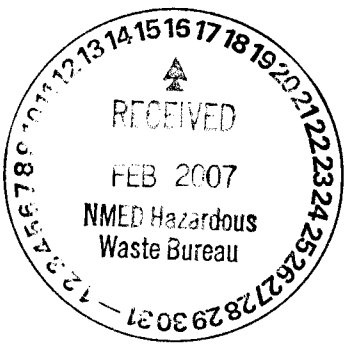
Giant Refining Company
Route 3, Box 7
Gallup, NM 87301

February 14, 2007

Carl Chavez, Environmental Engineer
Oil Conservation Division
1220 S. Saint Francis
Santa Fe, NM 87505



Hope Monzeglio
Environmental Specialist
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, BLDG 1
Santa Fe NM 87505

RE: Railroad Rack Lagoon Fan-out and Overflow Ditch Investigation Report

Dear Carl and Hope:

Enclosed is a copy of the report on the investigation that Trihydro Corporation conducted at the Fan-out and Ditch areas that were associated with the former Railroad Rack Lagoon at the Giant Refining - Ciniza Refinery. NMED had requested the investigation be conducted in the comments letter NMED sent to Giant regarding the Remedy Completion Report for the Railroad Rack Lagoon.

If you have any questions and comments, please contact me at jlieb@giant.com or (505) 722-0227.

Sincerely,

Jim Lieb, Environmental Engineer
Giant Refining, Ciniza Refinery
Gallup, NM

cc: Ed Rios
Ed Riege
Steve Morris

RAILROAD RACK LAGOON OVERFLOW DITCH AND FAN-OUT AREA, SWMU #8 SUBSURFACE INVESTIGATION GIANT REFINING COMPANY CINIZA REFINERY GALLUP, NEW MEXICO

February 8, 2007

Project No: 072-006-001

PREPARED BY: TRIHYDRO CORPORATION

1252 Commerce Drive
Laramie, WY 82070

SUBMITTED BY: GIANT REFINING COMPANY
I-40 Exit 39
Jamestown, NM 87347

Executive Summary

In June 2006, the Ciniza Refinery (Ciniza) located near Gallup, New Mexico, was requested by the New Mexico Environmental Department (NMED) to investigate the presence of residual contamination in the overflow ditch and fan-out area. These two areas are considered to be part of Solid Waste Management Unit (SWMU) #8. A subsurface soil investigation of the railroad rack lagoon overflow ditch and fan-out area was conducted on October 16, 17, and 18, 2006. A soil sampling work plan was submitted to the NMED on August 29, 2006. Two sample location modifications were requested by the NMED in a letter titled *Approval with Modifications Work Plan For Investigation of the Overflow Ditch and Fan-Out Area of Railroad Rack Lagoon, SWMU #8*, dated September 19, 2006. Ciniza modified the sampling locations accordingly. The remainder of the work plan was approved by the NMED.

Ten test pits were completed in the overflow ditch and fan-out area. Each test pit displayed very similar lithology. Test pits B-1 and B-6 were the only test pits that displayed visual contamination. Low density, black, asphalt-like clumps were noted on the surface around both of these test pits. Groundwater was not encountered during excavation of the test pits. Samples taken from the test pits at depths of 2 and 5 feet below grounds surface (ft bgs),were analyzed for diesel range organics (DRO) and semi-volatile organic compounds (SVOCs), if the concentration of DRO exceeded 500 milligrams per kilogram (mg/kg). Samples were also analyzed for volatile organic compounds (VOCs), Resource Conservation and Recovery Act (RCRA) metals, mercury, and cyanide. No cyanide, mercury, VOCs, or SVOCs were detected in the samples analyzed. Barium, chromium, and lead were the only metals detected, however detections were below the cleanup standards. DRO was detected in six of the 2 ft bgs samples and one of the 5 ft bgs samples. Four of the samples collected at the 2-ft sample interval were above the cleanup standard of 200 mg/kg for DRO. Further actions, such as additional sampling and/or cleanup requirements, will be discussed with NMED.

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1.0 INTRODUCTION

Giant Industries Arizona, Inc. requested that Trihydro Corporation (Trihydro) conduct a soil sampling investigation at the Ciniza Refinery (Ciniza) near Gallup, New Mexico. The purpose of this field investigation was to characterize soil in the railroad rack lagoon overflow ditch and fan-out area. The railroad rack lagoon overflow ditch and fan-out area is located on Ciniza property northeast of the main process area. A topographic map of Ciniza that also shows the relative location of the overflow ditch and fan-out area is included as Figure 1. Figure 2 shows SWMU #8 and surrounding well locations as required by NMED. A subsurface soil investigation was conducted on October 16, 17, and 18. This report describes the field activities to collect the soil samples and presents the soil analytical results.

2.0 BACKGROUND

The overflow ditch and fan-out area was used to manage overflow when the railroad rack lagoon was filled beyond capacity. The railroad rack lagoon has not been used since the mid-1980's. Figure 3 shows the dimensions and relative location of the overflow ditch and fan-out area. Both of these areas are considered to be part of SWMU # 8. The fan-out area is surrounded by earthen berms approximately 2-3 feet (ft) high. The railroad rack lagoon, overflow ditch, and fan-out area were sampled during the RCRA Facility Investigation (RFI) in 1992. During this investigation, soil samples from these areas were analyzed for VOCs, SVOCs, and total metals. The RFI concluded that VOCs/SVOCs were at minimal levels, and inorganic levels were below background contamination levels with the exception of chromium. However, chromium levels were below the RCRA Corrective Action levels, thus no remediation action was required.

A subsurface soil investigation of the railroad rack lagoon overflow ditch and fan-out area was conducted on October 16, 17, and 18, 2006. This investigation was conducted in response to a letter that Ciniza received from the NMED, dated June 29, 2006. In this correspondence, comment # 26 requested information regarding the presence of residual contamination at the overflow ditch and fan-out area locations. A soil sampling work plan was submitted to the NMED on August 29, 2006. Two sample location changes were requested by the NMED in a letter titled Approval with Modifications Work Plan For Investigation of the Overflow Ditch and Fan-Out Area of Railroad Rack Lagoon, SWMU #8, dated September 19, 2006. Ciniza modified the sampling locations accordingly. The remainder of the work plan was approved by the NMED.

3.0 SCOPE OF SERVICES

Ten sample locations, approved by the NMED, were located and staked using the overflow ditch and berms of the fan-out area as reference points. Samples were collected at 2 ft bgs using a hang auger at each of the 10 locations. Test pits were then installed at these locations to a depth of 4 ft bgs. A hand auger was then used to bore the remaining 1 ft to collect a sample at 5 ft bgs. Each sample location was logged and field screened for total organic vapors (TOVs). The test pits were backfilled after sample collection. The collected samples were then shipped to Hall Environmental located in Albuquerque, New Mexico for analysis. The soil samples were analyzed for DRO, SVOCs, VOCs, RCRA metals, mercury, and cyanide.

4.0 FIELD INVESTIGATION RESULTS

Soil sampling was conducted on October 17 and 18, 2006, by Trihydro personnel. The sample locations, methods, equipment, decontamination procedures, field screening techniques, documentation and logging, and investigation derived waste (IDW) disposal are described in this section.

4.1 SURFACE CONDITIONS

The surface topography of the area of investigation is relatively flat with the fan-out area being surrounded by earthen berms approximately 2-3 ft high. Vegetation at the site is sparse and consists mainly of sagebrush and natural grasses. The railroad rack lagoon and fan-out areas are located on land owned and controlled by Ciniza industrial property boundaries shown as figure 1.

4.2 SOIL INVESTIGATION METHODOLOGY

4.2.1 SAMPLE LOCATIONS

The ten sample locations were selected based on the sample locations from the RFI in 1992. These locations were submitted to the NMED for approval in the soil sampling work plan submitted on August 29, 2006. Two sample locations were modified at the NMED's request. The sample locations were then located in the field by Trihydro using the overflow ditch and the berms of the fan-out area as measurement reference points. The locations were staked and labeled with the applicable sample identification. Photographs of the staked locations are presented as Appendix A. Figure 3 illustrates the measured dimensions of the overflow ditch, the fan-out area, and the sample locations.

4.2.2 EQUIPMENT DECONTAMINATION PROCEDURES

Sampling equipment was decontaminated before sampling commenced and after each sample was collected. All sampling devices were decontaminated using a non-phosphate detergent solution followed by two distilled water rinses. Prior to use, the equipment was either air-dried or dried with clean paper towels. Decontaminated sampling devices were stored in a contaminant-free location until use.

The backhoe used to install the test pits was not decontaminated, because this equipment never came in contact with the material to be sampled.

4.2.3 FIELD DOCUMENTATION AND LOGGING

A qualified geologist was on site to log all test pits/boreholes during the sampling event. The test pit logs were completed according to the work plan specifications. Test pit logs and sample logs are included as Appendices B and C, respectively.

Each sample interval was field screened for TOVs using a MiniRae 2000 photoionization detector (PID). The PID was calibrated by Trihydro personnel each morning prior to field screening. Calibration logs are presented as Appendix D. The soil was collected with a decontaminated hand auger. The portion of soil to be field screened was then transferred to a clean, sealable plastic bag. The soil sample in the sealable bag was then allowed to reach standard temperature (approximately 70 degrees F). Once the sample reached the required temperature, the PID probe was inserted into the bag. The maximum reading was recorded on the test pit logs provided as Appendix A and summarized in Table 1. As shown in Table 1 TOVs were not detected above 11 ppm during field screening activities.

Photographs were also used to document field activities. Three photographs were taken at each sample location: one of the staked sample location, one of the 2 ft bgs hand augured borehole, and one displaying the completed test pit along with the two sealed plastic bags containing the samples that were used for field screening. All photographs, along with a photo log including a description of each photograph, are included as Appendix A.

4.2.4 SOIL SAMPLING

Soil samples were collected at the 10 locations (B-1 through B-10) identified on Figure 3. Two sample sets (a sample set consists of three - 4 ounce jars) were collected at each location for laboratory analysis: one from 2 ft bgs and one from 5 ft bgs. Each sample set submitted for laboratory analysis was collected with a decontaminated hand auger. Sampling at each location was completed in the following manner:

- A decontaminated, manually driven hand auger was used to create a borehole from 0 to 2 ft bgs.
- The 2 ft bgs sample was collected from the bottom of the borehole with the hand auger.
- A test pit was installed with a backhoe at the 2 ft bgs borehole location to a depth of 4 ft bgs.
- The hand auger was decontaminated.
- The decontaminated hand auger was used to create a borehole from 4 to 5 ft bgs from the bottom of the test pit.

- The 5 ft bgs sample was collected from the bottom of the 5 ft borehole.
- The hand auger was decontaminated.

Soil samples were transferred directly from the decontaminated hand auger to three clean 4-ounce jars. Three 4-ounce jars were required by the Hall Environmental laboratory in order to run all of the required analyses. The sample containers were completely filled to minimize headspace (by tamping during filling) and immediately sealed. Sample containers were immediately labeled, recorded on the sample logs (Appendix C), and stored on ice until each day's sampling was complete. The samples were then sealed with a custody seal by Trihydro personnel and stored in an on-site Ciniza sample refrigerator. A chain-of-custody (CoC) was completed by Trihydro personnel. A copy of the CoC is presented along with the laboratory analysis as Appendix E. The custody-sealed samples and the CoC were delivered to Hall Environmental located in Albuquerque, New Mexico. As specified on the CoC and work plan, the samples were analyzed for DRO by method 8015B, SVOCs by method 8270 if the DRO exceeded 500 mg/kg, VOCs by method 8260, RCRA metals by method 6010C, mercury by method 7471, and cyanide by method 335.2. The only preservation requirement specified by Hall Environmental was that the samples be cooled to 4 degrees Celsius or less and remain at that temperature until analysis.

4.3 SUBSURFACE CONDITIONS

As shown in the test pit logs, presented as Appendix B, the 10 test pits completed in the overflow ditch and fan-out area all displayed very similar lithology. Test pits B-3, B-4, B-5, B-7, B-8, and B-10 were composed of brown silt with some clay from ground surface to depths ranging from 2.5 to 3 ft bgs. Brown clay with some silt was present below this interval to total depth. This group of test pits, along with B-9, composes the central and southeast portions of the fan-out area as well as the entire overflow ditch. Test pit B-9 was composed of brown silt with some clay from ground surface to total depth. Test pits B-2 (in the northeast corner of the fan-out area) and B-6 (in the southwest corner of the fan out area) resembled B-3, B-4, B-5, B-7, B-8, and B-10, except brown clayey silt was present from 4 to 5 ft bgs. Test pit B-1 (in the northwest portion of the fan-out area) was composed of brown silty clay from ground surface to total depth. Groundwater was not encountered at any of the test pits.

Low density, black, asphalt-like material was noted on the surface around test pits B-1 and B-6. The material was also present in the subsurface at B-1 from 0 to 3 ft bgs and at B-6 from 0 to 1.5 ft bgs. Test pits B-1 and B-6 are the two western-most test pits in the fan-out area. This material was slightly sticky, soft, subrounded where eroded, and subangular on fresh surfaces and emitted an asphalt-like odor, noted when installing the test pits through the above-

referenced intervals. A photograph of one of the asphalt-like material is presented on page 31 of Appendix A. Staining or odor was noted only at test pits B-1 and B-6. TOVs were not above 11 parts per million (ppm) at any test pit.

4.4 INVESTIGATION DERIVED WASTE

All test pits were back-filled with excavated soil immediately after completion. Other wastes associated with sampling, including personal protective equipment (PPE), rinse water from decontamination, and other sampling-associated disposables were disposed appropriately by Ciniza.

5.0 REGULATORY CRITERIA

The NMED provided cleanup standards for DRO, SVOCs, VOCs, RCRA metals, mercury, and cyanide. Table A-1 of the New Mexico Soil Screening Levels, June 2006, Revision 4.0, provided the residential and industrial cleanup standards for RCRA metals, VOCs, mercury, and cyanide. The NMED instructed Ciniza that Table 2a of the total petroleum hydrocarbon (TPH) screening levels was to be used to for the cleanup standard of DRO. These tables are included as Appendix F.

6.0 SOIL SAMPLING ANALYTICAL RESULTS

Samples were analyzed for DRO by method 8015B, SVOCs by method 8270 if the DRO exceeded 500 mg/kg, VOCs by method 8260, RCRA metals by method 6010C, mercury by method 7471, and cyanide by method 335.2. A summary of the analytical data is provided in Table 2. No cyanide, mercury, VOCs, or SVOCs were detected in the samples analyzed. Barium, chromium, and lead were the only metals detected in the samples analyzed. Barium was detected in all samples at concentrations ranging from 200 to 310 mg/kg. Chromium was detected in all samples at concentrations ranging from 8.2 to 11.0 mg/kg, while lead was detected in all samples at concentrations ranging from 5.0 to 8.9 mg/kg. All of these concentrations are below the NMED residential soil screening levels (15,600 mg/kg for barium, 234 mg/kg for chromium, and 400 mg/kg for lead). DRO was detected in six of the 2 ft bgs samples (B-1, B-5, B-7, B-8, B-9, and B-10) and one of the 5 ft bgs samples (B-8). Concentrations ranged from 43 to 15,000 mg/kg. The NMED-approved cleanup standard for DRO is 200 mg/kg (from "Unknown oil" on Table 2a of NMED's TPH Screening Guidelines for Potable Groundwater (GW-1)). Four 2 ft bgs sample results (B-1, B-7, B-8, and B-9) exceeded this standard. Samples B-8 and B-9 are located in the northern most portion of the overflow ditch. Sample B-7 is located in close proximity to where the overflow ditch enters the fan-out area, and sample B-1 is located in the northeast portion of the fan-out area.

6.1 QUALITY ASSURANCE/QUALITY CONTROL PROTOCOL

Analytical data was validated through EPA Tier 1 and Tier 2 data validation standards. Analytical parameters, such as surrogate recoveries and duplicate sample analyses, were reviewed to verify the quality of data submitted. Laboratory data were also validated to verify that the samples were analyzed according to the specified USEPA Methods. Based on the Tier II data validation, several results were flagged with a "J," indicating that the detection value is estimated, or with a "UJ," indicating that the reporting limit is estimated. The analytical results as well as the data validations are included as Appendix E.

7.0 CONCLUSIONS

Soil samples were collected from 2 ft and 5 ft bgs at 10 locations in the railroad rack lagoon overflow ditch and fan-out area. In 1992, the overflow ditch and fan-out area was investigated during the RFI. Soil samples collected during the RFI were analyzed for VOCs, SVOCs, and total metals. Nine samples from the RFI sample set had low VOC and/or SVOCs detected. Neither VOCs nor SVOCs were detected in the samples collected in the 2006 investigation.

Soil samples collected during the RFI were also analyzed for total metals. Chromium was the only metal that showed elevated detections in the RFI samples. However, the chromium levels were below the RCRA Corrective Action limits for remediation (40 ppm). Chromium levels in the sample collected during 2006 did not exceed the RCRA corrective action levels. For this sample set, the chromium levels, as well as the other RCRA metals, are below the cleanup standards specified by NMED.

As discussed in Section 6.0, four of the 2 ft. bags soil samples exceeded the DRO TPH screening level of 200 Mg/Kg. It is important to note that the deeper 5 ft. bag samples did not exceed screening levels. In addition, all other detected constituents were reported at concentrations below applicable screening levels.

Further actions, such as additional sampling and/or cleanup requirements, will be decided upon between Ciniza and the NMED.

TABLES

TABLE 1. Soil Sample Field Screening Summary, Railroad Rack Lagoon Overflow Ditch and Fan-Out Area, Giant Refining Company, Ciniza Refinery, Gallup, New Mexico

Sample ID	Depth (ft)	TOV (ppm)
B-1	2	0.9
B-1	5	1.2
B-2	2	1.0
B-2	5	1.0
B-3	2	1.5
B-3	5	1.3
B-4	2	1.1
B-4	5	1.0
B-5	2	1.9
B-5	5	1.1
B-6	2	3.5
B-6	5	0.8
B-7	2	2.8
B-7	5	5.8
B-8	2	1.5
B-8	5	1.5
B-9	2	10.2
B-9	5	3.0
B-10	2	2.9
B-10	5	1.2

TABLE 2. Soil Sample Analytical Result Summary, Railroad Rack Lagoon Overflow Ditch and Fan-Out Area, Giant Refining Company, Cinizia Refinery, Gallup, New Mexico

Sample ID	Depth	Diesel Range Organics (mg/Kg)	Metals (mg/Kg)				Volatiles (mg/Kg)
			Barium	Chromium	Lead	All Others	All
B-1	2 feet	**470**	280	11	7.9	ND	ND
	5 feet	ND	300	8.8	5	ND	ND
B-2	2 feet	ND	260	10	7	ND	ND
	5 feet	ND	290	9.3	5.9	ND	ND
B-3	2 feet	ND	260	9	11	ND	ND
	5 feet	ND	290	9.4	8.3	ND	ND
B-4	2 feet	ND	250	11	8.1	ND	ND
	5 feet	ND	230	11	7.6	ND	ND
B-5	2 feet	130	250	10	7.3	ND	ND
	5 feet	ND	290	10	7.1	ND	ND
B-6	2 feet	ND	230	13	6.8	ND	ND
	5 feet	ND	260	9.6	5.8	ND	ND
B-7	2 feet	**360**	230	11	8.6	ND	ND
	5 feet	ND	280	10	6.3	ND	ND
B-8	2 feet	**2400**	270	9.6	8.5	ND	ND
	5 feet	43	260	8.2	8.9	ND	ND
B-9	2 feet	**15000**	220	8.5	8.3	ND	ND
	5 feet	ND	310	9.1	7.1	ND	ND
B-10	2 feet	63	280	9.5	8.4	ND	ND
	5 feet	ND	230	9.3	6.3	ND	ND
Clean Up Standard - Residential		200	15600	234	400	--	--
Clean Up Standard - Industrial		200	100000	3400	800	--	--

Notes: **Bold** numbers indicate analytical result exceeds cleanup standard.
All samples collected on 10/17/06 and 10/18/06.
Clean Up Standards for metals are taken from Table A-1: (NMED Soil Screening Levels) of the NM Soil Screening Levels, June 2006, Revision 4.0.
"Unknown Oil" clean up standards taken from Table 2a of the NMED TPH Screening Guidelines are used for DRO.

FIGURES