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Safety & Environmental Solutions, Inc.

February 26, 2016

Ms. Amber Griffin, Environmental Regulatory Agent
Yates Petroleum Company
105 South Fourth Street
Artesia, New Mexico 88210-2118

RE: Groundwater Investigation, Compromise SWD #1

Dear Ms. Griffin:

This letter will present the results of the groundwater investigation conducted at the Compromise SWD #1 well site, located 8 miles south of Artesia at the east end of Dayton Road. The site is identified as being at the location of a topographic feature called Kaiser Lake, which is now dry. A location map is included as Figure 1.

The investigation consisted of installing groundwater monitoring wells on July 21-23, 2015 and was followed by well development and initial water quality sampling. A second water quality sampling event was performed on December 15, 2015. Other activities included surveying of the monitor wells in order to determine groundwater flow direction.

Background

On January 27, 2015 Yates Environmental personnel were informed that on January 16, 2015 there was a release of oilfield produced water at this well site. The release was estimated at approximately 2,500 barrels of produced water with an estimated 2,300 barrels recovered via vacuum truck.

To determine the vertical extent of the water infiltration, Yates conducted soil investigation on February 12, March 11, and April 30, 2015. Numerous samples for BTEX (benzene, toluene, ethylbenzene, xylenes), TPH (total petroleum hydrocarbons) and chloride were collected in the area of the release to depths of 9 feet below ground surface (BGS). At 11 feet BGS and deeper there was an increase in water saturation that made collection of soil samples difficult and unsafe. The results at 9 feet BGS showed chloride concentrations at many sample points to be above 1,000 mg/Kg. BTEX/TPH concentrations were not detected at shallow depths to 3 feet BGS and were not analyzed below that depth.

The soil results were presented in a letter with a plan of work to the New Mexico Oil Conservation Division on May 11, 2015. On May 12, 2015 Ms. Heather Patterson, OCD Environmental Specialist in Artesia, responded by email that three monitor wells would be required at background locations to "obtain accurate water samples and a proper water gradient evaluation." A further email from Bradford Billings, OCD Hydrologist Santa Fe, regarding the information in the letter was received on May 13, 2015. The email includes a requirement that monitor wells for delineation "should be placed for evaluation of possible groundwater impact. Subsequent reporting must provide details on how wells are drilled, including boring logs, construction aspects of well, development and purging protocols, and sampling techniques." Additional requirements included survey requirements for

vertical accuracy to 0.01 feet for "depth to water assessment and confirmation of ground water gradient."

Yates Petroleum contacted Mr. David Boyer, P.G. with Safety and Environmental Solutions (SESI) to prepare a State Engineer monitor well permit, supervise installation of the monitor wells, development and sampling, and prepare a report for submittal to Yates.

Work Performed

A well permit application for three monitoring wells was prepared and submitted to the Roswell, New Mexico Office of the State Engineer on June 18, 2015. The permit was reviewed and approved on July 1, 2015. The OSE file number assigned for the wells is RA 12280.

Locations to the northwest, southeast, and east of the spill area were selected for well installation based on assumed direction of groundwater flow. Utility clearance was obtained using the New Mexico 811 "One-Call" system. Due to the proposed location of the northwest well being on a pipeline right-of-way, that location was moved several yards to the south of the pipeline.

SESI contracted with Enviro-Drill, Inc., of Albuquerque, New Mexico to drill and install the wells. The original date to begin installation was Monday, July 6, 2015. As the drillers arrived on site, a severe thunderstorm approached the area and drilling was postponed until the following morning. Upon arrival Tuesday, July 7, 2015, access to the drill sites was not possible due to heavy rainfall and flooding that occurred the previous evening. Without adequate access and a safe working environment, drilling was postponed until July 21, 2015.

Drilling began on Tuesday, July 21, 2015 with the installation of the northwest upgradient well MW-1. Based on previous encounter with saturated soils (11-15 feet BGS) a drilling depth of 25 feet BGS was selected. Wells were sampled for lithology with a 2-foot split-spoon until saturation was encountered. Soil samples were collected from the split-spoon to a depth of 12 feet BGS to be tested for chlorides. MW-1 and MW-2 were drilled to a depth of 25 feet BGS and completed with 15 feet of 2-inch ID PVC screen. MW-3 did not encounter split-spoon saturation until 30-32 feet BGS when a fine grained flowing sand was present in the split-spoon. The well was completed at 30 feet BGS with 20 feet of 2-inch ID PVC screen. Boring and well completion diagrams are shown in Appendix A.

Development of the wells occurred on July 22, 2015 using a steel bailer or plastic bailer to remove sediment in the PVC. This was followed by pumping with a Proactive sample pump. Sediment was removed until a solid well bottom was reached. However, the recovery water was still turbid and brown in two of the three wells, likely due to clay outside the sand pack. Purged water was placed in 55-gallon drums at each well location.

On August 14, 2015, the monitor wells were surveyed by Harcrow Surveying of Artesia. The locations of the monitor wells, the salt water disposal well and nearby features were surveyed and plotted on Google imagery, a topographic map and a detailed plat was prepared. These are presented in Appendix B. Elevations of the top of PVC casing, top of the 3 feet x 3 feet concrete pad and natural ground elevation were surveyed to a precision of 0.01 feet.

July 23, 2015 Groundwater Sampling

Water quality sampling occurred on July 23, 2015, following another round of purging to remove turbidity. At the direction of the Yates representative, only inorganic water constituents were collected for analysis. Prior to sampling, water levels were taken and recorded.

Depth to water upon completion of MW-1 was 12.85 feet BGS and 15.65 feet below top of casing (BTOC). The well was purged of approximately 20 gallons of water and sediment on July 22, 2015 and another 14 gallons with the sample pump on July 23, 2015 for a total of 34 gallons. There was low turbidity at the time of sampling which was performed with the sample pump.

Depth to water upon completion of MW-2 was 17.96 feet BGS and 20.75 feet BTOC. Only 8-10 gallons of water and sediment were purged on July 22, 2015 until the well went dry. On July 23, 2015 approximately 4 gallons of turbid water were purged until dryness. Total purged was estimated at 12 to 14 gallons. Upon recovery, the well was sampled with a dedicated plastic bailer, and the water was only slightly turbid.

Depth to water upon completion of MW-3 was 17.29 feet BGS and 19.79 feet BTOC. Approximately 18 gallons of sediment and water was purged on July 22, 2015 using a steel bailer and followed with the sample pump until a solid bottom was reached, but the water was still very turbid at purging completion. On July 23, 2015 an additional 23 gallons were purged with the pump to dryness for an estimated total of 41 gallons. The recovered water was still very turbid with very-fine grained sand, dark brown. Upon recovery, the well was sampled with a dedicated plastic bailer.

December 15, 2015 Groundwater Sampling

The second series of monitor well sampling took place on December 15, 2015. As before, groundwater levels and total depth readings were taken and recorded in the field notebook. A comparison of the water levels from July 2015 to December 2015 show an increase in MW-2 of 0.59 feet, while both MW-1 and MW-3 showed decreases of -0.89 feet and -0.27 feet, respectively. The increase in MW-2 may have been because when measurements were made on July 23, 2015 the well had not fully recovered from purging on July 22, 2015. Also, the depth of MW-3 had decreased by 0.66 feet, likely as a result of sediment from the saturation of the fine grained silty clay material outside the annular sand pack.

To minimize sample turbidity, purging was performed using the low-flow technique, now accepted by the regulatory agencies. In addition to reducing turbidity, this method reduces the volume of water removed by purging at flow rates between 0.5 and 1.0 liters per minute. During purging, the pump is placed halfway between the water surface and the well bottom and water quality parameters are monitored during the purging. At these monitor well locations, the water pH, specific conductivity and temperature were measured. For convenience, these are recorded at the beginning and every 5 minutes for a period of 15 minutes or longer, if necessary for parameter stabilization.

No problems were encountered during the sampling event; although, the water in MW-3 was very turbid even at the low flow rate and conductivity readings for MW-2 were not available due to the very high concentration of dissolved constituents present in that well.

The collected samples from both sampling events were preserved on ice and submitted together with a properly completed chain-of-custody to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico for testing. In addition to chloride and Total Dissolved Solids (TDS), a full suite of major inorganic constituents was analyzed. These included the cations: sodium, potassium, calcium and magnesium; anions: sulfate, chloride, bicarbonate/carbonate and several minor anionic constituents including nitrate, fluoride, bromide and phosphorus. The purpose of the additional analyses will be discussed below. Copies of the analytical results for the monitor wells, plus those for a water sample from the Compromise SWD #1 are provided in Appendix C.

Investigation Results

Soil Lithology and Analysis

Soil samples taken with the split-spoon were visually examined for physical characteristics including texture, color, moisture content, and plasticity. Soil samples to a depth of 12 feet BGS were collected and sent to Cardinal Laboratories in Hobbs, New Mexico for chloride analysis. Results of the analyses are shown on the boring logs in Appendix A and copies of the analyses are provided in Appendix C.

Near-surface soils 12 feet BGS and above were mostly very fine grained clay and silty clay with minor zones of silt. No sand was found above 12 feet BGS, but thin lenses were found at 15 feet BGS in MW-2 and 12.6 feet BGS in MW-3. Soil in the latter sample was dry.

In MW-1 a saturated stringer was found at 12.5 feet BGS in what otherwise was a clay sample. Saturated sand was found at 16 feet BGS in MW-2. Water and sand in MW-3 was found at 30 feet BGS; water rose to 14 feet upon completion indicating a partially confined condition at that location.

Soil chloride concentrations increased with depth in the borings with MW-3 having the highest concentration of 2,720 mg/Kg at the 10-12 feet BGS interval. Chloride concentration in the same interval was 240 mg/Kg for MW-1 and 1,150 mg/Kg for MW-2.

It is likely that the fine grained clay and silty clay sediments found above 12 feet BGS in these borings are found elsewhere in the vicinity of the spill. The topographic map shows the surface feature as the dry lake bed of a former shallow depression known as Kaiser Lake. The map also shows the release site is located centrally between the old and current Pecos River channels. In general, clastic material over most of a lake basin consists principally of silts and clays, especially away from shores and river mouths, where larger material is deposited.

Clay and clayey silts have water permeability three to four orders of magnitude less than sands and silty sands. The presence of such fine-grained, low permeability deposits can limit spill infiltration depth and most certainly the volume of chloride contamination transported.

Groundwater

Groundwater measurements taken on site July 23, 2015 and December 15, 2015 were tabulated together with surveyed monitor well elevation data to determine the depth to water and total depth of the well. The measurements were made from the top of the PVC casing and the results are shown in Table 1. As noted earlier, MW-2 showed a positive water level increase while levels in MW-1 and 3 decreased.

Water level elevations were plotted and the groundwater flow direction and gradient were determined. The resultant maps are shown in Figures 2 and 3 (note that the contour interval on the figures differ from July 2015 to December 2015). For the measurement date of July 23, 2015, groundwater flow was toward the south-southeast with a gradient of 0.0067 ft/ft. The December 15, 2015 flow direction was southeast with a gradient of 0.0034 ft/ft, one-half the gradient measured in July 2015. There is not a certain explanation for the flattening of the gradient; however, it is noted that the area received significant rainfall and flooding in early July 2015 and the December 2015 measurements may reflect redistribution of infiltration moisture in the shallow subsurface.

Water Quality

Following sample analysis, a cation-anion balance sheet was requested from the laboratory. The balance sheet is used to compare cation-anion totals. For substances like salt dissolved in water, there are an equal number of sodium ions and chloride ions in solution. However, because the molecular weights of the ions differ, 100 grams of sodium are not balanced by 100 grams of chloride. To balance 100 grams of sodium, 154 grams of chloride are required. In addition for calcium, magnesium and sulfate, the electron charge of the ion must also be considered. This leads to the concept of equivalent weights so that the charge balance of cations must equal that of anions. In theory and assuming no unknown organic particles with an electron charge are present in the water, the milliequivalent total of cations should equal the anion total. The sample balance sheets are included with the water quality analyses in Appendix C.

A sample analysis table was prepared to compare the results and calculate percentages of each constituent in each sample. These results are shown in Tables 2 and 3. Chloride in MW-1 increased from 1,800 mg/L to 2,200 mg/L from July 2015 to December 2015 and in MW-3 the increase was from 2,600 mg/L to 2,900 mg/L. TDS for MW-1 increased from 8,130 mg/L to 10,000 mg/L and in MW-3 the increase was from 8,790 mg/L to 9,370 mg/L. These constituents in both wells greatly exceed New Mexico Water Quality Control Commission (WQCC) groundwater standards of 250 mg/L for chloride and 1,000 mg/L for TDS. In addition, sulfate in the two wells is over five times greater than the WQCC standard of 600 mg/L. MW-1 is upgradient from the release area and the results, though exceeding standards, can be considered background for this site. The December 2015 TDS value of 10,000 mg/L in MW-1 is also the maximum TDS level which is offered protection under state regulations[1]. MW-3 is off gradient and though the TDS and chloride results differ, sodium concentrations are approximately the same as MW-1.

With TDS at 65,000± mg/L and chloride ranging from 17,000 mg/L to 19,000 mg/L in MW-2, these concentrations are over six times higher than the averages in MW-1 and MW-3. At first glance and looking only at TDS and chloride, it could be thought that the MW-2 well has been impacted by the Compromise SWD #1 release which has TDS and chloride at 201,365 mg/L and 120,000 mg/L, respectively. However, as discussed below, such a conclusion would likely be incorrect.

Discussion

A number of methods can be used to graphically present and interpret water quality analyses. In this instance the likelihood of MW-2 being impacted by the Compromise SWD #1 release is examined. The method chosen is use of a Piper Tri-linear graph which plots percentages of each major constituent on its own axis. The percentages (shown on Figures 4 and 5) do not consider total concentration, only the makeup of the water.[2] The discussion below applies to results from both sampling dates.

For cations, we see that MW-1 and MW-3 plot similarly but MW-2 is separated. This is because MW-2 is high in magnesium and very low in calcium. MW-2 has a higher percentage of sodium than the other two wells (55% in July 2015 and 59% in December 2015). The Compromise SWD #1 water sample with 94.1% sodium is far down in the lower right corner of the Cation triangle. If MW-2 had been impacted by the Compromise SWD #1 release, the sodium percentage would be higher and it

[1] The New Mexico State Engineer has defined protectable underground water as all waters in the State of New Mexico containing 10,000 milligrams/liter or less of total dissolved solids (TDS).

[2] Hounslow, Arthur W., Water Quality Data; Analysis and Interpretation, CRC Press, 1995.

would lay on a straight line between numbers 1 and 3, and the SWD. Instead it is near the horizontal line representing the 40+% magnesium content.

For anions, we see that all three wells lie on a line midway between high sulfate and high chloride. Carbonate/bicarbonate is 5.4% or less in all samples. Just taking into consideration the anions, we see that MW-3 has slightly more chloride than the other two, but all three wells are between 38% and 52% chloride. Depending on the well, sulfate is between 45% and 57% while the SWD has only 2.6% sulfate. Again, if the sample in MW-2 had been contaminated by SWD water with 97.3% chloride, it would not be grouped with the other two monitor wells but would be plotted between that group and the SWD sample.

The diamond portion of the graph shows all three monitor well waters plot close to each other and the SWD water is by itself in the right corner. If mixing had occurred, MW-2 would lay on a line between the other two monitor wells and the SWD.

As pointed out above, the graph shows only water quality, not total concentration. Given that the SWD water has a sodium and chloride concentration greater than 94%, and has TDS over 3 times that of MW-2, if the water in MW-2 was impacted it would show up as lying close to SWD water on the graph.

The results lead to a question as to why the water in MW-2 is so different than that in the other two wells. A possible and likely answer is that the water is from a relatively isolated permeable lithologic stringer that is hydraulically connected with deeper permeable sediments, but due to the high occurrence of clay, mass movement of the water is restricted. The high concentration of magnesium in the sample (38% to 42%) may be due to dissolution of rocks in the San Andres, Chalk Bluff and Rustler formations up river from the location.[1] The San Andres formation in Eddy County is composed of limestone, dolomitic limestone and dolomite ($CaMg(CO_3)_2$). On the east side of the Pecos River, magnesium is present in dolomitic limestone and dolomite in the Chalk Bluff and Rustler formations. The Rustler consists of anhydrite, gypsum and some, interbedded sandy clay and some dolomite beds. In any case, magnesium is not present in the SWD water above 1.4 percent.

Conclusions

Surficial soils in the monitor well borings which encircle the release area are fine grained clay and silty clays. Their presence will limit, to some extent, the depth of infiltration of the spill and their low permeability will prevent transport of a large volume of contaminated chlorides to the naturally brackish groundwater below.

Groundwater in the area of the Compromise SWD #1 well site release is at a depth between 12 feet and 18 feet BGS, depending on the date of measurement. The groundwater flow direction in July 2015 was south-southeasterly with a hydraulic gradient of 0.0067 ft/ft. The flow direction in December 2015 was southeasterly with a flatter gradient of 0.0034 ft/ft.

Shallow groundwater in the vicinity of the Compromise SWD #1 well site release is naturally brackish with an upgradient December 2015 TDS concentration in MW-1 of 10,000 mg/L, and with chloride concentrations averaging 2,000 mg/L. The two-sample average for sulfate is 3,850 mg/L. MW-2 has even greater concentrations of these constituents with a TDS averaging 65,200 mg/L and chloride and sulfate concentrations averaging 18,000 mg/L and 28,000 mg/L, respectively. Water from the

[1] Hendrickson, G.E. and R.S. Jones, Geology and Ground-Water Resources of Eddy County, New Mexico, Ground-Water Report 3, New Mexico Bureau of Mines and Mineral Resources, 1952.

SWD release has a TDS of over 201,000 mg/L and chloride and sulfate concentrations of 120,000 mg/L and 4,300 mg/L, respectively.

Graphical plotting of these concentrations on a Piper tri-linear diagram indicates that the water in MW-2 is unlikely to have originated from or has been impacted by the Compromise SWD #1 release. The water is most probably from a relatively isolated, lithologically permeable sedimentary stringer in a heavily clay environment.

Recommendations for Further Ground Water Monitoring

It is recommended that quarterly water level measurements be made for the next 12 to 24 months to verify groundwater flow direction and to detect any seasonal variation. Water quality samples should be collected from the wells on a quarterly basis for the first year and then semi-annually as might be required by the NMOCD. Major cation/anion constituents should be analyzed so as to update the Piper tri-linear graph and compare the results of those analyses with the initial results presented here. Due to high turbidity in the wells, especially MW-3, prior to sampling, the wells should be purged to remove accumulated sediment with water levels taken before purging and again before sampling, and the volume of water purged recorded.

If you have any questions, please contact me at (575) 397-0510 or at (575) 390-7067.

Sincerely yours,

David G. Boyer, P.G.

Attachments:
Tables and Figures
Appendices

Table 1. Water Level Measurements, Compromise SWD #1 Release Site

Monitor Well Name	Elevation Top of Casing (feet)	Measure-ment Date	Depth to Water Below TOC (feet)	Total Depth (feet)	Water Level Elev. (feet)	Water Saturated Thickness (feet)	Water Level Change (ft)
MW-1	3,283.12	07/23/15	15.65	26.50	3,267.47	10.9	--
		12/15/15	16.54	26.50	3,266.58	10.0	-0.89
MW-2	3,284.34	07/23/15	20.75	27.04	3,263.59	6.3	--
		12/15/15	20.16	26.99	3,264.18	6.8	0.59
MW-3	3,284.56	07/23/15	19.79	31.60	3,264.77	11.8	--
		12/15/15	20.06	30.94	3,264.50	10.9	-0.27

Table 2. Yates Compromise SWD Water Quality Comparison, July 23, 2015

		MW-1		MW-2			MW-3			SWD #1		
CATIONS	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%
Sodium	1,500	65.25	48.9	12,000	521.97	55.2	1,600	69.60	48.9	73,000	3,175.29	94.1
Potassium	10	0.26	0.2	18	0.46	0.0	4.1	0.10	0.1	580	14.83	0.4
Calcium	600	29.94	22.5	560	27.94	3.0	760	37.92	26.7	2,700	134.73	4.0
Magnesium	460	37.86	28.4	4,800	395.06	41.8	420	34.57	24.3	580	47.74	1.4
Total Cations		133.31	100.0		945.43	100.0		142.19	100.0		3,372.59	100.0
ANIONS												
Sulfate	3,200	66.63	53.4	26,000	541.33	52.5	3,300	68.71	46.9	4,300	89.53	2.6
Chloride	1,800	50.78	40.7	17,000	479.55	46.5	2,600	73.34	50.1	120,000	3,385.05	97.3
Bicarbonate	337.1	6.74	5.4	430	8.59	0.8	214.8	4.29	2.9	276	5.52	0.2
Carbonate	--	0	0.0	0	0	0.0	--	0	0.0	--	0	0.0
Nitrate	6.2	0.44	0.4	20	1.43	0.1	--	0	0.0	--	0	0.0
Fluoride	1.7	0.09	0.1	3.6	0.19	0.0	--	0	0.0	--	0	0.0
Bromide	1.4	0.02	0.0	18	0.23	0.0	1.2	0.02	0.0	39	0.49	0.0
Total Anions		124.70	100.0		1,031.32	100.0		146.36	100.0		3,480.59	100.0
TDS (measured)	8,130			64,900			8,790			201,365		
Sodium plus Potassium:			49.1			55.3			49.0			94.6
Cacium plus Magnisum:			50.9			44.7			51.0			5.4
Sulfate plus Chloride:			94.2			99.0			97.1			99.8
Carbonate plus Bicarbonate:			5.4			0.8			2.9			0.2

Table 3. Yates Compromise SWD Water Quality Comparison, December 15, 2015

		MW-1		MW-2			MW-3			SWD #1		
CATIONS	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%	mg/L	meq/L	%
Sodium	1,600	69.60	50.3	14,000	608.96	59.2	1,500	65.25	46.5	73,000	3,175.29	94.1
Potassium	7	0.19	0.1	13	0.33	0.0	6.7	0.17	0.1	580	14.83	0.4
Calcium	550	27.45	19.8	500	24.95	2.4	810	40.42	28.8	2,700	134.73	4.0
Magnesium	500	41.15	29.7	4,800	395.06	38.4	420	34.57	24.6	580	47.74	1.4
Total Cations		138.39	100.0		1,029.30	100.0		140.41	100.0		3,372.59	100.0
ANIONS												
Sulfate	4,500	93.69	57.2	30,000	624.61	53.3	3,400	70.79	45.1	4,300	89.53	2.6
Chloride	2,200	62.06	37.9	19,000	535.97	45.8	2,900	81.81	52.1	120,000	3,385.05	97.3
Bicarbonate	345.4	6.90	4.2	417.6	8.35	0.7	216.7	4.33	2.8	276	5.52	0.2
Carbonate	--	0	0.0	--	0	0.0	--	0	0.0	--	0	0.0
Nitrate	12	0.86	0.5	33	2.36	0.2	--	0	0.0	--	0	0.0
Fluoride	3.1	0.16	0.1	--	0	0.0	--	0	0.0	--	0	0.0
Bromide	--	0	0.0	--	0	0.0	--	0	0.0	39	0.49	0.0
Total Anions		163.67	100.0		1,171.29	100.0		156.93	100.0		3,480.59	100.0
TDS (measured)	10,000			65,500			9,370			201,365		
Sodium plus Potassium:			50.4			59.2			46.6			94.6
Cacium plus Magnisum:			49.6			40.8			53.4			5.4
Sulfate plus Chloride:			95.2			99.1			97.2			99.8
Carbonate plus Bicarbonate:			4.2			0.7			2.8			0.2

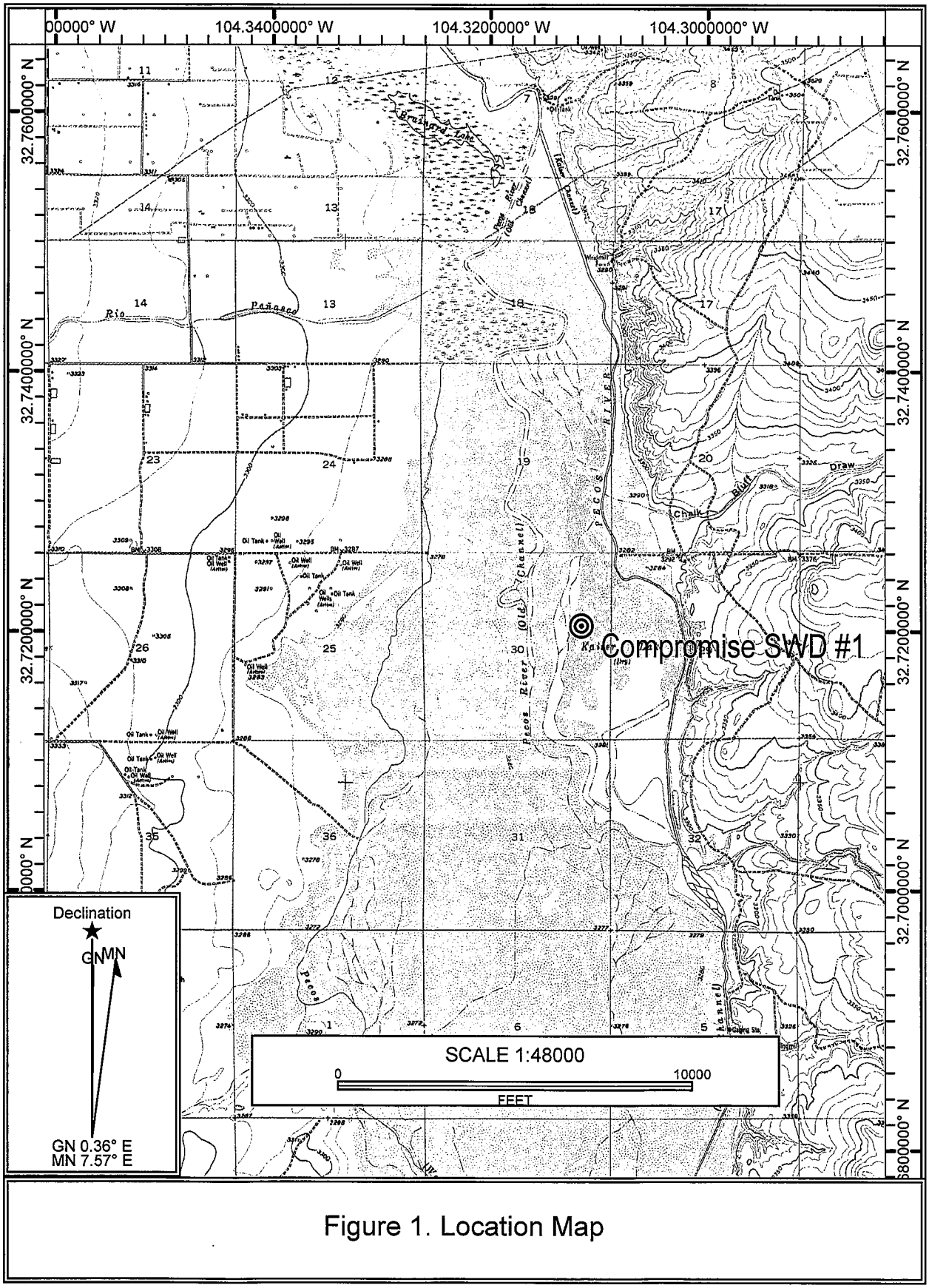
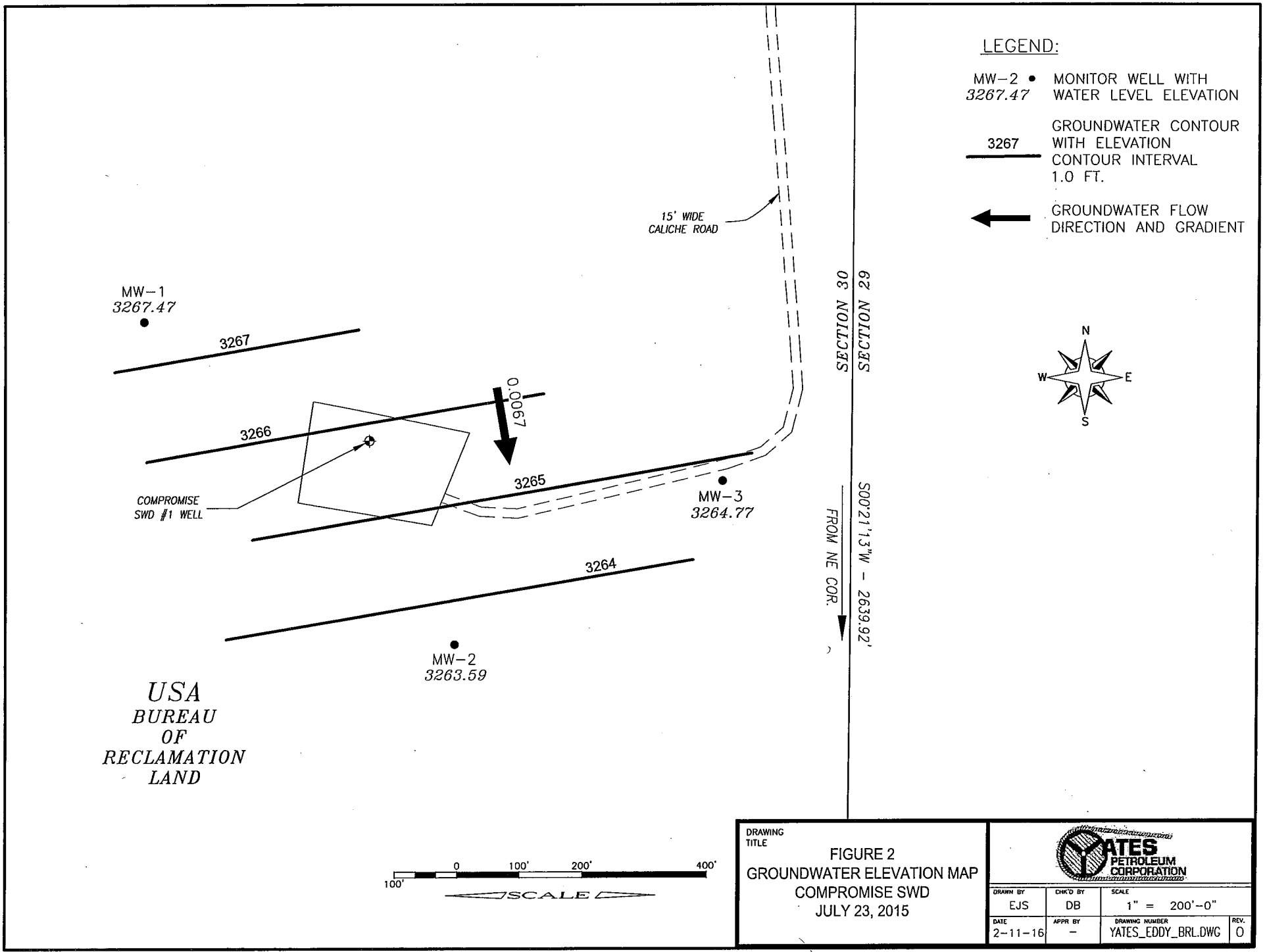


Figure 1. Location Map

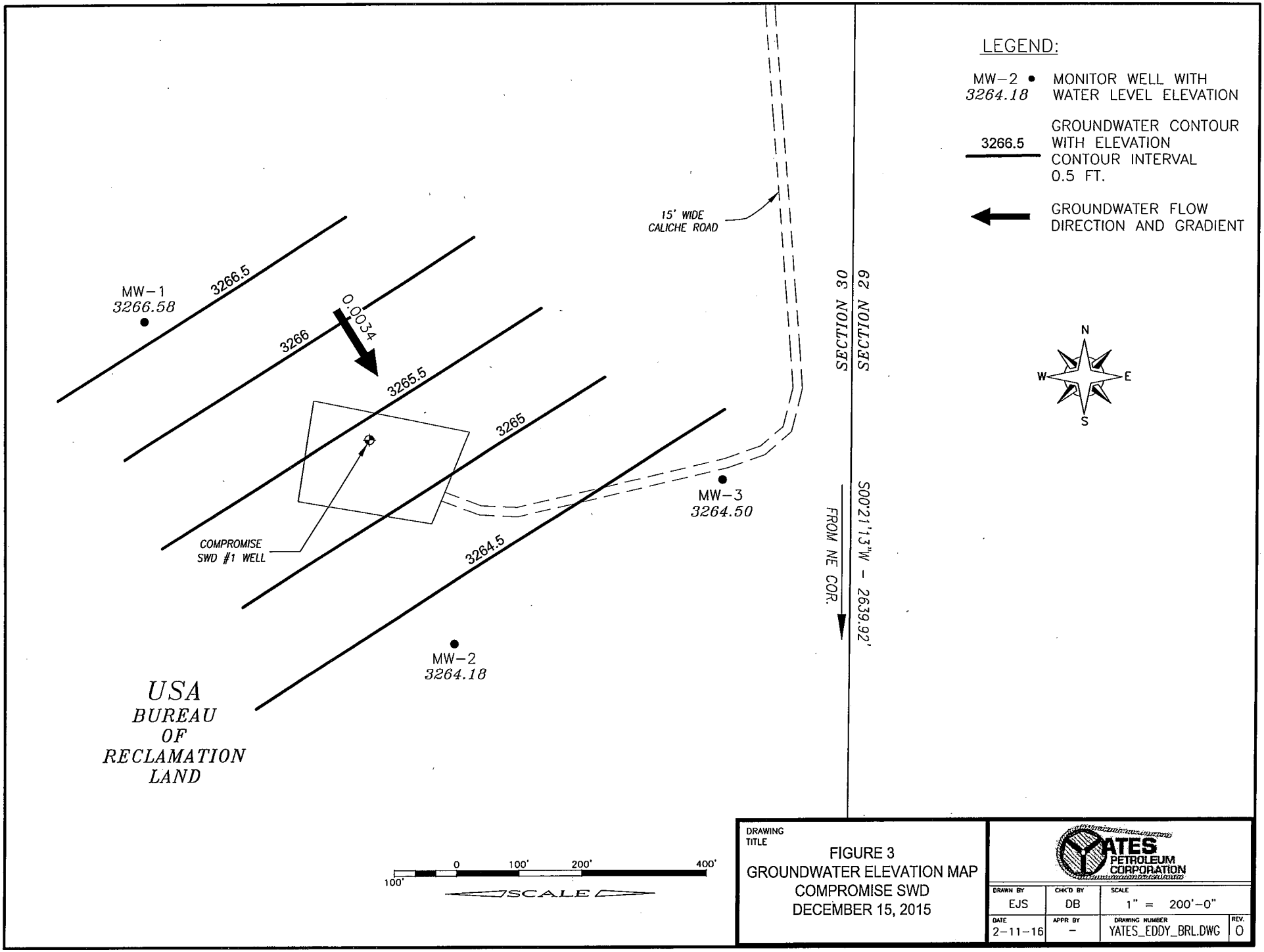


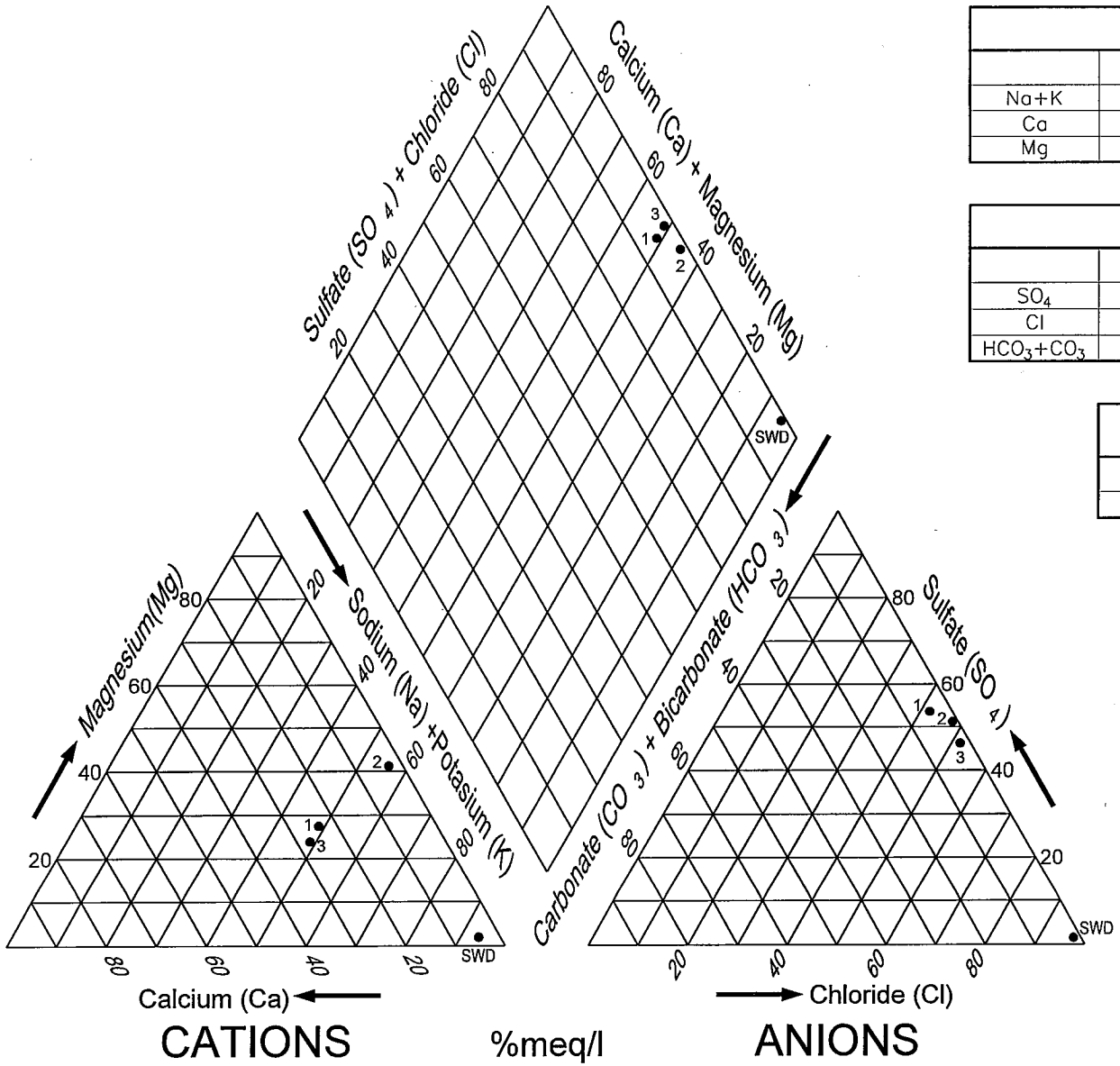
DRAWING TITLE

FIGURE 2
GROUNDWATER ELEVATION MAP
COMPROMISE SWD
JULY 23, 2015

YATES PETROLEUM CORPORATION

DRAWN BY	CHK'D BY	SCALE	
EJS	DB	1" = 200'-0"	
DATE	APPR BY	DRAWING NUMBER	REV.
2-11-16	-	YATES_EDDY_BRL.DWG	0


LEGEND:
MW–2 • 3264.18 MONITOR WELL WITH WATER LEVEL ELEVATION
3266.5 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 0.5 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
15' WIDE CALICHE ROAD
SECTION 29
SECTION 30
S00°21'13"W – 2639.92'
FROM NE COR.
MW–1
3266.58
MW–2
3264.18
MW–3
3264.50
3266.5
3266
3265.5
3265
3264.5
0.0034
COMPROMISE SWD #1 WELL
N
W
E
S
USA
BUREAU OF RECLAMATION LAND
0
100'
200'
400'
100'
SCALE
DRAWING TITLE
FIGURE 3
GROUNDWATER ELEVATION MAP
COMPROMISE SWD
DECEMBER 15, 2015
YATES PETROLEUM CORPORATION
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 200'–0"
DATE 2–11–16
APPR BY –
DRAWING NUMBER YATES_EDDY_BRL.DWG
REV. 0



CATIONS				
	MW-1	MW-2	MW-3	SWD#1
Na+K	49.1	55.2	49.0	94.5
Ca	22.5	3.0	26.7	4.0
Mg	28.4	41.8	24.3	1.4

ANIONS				
	MW-1	MW-2	MW-3	SWD#1
SO_4	53.4	52.5	46.9	2.6
Cl	40.7	46.5	50.1	97.3
HCO_3+CO_3	5.4	0.8	2.9	0.2

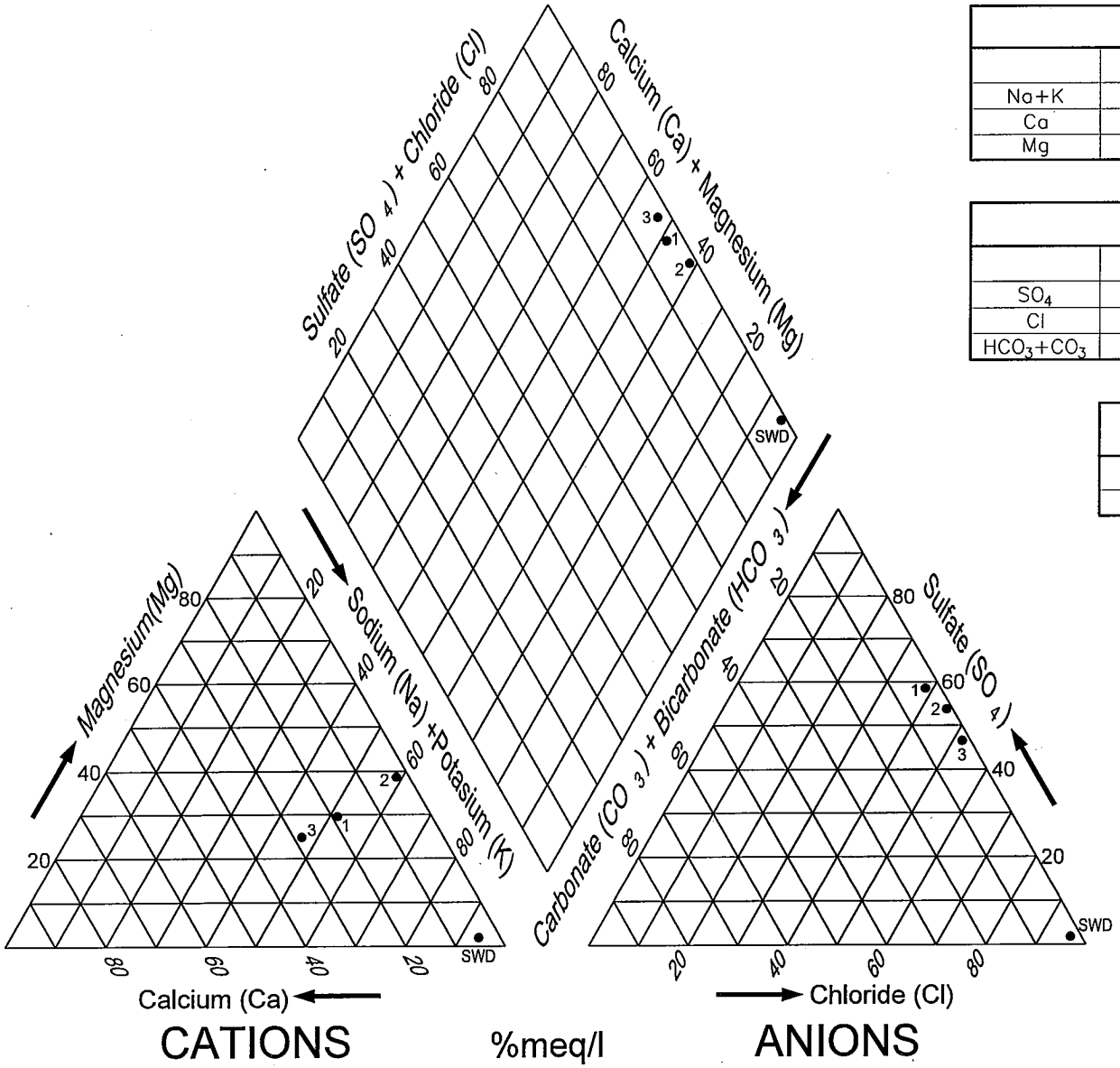
TDS (mg/L)			
MW-1	MW-2	MW-3	SWD#1
8,130	64,900	8,790	201,365

DRAWING TITLE

FIGURE 4
CATION/ANION PERCENTAGES
COMPROMISE SWD
JULY 23, 2015

YATES PETROLEUM CORPORATION

DRAWN BY	CHK'D BY	SCALE	
EJS	DB	NONE	
DATE	APPR BY	DRAWING NUMBER	REV.
2-11-16	-	YATES_EDDY_BRL.DWG	0



CATIONS				
	MW-1	MW-2	MW-3	SWD#1
Na+K	50.4	59.2	46.6	94.5
Ca	19.8	2.4	28.8	4.0
Mg	29.7	38.4	24.6	1.4

ANIONS				
	MW-1	MW-2	MW-3	SWD#1
SO_4	57.2	53.3	45.1	2.6
Cl	37.9	45.8	52.1	97.3
HCO_3+CO_3	4.2	0.7	2.8	0.2

TDS (mg/L)			
MW-1	MW-2	MW-3	SWD#1
10,000	65,500	9,370	201,365

DRAWING TITLE

FIGURE 5
CATION/ANION PERCENTAGES
COMPROMISE SWD
DECEMBER 15, 2015

YATES PETROLEUM CORPORATION

DRAWN BY	CHK'D BY	SCALE	
EJS	DB	NONE	
DATE	APPR BY	DRAWING NUMBER	REV.
2-11-16	-	YATES_EDDY_BRL-2.DWG	0

APPENDIX A.
Boring and Well Completion Logs

LOG OF BORING MW-1

Monitor Well #1
Yates Petroleum Corp., Compromise SWD #1
SE/4 NE/4 Section 30, T18S, R27E
Eddy County, New Mexico
N32.721114°, W104.313223°

Date/Time Started	: 07/21/15, 0700	Drilled By	: Enviro-Drill, Inc.
Date/Time Completed	: 07/22/15, 1200	Sampling Method	: 2 ft. split-spoon
Hole Diameter	: 8 1/4 in. OD	Logged By	: David Boyer, PG
Drilling Method	: Hollow Stem Auger	Client Representative	: Amber Griffin
Drilling Equipment	: CME-75	Survey By	: Harcrow Surveying

Sample Method:
SS Split Spoon (24")
CB Core Barrel (5')
CT Auger Cuttings
NR No recovery

Depth in Feet	Sample Method	Sample Recovery (ft.)	USCS	GRAPHIC	DESCRIPTION	Lab No.	Chlorides (mg/Kg)
0	SS	1.2	CL		0-2 ft. SILTY CLAY and CLAY, brown, dry, stiff, no H/C staining or odor	H501913-01	32.0
	SS	1.3	CL		2-4 ft. CLAY, brown, dry, stiff, plastic, no H/C staining or odor. 4-6 ft. 1.4 ft. recovery, CLAY, brown, dry 4-4.7 ft., slightly damp 4.7-6 ft.	H501913-02	80.0
5	SS	1.4				H501913-03	224
	SS	2.0	CL/ML		6-8 ft. SILTY CLAY grading to CLAYEY SILT, at base, brown, dry, soft at base, no H/C staining or odor.	H501913-04	96.0
	SS	2.0	ML		8-10 ft. SILT grading to CLAY at 9 ft. No H/C staining or odor.	H501913-05	192
10	SS	2.0	CL		10-12 ft. CLAY, brown, slightly moist, soft, plastic at 12 ft. No H/C staining or odor.	H501913-06	240
	SS	2.0	CL		12-14 ft. CLAY, saturated stringer at 12.5 ft. No H/C staining or odor.	--	--
			ML		13.1-14 ft. SILT, brown, dry. No H/C staining or odor.		
15	CT	--	CL/SC		14-25 ft. SANDY, CLAYEY, with mud balls. No defined permeable zones, no hydrocarbon staining or odor.		
20							
25							

Notes:
H/C - hydrocarbon
No chloride analysis below 12 feet or where saturated

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LOG OF BORING MW-2

(Page 1 of 1)

Monitor Well #2
Yates Petroleum Corp., Compromise SWD #1
SE/4 NE/4 Section 30, T18S, R27E
Eddy County, New Mexico
N32.719701°, W104.311612°

Date/Time Started	: 07/21/15, 0930	Drilled By	: Enviro-Drill, Inc.
Date/Time Completed	: 07/22/15, 1200	Sampling Method	: 2 ft. split-spoon
Hole Diameter	: 8 1/4 in. OD	Logged By	: David Boyer, PG
Drilling Method	: Hollow Stem Auger	Client Representative	: Amber Griffin
Drilling Equipment	: CME-75	Survey By	: Harcrow Surveying

Sample Method:
SS Split Spoon (24")
CB Core Barrel (5')
CT Auger Cuttings
NR No recovery

Depth in Feet	Sample Method	Sample Recovery (ft.)	USCS	GRAPHIC	DESCRIPTION	Lab No.	Chlorides (mg/Kg)
0	SS	1.0	ML		0-2 ft. SILT, brown, dry, no H/C staining or odor.	H501913-07	144
	SS	1.0	ML		2-4 ft. CLAYEY SILT grading to CLAY at 4 ft. dry, hard, no H/C staining or odor	H501913-08	192
5	SS	2.0	CL		4-6 ft. 4-4.3 ft. slough, 4.3-4.8 ft. SILTY CLAY, brown, 4.8-6.0 ft. CLAY, brown, dry, very stiff, no H/C staining or odor	H501913-09	656
	SS	1.3	CL/ML		6-8 ft. 6.0-6.6 ft. CLAY, brown, dry, stiff, 6.6-7.1 ft. CLAYEY SILT, brown, dry, crumbly, hard at base, no H/C staining or odor	H501913-10	656
	SS	2.0	CL		8-10 ft. 8-9.3 ft. slough, 9.3-10 ft. SILTY CLAY, brown, dry, caliche or salt flakes, plant root, no H/C staining or odor	H501913-11	1,140
10	SS	2.0	CL		10-12 ft. 10-10.7 ft. CLAY, brown, dry & crumbly, 10.7-12 ft. SILTY CLAY, brown, slightly moist, no H/C staining or odor	H501913-12	1,150
	SS	2.0	CL		12-14 ft. 12-12.7 ft. SILTY CLAY, brown, dry,	--	--
			ML		12.7-14 ft. SANDY SILT, reddish-brown, slightly moist, no H/C staining or odor		
					14-16 ft. 14-14.8 ft. SANDY SILT		
15	SS	2.0	SM		14.8-16 ft. SILTY SAND, light brown, very moist, no H/C staining or odor	--	--
	SS	2.2	SM/CL		16-18 ft. 2.2 ft. recovery, 16-16.7 ft. SILTY SAND/SANDY CLAY, light brown. 16.7-17.3 ft. saturated.	--	--
			CL		17.3-18.2 ft. CLAY with caliche or salt flakes, slightly moist, very plastic.		
20	CT	--	CL/SC		18.2-25 ft. Cuttings, SANDY, CLAYEY with mud balls. No defined permeable zones, no H/C staining or odor		
25							

Notes:
H/C - hydrocarbon
No chloride analysis below 12 feet or where saturated

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LOG OF BORING MW-3

Monitor Well #3
Yates Petroleum Corp., Compromise SWD #1
SE/4 NE/4 Section 30, T18S, R27E
Eddy County, New Mexico
N32.720417°, W104.310219°

Date/Time Started	: 07/21/15, 1225	Drilled By	: Enviro-Drill, Inc.
Date/Time Completed	: 07/22/15, 1200	Sampling Method	: 2 ft. split-spoon
Hole Diameter	: 8 1/4 in. OD	Logged By	: David Boyer, PG
Drilling Method	: Hollow Stem Auger	Client Representative	: Amber Griffin
Drilling Equipment	: CME-75	Survey By	: Harcrow Surveying

Sample Method:
SS Split Spoon (24")
CB Core Barrel (5')
CT Auger Cuttings
NR No recovery

Depth in Feet	Sample Method	Sample Recovery (ft.)	USCS	GRAPHIC	DESCRIPTION	Lab No.	Chlorides (mg/Kg)
0	SS	1.0	CL		0-2 ft. CLAY and SILTY CLAY, brown, dry, hard, no H/C staining or odor	H501913-13	144
	SS	1.4	CL		2-4 ft. SILTY CLAY, brown, dry, hard, no H/C staining or odor	H501913-14	336
5	SS	1.1	CL		4-6 ft. SILTY CLAY, brown, dry, hard, no H/C staining or odor	H501913-15	992
	SS	2.0	CL		6-8 ft. SILTY CLAY, brown, dry, friable, no H/C staining or odor	H501913-16	1,260
	SS	1.4	CL		8-10 ft. 8-8.8 ft. SILTY CLAY, brown, dry, friable.	H501913-17	1,280
			ML		8.8-9.4 ft. SILT, brown, some fine grained sand, no H/C staining or odor		
10	SS	1.4	ML/CL		10-12 ft. CLAYEY SILT grading to SILTY CLAY then to CLAY at 12 ft. brown, dry, no H/C staining or odor	H501913-18	2,720
	SS	2.2	CL		12-14 ft. 12-12.6 ft. CLAY, brown, dry.	--	--
			SP		12.6-13.6 ft. SAND, light brown, very fine grained, dry		
			ML		13.6-14.2 ft. SANDY SILT, brown, slightly moist, no H/C staining or odor		
15	SS	2.2	CL		14-16 ft. SANDY, SILTY CLAY, brown, slightly moist, no H/C.	--	--
	SS	2.2			16-18 ft. CLAY, brown, w/calcite or salt crystals and small caliche fragments, dry, plastic	--	--
	SS	2.2			18-20 ft. CLAY, brown, with caliche or salt flakes and small crystals, dry, hard	--	--
20	SS	2.2			20-22 ft. CLAY, brown, very stiff, dry, no H/C staining or odor	--	--
			CL		25-27 ft. CLAY, brown, slightly plastic, no H/C staining or odor. (split spoon every 5 ft. beginning at 25 ft.)		
25	SS	2.2				--	--
					(Clay-sand contact undetermined)		
30	CT	--	SP		30-32 ft. Flowing SAND, very fine grained, no H/C staining or odor	--	--

Notes:
H/C - hydrocarbon

No chloride sampling below 12 feet. Split spoon every 2 feet to 22 feet then every 5 feet

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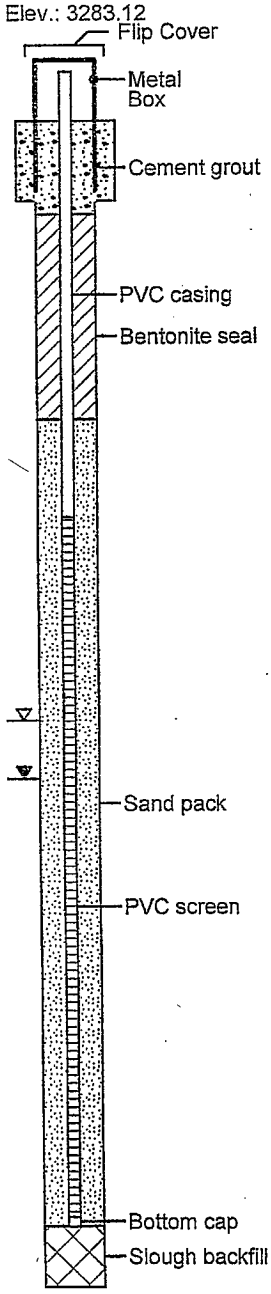
WELL COMPLETION LOG MW-1

Monitor Well #1
Yates Petroleum Corp., Compromise SWD #1
SE/4 NE/4 Section 30, T18S, R27E
Eddy County, New Mexico
N32.721114°, W104.313223°

Date/Time Started	: 07/21/15, 0700	Drilled By	: Enviro-Drill, Inc.
Date/Time Completed	: 07/22/15, 1200	Sampling Method	: 2 ft. split-spoon
Hole Diameter	: 8 1/4 in. OD	Logged By	: David Boyer, PG
Drilling Method	: Hollow Stem Auger	Client Representative	: Amber Griffin
Drilling Equipment	: CME-75	Survey By	: Harcrow Surveying

Water Levels
▼ During Drilling
▽ After Completion

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
0	CL		0-2 ft. SILTY CLAY and CLAY, brown, dry, stiff, no H/C staining or odor
	CL		2-4 ft. CLAY, brown, dry, stiff, plastic, no H/C staining or odor. 4-6 ft. 1.4 ft. recovery, CLAY, brown, dry 4-4.7 ft., slightly damp 4.7-6 ft.
5	CL/ML		6-8 ft. SILTY CLAY grading to CLAYEY SILT, at base, brown, dry, soft at base, no H/C staining or odor.
	ML		8-10 ft. SILT grading to CLAY at 9 ft. No H/C staining or odor.
10	CL		10-12 ft. CLAY, brown, slightly moist, soft, plastic at 12 ft. No H/C staining or odor.
	CL		12-14 ft. CLAY, saturated stringer at 12.5 ft. No H/C staining or odor.
	ML		13.1-14 ft. SILT, brown, dry. No H/C staining or odor.
15	CL/SC		14-25 ft. Cuttings, SANDY, CLAYEY, with mud balls. No defined permeable zones, no hydrocarbon staining or odor.
20			
25			



Well Construction Information

COMPLETION DATA

Hole Depth	: 25 ft. Below LS
TD Inside casing	: 26.50 ft. Below TOC
Top casing	: 2.8 ft. above ground level

CASING, SCREEN & CAP

Material, joints	: PVC, threaded
Diameter	: 2 in. ID
Manufacturer	: Monoflex
Screen type	: Slotted
Screen length	: 15 ft.
Screen opening	: 0.010 slot
Scrn. placement	: 8.5-23.5 ft. BLS
Bottom Cap	: 0.2 ft PVC
Protector Casing	: Above-ground steel
Lock Key #	: (Yates lock)

SEALS & SAND PACK

Cement seal type	: Cement grout
Cem't placement	: 0 - 2 ft. BLS
Annular seal type	: Bentonite 3/8" chips
Seal placement	: 2-6.4 ft. BLS
Sand pack type	: 10/20 Carmeuse silica
Sand placement	: 6.4-23.7 ft. BLS
Bottom hole backfill	: 23.7-25 ft. Native fill

ELEVATIONS.

Ground elevation	: 3280.32 ft.
Top of concrete pad	: 3280.56 ft.
Top of PVC casing	: 3283.12 ft.

WELL INSTALLATION:
7/21/15: Drilled to 25 feet. Saturated 12.5 ft. Set pipe/screen to 24 ft. Placed sand (12 bags) to 6.4 ft. Bentonite (2 bags) to 2 ft. Cement/bentonite grout (Quikcrete w/6% Portland cement) to surface and cement above-ground steel protection box with 3'x3' concrete pad.

WELL DEVELOPMENT:
7/22/15: Depth to water 12.6 ft. below ground surface, TD 23.3 ft. BGS before developing. Well developed with steel bailer, plastic bailer and sample pump. Approx. 20 gallons sediment and water. Solid bottom but very turbid at end.
7/23/15: Purged additional 14+ gallons to low turbidity, then sampled.

Water Level Measurements:
07/23/15 - 15.65 ft. BTOC

Notes:
H/C - hydrocarbon

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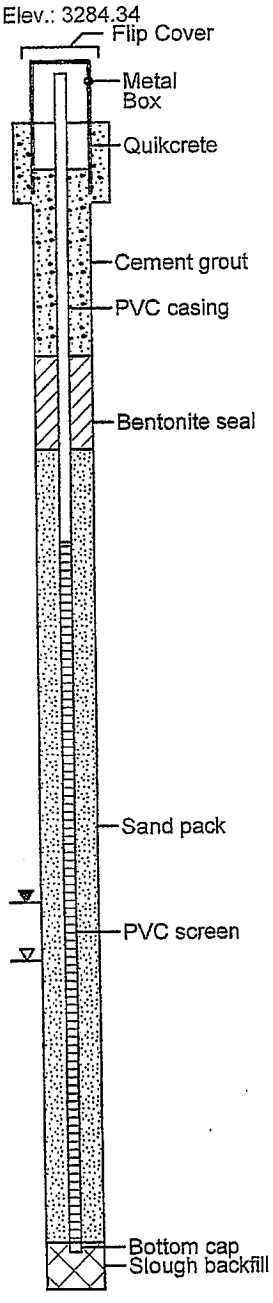
WELL COMPLETION LOG MW-2

Monitor Well #2
Yates Petroleum Corp., Compromise SWD #1
SE/4 NE/4 Section 30, T18S, R27E
Eddy County, New Mexico
N32.719701°, W104.311612°

Date/Time Started	: 07/21/15, 0930	Drilled By	: Enviro-Drill, Inc.
Date/Time Completed	: 07/22/15, 1200	Sampling Method	: 2 ft. split-spoon
Hole Diameter	: 8 1/4 in. OD	Logged By	: David Boyer, PG
Drilling Method	: Hollow Stem Auger	Client Representative	: Amber Griffin
Drilling Equipment	: CME-75	Survey By	: Harcrow Surveying

Water Levels
▼ During Drilling
▽ After Completion

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
0	ML		0-2 ft. SILT, brown, dry, no H/C staining or odor.
	ML		2-4 ft. CLAYEY SILT grading to CLAY at 4 ft. dry, hard, no H/C staining or odor
5	CL		4-6 ft. 4-4.3 ft. slough, 4.3-4.8 ft. SILTY CLAY, brown, 4.8-6.0 ft. CLAY, brown, dry, very stiff, no H/C staining or odor
	CL/ML		6-8 ft. 6.0-6.6 ft. CLAY, brown, dry, stiff, 6.6-7.1 ft. CLAYEY SILT, brown, dry, crumbly, hard at base, no H/C staining or odor
	CL		8-10 ft. 8-9.3 ft. slough, 9.3-10 ft. SILTY CLAY, brown, dry, caliche or salt flakes, plant root, no H/C staining or odor
10	CL		10-12 ft. 10-10.7 ft. CLAY, brown, dry & crumbly, 10.7-12 ft. SILTY CLAY, brown, slightly moist, no H/C staining or odor
	CL		12-14 ft. 12-12.7 ft. SILTY CLAY, brown, dry,
	ML		12.7-14 ft. SANDY SILT, reddish-brown, slightly moist, no H/C staining or odor 14-16 ft. 2 ft. recovery, 14-14.8 ft. SANDY SILT
15	SM		14.8-16 ft. SILTY SAND, light brown, very moist, no H/C staining or odor
	SM/CL		16-18 ft. 2.2 ft. recovery, 16-16.7 ft. SILTY SAND/SANDY CLAY, light brown. 16.7-17.3 ft. saturated.
	CL		17.3-18.2 ft. CLAY with caliche or salt flakes, slightly moist, very plastic.
20	CL/SC		18.2-25 ft. Cuttings, SANDY, CLAYEY with mud balls. No defined permeable zones, no H/C staining or odor
25			



Well Construction Information

COMPLETION DATA

Hole Depth	: 25 ft. Below LS
TD Inside casing	: 27.04 ft. Below TOC
Top casing	: 2.8 ft. above ground level

CASING, SCREEN & CAP

Material, joints	: PVC, threaded
Diameter	: 2 in. ID
Manufacturer	: Monoflex
Screen type	: Slotted
Screen length	: 15 ft.
Screen opening	: 0.010 slot
Scrn. placement	: 9 - 24 ft. BLS
Bottom Cap	: 0.2 ft PVC
Protector Casing	: Above-ground steel
Lock Key #	: (Yates lock)

SEALS & SAND PACK

Cement seal type	: Cement grout
Cem't placement	: 0 - 5 ft. BLS
Annular seal type	: Bentonite 3/8" chips
Seal placement	: 5 - 7 ft. BLS
Sand pack type	: 10/20 Carmeuse silica
Sand placement	: 7 - 24 ft. BLS
Bottom hole backfill	: 24 - 25 ft. Native fill

ELEVATIONS.

Ground elevation	: 3281.55 ft.
Top of concrete pad	: 3281.77 ft.
Top of PVC casing	: 3284.34 ft.

WELL INSTALLATION:
7/21/15: Drilled to 25 feet. Saturated 16.7 ft. Set pipe/screen to 24 ft. Placed sand (12 bags) to 7 ft. Bentonite (1 bag) to 5 ft. Cement/bentonite grout (Quikcrete w/6% Portland cement) to 1 ft. and Quikcrete to surface. Cement above-ground steel protection box with 3'x3' concrete pad.

WELL DEVELOPMENT:
7/22/15: Depth to water 17.8 ft. below ground surface, TD 24.0 ft. BGS before developing. Well developed with steel bailer, plastic bailer and sample pump. Purged dry at 8-10 gallons, still very turbid.
7/23/15: Purged additional 3 gallons to dryness. Sampled with bailer upon recovery.

Water Level Measurements:
07/23/15 - 20.75 ft. BTOC

Notes:
H/C - hydrocarbon

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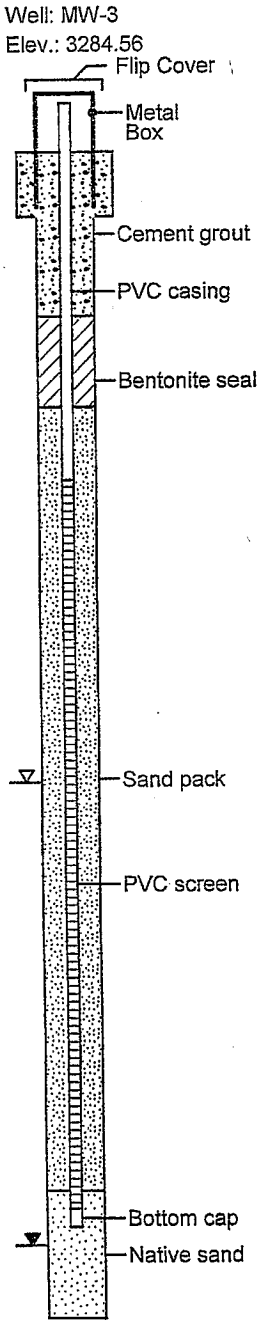
WELL COMPLETION LOG MW-3

Monitor Well #3
Yates Petroleum Corp., Compromise SWD #1
SE/4 NE/4 Section 30, T18S, R27E
Eddy County, New Mexico
N32.720417°, W104.310219°

Date/Time Started	: 07/21/15, 1225	Drilled By	: Enviro-Drill, Inc.
Date/Time Completed	: 07/22/15, 1200	Sampling Method	: 2 ft. split-spoon
Hole Diameter	: 8 1/4 in. OD	Logged By	: David Boyer, PG
Drilling Method	: Hollow Stem Auger	Client Representative	: Amber Griffin
Drilling Equipment	: CME-75	Survey By	: Harcrow Surveying

Water Levels
▼ During Drilling
▽ After Completion

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
0	CL		0-2 ft. CLAY and SILTY CLAY, brown, dry, hard, no H/C staining or odor
	CL		2-4 ft. SILTY CLAY, brown, dry, hard, no H/C staining or odor
5	CL		4-6 ft. SILTY CLAY, brown, dry, hard, no H/C staining or odor
	CL		6-8 ft. SILTY CLAY, brown, dry, friable, no H/C staining or odor
	CL		8-10 ft. 8-8.8 ft. SILTY CLAY, brown, dry, friable.
	ML		8.8-9.4 ft. SILT, brown, some fine grained sand, no H/C staining or odor
10	ML/CL		10-12 ft. CLAYEY SILT grading to SILTY CLAY then to CLAY at 12 ft. brown, dry, no H/C staining or odor
	CL		
	SP		12-14 ft. 12-12.6 ft. CLAY, brown, dry.
	ML		12.6-13.6 ft. SAND, light brown, very fine grained, dry
15	CL		13.6-14.2 ft. SANDY SILT, brown, slightly moist, no H/C staining or odor
			14-16 ft. SANDY, SILTY CLAY, brown, slightly moist, no H/C.
			16-18 ft. CLAY, brown, w/calcite or salt crystals and small caliche fragments, dry, plastic
20	CL		18-20 ft. CLAY, brown, with caliche or salt flakes and small crystals, dry, hard
			20-22 ft. CLAY, brown, very stiff, dry, no H/C staining or odor
			25-27 ft. CLAY, brown, slightly plastic, no H/C staining or odor. (split spoon every 5 ft. beginning at 25 ft.)
25			
			(Clay-sand contact undetermined)
30	SP		30-32 ft. Flowing SAND, very fine grained, no H/C staining or odor



Well Construction Information

COMPLETION DATA

Hole Depth	: 32 ft. Below LS
TD Inside casing	: 31.60 ft. Below TOC
Top casing	: 2.5 ft. above ground level

CASING, SCREEN & CAP

Material, joints	: PVC, threaded
Diameter	: 2 in. ID
Manufacturer	: Monoflex
Screen type	: Slotted
Screen length	: 20 ft.
Screen opening	: 0.010 slot
Scrn. placement	: 9 - 29 ft. BLS
Bottom Cap	: 0.2 ft PVC
Protector Casing	: Above-ground steel
Lock Key #	: (Yates lock)

SEALS & SAND PACK

Cement seal type	: Cement grout
Cem't placement	: 0 - 4.5 ft. BLS
Annular seal type	: Bentonite 3/8" chips
Seal placement	: 4.5 - 7 ft. BLS
Sand pack type	: 10/20 Carmeuse silica
Sand placement	: 7 - 28.5 ft. BLS
Bottom hole backfill	: 28.5 - 32 ft. Native : sand fill

ELEVATIONS.

Ground elevation	: 3282.06 ft.
Top of concrete pad	: 3282.46 ft.
Top of PVC casing	: 3284.56 ft.

WELL INSTALLATION:
7/21/15: Drilled to 30 feet, split-spoon to 32 ft. Saturated 30 ft. Set pipe/screen to 29 ft. Placed sand (20 bags) to 7 ft. Bentonite (1 bag) to 4.5 ft. hydrated. Cement/bentonite grout (Quikcrete w/6% Portland cement) to surface and cement above-ground steel protection box with 3'x3' concrete pad.
WELL DEVELOPMENT:
7/22/15: Depth to water 17.2 ft. below ground surface, TD 26.5 ft. BGS before developing. Well developed with steel bailer and plastic bailer. Purge approx.18 gallons sediment and water. Solid bottom but very turbid at end.
7/23/15: Continued purging with sample pump, removed 23 gallons to dryness, still very turbid with dark brown very fine grained sand. Sampled with bailer on recovery.

Notes:
H/C - hydrocarbon

Water Level Measurements:
07/23/15 - 19.79 ft. BTOC

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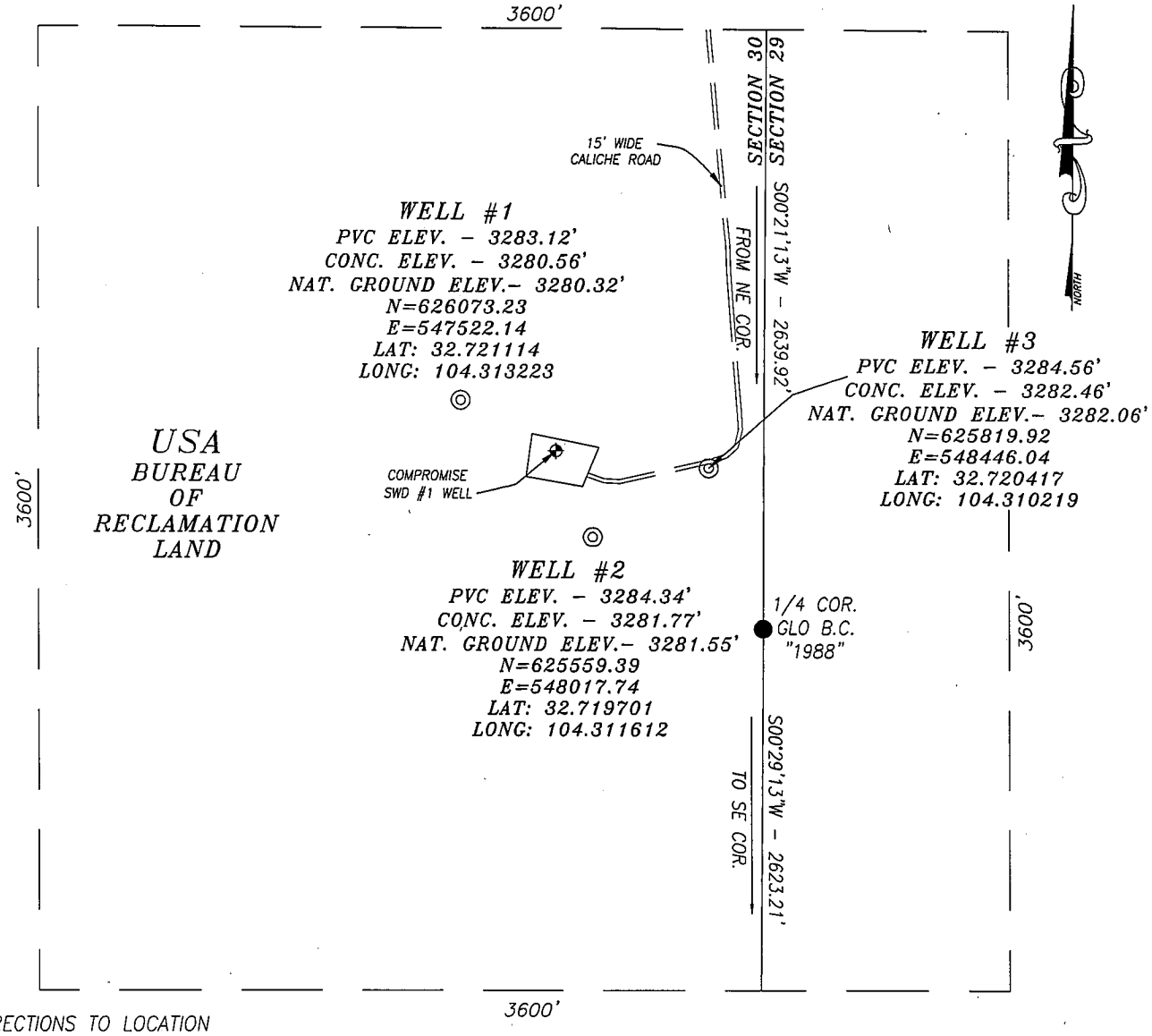
APPENDIX B
Harcrow Surveying Plats

SECTION 30, TOWNSHIP 18 SOUTH, RANGE 27 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF ST. HWY. 285 AND DAYTON RD. – CR. 41, GO EASTERLY ON DAYTON RD. FOR APPROX. 3.2 MI.; DAYTON RD. THEN TURNS INTO A CALICHE RD.; CONTINUE EASTERLY ON CALICHE RD. FOR APPROX. 1.8 MI.; THEN GO SOUTH (RIGHT) ON CALICHE RD. FOR APPROX. 0.4 MI.; THEN GO WEST (RIGHT) ON CALICHE RD. FOR APPROX. 0.1 MI. TO A CALICHE WELL PAD. THE MONITORING WELLS ARE SURROUNDING SAID CALICHE WELL PAD.

COORDINATES, DISTANCES AND VERTICAL DATUM SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM 1983 AS OBSERVED WITH GPS STATIC OBSERVATION AND OPUS SOLUTION AT WELL #3 AND THEN UTILIZING A CONVENTIONAL LEVEL TO LOOP THROUGH WELLS # 1 AND #2 FOR VERTICAL DATUM SHOWN HEREON.

600 0 600 1200 Feet

Scale: 1"=600'

HARCROW SURVEYING, LLC
2314 W. MAIN ST, ARTESIA, N.M. 88210
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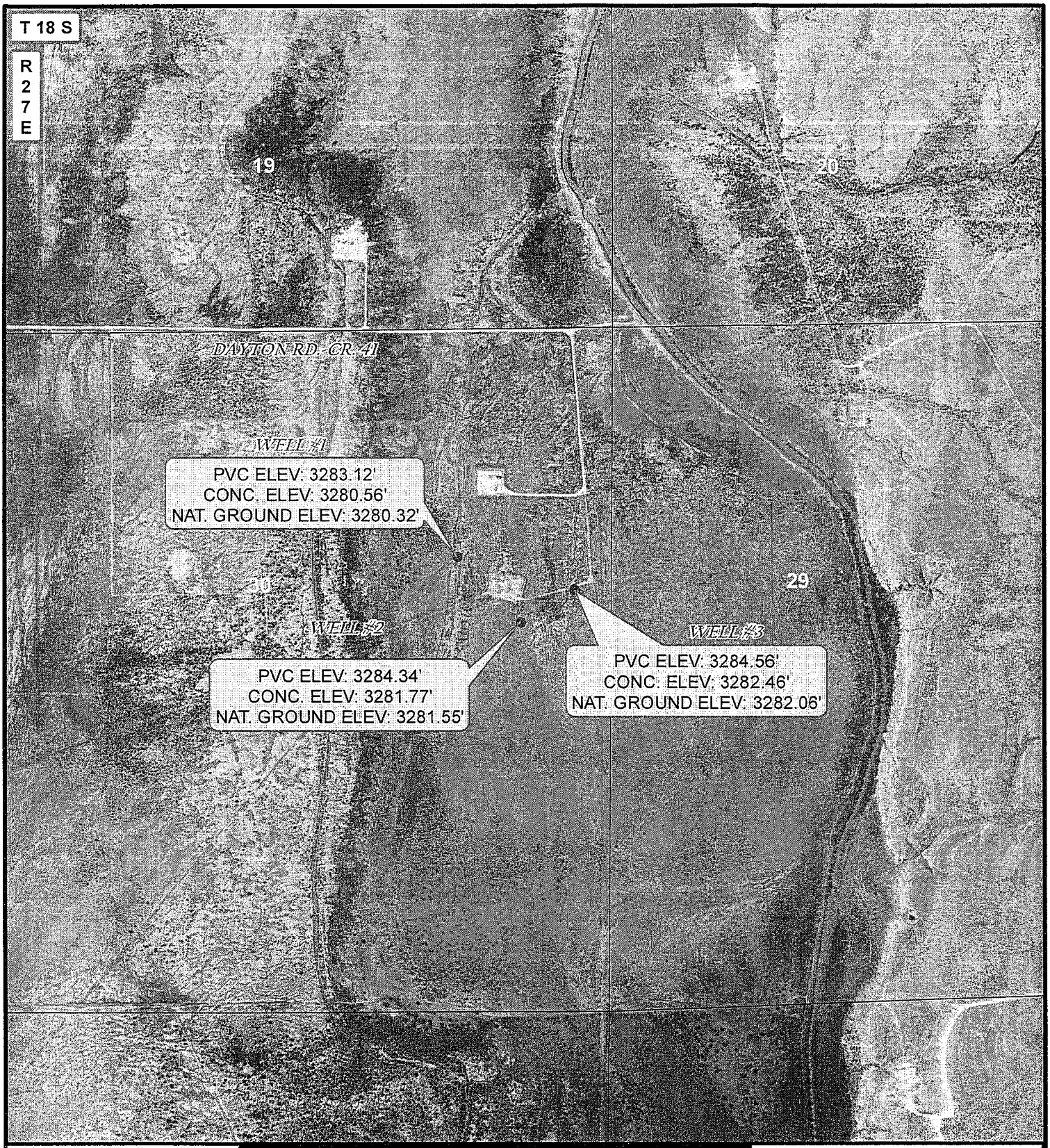
SAFETY AND ENVIRONMENTAL SOLUTIONS

A SURVEY OF 3 MONITORING WELLS
LOCATED IN SECTION 30, TOWNSHIP 18 SOUTH,
RANGE 27 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

SURVEY DATE: JULY 30, 2015		PAGE: 1 OF 1
DRAFTING DATE: AUGUST 13, 2015		
APPROVED BY: CH	DRAWN BY: SP	FILE: 15-927



LEGEND

MONITORING WELL

SES MONITORING WELLS

SECTION: 30 TOWNSHIP: 18 S. RANGE: 27 E.

STATE: NEW MEXICO COUNTY: EDDY

W.O. # 15-927 SURVEY: N.M.P.M

0 2,500 FEET

0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

LOCATION MAP IMAGERY 08/06/2015 SJP

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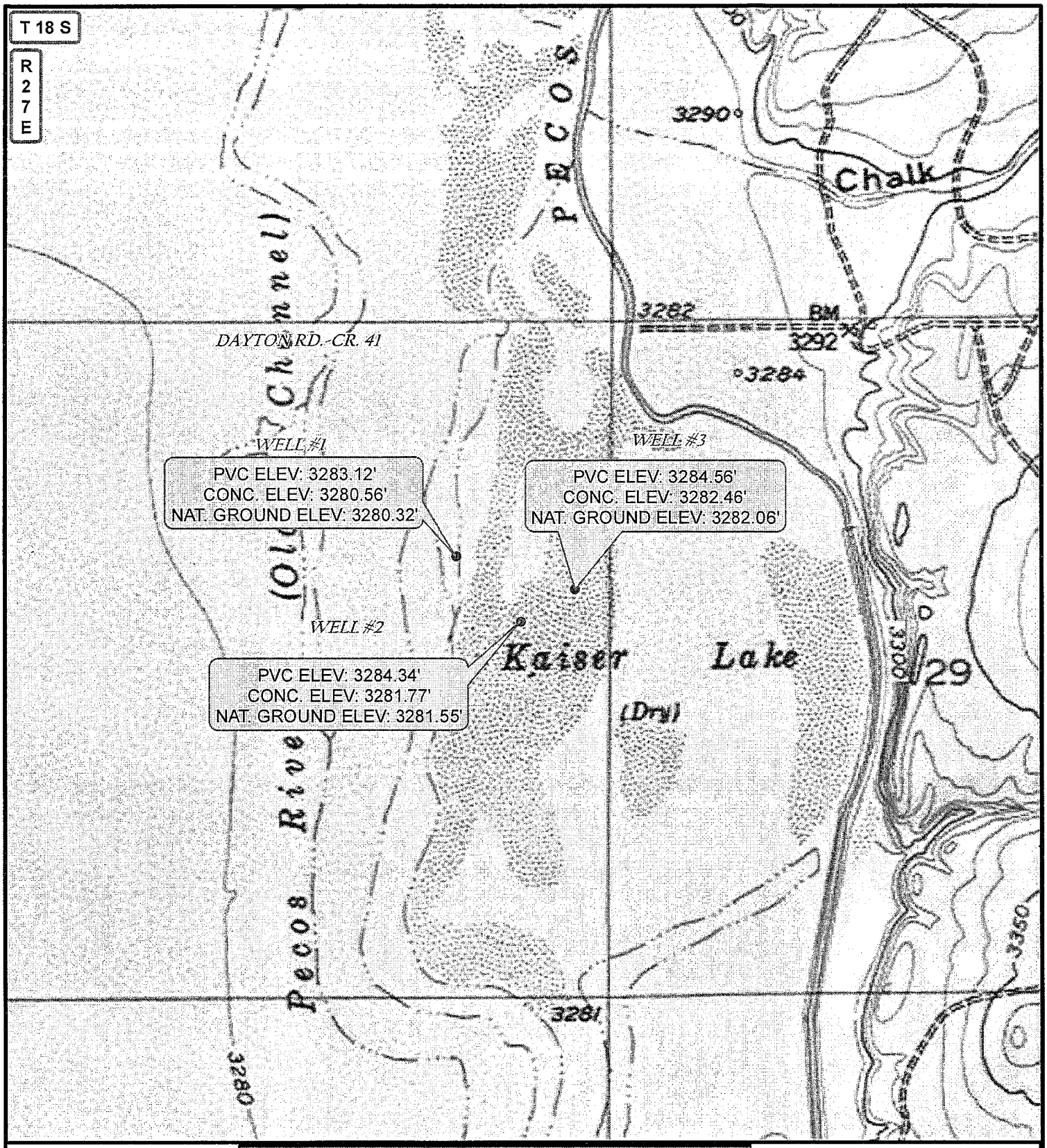

LEGEND

● MONITORING WELL

SES MONITORING WELLS		
SECTION: 30	TOWNSHIP: 18 S.	RANGE: 27 E.
STATE: NEW MEXICO	COUNTY: EDDY	
W.O. # 15-927		SURVEY: N.M.P.M

0 2,500 FEET

0 0.05 0.1 0.2 Miles 1 IN = 1,000 FT

LOCATION MAP TOPO 08/06/2015 S.P.

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