1R - 419

03 / 10 / 2009

STAGE 1& 2 AP WORKPLAN

ConocoPhillips

420 S. Keeler Ave.
Bartlesville, OK 74004
(918) 661-0310

March 10, 2009

Mr. Glenn Von Gonton
Acting Environmental Bureau Chief
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Federal Express
7964-1597-6925

Re: **McNeill Ranch Dauron #3 Well 1RP 419**
Unit A, Sec 10, T21S, R37E
Stage I & II Abatement Plan

Dear Mr. Von Gonton:

ConocoPhillips is submitting the attached Stage I and II Abatement Plan (2 copies) for your review. The Plan proposes a path forward for mitigating the petroleum hydrocarbon and chloride impaired soil found in a historic pit located on Mr. William McNeill's ranch. The Site is located approximately 3 miles north of Eunice, Lea County, New Mexico (32.4997487 N, 103.1447655 W).

The proposed abatement option includes removal of historical production pit material to a depth of approximately 12 to 15 feet below ground surface (fbgs) to minimize disturbance to the natural soil structure below the pit and limit impact to groundwater below the pit. A geo-membrane barrier would be installed in the excavation to channel precipitation away from the affected area and minimize further downward migration of petroleum hydrocarbons and chlorides in the vadose zone.

I look forward to our meeting on Thursday March 12, 2009 to discuss the attached plan. Should have any question or require additional information please contact me at 918-661-0310.

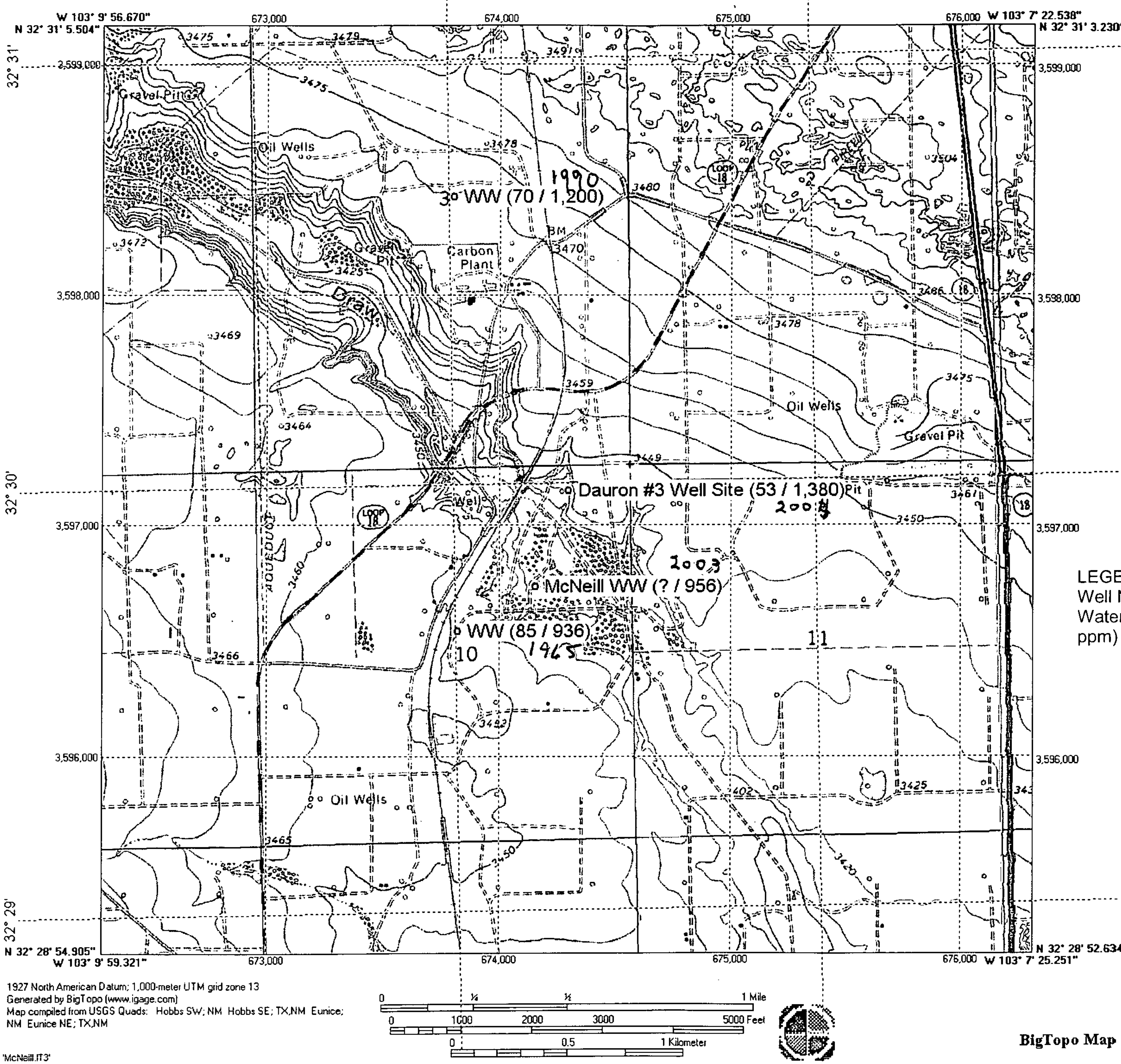
Sincerely,

Tom Wynn
Site Manager

Cc: Mr. Larry Hill, NMOCD District 1
Mr. John Coy, ConocoPhillips
Mr. Charles Durrett, Tetra Tech

FedEx
7964-1559-9320

McNeill



LEGEND:
Well Name (Depth to Water ft / Chloride ppm)

1927 North American Datum; 1,000-meter UTM grid zone 13
Generated by BigTopo (www.igage.com)
Map compiled from USGS Quads: Hobbs SW; NM Hobbs SE; TX,NM Eunice; NM Eunice NE; TX,NM

'McNeill.IT3'

BigTopo Map

TETRA TECH

STAGE 1 & 2 ABATEMENT PLAN

McNEILL RANCH
DAURON #3 WELL 1RP 419
SOIL REMEDIATION AND GROUNDWATER PROTECTION

LEA COUNTY, NEW MEXICO

Prepared for:

ConocoPhillips

Prepared by:

Tetra Tech, Inc.
1910 N. Big Spring
Midland, Texas 79705

March 10, 2009

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TABLE OF CONTENTS

STAGE 1 & 2 ABATEMENT PLAN
McNEILL RANCH
DAURON #3 WELL 1RP 419

1.0 INTRODUCTION

ConocoPhillips proposes a path forward plan for mitigating petroleum hydrocarbon and chloride affected soil and for protecting groundwater in the vicinity of an historic oil exploration and production (E&P) pit and associated equipment used in conjunction with the Dauron Well #3. The Site is located on land owned by Mr. William F. McNeill, within Unit A, Section 10, Township 21 South, Range 37 East (32.4997487° N, 103.1447655° W) and is approximately 3 miles north of Eunice, Lea County, New Mexico (Figure 1).

ConocoPhillips' proposes to remove historical production pit material to a depth of approximately 12 to 15 feet below ground surface (fbgs) to both minimize disturbance to the natural soil structure below the pit and limit impact to groundwater below the pit. A geo-membrane barrier will be installed in the excavation to channel precipitation away from the affected area and minimize further downward migration of petroleum hydrocarbons and chlorides in the vadose zone.

ConocoPhillips proposes abandonment and plugging of existing monitoring well B-MW-1 and installing two new monitoring wells at the Site. A quarterly groundwater sampling program will be established to monitor water levels, and chloride concentration levels in the two new wells and two existing monitoring wells. If the aquifer does not show evidence of self attenuation within two years, then ConocoPhillips would propose alternatives for NMOCD approval.

In addition, other affected areas (100 x 60 feet, and 30 x 45 feet) and a 370 X 8 feet run-off area would be remediated.

1.1 DESCRIPTION OF THE SITE

The Site is located about 800 feet northeast of Monument Draw, which slopes to the southeast. Except for a few foundations, this oil field location has been abandoned and all equipment removed (Figure 1). Vegetation in the area consists of short and mid grasses and shrubs. The gently sloping land around the Site currently supports livestock grazing.

1.2 SITE HISTORY AND NATURE OF THE RELEASE

Burlington Resources, now owned by ConocoPhillips, and its predecessors operated the Dauron Well #3 and its associated facilities from 1951 until it ceased operations in 1986. Burlington closed the historic E&P pit in 1992 in compliance with the New Mexico Oil Conservation Division (NMOCD) requirements at that time. Since closure, Mr. William McNeill hired legal counsel (Law Offices of James P. Lyle, P.C.), and filed a complaint with NMOCD suggesting that the closed pit impacted groundwater (Appendix A).[1]

The area in the immediate vicinity of the historic E&P pit has been impacted by petroleum hydrocarbon and chloride associated with releases of crude oil production liquids from the historic operation of the Dauron Well #3 and tank battery.

1.3 SUMMARY OF PREVIOUS INVESTIGATIONS

Mr. James Lyle, counsel to the landowner, on September 17, 2004, submitted two reports to the NMOCD,[1] prepared by TIERRA Technical Consultants (TIERRA; Appendix B and C).[2, 3] The first report, dated November 28, 2003,[2] reported that the Ogallala aquifer in Lea County generally flows to the southeast and claimed the water table was influenced by water well pumping. TIERRA also stated that the only water well in the area, the Barney water well owned by Mr. McNeill, is located 1/4 mile southwest of the pit. Attached to the November 28, 2003 TIERRA report[2] was a Phoenix Environmental, LLC (Phoenix) assessment that was performed in November 1999. The Phoenix report indicated that five soil borings were completed throughout the footprint of the historic pit. Drilling locations were at the four corners and the center of the pit. Soil samples from each of the 5 borings were collected at 5 foot intervals and field tested using a Mega TPH analyzer. Field analysis indicated that total petroleum hydrocarbon (TPH) concentrations were above 100 parts per million (ppm) in most samples.

The second TIERRA report, dated September 17, 2004,[3] presented both soil and groundwater data for the Site. Boring B-MW-1, located in the pit area, had a chloride concentration of 3,040 milligrams per kilogram (mg/Kg) at 45 feet below ground surface (fbgs). Groundwater in B-MW-1 was measured at 53.4 fbgs and had a chloride concentration of 1,380 milligrams per liter (mg/L). Two other borings B-MW-2 and -3, which appear to be cross-gradient to B-MW-1, had groundwater chloride concentrations of 406 and 469 mg/L, respectively. No log or well construction information was given for the monitoring wells.

In October 2004, Larson & Associates, Inc. (Larson) presented data from a single boring that indicated petroleum hydrocarbon concentrations, above the remediation threshold, extended to a depth of 6 to 7 fbgs in the footprint of the E&P pit (Appendix D).[4] In the boring, chloride concentrations above 250 parts per million (ppm) extended from the surface to a depth of 48 fbgs.

2.0 SITE HYDROLOGY

Regional and local geology and hydrology are described below.

2.1 REGIONAL GEOLOGY

According to the Geologic Map of New Mexico,[5] the Site is underlain by the Pliocene-age Ogallala Formation, which consists of fluvial sand, silt, clay, and gravel capped by erosion resistant caliche. The Ogallala formation overlays mudstone, sandstone and siltstone of the

Triassic-age Chinle formation of the Dockum group. Monument Draw has eroded through the Ogallala formation into the Dockum group and has filled with alluvium.[6]

2.2 SITE LITHOLOGY

Soils at the Site are fine sandy loam, underlain by indurated caliche.[7] Based on Larson's lithological description of soil collected during his subsurface investigation,[4] the shallow subsurface geology consists of caliche to 0.6 fbgs, sand to 37 fbgs, sandy clay to 41 fbgs, then sand and sandy clay to 48 fbgs.

2.3 SURFACE WATER HYDROLOGY

The land surface at the Site is nearly level to gently undulating, sloping to the west southwest into an erosional channel directed south toward Monument Draw. Regional slope of the topography is from the northwest to southeast. The elevation at the Site is 3,447 feet above sea level.

Monument Draw is the primary drainage system in the region. The Draw is located approximately 800 feet southwest of the historic pit and originates about 15 miles northwest. Monument Draw bisects the area between the existing monitoring wells (3) and the Barney well. The Draw eventually drains into the Colorado River, near Big Spring, Texas. Soils in the area of the Site are considered to be well-drained to excessively drained.

2.4 GROUNDWATER HYDROGEOLOGY

The Site is underlain by the Ogallala Aquifer. The aquifer extends ranges in thickness from 80 feet to more than 200 feet. The formation consists of heterogeneous sequences of clay, silt, sand and gravel.[8]

The Ogallala formation can be divided into the unsaturated zone and the saturated zone. The upper section of the Ogallala is unsaturated and is known as the "Vadose Zone". The lower section of the Ogallala Formation is the primary water-bearing unit and is the Ogallala Aquifer. Groundwater in the Ogallala Aquifer generally flows from northwest to southeast, normally at right angles to water level contours. Velocities of less than one foot per day are typical, but higher velocities may occur along filled erosional valleys where coarser grained deposits have greater permeabilities.

The nearest water well to the Site is located approximately 1,660 feet southwest of the Site and is owned by Mr. William McNeill. No water wells in this Section were identified in the New Mexico Office of the State Engineer's electronic database. The New Mexico Institute of Mining & Technology's WAIDS electronic database identified a water well located approximately 2,550 feet to the southwest of the Site with depth to water reported as 85 feet. The database also indicated chloride concentrations of 936 and 945 mg/L were noted during one 1965 sampling event for this well. The first groundwater zone at the Site is at a depth of 53.4 feet. Groundwater flow direction has not been determined at the Site.

Recharge of the aquifer system in the area mainly occurs in two ways: (1) infiltration of precipitation runoff in Monument Draw and (2) direct infiltration of precipitation into the coarse eolian surfical deposits.

2.5 MAGNITUDE, EXTENT AND ORIGIN OF PETROLEUM HYDROCARBONS AND CHLORIDE IN THE HISTORIC E&P PIT

Present Condition

From the previously described investigations,[2, 3, 4] it was determined that groundwater in the vicinity of the Site is less than 50 ft below the depth of impairment (12 to 15 fbgs). The distance from the nearest fresh water supply well at the Site is greater than 1,000 feet. Benzene concentrations in soil were reported below 10 mg/kg and total benzene, toluene, ethylbenzene and total xylenes (BTEX) concentrations were reported below 50 mg/kg. TPH concentrations in soil were detected above 100 mg/kg in earlier investigations.

Based on deep drill samples collected from the historic pit during previous subsurface investigations, the shallow subsurface geology consists of caliche to 0.6 fbgs, sand to 37 fbgs, sandy clay to 41 fbgs, then sand and sandy clay to 48 fbgs.[4]

October 1999.[2] Phoenix collected soil samples from five soil borings in the pit, a 100 x 100 foot area (Figure 2). The borings were advanced using an air rotary unit and split spoon samples were collected at 5 foot intervals. In addition, samples were collected from the following areas having remnants of crude oil releases:

- North spill area,
- West of old heater treater base,
- Center of spill area,
- West end of battery,
- Spill area, and
- Background.

These borings were completed to an average depth of 5 fbgs. Field analytical results are presented in Table 1.

In the historic pit area TPH concentrations ranged from 55 to 9,980 mg/kg (Table 1). Except for boring SB-2, TPH concentrations exceeded NMOCD's remediation threshold of 100 ppm in the 5 to 10 foot depths. Except for spill area and background, the other sampling locations were slightly above the TPH remediation threshold at 5 fbgs (Figure 2). TPH concentrations were below the remediation threshold at depths greater than 10 fbgs.

September 2004.[3] Phoenix installed three monitoring wells in the vicinity of the historic E&P pit and TIERRA reported the sampling results. No drilling logs, well construction logs or descriptions of the lithology were provided in the report. Report findings for each monitoring well are as follows (Figure 2):

- B-MW-1 was located inside the pit footprint, the total depth of the well was not given, but groundwater was noted at 53.4 fbgs. Soil samples were collected at 15, 30, and 45 fbgs and chloride concentrations for these depths were reported at 82.6, 14.3, and 3,040 mg/Kg, respectively. Laboratory analyses of groundwater for chloride and bromide indicated concentrations of 1,380 and 7.45 mg/L, respectively.

Table 1
Subsurface Investigation*
McNeill Ranch

Depth (fbgs)	Sampling Locations										
	Historic Pit Area					N Spill Area	W Treater Base	Center of Spill Area	Battery W End	Spill Area E End	250-ft N of Site
	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	SB-7	SB-8	SB-9	SB-10	Background
October 15, 1999 Total Petroleum Hydrocarbons (ppm)											
0-0.5											27
5	1,680	9,980	143	4,420	1,112	120	114	112	132	78	
10	67	1,190	75	1,454	101						
15		225		84	32						
20		55									

* Allen Hodge in: R.M. Renn. 2003. TIERRA Technical Consultants report to Mr. James P. Lyle, dated November 28, 2003.
fbgs = Feet below ground surface
SB = Soil boring
ppm = Parts per million
N = North
W = West
Blank cell = no data

- B-MW-2 was located approximately 100 feet southwest of B-MW-1. The total depth of the well was not given, and depth to groundwater was not given. No soil samples were collected. Laboratory analyses of groundwater for chloride and bromide indicated concentrations of 406 and 2.41 mg/L, respectively.

- B-MW-3 was located approximately 150 feet northeast of B-MW-1. the total depth of the well was not given, and depth to groundwater was not given. No soil samples were collected. Laboratory analyses of groundwater for chloride and bromide indicated concentrations of 467 and 4.30 mg/L, respectively.

On examining the limited data in the September 2004 report and knowing the Ogallala aquifer in Lea County generally flows in a southeasterly direction, it appears that B-MW-3 could be cross-gradient to B-MW-1 and considered a background location. If this is the case then background chloride concentration in groundwater is 467 mg/L.

October 2004.[4] Larson prepared a compendium of information for the Site. In addition, Larson added to the Site data by completing a boring near the center of the pit using a hollow stem auger to collect samples every foot. Analytical results for this effort are provided in Table 2. Laboratory analyses indicated TPH decrease to 10.7 mg/Kg at 10 fbgs. Benzene concentrations were reported in only two samples and were below NMOCD's remediation threshold (0.5 ppm). Chloride concentrations ranged from 723 to 4,040 mg/Kg.

Table 2
Subsurface Investigation*
September 30, 2004

Sample Depth (fbgs)	Chloride (mg/Kg)	Petroleum Hydrocarbons (mg/Kg)			Volatile Organic Compounds (mg/Kg)			
		GRO	DRO	Total	Benzene	Toluene	Ethylbenzene	Xylenes
0-1	1,380	172	4,840	5,010				
1-2	2,790	532	8,810	9,340	<0.025	0.0481	0.173	0.759
5-6	1,830	522	7,410	7,930	<0.25	0.328	0.0778	0.3352
6-7	1,380	426	6,610	7,040				
7-8								
8-9.5	1,830							
10-11	1,790	<10.0	10.7	10.7				
11-12	2,420							
12-13								
13-14	1,280							
15-16	1,320	<10.0	<10.0	>20.0				
16-17	1,620							
17-18	1,580							
20-21	2,000	<10.0	<10.0	>20.0				
21-22	2,680							
22-23								
23-24	1,000							
25-26	978	<10.0	<10.0	>20.0				
26-27	723							
30-31	1,320	<10.0	<10.0	>20.0				
31-32.5								
35-36	936	<10.0	<10.0	>20.0				
36-37								
40-41	3,220	<10.0	<10.0	>20.0				
41-42	2,770							
45-46	2,940	<10.0	22.6	22.6				
46-47	2,300							
47-48	4,040							

* M.J. Larson. 2004. Report on Burlington Pit and Barney Well Lea County, New Mexico. Report dated October 31, 2004, prepared for Lynch, Chappell & Alsup, P.C. Midland, Texas.

fbgs = Feet below ground surface
mg/Kg = Milligrams per kilogram
blank cell = No data available

Transport of TPH, and Chlorides to Groundwater

Provided that no further releases of crude oil and produced water enter the disturbed historic pit area, a simple geo-membrane barrier will confine residual TPH and chloride below the pit, minimizing further migration to groundwater. ConocoPhillips proposes a Stage II Abatement Plan, which includes:

- Removing impaired vadose zone material to a depth of approximately 12 to 15 fbgs;
- Backfilling the excavation to 6 fbgs with clean material;
- Constructing a geo-membrane barrier above the clean material; and
- Backfilling the remaining excavation with clean material.

This plan would re-direct water flow away from the sands located immediately below the barrier. The water would flow over the geo-membrane, into adjacent sub-soils, and then percolate downward through the unaffected sands to the first water zone. Details concerning the construction of the proposed barrier are in Section 6 entitled *Design and Support of the Preferred Abatement Option.*

3.0 PROPOSED MONITORING PROGRAM

For the first two years of implementation of the Abatement Plan, ConocoPhillips will:

- Obtain quarterly water levels and water samples from two new and two existing monitoring wells;
- Submit all water samples to a laboratory for analysis of chloride and total dissolved solids; and
- Provide the results of the monitoring program to NMOCD annually.

If the first groundwater zone does not show evidence of self-attenuation within two years, then ConocoPhillips would propose alternatives for NMOCD approval.

4.0 QUALITY ASSURANCE PLAN

With the report of results, ConocoPhillips will present evidence that the sampling and analysis is consistent with the techniques listed in Subsection B of 20.6.2.3107 NMAC and with 20.6.4.13 NMAC of the Water Quality Standards of Interstate and Intrastate Surface Water in New Mexico 20.6.4 MAC.

5.0 ASSESSMENT OF ABATEMENT OPTIONS

Three general options for dealing with the soil and groundwater contamination at the Site have been assessed and are discussed below.

Option 1:	No action.
Option 2:	Excavate impaired soil down to 5 feet above the first groundwater zone (53.4 fbgs), then backfill with clean material.
Option 3:	Remove impaired soil down to 12 to 15 fbgs, backfill and construct geo-membrane barrier.

<u>Option 1</u> would be to take no additional action. The historic release area has solidified and the volatile hydrocarbon constituents have weathered, making this area relatively stable. Since there are no groundwater users within 1,000 feet of the Site and the primary land use is rangeland, there would be limited opportunity for adverse effects to humans, livestock or wildlife. One down-gradient monitoring well would be installed and all three existing wells would be monitored in accordance with Section 3.0 entitled *Proposed Monitoring Program.*

<u>Option 2</u> would involve removal of all affected soils beneath the Site. In this option soil would be removed to a depth of approximately 48 feet. Owing to the sandy soil conditions (Class C

soil), excavation side walls would have to have a slope ratio 1:1.5 and would impact almost 1.4 acres of surface. Additionally, groundwater would be monitored for two years.

Option 2 includes:

- Abandoning and plugging monitoring well B-MW-1;
- Removing petroleum hydrocarbon and chloride affected material to an approximate depth of 48 fbgs;
- Transporting the removed material to a State approved landfill;
- Backfilling the excavations with clean material similar to that excavated;
- Preparing soil for re-seeding;
- Planting an appropriate seed mixture;
- Installing 2 new monitoring wells; and
- Monitoring groundwater in accordance with Section 3.0 entitled *Proposed Monitoring Program*.

Option 3 would remove the most highly affected surface soils from the historic pit area to a depth of 12 to 15 feet. Owing to the sandy soil conditions (Class C soil), excavation side walls would have to have a slope ratio 1:1.5 and would impact almost 0.5 acres of surface. The pit area would be capped to minimize migration of chlorides into the groundwater. The final excavation would be modified based upon concurrent soil analyses during actual soil removal. Additionally, groundwater would be monitored for two years.

Option 3 includes:

- Abandoning and plugging monitoring well B-MW-1
- Removing petroleum hydrocarbon and chloride affected material to an approximate depth of 12 to 15 fbgs;
- Transporting the removed material to a State approved landfill;
- Placing a 40-mil medium density polyethylene geo-membrane (liner) in the excavations;
- Backfilling the excavations with clean soils similar to that excavated;
- Controlling surface water drainage over the backfill with a slight slope on the fill surface;
- Re-seeding with an appropriate seed mixture;
- Installing 2 new monitoring wells; and
- Monitoring groundwater in accordance with Section 3.0 entitled *Proposed Monitoring Program*.

Excavation of all impaired materials from the area below the pit alters the lithologic structure of the soil (Option 2). The change in subsoil structure would expose the first water zone to unimpeded in-flow of potential contaminants. An excavation slope ratio of 1:1.5 (Class C soil) would be required to safely remove the sandy soil from a 100 x 100 x 48 foot excavation. Approximately 1.4 acres would be disturbed and approximately 44,050 cubic yards (CY) of unaffected soil would have to be stockpiled in order to remove approximately 18,000 CY of affected soil. Option 2 is also the most expensive option and would not provide greater protection of human health or the environment than Option 3.

The preferred abatement plan for the historic Dauron Well #3 E&P Pit site is Option 3. This option would remove the most significant sources of petroleum hydrocarbons in the near surface soils. By deploying a geo-membrane barrier to divert downward water flow around the impaired area, natural attenuation would allow groundwater to meet regulatory water quality mandates. An excavation slope ratio of 1:1.5 (Class C soil) would be required to safely remove the affected soil from a 100 x 100 x 15 foot excavation. Approximately 0.5 acres would be disturbed and approximately 3,150 CY of unimpaired soil would have to be stockpiled in order to remove approximately 5,600 CY of affected soil. This option has less surface and subsurface disturbance and is the most cost-effective means of preventing further contamination of the groundwater. Implementation of this option requires NMOCDs approval.

In using Option 3 instead of Option 2, the surface area of disturbance would be reduced from 1.5 to 0.5 acres and the volume of subsurface disturbance would be reduced from 62,050 to 8,750 CY of material. Additionally, Option 2 would increase the risk of residual contaminants in the remaining 5 feet of the unexcavated material from reaching groundwater.

6.0 DESIGN AND SUPPORT OF THE PREFERRED ABATEMENT OPTION

The design of the preferred abatement option is described below.

It is the objective of this abatement option (Plan) to remove historical production pit material, minimize collateral disturbance to adjacent natural soil structure and limit impact to groundwater below the historic pit. The Plan includes:

- Abandoning monitoring well B-MW-1 by tremming cement/bentonite from bottom to top of the well and removing the surface casing and pad,
- Removing petroleum hydrocarbon and chloride affected material down to a depth of approximately 15 fbgs,
- Using field instruments to monitor the removal of affected soil and confirming the field measurements with laboratory analyses. These analyses would be used to describe sidewall and floor conditions in the excavated area.
- Backfilling the excavation to 5 fbgs with clean material,
- Backfilling the excavation (top of clean backfilled material) with clean sand, free of rocks to a depth of one foot on the sides and 1.5 feet in the center to slightly dome the surface,
- Place a 40-mil medium density polyethylene geo-membrane (liner) directly above the sand base (the slight doming of the sand beneath the liner would promote lateral drainage off of the liner after placement),
- Backfilling an additional one foot of sand, with no rocks or debris, over the liner for surface protection,
- Backfilling with "good, clean" soil of a similar nature to that which was excavated, and;
- Preparing soil for re-seeding (a hydro-mulch procedure will be used to encourage re-vegetation).

The plan is to install a membrane barrier in the pit area to channel precipitation away from the affected area and minimize further downward migration of residual petroleum hydrocarbons and chlorides in the area of the pit.

In all options, the remedial action for the other historic impacted areas (100 x 60 feet, and 30 x 45 feet) and the run-off area (370 X 8 feet) would include:

- Removing petroleum hydrocarbon affected material down to a depth of 3 to 5 fbgs,
- Using field instruments to monitor the removal of affected soil and confirming the field measurements with laboratory analyses. These analyses would be used to describe sidewall and floor conditions in the excavated area. Backfilling the excavation with clean material and hydro-mulching.

For the run-off area and gully (370 X 8 feet):

- Selectively remove petroleum hydrocarbon affected material at impacted sites.
- Using field instruments to monitor the removal of affected soil and confirming the field measurements with laboratory analyses. These analyses would be used to describe sidewall and floor conditions in the excavated area. Backfill the excavated area with rip-rap to stabilize the side slope.

Also, a new monitoring well would be installed in approximately the same location (and same depth) as the old well B-MW-1 (which will have to be removed during excavation) and a second new down-gradient monitoring well would be installed. A quarterly groundwater sampling program would be established to monitor water levels, chloride concentration levels in the two new and two existing monitoring wells. If the first water zone does not show evidence of self attenuation within TWO yearS, then alternatives would be proposed for NMOCDs approval.

If this program is acceptable to NMOCD, ConocoPhillips is prepared to immediately execute the above proposed Plan.

7.0 POST CLOSURE PLAN

When eight (8) consecutive quarterly sampling events or other evidence demonstrates to the satisfaction of NMOCD that the water quality standards of Rule 19 are met, ConocoPhillips will petition for closure of the Abatement Plan. ConocoPhillips will plug and abandon monitoring wells that are associated with the Abatement Plan and restore the ground surface well sites as required by the NMOCD.

REFERENCES

1. Lyle, James P. 2004. Complaint letter submitted to the NMOCD dated September 17, 2004.

2. Renn, R.M. 2003. TIERRA Technical Consultants report to Mr. James P. Lyle, dated November 28, 2003.

3. Renn, R.M. 2004. TIERRA Technical Consultants report to Mr. James P. Lyle, dated September 17, 2004.

4. New Mexico Bureau of Geology and Mineral Resources, 2003. Geologic Map of New Mexico, 1:500,000.

5. Nicholson, Alexander and Alfred Clebsch. 1961. Geology and Ground-Water Conditions in Southern Lea County, New Mexico. USGS Ground-Water Rpt 6. NM Bureau of Mines & Minerals Res. Socorro, NM pp. 123.

6. Turner, M.T., D.N. Cox, B.C. Mickelson, A.J. Roath, and C.D. Wilson, 1973. Soil Survey Lea County, New Mexico, U.S. Department of Agriculture Soil Conservation Service, 89p.

7. Asworth, J.B. and J. Hopkins, 1995. Aquifers of Texas. Texas Water Development Board Report 34, 69p.

8. Larson, M.J. 2004. Report on Burlington Pit and Barney Well, Lea County, New Mexico. Report prepared for Lynch, Chappel & Alsup, P.C., Midland, Texas.

FIGURES

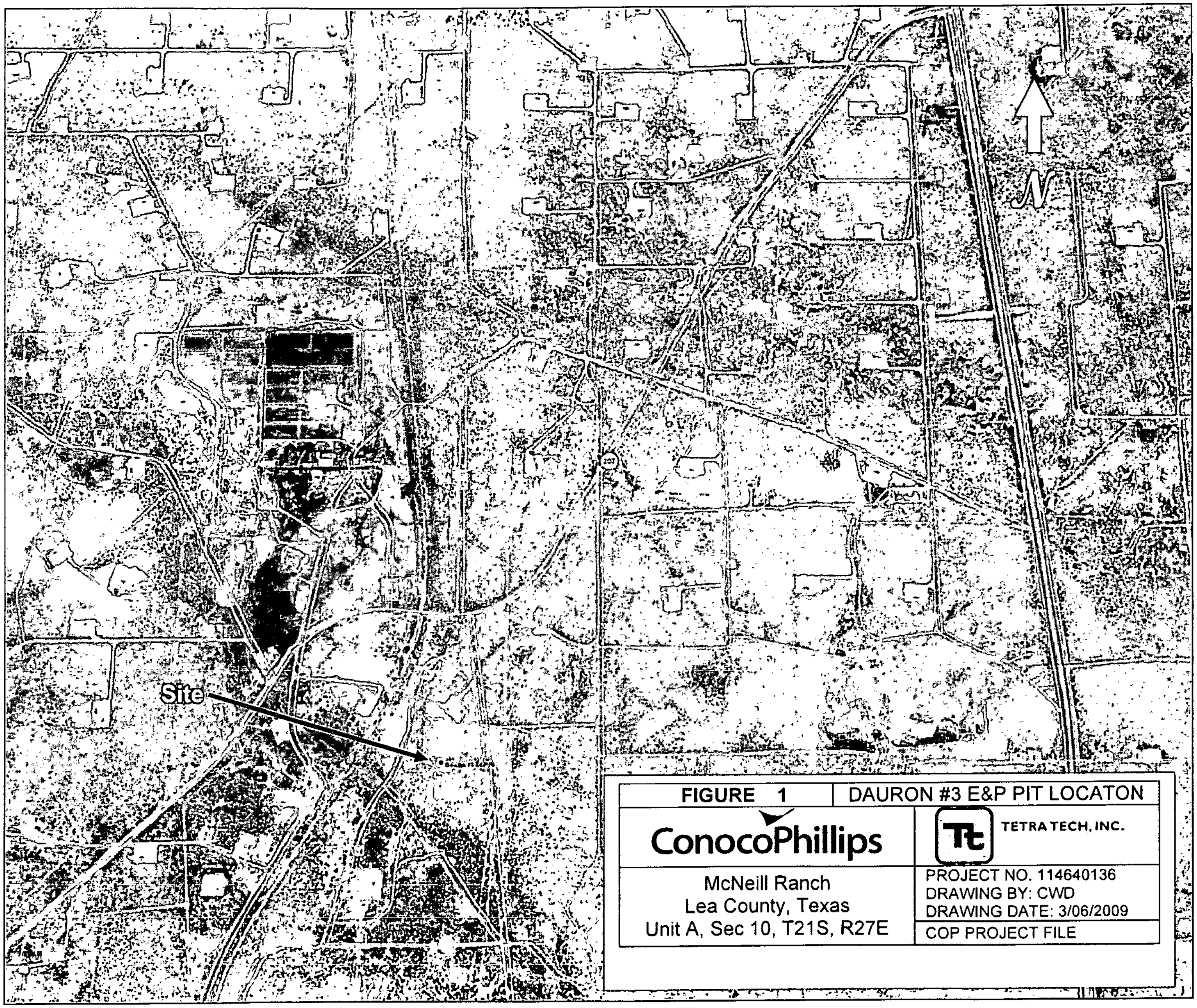


FIGURE 1	DAURON #3 E&P PIT LOCATON
ConocoPhillips	TETRA TECH, INC.
McNeill Ranch Lea County, Texas Unit A, Sec 10, T21S, R27E	PROJECT NO. 114640136 DRAWING BY: CWD DRAWING DATE: 3/06/2009
	COP PROJECT FILE

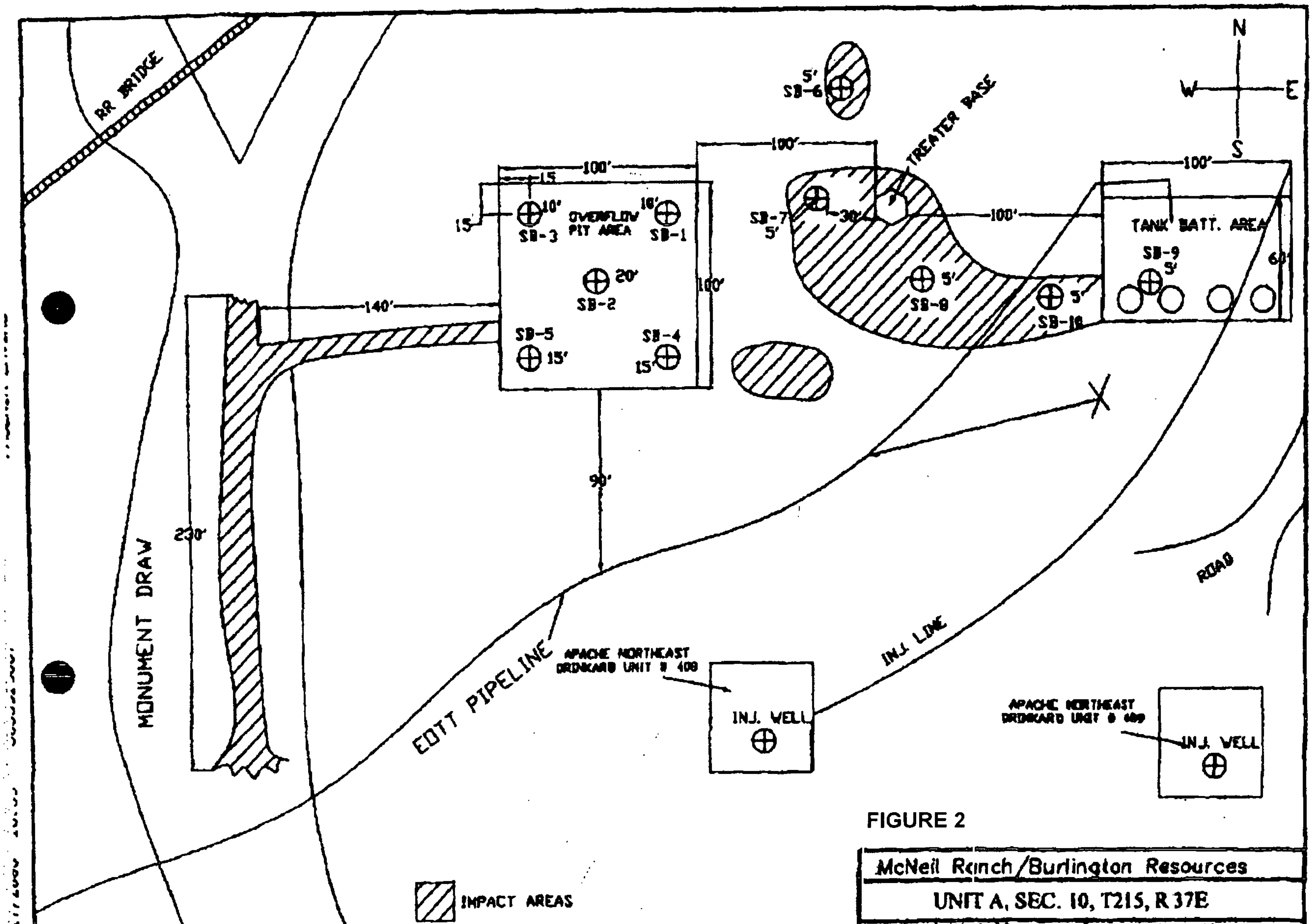
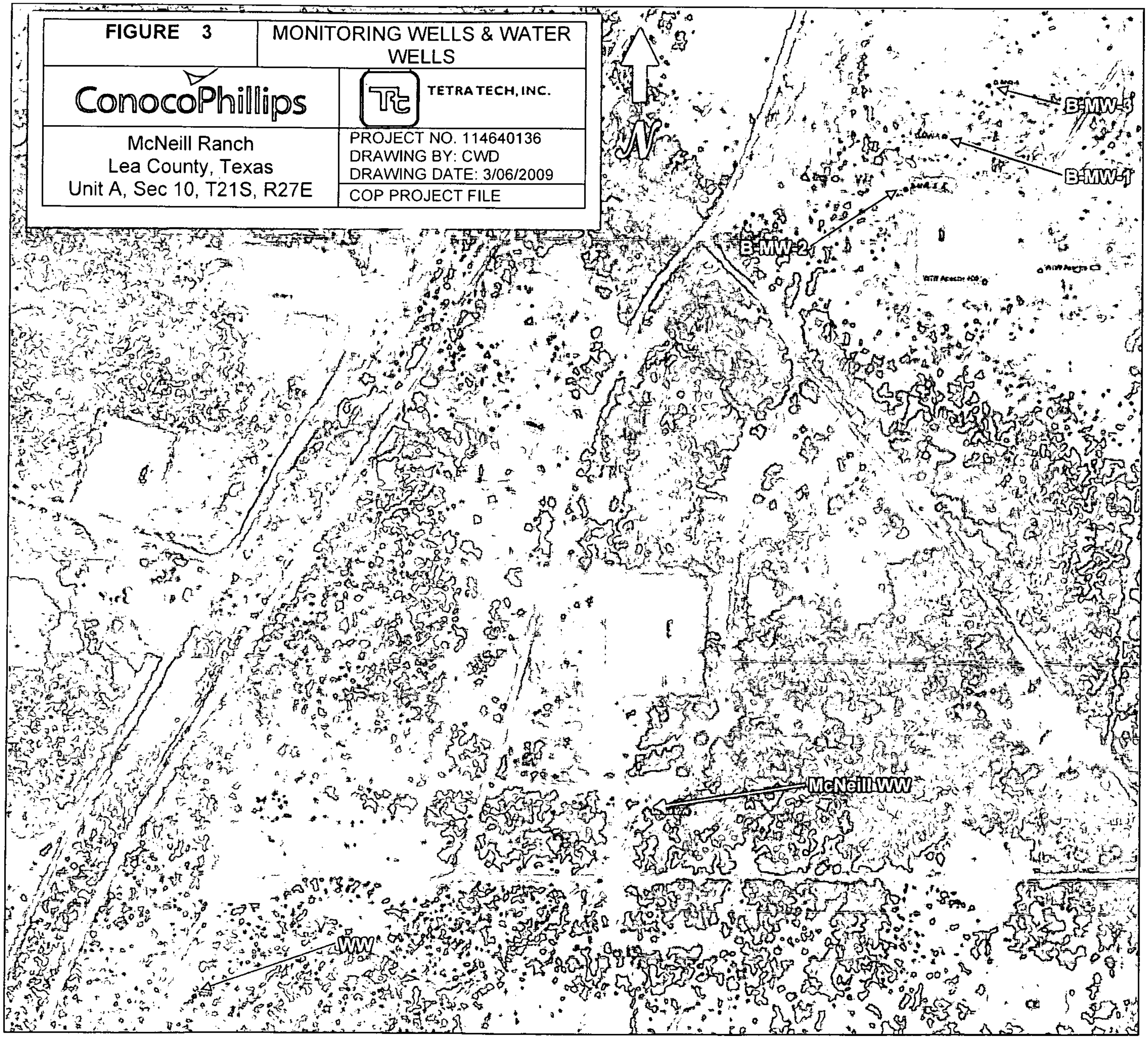


FIGURE 2

McNeil Ranch/Burlington Resources	
UNIT A, SEC. 10, T21S, R 37E	
DATE: NOV. 1999	DRAWN BY: EEO
SCALE: NONE	

Source: Phoenix Environmental LLC in TIERRA Technical Consultants report from R.M Renn to James P. Lyle dated November 28, 2003.

FIGURE 3	MONITORING WELLS & WATER WELLS
ConocoPhillips	TETRA TECH, INC.
McNeill Ranch Lea County, Texas Unit A, Sec 10, T21S, R27E	PROJECT NO. 114640136 DRAWING BY: CWD DRAWING DATE: 3/06/2009 COP PROJECT FILE



APPENDIX

APPENDIX A

Lyle, James P. 2004. Complaint letter submitted to the NMOCD dated September 17, 2004.

Law Offices of *James P. Lyle, P.C.*

Nationally Certified Civil Trial Specialist

James P. Lyle, Esquire
Judith M. Seff, Paralegal

1R0419

RECEIVED

SEP 20 2004

OIL CONSERVATION DIVISION

September 17, 2004

Roger Anderson, Bureau Chief
Environmental Bureau
Oil Conservation Division
1220 St. Francis Drive
Santa Fe, NM 87505

RE: Dauron #3 Well, Lea County, Hobbs, New Mexico

Dear Mr. Anderson:

Please accept this letter as a landowner notification on behalf of the McNeill Ranch of groundwater impact on the subject property, which is a pit associated with the Dauron #3 Well located on the NE1/4 NE1/4, Section 10, Township 21S, Range 37E, Lea County, New Mexico. For your information I am enclosing a copy of the September 17, 2004 monitor well results report of Tierra Technical Consultants, as well as Tierra's November 28, 2003 report. It is our understanding that Burlington Resource Oil and Gas Company is the current owner of this location and is the successor-in-interest to those companies which conducted all prior operations regarding the Dauron #3 Well.

Please contact me if you require any additional information.

Very truly yours,

LAW OFFICES OF JAMES P. LYLE, P.C.

James P. Lyle

JPL/jms
Enclosures
cc: Burlington Resource Oil and Gas Company (c/o Harper Estes, Esquire)
Turner W. Branch, Esquire
William F. McNeill
Paige McNeill

1116 2nd NW •Albuquerque, New Mexico 87102
(505) 843-8000 •(505) 843-8043 Facsimile •pennname@prodigy.net

APPENDIX B

Renn, R.M. 2003. TIERRA Technical Consultants report to Mr. James P. Lyle, dated November 28, 2003.

TIERRA
Technical Consultants

November 28, 2003

Mr. James P. Lyle, Attorney at Law
Law Offices of James P. Lyle, P.C.
1116 Second St. NW
Albuquerque, New Mexico 87102

RE: MCNEILL RANCH – BURLINGTON SITE

Dear Mr. Lyle:

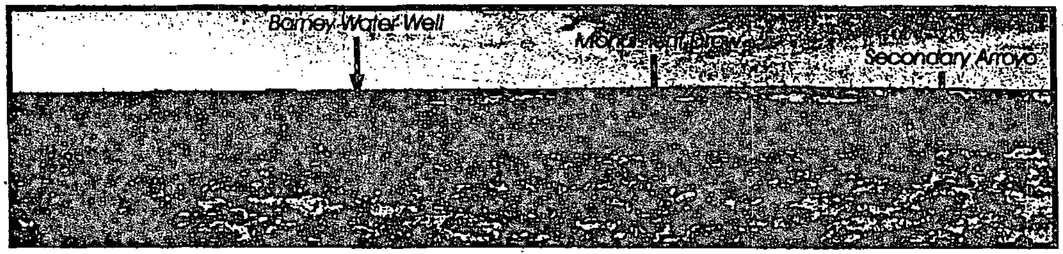
In October 2003, your office requested the involvement of TIERRA Technical Consultants (TIERRA) regarding brine contamination of groundwater on the McNeill Ranch property located in Section 10, Township (T) 21 South (S), Range (R) 37 East (E) in Lea County, New Mexico. The scope of involvement included collection, review, and analysis of existing site-specific data (e.g. environmental report, groundwater laboratory analyses, and deposition information); review of New Mexico Oil Conservation Division (OCD) Regulations; collection and review of regional geologic and hydrogeologic information; and review of the New Mexico Water Quality Control Commission (WQCC) Regulations standards for groundwater contaminants. The following text describes the information gleaned from the various sources, the assessments formulated, and the interpretations derived relative to chloride (brine) contamination of the McNeill Ranch Barney water well, and predicated upon the data acquired prior to the date of this correspondence.

SITE BACKGROUND: The operators of the McNeill Ranch drilled and completed the Barney water well located in the northeast quarter of Section 10, T21S, R37E (Attachment A), sometime prior to September 1976. The well was completed in the upper portion of the Ogallala aquifer, and a stock tank constructed in Monument Draw at the wellhead for livestock watering. According to Mr. Paige McNeill, the pump in the Barney water well is set at a depth of approximately 30 feet (personal communication, November 3, 2003), therefore, the depth to the top of groundwater is less than 30 feet. There is about 30 feet of elevation difference between the well head and the former waste disposal pit, which implies that groundwater in the area of the waste disposal pit, would likely lie at a depth of less than 50 feet below surface grade. Groundwater from the well was sampled in 1976, and submitted for assessment of water quality to Plains Laboratory in Lubbock, TX. The laboratory results from this sample determined a chloride concentration of 209 parts per million (ppm). Groundwater at this point in time was potable (safe for human consumption).

In this portion of Lea County, the Ogallala aquifer is underlain by large reserves of oil. Large quantities of brine (saltwater) are often produced along with the oil. Until 1969, the OCD allowed the unlimited disposing of the waste brine solutions into un-lined pits. The purpose was to dispose of the brine primarily through infiltration back into the subsurface, and secondarily through evaporation. As a result of this practice, the shallow, fresh water Ogallala aquifer was being contaminated by the large volume of brine being disposed (chloride concentrations in groundwater were rising), making some areas of the aquifer unfit for livestock watering, irrigation of crops, and human consumption.

In April 2003, the McNeill Ranch operators collected another groundwater sample from the Barney water well, and submitted it to Anachem Inc., for quantitative water quality analysis. In April 2003, laboratory results determined a chloride concentration of 956 milligrams/liter (mg/l) (mg/l is equivalent to ppm). The maximum allowable chloride concentration in drinking water is 250 mg/l, based upon the current WQCC standards. This analytical result indicated that the groundwater was no longer potable. Attachment B of this report includes copies of the 1976 and 2003 laboratory analyses.

During this period, an unlined oil field waste disposal pit existed, which was used for the disposal of brine and other hydrocarbon wastes produced in conjunction with the pumping of crude oil. The Barney water well is located approximately ¼ mile southwest of the waste disposal pit. Photograph 1 shows the general terrain in the vicinity of the



Photograph 1 – Southerly panorama of the landscape in the vicinity of the Barney water well and the former Burlington waste disposal pit.

Barney water well and the Burlington waste disposal pit. It also identifies the trace of Monument Draw as well as a secondary arroyo, which lies adjacent to the Burlington waste disposal pit, and flows into Monument Draw near the Barney water well. Attachment A consists of a topographic base map delineating the waste pit location and the affected Barney water well. Global Positioning Satellite (GPS) coordinates were recorded for the center of the waste pit footprint and the Barney water well to assure accurate depiction of each on the base map.

The current lease holder/operator of the former waste pit is Burlington Resource Oil and Gas Company (Burlington). According to Mr. James Lyle, attorney for the McNeill Ranch, Mr. Harper Estes, attorney for Burlington, stated that the waste pit was closed by Burlington in 1993 (James Lyle personal communication November 7, 2003). The statement was made during a deposition in Hobbs, New Mexico, on October 10, 2003. Presently, a barren, surface grade footprint of the former waste disposal pit is all that remains.

LAND STATUS: The property containing the Barney water well and the site of the waste disposal pit are owned by the Mc Neill Ranch. Over the years, the McNeill Ranch has leased portions of their property to various oil and gas development companies, which in turn have operated or controlled the waste disposal pit. The current lease-holder, Burlington, purportedly closed the pit in 1993.

No documentation regarding the closing date, method, or correspondence with the OCD has been received from Burlington at this date. Neither has any documentation relative to pit operations and maintenance (e.g. annual or total volume of brine disposed, chloride concentrations, releases (overflows), repairs, etc.) been received as of the date of this correspondence.

GEOLOGY/HYDROGEOLOGY: The High Plains occupies the southern part of the Great Plains physiographic province between the Rocky Mountains on the west and the Central Lowland on the east. This region extends from southern South Dakota to southeastern New Mexico and northwestern Texas. The southern portion of the High Plains province is further known as the Southern High Plains. The area is characterized by flat to gently rolling terrain, which is a remnant of a vast plain formed by sediments that were deposited by streams flowing eastward out of the Rocky Mountains. The High Plains aquifer in New Mexico and Texas consists mainly of near-surface deposits of late Tertiary or Quaternary. The principal water-bearing geologic unit in this area is the Tertiary Ogallala Formation. The Ogallala was formed when braided streams flowing eastward from the mountains transported eroded material, which was subsequently deposited as a heterogeneous sequence of clay, silt, sand, and gravel. The Quaternary deposits consist of alluvial, dune-sand, and valley-fill deposits. Where they overlie the Ogallala Formation, the Quaternary deposits are hydraulically connected to the Ogallala Formation to form one aquifer.

Within the Ogallala, zones cemented with calcium carbonate are resistant to erosion and weathering, and often form ledges in outcrops. The most distinctive of these layers is referred to as the Ogallala cap rock (commonly called caliche), and lies near the top of the Ogallala Formation. In Texas and New Mexico, this layer may be as thick as 60 feet. In northern Lea County, it is reported to be approximately 20 feet thick. The Ogallala aquifer is the sole source of shallow potable groundwater in most of southeastern New Mexico. It is composed mostly of unconsolidated sand and gravel, and well yields are generally high.

The average groundwater flow velocity for the Ogallala aquifer in Lea County is on the order of a few hundred feet per year. In Lea County, groundwater in the Ogallala generally flows southeasterly, but the water table gradient (flow direction) is influenced locally by the withdrawal of water from well pumping, and the influx, at discrete points, of surface water, such as unlined pits/ponds, arroyos (during precipitation events), leaking injection wells, etc. However, in the vicinity of the Barney water well and the former waste disposal pit, groundwater apparently has a southwesterly gradient. Attachment C illustrates the groundwater gradient for a portion of southern Lea County, including Section 10 (location of Barney water well and the former waste disposal pit), which is highlighted in blue. In this vicinity, the flow direction is distinctly southwest; from the former waste disposal pit towards the Barney well.

The map also denotes the depth to water as measured in the various area water wells, which are denoted on the map as open circles. The number adjacent to the open circle is the depth to water based upon well information provided by the New Mexico State Engineer Office (SEO). The wells nearest the former waste disposal pit in the northeast corner of Section 10 indicate a depth to groundwater of 25 and 27 feet. The map was produced by Chevron Corp. (Chevron), and a copy provided to Mr. Allen Hodge of Phoenix Environmental LLC (Phoenix). Mr. Hodge provided a copy of the map to this author for inclusion with this correspondence.

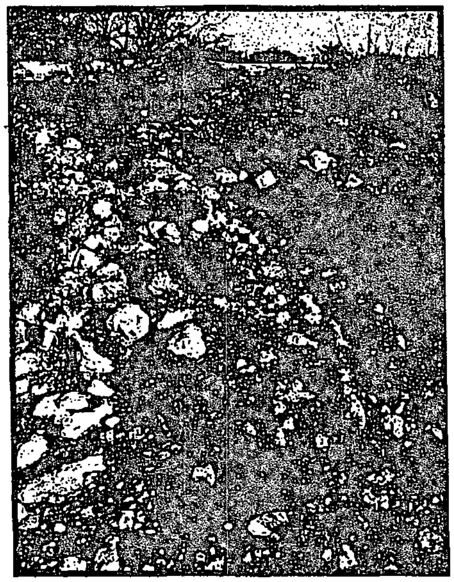
SOIL CHARACTERISTICS: The Soil Survey for Lea County, New Mexico, prepared by the U.S. Department of Agriculture, Natural Resources Conservation Service (1974) was reviewed to assess the soil type and characteristics present in the area of the former Burlington waste disposal pit. The Soil Survey indicated that the former Burlington waste disposal pit was situated in Mobeetie Series soils, and in particular Mobeetie-Potter association soil. The following soil descriptions are taken from the Soil Survey for Lea County, New Mexico (1974).

In general, the Mobeetie Series consists of well-drained soils that have a light fine sandy loam subsoil. These soils formed in calcareous sandy loam sediments derived from outcrops of the Ogallala Formation. The average annual precipitation is 10 to 13 inches. Mobeetie-Potter association soil is comprised of 70% Mobeetie fine sandy loam and about 25% Potter gravelly fine sandy loam. The permeability of the Mobeetie soil is described as moderately rapid. Water intake is rapid, and available holding capacity is 6 to 8 inches. Permeability of the Potter soil is described as moderate. Water intake is moderate, and the holding capacity is 0.5 to 1.5 inches.

The most important aspect of the soil relative to this matter is the ability to infiltrate waste water pumped into the pit. This soil characteristic is generally referred to as permeability. A low permeability would suggest that more water is lost to evaporation than a soil with a high permeability, which would allow more water to be lost through infiltration into the subsurface. The permeability of the Mobeetie-Potter association could be classified as moderate to high. This in turn implies that waste water pumped into the pit would readily infiltrate into the subsurface, and eventually through downward migration impact the groundwater.

SOIL AND GROUNDWATER QUALITY: At the request of the McNeill Ranch, an environmental assessment of the former waste disposal pit area was performed by Phoenix, in October 1999. The Phoenix assessment report is included with this correspondence as Attachment D. As part of the assessment, five soil borings were drilled throughout the footprint of the former waste disposal pit; at the four corners and the center. Soil samples were collected at 5-foot intervals, and submitted for laboratory analysis of total petroleum hydrocarbon (TPH) content. According to the analytical results, samples from all five soil borings had TPH concentrations in excess of 100 ppm, and samples from four of the five soil borings had TPH concentrations in excess of 1,000 ppm (Attachment D, *Soil Analysis Report*). The *Soil Analysis Report* summarizes the vertical extent of soil contamination beneath the former waste disposal pit.

In addition to the subsurface TPH contamination assessed in 1999 by Phoenix, the waste disposal pit surface outflow area was visually inspected on November 4, 2003. The outflow begins at the west end of the pit, and formed a small gully as waste fluids were released from the pit. The gully fed into a secondary arroyo, which then flows into Monument Draw proper (Photograph 1). Photograph 2 shows a view eastward up the gully back toward the waste disposal pit. A layer of hydrocarbon contaminated soil was observed on the surface, and is visible in the foreground. This hydrocarbon contaminated layer was traced along the entire length of the gully down to the secondary arroyo, and also along a downstream reach of the secondary arroyo (Photograph 3). A search upstream in the secondary arroyo revealed no such hydrocarbon contaminated layer.



Photograph 2 – Gully formed at outflow area of waste disposal pit. Hydrocarbon contaminated soil evident as black deposit in foreground.

Photograph 3 – Hydrocarbon contaminated soil in secondary arroyo downstream from outflow area gully.

In 1976, groundwater from the Barney water well was of a suitable quality to meet the WQCC standards for drinking water relative to the chloride concentration (209 ppm; Attachment B). Since then, the water quality has degraded (956 mg/l; Attachment B) as evidenced by the April 2003 analytical results, and no longer meets the WQCC drinking water standard for chloride, which is 250 mg/l.

OCD REGULATIONS: As an augmentation to this correspondence, Mr. Eddie Seay of Eddie Seay Consulting was asked to summarize the OCD regulations regarding disposal pits. Mr. Seay is a former OCD employee, and as such has worked with the OCD regulations extensively. According to Mr. Seay, the unlimited disposal of oil field wastes including brine solutions through the use of unlined pits was prohibited by rule R-3221, which went into effect in 1969. However, disposal of waste products was still allowed on a limited basis. The rule stated that one barrel per day per well could be disposed of in pits with a not to exceed limit of 16 barrels per day (e.g. no more than 16 wells to a pit).

Mr. Seay goes on to say that in 1993, the OCD developed unlined pit closure guidelines, which documented procedures for closure of unlined surface impoundments (pits) in a manner that assured protection of fresh waters, public health, and the environment. Prior to any closure activities, the OCD required submittal and approval of a closure plan. In this case, mandatory soil clean-up levels are determined based upon the depth to groundwater. If the depth to groundwater is less than 50 feet, as appears to be the case in the vicinity to the former waste disposal pit, TPH concentrations in the soil must be below 100 ppm. Mr. Seay added that there is also a 250 ppm chloride clean-up level. All soil clean-up must be verified through analytical data, and submitted to the OCD. Mr. Seay's regulatory summary has been included with this correspondence as Attachment E.

DISCUSSION: Water quality relative to chloride contamination in the McNeill Ranch's Barney water well has degraded from 1976 to 2003 (209 ppm vs. 956 mg/l). The WQCC drinking water standards allow no more than 250 mg/l. The water pumped from this well is no longer potable.

During this period, an unlined waste disposal pit was utilized for disposal of an unknown volume of oil field-produced brine/saltwater and other aqueous hydrocarbon wastes. Periodic releases of hydrocarbon wastes from the waste disposal pit were evidenced by a layer of black to dark brown hydrocarbon stained soil leading from the outfall area of the pit, down a small gully, and into a secondary arroyo (Photographs 2 and 3). The secondary arroyo flows into Monument Draw where the Barney water well is located. It is likely that brine-contaminated water was also released with the hydrocarbon wastes. The waste disposal pit was purportedly "closed" by the current leaseholder, Burlington, in 1993. The Barney water well is located approximately ¼ mile southwest of the former waste disposal pit.

Groundwater in the vicinity of the Barney water well and the former Burlington waste disposal pit is drawn from the Ogallala aquifer. Depth to groundwater at the site of the former waste disposal pit appears to be approximately 25 to 30 feet as indicated on a depth to groundwater map (Attachment C) produced by Chevron, which was based upon the interpretation of data supplied by the SEO. The groundwater flow gradient (based on the Chevron map) and estimated flow velocity is southwesterly toward the Barney water well at approximately 1 foot per day.

Though the greatest volume of brine in the waste disposal pit was lost through infiltration into the subsurface, a significant volume would have been lost through evaporation. Due to the high concentrations of chloride (salt) in the water disposed of in the pit, and the periodic high evaporation rates in this part of New Mexico, salt deposits (evaporites) likely formed in the soil of the pit walls and floor during periods when the brine was allowed to fully infiltrate and evaporate (e.g. the pit was allowed to dry out). These salt deposits result primarily from the evaporation of water, which contains soluble salts. Evaporation concentrates whatever salts were initially present in the water, and once the concentration reaches saturation, excess salts will precipitate out of solution (aqueous phase), and be deposited as a salt deposit (solid phase). These salt deposits would likely accumulate over time as more brine waste was added to the pit, and the mechanisms of infiltration and evaporation remained active.

It is postulated, that residual salt deposits remaining in the soil at and around the former Burlington waste disposal pit are responsible for the chronic chloride contamination found in the Barney water well ten years after the waste disposal pit was no longer utilized. Fresh water infiltrating the soil as precipitation would encounter these salt-laden soils. The salt would be leached and dissolved by the fresh water, and go back into solution, which would contaminate the water with chloride. The contaminated water would slowly percolate downward until reaching groundwater. Migrating southwesterly, the chloride contaminants would eventually be impact the Barney water well.

Pursuant to the 1993 OCD Unlined Surface Impoundment Closure guidelines, any party intent on closing an unlined waste disposal pit had to submit a closure plan to the OCD. It was required that the closure plan be approved by OCD prior to any closure activities in the field. Furthermore, the effectiveness of the closure operation had to be documented through analytical laboratory results of site soil and/or groundwater samples. As of the date of this report, no record of a closure plan or analytical data has been forthcoming from Burlington, and the OCD has no record of a closure plan being submitted for the site. With the depth to groundwater at the site less than 50 feet, OCD mandated clean-up standards of less than 100 ppm TPH and 250 ppm chloride were in effect. Soil samples collected from the site and analyzed indicated TPH concentrations in excess of 1,000 ppm throughout the former waste disposal pit with the exception of the northwest corner.

I hope this information is helpful. Please feel free to contact me should you have questions regarding the data or interpretations thereof.

Respectfully,

Richard M. Renn

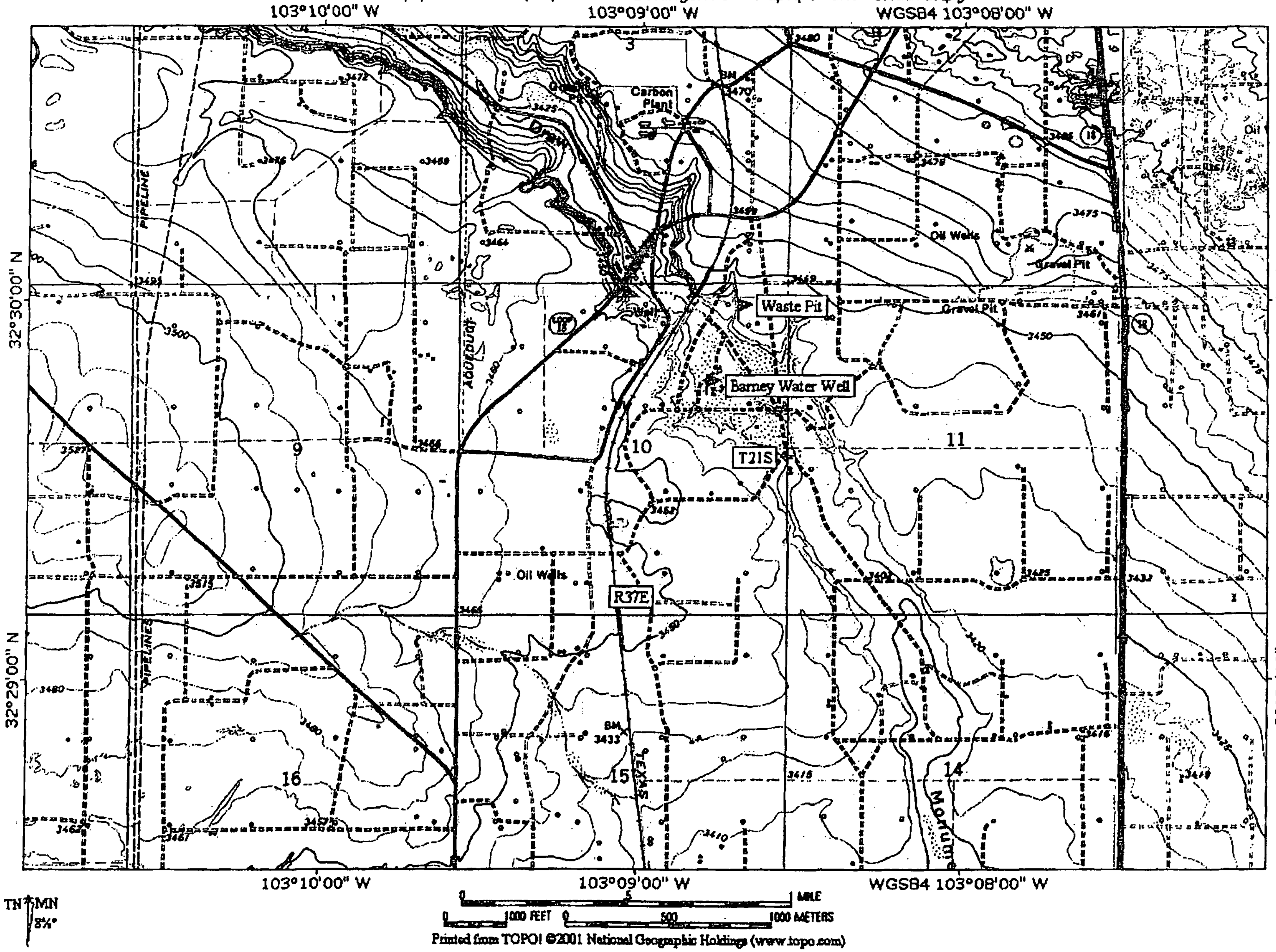
Richard M. Renn, R.G., C.P.G
TIERRA Technical Consultants

Cc w/attachments: File

Attachment A

Site Topographic Base Map

TOPO! map printed on 11/13/03 from "Burlington Site Map.tpo" and "Untitled.tpg"



Printed from TOPO! ©2001 National Geographic Holdings (www.topo.com)

Attachment B

Barney Water Well Analyses

W. A. FIX
J. H. SIKES
707 AVE. H
COTTONSEED PRODUCTS
LICENSED COTTONSEED CHEMIST

ESTABLISHED 1940

PLAINS LABORATORY

BOX 1590 TEL. 763-4061 LUBBOCK, TEXAS 79408

SOIL AND WATER ANALYSIS
OFFICIAL CHEMIST LUBBOCK GRAIN EXCHANGE
COMPLETE FEED, WATER AND FERTILIZER ANALYSIS

CERTIFICATE OF ANALYSIS—WATER

DATE 9-1-76

Submitted by McNeill Ranch
Hobbs, N.M.

Identification	#23 Harden Mill	#24 Walters Mill	#25 Burney Mill	
Sample No.	9544	9545	9546	
Calcium PPM	140	224	98	
Magnesium PPM	38	36	52	
Sodium PPM	170	580	410	
Potassium PPM	6	9	8	
Bicarbonate PPM	214	171	220	
Carbonates, PPM	48	30	60	
Chloride PPM	301	643	209	
Sulfate PPM	200	800	750	
Conductivity†	830	1550	1050	
Total Salts PPM	1119	2497	1807	
PH Value	7.0	6.7	6.9	

† In Micromhos/CM²

Signed [signature]

Remarks:

#23 is slightly salty and also #25.

#24 is very salty.

ANACHEM INC.

8 Prestige Circle, Suite 104 Allen, Texas 75002
972/727-9003 • FAX # 972/727-9003 • 1-800-888-1169

April 14, 2003

Allen Hodge
Phoenix Env. LLC
P.O. Box 1856

Hobbs, NM 88241
TEL: 505-391-9685 505-391-9687

Work Order: 0304202
Project: Barney Well

Dear Client:

Anachem, Inc. received 1 sample on 04/11/2003 for the analyses presented in the following report.

The samples were analyzed for the following tests:

BTEX by EPA 8021 - Aqueous
Ion Chromatograph Liquid (EPA 300.0)
Bromide
Chloride
Sulfate

Respectfully Submitted,
Anachem, Inc.

Howard H. Hayden, B.S.
Chemist

NOTE: Submitted material will be retained for 30 days unless notified or consumed in analysis. Material determined to be hazardous will be returned. The use of our name and reports are for the exclusive use of the client to whom they are addressed. The use of our name must receive our prior written approval. Our letters and reports apply to the sample tested and/or inspected, and are not necessarily indicative of the qualities of apparently identical or similar materials.

Anachem, Inc. Date: *14-Apr-03*

CLIENT:	Phoenix Env. LLC
Work Order:	0304202
Project:	Barney Well

Analyses	Result	Limit	Units	Date Analyzed
Lab ID: 0304202-01A				
Client Sample ID: Barney Well		**Collection Date:** 4/10/2003		
Location: McNeill Ranch, Lea Co., NM		**Matrix:** WATER		
0304202-01A BatchID: R23232 — **BTEX BY EPA 8021 - AQUEOUS**			**Prep Date:**	**Analyst:** AT
Benzene	ND	5	µg/L	4/12/2003
Toluene	ND	5	µg/L	4/12/2003
Ethylbenzene	ND	5	µg/L	4/12/2003
Xylenes, Total	ND	5	µg/L	4/12/2003
0304202-01A BatchID: R23220 — **ION CHROMATOGRAPH LIQUID (EPA 300.0)**			**Prep Date:**	**Analyst:** KAM
Bromide	4.6	0.1	mg/L	4/14/2003
Chloride	955	100	mg/L	4/14/2003
Sulfate	142	5	mg/L	4/14/2003

Qualifiers: ND - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank

Anachem, Inc.

Date: 14-Apr-03

CLIENT: Phoenix Env. LLC
Work Order: 0304202
Project: Barney Well

QC SUMMARY REPORT

Sample Matrix Spike

Ion Chromatograph Liquid (EPA 300.0)

BatchID: R23220 Units: mg/L Analysis Date: 4/14/2003

Analyte	SPK value	REC 1	REC 2	LowLimit	HighLimit	%RPD	RPDLimit
Bromide	10	98.0%	102.0%	80%	120%	3.0%	15
Chloride	50	80.0%	113.0%	80%	120%	33.3%	15
Sulfate	50	118.0%	118.0%	80%	120%	1.7%	15

BTEX by EPA 8021 - Aqueous

BatchID: R23222 Units: ug/L Analysis Date: 4/12/2003

Analyte	SPK value	REC 1	REC 2	LowLimit	HighLimit	%RPD	RPDLimit
Benzene	100	96.0%	94.7%	70%	130%	1.8%	30
Toluene	100	97.5%	99.3%	70%	130%	1.8%	30
Ethylbenzene	100	100.0%	102.0%	70%	130%	2.0%	30
Xylenes, Total	300	101.0%	102.0%	70%	130%	1.0%	30

Anachem, Inc.

Date: 14-Apr-03

CLIENT: Phoenix Env. LLC

Work Order: 0304202

Project: Barney Well

QC SUMMARY REPORT

Laboratory Control Spike

Ion Chromatograph Liquid (EPA 300.0)

BatchID: R23220 Units: mg/L Analysis Date: 4/14/2003

Analyte	SPK value	REC 1	REC 2	LowLimit	HighLimit	%RPD	RPDLimit
Bromide	1	100.0%	100.0%	80%	120%	0.0%	15
Chloride	5	98.0%	102.0%	80%	120%	4.1%	15
Sulfate	5	98.0%	98.6%	80%	120%	0.0%	15

BTEX by EPA 8021 - Aqueous

BatchID: R23222 Units: µg/L Analysis Date: 4/12/2003

Analyte	SPK value	REC 1	REC 2	LowLimit	HighLimit	%RPD	RPDLimit
Benzene	100	88.2%	89.3%	70%	130%	1.1%	30
Toluene	100	96.2%	99.8%	70%	130%	3.7%	30
Ethylbenzene	100	93.9%	97.1%	70%	130%	3.4%	30
Xylenes, Total	300	94.0%	97.0%	70%	130%	3.1%	30

Purchase Order/Chain Of Custody

Anachem, Inc. 8 Prestige Circle, Suite 104, Allen, TX 75002 Phone: 972-727-9003 Fax: 972-727-9686

Page ___ of ___

Report To: ALLEN Hodge
Company: Phoenix Environmental LLC
Address: P.O. BOX 1856
City, State, Zip: Hobbs, NM 88240
Phone: 605 391-9685 Fax: 391-9687

Bill To: (Buyer) Phoenix
Purchase Order #:
Address: SAME
City, State, Zip:
Phone: Fax:
Quote #:

Project Name: BARNEY WELL
Project Location: McNeill Ranch City, State: LEA CO. NM
Date Due: Rush: 0% 25% 50% 100% Sampled By: ALLEN Hodge

Lab#	Client Sample ID	Matrix	Date/Time	Sample Notes	BTEX	CL chlorides	Bromide	Sulfate				
0304202-01	1. BARNEY WELL	WATER	4/10/03 1700	2 X 40A	X							
*	2. " "	"	"	1 X 2 LT		X	X	X				
	3.											
	4.											
	5.											
	6.											
	7.											
	8.											
	9.											
	10.											

Relinquished By	Date	Time	Received By	Date	Time
[signature]	41003	1700	[signature]	4/11/03	10:00AM

In the event that Anachem determines that a sample is hazardous, the client agrees to:
Pay For Sample Disposal ___
Accept Returned Sample ___

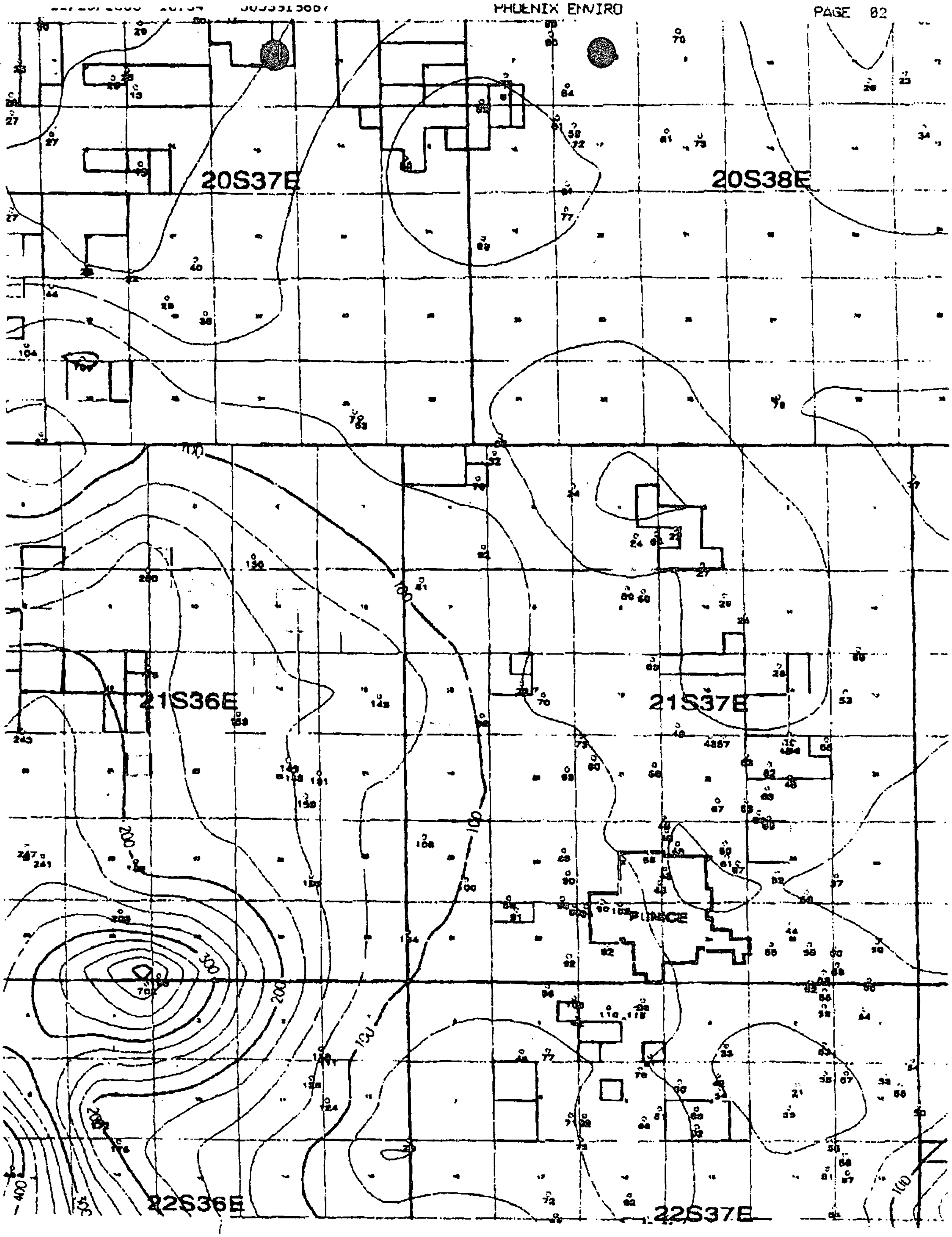
4°C FED EX!

Work Order #: 0304202

010 REV 1/00 Sample information is vital for proper login and reporting. This is a contract subject to the terms and conditions on the reverse side.

Attachment C

Chevron Depth To Groundwater Map


20S37E
20S38E
21S36E
21S37E
22S36E
22S37E
100
200
300
400

Attachment D

Phoenix Environmental Assessment Report

1.0 INTRODUCTION

This report presents the results of an on-site investigation of the Burlington Resources Oil & Gas Company, Battery site. The site is located on the McNeill Ranch in Unit A of Sec.10, T21S, R37E of Lea Co., New Mexico. The Battery site was owned and operated by Burlington Resources and at present has been abandoned. The McNeill Ranch owns the land at and around the site. Phoenix Environmental LLC (Phoenix) performed the site investigation during November 1999 to substantiate suspected vadose zone and the possibility of ground-water contamination at the site. The field investigation was performed in general accordance with the New Mexico Oil Conservation Division (NMOCD) regulations. The following sections present the findings resulting from our investigation.

1.10 Location

The eastern New Mexico farmland and prairie soils are composed of alluvial sediments. Near surface sediments consist primarily of Pliocene alluvial and Lacustrine deposits in the form of sands, gravel, and caliche beds. (Sources: Roadside Geology of New Mexico, Mountain Press Publishing Co., Halka Chrinic, 1987; Geologic Highway Map, Southern Rocky Mountain Region, & American Association of Petroleum Geologists).

1.20 Background

The McNeill Ranch, prior to the oil and gas industry, consisted of good grass prairie or range land. The depth to groundwater in this area is estimated to be in the 25' range below ground surface (BGS), based on water well information reviewed at the New Mexico State Engineer's Office in Roswell. Currently the site has been abandoned and all surface equipment removed. The site has visible surface staining and impacted soil from hydrocarbons. There is a suspected old overflow pit that is located to the west of the old tank battery area. The old pit area has been out of service for a number of unknown years and appears to have been covered up with caliche. There is a pipeline that comes into the southern end of the battery area that is owned by Eott Energy Corp and has been taken out of service.

2.0 PROCEDURES

Phoenix performed field investigation during November 1999. The objectives of this investigation were to define the vertical and horizontal extent of petroleum-based soil contamination and to determine if the groundwater has been impacted. To meet these objectives, Phoenix drilled and sampled five soil borings (SB) in the old pit area and five borings in and around the site to define the outer boundaries of the contamination. Samples from the borings were tested for Total Petroleum Hydrocarbons (TPH). The ten soil borings were plugged with bentonite to prevent vertical pathways for contamination to follow.

2.10 Summary of Field Investigation

The first phase of the field investigation was to interview Mr. McNeill, he gave no clues to the history, use or age of the suspected pit. Mrs. Lennah Frost, with Eott Energy Corp., was interviewed concerning the pipeline that crosses the south end of the pit area about the history of any leaks at the site. None were noted or found in her records. New Mexico One Call was contacted before any drilling at the site was started (confirmation # 99101510010239).

Five soil borings were drilled to define the vertical depth of impact in the pit area. SB-1 was drilled to a depth of 10' before the TPH level dropped below 100 ppm. SB-2 was drilled to a depth of 20' before the TPH level dropped below 100 ppm. SB-3, SB-4 and SB-5 were below 100 ppm at 15' in depth. SB-6 through 10 were drilled in the suspected spill areas to define the outer boundaries. These borings had an average depth of 5' to have TPH levels below 100 ppm. The other impacted areas had an average depth of 5' with TPH levels below 100 ppm.

SB-1 had a vertical depth of 20' when the TPH dropped below 100 ppm. This was the deepest that impact was found at the site. The ground water at the site has not yet been impacted as of this investigation. Pursuant to the NMOCD guidelines for clean up of unlined surface impoundments, the cleanup level for this site would be at <100 ppm of TPH, <50 ppm of total BTEX and CL at <250 ppm.

2.20 Site Borings and Sample Locations

The boring locations are shown on the site map. A description of the location and purpose of each boring are listed as follows.

- SB-1 was drilled at the northeast corner of the pit area. This boring was drilled to a depth of 10' with samples taken every 5' until the TPH had dropped below 100 ppm.
- SB-2 was drilled in the center of the pit area. This boring was drilled down to a depth of 20' before the TPH dropped below 100 ppm. This boring was drilled to further define the maximum vertical impact at the site.
- SB-3 was drilled in the northwest corner of the pit area. This boring was drilled down to a depth of 10' before the TPH dropped below 100 ppm. This boring was drilled to further define the vertical impact at the site.

- SB-4 was drilled in the southeast corner of the pit area. This boring was drilled down to a depth of 15' before the TPH dropped below 100 ppm. This boring was drilled to further define the maximum vertical impact at the site.

- SB-5 was drilled in the southwest corner of the pit area. This boring was drilled down to a depth of 15' before the TPH dropped below 100 ppm. This boring was drilled to further define the maximum vertical impact at the site.

- SB-6 to 10 were drilled in and around suspected spill areas to define the outer boundaries of surface impact. These borings were drilled down to an average depth of 5' to have TPH below 100 ppm (See site map for locations).

2.30 Boring and Sampling Procedures
Prior to drilling and sampling activities, the drill crew and other site personnel attended a tailgate safety meeting to cover site hazards and scope of work. Following the safety meeting the TPH analyzer, a Mega TPH analyzer from GAC SN # 1156, was calibrated using blanks for the zero.

Phoenix started drilling the soil borings in areas of known or suspected petroleum contamination. Soil borings were drilled using a small air rotary drill rig, with sampling on five-foot centers. The samples were taken using a 2" split spoon sampler for undisturbed samples.

The outer boundaries were defined by utilizing the same method as above to check the outer depths of the areas of known contamination, to quantify petroleum contamination.

3.0 RESULTS AND DISCUSSION
The following sections present the results of the field investigation. These results include physical data and qualitative data obtained from field observations and analysis. These results are shown in the site map, with respect to the impacted areas located at the site. Backup information, such as on site analysis, and site photos are included in this report.

3.10 Sampling
The objectives of the sampling were as follows:

- Discover source zones of petroleum-based hydrocarbon contamination.
- Define the vertical and horizontal extent of petroleum-based hydrocarbon contamination in the vadose zone.
- Determine if the groundwater at the site has been impacted with respect to the vertical depth of contamination.

In brief, results from sampling indicated that the groundwater at the site has not yet been impacted, although there is significant petroleum contamination originating from the pit area and the other areas at the site. For the most part there is no horizontal migration of the contamination in the vadose zone. Although there is a spill run off area that came from the pit and runs off the site to the west and into the bottom of the Monument Draw where the top of ground water is at 18' BGS.

As a result of the investigation, the old pit area has been defined to be 100'x100'x20' in size and will yield an estimated 7,408cyds of contaminated soils. The old impacted area 100'x80'x5' plus 30'x45'x5' in size will yield an estimated 1,361cyds of contaminated soils. The overflow area 370'x8'x3' in size will yield an estimated 329cyds of contaminated soils. The total volume of contaminated soils at the site is estimated to be +/- 9,098cyds.

3.20 Field and on Site Screening

Field screening and on site analysis methodology provided favorable results insofar as identification of petroleum-based hydrocarbon contamination from the source zones.

The majority of the vadose-zone contamination is located within the old pit area reaching a vertical depth of 20'. The other area with significant impact was the area in and around the treaters with a vertical depth in the 5' range. The rest of the impacted areas are limited to the near surface soils in the 3' depth range.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon the data generated and observations made during the site investigation of the source zones, Phoenix has developed the following conclusions.

- The near surface and vadose-zone soils at the site are contaminated with significant levels of petroleum-based hydrocarbons that are above the NMOCD guidelines for site closure.

- There is an estimated +/- 9,098cyds of contaminated soils that need to be addressed pursuant to the NMOCD guidelines for clean up of unlined surface impoundments.

- The groundwater at the site, as of this investigation, has not yet been impacted.

- The contamination at the site is associated with the production of oil and gas operation and old abandoned tank battery located at the site and has no other outside sources.

As a result of our investigation and analysis of the field data, Phoenix would recommend that the following steps be undertaken at the site.

- Removal of the source zones of contamination to prevent the future threat of possible groundwater impact or contamination.

5.0 LIMITATIONS

Phoenix Environmental LLC has prepared this ESA report to the best of its ability. No other warranty, expressed or implied, is made or intended.

This report has been prepared for the McNeill Ranch or client. The information contained in this report including all exhibits and attachments; may not be used by any other party without the express consent of Phoenix Environmental LLC and/or the or client.

PHOENIX ENVIRONMENTAL LLC

P.O. Box 1856 2113 French Dr. Hobbs, NM 88241-1856 Office 505-391-9685 Fax 505-391-9687

SOIL ANALYSIS REPORT

Date: 10-15-99
Client: McNeill Ranch
Supervisor: Allen Hodge
Sample Matrix: Soil

Facility: Burlington Pit & Battery Site
Test Method: EPA 418.1
Order No. Bill McNeill
Sample Received: Intact on site

	TPH		Depth	Location
SAMPLE NO. 1:	1,680	PPM	5'	SB-1 Pit Area
SAMPLE NO. 2:	67	PPM	10'	SB-1 Pit Area
SAMPLE NO. 3:	9,960	PPM	5'	SB-2 Pit Area
SAMPLE NO. 4:	1,190	PPM	10'	SB-2 Pit Area
SAMPLE NO. 5:	225	PPM	15'	SB-2 Pit Area
SAMPLE NO. 6:	55	PPM	20'	SB-2 Pit Area
SAMPLE NO. 7:	143	PPM	5'	SB-3 Pit Area
SAMPLE NO. 8:	75	PPM	10'	SB-3 Pit Area
SAMPLE NO. 9:	4,420	PPM	5'	SB-4 Pit Area
SAMPLE NO. 10:	1,454	PPM	10'	SB-4 Pit Area
SAMPLE NO. 11:	84	PPM	15'	SB-4 Pit Area

COMMENTS: These samples were taken with a split-spoon on 5' centers. The samples were to confirm vertical depth of the impacted soils at the site and to determine if groundwater had been impacted.

Phoenix Environmental LLC

P.O. Box 1856 2113 French Dr. Hobbs, NM 88241-1856 Office 505-391-9685 Fax 505-391-9687

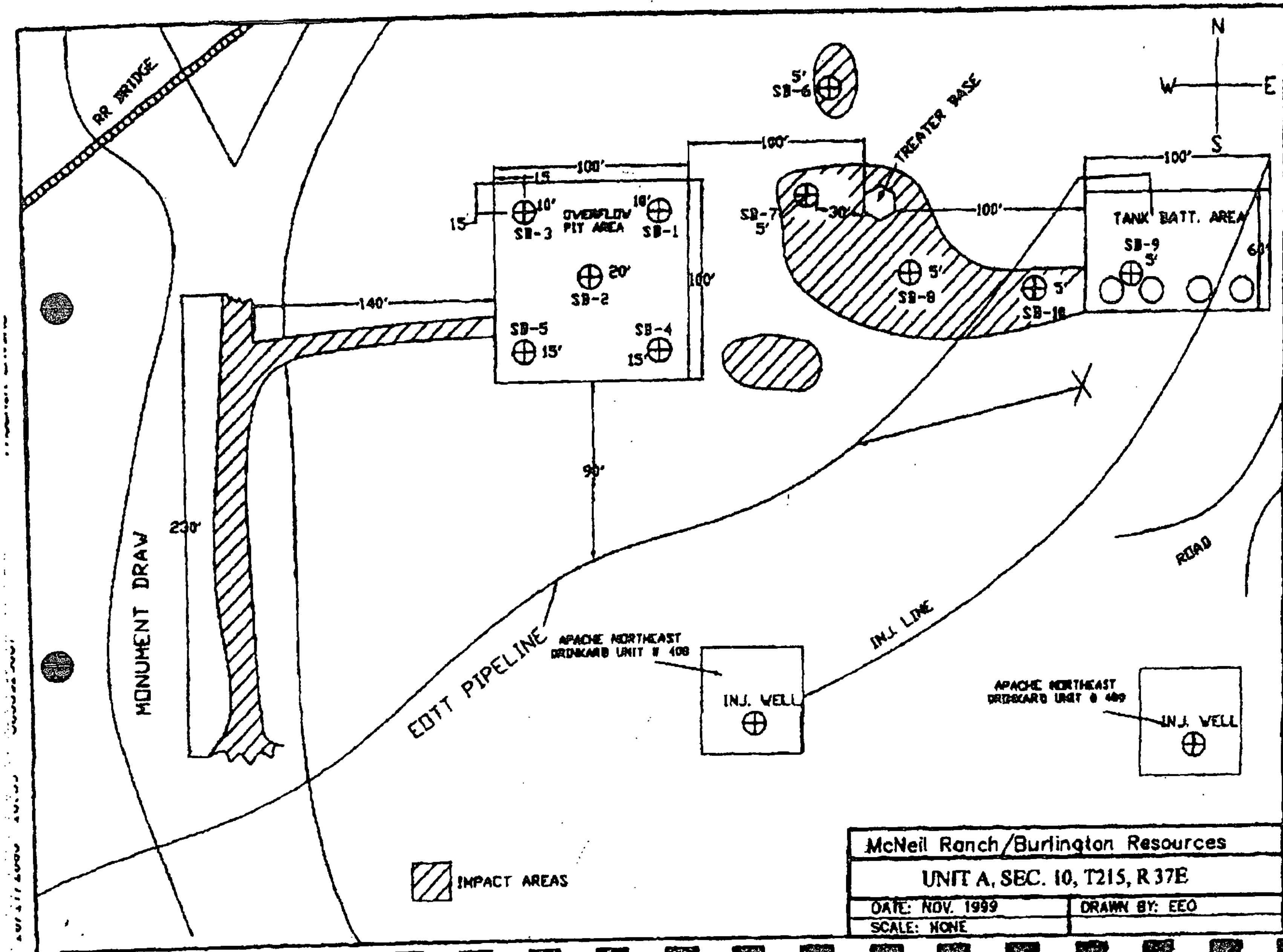
SOIL ANALYSIS REPORT

Date: 10-15-98
Client: McNeill Ranch
Supervisor: Allen Hodge
Sample Matrix: Soil

Facility: Burlington Pit & Battery Site
Test Method: EPA 418.1
Order No. Bill McNeill
Sample Received: Intact on site

	TPH		Depth	Location
SAMPLE NO. 1:	1,112	PPM	5'	SB-5 Pit Area
SAMPLE NO. 2:	101	PPM	10'	SB-5 Pit Area
SAMPLE NO. 3:	32	PPM	15'	SB-5 Pit Area
SAMPLE NO. 4:	120	PPM	5'	SB-6 Spill Area North
SAMPLE NO. 5:	114	PPM	5'	SB-7 West of Treater Base
SAMPLE NO. 6:	112	PPM	5'	SB-8 Center of Spill Area
SAMPLE NO. 7:	132	PPM	5'	SB-9 West End of Battery Area
SAMPLE NO. 8:	783	PPM	5'	SB-10 East End of Spill Area
SAMPLE NO. 9:	27	PPM	0-6"	Background 250' North of Site
SAMPLE NO. 10:		PPM		

COMMENTS: These samples were taken with a split-spoon on 5' centers. The samples were to confirm vertical depth of the impacted soils at the site and to determine if groundwater had been impacted.


RR BRIDGE
MONUMENT DRAW
230'
140'
100'
15
15'
10'
SB-3
OVERFLOW PIT AREA
18'
SB-1
20'
SB-2
SB-5
15'
SB-4
15'
100'
90'
100'
TREATER BASE
5'
SB-6
SB-7
5'
30'
100'
5'
SB-8
5'
SB-10
100'
TANK BATT. AREA
SB-9
5'
60'
N
W
E
S
EOTT PIPELINE
APACHE NORTHEAST DRINKARD UNIT # 408
INJ. WELL
INJ. LINE
ROAD
APACHE NORTHEAST DRINKARD UNIT # 409
INJ. WELL
IMPACT AREAS
McNeil Ranch/Burlington Resources
UNIT A, SEC. 10, T21S, R 37E
DATE: NOV. 1999
DRAWN BY: EEO
SCALE: NONE

Attachment E

Seay OCD Regulations Summary

November 18, 2003

Richard Renn
Tierra Technical Consultants
1694 Tierra Del Rio, NW
Albuquerque, NM 87107

RE: Pit Information

Mr. Renn:

In response to your inquiry concerning pits associated with oil and gas production in New Mexico.

First of all, the New Mexico Oil Conservation Division regulates the construction and closure of all pits. In 1967 the OCD passed rule R-3221 which prohibited disposal of produced waters in unlined pits, ponds, lakes, depressions, draws, stream beds or arroyos. It was deemed that this disposal threatened and was a hazard to fresh water supplies. Although in 1969, when the rule went into effect, they did allow some disposal, the rule said that one barrel per day per well could be put into pits, not to exceed 16 bls. per day. Their reasoning was that evaporation would take care of this amount of disposal.

In 1986, the OCD included Rule 8, which said no pit would be constructed without OCD approval.

In 1993, the OCD developed guidelines for "Surface Impoundment" closures. In this regulation it set forth the procedure for testing and properly closing a pit. The basic guide for closing is depth to groundwater, wellhead protection, and surface water. All of these criteria are considered in determining the level of cleanup. When groundwater is less that fifty feet from surface, you have a 100ppm TPH cleanup level, when groundwater is more that fifty feet but less that 100 feet, you have a 1000 ppm TPH cleanup level, and when groundwater is over 100 feet from surface, you have a 5000 ppm TPH cleanup level. You also have a 250 ppm chloride cleanup level which has to be met along with TPH. All closure activities have to be approved by OCD with laboratory analytical.

In 1997, the OCD sent out notices to all operators that they were aware some pits were still being used and were not properly closed. The notice required all operators to compile a pit inventory of all surface impoundment and then file a closure plan. Many pits were closed during this period.

Now in 2003, the OCD is in the process of writing and adopting a new rule on pits. All pits will need an OCD permit and all pits will be lined. This rule is still in the hearing stages.

This is all the information I could find on pits. Find enclosed a copy of the rules and regulations. If you have any questions or need anything else, please call.

Sincerely,

Eddie W. Seay

Eddie W. Seay
Eddie Seay Consulting
601 W. Illinois
Hobbs, NM 88242
(505)392-2236
seay04@leaco.net

APPENDIX C

Renn, R.M. 2004. TIERRA Technical Consultants report to Mr. James P. Lyle, dated September 17, 2004.

TIERRA
Technical Consultants

September 17, 2004

Mr. James P. Lyle
Law Offices of James P. Lyle, P.C.
1116 2nd St. NW
Albuquerque, NM 87102

RE: MONITOR WELL SAMPLING RESULTS, BURLINGTON SITE, McNEILL RANCH, NEW MEXIOC

Dear Mr. Lyle:

I am in receipt of the Assaigai Analytical Laboratories, Inc., soil and groundwater sampling laboratory results from the three monitor wells (B-MW-1, B-MW-2, and B-MW-3) recently installed on the McNeill Ranch property in the vicinity of the former oil field waste disposal pit, NE/4 Section 10, Township 21 South, Range 37 East, and the Barney Well. The monitor wells were drilled and completed by Phoenix Environmental, LLC on September 1 through September 3, 2004, and groundwater sampled on September 3, 2004. A copy of the laboratory results dated September 10, 2004, is attached with this correspondence.

The first monitor well drilled, B-MW-1, was drilled through the assumed surface footprint of the former waste disposal pit. Soil samples from depths of 15, 30, and 45 feet were also collected from B-MW-1, and submitted for laboratory analysis. The depth to groundwater as measured in B-MW-1 was 53.4 feet below surface grade. Due to logistics issues (oil field equipment, and arroyo), monitor well B-MW-2 was drilled approximately 100 feet southwest of B-MW-1. This placed the well between B-MW-1 and the Barney Well location. We do not have information as yet to discern if the B-MW-2 location lies directly down-gradient of B-MW-1. The third monitor well, B-MW-3, was drilled approximately 150 feet to the northeast of B-MW-1.

The three soil samples from B-MW-1 were analyzed for chlorides, and the groundwater samples were analyzed for both chlorides and bromides. The laboratory data for soils indicates an elevated concentration of chlorides at the 45-foot interval (3,040 milligrams/kilogram); about 8 feet above the water table. The laboratory results for the groundwater sample from B-MW-1 indicated a chloride concentration of 1,380 milligrams/liter (mg/l). Laboratory results for B-MW-2 and B-MW-3 yielded results of 406 mg/l and 467 mg/l, respectively. The analytical result for chlorides in groundwater from the Barney Well were 1,280 mg/l. The New Mexico Water Quality Control Commission (WQCC) has set a maximum allowable contaminant concentration of 250 mg/l for groundwater.

Groundwater samples were also analyzed for bromides, though the WQCC does not list a specific value for bromides, the concentration of bromides in conjunction with other salts (e.g. chlorides) is used to calculate the Total Dissolved Solids (TDS) concentration. The WQCC has a maximum allowable contaminant concentration of 1,000 mg/l for TDS. This value is exceeded by the chloride concentration alone in B-MW-1.

1694 Tierra Del Rio NW • Albuquerque • NM • 87107 • Phone: 505-345-6866 • FAX: 505-345-6966

Monitor well, B-MW-1, was drilled through the former waste disposal pit, based upon surface observations of the suspected pit footprint. The 45-foot depth soil sample collected from B-MW-1 indicates an elevated chloride concentration directly above the water table (53.4 feet). Groundwater analytical data indicates that groundwater beneath the former waste disposal pit is contaminated with chlorides (1,380 mg/l) or roughly 5 ½ times the WQCC maximum allowable contaminant concentration.

As always, should you have any questions or require further clarification, please do not hesitate to contact me.

Respectfully,

Richard M. Renn

Richard M. Renn, R.G., C.P.G.
Tierra Technical Consultants

cc: File

ASSAIGAI
ANALYTICAL
LABORATORIES, INC.
4301 Masthead NE • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259
3332 Wedgewood, Ste. N • El Paso, Texas 79925 • (915) 593-6000 • FAX (915) 593-7820
127 Eastgate Drive, 212-C • Los Alamos, New Mexico 87544 • (505) 662-2558

Explanation of codes

B	analyte detected in Method Blank
E	result is estimated
H	analyzed out of hold time
N	tentatively identified compound
S	subcontracted
1-9	see footnote

TIERRA TECHNICAL CONS.
attn: RICHARD M. RENN
1694 TIERRA DEL RIO NW
ALBUQUERQUE NM 87107

STANDARD

Assaigai Analytical Laboratories, Inc.

Certificate of Analysis

Client: TIERRA TECHNICAL CONS.
Project: MCNEILL RANCH
Order: 0409152 COD Receipt: 09-04-04

For William P. Biava: President of Assaigai Analytical Laboratories, Inc.

Sample: 30' Collected: 09-01-04 14:40:00 By:
Matrix: SOIL

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0409152-01A		EPA 300.0 Anions by IC					By:	DAW		
W04650	WC.2004.2580.7	16887-00-6	Chloride	14.3	mg / Kg	100	0.05		09-08-04	09-08-04

Sample: 15' Collected: 09-01-04 15:18:00 By:
Matrix: SOIL

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0409152-02A		EPA 300.0 Anions by IC					By:	DAW		
W04650	WC.2004.2580.8	16887-00-6	Chloride	82.6	mg / Kg	100	0.05		09-08-04	09-08-04

Sample: 45' Collected: 09-01-04 16:40:00 By:
Matrix: SOIL

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0409152-03A		EPA 300.0 Anions by IC					By:	DAW		
W04854	WC.2004.2585.9	16887-00-6	Chloride	3040	mg / Kg	1000	0.05		09-10-04	09-10-04

STANDARD

Assaigai Analytical Laboratories, Inc.

Certificate of Analysis

Client: TIERRA TECHNICAL CONS.
Project: MCNEILL RANCH
Order: 0409152 COD Receipt: 09-04-04

Sample: *BARNEY WELL* Collected: *08-31-04 0:00:00* By:
Matrix: *WATER*

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0409152-04A		EPA 300.0 Anions by IC					By: DAW			
W04649	WC.2004.2576.10		Bromide	5.69	mg / L	10	0.05		09-08-04	09-08-04
W04649	WC.2004.2576.28	16887-00-6	Chloride	1280	mg / L	100	0.05		09-08-04	09-08-04

Sample: *B-MW-1* Collected: *09-03-04 12:24:00* By:
Matrix: *WATER*

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0409152-05A		EPA 300.0 Anions by IC					By: DAW			
W04649	WC.2004.2576.11		Bromide	7.45	mg / L	10	0.05		09-08-04	09-08-04
W04649	WC.2004.2576.29	16887-00-6	Chloride	1380	mg / L	100	0.05		09-08-04	09-08-04

Sample: *B-MW-2* Collected: *09-03-04 12:49:00* By:
Matrix: *WATER*

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0409152-06A		EPA 300.0 Anions by IC					By: DAW			
W04649	WC.2004.2576.13		Bromide	2.41	mg / L	10	0.05		09-08-04	09-08-04
W04649	WC.2004.2576.30	16887-00-6	Chloride	406	mg / L	100	0.05		09-08-04	09-08-04

Sample: *B-MW-3* Collected: *09-03-04 11:50:00* By:
Matrix: *WATER*

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0409152-07A		EPA 300.0 Anions by IC					By: DAW			
W04649	WC.2004.2576.14		Bromide	4.30	mg / L	10	0.05		09-08-04	09-08-04
W04649	WC.2004.2576.31	16887-00-6	Chloride	467	mg / L	100	0.05		09-08-04	09-08-04

Unless otherwise noted, all samples were received in acceptable condition and all sampling was performed by client or client representative. Sample result of ND indicates Not Detected, ie result is less than the sample specific Detection Limit. Sample specific Detection Limit is determined by multiplying the sample Dilution Factor by the listed Reporting Detection Limit. All results relate only to the items tested. Any miscellaneous workorder information or footnotes will appear below.

Analytical results are not corrected for method blank or field blank contamination.

APPENDIX D

Larson, M.J. 2004. Report on Burlington Pit and Barney Well, Lea County, New Mexico. Report prepared for Lynch, Chappel & Alsup, P.C., Midland, Texas.

REPORT ON
BURLINGTON PIT AND BARNEY WELL
LEA COUNTY, NEW MEXICO

Prepared for:

Lynch, Chappel & Alsup, P.C.
300 North Marienfeld Street, Suite 700
Midland, Texas 79701

Prepared in Regards to:

Cause No. CV-99-00260-G
McNeill vs Burlington Resources
5th Judicial District Court
Lea County, New Mexico

October 31, 2004

Prepared by:

Larson and Associates, Inc.
507 North Marienfeld Street, Suite 202
Midland, Texas 79701

Mark J. Larson

TABLE OF CONTENTS

LIST OF TABLES

Table

LIST OF FIGURES

Figure

LIST OF APPENDICES

Appendix

1.0 INTRODUCTION

This report has been prepared at the request of Lynch, Chappel and Alsup, P.C., by Mark J. Larson, an employee of Larson and Associates, Inc. ("Larson"), and offers opinions, from a hydrogeologic perspective, regarding a closed pit ("Burlington Pit") operated by predecessors of Burlington Resources Oil and Gas Company ("Burlington") in unit letter ("UL") A (NW/NE/NE), Section 10, Township 21 South, Range 37 East, Lea County, New Mexico. The Pit is the subject of litigation in Cause No. CV-99-00260-G; McNeill vs Burlington Resources; 5th Judicial District Court, Lea County, New Mexico, for contamination of a water well ("Barney Well") located in UL H (NW/SE/NE), Section 10, Township 21 South, Range 37 East, Lea County, New Mexico. It is my understanding that no additional information, other than the reports and depositions referenced below, is expected to be filed by the Plaintiffs experts in this matter.

2.0 INFORMATION CONSIDERED

The following information was considered during formulation of my opinions and conclusions:

1. *Environmental Site Assessment of Burlington Resources Pit and Battery Site Located in Unit A Sec. 10, T21S, R37E of Lea Co., New Mexico*, October 21, 2001: prepared by Phoenix Environmental LLC;
2. *McNeill Ranch – Burlington Site*, November 28, 2003: prepared by Tierra Technical Consultants;
3. *Cost to Close the Burlington Resources Pit and Battery Site Located in Unit A Sec. 10, T21S, R37E of Lea Co., New Mexico*, January 15, 2004: prepared by Phoenix Environmental LLC;
4. *Cost to Clean Up Groundwater at the Burlington Resources Pit and Battery Site Located in Unit A Sec. 10, T21S, R37E of Lea Co., New Mexico*, January 15, 2004: prepared by Phoenix Environmental LLC;
5. Oral and Videotaped Deposition of Allen Hodge, July 7, 2004;
6. Videotaped Deposition of Richard Max Renn, July 12, 2004;
7. *Monitor Well Sampling Results, Burlington Site, McNeill Ranch, New Mexico,*

September 17, 2004: prepared by Tierra Technical Consultants;

8. Videotaped Deposition of Richard Max Renn, Volume 2, October 1, 2004;
9. Videotaped Deposition of Allen Hodge, Volume 2, October 4, 2004;
10. *CBP Depth to Ground Water Well Facilities*, June 3, 2002: prepared by Mr. Wayne Johnson, ChevronTexaco Exploration and Production Company;
11. 7.5-Minute Series (Topographic) Eunice Quadrangle, 1969 (photorevised 1979), Lea Co., New Mexico: United States Department of the Interior, Geological Survey;
12. Alexander Nicholson, Jr., and Alfred Clebsch, Jr, 1961, *Geology and Ground – Water Resources in Southern Lea County, New Mexico:* New Mexico Bureau of Mines and Mineral Resources, Ground-Water Report 6, 123p;
13. Ronit Nativ, 1988, *Hydrogeology and Hydrochemistry of the Ogallala Aquifer, Southern High Plains, Texas Panhandle and Eastern New Mexico*: Texas Bureau of Economic Geology, Report of Investigations No. 177, 64p;
14. Hem, J.D., 1985, *Study and Interpretation of the Chemical Characteristics of Natural Water*: United States Geological Survey Water Supply Paper 2254, 263p;
15. *RCRA Ground-Water Monitoring Technical Enforcement Guidance Document*, September 1986: prepared by United States Environmental Protection Agency, Office of Waste Programs Enforcement, Office of Solid Waste and Emergency Response, 208p;
16. *RCRA Ground-Water Monitoring: Draft Technical Guidance*, November 1992: United States Environmental Protection Agency Office of Solid Waste, EPA/530-R-93-001;
17. *Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers*: American Society for Testing Materials International, Designation D 5092-02, 14p;
18. *Unlined Surface Impoundment Closure Guideline*, February 1993: New Mexico Oil Conservation Division, 16p;
19. *New Mexico Underground Storage Tank Bureau Guidelines for Corrective Action, March 13,* 2000: New Mexico Environment Department
20. New Mexico Oil Conservation Division rules, orders and records;

21. New Mexico State Engineer rules and records;
22. New Mexico Water Quality Control Commission standards;
23. Aerial photographs;
24. Observations from site visits; and
25. Laboratory analysis of soil samples, September 30, 2004.

3.0 QUALIFICATIONS

I have served as President of Larson and Associates, Inc., a Texas corporation, since August 2000, and have over 15 years of experience conducting hydrogeological investigations at industrial facilities, including oil and gas installations. My experience was gained from employment with Larson and Associates, Inc. (Midland, Texas), Highlander Environmental Corp. (Midland, Texas), Roberts/Schornick & Associates, Inc. (Norman, Oklahoma), Engineering Enterprises, Inc., (Norman, Oklahoma), Jacobs Engineering Group (Lakewood, Colorado), United States Geological Survey (Golden, Colorado) and Schlumberger Technology Corp., Johnston-Macco Division (Hobbs, New Mexico, and Williston, North Dakota). I am registered as a Professional Geologist in the State of Arkansas (P.G. 1443), State of Texas (P.G. 4469), State of Utah (P.G. 2250) and State of Wyoming (P.G. 2386). I am a Certified Professional Geologist (C.P.G. No. 10490) by the American Institute of Professional Geologists. I am a Certified Ground Water Professional (C.G.W.P. No. 189957) by the National Ground Water Association and Association of Ground Water Scientists and Engineers. I am a Certified Environmental Manager (E.M. No. 1584) in the State of Nevada, and licensed Leaking Petroleum Storage Tank (LPST) Project Manager (P.M. No. 0000160) in the State of Texas. A detailed statement of my qualifications is presented in Appendix A.

4.0 COMPENSATION

Compensation has been strictly on a time (hourly rate) and materials (expenses) schedule using the fee schedule presented in Appendix B.

5.0 DISCUSSION

The New Mexico Oil Conservation Division ("NMOCD") regulates oil and gas production in the State of New Mexico. Prior to 1993, the NMOCD allowed unlimited discharge of water produced from oil and gas operations into unlined pits. On January 1, 1969, the NMOCD limited disposal of produced water in unlined pits, and released "Unlined Surface Impoundment Closure Guidelines" in February 1993, a guidance document for closing unlined pits. Prior to February 1993, the NMOCD specified closure of unlined surface pits by filling, leveling and compacting. An aerial photograph dated July 19, 1986, showed no fluid in the pit. Documents produced by Burlington in this matter show that the pit was closed in 1992. Appendix C presents the aerial photograph.

The land surface of the Burlington Pit is at about 3,447 feet above mean sea level (MSL), and the regional slope of the topography is from northwest to southeast. Monument Draw is located about 800 feet southwest of the Burlington Pit, and drains an area beginning about 15 miles to the northwest. Monument Draw flows to the southeast and eventually crosses into Texas. The Barney Well is located in Monument Draw about 1,500 feet southwest of the Burlington Pit. Figure 1 presents a location and topographic map.

A thin layer of loamy soil covers the surface, and is underlain by the Ogallala formation (Tertiary). The Ogallala formation consists of sand, silt, clay and gravel derived from mountainous areas to the west. A layer of calcium carbonate (commonly referred to as caliche) is often present near the upper part of the Ogallala formation and is resistant to erosion. The Ogallala formation rests unconformably on mudstone, sandstone and siltstone of the Triassic-age Chinle formation of the Dockum Group. The unconformity developed when the surface of the Dockum group was exposed to erosion, removing a portion of the geological record, before the Ogallala formation was deposited. Alexander Nicholson, Jr. and Alfred Clebsch, Jr., (1961) state that Monument Draw eroded through the Ogallala formation and about 50 feet into the Dockum group, and was filled with alluvium. Ground water occurs in the Ogallala formation (referred to as the Ogallala or High Plains aquifer), and in the alluvium of Monument Draw.

Ground water in the area flows from northwest to southeast (Alexander Nicholson, Jr. and Alfred Clebsch, Jr., 1961 and Ronit Nativ, 1988). During my research, I reviewed files at the NMOCD, and a ground water monitoring report dated April 22, 2003 (File No. 1R-398) shows ground water flowing from northwest to southeast at a gradient of 0.003 feet per foot. The report was from an Enron Trading and Transportation ("EOTT") pipeline leak located approximately 1,500 feet hydraulically up gradient (northwest) of the Burlington Pit, in the northeast quarter (NE/4), southeast quarter (SE/4), Section 3, Township 21 South, Range 37 East.

Mr. Richard Renn with Tierra Technical Consultants ("Tierra") used an unpublished depth to groundwater map that was prepared by ChevronTexaco Exploration and Production Company ("ChevronTexaco") to initially opine that ground water in the vicinity of the Burlington Pit flowed distinctly southwest (November 28, 2003). My review of the ChevronTexaco map, and discussion with the ChevronTexaco employee who prepared the map, causes me to conclude that the map is merely a depth to ground water map from which the direction or gradient of ground water flow cannot be determined. The ChevronTexaco map shows depth to ground water for wells completed in the Ogallala formation and depth to ground water in wells completed in other formations.

On November 28, 2003, Mr. Renn presented a certificate of water analysis from Plains Laboratory ("Plains") located in Lubbock, Texas. The certificate of analysis was dated September 1, 1976, and addressed to the McNeill Ranch for three (3) water samples (#23, #24 and #25) that were tested for calcium, magnesium, sodium, potassium, bicarbonate, carbonates, chloride, sulfate, conductivity, total salts (also known as total dissolved solids) and pH. The certificate of analysis stated that samples #24 (Harden mill) and #25 (Barney mill) were "slightly salty". Sample #25 (Barney mill) showed chloride, sulfate and total dissolved solids (TDS) at 209 parts per million (ppm), 750 ppm and 1,807 ppm, respectively. The sulfate and TDS results from water sample #25 exceeded the New Mexico Water Quality Control Commission ("NMWQCC") domestic water supply standards of 600 milligrams per liter (mg/L) and 1,000 mg/L, respectively. Milligrams per liter is equivalent to parts per million. No other laboratory data was produced for the Barney Well until April 10, 2003, when Mr. Allen Hodge with Phoenix Environmental LLC ("Phoenix") collected a sample, which was analyzed by Anachem, Inc. ("Anachem"), located in Allen, Texas. Anachem reported no benzene, toluene, ethyl benzene and toluene (collectively referred to as BTEX) in the sample, and bromide, chloride and sulfate were reported at 4.6 mg/L, 956 mg/L and 142 mg/L, respectively. No NMWQCC water quality standard exists for bromide.

On October 10, 2001, Mr. Hodge reported results of soil samples collected from borings drilled in the Burlington Pit on October 15, 1999. Mr. Hodge stated that boring SB-2, drilled near the center of the Burlington Pit, was drilled down to 20 feet before the total petroleum hydrocarbon ("TPH") dropped below 100 ppm.

On September 17, 2004, Mr. Renn reported installing three (3) monitoring wells (B-MW-1, B-MW-2 and B-MW-3) in the vicinity of the Burlington Pit, with well B-MW-1 installed near the center of the pit. Mr. Renn states in his deposition dated October 1, 2004 that he located well B-MW-2 down gradient of the Burlington Pit, and well B-MW-3 up gradient of the Burlington Pit. Well B-MW-2 is located between the Burlington Pit and the Barney Well, and well B-MW-3 is located northeast of the Burlington Pit. On October 1, 2004, Mr. Renn states, Mr. Hodge drilled the wells using an air rotary rig, and employed no protective measures at location B-MW-1 to protect the Ogallala aquifer during well drilling or construction. Mr. Renn measured the ground water level in well B-MW-1 at 53.4 feet below surface grade, but did not report ground water level measurements in wells B-MW-2, B-MW-3 or the Barney Well. No survey was performed to accurately locate the wells or determine ground or top of casing elevations.

August 24, 2004, Mr. Renn reported a chloride level of 3,390 milligrams per kilogram (mg/Kg) in a soil sample collected by Mr. Hodge from an approximate depth of 14 feet near the center of the Burlington Pit. On September 17, 2004, Mr. Renn states that Assaigai Laboratories, Inc. ("Assaigai") located in Albuquerque, New Mexico, analyzed three (3) soil samples collected from 15', 30' and 45' at location B-MW-1 near the center of the Burlington Pit. The chloride levels in the samples from 15', 30' and 45' were 82.6 mg/Kg, 14.3 mg/Kg and 3,040 mg/Kg, respectively.

On September 17, 2004, Mr. Renn states that chloride levels in ground water samples from the Barney Well, B-MW-1, B-MW-2 and B-MW-3 were 1,280 mg/L, 1,380 mg/L, 406 mg/L and 467 mg/L, respectively. Bromide in samples from the Barney Well, B-MW-1, B-MW-2, B-MW-3 and B-MW-4 were 5.69 mg/L, 7.45 mg/L, 2.41 mg/L and 4.30 mg/L, respectively. The background level for chloride was reported in well B-MW-3 (467 mg/L).

On September 30, 2004, I supervised drilling of a boring (BH-1) near the center of the Burlington Pit using a hollow stem auger rig. The hollow stem augers prevent sloughing of soil during drilling and sampling. A 5-foot long continuous sampler located inside the lead auger collected a 5-foot long core sample during each 5-feet of drilling, depending on sample recovery. A layer of caliche about 0.6 feet thick was encountered at approximately 1-foot bgs, and was underlain by sand. The sand was weak and became moist beginning at about 17 feet bgs. Sandy clay was encountered between 36.8 and 41 feet bgs, followed by a layer of sand, and another layer of sandy clay. The boring was terminated in the lower sandy clay unit at about 48 feet bgs. The augers were retracted about 2 feet, and remained in the boring until the following morning. On October 1, 2004, I recorded water in the boring at approximately 45.9 feet bgs. This finding shows that water is perched above the clay unit. The augers were retracted and the boring was plugged with bentonite.

Soil samples were collected about every 1-foot for field and laboratory analysis. The soil samples for laboratory analysis were placed in clean 4-ounce glass samples jars, labeled, chilled in an ice chest and delivered under chain-of-custody control to Environmental Lab of Texas, Inc. ("ELTI") located in Odessa, Texas. Duplicate samples were collected in clean 8-ounce glass jars for field headspace analysis, per NMOCD guidelines. I recorded the field headspace readings on a boring log presented in Appendix D.

ELTI analyzed soil samples for TPH, BTEX, and chloride. The TPH decreased to 10.7 mg/Kg at 10 feet bgs. No benzene was reported in two samples reporting the highest TPH concentrations (1 to 2 feet and 5 to 6 feet). Chloride was from 723 mg/Kg to 4,040 mg/Kg. Table 1 presents a summary of the laboratory analysis. Appendix E presents the laboratory report.

6.0 OPINIONS AND CONCLUSIONS

1. It is my opinion that at the time the Burlington Pit was closed the NMOCD allowed the use of unlined surface impoundments and closure requirements were filling, leveling and compacting.

2. It is my opinion ground water beneath the Burlington Pit occurs in the Tertiary-age Ogallala formation (aquifer) and most likely flows from northwest to southeast, although without a site-specific ground water study it cannot be determined accurately. My opinion is supported by multiple published scientific reports, a ground water report filed with the NMOCD from a site located about 1,500 feet hydraulically up gradient (northwest) of the Burlington Pit, and my professional experience conducting ground water investigations in southeast New Mexico.

   Two (2) published scientific reports (Alexander Nicholson, Jr. and Alfred Clebsch, Jr., 1961 and Ronit Nativ, 1988) state ground water in the Ogallala aquifer flows from northwest to southeast. A report filed with the NMOCD on April 22, 2003 (File No. 1R-398) shows ground water flowing from northwest to southeast at a gradient of 0.003 feet per foot approximately 1,500 feet hydraulically up gradient (northwest) of the Burlington Pit.

3. It is my opinion ground water quality in the alluvium of Monument Draw exceeded the NMWQCC domestic water supply standards for sulfate and TDS of 600 milligrams per liter (mg/L) and 1,000 mg/L, and the quality of water was poor before the initial sample was collected from the Barney Well (September 1, 1976). This opinion is supported by TDS and sulfate concentrations of 750 ppm and 1,807 ppm, respectively, reported by Plains. On September 1, 1976, Plains states that the Barney Well was slightly salty, and the sodium level was 400 mg/L.

4. It is my opinion chloride is not migrating in the Ogallala aquifer southwest of the Burlington Pit toward the Barney well. This opinion is supported by concentrations of chloride reported by Mr. Renn on September 17, 2004, for ground water samples from wells B-MW-1, B-MW-2 and B-MW-3. The chloride concentrations in samples B-MW-1, B-MW-2 and B-MW-3 were 1,380 mg/L, 406 mg/L and 467 mg/L, respectively. The concentration of chloride in ground water decreases to the southwest of the Burlington Pit, and was over three (3) times lower in well B-MW-2 (406 mg/L) compared to the concentration reported in well B-MW-1 (1,380 mg/L) installed near the center of the Burlington Pit. The background chloride level reported in well B-MW-3 (467 mg/L) was higher than the concentration reported in well B-MW-2 located southwest of the Burlington Pit.

5. It is my opinion that the Plaintiffs' experts drilled monitor well B-MW-1 near the center of the Burlington Pit in a manner that did not provide reasonable protection of the Ogallala aquifer from cross contamination with soil and shallow water containing BTEX and chloride.

The NMOCD states, among other things, that a monitor well should be installed adjacent to and hydrologically down gradient of an unlined surface impoundment to determine if protectable fresh water has been impacted.

The EPA states, among other things, that air rotary drilling should not be used in areas where the upper soil horizons are contaminated, and in such settings, sloughing of the sidewalls of the borehole would likely result in contamination of the ground water.

6. The Plaintiffs' experts did not conduct monitor well installations in accordance with published guidelines or recognized industry standards. The American Society of Testing Materials ("ASTM") Designation D 5092-02 states, among other things, that monitor wells should be surveyed for vertical and horizontal position, and the elevation of the top of casing established as a datum for ground water levels measurements. No survey was performed to accurately locate the wells, or the elevation of natural ground surface or top of casing for referencing ground water level measurements.

7. It is my opinion that the Plaintiffs' experts prepared a cost estimate to remediate ground water without acquiring the basic information required to prepare such an estimate. A cost estimate for ground water remediation cannot be prepared until the problem is thoroughly understood, including identifying the existence of a ground water contaminant plume, contaminant source, establishing the ground water flow direction and gradient, aquifer hydraulic conductivity, contaminant dispersion, dilution and geochemistry, evaluation of treatment alternatives. Such information can only be obtained from accurate investigations, and the Plaintiffs' experts have not determined the following:

    - Presence of a ground water contaminant plume beneath the Burlington Pit;
    - Source for chloride reported in ground water from well B-MW-1;

- Ground water flow direction and gradient;
- Aquifer hydraulic conductivity and geochemistry;
- Contaminant distribution and effects from dispersion and dilution; and
- Available treatment alternatives.

The concentration of chloride reported by the Plaintiffs' experts in samples from monitor wells B-MW-1, B-MW-2 and B-MW-3 shows that the chloride concentration decreases below the background levels about 100 feet southwest of the Burlington Pit. The Plaintiffs' experts did not install monitor well B-MW-1 in a reasonable manner to protect the Ogallala aquifer from cross contamination or establish the ground water flow direction and gradient necessary to determine if the Burlington Pit is the source for the chloride reported from well B-MW-1. The cost estimate failed to completely evaluate remedial alternatives for ground water remediation in accordance with industry standards.

8. It is my opinion that the Plaintiffs' experts did not characterize the contamination in the Barney well in accordance with industry methods. Aerial photographs revealed the following: two (2) unlined surface pits in or near Monument Draw about 1,500 feet northwest of the Barney Well, two (2) areas without vegetation where spills may have occurred about 1,150 to 1,500 feet west and northwest of the Barney Well, and surface stain that flow to Monument Draw from a carbon black plant northwest of the Barney Well. Appendix C presents the aerial photographs.

   NMOCD records showed that Apache Corp. had reported two (2) spills northwest of the Barney Well that involved 620 bbl of produced in UL C, Section 10, Township 21 South, Range 37 East, Lea County, New Mexico. The reports stated that only 100 bbl was recovered. A reconnaissance identified leaks from a produced water line about 500 feet southwest of the Barney Well. The line segment is located in a drainage that flows to the Barney Well, and was clamped in two (2) places where leaks had occurred.

Table 1

Summary of BTEX, TPH and Chloride Analyses of Soil Samples

Burlington Resources Oil and Gas Company, Dauron Pit

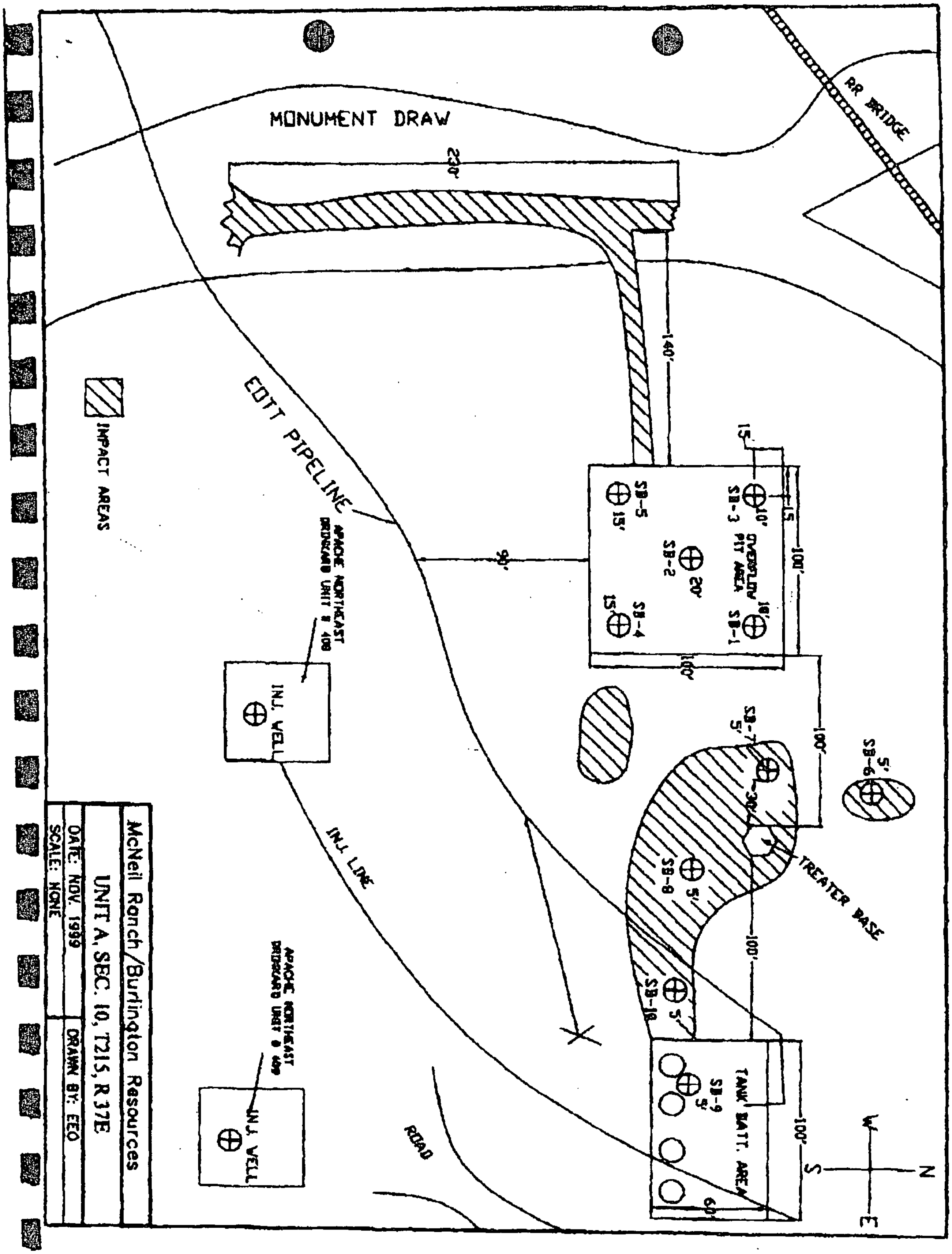
Unit Letter A, Section 10, Township 21 South, Range 37 East

Lea County, New Mexico

Boring Number	Depth (Feet BGS)	Sample Date	Chloride (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	TPH (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylene (mg/kg)
BH-1	0 - 1	9/30/04	1,380	172	4,840	5,010	--	--	--	-
	1 - 2	9/30/04	2,790	532	8,810	9,340	<0.025	0.0481	0.173	0.759
	5 - 6	9/30/04	1,830	522	7,410	7,930	<0.25	0.328	0.0778	0.3352
	6 - 7	9/30/04	1,380	426	6,610	7,040	--	--	--	--
	7 - 8	9/30/04	--	--	--	--	--	--	--	--
	8 - 9.5	9/30/04	1,830	--	--	--				
	10 - 11	9/30/04	1,790	<10.0	10.7	10.7	--	--	--	--
	11 - 12	9/30/04	2,420	--	--	--	--	--	--	--
	12 - 13	9/30/04	--	--	--	--	--	--	--	--
	13 - 14	9/30/04	1,280	--	--	--	--	--	--	--
	15 - 16	9/30/04	1,320	<10.0	<10.0	<20.0	--	--	--	--
	16 - 17	9/30/04	1,620	--	--	--	--	--	--	--
	17 - 18	9/30/04	1,580	--	--	--	--	--	--	--
	20 - 21	9/30/04	2,000	<10.0	<10.0	<20.0	--			
	21 - 22	9/30/04	2,680	--	--	--	--	--	--	--
	22 - 23	9/30/04	--	--	--	--	--	--	--	--
	23 - 24	9/30/04	1,000	--	--	--	--	--	--	--
	25 - 26	9/30/04	978	<10.0	<10.0	<20.0	--	--	--	--
	26 - 27	9/30/04	723				--	--	--	--
	30 - 31	9/30/04	1,320	<10.0	<10.0	<20.0	--	--	--	--
	31 - 32.5	9/30/04	--	--	--	--	--	--	--	--
	35 - 36	9/30/04	936	<10.0	<10.0	<20.0	--	--	--	--
	36 - 37	9/30/04	--	--	--	--	--	--	--	--
	40 - 41	9/30/04	3,220	<10.0	<10.0	<20.0	--	--	--	--
	41 - 42	9/30/04	2,770	--	--	--	--	--	--	--
	45 - 46	9/30/04	2,940	<10.0	22.6	22.6	--	--	--	--
	46 - 47	9/30/04	2,300	--	--	--	--	--	--	--
	47 - 48	9/30/04	4,040	--	--	--	--	--	--	--

Notes: Analysis performed by Environmental lab of Texas, Inc., Odessa, Texas

1. BGS: Depth in feet below ground surface
2. Mg/Kg: Milligrams per kilogram
3. --: No data available



McNeil Ranch/Burlington Resources
UNIT A, SEC. 10, T21S, R37E
DATE: NOV. 1999
SCALE: NONE
DRAWN BY: EEO
MONUMENT DRAW
RR BRIDGE
EOTT PIPELINE
IMPACT AREAS
230'
140'
90'
100'
15'
SB-1
SB-2
SB-3
SB-4
SB-5
SB-6
SB-7
SB-8
SB-9
SB-10
OVERFLOW PIT AREA
APACHE NORTHEAST DRINKARD UNIT # 408
APACHE NORTHEAST DRINKARD UNIT # 409
INJ. WELL
INJ. LINE
TREATER BASE
TANK BATT. AREA
ROAD
60'
N
S
E
W