



# AE Order Number Banner

## Report Description

This report shows an AE Order Number in Barcode format for purposes of scanning. The Barcode format is Code 39.



**App Number: pTO1426943859**

**1RP - 3359**

**COG OPERATING LLC**

3/4/2016

MAR 07 2016

## SITE INFORMATION

### Report Type: Work Plan

#### General Site Information:

<b>Site:</b>	Pronghorn SWD Facility		
<b>Company:</b>	COG Operating LLC		
<b>Section, Township and Range</b>	Unit B	Sec 24	T19S R32E
<b>Lease Number:</b>	API 30-025-32735		
<b>County:</b>	Lea County		
<b>GPS:</b>	32.65218° N	103.71698° W	
<b>Surface Owner:</b>	Federal		
<b>Mineral Owner:</b>			
<b>Directions:</b>	From the intersection of 529 and CR-126, travel south on 126 for 9.9 miles, turn left and travel 4.5 miles, turn right (at tin horn) and travel 0.6 miles to location		

Release Data:	Spill #1	Spill #2	Spill #3
<b>Date Released:</b>	10/15/2009	11/20/2009	7/20/2011
<b>Type Release:</b>	Produced Water	Produced Water	Produced Water
<b>Source of Contamination:</b>	Pressure Gauge	1x4 Swedge	Check Valve
<b>Fluid Released:</b>	60bbbls	1500bbbls	100bbbls
<b>Fluids Recovered:</b>	45bbbls	1300bbbls	95bbbls

#### Official Communication:

<b>Name:</b>	Robert McNeill	Ike Tavaréz
<b>Company:</b>	COG Operating, LLC	Tetra Tech
<b>Address:</b>	One Concho Center 600 W. Illinois Ave.	4000 N. Big Spring Suite 401
<b>City:</b>	Midland Texas, 79701	Midland, Texas
<b>Phone number:</b>	(432) 686-3023	(432) 682-4559
<b>Fax:</b>	(432) 684-7137	
<b>Email:</b>	rmcneill@conchoresources.com	ike.tavarez@tetrattech.com

#### Ranking Criteria

Depth to Groundwater:	Ranking Score	Site Data
<50 ft	20	
50-99 ft	10	
>100 ft.	0	0
WellHead Protection:	Ranking Score	Site Data
Water Source <1,000 ft., Private <200 ft.	20	
Water Source >1,000 ft., Private >200 ft.	0	0
Surface Body of Water:	Ranking Score	Site Data
<200 ft.	20	
200 ft - 1,000 ft.	10	
>1,000 ft.	0	0
<b>Total Ranking Score:</b>	<b>0</b>	

Acceptable Soil RRAL (mg/kg)		
Benzene	Total BTEX	TPH
10	50	5,000

*approved*  
*Jeffrey Yelking*  
 Environmental Specialist  
 NMOC-DIST 1  
 3/26/14



**TETRA TECH**

March 18, 2014

Mr. Geoffrey Leking  
Environmental Engineer Specialist  
Oil Conservation Division, District 1  
1625 North French Drive  
Hobbs, New Mexico 88240

**Re: Work Plan and Assessment Report for the COG Operating LLC,  
Pronghorn SWD Facility Spills, Unit B, Section 24, Township 19 South,  
Range 32 East, Lea County, New Mexico.**

Dear Mr. Leking:

Tetra Tech was contacted by COG Operating LLC (COG) to assess the spills from the Pronghorn SWD Facility located in Unit B, Section 24 Township 19 South, Range 32 East, Lea County, New Mexico (Site). The spill site coordinates are N 32.65218°, W 103.71698°. The site location is shown on Figures 1 and 2.

### **Background**

#### Spill #1

According to the State of New Mexico C-141 Initial Report, the leak was discovered on October 15, 2009, and released approximately 60 barrels of produced water when a pressure gauge failed and broke off inside the facility firewall. According to COG, the facility is lined with a plastic liner. Vacuum trucks were used to pick up standing fluids and recovered 45 barrels. The spill breached the firewall and released onto the pad, which migrated off the pad west and south of the facility. The initial C-141 is enclosed in Appendix A. The spill area is shown on Figure 3.

#### Spill #2

According to the State of New Mexico C-141 Initial Report, the leak was discovered on November 20, 2009 and released approximately 1,500 barrels of produced water. A 1" x 4" swedge broke off the discharge of the pump going to the Pronghorn well. Vacuum trucks were used to pick up standing fluids and recovered 1,300 barrels. The spill area impacted the area top of the previous spill footprint. The spill area is shown on Figure 3. The initial C-141 is enclosed in Appendix A.

Tetra Tech

1940 North Big Spring Midland, TX 79705

Tel 432.622.4559 Fax 432.622.3946 [www.tetrattech.com](http://www.tetrattech.com)



### Spill #3

According to the State of New Mexico C-141 Initial Report, the leak was discovered on July 20, 2011 and released approximately 100 barrels of produced water. The check valve on the transfer pump failed, the standing fluid has been removed and 95 bbls were recovered. The spill area released to the west of the facility and encompassed the area of the first and second spills. The initial C-141 is enclosed in Appendix A. The spill area is shown on Figure 4.

### **Groundwater**

The United States Geological Survey (USGS) database did not show any well in Section 24. The closest wells are located in Section 17 and 18, Township 19 South, Range 33 East, with reported depth to water of 116' and 340', respectively. The New Mexico State Engineer Well Reports showed two wells in Section 19 with reported depths of 102' and 345'. The NMOCD groundwater map shows an approximate depth to water at 175' below surface in the area of concern.

On July 14, 2009, Tetra Tech supervised the installation of a temporary well located in Section 24, Township 19 South, Range 32 East. The temporary well is located approximately 4,000' from the site. During a prior assessment, the temporary well was installed to establish depth to groundwater and evaluate the area for the presence of a possible perched aquifer. The well was drilled to a total depth of 131' below surface and encountered no groundwater in the well (dry). The groundwater data and the temporary well log are shown in Appendix B.

### **Regulatory**

A risk-based evaluation was performed for the Site in accordance with the New Mexico Oil Conservation Division (NMOCD) Guidelines for Remediation of Leaks, Spills and Releases, dated August 13, 1993. The guidelines require a risk-based evaluation of the site to determine recommended remedial action levels (RRAL) for benzene, toluene, ethylbenzene and xylene (collectively referred to as BTEX) and total petroleum hydrocarbons (TPH) in soil. The proposed RRAL for benzene was determined to be 10 parts per million (ppm) or milligrams per kilogram (mg/kg) and 50 ppm for total BTEX (sum of benzene, toluene, ethylbenzene, and xylene). Based upon the depth to groundwater, the proposed RRAL for TPH is 5,000 mg/kg.



## Soil Assessment and Results

### Spill #1 and #2

As discussed, the second spill (11/20/09) encompasses the first release to the west and south of the SWD facility. The second spill area measured approximately 110' x 180' to the west of the facility. The south spill area measured approximately 3' x 100' and 150' x 225'. Prior to assessing the impacted soils, COG removed approximately 2.0' of impacted soil and transported to CRI for proper disposal.

Once the excavation was completed, Tetra Tech supervised the installation of soil borings using an air rotary rig on January 11, 2010. A total of thirteen (13) soil borings were installed at the Site. Nine (9) soil borings were installed south of the facility to assess the soils. A total of four (4) soil borings were installed west of the facility. Additional soil borings could not be installed in the west area due to overhead power lines in the area. The soil boring locations are shown on Figure 3. The boring logs are shown in Appendix B. Selected samples were analyzed for TPH analysis by EPA method 8015 modified, BTEX by EPA Method 8021B and chloride by EPA method 300.0. Copies of laboratory analysis and chain-of-custody documentation are included in Appendix C. The sampling results are summarized in Table 1.

Referring to Table 1, all of the samples selected for TPH and BTEX were below the RRAL. The TPH concentrations ranged from <50 mg/kg to 365 mg/kg.

The chloride results indicate the maximum extent of impact greater than 1,000 mg/kg extending down to 30.0' below the excavated bottom. All the soil borings had chloride concentrations that decreased with depth. On the south spill area, majority of the soil borings (SB-3, SB-7 and SB-8) showed a shallow impact to the soils to approximately 2.0 to 4.0'. The area of SB-6 exhibited a slight chloride impact to the soils. The deeper chloride impact was encountered at SB-1, SB-2, SB-4, SB-5 and SB-9 at depths ranging from 6.0' to 25.0' below excavation bottoms.

On the west spill area, deeper chloride impact was encountered at SB-1, SB-11 and SB-12 at depths ranging from 25.0' to 30.0' below excavation bottom. Soil boring (SB-13) only showed a shallow chloride impact (0-1') to the subsurface soils.

### Spill #3

On July 20, 2011, the third spill occurred and encompassed spills #1 and #2 footprint located on the west side of the facility. On August 23, 2011, Tetra Tech personnel supervised the installation of soil borings using an air rotary drilling rig.



A total of three (3) soil borings (SB-1, SB-2 and SB-3) were installed to assess the third spill in the pasture. The soil boring locations are shown on Figure 4. The boring logs are shown in Appendix B. Selected samples were analyzed for TPH analysis by EPA method 8015 modified, BTEX by EPA Method 8021B and chloride by EPA method 300.0. Copies of laboratory analysis and chain-of-custody documentation are included in Appendix C. The results of the sampling are summarized in Table 2.

Referring to Table 2, all of the samples selected for TPH and BTEX were below the RRAL. The chloride impact greater than 1,000 mg/kg extends down to approximately 25.0' below the excavated bottom. All three of the soil borings showed chloride concentrations decreased with depth and were vertically defined. The areas of SB-1 and SB-2 showed a deeper impact to the soils to approximately 25' and shallow impact down to approximately 10' in the area of SB-2.

#### **Conclusions and Work Plan**

The site is located in a pasture and no receptors were within a one mile radius. During an assessment of a prior release, a temporary well was installed to a total depth of 131' below surface and found no groundwater in the well (dry). Based on the NMOCD groundwater map, the depth to ground water in this area approximately 175' below surface.

The soil assessment did show declining chlorides with depth to a maximum depth defined of approximately 30' to 40' below surface. In addition, the boring logs did show a presence of red clay from 25' to approximately 50' below surface. Referring to the temporary well log, dense red clays were encountered at depths from 45' to 60', to blue/gray clay from 60' to 90' and encountered stiff red clay (red bed) from 90' to 131' below surface.

In order to remediate the site, COG proposes to excavate the impacted soils to re-establish surface growth and to reduce the environmental liabilities for the protection of the groundwater. The proposed excavation depths are highlighted in Table 1 and Table 2 and shown on Figure 5. Due to the size of the release, COG proposes excavating an additional 2.0' of soil for a total excavation depth of 4.0' below surface. Once excavated, to the appropriate depth, the excavation bottom will be capped with either clay material or 40 mil liner and backfilled to grade with clean soil. All of the excavated soil removed will be properly transported to proper disposal.

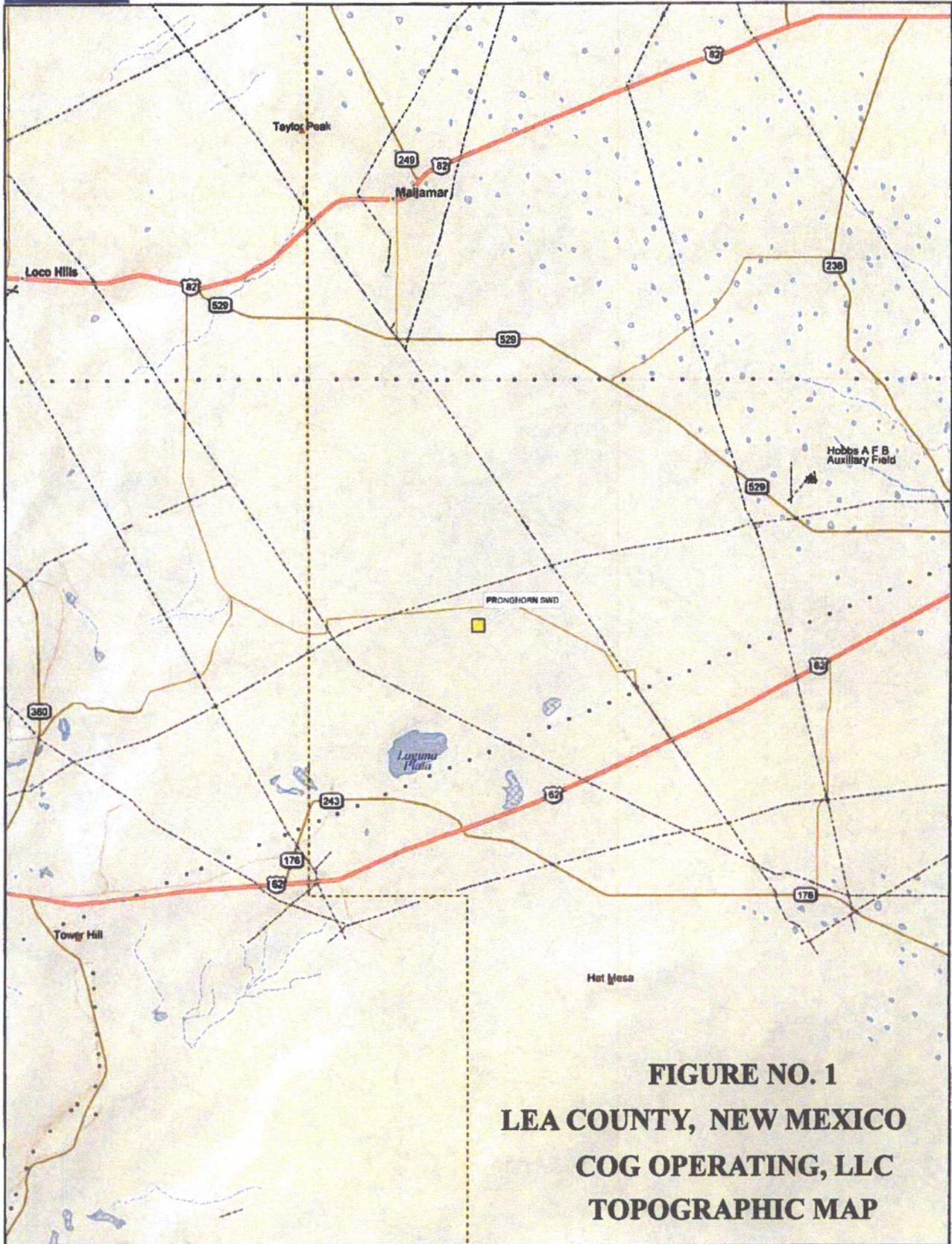


In addition, the former facility on the pad will be removed and any impacted soil encountered will be excavated and transported to proper disposal. If you require any additional information or have any questions or comments concerning this Work Plan and Assessment Report, please call at (432) 682-4559.

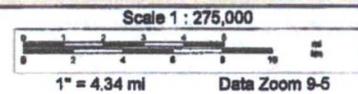
Respectfully submitted,  
TETRA TECH

Ike Tavaréz, PG  
Senior Project Manager

cc: Robert McNeill – COG  
Mike Burton -BLM



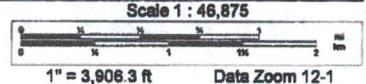
**FIGURE NO. 1  
LEA COUNTY, NEW MEXICO  
COG OPERATING, LLC  
TOPOGRAPHIC MAP**





**FIGURE NO. 2**  
**LEA COUNTY, NEW MEXICO**  
**COG OPERATING, LLC**  
**TOPOGRAPHIC MAP**

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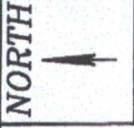


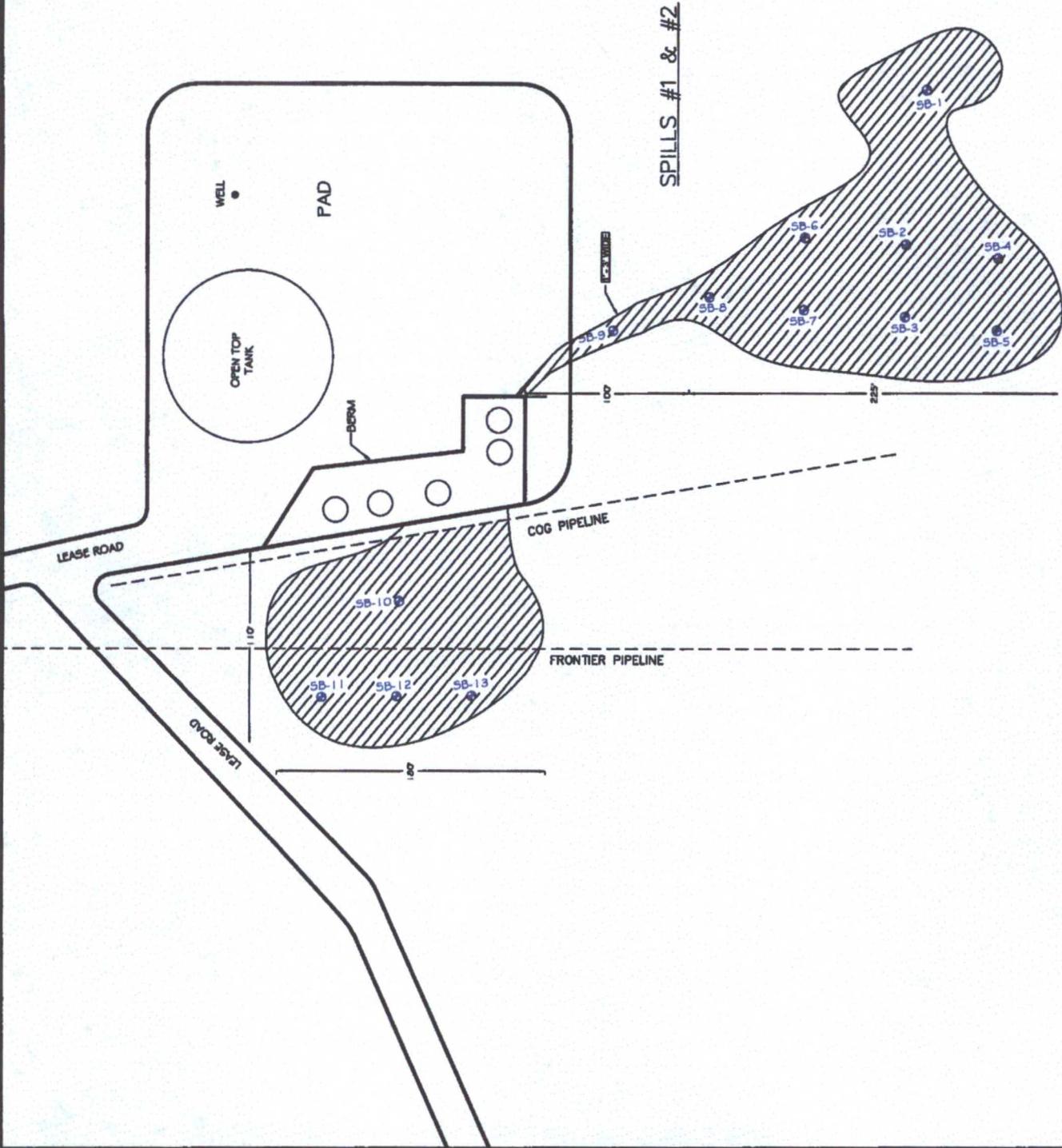
Figure 3

Pronghorn SWD

Spill #1 & #2 Assessment Map

Eddy County, New Mexico

Project: 112MC06426
Date: 02/28/2014
File: H:\COGN\112MC06426\FG 3



**LEGEND**

- SOIL BORE LOCATIONS - INSTALLED 01/11/2010
- SPILL AREA



Figure 3a

Pronghorn SWD

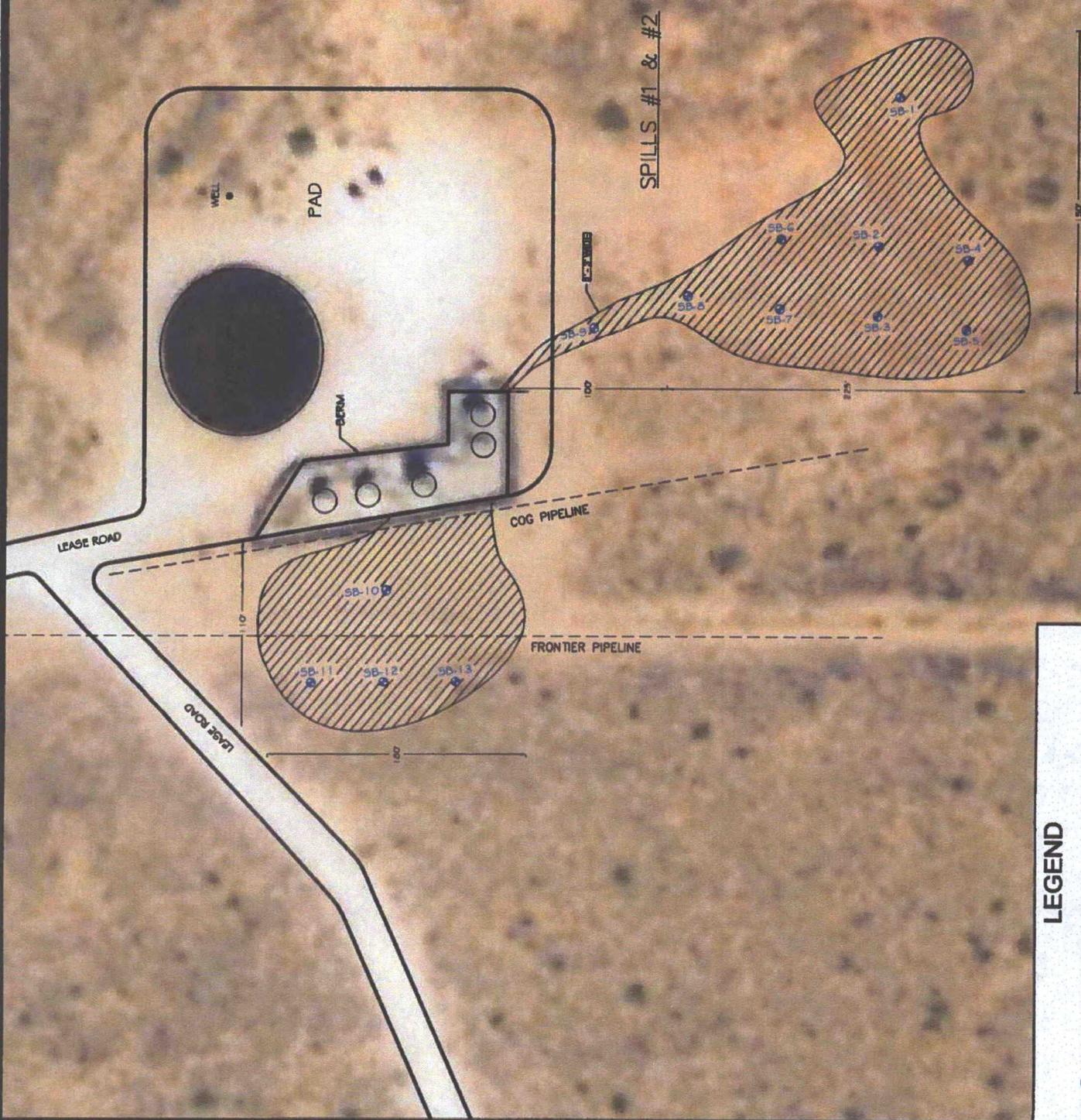
Spill #1 & #2 Assessment Map w/ Aerial

Eddy County, New Mexico

Project: 112MCO6426

Date: 02/28/2014

File: H:\COG\112MCO6426\FIG 3a



**LEGEND**

- SOIL BORE LOCATIONS - INSTALLED 01/11/2010
- SPILL AREA

NORTH



Figure 4

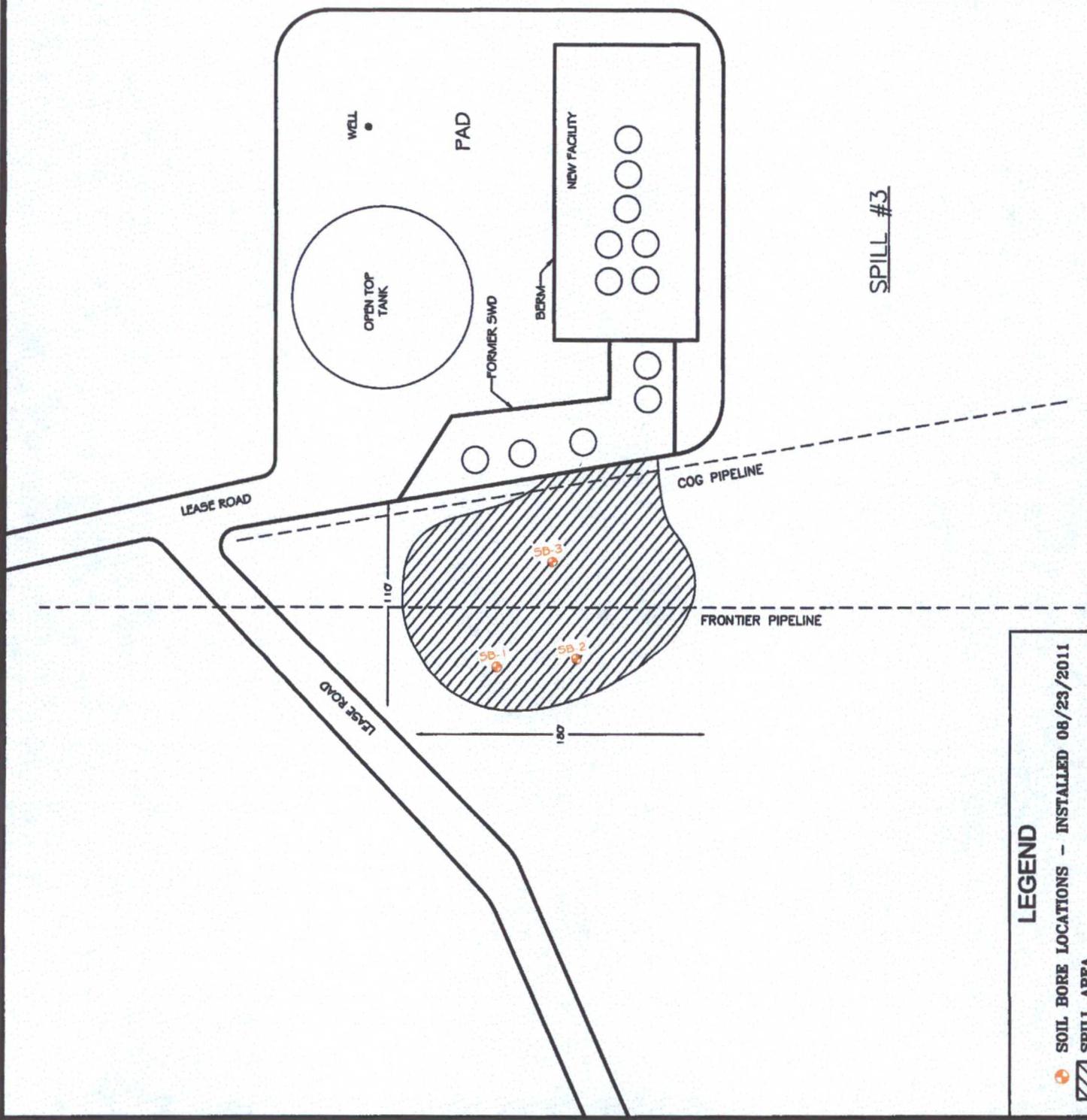
Pronghorn SWD

Spill #3 Assessment Map

Eddy County, New Mexico



Project: 112MC08424  
Date: 02/28/2014  
File: 112MC08424\FIG 4



SPILL #3

**LEGEND**

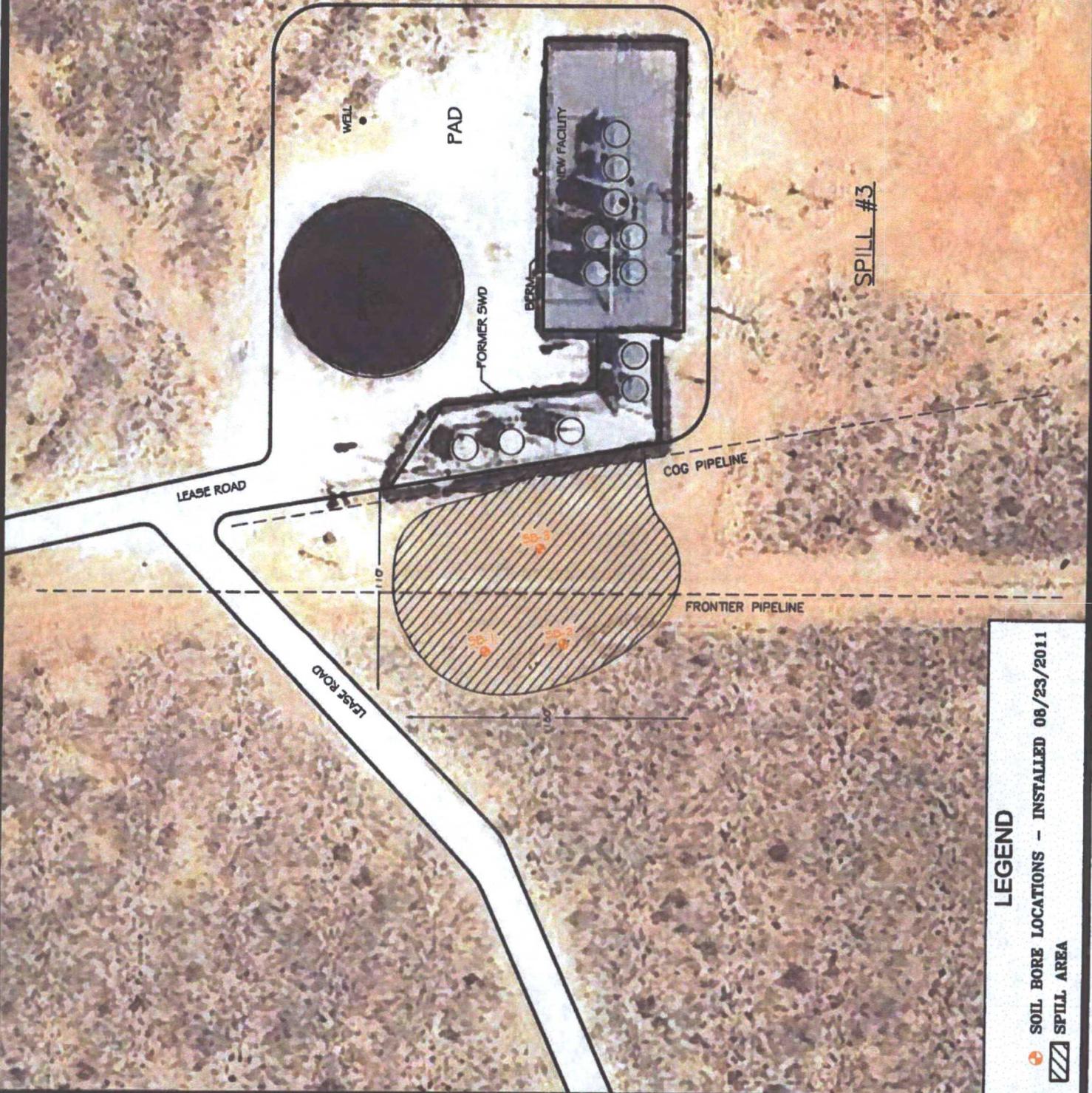
SOIL BORE LOCATIONS - INSTALLED 08/23/2011

SPILL AREA





Figure 4a  
Pronghorn SWD  
Spill #3 Assessment Map w/ Aerial  
Eddy County, New Mexico  
Project: 112MCO06424  
Date: 02/28/2014  
File: H:\COG\112MCO06426\FIG 4a



**LEGEND**

-  SOIL BORE LOCATIONS - INSTALLED 06/23/2011
-  SPILL AREA



Figure 5

Pronghorn SWD

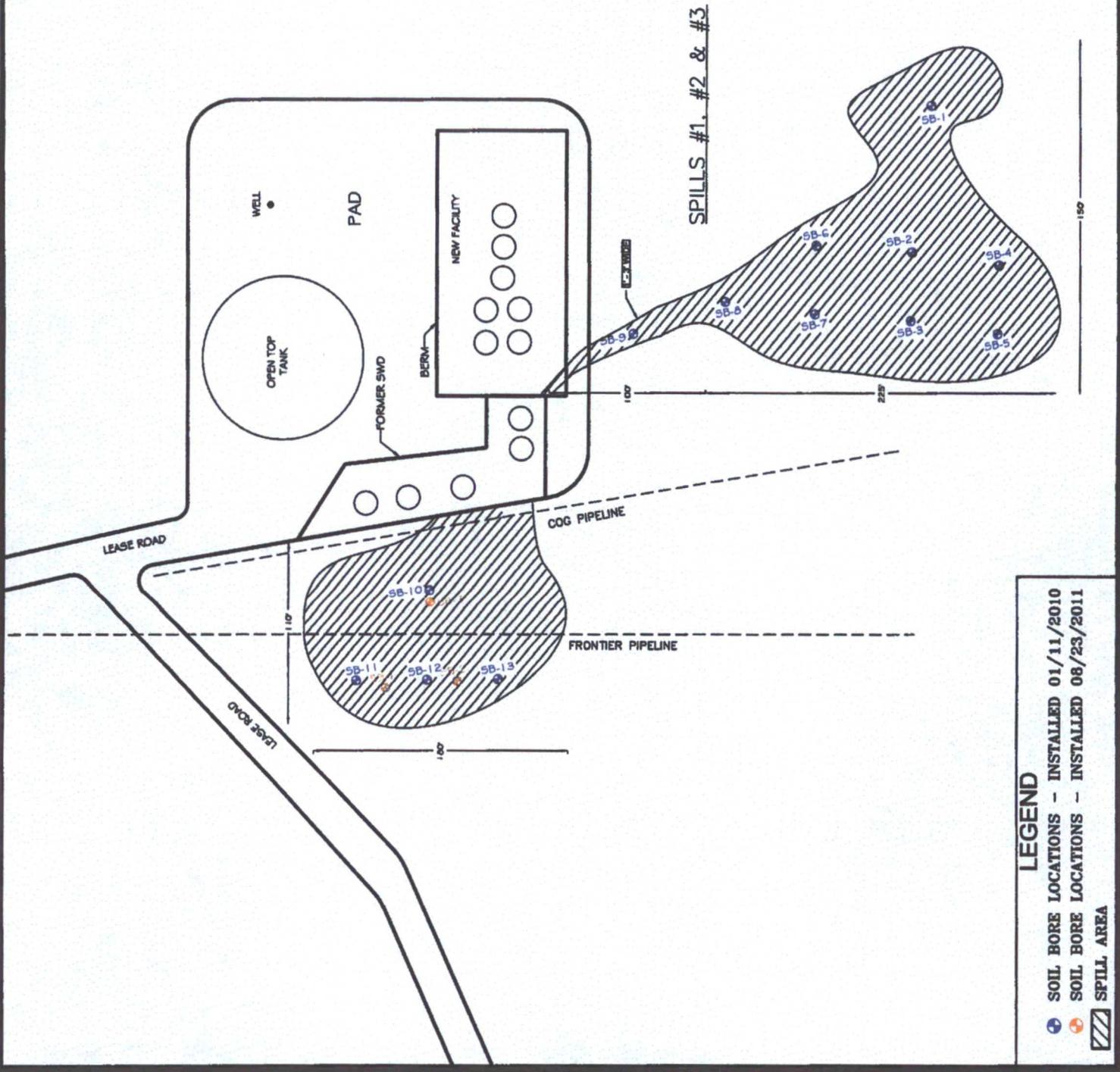
Spill #1, #2 & #3 Assessment Map

Eddy County, New Mexico

Project: 112MCO8428

Date: 02/28/2014

File: H1CO8112MCO8428\FIG5



**LEGEND**

-  SOIL BORE LOCATIONS - INSTALLED 01/11/2010
-  SOIL BORE LOCATIONS - INSTALLED 08/23/2011
-  SPILL AREA



Figure 6

Pronghorn SWD

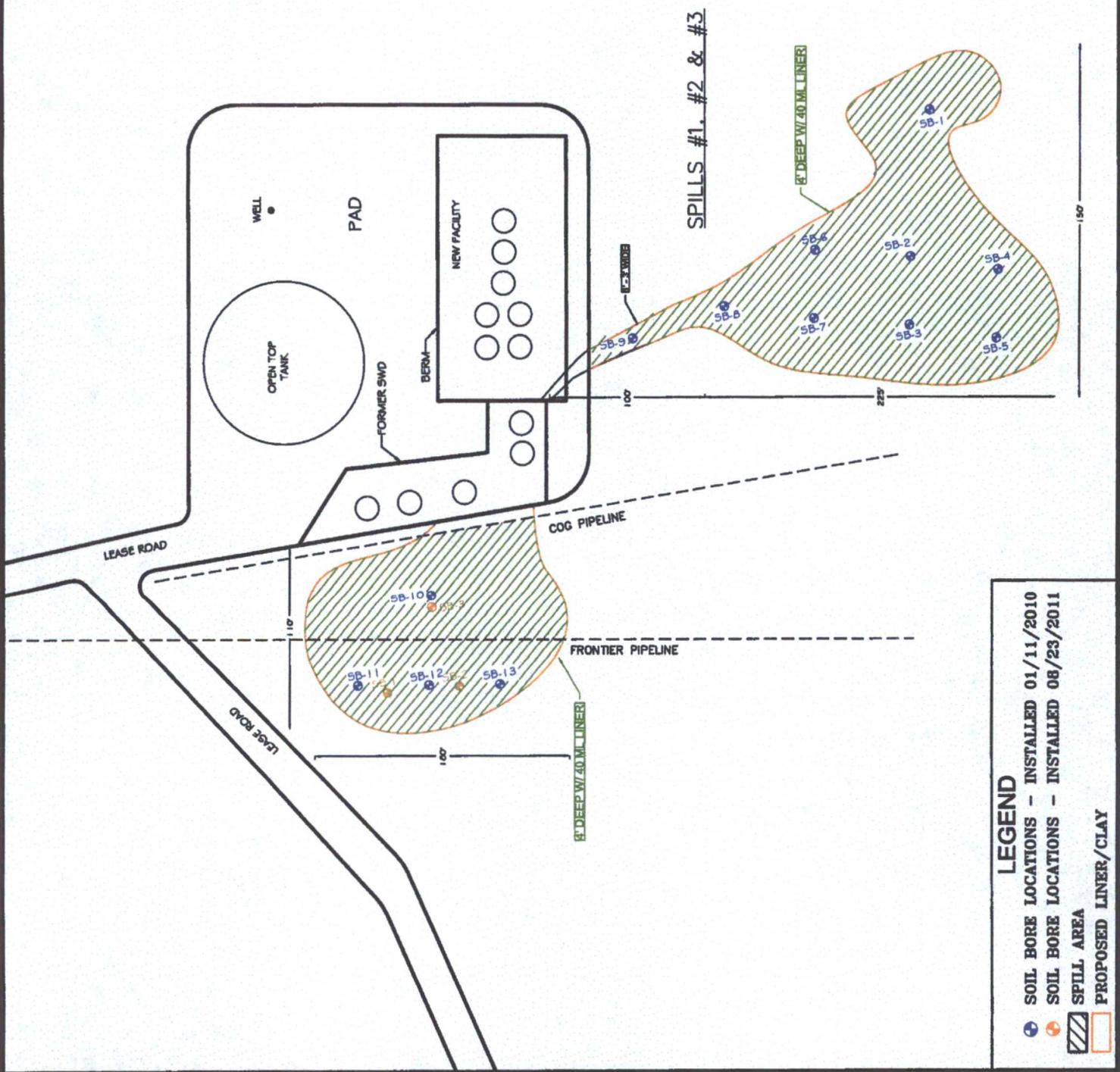
Proposed Excavation Areas & Depths Map

Eddy County, New Mexico

Project: 112MCO6428

Date: 02/28/2014

File: H:\COG\112MCO6428\FIG 6



**LEGEND**

- SOIL BORE LOCATIONS - INSTALLED 01/11/2010
- SOIL BORE LOCATIONS - INSTALLED 08/29/2011
- SPILL AREA
- PROPOSED LINER/CLAY

Table 1  
 COG Operating LLC.  
 Pronghorn SWD #1  
 SPILL #1 and #2  
 LEA COUNTY, NEW MEXICO

Sample ID	Date Sampled	Sample Depth (ft)	Excavation Depth	Soil Status		TPH (mg/kg)			Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylene (mg/kg)	Chloride (mg/kg)
				In-Situ	Removed	GRO	DRO	Total					
SB-13	1/12/2010	0-1'	2'	X		7.24	59.1	66.34	<0.0100	<0.0100	<0.0100	<0.0100	1,860
		2-3'		X									<200
		4-5'		X									205
		6-7'		X									<200
		10-11'		X									<200
		15-16'		X									<200
		20-21'		X									<200
		25-26'		X									<200
		30-31'		X									<200

BEB Below Excavation Bottom  
 Proposed Excavation Depths  
 Proposed Liner Installation











**Table 2**  
**COG Operating LLC**  
**Pronghorn SWD #1**  
**SPILL #3**

**Lea County, New Mexico**

Sample ID	Sample Date	Sample Depth (ft)	Depth (BEB)	Soil Status		TPH (mg/kg)			Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylene (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)
				In-Situ	Removed	GRO	DRO	Total						
SB-3	8/23/2011	0-1'	2'	X		<2.00	<50.0	<50.0	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	12,800
	"	3'		X		-	-	-	-	-	-	-	-	5,570
	"	5'		X		-	-	-	-	-	-	-	-	3,000
	"	7'		X		-	-	-	-	-	-	-	-	3,440
	"	10'		X		-	-	-	-	-	-	-	-	4,230
	"	15'		X		-	-	-	-	-	-	-	-	5,500
	"	20'		X		-	-	-	-	-	-	-	-	7,200
	"	25'		X		-	-	-	-	-	-	-	-	1,380
	"	30'		X		-	-	-	-	-	-	-	-	<200
	"	40'		X		-	-	-	-	-	-	-	-	<200
	"	50'		X		-	-	-	-	-	-	-	-	<200

(-) Not Analyzed  
 Proposed Excavation Depths  
 Proposed Liner Installed

**COG - Pronghorn SWD Facility**  
**Lea County, New Mexico**



**Former Pronghorn SWD Facility**



**Former Pronghorn SWD Facility**

COG - Pronghorn SWD Facility  
Lea County, New Mexico



New Pronghorn SWD Facility



New Pronghorn SWD Facility

**COG - Pronghorn SWD Facility  
Lea County, New Mexico**



**Excavated Area West of Facility**



**Excavated Area West of the Facility**

COG - Pronghorn SWD Facility  
Lea County, New Mexico

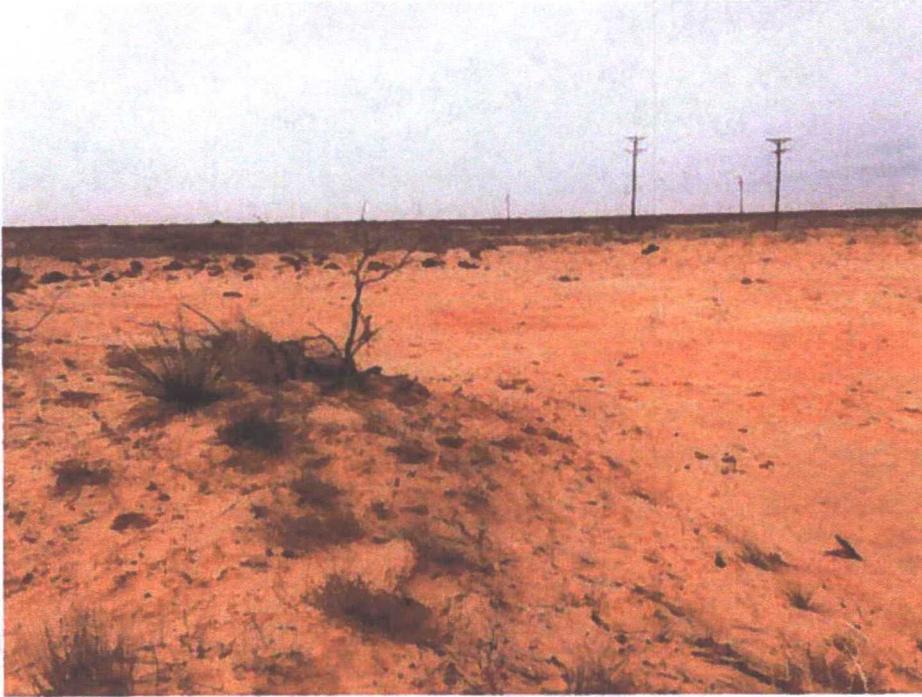


Excavated Area West of Facility

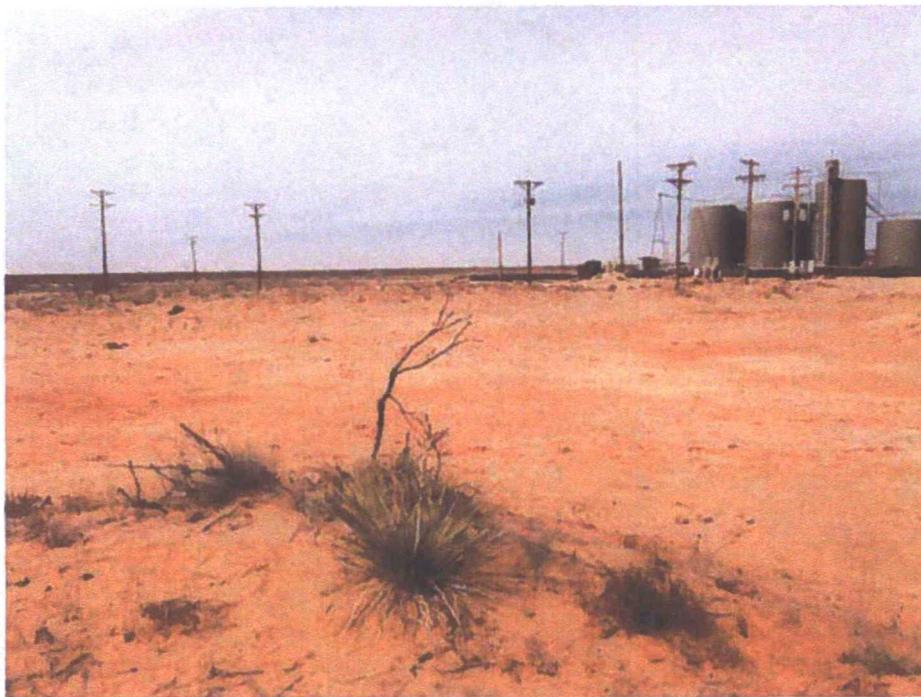


Excavated Area South of the Facility

**COG - Pronghorn SWD Facility  
Lea County, New Mexico**

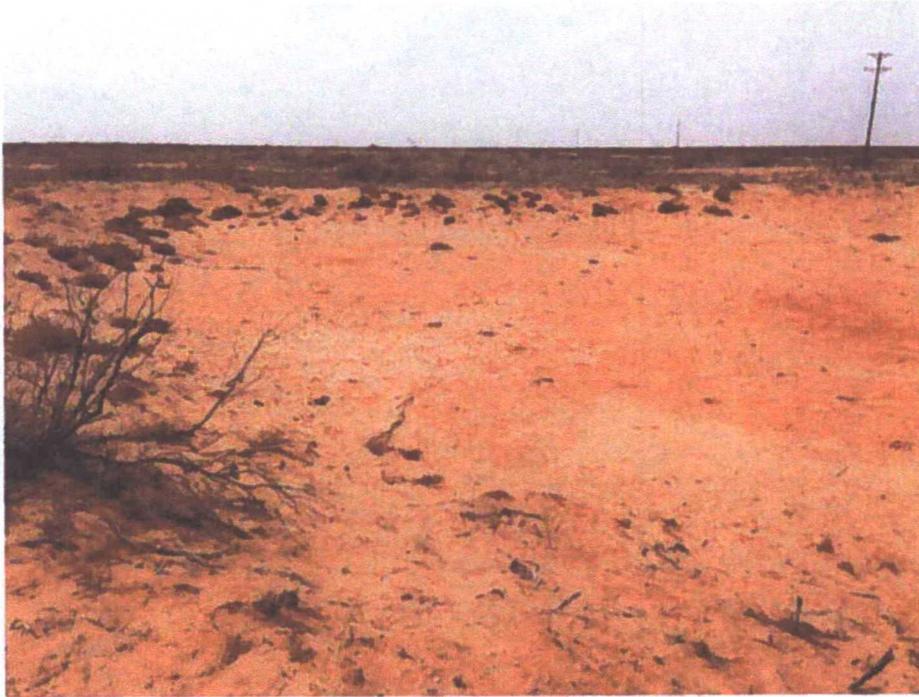


**Excavated Area South of Facility**

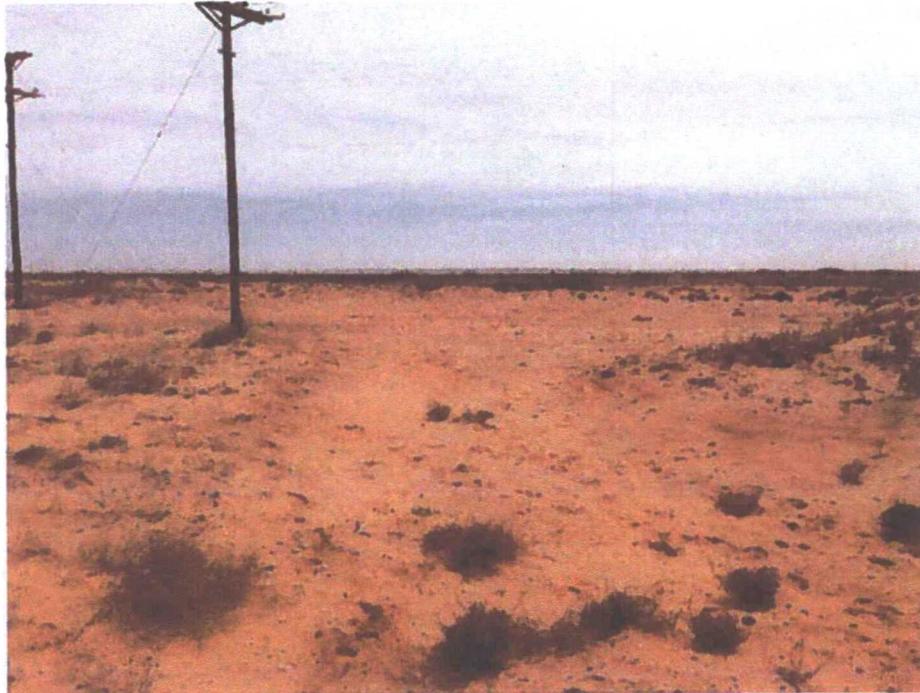


**Excavated Area South of the Facility**

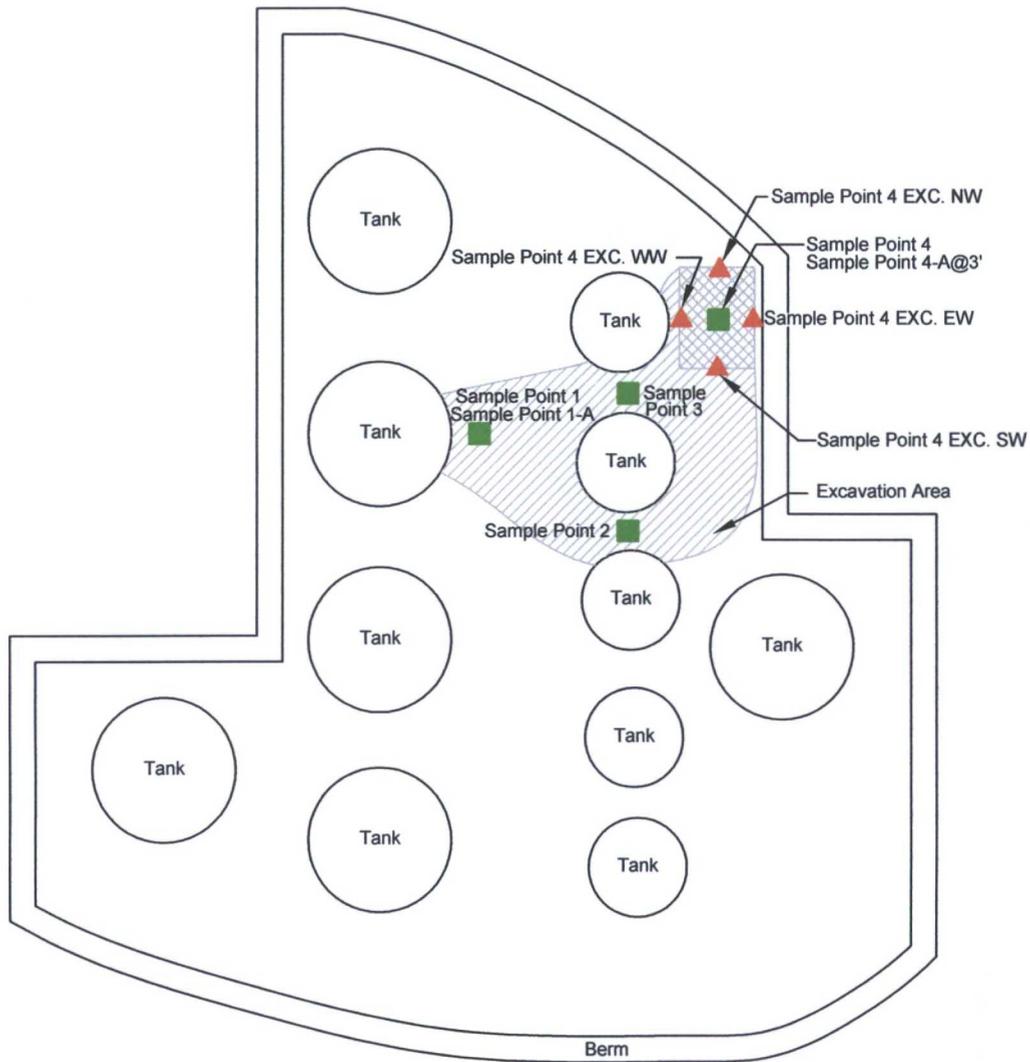
**COG - Pronghorn SWD Facility  
Lea County, New Mexico**



**View West - Excavated Area South of Facility**



**View South - Excavated Area South of the Facility**



- LEGEND:**
- ▲ Sidewall Soil Sample Location
  - Floor Soil Sample Location

**Figure 3**  
**Site Location Map**  
**High Sierra Transportation**  
**Carpenter Station**  
**Lea County, NM**



2057 Commerce Drive  
 Midland, Texas 79703  
 432.520.7720

[www.novasafetyandenvironmental.com](http://www.novasafetyandenvironmental.com)

December 10, 2013 | Scale: 1" = 30' | CAD By: TA | Checked By: CS

Lat. N 32° 34' 38.38" Long. W 103° 7' 25.84"