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An employee owned company

May 24, 2007
File No. 83817.PROP-ALB07LT001

Ms. Hope Monzeglio
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6313

RE: Request for Approval of Boring/Monitoring Well Locations
Ciniza Refinery
Jamestown, New Mexico

Dear Ms. Monzeglio:

Kleinfelder, Inc. (Kleinfelder) would like to formally request approval of the locations of the proposed borings/monitoring wells at the Ciniza refinery operated by Giant Industries. The attached Work Plan was developed in response to your March 23, 2007 correspondence to Giant. The proposed boring/monitoring locations were determined in accordance with your letter and are depicted in Figure 2 of the attached Work Plan. Kleinfelder reserves the ability for minor relocation of these locations depending on field conditions, i.e. relocation due to underground utilities.

Kleinfelder is currently planning to mobilize to the site for drilling activities the week of May 28th, 2007 and as such, your prompt attention is appreciated.

We appreciate the opportunity to work with you on this project. If you have any questions, or need additional information, please contact this office at 344-7373.

Respectfully submitted,
KLEINFELDER WEST, INC. (formerly Kleinfelder)

Justin D. Ball, P.G.
Project Manager

Reviewed by:

Bernard Bockisch, PMP
Project Manager

c: Carl Chavez, NMOCD

JDB:ad

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

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DOCUMENT TRANSMITTAL FORM

TO:	Ms. Hope Monzeglio NMED Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, NM 87505-6313	PAGE		OF	
		TRANSMITTAL DATE:	05/25/07		
		TRANSMITTAL DCN:	83817.PROP-ALB07TS003		

RETURN RESPONSES/COMMENTS TO:	J. Ball
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MAY 2007
NMED Hazardous Waste Bureau

PROJECT NO.:	83817	PROJECT NAME:	Giant Ciniza Refinery
ACTIVITY/DESCRIPTION:	Rev. 1 Work Plan		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Work Plan for Monitoring Well Installation – Ciniza Refinery	1		05/25/07	83817.PROP-ALB07WP001 Rev. 1

INSTRUCTIONS/REMARKS	RECEIPT AND READ ACKNOWLEDGEMENT PLEASE COMPLETE AND RETURN WITHIN 15 WORKING DAYS TO: KLEINFELDER DOCUMENT CONTROL CENTER ☐ Mark previous issues "obsolete", "superseded", or uncontrolled" ☐ Destroy previous affected material ☐ Return old material with this record ☒ New issue (no previous copies received) ☐ Replace with revised/new material ☐ Not Applicable

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RETURN RESPONSES/COMMENTS TO:	J. Ball
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PROJECT NO.:	83817	PROJECT NAME:	Giant Ciniza Refinery
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		TRANSMITTAL DATE:	05/25/07		
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ENTERED

WORK PLAN FOR MONITORING WELL INSTALLATION CINIZA REFINERY JAMESTOWN, NEW MEXICO

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

RECEIVED
JUN 2007
NMED Hazardous Waste Bureau

May 24, 2007

KLEINFELDER
An employee owned company

May 24, 2007
File No. 83817.PROP-ALB07WP001

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

Subject: Work Plan for Monitoring Well Installation Rev. 1 Ciniza Refinery Jamestown, New Mexico

Dear Mr. Lieb:

Kleinfelder West, Inc. is pleased to submit this work plan to Giant Industries (Client) to provide monitoring well installation services for the Ciniza refinery (Site) in Jamestown, New Mexico. This work plan was developed after discussions with you, Mr. Steve Morris and Mr. Frank Diller. Copies of this work plan have been sent to Ms. Hope Monzeglio of the New Mexico Environment Department Hazardous Wate Bureau and Carl Chavez of the Oil Conservation Division.

Respectfully submitted,
KLEINFELDER WEST, INC.

BJ, PE for

Justin D. Ball, P.G
Project Manager

Reviewed by:

Bernard Bockisch, PMP
Senior Project Manager

JDB:BB:ad

c: Hope Monzeglio, NMED HWB
Carl Chavez, OCD

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Figure 2 – Site Plan With Proposed Well Locations

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Appendix A – Field Operating Procedures
Appendix B – Resume of Justin D. Ball, P.G.

1.0 INTRODUCTION

Giant Industries, Inc., (Client) has requested that Kleinfelder West, Inc. (Kleinfelder), develop a work plan to perform services in the vicinity of the new American Petroleum Institute (API) oil/water separator (separator) at the Ciniza Refinery (Site) located at I-40, Exit 39, in Jamestown, New Mexico (Figure 1). The objectives of the work plan are to (1) summarize relevant information obtained from Giant, (2) detail a scope of work for installation of three monitoring wells at the Site, and (3) establish a schedule and budget for the proposed activities. The scope of work, project schedule, and project budget follow in Sections 2, 3, and 4, respectively.

The Site is located at 35° 29.41'N, 108° 25.80'W, McKinley County, New Mexico. The facility is an active refinery. Pertinent refinery equipment at the site includes the separator, an off-gas flare, aeration lagoons and an evaporation pond.

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. Various issues were discussed concerning addressing the Work Plan detailed in the New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB) letter dated March 23, 2007. This and subsequent conversations refined following scope of work and cost estimate. The installation of the three monitoring is designed to evaluated the presence of impact due to potential leaks from the separator.

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2.0 SCOPE OF WORK

The scope of work has been divided into the following three tasks:

- Task 1: Work plan development and project preparation
- Task 2: Field activities
- Task 3: Reporting

2.1 Task 1: Work Plan and Project Preparation

This task includes preparing and submitting this work plan and other project preparation activities that occur after work plan approval but before fieldwork mobilization. After receiving authorization to proceed, Kleinfelder will:

- Develop work orders for subcontractors.
- Notify the Client and NMED HWB a minimum of one week prior to the commencement of field and sampling activities.
- Notify New Mexico One-Call to facilitate location of underground utilities; and,
- Develop a Health and Safety Plan (HASP) that addresses field work specified in this work plan.
- Submission of the HASP to the Ciniza Refinery Health and Safety Office, Mr. Frank Diller, for approval a minimum of one week prior to the commencement of field and sampling activities.
- Review sample excavation and hot work permits and compile documentation necessary for their completion.
- Request an excavation permit a minimum of 24 hours prior to the commencement of field and sampling activities.
- Prepare a letter and site plan showing boring/monitoring well installation locations and change to flush-mounted well completions for NMED HWB approval.

2.2 Task 2: Field Activities

Task 2 will consist of field activities necessary to address the NMED HWB March 23, 2007 work plan letter.

2.2.1 Soil Borings

Three soil borings will be advanced in the vicinity of the separator utilizing hollow stem auger drilling techniques. Soil boring locations are shown on Figure 2. Two of these borings will be advanced in order to intersect the uppermost water-bearing zone anticipated to intersect the base of the separator. Previous borings advanced onsite indicate this uppermost water-bearing zone is between 5 and 8 ft bgs. These two shallow borings will be located immediately upgradient (KA-1) and downgradient (KA-2), and within 20 feet of the separator. Borings KA-1 and KA-2 will be terminated within the

confining unit. The third boring (KA-3) will be located adjacent to the downgradient shallow boring KA-2. KA-3 will be advanced to approximately 25 ft bgs and intersect the upper surface of the Chinle Group, a regional aquitard located beneath the site.

Each boring location will be hand-cleared to a depth of 5 ft bgs with a diameter greater than the auger flight in order to decrease the likelihood of drilling through unmarked or unknown underground utilities. A hole will be dug to four ft bgs with shovels and post hole diggers and advanced to 5 ft with hand augers and soil probes. Soil samples will be collected during hand clearing as discussed below.

At each boring, soil samples will be collected continuously from 5 ft bgs to the total depth using a 5-ft-long, continuous sampler. A degreed geologist will direct field activities and will describe the soil samples using ASTM's "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)" (ASTM, 2000). petroleum hydrocarbon concentration will be identified in 5-foot intervals by screening the soil samples for the presence of Volatile Organic Compounds (VOCs) using the heated headspace method detailed in Appendix A.

During boring advancement, soil samples will also be collected from 1) soil intervals with elevated headspace readings, and/or staining or olfactory evidence of hydrocarbon impact, 2) the bottom of each boring, 3) from the surface of the water table. In addition, per the March 23, 2007 NMED HWB letter, a sample will be collected "from the confining layer in the deepest boring". Kleinfelder has interpreted this phase as the confining layer beneath the uppermost water-bearing layer targeted by the shallow borings, not the upper portion of the Chinle Group in boring KA-3. Due to NMED HWB broad requirement of sampling "any soils containing visual contamination," Kleinfelder has conservatively estimated submitting 12 samples for laboratory analysis. Samples will be analyzed for benzene, toluene, ethylbenzene, total xylenes (BTEX) and methyl tert-butyl ether (MtBE) by EPA Method 8021 and gasoline and diesel range total petroleum hydrocarbons (TPH-GRO, DRO) by EPA method 8015B.

2.2.2 Monitoring Well Installation and Groundwater Sampling

The monitoring wells will be constructed with 2-in inside diameter (I.D.), Schedule 40, flush-joint, threaded polyvinyl chloride (PVC) casing and screen. Groundwater monitoring well construction will consist of a threaded PVC bottom plug and flush-joint, threaded, factory-slotted well screen (0.010 machine-slot). A sump and or end cap will be placed at the bottom of the screen. The remainder of the groundwater monitoring well will be constructed with the appropriate length of flush-joint, threaded PVC blank casing. A 2-inch diameter PVC expanding locking top plug will be placed at the top of the groundwater monitoring well.

The annular space around and 1 ft above the screen will be filled with 10-20 Colorado silica sand. Approximately 2 ft of 3/8-inch hydrated bentonite chips will be placed above the sand pack. The casing, sand filter pack, and bentonite seal will be placed inside the annulus as the augers are withdrawn from the soil boring. The surface completion will be constructed with a traffic rated flush mount 8" diameter manhole set in a 4 ft by 4 ft

concrete pad. Once constructed, the monitoring well will be developed in accordance with procedures in Appendix A; however, no more than 2 hours will be devoted to well development. Well development will not be conducted on monitoring wells containing measurable (0.01 ft or greater) quantities of LNAPL.

Deep monitoring well KA-3 will be constructed with 10 feet of screen slightly below the top of the Chinle Group contact, estimated at 25 to 15 ft bgs. Shallow monitoring wells KA-1 and KA-2 will be constructed so that a five foot screened interval intercepts the shallow water bearing zone estimated at 5 to 8 ft bgs. Since KA-1 and KA-2 will be advanced into the confining unit, the bottom of the boring will be backfilled with hydrated bentonite chips to prevent downward migration of fluids through the confining unit. The well screen will be isolated from this bentonite seal by at least six inches of 10-20 Colorado silica sand.

A professional surveyor licensed in the State of New Mexico will survey the horizontal location of each well to the nearest 0.1 ft and the top of casing and ground surface elevations of the new monitoring wells to the nearest 0.01 ft. The surveyor will tie in previously completed monitoring wells GMW-1 through GMW-3.

Fluid-level data collection and groundwater sampling will be performed in accordance with the procedures outlined in Appendix A. The wells will be purged and sampled using disposable bailers. Groundwater samples will be analyzed for BTEX and MtBE by EPA Method 8021B and TPH GRO and DRO by EPA Method 8015B. Well development and groundwater sampling will not be conducted in wells containing measurable (0.01 ft or greater) quantities of light non-aqueous phase liquids (LNAPL).

2.2.3 Investigation Derived Waste (IDW) Management

IDW soil cuttings will be drummed pending soil analytical results. If appropriate, soil cutting will be disposed of in the Ciniza refinery on-site land-farm. Groundwater generated during well development or sampling will be discharged to an impermeable surface and allowed to evaporate as discussed in Appendix A.

2.2.4 Health and Safety Considerations

Personal protective equipment (PPE) including steel-toed work boots, gloves, safety glasses and hard hats will be required (basic Level D requirements). Refinery specific PPE including fire resistant clothing and hydrogen sulfide personal air monitors will also be required. Kleinfelder will provide a HASP that will be reviewed and signed by on-site Kleinfelder personnel, subcontractors, and authorized visitors. The HASP will be submitted for review to Ciniza Refinery Health and Safety Office, Mr. Frank Deller, for approval a minimum of one week prior to the commencement of field and sampling activities.

At 8:00 am the morning of initial field work, Kleinfelder personnel, subcontractors, and authorized visitors will attend subcontractor training provided by the Ciniza Safety Department. A daily Hot Work Permit and a project long Excavation Permit will be obtained from the Ciniza Refinery prior to beginning work. In order to minimize ignition

sources, only diesel powered engines will be used onsite. While working in the vicinity of the off-gas flare, workers will be in contact with the Refinery Operator by refinery issued radio.

Kleinfelder anticipates conducting drilling under Level D conditions. Kleinfelder personnel and subcontractors will be prepared to upgrade to Level C PPE if warranted by working conditions. Air monitoring will be conducted in accordance with Kleinfelder's HASP and refinery subcontractor training.

2.2.5 Quality Assurance/Quality Control

Drilling and sampling will be completed in accordance with our standard Quality Assurance/Quality Control procedures designed to minimize cross-contamination between samples and to provide reliable laboratory results.

2.3 Task 3: Reporting

A draft report summarizing our field activities and findings will be submitted to the Client. The report will include a Site description, limited project history, description of data collection procedures, and a discussion of results. The report will also include:

- A scaled site plan showing the locations of newly installed monitoring wells, pertinent site features including the aeration lagoon, evaporation pond #1, the separator, existing monitoring wells GMW-1 through GMW-3 and identified utilities;
- Soil boring logs;
- Monitoring well construction diagrams;
- Tabulation of field VOC screening results and laboratory analytical test results;
- A map illustrating the distribution of petroleum hydrocarbon contaminants in soil, if extensive enough to map;
- A map illustrating the distribution of petroleum hydrocarbon contaminants in groundwater, if extensive enough to map;
- Description of sampling methods and procedures.

Following the Client's review of the draft report, Kleinfelder will incorporate any requested revisions before submission of the report to NMED HWB and the Oil Conservation District.

3.0 SCHEDULE

Kleinfelder will schedule this project for the week of May 28th, after Memorial Day and begin immediately upon receipt of your written authorization to proceed. Kleinfelder estimates the field program will be completed in two weeks after inception, the laboratory analyses will be completed two weeks after samples have been submitted to the laboratory, and the report will be completed 45 days after receiving the results of the laboratory testing

4.0 PROJECT BUDGET

Our lump sum fee for the described scope of work is as follows:

TASK NO.	TASK DESCRIPTION	LUMP SUM FEE	LUMP SUM FEE WITH NMGRT*
1	Work Plan, HASP, Regulatory Correspondence and Project Preparation	$3,164.00	$3,381.53
2	Field Activities	$18,540.40	$19,815.05
3	Reporting	$4,514.00	$4,824.34
TOTAL LUMP SUM FEE		**$26,218.40**	**$28,020.92**

* NMGRT for Bernalillo County is 6.875%

The cost assumes (1) Kleinfelder standard rates less 5%, (2) three days of field work to complete drilling activities and a second single day mobilization for groundwater sampling and surveying activities, (3) refinery permits will be completed within one hour of arrival onsite each day, (4) all work will be conducted in Level D PPE, and (5) a total of 12 soil and 6 groundwater samples will be submitted for laboratory analysis. Standby due to the permit process will be assessed at a standby rate of $275 per hour, excluding NMGRT. The total lump sum fee will be discounted by $132 and $120, excluding NMGRT, per each soil and groundwater sample, respectively, not submitted for laboratory analysis. If conditions require upgrading to Level C PPE during drilling, the total lump sum fee will be increased by $2,500, excluding NMGRT. If Ciniza refinery is unable to provide a CADD version of the Plant Site Drawing, Kleinfelder will reproduce the drawing and the total lump sum fee will be increased by 540 excluding NMGRT. Additional fees necessary to accomplish project objectives will be approved by the Client prior to performing additional work.

5.0 QUALIFICATIONS

The project manager for the proposed work is Justin D. Ball, P.G. A copy of Mr. Ball's resume is presented in Appendix B.

6.0 REFERENCES

ASTM, 2000. Designation D 2488-00, "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)."

NMED HWB, 2007. "Work Plan for Monitoring Well Installation around the New API Separator; HWB-GRCC-07-001, Giant Refining Company, Ciniza Refinery, NMED ID # NMD000333211". March 23, 2007

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FIGURES

Figure 1 – Site Location Map

Figure 2 – Site Plan With Proposed Well Location

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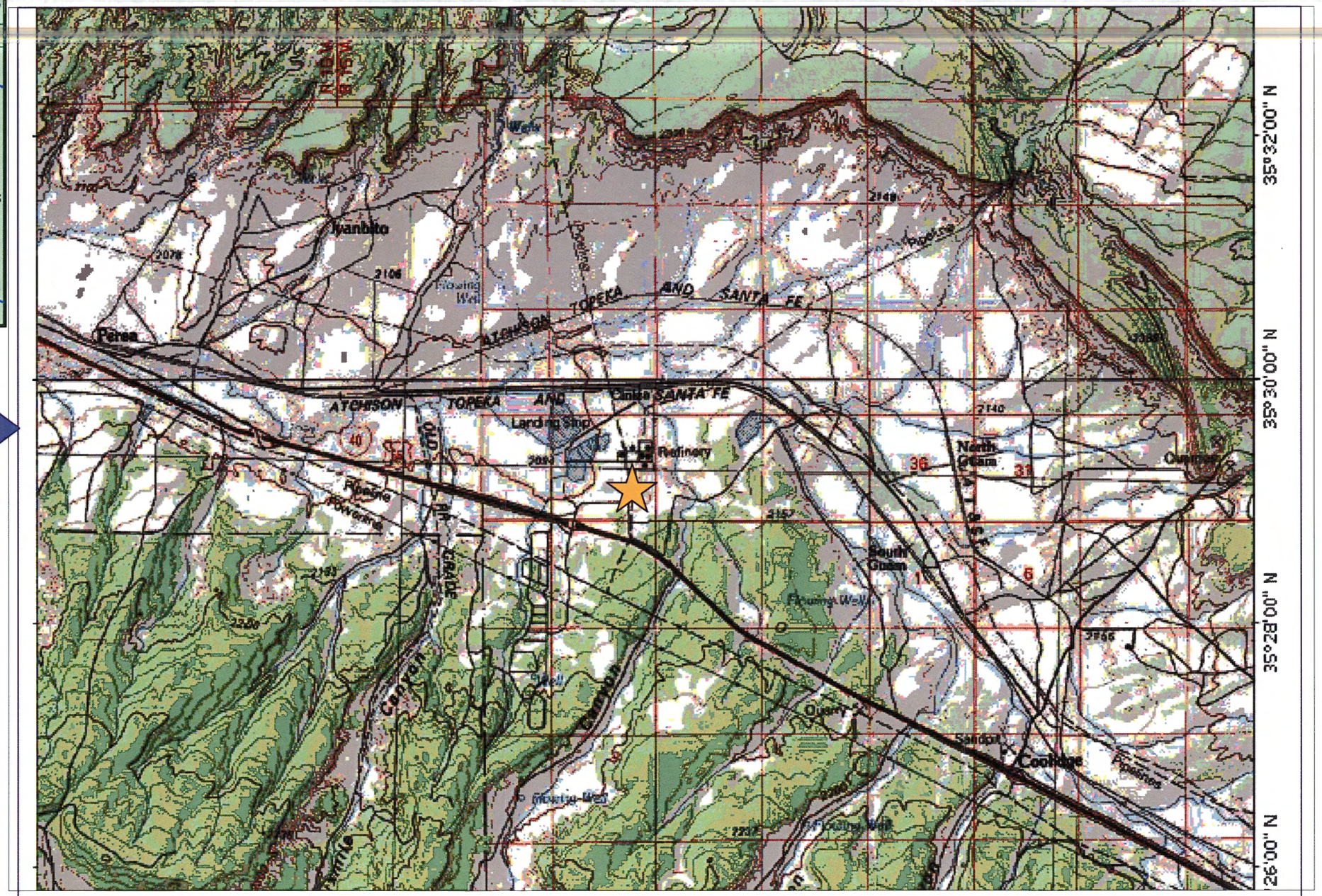

= SITE LOCATION
35d 29.41'N, 108d 25.80'W

Source: Map created with TOPO! 2003 National Geographic

Scale

0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 miles

KLEINFELDER		SITE LOCATION MAP Ciniza Refinery Jamestown, New Mexico	FIGURE 1
Drawn By: E. Loescher	Date: May 2007		
Project No.: 83817	Filename: 60952_01_1.dwg		
Scale: as noted	Revision: –		

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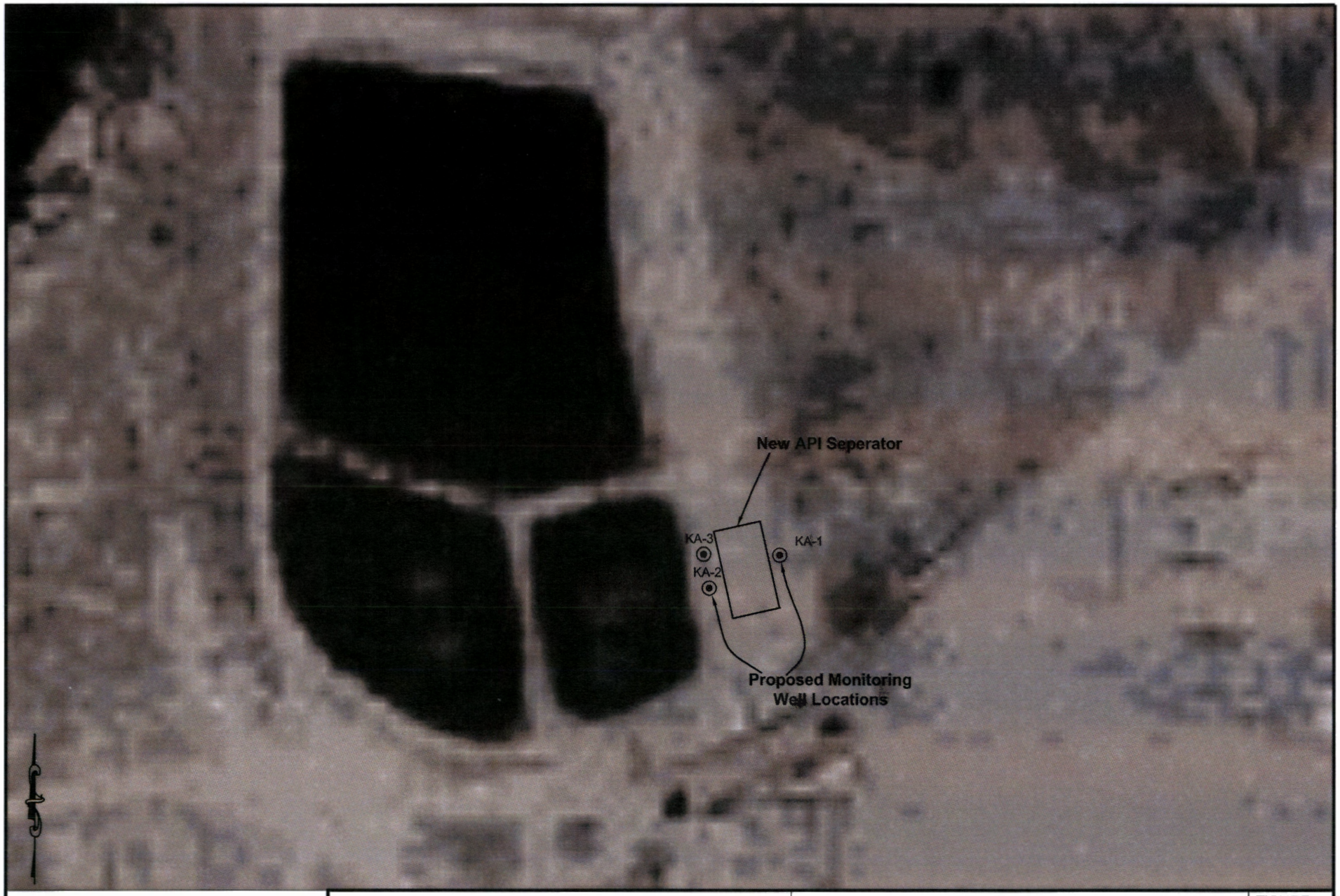

50 0 25 50

APPROXIMATE SCALE: 1 inch = 50 ft

KLEINFELDER

Drawn By: Ed Loescher	Date: May 2007
Project No.: 83817	Filename: 83817 fig -2
Scale: na	Drawing Category:

SITE PLAN WITH PROPOSED WELL LOCATIONS
CINIZA REFINERY
Monitoring Well Plan
Jamestown, NM

FIGURE

2

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APPENDIX A

Field Operating Procedures

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Field Operating Procedures

Soil Sampling Procedure – Before collecting each soil sample, the continuous sampler or split-spoon sampler and other soil sampling tools will be cleaned using a solution of Alconox and clean tap water. The sampler will then be rinsed with additional distilled water. New disposable latex gloves will be used for all soil sampling procedures to minimize the potential for cross contamination.

Upon retrieval of the sampler, a degreed geologist will first collect samples for field screening and laboratory analysis. Once these samples have been secured and preserved as required, the geologist will document percent recovery of the interval targeted for sampling and log the sample in accordance with American Society Testing and Materials (ASTM) standard D 2488-00 (ASTM 2000) for the description and identification of soils, visual-manual procedure.

Soil samples collected for field screening by the heated-headspace method will be collected in accordance with the SOP below and analyzed with a Rae Systems, Model PGM-761S Photo-Ionization Detector (PID), or equivalent. The PID will be calibrated daily to 100-parts per million (ppm) using isobutylene span gas as specified in the users' manual. The samples used for field-screening purposes will be collected from each distinct lithologic unit and obviously stained areas. At a minimum, one field-screen sample will be obtained from each 4-foot (ft) section of soil, where the quantity of soil obtained during sampling allows.

The second soil sample or samples will be collected for possible laboratory analyses in laboratory-supplied glassware. Each sample will be placed on ice in a cooler until selection of samples for laboratory analyses is made. Selected samples will remain in the cooler, which will be maintained at a temperature of 4 degrees Celsius or less and under the custody of the sampler until properly relinquished. Chain-of custody documentation will follow the samples until delivered to the laboratory analysis.

Heated Headspace Screening Method (per NMED, 2000) – Equipment needed for soil screening includes clean 0.5- to 1-liter or 16-ounce jars, aluminum foil, and a Flame Ionization Detector (FID), Photo-Ionization Detector (PID), detector tubes, or other acceptable field instruments. Use best judgment in choosing a field instrument. Factors to consider include, but are not limited to, the age of the underground storage tank system, soil characteristics, and extent of contaminant degradation. Instruments for field screening should be calibrated in the field following the manufacturer's instructions. If the temperature is below 60° Fahrenheit or 15° Celsius, a thermometer and water bath will also be needed. The container for the water bath must be large enough to hold the sample jar, heat source, and deionized water. It is also acceptable to warm up the sample using heated air from the interior of a vehicle. However, care should be taken to keep the sample out of direct sunlight since hydrocarbons can be oxidized by ultraviolet radiation. The use of a portable gas chromatograph is optional.

The steps for the heated headspace method are:

Step 1: Fill a 0.5-liter/16-ounce or larger clean glass jar half full of soil sample. Plastic bags or other non-glass containers are not acceptable.

Step 2: Seal top of jar with clean aluminum foil and lid ring or equivalent.

Step 3: Ensure sample is at 15° C to 25°C, or approximately 60°F to 80°F. A warm water bath or heated air from the interior of a vehicle should be used if necessary to raise sample temperature to the acceptable range. Samples are to be protected from direct sunlight in order to prevent photo-destruction of the volatiles.

Step 4: Aromatic hydrocarbon vapor concentrations should be allowed to develop in the headspace of the sample jar for 5-10 minutes. During the initial stages of headspace development, the sample is to be shaken vigorously for one minute.

Step 5: Immediately pierce the foil seal with the probe of an FID, a PID, or colorimetric tubes, and record the highest (peak) measurement. The instrument should be able to accurately detect total aromatic hydrocarbons (TAH) between 0 and 1000 parts per million (ppm).

Sample Collection for Methanol Extraction (per NMED, 2000) – This section applies to samples collection for analysis of volatile constituents.

Step 1: Soil samples can be collected from a backhoe bucket (for tank removals) or from a split-spoon sampler (for soil borings or monitoring wells). Avoid placing pebbles or other large particles in the sample.

If soil samples are collected from a backhoe bucket, ensure that the samples are representative of the area being sampled. Scrape off the top six inches of soil in the bucket and fill the syringe supplied by the laboratory with 10-15 cm3 of soil. The syringe should be marked to indicate whether the correct amount of soil has been collected.

For soil borings or monitoring well installations, soil samples should be collected from a split-spoon sampler using a syringe.

Step 2: Extract the soil sample with methanol using one of the two extraction procedures described below. In both procedures, work should be completed quickly to avoid losses of volatile compounds from the sample. In addition, sample bottles should be labeled, chain-of-custody documentation filled out, and sample bottles placed on ice for transport to the laboratory. For each sample, two bottles should be collected and extracted for volatile analysis.

1) Unscrew the cap on the sample bottle and quickly push the sample into the bottle with the syringe plunger, being careful not to get soil particles on the rim of the bottle. Quickly replace the cap and tighten securely.

2) If the methanol is provided in a vial separate from the sample bottle, unscrew the cap on the sample bottle and quickly push the sample into the bottle with the syringe plunger, being careful not to get soil particles on the rim of the bottle. Open the vial containing the methanol and pour it into the sample bottle, being careful not to spill any methanol. Quickly replace the cap and tighten securely. Gently agitate the sample to immerse the soil in the methanol. Excessive agitation may cause undue volatilization.

Step 3: For each sampling location at the site, collect a dry-weight sample in a bottle supplied by the laboratory. At least 20 grams of soil should be collected (the bottle must be at least half full with soil). Label the sample to correspond with the labeling on the matching field-preserved sample. This sample is used to measure moisture content and does not need any special preservation. Fill out the necessary chain-of-custody documentation indicating that the soil sample is for moisture analysis only.

Monitoring Well Installation – Groundwater monitoring wells will be constructed with 2-inch outer diameter, Schedule 40, flush joint, threaded polyvinyl chloride (PVC) casing and screen. Well construction will consist of a threaded PVC bottom plug and flush-joint, threaded, factory-slotted, well screen. The remainder of the well will be constructed with the appropriate length of flush-joint, threaded PVC blank casing to the ground surface. A 2-inch-diameter PVC expanding, locking top plug will be placed at the top of the well.

The sand filter pack, consisting of Colorado silica sand, No. 10-20 or equivalent, will be placed approximately 1-2 ft above the top of the screened interval. The sand pack will be followed by a ⅜-inch bentonite chip seal for a minimum thickness of approximately two ft, with the remainder of the annulus backfilled with a Portland cement/bentonite grout. The casing, sand filter pack, and bentonite seal and cement grout will be placed inside the annulus as the augers are withdrawn from the boring. Surface finishing of the wells will include installing a traffic-rated utility bolt-down manholes with a concrete apron (2□foot minimum diameter) installed at each wellhead.

Decontamination – The drill rig and down-hole drilling equipment will be decontaminated with a steam cleaner before mobilizing to the Site. The down-hole equipment will also be decontaminated between boring locations. All sampling and measuring equipment that will or may come in contact with the sample will be decontaminated between samples with a water/detergent wash, tap water rinse, and deionized water rinse.

Well Gauging – The first step in groundwater sampling is to measure depth to water in all on-site monitoring wells. Kleinfelder will use an electronic Solinst or interface probe water-level meter to measure this depth and the total depth of the well. Water level gauging will be conducted in one day so that an accurate potentiometric surface map can be produced. Results will be recorded in the field logbook. Condition of the wells will also be recorded and photographed, if warranted. Manhole gaskets and rims will be cleaned so that intrusion of surface water can be minimized.

Monitoring Well Development - Development of monitoring wells shall be conducted in accordance with the following procedures:

Monitoring well development equipment will be decontaminated before any development activities are initiated.

Water level measurements will be collected and well volumes will be calculated .

Well development equipment will be assembled, depending on the development method used (e.g., bailer or pump), and development activities will be initiated

Field parameters will be measured (e.g., temperature, pH, specific conductance) after each well volume and recorded in a field log book or field data sheet.

As the purge water clears, a weighted bailer will be placed in the well and lowered until it is near the top of the screen or water surface, the bailer will be alternately raised and lowered through the vertical distance of one to two feet; the velocity of the motion will depend upon the tightness of the formation in which the well is installed.

After surging the well a few times at a given depth, the bailer will be moved deeper by one or two feet; this will be repeated until the bailer has been lowered to the bottom of the screened section of the well.

The bailer will be raised out of the well and the well will be purged of sediment that may have accumulated due to the surging.

Surging will be repeated until the purge water remains clear and field parameters have stabilized.

If the well is pumped to dryness or near dryness, the water level will be allowed to sufficiently recover (to the static level) before the next development period is initiated.

All field decisions will be document in a field logbook.

Instrumentation Decontamination – The water-level meter will be decontaminated and bagged prior to arriving on site and between measurements using a water/Alconox wash, tap water rinse, and a final deionized water rinse. The sampler will wear new, latex gloves during decontamination and between well purging/sampling of each well.

Well Purging – The wells will be purged by removing at least three well bore volumes using new, sterile, disposable bailers. Measurements of temperature, specific conductance, dissolved oxygen, and oxidation-reduction potential will be collected every minute or less, and purging will continue until stable values have been obtained during three successive readings. If parameters have not stabilized after five successive readings, sampling will occur, and an entry noting the work plan deviation will be made in the field logbook. A YSI 556, multi-parameter groundwater quality meter or equivalent will be used to measure field parameters. The meter will be checked for proper operation prior to mobilization to the field and will be calibrated on a daily basis in accordance with the procedures specified by the manufacturer. Data collected will be documented in a field logbook and will be stored electronically by the instrument for later download into the project file. Water produced during decontamination will be allowed to evaporate on site.

Groundwater Sampling – Before sampling groundwater, the interface probe will be used to measure the depth to groundwater and to check for the presence of LNAPL.

After the depth to groundwater is measured, each groundwater monitoring well will be purged to allow fresh groundwater from the aquifer to enter the well. Kleinfelder will attempt to remove a minimum of three well volumes of groundwater from each well using either disposable bailers or a small electric pump until either the parameters of temperature, conductivity, pH, and turbidity have stabilized, or the well becomes dry.

New disposable latex gloves will be worn for each sampling event to minimize the possibility of cross contamination. Groundwater samples will be collected in laboratory-prepared glassware using the appropriate preservative and kept on ice until laboratory submittal. Submittal of groundwater samples will be performed under chain-of-custody procedures to the selected laboratory. Kleinfelder will submit the collected samples under chain-of-custody.

Groundwater Sample Collection – Well purging and collection of groundwater samples from the on-Site monitoring wells will commence after purging, groundwater samples will be collected with new disposable bailers. The sample will be collected in laboratory-prepared glassware (three 40-mL vials containing Teflonä septum) pre-preserved with mercuric chloride with zero headspace and kept on ice and under custody of the sampler until laboratory submittal. The samples will be labeled (including site location, sample designation, sample time, sampler name, preservative used, and analysis required) in such a manner that the cap is sealed. Submittal of groundwater samples will be performed under chain of custody to HEAL. The number of and time the samples were collected will be documented in the field logbook and on the chain-of-custody forms. Groundwater produced during purging and sampling will be poured onto an impervious surface located as close as practical to each respective wellhead. No quality control samples will be collected during the sampling event. However, a trip blank will travel with the cooler from the time the cooler and sample containers leave the laboratory until the samples are returned to the laboratory.

Investigation-Derived Waste Management – Cuttings from the soil borings identified through field-screening procedures as containing 100 ppm or greater volatile organic compounds (VOCs) will be placed in 55-gallon drums and disposed of at a regulated disposal facility. Assuming there is adequate physical space located onsite, cuttings that are identified as containing less than 100 ppm VOCs will be thin-spread onsite. Should there not be sufficient space to dispose of cutting onsite, they will be containerized, manifested, and transported to an off-site regulated facility.

Groundwater not containing LNAPLs generated from well development and purging will be placed on an impervious surface and allowed to evaporate. Groundwater containing LNAPLs will be placed in 55-gallon drums and disposed of at a regulated disposal facility.

Spatial Survey - A licensed New Mexico surveyor will perform a spatial survey of the two new monitoring wells and will resurvey all existing wells. A benchmark will be established or referenced from previous surveys to tie-in elevations of previously installed wells and used as a reference to locate the well's measuring point (i.e., the northern-most location on the top of the well casing). Spatial data, such as depth to water, collected from individual monitoring wells will then be measured relative to the monitoring well's measuring point, and, thus, a standard datum will be established. The horizontal coordinates of the measuring point will be referenced to the New Mexico State Plane Grid, Central Zone, North American Datum of 1983 and will be measured to the nearest 0.1 foot. The vertical coordinate of the measuring point will be referenced to the North American Vertical Datum 1988 and will be measured to the nearest 0.01 foot.

References

ASTM, 2000. Designation D 2488-00, "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)."

NMED, 2000. "Guidelines for Corrective Action," March 13, 2000.

APPENDIX B

Justin D. Ball, P.G.

Justin Ball

Summary of Experience

Mr. Ball is a project manager in Kleinfelder's Albuquerque Office. He has over 7 years experience with various environmental projects. His primary focus with Kleinfelder is providing technical support and project management for the environmental group.

Mr. Ball has extensive experience with environmental projects. Early in his career in Pennsylvania, he provided oversight of soil boring and monitoring well installations utilizing direct push, hollow-stem auger, and cone penetrometer drilling platforms at various sites in Pennsylvania and Ohio. He also conducted Phase I Environmental Site Assessments; soil classification and hydrocarbon impact screening; discrete soil, gas, and groundwater sampling; and aquifer hydraulic testing. He prepared environmental reports of increasing complexity including Site Characterization, Baseline Risk Assessment, Tank Excavation Assessment, Phase I Environmental Site Assessment, Remedial Action Plans and UST "Fund" reimbursement application packages. Noteworthy accomplishments include installing 30 wells in a 4-month period investigating LNAPL from historical releases at a large pipeline pumping station. He also gained increasing levels of responsibility in coordination of materials, laboratories, subcontractors, personnel supervision, development of scopes of work/cost estimates and client consultation.

Since relocating to New Mexico, Mr. Ball has continued his extensive report writing activities as well as project management duties for specific tasks for PSTB sites.

Education

BS, Geology, University of Georgia, 1994

MS, Geology, Washington State University, 1998

Registrations

Licensed Geologist (L.G.), No.1983, Board for Licensing of Geologists, NC, 2004

Licensed Geologist (L.G.), No.2387, Department of Labor, Licensing and Regulation, SC, 2005

Professional Geologist (P.G.), No.2801 001632, Virginia Board for Geology, VA, 2004

Professional Geologist (P.G.), No.PG 001758, Georgia State Board of Registration for Professional Geologists, GA, 2004

Professional Geologist (P.G.), No.PG004536, Bureau of Professional and Occupational Affairs, PA, 2004

Certifications

OSHA 40-Hour HAZWOPER, 1998

Select Project Experience

The following is a representative selection of Justin Ball's project experience.

Site Assessment, Major Petroleum Company, Pennsylvania Mr. Ball prepared the workplan and cost estimate for an expedited site characterization and cost/benefit analysis for a traditional site characterization method. He conducted a weeklong field event, which included discrete vapor, groundwater, and soil sampling, in conjunction with cone penetrometer testing with continuous ultra violet induced fluorescence readings. He was able to identify affected geologic layers on site with great precision.

Project Evaluation, Major Petroleum Company, Pennsylvania Mr. Ball evaluated historical environmental data for a petroleum distribution terminal and helped identify concerns arising from a previous consultant's work and communicated the resulting liability concerns to the client.

Site Assessment and Closure, Major Pipeline Company, Ohio Mr. Ball developed concurrent scopes of work and cost estimates for evaluating releases from two separate pipeline sites. He also completed combined drilling events and subsequent reporting within budget and narrow client timeframe and exceeded client expectation. He was able to obtain site closures.

Real Estate Transaction for Commercial/Industrial Properties, Major Oil Company, Pennsylvania, Ohio Mr. Ball was responsible for coordinating three geographically distant Phase I Environmental Site Assessments. He completed the investigations within a month and identified various sources of potential liability for the buyer client.

Pre-Construction Plan of Action/Site Assessment, Major Pipeline Company, Ohio Mr. Ball developed concurrent scopes of work and cost estimates for evaluating potential historical releases along the proposed construction right of way. He completed combined drilling events and subsequent reporting within budget and tight client timeframe. He also used advanced field-screening techniques with laboratory analytical results to allow for field screening to only take place during construction.

Risk Assessment and Closure, Regional Petroleum Distribution Company; Pennsylvania Mr. Ball evaluated current and future risks and impacts on soil and groundwater resulting from an overfill release of several hundred gallons of gasoline. He developed site-specific standards for groundwater both on- and off-site. He was able to obtain closure for the site.

Remedial System Installation, Regional Petroleum Distribution Company, Pennsylvania Mr. Ball assisted in developing of an oxygen-injection remedial action plan for two sites with low-level groundwater impact. He developed a workplan for the installation of injection points and the oxygen delivery system and oversaw field installation and startup of oxygen injection system.

Site Investigation, Major Pipeline Company, Ohio Mr. Ball was the lead scientist for an emergency assessment at a pumping station that has been in continuous operation since the early 1900s. In response to the potential seepage of LNAPL into local

sensitive waterways, Mr. Ball prepared a GIS database including extensive historical site characterization data, wetland maps, site facility infrastructure data and groundwater analytical data. Mr. Ball developed and implemented work scopes for three rounds of boring and well installations, LNAPL recovery, and groundwater sampling. Mr. Ball also developed remedial action work plans for automated LANPL recovery and sheet wall installation to protect the waterways.

Aquifer Pumping Test Design and Implementation, Governor Richardson's Water Innovation Fund, Veguita, New Mexico Mr. Ball assisted in the design and implementation of a 24 hour aquifer pumping test for the Veguita Groundwater Denitrification Project.

Site Assessment, Former Aerex Refinery, Bloomfield, New Mexico Mr. Ball was the field manager for a site assessment for the former Aerex Refinery, which operated from the 1930s to the 1960s. He supervised all field activities during the investigation including direct push soil boring installation, groundwater monitoring well installation, and baseline groundwater monitoring and sampling for petroleum constituents and geochemical parameters. Mr. Ball also prepared the Phase I Subsurface Assessment Report and Remedial Action Plan. The client is the New Mexico Oil Conservation Division.