



# HARTCROWSER

Earth and Environmental Technologies

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A-8357-00

December 27, 1993

Tesoro Alaska Petroleum Company  
P.O. Box 3369  
Kenai, Alaska 99611

Attn: Mr. Damon King

Re: Valdez Tank Farm  
Jet Fuel Spill Response

Gentlemen:

This letter report summarizes our activities during the response phase of the jet fuel release from the Valdez tank farm. Hart Crowser was notified of the spill by Mr. Steve Rog of Tesoro Alaska Petroleum Company (Tesoro) on Friday, August 27, 1993, and was requested to provide documentation, field screening, and other technical assistance during initial response operations. Hart Crowser personnel including Mark Madden, Matt Flynn, and Russell Grandel arrived on site on August 28, 1993 during the response operations, with at least one Hart Crowser personnel on site during each day of the operations. The following is a log which summarizes our activities. Figures and tables are provided as necessary to illustrate this narrative.

*Saturday, August 28, 1993*

Hart Crowser Personnel: Mark Madden, Matt Flynn

Weather: Cloudy, mid-50s, light wind increasing during the afternoon, occasional light drizzle in late afternoon.

After receiving a status briefing, site orientation and health and safety briefing from Tesoro personnel, Hart Crowser proceeded to perform site characterization sampling within the tank farm. The spill-affected area was subdivided into smaller work areas as indicated on Figure 1. Samples were identified using a 3-digit numbering scheme, with the first digit corresponding to the physical area from which the sample was collected.

On our arrival, all standing fuel had been collected, and most of the heavily saturated surface soils had been removed with a backhoe and stockpiled west of Tank No. 21. The stripping

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operation had removed soil varying in depths from 1 foot in Area 2 to in excess of 4 feet in the southeast corner of Area 1. Additionally, a trench extending to groundwater (approximately 10 feet) had been excavated outside the tank farm dike near the southeast corner and southwest corner. The southwest corner of the tank farm, comprising Area 9, had been excavated to a depth of approximately 5 feet.

Soil samples were collected for field screening purposes from random locations in work Areas 1, 2, 3, and 9. The samples were collected in a pattern which would provide uniform coverage of the area. All samples were screened using a photoionization detector (PID) to determine the amount of volatile organic compounds (VOCs) being released to the headspace of each sample. Selected samples were also screened using an infrared spectrophotometer (IR) to determine the total petroleum hydrocarbon (TPH) concentration in each sample by a method similar to EPA 418.1. Sample locations and screening results are presented on Figure 2 and in Table 1, respectively.

Soil samples were also collected along the base of the excavation of Area 7. This area followed the tank farm distribution piping and was being excavated directly beneath and around the piping and valves to a depth of 5 feet. The results of field screening of these samples are also included in Table 1.

The excavating crew was directed by Hart Crowser to provide additional support to the piping in the excavated zones in Area 7, since the excavation operation resulted in removal of several original pipe supports, leaving long pipe runs and valve clusters unsupported. The excavator was also directed not to excavate within a 1:1 soil prism out from the edge of any tank to prevent undermining the structures.

### *Sunday, August 29, 1993*

Hart Crowser Personnel: Mark Madden, Matt Flynn

Weather: Rain, occasional light fog, temperature in mid-50s

During the early morning, the clean-up contractor, VRCA, covered the spill-impacted areas with reinforced polyethylene to minimize rainwater infiltration. A discussion was held between Tesoro and Hart Crowser to determine the best utilization of the trench outside of the southeast corner of the dike area for containment of potentially migrating product. At that time, no fresh product had been observed in this excavation. The consensus was to extend the trench north to a point even with existing well MW-19. The trench was to be constructed to allow placement of a barrier membrane on the downgradient face of the trench.

*Any old product?*





Initial excavation in the southeast trench had encountered petroleum hydrocarbons in the water and soils below the groundwater elevation. The soils exhibited an odor of weathered hydrocarbon, very dissimilar to the odors from the fresh spill area. Additionally, a sheen was observed on the groundwater accumulation in the trench. This sheen exhibited little iridescence in comparison to the sheens associated with the freshly spilled product. It was interpreted from these observations that product from the current release had not migrated to the southeast trench by that time.

Hart Crowser collected six soil samples from the lined spoil stockpile west of Tank 21. The location of these samples is presented on Figure 3. Samples were field screened and submitted to Commercial Testing and Engineering Co. (CT&E) for determination of aromatic hydrocarbons (BTEX, EPA Method 8020) and leachable aromatic hydrocarbons (TCLP extraction; EPA Method 8311/8020). Results of these analyses are presented in Table 2.

The excavation in Area 9 was extended to groundwater, approximately 10 feet below grade. Free product was observed floating on the water surface. An attempt was made to measure the product thickness using product and water finding paste. The pastes were old, and measurements were inconclusive. Estimates made using a Flexidip groundwater/product interface probe indicated that the product thickness was between 1/2 inch and 1 inch.

Three existing monitoring wells located in the western portion of the site were checked to determine if floating product was present. The location of these wells is included on Figure 1. No measurable product was encountered in any of these wells. Following insertion into the well, the probe was dipped in clean water to determine if floating product might be present at a thickness less than the instrument could measure. No sheen was observed on the rinse water following any of the wells. The probe was thoroughly decontaminated prior to insertion into each well by scrubbing in an Alconox solution followed by two rinses in potable water.

While removing surficial product saturated soils from an area between the Area 9 excavation and the soil stockpile, the contractor encountered a silt layer at approximately 18 inches below original grade. Three samples of this strata were collected and field screened (Table 3; samples 907, 908, and 909). The silt layer appears to have retarded vertical product migration in this area.

At the request of the Tesoro health and safety officer, PID measurements were made in the breathing air throughout the tank farm. These measurements are presented on Figure 4. From the readings, it appears that the combination of rain and polyethylene had significantly reduced the vapor emissions from the soils within the tank farm. Occasional readings above background levels were encountered only on the stockpile and in the excavation in Area 9.





These readings were observed immediately following an activity such as removing a bucket of fresh soil from the Area 9 excavation.

Additional soil samples were collected from the bottom of the excavation in Area 7 to document conditions of this excavation at this depth. Ken Gaylord of Tesoro indicated that Tesoro would like to backfill this area in the very near future to ensure that the pipelines which serve the entire farm are properly supported.

*Monday, August 30, 1993*

Hart Crowser Personnel: Matt Flynn

Weather: Rain, temperature approximately 60°F

The clean-up contractor's evening shift crew had set up a rope mop in the Area 9 excavation, which was recovering free product from the groundwater. Hart Crowser did not measure or document the collection rate of this operation.

Four test pits were excavated along the south perimeter dike. Each test pit was advanced until groundwater was encountered. The location of these pits is indicated on Figure 1. Floating product was observed in test pits 1, 3, and 4. A 4-inch PVC standpipe was placed in test pit 3 prior to backfilling. The portion of pipe inserted in the groundwater was manually perforated.

In an attempt to allow delineation of product from the current release from product released in the past on the site, attempts were made to collect samples of old and new product. A sample of the new product was collected from the rope mop operation in Area 9. No appreciable floating product was present in the trench excavation outside the southeast corner of the dike, or in monitoring wells in this area. Soil samples were collected from the free water depth in the trench where the highest concentrations of product from past releases was anticipated. These samples were submitted to CT&E to obtain chromatogram traces which would "finger print" the two product classes.

*Tuesday, August 31, 1993*

Hart Crowser Personnel: Matt Flynn, Russell Grandel

Weather: Rain, temperature approximately 60°F

At the request of Damon King, air monitoring was performed using the PID. Readings above background were recorded with a maximum reading of 21 PID units. Additional air



monitoring was performed in the afternoon. Monitoring data for these events are presented on Figures 5 and 6, respectively.

VRCA had performed further excavation in Areas 7 and 9. Soil samples were collected from these locations and field screened using the PID and IR. Sample locations and screening results are presented on Figure 3 and in Table 4, respectively.

### *Wednesday, September 1, 1993*

Hart Crowser Personnel: Russell Grandel

Weather: Cloudy, approximately 65°F

The response phase was declared complete. VRCA covered all stockpiles and excavations with polyethylene. Hart Crowser demobilized from the site.

### *Subsequent Consultation*

On September 9, 1993, Mark Madden was contacted by Ken Gaylord to address concerns by Don Walker, the tank farm manager, regarding the stability of Tank 10 in light of the adjacent trench excavation. Based on the dimensions provided by Mr. Walker, it appears that at least for short-term operations, the slope adjacent to Tank 10 should be stable. If fuel recovery operations are to continue past October 1, 1993, the bank should be stabilized to prevent erosion, or the excavation backfilled around a culvert or other fuel recovery system. Long-term operation of this excavation as an open ditch is not recommended.

### **DISCUSSION OF OBSERVATIONS AND LABORATORY RESULTS**

In review of the field observations and laboratory data, two issues of interest became apparent:

- ▶ Differentiation between product from past spills and those from the current release
- ▶ Disposal requirements for the stockpiled soils with respect to the Resource Conservation and Recovery Act (RCRA)

### *Prior Releases*

The Valdez tank farm had experienced product releases prior to the August 1993 event. In May 1989, Hart Crowser installed seven monitoring wells on the property. Free-phase

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hydrocarbons were encountered in the area east of the tank farm in the areas south and west of the warehouse building, and near the former loading rack location. At that time, much of the free-phase hydrocarbons were entrapped within the soil matrix below the observed groundwater table. Subsequent pump testing by Hart Crowser in November 1989, indicated that gravity flow would not be effective in collecting these hydrocarbons.

Two samples were collected from the site to allow comparison of chromatograms produced by the "old" and "new" product in the soils on the site. Sample 1001 was a soil sample collected from the trench at the southeast corner of the tank farm in Area 10, and was assumed to contain "old" product. A water sample including fresh floating product from the trench in the southwest corner of the site, Area 11, was also submitted. Chromatograms of each sample, generated by EPA Method 8100 (modified) analysis, are presented as Figures 8 and 9, respectively.

The two chromatograms are distinctly different in that the sample containing fresh product (CT&E Ref. ID #079R0201.D) contained numerous peaks in the 8- to 18-minute range, well below the C<sub>28</sub> quantitative cutoff for diesel-range organics. The chromatographic pattern is typical of a light diesel product. By comparison, the chromatogram for the soil sample from the southeast trench (CT&E Ref. ID #077R0201.D) was relatively flat due to the low actual concentration of hydrocarbons present. The most distinct feature of this chromatogram is the surrogate peak at 19.2 minutes. It is of interest to note that while no marked peaks were observed in the "old" product chromatogram, the baseline of the chromatogram exhibits a slight rise at approximately 17 minutes (past the C<sub>30</sub> range), much later than that observed in the fresh fuel, as would be expected for a weathered product. Some additional peaks may be present beyond the time limit of the test.

### *RCRA Implications for Soil Disposal*

Six soil samples from the lined stockpile were extracted by the Toxicity Characteristic Leaching Potential (TCLP) method prior to analysis by EPA Method 8020. The EPA Method 8020 analytes identified in 40 CFR 261.24, Table 1 and the associated regulatory level include:

▶ Benzene	0.5 mg/L
▶ Chlorobenzene	100.0 mg/L
▶ 1,4-Dichlorobenzene	7.5 mg/L

No analytes exceeded these limits. The results of these analyses for benzene are summarized on Table 2. All laboratory results are included in Appendix A.



Tesoro Alaska Petroleum Company  
December 27, 1993

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We trust the enclosed narrative and attached tables and figures are comprehensive and adequate for your needs. If there are any questions regarding this document, please contact me at your earliest convenience.

Sincerely,

**HART CROWSER, INC.**

**Mark G. Madden, P.E.**  
Associate

/kgd

**Attachments:**

- Table 1 - Field Screening Data - 8/28/93 (Page 1 of 2)
- Table 1 - Field Screening Data - 8/28/93 (Page 2 of 2)
- Table 2 - Stockpile Sampling Results
- Table 3 - Field Screening Data - 8/29/93
- Table 4 - Field Screening Data - 8/31/93
- Figure 1 - Site Plan
- Figure 2 - Soil Sampling Locations - Areas 1, 2, 3 & 10
- Figure 3 - Soil Sampling Location - Area 7
- Figure 4 - Soil Sampling Locations - Areas 8, 9 & 11
- Figure 5 - PID Air Monitoring 8/29/93 10:00
- Figure 6 - PID Air Monitoring 8/31/93 9:00
- Figure 7 - PID Air Monitoring 8/31/93 14:00
- Figure 8 - "Old" Product Chromatogram
- Figure 9 - "Fresh" Product Chromatogram
- Appendix A - Laboratory Reports

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Table 1. Field Screening Data – 8/28/93  
 Tesoro Valdez Tank Farm  
 Jet–A Release Response

Hart Crowser  
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<u>Sample No.</u>	<u>Depth (ft)</u>	<u>PID <sub>1</sub> (ppm)</u>	<u>IR <sub>2</sub> (ppm)</u>	<u>Sample No.</u>	<u>Depth (ft)</u>	<u>PID (ppm)</u>	<u>IR (ppm)</u>
100	4.5	831		201	1	104	
101	4	862		202	1	294	
102	3.5	227		203	0.5	250	
103	3.5	80		204	0.5	235	
104	3	994		205	0.5	883	
105	2.5	11	43	206	0.5	854	
106	3	19		207	1	100	
107	2	30		208	0.5	480	
108	2.5	8	47	209	0.25	118	
109	4	705		210	0.25	239	
110	3	193		211	0.5	837	
111	3.5	126		212	0.5	867	
112	0.5	213		213	0.75	241	
113	1	>1200		214	0.5	686	
114	1.5	324		215	0.75	549	
115	1.25	>1130		216	0.75	137	
116	1.5	353		217	0.5	719	
117	1	>1130		218	1	331	
118	0.75	49		219	0.75	299	
119	1	449		220	0.5	244	
120	1	23					

Notes:

- <sup>1</sup> Photoionization device calibrated to an isobutylene standard. Values are reported in PID units.
- <sup>2</sup> Total petroleum hydrocarbons by modified EPA Method 418.1 and infrared spectrophotometer (IR).



Table 1. Field Screening Data – 8/28/93  
 Tesoro Valdez Tank Farm  
 Jet-A Release Response

Hart Crowser  
 A-8357-00

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<u>Sample No.</u>	<u>Depth (ft)</u>	<u>PID<sub>1</sub> (ppm)</u>	<u>IR<sub>2</sub> (ppm)</u>	<u>Sample No.</u>	<u>Depth (ft)</u>	<u>PID (ppm)</u>	<u>IR (ppm)</u>
301	1	418	1400	701	4	205	210
302	1	688		702	4	649	
303	1.5	151		703	4	510	
304	1.25	235		704	4	191	
305	2	247		705	4	385	
306	1.5	743					
307	0.75	88	61				
308	1.5	58	42	901	3.5	1009	4492
309	1	583	2680	902	3.5	784	2680
310	1	40	38	903	3.5	904	4540
311	1	617		904	3.5	120	33
312	1	648		905	3.5	829	4128
313	0.75	687		906	3.5	1117	4420
314	1	370	1560				
315	2	750					

Notes:

- 1 Photoionization device calibrated to an isobutylene standard. Values are reported in PID units.
- 2 Total petroleum hydrocarbons by modified EPA Method 418.1 and infrared spectrophotometer (IR).

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Table 2. Stockpile Sampling Results  
 Tesoro Valdez Tank Farm  
 Jet-A Release Response

Hart Crowser  
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Sample No.	Depth (ft)	PID (ppm)	EPA Method 8020				EPA Method 8020 on TCLP Extract			
			Benzene (mg/Kg)	E-Benzene (mg/Kg)	Toluene (mg/Kg)	Xylenes (mg/Kg)	Benzene (mg/L)	E-Benzene (mg/L)	Toluene (mg/L)	Xylenes (mg/L)
801	3	384	ND(1.0)	ND(1.0)	8.9	30.7	ND(0.01)	0.20	0.27	19.29
802	5	390	ND(1.0)	9.1	23.1	141.9	ND(0.01)	0.18	0.28	2.09
803	3	329	ND(1.0)	6.8	15.1	86.9	ND(0.01)	0.18	0.22	1.60
804	5	293	ND(1.0)	2.7	7.6	42.2	ND(0.01)	0.18	0.28	2.04
805	3	401	ND(1.0)	4.6	13.4	78.1	0.03	0.14	0.21	1.58
806	3	384	ND(1.0)	8.3	22.3	134.2	ND(0.01)	0.10	0.16	1.18

Notes:

1 Photoionization device calibrated to an isobutylene standard.  
 Values are reported in PID units.

ND() - Concentration below method detection limit indicated in parentheses



Table 3. Field Screening Data – 8/29/93  
 Tesoro Valdez Tank Farm  
 Jet-A Release Response

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<u>Sample No.</u>	<u>Depth (ft)</u>	<u>PID<sub>1</sub> (ppm)</u>	<u>IR<sub>2</sub> (ppm)</u>	<u>Sample No.</u>	<u>Depth (ft)</u>	<u>PID (ppm)</u>	<u>IR (ppm)</u>
801	3	384		907	1.5	2	47
802	5	390		908	1.5	3	48
803	3	329		909	1.5	7	47
804	5	293					
805	3	401					
806	3	384					

Notes:

- <sup>1</sup> Photoionization device calibrated to an isobutylene standard. Values are reported in PID units.
- <sup>2</sup> Total petroleum hydrocarbons by modified EPA Method 418.1 and infrared spectrophotometer (IR).

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Table 4. Field Screening Data -- 8/31/93  
 Tesoro Valdez Tank Farm  
 Jet-A Release Response

Hart Crowser  
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<u>Sample No.</u>	<u>Depth (ft)</u>	<u>PID<sub>1</sub> (ppm)</u>	<u>IR<sub>2</sub> (ppm)</u>	<u>Sample No.</u>	<u>Depth (ft)</u>	<u>PID (ppm)</u>	<u>IR (ppm)</u>
706	4	34	38	910	4	2	
707	4	724		911	4	2	
708	4	75		912	4	3	
709	4	24	35	913	4	6	42
710	4	442		914	5	4	
711	4	53	87	915	5	8	55
712	4	183		916	5	6	43
				917	4	0	
1001	8	2		918	4	0	
1101	9	0					
1102	9	0					

Notes:

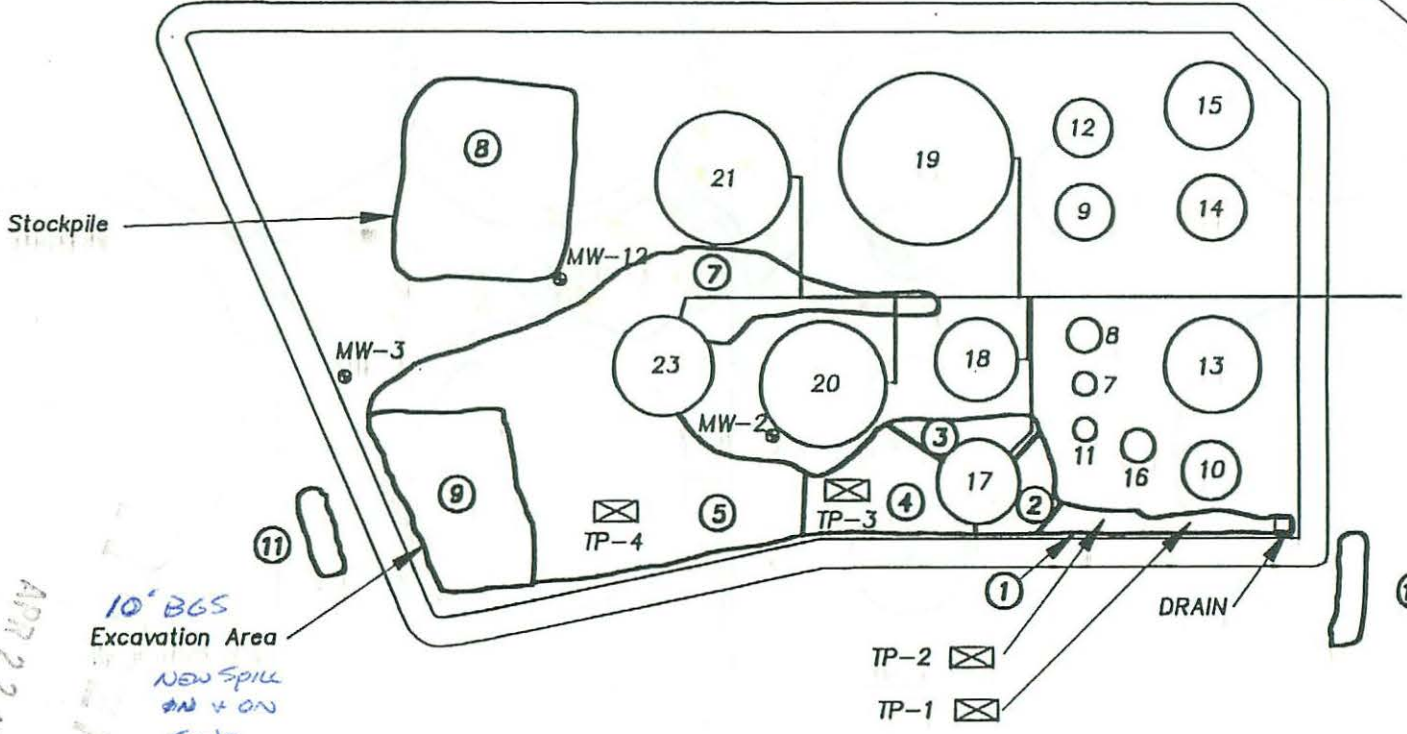
- <sup>1</sup> Photoionization device calibrated to an isobutylene standard. Values are reported in PID units.
- <sup>2</sup> Total petroleum hydrocarbons by modified EPA Method 418.1 and infrared spectrophotometer (IR).



**Site Plan**  
**Tesoro Tank Farm**  
**Valdez, Alaska**



Old Truck Loading Rack



**LEGEND**

- Approximate Limits of Surface Stain
- ⊠ Test Pit Location
- ① Site Sub-area (for sampling purposes only)
- Existing Monitoring Well Location

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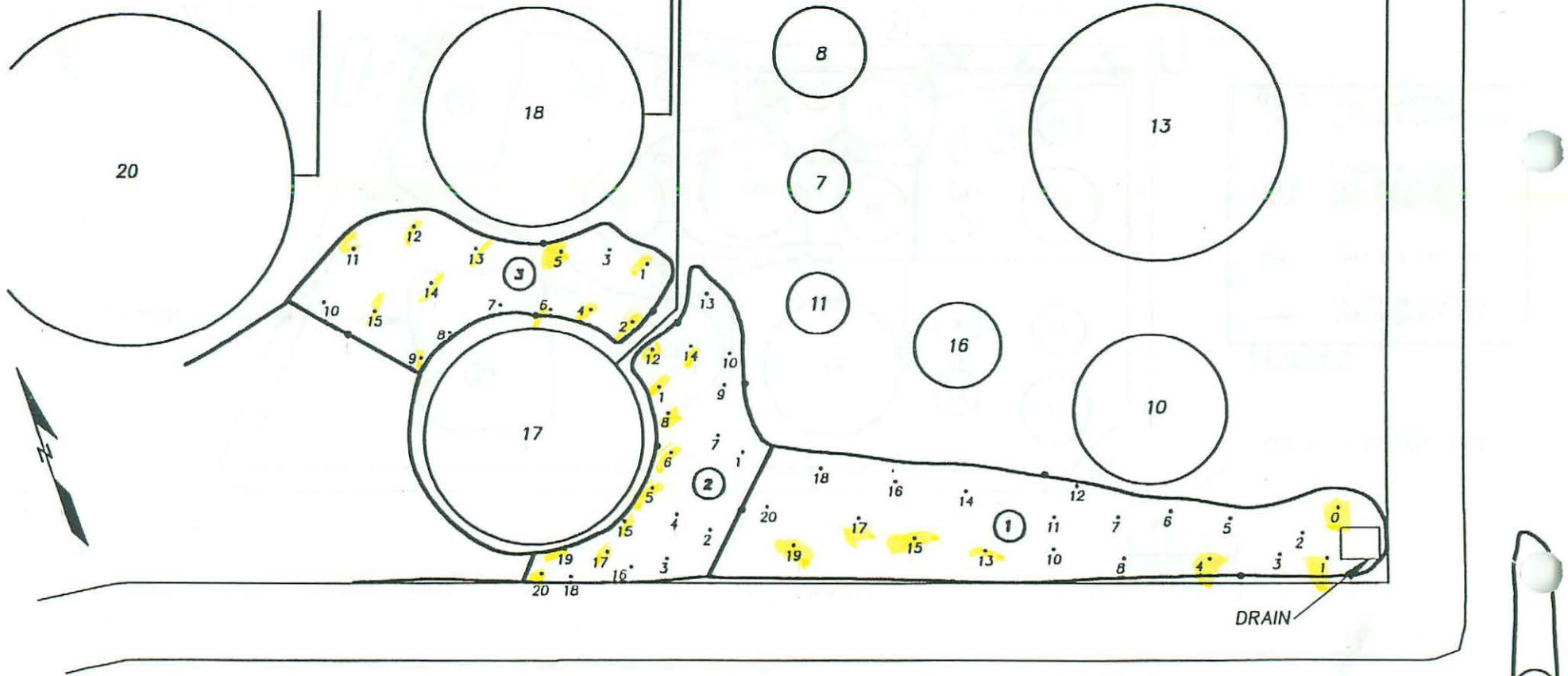
10' BGS  
 Excavation Area  
 NEW SPILL  
 #12 + ON  
 GWT



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 A-8357-00 12-93  
 FIGURE 1

# Soil Sampling Locations - Areas 1, 2, 3 & 10

Tesoro Tank Farm  
Valdez, Alaska



## LEGEND

	Limits of Saturated Soil
	Area designation
	Surface Soil Sample Location



TRENCH EXCAVATION



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FIGURE 2



# Soil Sampling Location - Area 7

## Tesoro Tank Farm

### Valdez, Alaska

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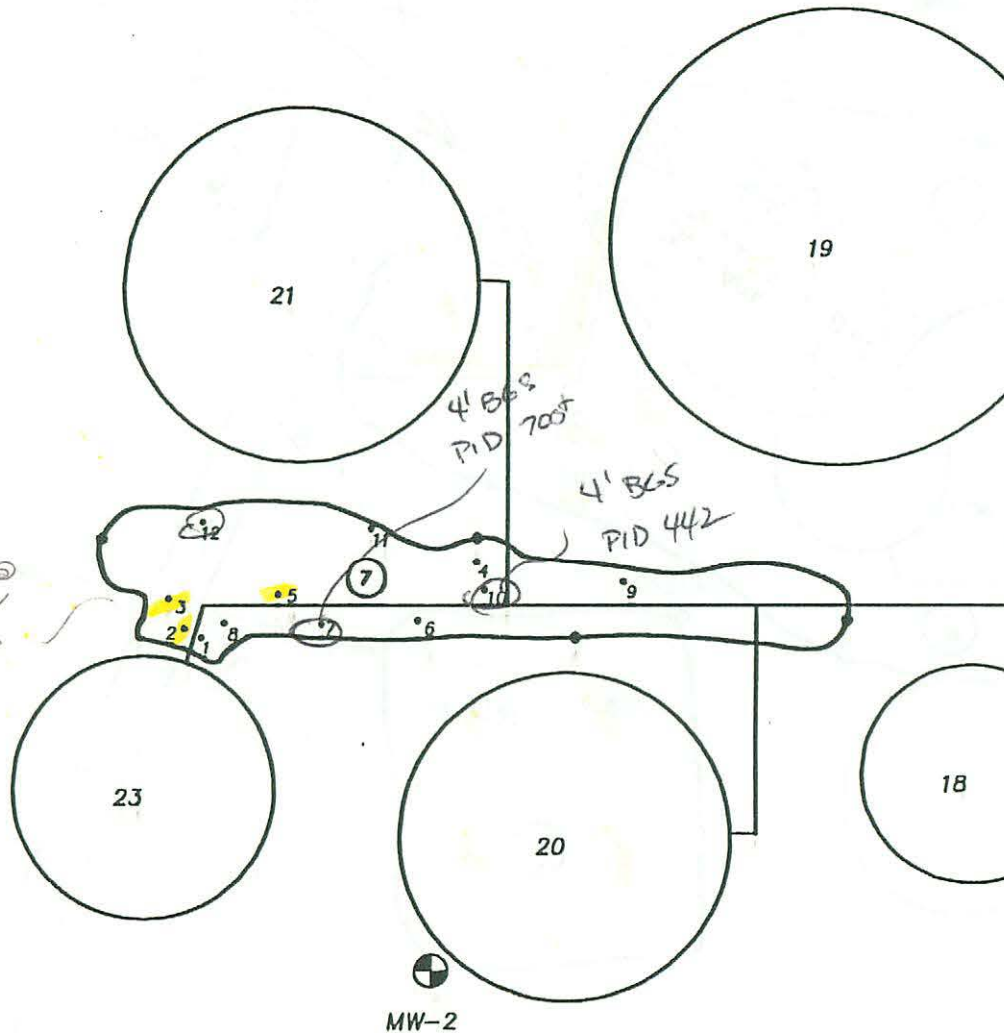
APR 22 1994

FIVE



MW-12

4' BGS



#### LEGEND

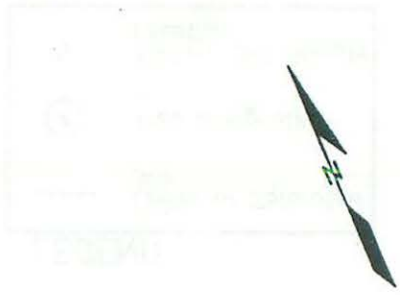
	Limits of Saturated Soil
	Area Designation
	Surface Soil Sample Location

NOTE: Drawing not to scale.

REF. NO: \ACAD-DWG\8357\SSLOC2

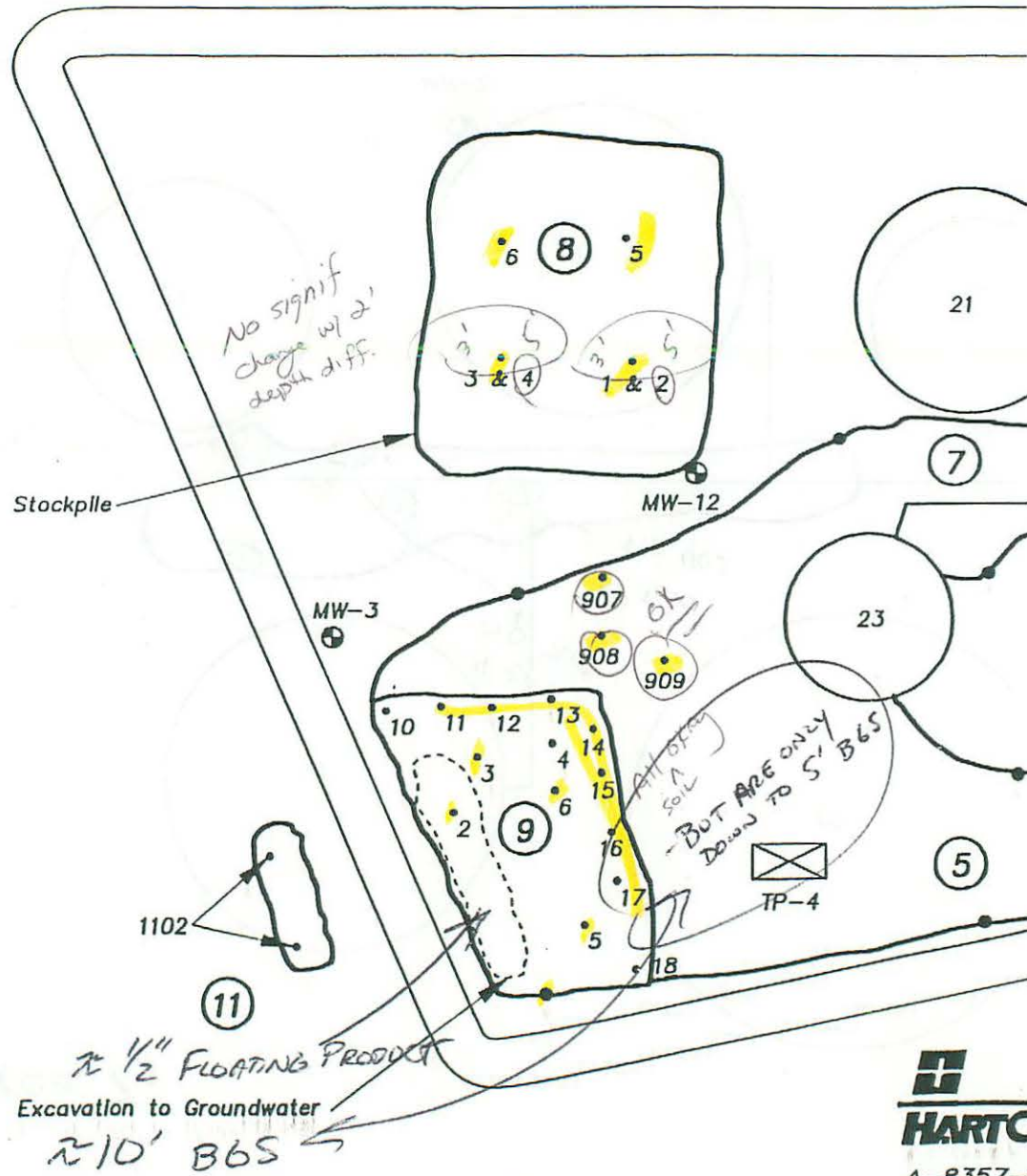
# Soil Sample Locations - Areas 8, 9 & 11

Tesoro Tank Farm  
Valdez, Alaska



## LEGEND

	Approximate Limits of Surface Stain
	Area Designation
	Surface Soil Sample Location



NOTE: Drawing not to scale

REF. NO: \ACAD-DWG\B357\SSLOC3



A-8357-00 12-93  
Figure 4



# PID Air Monitoring 8/29/93 10:00

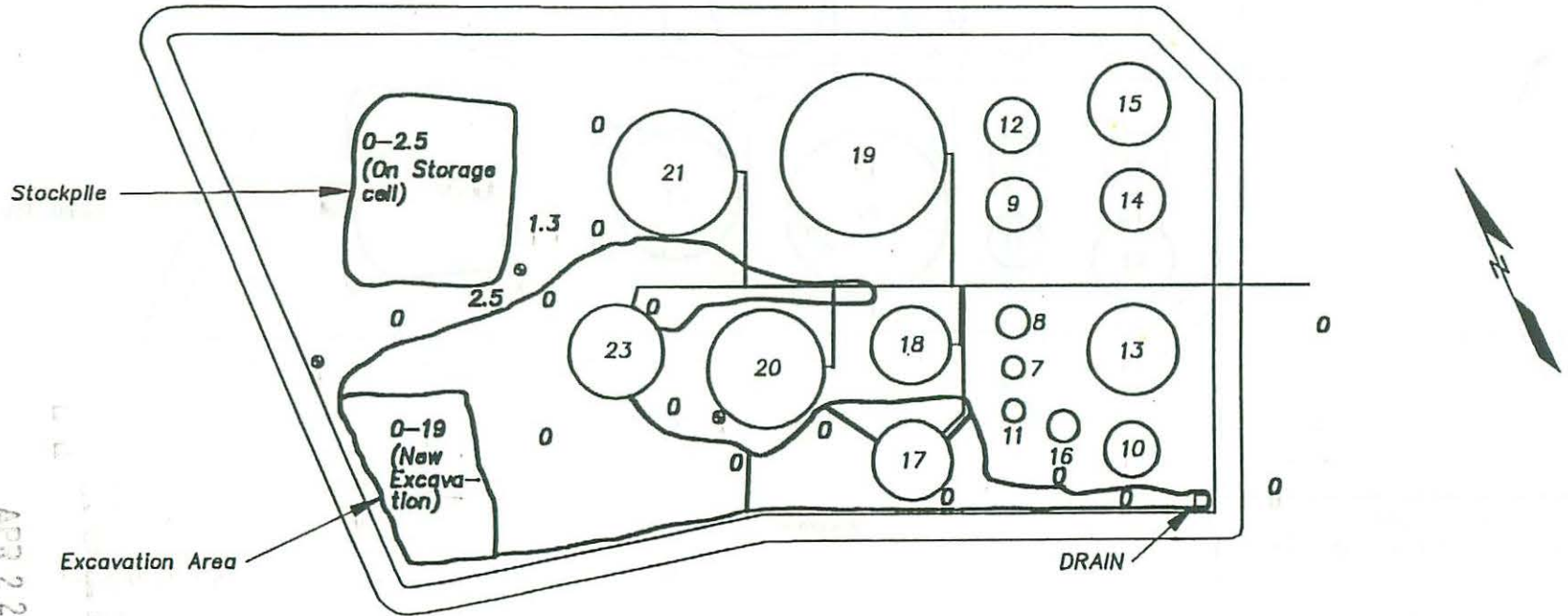
Tesoro Tank Farm  
Valdez, Alaska

## LEGEND

○ PID Reading Location



Old Truck Loading Rack



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FIGURE 5

# PID Air Monitoring 8/31/93 9:00

Tesoro Tank Farm

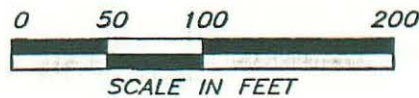
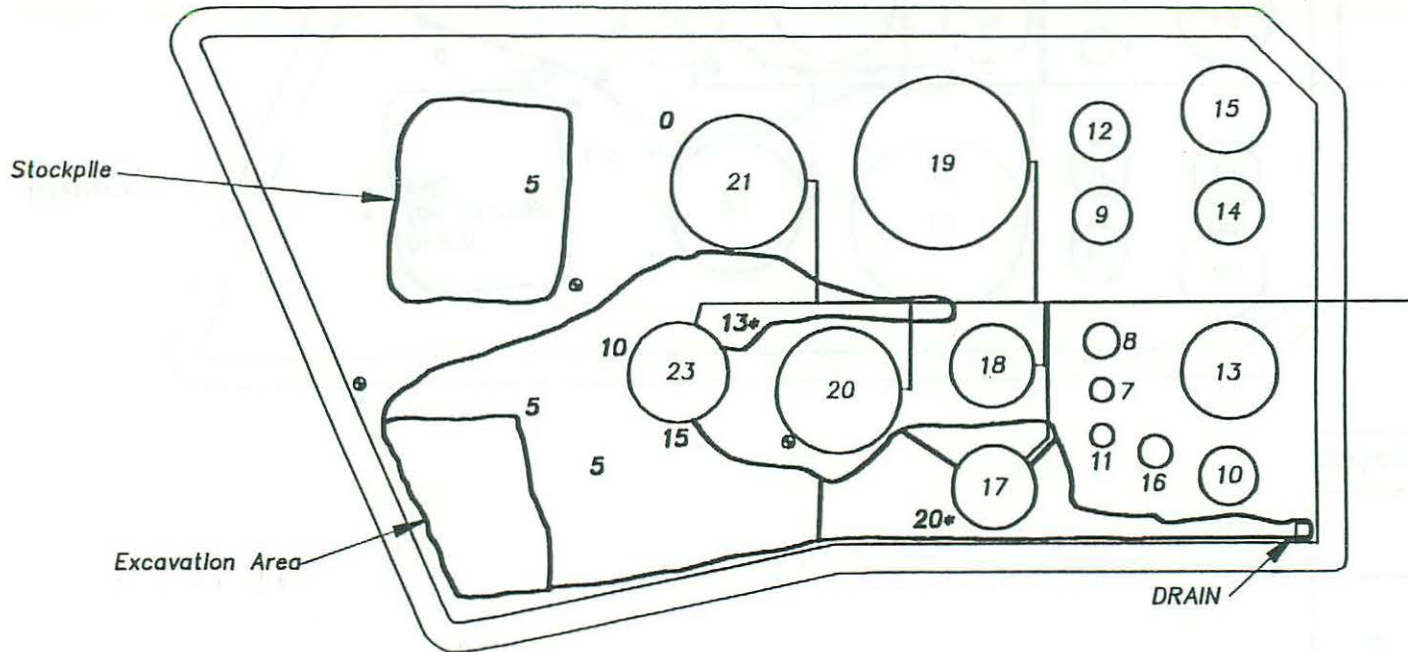
Valdez, Alaska

## LEGEND

- 5 PID Reading Location
- 13\* PID Reading - taken beneath polyethylene cover



Old Truck Loading Rack

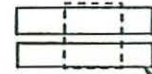




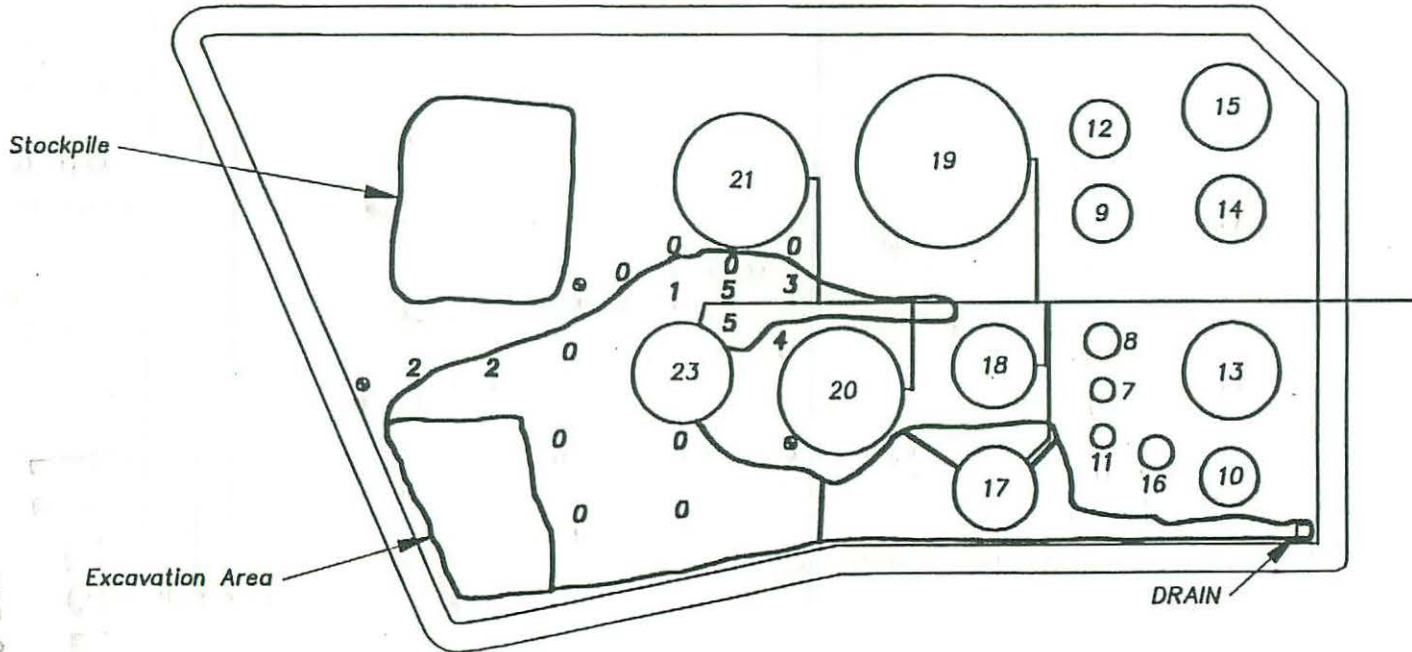
**PID Air Monitoring 8/31/93 14:00**  
**Tesoro Tank Farm**  
**Valdez, Alaska**

**LEGEND**

○ PID Reading Location



Old Truck Loading Rack

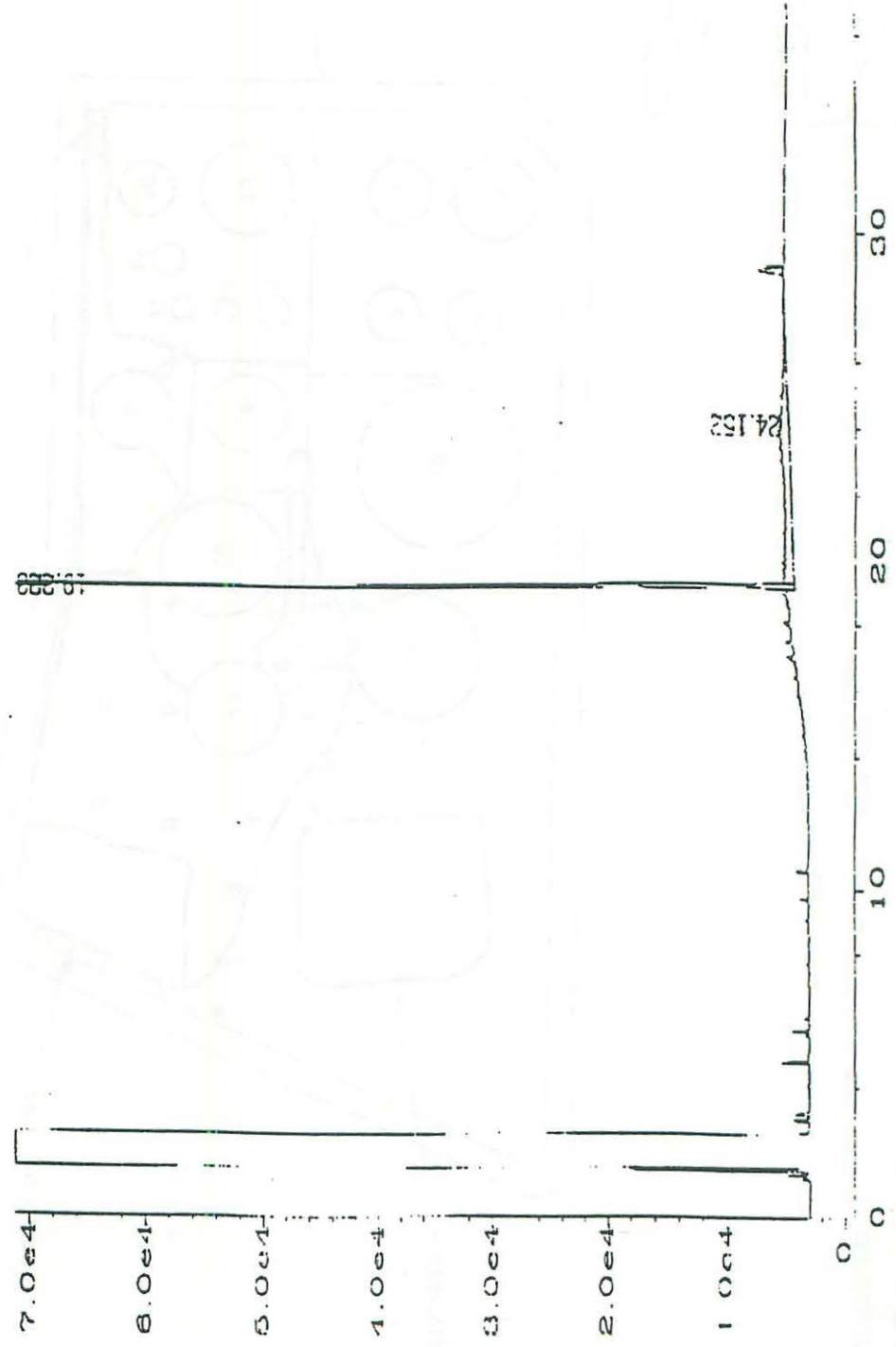


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 A-8357-00 12-93  
 FIGURE 7

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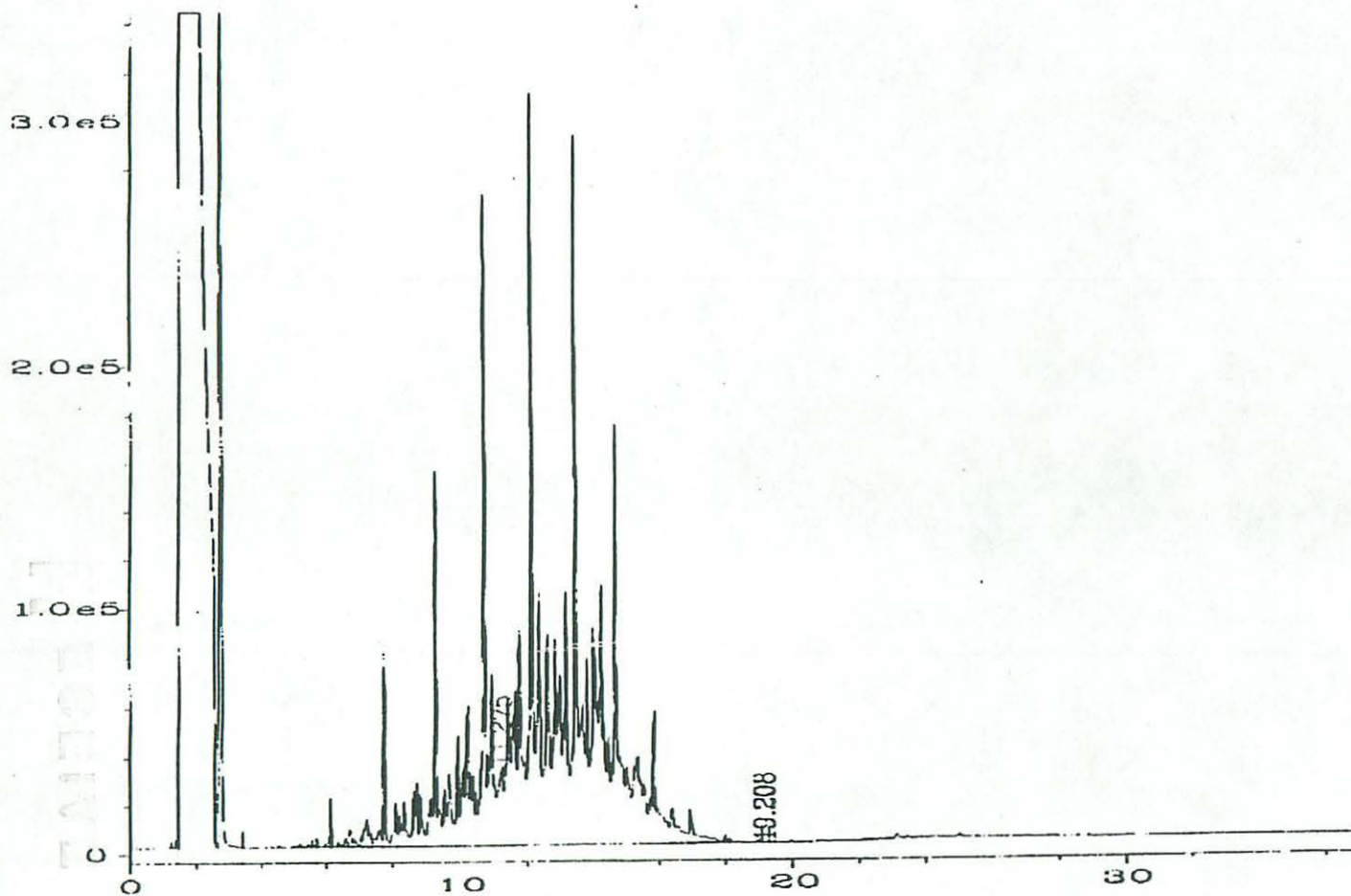
**"Old" Product Chromatogram**  
**Tesoro Tank Farm**  
**Valdez, Alaska**



SIG. 2 IN C:\ORGANICS\SEMI\_VOL\EPH3\091693A\077R0201.D



**"Fresh" Product Chromatogram**  
**Tesoro Tank Farm**  
**Valdez, Alaska**



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SIR. 2 in G:\ORGANICS\SEMI\_VOA\EPH3\091693A\079R0201.D

  
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FIGURE 9



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A-8357-00

APPENDIX A  
LABORATORY REPORTS





**COMMERCIAL TESTING & ENGINEERING CO.**  
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4580-1  
Client Sample ID :1101 AREA 11  
Matrix :SOIL

5633 B STREET  
ANCHORAGE, AK 99515  
TEL: (907) 562-2343  
FAX: (907) 561-5301

Client Name :TESORO AK PETROLEUM\*ANCH  
Ordered By :KEN GAYLORD  
Project Name :TESORO VALDEZ OIL SPILL  
Project# :  
PWSID :UA

WORK Order :70546  
Report Completed :09/17/93  
Collected :09/02/93 @ 13:30 hrs.  
Received :09/02/93 @ 17:52 hrs.  
Technical Director:STEPHEN C. EDE  
Released By : *C. Hunt*

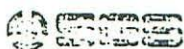
Sample Remarks: SAMPLE COLLECTED BY:

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	94.1		%	SM17 2540G			09/11	SMK
Hydrocarbons EPH	4.00	U	mg/Kg	3510/3550/8100M		09/14	09/15	JBH
Total Petroleum Hydro	18.0		mg/Kg	EPA 418.1		09/11	09/11	SMK

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\* See Special Instructions Above  
\*\* See Sample Remarks Above  
U = Undetected, Reported value is the practical quantification limit.  
D = Secondary dilution.

UA = Unavailable  
NA = Not Analyzed  
LT = Less Than  
GT = Greater Than



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**COMMERCIAL TESTING & ENGINEERING CO.**  
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4580-2  
Client Sample ID :1001 E TRENCH  
Matrix :SOIL

5633 B STREET  
ANCHORAGE AK 99518  
TEL: (907) 562-2343  
FAX: (907) 561-5301

Client Name :TESORO AK PETROLEUM\*ANCH  
Ordered By :KEN GAYLORD  
Project Name :TESORO VALDEZ OIL SPILL  
Project# :  
PWSID :UA

WORK Order :70546  
Report Completed :09/17/93  
Collected :09/02/93 @ 13:15 hrs.  
Received :09/02/93 @ 17:52 hrs.  
Technical Director:STEPHEN, C. EDE  
Released By : *C. Ede*

Sample Remarks: SAMPLE COLLECTED BY:

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	93.4		%	SM17 2540G			09/11	SMK
Hydrocarbons EPH	4.00	U	mg/Kg	3510/3550/8100M		09/14	09/15	JBH
Total Petroleum Hydro	22.4		mg/Kg	EPA 418.1		09/11	09/11	SMK

RECEIVED  
SEP 17 1993  
HART CROWDER, INC.

\* See Special Instructions Above  
\*\* See Sample Remarks Above  
U = Undetected, Reported value is the practical quantification limit.  
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UA = Unavailable  
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GT = Greater Than



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# COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

## REPORT of ANALYSIS

ChemLab Ref.# :93.4580-3  
Client Sample ID :1102 AREA 11  
Matrix :SOIL

5633 B STREET  
ANCHORAGE, AK 99518  
TEL: (907) 562-2343  
FAX: (907) 561-5301

Client Name :TESORO AK PETROLEUM\*ANCH  
Ordered By :KEN GAYLORD  
Project Name :TESORO VALDEZ OIL SPILL  
Project# :  
PWSID :UA

WORK Order :70546  
Report Completed :09/17/93  
Collected :09/02/93 @ 13:35 hrs.  
Received :09/02/93 @ 17:52 hrs.  
Technical Director:STEPHEN C. EDE  
Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY:

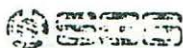
Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	92.1		%	SM17 2540G			09/11	SNK
Hydrocarbons EPH	4.00	U	mg/Kg	3510/3550/8100M		09/14	09/15	JBH
Total Petroleum Hydro	29.0		mg/Kg	EPA 418.1		09/11	09/11	SNK

APR 22 1994

DEPARTMENT OF  
ENVIRONMENTAL CONSERVATION  
MSDO

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UA = Unavailable  
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GT = Greater Than



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# COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

SINCE 1908

## REPORT of ANALYSIS

Chemlab Ref.# :93.4580-4  
Client Sample ID :NEW FUEL SW TRENCH  
Matrix :WATER

5633 B STREET  
ANCHORAGE, AK 99518  
TEL: (907) 562-2343  
FAX: (907) 561-5301

Client Name :TESORO AK PETROLEUM\*ANCH  
Ordered By :KEN GAYLORD  
Project Name :TESORO VALDEZ OIL SPILL  
Project# :  
PWSID :UA

WORK Order :70546  
Report Completed :09/17/93  
Collected :09/02/93 @ 13:10 hrs.  
Received :09/02/93 @ 17:52 hrs.  
Technical Director:STEPHEN C. EDE  
Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY: FINGER PRINT ANALYSIS. FLOATING SURFACE (OIL)  
IS CONSISTENT WITH DIESEL FUEL #1.

Parameter	Results	QC Qual Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	---		SM17 2540G				
Hydrocarbons EPH	100	%	3510/3550/8100M			09/15	JBH

SEP 14 1993  
COMMERCIAL TESTING & ENGINEERING CO.

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4-8357



# COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

## REPORT of ANALYSIS

Chemlab Ref.# :93.4592-1  
Client Sample ID :#801 PID 708  
Matrix :SOIL

5633 B STREET  
ANCHORAGE, AK 99518  
TEL: (907) 562-2343  
FAX: (907) 561-5307

Client Name :TESORO AK PETROLEUM\*ANCH  
Ordered By :KEN GAYLORD  
Project Name :  
Project# :  
PWSID :UA

WORK Order :70473  
Report Completed :09/07/93  
Collected :09/28/93 @ 13:05 hrs  
Received :09/03/93 @ 11:35 hrs  
Technical Director:STEPHEN L. EDE  
Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY: MATT FLYNN AND MARK MADDEN.

Parameter	Results	QC Qual Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	89.8	%	SM17 2540G			09/06	SMK
Total Petroleum Hydro	5040	mg/Kg	EPA 418.1		09/05	09/06	SMK

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APR 22 1994

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MSDO

\* See Special Instructions Above  
\*\* See Sample Remarks Above  
U = Undetected, Reported value is the practical quantification limit.  
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**COMMERCIAL TESTING & ENGINEERING CO.**  
 ENVIRONMENTAL LABORATORY SERVICES

REPORT OF ANALYSIS

ChemLab Ref.# :93.4592-2  
 Client Sample ID :#302 PID 710  
 Matrix :SOIL

5533 B STREET  
 ANCHORAGE, AK 99518  
 TEL: (907) 562-1343  
 FAX: (907) 561-5301

Client Name :TESORO AK PETROLEUM\*ANCH  
 Ordered By :KEN GAYLORD  
 Project Name :  
 Project# :  
 PWSID :UA

WORK Order :70473  
 Report Completed :09/07/93  
 Collected :08/28/93 @ 13:06 hrs.  
 Received :09/03/93 @ 11:35 hrs.  
 Technical Director:STEPHEN C. EDE  
 Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY: MATT FLYNN AND MARK MADDEN. JOB #A-8357 TESORO VALDEZ SPILL.

Parameter	Results	QC Qual Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	92.3	%	SM17 2540G			09/06	SMK
Total Petroleum Hydro	4800	mg/Kg	EPA 418.1		09/05	09/06	SMK

\* See Special Instructions Above

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GT = Greater Than



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**COMMERCIAL TESTING & ENGINEERING CO.**  
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1902

REPORT of ANALYSIS

Chemlab Ref.# :93.4592-3  
Client Sample ID :#803 PID 87.5  
Matrix :SOIL

5333 B STREET  
ANCHORAGE, AK 99513  
TEL: (907) 562-2343  
FAX: (907) 561-3301

Client Name :TESORO AK PETROLEUM\*ANCH  
Ordered By :KEN GAYLORD  
Project Name :  
Project# :  
PWSID :UA

WORK Order :70473  
Report Completed :09/07/93  
Collected :08/28/93 @ 13:09 hrs  
Received :09/03/93 @ 11:35 hrs  
Technical Director:STEPHEN C. EDE  
Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY: MATT FLYNN AND MARK MADDEN. JOB #A-8357 TESORO VALDEZ SPILL.

Parameter	Results	QC Qual Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	86.6	%	SM17 2540G			09/06	SMK
Total Petroleum Hydro	4200	mg/Kg	EPA 418.1		09/05	09/06	SMK

APR 22 1994

DEPARTMENT OF  
ENVIRONMENTAL CONSERVATION  
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UA = Unavailable  
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GT = Greater Than



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**COMMERCIAL TESTING & ENGINEERING CO.**  
 ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4592-4  
 Client Sample ID :#804 PID 415  
 Matrix :SOIL

5633 B STREET  
 ANCHORAGE, AK 99518  
 TEL: (907) 562-2343  
 FAX: (907) 561-5301

Client Name :TESORO AK PETROLEUM\*ANCH  
 Ordered By :KEN GAYLORD  
 Project Name :  
 Project# :  
 PWSID :UA

WORK Order :70473  
 Report Completed :09/07/93  
 Collected :08/28/93 @ 13:10 hrs.  
 Received :09/03/93 @ 11:35 hrs.  
 Technical Director:STEPHEN C. EDE  
 Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY: MATT FLYNN AND MARK MADDEN. JOB #A-8357 TESORO VALDEZ SPILL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	91.6		%	SM17 2540G			09/06	SMK
Total Petroleum Hydro	1340		mg/Kg	EPA 418.1		09/05	09/06	SMK

\* See Special Instructions Above

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ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4434-8  
Client Sample ID :#806 PID 988  
Matrix :SOIL

5633 B STREET  
ANCHORAGE, AK 99518  
TEL: (907) 562-2343  
FAX: (907) 561-5331

Client Name :TESORO AK PETROLEUM\*ANCH  
Ordered By :KEN GAYLORD  
Project Name :TESORO VALDEZ SPILL  
Project# :A-8357  
PWSID :UA

RUSH Order :70235  
Report Completed :09/01/93  
Collected :08/28/93 @ 13:20 hrs  
Received :08/30/93 @ 09:30 hrs  
Technical Director:STEPHEN C. EDE  
Released By : *Stephen C. Ede*

Sample Remarks: SAMPLE COLLECTED BY: MATT FLYNN AND MARK MADDEN. JOB #A-8357 TESORO VALDEZ SPILL.

Parameter	Results	QC	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
TCLP Extraction/ZHE	---			EPA 1311				
Aromatic Volatiles				EPA 8020				
Benzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
Toluene	0.101	D	mg/L	EPA 8020		08/31	08/31	JLB
Ethylbenzene	0.161	D	mg/L	EPA 8020		08/31	08/31	JLB
Chlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
p & m Xylene	0.746	D	mg/L	EPA 8020		08/31	08/31	JLB
o-Xylene	0.435	D	mg/L	EPA 8020		08/31	08/31	JLB
1,4 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
1,3 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
1,2 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
Aromatic Volatiles				EPA 8020				
Benzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
Toluene	8.29	D	mg/Kg	EPA 8020		08/30	08/30	JLB
Ethylbenzene	22.3	D	mg/Kg	EPA 8020		08/30	08/30	JLB
Chlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
p & m Xylene	88.2	D	mg/Kg	EPA 8020		08/30	08/30	JLB
o-Xylene	46.0	D	mg/Kg	EPA 8020		08/30	08/30	JLB
1,4 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
1,3 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
1,2 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB

APR 22 1994

DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
MSDO

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**COMMERCIAL TESTING & ENGINEERING CO.**  
 ENVIRONMENTAL LABORATORY SERVICES

REPORT OF ANALYSIS

Chemlab Ref.# :93.4434-7  
 Client Sample ID :#805 PID 625  
 Matrix :SOIL

5533 B STREET  
 ANCHORAGE, AK 99518  
 TEL: (907) 562-2343  
 FAX: (907) 561-5301

Client Name :TESORO AK PETROLEUM\*ANCH  
 Ordered By :KEN GAYLORD  
 Project Name :TESORO VALDEZ SPILL  
 Project# :A-8357  
 PWSID :UA

RUSH Order :70235  
 Report Completed :09/01/93  
 Collected :08/28/93 @ 13:15 hrs.  
 Received :08/30/93 @ 09:30 hrs.  
 Technical Director:STEPHEN C. EDE  
 Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY: MATT FLYNN AND MARK MADDEN. JOB #A-8357 TESORO VALDEZ SPILL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
TCLP Extraction/ZHE	---			EPA 1311				
Aromatic Volatiles				EPA 8020				
Benzene	0.026	D	mg/L	EPA 8020		08/31	08/31	JLB
Toluene	0.140	D	mg/L	EPA 8020		08/31	08/31	JLB
Ethylbenzene	0.214	D	mg/L	EPA 8020		08/31	08/31	JLB
Chlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
p & m Xylene	0.986	D	mg/L	EPA 8020		08/31	08/31	JLB
o-Xylene	0.594	D	mg/L	EPA 8020		08/31	08/31	JLB
1,4 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
1,3 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
1,2 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
Aromatic Volatiles				EPA 8020				
Benzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
Toluene	4.61	D	mg/Kg	EPA 8020		08/30	08/30	JLB
Ethylbenzene	13.4	D	mg/Kg	EPA 8020		08/30	08/30	JLB
Chlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
p & m Xylene	51.4	D	mg/Kg	EPA 8020		08/30	08/30	JLB
o-Xylene	26.7	D	mg/Kg	EPA 8020		08/30	08/30	JLB
1,4 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
1,3 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
1,2 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB

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# COMMERCIAL TESTING & ENGINEERING CO.

ENVIRONMENTAL LABORATORY SERVICES

## REPORT of ANALYSIS

Chemlab Ref.# :93.4434-6  
 Client Sample ID :#804 PID 415  
 Matrix :SOIL

5633 B STREET  
 ANCHORAGE, AK 99518  
 TEL: (907) 562-2343  
 FAX: (907) 561-5301

Client Name :TESORO AK PETROLEUM\*ANCH  
 Ordered By :KEN GAYLORD  
 Project Name :TESORO VALDEZ SPILL  
 Project# :A-8357  
 PWSID :UA

RUSH Order :70235  
 Report Completed :09/01/93  
 Collected :08/28/93 @ 13:10 hrs.  
 Received :08/30/93 @ 09:30 hrs.  
 Technical Director:STEPHEN C. EDE  
 Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY: MATT FLYNN AND MARK MADDEN. JOB #A-8357 TESORO VALDEZ SPILL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
TCLP Extraction/ZHE	---			EPA 1311				
Aromatic Volatiles				EPA 8020				
Benzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
Toluene	0.182	D	mg/L	EPA 8020		08/31	08/31	JLB
Ethylbenzene	0.276	D	mg/L	EPA 8020		08/31	08/31	JLB
Chlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
p & m Xylene	1.27	D	mg/L	EPA 8020		08/31	08/31	JLB
o-Xylene	0.767	D	mg/L	EPA 8020		08/31	08/31	JLB
1,4 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
1,3 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
1,2 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
Aromatic Volatiles				EPA 8020				
Benzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
Toluene	2.65	D	mg/Kg	EPA 8020		08/30	08/30	JLB
Ethylbenzene	7.61	D	mg/Kg	EPA 8020		08/30	08/30	JLB
Chlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
p & m Xylene	27.8	D	mg/Kg	EPA 8020		08/30	08/30	JLB
o-Xylene	14.4	D	mg/Kg	EPA 8020		08/30	08/30	JLB
1,4 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
1,3 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
1,2 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB

[Faint stamp]

APR 22 1994

DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
MSDO

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**COMMERCIAL TESTING & ENGINEERING CO.**  
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4434-5  
Client Sample ID :#803 PID 87.5  
Matrix :SOIL

5633 B STREET  
ANCHORAGE, AK 99518  
TEL: (907) 562-2343  
FAX: (907) 561-5301

Client Name :TESORO AK PETROLEUM\*ANCH  
Ordered By :KEN GAYLORD  
Project Name :TESORO VALDEZ SPILL  
Project# :A-8357  
PWSID :UA

RUSH Order :70235  
Report Completed :09/01/93  
Collected :08/28/93 @ 13:09 hrs.  
Received :08/30/93 @ 09:30 hrs.  
Technical Director:STEPHEN C. EDE  
Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY: MATT FLYNN AND MARK MADDEN. JOB #A-8357 TESORO VALDEZ SPILL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
TCLP Extraction/ZHE	---			EPA 1311				
Aromatic Volatiles				EPA 8020				
Benzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
Toluene	0.175	D	mg/L	EPA 8020		08/31	08/31	JLB
Ethylbenzene	0.223	D	mg/L	EPA 8020		08/31	08/31	JLB
Chlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
p & m Xylene	0.997	D	mg/L	EPA 8020		08/31	08/31	JLB
o-Xylene	0.599	D	mg/L	EPA 8020		08/31	08/31	JLB
1,4 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
1,3 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
1,2 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
Aromatic Volatiles				EPA 8020				
Benzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
Toluene	6.80	D	mg/Kg	EPA 8020		08/30	08/30	JLB
Ethylbenzene	15.1	D	mg/Kg	EPA 8020		08/30	08/30	JLB
Chlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
p & m Xylene	57.5	D	mg/Kg	EPA 8020		08/30	08/30	JLB
o-Xylene	29.4	D	mg/Kg	EPA 8020		08/30	08/30	JLB
1,4 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
1,3 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
1,2 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB

\* See Special Instructions Above  
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**COMMERCIAL TESTING & ENGINEERING CO.**  
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4434-4  
Client Sample ID :#802 PID 710  
Matrix :SOIL

5633 B STREET  
ANCHORAGE, AK 99518  
TEL: (907) 562-2343  
FAX: (907) 561-5301

Client Name :TESORO AK PETROLEUM\*ANCH  
Ordered By :KEN GAYLORD  
Project Name :TESORO VALDEZ SPILL  
Project# :A-8357  
PWSID :UA

RUSH Order :70235  
Report Completed :09/01/93  
Collected :08/28/93 @ 13:06 hrs.  
Received :08/30/93 @ 09:30 hrs.  
Technical Director:STEPHEN C. EDE  
Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY: MATT FLYNN AND MARK MADDEN. JOB #A-8357 TESORO VALDEZ SPILL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
TCLP Extraction/ZHE	---			EPA 1311				
Aromatic Volatiles				EPA 8020				
Benzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
Toluene	0.179	D	mg/L	EPA 8020		08/31	08/31	JLB
Ethylbenzene	0.282	D	mg/L	EPA 8020		08/31	08/31	JLB
Chlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
p & m Xylene	1.30	D	mg/L	EPA 8020		08/31	08/31	JLB
o-Xylene	0.788	D	mg/L	EPA 8020		08/31	08/31	JLB
1,4 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
1,3 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
1,2 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
Aromatic Volatiles				EPA 8020				
Benzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
Toluene	9.11	D	mg/Kg	EPA 8020		08/30	08/30	JLB
Ethylbenzene	23.1	D	mg/Kg	EPA 8020		08/30	08/30	JLB
Chlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
p & m Xylene	93.6	D	mg/Kg	EPA 8020		08/30	08/30	JLB
o-Xylene	48.3	D	mg/Kg	EPA 8020		08/30	08/30	JLB
1,4 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
1,3 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
1,2 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB

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UA = Unavailable  
NA = Not Analyzed  
LT = Less Than  
GT = Greater Than



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**COMMERCIAL TESTING & ENGINEERING CO.**  
ENVIRONMENTAL LABORATORY SERVICES

REPORT OF ANALYSIS

Chemlab Ref.# :93.4434-3  
Client Sample ID :#801 PID 708  
Matrix :SOIL

5633 B STREET  
ANCHORAGE, AK 99518  
TEL: (907) 562-2343  
FAX: (907) 561-5301

Client Name :TESORO AK PETROLEUM\*ANCH  
Ordered By :KEN GAYLORD  
Project Name :TESORO VALDEZ SPILL  
Project# :A-8357  
PWSID :UA

RUSH Order :70235  
Report Completed :09/01/93  
Collected :08/28/93 @ 13:05 hrs.  
Received :08/30/93 @ 09:30 hrs.  
Technical Director:STEPHEN C. EDE  
Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY: MATT FLYNN AND MARK MADDEN. JOB #A-8357 TESORO VALDEZ SPILL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
TCLP Extraction/ZHE	---			EPA 1311				
Aromatic Volatiles				EPA 8020				
Benzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
Toluene	0.198	D	mg/L	EPA 8020		08/31	08/31	JLB
Ethylbenzene	0.266	D	mg/L	EPA 8020		08/31	08/31	JLB
Chlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
p & m Xylene	1.20	D	mg/L	EPA 8020		08/31	08/31	JLB
o-Xylene	0.729	D	mg/L	EPA 8020		08/31	08/31	JLB
1,4 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
1,3 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
1,2 Dichlorobenzene	0.010	U	mg/L	EPA 8020		08/31	08/31	JLB
Aromatic Volatiles				EPA 8020				
Benzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
Toluene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
Ethylbenzene	8.94	D	mg/Kg	EPA 8020		08/30	08/30	JLB
Chlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
p & m Xylene	17.2	D	mg/Kg	EPA 8020		08/30	08/30	JLB
o-Xylene	13.5	D	mg/Kg	EPA 8020		08/30	08/30	JLB
1,4 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
1,3 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB
1,2 Dichlorobenzene	1.00	U	mg/Kg	EPA 8020		08/30	08/30	JLB

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**COMMERCIAL TESTING & ENGINEERING CO.**  
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4434-2  
Client Sample ID :#705 PID 350  
Matrix :SOIL

5633 B STREET  
ANCHORAGE, AK 99518  
TEL: (907) 562-2343  
FAX: (907) 561-5331

Client Name :TESORO AK PETROLEUM\*ANCH  
Ordered By :KEN GAYLORD  
Project Name :TESORO VALDEZ SPILL  
Project# :A-8357  
PWSID :UA

RUSH Order :70235  
Report Completed :09/03/93  
Collected :08/28/93 @ 10:20 hrs.  
Received :08/30/93 @ 09:30 hrs.  
Technical Director:STEPHEN C. EDE  
Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY: MATT FLYNN AND MARK MADDEN. JOB #A-8357 TESORO VALDEZ SPILL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	94.0		%	SM17 2540G			09/01	KR
Hydrocarbons EPH	7490	D	mg/Kg	3510/3550/8100M		09/01	09/03	JBH

APPROVED

APR 22 1994

DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
MSDO

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**COMMERCIAL TESTING & ENGINEERING CO.**  
 ENVIRONMENTAL LABORATORY SERVICES

REPORT OF ANALYSIS

Chemlab Ref.# :93.4434-1  
 Client Sample ID :#704 PID 175  
 Matrix :SOIL

5533 B STREET  
 ANCHORAGE, AK 99518  
 TEL: (907) 562-2343  
 FAX: (907) 561-5301

Client Name :TESORO AK PETROLEUM\*ANCH  
 Ordered By :KEN GAYLORD  
 Project Name :TESORO VALDEZ SPILL  
 Project# :A-8357  
 PWSID :UA

RUSH Order :70235  
 Report Completed :09/03/93  
 Collected :08/28/93 @ 10:15 hrs.  
 Received :08/30/93 @ 09:30 hrs.  
 Technical Director:STEPHEN C. EDE  
 Released By : *[Signature]*

Sample Remarks: SAMPLE COLLECTED BY: MATT FLYNN AND MARK MADDEN. JOB #A-8357 TESORO VALDEZ SPILL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	93.5		%	SM17 2540G			09/01	KR
Hydrocarbons EPH	1670	D	mg/Kg	3510/3550/8100M		09/01	09/03	JBH

RECEIVED  
 SEP 7 1993

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 GT = Greater Than



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