Western Refining
GALLUP

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Certified Return Receipt: #7010 1670 0001 3141 0187

June 12, 2012

JUN 2012

Mr. John Kieling, Chief
NMED - Hazardous Waste Bureau
2905 Rodeo Park Drive East, Bldg 1
Santa Fe, NM 87505-6303

RE: Third Notice of Disapproval
Requirement to Resurvey Ground Water Monitoring Wells and Recovery Wells
Western Refining Company, Southwest, Inc., Gallup Refinery
EPA ID #NMD000333211
HWB-WRG-11-003

Dear Mr. Kieling:

Western Refining Southwest, Gallup Refinery has prepared the following responses to the comments listed regarding the above referenced matter dated May 18, 2012.

Comment 1

NMED's Comments 2 and 3 from the second Notice of Disapproval (2nd NOD) dated February 12, 2012 required the Permittee to describe the accuracy and error associated with the survey method and instruments used during the survey event; however, the Permittee did not discuss this information in the response. The Permittee must discuss the accuracy and error associated with the survey method and instruments used during the survey event in the response letter to this disapproval.

Response: *The Leica 1200 GPS (Global Positioning System) Base and Rover with RTK technology is reliable at 99.99% for baselines up to 40 km. The system initializes within seconds and position updates every 0.05 second (20 Hz). Latency is rated at less than 0.03 second and has consistent cm-accuracy. The following specifications are listed for accuracies: Kinematic Horizontal: 10 mm + 1 ppm; Vertical: 20 mm + 1 ppm; Static (ISO 17123-8): Horizontal 5 mm + 0.05 ppm and vertical 10 mm + 0.05 ppm. Performance and accuracies can vary depending on number of satellites, satellite geometry, observation time, ephemeris, ionosphere, multipath, etc. (Specification sheet attached as Attachment 1).*

Comment 2

The Permittee continues to fail to provide a comprehensive and correct data table that summarizes the survey data. There are still several errors associated with *the 2011 Corrected Well Elevation Summary Table (Revision 2 – April 19, 2010) (2011 Table).* The following lists the errors associated with the table, revise the table as accordingly.

a. There are several instances where the previous stick-up length and the stick up length measurements collected during the 2011 survey (current) are significantly different. For example, BW-1B the previous measurement was 2.38 feet (ft) and the 2011 survey measurement is 0.68 ft. Explain the reason for the significant differences between the previous and current stick-up length measurements.

Response: *2011 Survey Stick-up lengths were determined by subtracting the 2011 Survey Well Casing Rim Elevation from the 2011 Ground Elevation Inside Steel Sleeve. Corrected values for the "stick-up" lengths would be subtracting the 2011 Survey Well Casing Rim Elevation from the 2011 Survey Ground Level Elevation. Column titled "2011 Ground Elevation Inside Steel Sleeve" has been removed as per Comment 2b below. Correction has been made to the table. (Attachment 2)*

b. The current stick-up length measurements do not seem to be correct. It appears that the Permittee calculated the stick up length by subtracting the "2011 Survey Well Casing Rim Elevation" from the "2011 Survey Ground Elevation inside Steel Sleeve." Revise the 2011 Table by correctly calculating the stick-up length by subtracting the "2011 Survey Well Casing Rim Elevation" from the "2011 Survey Ground Level Elevation." In addition, remove the column "2011 Survey Ground Elevation inside Steel Sleeve" from the table.

Response: *Column titled "2011 Survey Ground Elevation inside Steel Sleeve" has been removed from the table. The survey stick up length values have been revised by subtracting the "2011 Survey Well Casing Rim Elevation" from the "2011 Survey Ground Level Elevation." (Attachment 2)*

c. There appears to be a rounding error from the conversion of the previous stick-up length measurements from inches (in.) to ft. For example, the previous stick-up length measurement for BW-1A is 52.50 in. and the Permittee converted the measurement to 4.37 ft. It is actually 4.38 ft. Review all converted stick-up measurement data to ensure the calculated data are accurately reported in the 2011 Table.

Response: *Previous stick up length conversions have been corrected by converting the reported values in inches to feet (dividing by 12). (Attachment 2)*

d. Incorrect elevations are reported for the previous well casing bottom elevations for wells OW-50 and OW-52. Table 9.0 (Annual Well Data Summary Table) from the 2009 Annual Ground Water Monitoring Report reports well casing bottom elevations for wells OW-50 as 6977.37 ft and OW-52 as 6985.26 ft, respectively. The 2011 Table reports wells OW-50 as 6847.63 ft and OW-52 as 6828.53 ft, respectively. Review all elevation data from Table 9.0 and ensure all data are correctly reported in the 2011 Table.

Response: *Corrections have been made. (Attachment 2)*

e. Incorrect elevations are reported for the previous total well depths for wells MW-2 and SMW-4. Table 9.0 reports the total well depths for wells MW-2 as 138.94 ft below ground surface (bgs) and SMW-4 as 122.14 ft bgs. The 2011 Table reports the depths of the wells MW-2 as 140.24 ft bgs and SMW-4 as 72.20 ft bgs. Review all total well depth data from Table 9.0 and ensure all data are accurately reported in the 2011 Table.

Response: *All values reported in the 2011Corrected Well Elevation Summary Table has been cross checked with the 2009 Summary Table.*

f. There are significant differences between the previous and current well casing rim elevations. For example, OW-29 has a difference of 3.5 ft between the previous and current elevations. In Addition RW-6 has a 28.69 ft difference. Review the 2011 Table and explain why there are significant differences between the previous and current elevations and correct all errors.

Response: *It was determined in 2009 that ground level elevations were incorrectly reported as well casing rim elevations. Information was corrected using well logs available at the time and if there was no "rim casing elevation data" recorded the ground level elevation was entered as rim casing which accounts for the discrepancies noted. Discrepancies in rim casing elevations can also be attributed to type of instruments used, and where the measurement was taken with regard to rim casing at the time wells were installed. RW-6 elevation data was entered incorrectly. The previous elevation should read 6942.60 feet instead of 6972.60 feet. Corrections have been made to both the "Previous Ground Level Elevation (feet)" and the "Previous Well Casing Rim Elevation (feet)" to read as 6942.60 feet with a note explaining the change.*

g. Revise the 2011 Table to define all calculations performed in the table in the Notes section of the table. For example, the 2011 Survey Stick-up length was determined by subtracting the "2011 Survey Well Casing Rim Elevation" from the "2011 Survey Ground Level Elevation."

Response: *Notes section has been revised accordingly.*

Comment 3

There are significant errors associated with the reported location data in the 2009 Ground water Monitoring Report. Therefore, the Permittee must verify that all horizontal data provided (Northing and Easting) are correct and represent the actual locations of the monitoring wells surveyed.

Response: *"Significant errors" refers to elevation data as clarified by Ms. Leona Tsinnajinnie of NMED (e-mail dated May 23, 2012). The physical locations of all the active wells were field verified when survey was performed by DePauli Engineering on June 7, 2011. Several wells were cross referenced using the Corpscon v6.0.1, U.S. Army Corps of Engineers Coordinate Conversion Software to a common coordinate system by comparing survey information dated May 13, 1991 from Sterling & Mataya Engineers – Surveyors; Lynn Engineering & Surveying, Inc., dated June 21, 2007 and comparing this information to the survey conducted by DePauli Engineering on June 7, 2011. The survey information from 1991 used the North American Datum of 1927 (NAD 27) and the survey conducted by DePauli Engineering used the NAD 83 to collect coordinates. A cross reference is attached on several of the wells to confirm location points, conversions from NAD 27 to NAD 83 data and also technical data concerning grid shift and datum shift factors. Coordinate points do vary from 1991 to 2011 and that is a result of the type of survey instrument used, methodology and reference points used to gather measurements. Based on this information, requirement has been met to verify locations of the wells. (See Attachment 3 for supporting documents)*

Comment 4

In accordance with 40 CFR 270.11(d)(1), the Permittee must submit a statement indicating that the information provided was properly gathered and evaluated by qualified personnel. This statement must accompany all future reports. Submit this statement with the required information in the response to this disapproval.

Response: *Certification has been added to this response letter.*

If you have any questions regarding Western's responses, please do not hesitate to contact Cheryl Johnson of my staff at (505) 722-0231.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Ed Riege
Environmental Manager

cc: K. Van Horn, NMED HWB w/attach
C. Chavez, OCD w/attach
C. Johnson, Western-Gallup

Attachment 1

Leica GPS1200+
Technical specifications and system features

GPS1200+ receivers	GX1230+ GNSS/ ATX1230+ GNSS	GX1220+ GNSS	GX1230+	GX1220+	GX1210+
GNSS technology	SmartTrack+	SmartTrack+	SmartTrack	SmartTrack	SmartTrack
Type	Triple frequency	Triple frequency	Dual frequency	Dual frequency	Single frequency
Channels	120 channels L1/L2/L5 GPS L1/L2 GLONASS E1/E5a/ E5b/ Alt-BOC Galileo Compass[1] 4 SBAS	120 channels L1/L2/L5 GPS L1/L2 GLONASS E1/E5a/ E5b/ Alt-BOC Galileo Compass[1] 4 SBAS (with DGPS option)	16 L1 + 16 L2 GPS 4 SBAS	16 L1 + 16 L2 GPS 4 SBAS (with DGPS option)	16 L1 GPS 4 SBAS (with DGPS option)
Upgrade to GX1230+ GNSS	-	Yes	Yes	Yes	Yes
RTK	SmartCheck+	No	SmartCheck	No	No
Status indicators	3 LED indicators for GX1200+: power, tracking, memory				

GPS1200+ receivers	GX1230+ (GNSS)/ GX1220+ (GNSS)	GX1210+	ATX1230+ GNSS
Ports	1 power port, 3 serial ports, 1 controller port, 1 antenna port		1 power/controller port, *Bluetooth*® Wireless-Technology port
Supply voltage,	Nominal 12 VDC		Nominal 12 VDC
Consumption	4.6 W receiver + controller + antenna		1.8 W
Event input and PPS	Optional: 1 PPS output port 2 event input ports	Optional: 1 PPS output port 2 event input ports	
Standard antenna	SmartTrack+ AX1203+ GNSS	SmartTrack AX1201	SmartTrack+ ATX1230+ GNSS
Built-in groundplane	Built-in groundplane	Built-in groundplane	Built-in groundplane

The following apply to all receivers except where stated.

Power supply	Two Li-Ion 4.4 Ah/7.4 V plug into receiver. One Li-Ion 2.2 Ah/7.4 V plugs into ATX1230+ GNSS and RX1250.
Plug-in Li-Ion batteries Same for GNSS and TPS	Power receiver + controller + SmartTrack antenna for about 17 hours (for data logging). Power receiver + controller + SmartTrack antenna + low power radio modem or phone for about 11 hours (for RTK/DGPS). Power SmartAntenna + RX1250 controller for about 6 hours (for RTK/DGPS)
External power	External power input 10.5 V to 28 V.
Weights	Receiver 1.20 kg. Controller 0.48 kg (RX1210) and 0.75 kg (RX1250). SmartTrack antenna 0.44 kg. SmartAntenna 1.12 kg. Plug-in Li-Ion battery 0.11 kg (2.2 Ah) and 0.2 kg (4.4 Ah) Carbon fiber pole with SmartTrack antenna and RX1210 controller: 1.80 kg. All on pole: carbon fiber pole with SmartAntenna, RX1250 controller and plug-in batteries: 2.74 kg.

Temperature ISO9022 MIL-STD-810F	Operation:	Receiver	-40° C to +65° C
		Antennas	-40° C to +70° C
		Controllers	-30° C to +65° C
		Controller RX1250c	-30° C to +50° C
	Storage:	Receiver	-40° C to +80° C
		Antennas	-55° C to +85° C
		Controllers	-40° C to +80° C
		Controller RX1250c	-40° C to +80° C
Humidity ISO9022, MIL-STD-810F	Receiver, antennas and controllers Up to 100 % humidity.		
Protection against water, dust and sand IP67, MIL-STD-810F	Receiver, antennas and controllers: Waterpoof to 1 m temporary submersion. Dust tight		
Shock/drop onto hard surface	Receiver: withstands 1 m drop onto hard surface. Antennas: withstand 1.5 m drop onto hard surface.		
Topple over on pole	Receiver, antennas and controllers: withstand fall if pole topples over.		
Vibrations ISO9022 MIL-STD-810F	Receiver, antennas and controllers: withstand vibrations on large construction machines. No loss of lock.		

[1] The Compass signal is not finalized, although, test signals have been tracked with GPS1200+ receivers in a test environment. As changes in the signal structure may still

SmartTrack+ **Advanced GNSS measurement technology**	Time needed to acquire all satellites after switching on: typically about 50 seconds. Re-acquisition of satellites after loss of lock (e.g. passing through tunnel): typically within 1 second. Very high sensitivity: acquires more than 99 % of all possible observations above 10 degrees elevation. Very low noise. Robust tracking. Tracks weak signals to low elevations and in adverse conditions. Multipath mitigation. Jamming resistant. Measurement precision: Carrier phase on L1: 0.2 mm rms. On L2: 0.2 mm rms. Code (pseudorange) on L1 and L2: 20 mm rms.
SmartCheck+ **Advanced, long range RTK technology**	Initialization typically 8 seconds. Position update rate selectable up to 20 Hz. Latency < 0.03 secs. Range 40 km or more in favorable conditions. Self checking.
Accuracies	Kinematic Horizontal: 10 mm + 1 ppm Vertical: 20 mm + 1 ppm Static (ISO 17123-8) Horizontal: 5 mm + 0.5 ppm Vertical: 10 mm + 0.5 ppm Reliability: 99.99 % for baselines up to 40 km. Formats supported for transmission and reception: Leica proprietary (Leica, Leica 4G), CMR, CMR+, RTCM V2.1/2.2/2.3/3.0/3.1.
Reference station networks	RTK rover fully compatible with Leica's Spider i-MAX & MAX formats, VRS and Area Correction (FKP) reference station networks.
DGPS GX1230+ (GNSS), ATX1230+ GNSS, GX1220+ (GNSS) – standard GX1210+ – optional	DGPS, includes support of MSAS, WAAS, EGNOS and GAGAN. RTCM V2.1/2.2/2.3/3.0/3.1. formats supported for transmission and reception. Baseline rms: typically 25 cm rms with suitable reference station.
Position update rate and latency	Applies to RTK, DGPS and navigation positions. Update rate selectable from 0.05 sec (20 Hz) to 1 sec. Latency less than 0.03 secs.
NMEA output	NMEA 0183 V3.00 and Leica proprietary.
Post-processing with Leica Geo Office software **All GPS1200+ receivers**	Horizontal: 10 mm + 1 ppm, kinematic Vertical: 20 mm + 1 ppm, kinematic Horizontal: 5 mm + 0.5 ppm, static Vertical: 10 mm + 0.5 ppm, static For long lines with long observations Horizontal: 3 mm + 0.5 ppm, static Vertical: 6 mm + 0.5 ppm, static
Notes on performance and on accuracies	Figures quoted are for normal to favorable conditions. Performance and accuracies can vary depending on number of satellites, satellite geometry, observation time, ephemeris, ionosphere, multipath etc.

Controllers **RX1210/RX1250**	High contrast, 1/4 VGA display with colour option (RX1250) Touch screen, 11 lines x 32 characters. Windows CE 5.0 on RX1250. Full alphanumeric QWERTY keypad. Function keys and user definable keys. Illumination for screen and keys. Can also be used with TPS1200+ for alphanumeric input and extensive coding.
Operation with controller Same for GNSS and TPS	Via keypad and/or via touch screen. Graphical operating concept. Function keys and user definable keys. All information displayed.
Displayed information	All information displayed: status, tracking, data logging, database, RTK, DGPS, navigation, survey, stakeout, quality, timer, power, geographical, cartesian, grid coordinates etc.
Graphical display of survey Same for GNSS and TPS	Graphical display (plan) of survey. Zooming. Can access surveyed points directly via touch screen.
Stakeout display Same for GNSS and TPS	Graphical with zoom. Digital, polar and orthometric. Accuracy: 10 mm + 1 ppm at 20 Hz (0.05 sec) update rate. No degradation with high update rates.
Operation without controller GX1200+ only	Automatic on switching on. LED status indicators. For reference stations and static measurements.
Data logging Same cards used for GNSS and TPS **Capacity**	On CompactFlash cards: 256 MB and 1 GB Optional internal receiver memory: 256 MB. 64 MB sufficient for (30 % less for GPS/GLONASS): About 500 hours L1 + L2 data logging at 15 sec rate. About 2 000 hours L1 + L2 data logging at 60 sec rate. About 90 000 RTK points with codes.
Data management Same for GNSS and TPS	User definable job management. Point identifiers, coordinates, codes, attributes etc. Search, filter and display routines. Multi point averaging. Five types of coding systems cover all requirements.
Coordinate systems Same for GNSS and TPS	Ellipsoids, projections, geoidal models, coordinate, transformations, transformation parameters, country specific coordinate systems. Fully support of RTCM 3.1 coordinate system transfer.
Application programs Same for GNSS and TPS	Standard: Full range of COGO functions. Hidden point. Optional: RoadRunner, Reference Line, DTM Stakeout, Reference Plane, Area Division and X-Section Survey, DXF Export, LandXML Export and Volume Calculations
Programmable Same for GNSS and TPS	User programmable in GeoC++. Users can write and upload programs for their own special requirements and applications.
Communication **Data links**	One or two of the following devices can be connected: Radio modem, GSM, GPRS, CDMA. Different frequencies and/or formats can be received and transmitted.

Attachment 2

2011 CORRECTED WELL ELEVATION SUMMARY TABLE
Revision 3 - June 12, 2012

Date of Installation	Well ID Number	2011 Survey Measurement date[1]	Previous Casing Diameter (Inch)	2011 Verified Casing Diameter[2] (Inch)	Previous Ground Level Elevation (feet)	2011 Survey Ground Level Elevation[1] (feet)	Previous Well Casing Rim Elevation (feet)	2011 Survey Well Casing Rim Elevation[1] (feet)	2011 Measuring Point Description[1]	Previous Stick-up length[3] (feet)	2011 Survey Stick up Length[4] (feet)	Previous Well Casing Bottom Elevation (feet)	2011 Survey Well Casing Bottom Elevation[5] (feet)	Previous Total Well Depth (feet)	2011 Survey Total Well Depth[6] (feet)	Screened Interval Depth Top to Bottom[7] (feet)	Previous Stratigraphic unit in which screen exists	2012 Re-Evaluated Stratigraphic unit in which screen exists[8]
11/10/2003	BW-1A	6/7/2011	2.00	2.00	6,876.73	6,874.10	6,876.73	6,876.68	North edge PVC casing	4.38	2.58	6,836.73	6,839.06	40.00	37.62	30 - 35	Chinle/Alluvium	Upper Sand
10/28/2003	BW-1B	6/7/2011	2.00	2.00	6,876.91	6874.13[9]	6,876.91	6,876.94	North edge PVC casing	2.39	#VALUE!	6,811.71	6,809.49	67.55	67.45	54.6 - 64.6	Chinle/Alluvium	Chinle/Alluvium Interface
11/10/2003	BW-1C	6/7/2011	2.00	2.00	6,876.75	6,873.95	6,876.75	6,876.78	North edge PVC casing	4.52	2.83	6,719.75	6,740.39	157.00	136.39	125 -135	Sonsela Sandstone	Sonsela
11/10/2003	BW-2A	6/7/2011	2.00	2.00	6,874.72	6,871.88	6,874.72	6,874.69	North edge PVC casing	4.27	2.81	6,809.22	6,807.12	65.50	67.57	55 - 65	Chinle/Alluvium	Upper Sand
10/28/2003	BW-2B	6/7/2011	2.00	2.00	6,874.58	6,871.66	6,874.58	6,874.50	North edge PVC casing	4.50	2.84	6,784.08	6,782.24	90.50	92.26	80 - 90	Sonsela sandstone	Chinle/Alluvium Interface
10/28/2003	BW-2C	6/7/2011	2.00	2.00	6,875.40	6,872.90	6,875.40	6,875.30	North edge PVC casing	2.98	2.40	6,724.40	6,722.46	151.00	152.84	139.5 - 149.5	Sonsela sandstone	Sonsela
6/15/2004	BW-3A	6/7/2011	2.00	2.00	6,878.22	6,875.94	6,878.22	6,878.39	North edge PVC casing	3.00	2.45	6,828.22	6,826.04	52.60	52.35	39.5 - 49.5	Chinle/alluvium	Upper Sand
10/15/2003	BW-3B	6/7/2011	2.00	2.00	6,878.79	6,876.16	6,878.79	6,878.59	North edge PVC casing	3.15	2.43	6,803.79	6,809.19	75.00	69.40	63 - 73	Chinle/alluvium	Chinle/Alluvium Interface
7/20/2004	BW-3C	6/7/2011	2.00	2.00	6,878.08	6,875.72	6,878.08	6,877.95	North edge PVC casing	2.69	2.23	6,723.08	6,723.40	155.00	154.55	144.5 - 154.5	Sonsela sandstone	Sonsela
1/5/1981	OW-1	6/7/2011	4.00	4.00	6,868.00	6,866.32	6,868.45	6866.62[10]	North edge PVC casing*	1.92	0.30[10]	6,773.96	6,772.07	94.04	94.55	89.3 - 99.3	Sonsela sandstone	Sonsela
11/25/1980	OW-10	6/7/2011	4.00	4.00	6,872.00	6,873.67	6,875.12	6,874.91	North edge PVC casing	1.59	1.24	6,804.00	6,814.58	68.00	60.33	40 - 60	Chinle/alluvium	Sonsela
9/25/1981	OW-11	6/7/2011	4.00	4.00	6,923.89	6,922.05	6,923.51	6,923.51	North edge PVC casing	2.08	1.46	6,857.27	6,857.72	66.62	65.79	43 - 65	Chinle/alluvium	Sonsela
12/15/1980	OW-12	6/7/2011	4.00	4.00	6,940.43	6,939.57	6,940.43	6,940.69	North edge PVC casing	1.88	1.12	6,795.43	6,811.84	145.00	128.85	117.8 - 137.8	Sonsela sandstone	Sonsela
12/10/1980	OW-13	6/7/2011	4.00	4.00	6,920.12	6,918.95	6,920.12	6,920.07	North edge PVC casing	4.79	1.12	6,820.12	6,820.92	100.00	99.15	78.2 - 98.2	Sonsela sandstone	Sonsela
12/17/1980	OW-14	6/7/2011	4.00	4.00	6,926.64	6,924.55	6,926.64	6,926.65	North edge PVC casing	2.25	2.10	6,881.64	6,880.13	45.00	46.52	35 - 45	Chinle/alluvium	Chinle/Alluvium Interface
8/23/1996	OW-29	6/7/2011	4.00	4.00	6,913.50	6,913.89	6,913.50	6,917.00	North edge PVC casing	3.88	3.11	6,864.50	6,865.92	49.00	51.08	37.5 - 47.5	Chinle/alluvium	Chinle/Alluvium Interface
8/28/1996	OW-30	6/7/2011	4.00	4.00	6,921.60	6,921.81	6,921.60	6,924.69	North edge PVC casing	4.85	2.88	6,873.20	6,874.79	48.40	49.90	37.9 - 47.9	Chinle/alluvium	Chinle/Alluvium Interface
10/5/2009	OW-50	6/7/2011	2:00	2.00	6,914.37	6,912.63	6,914.37	6,914.21	North edge PVC casing	2.71	1.58	6,977.37	6,850.21	63.00	64.00	48 - 63	Chinle/alluvium	Chinle/Alluvium Interface
10/5/2009	OW-52	6/7/2011	2.00	2.00	6,906.26	6,906.53	6,907.68	6,907.68	North edge PVC casing	2.21	1.15	6,985.26	6,829.94	79.00	77.74	64 - 79	Chinle/alluvium	Chinle/Alluvium Interface
10/14/1981	MW-1	6/7/2011	5.00	5.00	6,878.52	6,876.63	6,878.15	6,878.12	North edge PVC casing	1.25	1.49	6,746.50	6,747.29	132.02	130.83	117.72 - 127.72	Chinle/Alluvium	Sonsela
10/15/1981	MW-2	6/7/2011	5.00	5.00	6,878.40	6,878.39	6,880.84	6,880.30	North edge PVC casing	1.88	1.91	6,741.90	6,742.82	138.94	137.48	112 - 122	Chinle/alluvium	Sonsela
10/16/1981	MW-4	6/7/2011	5.00	5.00	6,882.54	6,879.89	6,882.20	6,881.63	North edge PVC casing	2.31	1.74	6,760.40	6,759.91	122.14	121.72	101 - 121	Sonsela sandstone	Sonsela
7/21/1986	MW-5	6/7/2011	4.00	4.00	6,883.32	6,880.20	6,882.93	6,882.83	North edge aluminum casing	2.02	2.63	6,750.30	6,752.00	133.02	130.83	115 - 125	Sonsela sandstone	Sonsela
3/28/1995	RW-1	6/7/2011	4.00	4.00	6,943.50	6,942.86	6,943.50	6,946.06	North edge PVC casing	4.42	3.20	6,900.50	6,903.02	43.00	43.04	25 - 40	Chinle/alluvium	Chinle/Alluvium Interface
3/29/1995	RW-2	6/7/2011	4.00	4.00	6,927.20	6,926.40	6,927.20	6,928.53	North edge PVC casing	3.58	2.13	6,889.20	6,888.73	38.00	39.80	26.1 - 36.1	Chinle/alluvium	Chinle/Alluvium Interface
8/27/1997	RW-5	6/7/2011	4.00	4.00	6,942.50	6,941.53	6,942.50	6,943.57	West Edge PVC Casing (Existing Mark)	2.92	2.04	6,902.50	6,903.98	40.00	39.59	29.5 - 39.5	Chinle/alluvium	Chinle/Alluvium Interface
8/27/1997	RW-6	6/7/2011	4.00	4.00	6942.6[11]	6,941.96	6942.6[11]	6,944.01	North edge PVC casing	2.58	2.05	6,933.80	6,903.11	38.80	40.90	28.5 - 38.5	Chinle/alluvium	Chinle/Alluvium Interface
9/26/1985	SMW-2	6/7/2011	2.00	2.00	6,884.44	6,881.63	6,884.11	6,883.97	North edge aluminum casing	4.54	2.34	6,827.10	6,831.17	57.34	52.80	34.31 - 54.31	Chinle/alluvium	Chinle/Alluvium Interface and Upper Sand
9/25/1985	SMW-4	6/7/2011	2.00	2.00	6,882.54	6,877.63	6,882.73	6,879.52	North edge aluminum casing	3.83	1.89	6,760.40	6,809.84	122.14	69.68	51.7 - 71.7	Chinle/alluvium	Chinle/Alluvium Interface

2011 CORRECTED WELL ELEVATION SUMMARY TABLE
Revision 3 - June 12, 2012

Date of Installation	Well ID Number	2011 Survey Measurement date[1]	Previous Casing Diameter (Inch)	2011 Verified Casing Diameter[2] (Inch)	Previous Ground Level Elevation (feet)	2011 Survey Ground Level Elevation[1] (feet)	Previous Well Casing Rim Elevation (feet)	2011 Survey Well Casing Rim Elevation[1] (feet)	2011 Measuring Point Description[1]	Previous Stick-up length[3] (feet)	2011 Survey Stick up Length[4] (feet)	Previous Well Casing Bottom Elevation (feet)	2011 Survey Well Casing Bottom Elevation[5] (feet)	Previous Total Well Depth (feet)	2011 Survey Total Well Depth[6] (feet)	Screened Interval Depth Top to Bottom[7] (feet)	Previous Stratigraphic unit in which screen exists	2012 Re-Evaluated Stratigraphic unit in which screen exists[8]
7/8/2004	GWM-1	6/7/2011	2.00	2.00	6,912.65	6,910.22	6,912.65	6,912.61	North edge PVC casing	3.88	2.39	6,888.95	6,886.41	23.70	26.20	17.5 - 23.5	Chinle/alluvium	Chinle/Alluvium Interface
9/25/2005	GWM-2	6/7/2011	2.00	2.00	6,913.17	6,910.32	6,913.17	6,913.09	North edge PVC casing	4.75	2.77	6,896.97	6,894.28	18.97	18.81	3.2 - 16.2	Chinle/alluvium	Chinle/Alluvium Interface
9/25/2005	GWM-3	6/7/2011	2.00	2.00	6,912.65	6,907.35	6,912.65	6,910.25	North edge PVC casing	4.85	2.90	6,896.15	6,892.45	17.94	17.80	3 - 15	Chinle/alluvium	Chinle/Alluvium Interface
3/14/2008	NAPIS-1	6/7/2011	2.00	2.00	6,918.43	6,913.62	6,918.43	6,913.86	North edge PVC casing	0.29	0.24	6,904.40	6,900.33	14.00	13.53	3.7 - 13.7	Chinle/alluvium	Chinle/Alluvium Interface
3/14/2008	NAPIS-2	6/7/2011	2.00	2.00	6,917.27	6,913.40	6,917.27	6,912.65	North edge PVC casing	0.10	-0.75	6,902.80	6,899.04	14.50	13.61	4.2 - 14.2	Chinle/alluvium	Chinle/Alluvium Interface
3/14/2008	NAPIS-3	6/7/2011	2.00	2.00	6,917.31	6,913.38	6,917.31	6,912.76	North edge PVC casing	0.29	-0.62	6,886.60	6,882.34	30.70	30.42	25.4 - 30.4	Chinle/alluvium	Chinle/Alluvium Interface
6/11/2007	KA-3	6/7/2011	2.00	2.00	6,917.17	6,913.29	6,917.17	6,912.52	North edge PVC casing	0.17	-0.77	6,892.40	6,889.32	25.00	23.20	15 - 25	Chinle/alluvium	Chinle/Alluvium Interface

NOTES:

1) Surveyed by DePauli Engineering & Surveying, LLC on June 7, 2011 at request of NMED due to discrepancies on well casing and ground level elevations.
2) Field verified using a tape measure by Gallup Refinery field technician.
3) Original measurements were given in inches and converted to feet by dividing by 12.
4) Stick up length is determined by subtracting 2011 Survey Ground Level Elevation from 2011 Survey Well Casing Rim Elevation.
5) 2011 Survey Well Casing Bottom Elevation is determined by subtracting the 2011 Survey Well Casing Rim Elevation from the 2011 Survey Total Well Depth Measurement.
6) Total well depth was determined using a bottom sensing meter, Testwell Water level meter with bottom sensing indicator.
7) Screened interval for each well was verfied to the well boring logs. Settlement may have occurred since installation of well which is why total well depth is higher or equal to the screened interval levels.
8) Stratigraphic interpretation conducted by Peregrine Geoconnect to re-evaluate the named zones they produce water from. Tables were updated to reflect correct stratigraphic zone.
9) BW-1B 2011 Survey Ground Level Elevation is to the lowest concrete pad elevation surrounding the well.
10) OW-1 original stick up length was measured to the top of the pvc casing which is connected to the well shroud with a rubber coupling. 2011 survey measurement was taken to the top segment of pvc casing not connected to the rubber coupling. (Coupling is where elevation is referenced)
11) RW-6 elevation data was originally entered incorrectly as 6972.6 feet. Correct elevation is 6942.6 feet.
12) NAPIS 2, 3 and 4 well shroud is located below ground level therefore values entered in "2011 Survey Stick-Up Length (feet)" indicate a negative value.
13) Previous measurements and elevations are from the Well Data Summary Table from the 2009 Annual Ground Water Monitoring Report.

Attachment 3

Western Refining Company - Gallup Refinery

Coordinate Verification

24 May 2012

INPUT	OUTPUT
State Plane, NAD27	State Plane, NAD83
3003 - New Mexico West, U.S. Feet	3003 - New Mexico West, U.S. Feet
Vertical - NAVD88, U.S. Feet	Vertical - NAVD88, U.S. Feet

Accuracies of conversions from NAD 27 to NAD 83 are typically 12 to 18 cm.

MW-4

1/6

Northing/Y:	1635066.25	**Northing/Y:**	1635125.485
Easting/X:	321602.07	**Easting/X:**	2544510.099
Elevation/Z:	6882.54	**Elevation/Z:**	6882.540
Convergence:	-0 20 52.64584	**Convergence:**	-0 20 53.96608
Scale Factor:	0.999953091	**Scale Factor:**	0.999953166
Combined Factor:	0.999624001	**Combined Factor:**	0.999627292

Grid Shift (U.S. ft.): X/Easting = 2222908.0, Y/Northing = 59.2

Datum Shift (m.): Delta Lat. = 2.607, Delta Lon = 57.266

SMW-2

2/6

Northing/Y:	1635592.65	**Northing/Y:**	1635651.884
Easting/X:	321542.80	**Easting/X:**	2544450.829
Elevation/Z:	6884.44	**Elevation/Z:**	6884.440
Convergence:	-0 20 53.12879	**Convergence:**	-0 20 54.44912
Scale Factor:	0.999953115	**Scale Factor:**	0.999953190
Combined Factor:	0.999623934	**Combined Factor:**	0.999627225

Grid Shift (U.S. ft.): X/Easting = 2222908.0, Y/Northing = 59.2

Datum Shift (m.): Delta Lat. = 2.602, Delta Lon = 57.266

MW-2

3/6

Northing/Y:	1636184.06	**Northing/Y:**	1636243.294
Easting/X:	321035.35	**Easting/X:**	2543943.374
Elevation/Z:	6880.84	**Elevation/Z:**	6880.840
Convergence:	-0 20 56.76713	**Convergence:**	-0 20 58.08765
Scale Factor:	0.999953322	**Scale Factor:**	0.999953398
Combined Factor:	0.999624314	**Combined Factor:**	0.999627605

Grid Shift (U.S. ft.): X/Easting = 2222908.0, Y/Northing = 59.2

Datum Shift (m.): Delta Lat. = 2.596, Delta Lon = 57.271

SMW-4

4/6

Northing/Y:	1636153.54	**Northing/Y:**	1636212.774
Easting/X:	320974.85	**Easting/X:**	2543882.873
Elevation/Z:	6880.08	**Elevation/Z:**	6880.080
Convergence:	-0 20 57.18807	**Convergence:**	-0 20 58.50860
Scale Factor:	0.999953347	**Scale Factor:**	0.999953422
Combined Factor:	0.999624375	**Combined Factor:**	0.999627667

Grid Shift (U.S. ft.): X/Easting = 2222908.0, Y/Northing = 59.2

Datum Shift (m.): Delta Lat. = 2.597, Delta Lon = 57.272

Remark: Verification required by NMED to cross check 2011 Survey conducted by DePauli to previous survey (Sterling Mataya 1991)

Corpscon v6.0.1, U.S. Army Corps of Engineers

Western Refining Company - Gallup Refinery

Coordinate Verification

24 May 2012

INPUT	OUTPUT
State Plane, NAD27	State Plane, NAD83
3003 - New Mexico West, U.S. Feet	3003 - New Mexico West, U.S. Feet
Vertical - NAVD88, U.S. Feet	Vertical - NAVD88, U.S. Feet

Accuracies of conversions from NAD 27 to NAD 83 are typically 12 to 18 cm.

MW-1

		5/6	
Northing/Y:	1636112.13	**Northing/Y:**	1636171.364
Easting/X:	320903.76	**Easting/X:**	2543811.783
Elevation/Z:	6878.52	**Elevation/Z:**	6878.520
Convergence:	-0 20 57.68198	**Convergence:**	-0 20 59.00253
Scale Factor:	0.999953376	**Scale Factor:**	0.999953452
Combined Factor:	0.999624478	**Combined Factor:**	0.999627770

Grid Shift (U.S. ft.): X/Easting = 2222908.0, Y/Northing = 59.2

Datum Shift (m.): Delta Lat. = 2.597, Delta Lon = 57.273

OW-11

		6/6	
Northing/Y:	1632185.21	**Northing/Y:**	1632244.448
Easting/X:	323167.68	**Easting/X:**	2546075.724
Elevation/Z:	6923.59	**Elevation/Z:**	6923.590
Convergence:	-0 20 41.29121	**Convergence:**	-0 20 42.61069
Scale Factor:	0.999952454	**Scale Factor:**	0.999952529
Combined Factor:	0.999621402	**Combined Factor:**	0.999624690

Grid Shift (U.S. ft.): X/Easting = 2222908.0, Y/Northing = 59.2

Datum Shift (m.): Delta Lat. = 2.634, Delta Lon = 57.250

Remark: Verification required by NMED to cross check 2011 Survey conducted by DePauli to previous survey (Sterling Mataya 1991)

Corpscon v6.0.1, U.S. Army Corps of Engineers

Western Refining Company - Gallup Refinery

Coordinate Verification

31 May 2012

INPUT	OUTPUT
State Plane, NAD83	State Plane, NAD83
3003 - New Mexico West, U.S. Feet	3003 - New Mexico West, U.S. Feet
Vertical - NAVD88, U.S. Feet	Vertical - NAVD88, U.S. Feet

NAPIS-1 (KA-1R) 1/4

Northing/Y:	1634587.51	**Northing/Y:**	1634587.510
Easting/X:	2545700.49	**Easting/X:**	2545700.490
Elevation/Z:	6918.43	**Elevation/Z:**	6918.430
Convergence:	-0 20 45.54012	**Convergence:**	-0 20 45.54012
Scale Factor:	0.999952681	**Scale Factor:**	0.999952681
Combined Factor:	0.999625090	**Combined Factor:**	0.999625090

Grid Shift (U.S. ft.): X/Easting = 0.0, Y/Northing = 0.0

NAPIS-2 (KA-2R) 2/4

Northing/Y:	1634565.05	**Northing/Y:**	1634565.050
Easting/X:	2545647.32	**Easting/X:**	2545647.320
Elevation/Z:	6917.27	**Elevation/Z:**	6917.270
Convergence:	-0 20 45.91059	**Convergence:**	-0 20 45.91059
Scale Factor:	0.999952702	**Scale Factor:**	0.999952702
Combined Factor:	0.999625167	**Combined Factor:**	0.999625167

Grid Shift (U.S. ft.): X/Easting = 0.0, Y/Northing = 0.0

KA-3 3/4

Northing/Y:	1634583.87	**Northing/Y:**	1634583.870
Easting/X:	2545645.49	**Easting/X:**	2545645.490
Elevation/Z:	6917.17	**Elevation/Z:**	6917.170
Convergence:	-0 20 45.92581	**Convergence:**	-0 20 45.92581
Scale Factor:	0.999952703	**Scale Factor:**	0.999952703
Combined Factor:	0.999625173	**Combined Factor:**	0.999625173

Grid Shift (U.S. ft.): X/Easting = 0.0, Y/Northing = 0.0

NAPIS-3 (KA-3R) 4/4

Northing/Y:	1634589.80	**Northing/Y:**	1634589.800
Easting/X:	2545645.10	**Easting/X:**	2545645.100
Elevation/Z:	6917.31	**Elevation/Z:**	6917.310
Convergence:	-0 20 45.92930	**Convergence:**	-0 20 45.92930
Scale Factor:	0.999952703	**Scale Factor:**	0.999952703
Combined Factor:	0.999625166	**Combined Factor:**	0.999625166

Grid Shift (U.S. ft.): X/Easting = 0.0, Y/Northing = 0.0

Remark: Verification required by NMED to corss check 2011 Survey conducted by DePauli Engineering to previous survey conducted by l

Corpscon v6.0.1, U.S. Army Corps of Engineers

D.E. Sterling, P.E. & L.S.
W.P. Mataya, L.S.

Sterling & Mataya

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601 W. Aztec
P.O. Box 876

May 13, 1991

Well No.	Elevation Top Inside Pipe at V Notch	New Mexico State Plane Coordinates (west zone) X	Y	Point No. S & M Map (9-29-89)
SMW-6	6880.71	320,839.52	1,635,867.66	532
SMW-5	6878.02	320,778.61	1,636,054.28	530
MW-1	6878.52	320,903.76	1,636,112.13	529
SMW-4	6880.08	320,974.85	1,636,153.54	528
MW-2	6880.84	321,035.35	1,636,184.06	527
MW-5	6883.32	321,233.03	1,636,212.58	526
SMW-3	6884.56	321,397.90	1,635,948.75	524
SMW-2	6884.44	321,542.80	1,635,592.65	523
SMW-1	6883.29	321,501.32	1,635,501.43	522
MW-4	6882.54	321,602.07	1,635,066.25	539
OW-11	6923.89	323,167.68	1,632,185.21	645

Notes:

1. Geological Survey Monument ET 6 GT 1962 was the basis for this survey. The combined factor equals 0.99960744.

2. NGS Bench Mark Z 426 - 1983 having a normal ortho. Height of 2100.35015 meters (elev. 6890.91 feet) was used for this survey.

3. A Bench Mark was established for this project at SMW-3, Top of concrete pad at the south edge of the well casing. The elevation being 6882.64 feet.

4. Subtracting 0.37 feet from the elevations shown for this project should equal the elevations in this area shown on our 1989 map which was based on datum furnished by Giant Refinery.

WILLIAM P. MATAYA
4329
NEW MEXICO
REGISTERED PROFESSIONAL SURVEYOR

W. Pudson P. Mataya

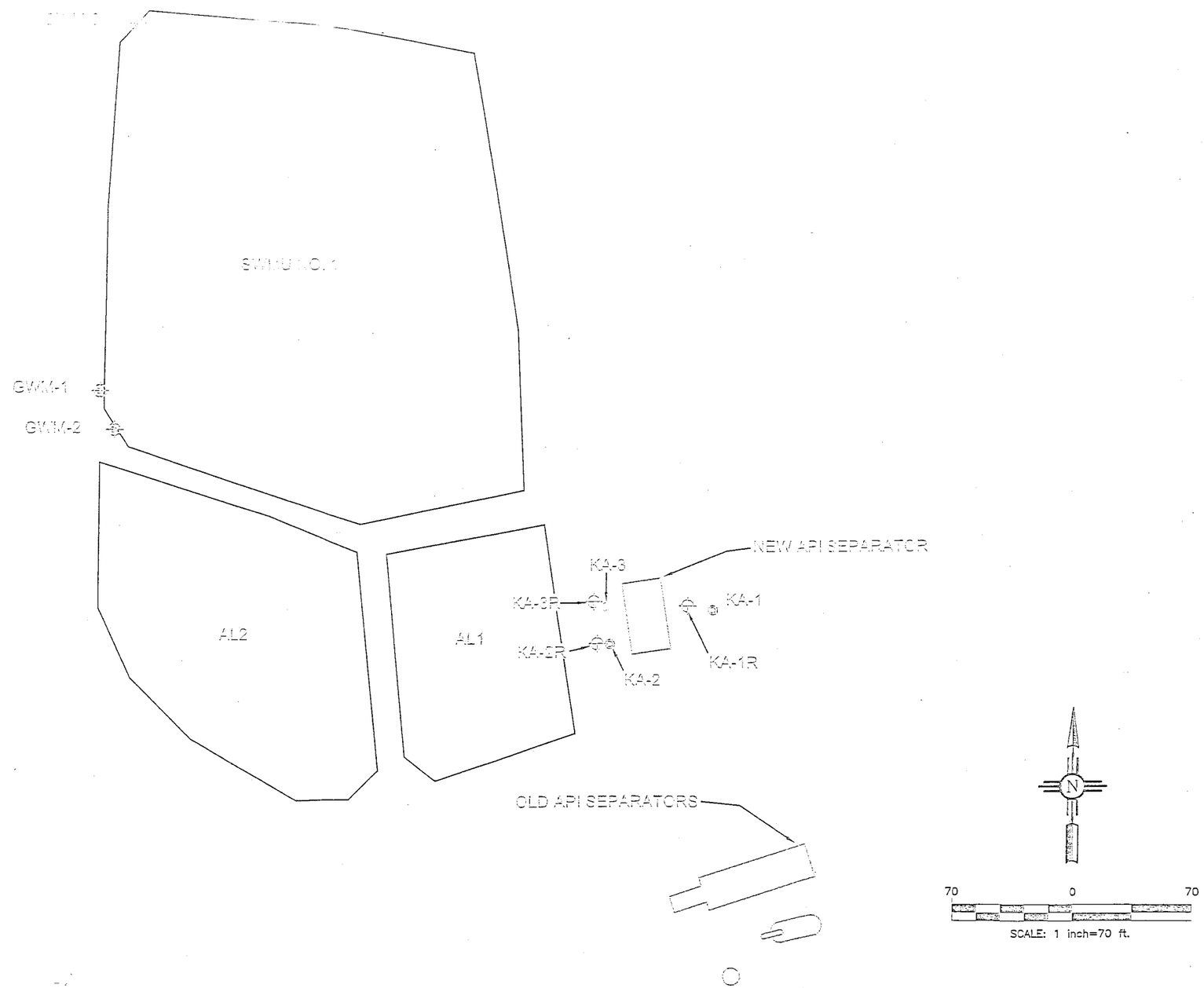
SURVEY DATA

Well ID	Northing	Easting	Top of Casing Elevation
KA-1R	1634587.51	2545700.49	6918.43
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



KLEINFELDER	SITE PLAN Ciniza Refinery Jamestown, New Mexico		FIGURE
Originator: B. Lucero	Drawn By: PDan	Date: April 2008	1
Approved By: E. Shannon	Project No.: 84579	Drawing No.:84579_01_0_4-08	
	Scale: 1" = 70'	Drawing Category: A	

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