

GW - 32

REPORTS

YEAR(S):

1995- SAMPLING

REPORT
ON THE
MARCH, 1995
SAMPLING ACTIVITIES

GIANT REFINING COMPANY
CINIZA REFINERY

JULY 24, 1995

PREPARED BY:
LYNN SHELTON
SENIOR ENVIRONMENTAL COORDINATOR
GIANT REFINING COMPANY

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[TA\WP\LS\REPCONT]

INTRODUCTION:

In order to complete the characterization of Solid Waste Management Unit (SWMU), #6 the **Leaded Gasoline Tanks**, Giant Refining Company - Ciniza (Giant) performed additional drilling and sampling activities during the weeks of October 24, 1994 and March 21, 1995.

The drilling and sampling activities performed in October were to characterize the extent of contamination at the following sample points in SWMU #6:

RFI0639V	Tank	569
RFI0640V	Tank	570

The sampling protocol called for drilling until two clean samples from each borehole were obtained. This task was successfully completed at sample point RFI0640V (Tank 570) using a combination of careful drilling practices, geological observations and the use of a Photo Ionization Detector (PID).

In drilling sample point RFI0639V (Tank 569), the same drilling techniques, including observations with a PID, were utilized and the coring proceeded in a straightforward fashion. As shown in the lithologic logs, everything appeared to be normal. Although a saturated zone was encountered, that zone was not considered suspicious. Interestingly enough, the zones between 40.0 and 50.0 feet showed very low PID readings. Laboratory analyses later samples at 40.0, 45.0, and 50.0 feet were clean, the PID showed elevated by hydrocarbon levels at 55.0 feet (later confirmed by laboratory analysis). See the original analytical data.

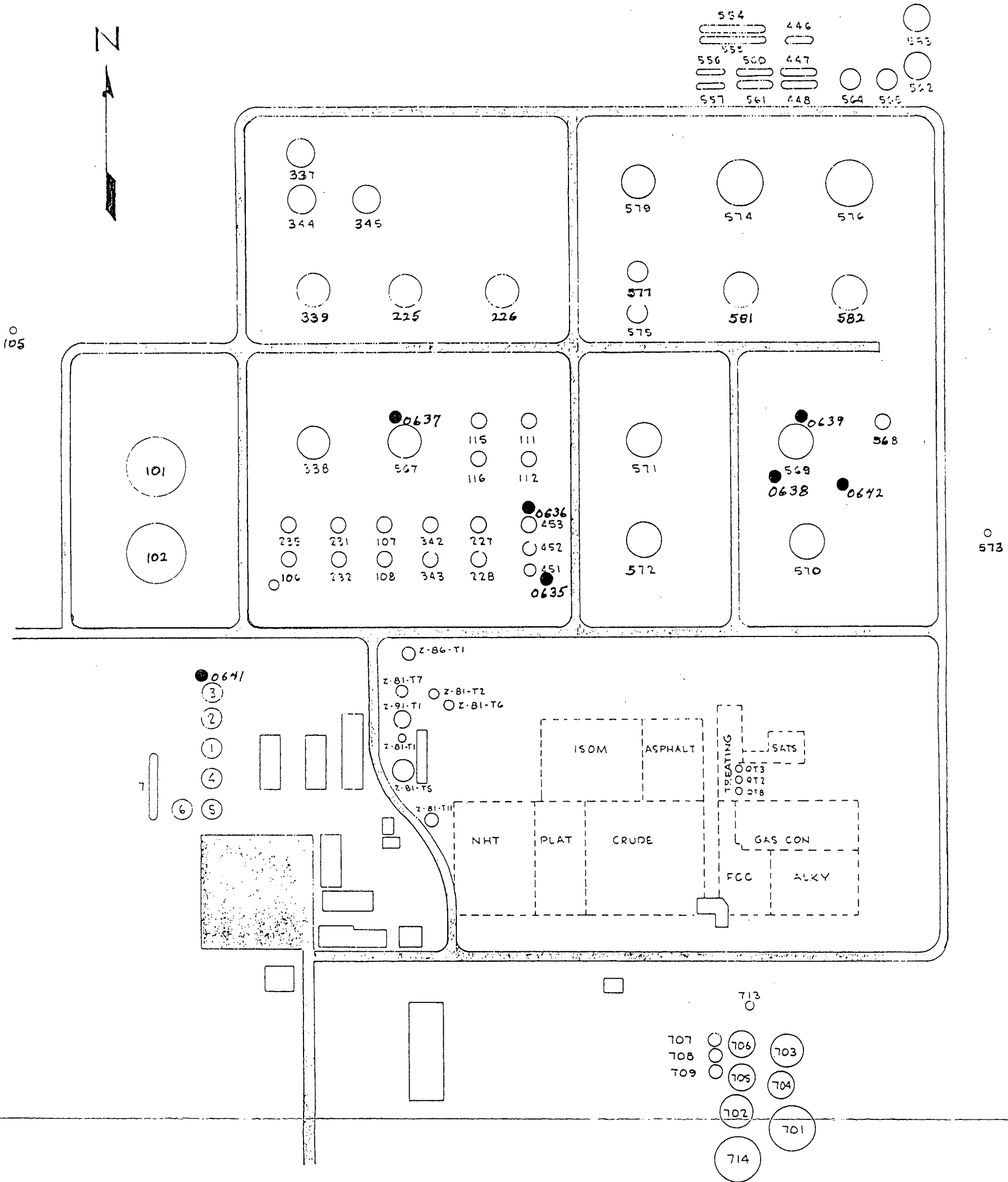
In retrospect, this rudimentary observation the field PID reading at 55.0 feet, which was considered questionable at the time, was significant. The presence of BTEX contamination at 55.0 feet indicated that Giant would have to drill deeper to obtain clean samples. This situation was reported to Region VI, USEPA in the December 16, 1994 **Quarterly Progress Report** While planning the drilling and sampling activities required by Region VI, USEPA (in it's December 22, 1994 letter), the reason for the presence of BTEX at 55.0 feet was realized.

It is now apparent that enough water/hydrocarbon had migrated down the open borehole during drilling operations (which included a break before drilling the 50.0-55.0 foot interval) to cause a "hit". In order to preclude a recurrence of this mistake, Giant and Precision Engineering, Inc. (The drilling/engineering firm used in this project) developed a plan to isolate the water bearing zone in the March drilling. This plan was submitted to Region VI, USEPA in the March 10, 1995 Sampling And Analysis Plan, RCRA Facility Investigation, SWMU #6 and to NMOCD in the February 24, 1995 Tank 569 Characterization Plan.

The final drilling was performed March 21-23, 1995 and incorporated the protocol outlined in the documents described above as well as the requirements in the aforementioned December 22, 1994 letter. The analytical results from this sampling event indicated that two, consecutive clean samples from each leaded gasoline tank were indeed obtained.

[TA\WP\LS\REPORT]

BORING PLAN MARCH '95 DRILLING PLAN



GIANT REFINING COMPANY

CINIZA

SWMU #06

PARAMETER	UNITS	0639V16.0 8/94	0639V25.0 8/94	0639V30.0 10/94	0639V35.0 10/94	0639V40.0 10/94	0639V45.0 10/94	0639V50.0 10/94	0639V55.0 10/94
Benzene	ug/Kg	3000	190	ND	360	ND	ND	ND	1500
Ethylbenzene	ug/Kg	160000	15000	27	170	ND	ND	ND	400
Toluene	ug/Kg	68000	14000	ND	210	ND	ND	ND	660
Xylenes	ug/Kg	370000	83000	31	220	ND	ND	ND	520

PARAMETER	UNITS	0639V1.5 3/95	0639V4.0 3/95	0639V4.8 3/95	0639V9.0 3/95	0639V11.0 3/95	0639V13.8 3/95	0639V19.0 3/95	0639V23.3 3/95
Benzene	ug/Kg	0.50	34	14	2.2	5.4	150	29	ND
Ethylbenzene	ug/Kg	1.6	240D	150D	5.9	1.3	360	110	11
Toluene	ug/Kg	5.5D	780D	430D	21	4.7	1400	380	15
Xylenes	ug/Kg	61D	1500D	850D	36	71	2000	670	69

PARAMETER	UNITS	0639V26.2 3/95	0639V34.2 3/95	0639V36.8 3/95	0639V42.0 3/95	0639V49.5 3/95	0639V54.0 3/95	0639V60.0 3/95
Benzene	ug/Kg	ND	2.0	2.6	0.19	0.082	ND	ND
Ethylbenzene	ug/Kg	19	2.5	1.7	0.19	0.43	ND	ND
Toluene	ug/Kg	33	10	7.0	0.78	0.97	ND	ND
Xylenes	ug/Kg	110	14	9.0	1.1	2.6	ND	ND

8020 BTEX

GIANT REFINING COMPANY

CINIZA

SWMU #06

PARAMETER	UNITS	0635V15.0 3/95	0635V20.0 3/95	0635V25.0 3/95	0635V30.0 3/95	0635V35.0 3/95
Benzene	ug/Kg	ND	ND	0.2	ND	ND
Ethylbenzene	ug/Kg	ND	8.2	0.4	ND	ND
Toluene	ug/Kg	ND	0.75	ND	ND	ND
Xylenes	ug/Kg	ND	19	ND	ND	ND

PARAMETER	UNITS	0636V16.0 8/94	0636V20.0 8/94	0636V25.0 3/95	0636V25.0 3/95	0636V30.0 3/95	0636V35.0 3/95
Benzene	ug/Kg	<10	10	ND	ND	ND	ND
Ethylbenzene	ug/Kg	26	13	0.15	ND	ND	ND
Toluene	ug/Kg	13	10	ND	ND	ND	ND
Xylenes	ug/Kg	42	19	0.27	ND	ND	ND

PARAMETER	UNITS	0637V16.0 8/94	0637V16.0D 8/94	0637V20.0 8/94	0637V20.0 3/95	0637V25.0 3/95	0637V30.0 3/95	0637V35.0 3/95	0637V40.0 3/95
Benzene	ug/Kg	<10	<10	<10	0.041	ND	0.076	ND	ND
Ethylbenzene	ug/Kg	600	63	110	0.029	ND	ND	ND	ND
Toluene	ug/Kg	1100	170	73	0.17	ND	0.14	ND	ND
Xylenes	ug/Kg	8300	1300	50	0.17	ND	0.057	ND	ND

PARAMETER	UNITS	0638V16.0 8/94	0638V20.0 3/95	0638V25.0 3/95	0638V30.0 3/95	0638V35.0 3/95	0638V37.0 3/95	0638V40.0 3/95	0638V45.0 3/95
Benzene	ug/Kg	<10	0.42	ND	0.23	0.41	ND	ND	ND
Ethylbenzene	ug/Kg	150	1.1	ND	0.51	ND	ND	ND	ND
Toluene	ug/Kg	170	2.0	ND	1.5	0.027	ND	ND	ND
Xylenes	ug/Kg	1400	6.0	ND	2.7	ND	ND	ND	ND

PARAMETER	UNITS	0640V16.0 8/94	0640V24.0 8/94	0640V30.0 10/94	0640V35.0 10/94	0640V35.0 10/94
Benzene	ug/Kg	4600	290	50	ND	ND
Ethylbenzene	ug/Kg	77000	37000	ND	ND	ND
Toluene	ug/Kg	37000	23000	34	ND	ND
Xylenes	ug/Kg	200000	130000	ND	ND	ND

PARAMETER	UNITS	0641V16.0 8/94	0641V19.0 8/94	0641V20.0 3/95	0641V25.0 3/95	0641V30.0 3/95
Benzene	ug/Kg	800	ND	ND	ND	ND
Ethylbenzene	ug/Kg	1800	ND	ND	ND	ND
Toluene	ug/Kg	500	ND	ND	ND	ND
Xylenes	ug/Kg	5400	500	ND	ND	ND

PARAMETER	UNITS	0642V20.0 8/94	0642V20.0 3/95	0642V25.0 3/95	0642V27.9 3/95	0642V30.0 3/95	0642V31.7 3/95	0642V35.0 3/95	0642V39.0 3/95
Benzene	ug/Kg	<10	ND	ND	ND	0.043	190	0.058	ND
Ethylbenzene	ug/Kg	450	ND	ND	ND	0.59	160	0.088	ND
Toluene	ug/Kg	460	ND	ND	ND	0.31	1000D	0.43	ND
Xylenes	ug/Kg	2600	ND	ND	ND	26	1000D	0.58	ND



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CLIENT GIANT REFINING
I 40 EXIT 39
RT 3 BOX 7
JAMESTOWN, NM 87347

SAMPLE NO. : 6404955
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY: *NAV*
PAGE : 1 OF 1

CLIENT SAMPLE ID : RFI0639V 30.0
SAMPLE TYPE: Soil
SAMPLED BY: W. Toomer
SUBMITTED BY: W. Toomer
SAMPLE SOURCE: Giant Refining

AUTHORIZED BY : L. Shelton
CLIENT P.O. : --
SAMPLE DATE ...: 10-28-94
SUBMITTAL DATE : 11-03-94
EXTRACTION DATE: 11-07-94

Method 8020 - BTEX + MTBE

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date
Benzene	<10	ug/Kg	10.	11-07-94
Toluene	<10	ug/Kg	10.	11-07-94
Ethylbenzene	27	ug/Kg	10.	11-07-94
Total Xylenes	31	ug/Kg	3.0	11-07-94
Methyl Tert-Butyl Ether	<20	ug/Kg	20.	11-07-94



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JAMESTOWN, NM 87347

SAMPLE NO. : 6404956
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY: *ARV*
PAGE : 1 OF 1

CLIENT SAMPLE ID : RFI0639V 35.0
SAMPLE TYPE: Soil
SAMPLED BY: W. Toomer
SUBMITTED BY: W. Toomer
SAMPLE SOURCE: Giant Refining

AUTHORIZED BY : L. Shelton
CLIENT P.O. : --
SAMPLE DATE ...: 10-28-94
SUBMITTAL DATE : 11-03-94
EXTRACTION DATE: 11-07-94

Method 8020 - BTEX + MTBE

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date
Benzene	360	ug/Kg	10.	11-07-94
Toluene	210	ug/Kg	10.	11-07-94
Ethylbenzene	170	ug/Kg	10.	11-07-94
Total Xylenes	220	ug/Kg	3.0	11-07-94
Methyl Tert-Butyl Ether	<20	ug/Kg	20.	11-07-94



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SAMPLE NO. : 6404957
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY: *AKH*
PAGE : 1 OF 1

CLIENT SAMPLE ID : RFI0639V 40.0
SAMPLE TYPE: Soil
SAMPLED BY: W. Toomer
SUBMITTED BY: W. Toomer
SAMPLE SOURCE: Giant Refining

AUTHORIZED BY : L. Shelton
CLIENT P.O. : --
SAMPLE DATE ...: 10-28-94
SUBMITTAL DATE : 11-03-94
EXTRACTION DATE: 11-07-94

Method 8020 - BTEX + MTBE

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date
Benzene	<10	ug/Kg	10.	11-07-94
Toluene	<10	ug/Kg	10.	11-07-94
Ethylbenzene	<10	ug/Kg	10.	11-07-94
Total Xylenes	<3.0	ug/Kg	3.0	11-07-94
Methyl Tert-Butyl Ether	<20	ug/Kg	20.	11-07-94



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SAMPLE NO. : 6404958
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY: *XXX*
PAGE : 1 OF 1

CLIENT SAMPLE ID : RFI0639V 45.0
SAMPLE TYPE: Soil
SAMPLED BY: W. Toomer
SUBMITTED BY: W. Toomer
SAMPLE SOURCE: Giant Refining

AUTHORIZED BY : L. Shelton
CLIENT P.O. : --
SAMPLE DATE ...: 10-28-94
SUBMITTAL DATE : 11-03-94
EXTRACTION DATE: 11-07-94

Method 8020 - BTEX + MTBE

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date
Benzene	<10	ug/Kg	10.	11-07-94
Toluene	<10	ug/Kg	10.	11-07-94
Ethylbenzene	<10	ug/Kg	10.	11-07-94
Total Xylenes	<3.0	ug/Kg	3.0	11-07-94
Methyl Tert-Butyl Ether	<20	ug/Kg	20.	11-07-94



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SAMPLE NO. : 6404959
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY: *WAT*
PAGE : 1 OF 1

CLIENT SAMPLE ID : RFI0639V 50.0
SAMPLE TYPE: Soil
SAMPLED BY: W. Toomer
SUBMITTED BY: W. Toomer
SAMPLE SOURCE: Giant Refining

AUTHORIZED BY : L. Shelton
CLIENT P.O. : --
SAMPLE DATE ...: 10-28-94
SUBMITTAL DATE : 11-03-94
EXTRACTION DATE: --

Method 8020 - BTEX + MTBE

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date
Benzene	<10	ug/Kg	10.	11-07-94
Toluene	<10	ug/Kg	10.	11-07-94
Ethylbenzene	<10	ug/Kg	10.	11-07-94
Total Xylenes	<3.0	ug/Kg	3.0	11-07-94
Methyl Tert-Butyl Ether	<20	ug/Kg	20.	11-07-94



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SAMPLE NO. : 6404960
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY: *[Signature]*
PAGE : 1 OF 1

CLIENT SAMPLE ID : RFI0639V 55.0
SAMPLE TYPE: Soil
SAMPLED BY: W. Toomer
SUBMITTED BY: W. Toomer
SAMPLE SOURCE: Giant Refining

AUTHORIZED BY : L. Shelton
CLIENT P.O. : --
SAMPLE DATE ...: 10-28-94
SUBMITTAL DATE : 11-03-94
EXTRACTION DATE: 11-07-94

Method 8020 - BTEX + MTBE

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date
Benzene	1500	ug/Kg	10.	11-07-94
Toluene	660	ug/Kg	10.	11-07-94
Ethylbenzene	400	ug/Kg	10.	11-07-94
Total Xylenes	520	ug/Kg	3.0	11-07-94
Methyl Tert-Butyl Ether	<20	ug/Kg	20.	11-07-94



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SAMPLE NO. : 6404961
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY: *[Signature]*
PAGE : 1 OF 1

CLIENT SAMPLE ID : RFI0640V 30.0
SAMPLE TYPE: Soil
SAMPLED BY: W. Toomer
SUBMITTED BY: W. Toomer
SAMPLE SOURCE: Giant Refining

AUTHORIZED BY : L. Shelton
CLIENT P.O. : --
SAMPLE DATE ...: 10-27-94
SUBMITTAL DATE : 11-03-94
EXTRACTION DATE: 11-07-94

Method 8020 - BTEX + MTBE

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date
Benzene	50	ug/Kg	10.	11-07-94
Toluene	34	ug/Kg	10.	11-07-94
Ethylbenzene	<10	ug/Kg	10.	11-07-94
Total Xylenes	<3.0	ug/Kg	3.0	11-07-94
Methyl Tert-Butyl Ether	<20	ug/Kg	20.	11-07-94



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CLIENT GIANT REFINING
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SAMPLE NO. : 6404962
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY: *WLF*
PAGE : 1 OF 1

CLIENT SAMPLE ID : RFI0640V 35.0
SAMPLE TYPE: Soil
SAMPLED BY: W. Toomer
SUBMITTED BY: W. Toomer
SAMPLE SOURCE: Giant Refining

AUTHORIZED BY : L. Shelton
CLIENT P.O. : --
SAMPLE DATE ...: 10-27-94
SUBMITTAL DATE : 11-03-94
EXTRACTION DATE: 11-07-94

Method 8020 - BTEX + MTBE

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date
Benzene	<10	ug/Kg	10.	11-07-94
Toluene	<10	ug/Kg	10.	11-07-94
Ethylbenzene	<10	ug/Kg	10.	11-07-94
Total Xylenes	<3.0	ug/Kg	3.0	11-07-94
Methyl Tert-Butyl Ether	<20	ug/Kg	20.	11-07-94



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SAMPLE NO. : 6404963
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY: *WWT*
PAGE : 1 OF 1

CLIENT SAMPLE ID : RFI0640V 40.0
SAMPLE TYPE: Soil
SAMPLED BY: W. Toomer
SUBMITTED BY: W. Toomer
SAMPLE SOURCE: Giant Refining

AUTHORIZED BY : L. Shelton
CLIENT P.O. : --
SAMPLE DATE: 10-27-94
SUBMITTAL DATE : 11-03-94
EXTRACTION DATE: 11-07-94

Method 8020 - BTEX + MTBE

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date
Benzene	<10	ug/Kg	10.	11-07-94
Toluene	<10	ug/Kg	10.	11-07-94
Ethylbenzene	<10	ug/Kg	10.	11-07-94
Total Xylenes	<3.0	ug/Kg	3.0	11-07-94
Methyl Tert-Butyl Ether	<20	ug/Kg	20.	11-07-94



Analytical Technologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 11/26/94 PAGE 1 OF 1

ATLAB.I.D.

PROJECT MANAGER:

ANALYSIS REQUEST

COMPANY: GIANT PEEINING
ADDRESS: ROUTE 3, BOX 7

PHONE: (505) 722-0212
FAX: (505) 722-0210

BILL TO: MAAT TOWER
COMPANY: SAME
ADDRESS: SAME

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
PEI0637V30.0	01/27/94	1006	SOIL	49495
PEI0637V35.0	01/27/94	1016	SOIL	49506
PEI0637V40.0	01/27/94	1030	SOIL	49517
PEI0637V45.0	01/27/94	1048	SOIL	49528
PEI0637V50.0	01/27/94	1127	SOIL	49539
PEI0637V55.0	01/27/94	1212	SOIL	49550
PEI0640V30.0	01/27/94	1632	SOIL	49561
PEI0640V35.0	01/27/94	1650	SOIL	49572
PEI0640V40.0	01/27/94	1702	SOIL	49583

PROJECT INFORMATION

SAMPLE RECEIPT

PROJ. NO:	PEI	NO. CONTAINERS	
PROJ. NAME:	RFI	CUSTODY SEALS	Y/N/NA
P.O. NO:	977-9023-05	RECEIVED INTACT	
SHIPPED VIA:	FED EX	RECEIVED COLD	

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments: sample PEI0637V35.0 - broken - transferred into another bottle

SAMPLED & RELINQUISHED BY: 1.

RELINQUISHED BY: 2.

RELINQUISHED BY: 3.

Petroleum Hydrocarbons (418.1)	
(MOD 8015) Gas/Diesel	
Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	
BTXE/MTBE (8020)	
Chlorinated Hydrocarbons (601/8010)	
Aromatic Hydrocarbons (602/8020)	
SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	
Pesticides/PCB (608/8080)	
Herbicides (615/8150)	
Base/Neutral/Acid Compounds GC/MS (625/8270)	
Volatile Organics GC/MS (624/8240)	
Polynuclear Aromatics (610/8310)	
SDWA Primary Standards - Arizona	
SDWA Secondary Standards - Arizona	
SDWA Primary Standards - Federal	
SDWA Secondary Standards - Federal	
The 13 Priority Pollutant Metals	
RCRA Metals by Total Digestion	
RCRA Metals by TCLP (1311)	

Signature:	Time:	Signature:	Time:	Signature:	Time:
Printed Name:	Date:	Printed Name:	Date:	Printed Name:	Date:
Company:	Phone:	Company:		Company:	
RECEIVED BY:	1.	RECEIVED BY:	2.	RECEIVED BY (LAB)	3.

Signature:	Time:	Signature:	Time:	Signature:	Time:
Printed Name:	Date:	Printed Name:	Date:	Printed Name:	Date:
Company:		Company:		Company:	
0116549344					

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Analytical**Technologies**, Inc.

9830 S. 51st Street Suite B-113 Phoenix, AZ 85044 (602) 496-4400

ATI ID: 503211

April 03, 1995

Giant Refining Company
Route 3, Box 7
Gallup, NM 87301

Attention: Lynn Shelton

Project Name/No: RFI
Samples Received: March 21-24, 1995
Matrix: Soil
Mobile Lab No.: ATI ML #5

Analytical Technologies, Inc.-Field Analytical Services received and analyzed samples on the above date(s). The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data are enclosed.

Due to matrix interference, the results for 503211-33,34 were confirmed by EPA 8240. The field results have been changed to reflect the confirmation results.

If you have any questions or comments, please do not hesitate to contact us at (602)496-4400.

Mary Tyer
Project Manager

ADHS License No.: AZM463
Elizabeth Proffitt, Laboratory Manager



Analytical Technologies, Inc.
Field Analytical Services
Analytical Results

ATI ID No.: 503211
ADHS Cert. No.: AZM463

Client Name: Giant Refining Company
Project Name/No.: RFI
Samples Received: March 21-24, 1995

ATI ID/ SAMPLE NUMBER	CLIENT ID	Matrix	Units	8020/BTEX								Total Xylenes	Sur. % Rec. %
				Date Extracted	Date Analyzed	Dil.	Benzene	Toluene	Ethyl Benzene				
503211 -01	RFI0639V 1.5	Soil	Mg/Kg	03/21/95	03/21/95	1	0.50	5.5DX20	1.6	61DX20	102		
503211 -02	RFI0639V 4.0	Soil	Mg/Kg	03/21/95	03/21/95	50	34	780D	240D	1500D	**		
503211 -03	RFI0639V 4.8	Soil	Mg/Kg	03/21/95	03/21/95	10	14	430D	150D	850D	**		
503211 -04	RFI0639V 9.0	Soil	Mg/Kg	03/21/95	03/21/95	10	2.2	21	5.9	36	**		
503211 -05	RFI0639V 11.0	Soil	Mg/Kg	03/21/95	03/21/95	10	5.4	4.7	1.3	71	**		
503211 -06	RFI0639V 13.8	Soil	Mg/Kg	03/21/95	03/21/95	500	150	1400	360	2000	**		
503211 -07	RFI0639V 19.0	Soil	Mg/Kg	03/21/95	03/21/95	500	29	380	110	670	**		
503211 -08	RFI0639V 23.3	Soil	Mg/Kg	03/21/95	03/21/95	10	<0.25	15	11	69	**		
503211 -09	RFI0639V 26.2	Soil	Mg/Kg	03/21/95	03/21/95	20	<0.50	33	19	110	**		
503211 -10	RFI0639V 34.2	Soil	Mg/Kg	03/21/95	03/21/95	10	2.0	10	2.5	14	129*		
503211 -11	RFI0639V 36.8	Soil	Mg/Kg	03/21/95	03/21/95	10	2.6	7.0	1.7	9.0	124		
503211 -12	RFI0639V 42.0	Soil	Mg/Kg	03/21/95	03/21/95	1	0.19	0.78	0.19	1.1	96		
503211 -13	RFI0639V 49.5	Soil	Mg/Kg	03/21/95	03/21/95	1	0.082	0.97	0.43	2.6	110		
503211 -14	RFI0639V 54.0	Soil	Mg/Kg	03/21/95	03/21/95	1	<0.025	<0.025	<0.025	<0.025	104		
503211 -15	RFI0639V 60.0	Soil	Mg/Kg	03/21/95	03/21/95	1	<0.025	<0.025	<0.025	<0.025	105		
503211 -16	RFI0638V 20.0	Soil	Mg/Kg	03/22/95	03/22/95	1	0.42	2.0	1.1	6.0	107		
503211 -17	RFI0638V 25.0	Soil	Mg/Kg	03/22/95	03/22/95	1	<0.025	<0.025	<0.025	<0.025	100		
503211 -18	RFI0638V 30.0	Soil	Mg/Kg	03/22/95	03/22/95	1	0.23	1.5	0.51	2.7	119		
503211 -19	RFI0638V 35.0	Soil	Mg/Kg	03/22/95	03/22/95	1	0.41	0.027	<0.025	<0.025	99		
503211 -20	RFI0638V 37.0	Soil	Mg/Kg	03/22/95	03/22/95	1	<0.025	<0.025	<0.025	<0.025	94		
503211 -21	RFI0638V 40.0	Soil	Mg/Kg	03/22/95	03/22/95	1	<0.025	<0.025	<0.025	<0.025	93		
503211 -22	RFI0638V 45.0	Soil	Mg/Kg	03/22/95	03/22/95	1	<0.025	<0.025	<0.025	<0.025	99		
503211 -23	RFI0642V 20.0	Soil	Mg/Kg	03/22/95	03/22/95	1	<0.025	<0.025	<0.025	<0.025	98		
503211 -24	RFI0642V 25.0	Soil	Mg/Kg	03/22/95	03/22/95	1	<0.025	<0.025	<0.025	<0.025	98		
503211 -25	RFI0642V 27.9	Soil	Mg/Kg	03/22/95	03/22/95	1	<0.025	<0.025	<0.025	<0.025	92		
503211 -26	RFI0642V 30.0	Soil	Mg/Kg	03/22/95	03/22/95	1	0.043	0.31	0.59	26	114		
503211 -27	RFI0642V 31.7	Soil	Mg/Kg	03/22/95	03/22/95	100	190	1000D	160	1000D	**		
503211 -28	RFI0642V 35.0	Soil	Mg/Kg	03/22/95	03/22/95	1	0.058	0.43	0.088	0.58	94		
503211 -29	RFI0642V 39.0	Soil	Mg/Kg	03/23/95	03/23/95	1	<0.025	<0.025	<0.025	<0.025	92		
503211 -30	B6-2V 37.0	Soil	Mg/Kg	03/23/95	03/23/95	100	93	300	71	360	**		



Analytical Technologies, Inc.
Field Analytical Services
Analytical Results

ATI ID No.: 503211
ADHS Cert. No.: AZM463

Client Name: Giant Refining Company
Project Name/No.: RFI
Samples Received: March 21-24, 1995

ATI ID/ SAMPLE NUMBER	CLIENT ID	Matrix	Units	8020/BTEX							Sur. Rec. %
				Date Extracted	Date Analyzed	Dil.	Benzene	Toluene	Ethyl Benzene	Total Xylenes	
503211 -31	B6-2V 45.0	Soil	Mg/Kg	03/23/95	03/23/95	1	<0.025	<0.025	<0.025	<0.025	88
503211 -32	RFI0635V 15.0	Soil	Mg/Kg	03/23/95	03/23/95	1	<0.025	<0.025	<0.025	<0.025	83
503211 -33	RFI0635V 20.0	Soil	Mg/Kg	03/23/95	03/23/95	20	<0.5	0.75	8.2	19	**
503211 -34	RFI0635V 25.0	Soil	Mg/Kg	03/23/95	03/23/95	1	0.2	<0.2	0.4	<0.2	113
503211 -35	RFI0635V 30.0	Soil	Mg/Kg	03/23/95	03/23/95	1	<0.025	<0.025	<0.025	<0.025	93
503211 -36	RFI0635V 35.0	Soil	Mg/Kg	03/23/95	03/23/95	1	<0.025	<0.025	<0.025	<0.025	83
503211 -37	RFI0641V 20.0	Soil	Mg/Kg	03/24/95	03/24/95	1	<0.025	<0.025	<0.025	<0.025	86
503211 -38	RFI0641V 25.0	Soil	Mg/Kg	03/24/95	03/24/95	1	<0.025	<0.025	<0.025	<0.025	79
503211 -39	RFI0641V 30.0	Soil	Mg/Kg	03/24/95	03/24/95	1	<0.025	<0.025	<0.025	<0.025	85
503211 -40	RFI0637V 20.0	Soil	Mg/Kg	03/24/95	03/24/95	1	0.041	0.17	0.029	0.17	98
503211 -41	RFI0637V 25.0	Soil	Mg/Kg	03/24/95	03/24/95	1	<0.025	<0.025	<0.025	<0.025	98
503211 -42	RFI0637V 30.0	Soil	Mg/Kg	03/24/95	03/24/95	1	0.076	0.14	<0.025	0.057	92
503211 -43	RFI0637V 35.0	Soil	Mg/Kg	03/24/95	03/24/95	1	<0.025	<0.025	<0.025	<0.025	94
503211 -44	RFI0637V 40.0	Soil	Mg/Kg	03/24/95	03/24/95	1	<0.025	<0.025	<0.025	<0.025	96

Notes:

- D Indicates the compound was analyzed at a greater dilution.
- * Result is out of quality control limits due to matrix interference.
- ** Due to the necessary dilution of the sample, result was not attainable.

Analytical Technologies, Inc.
Field Analytical Services
Analytical Quality Control Data

Client Name: Giant Refining Company
Project Name/No.: RFI
Samples Received: March 21-24, 1995

ATI ID No.: 503211
ADHS Cert. No.: AZM463

Reagent Blank Method 8020/BTEX

Units:	Mg/Kg
Matrix:	Soil
Benzene:	<0.025
Toluene:	<0.025
Ethyl Benzene:	<0.025
Total Xylenes:	<0.025
Surrogate Recovery %:	97
Date Extracted:	03/21/95
Date Analyzed:	03/21/95
Samples Linked:	503211-(1-15)

Units:	Mg/Kg
Matrix:	Soil
Benzene:	<0.025
Toluene:	<0.025
Ethyl Benzene:	<0.025
Total Xylenes:	<0.025
Surrogate Recovery %:	106
Date Extracted:	03/22/95
Date Analyzed:	03/22/95
Samples Linked:	503211-(16-28)

Units:	Mg/Kg
Matrix:	Soil
Benzene:	<0.025
Toluene:	<0.025
Ethyl Benzene:	<0.025
Total Xylenes:	<0.025
Surrogate Recovery %:	95
Date Extracted:	03/23/95
Date Analyzed:	03/23/95
Samples Linked:	503211-(29-36)

Units:	Mg/Kg
Matrix:	Soil
Benzene:	<0.025
Toluene:	<0.025
Ethyl Benzene:	<0.025
Total Xylenes:	<0.025
Surrogate Recovery %:	92
Date Extracted:	03/24/95
Date Analyzed:	03/24/95
Samples Linked:	503211-(37-44)

Analytical Technologies, Inc.
Field Analytical Services
Analytical Quality Control Data

Client Name: Giant Refining Company
Project Name/No.: RFI
Samples Received: March 21-24, 1995

ATI ID No.: 503211
ADHS Cert. No.: AZM463

MS/MSD Method 8020/BTEX

	Benzene	Toluene	Ethyl Benzene	Total Xylenes
Units:	Mg/Kg	Mg/Kg	Mg/Kg	Mg/Kg
Matrix:	Soil	Soil	Soil	Soil
Sample Result:	<0.025	<0.025	<0.025	<0.025
Spike Amount:	0.50	0.50	0.50	1.5
Spike Result:	0.45	0.53	0.47	1.5
Percent Recovery:	90%	106%	94%	100%
Duplicate Result:	0.43	0.46	0.46	1.4
Percent Recovery:	86%	92%	92%	93%
RPD:	5%	14%	2%	7%
Date Extracted:	03/21/95			
Date Analyzed:	03/21/95			
Samples Linked:	503211-(1-15)			
Sample Spiked:	503211-14			

	Benzene	Toluene	Ethyl Benzene	Total Xylenes
Units:	Mg/Kg	Mg/Kg	Mg/Kg	Mg/Kg
Matrix:	Soil	Soil	Soil	Soil
Sample Result:	<0.025	<0.025	<0.025	<0.025
Spike Amount:	0.50	0.50	0.50	1.5
Spike Result:	0.53	0.53	0.52	1.6
Percent Recovery:	106%	106%	104%	107%
Duplicate Result:	0.53	0.53	0.52	1.6
Percent Recovery:	106%	106%	104%	107%
RPD:	0%	0%	0%	0%
Date Extracted:	03/22/95			
Date Analyzed:	03/22/95			
Samples Linked:	503211-(16-28)			
Sample Spiked:	503211-21			

	Benzene	Toluene	Ethyl Benzene	Total Xylenes
Units:	Mg/Kg	Mg/Kg	Mg/Kg	Mg/Kg
Matrix:	Soil	Soil	Soil	Soil
Sample Result:	<0.025	<0.025	<0.025	<0.025
Spike Amount:	0.50	0.50	0.50	1.5
Spike Result:	0.45	0.46	0.45	1.3
Percent Recovery:	90%	92%	90%	87%
Duplicate Result:	0.48	0.48	0.48	1.4
Percent Recovery:	96%	96%	96%	93%
RPD:	6%	4%	6%	7%
Date Extracted:	03/23/95			
Date Analyzed:	03/24/95			
Samples Linked:	503211-(29-44)			
Sample Spiked:	503211-36			

PROJECT MANAGER: LYAN SHEFFER DATE: 3/21/55 PAGE 1 OF 2

GIANT REFINING CO.
ROUTE 3, BOX 7
CALLUP, NM 87301
(505) 722-3833
(505) 722-0210

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
RFI0639V 1.5	3/20/01	1119	Sol	1
RFI0639V 4.0		1122		2
RFI0639V 4.8		1125		3
RFI0639V 9.0		1134		4
RFI0639V 11.0		1143		5
RFI0639V 13.8		1145		6
RFI0639V 19.0		1152		7
RFI0639V 23.3		1200		8
RFI0639V 26.2		1210		9
RFI0639V 34.2		1449		10
RFI0639V 36.8		1504		11
RFI0639V 42.0		1550		12

Comments:

Initials	Printed Name	Signature
BLK	Blake Kirsch	Blake Kirsch
WT	WALTER COMER	WALTER COMER

PROJECT INFORMATION		SAMPLE RECEIPT	
Mobile Lab Time:		PROJ. NO.	NO CONTAINERS
Date:	3/21/95		12
Start Time:	800		CUSTODY SEALS
Stop Time:		PROJ. NAME:	RECEIVED INTACT
Client: Higwell			RECEIVED COLD



Analytical Technologies, Inc., Phoenix, Arizona
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

MOBILE LABORATORY CHAIN OF CUSTODY

ATI LAB I.D. 505211
ATMCS

PROJECT MANAGER: Lynn Shelton

DATE: 3/21/95 PAGE 2 OF 2

COMPANY: GIANT REFINING CO.
ADDRESS: ROUTE 3, BOX 7
CALLEP, NM 87301
PHONE: (505) 722-3833
FAX: (505) 722-0210
BILL TO: SAME
COMPANY:
ADDRESS:

SAMPLE ID DATE TIME MATRIX LAB ID

RFI0639V 49.5 3/20/95 16:50 Soil 13
RFI0639V 54.0 3/21/95 13:40 14
RFI0639V 60.0 3/21/95 15:05 15

Sampled & Relinquished By

Time Relinquished

Received By Analytical Technologies, Inc.

Petroleum Hydrocarbons (418.1)

BXTE (8020)

Diesel (Mod 8015)

Aromatic Volatile Organics (602 / 8020)

Halogenated Volatile Organics (601 / 8010)

Chlorinated Pesticides Screen (8080)

Metals by XRF
List Metals:

HOLD

NUMBER OF CONTAINERS

Comments:

Initials	Printed Name	Signature
BL	Blake Kirgeuk	Blake Kirgeuk
WT	WALTER TOOMEY	Walter Toomey

Mobile Lab Time:

Date: 3/21/95

Start Time: 8:00

Stop Time

Client Signature

PROJECT INFORMATION

PROJ. NO.

NO CONTAINERS 3

CUSTODY SEALS Y (N) NA

RECEIVED INTACT Y

RECEIVED COLD Y

PROJ. NAME:

RFI



Analytical Technologies, Inc., Phoenix, Arizona
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MOBILE LABORATORY CHAIN OF CUSTODY

ATI LAB I.D. 503411

MLS

PROJECT MANAGER: Lynn Shelton DATE: 3/25/95 PAGE 1 OF 1

COMPANY: GIANT ROBINSON CO.
ADDRESS: ROUTE 3, BOX 7
GALLUP, NM 87301
PHONE: (505) 722-3833
FAX: (505) 722-0210
BILL TO: SAME
COMPANY: _____
ADDRESS: _____

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
RF10642V	3/24/95	15:00	Soil	24
RG-2V	3/25/95	10:31		30
RG-2V		11:07		31
RF10635V		15:40		32
RF10635V		15:52		33
RF10635V		16:00		34
RF10635V		16:30		35
RF10635V		16:57		36

Sampled & Relinquished By	Time Relinquished	Received By Analytical Technologies, Inc.	Petroleum Hydrocarbons (418.1)	BKTE (8020)	Diesel (Mod 8015)	Aromatic Volatile Organics (602 / 8020)	Halogenated Volatile Organics (601 / 8010)	Chlorinated Pesticides Screen (8080)	Metals by XRF	List Metals:	HOLD	NUMBER OF CONTAINERS
WST 100	15:00	15:00		X								
WST 1	15:00	15:00		X								
WST 1	15:00	15:00		X								
WST 16:40	16:40	16:40		X								
WST 1	15:52	15:52		X								
WST 16:00	16:00	16:00		X								
WST 16:30	16:30	16:30		X								
WST 16:57	16:57	16:57		X								

Comments:

Initials	Printed Name	Signature
BK	Blake Kirsche	Blake Kirsche
WT	Walter Towner	Walter Towner

Mobile Lab Time:	Project Information	Sample Receipt
Date: <u>3/25/95</u>	PROJ. NO. _____	NO CONTAINERS <u>8</u>
Start Time: _____	PROJ. NAME: <u>DELL</u>	CUSTODY SEALS <u>Y(N) NA</u>
Stop Time: _____		RECEIVED INTACT <u>Y</u>
Client Signature: _____		RECEIVED COLD <u>Y</u>



Analytical Technologies, Inc., Phoenix, Arizona
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

MOBIL LABORATORY CHAIN OF CUSTODY

ATILABID. 503211

MEMO

PROJECT MANAGER: LYNN SHELTON		DATE: 3/21/95	PAGE: 1	OF: 1					
COMPANY: GIANT REPAIRING CO.		ANALYSIS REQUEST							
ADDRESS: ROUTE 3, BOX 7		Metals by XRF							
PHONE: (505) 722-3833		Chlorinated Pesticides Screen (8080)							
FAX: (505) 722-0210		Halogenated Volatile Organics (601 / 8010)							
BILL TO: SAME		Aromatic Volatile Organics (602 / 8020)							
COMPANY:		Diesel (Mod 8015)							
ADDRESS:		BXT (8020)							
SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Received By Analytical Technologies, Inc.	Petroleum Hydrocarbons (418.1)	Time Relinquished	Sampled & Relinquished By	
RFI0641V 20.0	3/24/95	9:50	Soil	37	AK	✓	WT 10:55	WT 10:55	
RFI0641V 25.0	3/24/95	10:2	Soil	38	AK	✓	WT 11:15	WT 11:15	
RFI0641V 30.0		10:14		35	AK	✓	WT 11:15	WT 11:15	
RFI0637V 20.0		15:45		40	AK	✓	WT 11:15	WT 11:15	
RFI0637V 25.0	3/24/95	15:55	Soil	41	AK	✓	WT 11:15	WT 11:15	
RFI0637V 30.0		16:05		42	AK	✓	WT 11:15	WT 11:15	
RFI0637V 35.0		17:45		43	AK	✓	WT 11:15	WT 11:15	
RFI0637V 40.0	3/24/95	17:55	Soil	44	AK	✓	WT 11:15	WT 11:15	

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.		NO CONTAINERS	8
PROJ. NAME:		CUSTODY SEALS	Y (N) NA
		RECEIVED INTACT	Y
		RECEIVED COLD	Y

Comments:

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.



Analytical **Technologies**, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. 504303

April 5, 1995

Giant Refining Co.
Route 3, Box 7
Gallup, NM 87301

Project Name/Number: RFI/OCD SPRING 95

Attention: Walt Toomer

On 04/03/95, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **non-aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure



Analytical Technologies, Inc.

CLIENT : GIANT REFINING
PROJECT # : SPRING 95
PROJECT NAME : RFI/OCD

DATE RECEIVED : 04/03/95

REPORT DATE : 04/05/95

ATI ID: 504303

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	BG-3V44.3	NON-AQ	03/27/95
02	RFI0636V20.0	NON-AQ	03/27/95
03	RFI0636V25.0	NON-AQ	03/27/95
04	RFI0636V30.0	NON-AQ	03/27/95
05	RFI0636V35.0	NON-AQ	03/27/95
06	BG-4V36.0	NON-AQ	03/28/95
07	BG-4V45.0	NON-AQ	03/28/95
08	BG-4V47.0	NON-AQ	03/28/95
09	BG-4V48.0	NON-AQ	03/28/95
10	B2V31.4	NON-AQ	03/29/95
11	B2V34.0	NON-AQ	03/29/95
12	B2V36.0	NON-AQ	03/29/95
13	B1V46.3	NON-AQ	03/30/95
14	B1V49.7	NON-AQ	03/30/95
15	B3V23.9	NON-AQ	03/30/95
16	B3V29.8	NON-AQ	03/30/95

---TOTALS---

MATRIX
NON-AQ

#SAMPLES
16

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING ATI I.D.: 504303
PROJECT # : SPRING 95
PROJECT NAME : RFI/OCD

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	BG-3V44.3	NON-AQ	03/27/95	04/03/95	04/04/95	1
02	RFI0636V20.0	NON-AQ	03/27/95	04/03/95	04/03/95	1
03	RFI0636V25.0	NON-AQ	03/27/95	04/03/95	04/03/95	1

PARAMETER	UNITS	01	02	03
BENZENE	MG/KG	<0.025	<0.025	<0.025
TOLUENE	MG/KG	<0.025	<0.025	<0.025
ETHYLBENZENE	MG/KG	<0.025	0.15	<0.025
TOTAL XYLENES	MG/KG	<0.025	0.27	<0.025
METHYL-t-BUTYL ETHER	MG/KG	<0.12	<0.12	<0.12

SURROGATE:

BROMOFLUOROBENZENE (%)	91	74	103
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Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING ATI I.D.: 504303
PROJECT # : SPRING 95
PROJECT NAME : RFI/OCD

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	RFI0636V30.0	NON-AQ	03/27/95	04/03/95	04/03/95	1
05	RFI0636V35.0	NON-AQ	03/27/95	04/03/95	04/03/95	1
06	BG-4V36.0	NON-AQ	03/28/95	04/03/95	04/03/95	20

PARAMETER	UNITS	04	05	06
BENZENE	MG/KG	<0.025	<0.025	0.64
TOLUENE	MG/KG	<0.025	<0.025	<0.5
ETHYLBENZENE	MG/KG	<0.025	<0.025	11
TOTAL XYLENES	MG/KG	<0.025	<0.025	36
METHYL-t-BUTYL ETHER	MG/KG	<0.12	<0.12	<2.4

SURROGATE:

BROMOFLUOROBENZENE (%)	91	87	135*
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*OUTSIDE ATI QUALITY CONTROL LIMITS DUE TO MATRIX INTERFERENCE



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING ATI I.D.: 504303
PROJECT # : SPRING 95
PROJECT NAME : RFI/OCD

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
07	BG-4V45.0	NON-AQ	03/28/95	04/03/95	04/03/95	1
08	BG-4V47.0	NON-AQ	03/28/95	04/03/95	04/04/95	1
09	BG-4V48.0	NON-AQ	03/28/95	04/03/95	04/04/95	1

PARAMETER	UNITS	07	08	09
BENZENE	MG/KG	<0.025	<0.025	<0.025
TOLUENE	MG/KG	<0.025	<0.025	<0.025
ETHYLBENZENE	MG/KG	<0.025	<0.025	0.040
TOTAL XYLENES	MG/KG	<0.025	<0.025	0.066
METHYL-t-BUTYL ETHER	MG/KG	<0.12	<0.12	<0.12

SURROGATE:

BROMOFLUOROBENZENE (%)	95	96	79
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Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING ATI I.D.: 504303
PROJECT # : SPRING 95
PROJECT NAME : RFI/OCD

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
10	B2V31.4	NON-AQ	03/29/95	04/03/95	04/04/95	10
11	B2V34.0	NON-AQ	03/29/95	04/03/95	04/04/95	1
12	B2V36.0	NON-AQ	03/29/95	04/03/95	04/04/95	1

PARAMETER	UNITS	10	11	12
BENZENE	MG/KG	<0.25	<0.025	<0.025
TOLUENE	MG/KG	1.1	<0.025	<0.025
ETHYLBENZENE	MG/KG	1.7	<0.025	<0.025
TOTAL XYLENES	MG/KG	4.4	<0.025	<0.025
METHYL-t-BUTYL ETHER	MG/KG	<1.2	<0.12	<0.12

SURROGATE:

BROMOFLUOROBENZENE (%)	78	94	96
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Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING ATI I.D.: 504303
PROJECT # : SPRING 95
PROJECT NAME : RFI/OCD

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
13	B1V46.3	NON-AQ	03/30/95	04/03/95	04/04/95	1
14	B1V49.7	NON-AQ	03/30/95	04/03/95	04/03/95	1
15	B3V23.9	NON-AQ	03/30/95	04/03/95	04/04/95	1

PARAMETER	UNITS	13	14	15
BENZENE	MG/KG	<0.025	<0.025	<0.025
TOLUENE	MG/KG	<0.025	<0.025	<0.025
ETHYLBENZENE	MG/KG	<0.025	<0.025	<0.025
TOTAL XYLENES	MG/KG	<0.025	<0.025	<0.025
METHYL-t-BUTYL ETHER	MG/KG	<0.12	<0.12	<0.12

SURROGATE:

BROMOFLUOROBENZENE (%)	92	95	87
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Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING ATI I.D.: 504303
PROJECT # : SPRING 95
PROJECT NAME : RFI/OCD

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
16	B3V29.8	NON-AQ	03/30/95	04/03/95	04/04/95	1
PARAMETER			UNITS		16	
BENZENE			MG/KG		<0.025	
TOLUENE			MG/KG		<0.025	
ETHYLBENZENE			MG/KG		<0.025	
TOTAL XYLENES			MG/KG		<0.025	
METHYL-t-BUTYL ETHER			MG/KG		<0.12	

SURROGATE:

BROMOFLUOROBENZENE (%) 96

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	: BTEX, MTBE (EPA 8020)	ATI I.D.	: 504303
BLANK I.D.	: 040395	MATRIX	: NON-AQ
CLIENT	: GIANT REFINING	DATE EXTRACTED	: 04/03/95
PROJECT #	: SPRING 95	DATE ANALYZED	: 04/03/95
PROJECT NAME	: RFI/OCD	DILUTION FACTOR	: 1

PARAMETER	UNITS	
BENZENE	MG/KG	<0.025
TOLUENE	MG/KG	<0.025
ETHYLBENZENE	MG/KG	<0.025
TOTAL XYLENES	MG/KG	<0.025
METHYL-t-BUTYL ETHER	MG/KG	<0.12

SURROGATE:

BROMOFLUOROBENZENE (%)	101
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Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEX, MTBE (EPA 8020)
MSMSD # : 50430314 ATI I.D. : 504303
CLIENT : GIANT REFINING DATE EXTRACTED : 04/03/95
PROJECT # : SPRING 95 DATE ANALYZED : 04/03/95
PROJECT NAME : RFI/OCD SAMPLE MATRIX : NON-AQ
REF. I.D. : 50430314 UNITS : MG/KG

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.025	1.0	0.94	94	1.0	100	6
TOLUENE	<0.025	1.0	0.94	94	1.0	100	6
ETHYLBENZENE	<0.025	1.0	0.97	97	1.1	110	13
TOTAL XYLENES	<0.025	3.0	2.9	97	3.2	107	10
METHYL-t-BUTYL ETHER	<0.12	2.0	2.0	100	2.2	110	10

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

PROJECT MANAGER:

COMPANY: GIANT REFINING CO.
ADDRESS: ROUTE 3, BOX 7
SALE WP, NM 87301
PHONE: (505) 722-3833
FAX: (505) 722-0210
BILL TO: WALTER D. TOOMER
COMPANY: SAME
ADDRESS: SAME

SAMPLEID	DATE	TIME	MATRIX	LABID
1	11/11/2011	11:00	1	1
2	11/11/2011	11:00	1	1
3	11/11/2011	11:00	1	1
4	11/11/2011	11:00	1	1
5	11/11/2011	11:00	1	1
6	11/11/2011	11:00	1	1
7	11/11/2011	11:00	1	1
8	11/11/2011	11:00	1	1
9	11/11/2011	11:00	1	1
10	11/11/2011	11:00	1	1
11	11/11/2011	11:00	1	1
12	11/11/2011	11:00	1	1
13	11/11/2011	11:00	1	1
14	11/11/2011	11:00	1	1
15	11/11/2011	11:00	1	1
16	11/11/2011	11:00	1	1
17	11/11/2011	11:00	1	1
18	11/11/2011	11:00	1	1
19	11/11/2011	11:00	1	1
20	11/11/2011	11:00	1	1
21	11/11/2011	11:00	1	1
22	11/11/2011	11:00	1	1
23	11/11/2011	11:00	1	1
24	11/11/2011	11:00	1	1
25	11/11/2011	11:00	1	1
26	11/11/2011	11:00	1	1
27	11/11/2011	11:00	1	1
28	11/11/2011	11:00	1	1
29	11/11/2011	11:00	1	1
30	11/11/2011	11:00	1	1
31	11/11/2011	11:00	1	1
32	11/11/2011	11:00	1	1
33	11/11/2011	11:00	1	1
34	11/11/2011	11:00	1	1
35	11/11/2011	11:00	1	1
36	11/11/2011	11:00	1	1
37	11/11/2011	11:00	1	1
38	11/11/2011	11:00	1	1
39	11/11/2011	11:00	1	1
40	11/11/2011	11:00	1	1
41	11/11/2011	11:00	1	1
42	11/11/2011	11:00	1	1
43	11/11/2011	11:00	1	1
44	11/11/2011	11:00	1	1
45	11/11/2011	11:00	1	1
46	11/11/2011	11:00	1	1
47	11/11/2011	11:00	1	1
48	11/11/2011	11:00	1	1
49	11/11/2011	11:00	1	1
50	11/11/2011	11:00	1	1
51	11/11/2011	11:00	1	1
52	11/11/2011	11:00	1	1
53	11/11/2011	11:00	1	1
54	11/11/2011	11:00	1	1
55	11/11/2011	11:00	1	1
56	11/11/2011	11:00	1	1
57	11/11/2011	11:00	1	1
58	11/11/2011	11:00	1	1
59	11/11/2011	11:00	1	1
60	11/11/2011	11:00	1	1
61	11/11/2011	11:00	1	1
62	11/11/2011	11:00	1	1
63	11/11/2011	11:00	1	1
64	11/11/2011	11:00	1	1
65	11/11/2011	11:00	1	1
66	11/11/2011	11:00	1	1
67	11/11/2011	11:00	1	1
68	11/11/2011	11:00	1	1
69	11/11/2011	11:00	1	1
70	11/11/2011	11:00	1	1
71	11/11/2011	11:00	1	1
72	11/11/2011	11:00	1	1
73				

RG-3V44.3	3/27/75 1530	SOIL	01
RF00636V20.0	3/27/75 1020	SOIL	02
RF00636V25.0	3/27/75 1030	SOIL	03
RF00636V30.0	3/27/75 1045	SOIL	04
RF00636V35.0	3/27/75 1100	SOIL	05
RG-4V36.0	3/28/75 1040	SOIL	06
RG-4V45.0	3/28/75 1050	SOIL	07
RG-4V47.0	3/28/75 1105	SOIL	08
RG-4V48.0	3/28/75 1115	SOIL	09

PROJECT INFORMATION

PROJ. NO.: SPRING 95	NO. CONTAINERS	9
PROJ. NAME: RFE / OCD	CUSTODY SEALS	Y/N / NA
P.O. NO.: RFE-97-9023-05	RECEIVED INTACT	Y
SHIPPED VIA: RFD EX	RECEIVED COLD	

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

	(RUSH)	124hr	148hr	172hr	11 WEEK	(NORMAL)	2 WEEK
Comments:							

N. T. C.

ANALYSIS REQUEST

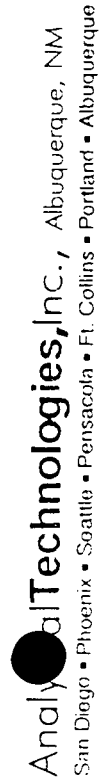
[illegible]

SAMPLED & RELINQUISHED BY: 1. RELINQUISHED BY:

Signature: <u>William J. Jones</u>	Time: <u>3:31 PM</u>	Signature:	Time:
Printed Name: <u>WILLIAM J. JONES</u>	Date: <u>11-00</u>	Printed Name:	Date:
Company: <u>WILLIAM J. JONES</u>	Phone: <u>11-00</u>	Company:	

RECEIVED BY: 1 RECEIVED BY:

	RECEIVED BY	DATE	SIGNATURE	TIME	RECEIVED BY	DATE	SIGNATURE	TIME
Signature:		Time:	Signature:	Time:	Signature:	Time:	Signature:	Time:
Printed Name:		Date:	Printed Name:	Date:	Printed Name:	Date:	Printed Name:	Date:
Company:			Company:		Company:		Analytical Technologies, Inc.	



ATILABI.D:

DATE: 3/30/95 PAGE 2 OF 2

PROJECT MANAGER:

COMPANY: GIANT PEEININGS CO.
ADDRESS: ROUTE 3, BOX 7
GALLUP, NM 87301
PHONE: (505) 722-3833
FAX: (505) 722-0210

BILL TO: WALTER D. TOOMER
COMPANY: SAME
ADDRESS: SAME

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
B2V 31.4	3/29/75	1110	SOIL	10
B2V 34.0	3/29/75	1119	SOIL	11
B2V 36.0	3/29/75	1125	SOIL	12
B1V 46.3	3/30/75	1055	SOIL	13
B1V 49.7	3/30/75	1105	SOIL	14
B3V 23.9	3/30/75	1605	SOIL	15
B3V 29.8	3/30/75	1615	SOIL	16

PROJECT INFORMATION

PROJ. NO.: SPRING 95	NO. CONTAINERS	7
PROJ. NAME: RFE/OCD	CUSTODY SEALS	(YIN / NA)
P.O. NO.: RFE-97-7023-05	RECEIVED INTACT	
SHIPPED VIA: RFD EX	RECEIVED COLD	

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK ☒ 2 WEEK (NORMAL)

[illegible]

ANALYSIS REQUEST

[illegible]

SAMPLED & RELINQUISHED BY: 1.

Signature: <i>William D. Jones</i>	Time: 2/31/95	Signature:	Time:
Printed Name: WALTER TOMMER	Date: 11/00	Printed Name:	Date:
Company: GIANT 6505722-0212	Phone:	Company:	
RECEIVED BY: 1.		RECEIVED BY: (LAB) 2.	
Signature:	Time:	Signature: <i>D. J. Jones</i>	Time: 1213
Printed Name:	Date:	Printed Name: <i>Donnell</i>	Date: 4/3/95
Company:		Company: Analytical Technologies, Inc.	

[illegible]

DISTRIBUTION: White, Canary - A11 • Pink - ORIGINATOR

PRECISION ENGINEERING, INC.

PROJECT: GIANT RFI
TANK FARM #569

LOG OF TEST BORINGS

FILE #: 94-158
ELEVATION:
TOTAL DEPTH:
LOGGED BY: WHK
DATE: 10-28-94
STATIC WATER: 34'
BORING ID: RFI 0639
PAGE: 1 of 3

DEPTH	P	L	O	T	S	A	M	P	L	Z	E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (PC#)
0-25												drill in auger plug, refer to previous drill log, this location	
25-25.5	*****				25		C					Sand, fine, wet, dense, hydrocarbon odor	
25.5-25.8	*****						C					Sandstone, rock, dense, white, medium not bedrock, moist, odor	
25.8-27.3	*****				26		C					Sand, clayey, dense, wet, red brown	
	*****						C						
27.3-28.2	000000000				27		C					Gravel, dense, mainly broken sandstone, multicolored, moist	
	000000000						C						
28.2-29.2					28							sample refusal, pulled sampler, drilled 1', replaced sampler - sandstone?	
29.2-29.6	*****				29		C					Sandstone, light yellow, medium, weathered(as a rock) not bedrock, moist, odor	
29.6-29.8	*****						C					Sand, brown red, loose, moist, gravelly,	
29.8-30.1	*****				30		C					Sandstone, light yellow, medium, weathered, moist	
30.1-33.5	000000000						C					Gravel, coarse sandy, dense, moist, grey brown, fatted hydrocarbon odor	
	000000000						C						
	000000000						C						
	000000000						C						
	000000000						C						
	000000000				33		C						
33.5-34.7	////////						C					Clay, hard, wet, brown, <sharp contact with above>, weak odor	
	////////				34		C						
34.7-35.4	//////00						C					Clay, slightly gravelly(1/2"), wet, hard, brown, weak odor	
	//////00				35		C						
35.4-39.2	000***000						C					Gravel, sand and cobbles of sandstone, wet, hydrocarbon odor	
	000***000						C						
	000***000						C						
	000***000						C						
	000***000						C						
	000***000						C						
	000***000						C						
39.2-41.9	---///---				39		C					Shale, interbedded red brown and light green, very clayey, hard, moist, weak odor	
	---///---						C						
	---///---						C						
	---///---						C						
	---///---						C						
	---///---						C						
41.9-43.6	---*---				42		C					Shale, fissile, some sandy, water bearing through fissures, hard, red brown	
	---*---						C					very weak odor	
	---*---				43		C						
43.6-45.2	---///---						C					Shale, blocky, fine, wet, not water bearing, hard, clayey, red brown	
	---///---						C						
	---///---						C						
45.2-46.2					45							too hard to push continuous sampler, no recovery, pulled, drilled, replaced sampler to 46.2	
46.2-47.1					46		C					Shale, blocky, hard, moist, red brown, green bands at 3" intervals each	
							C						

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" HSA

PRECISION ENGINEERING, INC.

FILE #: 94-158

PROJECT: GIANT RPI
TANK FARM #569

LOG OF TEST BORINGS

ELEVATION:

TOTAL DEPTH:

LOGGED BY: WEK

DATE: 10-28-94

STATIC WATER: 34'

BORING ID: RPI 0639(A)

PAGE: 2 of 3

DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (PPM)
47.1-47.3	-----	47	C	Shale, sandy, blocky, water bearing	
47.3-47.8	-----		C	Shale, blocky, hard, moist, red brown, green banding at 3" intervals each	
47.8-48.9	-----	48	C	Shale, green, hard, moist, slightly sandy, no odor	
	-----		C		
48.9-55.3	---///---	49	C	Shale, clayey, very fine blocky, hard, moist brown fissile, slightly drier >50	
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---	55	C		
TD				Grouted boring with 15% Bentonite-Cement	

PROJECT: GIANT RFI
TANK FARM #570

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 94-158
ELEVATION:
TOTAL DEPTH:
LOGGED BY: WHK
DATE: 10-27-94
STATIC WATER:
BORING ID: RFI 0640
PAGE: 3 OF 3

DEPTH	P	L	O	T	S	A	M	P	L	E	S	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (P=)
0-25												drill with auger plug, refer to previous drill log, this location	
25.0-27.8	////////	25	C									Clay, wet, stiff, brown	
	////////		C										
	////////		C										
	////////		C										
	////////		C										
27.8-28.2	///***//		C									Clay, sandy, wet, firm, brown, hydrocarbon odor	
28.2-28.9	*****	28	C									Sand, medium, laminar bedded, light multicolored, dense, moist	
	*****		C										
28.9-30.1	////////	29	C									Clay, stiff, brown, wet, hydrocarbon odor	
	////////		C										
30.1-32.6	***//***	30	C									Sand, very clayey, water bearing, loose, light brown laminar, no odor	
	//		C										
	//		C										
	//		C										
	//	32	C										
32.6-33.8	///***//		C									Clay, sandy, firm, wet, brown	
	///***//		C										
	///***//		C										
33.8-34.7	////////	34	C									Clay, stiff, brown, wet	
34.7-35.3	000//**00		C									Gravel, fine, clayey, sandy, dark brown, dense, wet	
	000//**00	35	C										
35.3-40.1	///00+///		C									Clay, stiff wet, occasional fine gravel, dark brown, weak carbonate nodules	
	///00+///		C										
	///00+///		C										
	///00+///		C										
	///00+///		C										
	///00+///		C										
	///00+///		C										
	///00+///		C										
	///00+///	40	C										
TD												Backfilled with Bentonite-Cement grout	

SIZE AND TYPE OF BORING: 4 1/4" HSA

LOGGED BY: WHK

PRECISION ENGINEERING, INC.

PROJECT: RFI

LOCATION: East Side of Tank

LOG OF TEST BORINGS

FILE #: 95-018
 ELEVATION: 6956.0
 TOTAL DEPTH: 35.0
 LOGGED BY: WHK
 DATE: 3-23-95
 STATIC WATER: 15.0
 BORING ID: 0635
 PAGE: 1

DEPTH	T	E	E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-0.2	xxxxxxx		C	Asphalt	
0.2-2.7	///---///	1.0	C	Clay, red brown, soft, silty, wet, (fill)	
	///---///		C		
	///---///		C		
2.7-7.1	///---///		C	Clay, silty, slightly sandy, red brown, firm, wet, carbonate filaments (not fill)	0.0
	///---///	3.0	C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///	5.0	C		
	///---///		C		
	///---///		C		
	///---///		C		
7.1-8.0	///---///	7.0	C	Clay, sandy, red brown, silty, wet, carbonate filaments, dark brown	0.2
	///---///		C		
8.0-9.8	*****	8.0	C	Sand, fine, moist, moderately dense, light brown, no odor	0.2
	*****		C		
	*****		C		
9.8-10.0	***000***		C	Sand, gravelly, moist, dense, light brown, some clay infilling	
10.0-10.6	///000///	10	C	Clay, gravelly, wet, hard, red brown, no odor	
10.6-11.3	///---///		C	Clay, silty, sandy, soft, red brown, wet, no odor	
	///---///	11	C		
11.3-11.7	///---///		C	as above but with hydrocarbon odor and black	2.2
11.7-14.2	***---***	12	C	Sand, medium, silty, moist, dense, red brown, no odor	0.2
	---		C		
	---		C		
	---		C		
	---	14	C		
14.2-15.8	***000***		C	Sand, very gravelly to 2", subrounded, sandstone and lime rock, some clay	0.2
	000	15	C	infilling, no odor, dense, multicolored, light brown	
15.8-17.8	000**//00		C	Gravel, sandy, clayey, dense, brown, no odor, water bearing	15.2
	000**//00	16	C		
	000**//00		C		
	000**//00		C		
17.8-19.0	*****		C	Sand, coarse, red brown, wet, strong hydrocarbon odor, dense	3.2
	*****	18	C		
	*****		C		
19.0-22.6	*****	19	C	Sand, fine to medium, dense, red brown, water saturated, hydrocarbon	2.2
	*****		C	odor	
	*****		C		
	*****		C		
	*****		C		
	*****	22	C		
22.6-23.3	***//00**		C	Sand, clayey, water bearing, red brown, scattered gravel, odor	2.2
	***//00**	23	C		

SIZE AND TYPE OF BORING: 4'-1/4" HSA

LOGGED BY: WHK

PRECISION ENGINEERING, INC.

PROJECT: RFI

LOCATION: East Side of Tank

451

LOG OF TEST BORINGS

FILE #: 95-018

ELEVATION: 6956.0

TOTAL DEPTH: 35.0

LOGGED BY: WHK

DATE: 3-23-95

STATIC WATER: 15.0

BORING ID: 0635

PAGE: 2

DEPTH	T	E	E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (ppm)
23.3-25.0	***000***		C	<u>Sand</u> , coarse, gravelly, loose, <u>water bearing</u> , black to dark grey	180
	000	24	C		
	000		C		
	000	25	C		200
	000		C		
	000		C		
	000		C		
	000		C		
	000		C		
	000	28	C		
28.4-30.0	-----		C	<u>CHINLE FORMATION</u>	
	-----		C	<u>Shale</u> , green, sandy, hard, moist, no odor	0.0
	-----		C		
30.0-33.4	-----	30	C	<u>Shale</u> , red brown, green interbedded, sandy partings, slightly blocky	
	-----		C	somewhat sandy, laminar bedding, moist	
	-----		C		
	-----		C		
	-----		C		
	-----	33	C		
33.4-34.2	000**0000		C	<u>Conglomerate</u> , hard, weakly cemented, few pebbles and very coarse sand, moist	
	000**0000	34	C	to wet, multicolored	
34.2-35.0	-----		C	<u>Shale</u> , red brown, hard, moist	0.5
	-----	35	C		
TD				end 4:45p pull auger, depth of water 15.0 @ 5:30p backfill with bentonite slurry from bottom of boring	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: RFI

LOCATION: N. Manway, Tank 453

LOG OF TEST BORINGS

FILE #: 95-018

ELEVATION: 6951.5

TOTAL DEPTH: 35.0

LOGGED BY: WHK

DATE: 3-27-95

STATIC WATER:

BORING ID: 0636

PAGE: 1

DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (ppm)
0.0-2.6	///0/////		C	Clay, slightly gravelly to 1.5", stiff, red brown, wet, some odor @ 2.1'	
	///0/////		C		
	///0/////		C		
	///0/////	2.0	C		
2.6-3.1	///****/		C	Clay, sandy, firm, wet, red brown	280
	///****/	3.0	C		
3.1-3.9	*****		C	Sand, fine, red brown, loose, moist, odor	300
3.9-4.1	///****/	4.0	C	Clay, sandy, red brown, moist to wet	
4.1-5.5	***000***		C	Sand, medium to coarse, gravelly to cobbly, some grey staining, odor, overall	280
	000	5.0	C	red brown, moist	
5.5-7.0	***-----		C	Sand, fine, red brown, silty, moist, loose	180
	***-----		C		
	***-----		C		
7.0-8.0	///---///	7.0	C	Clay, silty, wet, soft, brown, slightly black staining, odor	180
	///---///		C		
8.0-8.8	///---///	8.0	C	Clay, silty, brown, wet, firm	150
8.8-9.1	***000***		C	Sand, gravelly, red brown, odor, loose, moist	110
9.1-10.7	///000000	9.0	C	Clay, slightly gravelly, firm, brown, odor, wet	120
	///000000		C		
	///000000	10	C		
10.7-15.0	**000000**		C	Sand, very gravelly, dense, grey to brown, rounded to subrounded, some rock to	320
	000000	11	C	2.5", odor	
	000000		C		
	000000		C		
	000000		C		
	000000		C		
	000000		C		
	000000		C		
	000000		C		
	000000	15	C	(sandstone rock @ 15.0'-pulled sampler, drilled 8", replaced sampler and continued)	
	000000		C		
	000000		C		
	000000		C		
	000000		C		
	000000		C		
	000000		C		
	000000		C		
	000000		C		
19.0-19.5	**000000**	19	C	As above but black, water bearing, odor	150
19.5-22.9	////-////		C	Clay, slightly silty, some laminations, soft, wet, sticky, weak odor, red brown	70
	////-////		C		
	////-////		C		
	////-////		C		
	////-////		C		
	////-////	22	C		
	////-////		C		
22.9-23.6	000///000	23	C	Gravel, clayey, water bearing, brown, dense, slight odor	200

LOGGED BY: WZJ

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: RPI

LOCATION: N. Manway, Tank 453

LOG OF TEST BORINGS

FILE #: 95-018

ELEVATION: 6951.5

TOTAL DEPTH: 35.0

LOGGED BY: WHK

DATE: 3-27-95

STATIC WATER:

BORING ID: 0636

PAGE: 2

DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (ppm)
23.6-24.8	-----		C	<u>CHINLE FORMATION</u>	
	-----	24	C	Shale, sandy, wet, grey green, slight odor, hard	30
24.8-25.0	-----		C	Shale, red brown, hard, moist, no odor, some green laminations	2.0
25.0-29.3	-----	25	C	Shale, sandy, fissle, green grey, no odor, moist, hard	2.0
	-----		C		
	-----		C		
	-----		C		
	-----		C		
	-----		C		
	-----	28	C		
	-----		C		
	-----	29	C		
29.3-30.0	-----		C	Shale, fine blocky, green grey, no odor, damp, hard	1.0
30.0-35.0	-----	30	C	Shale, blocky, red brown, moist, hard, slightly fissle	1.0
	-----		C		
	-----		C		
	-----		C		
	-----		C		
	-----		C		
	-----		C		
	-----		C		
	-----	35	C		
TD				pull auger 11:00a backfill with montmorillonite clay and hydrate (13 50# bags)	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: RFI

LOCATION: N. Manway, Tank 567

LOG OF TEST BORINGS

FILE #: 95-018
 ELEVATION: 6945.6
 TOTAL DEPTH: 40.0
 LOGGED BY: WHK
 DATE: 3-22-95
 STATIC WATER:
 BORING ID: 0637
 PAGE: 1

DEPTH	P L O T	S A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (pcu)
0.0-4.6	////**//		C	<u>Clay</u> , sandy, coarse, gravelly, wet, soft, brown, no odor	0.0
	////**//	1.0	C		
	////**//		C		
	////**//		C		
	////**//		C		
	////**//		C		
	////**//		C		
	////**//	4.0	C		
4.6-6.9	*****		C	<u>Sand</u> , red brown, coarse, loose, wet, rounded pebbles	0.0
	*****	5.0	C		
	*****		C		
	*****		C		
	*****		C		
6.9-8.7	///-----	7.0	C	<u>Clay</u> , silty, very fine sandy, brown, soft, wet, hydrocarbon odor (old)	4.0
	///-----		C	odor only below 7.5'	
	///-----		C		
8.7-9.3	////**//		C	<u>Clay</u> , sandy, brown, soft, wet, odor	2.0
	////**//	9.0	C		
9.3-12.0	*****		C	<u>Sand</u> , fine, light grey, loose, moist, odor (old)	5.0
	*****		C		
	*****		C		
	*****		C		
	*****		C		
12.0-13.3	**0000**	12	C	<u>Sand</u> , very gravelly, moist, brown, some cobbles, dense, odor	10.0
	0000		C		
	0000	13	C		
13.3-16.7	*****		C	<u>Sand</u> , coarse, red brown, dense, moist, odor, some pebbles	10.0
	*****		C		
	*****		C		
	*****		C		
	*****		C		
	*****	16	C		
16.7-17.2	////**//		C	<u>Clay</u> , sandy, very wet, soft, brown-grey, odor, saturated (not water bearing)	50
	////**//	17	C		
17.2-19.1	****00**		C	<u>Sand</u> , fine to coarse, some pebbles, odor, <u>saturated water bearing</u>	250
	****00**		C		
	****00**		C		
19.1-20.5	-----	19	C	<u>CHINLE FORMATION</u>	
	-----		C	<u>Shale</u> , green to red brown, laminar bedding, blocky structure, hard, moist	50
	-----	20	C		
20.5-25.0	-----		C	<u>Shale</u> , green, fissile to blocky, moist to wet, hard	100
	-----		C		
	-----		C		
	-----		C		
	-----		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: RPI

LOCATION: N. Manway, Tank 567

LOG OF TEST BORINGS

FILE #: 95-018
 ELEVATION: 6945.6
 TOTAL DEPTH: 40.0
 LOGGED BY: WHK
 DATE: 3-24-95
 STATIC WATER:
 BORING ID: 0637
 PAGE: 2

DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
			C	continued from page 1	
		24	C		
25.0-30.0		25	C	<u>Shale</u> , green, some slightly grey banding, fissured, fissle, moist to wet, hard	2.0
			C		
			C	stop drilling 4:00p--wait for analysis	
			C	additional sample required @ 5:20p	
			C		
			C		
			C		
			C		
			C		
		30	C		
			C		
			C		
			C		
			C		
			C		
			C		
34.1-37.5		34	C	<u>Shale</u> , sandy, green, hard, moist, blocky, slightly laminar	0.0
			C		
			C		
			C		
			C		
			C		
		37	C		
37.5-40.0	+++++		C	<u>Sandstone</u> , green/yellow specs as limonite, jointed, weak carbonate cementation	0.0
	+++++		C	some carbonate infilling in joints, moist, hard	
	+++++		C		
	+++++		C		
	+++++		C		
	+++++	40	C		
TD				drilling stopped @ 5:50p backfilled with bentonite @ 6:35p	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569

LOCATION: Adjacent to South

Manway, Tank 569

LOG OF TEST BORINGS

FILE #: 95-018
 ELEVATION: 6947.1
 TOTAL DEPTH: 45.0
 LOGGED BY: WHK
 DATE: 3-22-95
 STATIC WATER: None
 BORING ID: 0638
 PAGE: 1

DEPTH	T	E	E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (ppm)
0.0-3.4	///---///		C	time in 10:00a--PID calibrated 0.54 hexane	
	///---///		C	Clay, silty, some gravel in upper 6", wet, soft	0 @ 1.8'
	///---///		C		
	///---///	2.0	C		0.3 @ 2.3'
	///---///		C		540 @ 2.8'
	///---///	3.0	C		
3.4-4.0	///---///		C	Clay, sandy, some odor, red brown, wet, soft	
4.0-5.6	****//	4.0	C	Sand, clayey, some odor, red brown, wet to moist, loose	1000 @ 4.2'
	****//		C		
	****//	5.0	C		
5.6-11.3	///---///		C	Clay, silty, sandy, blocky, red brown, firm, wet	
	///---///	6.0	C		>1438 @ 6.5'
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///	9.0	C		
	///---///		C		>1438 @ 9.5'
	///---///	10	C		
	///---///		C		
	///---///	11	C		
11.3-11.9	////////		C	Clay, firm, red brown, wet	
11.9-12.1	*****	12	C	Sand, wet, loose, red brown, weak hydrocarbon odor	
12.1-12.4	////////		C	Clay, firm, red brown, wet, odor	
12.4-13.3	///---///	13	C	Clay, silty, slightly sandy, soft, red brown, odor, wet	300 @ 13.3'
13.3-13.9	///---///		C	Clay, sandy, silty, soft, red brown, odor	
13.9-14.8	///+//	14	C	Clay, firm, some carbonate streaks, brown, wet	
14.8-15.0	*****		C	Sand, loose, silty, red brown	
15.0-15.9	///---///	15	C	Clay, sandy, red brown, soft, wet, odor	
	///---///		C		
15.9-17.7	*****	16	C	Sand, silty, moist, light brown, loose, strong hydrocarbon odor	
	*****		C		
	*****	17	C		>1438 @ 17.5'
17.7-18.8	///---///		C	Clay, silty, wet, light brown, soft, sand lens 1"	
	///---///	18	C		
18.8-21.3	****//		C	Sand, clayey, moist, hydrocarbon odor, dense, brown, jar sample @ 20.0'	
	****//	19	C		
	****//		C		
	****//	20	C		650 @ 20'
	****//		C		
	****//	21	C		
21.3-23.7	///---///		C	Clay, sandy, wet, hydrocarbon odor, soft, brown to red brown	
	///---///		C		
	///---///		C		
	///---///	23	C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

FILE #: 95-018
 ELEVATION: 6947.1
 TOTAL DEPTH: 45.0
 LOGGED BY: WHK
 DATE: 3-22-95
 STATIC WATER: None
 BORING ID: 0638
 PAGE: 2

PROJECT: TANK 569
 LOCATION: Adjacent to South
 Manway, Tank 569

LOG OF TEST BORINGS

DEPTH	T	E	E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
23.7-24.8	****//****		C	Sand, slightly clayey in laminations, wet to moist, loose to moderately dense	
	****//****	24	C	slight odor (sweet)	
24.8-25.0	*****		C	Sand, (sandstone rock @ 24.8'), moderately dense, light brown, moist	60 @ 25.0'
25.0-28.3	*****	25	C	Sand, slightly gravelly below 27.5', moderately dense, moist, slightly sweet	
	*****		C	hydrocarbon odor	
	*****		C		
	*****		C		
	*****		C		
	****00****		C		
	****00****	28	C		580 @ 28.0'
28.3-30.0	00000/000		C	Gravel, some minor clay, sandstone gravel and cobble material, moist, dense	
	00000/000		C	mottled red brown, strong odor	
	00000/000		C		
30.0-30.5	00000/000	30	C	as above but saturated with fresh gasoline odor	960 @ 32.0'
30.5-32.7	///****///		C	Clay, sandy, firm, brown, wet, hydrocarbon odor	1200 @ 30.3'
	///****///	31	C		
	///****///		C		
	///****///	32	C		
32.7-36.1	///----*///		C	Clay, silty, some sandy zones as infilling in joints or cracks, wet, firm to	
	///----*///	33	C	very firm, few pebbles; 33.3'-33.6', breaks into blocky fragments @ silt seams	
	///----*///		C	at random angles, weak hydrocarbon odor	
	///----*///		C		
	///----*///		C		
	///----*///	35	C		32 @ 35.0'
	///----*///		C		
36.1-37.5	***000***	36	C	Sand, very gravelly, gravel to 1.5", subrounded, sandstone pieces as fragments	
	000		C	black staining to 37.0', moist	
	000	37	C		
37.5-40.0	//////////		C	Top of CHINLE FORMATION	
	//////////	38	C	Clay, mottled green blotches, shaley, (weathered in-situ?), moist to wet, hard	
	//////////		C		
	//////////		C		
	//////////		C		
40.3	---+-----	40	C	Grades to	70 @ 42.0'
	---+-----		C	Shale, carbonate nodules, hard, red brown, moist to wet	
	---+-----		C		
	---+-----		C		
	---+-----	42	C	more carbonate @ 42.3'-42.6'	
	---+-----		C		
	---+-----	43	C		
43.5-44.5	-----		C	Shale, sandy, laminated, moist, green grey, hard, fissle	
	-----	44	C		
44.5-45.0	-----		C	Shale, fissle, dry to moist, brown, hard, light green grey last 1.5"	
	-----	45	C		15 @ 45.0'
TD				boring abandoned and backfilled with highyield montmorillonite clay (bentonite) at 1:35p	

LOGGED BY: WEL

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6948.2
TOTAL DEPTH: 60.0
LOGGED BY: WHK
DATE: 3-20-95
STATIC WATER: 44.3
BORING ID: 0639
PAGE: 1

DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (PDM)
0.0-2.0	///00*00//		C	Clay, gravelly, sandy, wet, soft, red brown	
	///00*00//		C		
	///00*00//		C		
2.0-3.8	///--0--//	2.0	C	Clay, silty, soft carbonate nodules give blotchy appearance	
	///--0--//		C		
	///--0--//		C		
3.8-4.3	///***///		C	Clay, sandy, hydrocarbon odor, moist to wet, soft, red brown	>1438
	///***///	4.0	C		
4.3-4.8	///-***//		C	Clay, silty, sandy, hydrocarbon odor, wet, red brown, 1" roots	570 @ 4'
4.8-5.8	****-****	5.0	C	Sand, fine, silty, red brown, loose, moist, roots	480 @ 4.8'
	****-****		C		
5.8-7.0	///---///	6.0	C	Clay, silty, red brown, firm, root matter (1") and filaments, wet	
	///---///		C		
7.0-10.7	///**---//	7.0	C	Clay, sandy to silty, hydrocarbon odor, wet, soft, red brown	
	///**---//		C		204 @ 7.5'
	///**---//		C		
	///**---//		C		
	///**---//		C		
	///**---//		C		
	///**---//	10	C		330 @ 10'
10.7-12.6	///--////		C	Clay, slightly silty, wet, red brown, firm, slight odor, 1" root at 12.6'	142 @ 11'
	///--////	11	C		
	///--////		C		
	///--////	12	C		
12.6-15.5	///****//		C	Clay, sandy to very sandy, very slightly bedded, red brown, strong odor	1220 @ 13'
	///****//		C		
	///****//		C		>1438 @ 14'
	///****//		C		
	///****//		C		
	///****//	15	C		
15.5-21.9	****//***		C	Sand, clayey, slightly laminated, brown to red brown, firm to moderately dense, moist, strong odor	>1438 @ 17.4'
	****//***		C		>1438 @ 20'
	****//***		C		
	****//***		C		
	****//***		C		
	****//***		C		
	****//***		C		
	****//***		C		
	****//***	20	C		
	****//***		C		
	****//***		C		
	****//***		C		
21.9-22.8	*****	22	C	Sand, fine, loose, brown, moist-odor	>1438
	*****		C		
22.8-25.0	***000***		C	Sand, gravelly, light brown, sandstone gravel, dense, slightly laminar structure	>1438 @ 23'

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6948.2
TOTAL DEPTH: 60.0
LOGGED BY: WHK
DATE: 3-20-95
STATIC WATER: 44.3
BORING ID: 0639
PAGE: 2

DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
	00*		C	continued from page 1	
	00*	24	C		
	00*		C		
25.0-27.4	**00000**	25	C	Sandstone cobble material, sandy, sandstone is white with psolomoline staining	>1438 @ 26.2
	00000		C	dense, strong hydrocarbon odor, free moisture condenses on sampler since 16'	
	00000		C		
	00000		C		
	00000	27	C		
27.4-28.0	*****		C	Sandstone, hard, no sample taken-refusal to push, (large rock)	
28.0-30.0	***000***	28	C	Sand, gravelly, cobbly, sandstone cobbles are white and hard, conglomeratic @	>1438 @ 28.5
	000		C	29.7'	
	000		C	driller note -- 32' drills very soft, 30'-35' pull sampler, PID readings from bore	
	000		C	vapor range from 600-700 PID	>1438 @ 30'
30.0-30.8	*0*0*0*0*	30	C	Conglomerate, fine to 1/4", hard	
	*0*0*0*0*		C		
30.8-32.8	///+///	31	C	Clay, sandy, red brown, soft, hydrocarbon odor, wet (not water bearing)	
	///+///		C		
	///+///	32	C		
32.8-33.3	***///***		C	Sand, clayey, red brown, soft, wet, hydrocarbon odor	1090 @ 32.8
	///	33	C		
33.3-33.9	///-///		C	Clay, silty, red brown, soft, wet	
33.9-35.0	///+///	34	C	sharp contact with above	
	///+///		C	Clay, red, filaments of carbonate, hard, wet, no odor, sandstone cobble in clay	
	///+///	35	C	matrix (geology note--not formation--eroded and redeposited from above)	
35.1-38.3	***000***		C	Sand, gravelly, hydrocarbon odor, dense, sandstone and siliceous rock, gravel	800 @ 36.8
	000	36	C	rounded to subrounded--80% is 1", weakly water bearing	
	000		C		
	000	37	C	pull sampler 35'-40'--PID reading 800-1100 water on top head of sampler when	
	000		C	withdrawn from hole	
	000	38	C		
38.3-40.0	-----		C	CHINLE FORMATION	730 @ 39.3
	-----		C	Shale, clayey, weathered in-situ, hard, blocky, green band 2" @ 39.5, red brown,	340 @ 39.8
	-----		C	moist	
40.0-42.4	-----	40	C	Shale, wet (saturated), does not appear water bearing, soft red brown, fine blocky	1200 @ 40.5
	-----		C		
	-----		C		
	-----		C		
	-----	42	C		
42.4-45.0	-----		C	Shale, hard, red brown, some green grey mottling, fine blocky, moist	500 @ 44.5
	-----		C		
	-----		C	drilling stopped @ 3:30p, sample downhole fluid @ 4:00p, shows hydrocarbon layer	
	-----	44	C	PID reading - 800, headspace reading of fluid - 1200	
	-----		C		
45.0-50.0	-----	45	C	Shale, fissile, red brown, redder when dry, green grey reduction zones of 10"	1200 @ 45.5
	-----		C	in intervals of 3', green grey from 46.8'-48.0', dry	
	-----		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4"-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569
LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6948.2
TOTAL DEPTH: 60.0
LOGGED BY: WHK
DATE: 3-20-95
STATIC WATER: 44.3
BORING ID: 0639
PAGE: 3

DEPTH	T	E	E	S A M P L E L E V E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
	-----				continued from page 2	
	-----	47				

	-----					317 @ 49.5
	-----	50				
TD (day 1)					hole allowed to remain open 1 hr--it is believed product flows down hole and contaminates soil between sample intervals. -- suspect zone 35'-38'	
Begin day 2					ream hole to 13" with little difficulty to 50' set 10" PVC casing--slip coupled and screw set, hole remained open to 48', set casing easily to 50', plug inside of casing with 50# - 1/2" bentonite pellets, hydrate pellets set 1" tremmie tube with some difficulty as hole was beginning to swell closed grout outside annulus with 8-94# bags cement, 50# high yield bentonite, approx 100 gallons of fresh water finish clean up 10:00p	
					begin drilling through casing 03-21-95 @ 12:10p 2" of product measured on water placed inside casing 03-20-95, light phase amber product. Product then water pumped from interior of casing. 5' of plug in bottom of casing, upper 3' bentonite pellets lost bottom "soup"-- appears to be free of product however drilled 4' with continuous sampler, encountered refusal @ 54' with continuous sampler, pulled sampler and drilled to 55'	
50.0-55.0	-----	50			Shale, fissile, hard, red brown, dry to moist, no odor, some siltstone lenses, very difficult to auger drill with continuous sampler, dry @ 55'	0.1

55.0-57.2	*****	55			Sandstone, dry, hard, red brown	

57.2-58.0	=====	57			Shale and Siltstone, red brown, hard, dry	
	=====					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: Tank 569

LOCATION: See Boring Plan

LOG OF TEST BORINGS

FILE #: 95-018

ELEVATION: 6948.2

TOTAL DEPTH: 60.0

LOGGED BY: WHK

DATE: 3-21-95

STATIC WATER: 44.3

BORING ID: 0639

PAGE: 4

DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (ppm)
58.0-58.6	*****	58		Sandstone, hard, white to light grey, water bearing	
58.6-59.5	*****			Sandstone and Shale, interbedded, water bearing	
	*****	59			
59.5-60.0	*****			Sandstone, white to light green grey, water bearing, very hard, sample may be	12
	*****	60		slightly contaminated with clay fines from drilling	
TD				stop drilling 5:10P sample method--2" split spoon sampler driven water level @ 5:20p---44.24', water appears to be filling casing rapidly decision made to grout immediately. Drilling believed to penetrate water bearing sandstone member of the Chinle (Sonsela). Stabilized water elevation not determined. grout to surface, clean up, finish--7:30p	

LOGGED BY: WEX

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

PROJECT: RFI

LOCATION: Marketing Tank 3

LOG OF TEST BORINGS

FILE #: 95-018
 ELEVATION: 6944.0
 TOTAL DEPTH: 30.0
 LOGGED BY: WHK
 DATE: 3-24-95
 STATIC WATER: 15.2
 BORING ID: 0641
 PAGE: 1

DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (ppm)
0.0-0.9	***----		C	start 9:15a PID calibrated with span gas 61	
	***----	1.0	C	Sand, silty, red brown, moist, loose	
0.9-3.1	///--+/		C	Clay, silty, stiff, wet, red brown, odor, some carbonate filaments and scattered	15
	///--+/		C	carbonate nodules	
	///--+/		C		
3.1-4.0	***000***	3.0	C	Sand, gravelly, red brown, loose, some gravel to 1.5", moist, hydrocarbon odor	280
	000		C		
4.0-5.0	///00+/	4.0	C	Clay, gravelly, some sand, red brown, wet, stiff, weak hydrocarbon odor	300
	///00+/		C		
5.0-8.5	///+/	5.0	C	Clay, red brown, stiff, wet, some carbonate filaments and occasional carbonate	150
	///+/		C	nodules, slightly blocky (fine), odor	
	///+/		C		
	///+/		C		
	///+/		C		
	///+/		C		
	///+/	8.0	C		
8.5-8.7	***//		C	Sand, clayey, loose, red brown, moist, odor	50
8.7-11.0	///--+/	9.0	C	Clay, silty, red brown, stiff, carbonate filaments and nodules, blocky (fine)	220
	///--+/		C	slightly fissured, hydrocarbon odor	
	///--+/	10	C		
	///--+/		C		
11.0-13.9	***--/**	11	C	Sand, silt, clay interbeds to 1" each, red brown, wet, odor, soft/loose	300
	***--/**		C		
	***--/**		C		
	***--/**		C		
	***--/**		C		
	***--/**		C		
13.9-14.7	***//	14	C	Sand, fine, slightly clayey, red brown/purple, saturated, odor, loose	300
14.7-15.2	///+//		C	Clay, sandy in streaks, soft, purple/red brown, wet, odor	200
15.2-17.4	***//	15	C	Sand, clayey, water bearing, soft, hydrocarbon odor, laminar banding	150
	***//		C	brown to red brown	
	***//		C		
	***//		C		
	***//	17	C		
17.4-18.4	***----		C	Sand, fine, silty, water bearing, loose, red brown	200
	***----	18	C		
18.4-20.0	***--/**		C	Sand, silt, clay interbedded, soft/loose, odor, wet, (not water bearing), red brown	100
	***--/**		C		
	***--/**		C		
20.0-21.3	*****	20	C	Sand, fine/medium, laminar, water bearing, loose, red brown	000
	*****		C		
	*****	21	C		
21.3-25.0	///--*/		C	Clay, silt, sand, interbedded, mainly clay, sand/silt in <1" bands, and are	200
	///--*/		C	individually laminar banded, brown to red brown overall, not water bearing	
	///--*/		C	no odor	
	///--*/		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

FILE #: 95-018

PROJECT: RFI

ELEVATION: 6944.0

LOCATION: Marketing Tank 3

LOG OF TEST BORINGS

TOTAL DEPTH: 30.0

LOGGED BY: WHK

DATE: 3-24-95

STATIC WATER: 15.2

BORING ID: 0641

PAGE: 2

DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)		PID
						(ppm)
	///--**//		C	continued from page 1		
	///--**//	24	C			
	///--**//		C			
25.0-28.1	///--**//	25	C	Clay, silty, wet (not water bearing), brown, stiff to firm, no odor		0.0
	///--**//		C			
	///--**//		C			
	///--**//		C			
	///--**//		C			
	///--**//		C			
28.1-28.5	///**//	28	C	Clay, sandy, wet, brown, no odor, stiff		0.0
28.5-30.0	///**//		C	Clay, sandy, sand seam 1", water bearing, brown, stiff		0.0
	///**//		C			
	///**//		C			
	///**//	30	C			
TD				stop drilling for sample analysis @ 10:15a leave auger in hole lab analysis OK--abandon hole with bentonite @ 2:45p		

LOGGED BY: WEZ

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PROJECT: Tank 569
LOCATION: See Boring Plan

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 95-018
ELEVATION: 6947.9
TOTAL DEPTH: 39.0
LOGGED BY: WHK
DATE: 3-22-95
STATIC WATER: 28.3
BORING ID: 0642
PAGE: 1

DEPTH	T	E	E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (pce)
0.0-1.3	///-***///		C	Clay, silty, sandy, brown, wet, soft	500 @ 0.3'
	///-***///	1.0	C		
1.3-2.5	////+//		C	Clay, some carbonate nodules, wet, firm, brown with white nodules	
	////+//	2.0	C		
2.5-4.0	///*--//		C	Clay, sandy, silty, soft, brown, wet	
	///*--//		C		
	///*--//		C		
4.0-4.6	***//---*	4.0	C	Sand, clayey, silty, loose, brown, wet	44 @ 4.4'
4.6-5.4	////-////		C	Clay, slightly silty, wet, soft, brown	
	////-////	5.0	C		
5.4-8.2	///*--//		C	Clay, sandy, silty, wet, soft, brown, fine sands and silts in interbeds 1/2"-1"	
	///*--//		C		
	///*--//		C		
	///*--//		C		
	///*--//		C		4 @ 6.3'
8.2-8.9	//////////	8.0	C	Clay, firm, brown, wet	
	//////////		C		
8.9-10.0	///*--//	9.0	C	Clay, fine sandy, silty, very little sand, soft, wet, in interbeds 1/2"-1"	
	///*--//		C		
10.0-11.3	//////////	10	C	Clay, wet, soft, brown	
	//////////		C		
	//////////	11	C		
11.3-12.0	///-***///		C	Clay, silty, very little sand, soft, wet, brown	
12.0-12.9	****//***	12	C	Sand, fine, slightly clayey, wet, loose, dark grey, black	
	****//***		C		
12.9-14.0	///-***///	13	C	Clay, silty, firm, wet, brown	
	///-***///		C		
14.0-15.2	****//***	14	C	Sand, fine, some minor clay, moist, moderately dense	
	****//***		C		
	****//***	15	C		
15.2-16.7	****//***		C	Sand, clayey, wet, loose, brown	
	****//***	16	C		
16.7-17.9	///*--//		C	Clay, sandy, silty, 1/2"-1" bedding, wet, soft	
	///*--//	17	C		
	///*--//		C		
17.9-21.2	**//---*	18	C	Sand, very clayey, silty, bedding and laminations as above, wet, loose/soft	
	**//---*		C	no odor, brown	
	**//---*		C		
	**//---*		C		
	**//---*	20	C		
	**//---*		C		
21.2-22.2	//////////	21	C	Clay, sandy, fine, soft, wet, brown	
	//////////		C		
22.2-23.8	*****	22	C	Sand, fine, dense, moist, light brown to white	
	*****		C		
	*****	23	C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

PRECISION ENGINEERING, INC.

FILE #: 95-018
 ELEVATION: 6947.9
 TOTAL DEPTH: 39.0
 LOGGED BY: WHK
 DATE: 3-22-95
 STATIC WATER: 28.3
 BORING ID: 0642
 PAGE: 2

PROJECT: Tank 569
 LOCATION: See Boring Plan

LOG OF TEST BORINGS

DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (ppm)
23.8-26.1	***000****	24	C	Sand, very gravelly, dense, light brown, moist, subrounded to rounded gravel no odor	27 @ 25.0'
	000*	25	C		
	000*		C		
26.1-26.3	*****	26	C	Sandstone cobble	
26.3-27.8	***000****		C	Sand, fine gravelly, moist, dense, light brown to white	
	000*		C		
27.8-28.1	*****		C	Sandstone cobble	7.6 @ 27.8'
28.1-31.1	***00****	28	C	Sand, medium to coarse, some gravel, dense, moist, strong odor, multicolored	
	00*		C		
	00*		C		
	00*		C		
	00*	30	C		
	00*		C		
31.1-32.9	***00****	31	C	Sand as above--saturated with hydrocarbon product and water	
	00*		C		>1438 @ 31.5'
	00*		C		
32.9-36.0	***000****		C	Sand, very gravelly, very dense, strong, hydrocarbon odor, does not appear	
	000*	33	C	saturated, angular sandstone pieces, some subrounded, wet	
	000*		C		
	000*		C		
	000*		C		
	000*	35	C		9.5 @ 35.0'
	000*		C		
36.0-37.1	0000**000	36	C	Gravel, cobbly, sandstone blocks, water bearing, hard, brown	
	0000**000		C		
37.1-39.0	-----	37	C	Top of <u>CHINLE FORMATION</u>	
	-----		C	Shale, red brown, hard, shows some green grey banding, (green grey @ 38.4-38.9)	
	-----		C	green grey appears more sandy in general, fine blocky, damp to dry.	
	-----		C		
39.0	-----	39	C		0.0 @ 39.0'
TD				pull auger, temporary hole covered pending decision on whether to continue drilling or abandon hole clean up and decon 5:45p 50# TR30 1/2 pellets added @ 5:30p grout boring from the bottom of bore elevation to the surface with 8% bentonite (montmorillonite clay) and cement grout 03-23-95 AM. Water level 28.3' 03-23-95 AM	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4'-1/4" HSA

SUMMARY:

The analytical results from the October, 1995 drilling and sampling activities indicated the need for additional characterization. The need to fully characterize the extent of hydrocarbon migration beneath all of the leaded gasoline tanks, as well as the requirements of the December 22, 1995 letter from Region VI USEPA defined the scope of the drilling and sampling activities performed in March, 1995.

Additionally, the October, 1994 drilling of RFI0639V demonstrated the need for a modified drilling and sampling protocol on a "coring by coring" basis. That is, careful observation would have to be made to establish whether or not upper water bearing zones, if encountered, would require isolation to prevent contamination of lower sampling intervals. This knowledge was vital to the successful completion of the characterization of SWMU #6.

Only during drilling of RFI0639V was additional casing needed to isolate a water bearing zone. After the water bearing zone was drilled, 10' PVC casing was installed to a depth of 50 feet and grouted back with a cement/bentonite slurry. After allowing 14 hours for set-up, the boring was completed to total depth. The sample interval at 55.0 feet yielded a clean sample. This indicated that the flow of hydrocarbon - contaminated water from a shallower interval (during the October, 1994 drilling and sampling) had, indeed, contaminated the 55.0 foot sample.

The analytical data obtained from the borings at some of the leaded gasoline tanks indicates that there has been migration of hydrocarbon constituents downward. Considering the reasonably consistent depths and concentrations of hydrocarbons, it appears to support the conclusion that the hydrocarbon detected is most likely the remnant of past tank cleaning practices. This is also corroborated by the absence of unexplainable inventory loss.

The most significant observation was determining the surface horizon of the Chinle Shale (See attachment I). This is especially important due to the fact that the Chinle Shale has extremely low permeability and, therefore, provides a virtually impenetrable barrier to water and hydrocarbon. This allows Giant to state unequivocally that the deepest vertical migration of potentially hazardous constituents is the top of the Chile Shale. Consequently, contamination has been clearly shown to be confined within the alluvial clays, sands and gravelly shales above the Chinle formation (see Lithologic Logs).

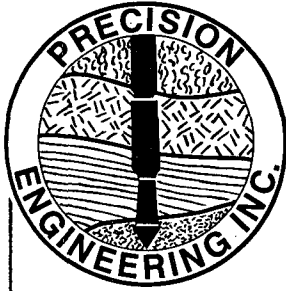
Recommendations:

Several options exist for remediation or clean-up activities at SWMU #6 (Leaded Gasoline Tanks), a few of which are listed below:

- 1) Free Product Removal
- 2) Vapor Extraction
- 3) Bio Venting
- 4) Air Sparging
- 5) Collection Basins

Developing the appropriate clean-up/remediation plan will entail careful consideration of specific geologic conditions (i.e. porosity, permeability) in conjunction with ancillary considerations such as (if any) equipment availability, time frame of clean-up, and the need for additional borings.

Obviously, whatever clean-up/remediation plan is developed, that plan must be in concert with the characterization and clean-up/remediation requirements of the New Mexico Oil Conservation Division. After characterization activities for the NMOCD are completed, a Corrective Action Plan will be created that satisfies the clean-up criteria of both the USEPA and the NMOCD. Giant will provide Region VI with a characterization plan for SWMU #6 at that time.



GEOTECHNICAL • MATERIALS • TESTING LABORATORY

Ph: (505) 523-7674 • FAX: (505) 523-7248

April 19, 1995

Mr. Lynn Shelton, CET
Senior Environmental Coordinator
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

Re: Tank 569 Investigation

Dear Mr. Shelton,

Enclosed are our logs for the investigation we have all been calling "Tank 569". As you are aware, during the course of the investigation we learned a great deal about the lithology in the tank farm area. I have briefly summarized the more important findings and observations for your information.

Previous work at the site indicates that the entire refinery facility is placed on an erosional remnant of the Chinle Formation. Specifically, maps showing the area as Sonsela would lead one to think the facility is placed directly on the Chinle Formation. We now know that at least in the tank farm area this is not true. Based on the drilling this past March we have identified that there are twenty five (25) to forty (40) feet of soils on top of the Chinle Formation. These soils, although derived from Chinle parent material, appear to have been deposited by alluviation. There is some indication that the Chinle surface does not have a uniform slope, rather, there may

April 19, 1995

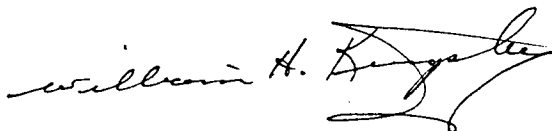
have been erosion of the surface prior to deposition of the present overburden. Additional work at the site would be required to fully characterize the Chinle surface.

The overburden soils are composed of clays, fine sands and sandy/clayey gravels. It was noted that these soils transmit water and contaminants far more easily than the dense shales of the Chinle Formation. At all locations where the drilling program penetrated the Chinle Formation it was noted that there is a gravelly sand layer on the order of two (2) feet thick or more lying directly on the Chinle shales. This zone is normally water bearing. The shales below are generally dry to moist and are not water bearing. We believe the water is recharged on the refinery property and migrates across the top of the Chinle shales through the gravelly sand above.

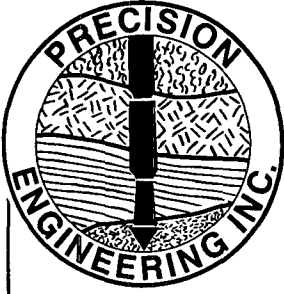
Data from the drilling program indicate that observation well 14 (OW-14) is completed in the gravelly sand zone that rests on the top of the Chinle shales. As we have discussed, this well should make a suitable down gradient well for the study area.

Sincerely,

Precision Engineering, Inc.

A handwritten signature in cursive script, appearing to read "William H. Kingsley".

William H. Kingsley, P.E.



GEOTECHNICAL • MATERIALS • TESTING LABORATORY

Ph: (505) 523-7674 • FAX: (505) 523-7248

July 20, 1995

Mr. Lynn Shelton, CET
Senior Environmental Coordinator
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

Re: RFI Drilling and Sampling Activities
File # 95-018

Dear Mr. Shelton,

As you are aware, during the course of the investigation we learned a great deal about the lithology in the tank farm area. I have briefly summarized the more important findings and observations for your information.

Previous work at the site indicates that the entire refinery facility is placed on an erosional remnant of the Chinle Formation. Specifically, maps showing the area as Sonsela would lead one to think the facility is placed directly on the Chinle Formation. We now know that at least in the tank farm area this is not true. Based on the drilling this past March we have identified that there are twenty five (25) to forty (40) feet of soils on top of the Chinle Formation. These soils, although derived from Chinle parent material, appear to have been deposited by alluviation. There is some indication that the Chinle surface does not have a uniform slope, rather, there may

July 20, 1995

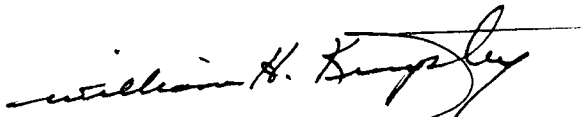
have been erosion of the surface prior to deposition of the present overburden. Additional work at the site would be required to fully characterize the Chinle surface.

The overburden soils are composed of clays, fine sands and sandy/clayey gravels. It was noted that these soils transmit water and contaminants far more easily than the dense shales of the Chinle Formation. At all locations where the drilling program penetrated the Chinle Formation it was noted that there is a gravelly sand layer on the order of two (2) feet thick or more lying directly on the Chinle shales. This zone is normally water bearing. The shales below are generally dry to moist and are not water bearing. We believe the water is recharged on the refinery property and migrates across the top of the Chinle shales through the gravelly sand above.

If you have any questions or wish to discuss our observations please contact our office.

Sincerely,

Precision Engineering, Inc.

A handwritten signature in cursive script, appearing to read "William H. Kingsley".

William H. Kingsley, P.E.