1R - 474

2010 AGWMR

09/08/2011

September 8, 2011

Samson State BD #4 Reserve Pit
NMOCD Case #1RP-474-0

2010 Annual Monitoring Report

Prepared by
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Location: T-12-S, R-33-E, Sec 2, Unit H
Latitude: North 33° 18' 35.0"
Longitude: West 103° 34' 39.2"
NMOCD#: 1RP-474

1 Executive Summary

The State BD #4 site, which is operated by Samson Resources Company (Samson), is located approximately 16 miles west of Tatum, New Mexico and directions to the site are documented in previous submissions. The data presented in this 2010 Annual Monitoring Report permits us to conclude:

- The extent and magnitude of ground water impairment is defined and does not extend beyond the footprint of the former drilling pit on the north, west or south sides.
- Ground water exceeds state standards for chloride and TDS for a distance of about 40 feet east (down gradient) of the former pit.
- The ground water impairment does not currently pose a threat to human health or livestock.
- The extent of impairment is generally stable and natural dilution and dispersion will reduce chloride and TDS over time.
- While pumping ground water from MW-3, from February to July 2007, was beneficial with respect to the removal of contaminant mass, monitoring data suggest improvement of ground water quality beneath the former drilling pit is best accomplished by natural restoration at this site.
- The engineered ET infiltration barrier functions as designed; the chloride flux from the vadose zone to ground water is at or near zero.
- Samson requests input from NMOCD regarding possible pathways to close the regulatory file including a decision on the part of NMOCD and the surface owner that a 10-acre area that includes the former pit and production pad is not "a place of withdrawal for present or reasonably foreseeable future use".
- Samson will continue to monitor ground water in all wells on an annual basis.

This report is consistent with the commitments and recommendations made in all previous correspondence including the 2009 Annual Ground Water Monitoring Report submitted to the NMOCD on April 12, 2010.

2 Work Elements Performed

Appendix A presents a table (Table 1) containing results of all historic soil sampling. A Table of the historic ground water gauging and laboratory results (Table 2) is also provided in Appendix A. The ground water monitoring laboratory reports and chain-of-custody documents for recent sampling events are included in Appendix B, and Appendix C provides graphs that depict the historic ground water impairment for each monitoring well.

Since May 2010, the site activities at the Samson State BD #4 site have included:

- The quarterly ground water sampling of the shallow and deep monitoring wells
- Monitoring of the soil moisture, both background and below the ET Barrier

3 Conclusions

3.1 ET Barrier Performing as Predicted

Plate 1 is a topographic map of the ET barrier surface which was designed to direct the precipitation runoff toward the less impacted areas of the former pit. Soil moisture monitoring ports and the location of monitoring wells are also plotted on Plate 1. Soil moisture monitoring, as shown below, demonstrates that the moisture content within the ET Barrier is very low relative to the background values. This result confirms the performance expectations of the ET Barrier.

	ET Cover Moisture Ports			Background Cluster Moisture Ports		
Vadose Zone Measurement Date	No. 1 West 2.4-foot	No.2 Center 5-foot	No. 3 East 8-foot	No. 1 West 13.9-foot	No.2 Center 9.8-foot	No. 3 East 6.5-foot
4/17/07	0	1	1	15	29	18
5/21/07	0	1	1	15	30	20
6/21/07	1	1	1	16	31	22
7/18/07	0	1	1	16	34	22
8/22/07	0	1	1	17	36	23
9/28/07	0	0	1	17	37	22
10/24/07	0	0	1	17	37	21
2/11/08	0	0	0	16	32	17
5/5/08	0	0	1	16	31	18
8/20/08	0	0	1	17	32	18
11/21/08	0	0	0	--	29	16
2/17/09	0	0	0	--	26	14
5/26/09	0	0	1	16	24	14
8/24/09	0	0	1	16	20	12
11/2/09	0	0	1	16	19	11
2/26/10	0	0	1	14	17	9
5/13/10	0	0	1	13	16	11
8/17/10	1	0	2	14	17	13
11/18/10	0	0	1	14	19	12

As discussed below, ground water monitoring results also demonstrate that the chloride concentration of upper portion of the aquifer beneath and adjacent to the ET cover is stable or declining over time. This observation supports a conclusion that the flux of chloride from the vadose zone to ground water beneath the cover is very low or nil.

3.2 Ground Water Flow Direction is Constant

Hicks Consultants gauged and sampled each of the monitoring wells on a quarterly basis during 2010. Ground water gradient maps (Plates 2A – 2D) indicate essentially no change in the gradient direction and an average gradient slope of 0.0072 ft/ft, which corresponds to the historic gradient for the life of the project.

3.3 Hydraulic Conductivity Increases with Depth

On February 26, 2010, residual drawdown and calculated recovery tests (Theis, 1935) were performed on the shallow (MW-4) and deep (MW-4d) monitoring wells located on the down gradient edge of the former reserve pit. The methodology and results of these tests are presented in Appendix D. They indicate that the upper portion of the aquifer at this location has a hydraulic conductivity (K) of 3.2 ft/day and the deeper portion of the aquifer has a K of 8.3 ft/day.

Mussharrafieh and Chudnoff (1999) estimated the hydraulic conductivity of the Ogallala Aquifer at the site as 21-40 ft/day. Because this published estimate represents the entire saturated thickness of the Ogallala, which is about 100 feet at the site location (Tillery, 2008), and the Ogallala is often coarser grained at the base and finer grained at the top of the unit (see http://www.npwd.org/new_page_2.htm) the relatively low values of hydraulic conductivity obtained from the recovery tests are within reason.

A calculation of ground water velocity at the site was performed using the measured K values, the average ground water gradient (0.0072 ft/ft), and the estimated porosity (0.25) as follows:

$$Ground\ Water\ Velocity\left(ft/yr\right) = Effective\ Flow\ Rate\left(ft/day\right) \times 365\left(days/yr\right),$$ where as

$$Effective\ Flow\ Rate\left(ft/day\right) = Ground\ Water\ Flow\ Rate\left(ft/day\right)/0.25\left(unitless\right),$$ and

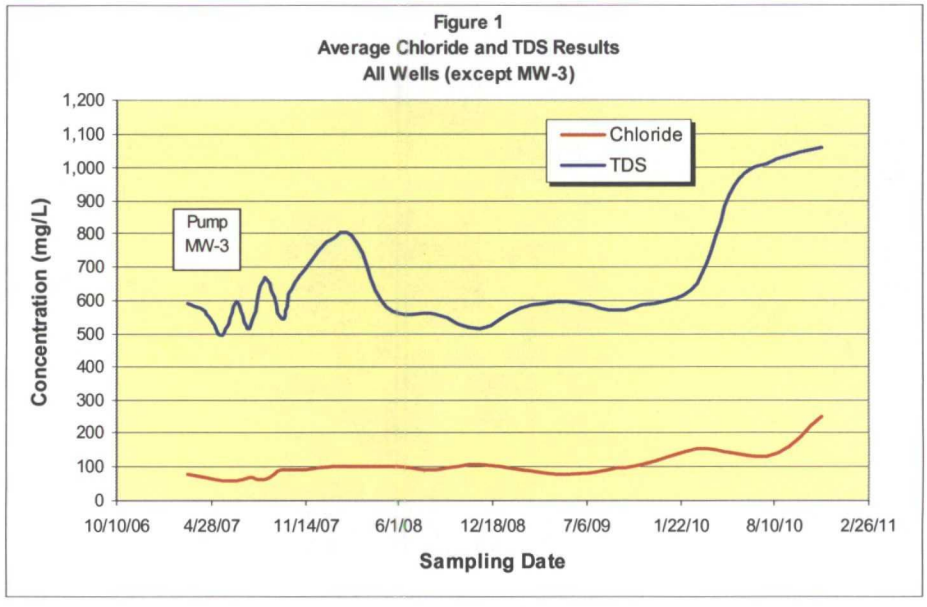
$$Ground\ Water\ Flow\ Rate\left(ft/day\right) = K\left(ft/day\right) \times 0.0072\left(ft/ft\right)$$

The results indicate that the ground water velocity is 33.6 ft/yr in upper portion of the aquifer and 87.3 ft/yr in the lower portion of the aquifer. This differential in ground water velocity (flux) with depth will cause the chloride plume to dilute more rapidly in the lower portion of the aquifer relative to the upper portion.

3.4 Pumping & Disposal Is a Marginally Effective Abatement Strategy

A total of 235,000 gallons of impaired ground water (3.7 tons chloride / 6.3 tons TDS) have been removed to disposal from the site to date. No ground water removal has been conducted since July 2007, except during sampling events.

Plate 3 depicts the laboratory results for both the shallow and deep zones for the 2010 sampling events. Figure 1 depicts the average chloride and TDS concentrations for all monitoring wells except MW-3 over time. In figure 1, the width of the text box describing the pumping is equivalent to the duration of the pumping event.



The data shows that the average site TDS concentration increased; independently of the chloride concentration, during the year after termination of the pumping operation then returned to the initial concentration of 500-600 mg/L. During 2008 and 2009, the TDS and chloride concentrations have remained stable; however both the TDS and chloride concentrations have increased in 2010 which is attributable to increased salinity in MW-4d (see Appendix C). These results suggest that the removal of saline water from MW-3 has produced no measurable benefit to the overall quality of the ground water relative to natural processes (particularly the settling of the dissolved solids to the base of the aquifer). We conclude that long-term, continual pumping effort at MW-3 would remove additional chloride mass from ground water but is a marginally effective abatement strategy for the site. Because the water from MW-3 will not be used by drilling fluid engineers, cementing companies or other contractors, all water pumped goes to disposal or must be treated prior to use. We do not believe the waste of this resource (disposal) or treatment of the water for subsequent use creates a reasonable relationship between the costs and benefits.

3.5 Chloride Fate and Transport is Dynamic but Contained

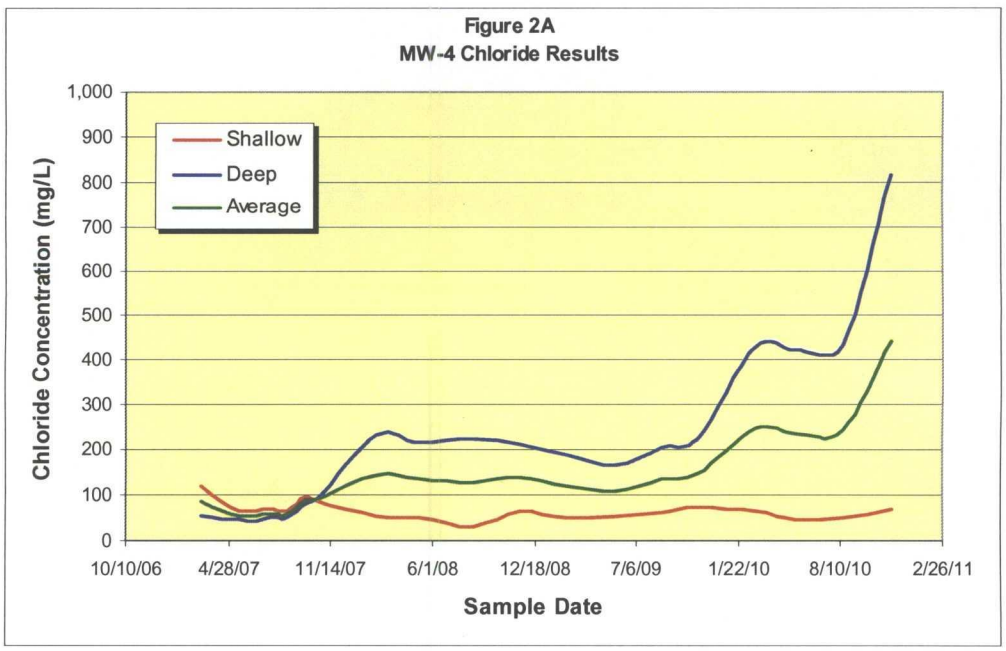
Plate 4 indicates the locations of the soil and ground water monitoring points relative to the original configuration of the reserve pit. Plate 5A shows the site during excavation and 5B shows sampling results of chloride concentrations at a depth of approximately 28 feet below the

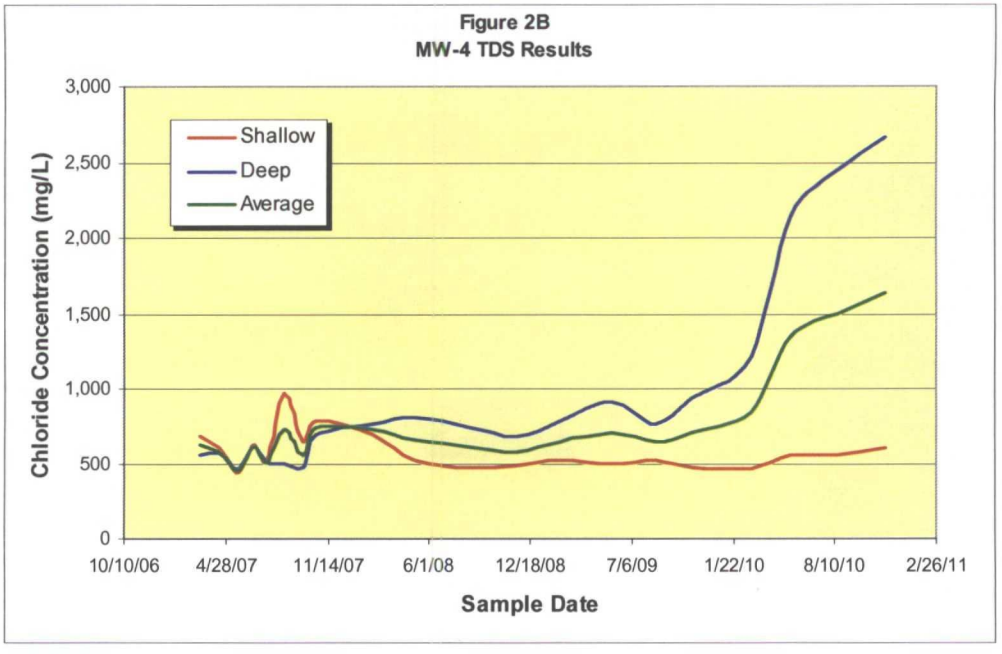
surface (10 feet above the ground water). Due to the lack of any low-permeability layers between the base of the pit and the water table, seepage from the pit would move vertically downward with little horizontal spreading. Therefore, the area of highest chloride concentrations in ground water due to pit seepage should exist below the area of highest impact defined by the trench soil samples.

A conceptual model that explains the chloride migration from January 2007 to November 2010 across the site is provided in map view (Plate 6A-6E) and cross-section view (Plates 7A-7E). It utilizes the historic laboratory chloride results from the shallow and deep monitoring wells with plume distributions that conform to the ground water velocities determined from the residual drawdown and calculated recovery tests performed in February 2010.

Based on this information, we believe that the primary ground water impact occurred due to saturated flow through the vadose zone below the northwestern edge of the former reserve pit. Pumping from MW-3 removed some of the chloride mass and caused the zone of highest chloride to move south. Over time the higher chloride concentrations (creating slightly denser water) sank lower into the aquifer where it was subject to greater ground water velocities (higher hydraulic conductivity values). At the same time, fresh water (precipitation) from the ET cover run-off was added to the upper portion of the aquifer which diluted the chloride between MW-3 and MW-4.

As a result, the chloride (and TDS) concentrations at MW-4 changed from being slightly higher in the shallow zone to being significantly higher in the deep zone over the monitoring period as shown in Figure 2A and 2B below:





Presently, the chloride and TDS concentration are below the WQCC standards in both of the cross gradient monitoring wells (MW-1 and MW-2). As of the most recent monitoring events the average chloride and TDS concentrations at MW-4s and 4d are above WQCC standards.

From these data, we conclude that an abatement strategy that employs natural restoration, supplemented with the fresh water run-off from the ET cover surface is effective but may result in a short-term exceedance of the regulatory standard outside of the footprint of the former drilling pit. Beneath the pit footprint, a linear regression analysis of the last three years of ground water data suggests that this area may exceed standards for 10-20 years.

3.6 Options for Closing the Regulatory File Are Limited

We have identified two options for closure of the regulatory file. Of these, option No. 1 is the most appropriate for the site, based on future land use and available ground water resources. Once further monitoring has established a stable plume, file closure may be pursued based upon:

1. A finding by NMOCD and the surface owner that a 10-acre area at and down gradient of the site is not a place of withdrawal for present or reasonably foreseeable future use, or
2. A successful petition for alternative abatement standards under Part 30 of NMOCD Rules

4 Recommendations

- Obtain a response from NMOCD regarding closure options.
- Continue to collect and analyze ground water samples on annual basis for chloride, TDS and field specific conductance from MW-3, MW-4d and MW-4s.
- Submit ground water monitoring results to the NMOCD if requested.

Plates

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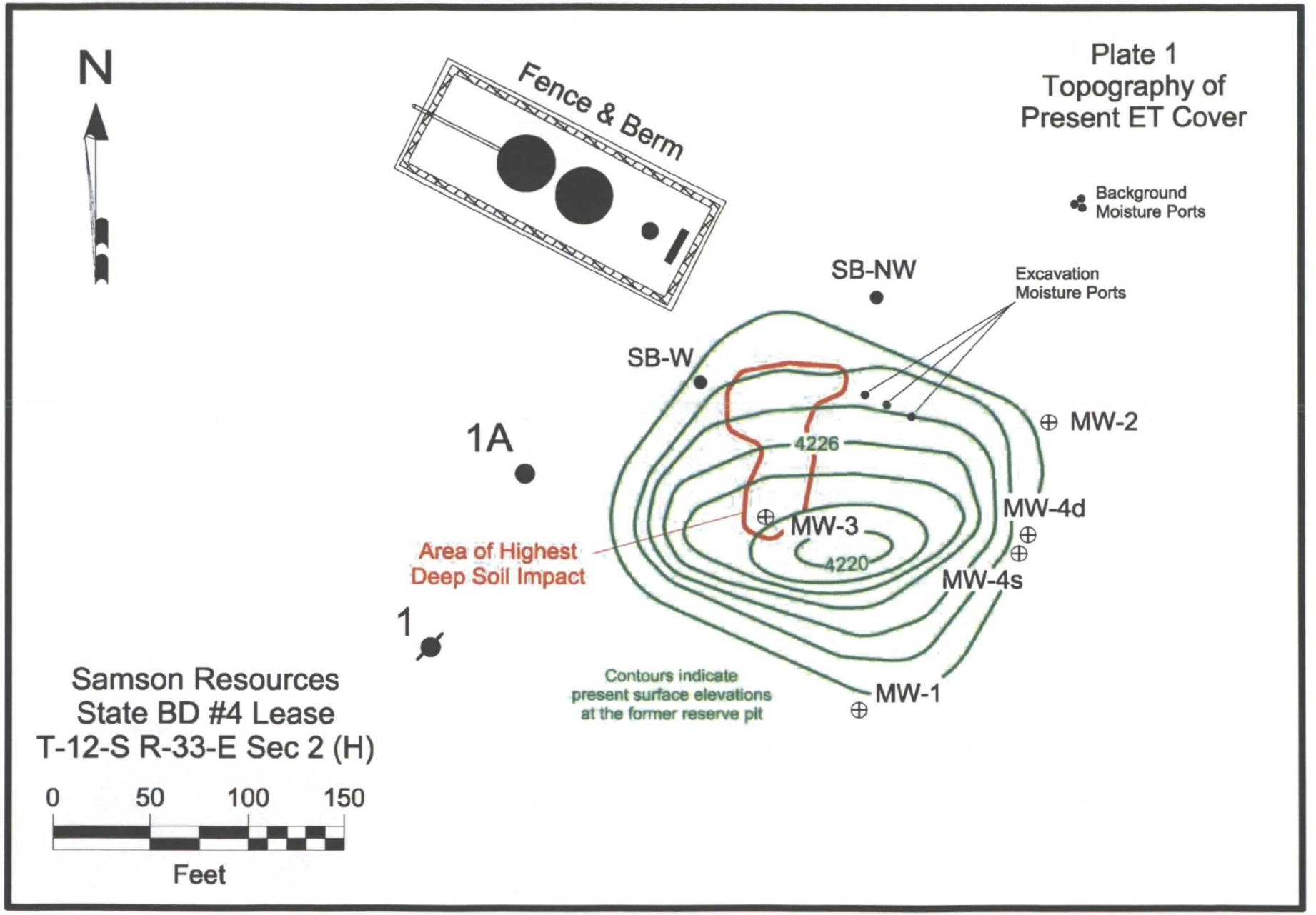
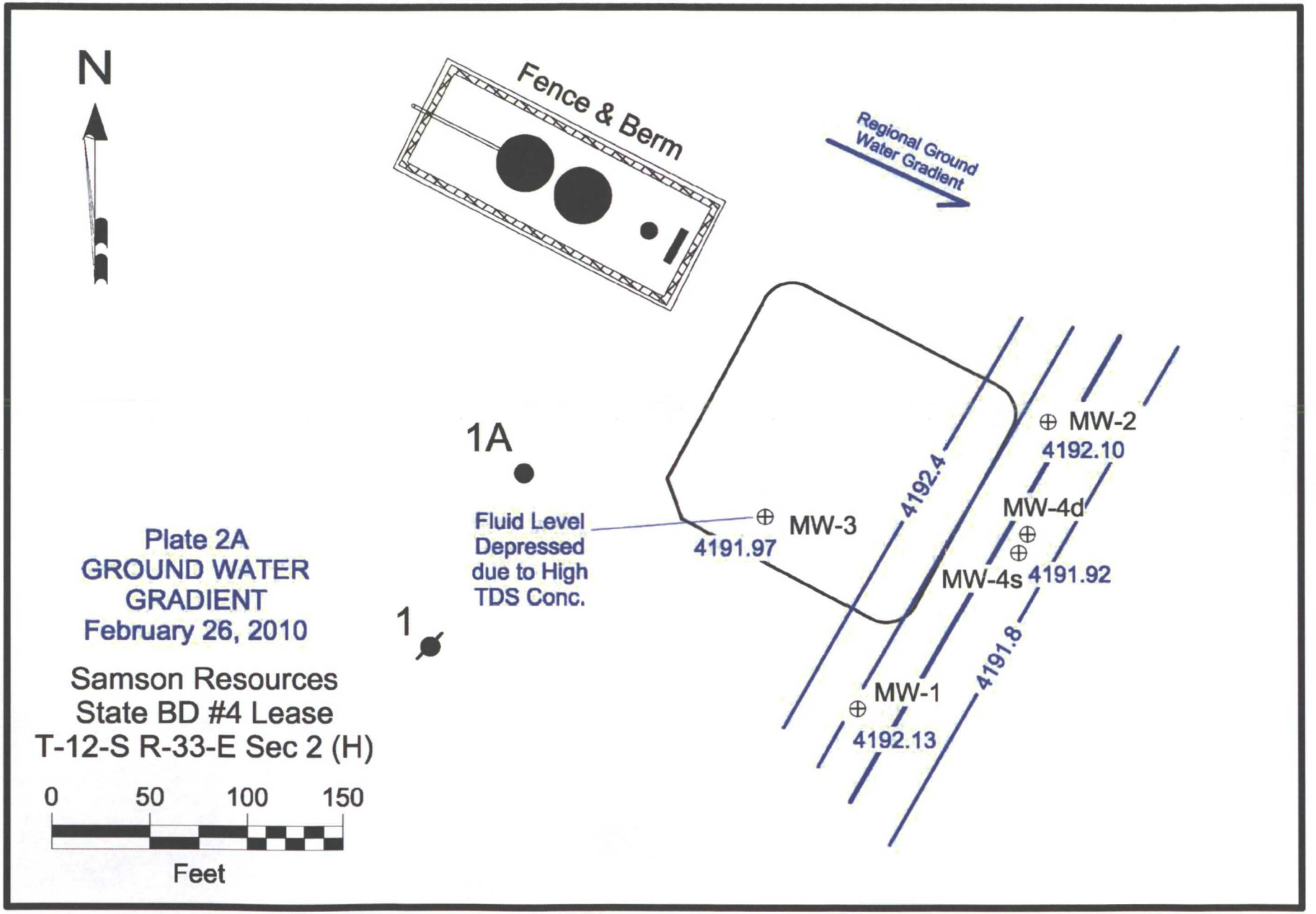
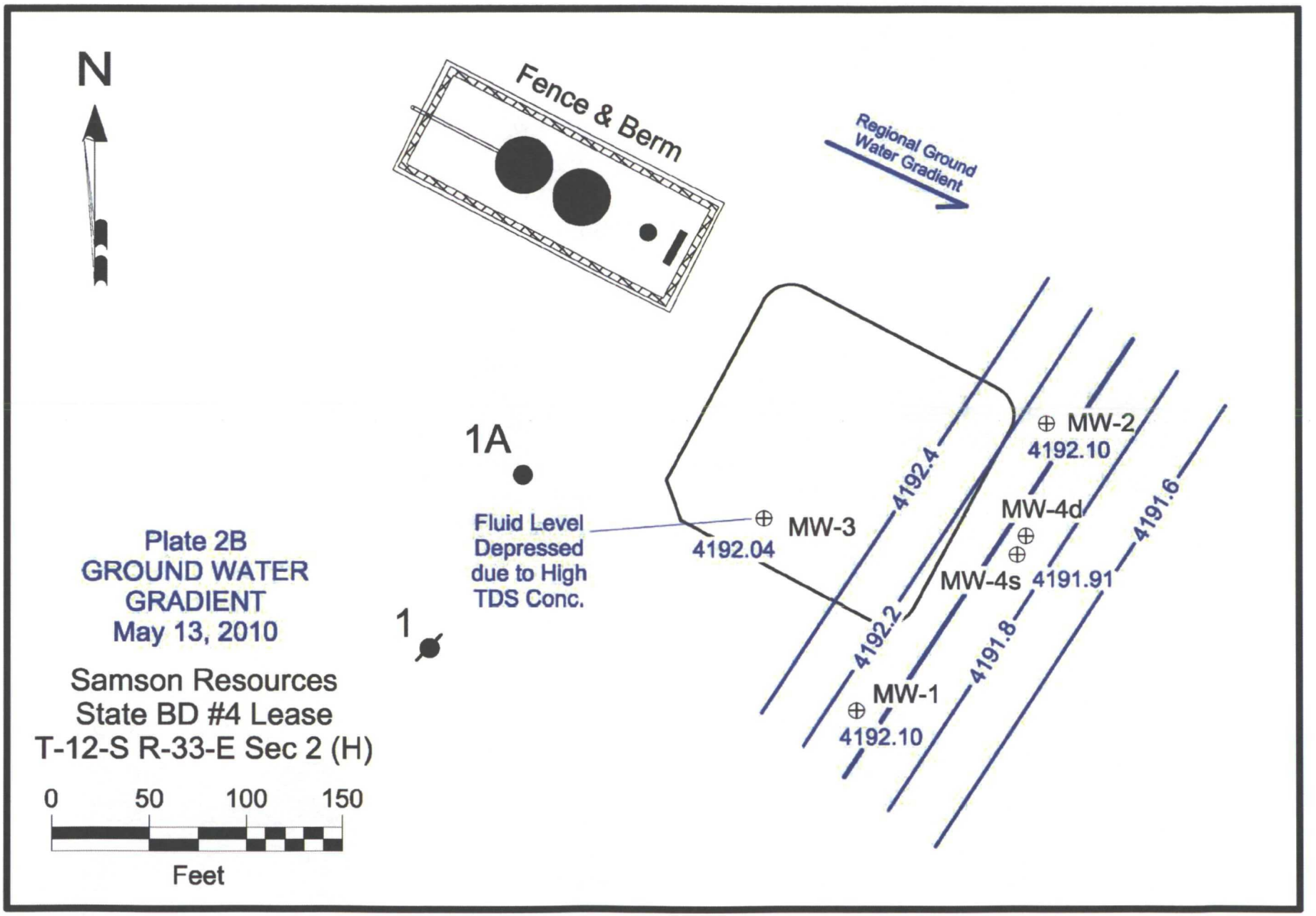
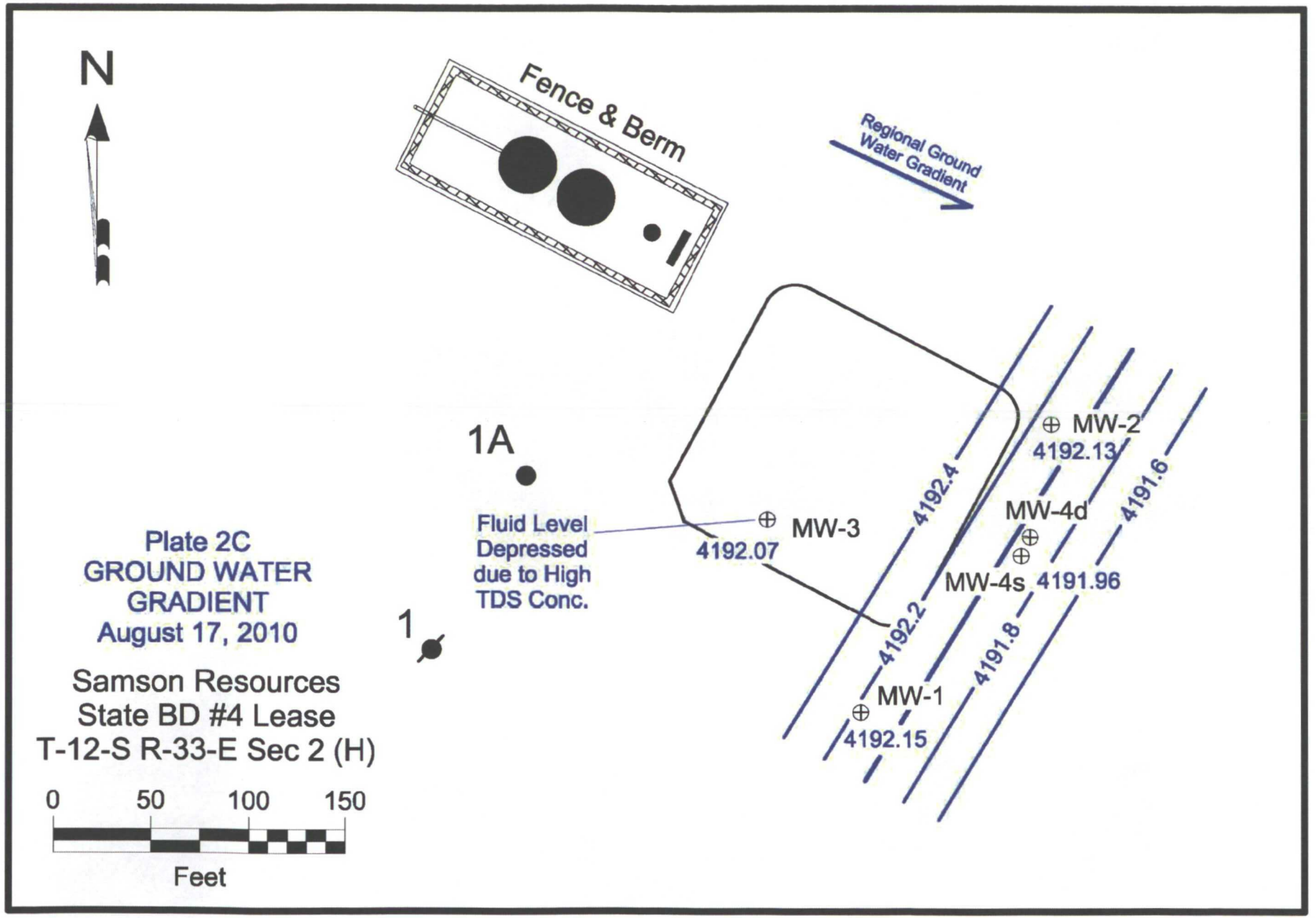
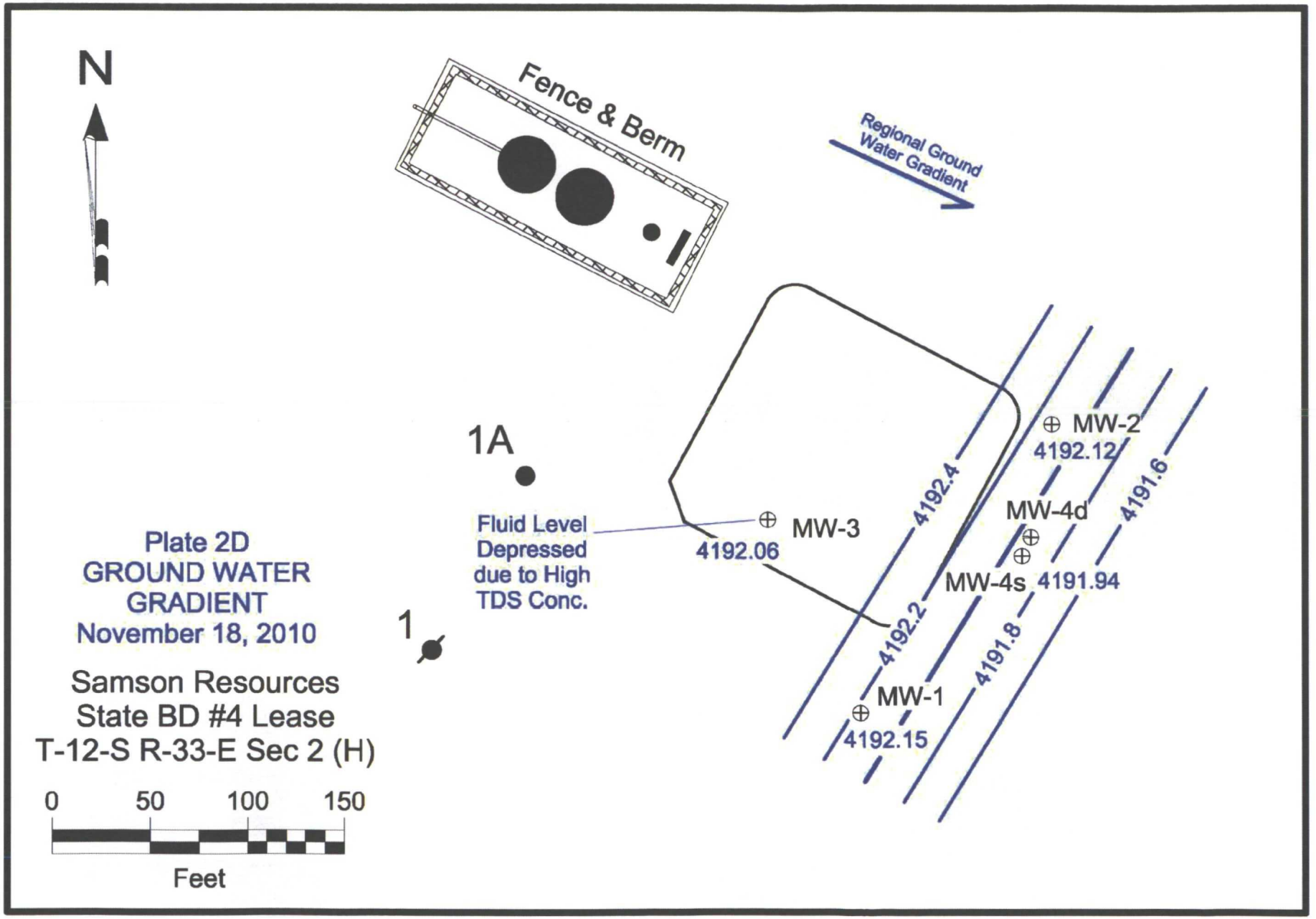
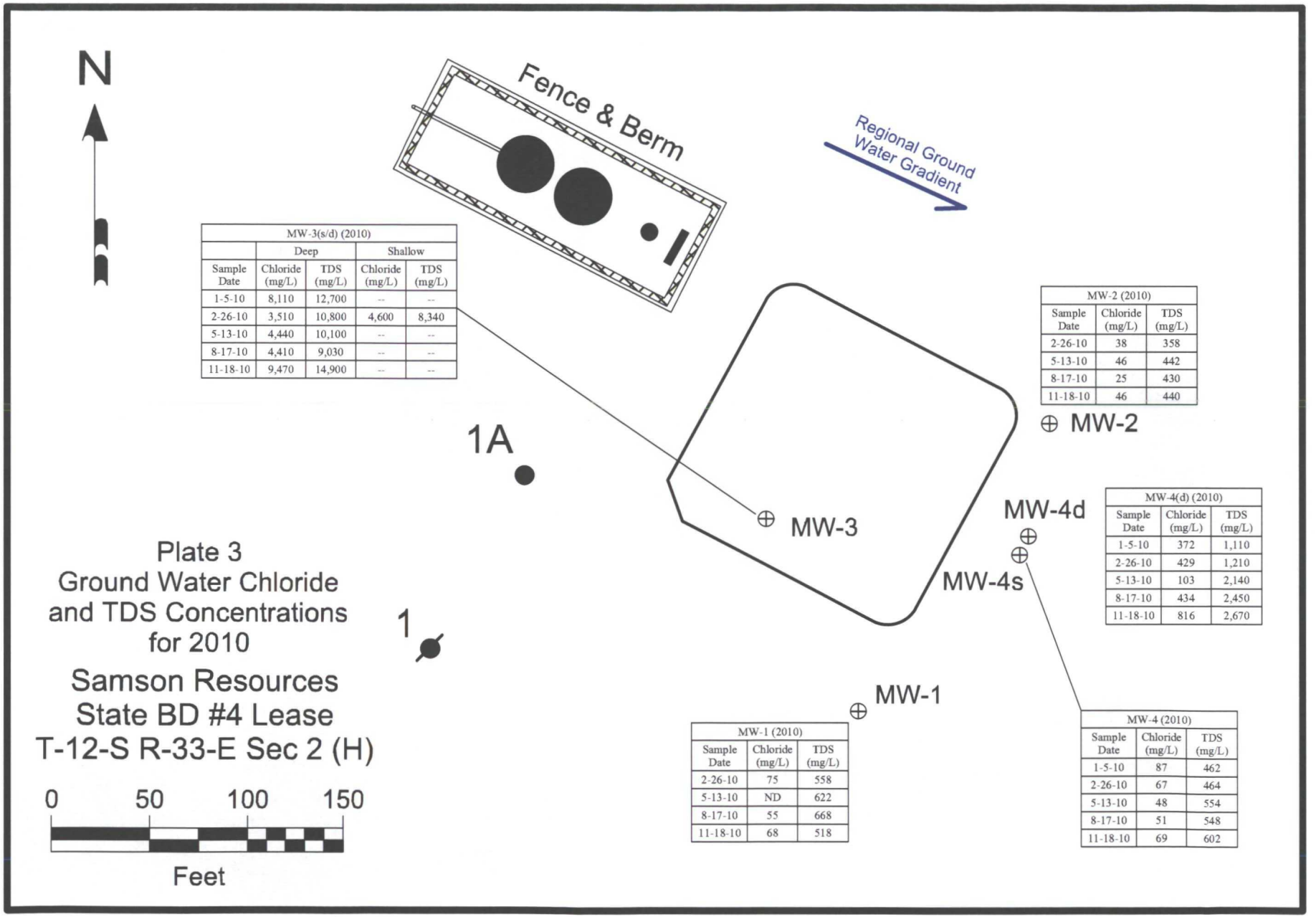

N
Fence & Berm
Plate 1
Topography of
Present ET Cover
Background
Moisture Ports
SB-NW
Excavation
Moisture Ports
SB-W
MW-2
1A
4226
MW-3
MW-4d
Area of Highest
Deep Soil Impact
4220
MW-4s
1
Contours indicate
present surface elevations
at the former reserve pit
MW-1
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet

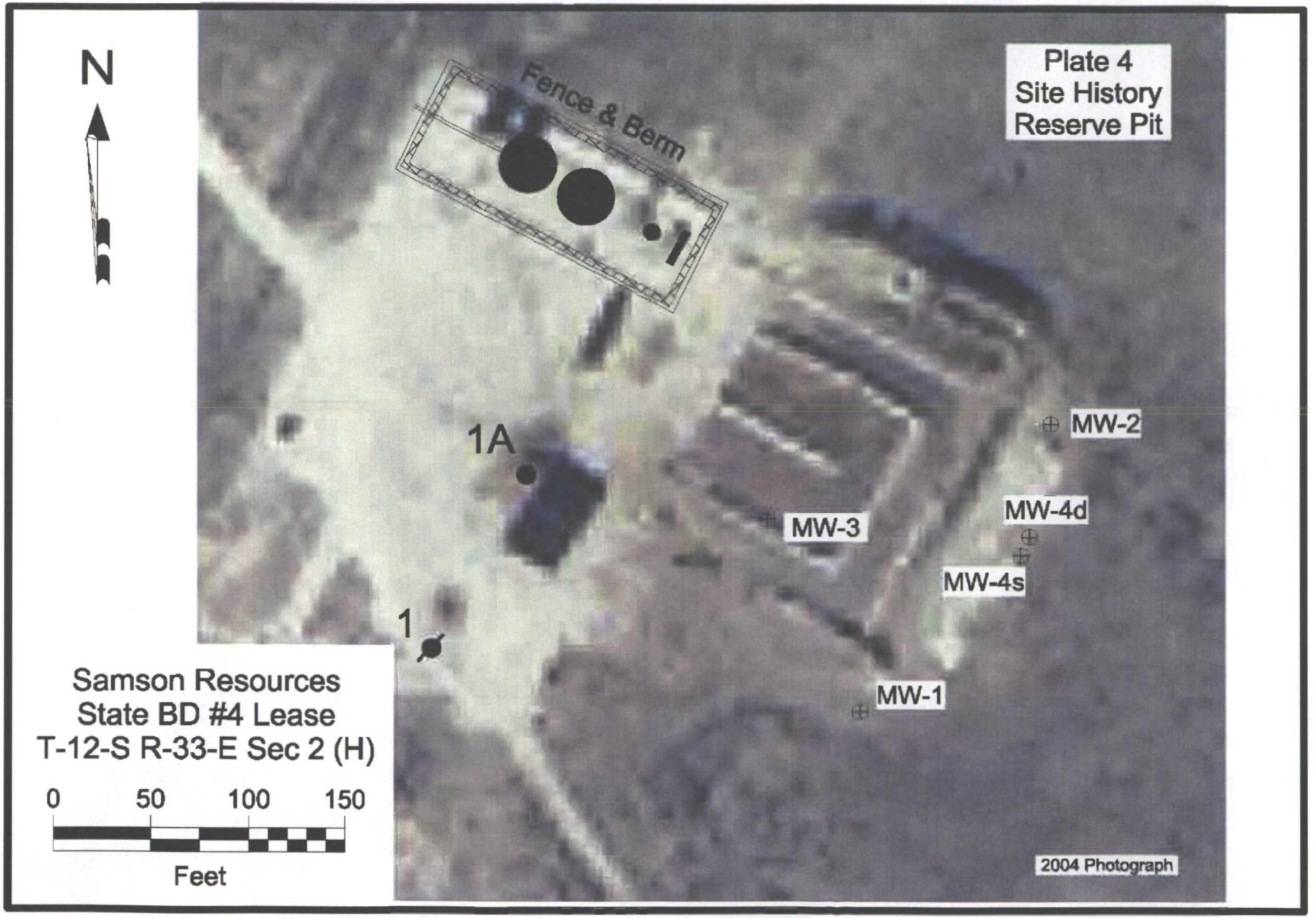

N
Fence & Berm
Regional Ground Water Gradient
1A
Fluid Level Depressed due to High TDS Conc.
MW-3
4191.97
4192.4
MW-2
4192.10
MW-4d
MW-4s 4191.92
4191.8
MW-1
4192.13
1
Plate 2A
GROUND WATER GRADIENT
February 26, 2010
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet

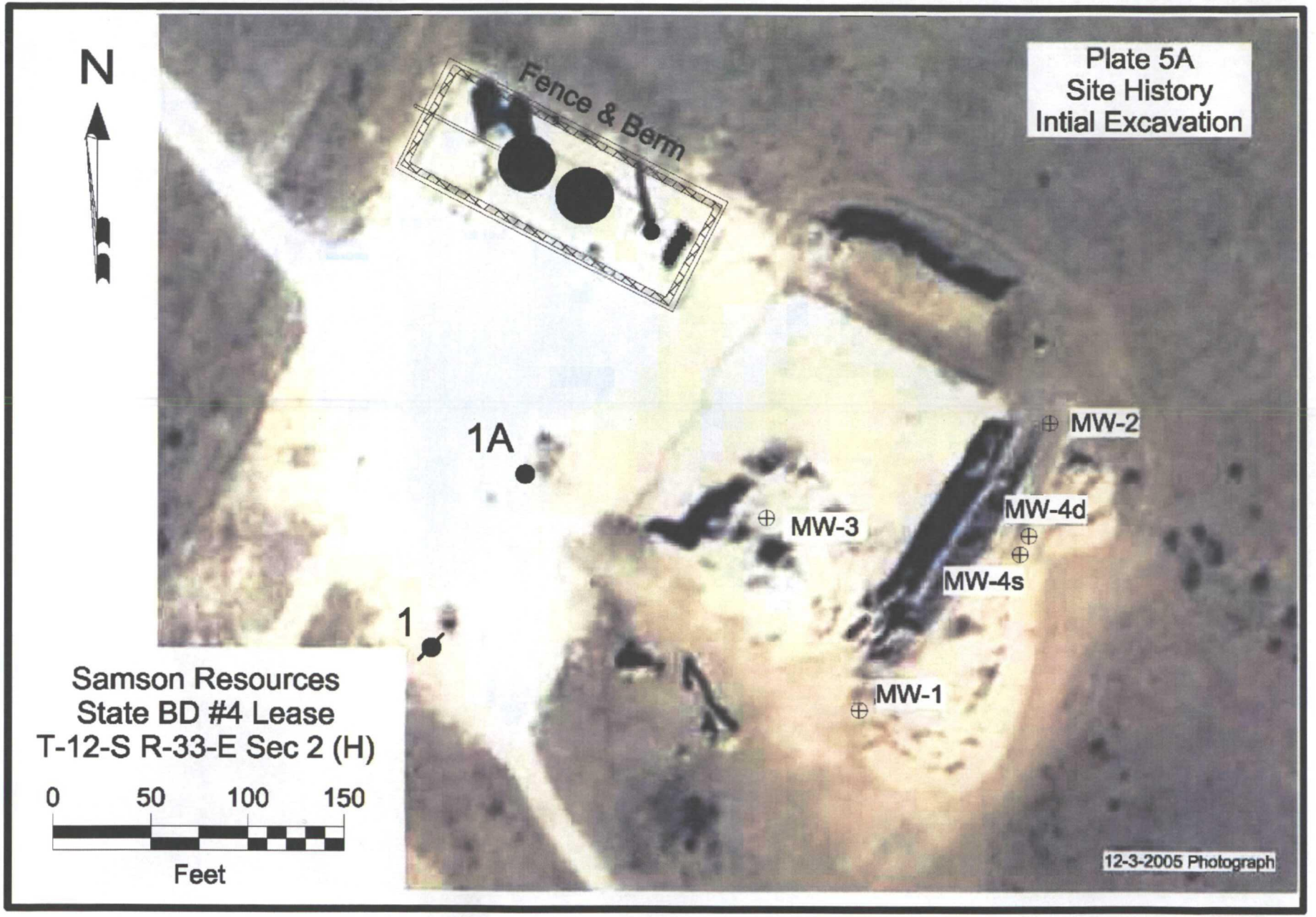

N
Fence & Berm
Regional Ground Water Gradient
1A
Fluid Level Depressed due to High TDS Conc.
MW-3
4192.04
MW-2
4192.10
MW-4d
MW-4s
4191.91
MW-1
4192.10
4192.4
4192.2
4191.8
4191.6
1
Plate 2B
GROUND WATER GRADIENT
May 13, 2010
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet

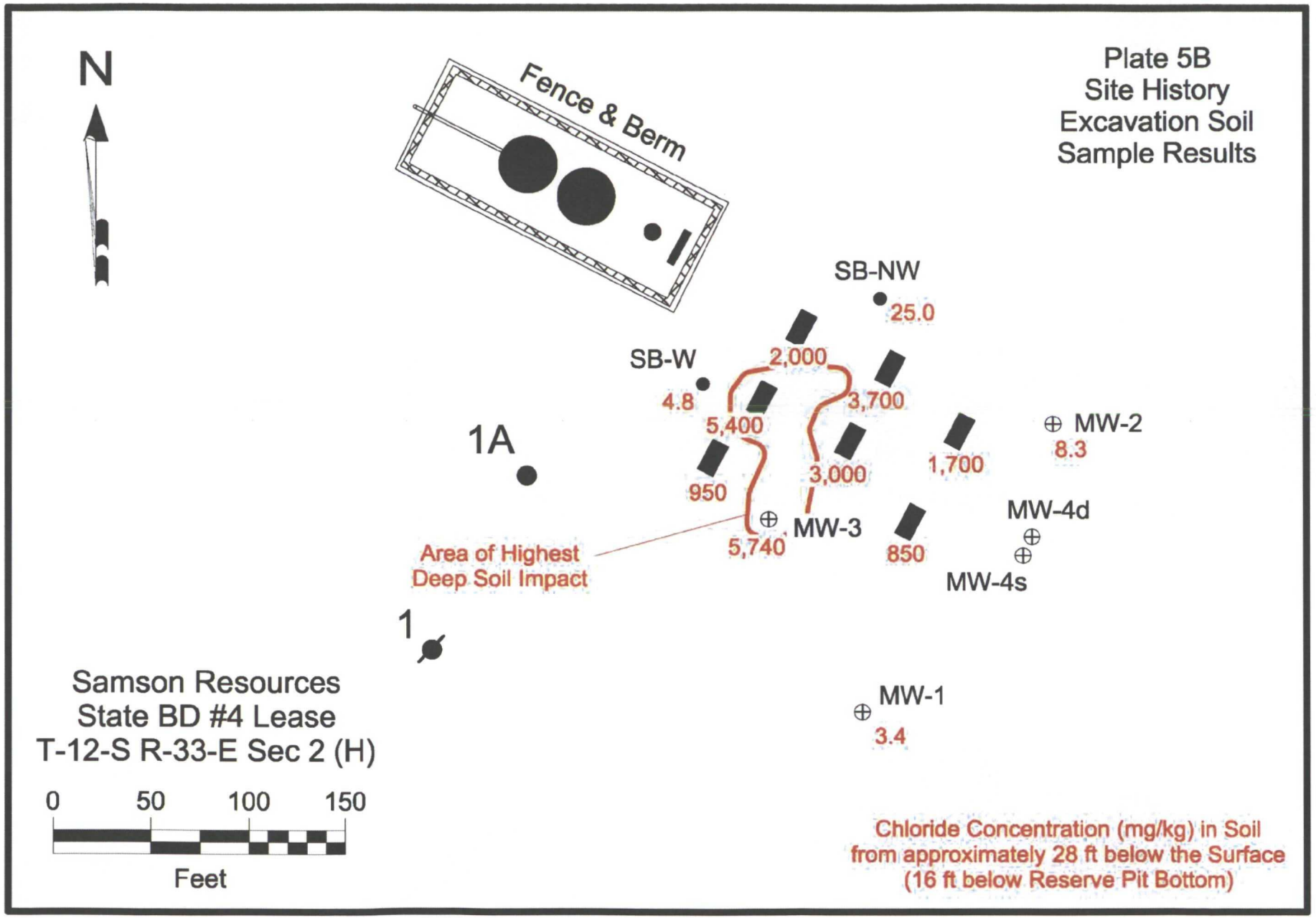

N
Fence & Berm
Regional Ground Water Gradient
1A
Fluid Level Depressed due to High TDS Conc.
MW-3
4192.07
MW-2
4192.13
MW-4d
MW-4s
4191.96
MW-1
4192.15
4192.4
4192.2
4191.8
4191.6
1
Plate 2C
GROUND WATER GRADIENT
August 17, 2010
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet

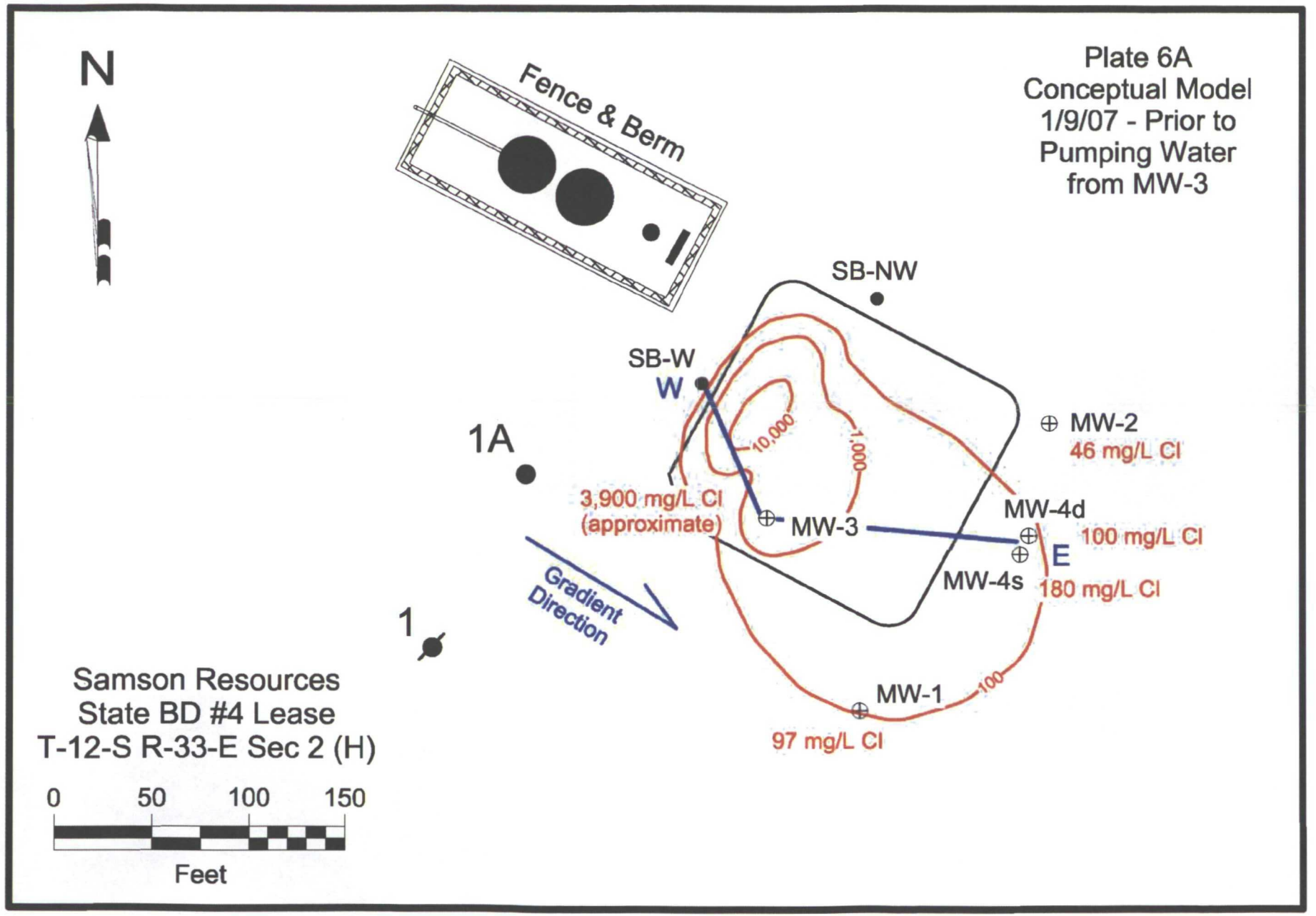

N
Fence & Berm
Regional Ground Water Gradient
1A
Fluid Level Depressed due to High TDS Conc.
MW-3
4192.06
MW-2
4192.12
MW-4d
MW-4s 4191.94
MW-1
4192.15
4192.4
4192.2
4191.8
4191.6
1
Plate 2D
GROUND WATER GRADIENT
November 18, 2010
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet

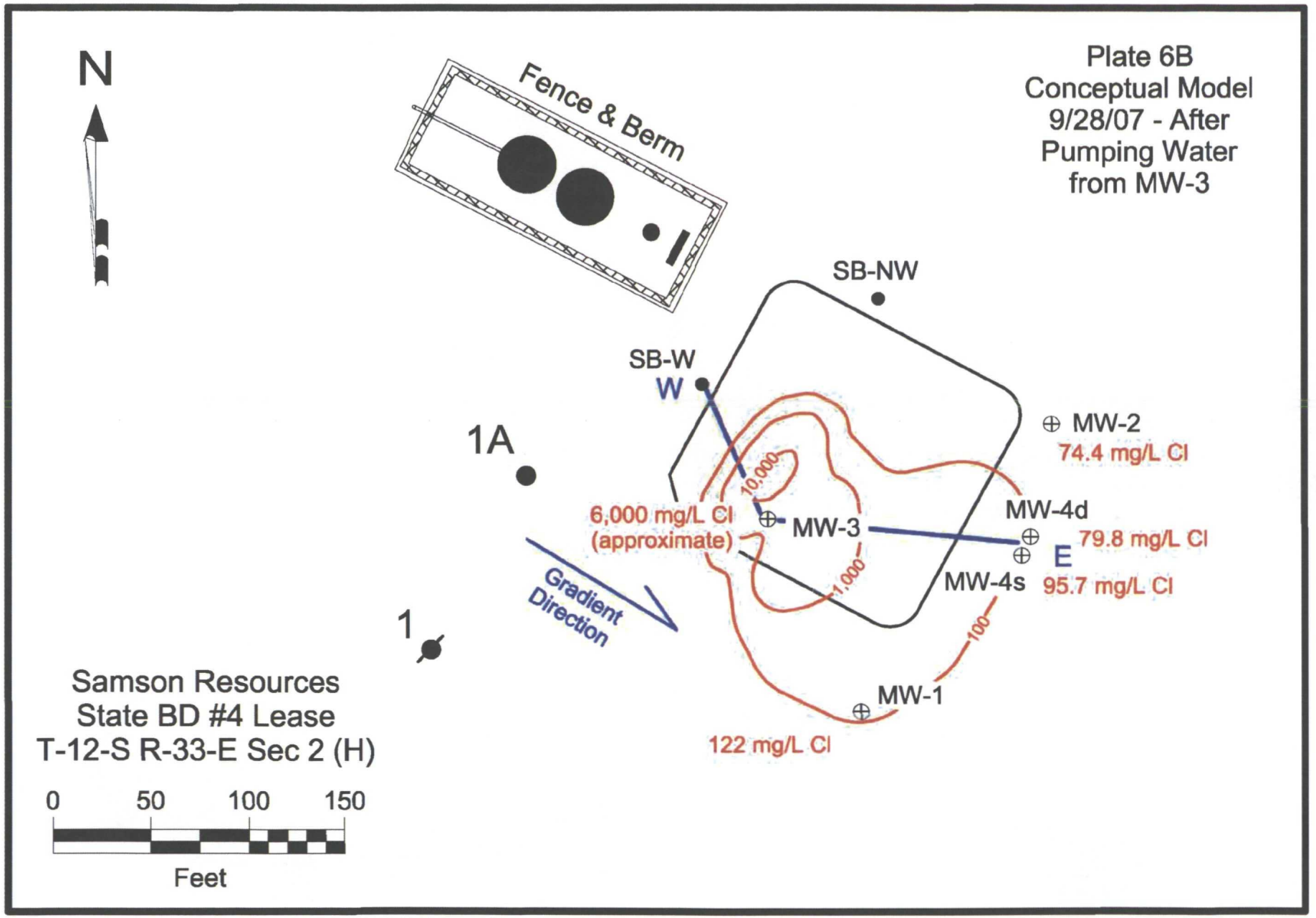

N
Fence & Berm
Regional Ground Water Gradient
MW-3(s/d) (2010)
Deep
Shallow
Sample Date
Chloride (mg/L)
TDS (mg/L)
Chloride (mg/L)
TDS (mg/L)
1-5-10 8,110 12,700 -- --
2-26-10 3,510 10,800 4,600 8,340
5-13-10 4,440 10,100 -- --
8-17-10 4,410 9,030 -- --
11-18-10 9,470 14,900 -- --
MW-2 (2010)
Sample Date
Chloride (mg/L)
TDS (mg/L)
2-26-10 38 358
5-13-10 46 442
8-17-10 25 430
11-18-10 46 440
MW-2
1A
MW-3
MW-4d
MW-4s
MW-4(d) (2010)
Sample Date
Chloride (mg/L)
TDS (mg/L)
1-5-10 372 1,110
2-26-10 429 1,210
5-13-10 103 2,140
8-17-10 434 2,450
11-18-10 816 2,670
1
MW-1
MW-1 (2010)
Sample Date
Chloride (mg/L)
TDS (mg/L)
2-26-10 75 558
5-13-10 ND 622
8-17-10 55 668
11-18-10 68 518
MW-4 (2010)
Sample Date
Chloride (mg/L)
TDS (mg/L)
1-5-10 87 462
2-26-10 67 464
5-13-10 48 554
8-17-10 51 548
11-18-10 69 602
Plate 3
Ground Water Chloride and TDS Concentrations for 2010
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0 50 100 150
Feet

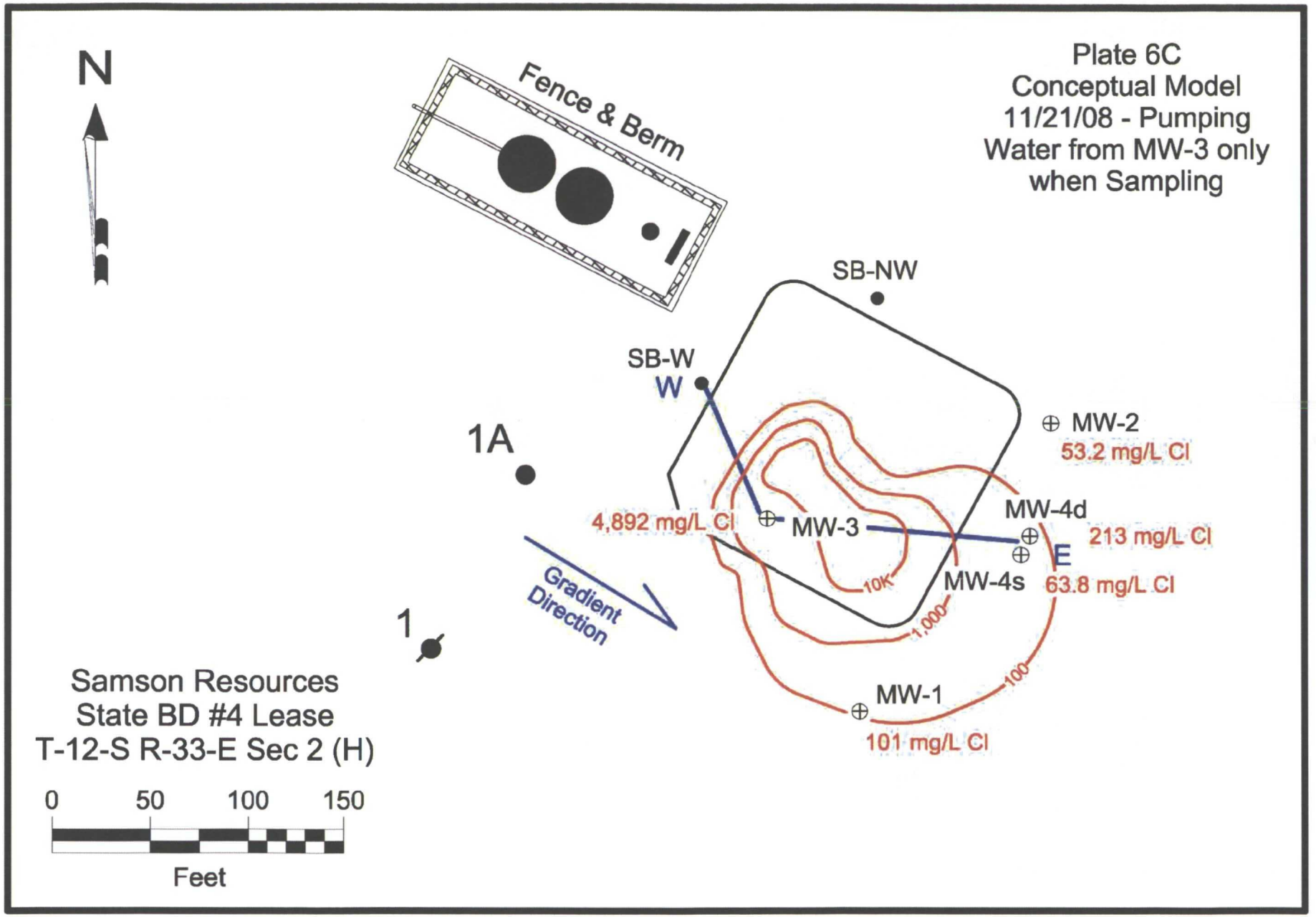

N
Plate 4
Site History
Reserve Pit
Fence & Berm
1A
1
MW-2
MW-3
MW-4d
MW-4s
MW-1
2004 Photograph
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet


N
Fence & Berm
Plate 5A
Site History
Intial Excavation
1A
1
MW-2
MW-3
MW-4d
MW-4s
MW-1
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet
12-3-2005 Photograph


N
Fence & Berm
Plate 5B
Site History
Excavation Soil
Sample Results
SB-NW
25.0
SB-W
4.8
2,000
3,700
5,400
1,700
MW-2
8.3
1A
950
3,000
MW-4d
MW-3
5,740
850
Area of Highest
Deep Soil Impact
MW-4s
1
MW-1
3.4
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet
Chloride Concentration (mg/kg) in Soil
from approximately 28 ft below the Surface
(16 ft below Reserve Pit Bottom)


N
Fence & Berm
Plate 6A
Conceptual Model
1/9/07 - Prior to
Pumping Water
from MW-3
SB-NW
SB-W
W
1A
1
10,000
1,000
3,900 mg/L Cl
(approximate)
MW-3
MW-2
46 mg/L Cl
MW-4d
100 mg/L Cl
E
MW-4s
180 mg/L Cl
Gradient
Direction
MW-1
100
97 mg/L Cl
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet


N
Fence & Berm
Plate 6B
Conceptual Model
9/28/07 - After
Pumping Water
from MW-3
SB-NW
SB-W
W
1A
1
MW-2
74.4 mg/L Cl
10,000
6,000 mg/L Cl
(approximate)
MW-3
MW-4d
79.8 mg/L Cl
E
MW-4s
95.7 mg/L Cl
1,000
100
Gradient
Direction
MW-1
122 mg/L Cl
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet


N
Fence & Berm
Plate 6C
Conceptual Model
11/21/08 - Pumping
Water from MW-3 only
when Sampling
SB-NW
SB-W
W
1A
MW-2
53.2 mg/L Cl
4,892 mg/L Cl
MW-3
MW-4d
213 mg/L Cl
E
MW-4s
63.8 mg/L Cl
10K
1,000
100
Gradient
Direction
1
MW-1
101 mg/L Cl
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet

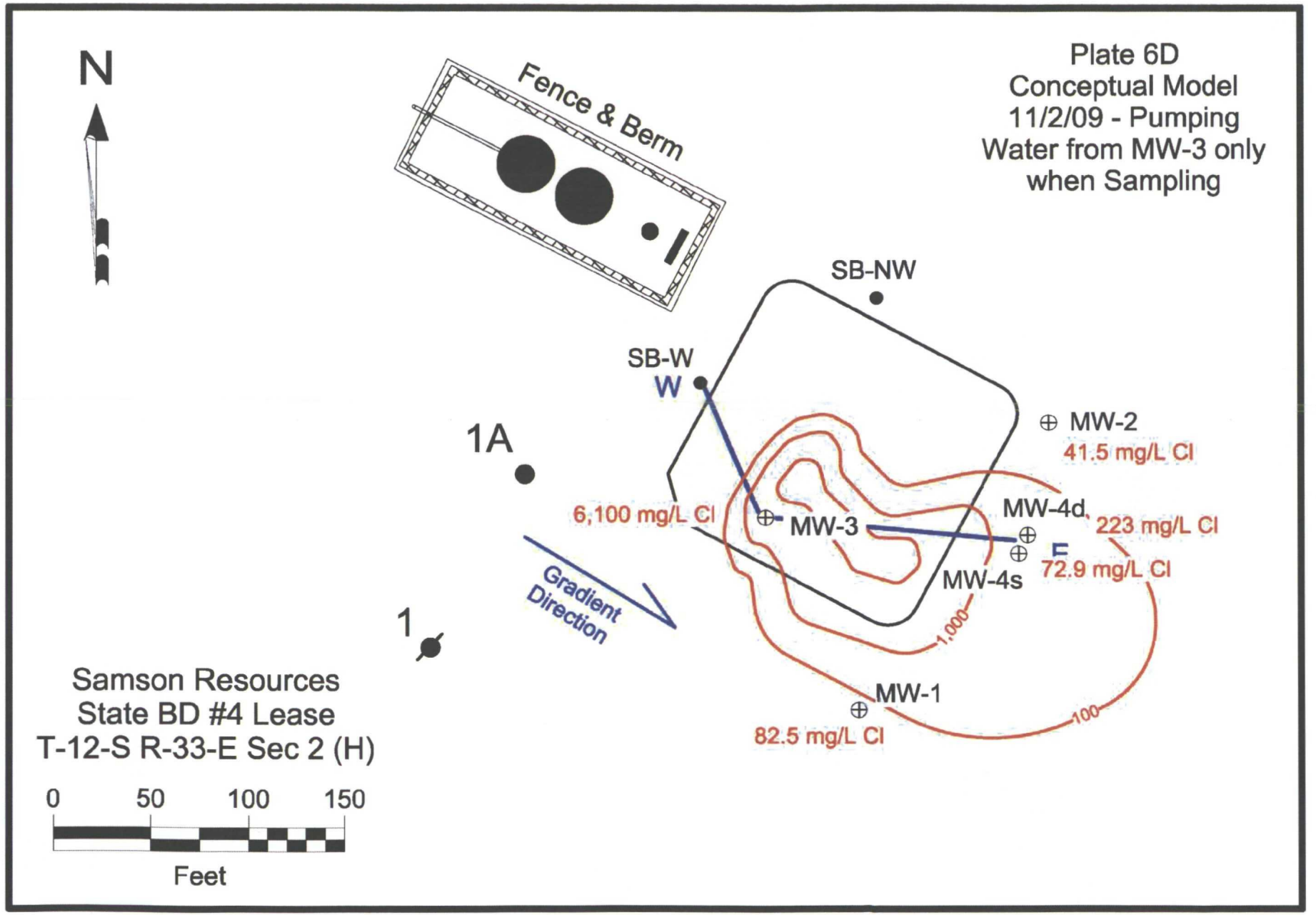
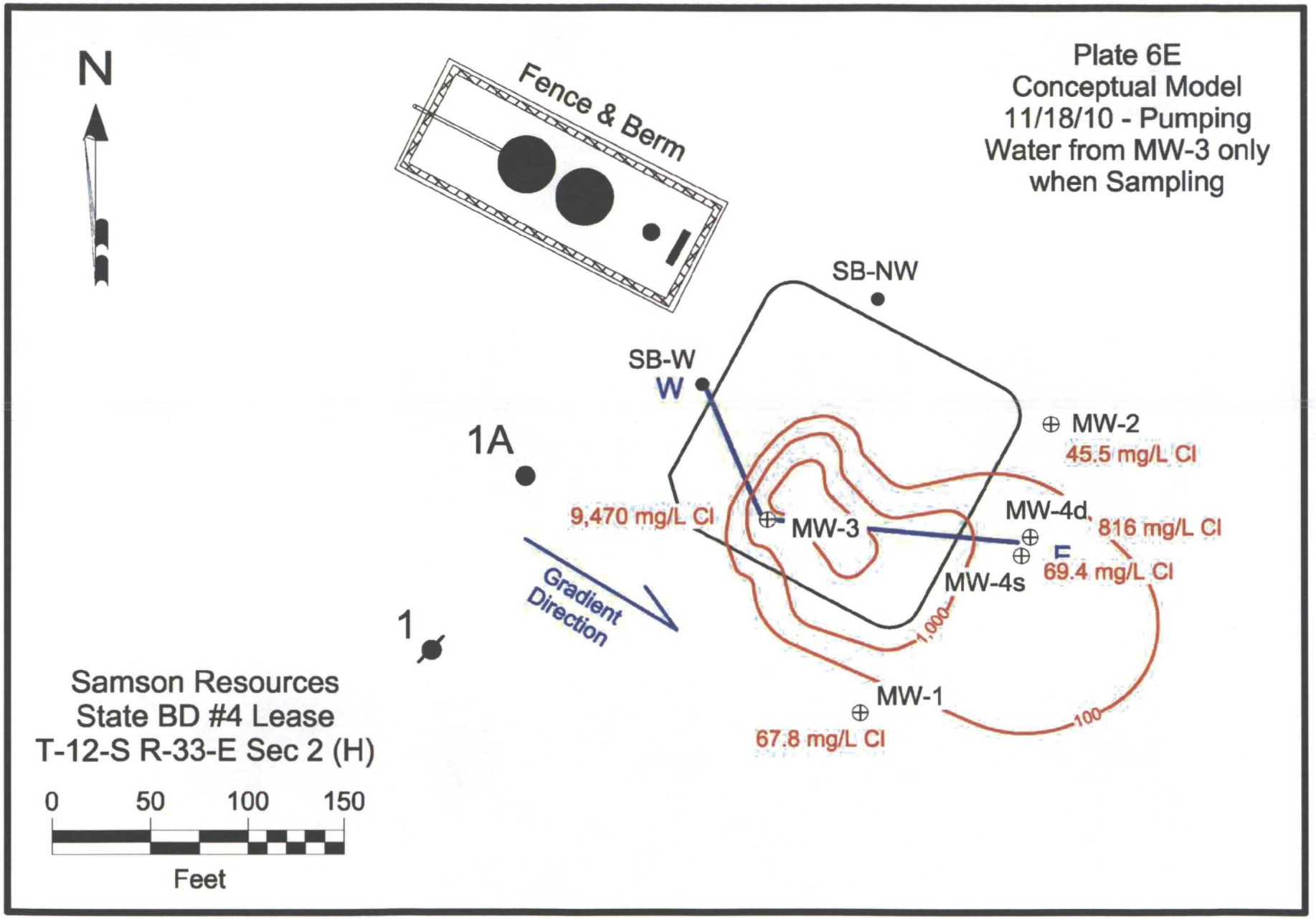


Plate 6D
Conceptual Model
11/2/09 - Pumping
Water from MW-3 only
when Sampling
N
Fence & Berm
SB-NW
SB-W
W
1A
1
MW-2
41.5 mg/L Cl
6,100 mg/L Cl
MW-3
MW-4d
223 mg/L Cl
E
72.9 mg/L Cl
MW-4s
Gradient
Direction
1,000
100
MW-1
82.5 mg/L Cl
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet


N
Fence & Berm
Plate 6E
Conceptual Model
11/18/10 - Pumping
Water from MW-3 only
when Sampling
SB-NW
SB-W
W
1A
MW-2
45.5 mg/L Cl
9,470 mg/L Cl
MW-3
MW-4d
816 mg/L Cl
E
69.4 mg/L Cl
MW-4s
Gradient
Direction
1
1,000
MW-1
67.8 mg/L Cl
100
Samson Resources
State BD #4 Lease
T-12-S R-33-E Sec 2 (H)
0
50
100
150
Feet

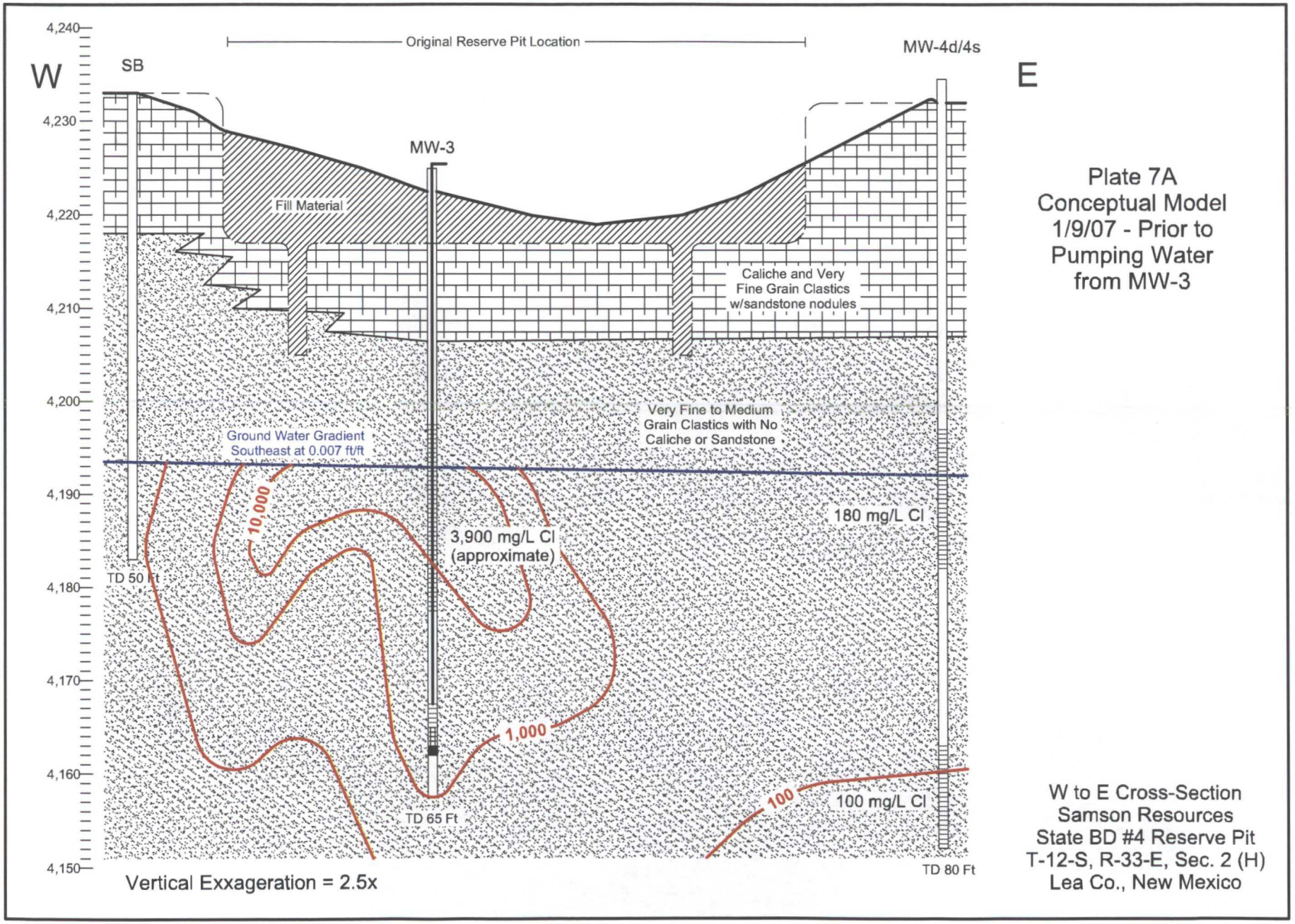


Plate 7A
Conceptual Model
1/9/07 - Prior to
Pumping Water
from MW-3

W to E Cross-Section
Samson Resources
State BD #4 Reserve Pit
T-12-S, R-33-E, Sec. 2 (H)
Lea Co., New Mexico

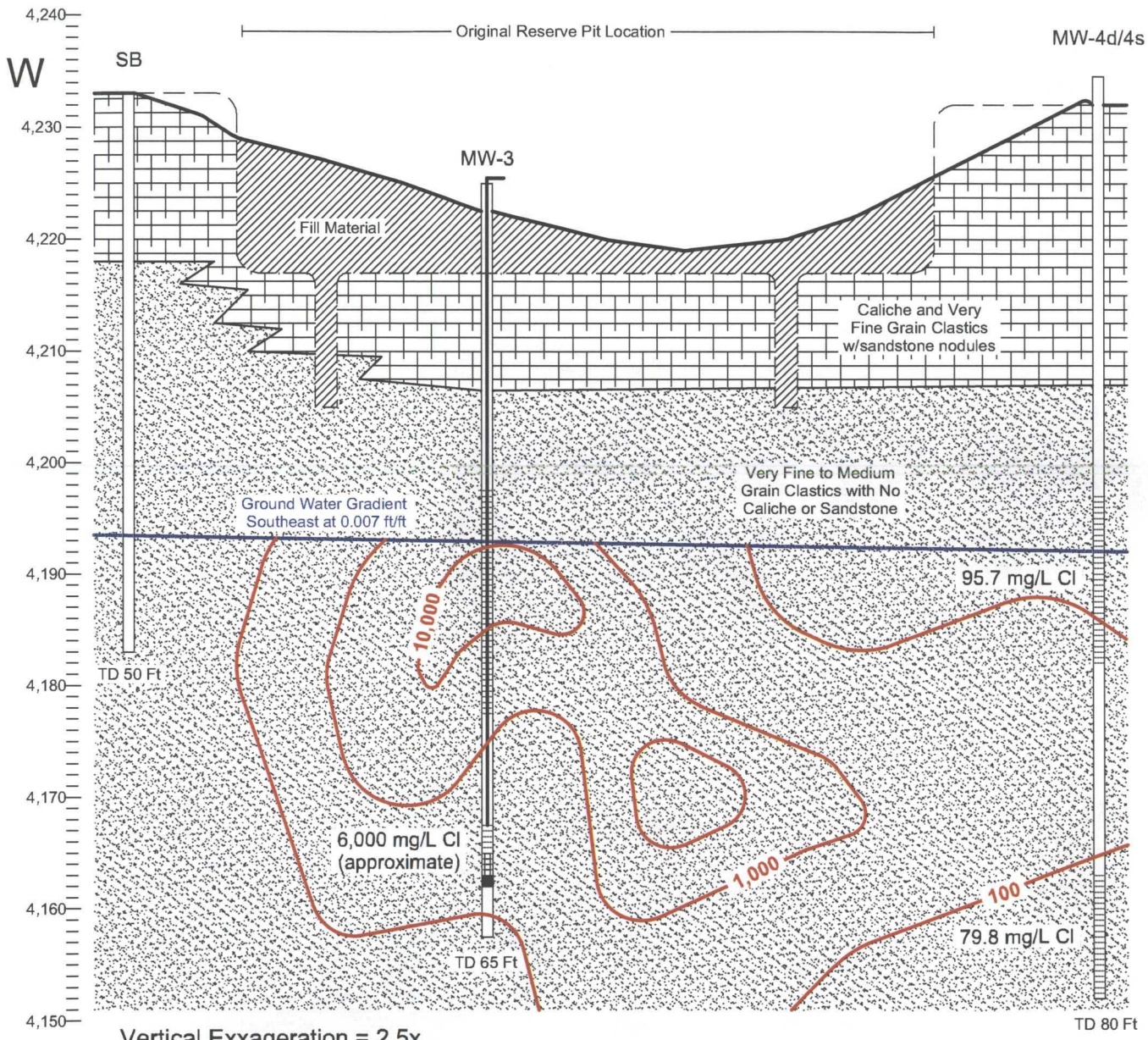


Plate 7B
Conceptual Model
9/28/07 - After
Pumping Water
from MW-3

W to E Cross-Section
Samson Resources
State BD #4 Reserve Pit
T-12-S, R-33-E, Sec. 2 (H)
Lea Co., New Mexico

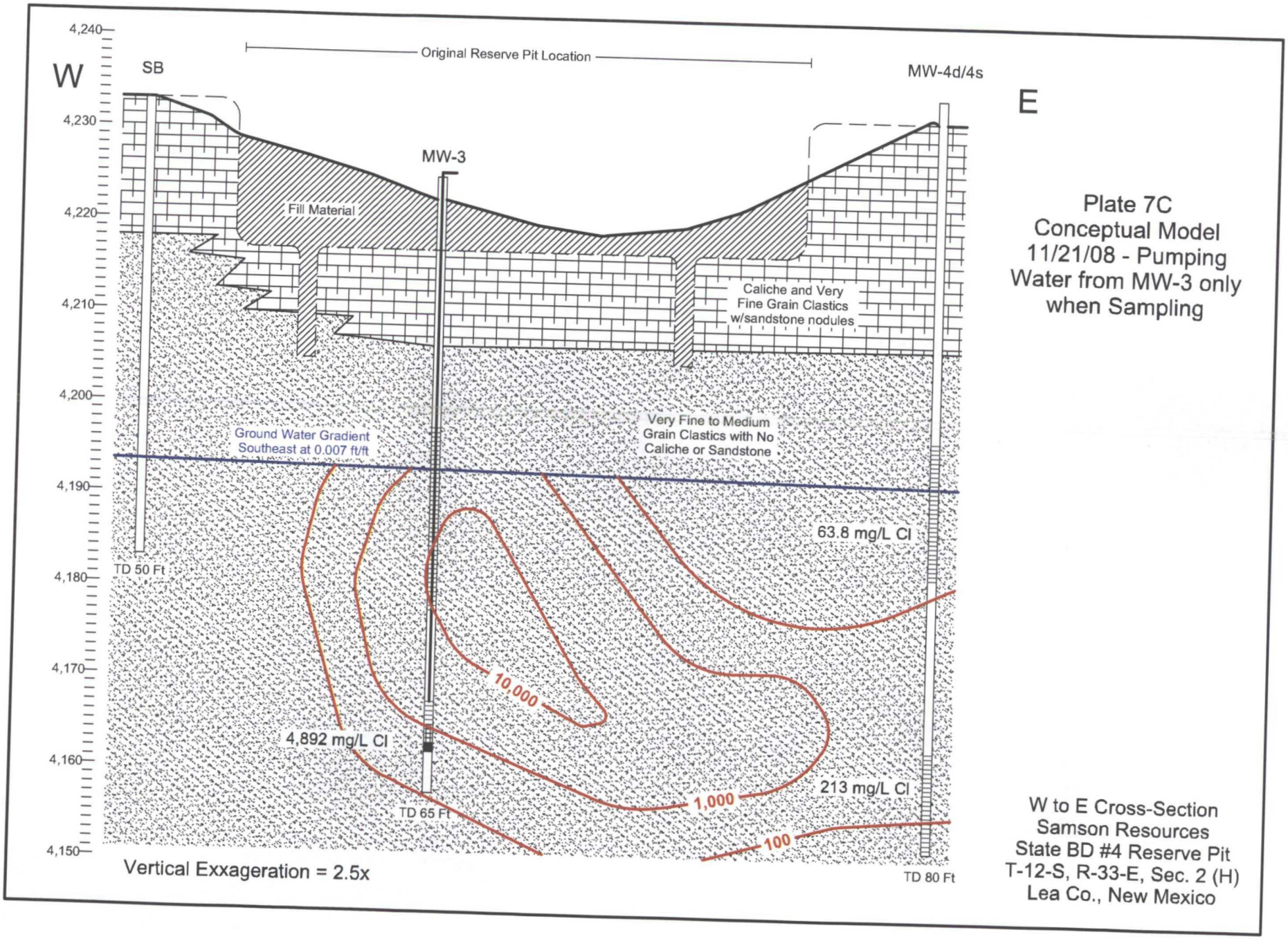


Plate 7C
Conceptual Model
11/21/08 - Pumping Water from MW-3 only when Sampling

W to E Cross-Section
Samson Resources
State BD #4 Reserve Pit
T-12-S, R-33-E, Sec. 2 (H)
Lea Co., New Mexico

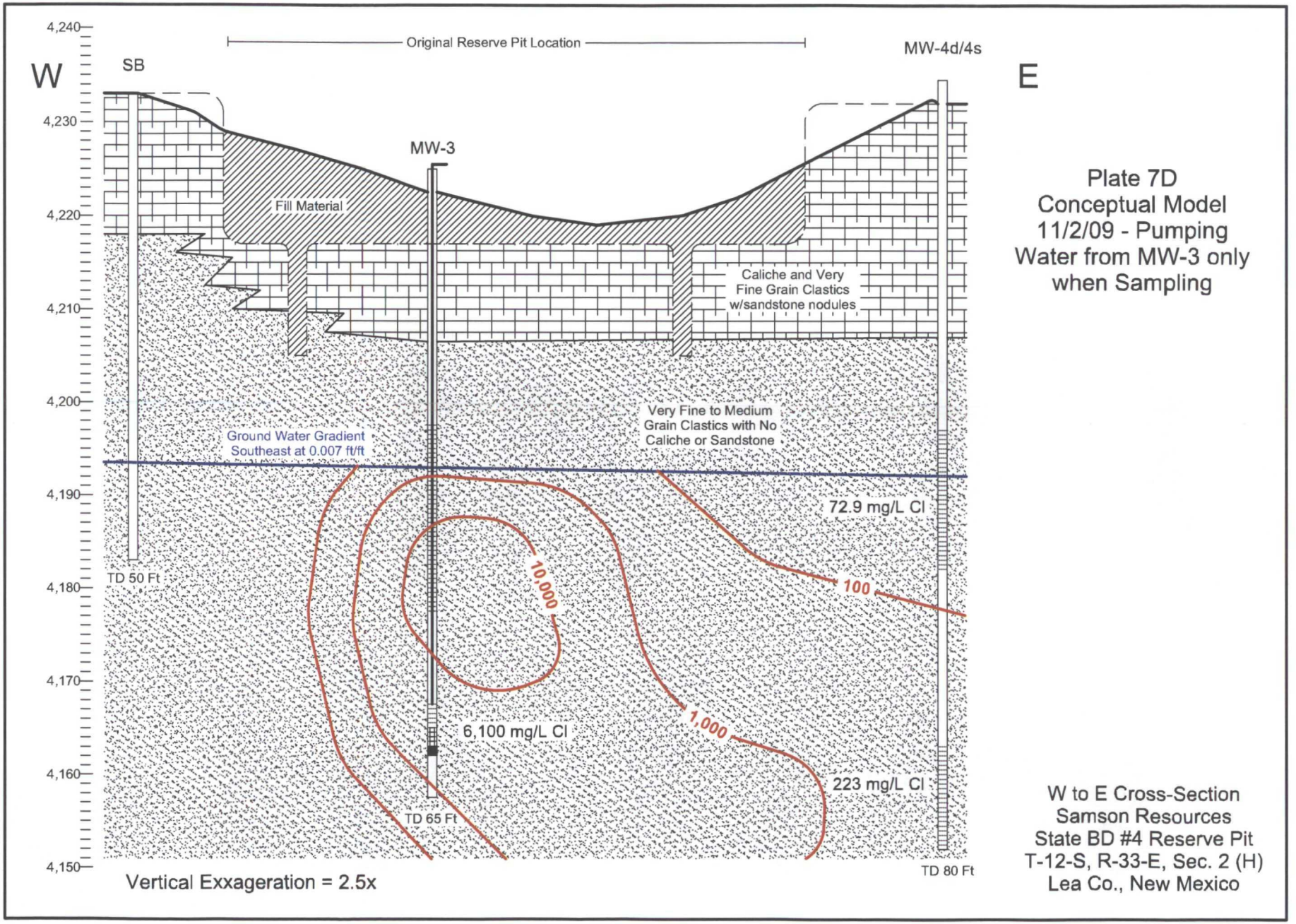


Plate 7D
Conceptual Model
11/2/09 - Pumping
Water from MW-3 only
when Sampling

W to E Cross-Section
Samson Resources
State BD #4 Reserve Pit
T-12-S, R-33-E, Sec. 2 (H)
Lea Co., New Mexico

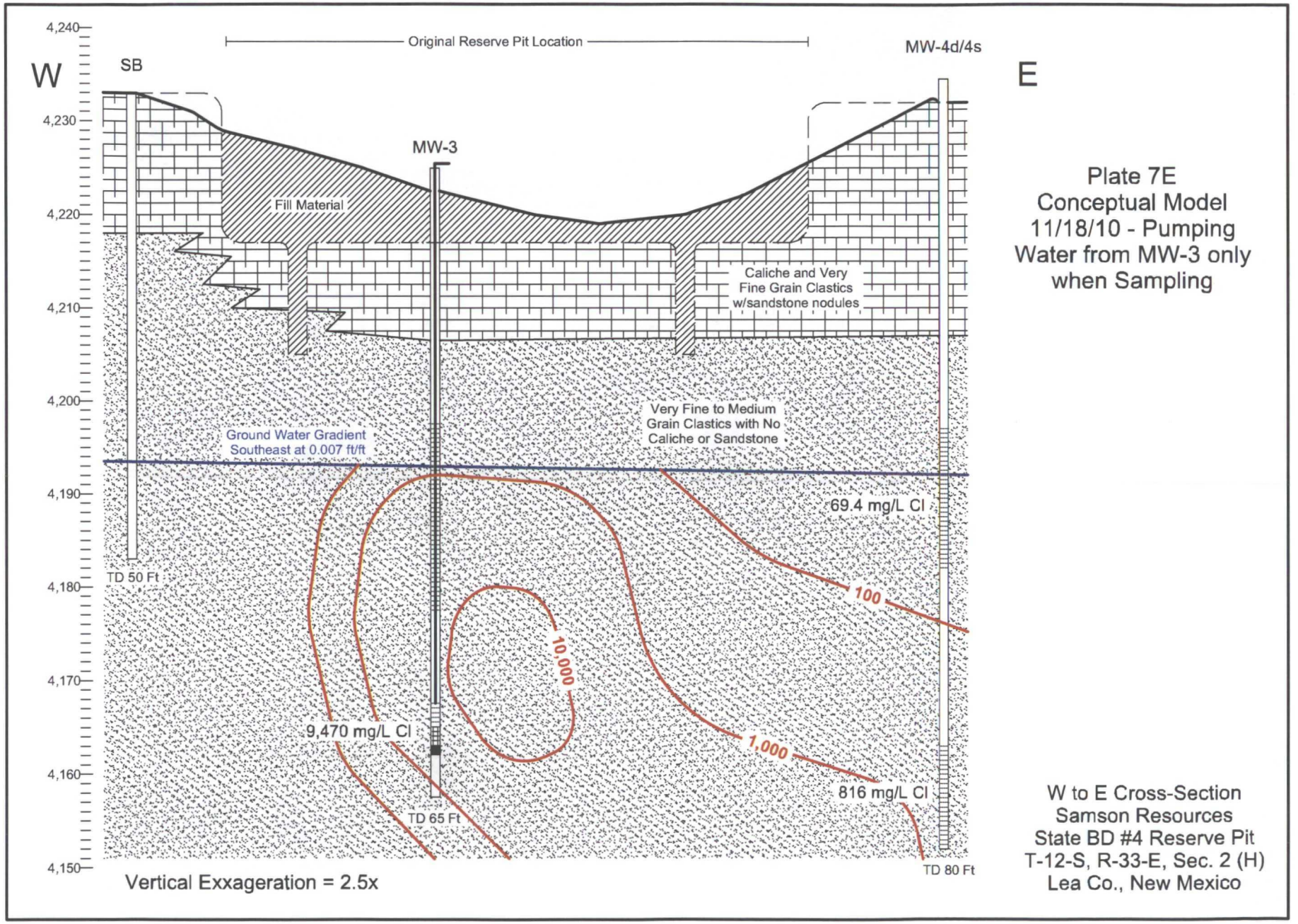


Plate 7E
Conceptual Model
11/18/10 - Pumping Water from MW-3 only when Sampling

W to E Cross-Section
Samson Resources
State BD #4 Reserve Pit
T-12-S, R-33-E, Sec. 2 (H)
Lea Co., New Mexico

Appendix A

Tables of Historic Data

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Appendix A

Tables of Historic Data

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Appendix A - Table 1A
Laboratory Results Summary - Pre-RT Hicks Soil Samples
Results in mg/kg

Sample Location Sample Depth (ft) Sample Date		Pit Comp. 16 ft (bgs) 12/2/05	Pit (max)* 28 ft (bgs) 12/2/05	Applicable Reg. Levels
Benzene		--	--	**0.2**
Toluene		--	--	**0.347**
Ethyl Benzene		--	--	**1.01**
Total Xylenes		--	--	**0.167**
GRO (C_6-C_{10})		--	--	**200**
DRO (>C_{10}-C_{28})		--	--	**200**
Total Alkalinity		208	96	--
Chloride		**4,958**	**6,958**	**1,000**
Carbonate		0	76	--
Bicarbonate		254	40	--
Sulfate		943	298	--
Calcium		128	705	--
Magnesium		78	467	--
Potassium		136	70	--
Sodium		2,928	2,928	--
Bromide		--	--	--

* - Sample taken from area of highest Cl concentration based on HACH kit field screening

Appendix A - Table 1B
Laboratory Results Summary - Excavation & Soil Boring Samples

Sample Location (Surface Elevation)	Sample Date	Depth (ft)	Elevation (ft)		Br (mg/kg)	Chloride (mg/kg)
MW-1 (4233.0)	5/8/06	9	4,224		--	49.4
		19	4,214		--	7.86
		29	4,204		--	3.38
		34	4,199		<0.1	5.02
MW-2 (4230.5)	5/9/06	9	4,222		--	10.0
		19	4,212		--	7.30
		29	4,202		--	8.27
		34	4,197		--	7.77
		39	4,192		0.187	12.0
NE "side" of Pit	7/12/06	28	4,205		<3.0	**3,700**
East "corner" of Pit	7/12/06	28	4,205		<3.0	**1,700**
North "corner" of Pit	7/12/06	28	4,205		<3.0	**2,000**
Center of Pit	7/12/06	28	4,205		<3.0	**3,000**
SE "side" of Pit	7/12/06	28	4,205		<3.0	850
NW "side" of Pit	7/12/06	28	4,205		<3.0	**5,400**
Avg. Clean Stockpile	7/12/06	surface	4,233		--	208
Avg. Dirty Stockpile	7/12/06	surface	4,233		--	**1,768**
East "corner" of Pit	7/12/06	28	4,205		--	950
MW-3 (4222.0)	12/11/06	15	4,207		--	**5,740**
		20	4,202		--	**5,320**
		25	4,197		--	**5,740**
		30	4,192		--	936
MW-4d (4232.0)	1/8/07	10	4,222		--	15.0
		35	4,197		--	3.6
		80	4,152		--	8.9
NW Soil Boring	1/8/07	10	4,224		--	**1,900**
		15	4,219		--	**1,100**
		35	4,199		--	25.0
West Soil Boring	1/9/07	10	4,224		--	**2,400**
		15	4,219		--	**1,300**
		35	4,199		--	4.8

NMOCD Landfarm Closure Standard	**1,000**

Bold **Text** indicate concentration exceeds Regulatory Standards

c:\Samson\State BD-4\BD #4 Project Data

Appendix A - Table 2
Laboratory Results Summary - Groundwater Samples

Monitor Well TOC Elev.	Sample Date	Water Depth	Water Elevation	pH (unitless)	Cond. (uS/cm)	Chloride (mg/L)	TDS (mg/L)	% Cl of TDS
MW-1	5/11/06	41.18	4,192.05	7.41	1.17	--	--	
4,233.23	5/12/06	41.24	4,191.99	7.15	0.88	131	838	16%
	8/2/06	41.22	4,192.01	7.07	0.99	115	648	18%
	10/17/06	41.14	4,192.09					
	12/12/06	41.09	4,192.14					
	1/9/07	41.07	4,192.16			97		
	2/6/07	41.32	4,191.91					
	2/6/07	41.25	4,191.98					
	2/16/07	41.37	4,191.86		0.985			
	3/8/07	41.39	4,191.84			83	620	13%
	3/13/07	41.36	4,191.87		1.025			
	4/17/07	41.13	4,192.10	7.41	0.82	89.6	674	13%
	5/21/07	40.99	4,192.24	7.96	0.79	83.8	630	13%
	6/21/07	41.02	4,192.21	7.52	0.74	76.5	632	12%
	7/18/07	41.05	4,192.18	7.50	0.80	102	650	16%
	8/22/07	40.96	4,192.27	7.26	0.86	88.0	672	13%
	9/28/07	40.94	4,192.29	7.62	0.94	122	606	20%
	10/24/07	41.00	4,192.23	7.75	0.93	117	710	16%
	2/11/08	41.01	4,192.22	7.60	1.00	84.7	1020	8%
	3/13/08	41.01	4,192.22	--	--	--	--	--
	5/5/08	41.03	4,192.20	7.26	1.22	96.3	596	16%
	8/20/08	41.10	4,192.13	7.19	0.96	72.3	568	13%
	11/21/08	41.11	4,192.12	7.14	1.01	101	498	20%
	2/17/09	41.10	4,192.13	7.17	1.14	75.4	558	14%
	5/26/09	41.13	4,192.10	7.43	0.89	60.9	554	11%
	8/24/09	41.09	4,192.14	7.27	0.99	65.5	586	11%
	11/2/09	40.95	4,192.28	7.23	1.00	82.5	540	15%
	2/26/10	41.10	4,192.13	7.19	1.00	74.5	558	13%
	5/13/10	41.13	4,192.10	7.16	0.97	ND	622	--
	8/17/10	41.08	4,192.15	7.09	0.94	54.6	668	8%
	11/18/10	41.08	4,192.15	7.26	0.95	67.8	518	13%
MW-2	5/11/06	41.85	4,192.02	7.80	0.81			
4,233.87	5/12/06	41.88	4,191.99	7.50	0.60	44.5	530	8%
	8/2/06	41.88	4,191.99	7.38	0.67	42.2	444	10%
	10/17/06	41.82	4,192.05					
	12/12/06	41.77	4,192.10					
	1/9/07	41.75	4,192.12			46.0		
	2/6/07	41.93	4,191.94					
	2/6/07	41.88	4,191.99					
	2/16/07	41.97	4,191.90		0.924			
	3/8/07	42.03	4,191.84			45	510	9%
	3/13/07	41.99	4,191.88		0.663			
	4/17/07	41.81	4,192.06	7.93	0.65	41.5	436	10%
	5/21/07	41.73	4,192.14	8.31	0.63	38.6	452	9%
	6/21/07	41.73	4,192.14	7.72	0.57	39.7	516	8%
	7/18/07	41.72	4,192.15	8.16	0.56	41.7	388	11%
	8/22/07	41.66	4,192.21	7.60	0.68	40.9	550	7%

Appendix A - Table 2
Laboratory Results Summary - Groundwater Samples

Monitor Well TOC Elev.	Sample Date	Water Depth	Water Elevation	pH (unitless)	Cond. (uS/cm)	Chloride (mg/L)	TDS (mg/L)	% Cl of TDS
	9/28/07	41.65	4,192.22	7.82	0.66	74.4	452	16%
	10/24/07	41.67	4,192.20	7.64	0.73	74.4	430	17%
	2/11/08	41.68	4,192.19	7.56	0.78	39.8	744	5%
	3/13/08	41.68	4,192.19	--	--	--	--	--
	5/5/08	41.68	4,192.19	7.37	0.77	40.1	406	10%
	8/20/08	41.75	4,192.12	7.51	0.71	28.7	440	7%
	11/21/08	41.78	4,192.09	7.40	0.77	53.2	388	14%
	2/17/09	41.77	4,192.10	7.43	0.87	39.7	462	9%
	5/26/09	41.78	4,192.09	7.79	0.66	35.8	418	9%
	8/24/09	41.76	4,192.11	7.63	0.75	35.8	424	8%
	11/2/09	41.66	4,192.21	7.80	0.75	41.5	406	10%
	2/26/10	41.77	4,192.10	7.49	0.74	38.2	358	11%
	5/13/10	41.77	4,192.10	7.19	0.72	45.8	442	10%
	8/17/10	41.74	4,192.13	7.43	0.73	25.2	430	6%
	11/18/10	41.75	4,192.12	7.67	0.72	45.5	440	10%
MW-3 (S)	12/12/06	32.81	4,191.71					
4,224.52	12/18/06	32.82	4,191.70			**3,900**	**5,800**	67%
	1/9/07	32.27	4,192.25					
	2/6/07	32.7	4,191.82					
Pump On	2/6/07	44.47	4,180.05			**2,500**	**4,400**	57%
	2/16/07	44.45	4,180.07		8.71			
	3/8/07	40.12	4,184.40		10.31	**3,400**	**6,200**	55%
	3/13/07	42.41	4,182.11		10.27			
	4/17/07	42	4,182.52	8.08	7.45	**2,730**	**4,520**	60%
	5/21/07	41	4,183.52	8.20	8.67	**3,340**	**6,430**	52%
	6/21/07	42	4,182.52	7.78	10.24	**4,750**	**7,960**	60%
Pump Off	7/18/07	32.48	4,192.04	7.45	10.24	**5,730**	**8,730**	66%
	8/22/07	32.22	4,192.30					
	9/28/07	32.24	4,192.28	On August 16, 2007 the pump was moved down to the lower screened interval. The base of the pump is set at a depth of 57 feet (screen at 55 - 60 ft).				
	10/24/07	32.35	4,192.17					
	2/11/08	32.42	4,192.10					
	2/26/10	32.55	4,191.97	7.73	17.33	**4,600**	**8,340**	55%
MW-3 (D)	12/18/06	--	--		0.87	**2,000**	**3,700**	54%
4,224.52	3/8/07	--	--		10.28	**3,500**	**6,200**	56%
	3/13/07	42.41	4,182.11		10.06			
	3/13/08	32.45	4,192.07	--	--	**7,730**	**12,400**	62%
	5/5/08	32.50	4,192.02	6.60	19.70	**9,680**	**15,200**	64%
	8/20/08	32.42	4,192.10	7.14	12.76	**5,300**	**7,550**	70%
	11/21/08	32.42	4,192.10	7.21	10.30	**4,892**	**6,330**	77%
	2/17/09	32.41	4,192.11	7.24	12.04	**4,110**	**5,720**	72%
	5/26/09	32.43	4,192.09	8.01	10.50	**3,300**	**5,330**	62%
	8/24/09	32.41	4,192.11	8.13	10.62	**3,150**	**5,250**	60%
	11/2/09	32.30	4,192.22	7.25	17.59	**6,100**	**9,110**	67%
	1/5/10	32.40	4,192.12	7.47	>20	**8,110**	**12,700**	64%
	2/26/10	32.55	4,191.97	7.80	>20	**3,510**	**10,800**	33%
	5/13/10	32.48	4,192.04	7.73	16.73	**4,440**	**10,100**	44%

Appendix A - Table 2
Laboratory Results Summary - Groundwater Samples

Monitor Well TOC Elev.	Sample Date	Water Depth	Water Elevation	pH (unitless)	Cond. (uS/cm)	Chloride (mg/L)	TDS (mg/L)	% Cl of TDS
	8/17/10	32.45	4,192.07	7.49	15.95	**4,410**	**9,030**	49%
	11/18/10	32.46	4,192.06	7.27	>20	**9,470**	**14,900**	64%
MW-4(S)	1/9/07	--	--			180		
4,233.52	2/6/07	41.73	4,191.79					
	2/6/07	41.80	4,191.72					
	2/16/07	41.84	4,191.68		0.98			
	3/8/07	41.85	4,191.67			120	680	18%
	3/13/07	41.82	4,191.70		0.99			
	4/17/07	41.61	4,191.91	7.78	0.79	84.8	598	14%
	5/21/07	41.50	4,192.02	8.16	0.73	65.7	442	15%
	6/21/07	41.51	4,192.01	7.79	0.65	65.8	618	11%
	7/18/07	41.54	4,191.98	7.81	0.68	67.5	514	13%
	8/22/07	41.44	4,192.08	7.46	0.78	64.0	960	7%
	9/28/07	41.43	4,192.09	7.89	0.77	95.7	640	15%
	10/24/07	41.48	4,192.04	7.97	0.84	85.1	786	11%
	2/11/08	41.50	4,192.02	7.44	0.90	55.2	688	8%
	3/13/08	41.50	4,192.02	--	--	--	--	--
	5/5/08	41.51	4,192.01	7.35	0.86	49.5	514	10%
	8/20/08	41.58	4,191.94	7.35	0.77	32.5	476	7%
	11/21/08	41.60	4,191.92	7.23	0.83	63.8	478	13%
	2/17/09	41.60	4,191.92	7.26	0.97	50.1	512	10%
	5/26/09	41.61	4,191.91	7.62	0.75	52.2	490	11%
	8/24/09	41.57	4,191.95	7.45	0.87	63.2	516	12%
	11/2/09	41.43	4,192.09	7.43	0.88	72.9	470	16%
	1/5/10	41.53	4,191.99	7.41	0.88	87.4	462	19%
	2/26/10	41.60	4,191.92	7.39	0.89	67.0	464	14%
	5/13/10	41.61	4,191.91	7.20	0.85	48.0	554	9%
	8/17/10	41.56	4,191.96	7.30	0.82	50.8	548	9%
	11/18/10	41.58	4,191.94	7.48	0.87	69.4	602	12%
MW-4(D)	1/9/07	--	--			100		
4,233.38	2/6/07	41.61	4,191.77					
	2/6/07	41.53	4,191.85					
	2/16/07	41.64	4,191.74		0.95			
	3/8/07	41.65	4,191.73			52.0	550	9%
	3/13/07	41.63	4,191.75		0.78			
	4/17/07	41.42	4,191.96	7.87	0.70	45.7	562	8%
	5/21/07	41.32	4,192.06	8.33	0.69	44.8	458	10%
	6/21/07	41.33	4,192.05	7.72	0.61	42.4	610	7%
	7/18/07	41.34	4,192.04	7.93	0.62	48.2	508	9%
	8/22/07	41.26	4,192.12	7.53	0.74	50.4	494	10%
	9/28/07	41.24	4,192.14	7.79	0.75	79.8	474	17%
	10/24/07	41.29	4,192.09	7.94	0.87	95.7	690	14%
	2/11/08	41.30	4,192.08	7.42	1.31	231	764	30%
	3/13/08	41.32	4,192.06	--	--	--	--	--
	5/5/08	41.32	4,192.06	7.26	1.22	217	804	27%
	8/20/08	41.39	4,191.99	7.33	1.16	225	736	31%
	11/21/08	41.41	4,191.97	7.22	1.25	213	682	31%

Appendix A - Table 2
Laboratory Results Summary - Groundwater Samples

Monitor Well TOC Elev.	Sample Date	Water Depth	Water Elevation	pH (unitless)	Cond. (uS/cm)	Chloride (mg/L)	TDS (mg/L)	% Cl of TDS
	2/17/09	41.40	4,191.98	7.22	1.48	190	778	24%
	5/26/09	41.42	4,191.96	7.50	1.12	167	912	18%
	8/24/09	41.39	4,191.99	7.35	1.35	203	762	27%
	11/2/09	41.25	4,192.13	7.35	1.35	223	926	24%
	1/5/10	41.35	4,192.03	7.27	1.82	**372**	**1,110**	34%
	2/26/10	41.41	4,191.97	7.22	2.02	**429**	**1,210**	35%
	5/13/10	41.43	4,191.95	6.94	2.23	103	**2,140**	5%
	8/17/10	41.38	4,192.00	7.00	2.56	**434**	**2,450**	18%
	11/18/10	41.38	4,192.00	7.00	3.12	**816**	**2,670**	31%

c:\Samson\State BD-4\BD #4 Project Data

Appendix B

Laboratory Reports

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Analytical Report 372721

for

RT Hicks Consultants Ltd. (Midland)

Project Manager: Dale Littlejohn

Samson State BD No. 4

L-126-0510

19-MAY-10

12600 West I-20 East Odessa, Texas 79765

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215-TX), Arizona (AZ0738), Arkansas (08-039-0), Connecticut (PH-0102), Florida (E871002)
Illinois (002082), Indiana (C-TX-02), Iowa (392), Kansas (E-10380), Kentucky (45), Louisiana (03054)
New Hampshire (297408), New Jersey (TX007), New York (11763), Oklahoma (9218), Pennsylvania (68-03610)
Rhode Island (LAO00312), USDA (S-44102)

Xenco-Atlanta (EPA Lab Code: GA00046):
Florida (E87429), North Carolina (483), South Carolina (98015), Utah (AALI1), West Virginia (362), Kentucky (85)
Louisiana (04176), USDA (P330-07-00105)

Xenco-Miami (EPA Lab code: FL01152): Florida (E86678), Maryland (330)
Xenco-Tampa Mobile (EPA Lab code: FL01212): Florida (E84900)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX)
Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX)
Xenco-Corpus Christi (EPA Lab code: TX02613): Texas (T104704370)
Xenco-Boca Raton (EPA Lab Code: FL00449):
Florida(E86240),South Carolina(96031001), Louisiana(04154), Georgia(917)
North Carolina(444), Texas(T104704468-TX), Illinois(002295)

XENCO Laboratories

19-MAY-10

Project Manager: **Dale Littlejohn**
RT Hicks Consultants Ltd. (Midland)
P.O. Box 7624

Midland, TX 79708

Reference: XENCO Report No: **372721**
Samson State BD No. 4
Project Address: Lea Co., NM

Dale Littlejohn:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number 372721. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. Estimation of data uncertainty for this report is found in the quality control section of this report unless otherwise noted. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 372721 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

Brent Barron, II
Odessa Laboratory Manager

XENCO Laboratories

Sample Cross Reference 372721

RT Hicks Consultants Ltd. (Midland), Midland, TX

Samson State BD No. 4

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
MW-1	W	May-13-10 08:58		372721-001
MW-2	W	May-13-10 07:46		372721-002
MW-3d	W	May-13-10 00:00		372721-003
MW-4s	W	May-13-10 08:30		372721-004
MW-4d	W	May-13-10 08:17		372721-005

CASE NARRATIVE

XENCO Laboratories

Client Name: RT Hicks Consultants Ltd. (Midland)
Project Name: Samson State BD No. 4

Project ID:	*L-126-0510*	*Report Date:*	*19-MAY-10*
Work Order Number:	*372721*	*Date Received:*	*05/13/2010*

Sample receipt non conformances and Comments:

None

Sample receipt Non Conformances and Comments per Sample:

None

Analytical Non Conformances and Comments:

Batch: LBA-806907 Inorganic Anions by EPA 300/300.1
None

Batch: LBA-807017 TDS by SM2540C
None

Certificate of Analysis Summary 372721

RT Hicks Consultants Ltd. (Midland), Midland, TX

Project Name: Samson State BD No. 4

Project Id: L-126-0510
Contact: Dale Littlejohn
Project Location: Lea Co., NM

Date Received in Lab: Thu May-13-10 01:57 pm
Report Date: 19-MAY-10
Project Manager: Brent Barron, II

Analysis Requested											
	Lab Id:	372721-001		372721-002		372721-003		372721-004		372721-005	
	Field Id:	MW-1		MW-2		MW-3d		MW-4s		MW-4d	
	Depth:										
	Matrix:	WATER		WATER		WATER		WATER		WATER	
	Sampled:	May-13-10 08:58		May-13-10 07:46		May-13-10 00:00		May-13-10 08:30		May-13-10 08:17	
Inorganic Anions by EPA 300/300.1	***Extracted:***										
	Analyzed:	May-17-10 09:07		May-17-10 09:07		May-17-10 09:07		May-17-10 09:07		May-17-10 09:07	
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL
Chloride		ND	1.00	45.8	1.00	4440	20.0	48.0	1.00	103	2.00
TDS by SM2540C	***Extracted:***										
	Analyzed:	May-17-10 15:55		May-17-10 15:55		May-17-10 15:55		May-17-10 15:55		May-17-10 15:55	
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL
Total dissolved solids		622	5.00	442	5.00	10100	5.00	554	5.00	2140	5.00

Brent Barron, II
Odessa Laboratory Manager

XENCO Laboratories

Flagging Criteria

X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to effect the recovery of the spike concentration. This condition could also effect the relative percent difference in the MS/MSD.

B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

D The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

F RPD exceeded lab control limits.

J The target analyte was positively identified below the MQL and above the SQL.

U Analyte was not detected.

L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

H The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

K Sample analyzed outside of recommended hold time.

JN A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

BRL Below Reporting Limit.

RL Reporting Limit

* Outside XENCO's scope of NELAC Accreditation.

XENCO Laboratories

BS / BSD Recoveries

Project Name: Samson State BD No. 4

Work Order #: 372721 **Project ID:** L-126-0510

Analyst: LATCOR **Date Prepared:** 05/17/2010 **Date Analyzed:** 05/17/2010

Lab Batch ID: 806907 **Sample:** 806907-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	ND	12.0	12.4	103	12	11.0	92	12	80-120	20	

Analyst: WRU **Date Prepared:** 05/17/2010 **Date Analyzed:** 05/17/2010

Lab Batch ID: 807017 **Sample:** 807017-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

TDS by SM2540C Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Total dissolved solids	ND	1000	986	99	1000	1060	106	7	80-120	30	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

XENCO Laboratories

Form 3 - MS Recoveries

Project Name: Samson State BD No. 4

Work Order #: 372721
Lab Batch #: 806907
Project ID: L-126-0510
Date Analyzed: 05/17/2010
Date Prepared: 05/17/2010
Analyst: LATCOR
QC- Sample ID: 372652-001 S
Batch #: 1
Matrix: Water
Reporting Units: mg/L

Inorganic Anions by EPA 300	MATRIX / MATRIX SPIKE RECOVERY STUDY					
Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag
Chloride	312	250	613	120	80-120	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference [E] = 200*(C-A)/(C+B)
All Results are based on MDL and Validated for QC Purposes

BRL - Below Reporting Limit

XENCO Laboratories

Sample Duplicate Recovery

Project Name: Samson State BD No. 4

Work Order #: 372721

Lab Batch #: 806907 **Project ID:** L-126-0510

Date Analyzed: 05/17/2010 **Date Prepared:** 05/17/2010 **Analyst:** LATCOR

QC- Sample ID: 372652-001 D **Batch #:** 1 **Matrix:** Water

Reporting Units: mg/L

Inorganic Anions by EPA 300/300.1	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Chloride	312	330	6	20	

Lab Batch #: 807017

Date Analyzed: 05/17/2010 **Date Prepared:** 05/17/2010 **Analyst:** WRU

QC- Sample ID: 372721-001 D **Batch #:** 1 **Matrix:** Water

Reporting Units: mg/L

TDS by SM2540C	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Total dissolved solids	622	640	3	30	

Spike Relative Difference RPD 200 * | (B-A)/(B+A) |
All Results are based on MDL and validated for QC purposes.
BRL - Below Reporting Limit

Xenco Laboratories

12600 West I-20 East
Odessa, Texas 79765
Phone: 432-563-1800
Fax: 432-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Dale Littlejohn
Company Name: RT Hicks Consultants Ltd
Company Address: P.O. Box 7624
City/State/Zip: Midland, Texas 79708
Telephone No: (432) 528-3878
Fax No: (432) 689-4578 (Fax)
Sampler Signature: Dale T. Littlejohn

Project Name: Samson State BD No. 4
Project #: L-126-0510
Project Loc: Lea Co., NM
PO #:

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers (1 HDPE)	Preservative: Ice	HNO_3	HCl	NaOH	H_2SO_4	None	Other (Specify)	Matrix: Water	Sludge	Soil	Other (specify)	Analyze For: TPH: 418.1 8015M 1005 1006	Cations (Ca, Mg, Na, K)	Anions (Cl, SO4, CO3, HCO3)	SAR / ESP / CEC	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030 or BTEX 8260	RCI	N.O.R.M.	Chloride	Bromide	Total Dissolved Solids		RUSH TAT (Pre-Schedule)	Standard TAT
31721																TCLP: / TOTAL:															
1	MW-1	5/13/10	0858	1	X							X														X		X			X
2	MW-2	"	0746	1	X							X														X		X			X
~~3~~	~~MW-3s~~	—	0936	~~1~~	~~X~~							~~X~~														~~X~~		~~X~~			~~X~~
3 4	MW-3d	5/13/10		1	X							X														X		X			X
4 5	MW-4s	"	0830	1	X							X														X		X			X
5 6	MW-4d	"	0817	1	X							X														X		X			X
6 7																															

Special Instructions: Send Invoice to RT Hicks Consult. 901 Rio Grande Blvd. NW, Suite F-142, Albuquerque, NM 87104; Send results to Dale Littlejohn at the adress above.

Sample Containers Intact? (Y) N
Temperature Upon Receipt: 0.6 °C
Laboratory Comments: labels, no seals

Relinquished by:	Date	Time	Received by:	Date	Time
Dale T. Littlejohn	5/13/10	1357			
Relinquished by:	Date	Time	Received by ELOT:	Date	Time
			Jeanne Fitch	05-13-10	1357

Environmental Lab of Texas

Variance/ Corrective Action Report- Sample Log-In

Client: RT Hicks

Date/ Time: 05-13-10 @ 1357

Lab ID # : 372721

Initials: JMF

Sample Receipt Checklist

					Client Initials
#1	Temperature of container/ cooler?	(Yes)	No	0.6 °C	
#2	Shipping container in good condition?	(Yes)	No		
#3	Custody Seals intact on shipping container/ cooler?	Yes	No	(Not Present)	
#4	Custody Seals intact on sample bottles/ container?	Yes	No	(Not Present)	
#5	Chain of Custody present?	(Yes)	No		
#6	Sample instructions complete of Chain of Custody?	(Yes)	No		
#7	Chain of Custody signed when relinquished/ received?	(Yes)	No		
#8	Chain of Custody agrees with sample label(s)?	(Yes)	No	ID written on Cont./ Lid	
#9	Container label(s) legible and intact?	(Yes)	No	Not Applicable	
#10	Sample matrix/ properties agree with Chain of Custody?	(Yes)	No		
#11	Containers supplied by ELOT?	(Yes)	No		
#12	Samples in proper container/ bottle?	(Yes)	No	See Below	
#13	Samples properly preserved?	(Yes)	No	See Below	
#14	Sample bottles intact?	(Yes)	No		
#15	Preservations documented on Chain of Custody?	(Yes)	No		
#16	Containers documented on Chain of Custody?	(Yes)	No		
#17	Sufficient sample amount for indicated test(s)?	(Yes)	No	See Below	
#18	All samples received within sufficient hold time?	(Yes)	No	See Below	
#19	Subcontract of sample(s)?	Yes	No	(Not Applicable)	
#20	VOC samples have zero headspace?	Yes	No	(Not Applicable)	

Variance Documentation

Contact: _____ Contacted by: _____ Date/ Time: _____

Regarding: _____

Corrective Action Taken:

Check all that Apply:

- ☐ See attached e-mail/ fax
- ☐ Client understands and would like to proceed with analysis
- ☐ Cooling process had begun shortly after sampling event

Analytical Report 386123

for

RT Hicks Consultants Ltd. (Midland)

Project Manager: Dale Littlejohn

Samson State BD No.4

L-126-0810

23-AUG-10

Celebrating 20 Years of commitment to excellence in Environmental Testing Services

12600 West I-20 East Odessa, Texas 79765

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215-10-6-TX), Arizona (AZ0738), Arkansas (08-039-0), Connecticut (PH-0102), Florida (E871002)
Illinois (002082), Indiana (C-TX-02), Iowa (392), Kansas (E-10380), Kentucky (45), Louisiana (03054)
New Hampshire (297408), New Jersey (TX007), New York (11763), Oklahoma (9218), Pennsylvania (68-03610)
Rhode Island (LAO00312), USDA (S-44102)

Xenco-Atlanta (EPA Lab Code: GA00046):
Florida (E87429), North Carolina (483), South Carolina (98015), Utah (AALI1), West Virginia (362), Kentucky (85)
Louisiana (04176), USDA (P330-07-00105)

Xenco-Miami (EPA Lab code: FL01152): Florida (E86678), Maryland (330)
Xenco-Tampa Mobile (EPA Lab code: FL01212): Florida (E84900)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX)
Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX)
Xenco-Corpus Christi (EPA Lab code: TX02613): Texas (T104704370)
Xenco-Boca Raton (EPA Lab Code: FL00449):
Florida(E86240),South Carolina(96031001), Louisiana(04154), Georgia(917)
North Carolina(444), Texas(T104704468-TX), Illinois(002295), Florida(E86349)

23-AUG-10

Project Manager: **Dale Littlejohn**
RT Hicks Consultants Ltd. (Midland)
P.O. Box 7624

Midland, TX 79708

Reference: XENCO Report No: **386123**
Samson State BD No.4
Project Address: Lea Co., NM

Dale Littlejohn:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number 386123. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. Estimation of data uncertainty for this report is found in the quality control section of this report unless otherwise noted. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 386123 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

Brent Barron, II
Odessa Laboratory Manager

XENCO Laboratories

Sample Cross Reference 386123

ACCREDITED IN ACCORDANCE WITH nelac

RT Hicks Consultants Ltd. (Midland), Midland, TX

Samson State BD No.4

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
MW-1		08-17-10 09:45		386123-001
MW-2		08-17-10 08:19		386123-002
MW-3d		08-17-10 10:02		386123-003
MW-4s		08-17-10 09:14		386123-004
MW-4d		08-17-10 08:55		386123-005

CASE NARRATIVE

Client Name: RT Hicks Consultants Ltd. (Midland)
Project Name: Samson State BD No.4

Project ID:	*L-126-0810*	*Report Date:*	*23-AUG-10*
Work Order Number:	*386123*	*Date Received:*	*08/18/2010*

Sample receipt non conformances and Comments:

None

Sample receipt Non Conformances and Comments per Sample:

None

Analytical Non Conformances and Comments:

Batch: LBA-819502 Anions by E300
None

Batch: LBA-819688 TDS by SM2540C
None

Certificate of Analysis Summary 386123

RT Hicks Consultants Ltd. (Midland), Midland, TX

Project Name: Samson State BD No.4

Project Id: L-126-0810
Contact: Dale Littlejohn
Project Location: Lea Co., NM

Date Received in Lab: Wed Aug-18-10 08:58 am
Report Date: 23-AUG-10
Project Manager: Brent Barron, II

Analysis Requested												
	Lab Id:	386123-001		386123-002		386123-003		386123-004		386123-005		
	Field Id:	MW-1		MW-2		MW-3d		MW-4s		MW-4d		
	Depth:											
	Matrix:	WATER		WATER		WATER		WATER		WATER		
	Sampled:	Aug-17-10 09:45		Aug-17-10 08:19		Aug-17-10 10:02		Aug-17-10 09:14		Aug-17-10 08:55		
Anions by E300	***Extracted:***											
	Analyzed:	Aug-18-10 17:11		Aug-18-10 17:11		Aug-18-10 17:11		Aug-18-10 17:11		Aug-18-10 17:11		
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	
Chloride		54.6	5.00	25.2	5.00	4410	100	50.8	5.00	434	12.5	
TDS by SM2540C	***Extracted:***											
	Analyzed:	Aug-18-10 16:00		Aug-18-10 16:00		Aug-18-10 16:00		Aug-18-10 16:00		Aug-18-10 16:00		
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	
Total dissolved solids		668	5.00	430	5.00	9030	5.00	548	5.00	2450	5.00	

Brent Barron, II
Odessa Laboratory Manager

Final 1.000

XENCO Laboratories

Flagging Criteria

X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to effect the recovery of the spike concentration. This condition could also effect the relative percent difference in the MS/MSD.

B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

D The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

F RPD exceeded lab control limits.

J The target analyte was positively identified below the MQL and above the SQL.

U Analyte was not detected.

L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

H The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

K Sample analyzed outside of recommended hold time.

JN A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit

PQL Practical Quantitation Limit

* Outside XENCO's scope of NELAC Accreditation.

XENCO Laboratories

BS / BSD Recoveries

Project Name: Samson State BD No.4

Work Order #: 386123 **Project ID:** L-126-0810

Analyst: LATCOR **Date Prepared:** 08/18/2010 **Date Analyzed:** 08/18/2010

Lab Batch ID: 819502 **Sample:** 819502-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Anions by E300 Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	ND	10.0	10.6	106	10	10.5	105	1	90-110	20	

Analyst: WRU **Date Prepared:** 08/18/2010 **Date Analyzed:** 08/18/2010

Lab Batch ID: 819688 **Sample:** 819688-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

TDS by SM2540C Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Total dissolved solids	ND	1000	934	93	1000	932	93	0	80-120	30	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

Final 1.000

XENCO Laboratories

Form 3 - MS Recoveries

Project Name: Samson State BD No.4

Work Order #: 386123
Lab Batch #: 819502
Project ID: L-126-0810
Date Analyzed: 08/18/2010
Date Prepared: 08/18/2010
Analyst: LATCOR
QC- Sample ID: 385765-002 S
Batch #: 1
Matrix: Water
Reporting Units: mg/L

Inorganic Anions by EPA 300	MATRIX / MATRIX SPIKE RECOVERY STUDY					
Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag
Chloride	2170	2000	4040	94	90-110	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference [E] = 200*(C-A)/(C+B)
All Results are based on MDL and Validated for QC Purposes

BRL - Below Reporting Limit

XENCO Laboratories

Sample Duplicate Recovery

ACCREDITED IN ACCORDANCE WITH nelac

Project Name: Samson State BD No.4

Work Order #: 386123

Lab Batch #: 819502 **Project ID:** L-126-0810

Date Analyzed: 08/18/2010 **Date Prepared:** 08/18/2010 **Analyst:** LATCOR

QC- Sample ID: 385765-002 D **Batch #:** 1 **Matrix:** Water

Reporting Units: mg/L

Anions by E300 Analyte	SAMPLE / SAMPLE DUPLICATE RECOVERY				
	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Chloride	2170	2120	2	20	

Lab Batch #: 819688

Date Analyzed: 08/18/2010 **Date Prepared:** 08/18/2010 **Analyst:** WRU

QC- Sample ID: 386117-001 D **Batch #:** 1 **Matrix:** Water

Reporting Units: mg/L

TDS by SM2540C Analyte	SAMPLE / SAMPLE DUPLICATE RECOVERY				
	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Total dissolved solids	12200	12800	5	30	

Spike Relative Difference RPD 200 * | (B-A)/(B+A) |
All Results are based on MDL and validated for QC purposes.
BRL - Below Reporting Limit

Xenco Laboratories

12600 West I-20 East
Odessa, Texas 79765
Phone: 432-563-1800
Fax: 432-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Dale Littlejohn
Company Name: RT Hicks Consultants Ltd
Company Address: P.O. Box 7624
City/State/Zip: Midland, Texas 79708
Telephone No: (432) 528-3878
Fax No: (432) 689-4578 (Fax)
Sampler Signature: Dale T Littlejohn

Project Name: Samson State BD No. 4
Project #: L-126-0810
Project Loc: Lea Co., NM
PO #:

386123

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	HNO_3	HCl	NaOH	H_2SO_4	None	Other (Specify)	Matrix: Water	Sludge	Soil	Other (specify):	Analyze For: TPH: 418.1 8015M 1005 1006	Cations (Ca, Mg, Na, K)	Anions (Cl, SO4, CO3, HCO3)	SAR / ESP / CEC	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030 or BTEX 8260	RCI	N.O.R.M.	Chloride	Bromide	Total Dissolved Solids		RUSH TAT (Pre-Schedule)	Standard TAT
-001	MW-1	8/17/10	0945	1	X							X														X		X			X
-002	MW-2	8/17/10	0819	1	X							X														X		X			X
-003	MW-3d	8/17/10	1002	1	X							X														X		X			X
-004	MW-4s	8/17/10	0914	1	X							X														X		X			X
-005	MW-4d	8/17/10	0855	1	X							X														X		X			X

Special Instructions: Send Invoice to RT Hicks Consult. 901 Rio Grande Blvd. NW, Suite F-142, Albuquerque, NM 87104; Send results to Dale Littlejohn at the adress above.

Sample Containers Intact? Y N
Temperature Upon Receipt: 1.6
Laboratory Comments:

Relinquished by:	Date	Time	Received by:	Date	Time
Dale T Littlejohn	8/18/10	858			
Relinquished by:	Date	Time	Received by ELOT:	Date	Time
				8/18/10	8:58

Final 1.000

XENCO Laboratories

XENCO Laboratories
Atlanta, Boca Raton, Corpus Christi, Dallas
Houston, Miami, Odessa, Philadelphia
Phoenix, San Antonio, Tampa

Document Title:	Sample Receipt Checklist
Document No.:	SYS-SRC
Revision/Date:	No. 01, 5/27/2010
Effective Date:	6/1/2010 Page 1 of 1

Prelogin / Nonconformance Report - Sample Log-In

Client: RT Hicks

Date/Time: 8/18/10 8:58

Lab ID # :

Initials: BB

Sample Receipt Checklist

1. Samples on ice?	Blue	(Water)	No	
2. Shipping container in good condition?	(Yes)	No	None	
3. Custody seals intact on shipping container (cooler) and bottles?	Yes	(No)	N/A	BB
4. Chain of Custody present?	(Yes)	No		
5. Sample instructions complete on chain of custody?	(Yes)	No		
6. Any missing / extra samples?	Yes	(No)		
7. Chain of custody signed when relinquished / received?	(Yes)	No		
8. Chain of custody agrees with sample label(s)?	(Yes)	No		
9. Container labels legible and intact?	(Yes)	No		
10. Sample matrix / properties agree with chain of custody?	(Yes)	No		
11. Samples in proper container / bottle?	(Yes)	No		
12. Samples properly preserved?	(Yes)	No	N/A	
13. Sample container intact?	(Yes)	No		
14. Sufficient sample amount for indicated test(s)?	(Yes)	No		
15. All samples received within sufficient hold time?	(Yes)	No		
16. Subcontract of sample(s)?	(Yes)	No	N/A	
17. VOC sample have zero head space?	(Yes)	No	N/A	

18. Cooler 1 No.		Cooler 2 No.		Cooler 3 No.		Cooler 4 No.		Cooler 5 No.	
lbs	1.6 °C	lbs	°C	lbs	°C	lbs	°C	lbs	°C

Nonconformance Documentation

Contact: _____ Contacted by: _____ Date/Time: _____

Regarding: _____

_____

Corrective Action Taken: _____

_____

_____

_____

Check all that apply:
- ☐ Cooling process has begun shortly after sampling event and out of temperature condition acceptable by NELAC 5.5.8.3.1.a.1.
- ☐ Initial and Backup Temperature confirm out of temperature conditions
- ☐ Client understands and would like to proceed with analysis

Analytical Report 397855

for

RT Hicks Consultants Ltd. (Midland)

Project Manager: Dale Littlejohn

Samson State BD No.4

L-126-1110

23-NOV-10

Celebrating 20 Years of commitment to excellence in Environmental Testing Services

12600 West I-20 East Odessa, Texas 79765

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215-10-6-TX), Arizona (AZ0738), Arkansas (08-039-0), Connecticut (PH-0102), Florida (E871002)
Illinois (002082), Indiana (C-TX-02), Iowa (392), Kansas (E-10380), Kentucky (45), Louisiana (03054)
New Hampshire (297408), New Jersey (TX007), New York (11763), Oklahoma (9218), Pennsylvania (68-03610)
Rhode Island (LAO00312), USDA (S-44102)

Xenco-Atlanta (EPA Lab Code: GA00046):
Florida (E87429), North Carolina (483), South Carolina (98015), Utah (AALI1), West Virginia (362), Kentucky (85)
Louisiana (04176), USDA (P330-07-00105)

Xenco-Miami (EPA Lab code: FL01152): Florida (E86678), Maryland (330)
Xenco-Tampa Mobile (EPA Lab code: FL01212): Florida (E84900)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX)
Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX)
Xenco-Corpus Christi (EPA Lab code: TX02613): Texas (T104704370)
Xenco-Boca Raton (EPA Lab Code: FL01273):
Florida(E86240),South Carolina(96031001), Louisiana(04154), Georgia(917)
North Carolina(444), Texas(T104704468-TX), Illinois(002295), Florida(E86349)

Xenco Phoenix (EPA Lab Code: AZ00901):
Arizona(AZ0757), California(06244CA), Texas(104704435-10-2), Nevada(NAC-445A), DoD(65816)
Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)
Xenco Tucson (EPA Lab code:AZ000989): Arizona (AZ0758)

23-NOV-10

Project Manager: **Dale Littlejohn**
RT Hicks Consultants Ltd. (Midland)
P.O. Box 7624

Midland, TX 79708

Reference: XENCO Report No: **397855**
Samson State BD No.4
Project Address: Lea Co., NM

Dale Littlejohn:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number 397855. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. Estimation of data uncertainty for this report is found in the quality control section of this report unless otherwise noted. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 397855 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

Brent Barron, II
Odessa Laboratory Manager

XENCO Laboratories

Sample Cross Reference 397855

RT Hicks Consultants Ltd. (Midland), Midland, TX

Samson State BD No.4

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
MW-1	W	Nov-18-10 16:08		397855-001
MW-2	W	Nov-18-10 15:00		397855-002
MW-3d	W	Nov-18-10 16:15		397855-003
MW-4s	W	Nov-18-10 15:45		397855-004
MW-4d	W	Nov-18-10 15:37		397855-005

CASE NARRATIVE

Client Name: RT Hicks Consultants Ltd. (Midland)
Project Name: Samson State BD No.4

Project ID:	*L-126-1110*	*Report Date:*	*23-NOV-10*
Work Order Number:	*397855*	*Date Received:*	*11/19/2010*

Sample receipt non conformances and Comments:

None

Sample receipt Non Conformances and Comments per Sample:

None

Certificate of Analysis Summary 397855

RT Hicks Consultants Ltd. (Midland), Midland, TX

Project Name: Samson State BD No.4

Project Id: L-126-1110
Contact: Dale Littlejohn
Project Location: Lea Co., NM

Date Received in Lab: Fri Nov-19-10 08:39 am
Report Date: 23-NOV-10
Project Manager: Brent Barron, II

Analysis Requested												
	Lab Id:	397855-001		397855-002		397855-003		397855-004		397855-005		
	Field Id:	MW-1		MW-2		MW-3d		MW-4s		MW-4d		
	Depth:											
	Matrix:	WATER		WATER		WATER		WATER		WATER		
	Sampled:	Nov-18-10 16:08		Nov-18-10 15:00		Nov-18-10 16:15		Nov-18-10 15:45		Nov-18-10 15:37		
Anions by E300	***Extracted:***											
	Analyzed:	Nov-22-10 09:13		Nov-22-10 09:13		Nov-22-10 09:13		Nov-22-10 09:13		Nov-22-10 09:13		
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	
Chloride		67.8	5.00	45.5	5.00	9470	250	69.4	5.00	816	12.5	
TDS by SM2540C	***Extracted:***											
	Analyzed:	Nov-22-10 16:00		Nov-22-10 16:00		Nov-22-10 16:00		Nov-22-10 16:00		Nov-22-10 16:00		
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	
Total dissolved solids		518	5.00	440	5.00	14900	5.00	602	5.00	2670	5.00	

Brent Barron, II
Odessa Laboratory Manager

Final 1.000

XENCO Laboratories

Flagging Criteria

X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to effect the recovery of the spike concentration. This condition could also effect the relative percent difference in the MS/MSD.

B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

D The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

F RPD exceeded lab control limits.

J The target analyte was positively identified below the MQL and above the SQL.

U Analyte was not detected.

L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

H The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

K Sample analyzed outside of recommended hold time.

JN A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit

PQL Practical Quantitation Limit

* Outside XENCO's scope of NELAC Accreditation.

XENCO Laboratories

BS / BSD Recoveries

Project Name: Samson State BD No.4

Work Order #: 397855 **Project ID:** L-126-1110

Analyst: LATCOR **Date Prepared:** 11/22/2010 **Date Analyzed:** 11/22/2010

Lab Batch ID: 833007 **Sample:** 833007-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

Anions by E300	BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY										
Analytes	**Blank Sample Result [A]**	**Spike Added [B]**	**Blank Spike Result [C]**	**Blank Spike %R [D]**	**Spike Added [E]**	**Blank Spike Duplicate Result [F]**	**Blk. Spk Dup. %R [G]**	**RPD %**	**Control Limits %R**	**Control Limits %RPD**	**Flag**
Chloride	ND	10.0	9.24	92	10	10.6	106	14	80-120	20	

Analyst: WRU **Date Prepared:** 11/22/2010 **Date Analyzed:** 11/22/2010

Lab Batch ID: 833176 **Sample:** 833176-1-BKS **Batch #:** 1 **Matrix:** Water

Units: mg/L

TDS by SM2540C	BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY										
Analytes	**Blank Sample Result [A]**	**Spike Added [B]**	**Blank Spike Result [C]**	**Blank Spike %R [D]**	**Spike Added [E]**	**Blank Spike Duplicate Result [F]**	**Blk. Spk Dup. %R [G]**	**RPD %**	**Control Limits %R**	**Control Limits %RPD**	**Flag**
Total dissolved solids	ND	1000	990	99	1000	1010	101	2	80-120	30	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

Form 3 - MS Recoveries

Project Name: Samson State BD No.4

Work Order #: 397855

Lab Batch #: 833007

Project ID: L-126-1110

Date Analyzed: 11/22/2010

Date Prepared: 11/22/2010

Analyst: LATCOR

QC- Sample ID: 397626-001 S

Batch #: 1

Matrix: Water

Reporting Units: mg/L

Inorganic Anions by EPA 300	MATRIX / MATRIX SPIKE RECOVERY STUDY					
Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag
Chloride	18700	10000	29400	107	80-120	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference [E] = 200*(C-A)/(C+B)
All Results are based on MDL and Validated for QC Purposes

BRL - Below Reporting Limit

Sample Duplicate Recovery

Project Name: Samson State BD No.4

Work Order #: 397855

Lab Batch #: 833007 **Project ID:** L-126-1110

Date Analyzed: 11/22/2010 **Date Prepared:** 11/22/2010 **Analyst:** LATCOR

QC- Sample ID: 397626-001 D **Batch #:** 1 **Matrix:** Water

Reporting Units: mg/L

Anions by E300	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Chloride	18700	19000	2	20	

Lab Batch #: 833176

Date Analyzed: 11/22/2010 **Date Prepared:** 11/22/2010 **Analyst:** WRU

QC- Sample ID: 397852-001 D **Batch #:** 1 **Matrix:** Water

Reporting Units: mg/L

TDS by SM2540C	SAMPLE / SAMPLE DUPLICATE RECOVERY				
Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Total dissolved solids	1690	1810	7	30	

Spike Relative Difference RPD 200 * | (B-A)/(B+A) |
All Results are based on MDL and validated for QC purposes.
BRL - Below Reporting Limit

Xenco Laboratories

12600 West I-20 East
Odessa, Texas 79765
Phone: 432-563-1800
Fax: 432-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Dale Littlejohn
Company Name: RT Hicks Consultants Ltd
Company Address: P.O. Box 7624
City/State/Zip: Midland, Texas 79708
Telephone No: (432) 528-3878 Fax No: (432) 689-4578 (Fax)
Sampler Signature: Dale T. Littlejohn

Project Name: Samson State BD No. 4
Project #: L-126-1110
Project Loc: Lea Co., NM
PO #:

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	HNO_3	HCl	NaOH	H_2SO_4	None	Other (Specify)	Matrix: Water	Sludge	Soil	Other (specify):	Analyze For: TCLP: TPH: 418.1 8015M 1005 1006	TOTAL: TPH: 418.1 8015M 1005 1006	Cations (Ca, Mg, Na, K)	Anions (Cl, SO4, CO3, HCO3)	SAR / ESP / CEC	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030 or BTEX 8260	RCI	N.O.R.M.	Chloride	Bromide	Total Dissolved Solids		RUSH TAT (Pre-Schedule)	Standard TAT
397855	MW-1	11/18/10	1608	1	X							X															X		X			X
	MW-2	11/18/10	1500	1	X							X															X		X			X
	MW-3d	11/18/10	1615	1	X							X															X		X			X
	MW-4s	11/18/10	1545	1	X							X															X		X			X
	MW-4d (time should have been 1537)	11/18/10	1337	1	X							X															X		X			X

Special Instructions: Send Invoice to RT Hicks Consult. 901 Rio Grande Blvd. NW, Suite F-142, Albuquerque, NM 87104; Send results to Dale Littlejohn at the adress above.

Sample Containers Intact? (Y) N
Temperature Upon Receipt: -2.1
Laboratory Comments:

Relinquished by:	Date	Time	Received by:	Date	Time
Dale T. Littlejohn	11/19/10	839			
Relinquished by:	Date	Time	Received by ELOT:	Date	Time
			Lisa Murdock	11-19-10	8:39

XENCO Laboratories

XENCO Laboratories
Atlanta, Boca Raton, Corpus Christi, Dallas
Houston, Miami, Odessa, Philadelphia
Phoenix, San Antonio, Tampa

Document Title: Sample Receipt Checklist
Document No.: SYS-SRC
Revision/Date: No. 01, 5/27/2010
Effective Date: 6/1/2010 Page 1 of 1

Prelogin / Nonconformance Report - Sample Log-In

Client: RT Hicks Consultants Ltd
Date/Time: 11-19-10 8:39
Lab ID # :
Initials: XM

Sample Receipt Checklist

1. Samples on ice?	Blue	(Water)	No	
2. Shipping container in good condition?	(Yes)	No	None	
3. Custody seals intact on shipping container (cooler) and bottles?	Yes	No	(N/A)	
4. Chain of Custody present?	(Yes)	No		
5. Sample instructions complete on chain of custody?	(Yes)	No		
6. Any missing / extra samples?	Yes	(No)		
7. Chain of custody signed when relinquished / received?	(Yes)	No		
8. Chain of custody agrees with sample label(s)?	(Yes)	No		
9. Container labels legible and intact?	(Yes)	No		
10. Sample matrix / properties agree with chain of custody?	(Yes)	No		
11. Samples in proper container / bottle?	(Yes)	No		
12. Samples properly preserved?	(Yes)	No	N/A	
13. Sample container intact?	(Yes)	No		
14. Sufficient sample amount for indicated test(s)?	(Yes)	No		
15. All samples received within sufficient hold time?	(Yes)	No		
16. Subcontract of sample(s)?	Yes	(No)	N/A	
17. VOC sample have zero head space?	Yes	(No)	N/A	

18. Cooler 1 No.		Cooler 2 No.		Cooler 3 No.		Cooler 4 No.		Cooler 5 No.	
lbs	-2.1 °C	lbs	°C	lbs	°C	lbs	°C	lbs	°C

Nonconformance Documentation

Contact:_____ Contacted by:_____ Date/Time:_____

Regarding: _____

Corrective Action Taken: _____

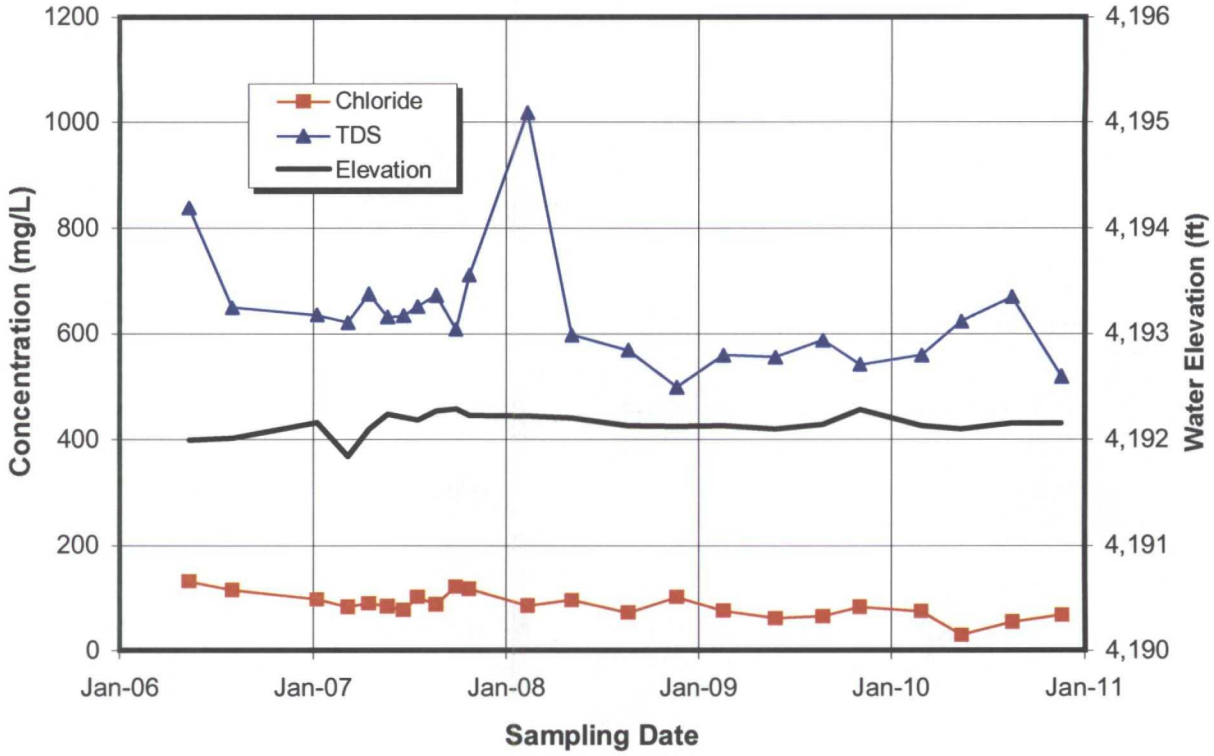
Check all that apply:
- ☐ Cooling process has begun shortly after sampling event and out of temperature condition acceptable by NELAC 5.5.8.3.1.a.1.
- ☐ Initial and Backup Temperature confirm out of temperature conditions
- ☐ Client understands and would like to proceed with analysis

Appendix C

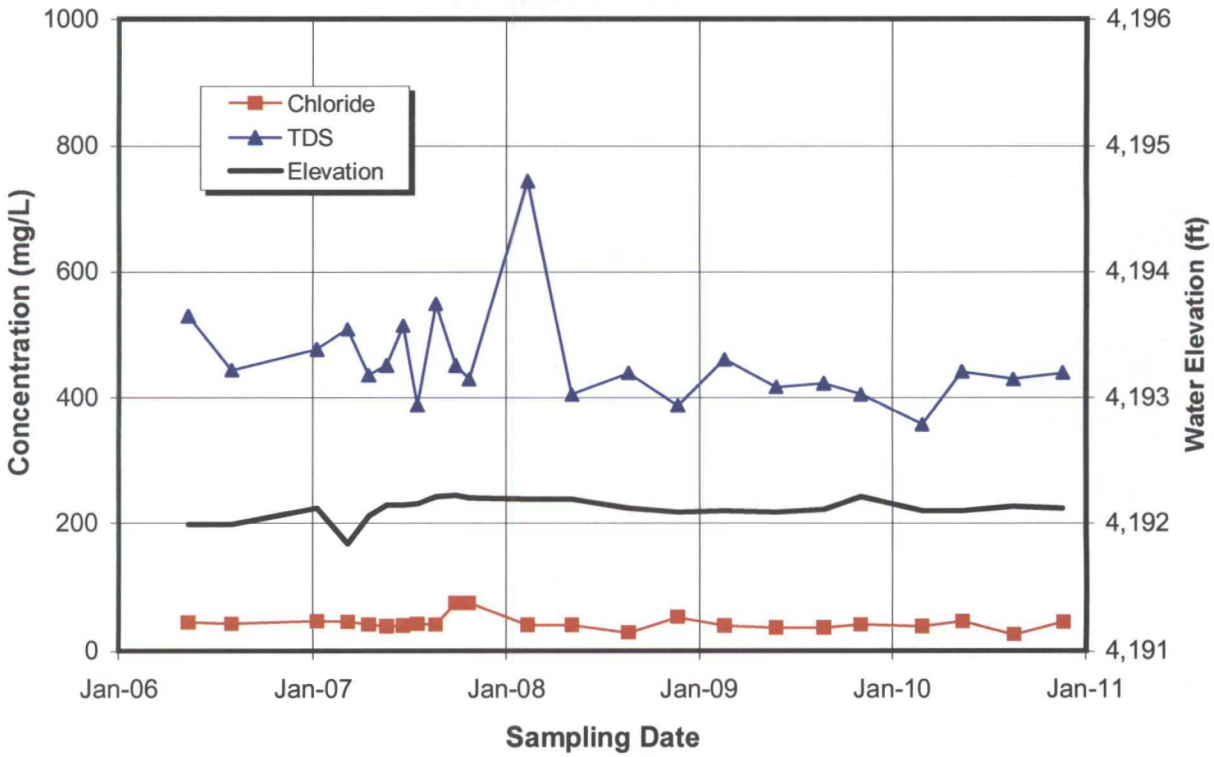
Graphs – Historic Groundwater Data

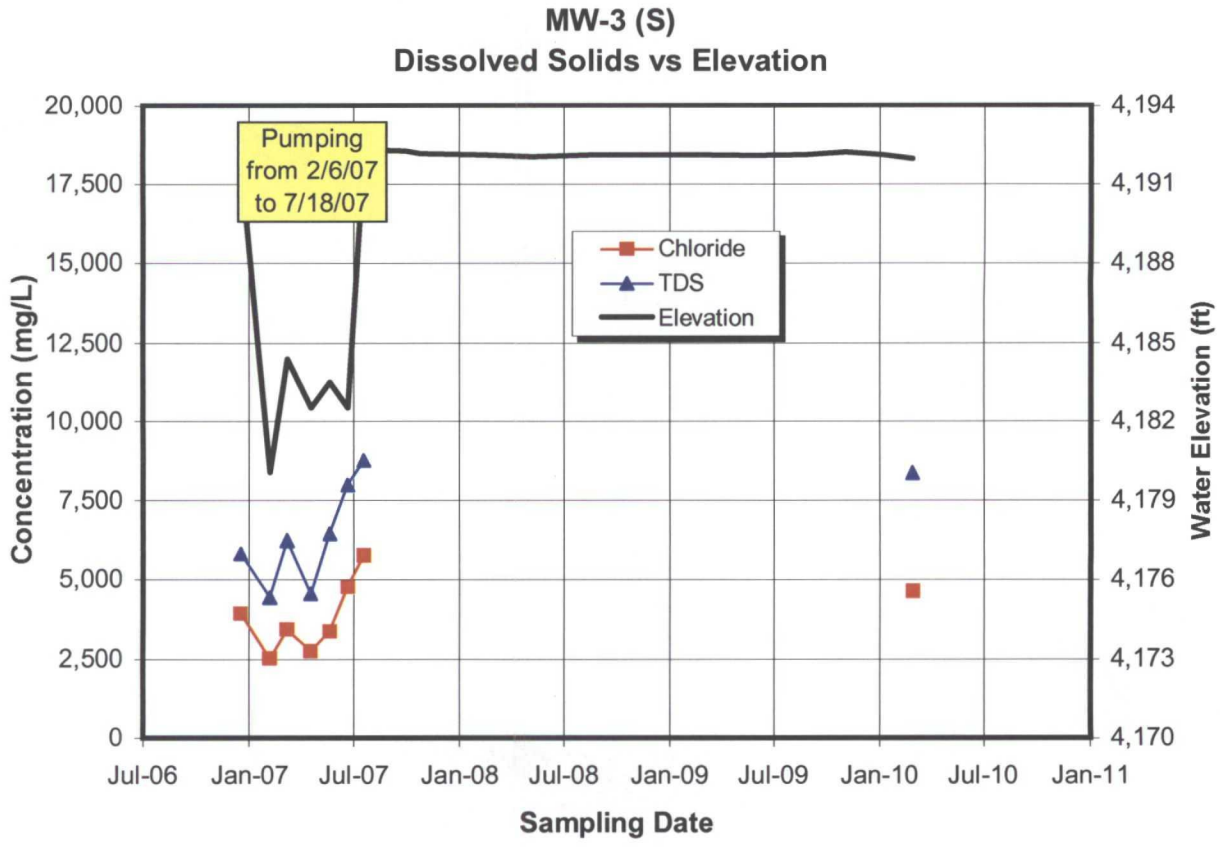
R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

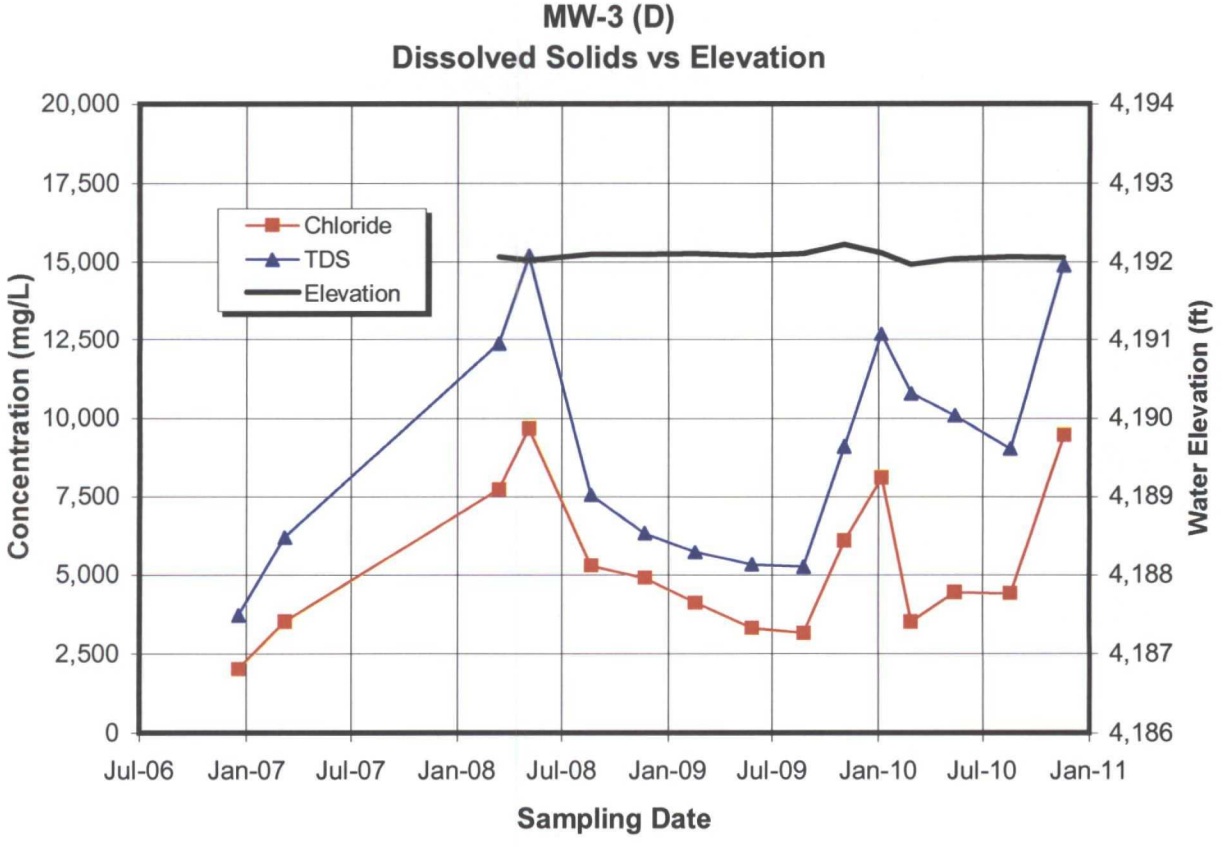
MW-1
Dissolved Solids vs Elevation

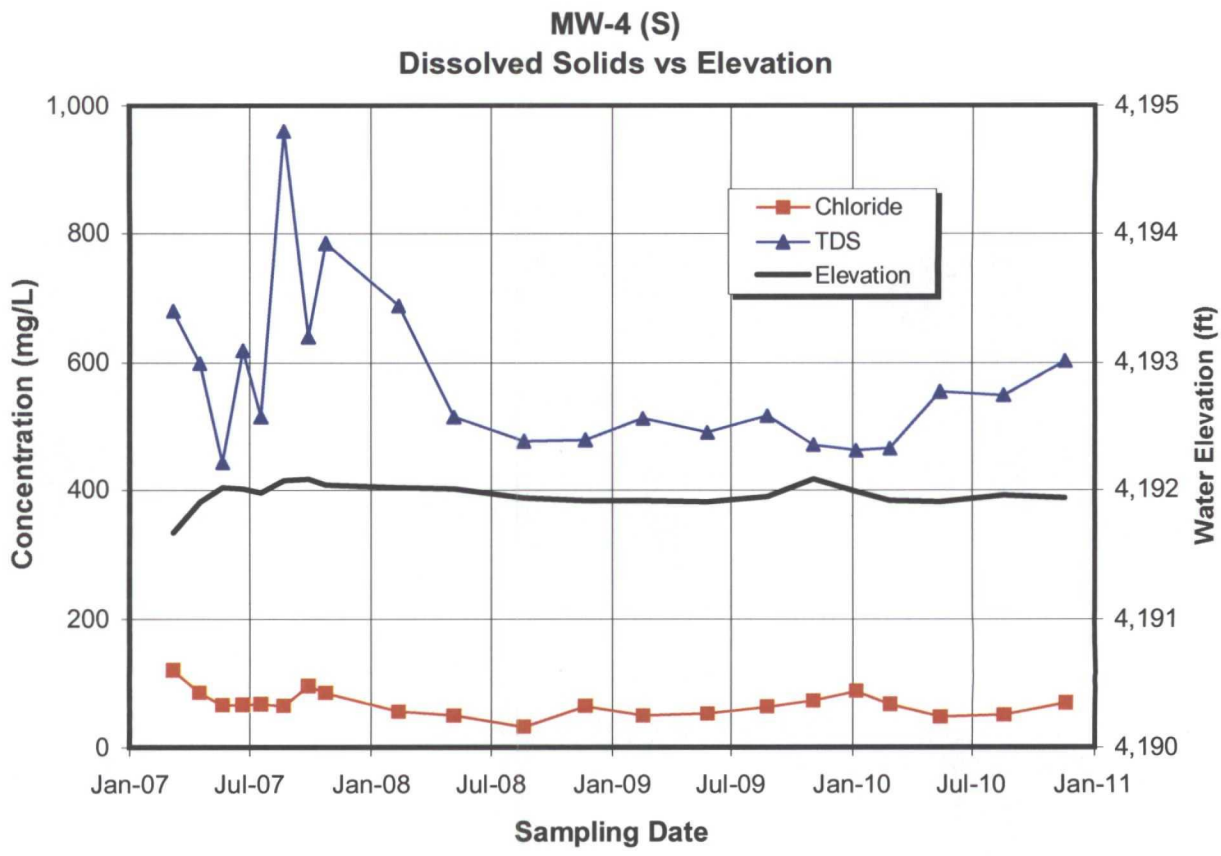


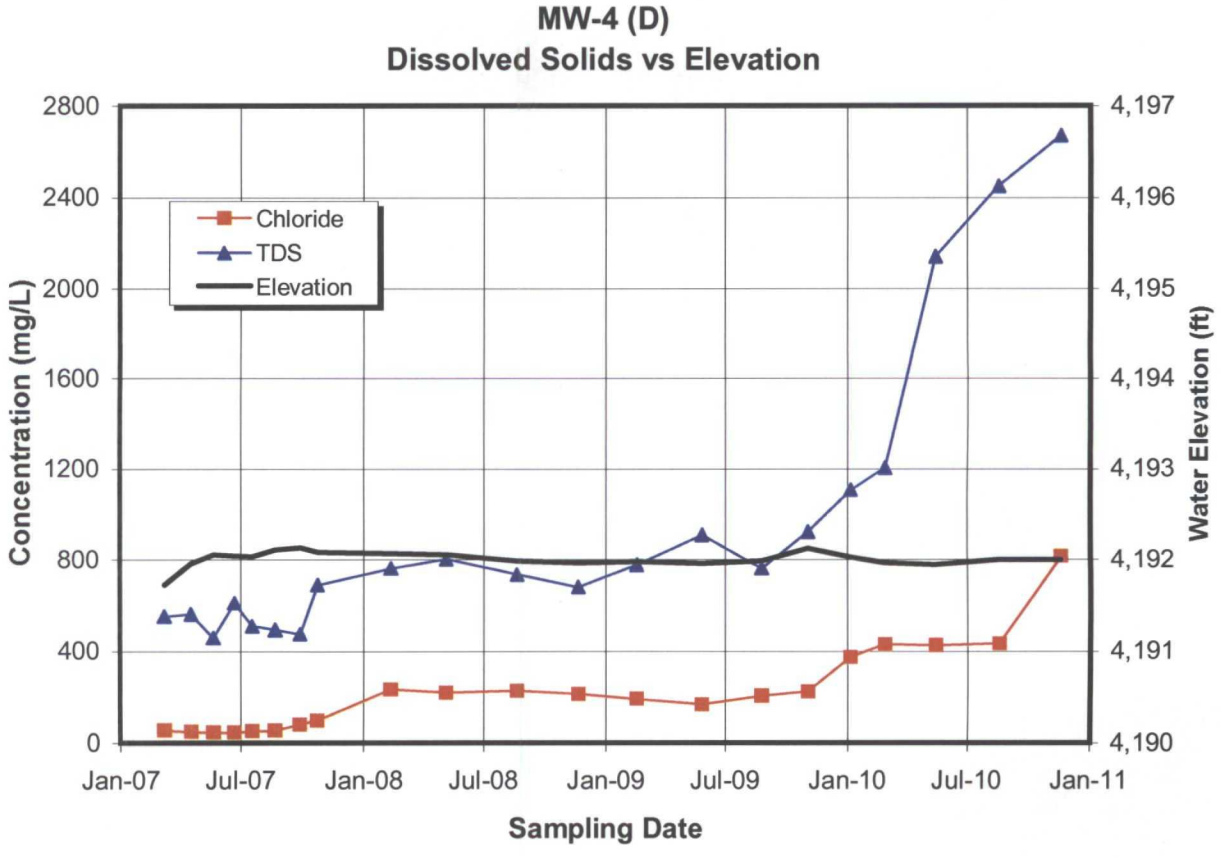
MW-2
Dissolved Solids vs Elevation




MW-3 (S)
Dissolved Solids vs Elevation
Pumping from 2/6/07 to 7/18/07
Chloride
TDS
Elevation
Concentration (mg/L)
Water Elevation (ft)
Sampling Date
20,000
17,500
15,000
12,500
10,000
7,500
5,000
2,500
0
4,194
4,191
4,188
4,185
4,182
4,179
4,176
4,173
4,170
Jul-06
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11


MW-3 (D)
Dissolved Solids vs Elevation
Chloride
TDS
Elevation
Concentration (mg/L)
Water Elevation (ft)
Sampling Date
20,000
17,500
15,000
12,500
10,000
7,500
5,000
2,500
0
4,194
4,193
4,192
4,191
4,190
4,189
4,188
4,187
4,186
Jul-06
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11

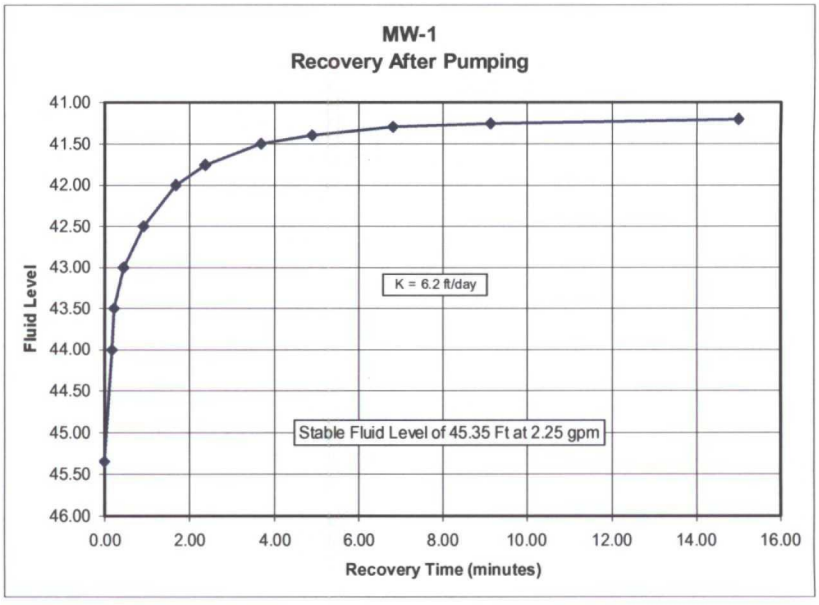

MW-4 (S)
Dissolved Solids vs Elevation
Chloride
TDS
Elevation
Concentration (mg/L)
Water Elevation (ft)
1,000
800
600
400
200
0
4,195
4,194
4,193
4,192
4,191
4,190
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Sampling Date

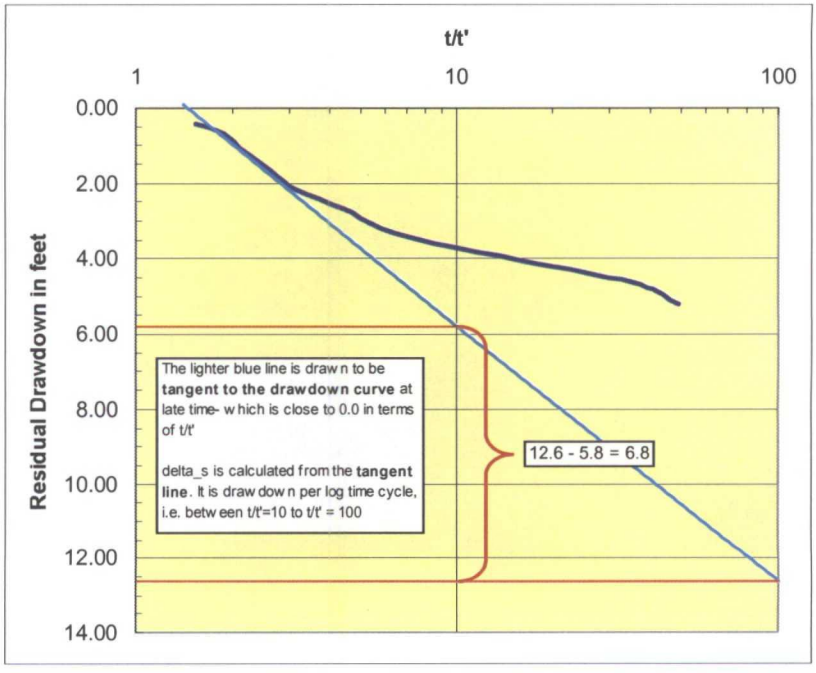

MW-4 (D)
Dissolved Solids vs Elevation
Chloride
TDS
Elevation
Concentration (mg/L)
Water Elevation (ft)
2800
2400
2000
1600
1200
800
400
0
4,197
4,196
4,195
4,194
4,193
4,192
4,191
4,190
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Sampling Date

Appendix D

Draw Down Test Results

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

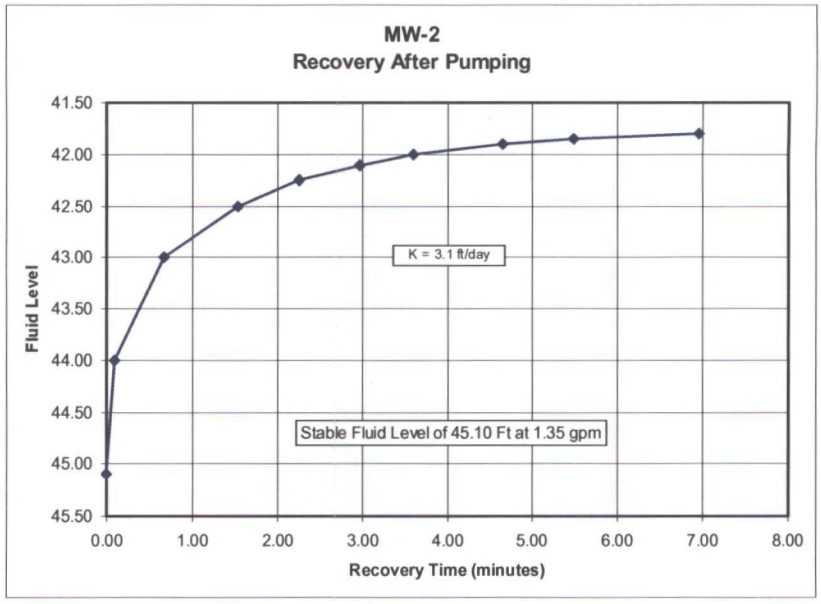


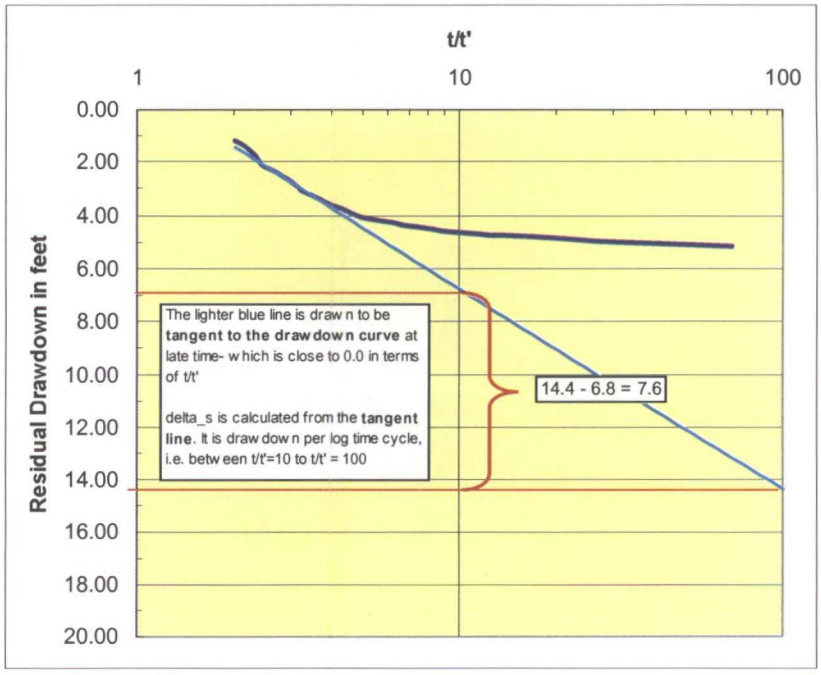


					delta_s is calculated from graph	
Input	Pumping Rate	2.25	[gal/min]	Input	6.8	[feet]

T = (264*Q)/delta_s **delta_s is residual drawdown in feet per log time cycle (Page 256, Groundwater and Wells)**

Output	T =	87.35294	[feet^2/day]
Input	Aquifer thickness	14.1	[feet]
Output	Resultant K	6.195244	[feet/day]

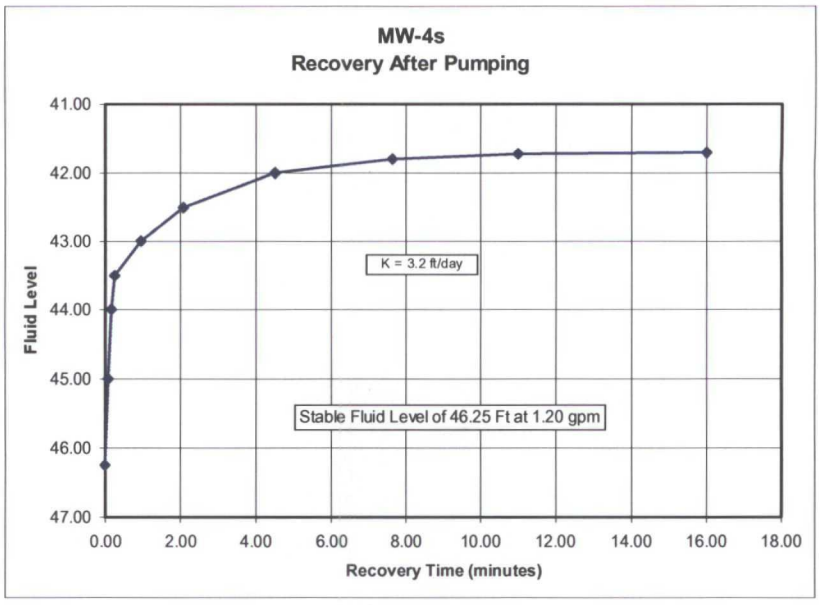


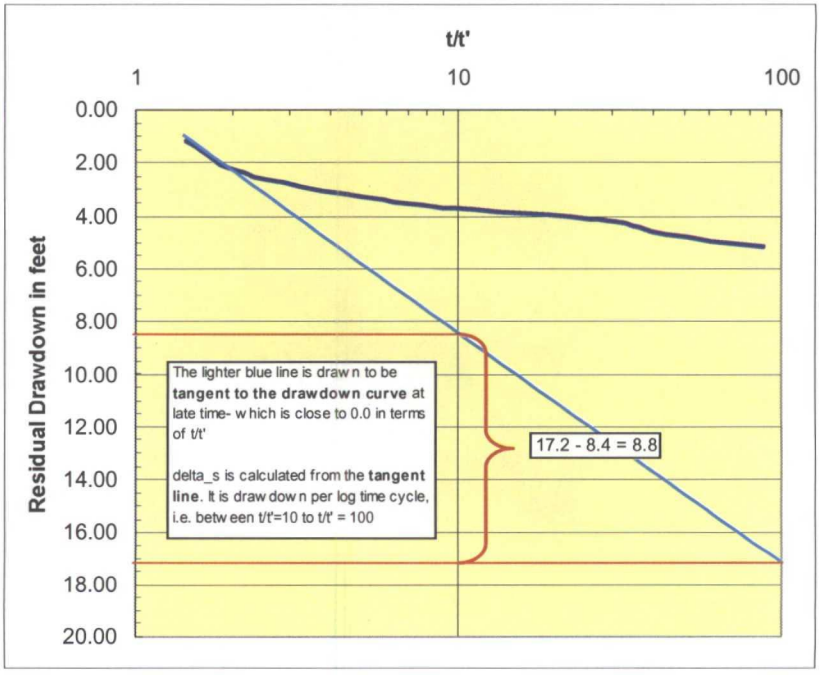


					delta_s is calculated from graph	
Input	Pumping Rate	1.35	[gal/min]	Input	7.6	[feet]

T = (264*Q)/delta_s **delta_s is residual drawdown in feet per log time cycle (Page 256, Groundwater and Wells)**

Output	T =	46.89474	[feet^2/day]
Input	Aquifer thickness	15.2	[feet]
Output	Resultant K	3.08518	[feet/day]

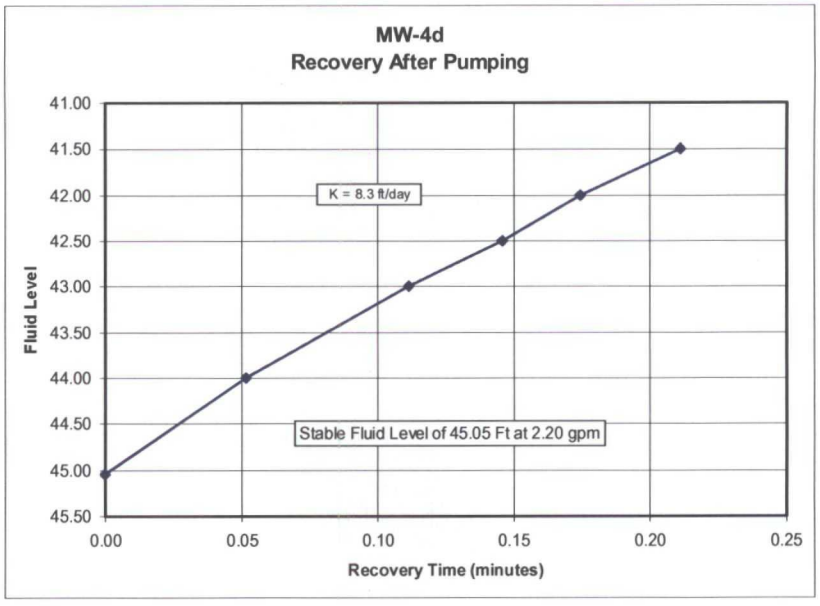


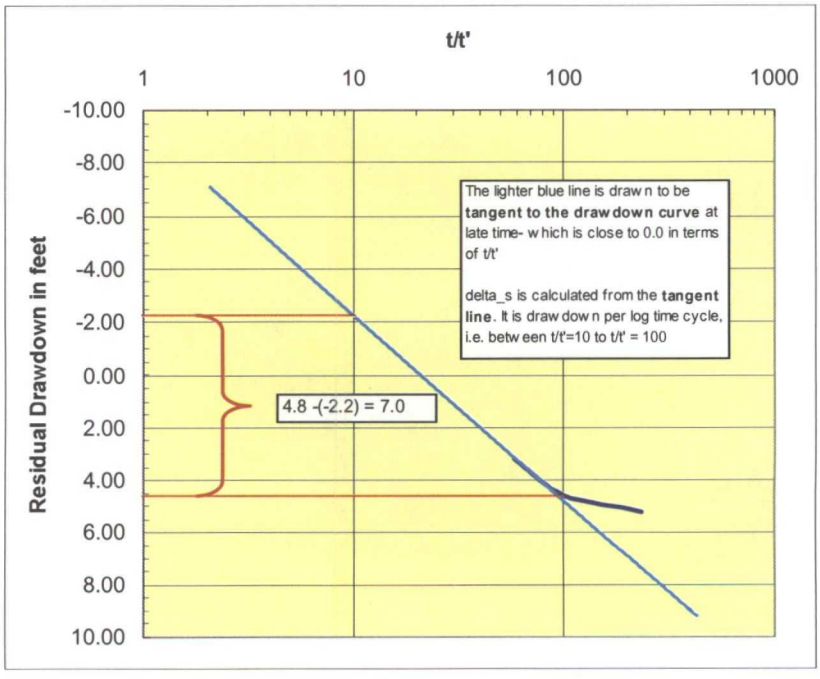


				delta_s is calculated from graph		
Input	Pumping Rate	1.20	[gal/min]	Input	8.8	[feet]

T = (264*Q)/delta_s **delta_s is residual drawdown in feet per log time cycle (Page 256, Groundwater and Wells)**

Output	T =	36	[feet^2/day]
Input	Aquifer thickness	11.4	[feet]
Output	Resultant K	3.157895	[feet/day]





					delta_s is calculated from graph	
Input	Pumping Rate	2.20	[gal/min]	Input	7	[feet]

T = (264*Q)/delta_s **delta_s is residual drawdown in feet per log time cycle (Page 256, Groundwater and Wells)**

Output	T =	82.97143	[feet^2/day]
Input	Aquifer thickness	10	[feet]
Output	Resultant K	8.297143	[feet/day]