GW - 32

MONITORING REPORTS

DATE:

5/97

SWMU 6

GIANT REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505.
722.3833

May 14, 1997

RECEIVED
MAY 19 1997
Environmental Bureau
Oil Conservation Division

Mr. Patricio Sanchez
Petroleum Engineer
Oil Conservation District
2040 S. Pacheco
Santa Fe, New Mexico 87505

RE: Update On Tank 569 / SWMU 6 Investigation

Dear Mr. Sanchez:

As part of Giant's investigation of contamination in the vicinity of Tank 569, five (5) soil borings were completed on 3/22/97 and 3/23/97. These borings were completed on Mr. Jon Myer's property, directly east of the Refinery.

Enclosed please find the following documents:

- Boring Logs for borings 0651 through 0655
- Analytical Data from groundwater sampled from Borings 0651, 0652, and 0653
- A map showing the locations of borings 0651 through 0655

The following Table lists corresponding identifications to help match data to boring.

Boring	Analytical ID	Sample Type	Notes
0651	RFI-06-1-X-Date	Water	X - depth of sample in ft.
0652	RFI-06-2-X-Date	Water	
0653	RFI-06-3-Date	Water	Depth to Water = 40 ft.
0654	No sample taken	--	Dry Hole, PID of soil = 0
0655	No sample taken	--	Dry Hole, PID of soil = 0

The samples were analyzed for BTEX and MTBE using Method 8020. Results were either "Not Detected" or below the Standards for Ground Water as listed in 20 NMAC 6.2 Subpart III, Section 3103.

If you have questions or comments regarding this report, please feel free to call me at (505) 722-0227.

Sincerely,

Dorinda Mancini
Environmental Manager, Ciniza Refinery

cc: w/attachments
Robert S. Dinwiddie, NMED
Stephen Pullen, NMED
Denny Foust, NMOCD - Farmington
Steve Morris, Environmental Specialist

w/o attachments
Dick Platt, Refinery Manager
Dave Pavlich, HSE Manager

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN

LOG OF TEST BORINGS

FILE #: 97-032
ELEVATION: 6923.04
TOTAL DEPTH: 47.5'
LOGGED BY: WHK
DATE: 3-22-97
STATIC WATER: 38.0'@30 MIN
BORING ID: 0651
PAGE: 1

DEPTH	PLOT	SAMPLE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-2.2	///***///		C	CLAY, SANDY, WET, SOFT, RED BROWN	ALL SAMPLES
	///***///		C		0
	///***///		C		
2.2	///***///		C		
2.2-3.5	***---***		C	SAND, FINE, SILTY, LOOSE, DRY, RED BROWN, SOME ROOT MATTER	
	---		C		
3.5	***---***		C		
3.5-9.3	///---///		C	CLAY, SILTY, FIRM, RED BROWN, DAMP-MOIST	
	///---///		C		
	///---///	5.0	C		
	///---///		C		
	///---///		C	VERY STIFF, SOME ROOT MATTER GREATER THAN 6.0 FEET	
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
9.3	///---///		C		
9.3-10.2	*********	10	C	SAND, FINE, DRY, LOOSE, RED BROWN, LIGHT COLOR	
10.2-10.9	---------		C	SILT, DRY, LIGHT RED BROWN, FIRM	
10.9	---------		C		
10.9-14.5	///---///		C	CLAY, SILTY, SOME ROOT MATTER, RED BROWN, FIRM, CHARCOAL	
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
14.5	///---///		C		
14.5-15.5	///***///	15	C	CLAY, SANDY, RED BROWN, STIFF, MOIST, CHARCOAL	
15.5	///***///		C		
15.5-17.5	***///***		C	SAND, CLAYEY, DAMP, LOOSE, RED BROWN	
	///		C		
	///		C		
17.5	***///***		C		
17.5-20.0	///***///		C	CLAY, VERY FINE, SANDY, RED BROWN, STIFF, DAMP-MOIST, SAND STREAKS AND SOME LAMINAR	
	///***///		C	BANDING ESPECIALLY IN SANDIER ZONES	
	///***///		C		
	///***///		C		
20.0	///***///	20	C		
20.0-22.0	*********		C	SAND, FINE, VERY MOIST-WET, NOT WATER BEARING, LOOSE, RED BROWN	
	*********		C		
	*********		C		
22.0	*********		C		
22.0-23.5	///****///		C	CLAY, VERY SANDY, WET, FIRM, RED BROWN	
	///****///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN

LOG OF TEST BORINGS

FILE #: 97-032
ELEVATION: 6923.04
TOTAL DEPTH: 47.5'
LOGGED BY: WHK
DATE: 3-22-97
STATIC WATER: 38.0' @30 MIN.
BORING ID: 0651
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
23.5	///****///		C	CLAY, VERY SANDY, WET FIRM, RED BROWN	
23.5-25.0	***///***		C	SAND, CLAYEY, SOME PURE ZONES APPROXIMATELY 3" THICK, LAMINAR BANDED, WET, NOT	ALL SAMPLES
	///		C	WATER BEARING, RED BROWN	@
25.0	***///***	25	C		
25.0-28.5	//////////		C	CLAY, SOFT, WET, NOT WATER BEARING, RED BROWN	
	//////////		C		
	//////////		C		
	//////////		C		
	//////////		C		
	//////////		C		
	//////////		C		
28.5	//////////		C		
28.5-30.4	///**////		C	CLAY, SIGHTLY SANDY, SOME CARBONATE NODULES, RED BROWN, HARD, MOIST-DAMP	
	///**////		C	HARD TO DRILL	
	///**////	30	C		
30.4	///**////		C		
30.4-34.0	//////////		C	CLAY, DENSE, RED BROWN TO DARK BROWN, MOIST, HARD	
	//////////		C		
	//////////		C		
	//////////		C		
	//////////		C		
	//////////		C		
34.0	//////////		C		
34.0-34.3	///***///		C	CLAY, SANDY, BROWN, MOIST, STIFF	
34.3-36.0	//////////	35	C	CLAY, HARD, DARK BROWN, MOIST	
	//////////		C	SOFT	
36.0	//////////		C		
36.0-37.8	///00*///		C	CLAY, SOME SCATTERED GRAVEL TO 1" IN SIZE, SOFT, WET, NOT WATER BEARING, DARK BROWN	
	///00*///		C	SOME COARSE SAND	
	///00*///		C		
37.8	///00*///		C		
37.8-39.5	***////**		C	SAND, VERY CLAYEY, MORE SAND AT 39.0 FEET, LOOSE, SATURATED, MAY BE VERY WEAKLY	
	***////**		C	WATER BEARING, RED BROWN	
39.5	***////**		C		
39.5-41.0	//////////	40	C	CLAY, BROWN, STIFF, WET, NOT WATER BEARING	
	//////////		C		
41.0	//////////		C		
41.0-44.6	********		C	SAND GRADING TO GRAVEL, SANDSTONE AND CHERT, SOME PETRIFIED WOOD, WATER BEARING	
	00**0		C	DENSE, RED BROWN, SLIGHTLY CLAYEY	
	*0*0*0*0*		C		
	*00*00*00		C		
	*00*00*00		C		
	*0S*0S*0S		C		
44.6	*0S/*0S/*		C		
44.6-47.5	=========	45	C	CHINLE FORMATION	
	=========		C	SHALE, RED BROWN, DENSE, DAMP, NO WATER, FISSLE	
	=========		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

LOCATION: SEE SITE PLAN

FILE #: 97-032
ELEVATION: 6923.04
TOTAL DEPTH: 47.5'
LOGGED BY: WHK
DATE: 3-22-97
STATIC WATER: 38.0'@30 MIN
BORING ID: 0651
PAGE: 3

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
			C	SHALE, RED BROWN, DENSE, DAMP, NO WATER, FISSLE	ALL SAMPLES
			C		0
47.5			C		
TOTAL DEPTH					
		50			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN

LOG OF TEST BORINGS

FILE #: 97-032
ELEVATION: 6929.56
TOTAL DEPTH: 45.0'
LOGGED BY: WHK
DATE: 3-22-97
STATIC WATER: 27.0'@30 MIN
BORING ID: 0652
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-5.5	///---///		C	CLAY, SILTY, SOFT, RED BROWN, WET, NOT WATER BEARING, SOME ROOT MATTER	0.0-26.0
	///---///		C		0
	///---///		C		
	///---///		C		
	///---///		C		
	////*////		C	CLAY, STIFF, MOIST, SOME SANDY STRINGERS, RED BROWN	
	////*////		C		
	////*////		C		
	////*////		C		
	////*////	5.0	C		
5.5	////*////		C		
5.5-8.0	///***///		C	CLAY, FINE, SANDY, RED BROWN, MOIST-DAMP, STIFF	
	///***///		C		
	///***///		C		
	///***///		C		
8.0	///***///		C		
8.0-9.6	///***///		C	CLAY, SANDY, SOME SAND STRINGERS, FINE, GRADES SANDIER DESCENDING, RED BROWN, STIFF	
	///***///		C		
9.6	///***///		C		
9.6-10.8	*********	10	C	SAND, LOOSE, RED BROWN, DAMP, FINE-MEDIUM	
	*********		C		
10.8	*********		C		
10.8-12.5	///***///		C	CLAY, HARD, SANDY, SOME SLICKENSIDED SURFACES FORM JOINTS, RED BROWN, MOIST-DAMP	
	///***///		C		
12.5	///***///		C		
12.5-12.8	*********		C	SAND, FINE, DRY, LOOSE, RED BROWN	
12.8-13.9	///***///		C	CLAY, SANDY, MOIST-DAMP, RED BROWN, HARD	
13.9	///***///		C		
13.9-17.5	///---///		C	CLAY, SILTY, SILT IN LAMINATIONS, SOME CHARCOAL, DAMP, HARD, RED BROWN	
	///---///	15	C	SOME SANDY ZONES GREATER THAN 16.0 FEET	
	///---///		C		
	///---///		C		
	///--**//		C		
	///--**//		C		
17.5	///--**//		C		
17.5-18.1	***///***		C	SAND, CLAYEY, DENSE, DAMP, RED BROWN	
18.1-19.5	///---///		C	CLAY, SILTY, SOME SILT IN LAMINATIONS, DAMP-MOIST, BROWN-RED BROWN, HARD	
	///---///		C		
19.5	///---///		C		
19.5-25.0	//////////	20	C	CLAY, MOIST-WET, SOME ROOT MATTER, BROWN-RED BROWN, HARD, FEW FINE ROOT MATTER,	
	//////////		C	SOME FINE BLOCKY FRACTURING (FORMER SHRINKAGE) BUT NO INFILLING WITH SAND	
	//////////		C	WET, NOT WATER BEARING GREATER THAN 23.5 FEET, SOME CHARCOAL OBSERVED, GRADING	
	//////////		C	SANDY AT 24.8 FEET	
	//////////		C		
	//////////		C		
	//////////		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN

LOG OF TEST BORINGS

FILE #: 97-032
ELEVATION: 6929.56
TOTAL DEPTH: 45.0'
LOGGED BY: WHK
DATE: 3-22-97
STATIC WATER: 27.0'@30 MIN
BORING ID: 0652
PAGE: 2

DEPTH	PLOT	SAMPLE	SAMP TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
			C	CLAY, MOIST-WET, SOME ROOT MATTER, BROWN-RED BROWN, HARD, FEW FINE ROOT MATTER,	0.0-26.0
			C	SOME FINE BLOCKY FRACTURING (FORMER SHRINKAGE) BUT NO INFILLING WITH SAND	0
			C	WET, NOT WATER BEARING GREATER THAN 23.5 FEET, SOME CHARCOAL OBSERVED, GRADING	
25.0		25	C	SANDY AT 24.8 FEET	
25.0-32.0			C	CLAY, VERY SLIGHTLY SANDY, SILTY, SOME CHARCOAL, WET, NOT WATER BEARING, SOFT-FIRM	
			C	RED BROWN	
			C		150
			C		
			C		
			C		
			C		20
			C		
			C		
		30	C		
			C		10
			C		
			C		
32.0			C		
32.0-34.0			C	SAND, CLAYEY, PURE SAND IN 2" SEAMS, WATER BEARING BUT WEAK, LOOSE, BROWN	32.0-45.0
			C		0
			C		
34.0			C		
34.0-37.1			C	CLAY, SILTY, BROWN, SOFT, WET, NOT WATER BEARING	
		35	C		
			C		
			C		
			C		
37.1			C		
37.1-39.5			C	SAND, VERY GRAVELLY, SANDSTONE, CHERT, PETRIFIED WOOD, PEBBLES/GRAVEL TO 3" IN SIZE	
			C	WATER BEARING, MULTICOLORED	
			C		
			C		
39.5			C		
39.5-40.0		40	C	CLAY, SILTY, LIGHT RED BROWN, SOFT, WET, NOT WATER BEARING	
40.0-42.0			C	SAND, VERY GRAVELLY, SANDSTONE, CHERT, WATER BEARING, DENSE	
			C		
			C		
42.0			C		
42.0-45.0			C	CHINLE FORMATION	
			C	SHALE, VERY SANDY, DAMP, NOT WATER BEARING, GREEN GREY	
			C		
			C		
			C		
45.0		45	C		
TOTAL DEPTH					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN

LOG OF TEST BORINGS

FILE #: 97-032
ELEVATION: 6931.12
TOTAL DEPTH: 40.0'
LOGGED BY: WHK
DATE: 3-22-97
STATIC WATER: 30.0'@30 MIN
BORING ID: 0653
PAGE: 1

DEPTH	PLOT	SCALE	SAMP LE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-1.0	///***///		C	CLAY, SANDY, FINE, WET, ROOT MATTER, SOFT, RED BROWN	ALL SAMPLES
1.0	///***///		C		0
1.0-3.0	///--*///		C	CLAY, SILTY, SLIGHTLY SANDY, RED BROWN, FIRM, MOIST	
	///--*///		C		
	///--*///		C		
3.0	///--*///		C		
3.0-6.1	///---///		C	CLAY, SILTY, SLIGHTLY BLOCKY, STIFF, MOIST, RED BROWN	
	///---///		C		
	///---///		C		
	///---///	5.0	C		
	///---///		C		
6.1	///---///		C		
6.1-7.0	///***///		C	CLAY, SANDY, HARD, DAMP-MOIST, RED BROWN	
7.0	///***///		C		
7.0-12.5	///---///		C	CLAY, SILTY, HARD, DAMP-MOIST, RED BROWN, ROOT MATTER, SOME LAMINATION	
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///	10	C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C	CHARCOAL AT 11.0 FEET	
12.5	///---///		C		
12.5-12.7	****/****		C	SAND, FINE-MEDIUM, DRY, RED BROWN, LOOSE, SLIGHTLY CLAYEY	
12.7-15.0	///--///		C	CLAY, SOME SILT, ROOT MATTER, SLIGHTLY BLOCKY, RED BROWN, HARD	
	///--///		C		
	///--///		C		
15.0	///--///	15	C		
15.0-17.5	///***///		C	CLAY, SANDY, GRADES TO SILT, SILTY IN THIN LAMINAR BANDS, MOIST, HARD, CHARCOAL	
	///**-///		C	AT 17.0 FEET, RED BROWN	
	///*--///		C		
	///*--///		C		
17.5	///*--///		C		
17.5-17.9	///***///		C	CLAY, SANDY, LAMINAR, HARD, MOIST, RED BROWN	
17.9-20.0	///---*//		C	CLAY, VERY SILTY, SANDY, LAMINAR, HARD, RED BROWN, MOIST-DAMP, SOME ROOT MATTER	
	///---*//		C		
	///---*//		C		
20.0	///---*//	20	C		
20.0-21.0	***---***		C	SAND, VERY FINE, SILTY, DRY LOOSE, BROWN, SOME ROOT MATTER	
21.0	***---***		C		
21.0-22.1	///---///		C	CLAY, SILTY, SHRINKAGE CRACKS, CLAY INFILLED, DRY-DAMP, BROWN, HARD	
22.1	///---///		C		
22.1-26.5	*******/***		C	SAND, VERY FINE, LIGHT BROWN, DRY, MODERATELY DENSE, CLAY LENSED AT 25.5 FEET	
	*********		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

LOCATION: SEE SITE PLAN

FILE #: 97-032
ELEVATION: 6931.12
TOTAL DEPTH: 40.0'
LOGGED BY: WHK
DATE: 3-22-97
STATIC WATER: 30.0'@30 MIN
BORING ID: 0653
PAGE: 2

DEPTH	PLOT	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
	*********		SAND, VERY FINE, LIGHT BROWN, DRY, MODERATELY DENSE, CLAY LENSED AT 25.5 FEET	ALL SAMPLES
	*********			0
	*********			
	*********	25		
	*********			
	*********			
26.5	*********			
26.5-29.5	//////////		CLAY, HARD, WET, NOT WATER BEARING, BROWN, SOFT AT 29.0 FEET	
	//////////			
	//////////			
	//////////			
	//////////			
29.5	//////////			
29.5-30.0	///***///	30	CLAY, VERY SANDY, WET, NOT WATER BEARING, BROWN, SOFT	
30.0-30.5	***///***		SAND, CLAYEY, BROWN, VERY LOOSE-SOFT, VERY WEAKLY WATER BEARING	
30.5-36.0	///--*///		CLAY, SILTY, SLIGHTLY SANDY, WET, NOT WATER BEARING, SOFT	
	///--*///			
	///--*///			
	///--*///			
	///--*///			
	///--*///			
	///--*///			
	///--*///			
	///--*///	35		
	///--*///			
36.0	///--*///			
36.0-38.5	***000***		SAND, VERY GRAVELLY, SANDSTONE, CHERT, PETRIFIED WOOD, WATER BEARING, MULTICOLORED	
	000			
	000			
	000			
38.5	***000***			
38.5-40.0	===***===		CHINLE FORMATION	
	===***===		SHALE, SANDY, MOIST-WET, NOT WATER BEARING, HARD, RED BROWN-GREY	
40.0	===***===	40		
TOTAL DEPTH				

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN

LOG OF TEST BORINGS

FILE #: 97-032
ELEVATION: 6938.33
TOTAL DEPTH: 25.0'
LOGGED BY: WHK
DATE: 3-23-97
STATIC WATER: NOT FOUND
BORING ID: 0654
PAGE: 1

DEPTH	PLOT	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-1.5	///---///	C	CLAY, WET, SILTY, SOFT, SOME ROOT MATTER, RED BROWN	ALL SAMPLES 0
	///---///	C		
1.5	///---///	C		
1.5-1.7	---------	C	SILT, DRY, LOOSE, LAMINAR, BROWN	
1.7-4.5	*********	C	SAND, FINE, ROOT MATTER, DRY, RED BROWN-LIGHT BROWN, LOOSE	
	*********	C		
	*********	C		
	*********	C		
4.5	*********	C		
4.5-4.8	---------	C	SILT, LAMINAR, DRY, LOOSE, LIGHT BROWN	
4.8-9.8	*********	C	SAND, FINE, DRY, MODERATELY DENSE, LIGHT BROWN	
	*********	C		
	*********	C		
	*********	C		
	*********	C		
	*********	C		
	*********	C		
	*********	C		
	*********	C		
9.8	*********	C		
9.8-10.8	***OO+***	C	SAND, COARSE, SOME FINE GRAVEL, SLIGHT CEMENTED CARBONATE INDURATION, DRY, LT. RED	
10.8	***OO+***	C		
10.8-11.3	---///---	C	SILT, CLAYEY, LAMINAR, MOIST, STIFF, ROOT MATTER, RED BROWN	
11.3-12.0	***OO****	C	SAND, FINE-MEDIUM, SOME FINE GRAVEL, RED BROWN, DENSE	
12.0-20.6	//////////	C	CLAY, RED BROWN, HARD, SLICKENSIDED JOINTS, MOIST, FINE ROOT MATTER, SOME CHARCOAL,	
	//////////	C	SOME SLIGHTLY SANDY ZONES WITHIN THE CLAY MASS, STUCTURELESS AND SANDIER GREATER	
	//////////	C	THAN 16.0 FEET	
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
	//////////	C		
20.6	//////////	C		
20.6-25.0	==========	C	CHINLE FORMATION	
	==========	C	SHALE, FINE, BLOCKY, DRY, RED BROWN, HARD, INTERBEDDED WITH THIN, GREY, FINE	
	==========	C	SANDSTONE, SOME REDUCTION SPOTS IN SHALE, LAMINAR BANDING IN SANDSTONE	
	==========	C		
	==========	C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN

LOG OF TEST BORINGS

FILE #: 97-032
ELEVATION: 6938.33
TOTAL DEPTH: 25.0'
LOGGED BY: WHK
DATE: 3-23-97
STATIC WATER: NOT FOUND
BORING ID: 0654
PAGE: 2

DEPTH	PLOT	SAMPLE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
			C	CHINLE FORMATION	ALL SAMPLES
			C	SHALE, FINE, BLOCKY, DRY, RED BROWN, HARD, INTERBEDDED WITH THIN, GREY, FINE	0
			C	SANDSTONE, SOME REDUCTION SPOTS IN SHALE, LAMINAR BANDING IN SANDSTONE	
25.0		25	C		
TOTAL DEPTH					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN

LOG OF TEST BORINGS

FILE #: 97-032
ELEVATION: 6943.62
TOTAL DEPTH: 34.0'
LOGGED BY: WHK
DATE: 3-23-97
STATIC WATER: NOT FOUND
BORING ID: 0655
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-2.0	///**////		C	CLAY, SLIGHTLY SANDY, WET, RED BROWN, SOFT, ROOT MATTER	ALL SAMPLES
	///**////		C		0
	///**///		C		
2.0	///**////		C		
2.0-2.5	*********		C	SAND, FINE, LIGHT BROWN, DRY, LOOSE	
2.5-3.5	***///***		C	SAND, CLAYEY, DRY, RED BROWN, LOOSE	
3.5	***///***		C		
3.5-8.0	///---///		C	CLAY, SILTY, DAMP-MOIST, RED BROWN, FIRM, SOME SANDY ZONES	
	///---///		C		
	///---///	5.0	C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
8.0	///---///		C		
8.0-10.8	***//****		C	SAND, SLIGHTLY CLAYEY, GRADING CLEANER FURTHER DOWN, LIGHT RED BROWN, DAMP, APPEARS	
	//*		C	EOLIAN, MEDIUM DENSE	
	//*		C		
	//*	10	C		
	//*		C		
10.8	***//****		C		
10.8-14.8	/////////		C	CLAY, HARD, DAMP, DARK BROWN, SOME SLICKESIDED JOINTS, SOME CARBONATE NODULES IN	
	/////////		C	SANDY ZONES (RARE), OCCATIONAL PEBBLE-WELL ROUNDED, CHERTY	
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
14.8	/////////	15	C		
14.8-15.3	**********		C	SAND, FINE, RED BROWN-BROWN, LOOSE-MODERATELY DENSE, DRY	
15.3-31.4	///***///		C	CLAY-VERY SANDY, FINE, HARD, DAMP, DARK BROWN, SOME CARBONATE NODULES, SOME LAMINAR	
	///***///		C	BANDING OTHERWISE STRUCTURELESS, SOME ROOT MATTER, FILIMENTED CARBONATE STRANDS	
	///***///		C	ABOVE 16.0 FEET, SOME PSOLOMOLENE, NO JOINTS, FINE BLOCKY GREATER THAN 25.0 FEET,	
	///***///		C	WET (NOT WATER BEARING) WITHIN 4" OF CHINLE FORMATION, PEBBLES ON CHINLE SURFACE	
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///	20	C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.

LOCATION: SEE SITE PLAN

LOG OF TEST BORINGS

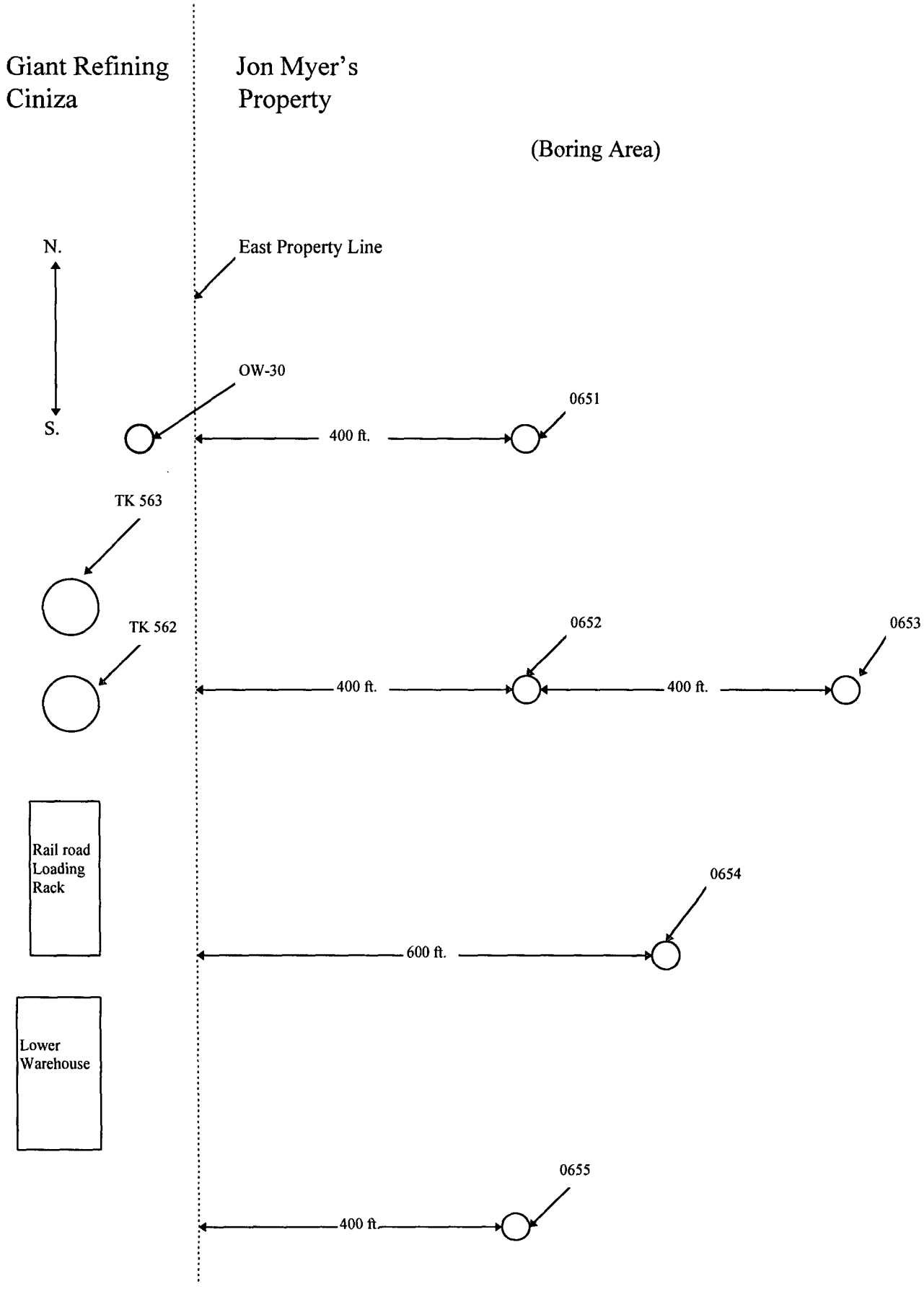
FILE #: 97-032
ELEVATION: 6943.62
TOTAL DEPTH: 34.0'
LOGGED BY: WHK
DATE: 3-23-97
STATIC WATER: NOT FOUND
BORING ID: 0655
PAGE: 2

DEPTH	PLOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
	///***///		C	CLAY-VERY SANDY, FINE, HARD, DAMP, DARK BROWN, SOME CARBONATE NODULES, SOME LAMINAR	ALL SAMPLES
	///***///		C	BANDING OTHERWISE STRUCTURELESS, SOME ROOT MATTER, FILIMENTED CARBONATE STRANDS	0
	///***///		C	ABOVE 16.0 FEET, SOME PSOLOMOLENE, NO JOINTS, FINE BLOCKY GREATER THAN 25.0 FEET.	
	///***///	25	C	WET (NOT WATER BEARING) WITHIN 4" OF CHINLE FORMATION, PEBBLES ON CHINLE SURFACE	
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///	30	C		
	///***///		C		
	///***///		C		
31.4	///***///		C		
31.4-34.0	SSSSSSSSS		C	SANDSTONE, WHITE-GREY, HARD, FINE GRAINED, MOIST	
	SSSSSSSSS		C		
	SSSSSSSSS		C		
	SSSSSSSSS		C		
34.0	SSSSSSSSS		C		
TOTAL DEPTH					

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

SWMU 6 INVESTIGATION



sm/c:/word/fenceline-5/14/97

Inter·Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

Dorinda Mancini
Giant Refining Company
Rt. 3, Box 7
Gallup, NM 87301

4 April 1997

Ms. Mancini:

Enclosed please find the corrected reports for the samples received by our laboratory for analysis on March 26, 1997.

If you have any questions about the results of these analyses, please don't hesitate to call at your convenience.

Sincerely,

Sharon Williams
Organic Analyst/IML-Farmington

Enclosure

xc: File

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

Giant Refining Co.

Case Narrative

On March 26, 1997, three water samples were submitted to Inter-Mountain Laboratories - Farmington for analysis. The sample was received intact. Analyses for Benzene-Toluene-Ethylbenzene-Xylenes (BTEX) and MTBE were performed on the samples as per the accompanying Chain of Custody document #44947.

BTEX and MTBE analysis on the samples were performed by EPA Method 5030, Purge and Trap, and EPA Method 8020, Aromatic Volatile Hydrocarbons, using an OI Analytical 4560 Purge and Trap and a Hewlett-Packard 5890 Gas Chromatograph, equipped with a photoionization detector. Detectable levels of BTEX and MTBE analytes were found in two of the samples as indicated in the enclosed reports.

It is the policy of this laboratory to employ, whenever possible, preparatory and analytical methods which have been approved by regulatory agencies. The methods used in the analyses of the samples reported herein are found in Test Methods for Evaluation of Solid Waste, SW-846, USEPA, 1986 and Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, USEPA, 1983.

Quality control reports appear at the end of the analytical packages and may be identified by title. If there are any questions regarding the information presented in this package, please feel free to call at your convenience.

Sincerely,

Sharon Williams
Organic Analyst

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS

Giant Refining Company

Project ID:	SWMU-6	Report Date:	04/04/97
Sample ID:	RFI-06-1-45-32297	Date Sampled:	03/22/97
Lab ID:	0397G00424	Date Received:	03/26/97
Sample Matrix:	water	Date Extracted:	NA
Condition:	Cool/Intact	Date Analyzed:	03/27/97

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
MTBE	1.1	1.0
Benzene	ND	1.0
Toluene	ND	1.0
Ethylbenzene	ND	1.0
m,p-Xylenes	ND	1.0
o-Xylene	ND	1.0

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	88%	70%-130%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS

Giant Refining Company

Project ID:	SWMU-6	Report Date:	04/04/97
Sample ID:	RFI-06-2-44-32297	Date Sampled:	03/22/97
Lab ID:	0397G00425	Date Received:	03/26/97
Sample Matrix:	water	Date Extracted:	NA
Condition:	Cool/Intact	Date Analyzed:	03/27/97

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
MTBE	ND	1.0
Benzene	ND	1.0
Toluene	ND	1.0
Ethylbenzene	ND	1.0
m,p-Xylenes	2.8	1.0
o-Xylene	ND	1.0

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	93%	70%-130%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS

Giant Refining Company

Project ID:	SWMU-6	Report Date:	04/04/97
Sample ID:	RFI-06-3-32297	Date Sampled:	03/22/97
Lab ID:	0397G00426	Date Received:	03/26/97
Sample Matrix:	water	Date Extracted:	NA
Condition:	Cool/Intact	Date Analyzed:	03/27/97

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
MTBE	ND	1.0
Benzene	ND	1.0
Toluene	ND	1.0
Ethylbenzene	ND	1.0
m,p-Xylenes	ND	1.0
o-Xylene	ND	1.0

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	94%	70%-130%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS
QUALITY CONTROL REPORT

Duplicate Analysis

Lab ID: 0397G00426
Sample Matrix: water
Condition: Cool/Intact

Report Date: 04/04/97
Date Analyzed: 03/27/97

Target Analyte	Duplicate Concentration (ppb)	Original Concentration (ppb)	% Difference
MTBE	ND	ND	NA
Benzene	ND	ND	NA
Toluene	ND	ND	NA
Ethylbenzene	ND	ND	NA
m,p-Xylenes	ND	ND	NA
o-Xylene	ND	ND	NA

ND - Analyte not detected at the stated detection limit.
NA - Not applicable or not calculated.

Quality Control:	Surrogate	Percent Recovery	Acceptance Limits
	Bromofluorobenzene	86%	70 -130%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS
QUALITY CONTROL REPORT

Matrix Spike Analysis

Lab ID: MB
Sample Matrix: water
Condition: Cool/Intact

Report Date: 04/04/97
Date Analyzed: 03/27/97

Target Analyte	Spiked Sample Result in ng	Sample result in ng	Spike Added (ng)	% Recovery	Acceptance Limits (%)
MTBE	19.36	0.00	20.00	97%	70-130
Benzene	19.85	0.25	20.0	98%	70-130
Toluene	19.96	0.12	20.0	99%	70-130
Ethylbenzene	20.00	0.08	20.0	100%	70-130
m,p-Xylenes	40.23	0.18	40.0	100%	70-130
o-Xylene	20.05	0.00	20.0	100%	70-130

ND - Analyte not detected at the stated detection limit.
NA - Not applicable or not calculated.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	99%	70 -130%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS
QUALITY CONTROL REPORT

Method Blank Analysis

Sample Matrix: Water
Lab ID: Method Blank

Report Date: 04/04/97
Date Analyzed: 03/27/97

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
MTBE	ND	1.0
Benzene	ND	1.0
Toluene	ND	1.0
Ethylbenzene	ND	1.0
m,p-Xylenes	ND	1.0
o-Xylene	ND	1.0

ND - Analyte not detected at the stated detection limit.

Quality Control:

	Surrogate	Percent Recovery	Acceptance Limits
Reference:	Bromofluorobenzene	92%	70-130%

Comments: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Analyst

Review

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS
QUALITY CONTROL REPORT

Trip Blank Analysis

Sample Matrix: Water
Lab ID: Trip Blank

Report Date: 04/04/97
Date Analyzed 03/27/97

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
MTBE	ND	1.0
Benzene	ND	1.0
Toluene	ND	1.0
Ethylbenzene	ND	1.0
m,p-Xylenes	ND	1.0
o-Xylene	ND	1.0

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	97%	70- 130%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Review

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

Quality Control / Quality Assurance

Known Analysis

BTEX

Client: **Giant Refining Company**
Project: Ciniza refinery

Date Reported: 04/04/97
Date Analyzed: 03/27/97

Known Analysis

Parameter	Found Concentration (ppb)	Known Concentration (ppb)	Percent Recovery	Acceptance Limits
MTBE	3.8	4.0	**96%**	70-130%
Benzene	3.7	4.0	**94%**	70-130%
Toluene	3.7	4.0	**93%**	70-130%
Ethylbenzene	3.7	4.0	**92%**	70-130%
m+p-Xylene	7.4	8.0	**93%**	70-130%
o-Xylene	3.7	4.0	**92%**	70-130%

Quality Control:	Surrogate	Percent Recovery	Acceptance Limits
	Bromofluorobenzene	**94%**	75-125%

Reference: Method 5030, Purge and Trap: Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst _____

Reviewed by _____

imi
Inter- Mountain
Laboratories, Inc.

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location	ANALYSES / PARAMETERS
GIANT/SWMU-6	CINIZA	
Sampler: (Signature)	**Chain of Custody Tape No.**	

Sample No./ Identification	Date	Time	Lab Number	Matrix	No. of Containers	BTEX-8020 + MTBE				Remarks
RFI-06-1-45-32297	3-22-97	0950		H_2O	2	V				
RFI-06-2-44-32297	3-22-97	1245		H_2O	2	V				
RFI-06-3-32297	3-22-97	1700		H_2O	2	V				
										Cool + intact

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
	3/25/97	1030	Chris Raynes	3-26-97	0859
Relinquished by: (Signature)	**Date**	**Time**	**Received by: (Signature)**	**Date**	**Time**
Relinquished by: (Signature)	**Date**	**Time**	**Received by laboratory: (Signature)**	**Date**	**Time**

Inter-Mountain Laboratories, Inc.

☐ 1633 Terra Avenue
Sheridan, Wyoming 82801
Telephone (307) 672-8945

☐ 1701 Phillips Circle
Gillette, Wyoming 82718
Telephone (307) 682-8945

☒ 2506 West Main Street
Farmington, NM 87401
Telephone (505) 326-4737

☐ 1160 Research Dr.
Bozeman, Montana 59715
Telephone (406) 586-8450

☐ 11183 SH 30
College Station, TX 77845
Telephone (409) 776-8945

44947

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

P 410 431 395

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Postage	$
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Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	

PS Form 3800, April 1995

June 2, 1997

CERTIFIED MAIL
RETURN RECEIPT NO. P-410-431-395

Ms. Dorinda Mancini
Environmental Manager
Giant Refining Co.
Route 3, Box 7
Gallup, NM 87301

RE: DISCHARGE PLAN MODIFICATION - EXTENSION
GIANT CINIZA REFINERY (GCR)
DISCHARGE PLAN GW-032
MCKINLEY COUNTY, NEW MEXICO

Dear Ms. Mancini:

The New Mexico Oil Conservation Division has received the extension request dated May 22, 1997 from GCR. The modification was required by the OCD on February 28, 1997 and was due for OCD review by May 28, 1997. **The OCD hereby approves of the extension to submit the modification until June 30, 1997.**

Please be advised this extension does not relieve GCR of liability should the operations of this facility result in pollution of surface waters, ground waters or the environment. Further, OCD authorization does not relieve GCR from responsibility for compliance with other federal, state, and local permitting requirements, rules, and regulations.

If you have any questions, please contact Pat Sanchez of my staff at (505) 827-7156.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief

RCA/pws

c: Aztec OCD District Office
Mr. Benito Garcia - Bureau Chief, NMED-HRMB

GIANT REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505.
722.3833

May 22, 1997

Mr. Roger Anderson
Environmental Bureau Chief
Oil Conservation District
2040 S. Pacheco
Santa Fe, New Mexico 87505

RE: Extension Request For Modification of Discharge Plan GW-32

Dear. Mr. Anderson:

Per our conversation on May 19, 1997, I am requesting an extension until June 30, 1997 to submit a modification of the discharge plan to include a comprehensive facility investigation work plan to determine the extent of soil and groundwater contamination related to GRC's activities.

If you have questions or comments regarding this request, please contact me at (505) 722-0227.

Sincerely,

Dorinda Mancini
Environmental Manager, Ciniza Refinery

cc: Denny Foust, NMOCD - Farmington
Steve Morris, Environmental Specialist
Dave Pavlich, HSE Manager

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

February 28, 1997

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-258-777

Ms. Dorinda Mancini
Environmental Manager
Giant Refining Co.
Route 3, Box 7
Gallup, NM 87301

RE: DISCHARGE PLAN MODIFICATION FOR WATER POLLUTION
CINIZA REFINERY
DISCHARGE PLAN GW-032
MCKINLEY COUNTY, NEW MEXICO

Dear Ms. Mancini:

The New Mexico Oil Conservation Division (OCD) met with Giant Refining Company (GRC) on February 20, 1997 to discuss the results of the recent GRC Ciniza Refinery soil and ground water investigations as contained in the following document:

- November 25, 1996 "UPDATE ON TANK 569 / SWMU 6 INVESTIGATION., CINIZA REFINERY, MCKINLEY COUNTY, NEW MEXICO".

As discussed in the above mentioned meeting and report, and other numerous investigations and work plans:

1. A number of current and past potential ground water contaminant source areas exist at the facility.

2. The delineation wells and borings in the above mentioned report show groundwater in what appears to be nested or perched in localized sand lens' above the Sonsela aquifer has been impacted.

Therefore, pursuant to WQCC regulation 3109.E, the OCD requires that GRC modify the facility discharge plan to abate water pollution. As an initial action the OCD requires that GRC submit a comprehensive facility investigation work plan to determine the extent of soil and ground water contamination related to GRC's activities. Please use the Stage 1 WQCC Abatement Regulations (20 NMAC 6.2.4106) in preparation of the investigation work plan. The OCD requires that the work plan be submitted to the OCD by May 28, 1997. Please submit the work plan to the OCD Santa Fe Office for approval and a copy to the OCD Aztec District Office.

All OCD rules, regulations, and guidelines are available on the Internet at the following website address: **www.emnrd.state.nm.us/ocd/**

If you have any questions, please contact Pat Sanchez of my staff at (505) 827-7156.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief

RCA/pws

c: Mr. Frank Chavez, OCD Aztec - District Supervisor
Mr. Denny Foust, OCD Aztec - Geologist
Mr. Benito Garcia, NMED, HRMB - Bureau Chief

P 288 258 777

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PS Form 3800, April 1995

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☐ Telephone ☒ Personal	Time 10:00 AM	Date 2-20-97

Originating Party	Other Parties
NMOCD - RCA, PWS, DF	Giant - Dave Pavlich, Dorinda Mancini, Steve Morris

Subject Groundwater Delineation process.

Discussion (1) February 14, 1997 Memo from Pat Sanchez to Roger Anderson (NMOCD) - see Attached copy - How to proceed with the vadose zone contamination and putting together a workplan to submit pursuant to 20 NMAC 6.2.3109.E (pg.35)
(2) Next week OCD will send a discharge plan "delineation/modification" letter - example copy as sent to Texaco.
(3) First Round of sampling to establish background will be 6.2.3103 (excluding Radiochem/Herbicides/pesticides).

Conclusions or Agreements

All parties agreed to the three above points

Distribution File, Denny Foust
Attachment. Giant

Signed [signatures]

D. C. Pavlich SC Morris
D. Mancini

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

Memorandum
February 14, 1997

To: **Roger C. Anderson, Bureau Chief**

From: **P.W. Sanchez, Petroleum Engineering Specialist**

Subject: **Giant Ciniza - GW-032, Soil/Groundwater Contamination investigation.**

Roger, outlined below are my recommendations for addressing the delineation and remediation of contamination in the soil (vadose zone) and groundwater at the Ciniza refinery if OCD is to have the regulatory leadership role in dealing with this facility.

1. OCD should manage the entire delineation and investigation as allowed in the WQCC regulations - in others words, the concept of breaking the facilities problems out into SWMU's as RCRA does is not practical from an overall concept. Further, there has been a significant amount of RFI and other RCRA required "studies" over the years, along with OCD required delineations and work plans as part of the discharge plan process. It is my opinion it only makes since at this point to move forward with an overall facility concept, and move away from the philosophy of handling the facilities problems in compartments - i.e. SWMU's.

Note: OCD, HRMB, and Giant should enter into and sign an MOU outlining this concept. If HRMB is not in agreement with this approach, OCD should move forward without them and require Giant per 20 NMAC 6.2.3109.E to Modify their discharge plan and handle the facilities contamination delineation and remediation as so provided.(Similar to how we are currently addressing the contamination at the Texaco Plants in Eunice.)

2. Giant as part of this process should also be required to go back and evaluate the existing monitoring wells at the facility, and those that are improperly constructed or completed should be submitted for OCD review along with Giant's proposal for plugging, and where needed replacement with a properly constructed and completed well.

These are the issues I feel must be addressed in short order so as to speed the delineation and clean-up process at the facility. I feel to continue the process under the current methods would only be a slow, cost intensive (To the State and Giant), and paperwork driven process.

c: Mr. Denny Foust - OCD Aztec District Office

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

Memorandum
February 14, 1997

To: **Roger C. Anderson, Bureau Chief**

From: **P.W. Sanchez, Petroleum Engineering Specialist**

Subject: **Giant Ciniza - GW-032, Soil/Groundwater Contamination investigation.**

Roger, outlined below are my recommendations for addressing the delineation and remediation of contamination in the soil (vadose zone) and groundwater at the Ciniza refinery if OCD is to have the regulatory leadership role in dealing with this facility.

1. OCD should manage the entire delineation and investigation as allowed in the WQCC regulations - in others words, the concept of breaking the facilities problems out into SWMU's as RCRA does is not practical from an overall concept. Further, there has been a significant amount of RFI and other RCRA required "studies" over the years, along with OCD required delineations and work plans as part of the discharge plan process. It is my opinion it only makes since at this point to move forward with an overall facility concept, and move away from the philosophy of handling the facilities problems in compartments - i.e. SWMU's.

Note: OCD, HRMB, and Giant should enter into and sign an MOU outlining this concept. If HRMB is not in agreement with this approach, OCD should move forward without them and require Giant per 20 NMAC 6.2.3109.E to Modify their discharge plan and handle the facilities contamination delineation and remediation as so provided.(Similar to how we are currently addressing the contamination at the Texaco Plants in Eunice.)

2. Giant as part of this process should also be required to go back and evaluate the existing monitoring wells at the facility, and those that are improperly constructed or completed should be submitted for OCD review along with Giant's proposal for plugging, and where needed replacement with a properly constructed and completed well.

These are the issues I feel must be addressed in short order so as to speed the delineation and clean-up process at the facility. I feel to continue the process under the current methods would only be a slow, cost intensive (To the State and Giant), and paperwork driven process.

c: Mr. Denny Foust - OCD Aztec District Office

GIANT REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

November 25, 1996

Mr. Patricio Sanchez
Petroleum Engineer
Oil Conservation District
2040 S. Pacheco
Santa Fe, New Mexico 87505

RE: Update On Tank 569 / SWMU 6 Investigation

Dear Mr. Sanchez:

As part of Giant's investigation of contamination in the vicinity of Tank 569, eight (8) soil borings were completed during the period from 8/22/96 through 9/9/96. Soils were sampled and analyzed during the drilling event to identify "clean" areas in front of the plume.

Enclosed please find the following documents:

- Boring Logs for borings 0643 through 0650
- Well Installation Diagrams for Wells OW-29 and OW-30
- Analytical Data from soil sampled during the drilling event
- Analytical Data from groundwater sampled from W-29 and OW-30
- A Ciniza Site Map showing borings completed to date

The following Table lists corresponding identifications to help match data to boring/well.

Boring/Well	Analytical ID	Sample Type	Notes
0643	RFI06-1-X-Date	Soil	X - depth of sample in ft.
0644	RFI06-2-X-Date	Soil	Completed as OW-29
0645	RFI06-3-X-Date	Soil	
0646	RFI06-4-X-Date	Soil	
0647	RFI06-5-X-Date	Soil	Completed as OW-30
0648	RFI06-6-X-Date	Soil	
0649	RFI06-7-X-Date	Soil	
0650	RFI06-8-X-Date	Soil	
OW-29	OW-29-Date	Water	
OW-30	OW-30-Date	Water	

Installation of the air compressors associated with the two recovery wells is in progress. We expect final installation to be completed within the next month or so.

As discussed during several phone conversations, Giant plans to delineate the eastern edge of the plume during the first quarter of 1997. We are currently negotiating the purchase of the parcel east of the refinery property line.

As new information becomes available, we will provide your office with an update of the project.

If you have questions or comments regarding this report, please feel free to call me at (505) 722-0227.

Sincerely,

Dorinda Mancini
Environmental Manager, Ciniza Refinery

cc: w/attachments
Michael Chacon, NMED
Denny Foust, NMOCD - Farmington

w/o attachments
Dick Platt, Refinery Manager
Dave Pavlich, HSE Manager
Steve Morris, Environmental Specialist

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS

Giant Refining Company

Project ID:	Ciniza	Report Date:	11/20/96
Sample ID:	OW-29-111396	Date Sampled:	11/13/96
Lab ID:	0396G02498	Date Received:	11/15/96
Sample Matrix:	water	Date Extracted:	NA
Condition:	Cool/Intact	Date Analyzed:	11/18/96

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
MTBE	2.0	0.2
Benzene	ND	0.2
Toluene	ND	0.2
Ethylbenzene	ND	0.2
m,p-Xylenes	ND	0.2
o-Xylene	ND	0.2

ND - Analyte not detected at the stated detection limit.

Quality Control:	Surrogate	Percent Recovery	Acceptance Limits
	Bromofluorobenzene	96%	70%-130%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS

Giant Refining Company

Project ID:	Ciniza	Report Date:	11/20/96
Sample ID:	OW-30-111396	Date Sampled:	11/13/96
Lab ID:	0396G02497	Date Received:	11/15/96
Sample Matrix:	water	Date Extracted:	NA
Condition:	Cool/Intact	Date Analyzed:	11/18/96

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
MTBE	0.9	0.2
Benzene	ND	0.2
Toluene	ND	0.2
Ethylbenzene	ND	0.2
m,p-Xylenes	ND	0.2
o-Xylene	ND	0.2

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	94%	70%-130%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

American Environmental Network, Inc.

CLIENT	: GIANT	AEN I.D.	: 608348
PROJECT #	: RFI06 TANK 569	DATE RECEIVED	: 8/23/96
PROJECT NAME	: RFI06 TANK 569	REPORT DATE	: 8/26/96

AEN ID. #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	RFI06-1-42-82296	SOIL	8/22/96
02	RFI06-1-44-82296	SOIL	8/22/96
03	RFI06-1-46-82296	SOIL	8/22/96
04	RFI06-1-48-82296	SOIL	8/22/96
05	RFI06-1-50-82296	SOIL	8/22/96

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT
PROJECT # : RFI06 TANK 569
PROJECT NAME : RFI06 TANK 569

AEN I.D.: 608348

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	RFIO6-1-42-82296	NON-AQ	8/22/96	8/23/96	8/23/96	1
02	RFIO6-1-44-82296	NON-AQ	8/22/96	8/23/96	8/23/96	1
03	RFIO6-1-46-82296	NON-AQ	8/22/96	8/23/96	8/23/96	1

PARAMETER	DET. LIMIT	UNITS	01	02	03
BENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOLUENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
ETHYLBENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOTAL XYLENES	0.025	MG/KG	< 0.025	< 0.025	< 0.025
METHYL-t-BUTYL ETHER	0.13	MG/KG	< 0.13	< 0.13	< 0.13
SURROGATE:					
BROMOFLUOROBENZENE (%)			92	102	99
SURROGATE LIMITS	(65 - 120)				

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT AEN I.D.: 608348
PROJECT # : RFI06 TANK 569
PROJECT NAME : RFI06 TANK 569

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	RFIO6-1-48-82296	NON-AQ	8/22/96	8/23/96	8/23/96	1
05	RFIO6-1-50-82296	NON-AQ	8/22/96	8/23/96	8/23/96	1

PARAMETER	DET. LIMIT	UNITS	04	05
BENZENE	0.025	MG/KG	< 0.025	< 0.025
TOLUENE	0.025	MG/KG	< 0.025	< 0.025
ETHYLBENZENE	0.025	MG/KG	< 0.025	< 0.025
TOTAL XYLENES	0.025	MG/KG	< 0.025	< 0.025
METHYL-t-BUTYL ETHER	0.13	MG/KG	< 0.13	< 0.13
SURROGATE:				
BROMOFLUOROBENZENE (%)			101	104
SURROGATE LIMITS	(65 - 120)			

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : GIANT INDUSTRIES AEN I.D.: 608348
PROJECT # : 0
PROJECT NAME : RFI06 TANK 569

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
03	RF106-1-46-82296	NON-AQ	8/22/96	8/26/96	8/26/96	1

PARAMETER	DET. LIMIT	UNITS	03
FUEL HYDROCARBONS, C6-C10	10	MG/KG	< 10
FUEL HYDROCARBONS, C10-C22	5.0	**MG/KG**	**15**
FUEL HYDROCARBONS, C22-C36	5.0	**MG/KG**	**7.4**
CALCULATED SUM			22
SURROGATE:			
O-TERPHENYL (%)			103
SURROGATE LIMITS	(66 - 151)		

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

CLIENT	: GIANT REFINING CO.	AEN I.D.	: 608352
PROJECT #	: RFI O6 TANK 569	DATE RECEIVED	: 8/26/96
PROJECT NAME	: RFI O6 TANK 569	REPORT DATE	: 8/29/96

AEN ID. #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	RFI06-3-35-82396	AQUEOUS	8/23/96
02	RFI06-3-18-82396	SOIL	8/23/96
03	RFI06-3-28-82396	SOIL	8/23/96
04	RFI06-3-40-82396	SOIL	8/23/96
05	RFI06-2-22-82396	SOIL	8/23/96
06	RFI06-2-44-82396	SOIL	8/23/96
07	RFI06-1-28-8-22-96	SOIL	8/22/96
08	TRIP BLANK	AQUEOUS	8/19/96

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING CO. AEN I.D.: 608352
PROJECT # : RFI O6 TANK 569
PROJECT NAME : RFI O6 TANK 569

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	RFI06-3-35-82396	AQUEOUS	8/23/96	NA	8/26/96	10
08	TRIP BLANK	AQUEOUS	8/19/96	NA	8/26/96	1

PARAMETER	DET. LIMIT	UNITS	01	08
BENZENE	0.5	**UG/L**	**3400**	< 0.5
TOLUENE	0.5	**UG/L**	**110**	< 0.5
ETHYLBENZENE	0.5	**UG/L**	**1100**	< 0.5
TOTAL XYLENES	0.5	**UG/L**	**4400**	< 0.5
METHYL-t-BUTYL ETHER	2.5	**UG/L**	**150**	< 2.5

SURROGATE:
BROMOFLUOROBENZENE (%) 113 109
SURROGATE LIMITS (80 - 120)

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING CO. AEN I.D.: 608352
PROJECT # : RFI O6 TANK 569
PROJECT NAME : RFI O6 TANK 569

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
02	RFI06-3-18-82396	NON-AQ	8/23/96	8/26/96	8/26/96	1
03	RFI06-3-28-82396	NON-AQ	8/23/96	8/26/96	8/26/96	1
04	RFI06-3-40-82396	NON-AQ	8/23/96	8/26/96	8/26/96	1

PARAMETER	DET. LIMIT	UNITS	02	03	04
BENZENE	0.025	**MG/KG**	< 0.025	**0.49**	< 0.025
TOLUENE	0.025	**MG/KG**	< 0.025	**0.038**	< 0.025
ETHYLBENZENE	0.025	**MG/KG**	< 0.025	**0.63**	< 0.025
TOTAL XYLENES	0.025	**MG/KG**	**0.076**	**0.92**	< 0.025
METHYL-t-BUTYL ETHER	0.13	MG/KG	< 0.13	< 0.13	< 0.13
SURROGATE:					
BROMOFLUOROBENZENE (%)			90	81	92
SURROGATE LIMITS	(65 - 120)				

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING CO. AEN I.D.: 608352
PROJECT # : RFI O6 TANK 569
PROJECT NAME : RFI O6 TANK 569

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
05	RFI06-2-22-82396	NON-AQ	8/23/96	8/26/96	8/26/96	1
06	RFI06-2-44-82396	NON-AQ	8/23/96	8/26/96	8/26/96	1
07	RFI06-1-28-8-22-96	NON-AQ	8/22/96	8/26/96	8/26/96	1

PARAMETER	DET. LIMIT	UNITS	05	06	07
BENZENE	0.025	**MG/KG**	< 0.025	< 0.025	**0.073**
TOLUENE	0.025	**MG/KG**	< 0.025	< 0.025	**0.032**
ETHYLBENZENE	0.025	**MG/KG**	< 0.025	< 0.025	**0.81**
TOTAL XYLENES	0.025	**MG/KG**	< 0.025	< 0.025	**0.83**
METHYL-t-BUTYL ETHER	0.13	MG/KG	< 0.13	< 0.13	< 0.13
SURROGATE:					
BROMOFLUOROBENZENE (%)			88	77	114
SURROGATE LIMITS	(65 - 120)				

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

CLIENT	: GIANT REFINING	AEN I.D.	: 608358
PROJECT #	: RFI06-TANK 569	DATE RECEIVED	: 8/28/96
PROJECT NAME	: RFI06-TANK 569	REPORT DATE	: 8/30/96

AEN ID. #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	RFI06-3-42-82596	SOIL	8/25/96
02	RFI06-4-28-82696	SOIL	8/26/96
03	RFI06-4-26-82696	SOIL	8/26/96
04	RFI06-4-31-82696	SOIL	8/26/96
05	RFI06-4-31W-82696	AQUEOUS	8/26/96
06	RFI06-4-33-82696	SOIL	8/26/96
07	RFI06-4-34-82696	SOIL	8/26/96
08	RFI06-4-36-82696	SOIL	8/26/96
09	RFI06-4-38-82696	SOIL	8/26/96

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : GIANT REFINING AEN I.D.: 608358
PROJECT # : RFI06-TANK 569
PROJECT NAME : RFI06-TANK 569

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
05	RFI06-4-31W-82696	AQUEOUS	8/26/96	8/28/96	8/28/96	1

PARAMETER	DET. LIMIT	UNITS	05
FUEL HYDROCARBONS, C6-C10	2.0	MG/L	5.6
FUEL HYDROCARBONS, C10-C22	1.0	MG/L	53
FUEL HYDROCARBONS, C22-C36	1.0	MG/L	2.2
CALCULATED SUM			61
SURROGATE:			
O-TERPHENYL (%)			98
SURROGATE LIMITS	(79 - 124)		

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : GIANT REFINING AEN I.D.: 608358
PROJECT # : RFI06-TANK 569
PROJECT NAME : RFI06-TANK 569

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
03	RFI06-4-26-82696	NON-AQ	8/26/96	8/28/96	8/28/96	1
07	RFI06-4-34-82696	NON-AQ	8/26/96	8/28/96	8/28/96	1

PARAMETER	DET. LIMIT	UNITS	03	07
FUEL HYDROCARBONS, C6-C10	10	MG/KG	<10	<10
FUEL HYDROCARBONS, C10-C22	5.0	**MG/KG**	<5.0	**110**
FUEL HYDROCARBONS, C22-C36	5.0	**MG/KG**	<5.0	**25**
CALCULATED SUM			NA	140
SURROGATE:				
O-TERPHENYL (%)			102	101
SURROGATE LIMITS	(66 - 151)			

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING AEN I.D.: 608358
PROJECT # : RFI06-TANK 569
PROJECT NAME : RFI06-TANK 569

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
05	RFI06-4-31W-82696	AQUEOUS	8/26/96	NA	8/28/96	10

PARAMETER	DET. LIMIT	UNITS	05
BENZENE	0.5	**UG/L**	**12**
TOLUENE	0.5	**UG/L**	**6.1**
ETHYLBENZENE	0.5	**UG/L**	**65**
TOTAL XYLENES	0.5	**UG/L**	**77**
METHYL-t-BUTYL ETHER	2.5	UG/L	< 25

SURROGATE:
BROMOFLUOROBENZENE (%) 93
SURROGATE LIMITS (80 - 120)

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING AEN I.D.: 608358
PROJECT # : RFI06-TANK 569
PROJECT NAME : RFI06-TANK 569

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	RFI06-3-42-82596	NON-AQ	8/25/96	8/28/96	8/28/96	1
02	RFI06-4-28-82696	NON-AQ	8/26/96	8/28/96	8/28/96	1
03	RFI06-4-26-82696	NON-AQ	8/26/96	8/28/96	8/28/96	1

PARAMETER	DET. LIMIT	UNITS	01	02	03
BENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOLUENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
ETHYLBENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOTAL XYLENES	0.025	MG/KG	< 0.025	< 0.025	< 0.025
METHYL-t-BUTYL ETHER	0.13	MG/KG	< 0.13	< 0.13	< 0.13
SURROGATE:					
BROMOFLUOROBENZENE (%)			100	95	91
SURROGATE LIMITS	(65 - 120)				

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING AEN I.D.: 608358
PROJECT # : RFI06-TANK 569
PROJECT NAME : RFI06-TANK 569

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	RFI06-4-31-82696	NON-AQ	8/26/96	8/28/96	8/28/96	1
06	RFI06-4-33-82696	NON-AQ	8/26/96	8/28/96	8/28/96	1
07	RFI06-4-34-82696	NON-AQ	8/26/96	8/28/96	8/28/96	1

PARAMETER	DET. LIMIT	UNITS	04	06	07
BENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOLUENE	0.025	**MG/KG**	**0.035**	< 0.025	< 0.025
ETHYLBENZENE	0.025	**MG/KG**	**0.35**	**0.061**	< 0.025
TOTAL XYLENES	0.025	**MG/KG**	**0.36**	**0.16**	< 0.025
METHYL-t-BUTYL ETHER	0.13	MG/KG	< 0.13	< 0.13	< 0.13
SURROGATE:					
BROMOFLUOROBENZENE (%)			86	81	96
SURROGATE LIMITS	(65 - 120)				

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING AEN I.D.: 608358
PROJECT # : RFI06-TANK 569
PROJECT NAME : RFI06-TANK 569

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
08	RFI06-4-36-82696	NON-AQ	8/26/96	8/28/96	8/28/96	1
09	RFI06-4-38-82696	NON-AQ	8/26/96	8/28/96	8/28/96	1

PARAMETER	DET. LIMIT	UNITS	08	09
BENZENE	0.025	MG/KG	< 0.025	< 0.025
TOLUENE	0.025	MG/KG	< 0.025	< 0.025
ETHYLBENZENE	0.025	MG/KG	< 0.025	< 0.025
TOTAL XYLENES	0.025	MG/KG	< 0.025	< 0.025
METHYL-t-BUTYL ETHER	0.13	MG/KG	< 0.13	< 0.13
SURROGATE:				
BROMOFLUOROBENZENE (%)			90	93
SURROGATE LIMITS	(65 - 120)			

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

CLIENT	: GIANT REFINING CO.	AEN I.D.	: 609301
PROJECT #	: (none)	DATE RECEIVED	: 9/5/96
PROJECT NAME	: (none)	REPORT DATE	: 9/10/96

AEN ID. #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	RFI-06-5-82896	AQUEOUS	8/28/96
02	RFI-06-5-42-82896	SOIL	8/28/96
03	RFI-06-5-48-82896	SOIL	8/28/96
04	RFI-06-6-30-9496	AQUEOUS	9/4/96
05	RFI-06-6-32-9496	SOIL	9/4/96
06	RFI-06-6-36-9496	SOIL	9/4/96
07	RFI-06-7-24-9496	AQUEOUS	9/4/96
08	RFI-06-7-26-9496	SOUL	9/4/96
09	RFI-06-7-28-9496	SOIL	9/4/96

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING CO. AEN I.D.: 609301
PROJECT # : (none)
PROJECT NAME : (none)

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	RFI-06-5-82896	AQUEOUS	8/28/96	NA	9/5/96	1
04	RFI-06-6-30-9496	AQUEOUS	9/4/96	NA	9/5/96	1
07	RFI-06-7-24-9496	AQUEOUS	9/4/96	NA	9/5/96	1

PARAMETER	DET. LIMIT	UNITS	01	04	07
BENZENE	0.5	**UG/L**	< 0.5	**1500 D(10)**	< 0.5
TOLUENE	0.5	**UG/L**	< 0.5	**5.4**	< 0.5
ETHYLBENZENE	0.5	**UG/L**	< 0.5	**9.3**	< 0.5
TOTAL XYLENES	0.5	**UG/L**	< 0.5	**8.0**	< 0.5
METHYL-t-BUTYL ETHER	2.5	**UG/L**	< 2.5	**59**	**11**
SURROGATE:					
BROMOFLUOROBENZENE (%)			100	117	107
SURROGATE LIMITS	(80 - 120)				

CHEMIST NOTES:
D(10)=DILUTED 10X, ANALYZED 9/5/96.

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING CO. AEN I.D.: 609301
PROJECT # : (none)
PROJECT NAME : (none)

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
02	RFI-06-5-42-82896	NON-AQ	8/28/96	9/5/96	9/5/96	1
03	RFI-06-5-48-82896	NON-AQ	8/28/96	9/5/96	9/5/96	1
05	RFI-06-6-32-9496	NON-AQ	9/4/96	9/5/96	9/5/96	1

PARAMETER	DET. LIMIT	UNITS	02	03	05
BENZENE	0.025	**MG/KG**	< 0.025	< 0.025	**0.049**
TOLUENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
ETHYLBENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOTAL XYLENES	0.025	MG/KG	< 0.025	< 0.025	< 0.025
METHYL-t-BUTYL ETHER	0.13	MG/KG	< 0.13	< 0.13	< 0.13
SURROGATE:					
BROMOFLUOROBENZENE (%)			97	92	96
SURROGATE LIMITS	(65 - 120)				

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING CO. AEN I.D.: 609301
PROJECT # : (none)
PROJECT NAME : (none)

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
06	RFI-06-6-36-9496	NON-AQ	9/4/96	9/5/96	9/5/96	1
08	RFI-06-7-26-9496	NON-AQ	9/4/96	9/5/96	9/5/96	1
09	RFI-06-7-28-9496	NON-AQ	9/4/96	9/5/96	9/5/96	1

PARAMETER	DET. LIMIT	UNITS	06	08	09
BENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOLUENE	0.025	**MG/KG**	< 0.025	**0.047**	< 0.025
ETHYLBENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOTAL XYLENES	0.025	**MG/KG**	< 0.025	**0.11**	**0.14**
METHYL-t-BUTYL ETHER	0.13	MG/KG	< 0.13	< 0.13	< 0.13
SURROGATE:					
BROMOFLUOROBENZENE (%)			92	97	97
SURROGATE LIMITS	(65 - 120)				

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : GIANT REFINING CO. AEN I.D.: 609301
PROJECT # : (none)
PROJECT NAME : (none)

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	RFI-06-5-82896	AQUEOUS	8/28/96	9/5/96	9/5/96	1
04	RFI-06-6-30-9496	AQUEOUS	9/4/96	9/5/96	9/5/96	1
07	RFI-06-7-24-9496	AQUEOUS	9/4/96	9/5/96	9/5/96	1

PARAMETER	DET. LIMIT	UNITS	01	04	07
FUEL HYDROCARBONS, C6-C10	2.0	**MG/L**	< 2.0	**2.0**	< 2.0
FUEL HYDROCARBONS, C10-C22	1.0	**MG/L**	< 1.0	**1.1**	< 1.0
FUEL HYDROCARBONS, C22-C36	1.0	MG/L	< 1.0	< 1.0	< 1.0
CALCULATED SUM			N/A	3.1	N/A
SURROGATE:					
O-TERPHENYL (%)			109	108	106
SURROGATE LIMITS	(79 - 124)				

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : GIANT REFINING CO. AEN I.D.: 609301
PROJECT # : (none)
PROJECT NAME : (none)

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
02	RFI-06-5-42-82896	NON-AQ	8/28/96	9/5/96	9/5/96	1
03	RFI-06-5-48-82896	NON-AQ	8/28/96	9/5/96	9/5/96	1
05	RFI-06-6-32-9496	NON-AQ	9/4/96	9/5/96	9/5/96	1

PARAMETER	DET. LIMIT	UNITS	02	03	05
FUEL HYDROCARBONS, C6-C10	10	MG/KG	< 10	< 10	< 10
FUEL HYDROCARBONS, C10-C22	5.0	MG/KG	< 5.0	< 5.0	< 5.0
FUEL HYDROCARBONS, C22-C36	5.0	MG/KG	< 5.0	< 5.0	< 5.0
CALCULATED SUM			N/A	N/A	N/A
SURROGATE:					
O-TERPHENYL (%)			106	107	104
SURROGATE LIMITS	(66 - 151)				

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : GIANT REFINING CO. AEN I.D.: 609301
PROJECT # : (none)
PROJECT NAME : (none)

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
06	RFI-06-6-36-9496	NON-AQ	9/4/96	9/5/96	9/5/96	1
08	RFI-06-7-26-9496	NON-AQ	9/4/96	9/5/96	9/5/96	1
09	RFI-06-7-28-9496	NON-AQ	9/4/96	9/5/96	9/5/96	1

PARAMETER	DET. LIMIT	UNITS	06	08	09
FUEL HYDROCARBONS, C6-C10	10	MG/KG	< 10	< 10	< 10
FUEL HYDROCARBONS, C10-C22	5.0	MG/KG	< 5.0	< 5.0	< 5.0
FUEL HYDROCARBONS, C22-C36	5.0	MG/KG	< 5.0	< 5.0	< 5.0
CALCULATED SUM			N/A	N/A	N/A
SURROGATE:					
O-TERPHENYL (%)			108	107	107
SURROGATE LIMITS	(66 - 151)				

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

CLIENT	: GIANT REFINING	AEN I.D.	: 609305
PROJECT #	: (none)	DATE RECEIVED	: 9/6/96
PROJECT NAME	: RFI-06	REPORT DATE	: 9/10/96

AEN ID. #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	RFI06-8-28-9596	SOIL	9/5/96
02	RFI06-8-30-9596	SOIL	9/5/96

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : GIANT REFINING AEN I.D.: 609305
PROJECT # : (none)
PROJECT NAME : RFI-06

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	RFI06-8-28-9596	NON-AQ	9/5/96	9/9/96	9/9/96	1
02	RFI06-8-30-9596	NON-AQ	9/5/96	9/9/96	9/9/96	1

PARAMETER	DET. LIMIT	UNITS	01	02
FUEL HYDROCARBONS, C6-C10	10	MG/KG	< 10	< 10
FUEL HYDROCARBONS, C10-C22	5.0	MG/KG	< 5.0	< 5.0
FUEL HYDROCARBONS, C22-C36	5.0	MG/KG	< 5.0	< 5.0
CALCULATED SUM:			N/A	N/A
SURROGATE:				
O-TERPHENYL (%)			89	96
SURROGATE LIMITS	(66 - 151)			

CHEMIST NOTES:
N/A

American Environmental Network, Inc.

GAS CHROMOTOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING AEN I.D.: 609305
PROJECT # : (none)
PROJECT NAME : RFI-06

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	RFI06-8-28-9596	NON-AQ	9/5/96	9/9/96	9/9/96	1
02	RFI06-8-30-9596	NON-AQ	9/5/96	9/9/96	9/9/96	1

PARAMETER	DET. LIMIT	UNITS	01	02
BENZENE	0.025	MG/KG	< 0.025	< 0.025
TOLUENE	0.025	MG/KG	< 0.025	< 0.025
ETHYLBENZENE	0.025	MG/KG	< 0.025	< 0.025
TOTAL XYLENES	0.025	MG/KG	< 0.025	< 0.025
METHYL-t-BUTYL ETHER	0.13	MG/KG	< 0.13	< 0.13
SURROGATE:				
BROMOFLUOROBENZENE (%)			106	119
SURROGATE LIMITS	(65 - 120)			

CHEMIST NOTES:
N/A

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery
Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6920.1
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 8/22/96
STATIC WATER: 31.4
BORING ID: 0643
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-1.0	//////////		C	CLAY, LOOSE, DRY, SOFT, RED BROWN	
1.0-1.6	***/////***		C	SAND, CLAYEY, DARK BROWN, MOIST, SOFT, APPEARS CONTAMINATED	
1.6-6.3	//////////	5.0	C	CLAY, RED BROWN, FIRM, SOME ROOT MATTER, MOIST	
6.3-8.5	///***///		C	CLAY, SANDY, VERY FINE, MOIST, FIRM, RED BROWN, SOME ROOT MATTER	
8.5-12.3	//////////	10	C	CLAY, FIRM, RED BROWN, MOIST	
12.3-12.5	///**-///		C	CLAY, SANDY, SILTY, GRADES TO SILT @ 12.5	
12.5-13.3	----------		C	SILT, DRY, FIRM, MOIST, LIGHT BROWN	
13.3-13.5	///---///		C	CLAY, SILTY	
13.5-13.75	*********		C	SAND, LOOSE, DRY, FINE, BROWN	
13.75-15.8	////*////	15	C	CLAY, WEAKLY SANDY, BROWN, STIFF, MOIST	
15.8-16.7	///***///		C	CLAY, VERY SANDY (COARSE), WET (NOT WATER BEARING), FIRM, RED BROWN	
16.7-17.75	///---///		C	CLAY, SILTY, STIFF, MOIST, RED BROWN	
17.75-21.8	//////////	20	C	CLAY, WET, RED BROWN, STIFF, SOME ROOT MATTER	
21.8-25.3	///***///		C	CLAY, FINE SANDY, WET, HYDROCARBON ODOR, GREY BROWN, SOME BLACK MOTTLING, NOT WATER BEARING, SOFT	22'-20 ppm

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6920.1
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 8-22-96
STATIC WATER: 31.4
BORING ID: 0643
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
21.8-25.3	///***/// ///***/// ///***/// ///***/// ///***///	25	C C C C C	**CLAY**, FINE SANDY, WET, HYDROCARBON ODOR, GREY BROWN, SOME DARK MOTTLING, NOT WATER BEARING, SOFT	22'-20 ppm 24'-29 ppm
25.3-27.0	****/**** ****/**** ****/**** ****/****		C C C C	**SAND**, LOOSE, VERY WET, VERY WEAKLY FLUID BEARING, HYDROCARBON SHEEN, GREY BROWN, CLAYEY	26'-34ppm
27.0-28.1	****/**** ****/****		C C	AS ABOVE BUT RED BROWN, LESS ODOR	
28.1-29.5	///**//// ///**//// ///**////		C C C	**CLAY**, SLIGHTLY SANDY, SOFT, WET, NOT WATER BEARING	28'-48ppm
29.5-31.4	***///*** ***///*** ***///***	30	C C C	**SAND**, CLAYEY, SOFT, WET, NOT WATER BEARING, CANNOT DETECT ODOR, VERY WEAK WATER BEARING	30'-0ppm
31.4-34.8	///***/// ///***/// ///***/// ///***/// ///***/// ///***/// ///***///		C C C C C C C	**CLAY**, SANDY, FINE, SOFT, WET (NOT WATER BEARING), VERY WEAKLY SANDY > 33.0'	32'-0ppm 34'-0ppm
34.8-36.1	***--**** ***--**** ***--****	35	C C C	**SAND**, BROWN, SILTY, GRAVELLY (1"), MOIST, NO ODOR, MODERATELY DENSE **WATER BEARING** 35.0-36.1, NO ODOR	
36.1-41.2	///////// ///////// ///////// ///////// ///////// ///////// ///////// ///////// ///////// ///////// /////////	40	C C C C C C C C C C C	**CLAY**, LIGHT BROWN, CARBONATE SALTS APPEAR AS WEB-LIKE FILIMENTS, SOME ROOT MATTER, STIFF	36'-0ppm 38'-0ppm 40'-0ppm
41.2-42.7	000000000 000000000 000000000		C C C	**GRAVEL (2")**, CHERT, SANDSTONE, PETRIFIED WOOD, **WATER BEARING**, MULTICOLORED	
42.7-48.0	========= ========= ========= ========= ========= ========= =========	45	C C C C C C C	**SHALE**, RED, DRY/MOIST/WET, DENSE **CHINLE FORMATION**	42'-20ppm 44'-30ppm

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4"ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery
Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6920.1
TOTAL DEPTH: 50.0
LOGGED BY: WHK
DATE: 8-22-96
STATIC WATER: 31.4
BORING ID: 0643
PAGE: 3

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
42.7-48.0	=========		C	**SHALE**, RED, DRY/MOIST/WET, DENSE	
	=========		C	**CHINLE FORMATION**	46'-10ppm
	=========		C		
	=========		C		
	=========		C		
48.0-50.0	=========		C	**SHALE**, DARK RED TO PURPLE RED, DRY, DENSE	48'-0ppm
	=========		C		
	=========		C		
	=========	50	C		50'-0ppm
TOTAL DEPTH					
		55			
		60			
		65			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6913.5
TOTAL DEPTH: 49.0
LOGGED BY: WHK
DATE: 8-23-96
STATIC WATER: 30.6
BORING ID: OW-29(0644)
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-6.9	///--////		C	**CLAY**, SLIGHTLY SILTY, DAMP TO DRY, DARK RED BROWN, STIFF	PID=0ppm ALL SAMPLES
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////	5.0	C		
	///--////		C		
	///--////		C		
	///--////		C		
6.9	///--////		C		
6.9-7.4	///**////		C	**CLAY**, SLIGHTLY SANDY, ROOT MATTER, RED BROWN, MOIST, STIFF	
7.4-10.6	///---///		C	**CLAY**, SILTY, ROOT MATTER, RED BROWN, MOIST, SOME CALCIUM CARBONATE NODULES < 2 mm, STIFF-HARD	
	///---///		C		
	///---///		C		
	///---///		C		
	///---///	10	C		
10.6	///---///		C		
10.6-14.3	////////		C	**CLAY**, RED BROWN, WET, STIFF	
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
14.3	////////		C		
14.3-14.7	///**////		C	**CLAY**, SLIGHTLY SANDY, MOIST, STIFF, RED BROWN	
14.7-14.9	///---///	15	C	**CLAY**, SILTY, STIFF, MOIST, RED BROWN	
14.9-16.0	***//****		C	**SAND**, SLIGHTLY CLAYEY, DENSE, MOIST, RED BROWN	
16.0	***//****		C		
16.0-20.5	////////		C	**CLAY**, MOIST, RED BROWN, HARD, CHARCOAL 19-20'	
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////	20	C		
20.5	////////		C		
20.5-22.2	///***///		C	**CLAY**, SANDY, CHARCOAL, RED BROWN, STIFF, MOIST	
	///***///		C		
22.2	///***///		C		
22.2-24.3	///---///		C	CLAY, SILTY, SILT IN LAMINATIONS, DRY-MOIST	
	///---///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6913.5
TOTAL DEPTH: 49.0
LOGGED BY: WHK
DATE: 8-23-96
STATIC WATER: 30.6
BORING ID: OW-29(0644)
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
22.2-24.3	///---///		C	**CLAY**, SILTY, SILT IN LAMINATIONS, DRY-MOIST	PID=0ppm ALL SAMPLES
	///---///		C		
24.3	///---///		C		
24.3-36.8	///**////	25	C	**CLAY**, ROOT MATTER, RED BROWN, STIFF, MOIST, SLIGHTLY BLOCKY, SOME CARBONATE NODULES APPROXIMATELY 1/2 cm AT 26.0-27.5, FRACTURES DURING SAMPLING FORM SLICKENSIDED SURFACES, SLIGHTLY SANDY 33.5-33.8', WET > 35'	
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////	30	C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////	35	C		
	///**////		C		
	///**////		C		
36.8	///**////		C		
36.8-37.1	*********		C	**SAND**, LIGHT BROWN, WET, MEDIUM, DENSE	
37.1-39.6	////0////		C	**CLAY**, LIGHT BROWN, WET, SOFT, SOME 3/4" GRAVEL RARE	
	////0////		C		
	////0////		C		
	////0////		C		
39.6	////0////		C		
39.6-40.4	///***///	40	C	**CLAY**, COARSE SANDY, WET, SOFT, LIGHT BROWN, CALCIUM CARBONATE	
40.4	///***///		C		
40.4-43.4	///**////		C	**CLAY**, LIGHT BROWN, WET, SOFT, SLIGHTLY SANDY > 42.5'	
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
43.4	///**////		C		
43.4-47.0	000//0000		C	**GRAVEL**, SLIGHTLY CLAYEY, CHERT, LIMESTONE, PETRIFIED WOOD, SANDSTONE, MULTICOLORED TO LIGHT RED BROWN, DENSE, **WATER BEARING**, SANDIER >45'	
	000//0000		C		
	000//0000	45	C		
	000//0000		C		
	000//0000		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PROJECT: Giant Refinery
Ciniza

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6913.5
TOTAL DEPTH: 49.0
LOGGED BY: WHK
DATE: 8-23-96
STATIC WATER: 30.6
BORING ID: OW-29(0644)
PAGE: 3

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
43.4-47.0	000//0000		C	**GRAVEL**, SLIGHTLY CLAYEY, CHERT, LIMESTONE, PETRIFIED WOOD, SANDSTONE, MULTICOLORED	PID=0ppm
47.0	000//0000		C	TO LIGHT RED BROWN, DENSE, **WATER BEARING,** SANDIER > 45'	ALL SAMPLES
47.0-49.0	========= ========= ========= =========		C	SHALE, RED PURPLE, DENSE, DAMP-MOIST (APPEARS DRY), NO WATER	
TOTAL DEPTH		50		NOTE: COMPLETED AS A 4" MONITORING WELL. SEE COMPLETION DIAGRAM.	
		55			
		60			
		65			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

PROJECT: Giant Refinery Ciniza

FILE #: 96-133
ELEVATION: 6931.1
TOTAL DEPTH: 43.0
LOGGED BY: WHK
DATE: 8-23-96
STATIC WATER: 29.3
BORING ID: 0645
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-3.2	///---///		C	**CLAY**, SILT, STIFF, DAMP, RED BROWN, ROOT MATTER	0ppm TO 14.0
3.2	///---///		C		
3.2-6.6	***--****		C	**SAND**, FINE, SLIGHTLY SILTY, RED BROWN, MODERATELY DENSE	
	--*	5.0	C		
6.6	***--****		C		
6.6-7.1	///***///		C	**CLAY**, SANDY, SOFT, DAMP, RED BROWN	
7.1-7.6	***///***		C	**SAND**, CLAYEY, LOOSE, DAMP, RED BROWN	
7.6-8.3	///***///		C	**CLAY**, SANDY, SOFT, MOIST, RED BROWN	
8.3-8.5	*********		C	**SAND**, FINE, LOOSE, RED BROWN, DAMP	
8.5-9.6	///***///		C	**CLAY**, SANDY	
9.6	///***///		C		
9.6-9.9	*********	10	C	**SAND**, FINE	
9.9-10.4	///***///		C	**CLAY**, SANDY	
10.4-13.2	*********		C	**SAND**, FINE, MOIST, RED BROWN, LOOSE	
13.2	*********		C		
13.2-13.9	///***///		C	**CLAY**, SANDY, WET, RED BROWN, SOFT	
13.9	///***///		C		14'-1ppm
13.9-14.2	*********		C	**SAND**, FINE, RED BROWN, LOOSE, MOIST	
14.2-14.5	***///***	15	C	**SAND**, FINE, DARK RED BROWN, WET, LOOSE, CLAYEY	
14.5-15.2	*********		C	**SAND**, FINE-MEDIUM, MODERATELY DENSE, RED BROWN, MOIST	
15.2-16.2	/////////		C	**CLAY**, LIGHT BROWN, SILTY, SOME CALCIUM CARBONATE NODULES, FIRM	16'-1ppm
16.2-21.5	////0////		C	**CLAY**, DARK BROWN, CARBONATE FILIMENTS, SOME NODULES, < 3/4" GRAVEL RARE, NO GRAVEL > 18', SOME BLACK INFILLING (PSOLOMOLENE)	
					18'-32ppm
		20			20'-4ppm
21.5	////0////		C		
21.5-23.8	/////////		C	**CLAY**, SANDY, SAND IN < 1" SEAMS, DARK BROWN TO PURPLE BROWN, STIFF, WET	22'-2ppm

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6931.1
TOTAL DEPTH: 43.0
LOGGED BY: WHK
DATE: 8-23-96
STATIC WATER: 29.3
BORING ID: 0645
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
21.5-23.8	///***///		C	**CLAY**, SANDY, SAND IN 1" SEAMS, DARK BROWN TO PURPLE BROWN, STIFF, WET	
23.8	///***///		C		24'-3ppm
23.8-25.6	///**////		C	**CLAY**, SLIGHTLY SANDY, STIFF, WET, BROWN-RED BROWN, SOME CHARCOAL IN < 2mm PIECES	
	///**////	25	C		
25.6	///**////		C		
25.6-29.2	///***///		C	**CLAY**, SANDY, **HYDROCARBON ODOR**, BLOCKY, JOINT FILLED WITH CALCIUM CARBONATE SALTS,	26'-24ppm
	///***///		C	SOME CHARCOAL, WET, RED BROWN-GREY BROWN, STIFF, LESS SAND AT 29.0	
	///***///		C		
	///***///		C		
	///***///		C		28'-185ppm
	///***///		C		
	///***///		C		
29.2	///***///		C		
29.2-30.0	///***///		C	**CLAY**, COARSE SANDY, WET, RED BROWN, STIFF	
30.0	///***///	30	C		30'-46ppm
30.0-34.1	///***///		C	**CLAY**, SANDY, **HYDROCARBON ODOR**, STIFF, RED BROWN, BLOCKY, WET	
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
34.1	///***///		C		
34.1-36.1	*********		C	**SAND**, **WATER BEARING**, FINE, GREY-GREENGREY, MODERATELY DENSE, **HYDROCARBON ODOR**,	
	*********	35	C	HYDROCARBON SHEEN	35'-130ppm
	*********		C		
36.1	*********		C		36'-90ppm
36.1-38.2	000***000		C	**GRAVEL**, SANDY, SANDSTONE, CHERT, PETRIFIED WOOD, **WATER BEARING**	
	000***000		C		
	000***000		C		
38.2	000***000		C		38'-30ppm
38.2-41.0	===***===		C	**SHALE**, VERY SANDY, FISSLE, DENSE, CRUMBLES IN HAND, MOIST-WET	
	===***===		C		
	===***===		C		
	===***===	40	C		40'-2ppm
	===***===		C	DRILLING STOPPED-OUT OF AUGER, WEATHER BAD	
41.0	===***===		C	RESTART DRILLING 8-25-96 @ 8:40 AM	
41.0-43.0	SSSSSSSSS		C	SANDSTONE, HARD, LIGHT GREY, SUSPECT NEAR SONSELA, WET, NOT WATER BEARING, NO ODOR	
	SSSSSSSSS				
	SSSSSSSSS				
	SSSSSSSSS				
TOTAL DEPTH					
		45			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6987.2
TOTAL DEPTH: 40.0
LOGGED BY: WHK
DATE: 8-27-96
STATIC WATER: 30.0
BORING ID: 0646
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-4.2	///***///		C	**CLAY**, SANDY, GRAVELLY, MOIST-WET, RED BROWN, STIFF	
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
4.2	///***///		C		
4.2-5.8	***//0***		C	**SAND**, SLIGHTLY CLAYEY, SCATTERED GRAVEL, (<1/2"), MOIST, RED BROWN, MODERATELY	
	//0	5.0	C	DENSE	
	//0		C		
5.8	***//0***		C		
5.8-9.0	///**////		C	**CLAY**, WET, SOFT, BROWN, SOME COARSE SAND	
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
9.0	///**////		C		
9.0-11.0	**///0***		C	**SAND**, VERY CLAYEY, SOFT-LOOSE, WET, BROWN, SCATTERED GRAVEL (MAXIMUM 1.5")	
	///0*	10	C		
	///0*		C		
11.0	**///0***		C		
11.0-13.8	///**////		C	**CLAY**, WET, SOFT, BROWN, SLIGHTLY SANDY	
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
13.8	///**////		C		
13.8-28.5	***000***		C	**SAND**, GRAVELLY, MOIST-WET, SLIGHTLY BANDED GRAVEL (SANDSTONE, CHERT MAINLY),	
	000	15	C	BROWN-RED BROWN, SOME 2" GRAVEL,SOME ROCK > 4" > 15', (WHITE SANDSTONE GRAVEL)	
	000		C	VERY GRAVELLY > 20', DENSE	
	000		C		
	000		C		
	000		C		
	000		C		
	000		C		
	000		C		
	000		C		
	000		C		
	000		C		
	000	20	C		
	000		C		
	000		C		
	000		C		
	000		C		
	000		C		
	000		C		
	000		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery
Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6987.2
TOTAL DEPTH: 40.0
LOGGED BY: WHK
DATE: 8-27-96
STATIC WATER: 30.0
BORING ID: 0646
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
13.8-28.5	***000***		C	**SAND**, GRAVELLY, MOIST-WET, SLIGHTLY BANDED GRAVEL (SANDSTONE, CHERT MAINLY), BROWN-RED BROWN, SOME 2" GRAVEL, SOME ROCK > 4" > 15', (WHITE SANDSTONE GRAVEL), VERY GRAVELLY > 20', DENSE	
	000		C		
	000		C		
	000	25	C		
	000		C		
	000		C		
	000		C		
	000		C		
	000		C		
	000		C		
	000		C		
28.5	***000***		C		
28.5- 29.1	///**////		C	**CLAY**, WET, BROWN, SLIGHTLY SANDY, SOFT	
29.1-30.0	***//****		C	**SAND**, SLIGHTLY CLAYEY, LIGHT BROWN-RED BROWN, MODERATELY DENSE, WET, MEDIUM TO FINE	
30.0	***//****	30	C	POSSIBLE **HYDROCARBON ODOR**	
30.0-30.8	***//****		C	**SAND**, SLIGHTLY CLAYEY, RED BROWN/GREY STREAKS, WATER BEARING, DEFINITE **HYDROCARBON**	
30.8	***//****		C	**ODOR** AND SHEEN, APPEARS SAME ZONE AS ABOVE	
30.8-31.8	SSSSSSSSS		C	**CHINLE FORMATION**	
31.8	SSSSSSSSS		C	**SANDSTONE**, WHITE, HARD, NOT VERY POROUS, **HYDROCARBON ODOR**	
31.8-40.0	===***===		C	**SHALE**, VERY SANDY, WET, NOT WATER BEARING, LESS SAND @ 34', MODERATELY DENSE,	
	===***===		C	**HYDROCARBON ODOR** TO 34', NO ODOR AT 40', LAMINAR BANDING, RED PURPLE, SHALEY	
	===***===		C	SANDSTONE, BREAKS ALONG LAMINATIONS OTHERWISE MASSIVE, DAMP-DRY >35'	
	===***===		C		
	===***===		C		
	===***===	35	C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===	40	C		
TOTAL DEPTH		45			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6921.6
TOTAL DEPTH: 48.4
LOGGED BY: WHK
DATE: 8-28-96
STATIC WATER: 24.4
BORING ID: OW-30(0647)
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-6.5	///---///		C	**CLAY**, SILTY, DRY, RED BROWN, FIRM, SOME ROOT MATTER	PID-0ppm ALL SAMPLES
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///		C		
	///---///	5.0	C		
	///---///		C		
	///---///		C		
6.5	///---///		C		
6.5-13.1	/////////		C	**CLAY**, RED BROWN, MOIST, STIFF, SOME ROOT MATTER, SOME CARBONATE NODULES < 1 cm	
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////	10	C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
13.1	/////////		C		
13.1-13.8	///***///		C	**CLAY**, SANDY, CARBONATE NODULES APPROXIMATELY 3mm, STIFF, DAMP, RED BROWN	
	///***///		C		
13.8	///***///		C		
13.8-16.5	///---///	15	C	**CLAY**, SILTY, DAMP-MOIST, RED BROWN, STIFF	
	///---///		C		
	///---///		C		
16.5	///---///		C		
16.5-22.5	/////////		C	**CLAY**, VERY STIFF, RED BROWN, MOIST	
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////	20	C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
	/////////		C		
22.5	/////////		C		
22.5-23.2	/////////		C	**CLAY**, SILTY, STIFF, MOIST, BROWN	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6921.6
TOTAL DEPTH: 48.4
LOGGED BY: WHK
DATE: 8-28-96
STATIC WATER: 24.4
BORING ID: OW-30(0647)
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
23.2-23.8	***---***		C	**SAND**, FINE, SILTY, BROWN, DAMP, MODERATELY DENSE	PID=0ppm
23.8	***---***		C		ALL SAMPLES
23.8-24.3	///---///		C	**CLAY**, SILTY, BROWN, VERY STIFF, MOIST	
24.3-39.7	////////	25	C	**CLAY**, BROWN, VERY STIFF, MOIST, SOME CARBONATE SPECKS > 28'	
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////	30	C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////	35	C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
	////////		C		
39.7	////////		C		
39.7-41.7	///***///	40	C	**CLAY**, SANDY, WET, SOFT, RED BROWN, SANDIER @ 41.2-41.7	
	///***///		C		
	///***///		C		
41.7	///***///		C		
41.7-42.6	////////		C	**CLAY**, BLACK, WET, ABUNDANT CHARCOAL, SOFT, SOME ROOT MATTER	
42.6	////////		C		
42.6-44.2	///--*///		C	**CLAY**, LIGHT BROWN, WET, SOFT, VERY SLIGHTLY SANDY, SILTY	
	///--*///		C		
44.2	///--*///		C		
44.2-47.3	OOOSSSOOO		C	**GRAVEL**, **WATER BEARING**, CHERT, SANDSTONE, SOME LIMESTONE, MODERATELY DENSE	
	OOOSSSOOO	45	C		
	OOOSSSOOO		C		
	OOOSSSOOO		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery
Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6921.6
TOTAL DEPTH: 48.4
LOGGED BY: WHK
DATE: 8-28-96
STATIC WATER: 24.4
BORING ID: OW-30(0647)
PAGE: 3

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
44.2-47.3	OOOSSSOOO OOOSSSOOO		C C	**GRAVEL, WATER BEARING**, CHERT, SANDSTONE, SOME LIMESTONE, MODERATELY DENSE	PID=0ppm ALL SAMPLES
47.3	OOOSSSOOO		C		
47.3-48.4	======== ========		C C	**SHALE, CHINLE FORMATION**, MOIST, HARD, RED TO WHITE (CARBONATE INDURATION)	
TOTAL DEPTH		50 55 60 65		NOTE: STATIC WATER ELEVATION 33.5 @ .5 HOURS AND 24.4 @ 72 HOURS	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6917.6
TOTAL DEPTH: 36.5
LOGGED BY: WHK
DATE: 9-4-96
STATIC WATER: 19' @ 27 HRS
BORING ID: 0648
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-6.2	///--////		C	**CLAY**, SLIGHTLY SILTY, ROOT MATTER, RED, BROWN, STIFF, MOIST	PID-0ppm ALL SAMPLES
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
	///--////	5.0	C		
	///--////		C		
6.2	///--////		C		
6.2-7.1	***///***		C	**SAND**, CLAYEY, GRADATIONALLY CONTACTS TOP, LOOSE, DRY, RED BROWN	
7.1	***///***		C		
7.1-8.3	///---///		C	**CLAY**, VERY SILTY, LAMINAR SILT, DRY-DAMP, FIRM, RED BROWN	
	///---///		C		
8.3	///---///		C		
8.3-12.3	---///---		C	**SILT**, CLAYEY, LAMINAR, DAMP-DRY, LIGHT BROWN, FIRM, ROOT MATTER	
	---///---		C		
	---///---	10	C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
12.3	---///---		C		
12.3-12.8	***---***		C	**SAND**, SILTY, FINE, LOOSE, DRY, RED BROWN	
12.8-14.3	///---///		C	**CLAY**, SILTY, STIFF, DAMP, ROOT MATTER, RED BROWN, SILT LAMINAR	
	///---///		C		
14.3	///---///		C		
14.3-16.5	***OO****	15	C	**SAND**, FINE, SCATTERED GRAVEL TO 2", SILTY, RED BROWN, MODERATELY DENSE, DRY-DAMP	
	OO*		C		
	OO*		C		
16.5	***OO****		C		
16.5-21.5	***SS****		C	**SAND**, COARSE-FINE, WET, SOME SANDSTONE GRAVEL TO 3", RED BROWN, SOME CLAY @ 19.5-20.0, WATER BEARING @ 20.0	
	SS*		C		
	SS*		C		
	SS*		C		
	SS*		C		
	SS*		C		
	SS*		C		
	SS*	20	C		
	SS*		C		
	SS*		C		
21.5	***SS****		C		
21.5-25.0	/////////		C	LOST SAMPLE-POSSIBLE SOFT, WET, CLAY BASED ON LEFTOVERS IN SAMPLER	
	/////////		C		
	/////////		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6917.6
TOTAL DEPTH: 36.5
LOGGED BY: WHK
DATE: 9-4-96
STATIC WATER: 19.0 @ 27 HRS
BORING ID: 0648
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
21.5-25.0	//////// //////// ////////		C C C	LOST SAMPLE-POSSOBLE SOFT, WET, CLAY BASED ON LEFTOVERS IN SAMPLER	PID-0ppm ALL SAMPLES
25.0	////////	25	C		
25.0-28.0	//////// //////// //////// //////// ////////		C C C C C	**CLAY**, WET, SOFT, RED BROWN	
28.0	////////		C		
28.0-30.0	*O*SS*O*O *O*SS*O*O *O*SS*O*O		C C C	**SAND & GRAVEL**, 4" SANDSTONE, CHERT, **WATER BEARING**, **HYDROCARBON ODOR**, LOOSE, MULTICOLORED	
30.0	*O*SS*O*O	30	C		
30.0-32.0	S=S=S=S=S S=S=S=S=S S=S=S=S=S		C C C	**CHINLE FORMATION** SAMPLER REFUSAL-POSSIBLE "SWEET" ODOR, SANDSTONE & SHALE > 30', NO ODOR, DRILL WITHOUT SAMPLER TO 35', MATRIX > 30' GREYGREEN, CEMENTED VERY DENSE ROCK @ 32'	
32.0	S=S=S=S=S		C	DIVE SAMPLER 3"-STUCK IN ROCK	
32.0-36.5	S=S=S=S=S S=S=S=S=S S=S=S=S=S S=S=S=S=S S=S=S=S=S S=S=S=S=S S=S=S=S=S		C C C C C C	**SANDSTONE & SHALE**, HARD, CALCARIOUS CEMENTATION, FINE TO COARSE, SHALE, GREEN-RED B	
36.5	S=S=S=S=S	35	C C C		
TOTAL DEPTH		40 45		NOTE: HYDROCARBON ODOR APPEARS TO BE CONCETRATED IN WATER LYING ON CHINLE FORMATION	

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6913.4
TOTAL DEPTH: 30.0
LOGGED BY: WHK
DATE: 9-4-96
STATIC WATER: 20.0
BORING ID: 0649
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-3.1	///--////		C	**CLAY**, DAMP, MOIST, RED BROWN, STIFF, SLIGHTLY SILTY, ROOT MATTER	PID-0ppm ALL SAMPLES
	///--////		C		
	///--////		C		
	///--////		C		
	///--////		C		
3.1	///--////		C		
3.1-4.0	***///***		C	**SAND**, CLAYEY, RED BROWN, MODERATELY DENSE, DRY-DAMP	
	///		C		
4.0	***///***		C		
4.0-5.0	///---///	5.0	C	**CLAY**, MOIST, RED BROWN, STIFF, SILTY, ROOT MATTER	
5.0-6.0	***///***		C	**SAND**, CLAYEY, RED BROWN, SOME COARSE, MODERATELY DENSE, DAMP	
6.0	***///***		C		
6.0-6.9	///***///		C	**CLAY**, SANDY, RED BROWN, VERY STIFF, MOIST	
6.9	///***///		C		
6.9-8.5	///--*///		C	**CLAY**, SLIGHTLY SILTY, WEAKLY SANDY, SOME CHARCOAL, SOME ROOT MATTER, RED BROWN, STIFF	
	///--*///		C		
8.5	///--*///		C		
8.5-8.9	*********		C	**SAND**, MEDIUM, RED BROWN, MODERATELY DENSE, DAMP	
8.9-17.0	///**////		C	**CLAY**, SLIGHTLY SANDY, RED BROWN, VERY STIFF, MOIST, SOME SCATTERED GRAVEL	
	///**////	10	C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////		C		
	///**////	15	C		
	///**////		C		
	///**////		C		
	///**////		C		
17.0	///**////		C		
17.0-17.3	***//****		C	**SAND**, RED BROWN, FINE, MOIST, SLIGHTLY CLAYEY, LOOSE	
17.3-23.2	///00////		C	**CLAY**, WET, RED BROWN, STIFF, SCATTERED FINE GRAVEL (RARE), SOME WHITE FILIMENTS OF CALCIUM CARBONATE SALTS	
	///00////		C		
	///00////		C		
	///00////		C		
	///00////	20	C		
	///00////		C		
	///00////		C		
	///00////		C		
	///00////		C		
	///00////		C		
	///00////		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 6913.4
TOTAL DEPTH: 30.0
LOGGED BY: WHK
DATE: 9-4-96
STATIC WATER: 20.0
BORING ID: 0649
PAGE: 2

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
23.2-25.0	000***/00		C	**GRAVEL**, SANDY, CHERT, SANDSTONE, SLIGHTLY CLAYEY, RED BROWN, DENSE, **WATER BEARING**	PID-0ppm ALL SAMPLES
	000***/00		C		
	000***/00		C		
25.0	000***/00	25	C		
25.0-30.0	===***===		C	**CHINLE FORMATION**	
	===***===		C	**SHALE**, SANDY, RED BROWN/GREEN INTERBEDS, DENSE, MOIST, NOT WATER BEARING	
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
	===***===		C		
30.0	===***===	30	C		
TOTAL DEPTH					
		35			
		40			
		45			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 7004.7
TOTAL DEPTH: 30.0
LOGGED BY: WHK
DATE: 9-9-96
STATIC WATER: NOT FOUND
BORING ID: 0650
PAGE: 1

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
0.0-3.7	///**--//		C	**CLAY**, SANDY, SILTY, MOIST, BROWN, FIRM	PID-0ppm ALL SAMPLES
	///**--//		C		
	///**--//		C		
	///**--//		C		
	///**--//		C		
	///**--//		C		
3.7	///**--//		C		
3.7-5.0	***000***		C	**SAND**, VERY GRAVELLY, DENSE, MOIST, BROWN-RED BROWN, GRAVEL 2-3"	
	000		C		
5.0	***000***	5.0	C		
5.0-8.7	000**SS00		C	**GRAVEL**, SANDY, SANDSTONE, CHERT, RED BROWN, DENSE, MOIST	
	000**SS00		C		
	000**SS00		C		
	000**SS00		C		
	000**SS00		C		
	000**SS00		C		
8.7	000**SS00		C		
8.7-9.8	///***///		C	**CLAY**, SANDY, MOIST, RED BROWN, FIRM	
	///***///		C		
9.8	///***///	10	C		
9.8-13.0	*********		C	**SAND**, FINE TO MEDIUM, RED BROWN, MOIST, LOOSE	
	*********		C		
	*********		C		
	*********		C		
	*********		C		
13.0	*********		C		
13.0-14.6	000**SS00		C	**GRAVEL**, SLIGHTLY SANDY, CEMENTED SANDSTONE, HARD	
	000**SS00		C		
14.6	000**SS00		C		
14.6-18.1	///**--//	15	C	**CLAY**, SANDY, SILTY, FIRM, WET, RED BROWN	
	///**--//		C		
	///**--//		C		
	///**--//		C		
	///**--//		C		
	///**--//		C		
18.1	///**--//		C		
18.1-18.4	***---***		C	**SAND**, SILTY, BROWN, LOOSE, FINE, MOIST	
18.4-29.0	///***///		C	**CLAY**, SANDY, SAND IN LANINATIONS, WET, FIRM, RED BROWN, SOME SAND STREAKS TO 1cm BUT VERY CLAYEY(> 20')	
	///***///		C		
	///***///	20	C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

PRECISION ENGINEERING, INC.

PROJECT: Giant Refinery
Ciniza

LOG OF TEST BORINGS

FILE #: 96-133
ELEVATION: 7004.7
TOTAL DEPTH: 30.0
LOGGED BY: WHK
DATE: 9-9-96
STATIC WATER: NOT FOUND
BORING ID: 0650
PAGE: 2

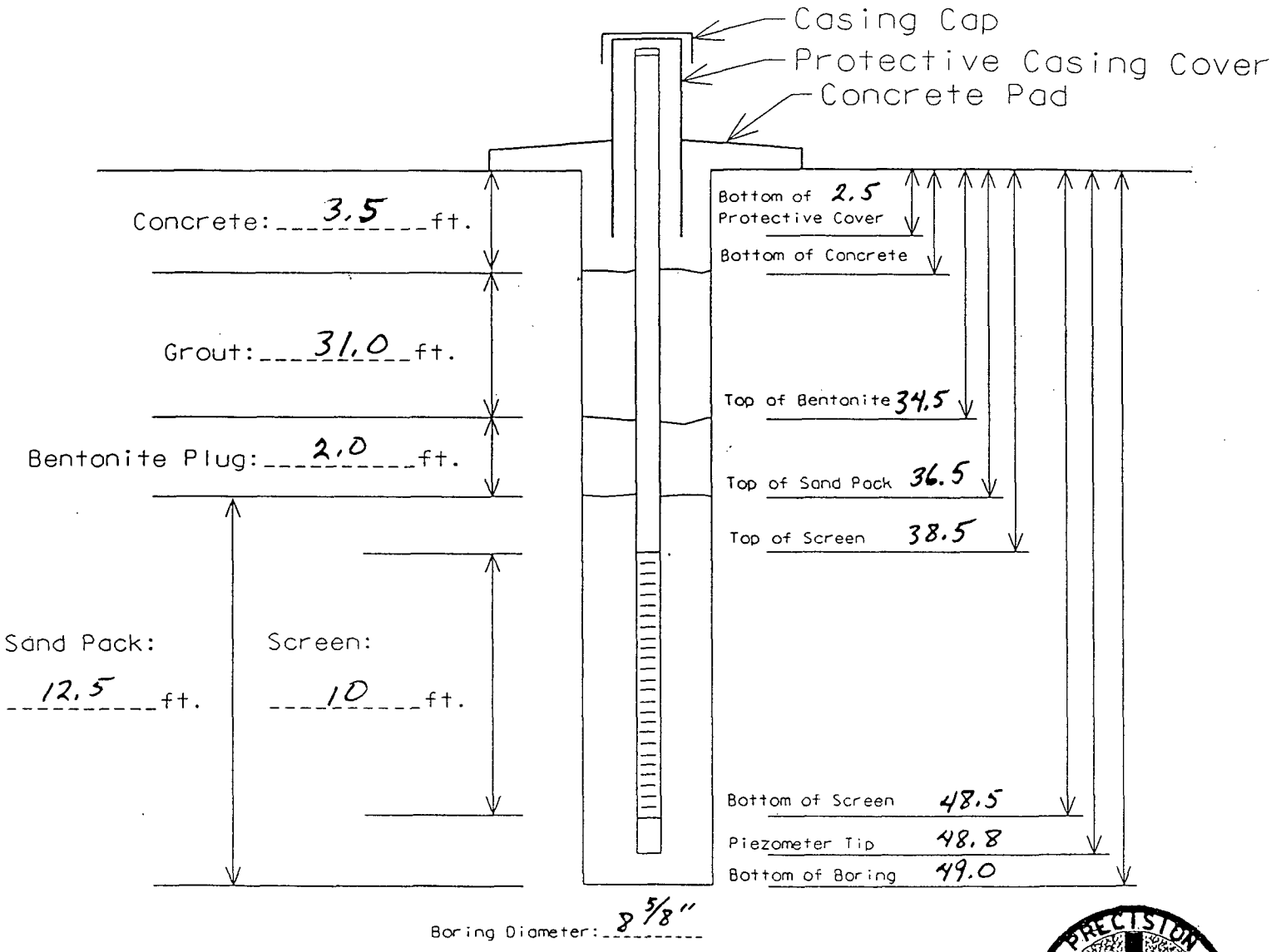
DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
18.4-29.0	///***///		C	**CLAY**, SANDY, SAND IN LAMINATIONS, WET, FIRM, RED BROWN, SOME SAND STREAKS TO 1cm	PID-0ppm
	///***///		C	BUT VERY CLAYEY (> 20')	ALL SAMPLES
	///***///		C		
	///***///	25	C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
	///***///		C		
29.0	///***///		C		
29.0-30.0	SSS===SSS		C	**CHINLE FORMATION**	
30.0	SSS===SSS	30	C	**SANDSTONE**, SHALEY, FINE, HARD, SLIGHTLY FISSLE, MOIST, RED PURPLE	
TOTAL DEPTH					
		35			
		40			
		45			

LOGGED BY: WHK

SIZE AND TYPE OF BORING: 4 1/4" ID Hollow Stemmed Auger

Installation Diagram

Monitoring Well No. OW-29



Boring Diameter: 8 5/8"

Sand Type: 20-40

Bollards. Type/Size: NONE

Bentonite: PEL PLUG TR-30, 3/8 PELLETS

Screen Type/Size: 4" ID, SCH. 40, PVC, #10 SLOT

Cement/Grout: 6% BENTONITE/CEMENT

Riser Type/Size: 4" ID SCH 40, PVC

Water: POTABLE

Locking Expandable Casing Plug?: YES

Site Northing: 5099.3

Other:

Bottom Cap Used?: YES

Site Easting: 360.0

Project #: 96-134

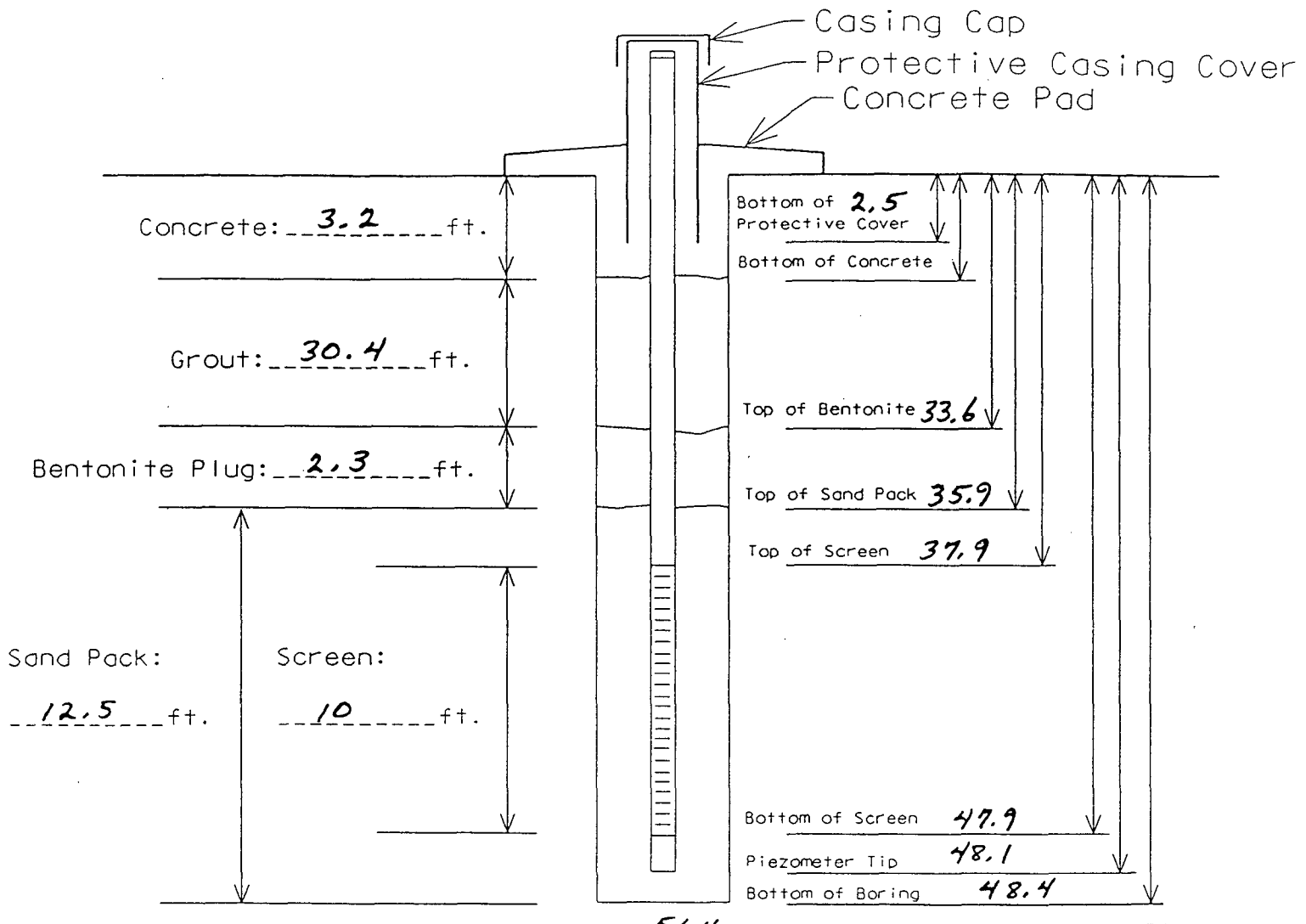
Project Name: CINIZA REFINERY INVESTIGATION

Elevation: 6913.5

PRECISION ENGINEERING, INC.
505-523-7674

Installation Diagram

Monitoring Well No. OW-30



Boring Diameter: 8 5/8"

Sand Type: 20-40

Bentonite: PELPLUG, TA-30 3/8" PELLETS

Cement/Grout: 6% BENTONITE/CEMENT

Water: POTABLE

Other:

Bollards, Type/Size: NONE

Screen Type/Size: 4"ID, #10, SCH40 PVC

Riser Type/Size: 4"ID, SCH 40, PVC

Locking Expandable Casing Plug? YES

Bottom Cap Used? YES

Project #: 96-134

Project Name: CINIZA REFINERY INVESTIGATION

Site Northing: 4599.3

Site Easting: 30.0

Elevation: 6921.6

PRECISION ENGINEERING, INC.

505-523-7674

5000' W
4500' W
4000' W
3500' W
3000' W
2500' W
2000' W
1500' W
1000' W
500' W
0.00' W
500' N
1000' N
1500' N
2000' N
2500' N
3000' N
3500' N
4000' N
4500' N
5000' N
5500' N
6000' N
6500' N
0.00' S

EXIT 39
EAST I-40
WEST I-40

89° 57' 30"
90° 02' 30"

LAND TREATMENT AREA
SWMU NO. 13
SWMU NO. 1 & AERATION LAGOONS
SWMU NO. 3
DCD LTA
INACTIVE LTA
RAIL RACK LAGOONS
HYDROGEN TANKS

NHT
PLAT
CRUDE
ISOM
SRU
DHT
GC
ALKY
GAS-CON
FRACTING
SATS

MARKED ROCK IN ROCK MOUND
SE CORNER OF SECTION 33, T15N, R15W

N. 6589.30'
W. 0.00'
2" IP SET IN CONCRETE, NE CORNER OF PROPERTY

d:/win32app/ingr/insitu/ciniza/sit Nov. 20, 1996 16:15:21

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

CERT. MAIL No. P-288-258-673

☒ Telephone ☐ Personal	Time 9:00AM to 9:50AM	Date 10-29-96

Originating Party	Other Parties
Pat Sanchez - OCD, Bob Sweeney and Mike Chacon - NMED, HRMB	Giant Ciniza - Dave Pavlich, Steve Morris

Subject: Tank 569 / SWMU No. 6 - Contamination investigation and letter from (Giant CEd Horst) dated September 4, 1996

Discussion: Discussed the "Contamination investigation" being permformed by Giant regarding Tank 569/SWMU No. 6.

(1) Asked about Number of wells drilled / completed as monitor wells. Seven so far.

(2) Asked if wells had been placed such that all Contamination delineated. (North, South, west - delineated) - Eastern portion to be delineated when land issue resolved.

(3) Asked about sample analysis thus far - BTEX, MTBE - samples from soils and openhole completions. Wells upon development to be sampled. (Method 8020-SW-846)

Conclusions or Agreements: (1) Mr. Pavlich will submit a report by the 3rd. Week of November 1996 - the report will include all of the data collected thus far, and a commit to finish delineating the eastern portion by the 1st. QTR of 1997 (Preferably End of January, 1997.) and a commitment to finish developing the monitor wells and Sample them.

Distribution: File, Denny Faust, Bob Sweeney, Dave Pavlich - Giant.

Signed: Patricia W. Sanchez

(OVER →)

(2) Mr. Pavlich upon completion of the "Delineation" to the east. by the 2nd or 3rd QTR - i.e. Mid to late spring 1997. Will submit his (Grants) "remmediation plan" pursuant to WQCC Regulation 3109.E. as a "Modification" to the discharge plan GW-032 for Grant Cinza.

P 288 258 673

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PS Form 3800, April 1995

NEW MEXICO ENVIRONMENT DEPARTMENT
Hazardous and Radioactive Materials Bureau

MEMORANDUM

Date: October 11, 1996

To: Pat Sanchez, Oil Conservation Division

From: Bob Sweeney, RCRA Permits Management Program

Re: Giant Ciniza Refinery, SWMU-6 Corrective Action Plan

I have reviewed Giant Refining Company's September 4, 1996 Response to your letter of June 20, 1996 regarding the Corrective Action Plan for SWMU-6 product recovery and have the following comments and questions:

1) In the Response, Giant refers to a "progress report". When is the first report to be sent?

2) In a couple of places a "six hole drilling/boring program" is mentioned. What is the current status of the program? Can we get more information on what the program includes (eg. locations of proposed boreholes and sample and analytical data) before the first quarterly progress report is sent?

3) Giant's response to the June 20th General Comment 1 states that analytical testing may include refinery products in addition to BTEX. Can Giant give us a list of which constituents will be analyzed for? In this same response Giant states that water samples will be obtained and handled similarly to the the soil samples. Will borings encountering groundwater be completed as monitoring wells, or will Giant attempt to take water samples from the open borehole?

4) According to Giant's response to the June 20th General Comment 3, sampling the groundwater in wells OW-13 and OW14 will monitor the success of the pump and treat method of remediation at SWMU-6. I doubt, based on correlation of well logs, OW-13 is capable of sampling groundwater from the same interval as B-2 and BG-4. Also, I doubt OW-14 is downgradient of the SWMU-6.

10-11-96 | Mtg. w/ Bob Sweet | NMED, HRMB.

TIME: 9:00 AM to 10:00 AM.

(1.) Delineation is still not done.

(2.) Interference testing needs to be conducted on the wells that will be part of the compliance area.

- After wells are developed - wait a time period, i.e. - about one week to allow the wells to stabilize, measure the fluid levels in all the wells at the same time (as practically possible.) then purge each well - one at a time 3 wellbore volumes and sample. (Measure the liquid level in all the wells after purging.)
- If NO pressure response is seen in any of the wells - i.e. fluid level drops, pick the well with the best recharge and pump test it for 24 hours - then measure the fluid level.

- This should help resolve the vested sand issue and tell us about the size of the water source.

(3.) Groundwater samples will be collected from Cased and grouted properly completed Monitor wells. Open hole well sample or temporary completion samples will not be allowed.

(4) When will the first quarterly Report be submitted, and when will the delineation be completed.

(5) OCD will not require a Part 4 abatement plan provided that Giant Fully delineate the lateral and vertical extent of the contamination and submit a modification to the discharge plan GW-032 will as an immediate plan based on the data collected from the delineation to clean up the vadose zone contamination.

(6.) Giant Needs to supply to other COC i.e. what about lead. OCD may require future water list as part of additional sampling. Monitor wells at compliance points will at least have to be sampled for volatiles and Semi-volatiles as well as lead.

(7) GW-14 contaminated, GW-13 appears to be completed in a zone below vested contaminated sands. (These wells are probably no good.)

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

GIANT
REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

September 4, 1996

Mr. Patricio Sanchez
New Mexico Oil and Gas Division
2040 South Pacheco Street
Santa Fe, New Mexico 87505

Dear Mr. Sanchez:

SUBJECT: CORRECTIVE ACTION PLAN-SWMU-6-RESPONSE

In your letter of June 20, 1996, you point out that pursuant to WQCC Section 4105 A. 6 Giant is exempt from filing an Abatement Plan provided: "under the authority of a ground-water discharge plan approved by the secretary, provided that such abatement is consistent with the requirements and provisions for Section 4101, 4103, 4106C, 4107, and 4112 of this part." In reviewing these sections of the WQCC it appears as if Giant is not required to submit an Abatement Plan, however, because this area is identified as a Solid Waste Management Unit (SWMU) in the Hazardous and Solid Waste Act (HSWA) portion of Giant's Resource Conservation and Recovery Act (RCRA) Permit, a Corrective Action Plan is required to be submitted to the regulatory agencies. Therefore Giant submitted the April 15, 1996, Corrective Action Plan (CAP).

The CAP was submitted not as a completed document but rather one that would allow Giant to begin product recovery from two (2) recovery wells, BG-4 and B-2. In reviewing the comments submitted by the New Mexico Oil Conservation Division (NMOCD), New Mexico Hazardous and Radioactive Materials Bureau (NMHRMB) and the U.S. Environmental Protection Agency (USEPA), it appears that the CAP must be expanded to address the various comments. The following information is being submitted in an effort to address these comments, however, Giant still feels that as this project develops and additional information is gathered, further modification to the CAP will likely be necessary.

In reviewing your June 20, 1996 letter, General Comment 1, you state that it is OCD's understanding that the source of contamination was due to old operational practices of tank cleaning and not leaking AST's or below grade lines. To insure all potential sources of contamination are addressed, Giant is presently reviewing all records, including tank inspection records. As stated on page 12 of the CAP, Giant will be submitting a written quarterly progress report which will include the findings of the record review.

As a part of the June 20, 1996 letter, NMOCD included comments, as attachments, from NMHRMB and USEPA. HRMB had four (4) "General Comments" and four (4) "Specific Comments" that will be addressed as follows:

file:m:cap6res

GENERAL COMMENT 1: SWMU-6 is included in the Hazardous and Solid Waste Amendments module of Giant Refining Company's Resource Conservation and Recovery Act Permit and, as such, requires certain corrective actions to be taken when hazardous constituents have been released to the environment. The following issues need to be addressed:

⇒ The source of contamination must be determined and further release prevented. Are the storage tanks in SWMU-6 now active? Have they been checked for releases? Has all piping in the area been tested for leaks? What other potential contamination sources exist at the site?

GIANT'S RESPONSE: As stated above, an extensive review of all records will be conducted to insure all potential contamination sources have been identified. All storage tanks in SWMU-6 are active with the exception of Tank 573. This tank was removed from service in 1995. Many of these tanks have been checked for leaks. Giant's environmental staff is presently reviewing the tank inspection records and will report their findings in the first progress report. As for the piping, again Giant's environmental staff is reviewing all available records and will report on them in the first progress report. The only other sources of contamination would be the mishandling, for example spills and tank cleanings, of the products or their residues over the past 40 years.

⇒ Contaminant characterization must be completed. What contaminant types and concentrations are in the groundwater and soils at SWMU-6? At what rate is the contamination spreading away from the SWMU-6? What is the extent (both vertical and horizontal) of contamination?

GIANT'S RESPONSE: As stated in the CAP, Giant anticipates modifying or amending the CAP so as to reflect "reality". Presently, a six hole drilling/boring program is underway to characterize and determine the extent, both horizontal and vertical, of the contamination. Giant will present its findings in the first progress report.

⇒ What are the hazardous constituents of concern for the site? How and where will environmental media be sampled for hazardous waste contamination? What will be done for hazardous constituents in both soils and groundwater?

GIANT'S RESPONSE: To fully answer this comment, the six (6) hole drilling/boring program must be completed and samples analyzed. Giant will sample the soils every two feet. Each sample will be placed in a sample container and field screened with a Photo-Ionizer Detector (PID). If the PID indicates that there maybe contamination present, the sample will be sent off for analytical testing. Initial analytical testing will concentrate on finding any constituents found in gasoline, i.e. benzene, toluene, ethylbenzene, total xylenes (BTEX) but may be expanded to include constituents found in other products produced by the refinery. In addition to the soil, if water bearing

zones are encountered, then water samples will be obtained and handled in the same manner as the soil samples.

GENERAL COMMENT 2: The proposed pump & treat method of product removal is likely to alter the characteristics of the contaminant plume. How does GRC-C proposed to monitor the changes?

GIANT'S RESPONSE: The characteristic base line will be established once the initial six (6) hole drilling/boring program is completed and the samples analyzed. From this point a sampling and analysis plan will be submitted to the regulatory agencies for review and approval.

GENERAL COMMENT 3: A timetable for completion of the several tasks associated with corrective action for SWMU-6 must be submitted.

GIANT'S RESPONSE: As set out in the CAP, Giant proposes to begin remediation through a pump and treat method. Initially, two (2) submergible pumps will be installed at wells B-2 and BG-4 by the end of the third quarter 1996. Monitoring of the success of this operation will be conducted through water sampling at down gradient wells OW-13 and OW-14 on the same schedule as presently required by the New Mexico Oil Conservation Divisions approved Ground Water Discharge Permit 32 (twice a year). Establishing one additional monitoring well will be completed by the end of the third quarter of 1996.

In addition, as stated above, Giant is performing a six (6) hole drilling/ boring and sampling/analytical program that began on August 22, 1996 and will be completed during the fourth quarter of 1996. Results from these efforts will be submitted to the regulatory agencies before the end of the fourth quarter of 1996.

GENERAL COMMENT 4: NMED needs construction & lithology logs and ground levels for the OW wells in order to determine if they're usable, as proposed. in the proposed corrective action.

GIANT'S RESPONSE: Attached as a part of this response is a copy of the typical construction of the OW wells throughout the facility. Lithology logs and ground levels for OW-13 and OW-14 are also included in the attachment.

SPECIFIC COMMENTS:

◊ Page 10, Paragraph 2: The bore-holes will be sampled and analyzed for hazardous constituents every two feet until two "clean" samples are found.

GIANT'S RESPONSE: There appears to be a misunderstanding about what Giant is stating in this paragraph. This was historical "Site Assessment" information and not

how the site will now be assessed. Giant did however follow NMHRMB's recommendations to gather bore hole soil samples every two feet for its current drilling/boring program. As stated above, each sample then was field screened with a PID, and, if there was any indication of organic compounds, the sample was sent to an independent analytical laboratory to be analyzed.

◊ Page 11, Paragraph 2: How will the API Separator effluent water be check for dissolved constituents? How will any contaminated water be handled?

GIANT'S RESPONSE: It is Giant's understanding, as above explained, that due to the small amount of liquid being placed into the API Separator system and the fact that all Giant's processed water passes through the API Separator, no additional monitoring would be required (see letter from NMOCD dated July 9, 1996). All contaminated water would be handled the same as process waters. Hydrocarbon would float on the surface, be captured by surface skimming, and be returned to the process to recover usable product.

◊ Page 11, Paragraph 2: Does GRC-C assume all free product will be removed by pumping for wells B-2 and BG-4. How will contaminated soil and groundwater be remediated?

GIANT'S RESPONSE: In reviewing the submitted CAP, I find myself again apologizing for causing a misunderstanding of what Giant is trying to accomplish. The purpose of the CAP was to begin a recovery process and begin a more complete site characterization. Once additional information is gathered, a Corrective Action Plan for handling contaminated soils and waters would be submitted. It is, however, anticipated that the contaminated groundwater would be also removed through the recovery wells and placed into the API Separator. The amount of water would be less then 3 gallons per minute and, more likely, due to the very slow recharge of the recovery wells, less then 1.5 gallons per minute.

◊ Page 12, Paragraph 1: Are the wells OW-14 and OW-13 down gradient of SWMU-6? Across which sands are the two wells screened?

GIANT'S RESPONSE: In addressing this comment, please refer to the attached information for answering NMHRMB's "GENERAL COMMENT 4:"

In reviewing USEPA's recommendations, it appears as though NMHRMB has incorporated USEPA's recommendations in their recommendations. Thus responding to NMHRMB's comments would in fact be responding to the USEPA's comments.

In summary, Giant is presently proceeding to fully characterize SWMU-6 through record searches, drilling/boring, sampling and analysis work. Giant will continue to monitor and sample existing OW wells near SWMU-6 and establish new monitoring wells down

gradient from SWMU-6. These new monitoring wells will be completed in the same geologic zones that appear to be contaminated and will be located in front of any plume that might be migrating.

If you have any questions on this matter, please contact Mr. Dave Pavlich at (505) 722-0217or Mr. Steve Morris at (505) 722-0258.

Sincerely,

Edward L. Horst, Environmental Manager
Giant Refinering Company
Ciniza Refinery

cc: Mr. Denny Foust - NMOCD
Mr. Bob Sweeney - NMED/HRMB
Mr. Dick Platt, General Manager - Giant Refining Company
Mr. Dave Pavlich, HSE Manager - Giant Refining Company
Mr. Steve Morris, Environmental Specialist - Giant Refining Company

file:m:cap6res

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

July 9, 1996

CERTIFIED MAIL
RETURN RECEIPT NO. P-594-835-276

Mr. Edward L. Horst
Environmental Manager
Giant Refining - Ciniza
Route 3, Box 7
Gallup, NM 87301

RE: CAP-SWMU#6/TANK 569
Recovery well sampling
Giant Ciniza Refinery - GW-032

Dear Mr. Horst:

The New Mexico Oil Conservation Division (OCD) has received Giant's letter and "Corrective action Plan dated April 15,1996, Clarification on OCD Requirements." dated July 4, 1996 (see attachment). The OCD (Pat Sanchez) and NMED HRMB (Bob Sweeney) have met to discuss the previously requested sampling of the two proposed recovery wells B-2 and BG-4. **Upon review of sample analysis that OCD obtained as part of the discharge plan renewal process and discussion of the plant waste water handling system and the disposal of API separator sludge - the OCD will not require that the two recovery wells be sampled at this time.** Giant may begin free product recovery as previously approved by the OCD on May 8, 1996 .

Giant will however propose the appropriate constituents of concern based upon process knowledge and the appropriate skinner list constituents cross referenced with WQCC constituents for the monitor wells that will be utilized and/or installed as part of the CAP for the area of concern.

Note, that OCD direction does not relieve Giant of liability should operations at Ciniza result in contamination of surface waters, ground waters or the environment which is a result of this directive. In addition, OCD direction does not relieve Giant of responsibility for compliance with any other Federal, State, or local laws and/or regulations.

Sincerely,

Patricio W. Sanchez
Petroleum Engineer

xc: Mr. Denny Foust - NMOCD, Mr. Bob Sweeney - NMED, HRMB
Attachment

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

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Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	

PS Form 3800, April 1995

August 20, 1996

CERTIFIED MAIL
RETURN RECEIPT NO.P-594-835-309

Mr. Edward L. Horst
Environmental Manager
Giant Refining - Ciniza
Route 3, Box 7
Gallup, NM 87301

RE: Request for a 30 day extension
CAP-SWMU #6/TANK 569
Discharge Plan GW- 32
Giant Ciniza Refinery

Dear Mr. Horst:

The New Mexico Oil Conservation Division (OCD) has received Giant's letter August 14, 1996 requesting an extension to the OCD letter dated June 20, 1996 regarding the above captioned item.

The request is hereby approved and the extension will expire on September 20, 1996.

Please note, that this extension does not relieve Giant of liability should operations as a result of this extension result in further contamination of the CAP-SWMU/Tank 569 area.

If Giant has any questions please feel free to call me at (505)-827-7156.

Sincerely,

Patricio W. Sanchez
Petroleum Engineer,
Environmental Bureau

xc: Mr. Denny Foust - NMOCD, Mr. Bob Sweeney - NMED, HRMB

GIANT REFINING CO.

August 14, 1996

Route 3, Box 7
Gallup, New Mexico
87301
505
722-3833

Mr. Patricio W. Sanchez
Petroleum Engineer
State of New Mexico
Energy, Minerals, and Natural Resources Department
Oil Conservation Division
2040 S. Pacheco
Santa Fe, New Mexico 87505

Dear Mr. Sanchez:

SUBJECT: REQUEST FOR A 30 DAY EXTENSION -CAP-SWMU#6/TANK 569

Giant Refining Company (Giant) is requesting a 30 days extension period for responding to the New Mexico Oil Conservation Division, the New Mexico Hazardous and Radioactive Materials Bureau and the US Environmental Protection Agency's comments on Giant's Corrective Action Plan (CAP) for SWMU#6. This extension is necessary because of the larger amount of time Giant's staff spent on projects such as the reviewing, copying and submitting a Class III Permit Modification and Amended Closure Plan for the RCRA Permitted Land Treatment Unit, responding to OCD's Permit Renewal Inspection Comments for Giant's Groundwater Permit GW-32, and the unscheduled drilling and sampling event at SWMU #1 (Aeration Lagoons).

If there are any questions please contact me at (505) 722-0227.

Sincerely,

Edward L. Horst, Environmental Manager
Giant Refining Company

cc: Mr. Denny Foust, NMOCD
Mr. Bob Sweeney, NMED/HRMB
Mr. David Pavlich, Giant Refining Company
Mr. Steve Morris, Giant Refining Company

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

June 14, 1995

CERTIFIED MAIL
RETURN RECEIPT NO.Z-765-962-699

Mr. Lynn Shelton
Giant Refining - Ciniza
Route 3, Box 7
Gallup, NM 87301

RE: **Characterization Plan-APPROVAL**
Potential hydrocarbon contamination
Tank 569
Giant Ciniza Refinery

Dear Mr. Shelton:

The New Mexico Oil Conservation Division (OCD) has received Giant's letter dated April 4, 1995 and has completed review of the "Characterization Plan" additional information and "Characterization Plan" dated February 24, 1995. The Characterization Plan document and additional information letter contains Giant's plan for assessment of the extent of contamination related to the RFI 0639 well that is to the north of tank 569.

The above referenced plan is approved with the following conditions:

1. Giant will determine if both free phase and dissolved phase contaminants exist in the area to be investigated by the Characterization Plan.

2. Giant will consult with the NMOCD to determine if investigation wells should be completed. NMOCD does not believe that a 2 hour drawdown period on openhole completions of the investigation wells is a sufficient period to effect a significant radius of investigation.

3. Giant will complete the investigation wells as shown on the attached wellbore schematic.

Note, that OCD approval does not limit Giant to the work proposed should it later be found that contamination exists which is beyond the scope of this work plan, or if Giant fails to completely define the extent of contamination. In addition , OCD approval does not relieve Giant of responsibility for compliance with any other Federal, State , or other local laws and/or regulations.

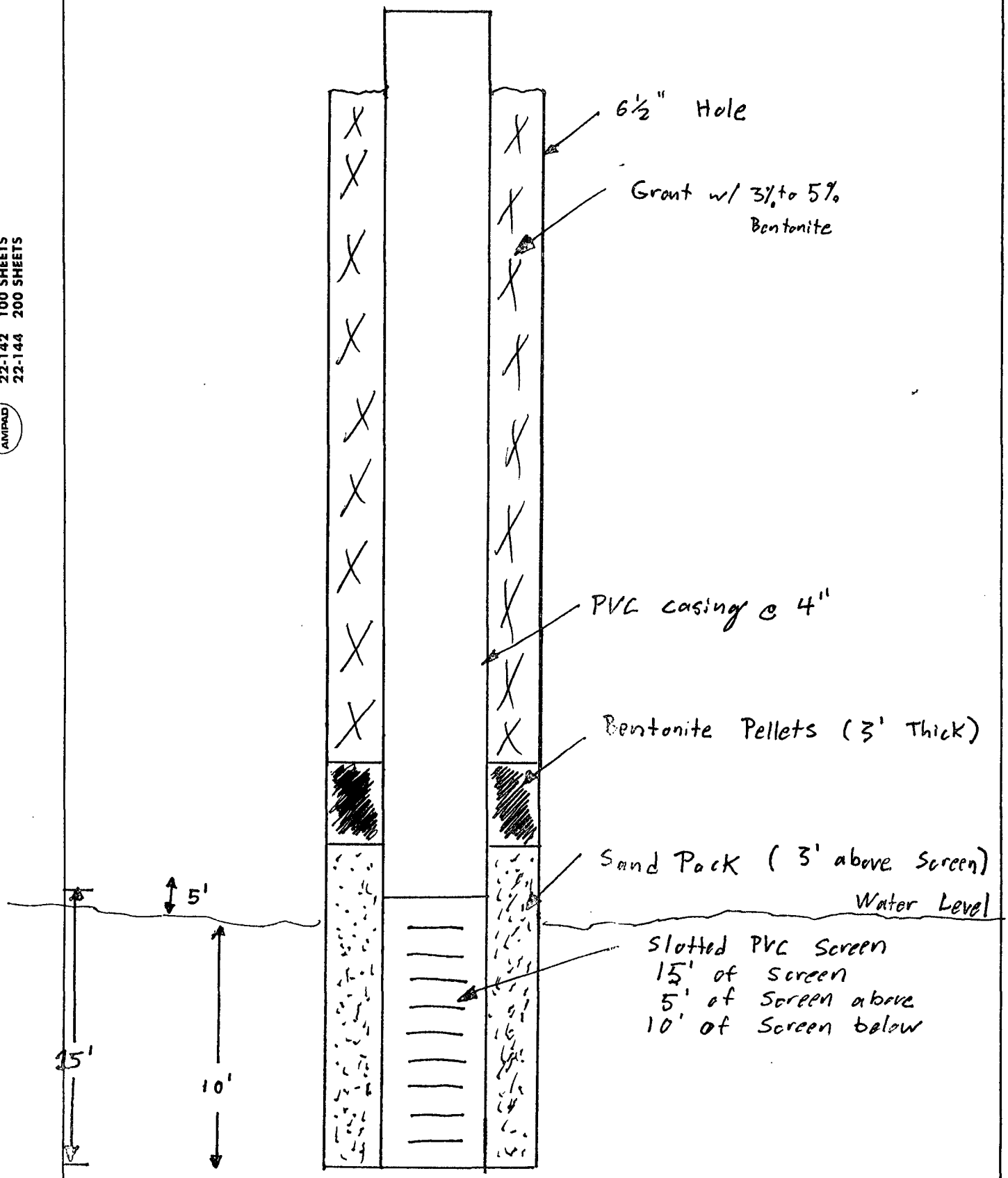
If you have any questions regarding this matter feel free to call me at (505)-827-7156.

Sincerely,

Patricio W. Sanchez
Petroleum Engineer, Environmental Bureau OCD

XC: Denny Foust

EXAMPLE | Well Completion | TANK 569
Giant Ciniza



Drawn by P.W. Sanchez
6-9-95

GIANT REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

April 4, 1995

Patricio W. Sanchez
Environmental Bureau
Oil Conservation Division
2040 South Pacheco
Santa Fe, NM 87505

Re: Characterization Plan - Tank 569
Giant - Ciniza Refinery GW-32

Dear Mr. Sanchez:

Giant Refining Company - Ciniza is in receipt of your March 23, 1995 letter concerning the characterization plan for potential hydrocarbon contamination beneath Tank 569.

Giant submits the following information and/or clarification as you requested:

1. *Please provide clarification as to why you think piping is not part of the problem - are all lines above ground or do recent hydrostatic integrity tests verify this theory?*

   All process lines are above ground with only the wastewater lines below the ground. As Giant had the wastewater lines at the tank farm visually inspected (using TV cameras) in 1990, those lines are not suspected of being the source of hydrocarbon.

2. *Is this shale fractured? Is it common for "shales" in this area to be water bearing?*

   This observation was an error on my part. In drilling RFI 0639 to 55.0' in October of 1994, it was determined that water was present at several intervals, including 41.9' - 43.6'. It was not until the borehole was grouted that it became apparent that there might be recoverable quantities of water. In reviewing the lithologic logs, it appeared that water was present in intervals that were shown to be dry in recent RFI drilling activities.

Specifically, an additional boring of RFI 0639 was drilled on March 20 and 21, 1995. That boring was drilled to 50.0' (through the gravel interval that was suspected of yielding recoverable quantities of water and hydrocarbon bearing water), then reamed, cased with 10" PVC casing, and grouted. Drilling then continued to 60.0' to insure that two "clean" samples were obtained. It was noted that all samples below the surface casing were dry and clean. The gravel intervals at 30.1' - 33.5' and 35.4' - 39.2' were the true water bearing intervals.

This drilling corroborated the theory that water had flowed down the borehole during auger flight and core barrel changes, thereby giving the appearance that water was present in lower sand intervals.

Giant does not believe that shales below the refinery site are water bearing, but that sand intervals occurring within shale zones may be water bearing.

3. *What geological and hydrogeological information does Giant have in order to make this assumption?*

Giant obtained this information primarily from the report Groundwater and Soils - Ciniza Refinery (Dames & Moore, March 1981).

4. *Does Giant intend to drill through the first water zones encountered during drilling? If so, and if perched water table(s) are anticipated, Giant must run surface casing in all boreholes in order to prevent possible contamination of deeper zones. Please clarify.*

Giant recognized that water would be encountered while redrilling RFI 0639 in March. Because it was necessary to drill to an unknown depth to obtain two "clean" samples for the RFI project, the decision was made to install surface casing to prevent contamination downhole (as was suspected in drilling RFI 0639 in October, 1994). This, the redrilling of RFI 0639 in March, 1995, could and did provide key information about the appropriate procedures to take in tank 569 characterization activities.

Not only does Giant now know that surface casing is not necessary, as the water bearing gravel is our target, but also that the total depth of the characterization drilling will likely be in the 45.0' - 50.0' range. Giant will address this change to the characterization plan in a later paragraph.

5a. *What are the methods that Giant will use to determine the above statement and who will be consulted and notified for approval of these completions?*

The redrilling of RFI 0639 in March, 1995 indicated that the gravel zone at 30.1' - 33.5' and 35.4' - 39.2' was the water bearing zone. That zone sits immediately above the Chinle Shale. Based on the observation of the amount of hydrocarbon-bearing water displaced (from RFI 0639) by grouting operations, Giant felt that sufficient quantities of water may be recoverable from the gravel interval in other boreholes, but additional drilling is the only way to verify that.

Giant plans to complete each boring through the gravel zone into the top of the Chinle shale, taking soil samples from the gravel zone and the Chinle shale for analysis and then pouring bentonite pellets into the borehole to provide a barrier against migration of hydrocarbon into the Chinle shale.

After the boring has been allowed to stand open for one to two hours, measurements to water will be taken. If hydrocarbon is present as a distinct layer and Giant feels that the charge rates to the borehole are sufficient (based on the apparent porosity of the gravel zone as determined by visual inspection and by the quantity of water in the borehole), the decision to complete as a well will be made as a collaboration between Giant environmental staff and the geologist.

- what about contacting NMOCD?

5b. *What does Giant propose as a method of analysis for water sampling in the boreholes?*

Giant proposes to analyze the hydrocarbon phase on a water sample collected by Method 8015 and the water phase by Method 8020. The water collected from a "clean" well will also be analyzed by Method 8020.

Giant had proposed in the Characterization Plan (February, 24, 1995), Section 3.A. Discussion of Borings, to drill to 75.0' or deeper if necessary. It is apparent from drilling RFI 0639 that appropriate depths will be in the 45.0' - 50.0' range. Giant will drill only deep enough to verify that the borehole has been advanced into the Chinle Shale and will obtain a clean sample from that zone.

Giant regrets the misunderstandings due to lack of clarity in some sections of the Tank 569 Characterization Plan and hopes that this letter provides the information you requested.

Sincerely,

Lynn Shelton

Lynn Shelton
Senior Environmental Coordinator
Giant Refining Company

TLS:sp

cc: David Pavlich, HSE Manager
Giant Refining Company

Kim Bullerdick, Corporate Counsel
Giant Industries Arizona, Inc.

Rich Mayer, RCRA, USEPA Region VI

Denny Foust, Deputy Inspector
Oil Conservation Division

(SRP)[C:\WPDOCS\TLS\OCD0404]

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

March 23, 1995

CERTIFIED MAIL
RETURN RECEIPT NO.Z-765-962-649

Mr. Lynn Shelton
Giant Refining - Ciniza
Route 3, Box 7
Gallup, NM 87301

RE: Characterization Plan Tank 569
Potential hydrocarbon contamination
Request additional information
Giant Refinery # GW 32

Dear Mr. Shelton:

The New Mexico Oil Conservation Division (OCD) has received Giant's letter dated February 24, 1995 and is in the process of reviewing the "Characterization Plan" that was attached with the letter. The " Characterization Plan" contains Giant's plan for assessment of the extent of contamination related to the RFI 0639 well that is to the north of tank 569.

The following additional information and clarification to the above referenced plan is requested:

1. In section 1.0 subsection B. the statement is made "*The potential.....may be a result of this activity as opposed to another source such as a leaking tank or piping.*"

Please provide clarification as to why you think piping is not part of the problem - are all lines above ground or do recent hydrostatic integrity tests verify this theory?

2. In section 2.0 subsection C. the statement " *Giant feels that the water bearing shale at 41.9' to 43.6 ' is the interval that contained hydrocarbon.*"

Is this shale fractured? Is it common for "shales" in this area to be water bearing?

3. In section 2.0 subsection C. the statement " *The sand, shale, and gravel intervals are not believed to be hydraulically connected with any potential aquifer and probably do not extend horizontally beyond the bluff area."*

What geological and hydrogeological information does Giant have in order to make this assumption?

4. In section 3. subsection B. " *All boreholes will be drilled.....*"

Does Giant intend to drill through the first water zones encountered during drilling? If so, and if perched water table(s) are anticipated Giant must run surface casing in all boreholes in order to prevent possible contamination of deeper zones. Please clarify.

5. In section 3. subsection B. " *Giant will determine during the course of drilling whether a given borehole will be completed (i.e. cased and screened) depending upon suitability of that borehole for recovery and remediation activities."*

What are the methods that Giant will use to determine the above statement and who will be consulted and notified for approval of these completions?

Also in the same section and subsection C. - *Sampling and Analysis.*

What does Giant propose as a method of analysis for water sampling in the boreholes?

OCD will defer any comment on remediation until after the characterization is done and the exact nature and extent of contamination has been determined.

Submission of the above information will allow OCD to complete review of this proposed "Characterization Plan."

If you have any questions regarding this additional request for clarification on this matter feel free to call me at (505)-827-7156.

Sincerely,

Patricio W. Sanchez
Petroleum Engineer, Environmental Bureau OCD

XC: Denny Foust

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

March 23, 1995

CERTIFIED MAIL
RETURN RECEIPT NO.Z-765-962-649

Mr. Lynn Shelton
Giant Refining - Ciniza
Route 3, Box 7
Gallup, NM 87301

RE: Characterization Plan Tank 569
Potential hydrocarbon contamination
Request additional information
Giant Refinery # GW 32

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If you have any questions regarding this additional request for clarification on this matter feel free to call me at (505)-827-7156.

Sincerely,

Patricio W. Sanchez
Petroleum Engineer, Environmental Bureau OCD

XC: Denny Foust

Dutton (1885). After intermediate revisions by various workers, Baker and others (1947) finally replaced the Wingate there with the Entrada; the Wingate is no longer recognized in the San Juan Basin (Green and Pierson, 1977; O'Sullivan, 1977). In the San Juan Basin, the Entrada consists of three members: a lower sandstone member (named the Iyanbito Member by Green, 1974), a middle siltstone member, and an upper sandstone member (Harshbarger and others, 1957). The Iyanbito Member is present only in the southern part of the basin. The middle and upper members are generally present throughout the basin. The upper member is generally a fine-grained, mature to supermature, subarkose to lithic arkose (tables 8 and 9). Thickness of the upper member is approximately 167 ft along the Church Rock mine road (fig. 80), 135 ft north of Prewitt, and 133 ft at Haystack Mountain; at San Ysidro the combined thickness of upper and middle Entrada is 115 ft (Stone, 1979a). The thickness of the Entrada based on subsurface data is mapped in fig. 81 (sheet 6, pocket). The Entrada conformably to unconformably overlies the Chinle Formation.

HYDROLOGIC PROPERTIES—Transmissivity, as indicated by a few specific-capacity tests, is less than 50 ft^2/d along the southern edge of the basin but more than 100 ft^2/d near the basin center (J. W. Shomaker, consulting geologist, personal communication, 1974). Values of hydraulic conductivity ranging from 0.5 to 5 ft/d in oil wells (Fassett and others, 1977, p. 24), would substantiate transmissivities of 100 ft^2/d or more. Jobin (1962, p. 42) reported a similar range of from 130 to 350 ft^2/d for the Entrada in the study area.

WATER QUALITY AND USE—In many places in or near recharge areas, water in the Entrada has a specific conductance less than 1,500 μmhos (fig. 82, sheet 6, pocket). Specific conductance increases to more than 10,000 μmhos in deeper parts of the basin.

In an elongate area between Bisti and San Ysidro, the Entrada produces oil from several fields (Fassett and others, 1977, p. 23). Large quantities of saline water that has a specific conductance of between 10,000 and 20,000 μmhos are produced with the oil. Test wells in this area produce water similar in quality to that of water produced from oil wells.

A well at Sanostee produced fresh water from the Entrada, but the water was unusable because of associated oil and gas (Halpenny and Harshbarger, 1950, p. 19). Domestic and stock wells in the area between Smith Lake and Mariano Lake produce much of their water from the Entrada Sandstone. Generally, however, water from the Entrada is not suitable for drinking, especially in deeper parts of the basin.

Figure 80—ENTRADA SANDSTONE NORTHWEST OF CHURCH ROCK MINE ROAD, 0.5 MI NORTH OF CHURCH ROCK. View to north in NE¼ SE¼ sec. 11, T. 15 N., R. 17 W.

Deeper deposits (pre-Jurassic)

Although there has been extensive drilling for petroleum in the San Juan Basin, most of these wells bottom in the Cretaceous section, and thus little is known of the deeper deposits of the area. The pre-Jurassic rocks are generally too deep to play a significant part in the energy-resource development or to be used extensively for water supply. The following general statements are included merely for completeness.

CHINLE FORMATION (TRIASSIC)—The Chinle Formation crops out in a considerable area at the southern margin of the basin, forming a broad valley between the northern flank of the Zuni Mountains and the red cliffs of the Entrada Sandstone. The Chinle Formation was first described by Gregory (1917). Subdivisions proposed by Stewart (1957) for southeast Utah are generally applied in New Mexico, but not all members are present (fig. 83). Other members have been recognized on the east side of the basin by Wood and Northrop (1946). The Chinle consists of mudstone, sandstone (often pebbly), and limestone. Total thickness of the formation is reportedly 700–1,500 ft (Molenaar, 1977a). The Chinle disconformably overlies the San Andres Limestone.

Aquifer tests of the Sonsela Sandstone Bed of the Petrified Forest Member of the Chinle northeast of Prewitt (well 13.10.18.212) gave a transmissivity of >100 ft^2/d. Specific conductances of water from the Sonsela and the shallower Correo Sandstone Bed of the Petrified Forest Member at this well exceed 10,000 μmhos. Generally, water quality deteriorates rapidly with depth, making the water unacceptable for stock or domestic use, except in or very near outcrop areas.

GLORIETA SANDSTONE-SAN ANDRES LIMESTONE (PERMIAN)—These formations are grouped because they intertongue and behave as a single unit hydraulically. The Glorieta Sandstone and overlying San Andres Limestone form the northern flank of the Zuni uplift. The Glorieta Sandstone, named by Keyes (1915) for exposures on Glorieta Mesa, San Miguel County, New Mexico, consists of fine- to medium-grained, quartzose sandstone. Baars and Stevenson (1977, fig. 4) gave a thickness map for the Glorieta that shows that it thins northward and northeastward, pinching out at approximately the latitude of Lybrook and Nageezi. The San Andres Limestone was named by Lee (Lee and Girty, 1909) for exposures in Rhodes Canyon, San Andres Mountains, Socorro County, New Mexico. The San Andres Limestone consists of thin-bedded dolostone, massive, micritic limestone (often fossiliferous), and fine-grained clastic rocks (Baars and Stevenson, 1977). The San Andres also thins northward and pinches out in the southern part of the San Juan Basin (Baars, 1962). The Glorieta Sandstone conformably overlies the Yeso Formation.

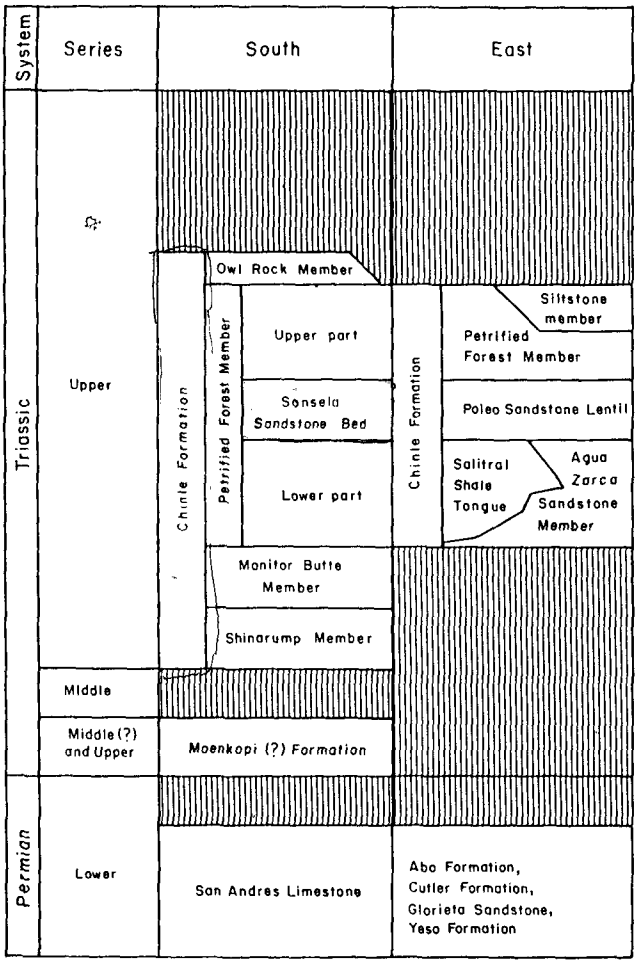

Figure 83—STRATIGRAPHIC NOMENCLATURE AND CORRELATION OF TRIASSIC AND ADJACENT DEPOSITS IN SAN JUAN BASIN (modified from O'Sullivan, 1977).

In the Grants-Bluewater area, dissolution of carbonate rocks has caused relatively high transmissivities. Gordon (1961, table 8) reported values ranging from 60,000 to 450,000 ft^2/d. Near Fort Wingate, the transmissivity is considerably lower, ranging from 5 to 3,700 ft^2/d (Shomaker, 1971, p. 36). A transmissivity of 90 ft^2/d for a well at Smith Lake may be typical for areas away from outcrops and not subjected to dissolution of carbonates. The Glorieta-San Andres yielded less than 1 gpm to a test hole drilled by Sohio north of Laguna (L. Jacobson, geologist, Sohio, personal communication, 1975), indicating a very low transmissivity for this aquifer in the southeast part of the study area.

The specific conductance of water from this aquifer ranges from 500 to 3,300 μmhos in the Grants-Bluewater area (Gordon, 1961, table 10) and from 800 to 3,500 μmhos near Fort Wingate (Shomaker, 1971, p. 46). The Smith Lake well yielded water with a specific conductance of 960 μmhos. Iron and manganese concentrations in this well are relatively high, making the water unsuitable as a domestic supply unless it is treated (Robert Mayers, engineer, U.S. Public Health Service, personal communication, 1976). The Glorieta-San Andres aquifer is the principal source of water along I-40 between Grants and Gallup. The city of Grants derives its water from this aquifer.

YESO FORMATION (PERMIAN)—Lee (Lee and Girty, 1909) named the Yeso Formation for exposures of sandstone, red beds, and gypsum on Mesa del Yeso, Socorro County, New Mexico. According to Baars and Stevenson (1977), the marine evaporites of the Yeso thicken south from a line roughly connecting Gallup and Albuquerque but are missing north of this line. The Yeso of the San Juan Basin is, therefore, almost exclusively an interval of red beds. The Yeso conformably overlies the De Chelly Sandstone.

The Yeso Formation is largely untested. A test of a well near Grants, which was drilled to determine the feasibility of injecting wastes from a uranium-processing mill, gave a transmissivity of 850 ft^2/d for the Yeso Formation (West, 1972, p. 16). Water from the well had dissolved-solids concentrations of between 3,000 and 4,000 mg/L (West, 1972, p. 13).

DE CHELLY SANDSTONE (PERMIAN)—The De Chelly Sandstone was named by Gregory (1915) for exposures in the Canyon de Chelly, Apache County, Arizona. The boundaries and correlation of this unit have been the subject of a lengthy debate. Recent drilling in the San Juan Basin has generally confirmed what Baars (1962) had advocated nearly 20 years ago: that the sandstone known as the Meseta Blanca Member of the Yeso Formation in the Albuquerque region and the De Chelly Sandstone of the Four Corners region are one and the same (Baars and Stevenson, 1977). The De Chelly consists of highly crossbedded, clean, eolian sandstone. Its thickness ranges from 800 ft in the southwest corner of San Juan County to less than 100 ft northeast of a line roughly connecting La Plata and Cuba (Baars and Stevenson, 1977, fig. 2). The De Chelly conformably overlies the lower Cutler and Abo Formations.

Cooley and others (1969, p. 47) reported transmissivities for this aquifer ranging from 40 to 100 ft^2/d. Water from the De Chelly, in places, has dissolved-solids concentrations of less than 500 mg/L (Harshbarger and Repenning, 1954, p. 15). Springs yielding as much as 80 gpm near Toadlena (Harshbarger and Repenning, 1954, p. 12) supply stock and domestic water to local users.

LOWER CUTLER/ABO FORMATION (PERMIAN)—A sequence of arkosic red beds overlies the Pennsylvanian strata throughout the San Juan Basin. In the northern part of the basin, these red beds are termed the lower Cutler Formation, and in the south they are termed the Abo Formation. The Abo was named by Lee (Lee and Girty, 1909) for exposures in Abo Canyon at the south end of the Manzano Mountains, Valencia and Torrance Counties, New Mexico. The Cutler was named by Cross and Howe (Cross and others, 1905) for exposures along Cutler Creek, near Ouray, Ouray County, Colorado. Thickness of the lower Cutler/Abo Formation ranges from 1,800 ft, where differentiated in the northeast part of the basin, to 200 ft, southeast of Gallup (Baars and Stevenson, 1977, fig. 1). The lower Cutler/Abo disconformably overlies various Pennsylvanian strata.

The lower Cutler/Abo Formation is largely untested as a source of water. West (1972, p. 13) reported a hydraulic conductivity of approximately 4×10^{-2} ft/d and a dissolved-solids concentration of 9,000 mg/L for water from the Abo near Grants. Water from the Abo near Fort Wingate has a dissolved-solids concentration of about 4,600 mg/L (Shomaker, 1971, table 5). Ander-

for which depths were reported but not the aquifer. Water-level, transmissivity, and water-chemistry maps were then prepared for each major aquifer (Lyford, 1979).

Because the study was regional in scope, some appreciation of local conditions and problems in several key areas of the basin was needed. Such local detail was provided by four masters thesis studies at New Mexico Institute of Mining and Technology, sponsored by the Bureau of Mines and Mineral Resources. These involved study of the hydrogeology and water resources of four 15-minute-quadrangle-sized areas (fig. 1): The Aztec quadrangle (Brown, 1976; Brown and Stone, 1979), the Ambrosia Lake-San Mateo area (Brod, 1979; Brod and Stone, 1981), the Cuba quadrangle (Anderholm, 1979; Anderholm and Stone, in preparation), and the Arroyo Chico–Torreon Wash area (Craigg, 1980; Craigg and Stone, in press). The Aztec quadrangle in San Juan County was selected because it is an area heavily dependent on surface water, the availability of which might be diminished with increasing coal development in the region. The Ambrosia Lake–San Mateo area provided insight into water-resource problems of an active uranium mining area in Cibola and McKinley Counties. The Cuba quadrangle (Rio Arriba and Sandoval Counties) afforded an opportunity to
area which straddles the basin margin and t
the water resources of a potential boom town
coal development in the southeast part of the
Arroyo Chico–Torreon Wash area (McKinle
doval Counties) provided an opportunity to
water-resource situation in an area of pot
development.

Previous work

This study was facilitated by the vast
previous work on the area. Many geologic re
been prepared on the San Juan Basin bec
wealth of energy resources. Similarly, a gr
hydrologic information has been previously
Although it is beyond the scope of this sectic
of these, it is useful to identify some of the
more comprehensive works; these in turn
tional references. Other works are cited at appropriate places in the text.

The geology of the area has been mapped at a scale of 1:500,000 by Dane and Bachman (1965). Geology is also covered at a scale of 1:250,000 by four $1° \times 2°$ sheets: the Shiprock quadrangle (O'Sullivan and Beikman, 1963), the Gallup quadrangle (Hackman and Olson, 1977), the Albuquerque quadrangle (Wyant and Olson, 1978), and the Aztec quadrangle (Manley and others, 1978). The location of these maps is shown on sheet 1.

The geologic structure of the San Juan Basin has been discussed by Kelley (1950, 1951, 1963), Hunt and Dane (1954), and Baltz (1967). Classical stratigraphic works include those by Sears and others (1941), Harshbarger and others (1957), Hollenshead and Pritchard (1961), and Baltz and others (1966). References on specific stratigraphic units and energy resources are given in the text.

Comprehensive hydrologic studies include those by Gregory (1916), Waring and Andrews (1935), Berry (1959), and Cooley and others (1969). Jobin (1962) addressed the transmissive character of Colorado Plateau strata. Baltz and West (1967) and Brimhall (1973) evaluated the water-resource potential of the Tertiary strata in the central part of the San Juan Basin. Gordon (1961), Cooper and John (1968), Mercer and Cooper (1970), and Shomaker (1971) reported on the geology and ground water of the southern part of the basin.

Well numbering

Two systems of numbering water wells and springs are used in this report; both are based on location. The first is the system employed by the New Mexico State Engineer that makes use of the Public Land Survey System (township, range, and section). In this system, each well or spring has a unique location number consisting of four parts separated by periods: 21.07.28.213. The first part (on the left) refers to the township, the second designates the range, and the third identifies the section (fig. 2a). The fourth locates the well or spring within the section to the nearest 10-acre tract as follows: each section is divided into quarters which are assigned numbers

Sec. 33 T15N R15W

15.15.33

K_{range} { 0.2 +o m/day
3.1 m/day

$\phi_{total} \approx 33\%$ $\phi_e \approx 10\%$ +o 20%

{ Not much info on hard copies of Micro Fiche.

A different numbering system, keyed to Bureau of Indian Affairs (BIA) quadrangles, is used for the main part of the Navajo Indian Reservation. This area has been divided into 15-minute quadrangles, each bearing a unique number. The well or spring number consists of three parts (for example, 32-3.65 × 17.05). The first part is the BIA quadrangle number, the second is the distance in miles west of the east line, and the third part is the distance in miles south of the north line. Thus, the well numbered 32-3.65 × 17.05 is located in BIA quadrangle 32, and lies 3.65 mi west of the east line and 17.05 mi south of the north line (fig. 2b).

In addition to these location numbers, the water wells have also been located by latitude and longitude coordinates (table 1).

Wells used in compiling subsurface stratigraphic data are shown on fig. 3 and are identified in table 2 (microfiche pocket). These wells were numbered sequentially as an aid in correlating fig. 3 with table 2.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☒ Telephone ☐ Personal | Time 7:50 AM | Date 3/22/95

Originating Party	Other Parties
Lynn Shelton - Giant Ciniza	Pat Sanchez - NMOCD

Subject: Tank 569 characterization Plan

Discussion: Told Lynn I was not yet ready to approve his characterization plan. Also we would defer remediation until characterization is done. He said they had already drilled a well near RFI 0639 and encountered water at 35.1' to 38.3'. Asked him what he was going to do with boreholes - he said they would plug dry holes with Bentonite and drill through water zones until samples are clean. He went further to say that 75' was a guestimate as a depth. Told him I needed to confer further with Bill Olson and would call him back latter.

Conclusions or Agreements

No conclusions or Agreements

Distribution

Signed Patricia A. Sanchez
3-22-95

GIANT REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

February 24, 1995

Bill Olson
Hydrogeologist
Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

Re: Tank 569

Dear Mr. Olson:

Giant Refining Company - Ciniza submits the Characterization Plan to determine the extent of potential hydrocarbon contamination beneath tank 569.

Giant proposes to submit a remediation plan after all the data from the Characterization Plan has been received and reviewed.

If you require additional information, please contact me at (505) 722-0227.

Sincerely,

Lynn Shelton
Senior Environmental Coordinator

TLS:sp

cc: David C. Pavlich - Health, Safety, and Environmental Manager
Giant Refining Company

Rich Mayer - USEPA Region VI

TLS\OCD0224

TANK 569

CHARACTERIZATION PLAN

GIANT REFINING COMPANY
CINIZA REFINERY

PREPARED FOR:
OIL CONSERVATION DIVISION
ENVIRONMENTAL BUREAU

PREPARED BY:
LYNN SHELTON
SENIOR ENVIRONMENTAL COORDINATOR

FEBRUARY 24, 1995

TLS\TK569CP

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FIGURE 2 - BORING LOCATIONS

FIGURE 3 - IMMISCIBLE LAYER

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ATTACHMENT II - ANALYTICAL DATA - OCTOBER, 1994

ATTACHMENT III - PREVIOUS BORING LOCATIONS

1.0 INTRODUCTION

As indicated in the November 11, 1994 correspondence with the Oil Conservation Division (OCD), Giant Refining Company - Ciniza (Giant), while performing soil boring and sampling activities for the RCRA Facility Investigation (RFI) requirements of this facility, observed some free hydrocarbon mixed with the water that had flowed from a water bearing interval during the period of time that RFI boring number RFI0639 had remained open. Although not observed during drilling, the water containing free hydrocarbon was displaced and observed as the boring was being backfilled with a cement/bentonite slurry.

A. Statement of Potential Problem

It appears that lighter phase hydrocarbon, such as gasoline, alkylate, or distillate, for example, has migrated vertically and has pooled with water in a sand or shale interval. Review of the boring logs reveals multiple layers of clay/sand intervals which will be discussed in Section 2.0.C., Geology.

Giant must develop a plan to determine the source of the hydrocarbons, to quantify the total extent of the hydrocarbon contamination and volume, if possible, of the hydrocarbon, as well as develop a remediation plan to recover the hydrocarbon.

This characterization/remediation plan must satisfy the requirements of both the OCD and the RFI and provide for expeditious resolution of the problem.

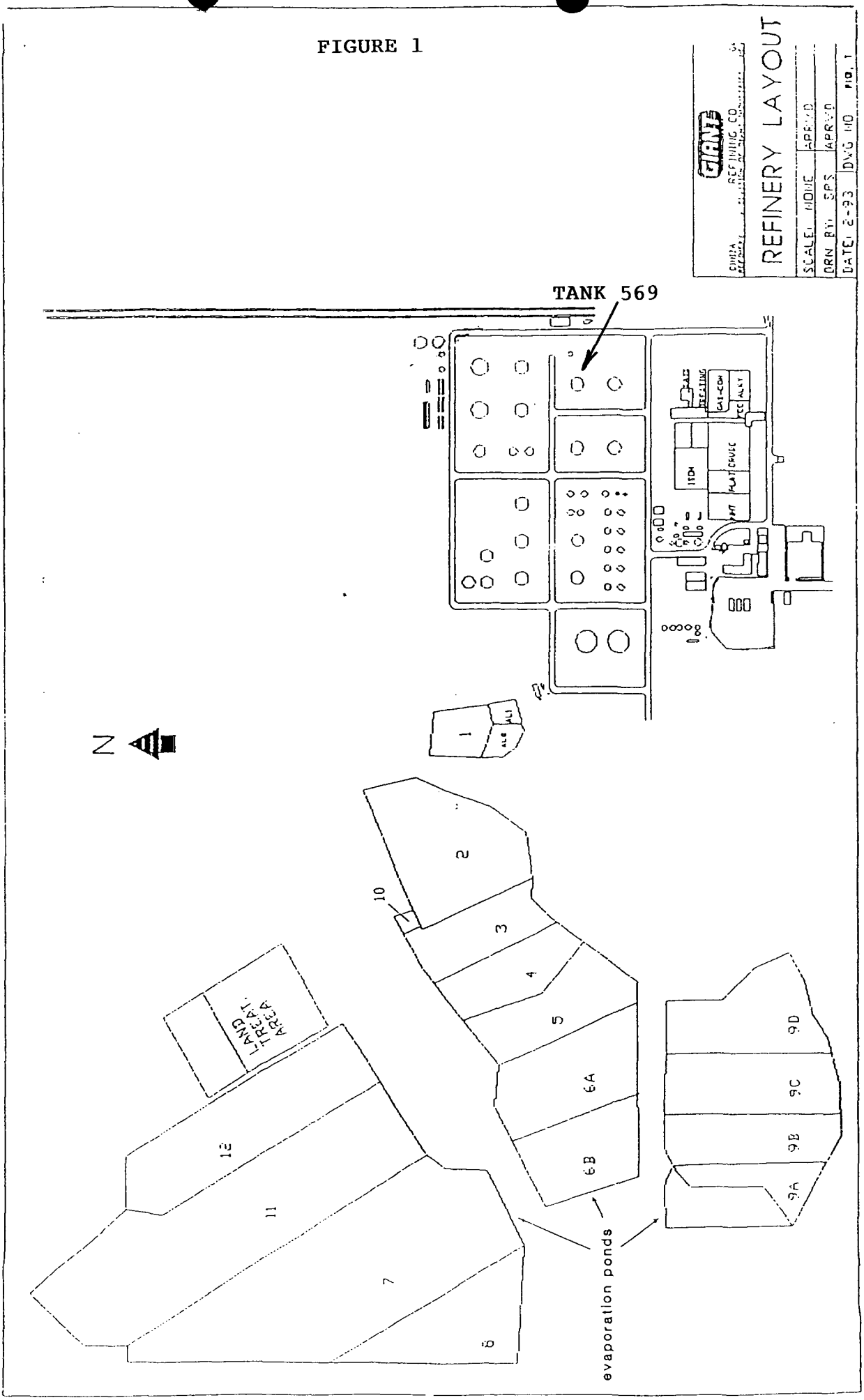
The Characterization and Remediation Plan prepared for OCD will be a companion or component of the Corrective Action Plan for this Solid Waste Management Unit (SWMU) for the RFI project.

B. Historical Background

The observation of hydrocarbon was made approximately 25 feet north of tank 569, which is in the eastern tank farm area (see site drawing, Figure 1). Most of these tanks were built in 1957 and have traditionally been used to store leaded gasoline and gasoline components.

All tanks that once contained leaded gasoline or tetraethyl lead were required to be sampled under the May, 1990 RFI Workplan. This sampling was to determine potential contamination of the area with lead.

FIGURE 1


GIANT
REFINING, CO.
GIANT REFINERY LAYOUT
SCALE: NONE
DRN BY: SPS
DATE: 2-93
TANK 569
N
1
2
3
4
5
6A
6B
7
8
9A
9B
9C
9D
10
11
12
LAND TREAT. AREA
evaporation ponds

Past maintenance practices are responsible for the investigation. Prior to regulatory constraints, a tank was generally cleaned by digging a pit beneath the manway and the residual product plus any scale, sludge, or debris was drained, washed, or pushed into the pit for recovery. The potential for contamination is relatively high and the observation of hydrocarbon may be a result of this activity as opposed to another source such as a leaking tank or piping.

After approximately 1980, all cleaning activities included using lined pits, portable metal sumps and vacuum trucks or a combination of these.

2.0 SITE ASSESSMENT

A. Location

Tank 569 is located within the facility boundaries of Giant Refining Company's Ciniza refinery. The Ciniza refinery is located in Sections 28 and 33 of T15N, R15W, and T14N, R15W, N.M.P.M. Drainage is north and west toward the south fork of the Puerco River, a westward flowing intermittent stream. The western two-thirds of the property is nearly flat with a slight northwestward topographic gradient. The eastern one-third is dominated by a bedrock bluff which is 60 to 100 feet higher than the adjacent flatland.

B. Geography

The site occupies the northeast flank of the Zuni Uplift Region of the Colorado Plateau. The flatlands have been mapped as quarternary alluvium and the bedrock bluff has been identified as the Sonsela sandstone of the Chinle formation (Shomaker).

C. Geology

The location of the refinery process units and tank farm, and therefore boring RFI0639, appears to be situated on the weathered equivalent of the Sonsela sandstone, which is believed to be an erosional remnant and does not appear to extend below the ground surface beyond the bluff area. This area has at various times been

characterized as being structured of unweathered bedrock consisting of interbedded shale and sandstone, with the uppermost bedrock unit consisting of reddish-brown silty shale with some fine sand, which grades gray or brown with depth, to a depth of up to 110 feet thick. A discontinuous two foot sandstone lens has been observed in this unit in some borings. The formation appears to lie at a 4° dip to the north-northwest.

Underlying the shale is a gray to brown fine to coarse grained sandstone, which has been referred to as the "near-surface aquifer". Giant does not agree that this interval is indeed the "near-surface aquifer". A definitive determination would require additional geologic investigations; nevertheless, the sand intervals should be watched if depths approach 100+ feet.

The lithologic logs of boring RFI0639 indicate alternating clay, shale, sandstone, and gravel layers (in no particular order) from 27.3 to 55.3 feet. Giant feels that the water bearing shale at 41.9 to 43.6 feet is the interval that contained hydrocarbon.

The sand, shale, and gravel intervals are not believed to be hydraulicly connected with any potential aquifer and probably do not extend horizontally beyond the bluff area.

3. CHARACTERIZATION PLAN

Giant proposes to drill additional bore holes to determine the extent of vertical and horizontal contamination at tank 569.

A. Discussion of Borings

Six borings are planned and the table below lists the name and depths of those bore holes. Location of the bore holes is shown on Figure 2.

Boring Name	Description	Depth *
BG1	Background	75'
RFI0639	Original Drilling	75'
B1	Down gradient	75'
B2	Down gradient	75'
B3	Down gradient	75'
B4	Down gradient	75'

* This is an estimated depth. May go deeper as needed.

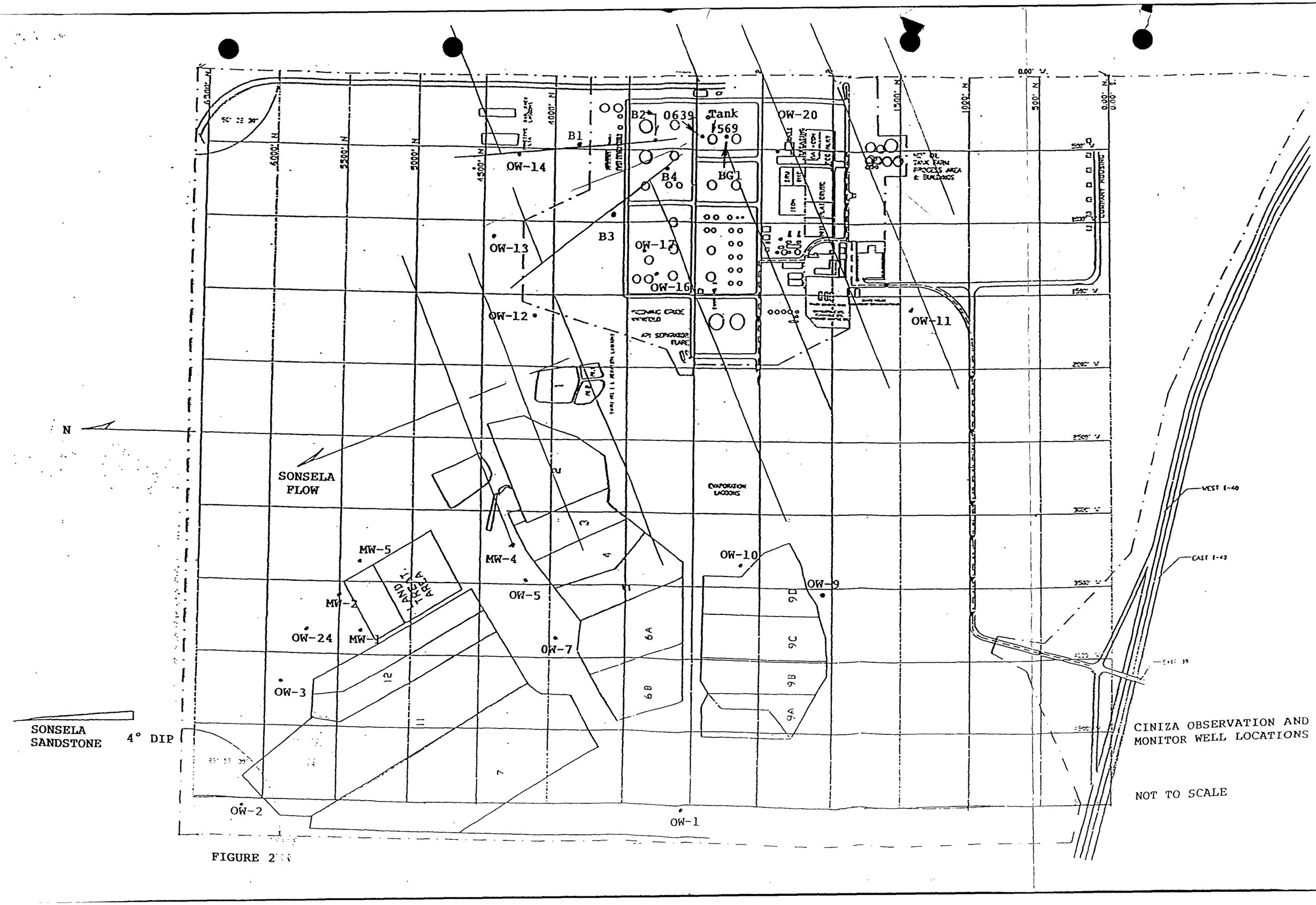

N
SONSELA FLOW
SONSELA SANDSTONE
4° DIP
B1
B2
0639
Tank 1569
B4
BG1
B3
OW-14
OW-13
OW-12
OW-17
OW-16
OW-20
OW-11
OW-10
OW-9
OW-5
OW-7
OW-24
OW-3
OW-2
OW-1
MW-5
MW-4
MW-2
MW-1
EVAPORATION LAGOONS
CINIZA OBSERVATION AND MONITOR WELL LOCATIONS
NOT TO SCALE

FIGURE 2

The down gradient borings will be made on either side of a 35° fan shaped area in anticipation that a plume may extend north beyond the bluff area. Although Giant believes that four down gradient borings will be sufficient to characterize the extent of hydrocarbon contamination, additional borings will be made as needed to determine the horizontal extent of contamination.

The background boring will be made approximately 50 feet south of tank 569. This boring is to verify that hydrocarbon contamination originates at tank 569, as Giant believes. If contamination is observed in this background boring, additional borings will be made further south southeast against the direction of groundwater flow until the southernmost extent of contamination is determined.

Boring RFI0639 will be drilled 5 ± 2 feet from the previous boring at this location. Giant suspects that the **BTEX** levels seen at 55.0 feet, after observing clean samples at 40.0, 45.0, and 50.0, are likely the result of contamination carrying down the borehole from the interval suspected of being hydrocarbon bearing (41.9 - 43.6 feet). Giant's suspicion is based on the saturated nature of the cuttings and the possibility of water and hydrocarbon infiltrating the borehole during auger flight and split spoon additions. For this reason, Giant plans to drill to 55 feet and then set 10" casing with a 50-50 cement/bentonite grout. After the grout has cured, drilling will continue until total depth is reached. This boring must be drilled deep enough to yield two "clean" samples to comply with **RFI** requirements.

B. <u>Drilling Protocol</u>

All boreholes will be drilled using a CME truck mounted rig with 8½" diameter (12½" on boring RFI0639) auger flights and continuous sampling with a 2½" CME carbon steel split spoon. The split spoon will be set up to advance 6" ahead of the augers to insure clean sampling.

Split spoons will be carefully decontaminated after each core recovery by washing with liquinox soap and then steam cleaning. Auger flights will be cleaned and decontaminated using the same protocol after each boring.

Giant will determine during the course of drilling whether a given borehole will be completed (i.e., cased and screened) depending upon the suitability of that borehole for recovery or remediation activities. Sufficient materials will be available to complete up to four borings if needed. Any boring not cased and

completed will be grouted back to the surface with a cement/bentonite slurry.

Precision Engineering, Incorporated of Las Cruces, New Mexico has been retained to perform all drilling, lithologic logging and well completion activities.

C. **Sampling and Analysis**

Samples will be collected at intervals that are suspected to be contaminated or that are in the same interval that hydrocarbon was previously observed. A photoionization detection meter (PID) will be used for preliminary screening at various intervals along the core. Staining, odors, and PID readings will be noted on the boring logs.

Samples will be recovered directly from the split spoon core barrel with the use of stainless steel spatula and placed into a stainless steel dish for disposition into glass sample bottles.

Sampling will be performed in a manner that is outlined in the Generic Sampling Plan, RFI Project, May 17, 1990, a copy of which will be available during the sampling project. After the samples have been bottled and labeled, they will be placed in a cooler and taken directly to the mobile laboratory for analysis.

Analytical Technologies, Incorporated (ATI) will provide a mobile laboratory to perform analysis on site. The lab will be capable of performing 20 BTEX and 20 TPH analyses per day. ATI will perform all analyses and quality assurance/quality control.

Each sample will be analyzed for BTEX or total petroleum hydrocarbons.

D. **Lithology**

Each boring will be logged for lithology, including odors and staining, by William Kingsley, P.E. of Precision Engineering.

The information obtained with the lithologic logs will be used to determine specific intervals that may affect transmissivity or pooling and will be instrumental in determining the extent of contamination and the projection of future migration. This, coupled with the immediate availability of analytical results, will allow Giant to make timely decisions regarding boring location,

number of boreholes, and depth.

4.0 Remediation Options

Designing the optimal remediation plan will depend on the characteristics of the hydrocarbon contamination. Giant prefers to propose a remediation plan after characterization of the hydrocarbon contamination is complete. However, some remediation options are discussed in the following sections.

A. Confined Contamination

Considering the geologic and hydrogeologic information available for this site, Giant is reasonably confident that the hydrocarbon contamination is confined to local fractured shale and sand intervals approximately 41 to 43 feet deep. These intervals are most likely fed by percolation from the surface.

If this assumption is shown to be accurate by the characterization project, then Giant will propose to install a product recovery well in the area immediately north of tank 569 and adjacent to boring RFI0639. A dedicated submersible pump would be installed to recover product and water, which would be pumped into the process wastewater system. The pump would be controlled by a timer to pump on an ongoing basis. Water samples could be taken on a periodic basis to determine the rate of reduction of hydrocarbon.

If a considerable confined area was determined to be contaminated, an additional recovery well could be installed if found to be necessary to expedite remediation.

Giant does not believe that vapor extraction or air sparging would be candidates for remediation due to low permeability and transmissivity rates. This will be confirmed with the characterization.

B. Contamination Plume

The characterization project may demonstrate that a hydrocarbon plume exists. This is possible if a

continuous interval of shale and sand extends from the bluff area to under the surface of the lower flatland area to the north of tank 569.

It would be necessary to install at least two or three recovery wells in order to enhance product recovery and remediation. One well would be adjacent to boring RFI0639, and the remaining recovery well(s) would be at the northernmost edge of the plume. A "clean" monitor well would then be installed outside the hydrocarbon plume to assure that no additional horizontal migration occurs.

Sampling activities would be essentially the same as previously described, differing only in the number of samples to collect.

5.0 Conclusions

Since discovering the presence of hydrocarbon with water in boring RFI0639, Giant has investigated factors that may have caused the contamination and may help delineate the extent of contamination.

As recommended by OCD, Giant has checked observation and monitor wells for an immiscible layer. The results of that investigation indicated no contaminants in any of those wells (see Figure 3).

Giant has also studied the geology underlying the Ciniza facility. Observations of potential conductive intervals (such as sands and fractured shales), permeability of those intervals and the presence of discontinuous erosional deposits indicates that the contamination is most likely confined within a relatively small area beneath tank 569.

Considering that no loss of inventory has occurred from tank 569, Giant believes that the source of contamination is the past practice of tank cleaning.

Giant submits that the characterization plan presented in this document should fully demonstrate the extent of the hydrocarbon contamination. Implementation of this plan will provide enough information for development of a plan best suited for expeditious remediation of the hydrocarbon contamination.

FIGURE 3

IMMISCIBLE LAYER

Well #	0W-3	OW-2	OW-1	MW-1	MW-2
Date	2-21	2-21	2-21	2-21	2-21
Time	9:12	9:29	9:02	9:40	9:48
Water Depth	31.34	28.89	0	5.18	7.39
Immisc. Layer	NO	NO	NO	NO	NO

Well #	MW-5	MW-4	OW-11	OW-10	OW-9
Date	2-21	2-21	2-21	2-21	2-21
Time	10:00	10:09	10:20	10:40	10:50
Water Depth	9.57	5.82	18.16	0	0
Immisc. Layer	NO	NO	NO	NO	NO

Well #	0W-14	OW-13	OW-20		
Date	2-21	2-21	2-21		
Time	3:35	3:50	4:05		
Water Depth	25.88	22.81	41.16		
Immisc. Layer	NO	NO	NO		

TLS/95

ATTACHMENT I

PRECISION ENGINEERING, INC.

File No. 94-114

Boring Location _____

LOG OF TEST BORINGS

Location CINIZA REFINERY

Elevation EXISTING

Boring Number: RFI 0639

Water Level NOT ENCOUNT. Date: 08/09/94

LAB #	DEPTH	BLOWS/N	PLOT	SAMPLE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	%M	LL	PI	CLASS.
			0/00/0		C	GRAVEL, CLAYEY, MOIST, DENSE, FILL				
			0/00/0		C					
	1.5		0/00/0		C					
			/*//*/		C	CLAY, SANDY, WET, STIFF, BROWN				
			/*//*/	2.5	C					
			/*//*/		C					
			/*//*/		C					
			/*//*/		C					
			/*//*/		C					
			/*//*/	5.0	C					
			/*//*/		C	SAND SEAMS AT 5'(GREY)				
	6.0		/*//*/		C					
			/-//-/		C	CLAY, SILTY, WET, STIFF, BROWN				
	7.0		/-//-/		C					
			/*//*/	7.5	C	CLAY, SANDY, WET, SOFT, BROWN				
			/*//*/		C					
	8.4		/*//*/		C					
			/-//-/		C	CLAY, SILTY, WET, STIFF, BROWN				
			/-//-/		C					
			/-//-/	10	C					
			/-//-/		C					
	11.1		/-//-/		C					
			//////		C	CLAY, WET, STIFF, BROWN				
			//////		C					
			//////		C					
	12.9		//////		C					
			/*/*/*		C	CLAY, VERY SANDY, SILTY, WET, STIFF				
			/*/*/*		C					
	20.0		/*/*/*		C					
			*-**-*	15	C	SAND, FINE, SILTY, MOIST, OCCASIONAL THIN CLAY				
			*-**-*		C	ZONES, BROWN				
			*-**-*		C					
			*-**-*		C					
			*-**-*		C					
			*-**-*		C					
			*-**-*		C					
			*-**-*		C					
			*-**-*		C					
			*-**-*		C					
			*-**-*		C					
	20.0		*-**-*	20	C					
			*0**0*		C	SAND, MEDIUM, GRAVELLY(FINE) MOIST, DENSE,				
			*0**0*		C	LIGHT BROWN				
			*0**0*		C					
			*0**0*		C					
			*0**0*		C					
			*0**0*		C					
			*0**0*		C					
			*0**0*		C					
			*0**0*		C					
			*0**0*		C					
	25.0		*0**0*	25	C					
	TOTAL DEPTH									

Size & Type of Boring: 4-1/4" ID Hollow Stemmed Auger

Logged By: WHK

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	SAMPLE TOT	SAMPLE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
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	OOOOOOOOO	27	C	**Gravel**, dense, mainly broken sandstone, multicolored, moist	
	OOOOOOOOO		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	OOOOOOOOO		C	**Gravel**, coarse sandy, dense, moist, grey brown, fetted hydrocarbon odor	
	OOOOOOOOO		C		
	OOOOOOOOO		C		
	OOOOOOOOO		C		
	OOOOOOOOO		C		
	OOOOOOOOO	33	C		
33.5-34.7	/////////		C	**Clay**, hard, wet, brown, <sharp contact with above>, weak odor	
	/////////	34	C		
34.7-35.4	////OO///		C	**Clay**, slightly gravelly(1/2"), wet, hard, brown, weak odor	
	////OO///	35	C		
35.4-39.2	OOO***OOO		C	**Gravel**, sand and cobbles of sandstone, wet, hydrocarbon odor	
	OOO***OOO		C		
	OOO***OOO		C		
	OOO***OOO		C		
	OOO***OOO		C		
	OOO***OOO		C		
	OOO***OOO		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**, fissle, 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 recoverory, 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.

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(A)
PAGE: 2 of 3

DEPTH	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,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 fissle, slightly drier>50	
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---		C		
	---///---	55	C		
TD				Grouted boring with 15% Bentonite-Cement	

LOGGED BY: WEK

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

PRECISION ENGINEERING, INC.

File No. 94-114

Boring Location _____

LOG OF TEST BORINGS

Location CINIZA REFINERY

Elevation EXISTING

Boring Number: RFI 0640

Water Level NOT ENCOUNT. Date: 08/09/94

LAB #	DEPTH	BLOWS/N	POCKET TORVANE	SAMPLE CASE	SAMPLE TYPE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	%M	LL	PI	CLASS.
			/-0/-0		C	CLAY, SILTY, GRAVELLY, DRY, SOFT, RED BROWN				
	1.0		/-0/-0		C					
			/-//-/		C	CLAY, SILTY, SLIGHTLY GRAVELLY, WET, VERY SOFT				
			/-/0-/		C	RED BROWN				
			/-//-/	2.5	C					
			/-/0-/		C					
			/-//-/		C					
			/-/0-/		C					
			/-//-/		C					
			/-/0-/	5.0	C					
			/-//-/		C					
	6.0		/-//-/		C					
			/-//-/		C	CLAY, SILTY, SLIGHTLY SANDY, WET, VERY SOFT,				
			/-/*-/		C	BLACK/GREY MOTTLING				
			/-//-/	7.5	C					
			/-/*-/		C					
			/-//-/		C					
			/-/*-/		C					
			/-//-/		C					
			/-/*-/	10	C					
			/-//-/		C					
	10.9		/-//-/		C					
			/*-/*-		C	CLAY, SANDY, SILTY, WET, SOFT TO FIRM, GREY				
			/*-/*-		C	BROWN, OCCASIONAL FINE SAND INTERBEDS				
			/*-/*-		C					
			/*-/*-		C					
	13.8		/*-/*-		C					
			/-//-/		C	CLAY, SILTY, WET, FIRM, RED BROWN				
	14.5		/-//-/		C					
			*-**-*	15	C	SAND, SILTY, MOIST, MODERATELY DENSE, GREY				
	15.9		*-**-*		C					
			/-//-/		C	CLAY, SILTY, WET, STIFF, RED BROWN				
			/-//-/		C					
	17.6		/-//-/		C					
			/*//*/		C	CLAY, SANDY, WET, FIRM, RED BROWN				
	19.2		/*//*/		C					
	19.7		//////		C	CLAY, WET, STIFF, RED BROWN				
	20.0		*/**/*	20	C	SAND, FINE, CLAYEY, MODERATELY DENSE,RED BROWN				
			/-//-/		C	CLAY, SILTY, WET, STIFF, RED BROWN,FINE BLOCKY				
	21.2		/-//-/		C					
			*/**/*		C	SAND, CLAYEY, MOIST, MODERATELY DENSE, RED				
			*/**/*		C	BROWN, OCCASIONAL INTERBEDDED(<1 CM)CLAY SEAMS				
			*/**/*		C					
			*/**/*		C					
			*/**/*		C					
	25.0		*/**/*	25	C					
			/-//-/		C	CLAY, SILTY, WET, STIFF, BROWN, FINE BLOCKY				
			/-//-/		C					
	27.0		/-//-/		C					
			*/**/*		C	SAND, MEDIUM, CLAYEY, OCCASIONAL FINE GRAVEL,				
			*/**/*		C	MOIST, DENSE, RED BROWN				
			*/**/*		C					
			*/**/*		C					
	30.0		*/**/*	30	C					
	TOTAL DEPTH									

Size & Type of Boring: 4-1/4" ID Hollow Stemmed Auger

Logged By: WHX

PRECISION ENGINEERING, INC.

PROJECT: GIANT RFI
TANK FARM #570

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	PLOT	SCALE	SAMPLE	MATERIAL CHARACTERISTICS (MOISTURE,CONDITION,COLOR,GRAINSIZE,ETC.)	PID (ppm)
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+///		C		
	///00+///	40	C		
TD				Backfilled with Bentonite-Cement grout	

LOGGED BY: WHK

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

ATTACHMENT II

Westech Laboratories Inc.
The Quality People
Since 1955

10737 Gateway West, No. 100
El Paso, Texas 79935-4906
(915) 592-3591 • fax 592-3594

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:
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
ANALYST .....: M. Woodhouse

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

Method 8020 - BTEX + MTBE

D A T A T A B L E

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

ATTACHMENT II

(Work File Copy)

Managing Director

Westech Laboratories Inc.
The Quality People
Since 1955

10737 Gateway West, No. 100
El Paso, Texas 79935-4906
(915) 592-3591 • fax 592-3594

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

SAMPLE NO. : 6404956
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY:
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
ANALYST .....: M. Woodhouse

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

Method 8020 - BTEX + MTBE

D A T A T A B L E

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

(Work File Copy)

Managing Director

Westech Laboratories Inc.
The Quality People
Since 1955

10737 Gateway West, No. 100
El Paso, Texas 79935-4906
(915) 592-3591 • fax 592-3594

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

SAMPLE NO. : 6404957
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY:
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
ANALYST .....: M. Woodhouse

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

Method 8020 - BTEX + MTBE

D A T A T A B L E

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

(Work File Copy)

Managing Director

Westech Laboratories Inc.
The Quality People
Since 1955

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El Paso, Texas 79935-4906
(915) 592-3591 • fax 592-3594

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

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

CLIENT SAMPLE ID : RFI0639V 45.0
SAMPLE TYPE .....: Soil
SAMPLED BY .....: W. Toomer
SUBMITTED BY ....: W. Toomer
SAMPLE SOURCE ...: Giant Reffining
ANALYST .....: M. Woodhouse

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

Method 8020 - BTEX + MTBE

D A T A T A B L E

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

(Work File Copy)

Managing Director

Westech Laboratories Inc.
The Quality People
Since 1955

10737 Gateway West, No. 100
El Paso, Texas 79935-4906
(915) 592-3591 • fax 592-3594

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

SAMPLE NO. : 6404959
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY:
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
ANALYST .....: M. Woodhouse

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

Method 8020 - BTEX + MTBE

D A T A T A B L E

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

(Work File Copy)

Managing Director

Westech Laboratories Inc.
The Quality People
Since 1955

10737 Gateway West, No. 100
El Paso, Texas 79935-4906
(915) 592-3591 • fax 592-3594

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

SAMPLE NO. : 6404960
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY:
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
ANALYST .....: M. Woodhouse

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

Method 8020 - BTEX + MTBE

D A T A T A B L E

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

(Work File Copy)

Managing Director

Westech Laboratories Inc.
The Quality People
Since 1955

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El Paso, Texas 79935-4906
(915) 592-3591 • fax 592-3594

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

SAMPLE NO. : 6404961
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY:
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
ANALYST .....: M. Woodhouse

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

Method 8020 - BTEX + MTBE

D A T A T A B L E

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

(Work File Copy)

Managing Director

Westech Laboratories Inc.
The Quality People
Since 1955

10737 Gateway West, No. 100
El Paso, Texas 79935-4906
(915) 592-3591 • fax 592-3594

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

SAMPLE NO. : 6404962
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY:
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
ANALYST .....: M. Woodhouse

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

Method 8020 - BTEX + MTBE

D A T A T A B L E

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

(Work File Copy)

Managing Director

Westech Laboratories Inc.
The Quality People
Since 1955

10737 Gateway West, No. 100
El Paso, Texas 79935-4906
(915) 592-3591 • fax 592-3594

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

SAMPLE NO. : 6404963
INVOICE NO.: 62141217
REPORT DATE: 11-17-94
REVIEWED BY:
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
ANALYST .....: M. Woodhouse

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

Method 8020 - BTEX + MTBE

D A T A T A B L E

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

(Work File Copy)

Managing Director

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

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

CHAIN OF CUSTODY

DATE: 11/02/94 PAGE 1 OF 1

ATI LAB ID:

PROJECT MANAGER:

COMPANY: GIANT REFINING
ADDRESS: ROUTE 3, BOX 7
GALLUP, NM 87301
PHONE: (505) 722-0212
FAX: (505) 722-0210

BILL TO: WALT TOOMER
COMPANY: SAME
ADDRESS: SAME

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	BTXE/MTBE (8020)	Lab #	NUMBER OF CONTAINERS
RFI0639V30.0	10/28/94	1006	SOIL	[illegible]	X	6404955	1
RFI0639V35.0	10/28/94	1016	SOIL	[illegible]	X	4956	1
RFI0639V40.0	10/28/94	1030	SOIL	[illegible]	X	4957	1
RFI0639V45.0	10/28/94	1048	SOIL	[illegible]	X	4958	1
RFI0639V50.0	10/28/94	1127	SOIL	[illegible]	X	4959	1
RFI0639V55.0	10/28/94	1212	SOIL	[illegible]	X	4960	1
RFI0640V30.0	10/27/94	1632	SOIL	[illegible]	X	4961	1
RFI0640V35.0	10/27/94	1650	SOIL	[illegible]	X	4962	1
RFI0640V40.0	10/27/94	1702	SOIL	[illegible]	X	4963	1

ANALYSIS REQUEST: 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); NUMBER OF CONTAINERS

PROJECT INFORMATION

PROJ. NO.: RFI
PROJ. NAME: RFI
P.O. NO.: 997-9023-05
SHIPPED VIA: FED EX

SAMPLE RECEIPT

NO. CONTAINERS:
CUSTODY SEALS: Y/N/NA
RECEIVED INTACT:
RECEIVED COLD:

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

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

Comments: sample RFI0639V35.0 - broken - transferred into another bottle

SAMPLED & RELINQUISHED BY: 1.
Signature: [signature] Time: 1100
Printed Name: WALT TOOMER Date: 11/2/94
Company: GIANT Phone: (505) 722-0212

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 3.
Signature: FEDX Time:
Printed Name: Date:
Company: FEDX 0116549344

RECEIVED BY: 1.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 3.
Signature: [signature] Time: [illegible]
Printed Name: [illegible] Date: [illegible]

0116549344

ATTACHMENT III

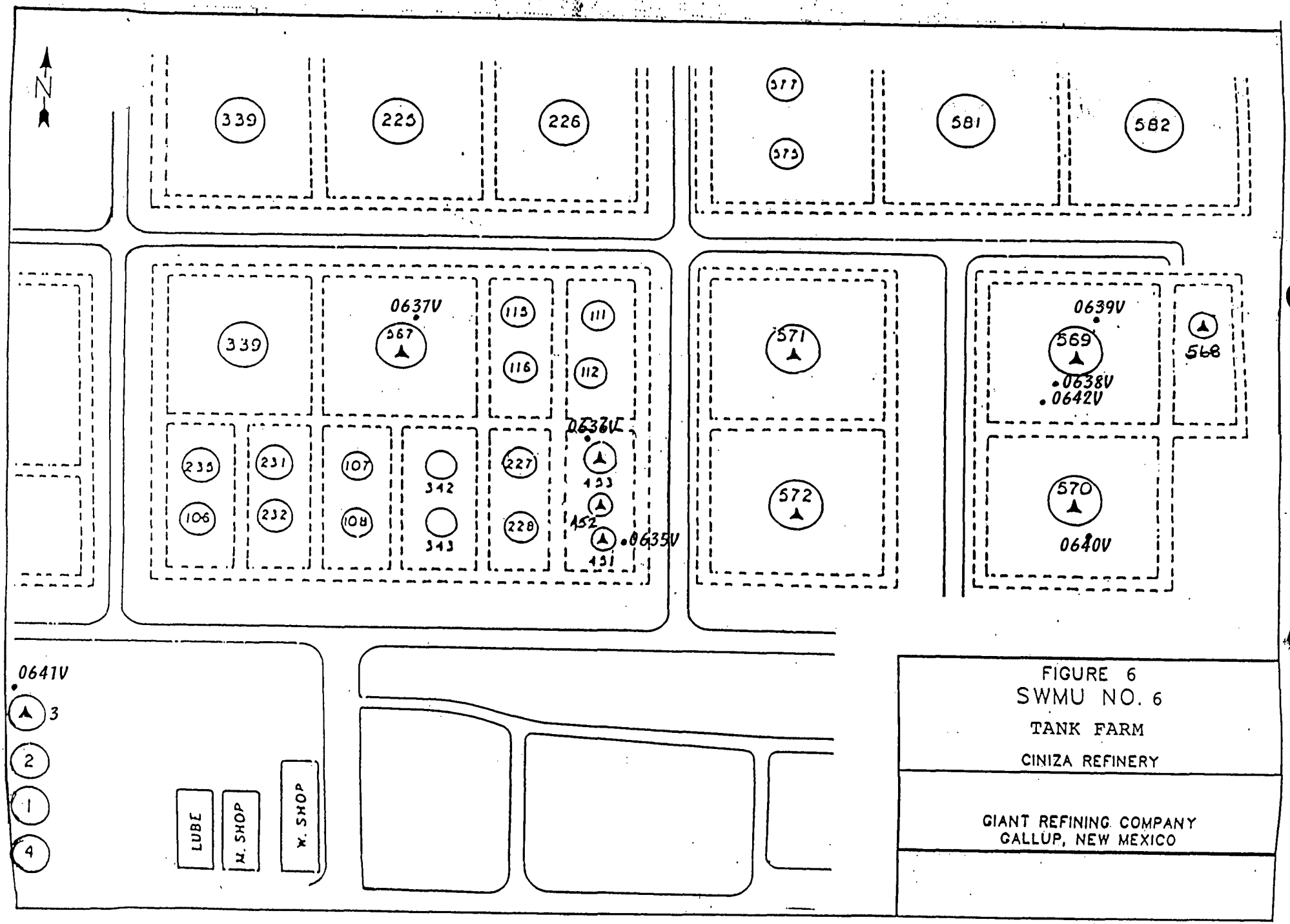

FIGURE 6
SWMU NO. 6
TANK FARM
CINIZA REFINERY

GIANT REFINING COMPANY
GALLUP, NEW MEXICO

GIANT REFINING CO.
Route 3, Box 7
Gallup, New Mexico
87301
505
722-3833

February 10, 1995

Bill Olson
Environmental Bureau
Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

Re: Tank 569 Work Plan

Dear Mr. Olson:

Giant Refining Company - Ciniza (Giant) will submit a work plan for the characterization and, if necessary, remediation of hydrocarbon at tank 569 on or before February 24, 1995.

Giant will include the information requested by your office in your letter of January 13, 1995.

If you require additional information, please contact me at (505) 722-0227.

Sincerely,

Lynn Shelton

Lynn Shelton
Senior Environmental Coordinator
Giant Refining Company

TLS:sp

cc: David C. Pavlich, HSE Manager

State of New Mexico
ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT
Santa Fe, New Mexico 87505
OIL CONSERVATION DIVISION
2040 S. Pacheco
Santa Fe, New Mexico 87505

January 13, 1995

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-242-204

Mr. David C. Pavlich
Health, Safety and Environmental Manager
Giant Refining Co.
Route 3, Box 7
Gallup, New Mexico 87301

RE: SOIL SAMPLING
GIANT CINIZA REFINERY

Dear Mr. Pavlich:

The New Mexico Oil Conservation Division (OCD) is in receipt of Giant Refining Co.'s November 11, 1994 correspondence regarding the discovery of free phase hydrocarbons during recent soil investigations within the Giant Ciniza Refinery tank farm.

The OCD requests that Giant provide the following information to the OCD by February 17, 1995:

1. The locations and sampling results of the soil borings.

2. Information on the presence and thickness of free phase products on ground water in all refinery monitor wells.

3. A work plan for determining the extent of contamination.

If you have any questions, please contact me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: OCD Aztec Office

VILLAGRA BUILDING - 408 Galisteo
Forestry and Resources Conservation Division
P.O. Box 1948 87504-1948
827-5830
Park and Recreation Division
P.O. Box 1147 87504-1147
827-7465

2040 South Pacheco
Office of the Secretary
827-5950
Administrative Services
827-5925
Energy Conservation & Management
827-5900
Mining and Minerals
827-5970
Oil Conservation

P 667 242 204

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Restricted Delivery Fee	
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Return Receipt Showing to Whom, Date, & Address of Delivery	
TOTAL Postage & Fees	$
Postmark or Date	

PS Form 3800, June 1990

Fold at line over top of envelope to the right of the return address.

GIANT REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

November 11, 1994

Mr. Roger Anderson
New Mexico Oil Conservation Division
P.O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87504

Dear Mr. Anderson:

Giant Refining recently completed soil sampling for a number of RFI Solid Waste Management Units (SWMUs) at its Ciniza refinery near Gallup. Included in this most recent sampling event were sampling locations within the refinery's tank farm.

After completion of sampling, all sample holes were backfilled with a bentonite mixture. As the final hole was being backfilled in the tank farm, Giant personnel noticed that the water displaced by the backfilling operation showed indications of some free hydrocarbon associated with the water.

Giant plans to drill an additional test boring in the vicinity of the hole indicating the presence of hydrocarbons. This boring will be used to obtain additional information about any hydrocarbon contamination as well as additional lithologic data for determining the best course to follow for any remediation efforts.

Giant will keep your office informed as the additional site sampling/lithologic data acquired and a recommended plan of action is being developed.

If you or your staff have any questions regarding the above, please do not hesitate to contact Lynn Shelton, Walt Toomer, or me at (5050) 722-3833.

Sincerely,

David C. Pavlich

David C. Pavlich
Health, Safety, and Environmental Manager

DCP:sp

PAV\OCD1111