3R - 258

REPORTS

DATE:

July 2002

AESE

August 12, 2002

RECEIVED
AUG 14 2002
ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

Mr. William Olson
New Mexico Oil Conservation Division
1220 South Street, Frances Drive
Santa Fe, New Mexico

RE: Case #3R258 Bloomfield Crude Station

Dear Mr. Olson,

Please find enclosed *Ground Water Sampling, Bloomfield Crude Station, Bloomfield, New Mexico, July 2002.* The report documents Giant's annual ground water sampling program for 2002. A ground water potentiometric surface map for the sampling event is included as Figure 3. It shows concentrations of contaminants found in each well. MW-2 contains free-phase hydrocarbons and was not sampled. Since a relationship between contaminants in MW-7 and free-phase hydrocarbon in MW-2 is questionable, no isopleth maps for contaminants were produced.

Please give me a call if you have any questions or require additional information.

Respectfully Submitted,
A. E. Schmidt Environmental

Ashley L. Lowe

Ashley L. Lowe
cc: Mr. Denny Foust, NMOCD Aztec District Office; Mr. Tim Kinney, Ms. Jacque Cumbie, and Mr. David Kirby, Giant Industries, Inc.

A. E. SCHMIDT ENVIRONMENTAL
906 San Juan Boulevard, Suite D
Farmington, New Mexico 87401
(505) 566-9116

Ground Water Sampling
Bloomfield Crude Station
Bloomfield, New Mexico

July 2002

RECEIVED
AUG 14 2002
ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

Prepared For

Giant Industries, Inc.
Bloomfield, New Mexico

Project 6171

AESE

A. E. Schmidt Environmental
906 San Juan Boulevard, Suite D
Farmington, NM 87401
505-566-9116

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Ground Water Sampling
Bloomfield Crude Station
Giant Industries, Inc.
July 2002

Introduction

A. E. Schmidt Environmental (AESE) collected ground water samples on May 5, 2002 as part of annual ground water investigations conducted at Giant Industries, Inc.'s (Giant) former Crude Station in Bloomfield, New Mexico. The following describes methods and results from sampling and analysis of ground water from five monitoring wells at the Bloomfield Crude Station.

The former Bloomfield Crude Station is located on the southwest corner of Blanco Boulevard and Fifth Street in the city of Bloomfield, San Juan County, New Mexico. The site occupies approximately 5.5 acres within the N ½, NW ¼, NW ¼ of Section 22, Township 29 North, Range 11 West. A regional location map is shown in Figure 1.

A 55,000 barrel crude oil storage tank was previously located at the site within an earthen berm, which occupied approximately 100,000 square feet on the west side of the former crude station. Tank 967-D and berms were removed during late 1995 through early 1996. The current physical setting at the site is an open excavated area where approximately 12,924 cubic yards of hydrocarbon impacted soil was removed and replaced by 6,048 cubic yards of clean backfill in August 2000. A site map presented as Figure 2 shows the boundary of the former excavation. West of the former tank site is a City of Bloomfield Electrical Substation and two well sites (Jan Redding #1 and Cook #1E) owned and operated by Manana Gas. To the west of the electric substation and Manana well sites, a vacant lot exists. What appears to be a monument may indicate a previous well site that has been plugged and abandoned. Historical research of this area indicate that several oil and possibly gas wells, may have once been operational on this lot, such as Bishop #1, Bishop #3, Hare #1 and Kittell #1 (Figure 2).

The former crude station has been the focus of a subsurface investigation where activities have included numerous soil borings and sampling, installation of seven ground water monitoring wells, excavation and offsite land farming of hydrocarbon impacted soil, and ground water sampling. The area of focused investigation is where the former crude oil storage tank numbered 967-D was located. A more detailed historical account can be found in a report previously submitted to the New Mexico Oil Conservation Division (NMOCD) titled *Comprehensive Report for the Bloomfield Crude Station*, dated January 2000. A chronology of site operations and investigations is found in the Golden Environmental Management report *Monitoring Well Installation, Ground Water Sampling and Bioventing Pilot Test Bloomfield Crude Station, Bloomfield, New Mexico*, dated July 2001.

Methodology

On May 10, 2002 ground water samples and depth-to-ground water measurements were collected from on-site monitoring wells. AESE also checked for the presence of free phase crude oil. Samples were collected from five monitor wells. Giant abandoned monitoring well MW-1 during excavation of the tank pad in August 2000. Samples were not collected from MW-2 due to presence of free phase crude oil and the absence of ground water. AESE recommended

abandonment of MW-7 in a previous report submitted to the NMOCD, because it is not directly downgradient of Giant's former tank or its bermed area. The NMOCD denied this request until Manana Gas is given time to investigate. Therefore, at the request of the NMOCD MW-7 was sampled for Giant on June 26, 2002 and July 1, 2002.

Using the previous quarter's analytical results, sampling began at the cleanest well and progressed to those containing higher concentrations of contaminants. Prior to sampling, depth to ground water and total depth of each well were measured with a Keck oil/water interface probe. Presence of any free phase crude oil was also investigated using the interface probe. The interface probe was decontaminated with Alconox™ soap and rinsed with de-ionized water prior to each measurement. The volume of water in the wells was calculated, and a minimum of three casing volumes of water was purged from each well using a disposable bailer. As water was extracted, pH, electric conductivity and temperature were monitored. The wells were purged until these properties had stabilized, indicating that the purge water was representative of aquifer conditions. The data were recorded on *Well Development and Purging Data* forms presented in Appendix A.

Once each monitoring well was purged, ground water samples were collected by filling two 40-milliliter (mL) glass vials. The pre-cleaned and pre-preserved vials were filled and capped with no air inside to prevent degradation of the sample. Samples were labeled with the time and date of collection, as well as the origin of the sample. They were immediately sealed and packed on ice. The samples were shipped to Pinnacle Laboratories, Inc. (Pinnacle) in Albuquerque, New Mexico in a sealed cooler via Greyhound Bus Line. Proper chain-of-custody procedures were followed with logs documenting the project name and number, sampling point, location, field ID number, date, time, sample type, number of containers, analyses required and sampler's signatures (Appendix B). Pinnacle analyzed the samples for benzene, toluene, ethylbenzene and total xylenes (BTEX) by USEPA Method 8021.

A one-gallon plastic bottle was filled with ground water for analysis of major cations and anions, total dissolved solids (TDS) and an ion balance by various EPA methods. These samples were labeled, stored on ice and transported to Inter-Mountain Laboratories in Farmington, New Mexico for analysis. AESE documented the project name, sampling location, field identification number, date, time, sample type, analysis required and sampler's signatures during chain-of-custody procedures (Appendix B).

Free phase crude oil was present in MW-2. An on-going effort to remove the floating product has involved manual bailing of product from the monitoring well using a disposable bailer. Any product removed from the well is collected in a 55-gallon drum on the site. Product and some water are bailed from the well until there is no measurable amount of free phase product in the well. Once the product has been removed, water depth is measured a second time. This process is carried out on a weekly basis.

Results

Depth-to-water measurements taken from September 1994 to July 2002 are shown in Table 1. Water depth ranged from 22.38 feet beneath the top of the well casing (BTOC) in MW-7 to 15.13 feet BTOC in MW-3. A layer of free phase crude oil 0.81 feet thick was found above the water in MW-2. Free phase crude oil was not detected in any of the other wells during this sampling event. Ground water elevations were calculated, and an inferred ground water elevation contour map is presented as Figure 3. Since depth-to-ground water in MW-7 was measured at a later date, ground water elevation in MW-7 was not used in determining position of ground water elevation contours for the entire site shown in Figure 3. The ground water elevation for MW-2 was corrected using a product density of 0.7 that of water to properly reflect the estimated elevation. Based on the contours, ground water movement appears to be to the southwest and the hydraulic gradient is 0.015 feet per feet.

Laboratory analytical results for BTEX are presented in Table 2, and complete reports from Pinnacle Laboratories are included in Appendix B. Ground water from MW-3, MW-4 and MW-5 is below detectable levels for BTEX. BTEX levels in ground water from MW-6 have declined since the last sampling event in 2001, with only ethylbenzene and xylenes detected at trace amounts. The concentration of ethylbenzene in the ground water sample for MW-6 is 0.53 micrograms per liter (µg/L). Total xylenes in the MW-6 sample are 1.4 µg/L. Analytical results from the ground water sample collected at MW-7 indicate the presence of benzene at a concentration of 2000 µg/L. Ethylbenzene is 140 µg/L, and total xylenes are 1100 µg/L. Toluene is not detected in MW-7. This is uncharacteristic of hydrocarbon impacted ground water at the site based on comparison of historical dissolved phase hydrocarbon concentrations from MW-2. The most recent laboratory results are compared to historical analytical results in Appendix C. Overall, detectable levels of BTEX have dropped in ground water at the site over time.

The results of general chemistry analyses are shown in Table 3. Results indicate high conductivity in all of the samples, ranging from 1870 microhms per centimeter (µmhos/cm) to 6880 µmhos/cm. Total dissolved salts (TDS) are also high, with levels between 1570 milligram per liter (mg/L) in MW-7 and 4810 mg/L in MW-5. All of the samples have concentrations greater than the New Mexico Water Quality Control Commission (NMWQCC) domestic water supply standard for TDS of 1000 mg/L. These results indicate a poor quality for potable use. The samples from all wells also exceed the NMWQCC water supply standard for sulfate. The standard for sulfate is 600 mg/L. The sample taken from MW-5 contained 1200 mg/L of chloride. The elevated levels of these parameters are indicators of the typically poor quality of shallow ground water at the site. General chemistry of ground water in MW-7 differs from ground water in the other wells on site. Most chemical properties are lower in value for ground water in MW-7 and a separate source of hydrocarbon impact may be associated with this well. The complete laboratory analytical reports from Inter-Mountain Laboratories are included in Appendix B. Historical general chemistry of ground water sampled at the Bloomfield Crude Station is included in Appendix C. MW-7 has continually displayed lower values of

conductivity, sulfate, calcium, magnesium and sodium compared to other well samples from the site.

Product Recovery

The thickness of free phase crude oil measured on May 10, 2002 in MW-2 was consistent with the thickness measured in 2001. The product thickness was 0.81 feet. AESE initiated product removal through weekly hand bailing on May 13, 2002 and continued through June 26, 2002. Table 4 displays data collected during weekly product recovery efforts. The thickness of free phase crude oil floating on top of ground water in MW-2 has been reduced from 0.81 feet to 0.05 feet. As the thickness is reduced, manual bailing is becoming less effective. AESE has recovered a total of approximately 25.1 quarts of product and waste water. Removal of free phase product has been an on-going effort since May 1995. A comprehensive summary of hydrocarbon monitoring and recovery is presented in Appendix D.

Conclusions

The ground water sampling and analyses for 2002 indicate the contaminant plume in the ground water at Giant's former Crude Station has not changed substantially since this investigation began in 1994. Laboratory analyses of ground water samples from MW-3, MW-4 and MW-5 remain below the detectable levels for BTEX. Ground water in the vicinity of MW-2, MW-6 and MW-7 has been impacted by BTEX; although, only ethylbenzene and xylenes were detected in MW-6, and these amounts were below standards. Ground water from MW-7 contains amounts of benzene, ethylbenzene and xylenes that are above NMWQCC standards. Toluene was not detected in MW-7, which is uncharacteristic of onsite ground water from MW-2 based on a comparison of historical dissolved phase hydrocarbon concentrations from the 1994 and 1995 analytical results. Floating free phase hydrocarbon is still present in MW-2. Efforts to remove the product have resulted in reduction of product thickness from 2.47 feet to 0.05 feet over seven years.

The NMWQCC standards for sulfate and total dissolved solids are exceeded at all monitoring wells. The NMWQCC standard for chloride in water is exceeded in upgradient well MW-3. The elevated levels of these parameters are indicators of the typically poor quality of the shallow ground water at the site. Ground water properties in MW-7 differ from the general chemistry of ground water sampled from other monitoring wells. Values are lower in almost every measured parameter. This, as well as the unusual absence of toluene in BTEX analyses, may suggest a different source of hydrocarbon impact for MW-7.

The potentiometric surface has decreased since last year, but general direction and flow gradient remain static. Ground water flow is to the southwest at 0.015 ft/ft.

Product recovery at MW-2 has resulted in the reduction of free phase product in the well. However, the level of product may be too low for manual bailing on a weekly basis to be effective. Reducing the frequency of product removal or a different method may be necessary.

Recommendations

After compiling the most recent analytical results and comparing these with historical results, the following remedial action and monitoring plan is recommended:

- Implement bioventing at the site to reduce the hydrocarbon concentrations in soil below NMOCD standards. A successful bioventing pilot test has already been completed at the site and is documented in *Monitoring Well Installation, Ground Water Sampling and Bioventing Pilot Test Bloomfield Crude Station Bloomfield, New Mexico*, dated July 2001. A *Bioventing Plan*, dated July 2002 is presently being submitted to the NMOCD for review.
- Continue implementing the product recovery plan to remove free phase hydrocarbon from the ground water in the vicinity of MW-2. Future product recovery may be achieved with a passive skimmer to be emptied when necessary. Following removal of product, sample MW-2 annually until BTEX levels are below NMWQCC ground water standards, then sample quarterly for closure.
- Conduct annual ground water sampling for BTEX at monitoring wells MW-3, MW-4, and MW-5.
- Conduct quarterly sampling for BTEX at MW-6 until the ground water is below standards for four consecutive quarters.

Table 1: Ground Water Elevation Data

Well Number	Casing Elevation (ft)	Date	Depth to Water (ft)	Depth to Product (ft)	Product Thickness (ft)	Groundwater Elevation (ft)
MW-1*	na	na	na	na	na	na
MW-2**	5485.33	5/13/2002	15.51	14.7	0.81	5470.39
MW-3	5488.61	5/10/2002	15.13	np	np	5473.49
MW-4	5486.18	5/10/2002	15.54	np	np	5470.64
MW-5	5481.61	5/10/2002	15.74	np	np	5465.87
MW_6	5486.18	5/10/2002	18.05	np	np	5468.13
MW-7†	5491.86	6/26/2002	22.38	np	np	5469.48

Notes:
Measuring points are marked by a notch in top of well casing
na: not applicable
np: indicates there was no free phase product present
Groundwater Elevation = (Surveyed Well Casing Elevation) - (Depth to Water)
Water level elevation is given in feet above mean sea level
* MW-1 was abandoned by Giant in 2000
** MW-2 water level is corrected for product thickness using a specific gravity of 0.7 that of water
† MW-7 was not sampled on May 10, 2002 because it was recommended for abandonement. Upon request of the NMOCD, it was sampled on June 26, 2002

Table 2: Ground Water Analytical Results

Well	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW-3	<0.5	<0.5	<0.5	<1.0
MW-4	<0.5	<0.5	<0.5	<1.0
MW-5	<0.5	<0.5	<0.5	<1.0
MW-6	<0.5	<0.5	0.53	1.4
MW-7*	2000	<2.5	140	1100
NMWQCC Standards	10	750	750	620

µg/L = micrograms per liter
NMWQCC = New Mexico Water Quality Control Commission
*MW-7 was analyzed at a dilution factor of 5 for toluene, ethylbenzene and total xylenes; MW-7 was analyzed at a 500 dilution for benzene.

Table 3: Ground Water General Chemistry Results

Analyte	Units	MW-3	MW-4	MW-5	MW-6	MW-7	NMWQCC
Lab pH	s.u.	7	6.9	6.5	6.8	6.8	6-9
Conductivity	µmhos/cm	4440	5140	6880	4460	1870	No Std.
TDS	mg/L	**3820**	**4420**	**4810**	**3560**	**1570**	1000
Alkalinity as CaCO3	mg/L	358	358	567	669	432	No Std.
Bicarbonate as HCO3	mg/L	437	437	692	816	527	No Std.
Carbonate as CO3	mg/L	<1	<1	<1	<1	<1	No Std.
Hydroxide	mg/L	<1	<1	<1	<1	<1	No Std.
Chloride	mg/L	46	47	**1200**	55	20	250
Sulfate	mg/L	**2520**	**2930**	**1230**	**1900**	**700**	600
Calcium	mg/L	446	449	661	319	258	No Std.
Magnesium	mg/L	43	47	55.3	33	27.8	No Std.
Potassium	mg/L	0.6	2.6	4.9	2.5	2.2	No Std.
Sodium	mg/L	705	873	855	830	151	No Std.

Notes:
s.u. = standard units
µmhos/cm - microhms per centimeter
mg/L = milligrams per liter
NMWQCC = New Mexico Water Quality Control Commission Standard

Table 4: Product Recovery

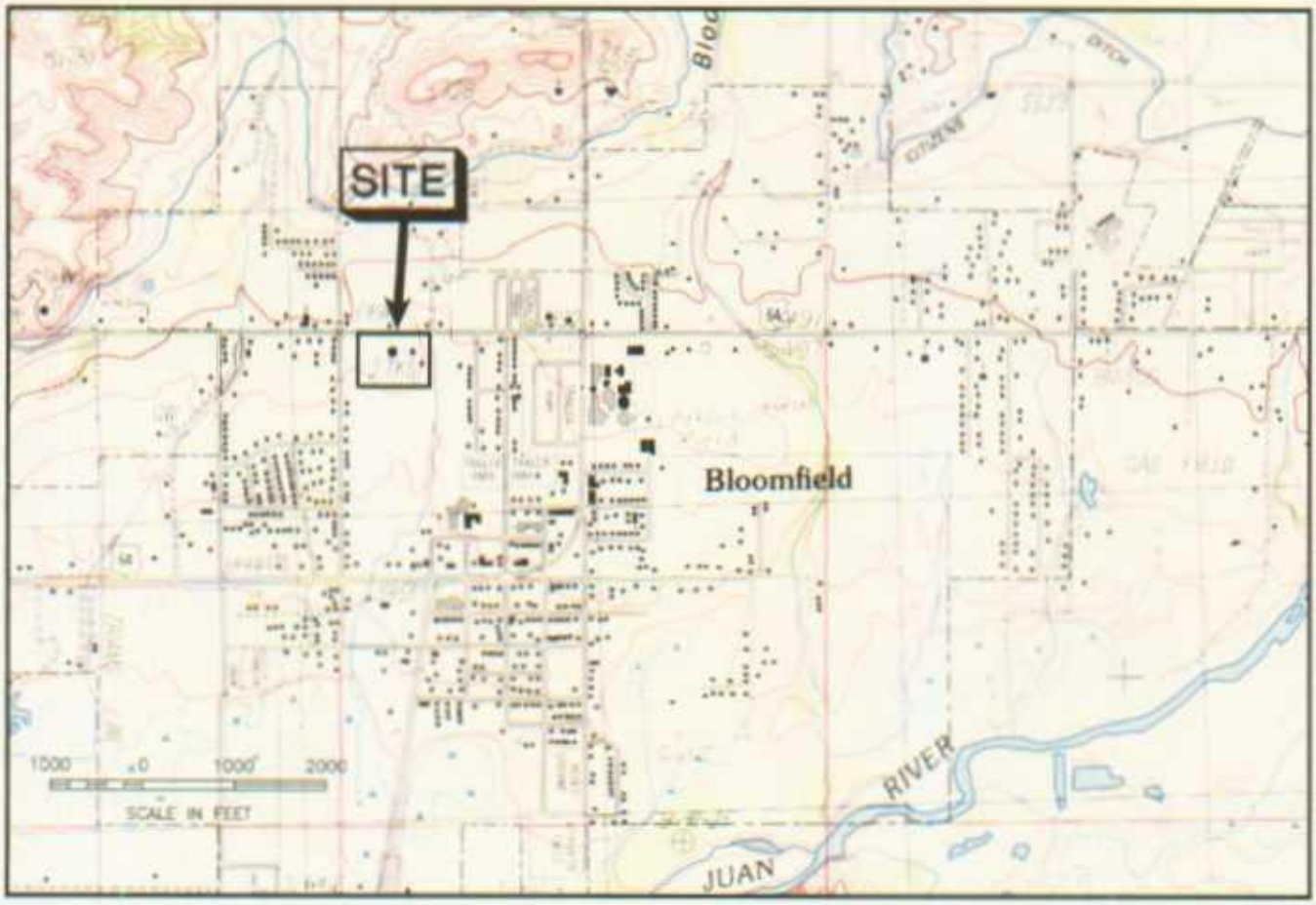
DATE	DEPTH TO PRODUCT (ft)	INITIAL DEPTH TO WATER (ft)	PRODUCT LEVEL (ft)	DEPTH TO WATER AFTER BAILING (ft)	VOLUME REMOVED (Product + Waste Water) (qts)
May 13, 2002	14.70	15.51	0.81	18.27	5.52
May 22, 2002	14.64	15.29	0.65	18.01	4.98
May 30, 2002	14.70	15.14	0.44	18.04	4.26
June 5, 2002	14.76	15.00	0.24	15.66	4.35
June 13, 2002	14.75	14.91	0.15	15.33	2.58
June 19, 2002	14.70	14.78	0.08	15.01	2.23
June 26, 2002	14.68	14.73	0.05	14.53	1.19
TOTAL					25.1

Figure 1: Regional Location Map

NEW MEXICO

SAN JUAN COUNTY

AREA IN DETAIL



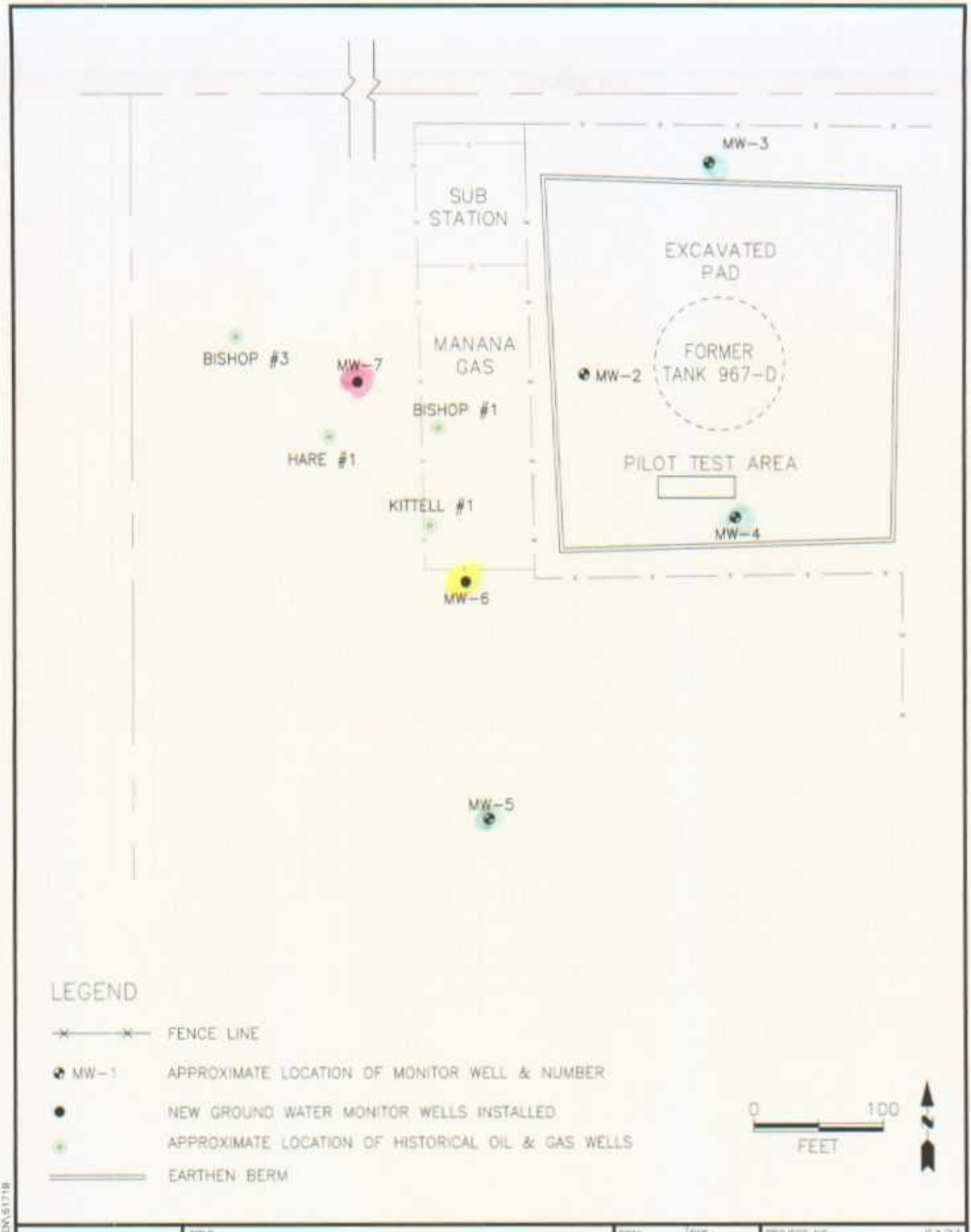
Modified from U.S. Geological Survey Quadrangle of Bloomfield, New Mexico, Provisional Edition 1985.

SCALE IS VARIABLE

D:\DRAW\GOLDEN\6171A

AESE 936 San Juan Blvd., Suite "D" Farmington, New Mexico 87401 Tele: (505) 566-9118	TITLE: GIANT INDUSTRIES ARIZONA, INC. BLOOMFIELD, NEW MEXICO SITE LOCATION MAP	DWN: CJG / DES.: ALL CHKD: MN / APPD: MN DATE: 05/10/02 / REV: 0	PROJECT NO.: 6171 GIANT INDUSTRIES BLOOMFIELD, NM FIGURE 1

Figure 2: Site Map



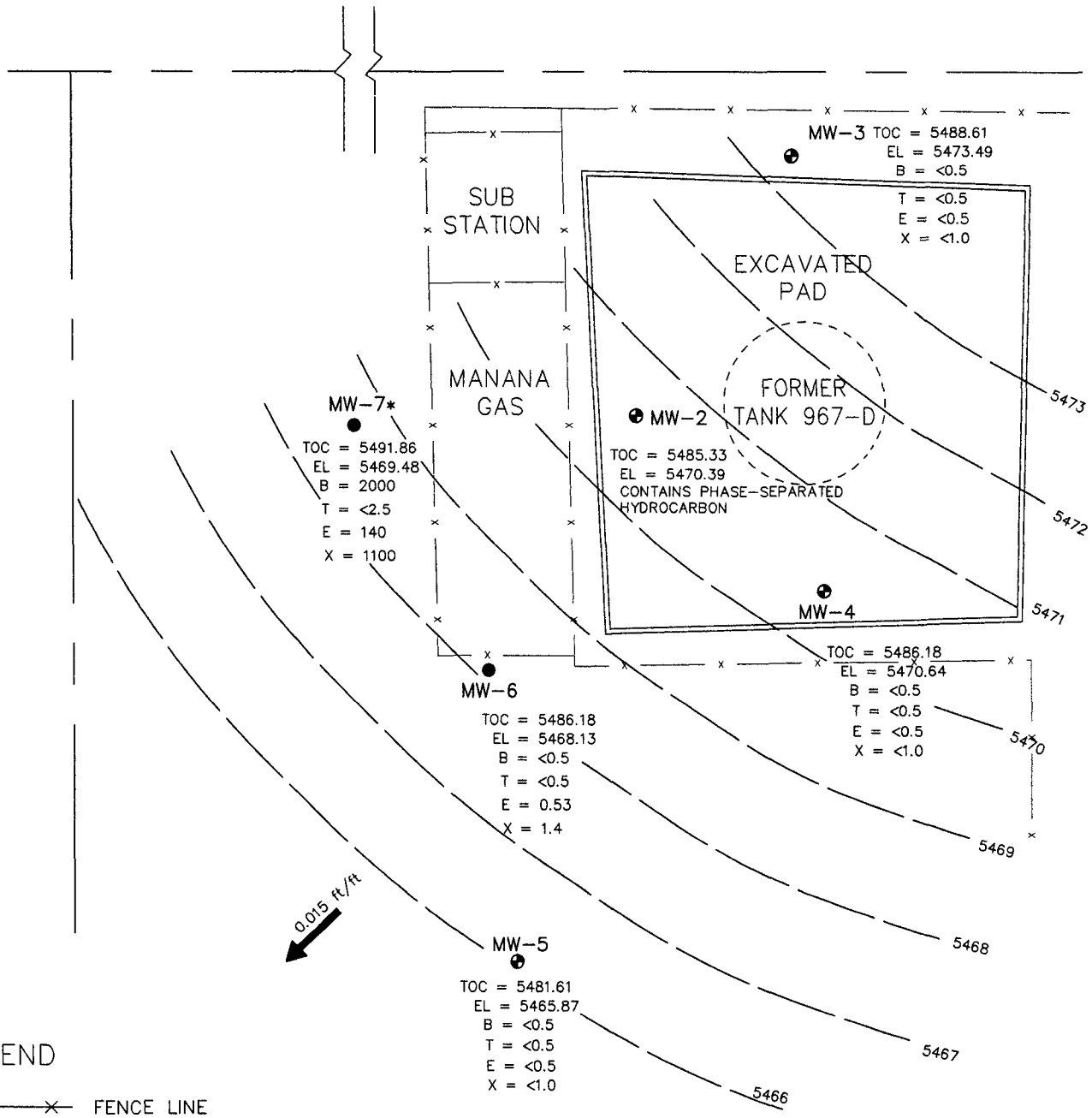
D:\DRAWINGS\GIANT\6171B

AESE
906 San Juan Blvd., Suite "D"
Farmington, New Mexico 87401
Tele: (505) 566-9716

TITLE:
GIANT INDUSTRIES ARIZONA, INC.
BLOOMFIELD, NEW MEXICO
SITE MAP

DWN:	DES.:	PROJECT NO.: 6171
CJG	ALL	GIANT INDUSTRIES BLOOMFIELD, NM
CHKD:	APPD:	
MN	MN	
DATE:	REV.:	FIGURE 2
05/10/02	1	

Figure 3: Ground Water Elevation Contour Map



LEGEND

⊕ MW-1	APPROXIMATE LOCATION OF MONITOR WELL & NUMBER
●	NEW GROUND WATER MONITOR WELLS INSTALLED
	EARTHEN BERM
	APPROXIMATE GROUND WATER GRADIENT
	POTENTIOMETRIC SURFACE OF GROUND WATER ON MAY 10, 2002
TOC	TOP OF CASING ELEVATION (ft)
EL	GROUND WATER ELEVATION (ft)
B	BENZENE (ug/L)
T	TOLUENE (ug/L)
E	ETHYLBENZENE (ug/L)
X	TOTAL XYLENES (ug/L)

0 100 FEET

N

NOTE: ISOPLETH MAPS FOR CONTAMINATES WERE NOT PRODUCED DUE TO LACK OF DATA POINTS

* DEPTH-TO-GROUNDWATER IN MW-7 WAS MEASURED ON JUNE 26, 2002 & WAS EXCLUDED FROM POTENTIOMETRIC SURFACE CALCULATIONS

AESE
906 San Juan Blvd., Suite "D"
Farmington, New Mexico 87401
Tele: (505) 566-9116

D:\DRAW\GOLDEN\6171E

TITLE:
GIANT INDUSTRIES ARIZONA, INC.
BLOOMFIELD, NEW MEXICO
SITE MAP

DWN:	DES.:
CJG	MN
CHKD:	APPD:
MN	MN
DATE:	REV.:
05/10/02	1

PROJECT NO.: 6171
GIANT INDUSTRIES
BLOOMFIELD, NM

FIGURE 3

Appendix A

Well Development and Purging Data

AESE

906 San Juan Blvd.Ste.D
Farmington, NM 87401
505.566.9116(9120fax)

Well Number MW-2

Development / Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name Bloomfield Crude Station | Project Manager Martin Nee | Project No. 6207

Client Company Giant | Phase.Task No.

Site Name | Site Address Bloomfield, NM

Development Criteria
- ☐ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other

Water Volume Calculation
- Initial Depth of Well (feet) 18.998' BTOC initial
- Initial Depth to Water (feet) 15.509' BTOC
- Height of Water Column in Well (feet)
- Diameter (inches): Well Gravel Pack

14.70' BTOC = depth to product

Instruments / Serial No. (if applicable)
- ☐ PH Meter
- ☐ DO Monitor
- ☐ Conductivity Meter
- ☐ Temperature Meter
- ☐ Other

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Water Disposal

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
		d(in)	gal/ft												
		2	0.16												
		4	0.65												
		6	1.47												

Circle the date and time that the development criteria are met.

Comments Product, strong odor, yellowish brown color; bailed product - ½-filled bailer w/product/water mixture 6 times. Water depth after product removal was 16.268' BTOC

Developer's Signature (s) Ashley Lowe | Date 05/13/02 | Reviewer | Date

0205100919

AESE

906 San Juan Blvd.Ste.D
Farmington, NM 87401
505.566.9116(9120fax)

Well Number MW-3

Development
Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name Bloomfield Crude Station Project Manager Martin Nee Project No. 6207

Client Company Giant Phase.Task No.

Site Name Site Address Bloomfield, NM

Development Criteria
- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other

Water Volume Calculation
Initial Depth of Well (feet) 18.689' BTOC
Initial Depth to Water (feet) 15.125' BTOC
Height of Water Column in Well (feet) 3.56'
Diameter (inches): Well 4" Gravel Pack

0.65 Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing	2.31 x 3 =	6.94 gal	x 6 = 44.3 oz.
Gravel Pack			
Drilling Fluids			
Total			

Instruments — **Serial No. (if applicable)**
- ☑ PH Meter
- ☐ DO Monitor
- ☑ Conductivity Meter
- ☑ Temperature Meter
- ☐ Other

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☑ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other

Water Disposal

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
05/09/02	8:42		✓					35 oz			18.4	5.76	3060		clear water
								48			16.9	6.19	2970		
								62			16.0	6.48	2940		
								76			15.4	6.60	2910		
								92			14.8	6.68	2890		
		d(in)	gal/ft					107			14.7	6.71	2880		
		2	0.16					117			14.6	6.78	2900		
		4	0.65					126			14.5	6.82	2910		clear water
		6	1.47					134			14.8	6.92	2920		

Circle the date and time that the development criteria are met.

Comments

Developer's Signature (s) Ashley L Lowe Date 05/09/02 (10) Reviewer Date

AESE

906 San Juan Blvd.Ste.D
Farmington, NM 87401
505.566.9116(9120fax)

Well Number MW-3

Development
Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name _____ Project Manager _____ Project No. _____

Client Company _____ Phase.Task No. _____

Site Name _____ Site Address _____

Development Criteria
- ☐ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other _____

Water Volume Calculation
Initial Depth of Well (feet) _____
Initial Depth to Water (feet) _____
Height of Water Column in Well (feet) _____
Diameter (inches): Well _____ Gravel Pack _____

Item	Water Volume in Well		Gallons to be Removed
	Cubic Feet	Gallons	
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments — Serial No. (if applicable)
- ☐ PH Meter _____
- ☐ DO Monitor _____
- ☐ _____
- ☐ Conductivity Meter _____
- ☐ Temperature Meter _____
- ☐ Other _____

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other _____

Water Disposal _____

Water Removal Data

Date	Time	Development Method		Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons)		Product Volume Removed (gallons)		Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
		Pump	Bailer				Increment	Cumulative	Increment	Cumulative					
								144			15.0	6.93	2930		
								162			14.9	6.90	2930		
								179			14.8	6.96	2920		
								198			14.9	6.99	2910		
								212			14.9	6.97	2930		
		d(in)	gal/ft					230			15.0	6.96	2920		
		2	0.16					247			15.0	6.97	2920		
		4	0.65					267			15.0	6.97	2930		
		6	1.47					288			15.1	6.96	2930		

Circle the date and time that the development criteria are met.

Comments _____

Developer's Signature (s) Ashley Lowe Date 05/09/02 Reviewer _____ Date _____

AESE

906 San Juan Blvd.Ste.D
Farmington, NM 87401
505.566.9116(9120fax)

Well Number MW-3

Development
Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name _____ Project Manager _____ Project No. _____

Client Company _____ Phase.Task No. _____

Site Name _____ Site Address _____

Development Criteria
- ☐ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other _____

Water Volume Calculation
Initial Depth of Well (feet) _____
Initial Depth to Water (feet) _____
Height of Water Column in Well (feet) _____
Diameter (inches): Well _____ Gravel Pack _____

Item	Water Volume in Well		Gallons to be Removed
	Cubic Feet	Gallons	
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments — Serial No. (if applicable)
- ☐ PH Meter _____
- ☐ DO Monitor _____
- ☐ Conductivity Meter _____
- ☐ Temperature Meter _____
- ☐ Other _____

Water Disposal _____

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other _____

Water Removal Data

Date	Time	Development Method Pump	Development Method Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons) Increment	Water Volume Removed (gallons) Cumulative	Product Volume Removed (gallons) Increment	Product Volume Removed (gallons) Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
								310			15.0	6.98	2910		
								328			14.9	6.97	2920		
								344			15.1	6.97	2920		
								363			15.0	6.97	2920		very light brown color
								385			15.0	6.98	2910		
		d(in)	gal/ft					407			15.1	6.97	2910		
at		2	0.16					426			15.0	6.97	2920		
05/10/02	9:19	4	0.65					445			15.1	6.97	2910		sample
		6	1.47												

Circle the date and time that the development criteria are met.

Comments _____

Developer's Signature (s) Ashley Lowe Date 05/10/02 Reviewer _____ Date _____

0205101015

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Well Number MW-4

Development
Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name Bloomfield Crude Station | Project Manager Martin Nee | Project No. 6207

Client Company Giant | Phase.Task No.

Site Name | Site Address Bloomfield, NM

Development Criteria
- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☑ Other or bail dry

Water Volume Calculation
Initial Depth of Well (feet) 26.142' BTOC
Initial Depth to Water (feet) 15.538' BTOC
Height of Water Column in Well (feet) 10.604'
Diameter (inches): Well 4 Gravel Pack

0.65 Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing	6.89 gal x 3 = 20.67 gal x 64 = 1322.9 oz		
Gravel Pack			
Drilling Fluids			
Total			

Instruments / **Serial No. (if applicable)**
- ☑ PH Meter
- ☐ DO Monitor
- ☑ Conductivity Meter
- ☑ Temperature Meter
- ☐ Other

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☑ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other

Water Disposal

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
05/10/02	9:32		✓					630z			18.6	6.56	3580		clear water - 2 bailers
								128			17.3	6.69	3340		
								194			16.7	6.79	3420		light yellow color
								260			16.0	6.82	3410		
								328			15.9	6.93	3410		clear
		d(in)	gal/ft					394			15.8	6.92	3400		
		2	0.16					459			15.7	6.91	3400		yellowish brown color
		4	0.65					523			15.5	6.90	3410		
		6	1.47					586			15.5	6.88	3400		

Circle the date and time that the development criteria are met.

Comments located in middle of site near biovent apparatus
well contained 2 bailers - used both to bail out 3 well casings - used clean sample bailer

Developer's Signature (s) Ashley Lowe Date 05/10/02 Reviewer Date

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Well Number MW-4

Development
Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name _____ Project Manager _____ Project No. _____

Client Company _____ Phase.Task No. _____

Site Name _____ Site Address _____

Development Criteria
- ☐ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other _____

Water Volume Calculation
Initial Depth of Well (feet) _____
Initial Depth to Water (feet) _____
Height of Water Column in Well (feet) _____
Diameter (inches): Well _____ Gravel Pack _____

Item	Water Volume in Well		Gallons to be Removed
	Cubic Feet	Gallons	
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments — Serial No. (if applicable)
- ☐ PH Meter _____
- ☐ DO Monitor _____
- ☐ Conductivity Meter _____
- ☐ Temperature Meter _____
- ☐ Other _____

Water Disposal _____

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other _____

Water Removal Data

Date	Time	Development Method		Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons)		Product Volume Removed (gallons)		Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
		Pump	Bailer				Increment	Cumulative	Increment	Cumulative					
								650			15.5	6.89	3400		
								714			15.4	6.92	3410		
								777			15.4	6.90	3410		
								840			15.5	6.91	3420		
								904			15.4	6.91	3410		
		d(in)	gal/ft					968			15.3	6.89	3410		Not losing recovery
		2	0.16					1032			15.3	6.88	3400		
		4	0.65					1096			15.4	6.91	3410		
		6	1.47					1160			15.3	6.90	3410		

Circle the date and time that the development criteria are met.

Comments _____

Developer's Signature (s) Ashley Lowe Date 05/10/02 Reviewer _____ Date _____

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Well Number MW-4

Development
Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name _____ Project Manager _____ Project No. _____

Client Company _____ Phase.Task No. _____

Site Name _____ Site Address _____

Development Criteria
- ☐ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other _____

Water Volume Calculation
Initial Depth of Well (feet) _____
Initial Depth to Water (feet) _____
Height of Water Column in Well (feet) _____
Diameter (inches): Well _____ Gravel Pack _____

Item	Water Volume in Well		Gallons to be Removed
	Cubic Feet	Gallons	
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments — Serial No. (if applicable)
- ☐ PH Meter _____
- ☐ DO Monitor _____
- ☐ Conductivity Meter _____
- ☐ Temperature Meter _____
- ☐ Other _____

Water Disposal _____

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other _____

Water Removal Data

Date	Time	Development Method		Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons)		Product Volume Removed (gallons)		Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
		Pump	Bailer				Increment	Cumulative	Increment	Cumulative					
								1224			15.3	6.90	3400		
								1288			15.3	6.89	3410		
								1352			15.3	689	3400		
05/10/02	10:15		✓												sample
		d(in)	gal/ft												
		2	0.16												
		4	0.65												
		6	1.47												

Circle the date and time that the development criteria are met.

Comments _____

Developer's Signature (s) Ashley Love Date 05/10/02 Reviewer _____ Date _____

0205101121

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Well Number MW-5

Development
Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name Bloomfield Crude Station Project Manager Martin Nee Project No. 6207

Client Company Giant Phase.Task No.

Site Name Site Address Bloomfield, NM

Development Criteria
- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☑ Other orbai l dry

Water Volume Calculation
Initial Depth of Well (feet) 24.565' BTOC
Initial Depth to Water (feet) 15.741' BTOC
Height of Water Column in Well (feet) 8.824'
Diameter (inches): Well 4' Gravel Pack

Instruments — Serial No. (if applicable)
- ☑ ~~PH~~ Meter
- ☐ DO Monitor
- ☑ Conductivity Meter
- ☑ Temperature Meter
- ☐ Other

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☑ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other

0.65

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing	5.72 gal x3	= 17.16 gal	x64 = 1098.2 oz
Gravel Pack			
Drilling Fluids			
Total			

Water Disposal

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
05/10/02	10:39		✓					64 oz			17.8	6.11	4580		clear water
								128			16.7	6.29	4530		
								195			15.9	6.33	4490		
								263			15.7	6.38	4490		
								326			15.7	6.41	4500		
		d(in)	gal/ft					394			15.7	6.43	4490		very clear
		2	0.16					458			15.6	6.46	4510		
		4	0.65					522			15.6	6.47	4500		
		6	1.47					586			15.7	6.46	4490		

Circle the date and time that the development criteria are met.

Comments well contained 2 bailers. Used both to bail ~~288~~ oz 1100 oz. Used clean sample bailer

Developer's Signature (s) Ashley Lowe Date 05/10/02 Reviewer Date

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Well Number _____ Development / Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-_____

Project Name _____ Project Manager _____ Project No. _____

Client Company _____ Phase.Task No. _____

Site Name _____ Site Address _____

Development Criteria
- ☐ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other _____

Water Volume Calculation
Initial Depth of Well (feet) _____
Initial Depth to Water (feet) _____
Height of Water Column in Well (feet) _____
Diameter (inches): Well _____ Gravel Pack _____

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments — Serial No. (if applicable)
- ☐ PH Meter _____
- ☐ DO Monitor _____
- ☐ Conductivity Meter _____
- ☐ Temperature Meter _____
- ☐ Other _____

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other _____

Water Disposal _____

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
								650			15.6	6.47	4490		plenty of recharge
								714			15.6	6.48	4500		
								778			15.6	6.47	4500		
								842			15.6	6.48	4510		
								906			15.5	6.48	4500		
		d(in)	gal/ft					970			15.6	6.48	4500		clear
		2	0.16					1034			15.6	6.47	4500		
		4	0.65					1098			15.6	6.47	4500		
		6	1.47					1162			15.6	6.47	4500		

Circle the date and time that the development criteria are met.

05/10/02 11:21

Comments sample

Developer's Signature (s) Ashley Lowe Date 05/10/02 Reviewer _____ Date _____

D2051128

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Well Number MW-6

Development
Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name Bloomfield Crude Station Project Manager Martin Nee Project No. 6207

Client Company Giant Phase.Task No.

Site Name Site Address Bloomfield, NM

Development Criteria
- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☑ Other or bail dry

Water Volume Calculation
Initial Depth of Well (feet) 23.385' BTOC
Initial Depth to Water (feet) 18.054' BTOC
Height of Water Column in Well (feet) 5.331
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well Cubic Feet	Water Volume in Well Gallons	Gallons to be Removed
Well Casing		0.85x3=	2.5gal x 64 = 163 8oz
Gravel Pack			
Drilling Fluids			
Total			

Instruments
- ☑ pH Meter
- ☐ DO Monitor
- ☑ Conductivity Meter
- ☐ Temperature Meter
- ☐ Other

Serial No. (if applicable)

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☑ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other

Water Disposal

Water Removal Data

Date	Time	Development Method Pump	Development Method Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons) Increment	Water Volume Removed (gallons) Cumulative	Product Volume Removed (gallons) Increment	Product Volume Removed (gallons) Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
05/10/02	12:02									32oz	19.6	6.35	2590		gray water-strong odor
										64	18.8	6.68	2030		brownish gray
										99	18.3	6.61	1940		
										131	17.9	6.63	2080		
										163	17.7	6.62	2240		cloudy brownish gray
		d(in)	gal/ft							198	17.7	6.64	2490		cloudy light brown
		2	0.16							230	17.8	6.62	2710		
		4	0.65							262	17.7	6.67	2870		
05/10/02	1258	6	1.47												sample

Circle the date and time that the development criteria are met.

Comments Well cover very hard to remove. Small well casing (2"), ~~[illegible]~~ AL
Bailer was filled w/dark gray water, strong odor, black on bailer string. Changed bailer & used clean one to bail & sample

Developer's Signature (s) Ashley Ignacio Date 05/10/02 Reviewer Date

02062613S1

AESE

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Well Number MW-7

Development / Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name Bloomfield Crude Station Project Manager Martin Nee Project No. 6171

Client Company Giant Phase Task No.

Site Name Site Address Bloomfield, NM

Development Criteria
- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other

Water Volume Calculation
Initial Depth of Well (feet) 33.430' BTOC
Initial Depth to Water (feet) 22.378' BTOC
Height of Water Column in Well (feet) 11.05'
Diameter (inches): Well 2" Gravel Pack

Instruments — Serial No. (If applicable)
- ☑ PH Meter
- ☑ DO Monitor
- ☑ Conductivity Meter
- ☑ Temperature Meter
- ☐ Other

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☑ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
	x 0.16		
Well Casing	1.768 x 3	= 5.3 gal	x 64 = 340 oz
Gravel Pack			
Drilling Fluids			
Total			

Water Disposal

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Temperature (°C)	PH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
06/26/02	13:25		✓						280z	280z	28.0	6.15	1780		clear, but contains
									30	58	24.5	6.33	1660		floating particles
									28	86	22.8	6.63	1580		(dirt & sediment)
									30	116	22.7	6.72	1510		
									28	144	21.6	6.74	1400		dirtier-grayish color
		d(in)	gal/ft						32	176	21.6	6.75	1380		slight sweet odor
		2	0.16						26	202	21.5	6.75	1380		
		4	0.65						32	234	21.3	6.76	1360		cloudy grayish black
		6	1.47						30	264	21.3	6.76	1350		

Circle the date and time that the development criteria are met.

Comments water sample contains loose particles of sediment & dirt. During purge process, sweet smell was evident

Developer's Signature (s) Ashley L Lowe Date 06/26/02 Reviewer Date

0206261351

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Farmington, NM 87401
505.566.9116(9120fax)

Well Number MW-7

Development
Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name Bloomfield Crude Station Project Manager Martin Nee Project No. 6171

Client Company Giant Phase Task No.

Site Name Site Address Bloomfield, NM

Development Criteria
- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other

Water Volume Calculation
Initial Depth of Well (feet)
Initial Depth to Water (feet)
Height of Water Column in Well (feet)
Diameter (inches): Well Gravel Pack

Item	Water Volume in Well		Gallons to be Removed
	Cubic Feet	Gallons	
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments — Serial No. (if applicable)
- ☑ PH Meter
- ☐ DO Monitor
- ☑ Conductivity Meter
- ☑ Temperature Meter
- ☐ Other

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☑ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other

Water Disposal

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Temperature (°C)	PH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
									28	292	21.2	6.78	1350		
									32	324	21.2	6.77	1330		
									32	356	21.2	6.78	1340		*
6/26/02	1351														sample
		d(in)	gal/ft												
		2	0.16												
		4	0.65												
		6	1.47												

Circle the date and time that the development criteria are met.

Comments see pg 1 of 2
* this sample was collected for BTEX analysis

Developer's Signature (s) Ashley L Lowe Date 06/26/02 Reviewer Date

0207010935

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505.566.9116(9120fax)

Well Number MW-7

Development
Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name Bloomfield Crude Station Project Manager M. Nee Project No. 6171

Client Company Giant Phase Task No.

Site Name Site Address Bloomfield, NM

Development Criteria
- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other

Water Volume Calculation
Initial Depth of Well (feet)
Initial Depth to Water (feet)
Height of Water Column in Well (feet)
Diameter (inches): Well Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing			
Gravel Pack			
Drilling Fluids			
Total			

Instruments — Serial No. (if applicable)
- ☑ PH Meter
- ☐ DO Monitor
- ☑ Conductivity Meter
- ☑ Temperature Meter
- ☐ Other

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☑ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other

Water Disposal

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Temperature (°C)	PH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
									32	295	18.1	6.57	1380		
									32	327	18.0	6.57	1380		sample
7/1/02	9:35														
		d(in)	gal/ft												
		2	0.16												
		4	0.65												
		6	1.47												

Circle the date and time that the development criteria are met.

Comments

Developer's Signature (s) Ashley L Lowe Date 07/01/02 Reviewer Date

020701 0935

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Farmington, NM 87401
505.566.9116(9120fax)

Well Number MW-7

Development
Purging

WELL DEVELOPMENT AND PURGING DATA

Serial No. WDPD-

Project Name Bloomfield Crude Station Project Manager Martin Nee Project No. 6171

Client Company Giant Phase Task No.

Site Name Site Address Bloomfield, NM

Development Criteria
- ☑ 3 to 5 Casing Volumes of Water Removal
- ☐ Stabilization of Indicator Parameters
- ☐ Other

Water Volume Calculation
Initial Depth of Well (feet) 33.429 'BTOC
Initial Depth to Water (feet) 23.322' BTOC
Height of Water Column in Well (feet) 10.107'
Diameter (inches): Well 2" Gravel Pack

X .16 Item	Water Volume in Well: Cubic Feet	Gallons	Gallons to be Removed
Well Casing	1.617 x 3 =	4.851 x 64 =	310.5 oz
Gravel Pack			
Drilling Fluids			
Total			

Instruments — **Serial No. (if applicable)**
- ☑ PH Meter
- ☑ DO Monitor
- ☐ Conductivity Meter
- ☑ Temperature Meter
- ☐ Other

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☑ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other

Water Disposal

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Water Volume Removed (gallons) oz: Increment	Water Volume Removed (gallons) oz: Cumulative	Temperature (°C)	PH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
07/01/02	8:58		✓						25oz	25oz	20.9	6.18	1470		clear, but contains floating particles
									31	56	19.1	6.22	1420		
									18	74	18.6	6.38	1380		gray color
									32	106	18.4	6.48	1390		
									30	136	18.4	6.53	1370		blackish color
		d(in)	gal/ft						32	168	18.2	6.56	1380		
		2	0.16						32	200	18.3	6.54	1380		
		4	0.65						32	232	18.1	6.55	1370		
		6	1.47						31	263	18.1	6.56	1380		

Circle the date and time that the development criteria are met.

Comments This sample was collected for general chemistry analysis.

Developer's Signature (s) Ashley L Lowe Date 07/01/02 Reviewer Date

Appendix B

Analytical Laboratory Reports

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

Pinnacle Lab ID number **205068**
May 16, 2002

AESE
906 SAN JUAN BLVD. SUITE D
FARMINGTON, NM 87401

GIANT INDUSTRIES
P.O. BOX 159
BLOOMFIELD, NM 87401

Project Name BLOOMFIELD CRUDE ST.
Project Number 6207

Attention: MARTIN NEE/TIM KINNEY

On 05/13/02 Pinnacle Laboratories, Inc., (ADHS License No. AZ0592 pending), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

If you have any questions or comments, please do not hesitate to contact us at (505)344-3777.

H. Mitchell Rubenstein, Ph. D.
General Manager

MR: jt

Enclosure

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

CLIENT	: AESE	PINNACLE ID	: 205068
PROJECT #	: 6207	DATE RECEIVED	: 05/13/02
PROJECT NAME	: BLOOMFIELD CRUDE ST.	REPORT DATE	: 05/16/02

PINNACLE ID #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
205068 - 01	MW-3	AQUEOUS	05/10/02
205068 - 02	MW-4	AQUEOUS	05/10/02
205068 - 03	MW-5	AQUEOUS	05/10/02
205068 - 04	MW-6	AQUEOUS	05/10/02
205068 - 05	TRIP BLANK	AQUEOUS	05/07/02

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021 MODIFIED
CLIENT : AESE
PROJECT # : 6207
PROJECT NAME : BLOOMFIELD CRUDE ST.

PINNACLE I.D.: 205068

SAMPLE I.D.#	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	MW-3	AQUEOUS	05/10/02	NA	05/14/02	1
02	MW-4	AQUEOUS	05/10/02	NA	05/14/02	1
03	MW-5	AQUEOUS	05/10/02	NA	05/14/02	1

PARAMETER	DET. LIMIT	UNITS	MW-3	MW-4	MW-5
BENZENE	0.5	UG/L	< 0.5	< 0.5	< 0.5
TOLUENE	0.5	UG/L	< 0.5	< 0.5	< 0.5
ETHYLBENZENE	0.5	UG/L	< 0.5	< 0.5	< 0.5
TOTAL XYLENES	1.0	UG/L	< 1.0	< 1.0	< 1.0
SURROGATE:					
BROMOFLUOROBENZENE (%)			105	104	102
SURROGATE LIMITS	(80 - 120)				

CHEMIST NOTES:
N/A

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021 MODIFIED
CLIENT : AESE
PROJECT # : 6207
PROJECT NAME : BLOOMFIELD CRUDE ST.

PINNACLE I.D.: 205068

SAMPLE ID	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	MW-6	AQUEOUS	05/10/02	NA	05/14/02	1
05	TRIP BLANK	AQUEOUS	05/07/02	NA	05/14/02	1

PARAMETER	DET. LIMIT	UNITS	MW-6	TRIP BLANK
BENZENE	0.5	UG/L	< 0.5	< 0.5
TOLUENE	0.5	UG/L	< 0.5	< 0.5
ETHYLBENZENE	0.5	**UG/L**	**0.53**	< 0.5
TOTAL XYLENES	1.0	**UG/L**	**1.4**	< 1.0

SURROGATE:
BROMOFLUOROBENZENE (%) 98 110
SURROGATE LIMITS (80 - 120)

CHEMIST NOTES:
N/A

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

EST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 205068
LANK I. D.	: 051402	DATE EXTRACTED	: N/A
LIENT	: AESE	DATE ANALYZED	: 05/14/02
ROJECT #	: 6207	SAMPLE MATRIX	: AQUEOUS
ROJECT NAME	: BLOOMFIELD CRUDE ST.		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<1.0
SURROGATE:		
BROMOFLUOROBENZENE (%)		101
SURROGATE LIMITS:	(80 - 120)	

CHEMIST NOTES:
N/A

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY QUALITY CONTROL
LCS/LCSD

EST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 205068
ATCH #	: 051402	DATE EXTRACTED	: N/A
LIENT	: AESE	DATE ANALYZED	: 05/14/02
ROJECT #	: 6207	SAMPLE MATRIX	: AQUEOUS
ROJECT NAME	: BLOOMFIELD CRUDE ST.	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
BENZENE	<0.5	20.0	19.6	98	19.1	96	3	(80 - 120)	20
TOLUENE	<0.5	20.0	19.8	99	19.6	98	1	(80 - 120)	20
ETHYLBENZENE	<0.5	20.0	20.1	101	20.0	100	0	(80 - 120)	20
TOTAL XYLENES	<1.0	60.0	62.1	104	61.6	103	1	(80 - 120)	20

CHEMIST NOTES:
A

$$\text{Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY QUALITY CONTROL
MS/MSD

EST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 205068
SMSD #	: 205068-01	DATE EXTRACTED	: N/A
LIENT	: AESE	DATE ANALYZED	: 05/14/02
ROJECT #	: 6207	SAMPLE MATRIX	: AQUEOUS
ROJECT NAME	: BLOOMFIELD CRUDE ST.	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
BENZENE	<0.5	20.0	20.2	101	19.5	98	4	(80 - 120)	20
TOLUENE	<0.5	20.0	20.0	100	19.4	97	3	(80 - 120)	20
ETHYLBENZENE	<0.5	20.0	20.4	102	19.8	99	3	(80 - 120)	20
TOTAL XYLENES	<1.0	60.0	63.1	105	61.1	102	3	(80 - 120)	20

CHEMIST NOTES:
NA

$$\text{Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Pinnacle Laboratories Inc.

CHAIN OF CUSTODY

DATE: 05/10/02 PAGE: 1 OF 1

PLI Accession #: 205068

SHADED AREAS ARE FOR LAB USE ONLY.

PLEASE FILL THIS FORM IN COMPLETELY.

PROJECT MANAGER: Martin Nee

COMPANY: AESE
ADDRESS: 906 San Juan Blvd, Ste D
Farmington, NM 87401
PHONE: 505-566-9116
FAX: 505-566-9120

BILL TO: Giant
COMPANY: Giant
ADDRESS: PO Box 159
Bloomfield, NM 87401

SAMPLE ID	DATE	TIME	MATRIX	LAB I.D.	Petroleum Hydrocarbons (418.1) TRPH	(MOD.8015) Diesel/Direct Inject	(M8015) Gas/Purge & Trap	8021 (BTEX)/8015 (Gasoline) MTBE	8021 (BTEX) ☐MTBE ☐TMB ☐PCE	8021 (TCL)	8021 (EDX)	8021 (HALO)	8021 (CUST)	504.1 EDB ☐ / DBCP ☐	8260 (TCL) Volatile Organics	8260 (Full) Volatile Organics	8260 (CUST) Volatile Organics	8260 (Landfill) Volatile Organics	Pesticides/PCB (608/8081/8082)	Herbicides (615/8151)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Polynuclear Aromatics (610/8310/8270-SIMS)	General Chemistry:		Priority Pollutant Metals (13)	Target Analyte List Metals (23)	RCRA Metals (8)	RCRA Metals by TCLP (Method 1311)	Metals:		NUMBER OF CONTAINERS
MW-3	5/10/02	9:19	H_2O	-01					X																						2
MW-4	5/10/02	10:15	H_2O	-02					X																						2
MW-5	5/10/02	11:21	H_2O	-03					X																						2
MW-6	5/10/02	12:18	H_2O	-04					X																						2
Trip Blank	5/7/02	11:34	"	-05					X																						1

ANALYSIS REQUEST

PROJECT INFORMATION

PROJ. NO.: 6207
PROJ. NAME: Bloomfield Crude Stn
P.O. NO.:
SHIPPED VIA:

SAMPLE RECEIPT

NO. CONTAINERS	9
CUSTODY SEALS	Ø Y, N, NA
RECEIVED INTACT	Y
BLUE ICE/ICE	5.9°C

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐24hr ☐48hr ☐72hr ☐1 WEEK (NORMAL) ☑

CERTIFICATION REQUIRED ☐NM ☐SDWA ☐OTHER

METHANOL PRESERVATION ☐

COMMENTS: FIXED FEE ☐

on ice

RELINQUISHED BY: 1.

Signature: Ashley Lowe Time: 10:00
Printed Name: Ashley Lowe Date: 05/13/02
Company:
See reverse side (Force Majeure)

RECEIVED BY: 1

Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 2

Signature: Time: 1690
Printed Name: Date: 5-13-02
Pinnacle Laboratories Inc.

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

Pinnacle Lab ID number **206098**
July 03, 2002

AESE
906 SAN JUAN BLVD. SUITE D
FARMINGTON, NM 87401

GIANT INDUSTRIES
111 COUNTY ROAD 4990
BLOOMFIELD, NM 87413

Project Name BLOOMFIELD CRUDE STN
Project Number 6207

Attention: ASHLEY LOWE/TIM KINNEY

On 06/27/02 Pinnacle Laboratories, Inc., (ADHS License No. AZ0592 pending), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

If you have any questions or comments, please do not hesitate to contact us at (505)344-3777.

H. Mitchell Rubenstein, Ph. D.
General Manager

MR: jt

Enclosure

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

LIENT	: AESE	PINNACLE ID	: 206098
ROJECT #	: 6207	DATE RECEIVED	: 06/27/02
ROJECT NAME	: BLOOMFIELD CRUDE STN	REPORT DATE	: 07/03/02

PINNACLE ID #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
206098 - 01	MW-7	AQUEOUS	06/26/02

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS

: EPA 8021 MODIFIED
IENT : AESE
OJECT # : 6207
ECT NAME : BLOOMFIELD CRUDE STN

PINNACLE I.D.: 206098

PLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
	MW-7	AQUEOUS	06/26/02	NA	06/28/02	5

METER	DET. LIMIT	UNITS	MW-7
ENE	0.5	**UG/L**	**2000-D100**
LUENE	0.5	UG/L	< 2.5
HYLBENZENE	0.5	**UG/L**	**140**
AL XYLENES	1.0	**UG/L**	**1100**

ROGATE:
OMOFLUOROBENZENE (%) 107
ROGATE LIMITS (80 - 120)

IST NOTES:
= This sample was analyzed at a 100X dilution on 06/28/02 for this compound.

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

EST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 206098
K I. D.	: 062802	DATE EXTRACTED	: N/A
IENT	: AESE	DATE ANALYZED	: 06/28/02
OJECT #	: 6207	SAMPLE MATRIX	: AQUEOUS
ECT NAME	: BLOOMFIELD CRUDE STN		

AMETER	UNITS	
ENZENE	UG/L	<0.5
OLUENE	UG/L	<0.5
THYLBENZENE	UG/L	<0.5
TAL XYLENES	UG/L	<1.0

URROGATE:
ROMOFLUOROBENZENE (%) 98
URROGATE LIMITS: (80 - 120)
HEMIST NOTES:

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY QUALITY CONTROL
LCS/LCSD

EST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 206098
A H #	: 062802	DATE EXTRACTED	: N/A
IENT	: AESE	DATE ANALYZED	: 06/28/02
ROJECT #	: 6207	SAMPLE MATRIX	: AQUEOUS
R ECT NAME	: BLOOMFIELD CRUDE STN	UNITS	: UG/L

ARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
EN ENE	<0.5	20.0	18.7	94	18.5	93	1	(80 - 120)	20
OL ENE	<0.5	20.0	19.3	97	19.1	96	1	(80 - 120)	20
THYLBENZENE	<0.5	20.0	19.9	100	19.7	99	1	(80 - 120)	20
OTAL XYLENES	<1.0	60.0	60.3	101	59.7	100	1	(80 - 120)	20

HEMIST NOTES:

$$\text{Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY QUALITY CONTROL
MS/MSD

ST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 206098
MOD #	: 206102-01	DATE EXTRACTED	: N/A
ENT	: AESE	DATE ANALYZED	: 06/28/02
OJECT #	: 6207	SAMPLE MATRIX	: AQUEOUS
CT NAME	: BLOOMFIELD CRUDE STN	UNITS	: UG/L

RAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
NZENE	<0.5	20.0	20.0	100	20.2	101	1	(80 - 120)	20
LUENE	<0.5	20.0	20.8	104	20.7	104	0	(80 - 120)	20
HYLBENZENE	<0.5	20.0	21.5	108	21.1	106	2	(80 - 120)	20
TAL XYLENES	<1.0	60.0	65.4	109	64.2	107	2	(80 - 120)	20

EMIST NOTES:

$$\text{ecovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{) (elative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

American Environmental Network (NM), Inc.

CHAIN OF CUSTODY

(Continuation Sheet)

PAGE 1 OF 1

CLIENT: AESE — 406 San Juan Blvd, Ste D, Farmington, NM 87401 — 505-566-9116 tel, 505-566-9120 fax

P.O. NUMBER Bill To: Giant Tim Kinney 206098

AEN(NM) Accession #: PO Box 159, Bloomfield, NM 87401

PARAMETERS: 8021 (BTEX)

CLIENT SAMPLE ID	LAB ID	DATE AND TIME SAMPLED	MATRIX	8021 (BTEX)	BOTTLE TYPE & NO.	NET PRICE
MW-7	01	6/26/02 1351	water	✓	2	

SAMPLES RELINQUISHED BY (SIGNATURE): Ashley Lowe — DATE AND TIME: 06/27/02 08:45

SAMPLES RELINQUISHED BY (SIGNATURE) — DATE AND TIME

SAMPLES RECEIVED BY (SIGNATURE) — DATE AND TIME

SAMPLES RECEIVED BY (SIGNATURE): [signature] — DATE AND TIME: 6/27/02 1605

REMARKS ON SAMPLE RECEIPT
- ☐ Bottle Intact
- ☐ Preserved
- ☐ Chilled
- ☐ Custody Seals
- ☐ Seals Intact
- ☐ See Remarks

REMARKS ON SAMPLE RECEIPT
- ☑ Bottle Intact
- ☑ Preserved
- ☑ Chilled
- ☐ Custody Seals
- ☐ Seals Intact
- ☐ See Remarks

PROJ #: 6207
Name: Bloomfield Crude Stn
Shipped via: Greyhound Bus

Rec'd 12° c On Ice

DISTRIBUTION: White - AEN (NM), Canary - Originator

Inter-Mountain Laboratories, Inc.

2506 West Main Street
Farmington , NM 87401

Date: 5/23/02

Client: Giant Bloomfield / AESE Bal

Lab ID: 0302W02155 - 2158

Project: Bloomfield Crude Station

Dear Client:

The samples were received for analysis at Inter-Mountain Laboratories (IML), Farmington, New Mexico. Enclosed is the result of the analyses.

Comment:

The enclosed report has been independently reviewed for compliance with IML-Farmington's Quality Assurance Plan and Data Quality Objectives. IML has examined all of the data in the report and has made every effort possible to make sure it is complete, accurate, and compliant. Quality Assurance data, if not included, is on file and available upon request.

Unless otherwise noted, all results were obtained by approved methods. Practical Quantification Limits (PQLs) are based on statistically derived determinations, and upon any dilutions necessary to obtain proper method response without matrix interference.

William Lipps
Laboratory Director/IML-Farmington, NM

Inter-Mountain Laboratories, Inc.

2506 West Main Street
Farmington, NM 87401

Client: Giant Refining Co.
Project: BLOOMFIELD CRUDE STATION
Sample ID: MW-3
Lab ID: 0302W02158
Matrix: Water
Condition: Cool/Intact

Date Received: 05/13/02
Date Reported: 05/23/02
Date Sampled: 05/10/02
Time Sampled: 1015

Parameter	Analytical Result	Units		Units	PQL	Method	Analysis Date	Time	Init.
General Parameters									
PH	7.0	s.u.			0.1	EPA 150.1	05/13/02	1145	RB
Electrical Conductivity	4,440	s.u.			0.1	EPA 150.1	05/13/02	1145	RB
Solids - Total Dissolved	3,820	mg/L			10	2540 C	05/14/02	1515	AB
Alkalinity (CaCO3)	358	mg/L			1	SM 2320B	05/20/02	1225	AB
Hardness (CaCO3)	1,290	mg/L			1	EPA 200.7			
Major Cations									
Calcium	446	mg/L	22.26	meq/L	0.2	EPA 200.7	05/13/02	1416	WL
Magnesium	43.0	mg/L	3.54	meq/L	0.2	EPA 200.7	05/13/02	1416	WL
Potassium	0.6	mg/L	0.02	meq/L	0.2	EPA 200.7	05/13/02	1416	WL
Sodium	705	mg/L	30.67	meq/L	0.2	EPA 200.7	05/13/02	1416	WL
Major Anions									
Bicarbonate (HCO3)	437	mg/L	7.16	meq/L	1	SM 2320B	05/20/02	1225	AB
Carbonate (CO3)	<1	mg/L	<0.01	meq/L	1	SM 2320B	05/20/02	1225	AB
Chloride	46	mg/L	1.30	meq/L	1	EPA 300.0	05/20/02	1317	ZW
Hydroxide (OH)	<1	mg/L	<0.01	meq/L	1	SM 2320B	05/20/02	1225	AB
Sulfate	2,520	mg/L	52.43	meq/L	5	EPA 300.0	05/20/02	1317	ZW
Anion/Cation Balance QC Information									
Anion Sum			63.25	meq/L	0.01	SM 1030			
Cation Sum			56.49	meq/L	0.01	SM 1030			
Cation/Anion Balance			3.73	%	0.01	SM 1030			

Reference: EPA - "Methods for Chemical Analysis of Water and Wastes (MCAWW)" - EPA/600/4-79-020 - March, 1983.
SM - "Standard Methods for the Examination of Water and Wastewater", APHA-AWWA-WEF,19th Edition, 1995.
EPA - "Methods for the Determination of Metals in Environmental Samples" - Supplement I - 600/R-94-111 - May, 1994.

Reviewed By: _____

Inter·Mountain Laboratories, Inc.

2506 West Main Street
Farmington, NM 87401

Client: Giant Refining Co.
Project: BLOOMFIELD CRUDE STATION
Sample ID: MW-4
Lab ID: 0302W02157
Matrix: Water
Condition: Cool/Intact

Date Received: 05/13/02
Date Reported: 05/23/02
Date Sampled: 05/10/02
Time Sampled: 1015

Parameter	Analytical Result	Units		Units	PQL	Method	Analysis Date	Time	Init.
General Parameters									
PH	6.9	s.u.			0.1	EPA 150.1	05/13/02	1145	RB
Electrical Conductivity	5,140	s.u.			0.1	EPA 150.1	05/13/02	1145	RB
Solids - Total Dissolved	4,420	mg/L			10	2540 C	05/14/02	1515	AB
Alkalinity (CaCO3)	358	mg/L			1	SM 2320B	05/20/02	1225	AB
Hardness (CaCO3)	1,310	mg/L			1	EPA 200.7			
Major Cations									
Calcium	449	mg/L	22.41	meq/L	0.2	EPA 200.7	05/13/02	1413	WL
Magnesium	47.0	mg/L	3.87	meq/L	0.2	EPA 200.7	05/13/02	1413	WL
Potassium	2.6	mg/L	0.07	meq/L	0.2	EPA 200.7	05/13/02	1413	WL
Sodium	873	mg/L	37.98	meq/L	0.2	EPA 200.7	05/13/02	1413	WL
Major Anions									
Bicarbonate (HCO3)	437	mg/L	7.16	meq/L	1	SM 2320B	05/20/02	1225	AB
Carbonate (CO3)	<1	mg/L	<0.01	meq/L	1	SM 2320B	05/20/02	1225	AB
Chloride	47	mg/L	1.32	meq/L	1	EPA 300.0	05/20/02	1303	ZW
Hydroxide (OH)	<1	mg/L	<0.01	meq/L	1	SM 2320B	05/20/02	1225	AB
Sulfate	2,930	mg/L	60.99	meq/L	5	EPA 300.0	05/20/02	1303	ZW
Anion/Cation Balance QC Information									
Anion Sum			69.44	meq/L	0.01	SM 1030			
Cation Sum			64.32	meq/L	0.01	SM 1030			
Cation/Anion Balance			3.83	%	0.01	SM 1030			

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Reference: EPA - "Methods for Chemical Analysis of Water and Wastes (MCAWW)" - EPA/600/4-79-020 - March, 1983.
SM - "Standard Methods for the Examination of Water and Wastewater", APHA-AWWA-WEF,19th Edition, 1995.
EPA - "Methods for the Determination of Metals in Environmental Samples" - Supplement I - 600/R-94-111 - May, 1994.

Reviewed By:

Inter-Mountain Laboratories, Inc.

2506 West Main Street
Farmington, NM 87401

Client: Giant Refining Co.
Project: BLOOMFIELD CRUDE STATION
Sample ID: MW-5
Lab ID: 0302W02156
Matrix: Water
Condition: Cool/Intact

Date Received: 05/13/02
Date Reported: 05/23/02
Date Sampled: 05/10/02
Time Sampled: 1121

Parameter	Analytical Result	Units		Units	PQL	Method	Analysis Date	Time	Init.
General Parameters									
PH	6.5	s.u.			0.1	EPA 150.1	05/13/02	1145	RB
Electrical Conductivity	6,880	s.u.			0.1	EPA 150.1	05/13/02	1145	RB
Solids - Total Dissolved	4,810	mg/L			10	2540 C	05/14/02	1515	AB
Alkalinity (CaCO3)	567	mg/L			1	SM 2320B	05/20/02	1225	AB
Hardness (CaCO3)	1,880	mg/L			1	EPA 200.7			
Major Cations									
Calcium	661	mg/L	32.98	meq/L	0.2	EPA 200.7	05/13/02	1411	WL
Magnesium	55.3	mg/L	4.55	meq/L	0.2	EPA 200.7	05/13/02	1411	WL
Potassium	4.9	mg/L	0.13	meq/L	0.2	EPA 200.7	05/13/02	1411	WL
Sodium	855	mg/L	37.20	meq/L	0.2	EPA 200.7	05/13/02	1411	WL
Major Anions									
Bicarbonate (HCO3)	692	mg/L	11.34	meq/L	1	SM 2320B	05/20/02	1225	AB
Carbonate (CO3)	<1	mg/L	<0.01	meq/L	1	SM 2320B	05/20/02	1225	AB
Chloride	1,200	mg/L	33.88	meq/L	1	EPA 300.0	05/20/02	1250	ZW
Hydroxide (OH)	<1	mg/L	<0.01	meq/L	1	SM 2320B	05/20/02	1225	AB
Sulfate	1,230	mg/L	25.69	meq/L	5	EPA 300.0	05/20/02	1250	ZW
Anion/Cation Balance QC Information									
Anion Sum			70.90	meq/L	0.01	SM 1030			
Cation Sum			74.86	meq/L	0.01	SM 1030			
Cation/Anion Balance			2.72	%	0.01	SM 1030			

Reference: EPA - "Methods for Chemical Analysis of Water and Wastes (MCAWW)" - EPA/600/4-79-020 - March, 1983.
SM - "Standard Methods for the Examination of Water and Wastewater", APHA-AWWA-WEF,19th Edition, 1995.
EPA - "Methods for the Determination of Metals in Environmental Samples" - Supplement I - 600/R-94-111 - May, 1994.

Reviewed By: _____

Inter·Mountain Laboratories, Inc.

2506 West Main Street
Farmington, NM 87401

Client: Giant Refining Co.
Project: BLOOMFIELD CRUDE STATION
Sample ID: MW-6
Lab ID: 0302W02155
Matrix: Water
Condition: Cool/Intact

Date Received: 05/13/02
Date Reported: 05/23/02
Date Sampled: 05/10/02
Time Sampled: 1218

Parameter	Analytical Result	Units		Units	PQL	Method	Analysis Date	Time	Init.
General Parameters									
PH	6.8	s.u.			0.1	EPA 150.1	05/13/02	1145	RB
Electrical Conductivity	4,460	s.u.			0.1	EPA 150.1	05/13/02	1145	RB
Solids - Total Dissolved	3,560	mg/L			10	2540 C	05/14/02	1515	AB
Alkalinity (CaCO3)	669	mg/L			1	SM 2320B	05/20/02	1225	AB
Hardness (CaCO3)	932	mg/L			1	EPA 200.7			
Major Cations									
Calcium	319	mg/L	15.92	meq/L	0.2	EPA 200.7	05/13/02	1409	WL
Magnesium	33.0	mg/L	2.71	meq/L	0.2	EPA 200.7	05/13/02	1409	WL
Potassium	2.5	mg/L	0.06	meq/L	0.2	EPA 200.7	05/13/02	1409	WL
Sodium	830	mg/L	36.11	meq/L	0.2	EPA 200.7	05/13/02	1409	WL
Major Anions									
Bicarbonate (HCO3)	816	mg/L	13.37	meq/L	1	SM 2320B	05/20/02	1225	AB
Carbonate (CO3)	<1	mg/L	<0.01	meq/L	1	SM 2320B	05/20/02	1225	AB
Chloride	55	mg/L	1.55	meq/L	1	EPA 300.0	05/20/02	1236	ZW
Hydroxide (OH)	<1	mg/L	<0.01	meq/L	1	SM 2320B	05/20/02	1225	AB
Sulfate	1,900	mg/L	39.57	meq/L	5	EPA 300.0	05/20/02	1236	ZW
Anion/Cation Balance QC Information									
Anion Sum			54.47	meq/L	0.01	SM 1030			
Cation Sum			54.80	meq/L	0.01	SM 1030			
Cation/Anion Balance			0.30	%	0.01	SM 1030			

Reference: EPA - "Methods for Chemical Analysis of Water and Wastes (MCAWW)" - EPA/600/4-79-020 - March, 1983.
SM - "Standard Methods for the Examination of Water and Wastewater", APHA-AWWA-WEF,19th Edition, 1995.
EPA - "Methods for the Determination of Metals in Environmental Samples" - Supplement I - 600/R-94-111 - May, 1994.

Reviewed By: _____

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CHAIN OF CUSTODY RECORD

PS# 6489

Client/Project Name	Project Location	ANALYSES / PARAMETERS
AESE / Giant	Bloomfield Crude Station	
Sampler: (Signature) Ashley Lowe	**Chain of Custody Tape No.**	

Sample No./ Identification	Date	Time	Lab Number	Matrix	No. of Containers	General Chemistry				Remarks
MW-6	05/10/02	12:18	W02155	water	1	✓				
MW-5	05/10/02	11:21	W02156	water	1	✓				
MW-4	05/10/02	10:15	W02157	water	1	✓				
MW-3	05/10/02	9:19	W02158	water	1	✓				

REC-COOL & INTACT
HAND DELIVERED:
SHIPPED:

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Ashley L Lowe	05/13/02	9:45			
Relinquished by: (Signature)	**Date**	**Time**	**Received by: (Signature)**	**Date**	**Time**
Relinquished by: (Signature)	**Date**	**Time**	**Received by laboratory: (Signature)**	**Date**	**Time**
				5/13/02	09:4

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College Station, TX 77845
Telephone (979) 776-8945

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Inter-Mountain Laboratories, Inc.

2506 West Main Street
Farmington , NM 87401

Date: 7/25/02

Client: A.E.S.E/GIANT INDUSTRIES

Lab ID: 0302W02659

Project: BLOOMFIELD CRUDE STATION

Dear Client:

The samples were received for analysis at Inter-Mountain Laboratories (IML), Farmington, New Mexico. Enclosed is the result of the analyses.

Comment:

The enclosed report has been independently reviewed for compliance with IML-Farmington's Quality Assurance Plan and Data Quality Objectives. IML has examined all of the data in the report and has made every effort possible to make sure it is complete, accurate, and compliant. Quality Assurance data, if not included, is on file and available upon request.

Unless otherwise noted, all results were obtained by approved methods. Practical Quantification Limits (PQLs) are based on statistically derived determinations, and upon any dilutions necessary to obtain proper method response without matrix interference.

William Lipps
Laboratory Director/IML-Farmington, NM

Inter·Mountain Laboratories, Inc.

2506 West Main Street
Farmington, NM 87401

Client: Giant Refining Co.
Project: BLOOMFIELD CRUDE STATION
Sample ID: MW-7
Lab ID: 0302W02659
Matrix: Water
Condition: Cool/Intact

Date Received: 07/01/02
Date Reported: 07/25/02
Date Sampled: 07/01/02
Time Sampled: 0935

Parameter	Analytical Result	Units		Units	PQL	Method	Analysis Date	Time	Init.
General Parameters									
PH	6.8	s.u.			0.1	EPA 150.1	07/01/02	1105	AB
Electrical Conductivity	1,870	µmhos/cm			10	SW-846 9050A	07/01/02	1105	AB
Solids - Total Dissolved	1,570	mg/L			10	2540 C	07/01/02	1330	AB
Alkalinity (CaCO3)	432	mg/L			1	SM 2320B	07/02/02	0840	AR
Hardness (CaCO3)	758	mg/L			1	EPA 200.7			
Major Cations									
Calcium	258	mg/L	12.87	meq/L	0.2	EPA 200.7	07/23/02	1506	JG
Magnesium	27.8	mg/L	2.28	meq/L	0.2	EPA 200.7	07/23/02	1506	JG
Potassium	2.2	mg/L	0.06	meq/L	0.2	EPA 200.7	07/23/02	1506	JG
Sodium	151	mg/L	6.57	meq/L	0.2	EPA 200.7	07/23/02	1506	JG
Major Anions									
Bicarbonate (HCO3)	527	mg/L	8.64	meq/L	1	SM 2320B	07/02/02	0840	AR
Carbonate (CO3)	<1	mg/L	<0.01	meq/L	1	SM 2320B	07/02/02	0840	AR
Chloride	20	mg/L	0.56	meq/L	1	EPA 300.0	07/08/02	1613	AR
Hydroxide (OH)	<1	mg/L	<0.01	meq/L	1	SM 2320B	07/02/02	0840	AR
Sulfate	700	mg/L	14.59	meq/L	5	EPA 300.0	07/08/02	1613	AR
Anion/Cation Balance QC Information									
Anion Sum			16.58	meq/L	0.01	SM 1030			
Cation Sum			21.78	meq/L	0.01	SM 1030			
Cation/Anion Balance			4.39	%	0.01	SM 1030			

Reference: EPA - "Methods for Chemical Analysis of Water and Wastes (MCAWW)" - EPA/600/4-79-020 - March, 1983.
SW-846 - "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", United States Environmental Protection Agency, Final Update 1, July 1992.
SM - "Standard Methods for the Examination of Water and Wastewater", APHA-AWWA-WEF,19th Edition, 1995.

Reviewed By:

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Inter- Mountain
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CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location	ANALYSES / PARAMETERS
AESE / Giant Industries	Bloomfield Crude Station	
Sampler: (Signature) Ashley L Lowe	**Chain of Custody Tape No.**	

Sample No./ Identification	Date	Time	Lab Number	Matrix	No. of Containers	General Chemistry				Remarks
MW-7	07/01/02	9:35	2659	water	1	✓				

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Ashley L. Lowe	07/01/02	10:15			
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by laboratory: (Signature)	Date	Time
			Lisa Hamm	7/1/02	10:15

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Appendix C

Comprehensive Summary of Ground Water Analysis

Summary of Ground Water Analytical Results for BTEX - September 1994 Through June 2002

NMWQCC Standards		Benzene (µg/L) 10	Toluene (µg/L) 750	Ethylbenzene (µg/L) 750	Total Xylenes (µg/L) 620
MW-1*	Sep-94	NS	NS	NS	NS
	Apr-95	NS	NS	NS	NS
	Sep-99	NS	NS	NS	NS
	Dec-99	NS	NS	NS	NS
	May-01	NS	NS	NS	NS
	May-02	NS	NS	NS	NS
MW-2	Sep-94	640	600	82	690
	Apr-95	220	280	53	430
	Sep-99	NSP	NSP	NSP	NSP
	Dec-99	NSP	NSP	NSP	NSP
	May-01	NSP	NSP	NSP	NSP
	May-02	NSP	NSP	NSP	NSP
MW-3	Sep-94	ND	ND	ND	ND
	Apr-95	ND	ND	ND	ND
	Sep-99	ND	ND	ND	ND
	Dec-99	ND	ND	ND	ND
	May-01	ND	ND	ND	ND
	May-02	ND	ND	ND	ND
MW-4	Sep-94	2.1	ND	ND	1.2
	Apr-95	ND	ND	ND	ND
	Sep-99	ND	ND	ND	ND
	Dec-99	ND	ND	ND	ND
	May-01	ND	ND	ND	ND
	May-02	ND	ND	ND	ND
MW-5	Sep-94	NS	NS	NS	NS
	Apr-95	ND	ND	ND	ND
	Sep-99	ND	ND	ND	ND
	Dec-99	ND	ND	ND	ND
	May-01	ND	ND	ND	ND
	May-02	ND	ND	ND	ND
MW-6**	May-01	12	15	13	83
	May-02	ND	ND	0.53	1.4
MW-7**	May-01	2,400	ND	380	2,800
	June-02	2,000	ND	140	1,100

Notes:
µg/L = micrograms per liter
ND = not detected
NS = not sampled
NSP = not sampled due to product in well
*MW-1 was not screened within the aquifer
**MW-6 and MW-7 were installed in May 2001
NMWQCC = New Mexico Water Quality Control Commission

Summary of Ground Water Analytical Results for General Water Chemistry - 1994, 2001 and 2002

NMWQCC Standards		Lab pH (su)	Conductivity (µmhos/cm)	TDS (mg/L)	Alkalinity ($CaCO_3$) (mg/L)	Hardness ($CaCO_3$) (mg/L)	Sodium Absorption Ratio	Bicarbonate (HCO_3) (mg/L)	Carbonate (CO_3) (mg/L)	Hydroxide (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)
		6-9	**No Std**	**1,000**	**No Std**	**No Std**	**No Std**	**No Std**	**No Std**	**No Std**	**250**	**600**	**No Std**	**No Std**	**No Std**	**No Std**
MW1	1994	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2001	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW2	1994	6.6	4,920	3,049	957	NT	11.785	1,170	0	0	1,050	245	325	30	1.4	828
	2001	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP
	2002	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP
MW3	1994	7.1	4,250	3,413	521	NT	8.147	635	0	0	48	1,920	439	37	1.4	661
	2001	7.3	4,500	3,960	459	1,220	NT	559	<1	<1	78	2,250	423	40.4	2.5	711
	2002	7	4,440	3,820	358	1,290	NT	437	<1	<1	46	2,520	446	43	0.6	705
MW4	1994	7.0	5,420	4,389	576	NT	10.883	703	0	0	175	2,470	439	53	3.5	907
	2001	7.1	5,090	4,630	490	1,460	NT	597	<1	<1	77	2,680	500	52.5	4.2	900
	2002	6.9	5,140	4,420	358	1,310	NT	437	<1	<1	47	2,930	449	47	2.6	873
MW5	1994	6.9	6,000	4,410	775	NT	8.84	945	0	0	996	1,390	634	51	6.6	861
	2001	6.7	7,000	5,230	757	2,010	NT	923	<1	<1	1,320	1,230	700	63.2	5.6	924
	2002	6.5	6,880	4,810	567	1,880	NT	692	<1	<1	1,200	1,230	661	55.3	4.9	855
MW6	2001	6.9	5,470	4,580	740	1,550	NT	903	<1	<1	80	2,780	534	53.3	6.3	1,030
	2002	6.8	4,460	3,560	669	932	NT	816	<1	<1	55	1,900	319	33	2.5	830
MW7	2001	6.7	2,160	1,710	600	843	NT	732	<1	<1	52	642	296	25.6	1.6	234
	2002	6.8	1,870	1,570	432	758	NT	527	<1	<1	20	700	258	27.8	2.2	151

Notes:
s.u. = standard units
µmhos/cm = micromhos per centimeter
mg/L = milligrams per liter
NMWQCC = New Mexico Water Quality Control Commission
No Std = no standard
NS = not sampled; MW-1 was not screened within the aquifer
NSP = no sample collected due to product in well
NT =

Summary of Ground Water Analytical Results for Polynuclear Aromatic Hydrocarbons (EPA 610) - September 1994

Units: µg/L	MW-3	MW-2	MW-4
Naphthalene	<0.5	8.9	<0.50
Acenaphthylene	<1.0	<1.0	<1.0
Acenaphthene	<0.50	<0.50	<0.50
Fluorene	<0.10	1.2	<0.10
Phenanthrene	<0.05	1.8	<0.05
Anthracene	<0.05	<0.05	<0.05
Fluoranthene	<0.10	1.2	<0.10
Pyrene	<0.10	<0.10	<0.10
Benzo(a)Anthracene	<0.10	<0.10	<0.10
Chrysene	<0.10	0.17	<0.10
Benzo(b)Fluoranthene	>0.10	<0.10	<0.10
Benzo(k)Fluoranthene	<0.10	<0.10	<0.10
Benzo(a)Pyrene	<0.10	<0.10	<0.10
Dibenzo(a,h)Anthracene	<0.20	<0.20	<0.20
Benzo(g,h,I)Perylene	<0.10	<0.10	<0.10
Indeno(1,2,3-CD)Pyrene	<0.10	<0.10	<0.10
1-Methylnaphthalene	<0.30	5.9	<0.30
1-Methylnaphthalene	<0.30	5.8	<0.30

Notes:
µg/L = micrograms per liter

Summary of Ground Water Analytical Results for Priority Pollutant Metals - September 1994

Metal	NMWQCC Standards	MW-2	MW-3	MW-4
Silver (mg/L)	0.05	<0.01	<0.01	<0.01
Arsenic (mg/L)	0.1	<0.005	<0.005	<0.005
Beryllium (mg/L)	No Std	<0.004	<0.004	<0.004
Cadmium (mg/L)	0.01	<0.0005	<0.0005	<0.0005
Chromium (mg/L)	0.05	0.010	<0.01	<0.01
Copper (mg/L)	1	0.012	<0.01	<0.01
Mercury (mg/L)	0.002	<0.0002	<0.0002	<0.0002
Nickel (mg/L)	0.2	<0.02	<0.02	<0.02
Lead (mg/L)	<0.05	<0.002	<0.002	<0.002
Antimony (mg/L)	No Std	<0.05	<0.05	<0.05
Selenium (mg/L)	0.05	<0.005	<0.005	<0.005
Thallium (mg/L)	No Std	<0.005	<0.005	<0.005
Zinc (mg/L)	10	0.032	0.023	0.026

Notes:
mg/L = milligrams per liter
NMWQCC = New Mexico Water Quality Control Commission
No Std = no standard

Appendix D

Comprehensive Summary of Phase Separated Hydrocarbons and Recovery

Summary of Phase-Separated Hydrocarbon Monitoring and Recovery in Ground Water Monitoring Well MW-2 - May 1995 – June 2002

Date	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Volume Removed (gal)
May 4, 1995	NA	NA	NA	9 (includes purge water)
Sept 30, 1999	15.00	17.48	2.47	2.75
Nov 16, 1999	14.65	17.00	2.35	2.0
Dec 14, 1999	14.66	16.76	2.10	5.0
May 11, 2001	14.69	16.77	1.96	2.5
May 21, 2001	15.10	15.65	0.55	0
May 23, 2001	15.13	15.69	0.56	0
July 3, 2001	15.48	16.32	0.84	0
July 9, 2001	15.54	16.43	0.89	1.1
May 13, 2002	14.70	15.51	0.81	1.4
May 22, 2002	14.64	15.29	0.65	1.2
May 30, 2002	14.70	15.14	0.44	1.1
June 5, 2002	14.76	15.00	0.24	1.1
June 13, 2002	14.75	14.91	0.15	0.6
June 19, 2002	14.70	14.78	0.08	0.6
June 26, 2002	14.68	14.73	0.05	0.3
Total Gallons of Product and Purge Water Removed Since 1995				37.55