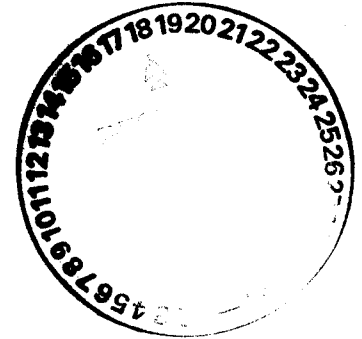


April 14, 2008  
File No. 84679.4-ALB08RP001

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



**Subject: Summary of Drilling and Sampling Activities  
Western Refining Company, Ciniza Refinery  
Gallup, New Mexico  
NMED ID # NMD000333211  
HWB-GRCC-07-001**

Dear Ms. Monzeglio:

Kleinfelder West, Inc. (Kleinfelder), on behalf of Western Refining Company (Western), is submitting this letter report summarizing the installation of replacement monitoring wells KA-1R, KA-2R and KA-3R, the abandonment of existing monitoring wells KA-1 and KA-2, and groundwater sampling at the above referenced site. Fieldwork was performed between March 13 and 15, 2008, and sampling of new monitoring wells KA-1R and KA-2R was performed on March 20, 2008 (field notes included in Appendix A). The well installation and sampling was performed in accordance with Kleinfelder's December 12, 2007 letter and the New Mexico Environment Department-Hazardous Waste Bureau's (NMED-HWB) December 20, 2007 approval letter.

**Site Description**

The Site is located at 35° 29.41'N, 108° 25.80'W, McKinley County, New Mexico. 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 (Figure 1).

**Site History**

Kleinfelder installed monitoring wells KA-1, KA-2, and KA-3 in June 2007. The work was performed in accordance with Kleinfelder's Work Plan No. 83817.PROP-ALB07001 Rev. 1 dated May 24, 2007. Western approved Kleinfelder's work plan via purchase order C16449 dated June 4, 2007. The NMED-HWB approved the work plan in a letter dated June 4, 2007. Fieldwork for this event was performed between June 11 - 21, 2007.

# KLEINFELDER ENTERED DOCUMENT TRANSMITTAL FORM

|                                      |  |                          |   |                    |   |
|--------------------------------------|--|--------------------------|---|--------------------|---|
| <b>TO:</b>                           | Ms. Hope Monzeglio<br>NMED HWB<br>2905 Rodeo Park Drive East, Building 1<br>Santa Fe, NM 87505 | <b>PAGE</b>              | 1 | <b>OF</b>          | 1 |
|                                      |  | <b>TRANSMITTAL DATE:</b> |   | 04/15/08           |   |
|                                      |  | <b>TRANSMITTAL DCN:</b>  |   | 84679.4-ALB08TS001 |   |
| <b>RETURN RESPONSES/COMMENTS TO:</b> |  | Eileen Shannon           |   |                    |   |
| <b>RETURN RESPONSES/COMMENTS BY:</b> |  | 04/29/08                 |   |                    |   |

|                              |               |                      |                 |
|------------------------------|---------------|----------------------|-----------------|
| <b>PROJECT NO.:</b>          | 84679         | <b>PROJECT NAME:</b> | Ciniza Refinery |
| <b>ACTIVITY/DESCRIPTION:</b> | Letter Report |                      |                 |

| DOCUMENTS BEING TRANSMITTED                 |      |       |          |                    |
|---|------|-------|----------|--------------------|
| ITEM  | REV. | PAGES | DATE     | DESIGNATOR         |
| Summary of Drilling and Sampling Activities | 0    |       | 04/15/08 | 84679.4-ALB08RP001 |
|   |      |       |          |                    |
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|  |  |
|--|--|
| <p><b>INSTRUCTIONS/REMARKS</b></p> <p>CC's: D. Cobrain, C. Frischkorn<br/>J. Lieb, E. Reige,<br/>W. Price, C.Chavez,<br/>and B. Powell</p> | <p><b>RECEIPT AND READ ACKNOWLEDGEMENT<br/>PLEASE COMPLETE AND RETURN WITHIN<br/>15 WORKING DAYS TO:</b></p> <p style="text-align: center;"><b>KLEINFELDER DOCUMENT CONTROL CENTER</b></p> <p> <input type="checkbox"/> Mark previous issues "obsolete", "superseded", or uncontrolled"<br/> <input type="checkbox"/> Destroy previous affected material<br/> <input type="checkbox"/> Return old material with this record<br/> <input checked="" type="checkbox"/> New issue (no previous copies received)<br/> <input type="checkbox"/> Replace with revised/new material<br/> <input type="checkbox"/> Not Applicable                 </p> |
|--|--|

| CLIENT RECEIPT                                 | PRINT NAME | SIGNATURE | DATE |
|--|------------|-----------|------|
| Complete & Return this page via Fax/Mail/Email |            |           |      |

| KLEINFELDER RECEIPT                            | PRINT NAME | SIGNATURE | DATE |
|--|------------|-----------|------|
| Complete this section upon receipt from client |            |           |      |

In its Notice of Disapproval letter dated October 15, 2007, the NMED-HWB rejected the installation of monitoring wells KA-1, KA-2, and KA-3, required that replacement monitoring wells be installed, and that the existing monitoring wells be plugged and abandoned. In a letter dated December 12, 2007, Kleinfelder submitted a new scope of work based upon these requirements. In a follow-up letter dated December 20, 2007, the NMED approved the scope of work, but required that existing monitoring well KA-3 be left in place.

### **Scope of Work**

The scope of work as directed by the NMED included the following:

- Installation of replacement monitoring wells KA-1R and KA-2R to depths of approximately 14.5 feet below ground surface (ft bgs) via hollow stem auger (HSA) drilling methods. The new monitoring wells were to be installed approximately five feet away from existing monitoring wells KA-1 and KA-2, respectively, and were to be screened from approximately four to 14 ft bgs;
- Installation of replacement monitoring well KA-3R approximately five feet away from existing monitoring well KA-3. The new well was to be installed via HSA drilling methods, with an outer casing/auger seated approximately 23 ft bgs and total depth (TD) at 30.5 ft bgs. A 2-inch monitoring well was to be set with a screened interval of approximately 25 to 30 ft bgs;
- Monitoring wells KA-1R and KA-2R were to be developed by manual bailing and surging. Groundwater samples were to be collected from the wells within two weeks of installation, and analyzed for volatile organic compounds (VOCs) per EPA Method 8260, semivolatile organics (SVOCs) / polyaromatic hydrocarbons (PAH) per EPA Method 8310, total petroleum hydrocarbons (gasoline range organics, diesel-range organics, and motor oil-range organics) per EPA Method 8015B, and RCRA 8 metals per EPA Method 6010/7470; and
- Monitoring wells KA-1 and KA-2 were to be properly plugged and abandoned during the same mobilization that the replacement wells were installed.

### **Scope of Work Deviations**

Due to ongoing construction activity on the eastern side of the new API separator at the time of the replacement monitor well installation, monitor well KA-1R was installed approximately 15 feet away from KA-1, rather than the initially proposed 5-foot distance. Construction activities at the time of installation included excavation of an approximate 15-foot deep pit on the southeastern corner of the new API separator for installation of a leak detector.

When existing monitoring well KA-1 was installed, a steel culvert prevented access of the drill rig closer to the API separator. At the time of installation of KA-1R, a soil ramp had been built over the culvert to allow construction equipment access to the eastern

side of the new API Separator. This enabled KA-1R to be installed closer to the new API separator.

Because of the approximate 0.8 foot higher ground elevation of KA-1 compared to KA-1R, the well screen of KA-1R was installed at a depth of approximately 3.7 to 13.7 feet below grade in order to be approximately 14.5 feet below the ground surface of KA-1. Screen elevations are summarized below:

| Well ID | Ground Elevation (feet) | Top of Casing Elevation (feet) | Screen Location (bgs in feet) | Screen Location (elevation in feet) |
|---------|-------------------------|--------------------------------|-------------------------------|-------------------------------------|
| KA-1    | 6918.3 (*)              | 6918.08                        | 4.5 - 9.5                     | 6913.8 - 6908.8                     |
| KA-1R   | 6917.5                  | 6918.43                        | 3.7 - 13.7                    | 6913.8 - 6903.8                     |

\* Estimated based on top of casing  
bgs = below ground surface

### Field Investigation

Rodgers Environmental Services, Inc. performed drilling of soil borings and installation of monitoring wells using a CME 75 drill rig and hollow stem auger drilling methods (See Figure 1 for boring and well locations). Borings were logged from cuttings generated during drilling (borehole logs included as Appendix B). The following fieldwork was performed:

- Monitoring well KA-3R was drilled and installed between March 13 and 14, 2008. The borehole was drilled from ground surface to 23 ft bgs using 10.25-in inner diameter (ID)/14.75-in outer diameter (OD) auger flights. Eight-inch casing was grouted in place to 23 ft bgs. The borehole was drilled to the TD of 30.7 ft bgs using 3.75-in ID/6.75-in OD auger flights;
- Monitoring well KA-3R was installed using 2-in ID schedule 40 PVC casing to a TD of 30.7 ft bgs. KA-3R was installed with 0.010-in slot screen from 25.4 to 30.4 ft bgs;
- Monitoring wells KA-1R and KA-2R were drilled and installed on March 14, 2008. Boreholes KA-1R and KA-2R were drilled from ground surface to their respective TDs of 14.0 and 14.5 ft bgs using 3.75-in ID/6.75-in O.D. auger flights;
- Monitoring wells KA-1R and KA-2R were installed using 2-in ID schedule 40 PVC casing to their respective TDs of 14.0 and 14.5 ft bgs. KA-1R was installed with 0.010-in slot screen from 3.7 to 13.7 ft bgs. KA-2R was installed with 0.010-in slot screen from 4.2 to 14.2 ft bgs;
- The replacement monitoring wells were developed by bailing and surging on March 15, 2008. Monitoring well KA-1R bailed dry after five gallons and did not recharge sufficiently to continue development. Thirty gallons were bailed from monitoring well KA-2R. Development water was disposed of in the API separator

drain. Insufficient water was present in monitoring well KA-3R to conduct development;

- Existing monitoring wells KA-1 and KA-2 were abandoned using cement/bentonite grout placed into the well via tremmie pipe. Monitoring well KA-3 was left in place;
- Replacement monitoring wells KA-1R and KA-2R were gauged and sampled on March 20, 2008. The wells were purged of three casing volumes via hand bailing. Water quality parameters were monitored and recorded with a properly calibrated YSI-556 water quality meter (parameters included in field notes in Appendix A). KA-1R and KA-2R were sampled for volatile organic compounds (VOCs) per EPA Method 8260, semivolatile organics (SVOCs) / polyaromatic hydrocarbons (PAH) per EPA Method 8310, total petroleum hydrocarbons (gasoline range organics, diesel-range organics, and motor oil-range organics) per EPA Method 8015B, and RCRA 8 metals per EPA Method 6010/7470. Purge water was disposed of in the separator drain. Insufficient water was present in KA-3R to sample;
- Cuttings generated during drilling were contained in 55 gallon drums. A composite soil sample was collected from the cuttings from existing monitoring wells KA-2 and KA-3, as well as from replacement monitoring wells KA-1R, KA-2R, and KA-3R following installation. The sample was collected for classification in order to dispose of the cuttings in Western's on-site landfarm. Cuttings from existing monitoring well KA-1 could not be sampled due to damage to the drum. The composite sample was analyzed for anions per EPA method 9056A, mercury per EPA method 7471, and for total metals per EPA method 6010B. The sample was also to be analyzed for free liquid, ignitability, corrosivity, and reactivity; and
- The replacement monitoring wells were surveyed on March 20, 2008.

### Site Stratigraphy

Soils in all borings are generally dry to moist lean clays, with varying sand content. Borehole logs are included as Appendix B. Following is a general description of the observed subsurface conditions:

- Ground surface to 22 ft bgs: Soils are typically red-brown to grey-brown lean clays with 25% to 50% sand. Sand is fine- to coarse-grained.
- 22 ft bgs to 30.5 ft bgs: Bedrock, likely Chinle sandstone.

## Site Hydrogeology

Following monitoring well installation but prior to development, the depth to water (DTW) was measured in each well on March 15, 2008 (see Table 1). The DTW in KA-1R and KA-2R was measured at 8.2 and 8.61 feet below top of casing (ft btoc) respectively. KA-3R was dry. Groundwater gradient near the API Separator is to the west toward the aeration lagoons.

Prior to sampling monitoring wells KA-1R and KA-2R on March 20, 2008, DTW was again measured in the replacement wells, as well as in existing monitoring well KA-3 (see Table 1). The DTW in KA-1R, KA-2R, and KA-3R were measured at 9.50, 8.77, and 30.70 ft btoc, respectively. It is important to note that the DTW in KA-3R corresponds to the TD measured in the well. The DTW in KA-3 was measured at 8.61 ft btoc. A groundwater contour map is included as Figure 2.

At the request of Jim Lieb (Western), DTW in existing monitoring wells were also measured, but were not used to construct the groundwater elevation contour map. The DTW in GWM-1 and GWM-2 were measured at 19.77 and 19.04 ft btoc, respectively. GWM-3 was dry.

## Soil Analytical Results

Several analytes were detected above the laboratory practical quantitation limits (PQL) in the composite soil sample collected from cuttings from monitoring wells KA-2, KA-3, KA-1R, KA-2R, and KA-3R (soil analytical results included in Appendix C; results summarized in Table 2). Chloride was detected at 170 mg/kg (PQL = 1.5 mg/kg). Mercury was detected at 0.073 mg/kg (PQL = 0.033 mg/kg). Barium was detected at 520 mg/kg (PQL = 2.0 mg/kg). Chromium was detected at 15 mg/kg (PQL = 1.5 mg/kg). Lead was detected at 6.2 mg/kg (PQL = 1.2 mg/kg).

The composite soil sample tested negative for free liquid. The flash point, determined from the ignitability analysis, was <200 degrees Fahrenheit. The pH of the soil, determined from the corrosivity analysis, was 8.72. Reactive cyanide and reactive sulfide were not detected in the composite sample.

## Groundwater Analytical Results

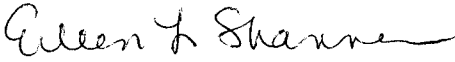
Groundwater samples were collected from replacement monitoring wells KA-1R and KA-2R on March 20, 2008 (groundwater analytical results included in Appendix C; results summarized in Table 3 and on Figure 3). No analytes were detected in the sample from KA-1R above New Mexico Water Quality Control Commission (NMWQCC) standards. In the sample from KA-2R, benzene was detected at 76 microgram per liter ( $\mu\text{g/L}$ ), which is above the NMWQCC standard of 10  $\mu\text{g/L}$ . Methyl tert-butyl ether was detected at 260  $\mu\text{g/L}$ , which is above the NMWQCC standard of 100  $\mu\text{g/L}$ . Total naphthalenes were detected at 70  $\mu\text{g/L}$ , which is above the NMWQCC standard of 30  $\mu\text{g/L}$ .

If you have any questions concerning the project or the content of this report, please contact Jim Lieb at (505) 722-0227 or me at (505) 344-7373.

Sincerely,

**KLEINFELDER, INC.**

Reviewed by:



Eileen Shannon, P.G.  
Project Manager



**For:** Barbara J. Everett, R.G., P.G.  
Program Manager

- Enclosures:
- Figure 1 – Site Plan
  - Figure 2 – Groundwater Elevation Contour Map, Alluvial Aquifer, March 20, 2008
  - Figure 3 – Distribution of Contaminants in Groundwater, March 20, 2008
  - Table 1 – Summary of Fluid Level Measurements
  - Table 2 – Composite Soil Sample Laboratory Analytical Results
  - Table 3 – Groundwater Sample Laboratory Analytical Results
  - Appendix A – Field Notes
  - Appendix B – Borehole Logs
  - Appendix C – Laboratory Analytical Results

- cc:
- J. Lieb, Western Refining Company
  - E. Reige, Western Refining Company
  - D. Cobrain, NMED-HWB
  - C. Frischkorn, NMED-HWB
  - C. Chavez, NMOCD
  - W. Price, NMOCD
  - B. Powell, NMOCD Aztec Office

## FIGURES



**SURVEY DATA**

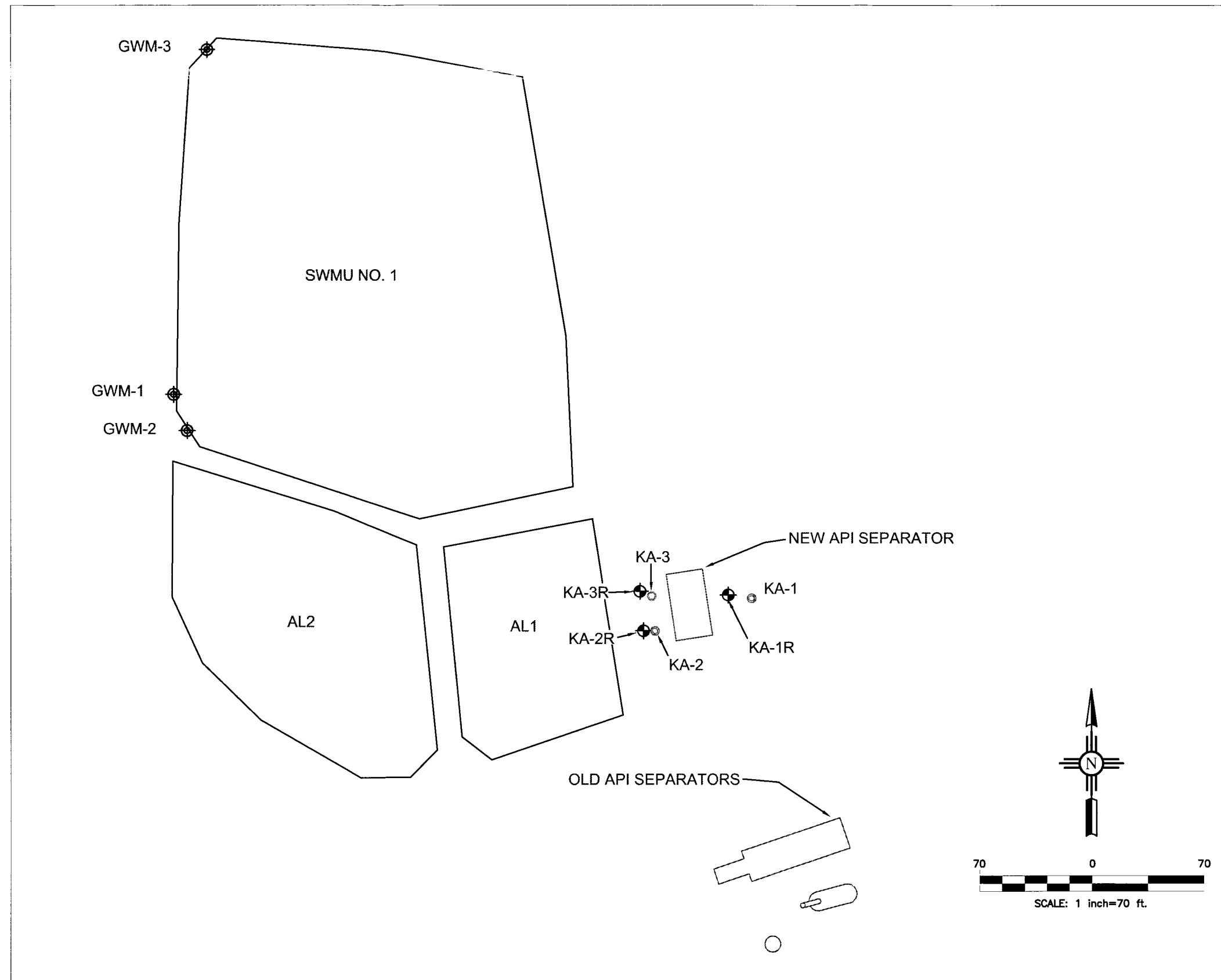
| Well ID | Northing   | Easting    | Top of Casing Elevation |
|---------|------------|------------|-------------------------|
| KA-1R   | 1634567.51 | 2545700.49 | 6916.43                 |
| KA-2R   | 1634565.05 | 2545647.32 | 6917.27                 |
| KA-3    | 1634583.87 | 2545645.49 | 6917.17                 |
| KA-3R   | 1634589.80 | 2545645.10 | 6917.31                 |

**NOTES:**

1. COORDINATES ARE NEW MEXICO STATE PLANE GRID, WEST ZONE, NAD 83.
2. ELEVATIONS SHOWN NAVD 88.
3. COORDINATES AND ELEVATIONS WERE DETERMINED FROM BRASS CAP, NMSHD 2765-11 (USED FOR CINIZA CONTROL SURVEY).
4. SURVEYING BY LYNN ENGINEERING & SURVEYING, INC., DATES 06/21/07 AND 03/20/08.
5. SOURCE: LOCATIONS OF SWM UNITS, AERATION LAGOONS, AND OLD API SEPERATORS TAKEN FROM A DRAWING PROVIDED BY GIANT REFINING CO. ENTITLED "REFINERY MONITOR WELL LOCATIONS," DRAWING NO. Z-02-155, DATED 10/20/1997.

**LEGEND**

- KA-3 = Monitoring Well Location
- ⊕ KA-1R = New Monitoring Well Location
- KA-1 = Monitoring Well Location (Abandoned)
- ⊕ GWM-1 = Existing Monitoring Well Location
- SWMU = Solid Waste Management Unit
- AL = Aeration Lagoon

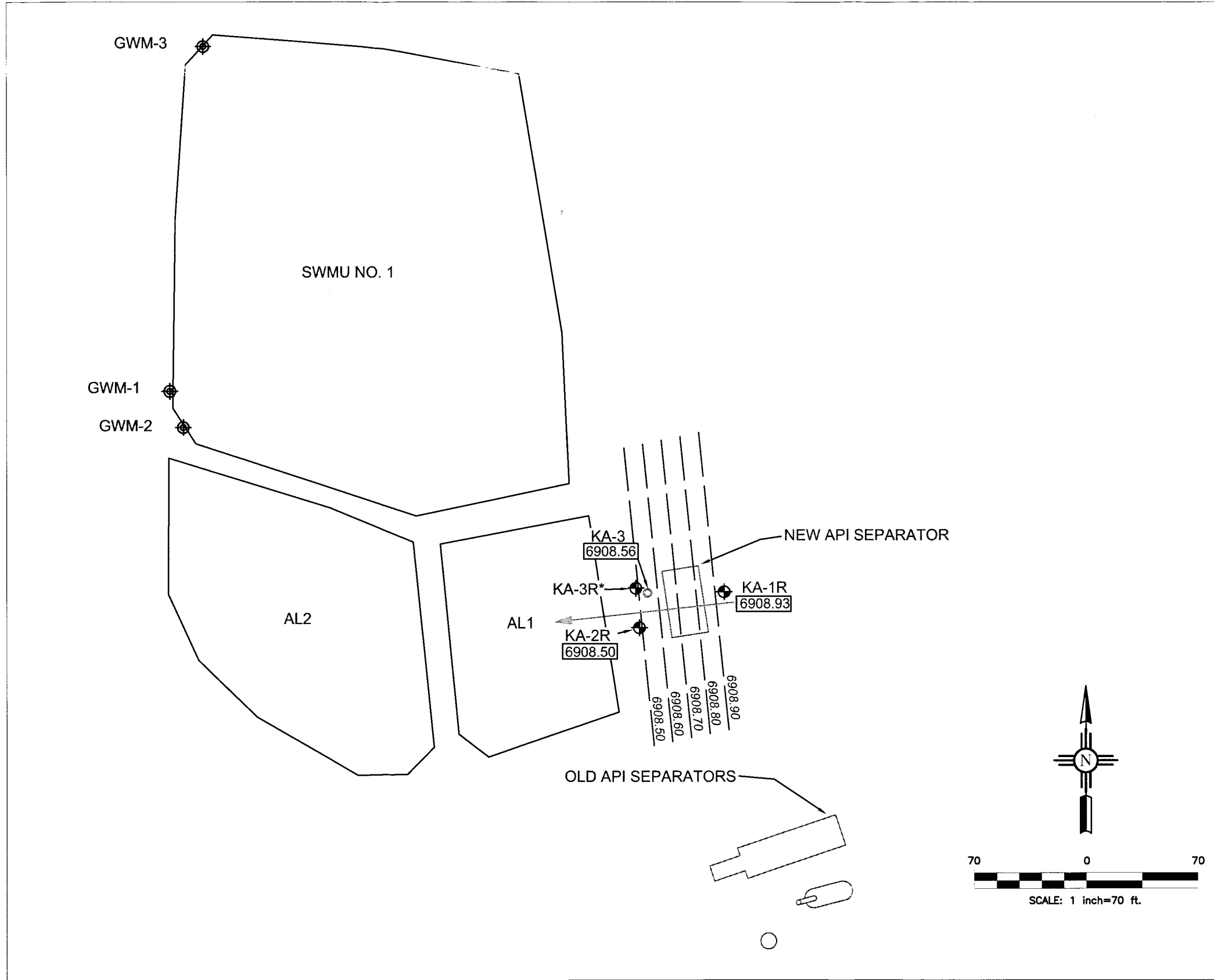


|                    |  |                    |                               |                              |
|--------------------|--|--------------------|-------------------------------|------------------------------|
| <b>KLEINFELDER</b> | <b>SITE PLAN</b><br>Ciniza Refinery<br>Jamestown, New Mexico |                    | <b>FIGURE</b><br><br><b>1</b> |                              |
|                    | Originator: B. Lucero  | Drawn By: P Dan    |                               | Date: April 2008             |
|                    | Approved By: E. Shannon                                      | Project No.: 84679 |                               | Drawing No.: 84679_01_0_4-08 |
|                    |  | Scale: 1" = 70'    |                               | Drawing Category: A          |

**LEGEND**

- KA-3 = Monitoring Well Location
- ⊕ KA-1R = New Monitoring Well Location
- ⊕ GWM-1 = Existing Monitoring Well Location
- SWMU = Solid Waste Management Unit
- AL = Aeration Lagoon
- KA-1R  
6908.93 = Groundwater Surface Elevation
- 6908.50 = Groundwater Elevation Contour
- = Groundwater Flow Direction

**NOTES:**  
 \* Not used in groundwater surface contour



|                         |  |                              |                               |
|-------------------------|--|------------------------------|-------------------------------|
| <b>KLEINFELDER</b>      | <b>GROUNDWATER ELEVATION CONTOUR MAP</b> |                              | <b>FIGURE</b><br><br><b>2</b> |
|                         | Alluvial Aquifer (March 20, 2008)        |                              |                               |
|                         | Ciniza Refinery                          |                              |                               |
|                         | Jamestown, New Mexico                    |                              |                               |
| Originator: B. Lucero   | Drawn By: PDan                           | Date: April 2008             |                               |
| Approved By: E. Shannon | Project No.: 84679                       | Drawing No.: 84679_01_0_4-08 |                               |
|                         | Scale: 1" = 70'                          | Drawing Category: A          |                               |

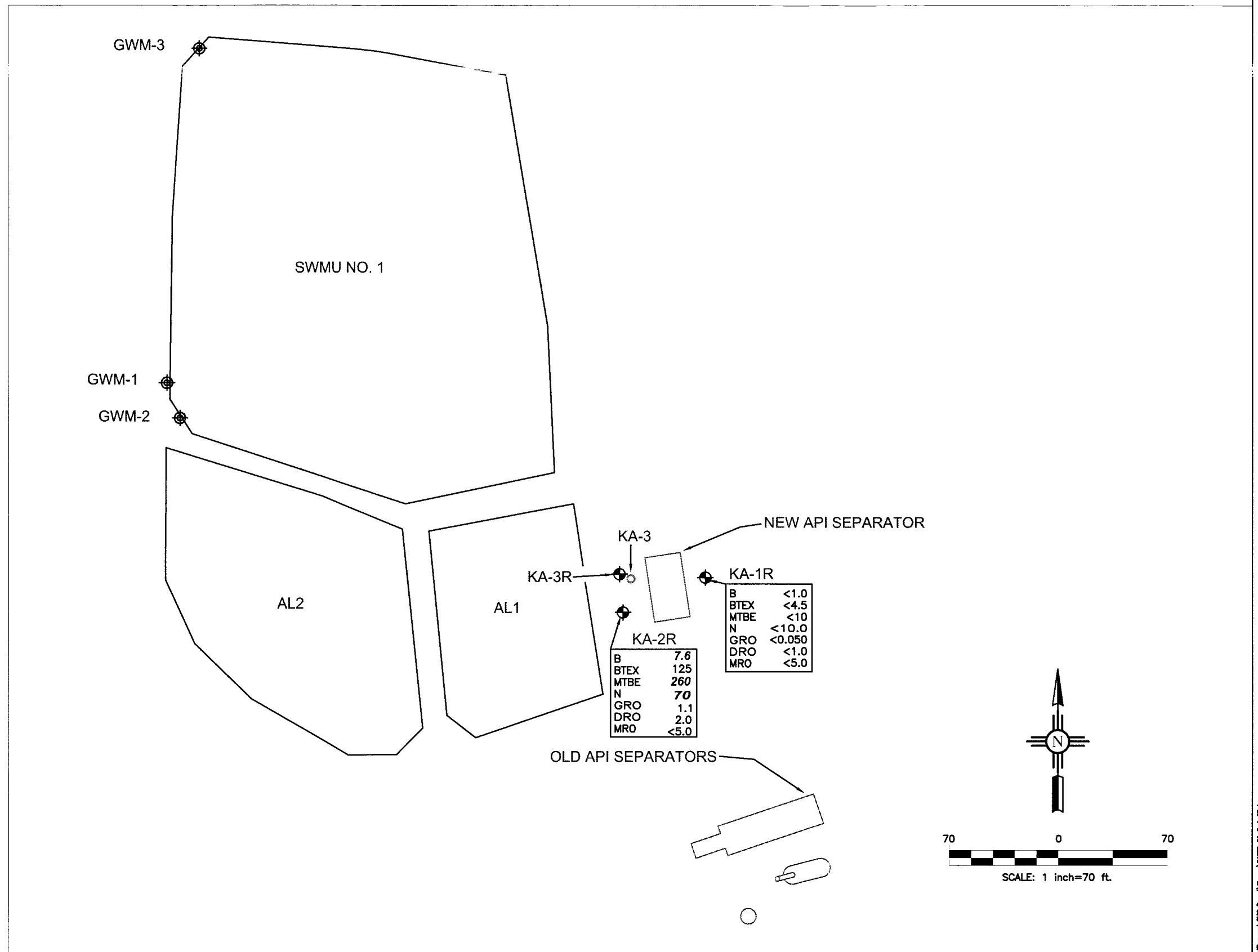
**LEGEND**

- KA-3 = Monitoring Well Location
- ⊕ KA-1R = New Monitoring Well Location
- ⊕ GWM-1 = Existing Monitoring Well Location
- SWMU = Solid Waste Management Unit
- AL = Aeration Lagoon

|      |        |
|------|--------|
| B    | <1.0   |
| BTEX | <4.5   |
| MTBE | <10    |
| N    | <10.0  |
| GRO  | <0.050 |
| DRO  | <1.0   |
| MRO  | <5.0   |

B = Benzene  
 BTEX = Benzene + Toulene + Ethylbenzene + Total Xylene  
 MTBE = Methyl Tert-butyl Ether  
 N = Naph + 1-Methylnapthalene + 2-Methylnapthalene  
 GRO = Gasoline Range Organics  
 DRO = Diesel Range Organics  
 MRO = Motor Oil Range Organics

NOTE: Values in **BOLD** exceed the NMWQCC Standard  
 3R Not Sampled Due to Lack of Water



|                         |   |                              |                    |
|-------------------------|---|------------------------------|--------------------|
| <b>KLEINFELDER</b>      | DISTRIBUTION OF CONTAMINANTS IN GROUNDWATER |                              | FIGURE<br><b>3</b> |
|                         | March 20, 2008                              |                              |                    |
|                         | Ciniza Refinery                             |                              |                    |
|                         | Jamestown, New Mexico                       |                              |                    |
| Originator: B. Lucero   | Drawn By: PDan                              | Date: April 2008             |                    |
| Approved By: E. Shannon | Project No.: 84679                          | Drawing No.: 84679_01_0_4-08 |                    |
|                         | Scale: 1" = 70'                             | Drawing Category: A          |                    |