	1900	U
87-68-3	Hexachlorobutadiene	93000	E
105-60-2	Caprolactam	1900	U
59-50-7	4-Chloro-3-methylphenol	1900	U
91-57-6	2-Methylnaphthalene	450	J
77-47-4	Hexachlorocyclopentadiene	1900	U
88-06-2	2,4,6-Trichlorophenol	1900	U
95-95-4	2,4,5-Trichlorophenol	4800	U
92-52-4	1,1´-Biphenyl	440	J
91-58-7	2-Chloronaphthalene	1900	U
88-74-4	2-Nitroaniline	4800	U
131-11-3	Dimethylphthalate	1900	U
606-20-2	2,6-Dinitrotoluene	1900	U
208-96-8	Acenaphthylene	650	J
99-09-2	3-Nitroaniline	4800	U
83-32-9	Acenaphthene	430	J
51-28-5	2,4-Dinitrophenol	4800	U
100-02-7	4-Nitrophenol	4800	U

EPA SAMPLE NO.

FGW51

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1810.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 31 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/18/00

Injection Volume: 2 (µL) Dilution Factor: 4.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	1900	U
121-14-2	2,4-Dinitrotoluene	290	J
84-66-2	Diethylphthalate	1900	U
86-73-7	Fluorene	280	J
7005-72-3	4-Chlorophenyl-phenylether	1900	U
100-01-6	4-Nitroaniline	4800	U
534-52-1	4,6-Dinitro-2-methylphenol	4800	U
86-30-6	N-Nitrosodiphenylamine (1)	110	J
101-55-3	4-Bromophenyl-phenylether	1900	U
118-74-1	Hexachlorobenzene	73000	E
1912-24-9	Atrazine	1900	U
87-86-5	Pentachlorophenol	4800	U
85-01-8	Phenanthrene	1000	J
120-12-7	Anthracene	180	J
86-74-8	Carbazole	1900	U
84-74-2	Di-n-butylphthalate	1900	U
206-44-0	Fluoranthene	1200	J
129-00-0	Pyrene	2300	
85-68-7	Butylbenzylphthalate	240	J
91-94-1	3,3'-Dichlorobenzidine	1900	U
56-55-3	Benzo(a)anthracene	130	J
218-01-9	Chrysene	210	J
117-81-7	bis(2-Ethylhexyl)phthalate	1100	BJ
117-84-0	Di-n-octylphthalate	1900	U
205-99-2	Benzo(b)fluoranthene	120	J
207-08-9	Benzo(k)fluoranthene	110	J
50-32-8	Benzo(a)pyrene	270	J
193-39-5	Indeno(1,2,3-cd)pyrene	170	J
53-70-3	Dibenzo(a,h)anthracene	1900	U
191-24-2	Benzo(g,h,i)perylene	730	J

1G

EPA SAMPLE NO.

FGW51

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

b Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1810.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 31 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/18/00

Injection Volume: 2 (µl) Dilution Factor: 4.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 7 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	055880-77-8	1,3-Butadiene, pentachloro-	9.37	1700	NJ
2.		Unknown (2)	9.50	1700	J
3.		Unknown (3)	12.63	1900	J
4.		Unknown (4)	14.57	1900	J
5.		Unknown (5)	18.20	2500	J
6.		Unknown (6)	24.69	1800	J
7.		Unknown (7)	25.09	1800	J

EPA SAMPLE NO.

FGW51DL

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1494.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 31 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 40.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	19000	U
108-95-2	Phenol	19000	U
111-44-4	bis(2-Chloroethyl)ether	19000	U
95-57-8	2-Chlorophenol	19000	U
95-48-7	2-Methylphenol	19000	U
108-60-1	2,2´-oxybis(1-Chloropropane)	19000	U
98-86-2	Acetophenone	19000	U
106-44-5	4-Methylphenol	19000	U
621-64-7	N-Nitroso-di-n-propylamine	19000	U
67-72-1	Hexachloroethane	8800	DJ
98-95-3	Nitrobenzene	19000	U
78-59-1	Isophorone	19000	U
88-75-5	2-Nitrophenol	19000	U
105-67-9	2,4-Dimethylphenol	19000	U
111-91-1	bis(2-Chloroethoxy)methane	19000	U
120-83-2	2,4-Dichlorophenol	19000	U
91-20-3	Naphthalene	19000	U
106-47-8	4-Chloroaniline	19000	U
87-68-3	Hexachlorobutadiene	71000	D
105-60-2	Caprolactam	19000	U
59-50-7	4-Chloro-3-methylphenol	19000	U
91-57-6	2-Methylnaphthalene	19000	U
77-47-4	Hexachlorocyclopentadiene	19000	U
88-06-2	2,4,6-Trichlorophenol	19000	U
95-95-4	2,4,5-Trichlorophenol	48000	U
92-52-4	1,1´-Biphenyl	19000	U
91-58-7	2-Chloronaphthalene	19000	U
88-74-4	2-Nitroaniline	48000	U
131-11-3	Dimethylphthalate	19000	U
606-20-2	2,6-Dinitrotoluene	19000	U
208-96-8	Acenaphthylene	19000	U
99-09-2	3-Nitroaniline	48000	U
83-32-9	Acenaphthene	19000	U
51-28-5	2,4-Dinitrophenol	48000	U
100-02-7	4-Nitrophenol	48000	U

1D

EPA SAMPLE NO.

FGW51DL

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1494.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 31 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 40.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	19000	U
121-14-2	2,4-Dinitrotoluene	19000	U
84-66-2	Diethylphthalate	19000	U
86-73-7	Fluorene	19000	U
7005-72-3	4-Chlorophenyl-phenylether	19000	U
100-01-6	4-Nitroaniline	48000	U
534-52-1	4,6-Dinitro-2-methylphenol	48000	U
86-30-6	N-Nitrosodiphenylamine (1)	19000	U
101-55-3	4-Bromophenyl-phenylether	19000	U
118-74-1	Hexachlorobenzene	40000	D
1912-24-9	Atrazine	19000	U
87-86-5	Pentachlorophenol	48000	U
85-01-8	Phenanthrene	1400	DJ
120-12-7	Anthracene	19000	U
86-74-8	Carbazole	19000	U
84-74-2	Di-n-butylphthalate	19000	U
206-44-0	Fluoranthene	1700	DJ
129-00-0	Pyrene	3600	DJ
85-68-7	Butylbenzylphthalate	19000	U
91-94-1	3,3'-Dichlorobenzidine	19000	U
56-55-3	Benzo(a)anthracene	19000	U
218-01-9	Chrysene	19000	U
117-81-7	bis(2-Ethylhexyl)phthalate	1600	DBJ
117-84-0	Di-n-octylphthalate	19000	U
205-99-2	Benzo(b)fluoranthene	19000	U
207-08-9	Benzo(k)fluoranthene	19000	U
50-32-8	Benzo(a)pyrene	19000	U
193-39-5	Indeno(1,2,3-cd)pyrene	19000	U
53-70-3	Dibenzo(a,h)anthracene	19000	U
191-24-2	Benzo(g,h,i)perylene	19000	U

1G

EPA SAMPLE NO.

FGW51DL

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1494.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 31 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/20/00

Injection Volume: 2 (µl) Dilution Factor: 40.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

Number TICs found: 2 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000095-50-1	Benzene, 1,2-dichloro-	6.81	18000	NJ
2.		Unknown	21.77	4000	J

1C

EPA SAMPLE NO.

FGW52

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-008B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1495.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 33 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 50.00

GPC Cleanup: (Y/N) Y pH: 8.0 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	25000	U
108-95-2	Phenol	25000	U
111-44-4	bis(2-Chloroethyl)ether	25000	U
95-57-8	2-Chlorophenol	25000	U
95-48-7	2-Methylphenol	25000	U
108-60-1	2,2´-oxybis(1-Chloropropane)	25000	U
98-86-2	Acetophenone	25000	U
106-44-5	4-Methylphenol	25000	U
621-64-7	N-Nitroso-di-n-propylamine	25000	U
67-72-1	Hexachloroethane	13000	J
98-95-3	Nitrobenzene	25000	U
78-59-1	Isophorone	25000	U
88-75-5	2-Nitrophenol	25000	U
105-67-9	2,4-Dimethylphenol	25000	U
111-91-1	bis(2-Chloroethoxy)methane	25000	U
120-83-2	2,4-Dichlorophenol	25000	U
91-20-3	Naphthalene	25000	U
106-47-8	4-Chloroaniline	25000	U
87-68-3	Hexachlorobutadiene	95000	
105-60-2	Caprolactam	25000	U
59-50-7	4-Chloro-3-methylphenol	25000	U
91-57-6	2-Methylnaphthalene	25000	U
77-47-4	Hexachlorocyclopentadiene	25000	U
88-06-2	2,4,6-Trichlorophenol	25000	U
95-95-4	2,4,5-Trichlorophenol	62000	U
92-52-4	1,1´-Biphenyl	25000	U
91-58-7	2-Chloronaphthalene	25000	U
88-74-4	2-Nitroaniline	62000	U
131-11-3	Dimethylphthalate	25000	U
606-20-2	2,6-Dinitrotoluene	25000	U
208-96-8	Acenaphthylene	1900	J
99-09-2	3-Nitroaniline	62000	U
83-32-9	Acenaphthene	25000	U
51-28-5	2,4-Dinitrophenol	62000	U
100-02-7	4-Nitrophenol	62000	U

1D

EPA SAMPLE NO.

FGW52

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-008B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1495.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 33 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 50.00

GPC Cleanup: (Y/N) Y pH: 8.0 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	25000	U
121-14-2	2,4-Dinitrotoluene	25000	U
84-66-2	Diethylphthalate	25000	U
86-73-7	Fluorene	25000	U
7005-72-3	4-Chlorophenyl-phenylether	25000	U
100-01-6	4-Nitroaniline	62000	U
534-52-1	4,6-Dinitro-2-methylphenol	62000	U
86-30-6	N-Nitrosodiphenylamine (1)	25000	U
101-55-3	4-Bromophenyl-phenylether	25000	U
118-74-1	Hexachlorobenzene	38000	
1912-24-9	Atrazine	25000	U
87-86-5	Pentachlorophenol	62000	U
85-01-8	Phenanthrene	3200	J
120-12-7	Anthracene	25000	U
86-74-8	Carbazole	25000	U
84-74-2	Di-n-butylphthalate	25000	U
206-44-0	Fluoranthene	3600	J
129-00-0	Pyrene	7500	J
85-68-7	Butylbenzylphthalate	25000	U
91-94-1	3,3'-Dichlorobenzidine	25000	U
56-55-3	Benzo(a)anthracene	25000	U
218-01-9	Chrysene	25000	U
117-81-7	bis(2-Ethylhexyl)phthalate	3600	BJ
117-84-0	Di-n-octylphthalate	25000	U
205-99-2	Benzo(b)fluoranthene	25000	U
207-08-9	Benzo(k)fluoranthene	25000	U
50-32-8	Benzo(a)pyrene	25000	U
193-39-5	Indeno(1,2,3-cd)pyrene	25000	U
53-70-3	Dibenzo(a,h)anthracene	25000	U
191-24-2	Benzo(g,h,i)perylene	1400	J

EPA SAMPLE NO.

FGW52

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-008B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1495.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 33 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/20/00

Injection Volume: 2 (µl) Dilution Factor: 50.00

GPC Cleanup: (Y/N) Y pH: 8.0 Extraction: (Type SONC

Number TICs found: 1 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000106-46-7	Benzene, 1,4-dichloro-	6.80	21000	NJ

EPA SAMPLE NO.

FGW53

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-009B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1496.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 36 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 50.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	26000	U
108-95-2	Phenol	26000	U
111-44-4	bis(2-Chloroethyl)ether	26000	U
95-57-8	2-Chlorophenol	26000	U
95-48-7	2-Methylphenol	26000	U
108-60-1	2,2´-oxybis(1-Chloropropane)	26000	U
98-86-2	Acetophenone	26000	U
106-44-5	4-Methylphenol	26000	U
621-64-7	N-Nitroso-di-n-propylamine	26000	U
67-72-1	Hexachloroethane	8400	J
98-95-3	Nitrobenzene	26000	U
78-59-1	Isophorone	26000	U
88-75-5	2-Nitrophenol	26000	U
105-67-9	2,4-Dimethylphenol	26000	U
111-91-1	bis(2-Chloroethoxy)methane	26000	U
120-83-2	2,4-Dichlorophenol	26000	U
91-20-3	Naphthalene	26000	U
106-47-8	4-Chloroaniline	26000	U
87-68-3	Hexachlorobutadiene	75000	
105-60-2	Caprolactam	26000	U
59-50-7	4-Chloro-3-methylphenol	26000	U
91-57-6	2-Methylnaphthalene	26000	U
77-47-4	Hexachlorocyclopentadiene	26000	U
88-06-2	2,4,6-Trichlorophenol	26000	U
95-95-4	2,4,5-Trichlorophenol	65000	U
92-52-4	1,1´-Biphenyl	26000	U
91-58-7	2-Chloronaphthalene	26000	U
88-74-4	2-Nitroaniline	65000	U
131-11-3	Dimethylphthalate	26000	U
606-20-2	2,6-Dinitrotoluene	26000	U
208-96-8	Acenaphthylene	1500	J
99-09-2	3-Nitroaniline	65000	U
83-32-9	Acenaphthene	26000	U
51-28-5	2,4-Dinitrophenol	65000	U
100-02-7	4-Nitrophenol	65000	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW53

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-009B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1496.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 36 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 50.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	26000	U
121-14-2	2,4-Dinitrotoluene	26000	U
84-66-2	Diethylphthalate	26000	U
86-73-7	Fluorene	26000	U
7005-72-3	4-Chlorophenyl-phenylether	26000	U
100-01-6	4-Nitroaniline	65000	U
534-52-1	4,6-Dinitro-2-methylphenol	65000	U
86-30-6	N-Nitrosodiphenylamine (1)	26000	U
101-55-3	4-Bromophenyl-phenylether	26000	U
118-74-1	Hexachlorobenzene	32000	
1912-24-9	Atrazine	26000	U
87-86-5	Pentachlorophenol	65000	U
85-01-8	Phenanthrene	2300	J
120-12-7	Anthracene	26000	U
86-74-8	Carbazole	26000	U
84-74-2	Di-n-butylphthalate	26000	U
206-44-0	Fluoranthene	2500	J
129-00-0	Pyrene	5400	J
85-68-7	Butylbenzylphthalate	26000	U
91-94-1	3,3'-Dichlorobenzidine	26000	U
56-55-3	Benzo(a)anthracene	26000	U
218-01-9	Chrysene	26000	U
117-81-7	bis(2-Ethylhexyl)phthalate	2700	BJ
117-84-0	Di-n-octylphthalate	26000	U
205-99-2	Benzo(b)fluoranthene	26000	U
207-08-9	Benzo(k)fluoranthene	26000	U
50-32-8	Benzo(a)pyrene	26000	U
193-39-5	Indeno(1,2,3-cd)pyrene	26000	U
53-70-3	Dibenzo(a,h)anthracene	26000	U
191-24-2	Benzo(g,h,i)perylene	26000	U

1G

EPA SAMPLE NO.

FGW53

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-009B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1496.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 36 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/20/00

Injection Volume: 2 (µl) Dilution Factor: 50.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 1 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1	000541-73-1	Benzene, 1,3-dichloro-	6.80	16000	NJ

EPA SAMPLE NO.

FGW54

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-010B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1813.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 26 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/18/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.4 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	450	U
108-95-2	Phenol	450	U
111-44-4	bis(2-Chloroethyl)ether	450	U
95-57-8	2-Chlorophenol	450	U
95-48-7	2-Methylphenol	450	U
108-60-1	2,2´-oxybis(1-Chloropropane)	450	U
98-86-2	Acetophenone	450	U
106-44-5	4-Methylphenol	450	U
621-64-7	N-Nitroso-di-n-propylamine	450	U
67-72-1	Hexachloroethane	450	U
98-95-3	Nitrobenzene	450	U
78-59-1	Isophorone	450	U
88-75-5	2-Nitrophenol	450	U
105-67-9	2,4-Dimethylphenol	450	U
111-91-1	bis(2-Chloroethoxy)methane	450	U
120-83-2	2,4-Dichlorophenol	450	U
91-20-3	Naphthalene	450	U
106-47-8	4-Chloroaniline	450	U
87-68-3	Hexachlorobutadiene	450	U
105-60-2	Caprolactam	450	U
59-50-7	4-Chloro-3-methylphenol	450	U
91-57-6	2-Methylnaphthalene	450	U
77-47-4	Hexachlorocyclopentadiene	450	U
88-06-2	2,4,6-Trichlorophenol	450	U
95-95-4	2,4,5-Trichlorophenol	1100	U
92-52-4	1,1´-Biphenyl	450	U
91-58-7	2-Chloronaphthalene	450	U
88-74-4	2-Nitroaniline	1100	U
131-11-3	Dimethylphthalate	450	U
606-20-2	2,6-Dinitrotoluene	450	U
208-96-8	Acenaphthylene	450	U
99-09-2	3-Nitroaniline	1100	U
83-32-9	Acenaphthene	450	U
51-28-5	2,4-Dinitrophenol	1100	U
100-02-7	4-Nitrophenol	1100	U

EPA SAMPLE NO.

FGW54

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-010B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1813.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 26 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/18/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.4 Extraction: (Type SONC

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	450	U
121-14-2	2,4-Dinitrotoluene	450	U
84-66-2	Diethylphthalate	450	U
86-73-7	Fluorene	450	U
7005-72-3	4-Chlorophenyl-phenylether	450	U
100-01-6	4-Nitroaniline	1100	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
86-30-6	N-Nitrosodiphenylamine (1)	450	U
101-55-3	4-Bromophenyl-phenylether	450	U
118-74-1	Hexachlorobenzene	450	U
1912-24-9	Atrazine	450	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	450	U
120-12-7	Anthracene	450	U
86-74-8	Carbazole	450	U
84-74-2	Di-n-butylphthalate	27	J
206-44-0	Fluoranthene	450	U
129-00-0	Pyrene	450	U
85-68-7	Butylbenzylphthalate	450	U
91-94-1	3,3'-Dichlorobenzidine	450	U
56-55-3	Benzo(a)anthracene	450	U
218-01-9	Chrysene	450	U
117-81-7	bis(2-Ethylhexyl)phthalate	76	BJ
117-84-0	Di-n-octylphthalate	450	U
205-99-2	Benzo(b)fluoranthene	450	U
207-08-9	Benzo(k)fluoranthene	450	U
50-32-8	Benzo(a)pyrene	450	U
193-39-5	Indeno(1,2,3-cd)pyrene	450	U
53-70-3	Dibenzo(a,h)anthracene	450	U
191-24-2	Benzo(g,h,i)perylene	450	U

EPA SAMPLE NO.

FGW54

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-010B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1813.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 26 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/18/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.4 Extraction: (Type SONC

Number TICs found: 3 CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	6.08	110	BJ
2.		Unknown (2)	30.73	1200	J
3.		Unknown (3)	34.52	500	J

1C

EPA SAMPLE NO.

FGW55

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-011B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1814.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 21 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/18/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 9.0 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	420	U
108-95-2	Phenol	420	U
111-44-4	bis(2-Chloroethyl)ether	420	U
95-57-8	2-Chlorophenol	420	U
95-48-7	2-Methylphenol	420	U
108-60-1	2,2´-oxybis(1-Chloropropane)	420	U
98-86-2	Acetophenone	420	U
106-44-5	4-Methylphenol	420	U
621-64-7	N-Nitroso-di-n-propylamine	420	U
67-72-1	Hexachloroethane	420	U
98-95-3	Nitrobenzene	420	U
78-59-1	Isophorone	420	U
88-75-5	2-Nitrophenol	420	U
105-67-9	2,4-Dimethylphenol	420	U
111-91-1	bis(2-Chloroethoxy)methane	420	U
120-83-2	2,4-Dichlorophenol	420	U
91-20-3	Naphthalene	420	U
106-47-8	4-Chloroaniline	420	U
87-68-3	Hexachlorobutadiene	420	U
105-60-2	Caprolactam	420	U
59-50-7	4-Chloro-3-methylphenol	420	U
91-57-6	2-Methylnaphthalene	420	U
77-47-4	Hexachlorocyclopentadiene	420	U
88-06-2	2,4,6-Trichlorophenol	420	U
95-95-4	2,4,5-Trichlorophenol	1100	U
92-52-4	1,1´-Biphenyl	420	U
91-58-7	2-Chloronaphthalene	420	U
88-74-4	2-Nitroaniline	1100	U
131-11-3	Dimethylphthalate	420	U
606-20-2	2,6-Dinitrotoluene	420	U
208-96-8	Acenaphthylene	420	U
99-09-2	3-Nitroaniline	1100	U
83-32-9	Acenaphthene	420	U
51-28-5	2,4-Dinitrophenol	1100	U
100-02-7	4-Nitrophenol	1100	U

EPA SAMPLE NO.

FGW55

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-011B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1814.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 21 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/18/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 9.0 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	420	U
121-14-2	2,4-Dinitrotoluene	420	U
84-66-2	Diethylphthalate	420	U
86-73-7	Fluorene	420	U
7005-72-3	4-Chlorophenyl-phenylether	420	U
100-01-6	4-Nitroaniline	1100	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
86-30-6	N-Nitrosodiphenylamine (1)	420	U
101-55-3	4-Bromophenyl-phenylether	420	U
118-74-1	Hexachlorobenzene	420	U
1912-24-9	Atrazine	420	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	420	U
120-12-7	Anthracene	420	U
86-74-8	Carbazole	420	U
84-74-2	Di-n-butylphthalate	420	U
206-44-0	Fluoranthene	420	U
129-00-0	Pyrene	420	U
85-68-7	Butylbenzylphthalate	420	U
91-94-1	3,3'-Dichlorobenzidine	420	U
56-55-3	Benzo(a)anthracene	420	U
218-01-9	Chrysene	420	U
117-81-7	bis(2-Ethylhexyl)phthalate	86	BJ
117-84-0	Di-n-octylphthalate	420	U
205-99-2	Benzo(b)fluoranthene	420	U
207-08-9	Benzo(k)fluoranthene	420	U
50-32-8	Benzo(a)pyrene	420	U
193-39-5	Indeno(1,2,3-cd)pyrene	420	U
53-70-3	Dibenzo(a,h)anthracene	420	U
191-24-2	Benzo(g,h,i)perylene	420	U

EPA SAMPLE NO.

FGW55

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-011B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1814.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 21 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/18/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 9.0 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 11 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	6.08	150	BJ
2.		Unknown (2)	7.25	120	J
3.		Unknown (3)	8.49	120	J
4.		Unknown (4)	19.78	110	J
5.		Unknown (5)	19.95	140	J
6.		Unknown (6)	22.47	100	J
7.		Unknown (7)	30.77	4400	J
8.		Unknown (8)	32.40	210	J
9.		Unknown (9)	32.63	120	J
10.		Unknown (10)	34.54	550	J
11.		Unknown (11)	35.07	170	J

EPA SAMPLE NO.

FGW56

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-021B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1499.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 46 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	610	U
108-95-2	Phenol	610	U
111-44-4	bis(2-Chloroethyl)ether	610	U
95-57-8	2-Chlorophenol	610	U
95-48-7	2-Methylphenol	610	U
108-60-1	2,2'-oxybis(1-Chloropropane)	610	U
98-86-2	Acetophenone	610	U
106-44-5	4-Methylphenol	610	U
621-64-7	N-Nitroso-di-n-propylamine	610	U
67-72-1	Hexachloroethane	610	U
98-95-3	Nitrobenzene	610	U
78-59-1	Isophorone	610	U
88-75-5	2-Nitrophenol	610	U
105-67-9	2,4-Dimethylphenol	610	U
111-91-1	bis(2-Chloroethoxy)methane	610	U
120-83-2	2,4-Dichlorophenol	610	U
91-20-3	Naphthalene	610	U
106-47-8	4-Chloroaniline	610	U
87-68-3	Hexachlorobutadiene	610	U
105-60-2	Caprolactam	610	U
59-50-7	4-Chloro-3-methylphenol	610	U
91-57-6	2-Methylnaphthalene	610	U
77-47-4	Hexachlorocyclopentadiene	610	U
88-06-2	2,4,6-Trichlorophenol	610	U
95-95-4	2,4,5-Trichlorophenol	1500	U
92-52-4	1,1'-Biphenyl	610	U
91-58-7	2-Chloronaphthalene	610	U
88-74-4	2-Nitroaniline	1500	U
131-11-3	Dimethylphthalate	610	U
606-20-2	2,6-Dinitrotoluene	610	U
208-96-8	Acenaphthylene	610	U
99-09-2	3-Nitroaniline	1500	U
83-32-9	Acenaphthene	610	U
51-28-5	2,4-Dinitrophenol	1500	U
100-02-7	4-Nitrophenol	1500	U

EPA SAMPLE NO.

FGW56

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-021B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1499.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 46 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	610	U
121-14-2	2,4-Dinitrotoluene	610	U
84-66-2	Diethylphthalate	610	U
86-73-7	Fluorene	610	U
7005-72-3	4-Chlorophenyl-phenylether	610	U
100-01-6	4-Nitroaniline	1500	U
534-52-1	4,6-Dinitro-2-methylphenol	1500	U
86-30-6	N-Nitrosodiphenylamine (1)	610	U
101-55-3	4-Bromophenyl-phenylether	610	U
118-74-1	Hexachlorobenzene	610	U
1912-24-9	Atrazine	610	U
87-86-5	Pentachlorophenol	1500	U
85-01-8	Phenanthrene	51	J
120-12-7	Anthracene	610	U
86-74-8	Carbazole	610	U
84-74-2	Di-n-butylphthalate	610	U
206-44-0	Fluoranthene	110	J
129-00-0	Pyrene	110	J
85-68-7	Butylbenzylphthalate	610	U
91-94-1	3,3'-Dichlorobenzidine	610	U
56-55-3	Benzo(a)anthracene	85	J
218-01-9	Chrysene	130	J
117-81-7	bis(2-Ethylhexyl)phthalate	170	BJ
117-84-0	Di-n-octylphthalate	610	U
205-99-2	Benzo(b)fluoranthene	81	J
207-08-9	Benzo(k)fluoranthene	84	J
50-32-8	Benzo(a)pyrene	66	J
193-39-5	Indeno(1,2,3-cd)pyrene	36	J
53-70-3	Dibenzo(a,h)anthracene	610	U
191-24-2	Benzo(g,h,i)perylene	36	J

EPA SAMPLE NO.

FGW56

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-021B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1499.D

Level: (low/med) LOW Date Received: 03/31/00

% Moisture: 46 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/20/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.7 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 19 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		NEOPHYTADIENE	16.21	210	J
2.		Unknown (2)	17.45	490	J
3.	073795-04-7	8-(1,1,2-Trimethyl-2-propenyl)-8H-c	21.66	220	NJ
4.	078661-23-1	10a_beta_-Hydroxymethyl-7-methoxy-3	21.87	210	NJ
5.		Unknown (5)	22.80	220	J
6.		Unknown (6)	23.67	180	J
7.		Unknown (7)	24.87	290	J
8.	002599-01-1	Tetradecanoic acid, hexadecyl ester	26.31	1200	NJ
9.		Unknown (9)	28.02	840	J
10.	014021-23-9	Taraxerol methyl ether	29.50	2200	NJ
11.	000540-10-3	Hexadecanoic acid, hexadecyl ester	29.61	1100	NJ
12.	000083-47-6	Stigmast-5-en-3-ol, (3_beta_,24S)-	30.48	290	NJ
13.		Unknown (13)	31.44	170	J
14.		Unknown (14)	32.12	470	J
15.		Unknown (15)	32.85	320	J
16.		Unknown (16)	33.07	250	J
17.		Unknown (17)	33.30	140	J
18.		Unknown (18)	35.30	210	J
19.		Unknown (19)	35.95	640	J

1C

EPA SAMPLE NO.

FGW57

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-012B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1815.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 27 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/18/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.9 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	450	U
108-95-2	Phenol	450	U
111-44-4	bis(2-Chloroethyl)ether	450	U
95-57-8	2-Chlorophenol	450	U
95-48-7	2-Methylphenol	450	U
108-60-1	2,2´-oxybis(1-Chloropropane)	450	U
98-86-2	Acetophenone	450	U
106-44-5	4-Methylphenol	450	U
621-64-7	N-Nitroso-di-n-propylamine	450	U
67-72-1	Hexachloroethane	450	U
98-95-3	Nitrobenzene	450	U
78-59-1	Isophorone	450	U
88-75-5	2-Nitrophenol	450	U
105-67-9	2,4-Dimethylphenol	450	U
111-91-1	bis(2-Chloroethoxy)methane	450	U
120-83-2	2,4-Dichlorophenol	450	U
91-20-3	Naphthalene	450	U
106-47-8	4-Chloroaniline	450	U
87-68-3	Hexachlorobutadiene	450	U
105-60-2	Caprolactam	450	U
59-50-7	4-Chloro-3-methylphenol	450	U
91-57-6	2-Methylnaphthalene	450	U
77-47-4	Hexachlorocyclopentadiene	450	U
88-06-2	2,4,6-Trichlorophenol	450	U
95-95-4	2,4,5-Trichlorophenol	1100	U
92-52-4	1,1´-Biphenyl	450	U
91-58-7	2-Chloronaphthalene	450	U
88-74-4	2-Nitroaniline	1100	U
131-11-3	Dimethylphthalate	450	U
606-20-2	2,6-Dinitrotoluene	450	U
208-96-8	Acenaphthylene	450	U
99-09-2	3-Nitroaniline	1100	U
83-32-9	Acenaphthene	560	
51-28-5	2,4-Dinitrophenol	1100	U
100-02-7	4-Nitrophenol	1100	U

EPA SAMPLE NO.

FGW57

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-012B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1815.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 27 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/18/00

Injection Volume: 2 (µL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.9 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	450	U
121-14-2	2,4-Dinitrotoluene	450	U
84-66-2	Diethylphthalate	450	U
86-73-7	Fluorene	450	U
7005-72-3	4-Chlorophenyl-phenylether	450	U
100-01-6	4-Nitroaniline	1100	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
86-30-6	N-Nitrosodiphenylamine (1)	33	J
101-55-3	4-Bromophenyl-phenylether	450	U
118-74-1	Hexachlorobenzene	450	U
1912-24-9	Atrazine	450	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	36	J
120-12-7	Anthracene	31	J
86-74-8	Carbazole	450	U
84-74-2	Di-n-butylphthalate	100	J
206-44-0	Fluoranthene	180	J
129-00-0	Pyrene	150	J
85-68-7	Butylbenzylphthalate	47	J
91-94-1	3,3'-Dichlorobenzidine	450	U
56-55-3	Benzo(a)anthracene	63	J
218-01-9	Chrysene	88	J
117-81-7	bis(2-Ethylhexyl)phthalate	210	BJ
117-84-0	Di-n-octylphthalate	450	U
205-99-2	Benzo(b)fluoranthene	73	J
207-08-9	Benzo(k)fluoranthene	66	J
50-32-8	Benzo(a)pyrene	57	J
193-39-5	Indeno(1,2,3-cd)pyrene	37	J
53-70-3	Dibenzo(a,h)anthracene	450	U
191-24-2	Benzo(g,h,i)perylene	59	J

EPA SAMPLE NO.

FGW57

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-012B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1815.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 27 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/18/00

Injection Volume: 2 (µl) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.9 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 23 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	12.96	98	J
2.		Unknown (2)	13.26	94	J
3.	000059-48-3	2H-Indol-2-one, 1,3-dihydro-	13.87	210	NJ
4.	000732-26-3	Phenol, 2,4,6-tris(1,1-dimethylethy	14.46	200	NJ
5.		Unknown (5)	14.58	96	J
6.		Unknown (6)	14.74	810	J
7.		Unknown (7)	15.39	110	J
8.		Unknown (8)	15.44	110	J
9.		Unknown (9)	15.67	370	J
10.		Unknown (10)	15.73	130	J
11.		Unknown (11)	15.76	94	J
12.		Unknown (12)	15.87	96	J
13.		Unknown (13)	16.09	180	J
14.		Unknown (14)	16.68	91	J
15.		Unknown (15)	17.34	270	J
16.		Unknown (16)	17.41	120	J
17.		Unknown (17)	17.46	250	J
18.		Unknown (18)	17.56	160	J
19.		Unknown (19)	18.85	180	J
20.		Unknown (20)	22.15	390	J
21.		Unknown (21)	30.77	2200	J
22.		Unknown (22)	31.30	640	J
23.		Unknown (23)	35.51	2200	J

EPA SAMPLE NO.

FGW64

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-013B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1816.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 74 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/19/00

Injection Volume: 2 (µL) Dilution Factor: 4.00

GPC Cleanup: (Y/N) Y pH: 7.6 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	5100	U
108-95-2	Phenol	5100	U
111-44-4	bis(2-Chloroethyl)ether	5100	U
95-57-8	2-Chlorophenol	5100	U
95-48-7	2-Methylphenol	5100	U
108-60-1	2,2´-oxybis(1-Chloropropane)	5100	U
98-86-2	Acetophenone	290	J
106-44-5	4-Methylphenol	5100	U
621-64-7	N-Nitroso-di-n-propylamine	5100	U
67-72-1	Hexachloroethane	5100	U
98-95-3	Nitrobenzene	5100	U
78-59-1	Isophorone	5100	U
88-75-5	2-Nitrophenol	5100	U
105-67-9	2,4-Dimethylphenol	5100	U
111-91-1	bis(2-Chloroethoxy)methane	5100	U
120-83-2	2,4-Dichlorophenol	5100	U
91-20-3	Naphthalene	260	J
106-47-8	4-Chloroaniline	460	J
87-68-3	Hexachlorobutadiene	430	J
105-60-2	Caprolactam	5100	U
59-50-7	4-Chloro-3-methylphenol	5100	U
91-57-6	2-Methylnaphthalene	880	J
77-47-4	Hexachlorocyclopentadiene	5100	U
88-06-2	2,4,6-Trichlorophenol	5100	U
95-95-4	2,4,5-Trichlorophenol	13000	U
92-52-4	1,1´-Biphenyl	5100	U
91-58-7	2-Chloronaphthalene	5100	U
88-74-4	2-Nitroaniline	13000	U
131-11-3	Dimethylphthalate	5100	U
606-20-2	2,6-Dinitrotoluene	5100	U
208-96-8	Acenaphthylene	680	J
99-09-2	3-Nitroaniline	13000	U
83-32-9	Acenaphthene	1900	J
51-28-5	2,4-Dinitrophenol	13000	U
100-02-7	4-Nitrophenol	13000	U

EPA SAMPLE NO.

FGW64

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-013B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1816.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 74 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/19/00

Injection Volume: 2 (µL) Dilution Factor: 4.00

GPC Cleanup: (Y/N) Y pH: 7.6 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	5100	U
121-14-2	2,4-Dinitrotoluene	5100	U
84-66-2	Diethylphthalate	5100	U
86-73-7	Fluorene	1500	J
7005-72-3	4-Chlorophenyl-phenylether	5100	U
100-01-6	4-Nitroaniline	13000	U
534-52-1	4,6-Dinitro-2-methylphenol	13000	U
86-30-6	N-Nitrosodiphenylamine (1)	470	J
101-55-3	4-Bromophenyl-phenylether	5100	U
118-74-1	Hexachlorobenzene	270	J
1912-24-9	Atrazine	5100	U
87-86-5	Pentachlorophenol	13000	U
85-01-8	Phenanthrene	4200	J
120-12-7	Anthracene	1100	J
86-74-8	Carbazole	5100	U
84-74-2	Di-n-butylphthalate	330	J
206-44-0	Fluoranthene	2600	J
129-00-0	Pyrene	2900	J
85-68-7	Butylbenzylphthalate	5100	U
91-94-1	3,3'-Dichlorobenzidine	5100	U
56-55-3	Benzo(a)anthracene	1000	J
218-01-9	Chrysene	1500	J
117-81-7	bis(2-Ethylhexyl)phthalate	6400	B
117-84-0	Di-n-octylphthalate	5100	U
205-99-2	Benzo(b)fluoranthene	750	J
207-08-9	Benzo(k)fluoranthene	830	J
50-32-8	Benzo(a)pyrene	1000	J
193-39-5	Indeno(1,2,3-cd)pyrene	460	J
53-70-3	Dibenzo(a,h)anthracene	5100	U
191-24-2	Benzo(g,h,i)perylene	700	J

1G

EPA SAMPLE NO.

FGW64

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-013B

Sample wt/vol: 30 (g/mL) G Lab File ID: I1816.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 74 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/19/00

Injection Volume: 2 (µl) Dilution Factor: 4.00

GPC Cleanup: (Y/N) Y pH: 7.6 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 30 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	7.51	1800	J
2.		Unknown (2)	7.96	3500	J
3.		Unknown (3)	8.38	2500	J
4.		Unknown (4)	8.54	1900	J
5.		Unknown (5)	8.74	2200	J
6.		Unknown (6)	9.37	1900	J
7.		Unknown (7)	9.65	2000	J
8.		Unknown (8)	10.99	2600	J
9.		Unknown (9)	11.63	3000	J
10.		Unknown (10)	11.90	1900	J
11.		Unknown (11)	12.15	2000	J
12.		Unknown (12)	12.63	19000	J
13.		Unknown (13)	12.99	2400	J
14.		Unknown (14)	13.19	1600	J
15.		Unknown (15)	13.29	2500	J
16.		Unknown (16)	13.45	4200	J
17.		Unknown (17)	13.81	2000	J
18.		Unknown (18)	14.06	2300	J
19.		Unknown (19)	14.22	3700	J
20.		Unknown (20)	14.36	3900	J
21.		Unknown (21)	14.57	1600	J
22.		Unknown (22)	15.22	2600	J
23.		Unknown (23)	15.31	2300	J
24.		Unknown (24)	15.40	3400	J
25.		Unknown (25)	15.57	1700	J
26.		Unknown (26)	15.73	1900	J
27.		Unknown (30)	16.19	1500	J
28.		Unknown (27)	16.25	3000	J
29.		Unknown (28)	17.56	3300	J
30.		Unknown (29)	18.01	3500	J

1C

EPA SAMPLE NO.

FGW65

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-014B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1514.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 70 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/21/00

Injection Volume: 2 (µL) Dilution Factor: 4.00

GPC Cleanup: (Y/N) Y pH: 7.6 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	4400	U
108-95-2	Phenol	4400	U
111-44-4	bis(2-Chloroethyl)ether	4400	U
95-57-8	2-Chlorophenol	4400	U
95-48-7	2-Methylphenol	4400	U
108-60-1	2,2´-oxybis(1-Chloropropane)	4400	U
98-86-2	Acetophenone	4400	U
106-44-5	4-Methylphenol	4400	U
621-64-7	N-Nitroso-di-n-propylamine	4400	U
67-72-1	Hexachloroethane	4400	U
98-95-3	Nitrobenzene	4400	U
78-59-1	Isophorone	4400	U
88-75-5	2-Nitrophenol	4400	U
105-67-9	2,4-Dimethylphenol	4400	U
111-91-1	bis(2-Chloroethoxy)methane	4400	U
120-83-2	2,4-Dichlorophenol	4400	U
91-20-3	Naphthalene	4400	U
106-47-8	4-Chloroaniline	220	J
87-68-3	Hexachlorobutadiene	290	J
105-60-2	Caprolactam	4400	U
59-50-7	4-Chloro-3-methylphenol	4400	U
91-57-6	2-Methylnaphthalene	450	J
77-47-4	Hexachlorocyclopentadiene	4400	U
88-06-2	2,4,6-Trichlorophenol	4400	U
95-95-4	2,4,5-Trichlorophenol	11000	U
92-52-4	1,1´-Biphenyl	4400	U
91-58-7	2-Chloronaphthalene	4400	U
88-74-4	2-Nitroaniline	11000	U
131-11-3	Dimethylphthalate	4400	U
606-20-2	2,6-Dinitrotoluene	4400	U
208-96-8	Acenaphthylene	650	J
99-09-2	3-Nitroaniline	11000	U
83-32-9	Acenaphthene	540	J
51-28-5	2,4-Dinitrophenol	11000	U
100-02-7	4-Nitrophenol	11000	U

EPA SAMPLE NO.

FGW65

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-014B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1514.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 70 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/21/00

Injection Volume: 2 (µL) Dilution Factor: 4.00

GPC Cleanup: (Y/N) Y pH: 7.6 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	4400	U
121-14-2	2,4-Dinitrotoluene	4400	U
84-66-2	Diethylphthalate	4400	U
86-73-7	Fluorene	1000	J
7005-72-3	4-Chlorophenyl-phenylether	4400	U
100-01-6	4-Nitroaniline	11000	U
534-52-1	4,6-Dinitro-2-methylphenol	11000	U
86-30-6	N-Nitrosodiphenylamine (1)	4400	U
101-55-3	4-Bromophenyl-phenylether	4400	U
118-74-1	Hexachlorobenzene	300	J
1912-24-9	Atrazine	4400	U
87-86-5	Pentachlorophenol	11000	U
85-01-8	Phenanthrene	3400	J
120-12-7	Anthracene	1000	J
86-74-8	Carbazole	4400	U
84-74-2	Di-n-butylphthalate	310	J
206-44-0	Fluoranthene	2000	J
129-00-0	Pyrene	3500	J
85-68-7	Butylbenzylphthalate	4400	U
91-94-1	3,3'-Dichlorobenzidine	4400	U
56-55-3	Benzo(a)anthracene	850	J
218-01-9	Chrysene	1300	J
117-81-7	bis(2-Ethylhexyl)phthalate	5800	B
117-84-0	Di-n-octylphthalate	4400	U
205-99-2	Benzo(b)fluoranthene	720	J
207-08-9	Benzo(k)fluoranthene	590	J
50-32-8	Benzo(a)pyrene	820	J
193-39-5	Indeno(1,2,3-cd)pyrene	510	J
53-70-3	Dibenzo(a,h)anthracene	4400	U
191-24-2	Benzo(g,h,i)perylene	660	J

EPA SAMPLE NO.

FGW65

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-014B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1514.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 70 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/21/00

Injection Volume: 2 (µl) Dilution Factor: 4.00

GPC Cleanup: (Y/N) Y pH: 7.6 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 30 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		Unknown (1)	7.66	3400	J
2.		Unknown (2)	8.04	2200	J
3.		Unknown (3)	8.20	2100	J
4.	000101-84-8	Benzene, 1,1'-oxybis-	12.28	9500	NJ
5.		Unknown (5)	13.39	3200	J
6.		Unknown (6)	14.02	3800	J
7.		Unknown (7)	15.06	2300	J
8.		Unknown (8)	15.13	2200	J
9.		Unknown (9)	15.50	3100	J
10.		Unknown (10)	15.53	4400	J
11.		Unknown (11)	16.35	2200	J
12.		Unknown PAH (12)	16.94	2400	J
13.	000613-12-7	Anthracene, 2-methyl-	17.09	2000	NJ
14.		Unknown PAH (13)	17.13	2100	J
15.		Unknown (14)	17.23	2900	J
16.		Unknown (15)	17.69	2700	J
17.		Unknown (16)	18.61	4300	J
18.		Unknown (17)	18.80	2600	J
19.	066425-11-4	2,7-DIMETHYL-3,5-DIMETHYLMERCAPT	19.08	3600	NJ
20.		Unknown PAH (19)	19.43	3700	J
21.		Unknown (20)	19.79	2400	J
22.		Unknown (21)	20.59	2800	J
23.		Unknown (22)	21.22	3200	J
24.		Unknown (23)	21.92	3800	J
25.		Unknown (24)	22.42	4100	J
26.		Unknown (25)	23.13	2100	J
27.		Unknown (26)	28.11	3800	J
28.		Unknown (27)	31.24	2900	J
29.		Unknown (28)	32.11	5300	J
30.		Unknown (29)	35.32	4000	J

1C

EPA SAMPLE NO.

FGW70

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-015B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1498.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 43 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.1 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	12000	U
108-95-2	Phenol	12000	U
111-44-4	bis(2-Chloroethyl)ether	12000	U
95-57-8	2-Chlorophenol	12000	U
95-48-7	2-Methylphenol	12000	U
108-60-1	2,2´-oxybis(1-Chloropropane)	12000	U
98-86-2	Acetophenone	12000	U
106-44-5	4-Methylphenol	12000	U
621-64-7	N-Nitroso-di-n-propylamine	12000	U
67-72-1	Hexachloroethane	7100	J
98-95-3	Nitrobenzene	12000	U
78-59-1	Isophorone	12000	U
88-75-5	2-Nitrophenol	12000	U
105-67-9	2,4-Dimethylphenol	12000	U
111-91-1	bis(2-Chloroethoxy)methane	12000	U
120-83-2	2,4-Dichlorophenol	12000	U
91-20-3	Naphthalene	12000	U
106-47-8	4-Chloroaniline	12000	U
87-68-3	Hexachlorobutadiene	30000	
105-60-2	Caprolactam	12000	U
59-50-7	4-Chloro-3-methylphenol	12000	U
91-57-6	2-Methylnaphthalene	12000	U
77-47-4	Hexachlorocyclopentadiene	12000	U
88-06-2	2,4,6-Trichlorophenol	12000	U
95-95-4	2,4,5-Trichlorophenol	29000	U
92-52-4	1,1´-Biphenyl	12000	U
91-58-7	2-Chloronaphthalene	12000	U
88-74-4	2-Nitroaniline	29000	U
131-11-3	Dimethylphthalate	12000	U
606-20-2	2,6-Dinitrotoluene	12000	U
208-96-8	Acenaphthylene	1600	J
99-09-2	3-Nitroaniline	29000	U
83-32-9	Acenaphthene	920	J
51-28-5	2,4-Dinitrophenol	29000	U
100-02-7	4-Nitrophenol	29000	U

EPA SAMPLE NO.

FGW70

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-015B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1498.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 43 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µL) Date Analyzed: 04/20/00

Injection Volume: 2 (µL) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.1 Extraction: (Type SONC

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
132-64-9	Dibenzofuran	12000	U
121-14-2	2,4-Dinitrotoluene	12000	U
84-66-2	Diethylphthalate	12000	U
86-73-7	Fluorene	800	J
7005-72-3	4-Chlorophenyl-phenylether	12000	U
100-01-6	4-Nitroaniline	29000	U
534-52-1	4,6-Dinitro-2-methylphenol	29000	U
86-30-6	N-Nitrosodiphenylamine (1)	12000	U
101-55-3	4-Bromophenyl-phenylether	12000	U
118-74-1	Hexachlorobenzene	8500	J
1912-24-9	Atrazine	12000	U
87-86-5	Pentachlorophenol	29000	U
85-01-8	Phenanthrene	2600	J
120-12-7	Anthracene	12000	U
86-74-8	Carbazole	12000	U
84-74-2	Di-n-butylphthalate	12000	U
206-44-0	Fluoranthene	3200	J
129-00-0	Pyrene	6100	J
85-68-7	Butylbenzylphthalate	12000	U
91-94-1	3,3'-Dichlorobenzidine	12000	U
56-55-3	Benzo(a)anthracene	12000	U
218-01-9	Chrysene	700	J
117-81-7	bis(2-Ethylhexyl)phthalate	2800	BJ
117-84-0	Di-n-octylphthalate	12000	U
205-99-2	Benzo(b)fluoranthene	12000	U
207-08-9	Benzo(k)fluoranthene	12000	U
50-32-8	Benzo(a)pyrene	600	J
193-39-5	Indeno(1,2,3-cd)pyrene	12000	U
53-70-3	Dibenzo(a,h)anthracene	12000	U
191-24-2	Benzo(g,h,i)perylene	1100	J

EPA SAMPLE NO.

FGW70

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-015B

Sample wt/vol: 30 (g/mL) G Lab File ID: H1498.D

Level: (low/med) LOW Date Received: 03/30/00

% Moisture: 43 Decanted: (Y/N) N Date Extracted: 04/13/00

Concentrated Extract Volume: 500 (µl) Date Analyzed: 04/20/00

Injection Volume: 2 (µl) Dilution Factor: 20.00

GPC Cleanup: (Y/N) Y pH: 8.1 Extraction: (Type SONC

CONCENTRATION UNITS:

Number TICs found: 6 (µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.	000106-46-7	Benzene, 1,4-dichloro-	6.81	4300	NJ
2.	000101-84-8	Benzene, 1,1'-oxybis-	12.28	6800	NJ
3.		Unknown (3)	19.72	4300	J
4.		Unknown (4)	19.95	3200	J
5.		Unknown (5)	20.13	2700	J
6.		Unknown (6)	20.16	2500	J

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW45

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-001D

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes084.rst

% Moisture: 21 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/16/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.1 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	2.2	U
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.2	U
72-55-9	4,4'-DDE	4.2	U
72-20-8	Endrin	4.2	U
33213-65-9	Endosulfan II	4.2	U
72-54-8	4,4'-DDD	4.2	U
1031-07-8	Endosulfan sulfate	4.2	U
50-29-3	4,4'-DDT	4.2	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.2	U
7421-93-4	Endrin aldehyde	4.2	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor 1016	42	U
11104-28-2	Aroclor 1221	85	U
11141-16-5	Aroclor 1232	42	U
53469-21-9	Aroclor 1242	42	U
12672-29-6	Aroclor 1248	42	U
11097-69-1	Aroclor 1254	42	U
11096-82-5	Aroclor 1260	42	U

RH 4-26-2000

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW46

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: ____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-002B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes087.rst

% Moisture: 19 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/16/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.3 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.1	U
72-55-9	4,4`-DDE	4.1	U
72-20-8	Endrin	4.1	U
33213-65-9	Endosulfan II	4.1	U
72-54-8	4,4`-DDD	4.1	U
1031-07-8	Endosulfan sulfate	4.1	U
50-29-3	4,4`-DDT	4.1	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.1	U
7421-93-4	Endrin aldehyde	4.1	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor 1016	41	U
11104-28-2	Aroclor 1221	83	U
11141-16-5	Aroclor 1232	41	U
53469-21-9	Aroclor 1242	41	U
12672-29-6	Aroclor 1248	41	U
11097-69-1	Aroclor 1254	41	U
11096-82-5	Aroclor 1260	41	U

RH4-26-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW47

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: ____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-003B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes088.rst

% Moisture: 18 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/16/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4`-DDE	4.0	U
72-20-8	Endrin	4.0	U
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4`-DDD	4.0	U
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4`-DDT	4.0	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor 1016	40	U
11104-28-2	Aroclor 1221	82	U
11141-16-5	Aroclor 1232	40	U
53469-21-9	Aroclor 1242	40	U
12672-29-6	Aroclor 1248	40	U
11097-69-1	Aroclor 1254	40	U
11096-82-5	Aroclor 1260	40	U

RH 4-26-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW48

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: ____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-004B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes214.rst

% Moisture: 50 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/19/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/20/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.3 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q	
319-84-6	alpha-BHC	3.4	U	
319-85-7	beta-BHC	3.4	U	
319-86-8	delta-BHC	3.4	U	
58-89-9	gamma-BHC (Lindane)	10	P	✓
76-44-8	Heptachlor	3.4	U	
309-00-2	Aldrin	130	PE	✓
1024-57-3	Heptachlor epoxide	3.4	U	
959-98-8	Endosulfan I	21	P	✓
60-57-1	Dieldrin	6.6	U	
72-55-9	4,4`-DDE	6.6	U	
72-20-8	Endrin	6.6	U	
33213-65-9	Endosulfan II	12	P	✓
72-54-8	4,4`-DDD	15	P	✓
1031-07-8	Endosulfan sulfate	6.6	U	
50-29-3	4,4`-DDT	6.6	U	
72-43-5	Methoxychlor	34	U	
53494-70-5	Endrin ketone	11	P	✓
7421-93-4	Endrin aldehyde	6.6	U	
5103-71-9	alpha-Chlordane	1.5	PJ	✓
5103-74-2	gamma-Chlordane	3.4	U	
8001-35-2	Toxaphene	340	U	
12674-11-2	Aroclor 1016	66	U	
11104-28-2	Aroclor 1221	130	U	
11141-16-5	Aroclor 1232	66	U	
53469-21-9	Aroclor 1242	66	U	
12672-29-6	Aroclor 1248	5200		✓
11097-69-1	Aroclor 1254	66	U	
11096-82-5	Aroclor 1260	66	U	

RH4-25-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW48DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-004B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes215.rst

% Moisture: 50 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/19/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/20/00

Injection Volume: 1 (uL) Dilution Factor: 10.00

GPC Cleanup: (Y/N) N pH: 8.3 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q	
319-84-6	alpha-BHC	34	U	
319-85-7	beta-BHC	34	U	
319-86-8	delta-BHC	34	U	
58-89-9	gamma-BHC (Lindane)	15	DPJ	✓
76-44-8	Heptachlor	34	U	
309-00-2	Aldrin	240	D	✓
1024-57-3	Heptachlor epoxide	34	U	
959-98-8	Endosulfan I	34	U	
60-57-1	Dieldrin	66	U	
72-55-9	4,4'-DDE	66	U	
72-20-8	Endrin	130	DP	✓
33213-65-9	Endosulfan II	66	U	
72-54-8	4,4'-DDD	66	U	
1031-07-8	Endosulfan sulfate	66	U	
50-29-3	4,4'-DDT	66	U	
72-43-5	Methoxychlor	290	DPJ	✓
53494-70-5	Endrin ketone	7.5	DPJ	✓
7421-93-4	Endrin aldehyde	66	U	
5103-71-9	alpha-Chlordane	34	U	
5103-74-2	gamma-Chlordane	34	U	
8001-35-2	Toxaphene	3400	U	
12674-11-2	Aroclor 1016	660	U	
11104-28-2	Aroclor 1221	1300	U	
11141-16-5	Aroclor 1232	660	U	
53469-21-9	Aroclor 1242	660	U	
12672-29-6	Aroclor 1248	8700	D	
11097-69-1	Aroclor 1254	660	U	
11096-82-5	Aroclor 1260	660	U	

RH4-25-00

1E

EPA SAMPLE NO.

FGW49

PESTICIDE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-005B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes114.rst

% Moisture: 56 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.2 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	3.9	U
319-85-7	beta-BHC	3.9	U
319-86-8	delta-BHC	3.9	U
58-89-9	gamma-BHC (Lindane)	3.9	U
76-44-8	Heptachlor	3.9	U
309-00-2	Aldrin	130	E
1024-57-3	Heptachlor epoxide	3.9	U
959-98-8	Endosulfan I	3.3	PJ
60-57-1	Dieldrin	7.5	U
72-55-9	4,4`-DDE	7.5	U
72-20-8	Endrin	7.5	U
33213-65-9	Endosulfan II	7.5	U
72-54-8	4,4`-DDD	12	P
1031-07-8	Endosulfan sulfate	7.5	U
50-29-3	4,4`-DDT	7.5	U
72-43-5	Methoxychlor	39	U
53494-70-5	Endrin ketone	30	
7421-93-4	Endrin aldehyde	7.5	U
5103-71-9	alpha-Chlordane	2.4	PJ
5103-74-2	gamma-Chlordane	3.9	U
8001-35-2	Toxaphene	390	U
12674-11-2	Aroclor 1016	75	U
11104-28-2	Aroclor 1221	150	U
11141-16-5	Aroclor 1232	75	U
53469-21-9	Aroclor 1242	75	U
12672-29-6	Aroclor 1248	4500	✓
11097-69-1	Aroclor 1254	75	U
11096-82-5	Aroclor 1260	1800	P ✓

RH 4-21-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW49DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-005B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes090.rst

% Moisture: 56 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/16/00

Injection Volume: 1 (uL) Dilution Factor: 10.00

GPC Cleanup: (Y/N) N pH: 8.2 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	39	U
319-85-7	beta-BHC	39	U
319-86-8	delta-BHC	39	U
58-89-9	gamma-BHC (Lindane)	39	U
76-44-8	Heptachlor	39	U
309-00-2	Aldrin	210	D
1024-57-3	Heptachlor epoxide	39	U
959-98-8	Endosulfan I	39	U
60-57-1	Dieldrin	75	U
72-55-9	4,4`-DDE	75	U
72-20-8	Endrin	75	U
33213-65-9	Endosulfan II	75	U
72-54-8	4,4`-DDD	75	U
1031-07-8	Endosulfan sulfate	75	U
50-29-3	4,4`-DDT	75	U
72-43-5	Methoxychlor	390	U
53494-70-5	Endrin ketone	36	DPJ
7421-93-4	Endrin aldehyde	75	U
5103-71-9	alpha-Chlordane	39	U
5103-74-2	gamma-Chlordane	39	U
8001-35-2	Toxaphene	3900	U
12674-11-2	Aroclor 1016	750	U
11104-28-2	Aroclor 1221	1500	U
11141-16-5	Aroclor 1232	750	U
53469-21-9	Aroclor 1242	750	U
12672-29-6	Aroclor 1248	6500	D
11097-69-1	Aroclor 1254	750	U
11096-82-5	Aroclor 1260	2200	DP

RH 4-26-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW50

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-006B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes115.rst

% Moisture: 52 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.1 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	3.5	U
319-85-7	beta-BHC	3.5	U
319-86-8	delta-BHC	16	P
58-89-9	gamma-BHC (Lindane)	3.5	U
76-44-8	Heptachlor	3.5	U
309-00-2	Aldrin	110	PE
1024-57-3	Heptachlor epoxide	3.5	U
959-98-8	Endosulfan I	3.5	U
60-57-1	Dieldrin	6.9	U
72-55-9	4,4'-DDE	6.9	U
72-20-8	Endrin	6.9	U
33213-65-9	Endosulfan II	6.9	U
72-54-8	4,4'-DDD	6.9	U
1031-07-8	Endosulfan sulfate	6.9	U
50-29-3	4,4'-DDT	6.9	U
72-43-5	Methoxychlor	35	U
53494-70-5	Endrin ketone	35	P
7421-93-4	Endrin aldehyde	6.9	U
5103-71-9	alpha-Chlordane	3.5	U
5103-74-2	gamma-Chlordane	3.5	U
8001-35-2	Toxaphene	350	U
12674-11-2	Aroclor 1016	69	U
11104-28-2	Aroclor 1221	140	U
11141-16-5	Aroclor 1232	69	U
53469-21-9	Aroclor 1242	69	U
12672-29-6	Aroclor 1248	3800	P
11097-69-1	Aroclor 1254	69	U
11096-82-5	Aroclor 1260	2100	P

RH 4-26-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW50DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-006B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes091.rst

% Moisture: 52 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/16/00

Injection Volume: 1 (uL) Dilution Factor: 10.00

GPC Cleanup: (Y/N) N pH: 8.1 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	35	U
319-85-7	beta-BHC	35	U
319-86-8	delta-BHC	35	U
58-89-9	gamma-BHC (Lindane)	35	U
76-44-8	Heptachlor	35	U
309-00-2	Aldrin	170	DP
1024-57-3	Heptachlor epoxide	35	U
959-98-8	Endosulfan I	35	U
60-57-1	Dieldrin	69	U
72-55-9	4,4`-DDE	69	U
72-20-8	Endrin	69	U
33213-65-9	Endosulfan II	69	U
72-54-8	4,4`-DDD	69	U
1031-07-8	Endosulfan sulfate	69	U
50-29-3	4,4`-DDT	69	U
72-43-5	Methoxychlor	350	U
53494-70-5	Endrin ketone	48	DJ
7421-93-4	Endrin aldehyde	69	U
5103-71-9	alpha-Chlordane	35	U
5103-74-2	gamma-Chlordane	35	U
8001-35-2	Toxaphene	3500	U
12674-11-2	Aroclor 1016	690	U
11104-28-2	Aroclor 1221	1400	U
11141-16-5	Aroclor 1232	690	U
53469-21-9	Aroclor 1242	690	U
12672-29-6	Aroclor 1248	5300	DP
11097-69-1	Aroclor 1254	690	U
11096-82-5	Aroclor 1260	2600	DP

RA 4-26-00

1E

EPA SAMPLE NO.

FGW51

PESTICIDE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-007B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes116.rst

% Moisture: 31 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.5	U
319-85-7	beta-BHC	6.8	P
319-86-8	delta-BHC	2.5	U
58-89-9	gamma-BHC (Lindane)	2.5	U
76-44-8	Heptachlor	2.5	U
309-00-2	Aldrin	2.5	U
1024-57-3	Heptachlor epoxide	5.2	P
959-98-8	Endosulfan I	2.5	U
60-57-1	Dieldrin	4.8	U
72-55-9	4,4`-DDE	4.8	U
72-20-8	Endrin	4.8	U
33213-65-9	Endosulfan II	4.8	U
72-54-8	4,4`-DDD	4.8	U
1031-07-8	Endosulfan sulfate	4.8	U
50-29-3	4,4`-DDT	4.8	U
72-43-5	Methoxychlor	25	U
53494-70-5	Endrin ketone	32	P
7421-93-4	Endrin aldehyde	4.8	U
5103-71-9	alpha-Chlordane	0.87	PJ
5103-74-2	gamma-Chlordane	2.5	U
8001-35-2	Toxaphene	250	U
12674-11-2	Aroclor 1016	48	U
11104-28-2	Aroclor 1221	97	U
11141-16-5	Aroclor 1232	48	U
53469-21-9	Aroclor 1242	48	U
12672-29-6	Aroclor 1248	48	U
11097-69-1	Aroclor 1254	320	P
11096-82-5	Aroclor 1260	48	U

RH 4-26-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW52

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-008B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes117.rst

% Moisture: 33 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.5	U
319-85-7	beta-BHC	6.1	P
319-86-8	delta-BHC	2.5	U
58-89-9	gamma-BHC (Lindane)	2.5	U
76-44-8	Heptachlor	2.5	U
309-00-2	Aldrin	16	P
1024-57-3	Heptachlor epoxide	2.5	U
959-98-8	Endosulfan I	2.5	U
60-57-1	Dieldrin	4.9	U
72-55-9	4,4'-DDE	4.9	U
72-20-8	Endrin	4.9	U
33213-65-9	Endosulfan II	4.9	U
72-54-8	4,4'-DDD	4.9	U
1031-07-8	Endosulfan sulfate	4.9	U
50-29-3	4,4'-DDT	4.9	U
72-43-5	Methoxychlor	25	U
53494-70-5	Endrin ketone	13	P
7421-93-4	Endrin aldehyde	4.9	U
5103-71-9	alpha-Chlordane	0.87	PJ
5103-74-2	gamma-Chlordane	2.5	U
8001-35-2	Toxaphene	250	U
12674-11-2	Aroclor 1016	49	U
11104-28-2	Aroclor 1221	100	U
11141-16-5	Aroclor 1232	49	U
53469-21-9	Aroclor 1242	49	U
12672-29-6	Aroclor 1248	49	U
11097-69-1	Aroclor 1254	370	P
11096-82-5	Aroclor 1260	49	U

RH 4-26-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW53

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-009B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes118.rst

% Moisture: 36 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.7	U
319-85-7	beta-BHC	6.8	P
319-86-8	delta-BHC	2.7	U
58-89-9	gamma-BHC (Lindane)	2.7	U
76-44-8	Heptachlor	2.7	U
309-00-2	Aldrin	16	P
1024-57-3	Heptachlor epoxide	7.0	P
959-98-8	Endosulfan I	2.7	U
60-57-1	Dieldrin	5.2	U
72-55-9	4,4`-DDE	11	P
72-20-8	Endrin	5.2	U
33213-65-9	Endosulfan II	5.2	U
72-54-8	4,4`-DDD	5.2	U
1031-07-8	Endosulfan sulfate	5.2	U
50-29-3	4,4`-DDT	5.2	U
72-43-5	Methoxychlor	27	U
53494-70-5	Endrin ketone	70	
7421-93-4	Endrin aldehyde	5.2	U
5103-71-9	alpha-Chlordane	2.7	U
5103-74-2	gamma-Chlordane	2.7	U
8001-35-2	Toxaphene	270	U
12674-11-2	Aroclor 1016	52	U
11104-28-2	Aroclor 1221	100	U
11141-16-5	Aroclor 1232	52	U
53469-21-9	Aroclor 1242	52	U
12672-29-6	Aroclor 1248	52	U
11097-69-1	Aroclor 1254	530	
11096-82-5	Aroclor 1260	52	U

RH 4-26-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW53DL

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-009B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes099.rst

% Moisture: 36 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/16/00

Injection Volume: 1 (uL) Dilution Factor: 10.00

GPC Cleanup: (Y/N) N pH: 7.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	27	U
319-85-7	beta-BHC	5.1	DPJ
319-86-8	delta-BHC	27	U
58-89-9	gamma-BHC (Lindane)	27	U
76-44-8	Heptachlor	27	U
309-00-2	Aldrin	28	DP
1024-57-3	Heptachlor epoxide	27	U
959-98-8	Endosulfan I	27	U
60-57-1	Dieldrin	52	U
72-55-9	4,4'-DDE	52	U
72-20-8	Endrin	52	U
33213-65-9	Endosulfan II	52	U
72-54-8	4,4'-DDD	52	U
1031-07-8	Endosulfan sulfate	52	U
50-29-3	4,4'-DDT	52	U
72-43-5	Methoxychlor	270	U
53494-70-5	Endrin ketone	90	DP
7421-93-4	Endrin aldehyde	52	U
5103-71-9	alpha-Chlordane	27	U
5103-74-2	gamma-Chlordane	27	U
8001-35-2	Toxaphene	2700	U
12674-11-2	Aroclor 1016	520	U
11104-28-2	Aroclor 1221	1000	U
11141-16-5	Aroclor 1232	520	U
53469-21-9	Aroclor 1242	520	U
12672-29-6	Aroclor 1248	520	U
11097-69-1	Aroclor 1254	680	D
11096-82-5	Aroclor 1260	520	U

RH 4-25-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW54

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-010B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes100.rst

% Moisture: 26 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/16/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.4 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.3	U
319-85-7	beta-BHC	2.3	U
319-86-8	delta-BHC	2.3	U
58-89-9	gamma-BHC (Lindane)	2.3	U
76-44-8	Heptachlor	2.3	U
309-00-2	Aldrin	2.3	U
1024-57-3	Heptachlor epoxide	2.3	U
959-98-8	Endosulfan I	2.3	U
60-57-1	Dieldrin	4.5	U
72-55-9	4,4`-DDE	4.5	U
72-20-8	Endrin	4.5	U
33213-65-9	Endosulfan II	4.5	U
72-54-8	4,4`-DDD	4.5	U
1031-07-8	Endosulfan sulfate	4.5	U
50-29-3	4,4`-DDT	4.5	U
72-43-5	Methoxychlor	23	U
53494-70-5	Endrin ketone	4.5	U
7421-93-4	Endrin aldehyde	4.5	U
5103-71-9	alpha-Chlordane	2.3	U
5103-74-2	gamma-Chlordane	2.3	U
8001-35-2	Toxaphene	230	U
12674-11-2	Aroclor 1016	45	U
11104-28-2	Aroclor 1221	91	U
11141-16-5	Aroclor 1232	45	U
53469-21-9	Aroclor 1242	45	U
12672-29-6	Aroclor 1248	45	U
11097-69-1	Aroclor 1254	45	U
11096-82-5	Aroclor 1260	45	U

RH4-26-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW55

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-011B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes101.rst

% Moisture: 21 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/16/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 9.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	2.2	U
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.2	U
72-55-9	4,4`-DDE	4.2	U
72-20-8	Endrin	4.2	U
33213-65-9	Endosulfan II	4.2	U
72-54-8	4,4`-DDD	4.2	U
1031-07-8	Endosulfan sulfate	4.2	U
50-29-3	4,4`-DDT	4.2	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.2	U
7421-93-4	Endrin aldehyde	4.2	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor 1016	42	U
11104-28-2	Aroclor 1221	85	U
11141-16-5	Aroclor 1232	42	U
53469-21-9	Aroclor 1242	42	U
12672-29-6	Aroclor 1248	42	U
11097-69-1	Aroclor 1254	42	U
11096-82-5	Aroclor 1260	42	U

RHn-26-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW56

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-021B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes106.rst

% Moisture: 46 Decanted: (Y/N) N Date Received: 03/31/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	3.1	U
319-85-7	beta-BHC	3.1	U
319-86-8	delta-BHC	3.1	U
58-89-9	gamma-BHC (Lindane)	3.1	U
76-44-8	Heptachlor	3.1	U
309-00-2	Aldrin	3.1	U
1024-57-3	Heptachlor epoxide	3.1	U
959-98-8	Endosulfan I	3.1	U
60-57-1	Dieldrin	6.1	U
72-55-9	4,4'-DDE	6.1	U
72-20-8	Endrin	6.1	U
33213-65-9	Endosulfan II	6.1	U
72-54-8	4,4'-DDD	6.1	U
1031-07-8	Endosulfan sulfate	6.1	U
50-29-3	4,4'-DDT	6.1	U
72-43-5	Methoxychlor	31	U
53494-70-5	Endrin ketone	6.1	U
7421-93-4	Endrin aldehyde	6.1	U
5103-71-9	alpha-Chlordane	3.1	U
5103-74-2	gamma-Chlordane	3.1	U
8001-35-2	Toxaphene	310	U
12674-11-2	Aroclor 1016	61	U
11104-28-2	Aroclor 1221	120	U
11141-16-5	Aroclor 1232	61	U
53469-21-9	Aroclor 1242	61	U
12672-29-6	Aroclor 1248	61	U
11097-69-1	Aroclor 1254	61	U
11096-82-5	Aroclor 1260	61	U

RH 4-26-00

1E

EPA SAMPLE NO.

FGW57

PESTICIDE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-012B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes102.rst

% Moisture: 27 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/16/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.9 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.3	U
319-85-7	beta-BHC	2.3	U
319-86-8	delta-BHC	2.3	U
58-89-9	gamma-BHC (Lindane)	2.3	U
76-44-8	Heptachlor	2.3	U
309-00-2	Aldrin	2.3	U
1024-57-3	Heptachlor epoxide	2.3	U
959-98-8	Endosulfan I	2.3	U
60-57-1	Dieldrin	4.5	U
72-55-9	4,4`-DDE	4.5	U
72-20-8	Endrin	4.5	U
33213-65-9	Endosulfan II	4.5	U
72-54-8	4,4`-DDD	4.5	U
1031-07-8	Endosulfan sulfate	4.5	U
50-29-3	4,4`-DDT	4.5	U
72-43-5	Methoxychlor	23	U
53494-70-5	Endrin ketone	4.5	U
7421-93-4	Endrin aldehyde	4.5	U
5103-71-9	alpha-Chlordane	2.3	U
5103-74-2	gamma-Chlordane	2.3	U
8001-35-2	Toxaphene	230	U
12674-11-2	Aroclor 1016	45	U
11104-28-2	Aroclor 1221	92	U
11141-16-5	Aroclor 1232	45	U
53469-21-9	Aroclor 1242	45	U
12672-29-6	Aroclor 1248	45	U
11097-69-1	Aroclor 1254	45	U
11096-82-5	Aroclor 1260	45	U

RH 4-26-00

1E

EPA SAMPLE NO.

FGW64

PESTICIDE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-013B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes119.rst

% Moisture: 74 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.6 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	6.5	U
319-85-7	beta-BHC	6.5	U
319-86-8	delta-BHC	6.5	U
58-89-9	gamma-BHC (Lindane)	6.5	U
76-44-8	Heptachlor	6.5	U
309-00-2	Aldrin	140	E
1024-57-3	Heptachlor epoxide	6.5	U
959-98-8	Endosulfan I	7.8	P
60-57-1	Dieldrin	13	U
72-55-9	4,4`-DDE	13	U
72-20-8	Endrin	72	
33213-65-9	Endosulfan II	12	PJ
72-54-8	4,4`-DDD	13	U
1031-07-8	Endosulfan sulfate	13	U
50-29-3	4,4`-DDT	13	U
72-43-5	Methoxychlor	65	U
53494-70-5	Endrin ketone	13	U
7421-93-4	Endrin aldehyde	13	U
5103-71-9	alpha-Chlordane	6.5	U
5103-74-2	gamma-Chlordane	6.5	U
8001-35-2	Toxaphene	650	U
12674-11-2	Aroclor 1016	130	U
11104-28-2	Aroclor 1221	260	U
11141-16-5	Aroclor 1232	130	U
53469-21-9	Aroclor 1242	130	U
12672-29-6	Aroclor 1248	4300	
11097-69-1	Aroclor 1254	130	U
11096-82-5	Aroclor 1260	1600	P

RH 4-26-00

1E

EPA SAMPLE NO.

FGW64DL

PESTICIDE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: ____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-013B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes103.rst

% Moisture: 74 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/16/00

Injection Volume: 1 (uL) Dilution Factor: 10.00

GPC Cleanup: (Y/N) N pH: 7.6 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	65	U
319-85-7	beta-BHC	65	U
319-86-8	delta-BHC	65	U
58-89-9	gamma-BHC (Lindane)	65	U
76-44-8	Heptachlor	65	U
309-00-2	Aldrin	230	D
1024-57-3	Heptachlor epoxide	65	U
959-98-8	Endosulfan I	65	U
60-57-1	Dieldrin	130	U
72-55-9	4,4`-DDE	130	U
72-20-8	Endrin	120	DJ
33213-65-9	Endosulfan II	130	U
72-54-8	4,4`-DDD	130	U
1031-07-8	Endosulfan sulfate	130	U
50-29-3	4,4`-DDT	130	U
72-43-5	Methoxychlor	650	U
53494-70-5	Endrin ketone	130	U
7421-93-4	Endrin aldehyde	130	U
5103-71-9	alpha-Chlordane	65	U
5103-74-2	gamma-Chlordane	65	U
8001-35-2	Toxaphene	6500	U
12674-11-2	Aroclor 1016	1300	U
11104-28-2	Aroclor 1221	2600	U
11141-16-5	Aroclor 1232	1300	U
53469-21-9	Aroclor 1242	1300	U
12672-29-6	Aroclor 1248	6100	D
11097-69-1	Aroclor 1254	1300	U
11096-82-5	Aroclor 1260	1800	D

RH 4-26-00

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FGW65

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-014B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes120.rst

% Moisture: 70 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 . (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.6 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	5.7	U
319-85-7	beta-BHC	5.7	U
319-86-8	delta-BHC	5.7	U
58-89-9	gamma-BHC (Lindane)	5.7	U
76-44-8	Heptachlor	5.7	U
309-00-2	Aldrin	110	E
1024-57-3	Heptachlor epoxide	5.7	U
959-98-8	Endosulfan I	14	P
60-57-1	Dieldrin	11	U
72-55-9	4,4`-DDE	11	U
72-20-8	Endrin	66	
33213-65-9	Endosulfan II	11	U
72-54-8	4,4`-DDD	11	U
1031-07-8	Endosulfan sulfate	11	U
50-29-3	4,4`-DDT	11	U
72-43-5	Methoxychlor	57	U
53494-70-5	Endrin ketone	12	
7421-93-4	Endrin aldehyde	11	U
5103-71-9	alpha-Chlordane	5.7	U
5103-74-2	gamma-Chlordane	5.7	U
8001-35-2	Toxaphene	570	U
12674-11-2	Aroclor 1016	110	U
11104-28-2	Aroclor 1221	220	U
11141-16-5	Aroclor 1232	110	U
53469-21-9	Aroclor 1242	110	U
12672-29-6	Aroclor 1248	3400	
11097-69-1	Aroclor 1254	110	U
11096-82-5	Aroclor 1260	1100	

RH 4-26-00

1E

EPA SAMPLE NO.

FGW65DL

PESTICIDE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-014B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes104.rst

% Moisture: 70 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/16/00

Injection Volume: 1 (uL) Dilution Factor: 10.00

GPC Cleanup: (Y/N) N pH: 7.6 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	57	U
319-85-7	beta-BHC	57	U
319-86-8	delta-BHC	57	U
58-89-9	gamma-BHC (Lindane)	57	U
76-44-8	Heptachlor	57	U
309-00-2	Aldrin	170	D
1024-57-3	Heptachlor epoxide	57	U
959-98-8	Endosulfan I	57	U
60-57-1	Dieldrin	110	U
72-55-9	4,4'-DDE	110	U
72-20-8	Endrin	94	DJ
33213-65-9	Endosulfan II	110	U
72-54-8	4,4'-DDD	110	U
1031-07-8	Endosulfan sulfate	110	U
50-29-3	4,4'-DDT	110	U
72-43-5	Methoxychlor	570	U
53494-70-5	Endrin ketone	110	U
7421-93-4	Endrin aldehyde	110	U
5103-71-9	alpha-Chlordane	57	U
5103-74-2	gamma-Chlordane	57	U
8001-35-2	Toxaphene	5700	U
12674-11-2	Aroclor 1016	1100	U
11104-28-2	Aroclor 1221	2200	U
11141-16-5	Aroclor 1232	1100	U
53469-21-9	Aroclor 1242	1100	U
12672-29-6	Aroclor 1248	4800	D
11097-69-1	Aroclor 1254	1100	U
11096-82-5	Aroclor 1260	1200	DP

RH 4-26-2000

1E

EPA SAMPLE NO.

FGW70

PESTICIDE ORGANICS ANALYSIS DATA SHEET

Lab Name: Clayton Group Services Contract: 68-W-99-069

Lab Code: CLAYTN Case No.: 27912 SAS No.: _____ SDG No.: FGW45

Matrix: (soil/water) SOIL Lab Sample ID: 00031137-015B

Sample wt/vol: 30 (g/mL) G Lab File ID: c:\pp_hp4d\5\apes121.rst

% Moisture: 43 Decanted: (Y/N) N Date Received: 03/30/00

Extraction: (Type) Sonc Date Extracted: 04/05/00

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/17/00

Injection Volume: 1 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.1 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	3.0	U
319-85-7	beta-BHC	3.0	U
319-86-8	delta-BHC	3.0	U
58-89-9	gamma-BHC (Lindane)	3.0	U
76-44-8	Heptachlor	3.0	U
309-00-2	Aldrin	3.0	U
1024-57-3	Heptachlor epoxide	3.0	U
959-98-8	Endosulfan I	3.0	U
60-57-1	Dieldrin	5.8	U
72-55-9	4,4`-DDE	5.8	U
72-20-8	Endrin	5.8	U
33213-65-9	Endosulfan II	5.8	U
72-54-8	4,4`-DDD	5.8	U
1031-07-8	Endosulfan sulfate	5.8	U
50-29-3	4,4`-DDT	5.8	U
72-43-5	Methoxychlor	30	U
53494-70-5	Endrin ketone	4.1	PJ
7421-93-4	Endrin aldehyde	5.8	U
5103-71-9	alpha-Chlordane	3.0	U
5103-74-2	gamma-Chlordane	3.0	U
8001-35-2	Toxaphene	300	U
12674-11-2	Aroclor 1016	58	U
11104-28-2	Aroclor 1221	120	U
11141-16-5	Aroclor 1232	58	U
53469-21-9	Aroclor 1242	58	U
12672-29-6	Aroclor 1248	58	U
11097-69-1	Aroclor 1254	58	U
11096-82-5	Aroclor 1260	58	U

RH 4-26-01

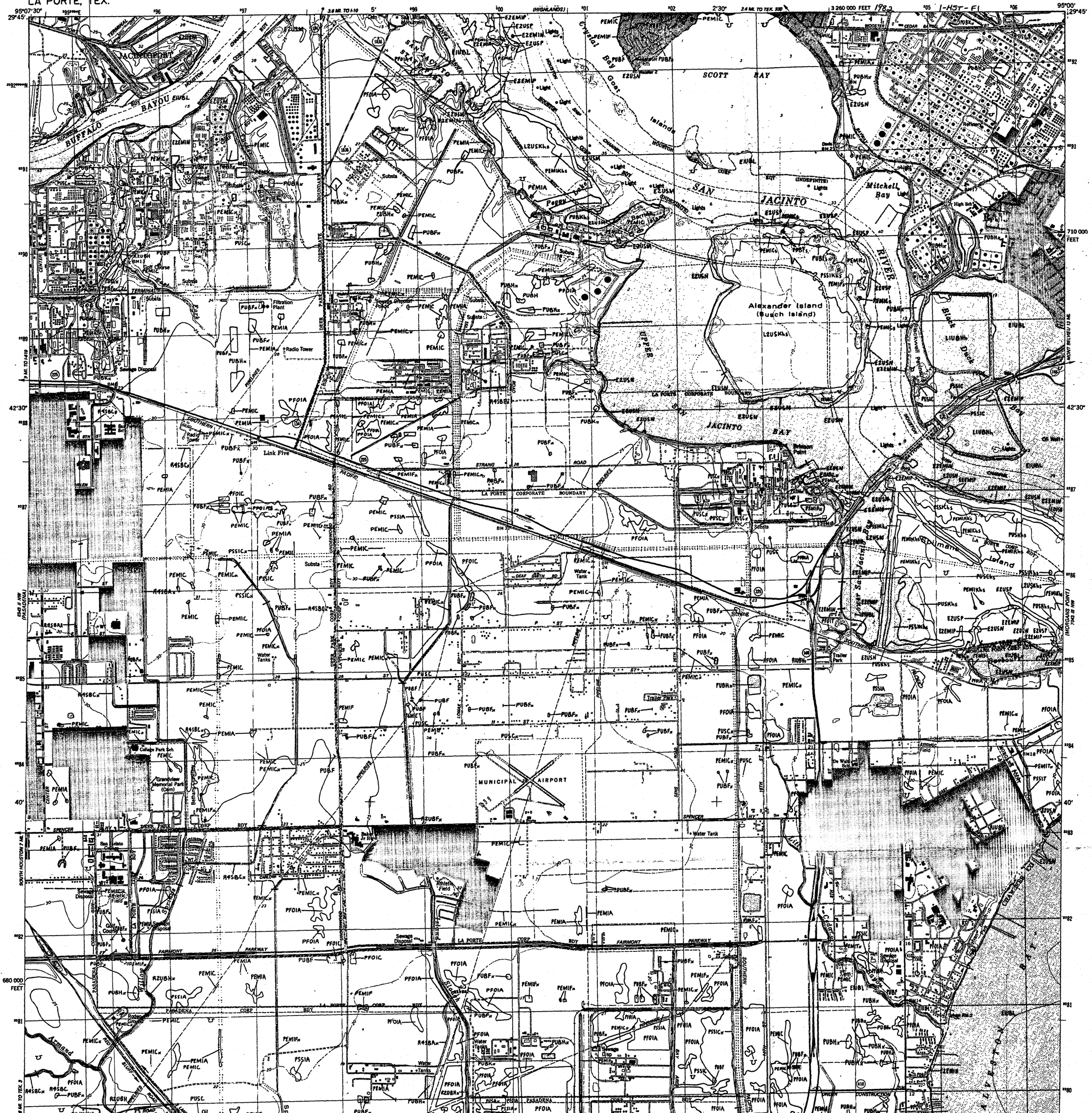
Reference 16

National Wetlands Inventory Map
La Porte, Texas

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR

LA PORTE, TEX.



HOUSTON NW
HOUSTON

LA PORTE, TEX.

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

1 acre | 5 acres | 10 acres | 20 acres | 40 acres

ACREAGE GUIDE

For information on availability of NWI maps, call 1-800-USA-MAPS.

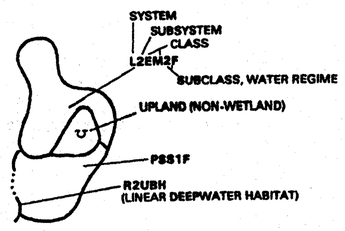
Regional Director (ARDE) Region II
U.S. Fish and Wildlife Service
P.O. Box 1306
Albuquerque, New Mexico 87103

SPECIAL NOTE

This document was prepared primarily by stereoscopic analysis of high altitude aerial photographs. Wetlands were identified on the photographs based on vegetation, visible hydrology, and geography in accordance with Classification of Wetlands and Deepwater Habitats of the United States (FWS/OBS - 79/31 December 1979). The aerial photographs typically reflect conditions during the specific year and season when they were taken. In addition, there is a margin of error inherent in the use of the aerial photographs. Thus, a detailed on the ground and historical analysis of a single site may result in a revision of the wetland boundaries established through photographic interpretation. In addition, some small wetlands and those obscured by dense forest cover may not be included on this document.

Federal, State and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, State or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, State or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

SYMBOLOGY EXAMPLE



U Primarily represents **upland areas**, but may include unclassified wetlands such as man-modified areas, non photo-identifiable areas and/or unintentional omissions.

NOTES TO THE USER

- Subsystems, Classes, Subclasses, and Water Regimes in *italics* were developed specifically for NATIONAL WETLANDS INVENTORY mapping.
- Some areas designated as R4SB, R4SBW, OR R4SBJ (INTERMITTENT STREAMS) may not meet the definition of wetland.
- This map uses the class Unconsolidated Shore (US). On earlier NWI maps that class was designated Beach/Bar (BB), or Flat (FL). Subclasses remain the same in both versions.

AERIAL PHOTOGRAPHY

DATE:	11 / 92	/ /
SCALE:	1:65 000	
TYPE:	CIR	

1999

U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Prepared by National Wetlands Inventory
Base map provided by the United States Geological Survey

SYSTEM: M — MARINE

SUBSYSTEM	1 — SUBTIDAL					2 — INTERTIDAL				
CLASS	RB — ROCK BOTTOM	UB — UNCONSOLIDATED BOTTOM	AB — AQUATIC BED	RF — REEF	OW — *OPEN WATER/ Unknown Bottom*	AB — AQUATIC BED	RF — REEF	RS — ROCKY SHORE	US — UNCONSOLIDATED SHORE
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 3 Rooted Vascular 5 *Unknown Submergent*	1 Coral 3 Worm		1 Algal 3 Rooted Vascular 5 *Unknown Submergent*	1 Coral 3 Worm	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic

SYSTEM: E — ESTUARINE

SUBSYSTEM	1 — SUBTIDAL					2 — INTERTIDAL								
CLASS	RB — ROCK BOTTOM	UB — UNCONSOLIDATED BOTTOM	AB — AQUATIC BED	RF — REEF	OW — *OPEN WATER/ Unknown Bottom*	AB — AQUATIC BED	RF — REEF	SS — STREAMBED	RS — ROCKY SHORE	US — UNCONSOLIDATED SHORE	EM — EMERGENT	SS — SCRUB-SHRUB	FO — FORESTED
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 3 Rooted Vascular 4 Floating Vascular 5 *Unknown Submergent* 6 *Unknown Surface*	2 Mollusc 3 Worm		1 Algal 3 Rooted Vascular 4 Floating Vascular 5 *Unknown Submergent* 6 *Unknown Surface*	2 Mollusc 3 Worm	3 Cobble-Gravel 4 Sand 5 Mud 6 Organic	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Persistent 2 Nonpersistent	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 *Deciduous* 7 *Evergreen*	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 *Deciduous* 7 *Evergreen*

SYSTEM: R — RIVERINE

SUBSYSTEM	1 — TIDAL		2 — LOWER PERENNIAL			3 — UPPER PERENNIAL			4 — INTERMITTENT	5 — *UNKNOWN PERENNIAL*
CLASS	RB — ROCK BOTTOM	UB — UNCONSOLIDATED BOTTOM	*SS — STREAMBED	AB — AQUATIC BED	RS — ROCKY SHORE	US — UNCONSOLIDATED SHORE	**EM — EMERGENT	OW — *OPEN WATER/ Unknown Bottom*		
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble 3 Cobble-Gravel 4 Sand 5 Mud 6 Organic 7 Vegetated	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 *Unknown Submergent* 6 *Unknown Surface*	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent			

*STREAMBED is limited to TIDAL and INTERMITTENT SUBSYSTEMS, and comprises the only CLASS in the INTERMITTENT SUBSYSTEM.
**EMERGENT is limited to TIDAL and LOWER PERENNIAL SUBSYSTEMS.

SYSTEM: L — LACUSTRINE

SUBSYSTEM	1 — LIMNETIC				2 — LITTORAL						
CLASS	RB — ROCK BOTTOM	UB — UNCONSOLIDATED BOTTOM	AB — AQUATIC BED	OW — *OPEN WATER/ Unknown Bottom*	RB — ROCK BOTTOM	UB — UNCONSOLIDATED BOTTOM	AB — AQUATIC BED	RS — ROCKY SHORE	US — UNCONSOLIDATED SHORE	EM — EMERGENT	OW — *OPEN WATER/ Unknown Bottom*
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 *Unknown Submergent* 6 *Unknown Surface*		1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 *Unknown Submergent* 6 *Unknown Surface*	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent	

SYSTEM: P — PALUSTRINE

CLASS	RB — ROCK BOTTOM	UB — UNCONSOLIDATED BOTTOM	AB — AQUATIC BED	US — UNCONSOLIDATED SHORE	ML — MOSS-LICHEN	EM — EMERGENT	SS — SCRUB-SHRUB	FO — FORESTED	OW — *OPEN WATER/ Unknown Bottom*
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 *Unknown Submergent* 6 *Unknown Surface*	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	1 Moss 2 Lichen	1 Persistent 2 Nonpersistent	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 *Deciduous* 7 *Evergreen*	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 *Deciduous* 7 *Evergreen*	

MODIFIERS

In order to more adequately describe wetland and deepwater habitats one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The formed modifier may also be applied to the ecological system.

WATER REGIME

Non-Tidal
- A Temporarily Flooded
- B Saturated
- C Seasonally Flooded
- D *Seasonally Flooded/ Well Drained*
- E *Seasonally Flooded/ Saturated*
- F Semipermanently Flooded
- G Intermittently Exposed
- H Permanently Flooded
- J Intermittently Flooded
- K *Artificially Flooded*
- W Intermittently Flooded/Temporary
- Y Saturated/Semipermanent/ Seasonal
- Z Intermittently Exposed/Permanent
- U *Unknown*

Tidal
- K *Artificially Flooded*
- L Subtidal
- M Irregularly Exposed
- N Regularly Flooded
- P Irregularly Flooded
- *S Temporary-Tidal
- *R Seasonal-Tidal
- *T Semipermanent-Tidal
- *V Permanent-Tidal
- U *Unknown*

*Three water regimes are only used in tidally influenced, freshwater systems.

WATER CHEMISTRY

Coastal Halinity
- 1 Hyperhaline
- 2 Euhaline
- 3 Mixohaline *(Brackish)*
- 4 Polyhaline
- 5 Mesohaline
- 6 Oligohaline
- 0 Fresh

Inland Salinity
- 7 Hypersaline
- 8 Eusaline
- 9 Mixosaline
- 0 Fresh

pH Modifiers for all Fresh Water
- a Acid
- t Circumneutral
- i Alkaline

SOIL
- g Organic
- n Mineral

SPECIAL MODIFIERS
- b *Beaver*
- d *Partially Drained/Ditched*
- f Farmed
- h *Diked/Impounded*
- r Artificial Substrate
- s *Spoil*
- x Excavated

Reference 17

Industrial Site Information

Texas Natural Resource Conservation Commission

INTEROFFICE MEMORANDUM

To: File Date: January 12, 1999

Thru: Jefffie Barbee, Data Management Liaison
Field Operations Division

From: Aron Athavaley, Field Investigator
Region 12-Houston Office

Subject: Shell Oil Company (Shell)
TNRCC Reg. No. 30007; Permit No. 50099
EPA ID No. TXD067285973
Compliance Evaluation Inspection (CEI), and
Boiler and Industrial Furnace (BIF) Inspection
conducted on November 30, and December 3, 9, and 10, 1998

I. INTRODUCTION

On November 30, and December 3, 9, and 10, 1998, 1998, Mr. Aron Athavaley of the Texas Natural Resource Conservation Commission (TNRCC) Region 12-Houston conducted an inspection of the subject facility. The facility, Shell Oil Company (Shell), was represented by Janice Wendel, Staff Environmental Specialist; and Flo Vuelvas, Environmental Representative-Operations. Also, personnel from other departments attended the meetings and site inspections as needed. On November 23, 1998, Ms. Wendel was notified by phone of this scheduled inspection. During the exit interview on December 10, 1998, potential violations were discussed with the same facility personnel.

The following information is noted detailing location and surroundings for this facility: Site location: 5700 State Hwy 225, Deer Park, TX 77536; Land use within one mile: Industrial and commercial; River basin and drainage area segment number: San Jacinto-1006; Name of the nearest drainage ditch or bayou: unnamed ditch connecting to Houston Ship Channel

II. GENERAL FACILITY AND WASTE PROCESS INFORMATION

A. General Facility Information

(1) Business activities: Shell's Deer Park facility consists of an oil refinery and chemical manufacturing units. The refinery produces gasoline, fuels, lubricants, waxes and feed stocks for the chemical plant. The chemical plant produces a variety of petrochemical products including chlorinated organics, plastics, resins, and solvents.

(2) Regulatory Status: The hazardous waste generation status for this facility is large quantity generator (LQG). The registration type is generator and receiver of wastes. The wastes received are

limited to other Shell facilities such as off-site gas stations and research laboratories. The facility maintains a treatment storges and disposal (TSD) permit no. 50099. All hazardous waste (HW) tanks and containers at this facility qualify for exemption from having a hazardous waste permit. The land disposal units- landfill and surface impoundments - are permitted. A hazardous waste pile and industrial boiler are under interim status. The on-going hazardous and/or industrial waste generation and management activities for which the company has provided notification are included in the Notice of Registration (NOR) # 30007. The NOR was last amended on November 2, 1998; see NOR in **Attachment 1**. The TNRCC regulatory status related to other programs is summarized as follows:

TNRCC program	Permit or account #	Description
Water Quality	WQ 00402/ NPDES 0004863	Waste water treatment plant (WWTP) outfall permit for waste water discharge
Air Quality	HG0659W	An account number covering point source air emission permits

B. Waste Generated:

The wastes generated and managed by the company were reviewed during the inspection. The review included the documents such as NOR, annual waste summary, and waste minimization plan. The following observations were made during the inspection:

- o It is noted that the bulk of the waste volume is disposed of on-site utilizing units such as landfill, boilers and injection wells.

- o A number of hazardous waste streams are treated by the WWTP. For example 0304207H - API skimmings, 8007104H - spent acids (D002), 8008109H -spent caustic (D002), 8019102H - waste water containing benzene (D018).

- o The WWTP sludges are noted to be non-hazardous. For example, 03085031- API basin primary sludge, 03056072 - biosolids secondary sludge.

- o The boiler feed streams are analyzed for metals, chlorine, ash and other parameters in accordance with the Waste Analysis Plan.

C. Waste Management Facilities:

Provided in **Attachment 2** are site map, unit location plot plan and sketches. Note that this attachment also includes process flow diagrams. The NOR, **Attachment 1**, presents a section on Active and Closure Pending Units. These units, identified by their NOR unit numbers, are grouped

as follows:

(1) Container storage areas (CSAs) and tanks

Unit type	Permit exempt "less than 90 days" unit NOR #	Non RCRA- NHW, or WWTP unit, NOR #
CSA and Mis. Storage containers	158, 164, 165, and 167.	166 for Class1 wastes, 168 for supplemental plant trash, 170 for plant trash, and 169 for asbestos.
Tanks	None	WWTP: 19, 25,27, 28, 32, 72, 73, 76, 77, 87, 89, 105, 108, 123, 124, 125, 126, 127, 133, 134, 135, 136, 138, 139, 163; Count = 25. Totally enclosed tank facilities(TETFs): 48, 49, 52, 55, 56, 83, 84, 85, 86, 173; Count = 10. These tanks are for BIF feed and slop oil storage. Class 1 tanks for UIC wells: 20, 24, 36, 41, 45; Count = 5. Others, like filters, separators, neutralizer- under WWTP: 12, 42, 65, 128, 149, 172; Count = 6. Until December 1995, following tanks were maintained as RCRA tanks: 66, 67, 68, 69, 70, and 137. These are now claimed to be WWTP tanks; Count = 6.

(2) Treatment and disposal units

Unit type	RCRA unit NOR #	NON RCRA, NOR #
Boilers	Interim status: 145, 146, 148	None

Unit type	RCRA unit NOR #	NON RCRA, NOR #
Surface impoundment-SI	RCRA permitted: 38, 39, 40; these are oxidation ponds of WWTP, which received hazardous waste in the past. The impoundments have variance from having a liner system	WWTP: 102, 103, 104, 106, 107, 132, 156; Count = 7.
Landfill (LF)	159	None
UIC well	None	10- for Class 1 waste water.
Waste pile	Interim status: 154- for stabilizing solids prior to landfilling	None

During the inspection, the following observations were made concerning the on-site waste management units:

- The problems concerning CSAs are addressed in the violations section of the IOM.

- Facility maintains 5 (five) satellite accumulation areas (SAAs) near various points of waste generation. No operational problems were noted during the inspection.

- Shell maintains all hazardous waste tanks as non-RCRA units. The tanks are exempted either as totally enclosed treatment facility or WWTP tanks (**Attachment 2A**).

- As the aeration basins of the old WWTP could not be considered as tanks, they are covered in the HW permit. The unit numbers are, NOR/permit nos: 38/II.B.2, 39/II.B.3, 40/II.B.4. The impoundments have exemption from having the liner system. The ground water monitoring requirements for these impoundments are covered under the Compliance Plan (50099-001) of the facility.

- The waste pile specified under NOR no. 154 has been included in the RCRA permit application. This unit serves as a staging and solidification area prior to the on-site landfilling. Generally primary solids and filtered sludges are delivered here in batches by dump trucks. The typical turn around time for the staging and solidification batches was noted to be 1 to 4 days. A small pile, 4-6 cubic yard size, was observed within the secondary containment or firewall for the pile storage area. A collection sump of the secondary containment was fairly dry and was noted to be well maintained.

- One landfill is active and is specified in accordance with unit no., NOR/permit, 159/ II.B.6. The primary sludges from the WWTP filters, NOR nos. 128 and 129, are sent for landfilling. The landfill has a double liner and is provided with required RCRA groundwater monitoring well system. Leachate and ground water collection lines go to the headworks of the WWTP. Required QA/QC procedures per waste analysis plan are followed for complying with the land disposal restrictions.

  Other landfills, NOR units 01, 04, 05, 59, and 60 have been closed. Required ground water monitoring is conducted for these landfills.

- One permitted incinerator, which was closed in 1998, is identified by unit no., NOR/ permit, 02/ II.B.5. The incinerator used to burn non-hazardous bio-solids from WWTP filters, NOR nos. 42, 43, and 44.

- The facility operates three (3) boilers, FUT-100 (NOR #145), FUT-110 (NOR #146) and FUT-130 (NOR #148), in which petroleum products (pyrolysis pitch and catalytic light gas oil), and hazardous and non-hazardous wastes are burned along with fuel gas.

- The facility submitted a certificate of pre-compliance by August 21, 1991. Subsequently, burn compliance tests were conducted for demonstrating the boiler performance and establishing the operating conditions meeting the BIF rules. The certificate of compliance was submitted in March 1993, extending the dead line of August 21, 1992. Also, the recertification testing has been performed in March 1996, at a frequency of three years. See the Certificate of Compliance form CC-5 in **Attachment 2B** .

  The Adjusted Tier I screening limits are applied for monitoring metals and chlorine emission rates, gram/hr. The boiler does not have a pollution control device for reducing emission rates.

  At this time, Shell has proposed to construct a new boiler which will be dedicated to hazardous waste burning. In the future, three existing boilers will cease to receive hazardous wastes. The trial burn planning and the permitting process will be applicable to the new boiler.

- Shell has completed implementation of a RCRA Facility Investigation (RFI). Eighteen RCRA units were assessed during the work plan implementation. The data sheets for these units were reviewed (**Attachment 2C**) during the inspection. No problem was noted.

- Shell submits ground water semiannual reports to the Austin Office of the TNRCC. The reports are reviewed (**Attachment 2D**) by the Corrective Action Section of the Remediation Division. It appears that Shell is in compliance with the requirements of the Compliance Plan. No problems were noted during the current inspection.

III. BACKGROUND INFORMATION

No problems were noted during the inspection concerning the compliance history for this site or nature of the company business. The latest RCRIS log for the facility was reviewed. The review indicated that the last inspection of this facility conducted by a Region 12-Houston is dated November 19,1998. This was a boiler facility inspection. There is one enforcement against the facility resulting from the boiler inspection dated May 20, 1997. The RCRIS log shows two outstanding violations related to steps being taken under this enforcement. The Enforcement Section in Austin is continuing to address the resolution of the outstanding violations.

IV. SUMMARY OF ALLEGED VIOLATIONS

During the inspection conducted on November 30, and December 3, 9, and 10, 1998, the following violations were noted and remain unresolved:

1. 30 Texas Administrative Code (TAC) 335.6(c)-Notification requirements (Category C3)

o Notice of Registration (NOR) update: As discussed during the inspection, the facility should update the latest NOR as follows:

Units: The following units should be added to the NOR: (i) Roll-off bin, miscellaneous storage container, which was being used for accumulating nonhazardous biosolids for off-site disposal, (ii) portable tank (Baker tank), miscellaneous storage container, which is utilized for collecting wash water sent to the waste water treatment plant.

Waste stream: The following waste streams should be added to the NOR: contaminated ground water from the recovery wells; biosolids generated from the north treater WWTP. It is noted that unlike the chemical plant biosolids, the refinery solids carry listed hazardous waste codes.

Miscellaneous changes: Refer to NOR stream # 03056072. Note that incinerator unit is closed and no longer handles this stream. Update the NOR for the correct waste management units.

2. 30 Texas Administrative Code (TAC) 335.69(a)(2)/40 Code of Federal Regulations (CFR) 262.34(a)(2) - Accumulation time (Category C3)

o During the inspection on November 30, 1998, a container located at the container storage area identified by NOR # 165 was without the required date. The container was storing hazardous waste from the resin plant area.

3. 30 Texas Administrative Code (TAC) 335.69(a)(3)/40 Code of Federal Regulations (CFR) 262.34(a)(3) - Accumulation time (Category C3)

o During the inspection on November 30, 1998, a container located at the container storage area identified by NOR # 164 was without the required label. The container was noted to have hazardous waste from the laboratory.

4. 30 TAC 335.221 (a)(8)/40(CFR) 266.103(a)(4)(ii) incorporating 265.15 (b)(1)-(4) - General Inspection Requirements (Category C3)

o The inspection plan found in the Part B application was reviewed. The plan submitted to the Permitting Section of the Industrial and Hazardous Waste Division in Austin did not include the inspection forms which itemize the types of problems to be looked at during the routine inspection.

5. Permit Section VI.A.2/ 30 Texas Administrative Code (TAC) 335.152(a)(1) incorporating 40 Code of Federal Regulations (CFR) 265.15 (d)-General Inspection Requirements (Category C3)

o The facility inspection logs for the permitted landfill identified by NOR unit # 159 were reviewed. The inspection form used by an operator, see **Attachment 3**, called for specific information concerning amount of leachate collected in the primary and secondary system. Several logs contained totalizer readings or comment like "not applicable, N/A". However, volumetric numerical values indicating the amount of leachate collected were missing.

VI. OTHER ISSUES

During the inspection conducted on November 30, and December 3, 9, and 10, 1998, the following issues were noted and remain unresolved:

1. Potential unauthorized discharge: During the inspection on November 30, 1998, a contractor was conducting the pipe painting job in open air. The solvent based paints were being used for this job. Although the job was being performed on the concrete pad with a collection sump, the job location appeared to be far from the sump. No curbing is provided for the concrete pad and it appeared that storm water run-off from the noted location would partially flow towards the adjacent road. The concern here is the possibility of contaminated storm running on to the unpaved road side area.

2. Inspection log, Waste pile: The interim status waste pile identified by NOR unit #154 was being inspected on a monthly basis. Although the current regulations do not specify the frequency for inspection, revised Part B application calls for a weekly inspections. Consequently, inspections should be conducted on the weekly basis.

3. Label for ground water monitoring well: During the inspection on November 30, 1998, a ground water monitoring system well, which was noted to be GW17R by the facility personnel, did not have an identifying label. Although, this well is not listed under the Compliance Plan, it should be properly labeled.

4. Biosolids handling: In accordance with the present NOR, waste stream # 03056072 is identified as " biosolids, nonhazardous, from refinery and chemical process units waste water treaters". Since the refinery treater receives waste water carrying EPA codes (F037- landfill leachate, K022-phenol heavy ends), it follows that the refinery biosolids will carry the identical EPA codes since the solids are derived from the noted waste water. Consequently, the waste stream # 03056072 containing mixture of solids will be also considered to be hazardous. However, the plant personnel indicated that refinery biosolids are not mixed with the chemical plant biosolids. Appropriate documentation to support this statement should be submitted to the Region 12-Houston Office for further review.

This is submitted for file information.

Signed: _____
Aron Athavaley
Field Investigator

Approved: _____
Nicole M. Bealle
Team Leader, Waste Section
Region 12- Houston

NMB/ASA

John Hall, *Chairman*
Pam Reed, *Commissioner*
R. B. "Ralph" Marquez, *Commissioner*
Dan Pearson, *Executive Director*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

July 14, 1995

Mr. J. W. Holden, Manager
Environmental Compliance
Shell Oil Company
Deer Park Manufacturing Complex
P.O. Box 100
Deer Park, TX 77536

Re: Shell Oil Company - Deer Park Complex
SWR No. 30007 / EPA I.D. No. TXD067285973
RCRA Ground-Water Monitoring System Operational & Maintenance Inspection (O&M)

Dear Mr. Holden:

On May 3, 1995 Kathy McCormick of the TNRCC Region 12 Office in Houston conducted a RCRA Ground-Water Monitoring System Operational & Maintenance Inspection at the above referenced facility. At the time of the inspection the facility was conducting quarterly sampling at three waste management areas. During the O&M and subsequent central office review no violations were found.

If you have any questions regarding these matters, please contact Charles Burner of the Industrial and Hazardous Waste Enforcement Section at (512) 239-2365.

Sincerely,

Thomas E. Jecha, Team Leader
Groundwater Enforcement Team 1
Enforcement Section
Industrial and Hazardous Waste Division

cc: Kathy McCormick, TNRCC Region 12 Office - Houston

TEJ/CCB/ccb

17 009

Texas Natural Resource Conservation Commission

INTEROFFICE MEMORANDUM

To: Susan D. Bredehoeft Date: June 1, 1995
Industrial and Hazardous Waste Liaison
Field Operations Division

Thru: Ernest Heyer, Field Operations Division

From: Kathy McCormick, Field Investigator
Industrial and Hazardous Waste Section
Region 12 - Houston

Subject: SHELL OIL COMPANY - DEER PARK COMPLEX
TNRCC Reg. No. 30007; HW Permit No. 50099-001
EPA Identification No. TXD067285973
Compliance Monitoring Evaluation (CME) conducted on May 3, 1995

I. Introduction

On May 3, 1995, Kathy McCormick, Field Investigator of the TNRCC Region 12 Industrial and Hazardous Waste Section conducted a Compliance Monitoring Evaluation (CME) at the subject facility. Marty Sanderlin, Field Investigator of the TNRCC Region 12 Office was also present during the May 3, 1995 inspection. Shell Oil Company was represented during the inspection by Ken Springer, Environmental Engineer and Ron Turpin, Environmental Technician, both employed by Shell Oil Company.

The Shell Deer Park facility is located on a 1600 acre tract in Harris County, north of State Highway 225, approximately one mile west of State Highway 134 in Deer Park. The Shell facility is located in the drainage area of Segment 1006 of the San Jacinto River Basin and consists of an oil refinery and chemical manufacturing units. The refinery has been operational since 1929 and produces gasoline, fuels, lubricants, waxes and feedstocks for the chemical plant. A variety of petrochemicals including chlorinated organics, plastics, resins and solvents are produced within the chemical plant which has been in operation since 1948. Land use within the immediate area is heavy industrial and commercial.

Shell was granted a post closure care permit and associated compliance plan by the Texas Water Commission (now TNRCC) on November 1, 1988. Groundwater monitoring plans for each of the Waste Management Areas were developed under an August 6, 1987 Agreed Order between Shell and the TNRCC. On March 17, 1995 Shell submitted a request to modify their compliance plan, this request

is currently under review by the TNRCC Industrial and Hazardous Waste Permit Section. A public hearing regarding the compliance plan Class 3 modification was held at the Shell Deer Park complex on April 24, 1995.

Under the terms of Compliance Plan 50099 ground water monitoring is required at two (2) active waste management areas, the Southeast Waste Management Area (SEWMA) and the Northeast Waste Management Area (NEWMA). Detection Monitoring is conducted at the Southwest Waste Management Area (SWWMA), all waste units in this area have been closed. Voluntary corrective action is currently being conducted by Shell at three additional areas within the Shell Deer Park Complex; VCM Area, Historical Oil Patch and the Cumene Recovery Trench.

A hydrogeological assessment of the NEWMA was finalized in October, 1988. This assessment identified three stratigraphic zones consisting of a permeable layer composed of sand, silty sand and clayey sand. Zone one (1) is identified as the "Shallow Sand" and is encountered between 18 feet MSL and -10 feet MSL, original fill material used during construction and expansion of the Houston Ship Channel industrial complex comprises much of the soil materials encountered in Zone one (1). All corrective action and compliance monitoring wells, with the exception of one well (21T) located in the VCM Area, are completed in Zone 1. Zone two (2) is identified as the "Intermediate Sand" and ranges in depth between -11 feet MSL and -30 feet MSL. Zone three (3) is identified as the "Deep Sand" and ranges in depth between -45 feet MSL and -60 feet MSL. An additional thin sand has been encountered in several borings located in the Site 103 area of the NEWMA but does not appear to be contiguous within the NWWMA. Hydraulic gradient is generally to the north (Houston Ship Channel) and to the east (Patrick's Bayou).

II. Existing Groundwater Monitoring Systems

Southeast Waste Management Area

Included in the SEWMA are the Well 270 - Basins Area and the Well 279 - Cells Area. A compliance groundwater monitoring program is required by permit in the Well 270 area which is an active waste management unit. Corrective action is currently underway in the Well 279 area to address concentrations of organic constituents from earlier (pre - RCRA) waste management activities.

The Well 270 Basins Area consists of three active biotreater surface impoundments permitted for the storage and treatment of industrial wastewater containing organic compounds . Processing

functions are limited to aerobic biological treatment. The impoundments are identified as follows:

Activated Sludge Biotreater East - Permit No. 2 - NOR No. 38
Activated Sludge Biotreater Middle - Permit No. 3 - Nor No 39
Activated Sludge Biotreater West - Permit No. 3 - NOR No. 40

A hydrogeologic investigation conducted by Shell in 1988 and a Phase II groundwater quality investigation conducted in 1989 delineated the contaminant plume in the area, just south of the basins area. Contaminants identified include benzene, toluene and phenol. Approval of the corrective action plan for the SEWMA was granted by the TNRCC on March 13, 1990. Approximately 1 GPM is being recovered by Well No. 10-R. Recovery operations began on November 23, 1990, total volume pumped to date is 1,908,000 gallons.

Final approval of the corrective action plan for the Well 279 Area was granted by the TNRCC on September 6, 1991. The Well 279 Area is not included in the Part B permit application and was closed (pre - RCRA) In 1987. Four cells; A, B, C, and D are included in the area and were originally utilized as Surface Impoundments for stormwater runoff. Cell C, NOR Unit No. 37 was also used for the collection of chemical plant wastewater. Previous waste management units included in the vicinity of the Well 279 area are a storm sewer impoundment and two Solids Surge Lagoons originally used for the storage of primary solids containing chlorinated organics. Contaminants identified and defined include benzene and chlorinated constituents.

Groundwater is being recovered from Recovery Well No. 12R at a rate of 1/4 gallon per minute. Recovery began on January 10, 1992 and to date approximately 332,000 gallons have been recovered.

Northwest Waste Management Area

Included in the NEWMA are Sites 101, 102, 103, 104 and the Decant Pond. Post closure compliance is being conducted at sites 101, 102, 103 and the Decant Pond. These closed units are all contiguous in the NEWMA. Groundwater monitoring is required at Site 104 under the terms of the permit.

Site 101, NOR Unit No. 001; Site 103 NOR Unit No. 005 and the Decant Pond, NOR Unit No. 011 are closed as landfills in accordance with closure plans approved by the TNRCC. Site 102, Permit Facility No. 1, NOR Unit No. 004 has also been closed as a landfill however, closure certification from the TNRCC has not been acknowledged since submittal on October 11, 1991.

A groundwater quality investigation report for the area adjacent to Site 102 was finalized in June, 1993 and determined that low levels of benzene and other volatile constituents were present in the groundwater. Corrective action began at Site 102 in August 28, 1991, approximately 16,200 gallons of water have been removed since that date. Groundwater is evacuated by vacuum truck daily from Monitor Wells #516, #517 and #518.

Sites 101, 102 and 103 were originally classified as surface impoundments but have been operated as landfills. Waste streams include chlorinated organics, spent catalyst, asbestos, caustic waste, amines, butyl alcohol liquid waste, oily sludges, petroleum contaminated soils and other hazardous and nonhazardous waste. The Decant Pond was used to collect surface runoff and lechate collected from Sites, 101, 102, 103 and 104.

Site 104, Permit Facility No. 6, NOR Unit No. 159, currently utilized as a landfill is constructed on the site of closed Primary Solid Lagoons (PSL) 1, 2 and 3. Closure of PSL 1, 2, and 3 was accepted by the TNRCC with the provision that groundwater monitoring requirements are to be satisfied during the 30 year post closure period. The post closure monitoring requirements for the landfill will extend at least 10 years beyond that for the PSLs.

Waste streams included primary solids containing chlorinated organics, spent catalyst and chemical plant slurries. Residual liquid waste was decanted and treated biologically in the Decant Pond. Wet solids were removed and placed in Site 103.

The Site 104 Landfill, also referred to as the MTR Landfill, consist of three cells and was placed into service in February, 1991. Total surface area of the cells cannot exceed 17.0 acres and total capacity of 338,000 cubic yards of waste per Permit Provision II.B.6.

A Corrective Action Plan for Cell 3 of the Site 104 Landfill was granted approval by the TNRCC on September 6, 1991. Groundwater recovery from Well 13-R began on January 9, 1992 at a rate of 1 gallon per minute. Approximately 1,3690,000 gallons have been recovered to date. Well 14-R was placed in service on June 3, 1993 and has recovered approximately 860,000 gallons of water.

Southwest Waste Management Area

The Southwest Waste Management Area is comprised of the Beltway Lagoon, NOR Unit No. 61 and has been constructed on sites 201, 202 and 150 which previously operated as landfills and were closed

prior to RCRA. This area, however is subject to a RCRA Facility Investigation (RFI) under Permit Provision IX.A.3.

The Beltway Lagoon area operated as a surface runoff collection pond which was closed in September 1989. Prior to usage as a collection pond, soils and materials generated during construction projects at the Shell Facility were placed in sites 201, 202 and 150. A Groundwater Detection Monitoring Plan, part of the postclosure care requirements, was approved for the Beltway Lagoon area on May 20, 1989 by the TWC. The post closure care period remaining is 25 years. Analytical results from wells in the area show elevated total organic carbon and total organic chlorides.

VCM Area

Voluntary corrective action involving recovery of Vinyl Chloride Monomers is currently being conducted in this area. A groundwater investigation conducted in 1987, identified chlorinated organic constituents in the shallow groundwater. The extent of impact was defined by during the 1987 investigation. Four wells, Nos. 248, 250, 257, 260, completed in the shallow zone and one well, No. 21-T, completed in the Intermediate Sand are being used to recover product from the groundwater. All wells are pumped on a continuous basis using air driven pulse pumps. The flow rate for the shallow wells is about 1 gallon per minute, flow rate for the intermediate zone is about 3 gallons per minute. Water from the wells is routed to the VCM sump located in the VCM Unit.

A system of observation wells is used to monitor the effectiveness of the recovery system. Groundwater elevation are used to validate the effectiveness of the recovery system.

Historic Oil Patch

Recovery of oil floating on the shallow groundwater has been underway in the central part of the refinery for many years. First attempts to recover oil were initiated in 1957 and expanded in 1980. An extensive array of observation wells defined the extent and thickness of the oil plume and established the recovery program.

Originally six wells were used to recover the oil, current recovery involves three wells (3R, 4R, 8R). Maximum product thickness prior to installation of the recovery system was 8 feet. As of January, 1994 maximum oil thickness was 3.8 feet.

A comparison of plume profiles, constructed annually indicate a significant reduction in area and volume of impact. Semi-annual measurements of groundwater elevations and product thickness indicate free phase product appears to be localized into three areas. Approximately 8,000 gallons of water is pumped a day with an annual recovery rate of 3,000,000 gallons. Shell is currently projecting an additional five (5) years of intensive recovery operations.

Cumene Recovery Trench

Cumene in the shallow zone was discovered in May 1993 near the vicinity of tank G-331. Corrective measures involved the installation of an interceptor trench, approximately 130 feet in length on September 24, 1993.

Approximately 1,180,00 of water which contained 4,600 gallons of cumene have been recovered by wells, 15R and 16R since 1993. Recovered water and cumene are routed to a product recovery system. Shell projects five years of contaminant recovery will be necessary for completion of the project.

III. RCRA Facility Investigation

Under the terms of the Permit, Shell was required to submit a RFI work plan to determine the extent of any hazardous constituents for units listed in Provisions IX.A.1. through IX.A.4. and IX.A.7 which are included in the waste management areas designated by the agreed order signed by the TNRCC and Shell Oil Company on August 26, 1987. Units included in this investigation are:

NOR Unit No. 57	Landspreading Area
NOR Unit No. 59	Land Treatment-Site 203
NOR Unit No. 60	Landfill-Sites 201 and 202
NOR Unit No. 62	Surface Impoundment
NOR Unit No. 79	Surface Impoundment

Shell submitted their RFI workplan to the TNRCC in 1989. Revisions to the original plan were submitted by Shell in August, 1989 and March, 1993. Shell is currently awaiting approval from the TNRCC on the current revision to the RFI Plan.

IV. Inspection Procedures and Observations

During the May 3, 1995 inspection, monitor wells MW-506, MW-517 and MW-518 located in the Northeast Waste Management Area (NEWMA) Site 102 were co-sampled by the TNRCC. MW-506 is one of the upgradient

observation well for the NEWMA. There are only three designated upgradient wells for the NEWMA. The other designated upgradient wells are MW-505 and MW-519. MW-517 and MW-518 are Point of Compliance wells for the Site 102 area of the NEWMA.

Groundwater samples were collected to be analyzed for volatiles, semi-volatiles and total heavy metals. All heavy metals samples were filtered in the field. Shell recovered an additional sample for Total Organic Carbon and Benzene for each well.

Historically significant volatiles contaminants measured in the NEWMA are: acetone, benzene, ethylbenzene, methylethyl keytone, toluene, and xylene. Historically significant semi-volatiles measured are phenol and 2,4-dimethylphenol. The inorganic constituents, arsenic was reported in MW-518 a few times but has never exceeded twice the MCL.

Shell utilizes dedicated bladder pumps for all monitor wells located within the waste management areas (NEWMA, SEWMA) requiring quarterly compliance monitoring or corrective action. All wells located in these waste management areas are constructed of 6" PVC casing.

All wells within the referenced waste management areas are purged to dryness or at least three casing volumes. A vacuum truck is used to evacuate the wells, usually 24 hours prior to the scheduled sampling event. During the inspection Shell personnel were observed to be following the Permit-approved sample collection procedures, utilizing appropriate containers, preservatives and approved chain of custody procedures.

IV. Summary of Violations

During the CME, no violations were observed.

V. Recommendations

It is recommended Shell contact Steve Omo, of the Groundwater Permits Group regarding a change in collection procedures of Semi-Volatiles. Shell under their current Sampling and Analysis Plan is required to collect all organic samples at a flow rate not to exceed 100 milliliters per minute. Collection of semi-volatile samples under the reduced flow rate greatly increases the amount of time required for well sampling.

This information is submitted as file data.

Signed: Kathy McCormick
Kathy McCormick, Field Investigator

Approved: Billie C. Zaporteza
Billie Zaporteza, Team Leader
Industrial and Hazardous Waste Section
Waste Program
Region 12 - Houston

BCZ/KPM

Attachments

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IHW020 *** TEXAS NATURAL RESOURCE CONSERVATION COMMISSION *** Page: 1

Notice of Registration Date: 11/01/00

Industrial and Hazardous Waste

30007 Shell Oil Company

Solid Waste Registration Number: 30007 EPA Id: TXD067285973

Company Name: Shell Oil Company
Site Name: Shell Oil Company - Deer Park
Site Location: 5700 State Hwy 225, Deer Park, TX
Contact: Wendel, Janice

Region: 12
County: 101 Harris
Title: Senior Engineer

Initial Registration Date: 02/14/1975
Last Amendment Date: 10/12/2000
Last Date NOR Computer update: 10/13/2000
Phone: 713-246-1068

Mailing Address: P. O. Box 100
Deer Park, TX 77536-

Site Street Address: 5700 State Hwy 225
Deer Park, TX 77536

Registration Status: Active HW Permit #: 50099 Reporting Method: STEERS
Registration Type: Generator Receiver
Generator Type: Industrial Hazardous Waste Generation Status: Large Quantity Generator
This registration has the following merged registrations: 30700, 50099

Business Description: 2869 (Industrial Organic Cheimcals, nec)

Primary SIC Code: 2911 Petroleum Refining
Handler Status:

Operator Information
Name:
Phone:
Address:

Owner Information
Name:
Phone:
Address:

As of 10/12/2000 - the next unassigned sequence number for WASTES is 8040 and
the next unassigned sequence number for UNITS is 180.

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30007 Shell Oil Company

**** WASTE INFORMATION ****

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio- active	TNRCC Audit Complete

****** Active Wastes ******

0001203H H Active 06/30/94 On/Off No No
Description from Generator: Acetonitrile (methyl cyanide), spent, from isoprene and butadiene recovery units
Refers to waste code (6): 993003
Form Code: 203 Non-halogenated solvent
EPA Hazardous Waste Numbers: D001 D018 U003
Current Management Units: Contain Store Area 167
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment A37 Spent process liquids removal
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Acetonitrile, Spent

00024031 1 Active 06/21/94 On No No
Description from Generator: Polybutadiene from butadiene production unit
Refers to waste code (6): 181110
Form Code: 403 Solid resins or polymerized organics
Current Management Units: Waste Pile 155
Landfill 159
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Polybutadiene

00034031 1 Active 05/01/97 On No No
Description from Generator: DEA Polymer
Form Code: 403 Solid resins or polymerized organics
Current Management Units: Waste Pile 155
Landfill 159
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): DEA Polymer

00042191 1 Active 05/22/97 On No No
Description from Generator: Butadiene Heavy Ends
Form Code: 219 Other organic liquids
Current Management Units: Boiler 145 146 148 179
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Butadiene Heavy Ends

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

0005403H H Active 07/05/00 No No

Description from Generator: IRU Polymer
Form Code: 403 Solid resins or polymerized organics
EPA Hazardous Waste Numbers: D001
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): 0005403H

01012191 1 Active 01/19/94 On/Off No No

Description from Generator: Resin waste from resin manufacturing processes. Includes off spec. resins and resin curing agents, all are non hazardous
Refers to waste code (6): 111380
Form Code: 219 Other organic liquids
Current Management Units: Waste Pile 155
Landfill 159
Contain Store Area 165 167
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up

0102219H H Active 01/19/94 On/Off No No

Description from Generator: Resin waste from resin manufacturing processes. Includes offspec resins and resin curing agents, all are hazardous.
Refers to waste code (6): 913700
Form Code: 219 Other organic liquids
EPA Hazardous Waste Numbers: D001 D035
Current Management Units: Contain Store Area 165 167
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
* Source Codes: A57 Discarding off-spec material A53 Cleanup of spill residues
A58 Discarding out-of-date products or chemicals
* Measurement Points: 1 Before mixing
* SIC Codes: 2821 Plastic Materials, Synthetic Resins & Elastomers

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01034031 1 Active 01/19/94 On/Off No No

Description from Generator: Resin waste from resin manufacturing processes. Includes offspec resins and resin curing agents all are nonhazardous.
Refers to waste code (6): 114720
Form Code: 403 Solid resins or polymerized organics
Current Management Units: Waste Pile 155
Landfill 159
Contain Store Area 165 167
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

0104403H H Active 01/19/94 On/Off No No
Description from Generator: Resin waste from resin manufacturing processes. Includes offspec resins and resin curing agents all are hazardous.(Ign.)
Refers to waste code (6): 913700
Form Code: 403 Solid resins or polymerized organics
EPA Hazardous Waste Numbers: D001 D035
Current Management Units: Contain Store Area 165 167
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
* Source Codes: A57 Discarding off-spec material A53 Cleanup of spill residues
A58 Discarding out-of-date products or chemicals
* Measurement Points: 1 Before mixing
* SIC Codes: 2821 Plastic Materials, Synthetic Resins & Elastomers

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02014031 1 Active 06/21/94 On No No
Description from Generator: Solid bis-phenol acetone waste from bis-phenol acetone production unit
Refers to waste code (6): 183050
Form Code: 403 Solid resins or polymerized organics
Current Management Units: Waste Pile 155
Landfill 159
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
Company's Internal Code(s): BPA Solids

02022191 1 Active 06/21/94 On No No
Description from Generator: Bis-phenol acetone/phenol waste liquid mixture from bis-phenol acetone production unit
Refers to waste code (6): 183050
Form Code: 219 Other organic liquids
Current Management Units: Waste Pile 155
Boiler 145 146 147 148 179
Landfill 159
Tank (Surface) 024
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
Company's Internal Code(s): BPA Liquid, Nonhazar

0203219H H Active 06/21/94 Off No No
Description from Generator: Bis-phenol acetone/phenol/acetone waste liquid mixture from bis-phenol acetone production unit
Refers to waste code (6): 913700
Form Code: 219 Other organic liquids
EPA Hazardous Waste Numbers: D001
Current Management Units: None
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
* Source Codes: A09 Clean out process equipment A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2821 Plastic Materials, Synthetic Resins & Elastomers
Company's Internal Code(s): BPA Liquid, Hazardou

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

02041021 1 Active 06/21/94 On No No
Description from Generator: NaCl brine from bisphenol acetone production unit, contains trace hydrocarbons
Refers to waste code (6): 100510
Form Code: 102 Aqueous waste with low other toxic organics
Current Management Units: Injection Well 010
Tank 041
Tank (Surface) 045
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): NaCl brine w/ trace

0301116H H Active 06/21/94 On/Off No No
Description from Generator: Landfill leachate from onsite hazardous waste landfill
Refers to waste code (6): 905950
Form Code: 116 Leachate - (inorganic)
EPA Hazardous Waste Numbers: F039
Current Management Units: Contain Store Area 177
* Origin Codes: 5 Onsite haz waste mgmt 3 From non-haz waste mgmt
* System Types: 132 Landfill
* Source Codes: A79 Leachate collection
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Landfill leachate

0303205H H Active 06/21/94 On/Off No No
Description from Generator: DAF unit float skim and bottoms from refinery wastewater treater
Refers to waste code (6): 950400
Form Code: 205 Oil-water emulsion or mixture
EPA Hazardous Waste Numbers: D018 K048
Current Management Units: Tank (Surface) 068 069 163
* Origin Codes: 1 Onsite-process/service
* Source Codes: A75 Wastewater treatment
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining
Company's Internal Code(s): DAF float and bottom

0304207H H Active 06/21/94 On/Off No No
Description from Generator: API skimmings from chemical process units' wastewater treater
Refers to waste code (6): 909390
Form Code: 207 Concentrated aqueous solution of other organics
EPA Hazardous Waste Numbers: D001 D018 D035
Current Management Units: WWTP 017
* Origin Codes: 1 Onsite-process/service
* Source Codes: A75 Wastewater treatment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified 2821 Plastic Materials, Synthetic Resins & Elastomers
Company's Internal Code(s): API skimmings - SET

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

03056072 2 Active 06/21/94 On/Off No No
Description from Generator: Biosolids, nonhazardous, from refinery and chemical process units' wastewater treaters
Refers to waste code (6): 249890
Form Code: 607 Biological treatment sludge (organic)
Current Management Units: Contain Store Area 178
WWTP 017 042 149
Tank (Surface) 019
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Biosolids, nonhazard

0307503H H Active 06/21/94 On/Off No No
Description from Generator: CPI sludge from refinery wastewater treater
Refers to waste code (6): 941520
Form Code: 503 Inorganic wastewater treat sludge w/toxic organics
EPA Hazardous Waste Numbers: D007 D008 D009 D018 F037 K048
Current Management Units: Landfill 159
* Origin Codes: 1 Onsite-process/service
* Source Codes: A75 Wastewater treatment A76 Sludge dewatering
* Measurement Points: 2 After mix (haz. only)
* SIC Codes: 2911 Petroleum Refining
Company's Internal Code(s): Primary solids, refi

03085031 1 Active 06/30/94 On No No
Description from Generator: API basin sludge from chemical plant wastewater treater
Refers to waste code (6): 141520
Form Code: 503 Inorganic wastewater treat sludge w/toxic organics
Current Management Units: Waste Pile 155
Landfill 159
Tank (Surface) 128
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Primary Solids, Chem

0309205H H Active 10/04/94 On/Off No No
Description from Generator: IGF float generated from refinery wastewater induced gas floatation units.
Form Code: 205 Oil-water emulsion or mixture
EPA Hazardous Waste Numbers: D018 F038
Current Management Units: Tank (Surface) 173
* Origin Codes: 1 Onsite-process/service
* Source Codes: A75 Wastewater treatment
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining
Company's Internal Code(s): IGF Unit Float

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

0310503H H Active 10/04/94 On/Off No No
Description from Generator: CPI sludge from refinery wastewater benzene neshap pretreatment unit
Form Code: 503 Inorganic wastewater treat sludge w/toxic organics
EPA Hazardous Waste Numbers: D018 F037
Current Management Units: WWTP 172
* Origin Codes: 1 Onsite-process/service
* Source Codes: A75 Wastewater treatment
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining
Company's Internal Code(s): Primary Solids, Benz

0312102H H Active 12/21/98 On No No
Description from Generator: Groundwater, hazardous
Form Code: 102 Aqueous waste with low other toxic organics
EPA Hazardous Waste Numbers: D018 D028 D043
Current Management Units: WWTP 017 065
* Origin Codes: 7 Cor action/closure
* Source Codes: A69 Other remediation
* Measurement Points: 4 After mix(haz & nonhaz)
* SIC Codes: 2911 Petroleum Refining 2865 Cyclic Crudes & Cyclic Intermediates, Dyes, Etc
Company's Internal Code(s): Groundwater, haz

03131021 1 Active 12/21/98 On No No
Description from Generator: Groundwater, nonhazardous
Form Code: 102 Aqueous waste with low other toxic organics
Current Management Units: WWTP 017 065
* Origin Codes: 7 Cor action/closure
Company's Internal Code(s): Groundwater, nhaz

03146071 1 Active 03/17/99 On/Off No No
Description from Generator: Biosolids, nonhazardous, from refinery wastewater treater
Form Code: 607 Biological treatment sludge (organic)
Current Management Units: Landfill 159
WWTP 065
Tank (Sub-surface) 072 073
* Origin Codes: 1 Onsite-process/service

03152071 1 Active 12/01/99 On/Off No No
Description from Generator: API Skim from SET, Nonhazardous
Form Code: 207 Concentrated aqueous solution of other organics
Current Management Units: Contain Store Area 167 177
* Origin Codes: 3 From non-haz waste mgmt
Company's Internal Code(s): API Skim, Nonhaz

05013932 2 Active 06/30/94 On/Off No No
Description from Generator: Catalyst from cat cracker unit, spent
Refers to waste code (6): 371310
Form Code: 393 Catalyst waste (inorganic solid)
Current Management Units: Surface Impoundment 132
Landfill 159
WWTP 017

0247

Tank (Surface) 128

17 025

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Catalyst, CCU Spent

0601219H H Active 06/21/94 Off No No
Description from Generator: Epichlorohydrin finishing unit light ends and heavy ends
Refers to waste code (6): 910141
Form Code: 219 Other organic liquids
EPA Hazardous Waste Numbers: D001 K017
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A33 Product distillation
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified 2821 Plastic Materials, Synthetic Resins & Elastomers
Company's Internal Code(s): ECH light & heavy en

0602516H H Active 06/21/94 Off No No
Description from Generator: Tank bottom sludge containing epichlorohydrin heavy ends (still bottoms)
Refers to waste code (6): 949610
Form Code: 516 Chloride or other brine sludge
EPA Hazardous Waste Numbers: K017
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A38 Tank sludge removal
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified 2821 Plastic Materials, Synthetic Resins & Elastomers
Company's Internal Code(s): Tank bottoms, ECH

0604207H H Active 07/26/00 No No
Description from Generator: 1,2,3 trichloropropane from tank cleanout with ECH
Form Code: 207 Concentrated aqueous solution of other organics
EPA Hazardous Waste Numbers: D001 U041
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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0607207H H Active 09/30/99 On/Off No No
Description from Generator: Epichlorohydrin liquid
Form Code: 207 Concentrated aqueous solution of other organics
EPA Hazardous Waste Numbers: D001 U041
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service
* Source Codes: A94 Laboratory wastes
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): ECH Liquid

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

07013891 1 Active 06/21/94 On/Off No No

Description from Generator: Sandblasting grit, spent, nonhazardous. Per a notification dated April 10, 1997 (accompanied by a April 14, 1997 cover letter), the generator has notified the TNRCC that they intend to recycle this waste "into road products" (i.e., TXDOT "Spec Item 247 and 276) at the Southern Crushed Concrete, Inc . in Housont, Texas.
Refers to waste code (6): 170770
Form Code: 389 Nonhazardous sandblasting waste (inorganic solid)
Current Management Units: Waste Pile 160 161 171
Landfill 159
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): *Sandblasting Grit, N*

0704209H H Active 01/19/94 On/Off No No

Description from Generator: Paint liquids waste materials.
Refers to waste code (6): 910650
Form Code: 209 Organic paint, ink, lacquer, or varnish
EPA Hazardous Waste Numbers: D001 D005 D035 F002 F003 F005
Current Management Units: Contain Store Area 158 165
Distill/Solv Recovery 157 175
* Origin Codes: 1 Onsite-process/service
* Source Codes: A21 Painting
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified

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0705409H H Active 01/19/94 On/Off No No

Description from Generator: Paint solids waste materials. B409-paint waste solids.
Refers to waste code (6): 910650
Form Code: 409 Other non-halogenated organic solids
EPA Hazardous Waste Numbers: D001 D005 D035 F002 F003 F005
Current Management Units: Contain Store Area 158 165
Distill/Solv Recovery 157 175
* Origin Codes: 1 Onsite-process/service
* Source Codes: A21 Painting
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2992 Lubricating Oils & Greases

---

07063111 1 Active 06/30/94 On/Off No

Description from Generator: Asbestos debris generated from demolition and maintenance activities.
Refers to waste code (6): 170750
Form Code: 311 Asbestos solids and debris
Current Management Units: Landfill 159
Contain Store Area 166
Misc Store Container 169
* Origin Codes: 1 Onsite-process/service

07083901 1 Active 12/08/94 On/Off No No

Description from Generator: Manmade mineral fiber (MMMF) insulation
Form Code: 390 Non-haz concrete, cement, construction debris
Current Management Units: Landfill 159
Contain Store Area 166
Misc Store Container 174

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio- active	TNRCC Audit Complete

****** Active Wastes ******

* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
Company's Internal Code(s): Manmade mineral fibe

07113901 1 Active 07/08/97 On/Off No No
Description from Generator: CONCRETE/CONSTRUCTION DEBRIS. Waste will be recycle into TXDOT spec items nos. 247 and 276.
Form Code: 390 Non-haz concrete, cement, construction debris
Current Management Units: Waste Pile 176
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): CONCRETE/DEBRIS

08013192 2 Active 06/21/94 On/Off No Yes
Description from Generator: Sulfur waste/scrap from sulfur recovery unit
Refers to waste code (6): 270240
Form Code: 319 Other waste inorganic solids
Current Management Units: Waste Pile 155
Landfill 159
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
Company's Internal Code(s): Sulfur Waste/Scrap

09010031 1 Active 01/19/94 On/Off No No
Description from Generator: Lab packs nonhazardous mixed.
Refers to waste code (6): 178400
Form Code: 003 Mixed lab packs
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service

0902003H H Active 01/19/94 On/Off No No
Description from Generator: Lab packs, hazardous mixed.
Refers to waste code (6): 978400
Form Code: 003 Mixed lab packs
EPA Hazardous Waste Numbers: D001 D002 D003 D009
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service
* Source Codes: A94 Laboratory wastes
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified

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0903103H H Active 01/19/94 On/Off No No
Description from Generator: Spent acid containing mercury salts generated from laboratory testing.
Refers to waste code (6): 905050
Form Code: 103 Spent acid with metals
EPA Hazardous Waste Numbers: D001 D002 D009 D011
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service
* Source Codes: A94 Laboratory wastes
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

1701301H H Active 01/15/98 On/Off No No
Description from Generator: Soil contaminated with a listed commercial chemical product
Form Code: 301 Soil contaminated with organics
EPA Hazardous Waste Numbers: U002 U031 U041 U055 U140 U161 U165 U188
Current Management Units: Contain Store Area 165 167
* Origin Codes: 2 Spill clean-up
* Source Codes: A69 Other remediation A51 Leak collection
A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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1702208H H Active 06/21/94 On/Off No No
Description from Generator: Phenol heavy ends (distillation bottoms)generated from the production of phenol and acetone from cumene
Refers to waste code (6): 919440
Form Code: 208 Concentrated phenolics
EPA Hazardous Waste Numbers: D001 K022
Current Management Units: Boiler 145 146 147 148 179
Contain Store Area 165
Tank (Surface) 048 049 051 052
* Origin Codes: 1 Onsite-process/service
* Source Codes: A33 Product distillation
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified 2821 Plastic Materials, Synthetic Resins & Elastomers
Company's Internal Code(s): Phenol heavy ends

1703393H H Active 06/21/94 On/Off No No
Description from Generator: Aluminum chloride, anhydrous, used as a catalyst in phenol acetone production unit
Refers to waste code (6): 973850
Form Code: 393 Catalyst waste (inorganic solid)
EPA Hazardous Waste Numbers: D003
Current Management Units: Contain Store Area 165
* Origin Codes: 2 Spill clean-up 1 Onsite-process/service
* Source Codes: A53 Cleanup of spill residues A51 Leak collection
A55 Filter/Battery replacement
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified 2821 Plastic Materials, Synthetic Resins & Elastomers
Company's Internal Code(s): Aluminum chloride, a

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

1704208H H Active 06/21/94 On/Off No No
Description from Generator: Phenolic liquid waste from loading drips and spills
Refers to waste code (6): 910230
Form Code: 208 Concentrated phenolics
EPA Hazardous Waste Numbers: U188
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
* Source Codes: A51 Leak collection A09 Clean out process equipment
A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Phenolic Liquid Wast

1705114H H Active 05/15/97 Off No No
Description from Generator: Washwater w/residue from combustion of phenol heavy ends
Form Code: 114 Other aqueous waste with low dissolved solids
EPA Hazardous Waste Numbers: K022
Current Management Units: None
* Origin Codes: 5 Onsite haz waste mgmt
* System Types: 051 Energy recovery - liquids
* Source Codes: A09 Clean out process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Washwater w/K022 Ash

1706319H H Active 12/01/97 Off No No
Description from Generator: Debris contaminated with K022 waste
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: K022
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): K022 cont. debris

1707606H H Active 04/28/99 On/Off No No
Description from Generator: EX-76 Tank Bottoms. This is a one-time generated waste from a storage tank cleanout.
This code will become inactive as
Form Code: 606 Resins, tars, or tarry sludge
EPA Hazardous Waste Numbers: D001 U055 U188
Current Management Units: Misc Store Container 174
* Origin Codes: 1 Onsite-process/service
* Source Codes: A38 Tank sludge removal
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete
****** Active Wastes ******						
5202602H	H	Active	04/27/00	On/Off	No	No

Description from Generator: Spent sulfolane sludge, contains benzene
Form Code: 602 Still bottoms of non-halogentd solvnts/organic liq
EPA Hazardous Waste Numbers: D018
Current Management Units: Contain Store Area 165 167 177
* Origin Codes: 1 Onsite-process/service
* Source Codes: A60 Sludge removal
* Measurement Points: 1 Before mixing
* SIC Codes: 2865 Cyclic Crudes & Cyclic Intermediates, Dyes, Etc
Company's Internal Code(s): Sulfolane Sludge

60033011 1 Active 06/21/94 On No No
Description from Generator: Media contaminated with process chemicals, nonhazardous
Refers to waste code (6): 177720
Form Code: 301 Soil contaminated with organics
Current Management Units: Waste Pile 155
Landfill 159
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
Company's Internal Code(s): Media, chemical cont

6004219H H Active 10/05/95 On/Off No No
Description from Generator: Hazardous recovered organics from chemical process units.
Form Code: 219 Other organic liquids
EPA Hazardous Waste Numbers: D001 D009 D018
Current Management Units: Boiler 145 146 148 179
Tank (Surface) 055 056
* Origin Codes: 1 Onsite-process/service
* Source Codes: A33 Product distillation A34 Product solvent extraction
A49 Other processes other than surface preparation
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Chem. Rec. Oil, Haz

60052191 1 Active 10/05/95 On/Off No No
Description from Generator: Nonhazardous recovered organics from chemical process units.
Form Code: 219 Other organic liquids
Current Management Units: Tank (Surface) 055 056
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Chem Rec Oil, Nonhaz

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17 031 31

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

7001319H H Active 01/19/94 On/Off No No

Description from Generator: Heat exchanger cleaning solids from refinery heat exchanger cleaning. B319 Refinery heat exchanger solids.
Refers to waste code (6): 982780
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: D007 D008 K050
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2992 Lubricating Oils & Greases

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70023011 1 Active 06/21/94 On No No

Description from Generator: Media, oil contaminated, nonhazardous
Refers to waste code (6): 177720
Form Code: 301 Soil contaminated with organics
Current Management Units: Waste Pile 155
Landfill 159
* Origin Codes: 2 Spill clean-up 1 Onsite-process/service
Company's Internal Code(s): Media, Oil Contamina

7003114H H Active 06/21/94 On/Off No No

Description from Generator: Heat exchanger cleaning liquids from refinery heat exchanger cleaning
Refers to waste code (6): 982780
Form Code: 114 Other aqueous waste with low dissolved solids
EPA Hazardous Waste Numbers: K050
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining
Company's Internal Code(s): Heat Exchanger Liqui

7004393H H Active 02/09/99 On/Off No No

Description from Generator: Refinery hydrotreater catalyst, spent
Form Code: 393 Catalyst waste (inorganic solid)
EPA Hazardous Waste Numbers: D001 D003 D004 D018 K171
Current Management Units: Contain Store Area 167 177
* Origin Codes: 1 Onsite-process/service
* Source Codes: A36 Spent catalyst removal
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining
Company's Internal Code(s): catalyst, hydrotreat

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

7005319H H Active 02/09/99 On/Off No No
Description from Generator: Refinery crude oil storage tank sediment
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: K169
Current Management Units: Contain Store Area 167 177
* Origin Codes: 1 Onsite-process/service
* Source Codes: A38 Tank sludge removal
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining
Company's Internal Code(s): Tank bottoms, crude

7006319H H Active 02/09/99 On/Off No No
Description from Generator: Clarified slurry oil storage tank sediment and/or inline filter/separationsolids
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: K170
Current Management Units: Contain Store Area 165 167 177
* Origin Codes: 1 Onsite-process/service
* Source Codes: A38 Tank sludge removal A09 Clean out process equipment
A32 Product filtering
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining
Company's Internal Code(s): Slurry oil solids

7007102H H Active 03/30/00 On/Off No No
Description from Generator: Wastewater contaminated with refinery listed waste codes K050, K169, K170, K171
Form Code: 102 Aqueous waste with low other toxic organics
EPA Hazardous Waste Numbers: D018 K050 K169 K170 K171
Current Management Units: WWTP 065 172
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining
Company's Internal Code(s): Ref Listed WW

80012971 1 Active 01/19/94 On/Off No No
Description from Generator: PCB oil, > 50 And < 500 ppm PCB's from electrical equipment.
Refers to waste code (6): 116080
Form Code: 297 Non-haz organ. liq contain >= 50 & < 500 ppm PCB's
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service

80023961 1 Active 01/19/94 On/Off No No
Description from Generator: PCB cont. electrical equipment, > 50 and < 500 ppm PCB's in oil.
Refers to waste code (6): 178160
Form Code: 396 Nonhazard elec equip/dev >=50 ppm & <500 ppm PCBs
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

80033191 1 Active 01/19/94 On/Off No No

Description from Generator: PCB cont media (soil gloves rags etc) >50 and < 500 ppm pcb's nonhazardous. B319 PCB cont *soil gloves rags etc.*

Refers to waste code (6): 179430

Form Code: 319 Other waste inorganic solids

Current Management Units: Contain Store Area 165

* Origin Codes: 2 Spill clean-up 1 Onsite-process/service

80041021 1 Active 06/21/94 On No No

Description from Generator: Wastewater, nonhazardous, from refinery and chemical production facilities

Refers to waste code (6): 107140

Form Code: 102 Aqueous waste with low other toxic organics

Current Management Units: Surface Impoundment 038 039 040
Tank 041
WWTP 017 065
Tank (Surface) 020 025 026 027 028 032 036 066 067 068 069 070 076 077 087 089 105 108 128 133 134 135 136 137 138 139
Tank (Sub-surface) 072 073 123 124 125 126 127

* Origin Codes: 1 Onsite-process/service 2 Spill clean-up 3 From non-haz waste mgmt

Company's Internal Code(s): Wastewater, nonhazar

80053931 1 Active 06/21/94 On/Off No No

Description from Generator: Catalyst, nonhazardous spent.Wast is recycled into TXDOT specification Item # 276 (portland cement treated base) or TXDOT Specification Item #247 (flexible base). Notification for Recycling of the aforementioned waste is acknowledge.

Refers to waste code (6): 170210

Form Code: 393 Catalyst waste (inorganic solid)

Current Management Units: Waste Pile 155
Landfill 159
Contain Store Area 165 177

* Origin Codes: 1 Onsite-process/service

Company's Internal Code(s): Catalyst, nonhazardo

8006393H H Active 06/21/94 On/Off No No

Description from Generator: Catalyst, hazardous spent

Refers to waste code (6): 970210

Form Code: 393 Catalyst waste (inorganic solid)

EPA Hazardous Waste Numbers: D001 D003 D004 D018

Current Management Units: Contain Store Area 165 167 177

* Origin Codes: 1 Onsite-process/service

* Source Codes: A36 Spent catalyst removal

* Measurement Points: 1 Before mixing

* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified

Company's Internal Code(s): Catalyst, hazardous

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

8007104H H Active 06/21/94 On/Off No No

Description from Generator: Spent acid solutions from refinery and chemical plant production facilities
Refers to waste code (6): 905050
Form Code: 104 Spent acid without metals
EPA Hazardous Waste Numbers: D002
Current Management Units: WWTP 017 065
Tank (Surface) 089 108 133 134
Tank (Sub-surface) 072 073 123 124 125 126 127
Misc Store Container 164
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
* Source Codes: A37 Spent process liquids removal A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Acid solutions

8008109H H Active 06/21/94 On/Off No No

Description from Generator: Spent caustic solutions from refinery and chemical plant production facilities
Refers to waste code (6): 900630
Form Code: 109 Spent caustic
EPA Hazardous Waste Numbers: D002
Current Management Units: WWTP 017 065
Tank (Surface) 089 108 133 134
Tank (Sub-surface) 072 073 123 124 125 126 127
Misc Store Container 164
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
* Source Codes: A37 Spent process liquids removal A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Caustic solutions

8009319H H Active 06/21/94 Off No No

Description from Generator: Chrome contaminated media (eg: cooling water tower solids, filters, spills, containers, etc)
Refers to waste code (6): 908210
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: D007
Current Management Units: None
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
* Source Codes: A09 Clean out process equipment A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Media, chrome contam

80103191 1 Active 06/21/94 On/Off No No

Description from Generator: Storage tank bottom solids, nonhazardous, from refinery and chemicalproduction facilities
Refers to waste code (6): 113180
Form Code: 319 Other waste inorganic solids
Current Management Units: Waste Pile 155
Landfill 159
* Origin Codes: 1 Onsite-process/service

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

Company's Internal Code(s): Tank bottoms, nonhaz

80111021 1 Active 06/30/94 On No No
Description from Generator: Amine/water mixture from fuel gas treating units, nonhazardous
Refers to waste code (6): 108940
Form Code: 102 Aqueous waste with low other toxic organics
Current Management Units: Surface Impoundment 038 039 040
WWTP 017 065
Tank (Surface) 028
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Amines in Water, Non

80123101 1 Active 01/19/94 On/Off No No
Description from Generator: Spent filter media contaminated with nonhazardous compounds.
Refers to waste code (6): 179640
Form Code: 310 Spent solid filters or adsorbents (inorganic)
Current Management Units: Landfill 159
* Origin Codes: 1 Onsite-process/service

8013310H H Active 01/19/94 On/Off No No
Description from Generator: Spent filter media contaminated with hazardous compounds.
Refers to waste code (6): 913700
Form Code: 310 Spent solid filters or adsorbents (inorganic)
EPA Hazardous Waste Numbers: D001 U002 U003 U031 U041 U140 U159 U161
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service
* Source Codes: A55 Filter/Battery replacement A78 Air pollution control devices
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified

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80142981 1 Active 01/19/94 On/Off No No
Description from Generator: PCB oil > 500 ppm PCB's from electrical equipment.
Refers to waste code (6): 116080
Form Code: 298 Non-haz organ. liq containing > 500 ppm PCB's
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service

80153971 1 Active 01/19/94 On/Off No No
Description from Generator: PCB cont electrical equipment >500 ppm PCB's in oil.
Refers to waste code (6): 173880
Form Code: 397 Nonhazard electrical equip/dev >= 500 ppm PCBs
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

8016319H H Active 12/01/97 On/Off No No

Description from Generator: PCB cont media (soil gloves rags etc.) >50 and < 500 ppm PCB's hazardous. B319 PCB cont soil gloves rags etc.
Refers to waste code (6): 979430
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: D001
Current Management Units: Contain Store Area 165
* Origin Codes: 2 Spill clean-up 1 Onsite-process/service
* Source Codes: A53 Cleanup of spill residues A54 Oil changes
A91 Clothing and personal protective equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2992 Lubricating Oils & Greases

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8017207H H Active 06/21/94 On/Off No No

Description from Generator: Misc. listed organics from spills, drips, etc.
Refers to waste code (6): 917180
Form Code: 207 Concentrated aqueous solution of other organics
EPA Hazardous Waste Numbers: D001 U002 U031 U140 U159 U161
Current Management Units: Tank (Surface) 076 077
Misc Store Container 164
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
* Source Codes: A51 Leak collection A09 Clean out process equipment
A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Mics. Organics

8018319H H Active 06/21/94 Off No No

Description from Generator: Storage tank bottom solids, hazardous, from refinery and chemical plant storage tanks
Refers to waste code (6): 950430
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: D001 D018 U031 U140
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Tank Bottoms, Hazard

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

8019102H H Active 06/21/94 On/Off No No

Description from Generator: Wastewater, hazardous, from refinery and chemical production facilities
Refers to waste code (6): 909080
Form Code: 102 Aqueous waste with low other toxic organics
EPA Hazardous Waste Numbers: D007 D018 D022 D026 D028 D038
Current Management Units: Surface Impoundment 038 039 040
WWTP 017 065
Tank (Surface) 025 026 027 028 032 066 067 068 069 070 076 077 087 089 105 108 128 133 134 135 136 137 138 139
Tank (Sub-surface) 072 073 123 124 125 126 127
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up 5 Onsite haz waste mgmt
* Source Codes: A33 Product distillation A31 Product rinsing
A34 Product solvent extraction
* Measurement Points: 4 After mix(haz & nonhaz)
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Wastewater, hazardou

80203191 1 Active 06/30/94 On/Off No

Description from Generator: Trash, plant, nonhazardous, from refining/chemical complex. Includes, but is not limited to , oil or chemical contaminated packaging, clothing, rags; floor sweepings; scrap materials. This trash is collected and disposed of separately from "General Trash", waste code 80219012.
Refers to waste code (6): 170770
Form Code: 319 Other waste inorganic solids
Current Management Units: Contain Store Area 166
Misc Store Container 168
* Origin Codes: 1 Onsite-process/service

8024404H H Active 06/09/94 On/Off No No

Description from Generator: Filter media contaminated with benzene
Form Code: 404 Spent carbon
EPA Hazardous Waste Numbers: D001 D018
Current Management Units: Contain Store Area 165 167
* Origin Codes: 1 Onsite-process/service
* Source Codes: A78 Air pollution control devices A71 Filtering/screening
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Filter media, benzen

8025102H H Active 06/30/94 On No No

Description from Generator: Amine/water mixture from fuel gas treating units, contains benzene
Form Code: 102 Aqueous waste with low other toxic organics
EPA Hazardous Waste Numbers: D018
Current Management Units: Surface Impoundment 038 039 040
WWTP 017 065
Tank (Surface) 028
* Origin Codes: 1 Onsite-process/service
* Source Codes: A34 Product solvent extraction
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Amines in Water, Haz

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete
****** Active Wastes ******						
80264891 1		Active	12/08/94	On	No	No

Description from Generator: Coke fines from refinery processes
Form Code: 489 Petroleum contaminated solids
Current Management Units: Waste Pile 155
Landfill 159
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
Company's Internal Code(s): Coke fines

80289992 2 Active 03/26/96 On/Off No No
Description from Generator: Trash, general misc. from manufacturing complex, including but not limited to paper, food wastes, styrofoam, glass.
Refers to waste code (6): 279760
Form Code: 999 Plant Refuse
Current Management Units: Misc Store Container 170
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Trash, Class 2

80294091 1 Active 09/04/96 On/Off No No
Description from Generator: Class 1 Organic Solids
Form Code: 409 Other non-halogenated organic solids
Current Management Units: Landfill 159
Contain Store Area 166 167
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Class 1 Organic Soli

80302191 1 Active 11/19/96 On/Off No No
Description from Generator: Class 1 Organic Liquids
Form Code: 219 Other organic liquids
Current Management Units: Contain Store Area 165 167
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Class1 Organic Liqui

8032405H H Active 11/02/98 On/Off No No
Description from Generator: Pyrophoric Solids
Form Code: 405 Reactive organic solid
EPA Hazardous Waste Numbers: D001
Current Management Units: Contain Store Area 165 167
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment A38 Tank sludge removal
A59 Oth product-derived one-time intermittent process
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified 2911 Petroleum Refining
Company's Internal Code(s): Pyrophoric Solids

80332061 1 Active 12/14/98 On/Off No No
Description from Generator: PCB OIL, <50 PPM PCB'S
Form Code: 206 Waste oil
Current Management Units: Contain Store Area 165
* Origin Codes: 2 Spill clean-up
Company's Internal Code(s): PCB OIL, <50 PPM PCB

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

80343191 1 Active 12/14/98 On/Off No No
Description from Generator: PCB CONT. ELECTRICAL EQPT, <50 PPM PCB'S
Form Code: 319 Other waste inorganic solids
Current Management Units: Contain Store Area 165
* Origin Codes: 2 Spill clean-up
Company's Internal Code(s): PCB EQPT, <50 PPM PC

80353191 1 Active 12/14/98 On/Off No No
Description from Generator: PCB CONT. MEDIA, NONHAZARDOUS, <50 PPM PCB'S
Form Code: 319 Other waste inorganic solids
Current Management Units: Contain Store Area 165
* Origin Codes: 2 Spill clean-up
Company's Internal Code(s): PCB MEDIA, <50 PPM P

80363191 1 Active 02/25/99 On/Off No No
Description from Generator: Corrosive Solids
Form Code: 319 Other waste inorganic solids
Current Management Units: Contain Store Area 165 167
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Corrosive Solids

80373191 1 Active 03/25/99 On/Off No No
Description from Generator: Inert materials suitable for recycle into roadbase. Examples are firebrick, carbon, clay absorbents, catalyst support. Recycling: Waste is recycled by Southern Crushed Stone with TXDOT Spec #247 and #276 per STEERS notification dated 1/6/2000.
Form Code: 319 Other waste inorganic solids
Current Management Units: Waste Pile 171
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Recyclable Materials

8038409H H Active 08/02/99 On/Off No No
Description from Generator: Tank Seals, Hazardous
Form Code: 409 Other non-halogenated organic solids
EPA Hazardous Waste Numbers: D001 D018
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service
* Source Codes: A56 Discontinue use of process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

8039319H H Active 02/24/00 On/Off No No
Description from Generator: Media contaminated with lead
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: D008
Current Management Units: Contain Store Area 167
* Origin Codes: 1 Onsite-process/service
* Source Codes: A29 Other surface coating/preparation
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): MEDIA, LEAD CONT.

* The first value is considered the primary value (e.g. primary origin code).
As of 10/12/2000, the next unassigned sequence number for WASTES is 8040.

** No Longer Generated Wastes **

0302607H H Inactive 04/18/96 NA No No
Description from Generator: Biosolids, hazardous, from refinery wastewater treater
Refers to waste code (6): 949890
Form Code: 607 Biological treatment sludge (organic)
EPA Hazardous Waste Numbers: K048
Current Management Units: Incinerator 002
WWTP 042 065
Tank (Surface) 019
* Origin Codes: 1 Onsite-process/service
* Source Codes: A75 Wastewater treatment
* Measurement Points: 3 After mix (non-haz)
* SIC Codes: 2911 Petroleum Refining
Company's Internal Code(s): Biosolids, hazardous

03063032 2 Inactive 05/01/97 NA No No
Description from Generator: Incinerator ash from biosolids incinerator
Form Code: 303 Ash, slag or other res-(inorgan.) incin. of waste
Current Management Units: None
* Origin Codes: 5 Onsite haz waste mgmt 3 From non-haz waste mgmt
Company's Internal Code(s): Incinerator Ash

0311303H H Inactive 02/16/99 NA No No
Description from Generator: Incinerator Ash, Hazardous
Refers to waste code (6): 970260
Form Code: 303 Ash, slag or other res-(inorgan.) incin. of waste
EPA Hazardous Waste Numbers: D007 F002 F003 F005 K048
Current Management Units: None
* Origin Codes: 5 Onsite haz waste mgmt
* System Types: 042 Incineration - sludges
* Source Codes: A74 Incineration/Thermal treatment
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Incinerator Ash, Haz

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

0702203H H Inactive 04/18/96 NA No No
Description from Generator: Parts cleaning solvents.
Refers to waste code (6): 900250
Form Code: 203 Non-halogenated solvent
EPA Hazardous Waste Numbers: D006 D007 D008 D018 D021 D027 D039 D040
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A04 Flush rinsing
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2992 Lubricating Oils & Greases

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0703211H H Inactive 08/10/94 NA No No
Description from Generator: Parts cleaning naphtha.
Refers to waste code (6): 910020
Form Code: 211 Paint thinner or petroleum distillates
EPA Hazardous Waste Numbers: D001 D018 D039
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A04 Flush rinsing
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2992 Lubricating Oils & Greases

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0709204H H Inactive 04/18/96 NA No No
Description from Generator: Parts Cleaning Solvents
Form Code: 204 Halogenated/non-halogenated solvent mixture
EPA Hazardous Waste Numbers: D006 D007 D008 D018 D021 D027 D039 D040
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A04 Flush rinsing
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Parts Cleaning Solve

0710309H H Inactive 07/12/00 NA No No
Description from Generator: Spent Ni-cad Batteries
Form Code: 309 Batteries or battery parts, casings, cores
EPA Hazardous Waste Numbers: D002 D006 D010
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service
* Source Codes: A55 Filter/Battery replacement
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Batteries, Ni-cad

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio- active	TNRCC Audit Complete

** No Longer Generated Wastes **

0904105H H Inactive 04/18/96 NA No No
Description from Generator: Laboratory wastewater containing sulfuric acid and hydrocarbons
Refers to waste code (6): 909150
Form Code: 105 Acidic aqueous waste
EPA Hazardous Waste Numbers: D002
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service
* Source Codes: A94 Laboratory wastes
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Lab wastewater w/aci

52012191 1 Inactive 04/18/96 NA No No
Description from Generator: Sulfolane waste from regeneration process
Form Code: 219 Other organic liquids
Current Management Units: Tank (Surface) 066 067 070 076 077 089 090 091 092 093 094 096 097 133
Tank (Sub-surface) 072 073 095 123 124 125 126 127
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up

80219012 2 Inactive 04/18/96 NA No No
Description from Generator: Trash, general misc., from refining/chemical complex. This is non-contaminated trash, including but not limited to, paper, styrofoam, food wastes, glass, aluminum foil, packaging materials. This trash is collected and disposed of separately from "plant trash"", waste code 80203191.
Refers to waste code (6): 279760
Form Code: 901 Plant production refuse
Current Management Units: Misc Store Container 170
* Origin Codes: 1 Onsite-process/service

8027319H H Inactive 07/12/00 NA No No
Description from Generator: Media, mercury contaminated
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: D009
Current Management Units: Contain Store Area 165
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
* Source Codes: A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2911 Petroleum Refining 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): Media, mercury cont.

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete
** No Longer Generated Wastes **						
8031319H	H	Inactive	02/25/99	NA	No	No

Description from Generator: Corrosive Solids
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: D002
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A59 Oth product-derived one-time intermittent process A09 Clean out process equipment
A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified 2911 Petroleum Refining
Company's Internal Code(s): Corrosive Solids

100510 1 Inactive 04/18/96 NA No No
Description from Generator: SODIUM CHLORIDE BRINE (NACL) MAY CONTAIN TRACE HYDROCARBONS
Form Code:
Current Management Units: Tank (Surface) 151 152 153
* Origin Codes:

107140 1 Inactive 04/18/96 NA No No
Description from Generator: WASTEWATER CONTAINING ORGANICS
Form Code:
Current Management Units: Waste Treatment Unit 043 044
Tank (Surface) 026 034 066 090 091 092 093 094 096 097 098 099 101 117 118 119 121 122 129 151 152 153
Tank (Sub-surface) 071 088 095 109 111 112 113 114 115 116
* Origin Codes:

108940 1 Inactive 04/18/96 NA No No
Description from Generator: DIISOPROPYLAMINE IN WATER
Form Code:
Current Management Units: Landfill 159
Tank (Surface) 066
* Origin Codes:

108980 1 Inactive 06/21/94 NA No No
Description from Generator: WASTEWATER, PHENOLIC, CONTAINS 5% OR LESS PHENOLS
Form Code:
Current Management Units: Tank (Sub-surface) 109
* Origin Codes:

111380 1 Inactive 04/18/96 NA No No
Description from Generator: AMINES-RESIN CURING AGENT WASTES
Form Code:
Current Management Units: Landfill 159
* Origin Codes:

113180 1 Inactive 12/01/97 NA No
Description from Generator: AMINES
Form Code:
Current Management Units: None
* Origin Codes:

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

114720 1 Inactive 04/18/96 NA No No
Description from Generator: EPOXY RESIN, HEAVY ENDS
Form Code:
Current Management Units: None
* Origin Codes:

116080 1 Inactive 04/18/96 NA No No
Description from Generator: PCB TRANSFORMER OIL
Form Code:
Current Management Units: Misc Store Container 082
* Origin Codes:

141520 1 Inactive 04/18/96 NA No No
Description from Generator: PRIMARY SOLIDS
Form Code:
Current Management Units: Landfill 159
Tank (Surface) 034 129
* Origin Codes:

170210 1 Inactive 04/18/96 NA No No
Description from Generator: CATALYST, SPENT
Form Code:
Current Management Units: Waste Pile 154
Landfill 159
* Origin Codes:

170750 1 Inactive 04/18/96 NA No No
Description from Generator: ASBESTOS
Form Code:
Current Management Units: Landfill 159
* Origin Codes:

170770 1 Inactive 04/18/96 NA No No
Description from Generator: PLANT WASTES
Form Code:
Current Management Units: Landfill 159
* Origin Codes:

173880 1 Inactive 04/18/96 NA No No
Description from Generator: PCB CAPACITOR
Form Code:
Current Management Units: Misc Store Container 082
* Origin Codes:

177720 1 Inactive 04/18/96 NA No No
Description from Generator: SOIL, OIL CONTAMINATED
Form Code:
Current Management Units: Waste Pile 154
Landfill 159
* Origin Codes:

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite*	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

178160 1 Inactive 04/18/96 NA No No
Description from Generator: PCB TRANSFORMER
Form Code:
Current Management Units: None
* Origin Codes:

178400 1 Inactive 04/18/96 NA No No
Description from Generator: LAB-PACKS
Form Code:
Current Management Units: None
* Origin Codes:

179410 1 Inactive 06/21/94 NA No No
Description from Generator: CONTAINERS, CHEMICAL CONTAMINATED (METAL)
Form Code:
Current Management Units: Misc Store Container 082
* Origin Codes:

179430 1 Inactive 04/18/96 NA No No
Description from Generator: PCB CONTAMINATED SOLIDS
Form Code:
Current Management Units: Misc Store Container 082
* Origin Codes:

179640 1 Inactive 04/18/96 NA No No
Description from Generator: RESIN WASTE, RESIN MANUFACTURING
Form Code:
Current Management Units: Landfill 159
* Origin Codes:

180620 1 Inactive 06/02/95 NA No No
Description from Generator: TRASH, OILY
Form Code:
Current Management Units: None
* Origin Codes:

181110 1 Inactive 04/18/96 NA No No
Description from Generator: POLYBUTADIENE, WITH 'POPCORN' POLYMER
Form Code:
Current Management Units: None
* Origin Codes:

183050 1 Inactive 04/18/96 NA No No
Description from Generator: BISPHENOL OF ACETONE RESIN POLYMER
Form Code:
Current Management Units: Waste Pile 154
Boiler 146 147 148
Landfill 159
* Origin Codes:

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

183620 1 Inactive 06/21/94 NA No No
Description from Generator: OIL AND DEBRIS
Form Code:
Current Management Units: Waste Pile 154
Landfill 159
* Origin Codes:

249890 2 Inactive 04/18/96 NA No No
Description from Generator: BIOLOGICAL SLUDGE, INDUSTRIAL WASTEWATER TREATMENT
Form Code:
Current Management Units: Incinerator 002
Waste Treatment Unit 043 044
Tank (Surface) 098 099 101 119 121 122
Tank (Sub-surface) 071
* Origin Codes:

270240 2 Inactive 04/18/96 NA No No
Description from Generator: SULFUR WASTE/SCRAP
Form Code:
Current Management Units: Landfill 159
* Origin Codes:

271380 2 Inactive 09/17/92 NA No
Description from Generator: ASH, FLY
Form Code:
Current Management Units: None
* Origin Codes:

276060 2 Inactive 09/17/92 NA No
Description from Generator: SLAG
Form Code:
Current Management Units: None
* Origin Codes:

279760 2 Inactive 04/18/96 NA No No
Description from Generator: PLANT REFUSE, GENERAL MISC.
Form Code:
Current Management Units: Waste Pile 162
* Origin Codes:

280370 2 Inactive 06/21/94 NA No No
Description from Generator: ASPHALT
Form Code:
Current Management Units: None
* Origin Codes:

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

371310 3 Inactive 04/18/96 NA No No
Description from Generator: CATALYST, CATALYTIC CRACKING
Form Code:
Current Management Units: Surface Impoundment 132
Landfill 159
Tank (Surface) 129
* Origin Codes:

382110 3 Inactive 09/17/92 NA No
Description from Generator: COAL AND/OR DUST
Form Code:
Current Management Units: None
* Origin Codes:

900250 H Inactive 04/18/96 NA No No
Description from Generator: METAL CLEANING WASTES
Form Code: 203 Non-halogenated solvent
EPA Hazardous Waste Numbers: D006 D007 D008 D018 D021 D027 D039 D040
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A19 Other cleaning and degreasing
* SIC Codes: 2911 Petroleum Refining

900630 H Inactive 04/18/96 NA No No
Description from Generator: CAUSTIC WASTES
Form Code: 109 Spent caustic
EPA Hazardous Waste Numbers: D002
Current Management Units: Tank (Sub-surface) 109
* Origin Codes: 1 Onsite-process/service
* Source Codes: A37 Spent process liquids removal
* SIC Codes: 2911 Petroleum Refining

905050 H Inactive 04/18/96 NA No No
Description from Generator: WASTEWATER, ACID
Form Code: 104 Spent acid without metals
EPA Hazardous Waste Numbers: D002 F037
Current Management Units: Tank (Sub-surface) 109
* Origin Codes: 1 Onsite-process/service
* Source Codes: A37 Spent process liquids removal
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio- active	TNRCC Audit Complete

** No Longer Generated Wastes **

905950 H Inactive 04/18/96 NA No No
Description from Generator: LEACHATE CONCENTRATE
Form Code: 116 Leachate - (inorganic)
EPA Hazardous Waste Numbers: F037
Current Management Units: Landfill 159
* Origin Codes: 5 Onsite haz waste mgmt
* Source Codes: A79 Leachate collection
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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908210 H Inactive 04/18/96 NA No No
Description from Generator: CHROMIUM BEARING WASTE
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: D007
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* SIC Codes: 2911 Petroleum Refining

908510 H Inactive NA No
Description from Generator: ALCOHOL, ETHYL, BENZENE, AND WATER
Form Code:
EPA Hazardous Waste Numbers: U019
Current Management Units: None
* Origin Codes:

908580 H Inactive 04/18/96 NA No No
Description from Generator: HYDRAZINE SCRUBBER SOLUTION
Form Code:
EPA Hazardous Waste Numbers: U133
Current Management Units: None
* Origin Codes:

908830 H Inactive NA No
Description from Generator: STILL BOTTOMS, FOOT
Form Code:
EPA Hazardous Waste Numbers: D000
Current Management Units: None
* Origin Codes:

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio- active	TNRCC Audit Complete

** No Longer Generated Wastes **

908910 H Inactive NA No
Description from Generator: CAUSTIC, HYDROCARBON TREATING, SPENT (CONTAINS NA2S)
Form Code:
EPA Hazardous Waste Numbers: D002
Current Management Units: None
* Origin Codes:

909080 H Inactive 04/18/96 NA No No
Description from Generator: WASTE WATER, INDUSTRIAL CONTAINS ORGANIC COMPOUNDS
Form Code: 102 Aqueous waste with low other toxic organics
EPA Hazardous Waste Numbers: D018 D022 D028
Current Management Units: Tank (Surface) 026 090 091 092 093 094 096 097 117 118 129
Tank (Sub-surface) 071 088 095 109 111 112 113 114 115 116
* Origin Codes: 1 Onsite-process/service
* Source Codes: A33 Product distillation
* SIC Codes: 2911 Petroleum Refining

909150 H Inactive 04/18/96 NA No No
Description from Generator: ACID, SULFURIC, HYDROCARBON CONTAINING
Form Code: 105 Acidic aqueous waste
EPA Hazardous Waste Numbers: D002
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A94 Laboratory wastes
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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909390 H Inactive 04/18/96 NA No No
Description from Generator: API WASTE SKIMMINGS
Form Code: 207 Concentrated aqueous solution of other organics
EPA Hazardous Waste Numbers: D001 D018
Current Management Units: Tank (Sub-surface) 111 112
* Origin Codes: 1 Onsite-process/service
* Source Codes: A75 Wastewater treatment
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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910020 H Inactive 04/18/96 NA No No
Description from Generator: NAPHTHA
Form Code: 201 Concentrated solvent-water solution
EPA Hazardous Waste Numbers: D001
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A19 Other cleaning and degreasing
* SIC Codes: 2911 Petroleum Refining

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

910131 H Inactive 06/21/94 NA No No
Description from Generator: EPICHLOROHYDRIN, LIGHT ENDS
Form Code: 207 Concentrated aqueous solution of other organics
EPA Hazardous Waste Numbers: D001
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A33 Product distillation
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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910141 H Inactive 04/18/96 NA No No
Description from Generator: EPICHLOROHYDRIN, HEAVY ENDS
Form Code: 219 Other organic liquids
EPA Hazardous Waste Numbers: D001 K017
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A33 Product distillation
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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910230 H Inactive 04/18/96 NA No No
Description from Generator: PHENOLIC WASTE, LIQUID
Form Code: 208 Concentrated phenolics
EPA Hazardous Waste Numbers: U188
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A51 Leak collection
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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910650 H Inactive 04/18/96 NA No No
Description from Generator: PAINT WASTE, LIQUID
Form Code: 209 Organic paint, ink, lacquer, or varnish
EPA Hazardous Waste Numbers: F002 F003 F005
Current Management Units: Contain Store Area 141
Distill/Solv Recovery 157
* Origin Codes: 1 Onsite-process/service
* Source Codes: A21 Painting
* SIC Codes: 2911 Petroleum Refining

910870 H Inactive NA No
Description from Generator: METHYLENE CHLORIDE
Form Code:
EPA Hazardous Waste Numbers: F001 F002 U080
Current Management Units: None
* Origin Codes:

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete
** No Longer Generated Wastes **						
911020	H	Inactive		NA		No
Description from Generator: ACID, ACRYLIC						
Form Code:						
EPA Hazardous Waste Numbers: U008						
Current Management Units: None						
* Origin Codes:						
912370	H	Inactive	06/21/94	NA	No	No
Description from Generator: ETHYL ACRYLATE						
Form Code:						
EPA Hazardous Waste Numbers: U113						
Current Management Units: None						
* Origin Codes:						
912380	H	Inactive		NA		No
Description from Generator: TRIPHENYL PHOSPHINE						
Form Code:						
EPA Hazardous Waste Numbers: P006						
Current Management Units: None						
* Origin Codes:						
912570	H	Inactive		NA		No
Description from Generator: DIETHYL PHTHALATE						
Form Code:						
EPA Hazardous Waste Numbers: U088						
Current Management Units: None						
* Origin Codes:						
912830	H	Inactive	06/21/94	NA	No	No
Description from Generator: ACETONITRILE (METHYL CYANIDE)						
Form Code:						
EPA Hazardous Waste Numbers: D001 U003						
Current Management Units: None						
* Origin Codes:						
912940	H	Inactive		NA		No
Description from Generator: ALCOHOL, (C6 AND LESS)						
Form Code:						
EPA Hazardous Waste Numbers: D000 D001						
Current Management Units: None						
* Origin Codes:						

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

913050 H Inactive NA No
Description from Generator: ETHERS
Form Code:
EPA Hazardous Waste Numbers: D000 D001
Current Management Units: None
* Origin Codes:

913690 H Inactive NA No
Description from Generator: CHLORIDES, ORGANIC, LIGHT ENDS
Form Code:
EPA Hazardous Waste Numbers: U043
Current Management Units: None
* Origin Codes:

913700 H Inactive 04/18/96 NA No No
Description from Generator: RESIN WASTE, LIQUID
Form Code: 219 Other organic liquids
EPA Hazardous Waste Numbers: D001
Current Management Units: Contain Store Area 165
Misc Store Container 082
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* SIC Codes: 2821 Plastic Materials, Synthetic Resins & Elastomers

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914670 H Inactive NA No
Description from Generator: TOLUENE BOTTOMS
Form Code:
EPA Hazardous Waste Numbers: F005 U220
Current Management Units: None
* Origin Codes:

914680 H Inactive NA No
Description from Generator: ORGANICS, CHLORINATED
Form Code:
EPA Hazardous Waste Numbers: F002 U041 U076 U077 U226
Current Management Units: None
* Origin Codes:

914700 H Inactive 06/21/94 NA No No
Description from Generator: CATALYST PURGE, C4 ALCOHOL MFG.
Form Code:
EPA Hazardous Waste Numbers: D001
Current Management Units: None
* Origin Codes:

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

914710 H Inactive NA No
Description from Generator: CHLORIDE HEAVY ENDS, ORGANIC
Form Code:
EPA Hazardous Waste Numbers: F024 K017 K019 K020
Current Management Units: None
* Origin Codes:

914760 H Inactive NA No
Description from Generator: PHENYL GLYCIDOL ETHER-HEAVY ENDS
Form Code:
EPA Hazardous Waste Numbers: D000
Current Management Units: None
* Origin Codes:

915190 H Inactive 08/10/94 NA No No
Description from Generator: ISOPROPYL ETHER AND PHENOLIC WATER
Form Code:
EPA Hazardous Waste Numbers: D001
Current Management Units: None
* Origin Codes:

915470 H Inactive NA No
Description from Generator: BUTYL MERCAPTAN
Form Code:
EPA Hazardous Waste Numbers: D003
Current Management Units: None
* Origin Codes:

917180 H Inactive 04/18/96 NA No No
Description from Generator: ORGANICS, MISC.
Form Code: 207 Concentrated aqueous solution of other organics
EPA Hazardous Waste Numbers: U002 U031 U140 U159 U161
Current Management Units: Tank (Surface) 089
* Origin Codes: 1 Onsite-process/service
* Source Codes: A51 Leak collection
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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919440 H Inactive 04/18/96 NA No No
Description from Generator: PHENOL ACETONE HEAVY ENDS
Form Code: 208 Concentrated phenolics
EPA Hazardous Waste Numbers: K022
Current Management Units: Boiler 146 147 148
Landfill 159
Misc Store Container 082
* Origin Codes: 1 Onsite-process/service
* Source Codes: A33 Product distillation
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

919450 H Inactive 06/21/94 NA No No
Description from Generator: OIL, RECOVERED
Form Code: 206 Waste oil
EPA Hazardous Waste Numbers: D001
Current Management Units: Tank (Surface) 083 084 085 086
* Origin Codes: 1 Onsite-process/service
* Source Codes: A35 By-product processing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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941520 H Inactive 04/18/96 NA No No
Description from Generator: Refinery Primary Solids
Form Code: 503 Inorganic wastewater treat sludge w/toxic organics
EPA Hazardous Waste Numbers: D018 F037
Current Management Units: Landfill 159
* Origin Codes: 1 Onsite-process/service
* Source Codes: A75 Wastewater treatment
* SIC Codes: 2911 Petroleum Refining

948880 H Inactive NA No
Description from Generator: SULFUR-POLYMER
Form Code:
Current Management Units: None
* Origin Codes:

949610 H Inactive 04/18/96 NA No No
Description from Generator: CHLORIDE SLUDGE, ORGANIC
Form Code: 516 Chloride or other brine sludge
EPA Hazardous Waste Numbers: K017
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A38 Tank sludge removal
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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949890 H Inactive 04/18/96 NA No No
Description from Generator: BIOLOGICAL SLUDGE, INDUSTRIAL WASTEWATER TREATMENT
Form Code: 607 Biological treatment sludge (organic)
EPA Hazardous Waste Numbers: K048
Current Management Units: Incinerator 002
Waste Treatment Unit 043 044
* Origin Codes: 1 Onsite-process/service
* Source Codes: A75 Wastewater treatment
* SIC Codes: 2911 Petroleum Refining

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

950400 H Inactive 04/18/96 NA No No
Description from Generator: DAF UNIT FLOAT SKIM & BOTTOMS
Form Code: 205 Oil-water emulsion or mixture
EPA Hazardous Waste Numbers: D018 K048
Current Management Units: Tank (Sub-surface) 071
* Origin Codes: 1 Onsite-process/service
* Source Codes: A75 Wastewater treatment
* SIC Codes: 2911 Petroleum Refining

950430 H Inactive 04/18/96 NA No No
Description from Generator: OIL SLUDGE, HEAVY
Form Code: 695 Petro contam sldg not still bottoms & oily sludges
EPA Hazardous Waste Numbers: D018 F037 K049 K050
Current Management Units: Landfill 159
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* SIC Codes: 2911 Petroleum Refining

950540 H Inactive NA No
Description from Generator: ETHYLCHLORIDE(WITH FE CL3)FROMCHLORINATED HYDROCARBON MFG.
Form Code:
EPA Hazardous Waste Numbers: D000
Current Management Units: None
* Origin Codes:

951170 H Inactive 06/21/94 NA No No
Description from Generator: STILL BOTTOMS, ORGANIC
Form Code:
EPA Hazardous Waste Numbers: D001
Current Management Units: None
* Origin Codes:

951720 H Inactive NA No
Description from Generator: CHLORIDE SLUDGE, ORGANIC
Form Code:
EPA Hazardous Waste Numbers: F001 F002 U041 U076 U077 U078
Current Management Units: None
* Origin Codes:

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30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

970210 H Inactive 12/01/97 NA No No
Description from Generator: CATALYST, SPENT
Form Code: 393 Catalyst waste (inorganic solid)
EPA Hazardous Waste Numbers: D001 D003 D004 D018
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A36 Spent catalyst removal
* SIC Codes: 2911 Petroleum Refining

970260 H Inactive 04/18/96 NA No No
Description from Generator: ASH, INCINERATOR
Form Code: 303 Ash, slag or other res-(inorgan.) incin. of waste
EPA Hazardous Waste Numbers: D007 F002 F003 F005 K048
Current Management Units: Landfill 159
Tank (Surface) 034 129
* Origin Codes: 4 Received from offsite
* Source Codes: A74 Incineration/Thermal treatment
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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970440 H Inactive NA No
Description from Generator: FILTER CAKE, MEDIA WASTES
Form Code:
EPA Hazardous Waste Numbers: D000
Current Management Units: None
* Origin Codes:

971920 H Inactive NA No
Description from Generator: CONTAINERS, ACRYLIC ACID CONTAMINATED
Form Code:
EPA Hazardous Waste Numbers: U008
Current Management Units: None
* Origin Codes:

972080 H Inactive NA No
Description from Generator: MONOCROTOPHOSPHATE (AZODRIN)
Form Code:
EPA Hazardous Waste Numbers: D000
Current Management Units: None
* Origin Codes:

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17 057

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

972350 H Inactive NA No
Description from Generator: FERRIC CHLORIDE
Form Code:
EPA Hazardous Waste Numbers: U088
Current Management Units: None
* Origin Codes:

973340 H Inactive NA No
Description from Generator: FILTER WASTES
Form Code:
EPA Hazardous Waste Numbers: D000
Current Management Units: None
* Origin Codes:

973850 H Inactive 04/18/96 NA No No
Description from Generator: ALUMINUM CHLORIDE, ANHYDROUS
Form Code: 393 Catalyst waste (inorganic solid)
EPA Hazardous Waste Numbers: D003 D018
Current Management Units: None
* Origin Codes: 2 Spill clean-up
* Source Codes: A53 Cleanup of spill residues
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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978400 H Inactive 04/18/96 NA No No
Description from Generator: LAB-PACKS
Form Code: 003 Mixed lab packs
EPA Hazardous Waste Numbers: D001
Current Management Units: Misc Store Container 082
* Origin Codes: 1 Onsite-process/service
* Source Codes: A94 Laboratory wastes
* SIC Codes: 2911 Petroleum Refining

979130 H Inactive NA No
Description from Generator: LEAD CONTAMINATED WASTE, SOLID
Form Code:
EPA Hazardous Waste Numbers: K052
Current Management Units: None
* Origin Codes:

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17 058

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

979430 H Inactive 04/18/96 NA No No
Description from Generator: PCB CONTAMINATED SOLIDS
Form Code: 395 Non-haz inorganic solids con > 500 ppm PCB's
EPA Hazardous Waste Numbers: D001
Current Management Units: Misc Store Container 082
* Origin Codes: 2 Spill clean-up
* Source Codes: A53 Cleanup of spill residues
* SIC Codes: 2911 Petroleum Refining

979450 H Inactive 06/21/94 NA No No
Description from Generator: CONTAINERS, EMPTY
Form Code: 406 Empty fiber or plastic containers
EPA Hazardous Waste Numbers: P018
Current Management Units: Misc Store Container 082
* Origin Codes: 1 Onsite-process/service
* Source Codes: A59 Oth product-derived one-time intermittent process
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

---

979840 H Inactive NA No
Description from Generator: SOIL, PETROLEUM CONTAMINATED
Form Code:
EPA Hazardous Waste Numbers: K051
Current Management Units: None
* Origin Codes:

982780 H Inactive 04/18/96 NA No No
Description from Generator: HEAT EXCHANGER SOLIDS
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: K050
Current Management Units: Misc Store Container 082
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* SIC Codes: 2911 Petroleum Refining

983320 H Inactive 08/10/94 NA No No
Description from Generator: ORGANIC,SOLID, LEAD CONTAINING
Form Code: 409 Other non-halogenated organic solids
EPA Hazardous Waste Numbers: K052 P110
Current Management Units: Landfill 159
* Origin Codes: 1 Onsite-process/service
* Source Codes: A38 Tank sludge removal
* SIC Codes: 2911 Petroleum Refining

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17 059 59

30007 Shell Oil Company

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

986400 H Inactive NA No
Description from Generator: DAF UNIT SOLIDS
Form Code:
EPA Hazardous Waste Numbers: K048 K051
Current Management Units: None
* Origin Codes:

991002 H Inactive 06/21/94 NA No No
Description from Generator: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHY-
Form Code: 202 Halogenated (e.g., chlorinated) solvent
EPA Hazardous Waste Numbers: F002 F004
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A19 Other cleaning and degreasing
* SIC Codes: 2911 Petroleum Refining

993003 H Inactive 12/01/97 NA No No
Description from Generator: U003 ACETONITRILE OR ETHANENTRILE
Form Code: 203 Non-halogenated solvent
EPA Hazardous Waste Numbers: D001 U003
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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* The first value is considered the primary value (e.g. primary origin code).
As of 10/12/2000, the next unassigned sequence number for WASTES is 8040.

17 060

30007 Shell Oil Company

**** UNITS AT THIS SITE MANAGING WASTE ****

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

010 Injection Well Active 08/08/90 1/ NA DW173 UIC Permit Yes/
Description from Company: No. 2 WDW-173
Capacity: 1.0000 Capacity Unit of Measure: U
System Types: 134 Deepwell/underground injection
Wastes Currently Managed in Unit: 02041021 NaCl brine
Wastes Previously Managed in Unit: 100510 107140 80041021

017 WWTP Active 06/01/76 1 2 H/2 NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: Chemical Wastewater Treat
System Types: 121 Neutralization only 123 Settling/clarification only
124 Phase separation 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 0304207H API skimmi 03056072 Biosolids, 0312102H Groundwate 03131021 Groundwate 05013932 Catalyst f
80041021 Wastewater 8007104H Spent acid 8008109H Spent caus 80111021 Amine/wate 8019102H Wastewater
8025102H Amine/wate
Wastes Previously Managed in Unit: 03063032 107140 249890 909080

019 Tank (Surface) Active 06/01/77 2 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: SET Biosolids Surge Tank,
System Types: 141 Storage
Wastes Currently Managed in Unit: 0302607H Biosolids, 03056072 Biosolids,
Wastes Previously Managed in Unit: 107140 249890 949890

020 Tank (Surface) Active 06/01/77 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Tank T-2800
System Types: 141 Storage
Wastes Currently Managed in Unit: 80041021 Wastewater
Wastes Previously Managed in Unit: 02041021 100510 107140

024 Tank (Surface) Active 06/01/74 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: V-2426
System Types: 141 Storage
Wastes Currently Managed in Unit: 02022191 Bis-phenol
Wastes Previously Managed in Unit: 183050

025 Tank (Surface) Active 06/01/77 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: Tank T-1300
System Types: 141 Storage
Wastes Currently Managed in Unit: 80041021 Wastewater 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 108980 909080

17 061

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date
** 'Active' & 'Closure Pending' Units **								
027	Tank (Surface)	Active	06/01/75	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: Tank T-1310								
System Types: 141 Storage								
Wastes Currently Managed in Unit: 80041021 Wastewater 8019102H Wastewater								
Wastes Previously Managed in Unit: 107140 909080								
028	Tank (Surface)	Active	06/01/74	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: Tank T-13146								
System Types: 141 Storage								
Wastes Currently Managed in Unit: 80041021 Wastewater 80111021 Amine/wate 8019102H Wastewater 8025102H Amine/wate								
Wastes Previously Managed in Unit: 107140 108940 108980 909080								
032	Tank (Surface)	Active		1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: Tank T-6								
System Types: 141 Storage								
Wastes Currently Managed in Unit: 80041021 Wastewater 8019102H Wastewater								
Wastes Previously Managed in Unit: 107140 108980 909080								
036	Tank (Surface)	Active		1/ NA	NA	NA	Non-Hazardous Regulated	NA /
Description from Company: storage								
System Types: 141 Storage								
Wastes Currently Managed in Unit: 80041021 Wastewater								
Wastes Previously Managed in Unit: 02041021 100510 107140								
038	Surface Impoundment	Active		1 H/2	NA	002	RCRA Permitted	NA /
Description from Company: Chemical plant wastewateractivated sludge biotreater east basin								
Capacity: 1.5000 Capacity Unit of Measure: A								
System Types: 081 Biological treatment								
Wastes Currently Managed in Unit: 80041021 Wastewater 80111021 Amine/wate 8019102H Wastewater 8025102H Amine/wate								
039	Surface Impoundment	Active		1 H/2	NA	003	RCRA Permitted	NA /
Description from Company: Chemical plant waste water activated sludge biotreater middle basin								
Capacity: 1.5000 Capacity Unit of Measure: A								
System Types: 081 Biological treatment								
Wastes Currently Managed in Unit: 80041021 Wastewater 80111021 Amine/wate 8019102H Wastewater 8025102H Amine/wate								
040	Surface Impoundment	Active		1 H/2	NA	004	RCRA Permitted	NA /
Description from Company: chemical plant wastewater activated sludge biotreater west basin								
Capacity: 1.6000 Capacity Unit of Measure: A								
System Types: 081 Biological treatment								
Wastes Currently Managed in Unit: 80041021 Wastewater 80111021 Amine/wate 8019102H Wastewater 8025102H Amine/wate								
041	Tank	Active		1/ NA	NA	NA	Non-Hazardous Regulated	Yes/

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30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

Description from Company: neutralization/filtration system disposal well facility
System Types: 121 Neutralization only 124 Phase separation
Wastes Currently Managed in Unit: 02041021 NaCl brine 80041021 Wastewater
Wastes Previously Managed in Unit: 100510 107140

---

042 WWTP Active 2 H/2 NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: biosolids belt filters(3)
System Types: 124 Phase separation
Wastes Currently Managed in Unit: 0302607H Biosolids, 03056072 Biosolids,
Wastes Previously Managed in Unit: 107140 249890 949890

---

045 Tank (Surface) Active 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: T-9554
System Types: 141 Storage
Wastes Currently Managed in Unit: 02041021 NaCl brine
Wastes Previously Managed in Unit: 100510 80041021

---

048 Tank (Surface) Active 01/01/81 H/ NA NA NA RCRA Pmt Exempt-Tot Encl Trtmt NA /
Description from Company: T-EX-76
Capacity: 147000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 1702208H Phenol hea
Wastes Previously Managed in Unit: 919440

---

049 Tank (Surface) Active 01/01/81 H/ NA NA NA RCRA Pmt Exempt-Tot Encl Trtmt NA /
Description from Company: T-EX-77
Capacity: 147000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 1702208H Phenol hea
Wastes Previously Managed in Unit: 919440

---

051 Tank (Surface) Active 01/01/70 H/ NA NA NA RCRA Pmt Exempt-Tot Encl Trtmt NA /
Description from Company: V-OL-211
Capacity: 8000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 1702208H Phenol hea
Wastes Previously Managed in Unit: 919440

---

052 Tank (Surface) Active 01/01/70 H/ NA NA NA RCRA Pmt Exempt-Tot Encl Trtmt NA /
Description from Company: phenol heavy ends
Capacity: 104000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 1702208H Phenol hea
Wastes Previously Managed in Unit: 919440

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0690

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

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055 Tank (Surface) Active 01/01/69 1 H/ NA NA NA RCRA Pmt Exempt-Tot Encl Trtmt NA /
Description from Company: recovered oil
Capacity: 997500.0000 Capacity Unit of Measure: G
System Types: 124 Phase separation 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 6004219H Hazardous 60052191 Nonhazardo
Wastes Previously Managed in Unit: 919450

---

056 Tank (Surface) Active 01/01/41 1 H/ NA NA NA RCRA Pmt Exempt-Tot Encl Trtmt NA /
Description from Company: recovered oil
Capacity: 11600.0000 Capacity Unit of Measure: G
System Types: 124 Phase separation 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 6004219H Hazardous 60052191 Nonhazardo
Wastes Previously Managed in Unit: 919450

---

065 WWTP Active 1 H/1 H NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: Refinery Wastewater Treat
System Types: 081 Biological treatment 121 Neutralization only
123 Settling/clarification only 124 Phase separation
141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 0302607H Biosolids, 0312102H Groundwate 03131021 Groundwate 03146071 Biosolids, 7007102H Wastewater
80041021 Wastewater 8007104H Spent acid 8008109H Spent caus 80111021 Amine/wate 8019102H Wastewater
8025102H Amine/wate
Wastes Previously Managed in Unit: 03056072 107140 1705114H 249890 910650

---

066 Tank (Surface) Active 1 H/1 H NA NA RCRA Interim Status Unit NA /
Description from Company: Used for Decanting, X324
Capacity: 21000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 52012191 Sulfolane 80041021 Wastewater 8019102H Wastewater 107140 WASTEWATER 108940 DIISOPROPY
Wastes Previously Managed in Unit: 108980 8017207H 909080 910650 917180 950400 950430

---

067 Tank (Surface) Active 1 H/1 H NA NA RCRA Interim Status Unit NA /
Description from Company: Used for Decanting, X-325
Capacity: 21000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 52012191 Sulfolane 80041021 Wastewater 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 108940 108980 8017207H 909080 910650 917180 950400 950430

---

068 Tank (Surface) Active 1 H/1 H NA NA RCRA Interim Status Unit NA /

17 064 44

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **
Description from Company: Used for Decanting, X326
Capacity: 21000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 0303205H DAF unit f 80041021 Wastewater 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 108940 108980 8017207H 909080 910650 917180 950400 950430

---

069 Tank (Surface) Active 1 H/1 H NA NA RCRA Interim Status Unit NA /
Description from Company: Used for Decanting, X-327
Capacity: 21000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 0303205H DAF unit f 80041021 Wastewater 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 108940 108980 8017207H 909080 910650 917180 950400 950430

---

070 Tank (Surface) Active 1 H/1 H NA NA RCRA Interim Status Unit NA /
Description from Company: Used for Decanting, X-328
Capacity: 21000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 52012191 Sulfolane 80041021 Wastewater 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 108940 108980 8017207H 909080 910650 917180 950400 950430

---

072 Tank (Sub-surface) Active 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: west concrete decant
System Types: 124 Phase separation
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 03146071 Biosolids, 52012191 Sulfolane 80041021 Wastewater 8007104H Spent acid 8008109H Spent caus
8019102H Wastewater
Wastes Previously Managed in Unit: 0307503H 107140 900630 905050 909080 941520

---

073 Tank (Sub-surface) Active 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: east concrete decant
System Types: 124 Phase separation
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 03146071 Biosolids, 52012191 Sulfolane 80041021 Wastewater 8007104H Spent acid 8008109H Spent caus
8019102H Wastewater
Wastes Previously Managed in Unit: 0307503H 107140 900630 905050 909080 941520

---

076 Tank (Surface) Active 07/01/80 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: Tank X-322
System Types: 141 Storage
Wastes Currently Managed in Unit: 52012191 Sulfolane 80041021 Wastewater 8017207H Misc. list 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 909080 917180

---

077 Tank (Surface) Active 07/01/80 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /

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65

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

Description from Company: Tank X-323
System Types: 141 Storage
Wastes Currently Managed in Unit: 52012191 Sulfolane 80041021 Wastewater 8017207H Misc. list 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 909080 917180

---

083 Tank (Surface) Active 06/01/86 H/ NA NA NA RCRA Pmt Exempt-Tot Encl Trtmt NA /
Description from Company: L-301
Capacity: 210000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 919450 OIL, RECOV

---

084 Tank (Surface) Active 06/01/86 H/ NA NA NA RCRA Pmt Exempt-Tot Encl Trtmt NA /
Description from Company: L-302
Capacity: 210000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 919450 OIL, RECOV

---

085 Tank (Surface) Active H/ NA NA NA RCRA Pmt Exempt-Tot Encl Trtmt NA /
Description from Company: L-303
Capacity: 210000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 919450 OIL, RECOV

---

086 Tank (Surface) Active H/ NA NA NA RCRA Pmt Exempt-Tot Encl Trtmt NA /
Description from Company: L-304
Capacity: 210000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 919450 OIL, RECOV

---

087 Tank (Surface) Active 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: Ballast Water Tank X-320
System Types: 141 Storage
Wastes Currently Managed in Unit: 80041021 Wastewater 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 909080

---

089 Tank (Surface) Active 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: NET Spill Diversion Tank
System Types: 141 Storage
Wastes Currently Managed in Unit: 52012191 Sulfolane 80041021 Wastewater 8007104H Spent acid 8008109H Spent caus 8019102H Wastewater
917180 ORGANICS,
Wastes Previously Managed in Unit: 0301116H 107140 8017207H 900630 905050 905950 909080 910650

---

102 Surface Impoundment Active / NA NA NA NA /

17 990 066

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

Description from Company: north pond
System Types: 133 Surface impoundment (to be closed as a landfill)
Wastes Currently Managed in Unit:

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103 Surface Impoundment Active / NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: refinery stormwater holding pond
System Types: 141 Storage
Wastes Currently Managed in Unit:

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104 Surface Impoundment Active / NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: chemical stormwater cell A
System Types: 141 Storage
Wastes Currently Managed in Unit:

---

105 Tank (Surface) Active 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: Ballast Water Tank X-315
System Types: 141 Storage
Wastes Currently Managed in Unit: 80041021 Wastewater 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 909080

---

106 Surface Impoundment Active / NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: chemical stormwater cell B
System Types: 141 Storage
Wastes Currently Managed in Unit:

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107 Surface Impoundment Active / NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: chemical stormwater cell D
System Types: 141 Storage
Wastes Currently Managed in Unit:

---

108 Tank (Surface) Active 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: SET Spill Diversion Tank,
System Types: 141 Storage
Wastes Currently Managed in Unit: 80041021 Wastewater 8007104H Spent acid 8008109H Spent caus 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 108980 900630 905050 909080

---

123 Tank (Sub-surface) Active 1 H/1 H NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: CCLP CPI
System Types: 141 Storage
Wastes Currently Managed in Unit: 52012191 Sulfolane 80041021 Wastewater 8007104H Spent acid 8008109H Spent caus 8019102H Wastewater
Wastes Previously Managed in Unit: 0301116H 107140 900630 905050 905950 909080 910650 982780

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124 Tank (Sub-surface) Active 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /

17 0690 67

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

Description from Company: TC&G CPI
System Types: 141 Storage
Wastes Currently Managed in Unit: 52012191 Sulfolane 80041021 Wastewater 8007104H Spent acid 8008109H Spent caus 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 900630 905050 909080

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125 Tank (Sub-surface) Active 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: DD-2 CPI
System Types: 141 Storage
Wastes Currently Managed in Unit: 52012191 Sulfolane 80041021 Wastewater 8007104H Spent acid 8008109H Spent caus 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 900630 905050 909080

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126 Tank (Sub-surface) Active 1 H/1 H NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: CPI-2
System Types: 141 Storage
Wastes Currently Managed in Unit: 52012191 Sulfolane 80041021 Wastewater 8007104H Spent acid 8008109H Spent caus 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 900630 905050 909080

---

127 Tank (Sub-surface) Active 1 H/1 H NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: CPI-1
System Types: 141 Storage
Wastes Currently Managed in Unit: 52012191 Sulfolane 80041021 Wastewater 8007104H Spent acid 8008109H Spent caus 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 900630 905050 909080

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128 Tank (Surface) Active 1 2 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: primary solids belt filters (2)
System Types: 124 Phase separation
Wastes Currently Managed in Unit: 03085031 API basin 05013932 Catalyst f 80041021 Wastewater 8019102H Wastewater
Wastes Previously Managed in Unit: 03063032 107140 141520 371310 909080 970260

---

132 Surface Impoundment Active 2 3/ NA NA NA Non-Hazardous Regulated Yes/
Description from Company: Site 301
System Types: 133 Surface impoundment (to be closed as a landfill)
Wastes Currently Managed in Unit: 05013932 Catalyst f 371310 CATALYST,

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133 Tank (Surface) Active 1 H/1 H NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: NET Equalization Tank, X-
System Types: 141 Storage
Wastes Currently Managed in Unit: 52012191 Sulfolane 80041021 Wastewater 8007104H Spent acid 8008109H Spent caus 8019102H Wastewater
Wastes Previously Managed in Unit: 107140 900630 905050 909080 910650

29 890 17

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date
** 'Active' & 'Closure Pending' Units **								
134	Tank (Surface)	Active		1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: SET Spill Diversion Tank,								
System Types: 141 Storage								
Wastes Currently Managed in Unit: 80041021 Wastewater 8007104H Spent acid 8008109H Spent caus 8019102H Wastewater								
Wastes Previously Managed in Unit: 107140 108980 900630 905050 909080								
135	Tank (Surface)	Active		1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: Tank T-1331								
System Types: 141 Storage								
Wastes Currently Managed in Unit: 80041021 Wastewater 8019102H Wastewater								
Wastes Previously Managed in Unit: 107140 909080								
136	Tank (Surface)	Active		1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: Tank T-1332								
System Types: 141 Storage								
Wastes Currently Managed in Unit: 80041021 Wastewater 8019102H Wastewater								
Wastes Previously Managed in Unit: 107140 909080								
137	Tank (Surface)	Active		1 H/ NA	NA	NA	RCRA Interim Status Unit	NA /
Description from Company: Tank T-1333								
Capacity: 16000.0000 Capacity Unit of Measure: G								
System Types: 141 Storage								
Wastes Currently Managed in Unit: 80041021 Wastewater 8019102H Wastewater								
Wastes Previously Managed in Unit: 107140 909080 909390								
138	Tank (Surface)	Active		1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: Tank T-1334								
System Types: 141 Storage								
Wastes Currently Managed in Unit: 80041021 Wastewater 8019102H Wastewater								
Wastes Previously Managed in Unit: 107140 909080								
139	Tank (Surface)	Active		1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: Tank T-1340								
System Types: 141 Storage								
Wastes Currently Managed in Unit: 80041021 Wastewater 8019102H Wastewater								
Wastes Previously Managed in Unit: 107140 905050 909080 909150								
145	Boiler	Active		1 H/ NA	NA	NA	RCRA Interim Status Unit	NA /
Description from Company: processing for energy recovery fut 120								
System Types: 051 Energy recovery - liquids								
Biennial System Regulatory Status: Regulatory status unknown								
Wastes Currently Managed in Unit: 00042191 Butadiene 02022191 Bis-phenol 1702208H Phenol hea 6004219H Hazardous								
Wastes Previously Managed in Unit: 183050 919440								

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

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146 Boiler Active 1 H/ NA NA IN1 RCRA Interim Status Unit NA /
Description from Company: processing for energy recovery fut 110
Capacity: 1.0000 Capacity Unit of Measure: U
System Types: 051 Energy recovery - liquids
Wastes Currently Managed in Unit: 00042191 Butadiene 02022191 Bis-phenol 1702208H Phenol hea 6004219H Hazardous 183050 BISPHENOL
919440 PHENOL ACE

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148 Boiler Active 1 H/ NA NA IN3 RCRA Interim Status Unit NA /
Description from Company: processing for energy recovery fut 130
Capacity: 1.0000 Capacity Unit of Measure: U
System Types: 051 Energy recovery - liquids
Wastes Currently Managed in Unit: 00042191 Butadiene 02022191 Bis-phenol 1702208H Phenol hea 6004219H Hazardous 183050 BISPHENOL
919440 PHENOL ACE

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149 WWTP Active 2/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: SET Biosolids Hydrolysis
System Types: 094 Other organic/inorganic treatment
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 03056072 Biosolids,
Wastes Previously Managed in Unit: 02041021 100510 107140

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155 Waste Pile Active 01/01/90 1 2/1 H NA 007 RCRA Permitted NA /
Description from Company: staging solidificaton unit
Capacity: 2500.0000 Capacity Unit of Measure: Y
System Types: 111 Stab/Fix with cementitious/or pozzolanie materials 141 Storage
Wastes Currently Managed in Unit: 00024031 Polybutadi 00034031 DEA Polyme 01012191 Resin wast 01034031 Resin wast 02014031 Solid bis-
02022191 Bis-phenol 03085031 API basin 08013192 Sulfur was 60033011 Media cont 70023011 Media, oil
80053931 Catalyst, 80103191 Storage ta 80264891 Coke fines
Wastes Previously Managed in Unit: 03063032 111380 141520 177720 179640 183620 270240 80111021 8025102H 913700 950430
970260 979840 982780

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156 Surface Impoundment Active / NA NA NA RCRA Pmt Exempt-W.W.T. Yes/
Description from Company: ponds for stormwater outfalls 001, 002, 003, 004
System Types: 141 Storage
Wastes Currently Managed in Unit:

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158 Contain Store Area Active H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: refinery paint yard container storage area
System Types: 141 Storage
Wastes Currently Managed in Unit: 0704209H Paint liqu 0705409H Paint soli
Wastes Previously Managed in Unit: 910650

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159 Landfill Active 1 2 3 H/1 H NA 006 RCRA Permitted Yes/

17 070 70

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

Description from Company: Site 104
Capacity: 17.0000 Capacity Unit of Measure: A
System Types: 132 Landfill
Wastes Currently Managed in Unit: 00024031 Polybutadi 00034031 DEA Polyme 01012191 Resin wast 01034031 Resin wast 02014031 Solid bis-
02022191 Bis-phenol 0307503H CPI sludge 03085031 API basin 03146071 Biosolids, 05013932 Catalyst f
07013891 Sandblasti 07063111 Asbestos d 07083901 Manmade mi 08013192 Sulfur was 60033011 Media cont
70023011 Media, oil 80053931 Catalyst, 80103191 Storage ta 80123101 Spent filt 80264891 Coke fines
80294091 Class 1 Or 108940 DIISOPROPY 111380 AMINES-RES 141520 PRIMARY SO 170210 CATALYST,
170750 ASBESTOS 170770 PLANT WAST 177720 SOIL, OIL 179640 RESIN WAST 183050 BISPHENOL
183620 OIL AND DE 270240 SULFUR WAS 371310 CATALYST, 905950 LEACHATE C 919440 PHENOL ACE
941520 Refinery P 950430 OIL SLUDGE 970260 ASH, INCIN 983320 ORGANIC,SO
Wastes Previously Managed in Unit: 03063032 0311303H 113180 8006393H 8013310H 910650 948880

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160 Waste Pile Active 10/03/96 1/ NA NA NA NA / NA
Description from Company: sandblasting rabbit patch
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 07013891 Sandblasti
Wastes Previously Managed in Unit: 279760

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161 Waste Pile Active 09/17/92 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: sandblasting refinery paint yard
System Types: 141 Storage
Wastes Currently Managed in Unit: 07013891 Sandblasti
Wastes Previously Managed in Unit: 279760

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163 Tank (Surface) Active 10/19/93 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: DAF Float Storage Tank, X
System Types: 141 Storage
Wastes Currently Managed in Unit: 0303205H DAF unit f

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164 Misc Store Container Active 10/19/93 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: chem lab waste portable container
Capacity: 500.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 8007104H Spent acid 8008109H Spent caus 8017207H Misc. list

---

165 Contain Store Area Active 05/17/93 1 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: northeast container storage area
System Types: 141 Storage
Wastes Currently Managed in Unit: 01012191 Resin wast 0102219H Resin wast 01034031 Resin wast 0104403H Resin wast 0607207H Epichloroh
0704209H Paint liqu 0705409H Paint soli 0710309H Spent Ni-c 09010031 Lab packs 0902003H Lab packs,
0903103H Spent acid 0904105H Laboratory 1701301H Soil conta 1702208H Phenol hea 1703393H Aluminum c
1704208H Phenolic l 5202602H Spent sulf 7001319H Heat excha 7003114H Heat excha 7006319H Clarified
80012971 PCB oil, > 80023961 PCB cont. 80033191 PCB cont m 80053931 Catalyst, 8006393H Catalyst,
8013310H Spent filt 80142981 PCB oil > 80153971 PCB cont e 8016319H PCB cont m 8024404H Filter med
8027319H Media, mer 80302191 Class 1 Or 8032405H Pyrophoric 80332061 PCB OIL, < 80343191 PCB CONT.
80353191 PCB CONT. 80363191 Corrosive 8038409H Tank Seals 913700 RESIN WAST
Wastes Previously Managed in Unit: 0311303H 111380 116080 173880 179410 179430 8031319H 910650 919440 970210 979430
979450 982780

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

166 Contain Store Area — Active — 08/04/94 — 1/ NA — NA — NA — Non-Hazardous Regulated — NA /
Description from Company: northeast class 1 container storage area
System Types: 141 Storage
Wastes Currently Managed in Unit: 07063111 Asbestos d 07083901 Manmade mi 80203191 Trash, pla 80294091 Class 1 Or

167 Contain Store Area — Active — 06/14/94 — 1 H/ NA — NA — NA — RCRA Pmt Exempt - Accumulation Time — NA /
Description from Company: bulk container storage area
System Types: 141 Storage
Wastes Currently Managed in Unit: 0001203H Acetonitri 01012191 Resin wast 0102219H Resin wast 01034031 Resin wast 0104403H Resin wast
03152071 API Skim f 1701301H Soil conta 5202602H Spent sulf 7004393H Refinery h 7005319H Refinery c
7006319H Clarified 8006393H Catalyst, 8024404H Filter med 80294091 Class 1 Or 80302191 Class 1 Or
8032405H Pyrophoric 80363191 Corrosive 8039319H Media cont
Wastes Previously Managed in Unit: 0311303H 8031319H 941520 993003

168 Misc Store Container — Active — 06/14/94 — 1/ NA — NA — NA — Non-Hazardous Regulated — NA /
Description from Company: misc. class 1plant trash containers
System Types: 141 Storage
Wastes Currently Managed in Unit: 80203191 Trash, pla

169 Misc Store Container — Active — 06/14/94 — 1/ NA — NA — NA — Non-Hazardous Regulated — NA /
Description from Company: misc asbestos containers
System Types: 141 Storage
Wastes Currently Managed in Unit: 07063111 Asbestos d

170 Misc Store Container — Active — 06/14/94 — 2/ NA — NA — NA — Non-Hazardous Regulated — NA /
Description from Company: misc. class 2 general trash containers
System Types: 141 Storage
Wastes Currently Managed in Unit: 80219012 Trash, gen 80289992 Trash, gen

171 Waste Pile — Active — 06/21/94 — 1/ NA — NA — NA — Non-Hazardous Regulated — NA /
Description from Company: blasting grit accumulation site
System Types: 141 Storage
Wastes Currently Managed in Unit: 07013891 Sandblasti 80373191 Inert mate

172 WWTP — Active — 10/04/94 — H/ NA — NA — NA — RCRA Pmt Exempt-W.W.T. — NA /
Description from Company: refinery wastewater benzene neshap
System Types: 123 Settling/clarification only 125 Other treatment
Wastes Currently Managed in Unit: 0310503H CPI sludge 7007102H Wastewater

173 Tank (Surface) — Active — 10/04/94 — H/ NA — NA — NA — RCRA Pmt Exempt-Tot Encl Trtmt — NA /
Description from Company: IGF float treatment tanks
System Types: 124 Phase separation
Wastes Currently Managed in Unit: 0309205H IGF float

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

174 Misc Store Container — Active — 12/08/94 — 1 H/ NA — NA — NA — Non-Hazardous Regulated — NA /
Description from Company: misc. manmade mineral fiber containers
System Types: 141 Storage
Wastes Currently Managed in Unit: 07083901 Manmade mi 1707606H EX-76 Tank

175 Distill/Solv Recovery — Active — 01/07/97 — H/ NA — NA — NA — RCRA Pmt Exempt-Recycling Unit — NA /
Description from Company: paint solvent recovery still
System Types: 021 Fractionation/distillation
Biennial System Regulatory Status: All units exempt from EPA and TX permits
Wastes Currently Managed in Unit: 0704209H Paint liqu 0705409H Paint soli

176 Waste Pile — Active — 07/08/97 — 1/ NA — NA — NA — Other — NA /
Description from Company: recycle material pile
System Types: 141 Storage
Biennial System Regulatory Status: All units exempt from EPA and TX permits
Wastes Currently Managed in Unit: 07113901 CONCRETE/C

177 Contain Store Area — Active — 12/21/98 — 1 H/ NA — NA — NA — Other — NA /
Description from Company: misc. portable tanks
System Types: 141 Storage
Biennial System Regulatory Status: All units exempt from EPA and TX permits
Wastes Currently Managed in Unit: 0301116H Landfill 1 03152071 API Skim f 5202602H Spent sulf 7004393H Refinery h 7005319H Refinery c
7006319H Clarified 80053931 Catalyst, 8006393H Catalyst,

178 Contain Store Area — Active — 12/21/98 — 2/ NA — NA — NA — Non-Hazardous Regulated — NA /
Description from Company: storage
System Types: 141 Storage
Biennial System Regulatory Status: All units exempt from EPA and TX permits
Wastes Currently Managed in Unit: 03056072 Biosolids,

179 Boiler — Active — 09/06/00 — 1 H/ NA — NA — NA — RCRA Interim Status Unit — NA /
Description from Company: processing for energy recovery/1 Unit
System Types: 051 Energy recovery - liquids
Biennial System Regulatory Status: All units subject to RCRA regulations
Wastes Currently Managed in Unit: 00042191 Butadiene 02022191 Bis-phenol 1702208H Phenol hea 6004219H Hazardous

As of 10/12/2000, the next unassigned sequence number for UNITS is 180.

** 'Inactive', 'Closed' & 'Post Closure Care' Units **

001 Landfill — Post Close Care — 09/30/96 — / NA — NA — NA — RCRA Interim Status Unit — Yes/
Description from Company: landfill
System Types: 132 Landfill
Wastes Previously Managed in Unit: 107140 108940 108980 113180 141520 170210 170750 180620 183050 270240 371310
900630 905950 910650 919440 948880 950430 970260 983320

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Inactive', 'Closed' & 'Post Closure Care' Units **

002 Incinerator — Closed — 06/26/98 — 2 H/2 — NA — 005 — RCRA Permitted — NA /
Description from Company: incinerator
System Types: 042 Incineration - sludges
Wastes Previously Managed in Unit: 03056072

003 Injection Well — Inactive — 06/01/56 — / NA — DW172 — UIC Permit — Yes/
Description from Company: WDW-172
Capacity: 1.0000 Capacity Unit of Measure: U
System Types: 134 Deepwell/underground injection
Wastes Previously Managed in Unit: 100510 107140

004 Landfill — Post Close Care — 06/01/77 — / NA — NA — 001 — RCRA Permitted — Yes/
Description from Company: Site 102
Capacity: 65000.0000 Capacity Unit of Measure: Y
System Types:
Wastes Previously Managed in Unit: 113180 141520 170210 170750 177720 183050 183620 270240 371310 905950 910650 919440 948880 950430 970260 983320

005 Landfill — Inactive — / NA — NA — NA — Yes/
Description from Company: Site 103
System Types: 132 Landfill
Wastes Previously Managed in Unit: 108940 108980 113180 141520 170210 180620 183050 270240 371310 900630 905950 910650 948880 950430 970260 983320

006 Waste Pile — Inactive — / NA — NA — NA — NA /
Description from Company: closure underway
System Types: 137 Other disposal
Wastes Previously Managed in Unit: 183620 280370 950430

007 Incinerator — Closed — / NA — NA — NA — NA /
Description from Company: incinerator
System Types: 042 Incineration - sludges
Wastes Previously Managed in Unit: 913690 914680 914710 949610

011 Surface Impoundment — Post Close Care — 09/30/96 — / NA — NA — NA — RCRA Interim Status Unit — NA /
Description from Company: surface impoundment
System Types: 133 Surface impoundment (to be closed as a landfill)
Wastes Previously Managed in Unit: 107140 108940 108980 113180 141520 170210 180620 183050 249890 270240 948880 950430 979840

012 Surface Impoundment — Closed — 06/01/77 — / NA — NA — NA — RCRA Interim Status Unit — NA /
Description from Company: surface impoundment
System Types: 133 Surface impoundment (to be closed as a landfill)
Wastes Previously Managed in Unit: 107140 108940 108980 113180 141520 170210 180620 183050 270240 900630 908210 909080 909150 948880 950430

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date
** 'Inactive', 'Closed' & 'Post Closure Care' Units **								
013	Surface Impoundment	Inactive		/ NA	NA	NA		NA /
Description from Company: surface impoundment								
System Types: 133 Surface impoundment (to be closed as a landfill)								
Wastes Previously Managed in Unit: 107140 108940 108980 113180 141520 170210 180620 183050 270240 900630 908210 909080 909150 948880 950430 979840								
014	Surface Impoundment	Closed		/ NA	NA	NA		NA /
Description from Company: surface impoundment								
System Types: 133 Surface impoundment (to be closed as a landfill)								
Wastes Previously Managed in Unit: 107140 108940 108980 113180 141520 170210 180620 183050 270240 900630 908210 909080 909150 948880 950430 979840								
015	Surface Impoundment	Closed		/ NA	NA	NA		NA /
Description from Company: surface impoundment								
System Types: 133 Surface impoundment (to be closed as a landfill)								
Wastes Previously Managed in Unit: 107140 141520 909080								
016	Surface Impoundment	Closed		/ NA	NA	NA		NA /
Description from Company: surface impoundment								
System Types: 133 Surface impoundment (to be closed as a landfill)								
Wastes Previously Managed in Unit: 107140 141520 909080								
018	Tank (Sub-surface)	Closed		/ NA	NA	NA		NA /
Description from Company: A-1319								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 107140 249890 909080								
021	Tank (Surface)	Closed		/ NA	NA	NA		NA /
Description from Company: T-9562								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 100510 107140								
026	Tank (Surface)	Closed	06/02/95	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: T-1317								
System Types: 141 Storage								
029	Contain Store Area	Closed		/ NA	NA	NA		NA /
Description from Company: container storage								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 113180 170750 900630 910870 912370 912380 913050 913700 914670 914760 948880 949610 951720 970440 971920								
030	Contain Store Area	Closed		/ NA	NA	NA		NA /

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date
** 'Inactive', 'Closed' & 'Post Closure Care' Units **								
Description from Company: container storage								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 113180 170750 900630 910870 912370 912380 913050 913700 914670 914760 948880 949610 951720 970440 971920								
031	Contain Store Area	Closed		/ NA	NA	NA		NA /
Description from Company: Storage								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 113180 170750 900630 910870 912370 912380 913050 913700 914670 914760 948880 949610 951720 970440 971920								
033	Tank (Surface)	Inactive		/ NA	NA	NA		NA /
Description from Company: A-1323								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 107140 108980 909080								
034	Tank (Surface)	Inactive	06/21/94	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: storage								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 03085031								
037	Surface Impoundment	Inactive		/ NA	NA	NA		NA /
Description from Company: stormwater impoundment lagoon cell C								
System Types: 141 Storage								
043	Waste Treatment Unit	Inactive	06/21/94	1 2 H/ NA	NA	NA		NA /
System Types:								
044	Waste Treatment Unit	Inactive	06/21/94	1 2 H/ NA	NA	NA		NA /
System Types:								
046	Tank (Surface)	Inactive		/ NA	NA	NA		NA /
Description from Company: T-760								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 100510 107140								
047	Tank (Surface)	Closed		/ NA	NA	NA		NA /
Description from Company: T--2118								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 100510 107140								
050	Tank (Surface)	Inactive		/ NA	NA	NA		NA /
Description from Company: V-8326								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 919440								

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30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date
** 'Inactive', 'Closed' & 'Post Closure Care' Units **								
057	Landspreading Area	Closed	06/01/77	/ NA	NA	NA		Yes/
Description from Company: landspreading area System Types: 131 Land treatment/application/farming Wastes Previously Managed in Unit: 983320								
058	Surface Impoundment	Closed	06/01/78	/ NA	NA	NA		Yes/
Description from Company: oil sludge System Types: 133 Surface impoundment (to be closed as a landfill) Wastes Previously Managed in Unit: 950430								
059	Landfill	Closed	06/01/77	/ NA	NA	NA		Yes/
Description from Company: Site 203 System Types: 132 Landfill Wastes Previously Managed in Unit: 170210 249890 950430								
060	Landfill	Closed	06/01/78	/ NA	NA	NA		Yes/
Description from Company: Sites 201 and 202 System Types: 132 Landfill Wastes Previously Managed in Unit: 170210 249890 950430								
061	Surface Impoundment	Inactive		/ NA	NA	NA		NA /
Description from Company: beltway runoff lagoon System Types: 133 Surface impoundment (to be closed as a landfill) Wastes Previously Managed in Unit: 180620 183620								
062	Surface Impoundment	Inactive		/ NA	NA	NA		NA /
Description from Company: dewatering System Types: 133 Surface impoundment (to be closed as a landfill) Wastes Previously Managed in Unit: 249890								
071	Tank (Sub-surface)	Inactive	06/21/94	1 2 H/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste storage System Types: 141 Storage Wastes Previously Managed in Unit: 910650								
074	Contain Store Area	Closed	03/01/85	/ NA	NA	NA		NA /
Description from Company: storage System Types: 141 Storage Wastes Previously Managed in Unit: 170750								
075	Contain Store Area	Closed	03/01/85	/ NA	NA	NA		NA /
Description from Company: storage System Types: 141 Storage Wastes Previously Managed in Unit: 917180 973340 979450 983320								

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date
** 'Inactive', 'Closed' & 'Post Closure Care' Units **								
078	Surface Impoundment	Closed		/ NA	NA	NA		Yes/
Description from Company: acid neutralization pit								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 905050 909150								
079	Surface Impoundment	Inactive		/ NA	NA	NA		NA /
Description from Company: biological sludge								
System Types: 133 Surface impoundment (to be closed as a landfill)								
Wastes Previously Managed in Unit: 249890								
080	Surface Impoundment	Inactive		/ NA	NA	NA		NA /
Description from Company: refinery waste water-south pond refinery								
System Types: 133 Surface impoundment (to be closed as a landfill)								
Wastes Previously Managed in Unit: 107140 108980 113180 900630 905050 908910 909080 910230								
082	Misc Store Container	Inactive	06/21/94	1 H/ NA	NA	NA		NA /
Description from Company: paint waste								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 111380 910650 970210								
088	Tank (Sub-surface)	Inactive	06/21/94	1 H/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste, liquid								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 910650								
090	Tank (Surface)	Inactive	06/21/94	1 H/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste, liquid								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 910650								
091	Tank (Surface)	Inactive	06/21/94	1 H/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste, liquid								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 910650								
092	Tank (Surface)	Inactive	06/21/94	1 H/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste liquid								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 910650								
093	Tank (Surface)	Inactive	06/21/94	1 H/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste liquid								
System Types: 141 Storage								
Wastes Previously Managed in Unit: 910650								

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30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date
** 'Inactive', 'Closed' & 'Post Closure Care' Units **								
094	Tank (Surface)	Inactive	06/21/94	1 H/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste, liquid System Types: 141 Storage Wastes Previously Managed in Unit: 910650								
095	Tank (Sub-surface)	Inactive	06/21/94	1 H/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste, liquid System Types: 141 Storage Wastes Previously Managed in Unit: 910650								
096	Tank (Surface)	Inactive	06/21/94	1 H/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste, liquid System Types: 081 Biological treatment Wastes Previously Managed in Unit: 910650								
097	Tank (Surface)	Inactive	06/21/94	1 H/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste liquid System Types: 081 Biological treatment Wastes Previously Managed in Unit: 910650								
098	Tank (Surface)	Inactive	06/21/94	1 2/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste, liquid System Types: 123 Settling/clarification only Wastes Previously Managed in Unit: 910650								
099	Tank (Surface)	Inactive	06/21/94	1 2/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste, liquid System Types: 123 Settling/clarification only Wastes Previously Managed in Unit: 910650								
101	Tank (Surface)	Inactive	06/02/95	1 2/1 H	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: paint waste liquid System Types: 124 Phase separation Wastes Previously Managed in Unit: 910650								
109	Tank (Sub-surface)	Inactive	06/21/94	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: wastewater neutralization unit System Types: 121 Neutralization only								
111	Tank (Sub-surface)	Inactive	06/21/94	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: Wastewater storage System Types: 141 Storage								
112	Tank (Sub-surface)	Inactive	06/21/94	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /

0279

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date
** 'Inactive', 'Closed' & 'Post Closure Care' Units **								
Description from Company: wastewater storage								
System Types: 141 Storage								
113	Tank (Sub-surface)	Inactive	06/21/94	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: wastewater storage								
System Types: 141 Storage								
114	Tank (Sub-surface)	Inactive	06/21/94	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: wastewater storage								
System Types: 141 Storage								
115	Tank (Sub-surface)	Inactive	06/21/94	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: wastewater storage								
System Types: 141 Storage								
116	Tank (Sub-surface)	Inactive	06/21/94	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: wastewater storage								
System Types: 141 Storage								
117	Tank (Surface)	Inactive	06/21/94	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: wastewater storage								
System Types: 141 Storage								
118	Tank (Surface)	Inactive	06/21/94	1 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: wastewater storage								
System Types: 141 Storage								
119	Tank (Surface)	Inactive	06/21/94	1 2/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: wastewater storage								
System Types: 141 Storage								
121	Tank (Surface)	Inactive	06/21/94	1 2/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: wastewater storage								
System Types: 141 Storage								
122	Tank (Surface)	Inactive	06/21/94	1 2/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: wastewater storage								
System Types: 141 Storage								
129	Tank (Surface)	Inactive	06/21/94	1 3 H/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /
Description from Company: solids filters								
System Types: 124 Phase separation								
141	Contain Store Area	Inactive	06/21/94	H/ NA	NA	NA		NA /

080

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Inactive', 'Closed' & 'Post Closure Care' Units **

Description from Company: refinery paint yard
System Types: 141 Storage
Wastes Previously Managed in Unit: 0704209H 0705409H

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142 Contain Store Area Inactive / NA NA NA NA / NA

Description from Company: rabbit patch paint yard
System Types: 141 Storage
Wastes Previously Managed in Unit: 910650

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143 Contain Store Area Inactive 06/14/94 / NA NA NA NA / NA

Description from Company: dupont paint yard
System Types: 141 Storage
Wastes Previously Managed in Unit: 910650

---

144 Contain Store Area Inactive / NA NA NA NA / NA

Description from Company: temp staging area
System Types: 141 Storage
Wastes Previously Managed in Unit: 141520 177720 183620 270240 910650 913700 950430 982780

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147 Boiler Inactive 04/18/96 1 H/ NA NA IN2 RCRA Interim Status Unit NA / NA

Description from Company: processing for energy recovery fut 120
Capacity: 1.0000 Capacity Unit of Measure: U
System Types: 051 Energy recovery - liquids
Biennial System Regulatory Status: Regulatory status unknown

---

151 Tank (Surface) Inactive 06/21/94 1/ NA NA NA RCRA Pmt Exempt-W.W.T. NA / NA

Description from Company: wastewater storage
System Types: 141 Storage

---

152 Tank (Surface) Inactive 06/21/94 1/ NA NA NA RCRA Pmt Exempt-W.W.T. NA / NA

Description from Company: wastewater storage
System Types: 141 Storage

---

153 Tank (Surface) Inactive 06/21/94 1/ NA NA NA RCRA Pmt Exempt-W.W.T. NA / NA

Description from Company: wastewater storage
System Types: 141 Storage

---

154 Waste Pile Inactive 06/21/94 1/ NA NA NA NA / NA

Description from Company: curbed concrete area
System Types: 141 Storage
Wastes Previously Managed in Unit: 113180

---

157 Distill/Solv Recovery Inactive 01/02/97 H/ NA NA NA RCRA Pmt Exempt-Recycling Unit NA / NA

1801

30007 Shell Oil Company

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date
** 'Inactive', 'Closed' & 'Post Closure Care' Units **								
Description from Company: paint solvent still - reclaims solvent								
System Types: 021 Fractionation/distillation								
Biennial System Regulatory Status: Regulatory status unknown								
162	Waste Pile	Inactive	06/14/94	2/ NA	NA	NA		NA /
Description from Company: sandblasting dupont paint yard								
System Types: 141 Storage								

Reference 18

Industrial Site Information

Robert J. Huston, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Jeffrey A. Saitas, *Executive Director*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

August 16, 2000

CERTIFIED MAIL #Z 091 355 266
RETURN RECEIPT REQUESTED

Mr. Julius A. Rexer
Senior Environmental Engineer
The Lubrizol Corporation
12801 Bay Area Boulevard
Pasadena, Texas 77507-2851

Re: Notice of Violation for the: Comprehensive Monitoring Evaluation (CME) at:
The Lubrizol Corporation, 41 Tidal Road, Deer Park (Harris County), Texas
TNRCC ID No.: 30324, EPA ID No.:TXD041067638, Permit/CP-50077

Dear Mr. Rexer:

On June 28 and July 21, 2000, Casimir Onwuka of the Texas Natural Resource Conservation Commission (TNRCC) Houston Region Office conducted a CME of the above-referenced facility to evaluate compliance with applicable industrial solid waste requirements. During the inspection, an outstanding alleged violation and other issue were identified for which a written reply is needed. Please submit a written response to this office addressing the outstanding alleged violation and other issue, and provide documentation by September 15, 2000, demonstrating that compliance has been achieved.

In listing the alleged violation, we have cited applicable requirements, including TNRCC rules. If you would like to obtain a copy of the applicable TNRCC rules, you may contact any of the sources listed in the enclosed brochure entitled "Obtaining TNRCC Rules." Copies of applicable federal regulations may be obtained from either of the following offices:

U.S. Government Printing Office
Texas Crude Building
801 Travis Street
Houston, Texas 77002
713/228-1187 (phone)

U.S. Government Printing Office
Room 1C-50
Federal Building
1100 Commerce Street
Dallas, Texas 75242
214/767-0076 (phone)

Mr. Julius A. Rexer
The Lubrizol Corporation
August 16, 2000

The TNRCC recognizes that the great majority of the regulated community wants to prevent pollution and to comply with environmental laws. The TNRCC looks forward to working with you to resolve these matters. If you complete the necessary corrective actions and resolve the outstanding alleged violation in a timely manner, we will not pursue further action for the alleged violation at this time. However, please note that if you fail to adequately respond, the TNRCC will consider exercising the enforcement powers granted by the Legislature to carry out its mission to protect human health and the environment.

If you or members of your staff have any questions regarding these matters, please feel free to contact Mr. Casimir Onwuka in the Houston Region Office at (713)767-3606.

Sincerely,

Rama Yadav

Rama Yadav, Ph. D., P. E.
Team Leader, Waste Section
Houston Region Office

RSY/ceo/gh

cc: Mr. Norman W. Mollard, III, Environmental Engineer, The Lubrizol Corporation, 41 Tidal Road, PO Box 158, Deer Park, TX 77536-0158

Enclosures: Summary of Inspection Findings
Obtaining TNRCC Rules

Texas Natural Resource Conservation Commission
Inspection Report

The Lubrizol Corporation
TNRCC ID # 30324 , EPA ID # TXD041067638,
Permit # HW-50077 , Compliance Plan #CP- 50077
IHW-Comprehensive Monitoring Evaluation (CME)
Conducted on June 28 and July 21, 2000

INTRODUCTION

On June 28 and July 21, 2000, Casimir Onwuka of the Texas Natural Resource Conservation Commission (TNRCC), Region 12 Office conducted a CME at The Lubrizol Corporation (Lubrizol), in Deer Park, Harris County, Texas. Mr. Julius Rexer, Senior Environmental Engineer, Lubrizol was notified of the CME by telephone and fax on June 13, 2000. During a facility record review conducted on June 28, 2000, Lubrizol was represented by Mr. Rexer; Mr. Norman Mollard, Environmental Engineer; Mr. Gary Kratochvil, Senior Associate, Corrigan Consulting, Inc., Seabrook, Texas; and Mr. Bruce Woodhouse, Environmental Resource Manager, ERM-Southwest. Inc., Houston, Texas. The sampling event was conducted on July 21, 2000, by Ms. Susan-Marie Williams of ERM-Southwest, Inc., Houston, Texas. Ms. Williams was assisted by Mr. Rexer and Mr. Mollard. Mr. Bruce Arnett and Ms. Linda Vasse of the TNRCC Region 12 office participated in the CME as observers during the sampling event. Mr. Rexer was given an exit interview on July 21, 2000, during which findings of the inspection were discussed. The discussion included discrepancies on total well depths.

Lubrizol is located on a 32.57-acres tract of land at 41 Tidal Road, Deer Park (Harris County) Texas, about 12 miles southeast of downtown Houston, in the drainage area Segment 1006 of the San Jacinto River Basin. The facility is located in a heavily industrialized area of the Buffalo Bayou also known as the Houston Ship Channel. Facility layout and location maps are attached to this report as **Attachment 1.**

GENERAL FACILITY AND WASTE PROCESS INFORMATION

Lubrizol has been in operation since 1952, and manufactures additives for oils, greases, and fuels. The facility notice of registration (NOR) reviewed was last amended on May 25, 2000. Lubrizol is a large quantity generator of hazardous waste, and has 46 active waste streams consisting of sixteen (16) hazardous wastes; fifteen (15) Class 1 nonhazardous wastes; and seven (7) Class 2 nonhazardous wastes (**See Attachment 2**). The NOR also lists 59 active and thirteen (13) inactive/closed waste management units (WMUs). The active WMUs include one (1) permitted tank

(NOR WMU # 015), six (6) "less than 90-day" tank, fourteen (14) "less than 90 day" container storage areas (CSAs) one (1) hazardous waste pile and one (1) hazardous waste water treatment plant. It was noted, however, that two of the listed active units (NOR WMU #s 072 and 073) were closed.

Permit and Compliance Plan

Lubrizol's permit, No. HW-50077, and compliance plan (CP), No. CP - 50077, were initially issued on February 16, 1988. The permit and CP were reissued on April 16, 1999, and required the facility to conduct RCRA facility investigation (RFI) at three solid waste management units (SWMUs) identified as Unit U (Unit 116), Unit 045 (Abrasive Blast Pile) and Unit V (Dirt Pile), and for any new SWMUs discovered after the issuance of the compliance plan. The February 1988 CP required corrective action and ground water monitoring at a SWMU referred to as Equalization Basin (EQ Basin), and a RFI at No. 1 Lift Station.

Groundwater Monitoring Systems

The EQ Basin was a surface impoundment with a total capacity of approximately 1.39 million gallons. It was constructed in 1970, and was removed from service in 1985. During the active period of the basin it was used to treat process wastewater generated from the site. The unit was approved for closure by the TNRCC on March 21, 1986.

The corrective action and groundwater monitoring approved for the unit are contained in the permit and the compliance plan. The plan requires the facility to initiate a corrective action system to remove or treat in place hazardous constituents in groundwater. Corrective action was not initiated. Instead, Lubrizol conducted a risk reduction evaluation of the unit to achieve compliance. In addition, the plan requires quarterly monitoring to establish groundwater quality and semiannual reporting to the TNRCC. The monitoring system presently consists of two background wells (AE-2 and AE-4) and three points of compliance wells (EQ-1, EQ-2 and EQ-3). Historically, main groundwater contaminants detected in the wells are elevated levels of Barium, 2,4-Dimethyphenol, Phenol, Toluene, Ethylbenzene and Xylene.

On October 30, 1992, Lubrizol submitted a risk reduction evaluation of the EQ Basin to the TNRCC. The report suggested that the unit had attained closure of the basin based on Risk Reduction Standard 3 and requested termination of the compliance plan. In letters dated April 3, 1995, November 12, 1999, and November 19, 1999 (**See Attachment 3**), the TNRCC approved the risk reduction evaluation. However, the facility was advised to continue groundwater monitoring until the compliance plan is modified to terminate monitoring.

RFI Units

Pursuant to February 1988 CP Provision VIII, Lubrizol had implemented a RCRA Facility Investigation (RFI) to determine if releases had occurred at the No. 1 Lift Station. The No. 1 Lift Station was closed in 1986. Lubrizol submitted a comprehensive RFI report to the TNRCC on May 7, 1991; and a supplemental assessment and groundwater analytical reports; and a risk reduction evaluation of the No. 1 Lift on April 14, 1997. The TNRCC approved closure for the unit in a letter (**See Attachment 4**) dated January 9, 1998. Additionally, in compliance with Provision VIII B & D of the April6, 1999 CP, Lubrizol had submitted RFI reports for Unit U (unit 116), Unit 045 (Abrasive Blast Pile), Unit V (Dirt Pile) and No. 2 Lift Station (also referred to as B-5 AOC). **Table 1** and **Attachment 5** provide summary information on the RFIs and present status of the units, and TNRCC approval/comments.

Table 1. Summary of RCRA Facility Investigations conducted by Lubrizol.

Unit	**RFI DATE**	**DATE RFI SUBMITTED TO TNRCC/ RESPONSE**	**COMMENT**
No. 1 Lift Station/	May 7, 1991 - Initial RFI; April 14, 1997 - Supplemental Assessment Report and Risk Reduction Evaluation	January 9, 1998 - Closure Approved	Closure under RRS 3
Unit U (unit 116)- No. 1 MUA (Muriatic Acid Unit)	May 14, 1999	January 5, 2000 - Closure Approved	Closure of soil media under RRS 2. Interim - corrective measures of "perched"shallow groundwater in progress.
Unit V (Soil Pile) About 6.33 acres mound of stockpiled soil and construction debris . Presently being recycled offsite for roadway construction	August 31, 1999 - Initial RFI; February 17, 2000 - RFI Supplemental Investigation	June 8, 2000 - Closure Approved	Closure under RRS 2. No groundwater impact.

Unit 045 (Abrasive Blast Area)	RFI report scheduled to be submitted by 4/30/01. The facility claims no groundwater impact.	Report pending	
No. 2 Lift Station and B-5 Area of Concern (Compressor Area) Elevated Cadmium, total Chromium and Lead detected in soil samples in 1997.	May 27, 2000	January 9, 1998 - RFI Approved; June 13, 2000 - Deed Recordation Approved; April 27, 2000 - Closure Approved	Closure under RRS 2

*RRS = Risk Reduction Standard

SUMMARY OF FINDINGS

On June 28, 2000, Casimir Onwuka met with Lubrizol personnel and representatives: Mr. Rexer, Mr. Mollard, Mr. Kratochvil, and Mr. Woodhouse, to review facility records and to confirm status of the permitted units. The record review revealed that Lubrizol had used bail-purge sampling protocol instead of low-flow purge sampling protocol recommended in the 1998 CP. Mr. Rexer stated that Lubrizol had requested and received approval from Ms. Kathy McCormick of TNRCC Region 12 Office to continue to use the bail-purge sampling protocol but had no record to document the approval. The facility was advised to request for a variance to the CP if it wishes to continue to use bailers. The TNRCC granted Lubrizol a variance to use bail-purge sampling protocol in a letter dated July 17, 2000.

On July 21, 2000, the sampling portion of the CME was conducted by Casimir Onwuka, Bruce Arnett and Linda Vasse. Ms. Williams, Mr. Rexer and Mr. Mollard represented Lubrizol for the event. Prior to sampling, the background wells and points of compliance wells that serve as the groundwater monitoring system for the EQ Basin were inspected to determine water level elevations and conditions of well casing, labeling, protective bumpers, and well caps. It was noted that the measured total depths at wells EQ-2 and EQ-3 were less than the completed well depths as reported in the facility records. This violation is addressed in the Summary of Outstanding Alleged Violation section of this report.

Split samples from two wells (background well AE-2 and point of compliance well EQ- 2) were collected for laboratory analysis. EQ-2 was chosen because analytical results from a January 20, 2000, sampling shows that concentration of barium(2.52 mg/L) in the well exceeded CP Ground-Water Protection Standard of 2.0 mg/L (**See Attachment 6**). The TNRCC samples were analyzed

for volatiles, semi-volatiles and RCRA metals. The facility samples will be analyzed for volatiles, semi-volatiles, phenols and RCRA metals. Analytical results of the sample analyses including chain of custody forms will be added to this report as an addendum when they are received from the laboratories.

SUMMARY OF OUTSTANDING ALLEGED VIOLATION

Compliance Plan No. CP-50077, VI.C.4.d - Field Determination Requirements - All Compliance Plan Wells (Category B1).

During the CME on July 21, 2000, water levels and total depths of the monitor wells were measured with an electronic water level meter. The total depths were compared with completed well depths at development as contained in facility records and logs. It was noted that points of compliance monitor wells EQ-2 and EQ-3 had silted up about 3.52 feet and 12.32 feet, respectively. The 12.32 feet silt in EQ-3 includes 2.3 feet or approximately 46% of the screened section of the well. A review of historical total depth measurements of EQ-3 (**See Attachment 7**) suggests that about 20% of the screened section has silted since May 9, 1995. It was also noted that Lubrizol had not taken any action to redevelop the affected wells. Lubrizol is advised to initiate redevelopment of the monitor wells, EQ-2 and EQ-3, to reduce silt accumulation and improve the integrity of the screened sections of the wells.

OUTSTANDING OTHER ISSUE

A review of historical total depth measurements of EQ-3 (**See Attachment 7**) suggests that total well depths were not measured during each sampling event as required by provision CP - 50077, VI.C.4.d. and CP - 50077 Groundwater Sampling and Analysis Plan, Section 3.1.1. The record for EQ-3 shows that total well depth had been gauged in the field six (6) times out of 39 sampling events conducted from April 1990 to January 2000. Monitoring well condition is an essential part of groundwater monitoring as it relates directly to the validity of acquired data for groundwater quality analysis. If Lubrizol is currently undertaking any ground water monitoring activities at the facility, either through voluntary action or regulatory requirements, it should ensure that it monitors well conditions so that acquired data is accurate and may be used for reporting requirements. Therefore, Lubrizol is advised to take measurement of total depths at each of the monitoring wells during each sampling event.

Signed Casimir E. Onwuka — 8/16/00

Casimir E Onwuka
Environmental Investigator
Region 12-Houston

Date

Approved Rama Yadav — 8/16/00

Rama Yadav, Ph.D., P.E.
Team Leader, Waste Section
Region 12-Houston

Date

CME INSPECTION REPORT
HYDROGEOLOGIC & COMPLIANCE EVALUATION REPORT

Section A -- Introduction

1. Facility Name: The Lubrizol Corporation

2. Permit No.: HW-50077 Compliance Plan No.: CP-50077

3. Facility Description: [description of facility location, surrounding land use, facility age, operations/processes, generated wastes, brief summary of permit/compliance plan (if applicable)].

Lubrizol is located on a 32.57-acres tract of land at 41 Tidal Road, Deer Park (Harris County) Texas, about 12 miles southeast of downtown Houston, in the drainage area Segment 1006 of the San Jacinto River Basin. The facility is located in a heavily industrialized area of the Buffalo Bayou also known as the Houston Ship Channel. A facility map is attached to this report as **Attachment 1.**

Lubrizol has been in operation since 1952, and manufactures additives for oils, greases, and fuels. The facility notice of registration (NOR) reviewed was last amended on May 25, 2000. Lubrizol is a large quantity generator of hazardous waste, and has 46 active waste streams consisting of sixteen (16) hazardous wastes; fifteen (15) Class 1 nonhazardous wastes; and seven (7) Class 2 nonhazardous wastes (**See Attachment 2**). The NOR also lists 59 active and thirteen (13) ctive/closed waste management units (WMUs). The active WMUs include one (1) permitted tank (NOR WMU # 015), ..x (6) "less than 90-day" tank, fourteen (14) "less than 90 day" container storage areas (CSAs) one (1) hazardous waste pile and one (1) hazardous waste waster treatment plant. It was noted, however, that two of the listed active units (NOR WMU #s 072 and 073) were closed.

Lubrizol's permit, No. HW-50077, and compliance plan (CP), No. CP - 50077, were initially issued on February 16, 1988. The permit and CP were reissued on April 16, 1999, and require the facility to conduct RCRA facility investigation (RFI) at three solid waste management units (SWMUs) identified as Unit U (also referred to as Unit 116), Unit 045 (Abrasive Blast Pile) and Unit V (Dirt Pile), and for new SWMUs discovered after the issuance of the compliance plan. The February 1988 CP required corrective action and ground water monitoring at a SWMU referred to as Equalization Basin (EQ Basin), and a RFI at No. 1 Lift Station.

4. Date of Previous CME: June 9, 1995

5. Chronology of Ground-Water Monitoring Activities Since the Previous CME (or inception of ground-water activities if no CME conducted):

7/14/95	Groundwater (GW) Monitoring System Operation and Maintenance Inspection
9/8/95	Letter of Transfer (LOT) for Semi-Annual Report
10/31/95	Letter- EQ Basin Closure - Deed Recordation
11/27/95	Letter - Receipt and approval by TNRCC of semiannual GW monitoring reported submitted 9/8/95
1/31/96	LOT for Semi-Annual Report
3/29/96	Letter - Receipt and approval by TNRCC of semiannual GW monitoring report submitted 1/24/96
'27/96	LOT for Semi-Annual Report
9/18/96	Letter - Receipt and approval by TNRCC of semiannual GW monitoring report submitted 6/27/96
2/21/97	Letter - Receipt and approval by TNRCC of semiannual GW monitoring report submitted 1/29/97
9/19/97	Letter - Receipt and approval by TNRCC of semiannual GW monitoring report submitted 7/14/97

***** An entry in this column indicates corrective action or comment is needed.**

3/30/98	Letter - Receipt and approval by TNRCC of semiannual GW monitoring report submitted 1/18/98
2/5/99	GW Compliance Plan Application and Technical Report
8/99	LOT for Quarterly Report
10/29/99	Letter - Termination of Corrective Action and Monitoring Programs
11/12/99	Letter - Approval to terminate corrective action and request to submit modification to CP to terminate monitoring
11/19/99	Letter - Receipt/approval of semiannual GW monitoring reports submitted 1/25/99 and 10/29/99
7/17/00	Letter - Request/Approval for Variance to CP.

6. RCRA Regulated Waste Management Unit(s) (WMU) Requiring Ground-Water Monitoring:

a. Indicate all WMUs subject to RCRA Ground-Water Monitoring and the location of the monitoring wells on a site diagram(s) as **Attachment** 1.

b. Unit Information -

Unit Name: Equalization Basin
Facility No.: N/A
Size: 1.39 Million gallons
Year in Service: 1970 to 1985
Status: Closed
Construction: Earthen basin liner

COMMENT: [brief description/history of RCRA units]

EQ Basin was a surface impoundment constructed in 1970 and was used to treat process wastewater generated on the site. It was approved for closure in 1986. Groundwater monitoring plans for the basin were developed under a judgement rendered in the case between Lubrizol and the State of Texas settled on November 1985 and ruled final on January 6, 1986. The plans included a groundwater recovery/treatment system and compliance monitoring. Corrective action was not initiated, instead, the facility conducted a risk reduction evaluation for which it received approval to terminate corrective action on April 3, 1995. However, the facility was advised to continue compliance monitoring until the compliance plan was modified to terminate monitoring.

Section B -- Technical Review

1. Regional Geology

COMMENT: [brief description of regional geology including stratigraphy, depositional environments, structure]

The Lubrizol Corporation Deer Park facility is underlain by a thick (greater than 30,000 feet) sequence of sedimentary deposits. These deposits crop out in belts parallel to the Gulf Coast and dip at low angles, thickening down-dip toward the Gulf. The near surface geologic materials underlying the facility belong to the Beaumont Formation of Pleistocene Age and a relatively thin veneer of recent sediments fill of Holocene Age: Fill and Spoil, Alluvium and Pleistocene Dewyville Formation. The Beaumont Formation is underlain by the Pleistocene Montgomery, Bentley, and Willis Formations and the Pliocene Goliad Formation.

During the Tertiary, the Texas Gulf Coast consisted of large delta-dominated depositional centers. Rapid sedimentation and loading conditions resulted in developments of growth faults from delta fronts sand/silts overriding pro-delta clays. During the Miocene, the depositional environment was dominated by marine-dominated systems. Growth faulting along the Texas Gulf Coast subsided and ceased in the late Tertiary. Presently, the majority of faults along the coast are deemed inactive. However, there have been reports of recent renewed movements along many of the faults in the Houston-Galveston region due to subsidence attributed to massive groundwater withdrawal through pumping. Further descriptions of the formations are provided below from

he oldest to the youngest.

Formation(s) - Youngest to the oldest

Fill and Spoil: The Fill and Spoil are described in the Geologic Atlas of Texas, Houston Sheet, as materials dredged along water ways, and for raising land surface above alluvium and barrier-island deposits and for creating land.

Holocene or Pleistocene Dewyville Formation: consists of sand, silt clay and gravel, locally indurated with calcium carbonate and includes point bar, natural levee, stream channel and older sand dune deposits.

Pleistocene Beaumont Formation: consists of interbedded clay, silt clay and sand units. Deposition includes stream channel, point bar, natural levee, back swamp deposits, and coastal marsh and mud flat deposits. The formation has a total thickness greater than 100 feet with calcium carbonate, iron oxide, and iron-manganese oxide concretions common in zones of weathering.

Pleistocene Montgomery Formation: consists of clay, silt, and sand units with siliceous grains. The unit is locally calcareous with calcium carbonate, iron oxide and manganese oxide concretions common in zones of weathering. The thickness of the formation ranges from 100 to 150 feet in northern Harris County, Texas.

Pleistocene Bentley Formation: consists of clay, silt, sand, and minor amounts of gravel. The unit is very similar lithologically to the Montgomery with less siliceous grains. Top of the formation occurs in Harris County at about 250 feet below ground surface (BGS). This formation is included in the Lower Chicot Aquifer.

Pleistocene Willis Formation: consists of clay, silt, and sand with minor amounts of granule to pebble size siliceous gravels. The Willis deposits are less than 75 feet thick at their outcrop in northern Harris County. The formation is generally noncalcareous with numerous iron oxide concretions, may be significantly weathered and locally cemented with iron oxide. This interval is included in the Lower Chicot Aquifer.

Pliocene Goliad Formation: overlies the Miocene formations. The formation consists of sands interbedded with gravel, silt, and clay. Generally top of the formation is encountered at about 450 feet BGS. The Goliad sand outcrops in Montgomery County and reaches a thickness of about 2400 feet in Galveston County. The Goliad is included in the Evangeline Aquifer.

b. Regional Dip and Gradient: Dip is southeast, approximately 3 feet/mile; gradient is 0.0006
Reference: U.S.G.S topographic Map, Virginia Point Quadrangle

2. Site Geology
COMMENT: [brief description of geology of site, including surface geology, topography, faulting, subsidence, etc.]

The Lubrizol Corporation Deer Park facility is located on an outcrop of the Pleistocene Beaumont Formation. The Beaumont Formation was deposited as a fluvial/deltaic system consisting mainly of clay, silty clay, clayey sand and sand. Beneath the Beaumont are Pleistocene Montgomery, Bentley and Willis Formations. These formations consist of terrace deposits of silt, sand, clay, and some grave. The site is flat with a maximum elevation approximately 34.5 feet MSL, but slops very gently to the southwest.

a. Site Diagram - **Attachment 1**.

b. Site Stratigraphy -
   i. Depth of investigation:
   ii. Geologic Units -

Unit Name: Unit 1 - Fill
Depth interval
encountered: Surface to 28 feet MSL, maximum thickness about 6 feet.

***** An entry in this column indicates corrective action or comment is needed.**

Description: Silty clay with construct debris

Unit Name: Unit II - Silty Clay - Alluvium - Holocene
Depth interval
encountered: 29.5 feet to 16 feet MSL.
Description: Stiff silty clay, some localized areas with calcareous nodules. The unit acts as a confining layer for unit III below.

Unit Name: Unit III - Clayey Sand - Beaumont Formation
Depth interval
encountered: 16 feet to 11.5 feet MSL
Description: Clayey sand and silty sand of abundant channel-fill, inter-distributary and overbank fluvial origin.

Unit Name: Unit IV - Silty Clay - Beaumont Formation
Depth interval
encountered: Top from approximately 12 feet MSL
Description: Silty clay, sometimes with mudflat deposits, concretions of calcium carbonate, iron oxide, and iron manganese oxides in weathered zones.

c. Cross-sections provided as **Attachment 8**.

3. Regional Hydrology
COMMENT: [brief discussion of regional aquifers/aquitards]

The Chicot Aquifer and the Evangeline Aquifer, are referred to as the Gulf Coast Aquifer of the upper Coastal Plain of Texas. Chicot Aquifer is the uppermost aquifer underlying the Lubrizol Deer Park facility. The Chicot comprises Pleistocene and Quaternary deposits and includes the transmissive sand lenses of the Beaumont, Montgomery, Bentley, and Willis formations. The Evangeline Aquifer consists of the Goliad Sand stratigraphic unit. The Chicot Aquifer and the Evangeline Aquifer are approximately 400 feet and 600 feet, respectively, below the surface at Lubrizol.

The Chicot and the Evangeline are the major source of fresh water in Galveston and southern Harris counties. However, industries along the Houston and Texas City Ship Channel obtain their water from surface waster sources. The aquifer's transmissive sand lenses of the Beaumont Formation are typically saturated at very shallow depths in the vicinity of the facility. The depth of water level from ground surfaces in the area is typically less than 15 feet.

a. Regional ground-water flow -
Direction: South-southeast
Reference: Stratigraphic and Hydrogeologic Framework of the Coastal Plains of Texas, Baker, E. T.; Hydrogeology of Gulf Coast Aquifers, Houston-Galveston Area, Texas, Kreitler, C. W., Guevara, G, Granata, G, McKalips, D.

b. Is the site located on the recharge area of a major aquifer? Yes, Gulf Coast Aquifer

c. Is the site located on the recharge area of a minor aquifer? No.

4. Site Hydrology
COMMENT: [brief discussion of hydrology of site, including nearby surface water bodies and other recharge/discharge ures or wells, summarize the zones that are confined, semi-confined, water table, etc.]

Groundwater assessment studies conducted by the facility, revealed four hydrogeologic units that characterize the site

hydrogeology. The units include the saturated zone: Stratum III, and two aquitards: Stratum II and Stratum IV. Stratum I is the uppermost unit consisting of silty clay with fill materials mainly construction debris, refer to site geology section above. There reports of random and discontinuous water bearing zones within the fill material within the facility which represent perched groundwater. Stratum II consists mainly of stiff gray clay, locally silty to sandy, with streaks and calcareous nodules. The stratum acts as a confining layer or aquitard for Stratum III. Stratum III is a silt to silty fine-grained sand with interbedded clays and is saturated with groundwater. Generally groundwater flow is to the west, toward Patrick Bayou located approximately 60 feet from the EQ Basin. Groundwater monitoring wells in the EQ Basin are screened in Stratum III. Stratum IV serves as an aquitard beneath the saturated Stratum II sands.

a. Saturated zone(s) and aquitard(s) -

Unit: Stratum I - Surface unit, may contain perched groundwater.
Depth interval encountered (ft-ft): Surface elevation, 34 feet to 35 feet MSL
Saturated thickness: 5 to 6 feet
Confined/unconfined: unconfined
Potentiometric rise (if confined): N/A
Horizontal hydraulic conductivity (k): unknown
Source of k value: Part B Permit Renewal Application, Volume 2
Vertical hydraulic conductivity: Unknown
Source of k value: N/A

Unit: Stratum II - aquitard.
Depth interval encountered (ft-ft): 29 feet to14 feet MSL
Saturated thickness: 15 feet
Confined/unconfined: N/A (aquitard)
Potentiometric rise (if confined): N/A
Horizontal hydraulic conductivity (k): Unknown
Source of k value: Part B Permit Renewal Application, Volume 2
Vertical hydraulic conductivity: Unknown
Source of k value: N/A

Unit: Stratum III.
Depth interval encountered (ft-ft): 16 feet to 14 feet MSL
Saturated thickness: 4 feet
Confined/unconfined: confined
Potentiometric rise (if confined): Approximately 12 feet
Horizontal hydraulic conductivity (k): 1.78 X 10(-3) cm/s or 1842 feet/year
Source of k value: Part B Permit Renewal Application, Volume 2
Vertical hydraulic conductivity: Unknown
Source of k value: N/A

Unit: Stratum IV - aquitard.
Depth interval encountered (ft-ft): 12 feet to 11feet MSL
Saturated thickness: unknown
Confined/unconfined: N/A (aquitard)
Potentiometric rise (if confined): N/A
Horizontal hydraulic conductivity (k): Unknown
Source of k value: Part B Permit Renewal Application, Volume 2
Vertical hydraulic conductivity: Unknown
Source of k value: N/A

b. Is the first water-bearing zone identified in Section B.4.a., above, in communication with a deeper zone(s)? No.

c. Is the aquitard(s) continuous beneath the site? Yes.

d. Geologic unit(s) monitored during interim status: N/A.

e. Geologic unit designated as the uppermost aquifer in the Part B application/permit: Concur with designation? Yes.

5. Site Ground-Water Movement

a. Potentiometric surface map(s) provided as **Attachment** 8.

b. Calculations of minimum and maximum observed gradients (i) in units of feet/foot.
i(min) = 0.60 feet/85.5 feet or 0.007 feet/foot
i(max) = 0.20 feet/34.2 feet or 0.0058 feet/foot

c. Calculation of Ground-Water Velocity (v) in feet/day.
$v = ki/n_e$ (1.28 feet/day x 0.007 feet/foot)/0.30 = 0.03 feet/day (Minimum)
$v = ki/n_e$ (1.28 feet/day x 0.0058 feet/foot)/0.30 = 0.0247 feet/day (Maximum)
(k=hydraulic conductivity; n_e=effective porosity; i=gradient)
Reference: Part B Permit Renewal Application 1997.

Monitor Well Construction and Vertical Placement.

a. Table of well construction details provided as **Attachment** 9.
(Note: not optional)

b. Vertical placement of wells satisfactory?
Comment: Yes.

c. Are detailed well installation diagrams, including lithologic logs, available for all monitor wells?
Comment: Yes

Section C -- MONITORING SYSTEM COMPLIANCE WITH RULES AND PERMIT/COMPLIANCE PLAN PROVISIONS

1. Interim Status Detection Monitoring N/A x

2. Interim Status Assessment Monitoring N/A x

3. Permitted Status Detection, Compliance, or Corrective Action Monitoring N/A

List unit(s) operating under this status (specify detection, compliance, or corrective action monitoring for each unit, delete Section C.3. if N/A):

qualization Basin - Compliance monitoring

a. Does the ground-water monitoring system consist of a sufficient number of wells, installed at appropriate locations

and depths to yield ground-water samples from the uppermost aquifer that:

i. Represent the quality of background water that has not been affected by leakage from a regulated unit? [335.163(1)(A)/264.97(a)(1)]
Comment: Yes.

ii. Represent the quality of ground-water passing the point of compliance? [335.163(1)(B)/264.97(a)(2)]
Comment: Yes.

iii. Allow for the detection of contamination when hazardous waste or hazardous constituents have migrated from the waste management unit to the uppermost aquifer? [335.163(1)(C)/264.97(a)(3)]
Comment: Yes.

b. Are all monitoring wells cased in a manner that maintains the integrity of the monitoring well borehole? [335.163(3)/264.97(c)]
Comment: No. An alleged violation is advanced as noted below.

Compliance Plan No. CP-50077, VI.C.4.d - Field Determination Requirements - All Compliance Plan Wells (Category B).

During the CME on July 21, 2000, water levels and total depths of the monitor wells were measured with an electronic water level meter. The total depths were compared with completed well depths at development as contained in facility records and logs. It was noted that points of compliance monitor wells EQ-2 and EQ-3 had silted up about 3.52 feet and 12.32 feet, respectively. The 12.32 feet silt in EQ-3 includes 2.3 feet or approximately 46% of the screened section of the well. A review of historical depth measurements of EQ-3 (See **Attachment 7**) suggests that about 20% of the screened section has been silted since May 9, 1995. It was also noted that Lubrizol had not taken any action to redevelop the affected wells. Lubrizol is advised to initiate redevelopment of the monitor wells, EQ-2 and EQ-3, to reduce silt accumulation and improve the integrity of the screened sections of the wells.

c. Does the ground-water monitoring system satisfy the requirements specified in the permit/compliance plan?
Comment: No. An other issue is advanced as noted below.

A review of historical total depth measurements of EQ-3 (See **Attachment 7**) suggests that total well depths were not measured during each sampling event as required by provision CP - 50077, VI.C.4.d. and CP - 50077 Groundwater Sampling and Analysis Plan, Section 3.1.1. The record for EQ-3 shows that total well depth had been gauged in the field six (6) times out of 39 sampling events conducted from April 1990 to January 2000. Monitoring well condition is an essential part of groundwater monitoring as it relates directly to the validity of acquired data for groundwater quality analysis. If Lubrizol is currently undertaking any ground water monitoring activities at the facility, either through voluntary action or regulatory requirements, it should ensure that it monitors well conditions so that acquired data is accurate and may be used for reporting requirements. Therefore, Lubrizol is advised to take measurement of total depths at each of the monitoring wells during each sampling event.

d. Have any changes in ground-water flow direction occurred which would warrant a permit or compliance plan amendment to require additional point of compliance or background wells? [335.164(8)/264.98(h)]
Comment: No.

Compliance with Enforcement Order Provisions N/A____

a. Has an enforcement order been issued to the facility?

Comment (include date issued, if applicable): Yes. Groundwater monitoring plans for the basin were developed under a judgement rendered in the case between Lubrizol and the State of Texas settled on November 1985 and ruled final on January 6, 1986. The plans included a groundwater recovery/treatment system and compliance monitory. Corrective action was not initiated, instead, the facility achieved compliance with a risk reduction evaluation for which she received approval to terminate corrective action on April 3, 1995. However, the facility was advised to continue compliance monitoring till the compliance plan is modified.

b. Is the facility compliant with all provisions of the enforcement order concerning ground-water monitoring, assessment and corrective action?
Comment: Yes. Refer to 4. a. above.

30324 The Lubrizol Corporation

Solid Waste Registration Number: 30324 EPA Id: TXD041067638

Company Name: The Lubrizol Corporation
Site Name: Deer Park
Site Location: 41 Tidal Road, Deer Park, TX
Contact: Rexer, Julius

Region: 12
County: 101 Harris
Initial Registration Date: 07/05/1976
Last Amendment Date: 10/12/2000
Last Date NOR Computer update: 10/13/2000
Title: Sr. Environmental Engine Phone: 281-884-5284

Mailing Address: 41 Tidal Road
Deer Park, TX 77536-0158

Site Street Address: 41 Tidal Road
Deer Park, TX 77536

Registration Status: Active HW Permit #: 50077
Registration Type: Generator
Generator Type: Industrial
Reporting Method: STEERS
Hazardous Waste Generation Status: Large Quantity Generator

Primary SIC Code: 2869 Industrial Organic Chemicals Not Else Classified
Handler Status:

Operator Information
Name:
Phone:
Address:

Owner Information
Name:
Phone:
Address:

As of 10/12/2000 - the next unassigned sequence number for WASTES is 10000 and
the next unassigned sequence number for UNITS is 074.

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30324 The Lubrizol Corporation

**** WASTE INFORMATION ****

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

00012051 1 Active 06/27/94 On/Off No No
Description from Generator: Oil/Water emulsion.
Refers to waste code (6): 115490
Form Code: 205 Oil-water emulsion or mixture
Current Management Units: Contain Store Area 054
WWTP 010 012 025 035
Tank (Surface) 004 006 026 027 031 032 033 034 048 056 059 067 068
* Origin Codes: 1 Onsite-process/service

00022051 1 Active 06/27/94 On/Off No No
Description from Generator: Crankcase oil.
Refers to waste code (6): 115530
Form Code: 205 Oil-water emulsion or mixture
Current Management Units: Misc Store Container 046
* Origin Codes: 1 Onsite-process/service

00032051 1 Active 06/27/94 Off No No
Description from Generator: Non-hazardous clarifier sludge from C61.
Refers to waste code (6): 148930
Form Code: 205 Oil-water emulsion or mixture
Current Management Units: None
* Origin Codes: 1 Onsite-process/service

00053892 2 Active 06/27/94 On/Off No No
Description from Generator: Sandblasting waste. Black beauty Recycling notice 6/19/97, reused in the target mixture design for TxDOT specification Item #276, Portland cement treated base (plant mix) and for TxDOT Specification Item #247, flexible base.
Refers to waste code (6): 171770
Form Code: 389 Nonhazardous sandblasting waste (inorganic solid)
Current Management Units: Waste Pile 045
* Origin Codes: 1 Onsite-process/service

00063111 1 Active 06/27/94 On/Off No No
Description from Generator: Asbestos debris.
Refers to waste code (6): 179390
Form Code: 311 Asbestos solids and debris
Current Management Units: Misc Store Container 039
* Origin Codes: 1 Onsite-process/service

00076071 1 Active 06/27/94 On/Off No No
Description from Generator: Biological sludge from domestic sewer. Waste will be recycled off site by Southern Crushed Concrete into TxDOT items 247 & 276. jds 11-2-99.
Refers to waste code (6): 249950
Form Code: 607 Biological treatment sludge (organic)
Current Management Units: Misc Store Container 019
* Origin Codes: 1 Onsite-process/service

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

00083191 1 Active 06/27/94 On/Off No No
Description from Generator: Sulfur waste and scrap.
Refers to waste code (6): 270240
Form Code: 319 Other waste inorganic solids
Current Management Units: Contain Store Area 054 060
* Origin Codes: 1 Onsite-process/service

00094891 1 Active 06/27/94 On/Off No No
Description from Generator: 156 filter cake.
Refers to waste code (6): 270640
Form Code: 489 Petroleum contaminated solids
Current Management Units: Contain Store Area 054 060
* Origin Codes: 1 Onsite-process/service

00104891 1 Active 06/27/94 On/Off No No
Description from Generator: 116 filter cake.
Refers to waste code (6): 270640
Form Code: 489 Petroleum contaminated solids
Current Management Units: Contain Store Area 054
Misc Store Container 023
* Origin Codes: 1 Onsite-process/service

00114891 1 Active 06/27/94 On/Off No No
Description from Generator: 177 filter cake.
Refers to waste code (6): 270640
Form Code: 489 Petroleum contaminated solids
Current Management Units: Contain Store Area 054
Misc Store Container 022
* Origin Codes: 1 Onsite-process/service

00124891 1 Active 06/27/94 On/Off No No
Description from Generator: 121 filter cake. Waste will be sent to Southern Crushed and Concrete for TxDOT spec mixtures.
Refers to waste code (6): 270640
Form Code: 489 Petroleum contaminated solids
Current Management Units: Contain Store Area 054
Misc Store Container 053
* Origin Codes: 1 Onsite-process/service

00134891 1 Active 06/27/94 On/Off No No
Description from Generator: Manufacturing building filter cake.
Refers to waste code (6): 270640
Form Code: 489 Petroleum contaminated solids
Current Management Units: Contain Store Area 054
Misc Store Container 024
* Origin Codes: 1 Onsite-process/service

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

0015119H H Active 06/27/94 Off No No
Description from Generator: Hydrochloric acid (HCl).
Refers to waste code (6): 900060
Form Code: 119 Other inorganic liquids
EPA Hazardous Waste Numbers: D002
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A59 Oth product-derived one-time intermittent process
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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0016110H H Active 06/27/94 Off No No
Description from Generator: Sodium aluminate solution.
Refers to waste code (6): 900880
Form Code: 110 Caustic aqueous waste
EPA Hazardous Waste Numbers: D002
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A31 Product rinsing
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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0017110H H Active 06/27/94 On/Off No No
Description from Generator: Scrubber water from chemsthon unit.
Refers to waste code (6): 908260
Form Code: 110 Caustic aqueous waste
EPA Hazardous Waste Numbers: D002
Current Management Units: WWTP 065
Tank (Surface) 015
* Origin Codes: 1 Onsite-process/service
* Source Codes: A78 Air pollution control devices
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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0018206H H Active 06/27/94 On/Off No No
Description from Generator: Lab waste, organic liquid.
Refers to waste code (6): 910590
Form Code: 206 Waste oil
EPA Hazardous Waste Numbers: D001
Current Management Units: Tank (Surface) 037
* Origin Codes: 1 Onsite-process/service
* Source Codes: A94 Laboratory wastes
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

0019206H H Active 06/27/94 On/Off No No
Description from Generator: Hazardous waste oil.
Refers to waste code (6): 915490
Form Code: 206 Waste oil
EPA Hazardous Waste Numbers: D001 D005
Current Management Units: Tank (Surface) 034 048 056 059
Misc Store Container 040 043 055
* Origin Codes: 1 Onsite-process/service
* Source Codes: A49 Other processes other than surface preparation
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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0020489H H Active 06/27/94 On/Off No No
Description from Generator: Barium filter cake media.
Refers to waste code (6): 940370
Form Code: 489 Petroleum contaminated solids
EPA Hazardous Waste Numbers: D005
Current Management Units: Contain Store Area 054
Misc Store Container 021
* Origin Codes: 1 Onsite-process/service
* Source Codes: A32 Product filtering
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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0021603H H Active 06/27/94 Off No No
Description from Generator: Hazardous clarifier sludge.
Refers to waste code (6): 948930
Form Code: 603 Oily sludge
EPA Hazardous Waste Numbers: D001
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A32 Product filtering
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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0022319H H Active 06/27/94 On/Off No No
Description from Generator: Mercury contaminated debris.
Refers to waste code (6): 978850
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: D009 U151
Current Management Units: Misc Store Container 047
* Origin Codes: 1 Onsite-process/service
* Source Codes: A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

0023489H H Active 06/27/94 On/Off No No
Description from Generator: Arsenic filter cake.
Refers to waste code (6): 970490
Form Code: 489 Petroleum contaminated solids
EPA Hazardous Waste Numbers: D004
Current Management Units: Contain Store Area 054
Misc Store Container 053
* Origin Codes: 1 Onsite-process/service
* Source Codes: A32 Product filtering
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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0024319H H Active 06/27/94 On/Off No No
Description from Generator: Phosphorus pentasulfide.
Refers to waste code (6): 970490
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: U189
Current Management Units: Misc Store Container 042
* Origin Codes: 1 Onsite-process/service
* Source Codes: A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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0025489H H Active 06/27/94 On/Off No No
Description from Generator: Waste paint materials. Recycling notice 6/20/97, equipment wash recaptured in a small batch still and reused to clean paint equipment. Equipment wash is recaptured in a small batch still and reuse as a solvent.
Refers to waste code (6): 913860
Form Code: 489 Petroleum contaminated solids
EPA Hazardous Waste Numbers: D001
Current Management Units: Misc Store Container 044
* Origin Codes: 1 Onsite-process/service
* Source Codes: A21 Painting
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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00263081 1 Active 06/27/94 On/Off No No
Description from Generator: Scrapmetal containers and filters.
Form Code: 308 Empty or crushed metal drums or containers
Current Management Units: Misc Store Container 057
* Origin Codes: 1 Onsite-process/service

00273881 1 Active 06/27/94 On/Off No No
Description from Generator: scrap glass containers and sample jars.
Form Code: 388 Empty or crushed glass containers
Current Management Units: Contain Store Area 054
Misc Store Container 022 058
* Origin Codes: 1 Onsite-process/service

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

00283192 2 Active 06/27/94 On/Off No No
Description from Generator: Medical waste.
Form Code: 319 Other waste inorganic solids
Current Management Units: Contain Store Area 061
* Origin Codes: 1 Onsite-process/service

00299022 2 Active 09/06/94 On/Off No No
Description from Generator: Supplemental Plant Production Trash. Could include metal, glass, and scrap materials.
Refers to waste code (6): 279760
Form Code: 902 Supplemental plant production refuse
Current Management Units: Misc Store Container 002
* Origin Codes: 1 Onsite-process/service

00304891 1 Active 11/10/94 On/Off No No
Description from Generator: Cross ties-foundation for the railroad tracks; wood is treated with oil preservatives;may contain spills residue
Form Code: 489 Petroleum contaminated solids
Current Management Units: Misc Store Container 062
* Origin Codes: 1 Onsite-process/service

00313902 2 Active 01/11/95 On/Off No No
Description from Generator: Rocks and concrete debris from demolition of roads and foundations. recycling notice 6/20/97. Material will be crushed, sorted and regraded with appropriate admixtures to achieve compliance with TxDOT Specificatioin Item #276, Portland Cement Treated Based (Plant Mixed) or TxDOT Specification Item #247, Flexible Base.
Form Code: 390 Non-haz concrete, cement, construction debris
Current Management Units: Misc Store Container 063
* Origin Codes: 1 Onsite-process/service

0032319H H Active 02/03/95 On/Off No No
Description from Generator: Flourescent and other light bulbs that contain mercury.
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: D009
Current Management Units: Contain Store Area 064
* Origin Codes: 1 Onsite-process/service
* Source Codes: A99 Other
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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00334891 1 Active 07/13/95 On/Off No No
Description from Generator: Mixed filter cake.Any combination of thefollowing existing waste streams:0009/ 0010/0011/0012/0013/0027/0001/0004/0008.
Form Code: 489 Petroleum contaminated solids
Current Management Units: Contain Store Area 054
* Origin Codes: 1 Onsite-process/service

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30324 The Lubrizol Corporation

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio- active	TNRCC Audit Complete

****** Active Wastes ******

00346072 2 Active 12/19/95 On/Off No No
Description from Generator: Biological sludge from domestic sewer.
Form Code: 607 Biological treatment sludge (organic)
Current Management Units: Misc Store Container 019
* Origin Codes: 1 Onsite-process/service

00359992 2 Active 12/19/95 On/Off No No
Description from Generator: Plant trash, stored in misc. containers.
Refers to waste code (6): 279760
Form Code: 999 Plant Refuse
Current Management Units: Misc Store Container 002 049 050 051 052
* Origin Codes: 1 Onsite-process/service

0036219H H Active 11/15/96 On/Off No No
Description from Generator: Light organic (chlorinated polyisobutylene)
Form Code: 219 Other organic liquids
EPA Hazardous Waste Numbers: D001 D002 D019 D022 D039
Current Management Units: Contain Store Area 066
Misc Store Container 069 070 071
* Origin Codes: 1 Onsite-process/service
* Source Codes: A35 By-product processing
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): 116 unit light ends

0037111H H Active 12/04/96 Off No No
Description from Generator: Aqueous Sulfide Solution from S-43 Scrubber.
Form Code: 111 Aqueous waste with reactive sulfides
EPA Hazardous Waste Numbers: D001 D002 D003
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A78 Air pollution control devices
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): S-43 Scrubber Soluti

00383012 2 Active 10/15/99 On/Off No No
Description from Generator: Dirt, rocks, and rubble with slight organic contamination. SWM Unit V, Soil Pile, TNRCC Project #5402.
Form Code: 301 Soil contaminated with organics
Current Management Units: Waste Pile 072
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): Soil Pile Waste

00393022 2 Active 05/25/00 Off No No
Description from Generator: Contaminated Soils, B-5 AOC (AREA OF CONCERN). TNRCC Project No. 5398.
Form Code: 302 Soil contaminated with inorganics only
Current Management Units: None
* Origin Codes: 7 Cor action/closure
Company's Internal Code(s): B-5,AOC,#5398

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30324 *The Lubrizol Corporation*

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

9997111H H Active 03/28/99 No No
Description from Generator: AQUEOUS WASTEWATER FROM THE PRODUCTION OF GEAR BOX GREASE ADDITIVES.
Form Code: 111 Aqueous waste with reactive sulfides
EPA Hazardous Waste Numbers: D003
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): ONE TIME 156 W/L

9999111H H Active 02/17/99 Off No No
Description from Generator: ONE TIME SHIPMENT OF SODIUM SULFIDE SOLUTION, VALID UNTIL 6/1/99.
Form Code: 111 Aqueous waste with reactive sulfides
EPA Hazardous Waste Numbers: D003
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A59 Oth product-derived one-time intermittent process A09 Clean out process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): D-31 TANK CLEAN-OUT

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* The first value is considered the primary value (e.g. primary origin code).
As of 10/12/2000, the next unassigned sequence number for WASTES is 10000.

** *No Longer Generated Wastes* **

00044931 1 Inactive 02/04/00 NA No No
Description from Generator: 177 Catalyst. Waste inactivated due to source reduction.
Refers to waste code (6): 149990
Form Code: 493 Catalyst waste (organic sludge)
Current Management Units: None
* Origin Codes: 1 Onsite-process/service

00149012 2 Inactive 06/30/97 NA No No
Description from Generator: Plant refuse, general miscellaneous.
Refers to waste code (6): 279760
Form Code: 901 Plant production refuse
Current Management Units: Misc Store Container 002 049 050 051 052
* Origin Codes: 1 Onsite-process/service

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete
** No Longer Generated Wastes **						
9998205H	H	Inactive	02/04/00	NA	No	No

Description from Generator: one time shipment of 0710 decomp. Waste inactivated due to one-time shipment.
Form Code: 205 Oil-water emulsion or mixture
EPA Hazardous Waste Numbers: D001 D002 D004
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): one time 0710 decomp

111920 1 Inactive NA No No
Description from Generator: PARAFFIN, CHLORINATED
Form Code:
Current Management Units: None
* Origin Codes:

115490 1 Inactive 06/30/97 NA No No
Description from Generator: ORGANIC LIQUID AND WATER
Form Code:
Current Management Units: WWTP 010 011 012 025 029 035
Tank (Surface) 004 006 007 009 016 026 027 030 031 032 033 034 036 048
Misc Store Container 040 043
* Origin Codes:

115530 1 Inactive 06/30/97 NA No No
Description from Generator: OIL, CRANKCASE
Form Code:
Current Management Units: Tank (Surface) 007 048
Misc Store Container 046
* Origin Codes:

148930 1 Inactive 06/30/97 NA No No
Description from Generator: SLUDGE, CLARIFIER, CONTAINING TRACE ORGANICS
Form Code:
Current Management Units: None
* Origin Codes:

149990 1 Inactive 06/30/97 NA No No
Description from Generator: ION EXCHANGE RESIN
Form Code:
Current Management Units: Misc Store Container 041
* Origin Codes:

171770 1 Inactive 06/30/97 NA No No
Description from Generator: SAND, SANDBLASTING
Form Code:
Current Management Units: Waste Pile 045
* Origin Codes:

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

179390 1 Inactive 06/30/97 NA No No
Description from Generator: ASBESTOS INSULATON
Form Code:
Current Management Units: Misc Store Container 039
* Origin Codes:

249950 2 Inactive 06/30/97 NA No No
Description from Generator: BIOLOGICAL SLUDGE, DOMESTIC SEWER
Form Code:
Current Management Units: Misc Store Container 019 022 023 024
* Origin Codes:

270240 2 Inactive 06/30/97 NA No No
Description from Generator: SULFUR WASTE/SCRAP
Form Code:
Current Management Units: Misc Store Container 022 023 024
* Origin Codes:

270640 2 Inactive 06/30/97 NA No No
Description from Generator: DIATOMACEOUS EARTH, FILTER MEDIA WITH OIL, PLASTIC & DIRT
Form Code:
Current Management Units: Misc Store Container 022 023 024
* Origin Codes:

279760 2 Inactive 06/30/97 NA No No
Description from Generator: PLANT REFUSE, GENERAL MISC.
Form Code:
Current Management Units: Misc Store Container 002
* Origin Codes:

900060 H Inactive 06/30/97 NA No No
Description from Generator: ACID, HYDROCHLORIC (HCL)
Form Code:
EPA Hazardous Waste Numbers: D002
Current Management Units: None
* Origin Codes:

900880 H Inactive 06/30/97 NA No No
Description from Generator: SODIUM ALUMINATE
Form Code:
EPA Hazardous Waste Numbers: D002
Current Management Units: None
* Origin Codes:

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete
** No Longer Generated Wastes **						
906290	H	Inactive	06/30/97	NA	No	No

Description from Generator: WASHWATER FROM EQUIPMENT WASHING
Form Code:
EPA Hazardous Waste Numbers: D001
Current Management Units: None
* Origin Codes:

908260 H Inactive 06/30/97 NA No No
Description from Generator: SCRUBBER WATER
Form Code: 110 Caustic aqueous waste
EPA Hazardous Waste Numbers: D002
Current Management Units: Tank (Surface) 014 015
* Origin Codes: 1 Onsite-process/service
* Source Codes: A78 Air pollution control devices
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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910030 H Inactive 06/30/97 NA No No
Description from Generator: XYLENE/XYLOL
Form Code:
EPA Hazardous Waste Numbers: U239
Current Management Units: Contain Store Area 020
* Origin Codes:

910590 H Inactive 06/30/97 NA No No
Description from Generator: LAB WASTE, ORGANIC LIQUID
Form Code: 206 Waste oil
EPA Hazardous Waste Numbers: D001
Current Management Units: Tank (Surface) 007 048
* Origin Codes: 1 Onsite-process/service
* Source Codes: A94 Laboratory wastes
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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910760 H Inactive NA No No
Description from Generator: CHEMICALS, ORGANIC (DRAINAGE, FLUSHINGS AND WASHINGS).
Form Code:
EPA Hazardous Waste Numbers: D001 F003 F005 U031 U122 U140 U147 U154 U188 U239
Current Management Units: None
* Origin Codes:

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

911080 H Inactive 06/30/97 NA No No
Description from Generator: METHANOL
Form Code:
EPA Hazardous Waste Numbers: U154
Current Management Units: Contain Store Area 020
* Origin Codes:

913640 H Inactive 06/30/97 NA No No
Description from Generator: PHENOL
Form Code:
EPA Hazardous Waste Numbers: U188
Current Management Units: Contain Store Area 020
* Origin Codes:

913860 H Inactive 06/30/97 NA No No
Description from Generator: SOLVENTS, NON-HALOGENATED
Form Code: 489 Petroleum contaminated solids
EPA Hazardous Waste Numbers: F005
Current Management Units: Tank (Surface) 007
Misc Store Container 044
* Origin Codes: 1 Onsite-process/service
* Source Codes: A21 Painting
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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914250 H Inactive 06/30/97 NA No No
Description from Generator: ALCOHOL, ISOBUTYL
Form Code:
EPA Hazardous Waste Numbers: U140
Current Management Units: Contain Store Area 020
* Origin Codes:

914990 H Inactive 06/30/97 NA No No
Description from Generator: ALCOHOL, N-BUTYL
Form Code:
EPA Hazardous Waste Numbers: U031
Current Management Units: Contain Store Area 020
* Origin Codes:

915490 H Inactive 06/30/97 NA No No
Description from Generator: ORGANIC LIQUID AND WATER
Form Code: 205 Oil-water emulsion or mixture
EPA Hazardous Waste Numbers: D001 D005
Current Management Units: WWTP 011 025
Tank (Surface) 004 006 007 009 016 028 034 036 048
Misc Store Container 040 043
* Origin Codes: 1 Onsite-process/service
* Source Codes: A37 Spent process liquids removal
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete
** No Longer Generated Wastes **						
940370	H	Inactive	06/30/97	NA	No	No

Description from Generator: FILTER CAKE MEDIA
Form Code: 489 Petroleum contaminated solids
EPA Hazardous Waste Numbers: D005
Current Management Units: Misc Store Container 021
* Origin Codes: 1 Onsite-process/service
* Source Codes: A32 Product filtering
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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948930 H Inactive 06/30/97 NA No No
Description from Generator: SLUDGE, CLARIFIER, CONTAINING TRACE ORGANICS
Form Code: 603 Oily sludge
EPA Hazardous Waste Numbers: D001
Current Management Units: Tank (Surface) 048
* Origin Codes: 1 Onsite-process/service
* Source Codes: A49 Other processes other than surface preparation
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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970490 H Inactive 06/30/97 NA No No
Description from Generator: SOIL, CONTAMINATED
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: P022 U031 U140 U147 U154 U188 U189 U239
Current Management Units: Contain Store Area 020
* Origin Codes: 1 Onsite-process/service
* Source Codes: A53 Cleanup of spill residues
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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972660 H Inactive 06/30/97 NA No No
Description from Generator: PHOSPHOROUS PENTASULFIDE
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: U189
Current Management Units: Misc Store Container 042
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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978850 H Inactive 06/30/97 NA No No
Description from Generator: MERCURY CONTAMINATED SOLID
Form Code:
EPA Hazardous Waste Numbers: U151
Current Management Units: Misc Store Container 047
* Origin Codes:

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete
** No Longer Generated Wastes **						
981690	H	Inactive	02/19/93	NA	No	No

Description from Generator: CARBON DISULFIDE
Form Code:
EPA Hazardous Waste Numbers: P022
Current Management Units: Contain Store Area 020
* Origin Codes:

* The first value is considered the primary value (e.g. primary origin code).
As of 10/12/2000, the next unassigned sequence number for WASTES is 10000.

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**** UNITS AT THIS SITE MANAGING WASTE ****

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date
** 'Active' & 'Closure Pending' Units **								
002	Misc Store Container	Active	08/01/72	2/ NA	NA	NA	Non-Hazardous Regulated	NA /

Description from Company: Steel Bins for Plant Tras
Capacity: 40.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 00149012 Plant refu 00299022 Supplement 00359992 Plant tras 279760 PLANT REFU

010	WWTP	Active		1/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /

Description from Company: Tank T-19-X
Capacity: 10000.0000 Capacity Unit of Measure: G
System Types: 124 Phase separation
Wastes Currently Managed in Unit: 00012051 Oil/Water 115490 ORGANIC LI

012	WWTP	Active		1/ NA	NA	NA	RCRA Pmt Exempt-W.W.T.	NA /

Description from Company: Tank T-20-X
Capacity: 16000.0000 Capacity Unit of Measure: G
System Types: 124 Phase separation
Wastes Currently Managed in Unit: 00012051 Oil/Water 115490 ORGANIC LI

015	Tank (Surface)	Active		H/ NA	NA	002	RCRA Permitted	NA /

Description from Company: Tank J-42
Capacity: 10000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 0017110H Scrubber w 908260 SCRUBBER W

019	Misc Store Container	Active		1 2/ NA	NA	NA	Non-Hazardous Regulated	NA /

Description from Company: Steel Bins at Effluent (B
Capacity: 30.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00076071 Biological 00346072 Biological 249950 BIOLOGICAL

021	Misc Store Container	Active		H/ NA	NA	NA	RCRA Pmt Exempt - Accumulation Time	NA /

Description from Company: WC3C, Barium Filter Cake
Capacity: 30.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 0020489H Barium fil 940370 FILTER CAK

022	Misc Store Container	Active	11/01/85	1 2/ NA	NA	NA	Non-Hazardous Regulated	NA /

Description from Company: WC2A, 177 Unit Filter Ca
Capacity: 30.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00114891 177 filter 00273881 scrap glas 249950 BIOLOGICAL 270240 SULFUR WAS 270640 DIATOMACEO

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Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

023 Misc Store Container Active 11/01/85 1 2/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: WC3A, 116 Unit Non-Haz Fi
Capacity: 30.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00104891 116 filter 249950 BIOLOGICAL 270240 SULFUR WAS 270640 DIATOMACEO

024 Misc Store Container Active 11/01/85 1 2/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: WC1A, Main Manufacturing
Capacity: 30.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00134891 Manufactur 249950 BIOLOGICAL 270240 SULFUR WAS 270640 DIATOMACEO

025 WWTP Active 11/01/85 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: Tank RA-3
Capacity: 16521.0000 Capacity Unit of Measure: G
System Types: 124 Phase separation
Wastes Currently Managed in Unit: 00012051 Oil/Water 115490 ORGANIC LI 915490 ORGANIC LI

026 Tank (Surface) Active 11/01/85 1/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Tank WO-4
Capacity: 10066.0000 Capacity Unit of Measure: G
System Types: 124 Phase separation
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 00012051 Oil/Water 115490 ORGANIC LI
Wastes Previously Managed in Unit: 0018206H

027 Tank (Surface) Active 11/01/85 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Tank H-73
Capacity: 10000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 00012051 Oil/Water 115490 ORGANIC LI

031 Tank (Surface) Active 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Tank WO-14
Capacity: 2110.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 00012051 Oil/Water 115490 ORGANIC LI

032 Tank (Surface) Active 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Tank WO-9
Capacity: 1113.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 00012051 Oil/Water 115490 ORGANIC LI

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Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

033 Tank (Surface) Active 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Tank WO-10
Capacity: 1064.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 00012051 Oil/Water 115490 ORGANIC LI

034 Tank (Surface) Active 1 H/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Tank BB-3.
Capacity: 2695.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 00012051 Oil/Water 0019206H Hazardous 115490 ORGANIC LI 915490 ORGANIC LI

035 WWTP Active 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Tank: T/C-1 (tank car she
Capacity: 10567.0000 Capacity Unit of Measure: G
System Types: 124 Phase separation
Wastes Currently Managed in Unit: 00012051 Oil/Water 115490 ORGANIC LI

037 Tank (Surface) Active H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Tank: LAB-A
Capacity: 345.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 0018206H Lab waste,
Wastes Previously Managed in Unit: 910590

039 Misc Store Container Active 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Asbestos Storage Bin
Capacity: 40.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00063111 Asbestos d 179390 ASBESTOS I

040 Misc Store Container Active 1 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Container: 156 W/O
Capacity: 250.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 0019206H Hazardous 115490 ORGANIC LI 915490 ORGANIC LI

041 Misc Store Container Active 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Catalyst Bin at 177 Unit
Capacity: 20.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 149990 ION EXCHAN
Wastes Previously Managed in Unit: 00044931

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Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

042 Misc Store Container Active H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Drums: Waste Phosphoruspe
Capacity: 30.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 0024319H Phosphorus 972660 PHOSPHOROU

043 Misc Store Container Active 1 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Container: PP-W/O (Poly P
Capacity: 250.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 0019206H Hazardous 115490 ORGANIC LI 915490 ORGANIC LI

044 Misc Store Container Active H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Drums: Waste Paint Relate
Capacity: 55.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 0025489H Waste pain 913860 SOLVENTS,

045 Waste Pile Active 1 2/ NA NA NA Non-Hazardous Regulated Yes/
Description from Company: Sandblast Area
Capacity: 0.5000 Capacity Unit of Measure: A
System Types: 141 Storage
Wastes Currently Managed in Unit: 00053892 Sandblasti 171770 SAND, SAND

046 Misc Store Container Active 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Drum: Auto Shop
Capacity: 55.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 00022051 Crankcase 115530 OIL, CRANK

047 Misc Store Container Active H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Drum: Mercury Contaminate
Capacity: 55.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 0022319H Mercury co 978850 MERCURY CO

048 Tank (Surface) Active 02/19/93 1 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Tank: WO-13
Capacity: 16921.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 00012051 Oil/Water 0019206H Hazardous 115490 ORGANIC LI 115530 OIL, CRANK 910590 LAB WASTE,
915490 ORGANIC LI 948930 SLUDGE, CL

049 Misc Store Container Active 06/29/94 2/ NA NA NA Non-Hazardous Regulated NA /

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Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

Description from Company: Storage Bins for Plant Tr
Capacity: 40.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00149012 Plant refu 00359992 Plant tras

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050 Misc Store Container Active 06/29/94 2/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Steel Bins for Plant Tras
Capacity: 40.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00149012 Plant refu 00359992 Plant tras

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051 Misc Store Container Active 06/29/94 2/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Steel Bins for Plant Tras
Capacity: 40.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00149012 Plant refu 00359992 Plant tras

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052 Misc Store Container Active 06/29/94 2/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Steel Bin for Plant Trash
Capacity: 40.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00149012 Plant refu 00359992 Plant tras

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053 Misc Store Container Active 06/29/94 1 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Container: WC4, 121 Unit
Capacity: 30.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00124891 121 filter 0023489H Arsenic fi

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054 Contain Store Area Active 06/29/94 1 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: East Property Filter Cake
Capacity: 500.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00012051 Oil/Water 00083191 Sulfur was 00094891 156 filter 00104891 116 filter 00114891 177 filter
00124891 121 filter 00134891 Manufactur 0020489H Barium fil 0023489H Arsenic fi 00273881 scrap glas
00334891 Mixed filt
Wastes Previously Managed in Unit: 00044931

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055 Misc Store Container Active 06/29/94 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Container: PWT-01 (Ploypl
Capacity: 550.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 0019206H Hazardous

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056 Tank (Surface) Active 06/29/94 1 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /

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Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

Description from Company: Tank: H-77
Capacity: 9000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 00012051 Oil/Water 0019206H Hazardous

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057 Misc Store Container Active 06/29/94 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Container: Paint & Other
Capacity: 3.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00263081 Scrapmetal

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058 Misc Store Container Active 06/29/94 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Container: Glass Sample J
Capacity: 3.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00273881 scrap glas

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060 Contain Store Area Active 06/29/94 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Contaner Area for 156 Fil
System Types: 141 Storage
Wastes Currently Managed in Unit: 00083191 Sulfur was 00094891 156 filter

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061 Contain Store Area Active 06/29/94 2/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Medical Waste
Capacity: 5.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00283192 Medical wa

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062 Misc Store Container Active 11/10/94 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Crossties.
Capacity: 30.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00304891 Cross ties

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063 Misc Store Container Active 01/11/95 2/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Storage Bins for Rocks &
Capacity: 25.0000 Capacity Unit of Measure: Y
System Types: 141 Storage
Wastes Currently Managed in Unit: 00313902 Rocks and

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064 Contain Store Area Active 02/03/95 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Light Bulbs
Capacity: 400.0000 Capacity Unit of Measure: P
System Types: 141 Storage
Wastes Currently Managed in Unit: 0032319H Flourescen

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Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

065 WWTP Active 01/24/95 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: Waste Water Treatment Pla
System Types: 091 Chemical precipitation with biological treatment 121 Neutralization only
122 Evaporation only 124 Phase separation
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 0017110H Scrubber w
Wastes Previously Managed in Unit: 908260

066 Contain Store Area Active 11/15/96 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Tote Bin Storage Area Nor
Capacity: 5000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulated only by TX for haz. activities
Wastes Currently Managed in Unit: 0036219H Light orga

067 Tank (Surface) Active 12/05/96 1/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Tank BB-500
Capacity: 24374.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulated only by TX for haz. activities
Wastes Currently Managed in Unit: 00012051 Oil/Water
Wastes Previously Managed in Unit: 0019206H

068 Tank (Surface) Active 12/05/96 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Tank BB-504
Capacity: 25719.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: All units exempt from EPA and TX permits
Wastes Currently Managed in Unit: 00012051 Oil/Water

069 Misc Store Container Active 07/23/97 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Tote Bin Loading Spot at
Capacity: 350.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulated only by TX for haz. activities
Wastes Currently Managed in Unit: 0036219H Light orga

070 Misc Store Container Active 07/23/97 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Tote Bin Loading Spot at
Capacity: 350.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulated only by TX for haz. activities
Wastes Currently Managed in Unit: 0036219H Light orga

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Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date
** 'Active' & 'Closure Pending' Units **								
071	Misc Store Container	Active	07/23/97	H/ NA	NA	NA	RCRA Pmt Exempt - Accumulation Time	NA /
Description from Company: Tote Bin Loading Spot at Capacity: 350.0000 Capacity Unit of Measure: G System Types: 141 Storage Biennial System Regulatory Status: Regulated only by TX for haz. activities Wastes Currently Managed in Unit: 0036219H Light orga								
073	Landfill	Active	05/25/00	/ NA	NA	NA	Non-Hazardous Regulated	NA /
Description from Company: B-5 AOC (Area of Concern). TNRCC Project #5398. Capacity: 100.0000 Capacity Unit of Measure: Y System Types: 137 Other disposal Wastes Currently Managed in Unit:								
As of 10/12/2000, the next unassigned sequence number for UNITS is 074.								
** 'Inactive', 'Closed' & 'Post Closure Care' Units **								
001	Tank (Sub-surface)	Closed	06/30/97	/ NA	NA	NA		NA /
Description from Company: TNRCC Project No. 5399, F System Types: 141 Storage Biennial System Regulatory Status: Regulatory status unknown Wastes Previously Managed in Unit: 249950 270240 270640								
004	Tank (Surface)	Closed	07/07/00	1 H/ NA	NA	NA	RCRA Pmt Exempt - Accumulation Time	NA /
Description from Company: Tank WO-1, TNRCC Project Capacity: 6000.0000 Capacity Unit of Measure: G System Types: 141 Storage Biennial System Regulatory Status: Regulatory status unknown								
005	Tank (Surface)	Closed	07/07/00	/ NA	NA	NA	RCRA Pmt Exempt - Accumulation Time	NA /
Description from Company: Tank WO-3, TNRCC Project Capacity: 13709.0000 Capacity Unit of Measure: G System Types: 141 Storage Biennial System Regulatory Status: Regulatory status unknown Wastes Previously Managed in Unit: 115490 915490								
006	Tank (Surface)	Closed	07/07/00	1 H/ NA	NA	NA	RCRA Pmt Exempt - Accumulation Time	NA /
Description from Company: Tank WO-5, TNRCC Project Capacity: 8408.0000 Capacity Unit of Measure: G System Types: 141 Storage Biennial System Regulatory Status: Regulatory status unknown								
007	Tank (Surface)	Closed	08/22/94	1 H/ NA	NA	NA	RCRA Permitted	NA /

30324 The Lubrizol Corporation

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Inactive', 'Closed' & 'Post Closure Care' Units **

Description from Company: Tank WO-6
Capacity: 25320.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown

---

008 Tank (Surface) Closed 06/30/97 / NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Tank T-19P
Capacity: 10000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Previously Managed in Unit: 115490 915490

---

009 Tank (Surface) Closed 08/22/94 1 H/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Tank T-19-W
Capacity: 4500.0000 Capacity Unit of Measure: G
System Types: 141 Storage

---

011 WWTP Inactive 08/22/94 1 H/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: Tank T-19-Y
Capacity: 12000.0000 Capacity Unit of Measure: G
System Types: 124 Phase separation

---

013 Tank (Surface) Inactive 10/01/87 / NA NA NA NA /
Description from Company: Tank T-23-X
System Types: 141 Storage
Wastes Previously Managed in Unit: 900880

---

014 Tank (Surface) Closed 05/02/95 H/ NA NA 001 RCRA Permitted NA /
Description from Company: Tank CA-1
Capacity: 19543.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Previously Managed in Unit: 0017110H

---

016 Tank (Surface) Closed 07/07/00 1 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Tank H-6, TNRCC Project N
Capacity: 12126.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown

---

017 Tank (Surface) Closed 03/01/87 / NA NA NA NA /
Description from Company: Effluent Tank Car Shell
System Types: 141 Storage
Wastes Previously Managed in Unit: 915490

---

018 Tank (Surface) Closed 04/01/88 / NA NA NA NA /

180 031 94

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Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Inactive', 'Closed' & 'Post Closure Care' Units **

Description from Company: Tank B-32
System Types: 141 Storage
Wastes Previously Managed in Unit: 115530 910590 913860

---

020 Contain Store Area Inactive 08/22/94 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Drum Storage at Main Manu
System Types: 141 Storage

---

028 Tank (Surface) Closed 08/22/94 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Tank WO-2
Capacity: 5000.0000 Capacity Unit of Measure: G
System Types: 141 Storage

---

029 WWTP Inactive 08/22/94 1/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: Tank RA-10
Capacity: 1000.0000 Capacity Unit of Measure: G
System Types: 124 Phase separation

---

030 Tank (Surface) Closed 07/07/00 1/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Tank WO-8, TNRCC Project
Capacity: 1113.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown

---

036 Tank (Surface) Closed 07/07/00 1 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Tank P-25, TNRCC Project
Capacity: 2110.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown

---

038 Tank (Sub-surface) Closed 12/01/87 - / NA NA NA NA /
Description from Company: Tank LAB-B, TNRCC Project
System Types: 141 Storage
Wastes Previously Managed in Unit: 910590

---

059 Tank (Surface) Closed 07/07/00 1 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Tank: WO-6-R, TNRCC Proje
Capacity: 10000.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown

---

072 Waste Pile Closed 07/07/00 2/ NA NA NA Non-Hazardous Regulated NA /
Description from Company: Soil Pile on East Propert
Capacity: 900000.0000 Capacity Unit of Measure: y
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown

Reference 19

Industrial Site Information

Texas Natural Resource Conservation Commission

INTEROFFICE MEMORANDUM

To: File

Date: December 13, 1995

Thru: Ernest Heyer
Field Operations Division

Susan Bredehoeft, I & HW Liaison
Field Operations Division

From: Matthew Chun, Field Investigator
Region 12 - Houston

Subject: Occidental Chemical Corporation (Oxychem)
Solid Waste Registration No. 38000; Permit No. 50248
EPA ID No. TXD9821911209
Compliance Evaluation Inspection (CEI) conducted on November 2, 7 and 9, 1995

I. INTRODUCTION

On October 31, November 2, 7 and 9, 1995 Matthew Chun, Field Investigator from the Region 12 - Houston office of the Texas Natural Resource Conservation Commission (TNRCC) conducted a Compliance Evaluation Inspection (CEI) of the above referenced facility. Representing Oxychem during the inspection were Patricia Bragan, Environmental Engineer, Vic Rebecek, Environmental & Training Coordinator and Paul Green, Environmental Technician. Kurk Grinbergs, Environmental Engineer, was also present during the inspection on November 7, 1995. During the exit interview on November 9, 1995, Oxychem was represented by Ted Brenneman, Environmental Manager, William Higgins, Production Manager, Jerry Korhonen, Production Supervisor, Patricia Bragan, Vic Rebecek, and Paul Green.

Oxychem is located on 1000 Tidal Road in Deer Park, Harris County. The site is within the Shell Chemical Complex about one-half mile south of the Houston Ship Channel. The surrounding land use is commercial and heavy industrial.

The Oxychem facility was purchased from Shell in 1987. This facility produces vinyl chloride monomer (VCM) for the production of Polyvinyl Chloride (PVC). Oxychem incinerates two waste streams generated by Shell. The wastes are hard piped from Shell to Oxychem. With the receipt of waste streams from Shell the Oxychem facility is classified as a commercial facility.

All violations from the previous Compliance Evaluation Inspections conducted on October 19, 1994 were resolved. All RCRIS violations were resolved and presently there

are no outstanding violations on RCRIS.

II. GENERAL FACILITY AND WASTE PROCESS INFORMATION

NOR dated 7-12-95 shows thirty one (31) waste streams as active (see **NOR in attachment 1).** However, thirteen (13) of the thirty one waste streams were the old six-digit waste codes which should have been deactivated. In addition, eight (8) new waste streams have been submitted for notification for update. Of the twenty six (26) total active streams, sixteen (16) are listed as hazardous waste, six (6) are class 1 nonhazardous waste and four (4) are class 2 nonhazardous waste. The new waste streams are described as follow:

WASTE CODE NUMBER	WASTE DESCRIPTION	DISPOSITION
0025319H	Acid bricks	USPCI, Waynoka, OK for landfill
00263011	Acid/caustic contaminated dirt	BFI, Anahuac, TX for landfill
0028304H	Furnace coke	Rollins, Deer Park, TX for landfill
00299012	Plant trash	BFI, McCarty, TX for landfill
00313891	Sandblast grit with lead	BFI, Anahuac, TX for landfill
0027301H	Tank Sludge	Chemical Waste Management, Port Arthur, TX
0023319H	Flint Rock/Limestone	USPCI, Waynoka, OK for landfill
0501203H	Petroleum Naptha	Safety-Kleen, Pasadena, TX for recycling

The NOR shows seven (7) active waste management units (WMUs) which includes two (2) permitted incinerators (NOR #001 and #002), three (3) interim status tanks (NOR #005, #006 and #009), one less-than-90 day tank (NOR #010), and one (1) interim status container storage area (NOR #008). Shell had been operating two (2) incinerators for the incineration of two (2) waste streams (Epichlorohydrin Light Ends and Heavy Ends) until the time of purchase. Oxychem took over the operation of the incinerators and continue to incinerate the two Shell waste streams in addition to two (2) waste streams generated

at Oxychem (Organic Chlorides Heavy and Light Ends) (NOR #s 0008701H & 0009202H). In addition to the seven (7) WMUs on the NOR, three (3) WMUs have been submitted for notification update. The new WMUs are described as follow:

Neutralization Tank T1701 (NOR #013), also known as the Rockbox, a flow-through wastewater tank where limestone was used to neutralize the hydrochloric acid wastewater from the incinerator scrubber columns prior to discharge to the Shell wastewater treatment plant.

HCIN Container Storage Area (NOR #011), a non-hazardous waste storage area near the incinerators, is used for the storage of non-hazardous waste bins and drums.

Control Room Container Storage Area (NOR #012), a less-than-90 day storage area west of the control room, is used for the storage of hazardous and non-hazardous waste drums.

III. SUMMARY OF RESOLVED VIOLATIONS DURING CURRENT INSPECTION

All violations in the previous CEI dated October 6, 10 and 19, 1994 have been resolved. The following noncompliances noted during the present inspection were also resolved during the inspection.

1. 30 Texas Administrative Code (TAC) 335.6(b) - Notification Requirements

o Oxychem is required to notify TNRCC of the following:

Waste streams with the old six-digit codes were included in the updated NOR as separate waste streams in addition to the newly converted 8-digit waste codes. These waste streams with the old six-digit codes should be deleted from the NOR.

Waste codes 00299012 (plant trash), 0027301H (tank sludge), 0023319H (waste flintrock/limestone) (see waste codes used in manifests in attachment 2), and 0501203H or its equilvalent code (petroleum naptha) (see waste codes used in attachment 3) should be added as new waste streams.

Waste management unit numbers 011 (HCIN CSA), 012 (CSA west of Control Room), and 013 (Neutralization Tank) should be added on the NOR as new waste management units.

On November 15, 1995, Oxychem revised the NOR to include the changes stated above, thus resolving the violation (see Oxychem's letter of response dated

November 14, 1995 in attachment 4).

2. 30 TAC 335.503(b) - Waste Classification and Waste Coding Required

o The old waste codes under all the waste management units should be updated and converted to the eight-digit codes.

On November 15, 1995, Oxychem revised the NOR to include the changes stated above, thus **resolving** the violation **(see Oxychem's letter of response dated November 14, 1995 in attachment 4).**

3. 30 TAC 335.431(c) / 40 Code of Federal Regulations (CFR) 268.7(a) (1) - Waste Analysis and Recordkeeping

o During the record review of the manifest and LDR certifications on November 9, 1995, several discrepancies were noted on the following manifests and LDR certificates:

No LDR certificates were found for the following manifests (see **attachment 3**):

Manifest No. 1048169 dated 02-22-95
Manifest No. SKC22161 dated 05-17-95
Manifest No. SKC75593 dated 08-11-95

On November 15, 1995, Oxychem forwarded a letter of response to the inspection. Copy of the LDR certificates were submitted to the TNRCC, Region 12 office, thus **resolving** the violation **(see Oxychem's letter of response dated November 14, 1995 in attachment 4).**

IV. AREAS OF CONCERN

During the CEI conducted on October 31, November 2, 7 and 9, 1995, the following areas of concern were noted:

1. During the record review on site, the Incinerator Inspection Record were noted to have some deficiencies (see **attachment 8**). These included incomplete page of V Operations on the following dates. Oxychem stated that the Inspection Record checklists are undergoing revision and the particular pages of V Operations will be eliminated, this is thus addressed as area of concern:

January 4, 5, 6, 11, 14, 15, 20, 22, 1995

April 14, 16, 1995
July 9, 22, 1995
October 3, 5, 6, 20, 22, 21, 23, 25, 26, 1995

On November 15, 1995, Oxychem forwarded a letter of response to the inspection stating that Oxychem had conducted meetings and given instructions to all shift operators to properly complete the inspection checklists and that instructions were given to the shift supervisors to check that this is being done on a daily basis to assure that the inspection sheets will be completed. **[This area of concern is thus resolved] (see Oxychem's letter of response dated November 14, 1995 in attachment 4).**

2. During the record review, the waste handling codes section in the following manifests shipped to USPCI in Waynoka, Oklahoma **(see attachment 2)** were noted not being filled out:

Manifest No. 00886667
Manifest Nos. 00886615 to 00886620
Manifest Nos. 00886622 to 00886623
Manifest Nos. 00886625 to 00886630
Manifest No. 00886665
Manifest Nos. 00886668 to 00886676
Manifest No. 00886683

On November 15, 1995, Oxychem forwarded a letter of response to the inspection stating that Oxychem had made revision to their handling of the manifests to assure that the manifests to USPCI will be completed in area K for handling codes. **[This area of concern is thus resolved] (see Oxychem's letter of response dated November 14, 1995 in attachment 4).**

This information is submitted as file data.

Signed: _____
Matthew Chun
Field Investigator

Approved: _____
Nicole Bealle
Team Leader
Industrial and Hazardous Waste Program
Region 12 - Houston

38000 Oxy Vinyls, LP

Solid Waste Registration Number: 38000 EPA Id: TXD981911209

Company Name: Oxy Vinyls, LP
Site Name: Houston Operations, Deer Park VCM Site
Site Location: Highway 225 & Tidal Rd, Deer Park , TX
Contact: Green, Paul S

Region: 12 Initial Registration Date: 05/08/1987
County: 101 HARRIS Last Amendment Date: 10/02/2000
Last Date NOR Computer update: 10/09/2000
Title: Environmental Specialist Phone: 281-476-2200

Mailing Address: 500
Deer Park, TX 77536

Site Street Address: Highway 225 & Tidal Rd
Deer Park, TX 77536

Registration Status: Active HW Permit #: 50248 Reporting Method: STEERS
Registration Type: Generator Receiver
Generator Type: Industrial Hazardous Waste Generation Status: Large Quantity Generator
Receiver Type: Captive

Business Description: Manufacturer of vinyl chloride monomer

Primary SIC Code: 2869 Industrial Organic Chemicals Not Else Classified
Handler Status: Permitted TSD

Operator Information
Name: Oxy Vinyls, LP
Phone:
Address: 5005 LBJ, Suite 500 LB30 Freeway
Dallas, TX, 75244-6123

Owner Information
Name: Oxy Vinyls, LP
Phone:
Address: 5005 LBJ, Suite 500 LB30 Freeway
Dallas, TX, 75244-6123

As of 10/02/2000 - the next unassigned sequence number for WASTES is 0073 and
the next unassigned sequence number for UNITS is 018.

19 006 6

38000 Oxy Vinyls, LP

**** WASTE INFORMATION ****

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete
****** Active Wastes ******						
00012971 1		Active	06/30/94	On/Off	No	No

Description from Generator: PCB contaminated liquids containing 50-500 ppm PCBs. Removed from electrical transformers/capacitors in vinyl chloride process. Date of generation Sept. 1990
Refers to waste code (6): 110550
Form Code: 297 Non-haz organ. liq contain >= 50 & < 500 ppm PCB's
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM-013-0001

00023022 2		Active	06/30/94	On/Off	No	No

Description from Generator: Cooling tower sludge. Removed from cooling water tower in vinyl chloride process. Date of generation July 1987.
Refers to waste code (6): 140290
Form Code: 302 Soil contaminated with inorganics only
Current Management Units: Contain Store Area 014
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM-009-0001

00033111 1		Active	06/30/94	On/Off	No	No

Description from Generator: Asbestos insulation. Removed from process equipment and buildings in VCM process. March 1989.
Refers to waste code (6): 179390
Form Code: 311 Asbestos solids and debris
Current Management Units: Contain Store Area 013 014
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM-012-0001

00044891 1		Active	06/30/94	On/Off	No	No

Description from Generator: Adsorbant, dirt and other solids contaminated with oil. From maintenance activities and oil spill cleanup at VCM process. date of generation July 1987.
Refers to waste code (6): 179700
Form Code: 489 Petroleum contaminated solids
Current Management Units: Contain Store Area 008 013
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM-015-0001

00054882 2		Active	06/30/94	On/Off	No	No

Description from Generator: Wood from cooling tower. From demolition or maintenance of cooling water tower in VCM process. initial generation July 1987.
Refers to waste code (6): 185140
Form Code: 488 Wood debris
Current Management Units: Contain Store Area 014
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM-011-0001

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19 0074

38000 Oxy Vinyls, LP

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

00063192 2 Active 06/30/94 On/Off No No

Description from Generator: Column packing saddles. Removed from wastewater stripper. Initial generation July 1987.
Refers to waste code (6): 270830
Form Code: 319 Other waste inorganic solids
Current Management Units: Contain Store Area 008 013
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM-008-0002

0007209H H Active 06/30/94 On/Off No No

Description from Generator: Waste paint and thinner. From maintenance activities at VCM process. Initial generation July 1987.
Refers to waste code (6): 910650
Form Code: 209 Organic paint, ink, lacquer, or varnish
EPA Hazardous Waste Numbers: D001 D007 D008 D019 D021 D026 D035 D039 D040 F002 F003 F005
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
* Source Codes: A21 Painting A01 Stripping
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-014-0001

0008701H H Active 06/30/94 On No No

Description from Generator: Light ends from hazardous waste storage tanks.initial generation July 1987
Refers to waste code (6): 913690
Form Code: 701 Inorganic gases
EPA Hazardous Waste Numbers: K019 K020
Current Management Units: Incinerator 001 002
* Origin Codes: 5 Onsite haz waste mgmt
* System Types: 141 Storage
* Source Codes: A89 Other pollution control or waste treatment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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0009202H H Active 06/30/94 On/Off No No

Description from Generator: Heavy ends from VCM production. initial generation July 1987. Material is sent to Geon Company for use as a feed stock. jds 3/19/99
Refers to waste code (6): 914710
Form Code: 202 Halogenated (e.g., chlorinated) solvent
EPA Hazardous Waste Numbers: D001 D007 K019 K020
Current Management Units: Incinerator 001 002
Tank 010
Tank (Surface) 005 006 009
Misc Store Container 017
* Origin Codes: 1 Onsite-process/service
* Source Codes: A33 Product distillation
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-003-0001

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19 800 08

00

38000 Oxy Vinyls, LP

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

0010206H H Active 06/30/94 On No No
Description from Generator: Waste lubricating oil from VCM process.initial generation July 1987
Refers to waste code (6): 919450
Form Code: 206 Waste oil
EPA Hazardous Waste Numbers: D008 D028
Current Management Units: Incinerator 001 002
Contain Store Area 008
Tank (Surface) 009
Misc Store Container 017
* Origin Codes: 1 Onsite-process/service
* Source Codes: A54 Oil changes
* Measurement Points: 1 Before mixing
* SIC Codes: 2812 Alkalies & Chlorine
Company's Internal Code(s): VCM-001-0001

0011303H H Active 06/30/94 On/Off No No
Description from Generator: Incinerator ash from hazardous waste incineration.initial generation July 1987
Refers to waste code (6): 941520
Form Code: 303 Ash, slag or other res-(inorgan.) incin. of waste
EPA Hazardous Waste Numbers: K017 K019 K020
Current Management Units: Contain Store Area 008
* Origin Codes: 5 Onsite haz waste mgmt
* System Types: 041 Incineration - liquids 044 Incineration - gases
* Source Codes: A74 Incineration/Thermal treatment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-002-0003

0012409H H Active 06/30/94 On/Off No No
Description from Generator: Contaminated plant trash. Clothing, PPE, glassware and other debris contaminated with chlorinated organics. initial generation July 1987.
Refers to waste code (6): 970770
Form Code: 409 Other non-halogenated organic solids
EPA Hazardous Waste Numbers: D028 D043 K017 K019 K020 U077
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
* Source Codes: A91 Clothing and personal protective equipment A92 Routine cleanup waste (e.g., floor sweepings)
A94 Laboratory wastes
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-007-0001

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19 0099

38000 Oxy Vinyls, LP

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

0013301H H Active 06/30/94 On/Off * No No

Description from Generator: EDC contaminated soil. From excavation and spill cleanups in VCM process. initial generation July 1987.
Refers to waste code (6): 979850
Form Code: 301 Soil contaminated with organics
EPA Hazardous Waste Numbers: D019 D028 D039 D040 D043 K017 K019 K020 U043 U077
Current Management Units: Contain Store Area 008 013
* Origin Codes: 1 Onsite-process/service 2 Spill clean-up
* Source Codes: A60 Sludge removal A53 Cleanup of spill residues
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-010-0003

0019310H H Active 06/30/94 On/Off No No

Description from Generator: Acid filters. Removed from HCL absorber column, which is part of hazardous waste incinerator pollution control. initial generation July 1987.
Form Code: 310 Spent solid filters or adsorbents (inorganic)
EPA Hazardous Waste Numbers: K017 K019 K020
Current Management Units: Contain Store Area 008
* Origin Codes: 4 Received from offsite
* Source Codes: A74 Incineration/Thermal treatment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-023-0001

0020609H H Active 09/08/93 On/Off No No

Description from Generator: Mud prvn liquids/Generated by cleanout of trenches, sumps in vinyl chloride production unit. first generated 6/18/93.
Form Code: 609 Other organic sludges
EPA Hazardous Waste Numbers: D022 D028 D043 U019 U020 U043
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
* Source Codes: A74 Incineration/Thermal treatment A39 Slag removal
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-002-0004

0021101H H Active 11/13/95 Off No No

Description from Generator: Steam stripper wastewater./ initial generation July 1987
Form Code: 101 Aqueous waste with low solvents
EPA Hazardous Waste Numbers: D002 D028
Current Management Units: None
* Origin Codes: 1 Onsite-process/service 5 Onsite haz waste mgmt
* Source Codes: A73 Solvents recovery
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-037-0002

38000 Oxy Vinyls, LP

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

0022105H H Active 11/13/95 Off No No

Description from Generator: Rock box wastewater from limestone neutralization of acid from incinerators. Initital generation July 1987.
Form Code: 105 Acidic aqueous waste
EPA Hazardous Waste Numbers: D002 K017 K019 K020
Current Management Units: None
* Origin Codes: 5 Onsite haz waste mgmt 1 Onsite-process/service
* System Types: 041 Incineration - liquids 044 Incineration - gases
* Source Codes: A74 Incineration/Thermal treatment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-037-0001

0023319H H Active 11/13/96 On/Off No No

Description from Generator: Waste flintrock, Limestone from cleanout of T - 1701.
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: K017 K019 K020
Current Management Units: Contain Store Area 012 013 014
* Origin Codes: 4 Received from offsite
* Source Codes: A05 Dip rinsing A04 Flush rinsing
A06 Spray rinsing
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM - 020 - 0001

0024310H H Active 04/11/94 On/Off No No

Description from Generator: VCM Carthadge filters. First generated January 1994.
Form Code: 310 Spent solid filters or adsorbents (inorganic)
EPA Hazardous Waste Numbers: D043
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
* Source Codes: A32 Product filtering
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM - 026-0001

0025319H H Active 11/13/96 On/Off No No

Description from Generator: Acid Brick. Brick and debris removed from hazardous waste incinerator system.
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: K017 K019 K020
Current Management Units: Contain Store Area 008 013
* Origin Codes: 4 Received from offsite
* Source Codes: A09 Clean out process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-032-0001

38000 Oxy Vinyls, LP

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

00263011 1 Active 11/13/96 On/Off No
Description from Generator: Acid / Caustic contarinated dirt. From spill cleanup or excavation for maintenance work.
Form Code: 301 Soil contaminated with organics
Current Management Units: Tank 011
Contain Store Area 008 012 013 014
* Origin Codes: 2 Spill clean-up 1 Onsite-process/service
Company's Internal Code(s): VCM - 036 - 0001

0027301H H Active 07/25/95 On/Off No No
Description from Generator: Tank sludge from cleanout of tanks, other equipment at VCM site. First generated April 1995.
Form Code: 301 Soil contaminated with organics
EPA Hazardous Waste Numbers: D018 D019 D022 D028 D033 D034 D039 D040 K017 K019 K020
Current Management Units: Contain Store Area 008 013
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-016-0001

0028304H H Active 11/13/96 On/Off No No
Description from Generator: Furnace Coke. Removed from quench column in VCM production unit.
Form Code: 304 Other "dry" ash, slag, or thermal inorgan. residue
EPA Hazardous Waste Numbers: D007 D018 D019 D028 D039 D040 D043
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
* Source Codes: A09 Clean out process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM - 002 - 0001

00299992 2 Active 11/13/96 On/Off No
Description from Generator: General Plant Trash from offices, Maintenance and operations.
Form Code: 999 Plant Refuse
Current Management Units: Contain Store Area 014
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM - 037 - 0001

00303191 1 Active 08/16/96 On/Off No
Description from Generator: Process furnace brick and insulation First generated January 1991.
Form Code: 319 Other waste inorganic solids
Current Management Units: Contain Store Area 013
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM - CO1

00313891 1 Active 11/13/96 On/Off No
Description from Generator: Sandblast grit with lead. From sandblasting of equipment with lead containing paint. First generated April 1995.
Form Code: 389 Nonhazardous sandblasting waste (inorganic solid)
Current Management Units: Waste Pile 015
Contain Store Area 008 012 014

19 012 12

38000 Oxy Vinyls, LP

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM - 019 - 0001

00323012 2 Active 11/13/96 On/Off No Yes
Description from Generator: Class 2 Dirt / Concrete. From spill cleanup or excavation due to maintenance. First generated July 1995. October 29, 1997 recycling notification -processed into TxDOT 247 & 276.
Form Code: 301 Soil contaminated with organics
Current Management Units: Contain Store Area 008 013 014
* Origin Codes: 2 Spill clean-up 1 Onsite-process/service
Company's Internal Code(s): VCM - 036 - 0002

0034202H H Active 11/13/95 On/Off No No
Description from Generator: Spent solvents used for tool and parts cleaning
Form Code: 202 Halogenated (e.g., chlorinated) solvent
EPA Hazardous Waste Numbers: D001 F003 K017 K019 K020
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
* Source Codes: A75 Wastewater treatment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-038-0001

00353102 2 Active 12/21/95 On/Off No
Description from Generator: Molecular Sieve removed from ethylene driers.
Form Code: 310 Spent solid filters or adsorbents (inorganic)
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM-025-0001

00374042 2 Active 03/08/96 On/Off No
Description from Generator: Potasium Permanganate /spent carbon from building air conditioner filters.
Form Code: 404 Spent carbon
Current Management Units: Contain Store Area 008 013
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): USM-038-001

00384031 1 Active 11/13/96 On/Off No
Description from Generator: Miscellaneous Construction Debris / Leftover material from various construction jobs. 5/6/96
Form Code: 403 Solid resins or polymerized organics
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM - 039 - 0001

00399022 2 Active 06/25/96 On/Off No
Description from Generator: general plant maintenance in production of vinyl chloride and ethylene dichloride.
Form Code: 902 Supplemental plant production refuse
Current Management Units: Contain Store Area 012 014
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): vcm-037-0002

19 013 13

38000 Oxy Vinyls, LP

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio- active	TNRCC Audit Complete

****** Active Wastes ******

0040404H H Active 06/25/96 On/Off No No
Description from Generator: carbon contaminated with organics/spent activated carbon used in production of EDC/ 6-96.
Form Code: 404 Spent carbon
EPA Hazardous Waste Numbers: D028
Current Management Units: Contain Store Area 008
* Origin Codes: 4 Received from offsite
* Source Codes: A75 Wastewater treatment A38 Tank sludge removal
A76 Sludge dewatering
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): vcm-039-0001

00503011 1 Active 04/14/93 On/Off No
Description from Generator: Solvents contaminated soil, generated when excavating soil for maintenanceactivities.
Consists of soil, concrete and rock which may contain low levels of chlorinated organics.
Form Code: 301 Soil contaminated with organics
Current Management Units: Contain Store Area 008 013 014
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM-010-0002

00523931 1 Active 08/16/96 On/Off No No
Description from Generator: Copper chloride catalyst from OHC First generated November 1988 (streamis generated every 2-3 years)
Form Code: 393 Catalyst waste (inorganic solid)
Current Management Units: Contain Store Area 008 013
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM - BO5

00531191 1 Active 08/16/96 On/Off No
Description from Generator: OHC copper chloride catalyst reactor wash water. First generated November1988 (stream is generated every 2-3 years)
Form Code: 119 Other inorganic liquids
Current Management Units: Contain Store Area 013 016
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM-B06

0054319H H Active 09/16/96 On/Off No No
Description from Generator: Solvents contaminated Debris (Concrete Piping) Spill Cleanup at Vinyl Chloride Moromer unit. 6/96
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: D018 D019 D022 D028 D033 D034 D039 D040 K020 U043 U077
Current Management Units: Contain Store Area 008
* Origin Codes: 2 Spill clean-up 1 Onsite-process/service
* Source Codes: A53 Cleanup of spill residues A69 Other remediation
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM - G07

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19 014 14

38000 Oxy Vinyls, LP

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

00551191 1 Active 09/16/96 On/Off No

Description from Generator: Waste passivation solution, from cleaning of new process equipment. Solution is a mis of acids, bases, and glycols.
Form Code: 119 Other inorganic liquids
Current Management Units: Contain Store Area 013 016
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM- F11

0056302H H Active 11/26/96 On/Off No No

Description from Generator: Lead contaminated sandblast grit. Sandblasting of equipment. November 1996.
Form Code: 302 Soil contaminated with inorganics only
EPA Hazardous Waste Numbers: D008
Current Management Units: Waste Pile 015
Contain Store Area 008 014
* Origin Codes: 1 Onsite-process/service
* Source Codes: A29 Other surface coating/preparation
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCU - F12

0057203H H Active 06/04/97 Off No No

Description from Generator: Waste petroleum naptha from parts cleaner, Safety - Kleen operation. First generated June 1997.
Form Code: 203 Non-halogenated solvent
EPA Hazardous Waste Numbers: D008 D018 D039 D040
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A19 Other cleaning and degreasing
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM - F14

0058319H H Active 06/04/97 On/Off No No

Description from Generator: Waste paint related solids
Form Code: 319 Other waste inorganic solids
EPA Hazardous Waste Numbers: D007 D008 D019 D021 D026 D035 D039 D040 F002 F003 F005
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
* Source Codes: A19 Other cleaning and degreasing A21 Painting
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-F15

38000 Oxy Vinyls, LP

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

****** Active Wastes ******

0059310H H Active 11/13/95 On/Off No No
Description from Generator: vcm contaminated alumina
Form Code: 310 Spent solid filters or adsorbents (inorganic)
EPA Hazardous Waste Numbers: U043
Current Management Units: Contain Store Area 008 013
* Origin Codes: 1 Onsite-process/service
* Source Codes: A32 Product filtering
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): vcm-c05

00603191 1 Active 10/02/00 On/Off No No
Description from Generator: DELISTED ROCKBOX RESIDUE. First Generated 9/00
Form Code: 319 Other waste inorganic solids
Current Management Units: Contain Store Area 012 013 014
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM-D06

* The first value is considered the primary value (e.g. primary origin code).
As of 10/02/2000, the next unassigned sequence number for WASTES is 0073.

** No Longer Generated Wastes **

00369992 2 Inactive 10/14/96 NA No No
Description from Generator: Plant trash from vinyl clloride process and supporting operations such as maintenance.
Form Code: 999 Plant Refuse
Current Management Units: Contain Store Area 014
* Origin Codes: 1 Onsite-process/service
Company's Internal Code(s): VCM-037-0001

0051307H H Inactive 11/13/95 NA No No
Description from Generator: Piping contaminated with heavy ends. Generated in VCM production unit. Initially generated 4/12/93.
Form Code: 307 Metal scale, filings, or scrap
EPA Hazardous Waste Numbers: D028 D039 K020
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
* Source Codes: A56 Discontinue use of process equipment
* Measurement Points: 1 Before mixing
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified
Company's Internal Code(s): VCM-035-0001

38000 Oxy Vinyls, LP

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

0072203H H Inactive 11/24/99 NA No No
Description from Generator: Waste petroleum naptha from parts cleaner, Safety - Kleen operation. First generated June 1997 Waste inactivated due to error in submission.
Form Code: 203 Non-halogenated solvent
EPA Hazardous Waste Numbers: D008 D018 D039 D040
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A19 Other cleaning and degreasing
* Measurement Points: 1 Before mixing
* SIC Codes: 2812 Alkalies & Chlorine
Company's Internal Code(s): BAT - E13

110550 1 Inactive 11/13/95 NA No No
Description from Generator: PCB CONTAMINATED LIQUIDS
Form Code:
Current Management Units: None
* Origin Codes:

140290 1 Inactive 11/13/95 NA No No
Description from Generator: Cooling Tower Sludge
Form Code:
Current Management Units: None
* Origin Codes:

179390 1 Inactive 11/13/95 NA No No
Description from Generator: ASBESTOS INSULATON
Form Code:
Current Management Units: None
* Origin Codes:

179700 1 Inactive 11/13/95 NA No No
Description from Generator: ABSORBTANT, OIL
Form Code:
Current Management Units: Contain Store Area 008
* Origin Codes:

185140 1 Inactive 11/13/95 NA No No
Description from Generator: Wood from cooling tower
Form Code:
Current Management Units: None
* Origin Codes:

270830 2 Inactive 11/13/95 NA No No
Description from Generator: COLUMN PACKING
Form Code:
Current Management Units: Contain Store Area 008
* Origin Codes:

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Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

910650 H Inactive 11/13/95 NA No No
Description from Generator: PAINT WASTE, LIQUID
Form Code: 209 Organic paint, ink, lacquer, or varnish
EPA Hazardous Waste Numbers: D008 D019 D021 D026 D035 D039 D040 F002 F003
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
* Source Codes: A21 Painting
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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913690 H Inactive 11/13/95 NA No No
Description from Generator: CHLORIDES, ORGANIC, LIGHT ENDS
Form Code: 701 Inorganic gases
EPA Hazardous Waste Numbers: U077
Current Management Units: Incinerator 001 002
Tank 010
Tank (Surface) 005 006
* Origin Codes: 1 Onsite-process/service
* Source Codes: A89 Other pollution control or waste treatment
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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914710 H Inactive 11/13/95 NA No No
Description from Generator: CHLORIDE HEAVY ENDS, ORGANIC
Form Code: 202 Halogenated (e.g., chlorinated) solvent
EPA Hazardous Waste Numbers: K017 K019 K020
Current Management Units: Incinerator 001 002
Tank 010
Tank (Surface) 005 006 009
* Origin Codes: 1 Onsite-process/service
* Source Codes: A33 Product distillation
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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919450 H Inactive 11/13/95 NA No No
Description from Generator: OIL, RECOVERED
Form Code: 206 Waste oil
EPA Hazardous Waste Numbers: D008
Current Management Units: None
* Origin Codes: 1 Onsite-process/service
* Source Codes: A54 Oil changes
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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19 018 19

38000 Oxy Vinyls, LP

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete

** No Longer Generated Wastes **

940290 H Inactive 07/25/91 NA No
Description from Generator: SLUDGE, COOLING TOWER
Form Code:
EPA Hazardous Waste Numbers: D006
Current Management Units: Contain Store Area 008
* Origin Codes:

941520 H Inactive 11/13/95 NA No No
Description from Generator: PRIMARY SOLIDS
Form Code: 303 Ash, slag or other res-(inorgan.) incin. of waste
EPA Hazardous Waste Numbers: K017
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
* Source Codes: A74 Incineration/Thermal treatment
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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970210 H Inactive 06/30/94 NA No No
Description from Generator: CATALYST, SPENT
Form Code:
EPA Hazardous Waste Numbers: D039 U210
Current Management Units: Contain Store Area 008
* Origin Codes:

970440 H Inactive NA No
Description from Generator: FILTER CAKE, MEDIA WASTES
Form Code:
EPA Hazardous Waste Numbers: U041 U043 U076
Current Management Units: None
* Origin Codes:

970770 H Inactive 11/13/95 NA No No
Description from Generator: PLANT WASTES
Form Code: 409 Other non-halogenated organic solids
EPA Hazardous Waste Numbers: F025 K020 U077
Current Management Units: Contain Store Area 008
* Origin Codes: 1 Onsite-process/service
* Source Codes: A91 Clothing and personal protective equipment
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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19 019 15

38000 Oxy Vinyls, LP

Texas Waste Code	Waste Class	Status	Date of Status	Managed Onsite/ Offsite	Radio-active	TNRCC Audit Complete
** No Longer Generated Wastes **						
979850	H	Inactive	11/13/95	NA *	No	No

Description from Generator: SOIL, ORGANIC CHEMICALS CONTAMINATED
Form Code: 301 Soil contaminated with organics
EPA Hazardous Waste Numbers: D028
Current Management Units: Contain Store Area 008
* Origin Codes: 2 Spill clean-up
* Source Codes: A53 Cleanup of spill residues
* SIC Codes: 2869 Industrial Organic Chemicals Not Else Classified

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985140 H Inactive 10/10/91 NA No
Description from Generator: WOOD FROM COOLING TOWER
Form Code:
EPA Hazardous Waste Numbers: D006
Current Management Units: Contain Store Area 008
* Origin Codes:

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* The first value is considered the primary value (e.g. primary origin code).
As of 10/02/2000, the next unassigned sequence number for WASTES is 0073.

19 020 20

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**** UNITS AT THIS SITE MANAGING WASTE ****

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date
** 'Active' & 'Closure Pending' Units **								
001	Incinerator	Active		H/ NA	NA	001	RCRA Permitted	NA /

Description from Company: HCIN #2 incinerator
Capacity: 1.0000 Capacity Unit of Measure: U
System Types:
Wastes Currently Managed in Unit: 0008701H Light ends 0009202H Heavy ends 0010206H Waste lubr 913690 CHLORIDES, 914710 CHLORIDE H

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002 Incinerator Active H/ NA NA 002 RCRA Permitted NA /
Description from Company: HCIN #3 incinerator
Capacity: 1.0000 Capacity Unit of Measure: U
System Types:
Wastes Currently Managed in Unit: 0008701H Light ends 0009202H Heavy ends 0010206H Waste lubr 913690 CHLORIDES, 914710 CHLORIDE H

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005 Tank (Surface) Active H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: T9567 Hazardous waste tan
Capacity: 158640.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 0009202H Heavy ends 913690 CHLORIDES, 914710 CHLORIDE H

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006 Tank (Surface) Active H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: V-477 Hazardous waste tan
Capacity: 642768.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 0009202H Heavy ends 913690 CHLORIDES, 914710 CHLORIDE H

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008 Contain Store Area Active 1 2 H/ NA NA 003 RCRA Permitted NA /
Description from Company: Container storage area. Haz Waste Drum capacity of 3425 gallons.
Capacity: 1250.0000 Capacity Unit of Measure: G
System Types:
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit:

00012971	PCB contam	00044891	Adsorbant,	00063192	Column pac	0007209H	Waste pain	0010206H	Waste lubr
0011303H	Incinerato	0012409H	Contaminat	0013301H	EDC contam	0019310H	Acid filte	0020609H	Mud prvn l
0024310H	VCM Cartha	0025319H	Acid Brick	00263011	Acid / Cau	0027301H	Tank sludg	0028304H	Furnace Co
00313891	Sandblast	00323012	Class 2 Di	0034202H	Spent solv	00353102	Molecular	00374042	Potasium P
00384031	Miscellane	0040404H	carbon con	00503011	Solvents c	0051307H	Piping con	00523931	Copper chl
0054319H	Solvents c	0056302H	Lead conta	0058319H	Waste pain	0059310H	vcm contam	179700	ABSORBTANT
270830	COLUMN PAC	910650	PAINT WAST	940290	SLUDGE, CO	941520	PRIMARY SO	970210	CATALYST,
970770	PLANT WAST	979850	SOIL, ORGA	985140	WOOD FROM				

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009 Tank (Surface) Active H/ NA NA IN1 RCRA Interim Status Unit NA /

19 02121

38000 Oxy Vinyls, LP

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

Description from Company: T-9568 Hazardous waste ta
Capacity: 158000.0000 Capacity Unit of Measure: G
System Types:
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 0009202H Heavy ends 0010206H Waste lubr 914710 CHLORIDE H

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010 Tank Active 05/13/93 H/ NA NA 004 RCRA Permitted NA /
Description from Company: T-9555 Hazardous waste st
Capacity: 50050.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Currently Managed in Unit: 0009202H Heavy ends 913690 CHLORIDES, 914710 CHLORIDE H

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011 Tank Active 09/26/94 1/ NA NA NA RCRA Pmt Exempt-W.W.T. NA /
Description from Company: T-1701 Neutralization tan
Capacity: 53000.0000 Capacity Unit of Measure: G
System Types: 121 Neutralization only
Wastes Currently Managed in Unit: 00263011 Acid / Cau
Wastes Previously Managed in Unit: 00313891 00323012

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012 Contain Store Area Active 11/13/95 1 2 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Container storage area.
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 0023319H Waste flin 00263011 Acid / Cau 00313891 Sandblast 00399022 general pl 00603191 DELISTED R

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013 Contain Store Area Active 11/13/95 1 2 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: HCIN container storage ar
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 00033111 Asbestos i 00044891 Adsorbant, 00063192 Column pac 0013301H EDC contam 0023319H Waste flin
0025319H Acid Brick 00263011 Acid / Cau 0027301H Tank sludg 00303191 Process fu 00323012 Class 2 Di
00374042 Potasium P 00503011 Solvents c 00523931 Copper chl 00531191 OHC copper 00551191 Waste pass
0059310H vcm contam 00603191 DELISTED R

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014 Contain Store Area Active 11/13/95 1 2 H/ NA NA NA RCRA Pmt Exempt - Accumulation Time NA /
Description from Company: Container storage area.
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 00023022 Cooling to 00033111 Asbestos i 00054882 Wood from 0023319H Waste flin 00263011 Acid / Cau
00299992 General Pl 00313891 Sandblast 00323012 Class 2 Di 00369992 Plant tras 00399022 general pl
00503011 Solvents c 0056302H Lead conta 00603191 DELISTED R

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015 Waste Pile Active 06/10/96 1 H/ NA NA NA Non-Hazardous Regulated NA /

19 02222

38000 Oxy Vinyls, LP

Unit Number	Unit Type	Unit Status	Date of Status	Classes of Waste Managed in Unit Onsite / Offsite	Unit Permit Number	Unit # on Permit	Regulatory Status	Deed Recording Needed/Date

** 'Active' & 'Closure Pending' Units **

016 Contain Store Area — Active — 05/14/97 — 1/ NA — NA — NA — Non-Hazardous Regulated — NA /
Description from Company: Portable container suppli
System Types: 141 Storage
Biennial System Regulatory Status: Regulatory status unknown
Wastes Currently Managed in Unit: 00531191 OHC copper 00551191 Waste pass

017 Misc Store Container — Active — 06/04/99 — H/ NA — NA — NA — RCRA Permit Exempt<90 Day Storage — NA /
Description from Company: Portable container supplied by off-site vendor
System Types: 141 Storage
Wastes Currently Managed in Unit: 0009202H Heavy ends 0010206H Waste lubr
Wastes Previously Managed in Unit: 0022105H

As of 10/02/2000, the next unassigned sequence number for UNITS is 018.

** 'Inactive', 'Closed' & 'Post Closure Care' Units **

003 Tank (Surface) — Inactive — / NA — NA — NA — NA /
Description from Company: Formerly shell tank T-955
Capacity: 424452.0000 Capacity Unit of Measure: G
System Types: 141 Storage
Wastes Previously Managed in Unit: 913690 914710

007 Tank (Surface) — Inactive — / NA — NA — NA — NA /
Description from Company: Formerly shell tank V-600
System Types: 141 Storage
Wastes Previously Managed in Unit: 913690

19 023 23

Reference 20

SSI Data Assessment

Analytical Data Assessment Checklist of CLP Data Packages

Site Name: **Patrick Bayou**

No. of samples collected and matrix type: **28 Sediments**

Laboratories:

The soil/sediment samples were analyzed for metals and cyanide by **AATS** in **Broken Arrow, OK.** The soil/sediment samples were analyzed for volatiles, semivolatiles and pesticides/PCBs by **Clayton Environmental Consulting** in **Novi, MI.**

The resulting CLP data packages were reviewed and validated by EPA Region 6 according to the USEPA CLP Statement of Work for Inorganic Analysis (Document Number ILM04.0), USEPA CLP Statement of Work for Organic Analysis (Document Number OLM04.2) and National Functional Guidelines for Organic Data Review (EPA 1999) and Inorganic Analyses (EPA 1994). The ESAT data validation reports are included in the references and should be referred to for interpretation of the data quality.

Quality Assurance/Quality Control (QA/QC) Review

According to the Quality Assurance Project Plan (QAPP) for the TNRCC Preliminary Assessment/Site Inspection Program (FY00-01), the TNRCC has reviewed the inorganic and organic analyses and the ESAT data validation reports, and concurs with the ESAT assessments. TNRCC has further assessed the usability of the data for Superfund decision-making, including the scoring of this site.

Four (4) Sample Delivery Groups (SDG) comprise the twenty-eight (28) sediment samples. SDG MFHW65 and MFHM71 refers to the sediment inorganic analyses. SDG FGA73 and FGW45 refers to the sediment organic analyses.

Accuracy

ICP Interference Check Samples (ICS)
ICP Interference Check Samples (ICS) Acceptable. Acceptable ICS results indicated satisfactory interelement and background correction.

Laboratory Control Samples (LCS)
Lab Control Samples (LCS) were acceptable. Acceptable LCS results indicate satisfactory sample preparation and analysis.

Tuning

FGA73: The bromofluorobenzene (BFB) and decafluorotriphenylphosphine (DFTPP) analyses met GC/MS tuning criteria. All Pest/PCB sample analyses met instrument performance guidelines although endosulfan I and α-chlordane coeluted on column DB5-MS. The identifications of endosulfan I and α-chlordane were qualified as tentative ("N") in sample FGW66 because of theis chromatographic problem. Several other pesticides also had overlapping retention time windows, but the sample results were not affected by the chromatographic problem.

FGT42: The bromofluorobenzene (BFB) and decafluorotriphenylphosphine (DFTPP) analyses met GC/MS tuning criteria. Several pesticides had overlapping retention time windows, but the sample results were not affected by the chromatographic problem.

Internal Standards (IS)

FGA73: The internal standard performance met the QC criteria with the following exceptions:

BNA: The IS responses exceeded the QC limits for sample FGW69 and its reanalysis. Data qualification was unnecessary per Region 6 guidelines. Samples FGW63 and FGW71 and their reanalyses had low IS responses which demonstrated matrix effect. The original analysis results are recommended for use. The analyte results associated with the IS's listed below were qualified as estimated with a low bias for the QL's.

Sample	IS
FGW63	IS4, IS5 and IS6
FGT71	IS6

System Monitoring Compounds (SMCs)/ Surrogate Recoveries

FGW45:SMC and surrogate recoveries were acceptable for all VOA and BNA samples.
Pest/PCB: The results for the early eluting pesticides in samples FGW54, FGW55, FGW56, and FGW57 because poor extraction efficiency was indicated by TCX recoveries below the QC limit in these samples. Very high recoveries (up to 21,000 percent) or zero percent recoveries were reported on one or both columns for TCX and DCB in most other analyses, but these outlying results were caused by coeluting matrix interferences.

Matrix Spike Recoveries (MS)

MFHW65: The laboratory reported acceptable matrix spike recoveries.
MFHM71: Antimony and cyanide results were qualified as estimated and biased low because

the associated matrix spike recoveries were below 75 percent.
FGW45: The MS/MSD results met QC guidelines for precision and %recovery with the following exceptions:
VOA - The chlorobenzene result for medium level sample FGW51DL was qualified as estimated and biased high because the MS/MSD recoveries for chlorobenzene exceeded the QC limits for the spiked analyses.

Blanks
MFHM71: Preparation and calibration blanks met contractual requirements although the laboratory reported nine analytes in the blanks. The cobalt result for sample MFHW79 and the antimony results for samples MFHW78, MFHW82, MFHW83, MFHW87, and MFHW89 as undetected because of laboratory blank concentrations.

MFHW65: Preparation and calibration blanks met contractual requirements although the laboratory reported seven analytes in the blanks.

FGW45: The method and Pest/PCB instrument blanks met contractual QC guidelines. The storage contamination for VOA sample FGW56 could not be assessed because the samples was analyzed 15 days after the storage blank was analyzed. No target analyte was detected in the Pest/PCB blanks.
VOA - Target analytes detected at concentrations below the contractual limits incude 1,1,2-trichloro-1,2,2-trifluoroethane, acetone, carbon disulfide, methylene chloride and/or 2-hexanone in the method and storage blanks and methyl acetate in the storage blank.
BNA - Method blanks SBLKS2HA and SBLKS2IA contained concentrations of bis(2-ethylhexyl)phthalate below the CRQL.

Precision

Field Duplicates:
MFHW65
The mercury results for samples MFHW69 and MFHW70 were qualified because field duplicate results were inconsistent.
MFHM71
Field duplicate differences indicated acceptable laboratory and field precision.

FGT38: The field duplicate results were generally consistent. Although the chromatographic patterns were similar, the BNA field duplicate samples FGT58 and FGT59 were analyzed at different levels.

Inorganic Laboratory Duplicates
MFHM71
The laboratory reported duplicate differences that met technical QC criteria, indicating

satisfactory laboratory precision.
MFHW65
The aluminum and mercury results as estimated because the associated laboratory duplicate differences were outside the technical QC limits.

ICP replicates reading
MFHW65: Replicate instrument readings were consistent.

MFHM71: The selenium result for sample MFHW89 was qualified as estimated because replicate instrument readings were inconsistent.

Representativeness

Field Blanks
No field blanks were collected.

Rinsate Samples
No rinsate samples were collected.

Comparability

Holding Times

Inorganic: All samples met contractual holding time and sample preservation criteria. Technical holding time criteria have not yet been established for soil samples.
Organic:
FGW45: VOA sample FGW56 was analyzed 15 days past the contractual holding time limit, and all BNA samples and Pest/PCB sample FGW48 were extracted3 to 10 days past the contractual limit. Technical holding time limits have not yet been established for soil samples. However, per Region 6 guidelines, the positive hit results for VOA sample FGW56 and Pest/PCB sample FGW48 were qualified as estimated.
FGA73: The extractions exceeded the contractual holding time limit (8 to 10 days) for BNA samples FGW66, FGW66MS, FGW66MSD, FGW67, and FGW68 and Pest/PCB samples FGA73, FGW58, FGW58MS, FGW58MSD, FGW62, FGW62DL, and FGW71. Technical holding times have not yet been established for the soil samples. However, per Region 6 guidelines, the positive hit results (above SQL's) for BNA samples FGW66 and FGW68 and Pest/PCB samples FGA73, FGW58, FGW62DL, and FGW71 were qualified as estimated.

Methodology
Required CLP methodology was conducted.

ICP Calibrations
MFHW65: All calibrations met contractual requirements.

MFHM71: All calibrations met contractual requirements.

Organic Initial and Continuing Calibration

FGT38: TCL compounds generally met contactual calibration criteria. Some VOA and BNA analytes failed the technical %RSD and/or %D calibration criteria. Since these compounds were not detected at concentrations above the SQL's, data qualification was unnecessary.
FGT42: TCL compounds met contactual calibration criteria for all fractions.

Serial Dilution

All serial dilution differences were acceptable.

Other ICP Criteria

The instrument detection limits, the ICP interelement correction factor, and the ICP linear range requirements were met.

Comments

FGA73: Total number of results was 1692. Coeluting Aroclor peaks obscured the detection and quantitation for aldrin in several samples. Two BNA samples had low IS responses. Aldrin had a high %RPD for the MS/MSD analyses.
FGW45: Total number of results was 2256. Excessive holding times caused data qualification for VOA sample FGW56 and Pest/PCB sample FGW48. AR1248 peaks interfered with aldrin detection in Pest/PCB samples FGW48, FGW49, and FGW50.
MFHW65: Total number of results was 384. Laboratory and field duplicate results were inconsistent for mercury.
MFHM71: Total number of results 288. The antimony and cyanide matrix spoke recoveries were below 75 percent. Some antimony results were affected by laboratory blank concentrations.

Field Custody

Custody seals were all present and intact. Sample condition was reported as intact for each sample received.

Completeness

Calculated % completeness: 98.6%

All acceptable CLP inorganic and organic data reported herein represent good quality data of reasonable confidence, and are suitable for use in Superfund decision-making, including the scoring of this site.

20 00

This field event is associated with Decontamination Event #21:
Decontamination Event #21 Case Number 27976 and SDG Numbers: MFHZ54 and FGW19

DECONTAMINATION EVENT #21 DATA ASSESSMENT

Case No. 27976 SDG MFHZ54 Site Longview Refining Lab AATS

SDG MFHZ54			
Constituent μg/L	**ER-01 MFHZ54 Blank**	**ER-02 MFHZ55 Rinsate**	**10X Highest Concentration Detected**
MERCURY	0.15L [0.2]	ND [0.2]	1.5
ZINC	15.6L [20]	5.5L [20]	156

ND = Not detected at the sample quantitation limit (SQL).
[ ] = Sample Quantitation Limit (SQL)

SDG MFHZ54: Two water samples comprised this SDG. One was an equipment rinsate (ER-01/MFHZ54), collected after the equipment had undergone decontamination procedures (See the Quality Assurance Project Plan for Texas Natural Resource Conservation Commission Preliminary Assessment/Site Inspection Program FY '00-01), and the other was a field blank sample (ER-02/MFHZ55). Both were ultra-distilled water (ESS Environmental Sampling Supply). The resulting Contract Laboratory Program (CLP) data packages were reviewed and validated by EPA Region 6 ESAT, according to the USEPA CLP Statement of Work for Inorganic Analysis (Document Number ILMO4.0) and the National Functional Guidelines for Inorganic Analyses (EPA 1994).

Zinc was detected in the equipment rinsate. Mercury and zinc were detected in the field blank.

> If the contaminant(s) found in the blank is not found in the equipment rinsate sample, then no action is taken.

> If the contaminant concentration in the blank is above the CRDL and is also detected in the sample, then the sample results are qualified by elevating the quantitation limit to the concentration found in the sample when the sample concentration is less than 10 times (10x) the blank concentration. The results must not be corrected by subtracting any blank value.

SDG FGW19			
VOLATILES µg/L	ER-01 FGW19 Blank	ER-02 FGW20 Rinsate	10X Highest Concentration Detected
All volatiles were non-detect			

SDG FGW19			
SEMIVOLATILES µg/L	ER-01 FGW19 Blank	ER-02 FGW20 Rinsate	10X Highest Concentration Detected
Benzaldehyde	0.9LJ [10]	ND [10]	9

ND = Not detected at the sample quantitation limit (SQL).
[ ] = Sample Quantitation Limit (SQL).

SDG FGW19			
Pesticides/PCBs µg/L	ER-01 FGW19 Blank	ER-02 FGW20 Rinsate	10X Highest Concentration Detected
All pesticides/PCBs were non-detect			

SDG FGW19: Two water samples comprised this SDG. One was an equipment rinsate (ER-02/FGW20), collected after the equipment had undergone decontamination procedures (See the Quality Assurance Project Plan for Texas Natural Resource Conservation Commission Preliminary Assessment/Site Inspection Program FY '00-01), and the other was a field blank sample (ER-01/FGW19). Both were ultra-distilled water (ESS Environmental Sampling Supply). The resulting Contract Laboratory Program (CLP) data packages were reviewed and validated by EPA Region 6 ESAT, according to the USEPA CLP Statement of Work for Organic Analysis (Document Number OLMO4.2) and the National Functional Guidelines for Organic Data Review (EPA 1994).

No volatiles were detected in the equipment rinsate sample (ER-02/FGW20) and the field blank (ER-01/FGW19). Benzaldehyde was detected in the field blank sample (ER-01/FGW19), no semivolatiles were detected in the equipment rinsate (ER-02/FGW20). No pesticides/PCBs were detected in the equipment rinsate sample (ER-02/FGW20) and the field blank (ER-01/FGW19).

Reference 21
Fish Advisories and Bans 1997

FISH

ADVISORIES & BANS

1997

Texas Department of Health
Seafood Safety Division

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POTENTIAL HEALTH EFFECTS FROM CHEMICAL CONTAMINANTS FOUND IN FISH AND SHELLFISH

PESTICIDES

DDE

DDE is an extremely persistent break-down product of DDT, which was once one of the most widely used insectides, until its banning by EPA in 1972. DDE is a probable human carcinogen that has a high potential for bioaccumulation in fish. Long term consumption of fish contaminated with DDE may increase the risk of cancer of the liver and may damage the nervous system.

TOXAPHENE

Toxaphene was a widely applied insecticide until it was banned by EPA in 1982. Toxaphene is a probable human carcinogen that has been shown to cause liver tumors in mice. Chronic low level exposure has been reported to cause degenerative changes to the liver, kidney, and nervous system.

CHLORDANE

Chlordane was commonly used for termite control until it was banned in 1987 by the EPA. It is extremely persistent in the environment and has a high potential for bioaccumulation in fish. Long term exposure to chlordane can lead to cancer of the liver and can cause harmful effects on the nervous system, digestive system, and liver.

DIELDRIN

Dieldrin is a persistent organochlorine pesticide which was phased out between 1974 and 1987. It is extremely persistent in the environment and has a high potential for bioaccumulation in fish. Long term exposure to chlordane can lead to cancer of the liver and harmful effects on the nervous system and the liver.

METALS

SELENIUM

Selenium is an essential trace element that can become toxic if excessively consumed. Environmental distribution of selenium occurs through the burning of fuels and through mining and smelting of various metals. Symptoms of subacute or chronic toxicity in humans include brittleness and loss of hair and nails, skin redness, blisters, vomiting, fatigue, various neurologic symptoms, congenital defects, and liver and spleen damage.

MERCURY

Mercury is a naturally occurring element that can be emitted from industrial sources such as coal burning, municipal incinerators, chlor-alkali plants, and mining. Mercury concentrations in fish can be over 100,000 times the mercury concentration found in water. Adverse health effects from mercury include tingling of the skin, incoordination, visual and hearing impairment, and damage to the central nervous system and brain. Infants and children exposed prenatally may exhibit neurological symptoms similar to a cerebral palsy like syndrome. The fetus is at a particular risk for irreversible nervous system damage from mercury poisoning.

OTHER ORGANIC CONTAMINANTS

DIOXIN

Dioxin is an unwanted by-product formed during several industrial processes, including the production of bleached paper. Dioxin is a probable human carcinogen that can cause a type of dermatitis in humans. Adverse effects in animals include red blood cell damage, nervous system disorders, suppression of the immune system, liver and thymus abnormalities, birth defects, and reproductive effects. Health concerns from dioxin are related to long term, regular consumption of fish and shellfish contaminated with the persistent compound.

PCBs

PCBs are a family of commercial products used primarily in capacitors and transformers. PCBs are probable human carcinogens that can persist in the environment for years and can readily bioaccumulate in fish tissue. Adverse health effects in animals include liver tumors, skin irritations, reproductive and developmental effects, suppression of the immune system, and damage to the stomach, thyroid, and kidney.

VOLATILE ORGANIC CHEMICALS

Dichloroethane and trichloroethane are volatile chemicals used mostly to make vinyl chloride and several solvents. They are not known to bioaccumulate in fish and are usually a reflection of the same concentration of these contaminants in water. They have been found to cause several types of tumors in animals, including cancer of the liver and kidney.

FISH CONSUMPTION ADVISORIES AND CLOSURES

Fish in several bodies of water in Texas contain chemical residues at levels that may represent a threat to human health if consumed. In order to inform the public of possible contamination, the Texas Department of Health issues fish consumption advisories. In instances where a serious or imminent health threat to public health exists, the Texas Department of Health may prohibit the taking of fish or shellfish from an area. Taking of fish from a closed area is a violation of State Law, enforced by Texas Parks and Wildlife. Taking of fish from an area with a consumption advisory is not illegal; however, it is not recommended. The Texas Department of Health periodically monitors areas of concern to determine whether changes are necessary.

GUIDELINES TO REDUCE THE RISK FROM CHEMICAL CONTAMINANTS IN FISH

Organic chemicals such as DDE, toxaphene, chlordane, dioxin and PCBs readily accumulate in the fat of fish tissue. To reduce the amount of exposure to these chemicals, the skin and fatty areas of fish should be removed before cooking. This includes the belly fat, side fat, and flesh along the top of the back. Baking or broiling skinned, trimmed fish on a rack or grill allows more fat to drip away.

Organs such as the fish liver can be high in contaminants such as selenium and should be removed before cooking.

Mercury accumulates mainly in the muscle (fillet) of fish and cannot easily be removed by trimming skin and fat or reduced by cooking. However, in mercury contaminated waters, smaller, younger fish have had less time to bioaccumulate the contaminant. Predator fish such as red drum, black drum, flounder, bass, and gar accumulate mercury by eating smaller contaminated fish.

No studies are available to determine whether cooking or trimming can remove or reduce volatile organic chemicals in edible fish tissue. Texas Department Health recommends no consumption of these fish.

IN GENERAL:

- Smaller and younger fish have had less time to accumulate contaminants than older and larger fish and are safer for consumption in areas of concern.
- Removing skin and fat from fish greatly reduces risk from exposure to environmentally persistent pesticides and organic chemicals.
- Very little risk exists from eating a few fish meals from any area of concern. Risk increases from eating contaminated fish frequently and regularly over a long period of time from one area of concern. Fish meals should be taken from a variety of waterbodies to reduce or eliminate risk of heavy exposure to any one chemical or group of chemicals.

210004

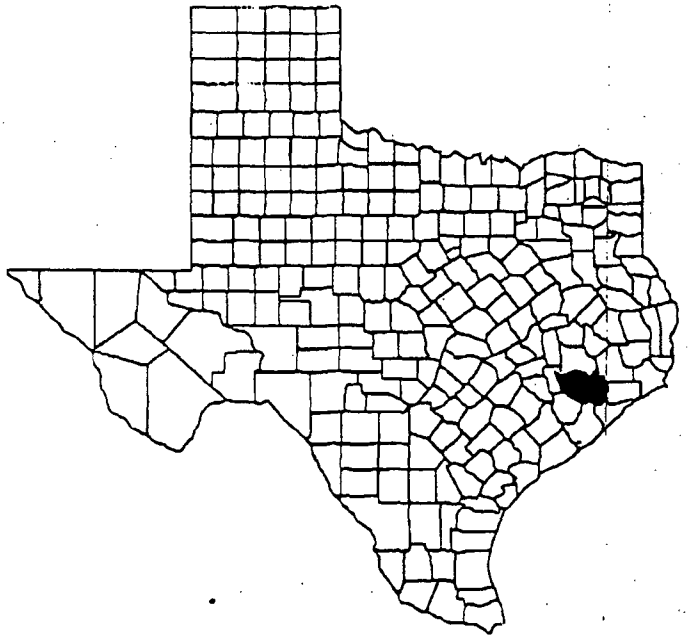
OUSTON SHIP CHANNEL AND UPPER GALVESTON BAY

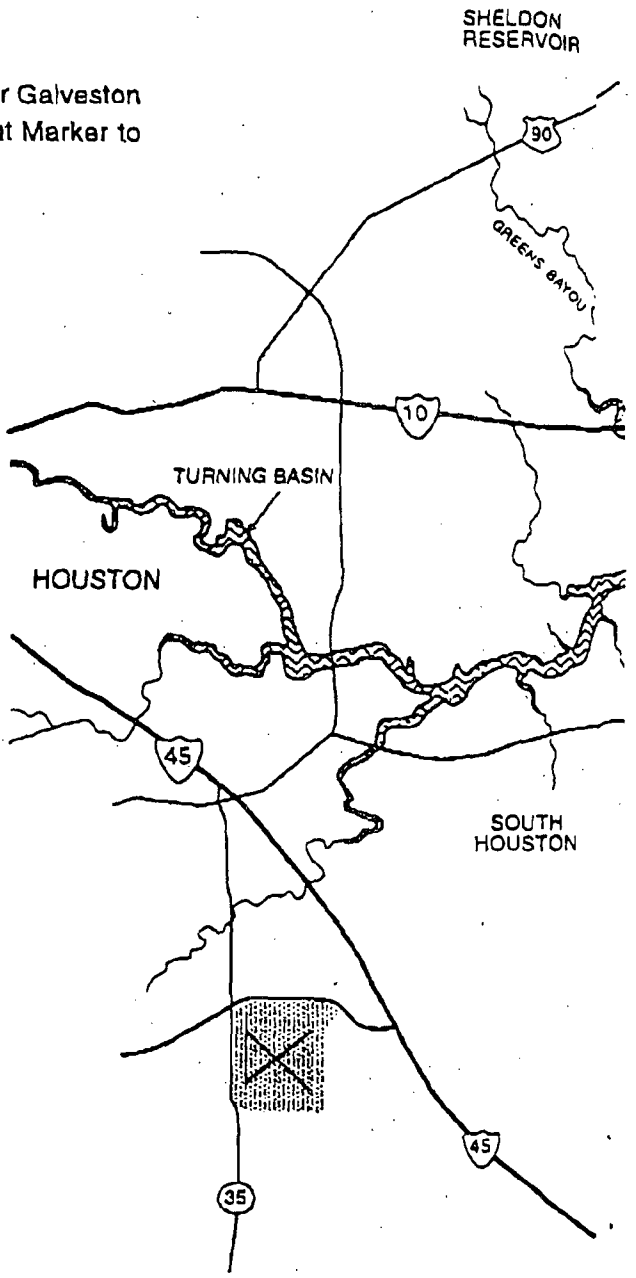
ADV-3 Issued September 19, 1990

HARRIS COUNTY

ADVISORY AREA:

The Houston Ship Channel and all contiguous waters, and upper Galveston Bay North of a line drawn from Red Bluff Point to Five Mile Cut Marker to Houston Point





CHEMICAL OF CONCERN:

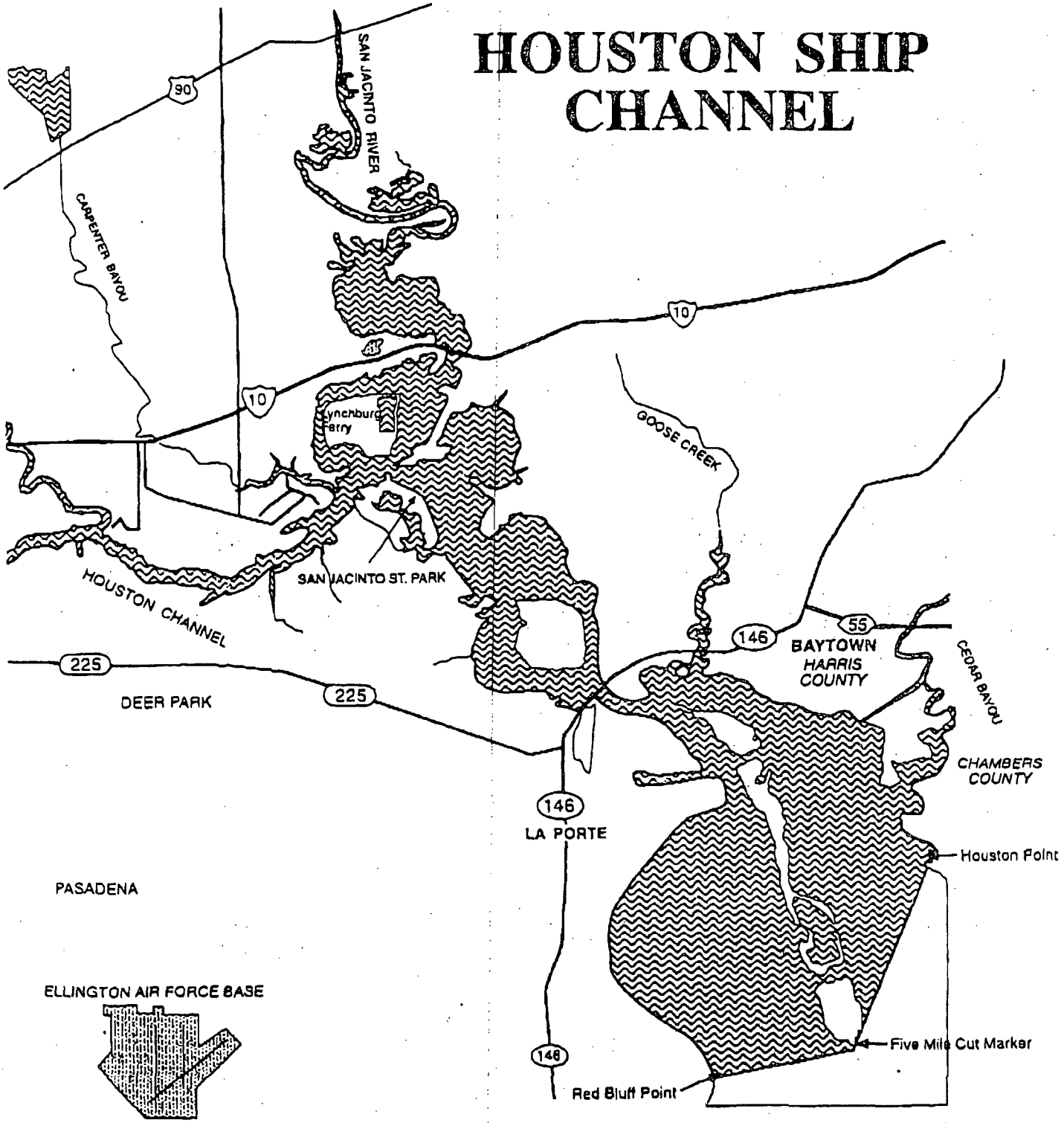
Dioxin

CONSUMPTION ADVICE:

The advisory includes all species of catfish and blue crab and recommends consumption of no more than one meal, not to exceed 8 ounces, each month. Women of childbearing age and children should not consume any fish from this area.

210005

HOUSTON SHIP CHANNEL



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