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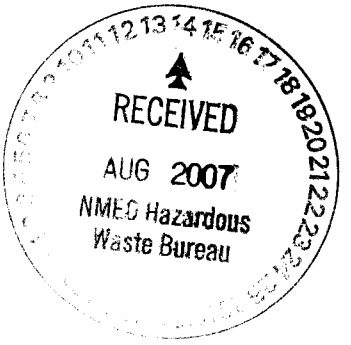
August 7, 2007



Kleinfelder Project No. 84679
File No.: 84679.3-ALB07RP001

Giant Industries
Ciniza Refinery
I-40, Exit 39
Jamestown, NM 87347
Attn: Mr. Jim Lieb

Subject: **Monitoring Well Installation Report**
Ciniza Refinery
Jamestown, New Mexico

Dear Mr. Lieb:

Kleinfelder West, Inc. (Kleinfelder) is pleased to present the results of the monitoring well installations and groundwater monitoring event performed at the Ciniza Refinery in Jamestown, NM. This report includes a description of field activities, a summary of data, and discussion of results. With your approval, a copy of this report will be forwarded to Ms. Hope Monzeglio with the New Mexico Environment Department Hazardous Waste Bureau and Carl Chavez with the New Mexico Oil Conservation Division.

Should any questions arise concerning this report, please contact the project manager, Mr. Justin Ball, at (505) 344-7373.

Respectfully submitted,
KLEINFELDER WEST, INC.

Brian Lucero
Staff Geologist

Reviewed by:

Justin D. Ball, P.G.
Project Manager

BL:JDB:ad

c: Hope Monzeglio, NMED HWB
Carl Chavez, OCD

KLEINFELDER 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505) 344-7373 (505) 344-1711 fax

Monzeglio, Hope, NMENV

From: Justin Ball [JBall@kleinfelder.com]
Sent: Wednesday, August 22, 2007 4:05 PM
To: Monzeglio, Hope, NMENV
Cc: jlieb@giant.com; Brian Lucero
Subject: Clarification for Ciniza Boring Logs

Hope:

The GW elevation triangles refer to the groundwater elevation in the wells as measured after installation (open) and during the gauging event (solid). The numerical depth, time and date are for these measurements are given in the groundwater header on the upper right side of the log.

Hope this is helpful,

Justin

Justin D. Ball, P.G.
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MONITORING WELL INSTALLATION REPORT
CINIZA REFINERY
JAMESTOWN, NEW MEXICO
KLEINFELDER PROJECT NO. 84679

Prepared for:

GIANT INDUSTRIES
CINIZA REFINERY
I-40, EXIT 39
JAMESTOWN, NEW MEXICO

Prepared by:

KLEINFELDER
8300 Jefferson NE Suite B
Albuquerque, New Mexico 87113

August 7, 2007

TABLE OF CONTENTS

1.0 INTRODUCTION

This report presents the results of the monitoring well installations and groundwater monitoring event performed at Giant Industries' (Giant) Ciniza refinery located at I-40, Exit 39, in Jamestown, NM (Site). The work was performed in accordance with Kleinfelder, Inc.'s (Kleinfelder's) Work Plan No. 83817.PROP-ALB07001 Rev. 1 dated May 24, 2007 (Kleinfelder, 2007). Giant Industries approved Kleinfelder's work plan via purchase order C16449 dated June 4, 2007. The New Mexico Environment Department (NMED) approved the work plan in a letter dated June 4, 2007. Fieldwork for this event was performed on June 11 & 12, and June 21, 2007.

1.1 Site Description

The Site is located at 35° 29.41'N, 108° 25.80'W, McKinley County, New Mexico (see Figure 1). The facility is an active refinery. Refinery equipment near the site includes the new American Petroleum Institute (API) oil/water separator (separator), an off-gas flare, two aeration lagoons and an evaporation pond.

1.2 Site History and Previous Work

Mr. Justin Ball mobilized on May 9th, 2007 for a site orientation and reconnaissance with Mr. Jim Lieb, and Mr. Steve Morris of Giant Industries, Inc. During this visit, details were discussed concerning the Work Plan detailed in the NMED Hazardous Waste Bureau (HWB) letter dated March 23, 2007. This and subsequent conversations refined the scope of work and cost estimate. The purpose of the monitoring well installations and groundwater monitoring event, per the letter from the HWB, is to address potential leaks of hydrocarbons from the new API separator.

1.3 Proposed Scope of Work

The scope of work specified in the approved work plan included the following key elements:

- Developing a work plan and project planning;
- Advancing a total of 3 soil borings; 2 borings to 10 feet (ft) below ground surface (bgs) and 1 boring to 25 ft bgs;
- Collecting soil screening readings and lithologic information at 5-ft intervals or less in each boring using a 5-ft continuous sampler;
- Collecting soil samples at specified intervals from each boring for analysis by EPA methods 8021B [Benzene, Toluene, Ethylbenzene, total xylenes (BTEX) and Methyl tert-Butyl Ether (MTBE)], and 8015B [Total Petroleum Hydrocarbons (TPH) gasoline range organics (GRO), diesel range organics (DRO) and motor oil range organics (MRO)];
- Converting each boring to a 2-in diameter monitoring well;

- Developing and sampling each well for analysis by EPA methods 8021B (BTEX and MTBE), and 8015B (TPH GRO and DRO);

- Reporting the results of the soil characterization and groundwater monitoring events.

1.4 Work Plan Deviations

The following workplan deviations were discussed and approved by Giant and HWB during the field event:

- The surface completions of monitoring wells KA-1 through KA-3 were constructed with flush mounted vaults to allow for vehicle access between the new API separator and Areation Lagoon #1;

- Boring/monitoring well KA-1 was located approximately 45 ft east of new API separator instead of 20 ft, due to the presence of subsurface and aboveground utilities.

1.5 Project Preparation

Upon receipt of authorization to proceed from Giant, the following tasks were performed prior to commencing field activities:

- Project files were set up and work orders were issued to Spectrum Exploration, Inc. for drilling services;

- The HWB project manager, Ms. Hope Monzeglio, and the Giant project manager, Mr. Jim Lieb were notified of planned onsite activities;

- The New Mexico One Call system was contacted for utility line location;

- A Health and Safety Plan (HASP) was generated for the project (signature pages in Appendix A);

Field supplies were secured and checked for workability and sample containers were obtained from Hall Environmental Analysis Laboratories (HEAL) in Albuquerque, NM.

2.0 FIELD ACTIVITIES

Field activities were conducted on June 11 & 12, 2007 and on June 21, 2007. While in the field, the HASP was reviewed and a tailgate safety meeting was conducted each day. The HASP signatory pages are included in Appendix A. Work was performed in OSHA Level D personal protective equipment, which was modified to include the use of personal hydrogen sulfide meters by Kleinfelder and contractor personnel. A degreed field geologist supervised field activities and performed work in compliance with the HASP. A copy of the field notes is included in Appendix B. Field work was conducted in accorance with Kleinfelder's standard quality assurance/quality control procedures, as outlined in the Field Operating Procedures included in Appendix C.

2.1 Soil Boring Advancement, Soil Sampling, and Soil Analysis

The soil borings were advanced in three locations around the new API separator in the northwest portion of the refinery property (Figure 2). The procedures used to sample soils are detailed in Appendix C. A summary of these activities is provided below. Boring logs are included in Appendix D.

Advancement of soil borings was performed using Hollow Stem Auger (HSA) drilling methods (outer diameter 8 inches). Borings KA-1 was advanced on the east side of the API separator to 10 ft bgs; KA-2 and KA-3 were advanced on the west side of the API separator to 10 and 25 ft bgs, respectively (see Figure 2). Soils were sampled using a properly decontaminated 5-ft continuous sampler.

Once collected, samples were visually classified and logged by a degreed geologist using the American Society for Testing and Materials standard D 2488-00, "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)." Two soil samples were collected from each soil sample interval; one for heated headspace field analysis and the other for possible laboratory analysis. Heated headspace readings were made using a field calibrated Thermo Environmental Instruments 580B PID and the field screening procedures described in Appendix C. Results are listed in Table 1. The second soil sample was placed in laboratory-provided glassware and preserved on ice for possible laboratory analyses.

Soil samples were collected from soil intervals with elevated headspace readings, and/or staining or olfactory evidence of hydrocarbon impact, from the bottom of each boring, and from the surface of the water table. In addition, per the March 23, 2007 NMED HWB letter, a sample was collected "from the confining layer in the deepest boring". The samples were containerized, preserved, and submitted under chain of custody to HEAL in Albuquerque, NM. Soil samples were submitted for analysis by EPA methods 8021B (BTEX and MTBE), and 8015B (TPH GRO, DRO and MRO). Soil samples for VOC and TPH-GRO analysis were extracted with methanol in the field.

2.2 Monitoring Well Installation and Groundwater Sampling

After drilling and sampling activities were completed, each hole was converted to a monitoring well using 2-in inside diameter (I.D.), schedule 40, flush-joint, threaded

polyvinyl chloride (PVC) casing and screen. The groundwater monitoring wells were constructed using a threaded PVC bottom plug and flush-joint, threaded, factory-slotted well screen (0.010 machine-slot). A 2-inch diameter PVC expanding locking top plug was placed at the top of the groundwater monitoring well.

Monitoring wells KA-1 and KA-2 were constructed with the screened interval set from 4.5 to 9.5 ft bgs in order to intersect the water table. Since KA-1 and KA-2 were advanced into the confining unit, the bottom of each boring was backfilled with hydrated bentonite chips to prevent downward migration of fluids through the confining unit. Monitoring well KA-3 was constructed with the screened interval from 15 to 25 ft bgs, across alluvial-Chinle Formation contact.

The annular space around and 1 to 2 ft above the screen was filled with 10/20 Colorado silica sand. Approximately 2 ft of 3/8-inch bentonite chips were placed above the sand pack and properly hydrated. The casing, sand filter pack, and bentonite seal were placed inside the annulus as the augers were withdrawn from the soil boring. The surface completions were constructed with a traffic-rated, flush-mount 8-in diameter well vault set in a 2-ft diameter concrete pad. Once constructed, the monitoring wells were developed in accordance with procedures in Appendix C.

Once development was complete, each well was purged by bailing with a disposable polyethylene bailer. Prior to sampling, the wells were purged until a total of 3 well casing volumes of groundwater were removed, or the wells bailed dry. The temperature, specific conductivity, and pH were measured and logged at regular intervals using a YSI-556 water quality meter. These recorded values are included with the field notes in Appendix B. Further description of the disposable bailer purging/sampling technique is provided in Appendix C.

Once each well was purged, a ground water sample was collected and poured into the laboratory-prepared vials using disposable bottom emptying devices. Groundwater samples were submitted for analysis by EPA methods 8021B (BTEX and MTBE), and 8015B (TPH GRO, DRO and MRO). Samples were slowly poured into 40-milliliter (mL) glass vials and were preserved with mercuric chloride. The samples were then placed on ice and hand-delivered under standard chain-of-custody procedures to HEAL in Albuquerque, New Mexico. Laboratory results are provided in Appendix E.

2.3 Site Survey

Upon completion of well installation, the wells were surveyed by a professional surveyor licensed in the State of New Mexico. The horizontal location of each well was surveyed to the nearest 0.1 ft, coordinates are New Mexico State Plane Grid, West Zone, North American Datum 83. The top of casing and ground surface elevations were surveyed to the nearest 0.01 ft; elevations are North American Vertical Datum 88, U.S. feet. The survey was tied into brass cap NMSHD 2765-11, which was used for the Ciniza control survey. See Figure 2 for survey data.

Investigation Derived Waste Management

During advancement of the 3 soil borings, cuttings from each boring were placed in 55-gallon drums and stored on-site pending the results of laboratory analysis of submitted samples. Drill cuttings will be properly disposed of at Ciniza refinery's on-site landfarm. NMED will be notified in writing once the cuttings have been removed to the landfarm.

3.0 SUMMARY OF DATA

3.1 Site Geology and Hydrogeology

As indicated in the boring logs in Appendix D, sediments consisting of various combinations of clay, silt, and sand are present from ground surface to 25 ft bgs. From ground surface to approximately 7 ft bgs, sediments are reddish, poorly cemented, poorly graded sand to sandy lean clay, and are dry to moist. Sand is fine- to medium-grained, and subangular to subrounded. From 6 to 10 ft bgs, sediments grade into dark red to dark brown lean clay to lean clay with sand. These clays contain 5 to 15% fine sand, are poorly cemented, and are moist.

Boring KA-3 is the only boring deeper than 10 ft bgs (total depth = 25 ft bgs). Sediments from 10 to 12.5 ft bgs in KA-3 are the same as those encountered in borings KA-1 and KA-2 between 7 and 10 ft bgs. From 12.5 to 18 ft bgs, sediments consist of lenses of poorly graded sand with varying percentages of clay and silt interbedded with lenses of sandy lean clay. These varying lenses are reddish to brown, wet (especially within fractures), and poorly to moderately cemented. The sand in these lenses is fine- to medium-grained and subangular to subrounded.

Dark red to reddish grey, highly fractured mudstone was encountered at 18-25 ft bgs. Fracturing and moisture content decreased with depth. This mudstone is the upper portion of the Chinle Formation. The contact between the alluvial deposits and the Chinle in boring KA-3 was difficult to determine due to the low induration of the mudstone and therefore the boring was advanced 8 ft into the Chinle. A simple cross section (Appendix D), based on previous site borings MW-4, GWM-1, and OW-12, illustrates the screened interval of KA-3 across the alluvial-Chinle contact.

Total depth (25 ft bgs) was reached in boring KA-3 at 14:33 on June 11, 2007. Depth to water (DTW) was measured in KA-3 on the morning of June 12, prior to well development, at 12.5 ft bgs. DTW was measured at 9.50 ft bgs in both KA-1 and KA-2 on the morning of June 12. Prior to purging and sampling on the morning of June 21, DTW was measured in KA-1, KA-2, and KA-3 at 8.22 ft bgs, 8.54 ft bgs, and 8.50 ft bgs, respectively.

3.2 Soil Screening/Analysis

Soil screening readings for VOCs are provided on the boring logs presented in Appendix D and are summarized in Table 1. The highest field screening reading of 137.4 ppmv was observed in the sample collected at 10 ft bgs in boring KA-2, which is above the NMED action level of 100 ppmv. Results of the remaining field screening readings in borings KA-1, KA-2, and KA-3 were below 100 ppmv.

Results of the analytical testing performed on collected soil samples are presented below and are summarized in Table 2; a copy of the laboratory report is included in Appendix E.

Boring KA-1

Benzene, toluene, ethylbenzene, total xylenes, MTBE, and TPH-GRO were not detected in the three analytical samples submitted from KA-1. Total TPH (GRO+DRO+MRO) was detected in sample KA1@1 at 99 milligrams per kilogram (mg/kg). Total TPH results for each of the three samples from KA-1 were below 100 mg/kg, the NMED standard for the confirmation of a release of petroleum (NMED, 2005b).

Boring KA-2

Benzene, toluene, ethylbenzene, total xylenes, and MTBE were not detected at levels above the NMED Hazardous Waste Bureau soil screening levels that are considered the lowest concentrations of each compound that require corrective action (NMED, 2005). Total TPH was detected in sample KA2@9 at 400 mg/kg, which is above the NMED standard for total TPH. Results for total TPH in samples KA2@5 and KA2@10 were below NMED standards.

Boring KA-3

Benzene, toluene, ethylbenzene, total xylenes, and TPH-GRO were not detected in the four analytical samples submitted from KA-3. Total TPH was detected in sample KA3@10 at 460 mg/kg, which is above the NMED standard for total TPH. Total TPH levels in samples KA3@12.5, KA3@22.5, and KA3@25 are below NMED standards.

3.3 Groundwater Analysis

Results of the analytical testing performed on groundwater samples are summarized in Table 3; a copy of the laboratory report is included in Appendix E.

Monitoring Well KA-1

Benzene, toluene, ethylbenzene, total xylenes, MTBE, TPH-GRO, TPH-DRO, and TPH-MRO were not detected in KA-1.

Monitoring Well KA-2

Benzene was detected at 870 µg/L, which is above the NMWQCC regulatory limit of 10 µg/L. Total xylenes were detected at 860 µg/L, which is above the NMWQCC regulatory limit of 620 µg/L. MTBE was detected at 680 µg/L, which is above the NMWQCC regulatory limit of 100 µg/L. Toluene and ethylbenzene were not detected in KA-2 at levels above the NMWQCC regulatory limits of 750 µg/L. Total TPH was not detected at a level above the NMED standard of 100 mg/l in the samples collected from KA-2.

Monitoring Well KA-3

Benzene, toluene, ethylbenzene, and total xylenes were not detected in well KA-3. MTBE was detected at 150 µg/L, which is above the NMWQCC regulatory limit of 100 µg/L. TPH-GRO was detected in the sample collected from KA-3 at 0.16 mg/L. TPH-DRO and TPH-MRO were not detected in KA-3.

4.0 SUMMARY

- A total of 3 soil borings, 2 borings to 10 feet (ft) below ground surface (bgs) and 1 boring to 25 ft bgs, were advanced adjacent to the API separator;
- Soil screening readings and lithologic information were collected at 5-ft intervals or less in each boring using a 5-ft continuous sampler;
- Soil samples were collected at specified intervals from each boring for analysis by EPA methods 8021B (BTEX and MTBE), and 8015B (TPH-GRO, DRO and MRO). Analytical results were above the NMED standard for total TPH at 9 ft bgs in boring KA-2 and 10 ft bgs in boring KA-3;
- Each boring was converted to a 2-in diameter monitoring well, developed, and sampled for analysis by EPA methods 8021B (BTEX and MTBE), and 8015B (TPH GRO and DRO). Benzene, total xylenes, and MTBE were detected at levels above regulatory limits in well KA-2. MTBE was detected above regulatory limits in well KA-3.

5.0 LIMITATIONS

The scope of work for this report was intended to provide a limited investigation related to the presence of hazardous materials at the referenced site. This assessment was not intended to be comprehensive, identify all potential concerns, or eliminate the possibility of using this information with some degree of risk.

This report may be used only by the client and only for the purposes stated, and within a reasonable time from its issuance, but in no event later than one year from the date of the report. Land use, site conditions (both off and on site) or other factors may change over time and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify Kleinfelder of such intended use. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party and client agrees to defend, indemnify, and hold harmless Kleinfelder from any claim or liability associated with such unauthorized use or non-compliance.

It should be recognized that definition and evaluation of environmental conditions is a difficult and inexact science. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the conditions present. More extensive studies may reduce the inherent uncertainties associated with environmental conditions. If the client wishes to further reduce the uncertainty associated with this study, Kleinfelder should be notified for additional consultation. No warranty, expressed or implied, is made.

6.0 REFERENCES

Kleinfelder, 2007. Work Plan for Monitoring Well Installation, Ciniza Refinery, Jamestown, New Mexico, Proposal No. 83817, May 24, 2007.

New Mexico Environment Department, Groundwater Quality Bureau 2005. Technical Background Document for Development of Soil Screening Levels, August, 2005.

New Mexico Environment Department, Hazardous Waste Bureau 2007. Work Plan for Monitoring Well Installation around the new API Separator, HWB-GRCC-07-001 Giant Refining Company, Ciniza Refiner NMED ID# NMD000333211, March 23, 2007.

New Mexico Environment Department, Petroleum Storage Tank Bureau 2000. Guidelines for Corrective Action, March 13, 2000.

FIGURES