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: pLWJ1020430895

1RP - 2509

DEVON ENERGY PRODUCTION CO.,L.P.

7/27/2016

Whole Earth Environmental, Inc
2103 Arbor Cove
Katy, TX 77494

IRP-2509

June 15, 2010

Devon Energy Corporation
20 North Broadway
Oklahoma City, OK 73102

Attn: Darren Smith

Reference: Tomcat 21 Spill Remediation Plan

Dear Mr. Smith:

Enclosed, please find a draft copy of our remediation plan for the Tomcat 21 release. The protocol outlines the excavation and commercial disposal of brine impacted soils to a depth below the normal root zone for plants in an arid environment. A bentonite liner will be installed below the excavated areas to provide protection for vertical migration of the chlorides.

Thank you again for the opportunity of working with you on this project.

Warmest personal regards,

Mike Griffin
President
Whole Earth Environmental, Inc.

Executive Summary
Devon Tomcat 21
Remediation Project

Location

The site is located approximately fourty two miles s.west of the City of Hobbs, Lea County, New Mexico on federal lands. The primary land use is grazing of cattle however extensive oil and gas operations are prevalent in the area. The area is semi-arid with a net precipitation / evaporation amount of –73" per year. The legal description is S-21, T-23S, R -32E. Depth to groundwater is estimated to be approximately 415' below ground surface.

History

The leak was discovered on the morning of March 31, 2010 as the result of a parted weld on a 4" poly line. The spill volume was initially reported based on the loss of three days produced water production from the Tomcat 21 Lease. Field and laboratory analysis of the soil profile indicates that significantly larger volumes are involved. A revised C-141 will be submitted to the NMOCD prior to the commencement of remediation activities.

Delineation

The affected area was inspected by Whole Earth Environmental and Devon personnel and found to encompass approximately one acre in total affected area. The terrain is quite hilly with cattle trails connecting twelve puddle areas. The lateral extent of the spill was delineated through the use of a Geonics EM-38 electromagnetic survey instrument in vertical mode which averages the soil conductivity to a depth of 5' below ground surface. An archeological survey was requested by the Bureau of Land Management and the affected area was determined to have no relics or historical artifacts present at the ground surface.

Selected points were vertically delineated by coring. An impermeable red bed clay layer was discovered at a depth of approximately 90' below ground surface at the leak source and rising to a depth of approximately 35' to the south and west. No significant chloride concentrations were found to penetrate this layer in any boring.

Exhibit index

A. NMOCD C-141
B. NMOCD Assessment Criteria Worksheet
C. Site Plat Map
D. USGS 7.5' Map
E. Geonics EM-38 Survey Map
F. Spill Overlay Map With Archeological Survey Area
G. Boring Logs

Remediation Protocol
Devon Energy Tomcat 21
Brine Release

1.0 Purpose

This protocol is to provide a detailed outline of the steps to be employed in the remediation of a brine and hydrocarbon affected area in Lea County, New Mexico.

2.0 Scope

This protocol is site specific for the above project.

3.0 Preliminary

Prior to any field operations, Whole Earth Environmental shall conduct the following activities:

3.1 Client Review

3.1.1 Whole Earth shall meet with appointed personnel within Devon to review this protocol and make any requested modifications or alterations.

3.1.2 Changes to this protocol will be documented and submitted for final review by Devon prior to the initiation of actual fieldwork.

3.1.3 Upon client approval, this protocol and supporting documentation will be submitted to the Hobbs district of the NMOCD and the Carlsbad District of the USBLM for approval.

4.0 Safety

4.1 Prior to work on the site, Whole Earth shall obtain the location and phone numbers of the nearest emergency medical treatment facility. We will review all safety related issues with the appropriate Devon personnel, sub-contractors and exchange phone numbers.

4.2 A tailgate safety meeting shall be held and documented each day. All sub-contractors must attend and sign the daily log-in sheet.

4.3 Anyone allowed on to location must be wearing sleeved shirts, steel toed boots, hardhats, safety glasses and long pants. Each vehicle must be equipped with two way communication capabilities.

5.0 Remediation Procedure

5.1 The areas identified in the support documentation as the Source and Puddles A and B shall be excavated to a minimum depth of four feet below ground surface with all excavated soils being sent to a licensed commercial disposal facility. Manifest of all materials sent to commercial disposal shall be maintained and submitted as part of the final closure report.

5.2 A geotextile bentonite liner will be placed at the bottom of the excavations and covered with topsoils to a sufficient elevation to match background contours.

5.3 Puddle area D lies directly atop an EOG high pressure pipeline. We propose to flood the Puddle D area with ion exchange amendments that will move the chlorides down below the root zone while beneficially replacing the sodium cations with calcium, potassium and ammonium within the upper soil profile. This replacement will insure that the sodium cannot migrate to the surface (wicking) due to the unavailability of soil receptor sites. The sodium will concentrate at a depth of approximately 6' below ground surface forming a dispersion zone diverting water around the lower affected zones.

5.4 The remainder of the sites shall be excavated similarly to puddle areas A-C except that the excavation depths may be made shallower with the adjacent hillocks used to bring the surface elevations of materials above the liner to a minimum depth of 4' below ground level.

6.0 Site Restoration Procedure

6.1 The affected areas shall be contoured to minimize erosion and seeded with an approved BLM seed mixture.

7.0 Closure Report

At the conclusion of the project, Whole Earth shall prepare a closure report which contains the following minimum information:

- Photographs of the location prior to remediation
- Photographs of all excavations at the point of maximum soil removal
- Photographs of the location at time of final closure
- All pre-closure contaminant concentrations
- Copies of this protocol and all testing procedures

- Manifests of all materials sent to commercial disposal
- MSDS certificates of the ion exchange agents

Remediation Plan

We propose to excavate the chloride contaminated soils contained within the leak source, and puddles B and C to a minimum depth of 4' below ground surface and sending these soils to commercial disposal. A woven geotextile (bentonite) mat will be placed at the bottom of each excavation and backfilled to surface with fresh topsoil.

Puddle area D lies directly atop an EOG high pressure pipeline. We propose to flood the Puddle D area with ionexchange amendments that will move the chlorides down below the root zone while beneficially replacing the sodium cations with calcium, potassium and ammonium within the upper soil profile. At the time of this submittal, EOG has not approved the scope of work around their line. Implementation of this portion of the remediation plan will require their prior approval. This replacement will insure that the sodium cannot migrate to the surface (wicking) due to the unavailability of receptor sites. The sodium will concentrate at a depth of approximately 6' below ground surface forming a dispersion barrier diverting water around the lower affected zones.

The remainder of the sites shall be excavated similarly to puddle areas A-C except that the excavation depths may be made shallower with the adjacent hillocks used to bring the surface elevations of materials above the liner to a minimum depth of 4' below ground level.

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 South First, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
2040 South Pacheco
Santa Fe, NM 87505

Form C-141
Revised March 17, 1999

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company Devon Energy Production Co. L.P.	Contact Tracy Kidd
Address P.O. Box 250, Artesia, NM 88210	Telephone No. 575-513-0628
Facility Name Tomcat 21 Battery	Facility Type Battery

Surface Owner Federal	Mineral Owner	Lease No.NM-86153

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
	21	23S	32E	1980	North	1980	West	Lea

NATURE OF RELEASE

Type of Release Produced water	Volume of Release 100 bbls	Volume Recovered 0
Source of Release Poly pipe line	Date and Hour of Occurrence 3/31/10 11:00 AM	Date and Hour of Discovery 3/31/2010 11:00AM
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Larry Johnson OCD	
By Whom? Tracy Kidd	Date and Hour 3/31/10 3:00 PM	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

n/a

Describe Cause of Problem and Remedial Action Taken.*

Three inch SDR 7 poly line parted in fused section of pipe releasing an estimated 100 bbls of water. Line was repaired and soil samples were taken.

Describe Area Affected and Cleanup Action Taken.*

The affected area was 500' long and 2' to 60' in width. Whole Earth has been called to do remediation.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature: Tracy A. Kidd	OIL CONSERVATION DIVISION
Printed Name: Tracy Kidd	Approved by District Supervisor:
Title: Production Foreman	Approval Date: / Expiration Date:
Date: 4/5/2010 Phone: 575-513-0628	Conditions of Approval: / Attached ☐

* Attach Additional Sheets If Necessary

SITE ASSESMENT CRITERIA (NMOCD)

Devon Energy Corporation
Tomcat Fed 21 # 1
Depth to Groundwater: Approx. 500' bgs

DEPTH TO GROUND WATER

(Vertical distance from contaminants to seasonal high water elevation of ground water.)

Less than 50' BGS	(20 points)	
50' to 99' BGS	(10 points)	
Greater than 100' BGS	(0 points)	0

WELLHEAD PROTECTION AREA

(Less tan 200' from a private domestic water source, or; less than 1000' from all other water sources)

YES	(20 points)	
NO	(0 points)	0

DISTANCE TO SURFACE WATER BODY

(Horizontal distance to perennial lakes, ponds, rivers, streams, creeks, irrigation canals, and ditches)

Less than 200'	(20 points)	
200' to 1000'	(10 points)	
Greater than 1000'	(0 points)	0

RANKING SCORE TOTAL POINTS 0

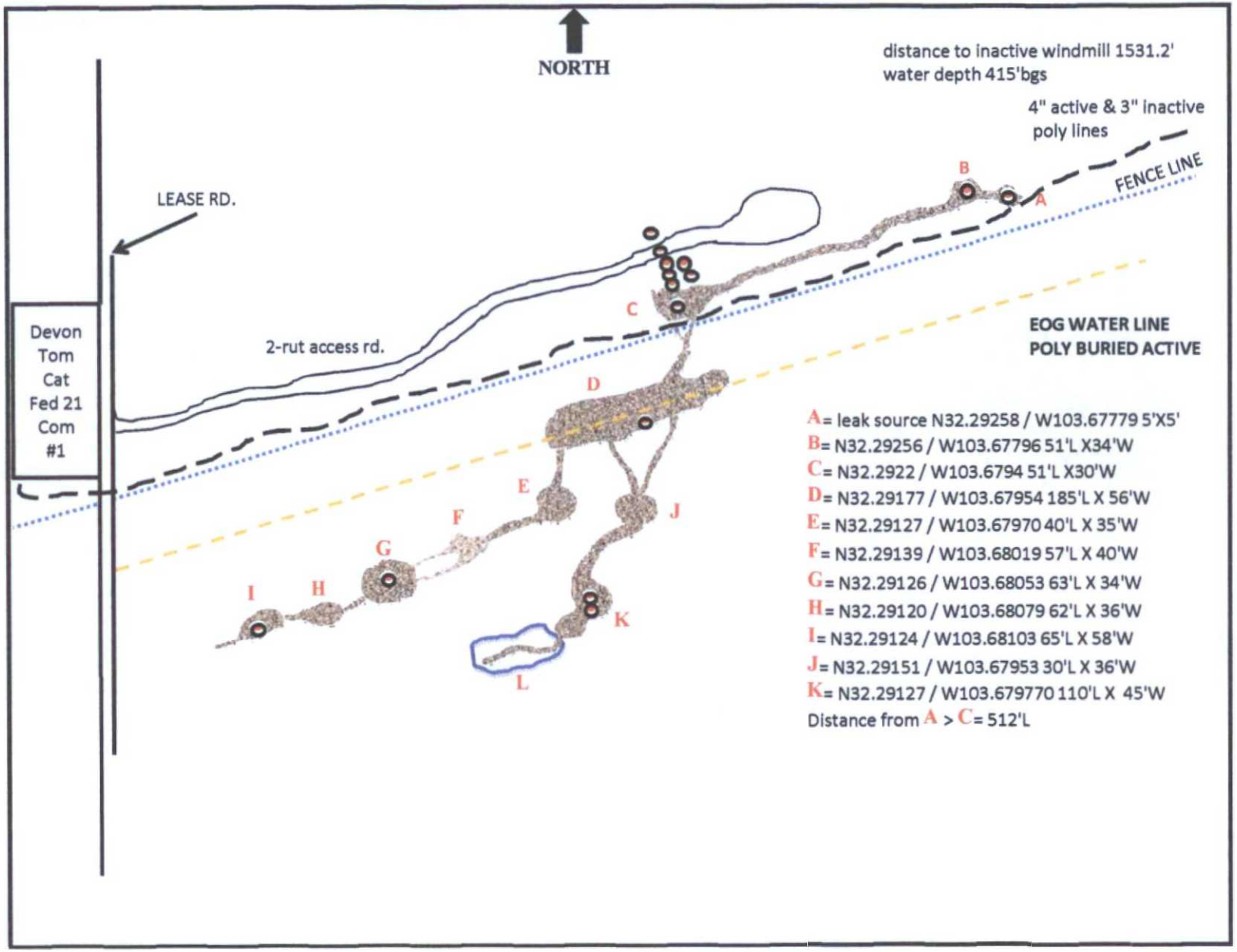
CLEAN - UP TARGET CONCENTRATIONS FOR "SITE CLOSURE"

IF RANKING SCORE IS:	> 19	10 - 19	0 - 9
BENZENE (ppm)*	10	10	10
BTEX (ppm)*	50	50	50
TPH (ppm)**	100	1000	5000

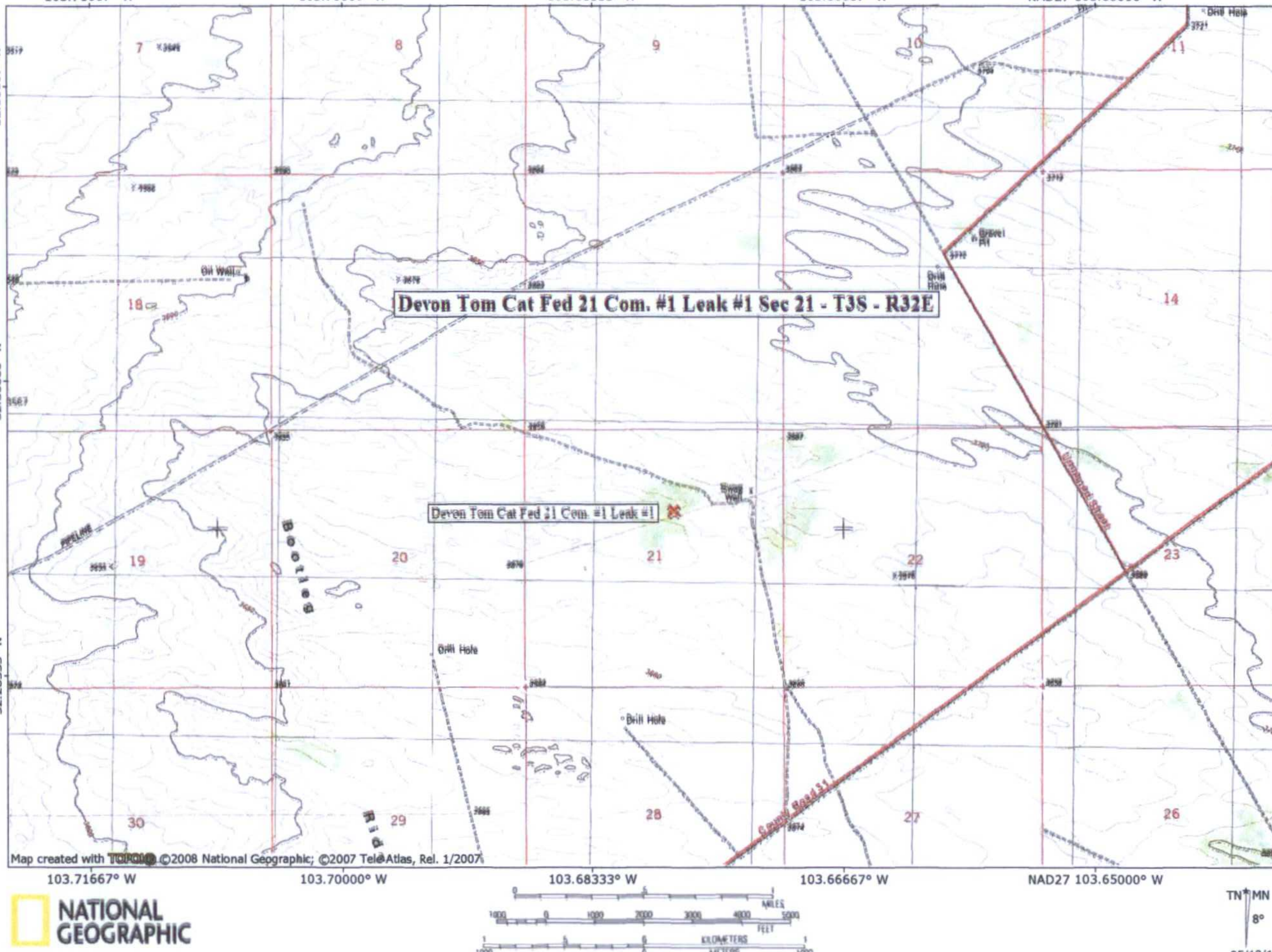
*A field vapor headspace measurement of 100 ppm may be substituted for a laboratory analysis.
** The contaminant concentration for TPH is the concentration above background levels.

DEVON TOMCAT FED 21 COM. #1 LEAK #1

Sec 21 - T23S - R32E API # 30-025-33356

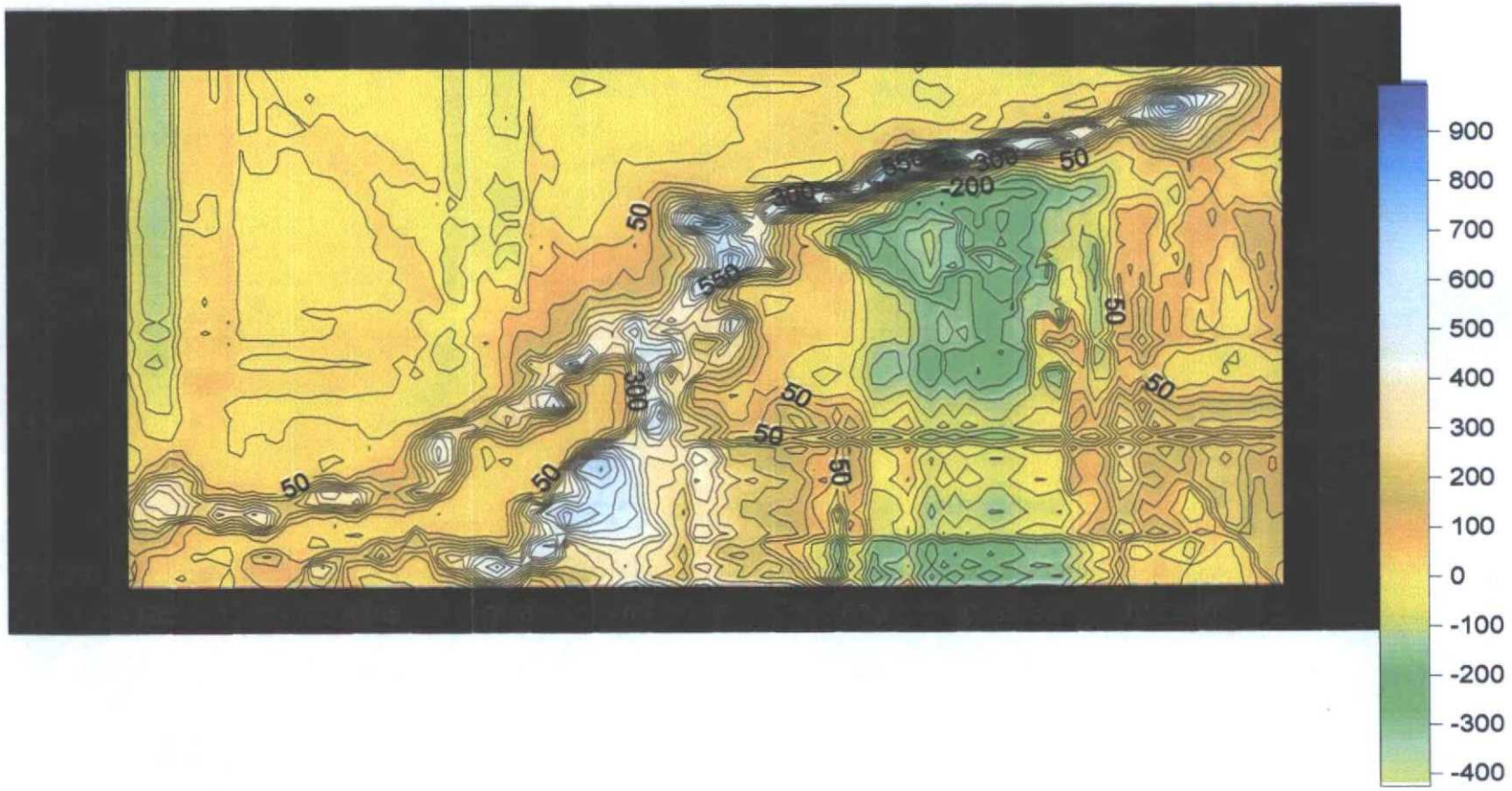


32.29682° N, 103.67989° W NAD27TOPO! map printed on 05/13/10 from "Untitled.tpo"



NATIONAL GEOGRAPHIC

Devon Energy
Tomcat 21 EM-38 Survey (0-5')



Devon Tomcat 21 Pipeline Spil

Log of Boring No.16 Leak 1

Atkins ENGINEERING ASSOCIATES

Whole Earth Environmental
2103 Arbor Cove
Katy, TX 77494

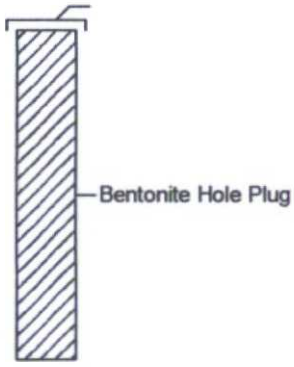
Contact: Mike Griffin

Job #: WHOLETH.DEV.10

Start Date	: 05/04/10	Site Location	: Devon Tomcat 21 Site
Start Time	:		
End Date	: 05/04/10	Auger Type	: 4 1/4" ID Hollow Stem
End Time	:	Logged By	: J.L. Atkins
Boring Location	:		

Depth In Feet	GRAPHIC	USCS	Sample	DESCRIPTION	PID	Lab
0		SP		SAND with Caliche Layer, Tan, Fine Grained		
5			1	SAND, Tan, Fine Grained		
10		SP				
15			2			
20			3			

Bore 16 Leak 1



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Log of Boring No.10 Leak 1

Atkins ENGINEERING ASSOCIATES

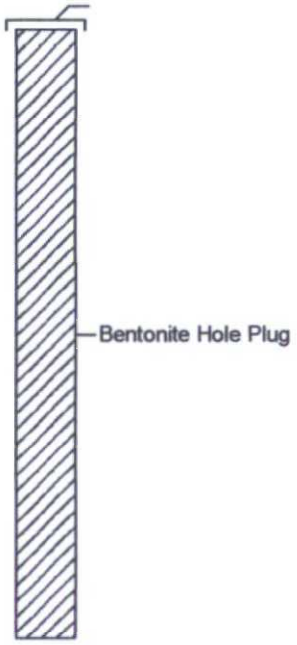
Whole Earth Environmental
2103 Arbor Cove
Katy, TX 77494

Contact: Mike Griffin

Job #: WHOLETH.DEV.10

Start Date	: 05/05/10	Site Location	: Devon Tomcat 21 Site
Start Time	:		
End Date	: 05/05/10	Auger Type	: 4 1/4" ID Hollow Stem
End Time	:	Logged By	: J.L. Atkins
Boring Location	:		

Depth In Feet	GRAPHIC	USCS	Sample	DESCRIPTION	PID	Lab
0		SP	1	SAND, Light Brown, Fine to Medium Grained		
5						
10						
15			2			
20						
25			3			
30		SC	4	CLAYEY SAND, Dark Reddish Brown, Fine to Medium Grained		
			5			
35			6			
			7			
40						
45						
50						
55						
60						
65						
70						
75						
80						



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Log of Boring No.11 Leak 1

Atkins ENGINEERING ASSOCIATES

Whole Earth Environmental
2103 Arbor Cove
Katy, TX 77494

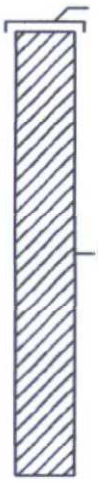
Contact: Mike Griffin

Job #: WHOLETH.DEV.10

Start Date	: 05/05/10	Site Location	: Devon Tomcat 21 Site
Start Time	:		
End Date	: 05/05/10	Auger Type	: 4 1/4" ID Hollow Stem
End Time	:	Logged By	: J.L. Atkins
Boring Location	:		

Depth In Feet	GRAPHIC	USCS	Sample	DESCRIPTION	PID	Lab
0		SP		SAND with Claliche Layer, Brown, Fine to Medium Grained		
5			1			
		SP		SAND with Caliche Layers, Tan, Fine to Medium Grained		
10						
15			2			
		SP		SAND, Brown, Fine Grained		
20						
25			3			
			4			

Bore 11 Leak 1



30 35 40 45 50 55 60 65 70 75 80

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Log of Boring No.12 Leak 1

Atkins ENGINEERING ASSOCIATES

Whole Earth Environmental
2103 Arbor Cove
Katy, TX 77494

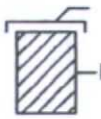
Contact: Mike Griffin

Job #: WHOLETH.DEV.10

Start Date	: 05/05/10	Site Location	: Devon Tomcat 21 Site
Start Time	:		
End Date	: 05/05/10	Auger Type	: 4 1/4" ID Hollow Stem
End Time	:	Logged By	: J.L. Atkins
Boring Location	:		

Depth In Feet	GRAPHIC	USCS	Sample	DESCRIPTION	PID	Lab
0		SP		SAND with Sandstone Layer, Dark Brown, Fine to Medium Grained		

Bore 12 Leak 1



Bentonite Hole Plug

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Log of Boring No.13 Leak 1

Atkins ENGINEERING ASSOCIATES

Whole Earth Environmental
2103 Arbor Cove
Katy, TX 77494

Contact: Mike Griffin

Job #: WHOLETH.DEV.10

Start Date	: 05/05/10	Site Location	: Devon Tomcat 21 Site
Start Time	:		
End Date	: 05/05/10	Auger Type	: 4 1/4" ID Hollow Stem
End Time	:	Logged By	: J.L. Atkins
Boring Location	:		

Depth In Feet	GRAPHIC	USCS	Sample	DESCRIPTION	PID	Lab
0		SP	1	SAND with Caliche Layer, Brown, Fine to Medium Grained		
5						
10						
15						
20						
25						
30						
35						
40						
45						
50						
55						
60						
65						
70						
75						
80						

Bore 13 Leak 1

Bentonite Hole Plug

05-20-2010 C:\Users\Paddy\Documents\Whole Earth\Devon Site (2010)\Bore13_Leak1.bor

Log of Boring No.14 Leak 1

Atkins ENGINEERING ASSOCIATES

Whole Earth Environmental
2103 Arbor Cove
Katy, TX 77494

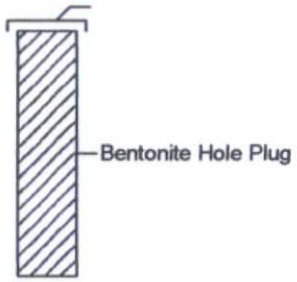
Contact: Mike Griffin

Job #: WHOLETH.DEV.10

Start Date	: 05/05/10	Site Location	: Devon Tomcat 21 Site
Start Time	:		
End Date	: 05/05/10	Auger Type	: 4 1/4" ID Hollow Stem
End Time	:	Logged By	: J.L. Atkins
Boring Location	:		

Depth In Feet	GRAPHIC	USCS	Sample	DESCRIPTION	PID	Lab
0		SP	1	SAND with Caliche Layer, Tan, Fine to Medium Grained		
5						
10						
15			2			

Bore 14 Leak 1



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Log of Boring No.15 Leak 1

Atkins ENGINEERING ASSOCIATES

Whole Earth Environmental
2103 Arbor Cove
Katy, TX 77494

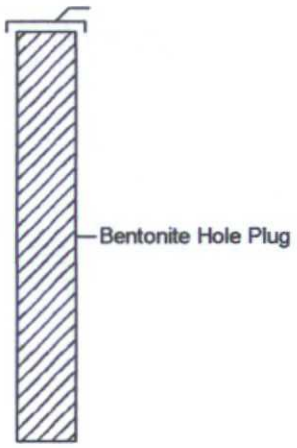
Contact: Mike Griffin

Job #: WHOLETH.DEV.10

Start Date	: 05/05/10	Site Location	: Devon Tomcat 21 Site
Start Time	:		
End Date	: 05/05/10	Auger Type	: 4 1/4" ID Hollow Stem
End Time	:	Logged By	: J.L. Atkins
Boring Location	:		

Depth In Feet	GRAPHIC	USCS	Sample	DESCRIPTION	PID	Lab
0		SP		SAND, Brown, Fine Grained		
5			1	SAND with Caliche Layers, Tan, Fine Grained		
10		SP				
15			2	SAND, Brown, Fine Grained		
20		SP	3			
25			4			

Bore 15 Leak 1



30 35 40 45 50 55 60 65 70 75 80

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Log of Boring No.16 Leak 1

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Atkins ENGINEERING ASSOCIATES

Whole Earth Environmental
2103 Arbor Cove
Katy, TX 77494

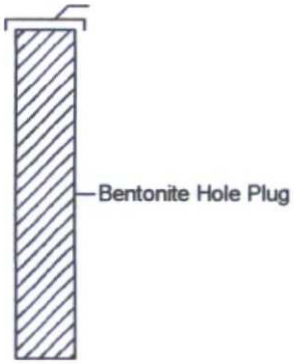
Contact: Mike Griffin

Job #: WHOLETH.DEV.10

Start Date	: 05/04/10	Site Location	: Devon Tomcat 21 Site
Start Time	:		
End Date	: 05/04/10	Auger Type	: 4 1/4" ID Hollow Stem
End Time	:	Logged By	: J.L. Atkins
Boring Location	:		

Depth In Feet	GRAPHIC	USCS	Sample	DESCRIPTION	PID	Lab
0		SP	1	SAND with Caliche Layer, Tan, Fine Grained		
5		SP	2	SAND, Tan, Fine Grained		
10						
15			3			
20						

Bore 16 Leak 1



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Log of Boring No.2 Leak 2

Atkins ENGINEERING ASSOCIATES

Whole Earth Environmental
2103 Arbor Cove
Katy, TX 77494

Contact: Mike Griffin

Job #: WHOLETH.DEV.10

Start Date	: 05/03/10	Site Location	: Devon Tomcat 21 Site
Start Time	:		
End Date	: 05/03/10	Auger Type	: 4 1/4" ID Hollow Stem
End Time	:	Logged By	: J.L. Atkins
Boring Location	:		

Depth In Feet	GRAPHIC	USCS	Sample	DESCRIPTION	PID	Lab
0		SP	1	SAND, Light Brown, Fine to Medium Grained		
5				SAND with Caliche Layer, Light Tan, Fine Grained		
10		SP	2			
15						
20						
25			3	SAND, Tan, Fine Grained		
30			4			
35		SP	5			
40						
45			6	SAND, Reddish Brown, Fine Grained		
50						
55						
60		SP				
65			7			
70						
75			8	CLAYEY SAND, Dark Reddish Brown, Fine to Medium Grained		
80		SC				
85			9			
90						

Bore 2 Leak 2

Bentonite Hole Plug

05-20-2010 C:\Users\Paddy\Documents\Whole Earth\Devon Site (2010)\Bore2_Leak2.bor

Log of Boring No.7 Leak 1

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Atkins ENGINEERING ASSOCIATES

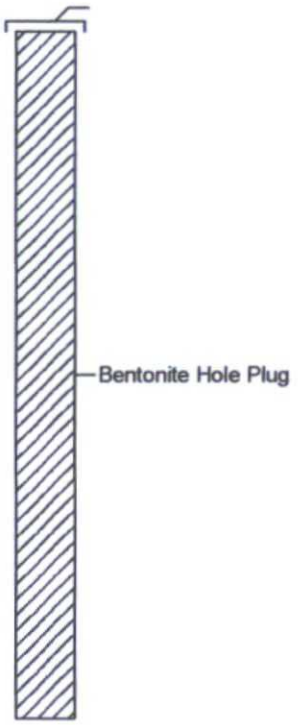
Whole Earth Environmental
2103 Arbor Cove
Katy, TX 77494

Contact: Mike Griffin

Job #: WHOLETH.DEV.10

Start Date	: 05/04/10	Site Location	: Devon Tomcat 21 Site
Start Time	:		
End Date	: 05/04/10	Auger Type	: 4 1/4" ID Hollow Stem
End Time	:	Logged By	: J.L. Atkins
Boring Location	:		

Depth In Feet	GRAPHIC	USCS	Sample	DESCRIPTION	PID	Lab
0		SP	1	SAND, Reddish Brown, Fine to Medium Grained		
5		SP		SAND with Caliche Layers, Light Tan, Fine Grained		
10			2			
15		SP		SAND, Brown, Fine Grained		
20			3			
25						
30			4			
35		SC	5	CLAYEY SAND, Dark Reddish Brown, Fine Grained		
40			6			
45						
50						
55						
60						
65						
70						
75						
80						



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Log of Boring No.8 Leak 1

(Page 1 of 1)

Atkins ENGINEERING ASSOCIATES

Whole Earth Environmental
2103 Arbor Cove
Katy, TX 77494

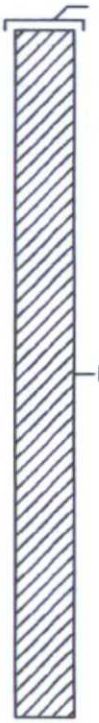
Contact: Mike Griffin

Job #: WHOLETH.DEV.10

Start Date	: 05/05/10	Site Location	: Devon Tomcat 21 Site
Start Time	:		
End Date	: 05/05/10	Auger Type	: 4 1/4" ID Hollow Stem
End Time	:	Logged By	: J.L. Atkins
Boring Location	:		

Depth In Feet	GRAPHIC	USCS	Sample	DESCRIPTION	PID	Lab
0		SP	1	SAND with Caliche Layer, Tan, Fine to Medium Grained		
15		SP	2	SAND, Brown, Fine Grained		
35		SC	4	CLAYEY SAND, Dark Reddish Brown, Fine Grained		
40		CL	5	CLAY, Dark Reddish Brown with Gray Clay Streaks		

Bore 8 Leak 1



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Log of Boring No.9 Leak 1

Atkins ENGINEERING ASSOCIATES

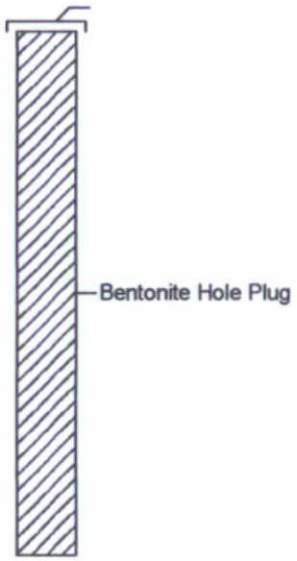
Whole Earth Environmental
2103 Arbor Cove
Katy, TX 77494

Contact: Mike Griffin

Job #: WHOLETH.DEV.10

Start Date	: 05/05/10	Site Location	: Devon Tomcat 21 Site
Start Time	:		
End Date	: 05/05/10	Auger Type	: 4 1/4" ID Hollow Stem
End Time	:	Logged By	: J.L. Atkins
Boring Location	:		

Depth In Feet	GRAPHIC	USCS	Sample	DESCRIPTION	PID	Lab
0		SC	1	CLAYEY SAND with Claliche Layer, Brown, Medium Grained		
5				SAND with Caliche Layers, Tan, Fine Grained		
10		SP				
15			2	CLAYEY SAND, Dark Brown, Medium Grained		
20		SC				
25						
30			3			
			4			
35						
40						
45						
50						
55						
60						
65						
70						
75						
80						



05-20-2010 C:\Users\Paddy\Documents\Whole Earth\Devon Site (2010)\Bore9_Leak1.bor

Analytical Results
Index

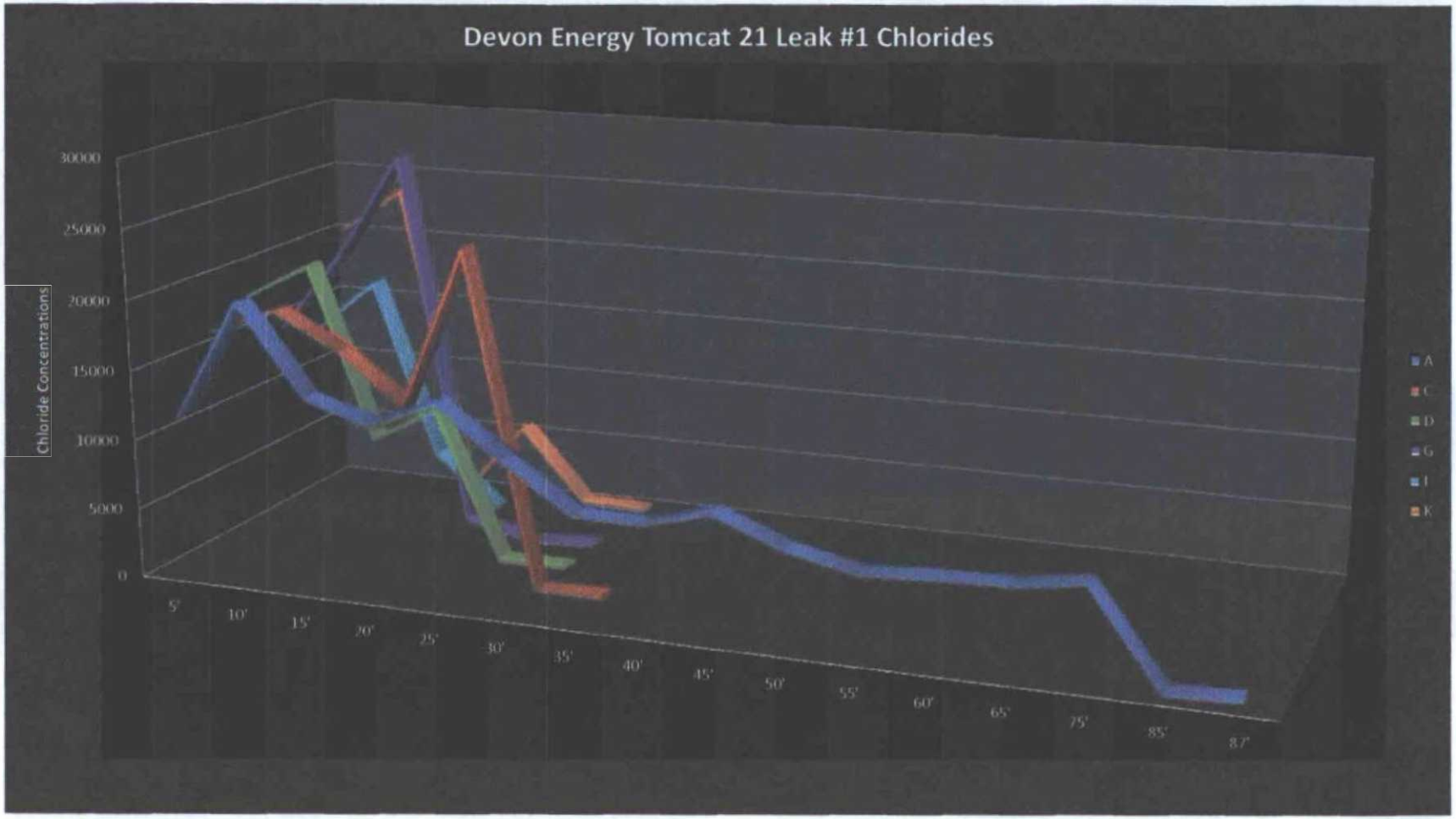
Summary of Excavation Soil Sample Analytical Results
Devon Tom Cat Fed #21 Com. #1 Leak #1

Soil Sample ID.	Depth (Feet)	Sample Date	Soil Status	PID Reading (ppm)	Field Chloride Analysis (ppm)	Laboratory ID	Carbon Ranges (C6-C10) (mg/Kg)	Carbon Ranges (C10-C28) (mg/Kg)	Moisture %	Chloride (mg/Kg)
B (Bore 1)	surface	4/14/10	bit returns	42.3	n/a		<500	59,900		25,600
	5'			14.1	12,916					
	10'			3.5	15,682					
	15'			1.9	17,934					
	20'			3.9	24,492		<10.0	<10.0		23,600
C (Bore 2)	surface	4/15/10	bit returns	61.5	5,537		<100	19,000		9,000
	5'			6.8	21,553					
	7'			bit refusal						
C (Bore 3)	5'			6.9	10,172					
	bit refusal			bit refusal						
K (Bore 4)	surface	04/15/10	bit returns	11.6	33,958		<10.0	<10.0		24,800
	5'			7.8	14,205					
	10'			1.5	13,404					
	15'			3.8	7,450					
	20'			1.4	11,462		<10.0	<10.0		12,800

Soil Sample ID.	Depth (Feet)	Sample Date	Soil Status	PID Reading (ppm)	Field Chloride Analysis (ppm)		Carbon Ranges (C6-C10) (mg/Kg)	Carbon Ranges (C10-C28) (mg/Kg)	Moisture %	Chloride (mg/Kg)
A (Bore 5)	5'	4/29/10	split spoon	N/A	11,422					
	10'				20,098					
	15'				13,777					
	20'				12,222					
	25'				14,275					
	30'				10,754					
	35'				7,535					
	40'				7,420					
	45'				8,701					
	50'				6,794					
	55'				5,714					
	60'				5,998					
	65'				6,101					
	75'				6,800					
	85'				120	H19783	<10.0	<10.0		64
	87'				348	H19783	<10.0	<10.0		480
C (Bore 6)	5'	4/30/10	split spoon	N/A	16,588					
	15'				18,438					
	25'				15,925					
	35'				12,373					
	45'				23,937					
	55'				58	H19795	<10.0	<10.0		48
	60'				120	H19795	<10.0	<10.0		32
D	5'			N/A	18,125					
	15				20,703					
	25				8,282					

(Bore 7)	35	5/4/10	split spoon	N/A	10,798					
	45				165		<10.0	<10.0		128
	47				176					160
K (Bore 8)	5'			N/A	20,371					
	15'				23,585					
	25'				242					
	35'				5,635					
	40'				245					
	42'				95					

Soil Sample ID.	Depth (Feet)	Sample Date	Soil Status	PID Reading (ppm)	Field Chloride Analysis (ppm)		Carbon Ranges (C6-C10) (mg/Kg)	Carbon Ranges (C10-C28) (mg/Kg)	Moisture %	Chloride (mg/Kg)
I (Bore 9)	5'	05/05/10	split spoon	1.5	13,422					
	15'			13.9	17,339					
	30'			2.1	4,525	H19840			14.6	6,400
	32'			2.2	647	H19840	<10.0	<10.0	17.3	608
G (Bore 10)	5'			2.7	14,805					
	15'			15.2	20,596					
	25'			3.5	28,102					
	30'			2.1	1,324					
	35'			28	114	H19838	<10.0	<10.0	13.6	96
	37'			3.3	418	H19838			14.2	1,920
C (Bore 11)	5'				12,376					
	15'				10,583					
	25'				5,563					
C (Bore 12)	5'				1,109					
C (Bore 13)	5'				1,205					
C (Bore 14)	5'				302					
	15				1,945					
C (Bore 15)	5'				199					
	15'				47					
	20'				652					
	25'				1,568					
C (Bore 16)	5'			2.1	58					
	15'			3.3	79	H19839	<10.0	<10.0	13.7	48
	20'			2.4	80	H19839	<10.0	<10.0	9.17	48


Devon Energy Tomcat 21 Leak #1 Chlorides
Chloride Concentrations
30000
25000
20000
15000
10000
5000
0
5'
10'
15'
20'
25'
30'
35'
40'
45'
50'
55'
60'
65'
75'
85'
87'
A
C
D
G
I
K

CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

May 3, 2010

Mike Griffin
Whole Earth Environmental, Inc.
2103 Arbor Cove
Katy, TX 77494

Re: Tomcat 21

Enclosed are the results of analyses for sample number H19783, received by the laboratory on 04/30/10 at 7:58 am.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydrocarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accredited though the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.2	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

Total Number of Pages of Report: 3 (includes Chain of Custody)

Sincerely,

Celey D. Keene
Laboratory Director

This report conforms with NELAP requirements.

CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
WHOLE EARTH ENVIRONMENTAL, INC.
ATTN: MIKE GRIFFIN
2103 ARBOR COVE
KATY, TX 77494
FAX TO: (281) 394-2051

Receiving Date: 04/30/10
Reporting Date: 05/03/10
Project Number: NOT GIVEN
Project Name: NOT GIVEN
Project Location: TOMCAT 21

Sampling Date: 04/29/10
Sample Type: SOIL
Sample Condition: COOL & INTACT @ 2.5°C
Sample Received By: JH
Analyzed By: AB/HM

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/kg)	DRO (>C_{10}-C_{28}) (mg/kg)	Cl* (mg/kg)
ANALYSIS DATE		05/01/10	05/01/10	04/30/10
H19783-1**	TOMCAT 21 85'	<10.0	<10.0	64
H19783-2	TOMCAT 21 90'	<10.0	<10.0	480
Quality Control		475	514	500
True Value QC		500	500	500
% Recovery		95.0	103	100
Relative Percent Difference		1.7	12.7	< 0.1

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; Cl: Std. Methods 4500-ClB
*Analyses performed on 1:4 w:v aqueous extracts. Reported on wet weight.
**One or more TPH surrogates outside historical limits due to matrix interference.

Lab Director

05/03/10
Date

H19783 TCL WEE

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603
(505) 393-2326 FAX (505) 393-2476 (325) 673-7001 FAX (325)673-7020

Company Name: Whole Earth	**BILL TO**
Project Manager: Mike Griffin	P.O. #:
Address:	Company:
City: Katy State: TX Zip:	Attn:
Phone #: Fax #:	Address:
Project #: Project Owner:	City:
Project Name:	State: Zip:
Project Location: Tomcat 21	Phone #:
Sampler Name:	Fax #:

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST		
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID/BASE:	ICE / COOL	OTHER:	DATE	TIME	8015M	chlorides	
H19753-1	Tomcat 21 85'	G	1			✓					✓		9/29/10	4:00	✓	✓	
-2	1' 90'	G	1			✓					✓		1'	4:45	✓	✓	

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:	Date: 9/30/10 Time: 7:58	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Date: Time:	Received By: Jodi Henson	Fax Result: ☐ Yes ☐ No Add'l Fax #:
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition: Cool ☐ Yes ☐ No; Intact ☐ Yes ☐ No	CHECKED BY: (Initials)	REMARKS: email to Mikeg@Vacbe.us

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

#126

CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

May 4, 2010

Mike Griffin
Whole Earth Environmental, Inc.
2103 Arbor Cove
Katy, TX 77494

Re: Tomcat 21

Enclosed are the results of analyses for sample number H19795, received by the laboratory on 05/03/10 at 7:55 am.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydrocarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accredited though the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.2	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

Total Number of Pages of Report: 3 (includes Chain of Custody)

Sincerely,

Celey D. Keene
Laboratory Director

This report conforms with NELAP requirements.

CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
WHOLE EARTH ENVIRONMENTAL, INC.
ATTN: MIKE GRIFFIN
2103 ARBOR COVE
KATY, TX 77494
FAX TO: (281) 394-2051

Receiving Date: 05/03/10
Reporting Date: 05/04/10
Project Number: NOT GIVEN
Project Name: TOMCAT 21
Project Location: NOT GIVEN

Sampling Date: 05/03/10
Sample Type: SOIL
Sample Condition: COOL & INTACT @ 6°C
Sample Received By: JH
Analyzed By: AB/HM

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/kg)	DRO (>C_{10}-C_{28}) (mg/kg)	Cl (mg/kg)
ANALYSIS DATE		05/04/10	05/04/10	05/03/10
H19795-1	PUDDLE 2 BORE 2 (55')	<10.0	<10.0	48
H19795-2	PUDDLE 2 BORE 2 (60')	<10.0	<10.0	32
Quality Control		460	456	500
True Value QC		500	500	500
% Recovery		92.0	91.2	100
Relative Percent Difference		1.2	0.6	< 0.1

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; Cl: Std. Methods 4500-ClB
*Analyses performed on 1:4 w:v aqueous extracts. Reported on wet weight.

Lab Director

05/04/10
Date

H19795 TCL WEE

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603
(505) 393-2326 FAX (505) 393-2476 (325) 673-7001 FAX (325)673-7020

Company Name: Whole Earth Envir	**BILL TO**
Project Manager: Michael Griffin	P.O. #:
Address:	Company:
City: Katy State: TX Zip:	Attn:
Phone #: Fax #:	Address:
Project #: Project Owner:	City:
Project Name: Tomcat #1	State: Zip:
Project Location:	Phone #:
Sampler Name:	Fax #:

ANALYSIS REQUEST

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRESERV.: ACID/BASE:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	BTEX 8015M	Chlorides											
H19795-1	Puddle 2 Bore 2 (55')	G	1			✓					✓		5/3/10	7:52	✓	✓											
2	" (60')	G	1			✓					✓		"	4:20	✓	✓											

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:	Date: 5-3-10	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
	Time: 7:35		Fax Result: ☐ Yes ☐ No Add'l Fax #:
Relinquished By:	Date:	Received By: Jodi Henson	REMARKS: RUSH
	Time:		email to Mikeg@Vtdose.US
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition: Cool ☑ Yes ☐ No; Intact ☑ Yes ☐ No	CHECKED BY: (Initials)
		6°C	

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

#26

CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

May 11, 2010

Michael Griffin
Whole Earth Environmental, Inc.
2103 Arbor Cove
Katy, TX 77494

Re: Tomcat 21 Fed 21 Com #1 Leak 1

Enclosed are the results of analyses for sample number H19838, received by the laboratory on 05/07/10 at 8:05 am.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydrocarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accredited though the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.2	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

Total Number of Pages of Report: 4 (includes Chain of Custody)

Sincerely,

Celey D. Keene
Laboratory Director

This report conforms with NELAP requirements.

CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
WHOLE EARTH ENVIRONMENTAL, INC.
ATTN: MICHAEL GRIFFIN
2103 ARBOR COVE
KATY, TX 77494
FAX TO: (281) 394-2051

Receiving Date: 05/07/10
Reporting Date: 05/10/10
Project Owner: NOT GIVEN
Project Name: TOMCAT 21 FED 21 COM#1 LEAK 1
Project Location: NOT GIVEN

Sampling Date: 05/05/10
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: JH
Analyzed By: AB

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/kg)	DRO (>C_{10}-C_{28}) (mg/kg)
ANALYSIS DATE:		05/07/10	05/07/10
H19838-1	PUDDLE G (B10) 35'	<10.0	<10.0
Quality Control		462	452
True Value QC		500	500
% Recovery		92.4	90.4
Relative Percent Difference		1.3	0.2

METHOD: SW-846 8015 M. Reported on wet weight.

Chemist

05/11/10
Date

H19838 TPH WEE

CARDINAL LABORATORIES

PHONE (575) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
WHOLE EARTH ENVIRONMENTAL, INC.
ATTN: MICHAEL GRIFFIN
2103 ARBOR COVE
KATY, TX 77494
FAX TO: (281) 394-2051

Receiving Date: 05/07/10
Reporting Date: 05/10/10
Project Owner: NOT GIVEN
Project Name: TOMCAT 21 FED 21 COM #1 LEAK 1
Project Location: NOT GIVEN

Sampling Date: 05/05/10
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: JH
Analyzed By: HM/AB

LAB NO.	SAMPLE ID	* Cl^- (mg/kg)	WATER (%)
Analysis Date:		05/07/10	05/10/10
H19838-1	PUDDLE G (B10) 35'	96	13.6
H19838-2	PUDDLE G (B10) 37'	1,920	14.2
Quality Control		500	NR
True Value QC		500	NR
% Recovery		100	NR
Relative Percent Difference		2.0	NR

METHOD: Standard Methods	4500-ClB	D2216

* Note: Analyses performed on 1:4 w:v aqueous extracts.

Chemist

05/10/10
Date

H19838 WEE

CARDINAL LABORATORIES

101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603
(505) 393-2326 FAX (505) 393-2476 (325) 673-7001 FAX (325)673-7020

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name:	Whole Earth Envir.
Project Manager:	Michael C. Griffin
Address:	
City:	Kerr State: TX Zip:
Phone #:	Fax #:
Project #:	Project Owner:
Project Name:	Tomcat 21 Fed 21 com #1 Leak 1
Project Location:	
Sampler Name:	

BILL TO

P.O. #:	
Company:	
Attn:	
Address:	
City:	
State:	Zip:
Phone #:	
Fax #:	

ANALYSIS REQUEST

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRESERV: ACID/BASE:	ICE / D.I.WATER	OTHER:	SAMPLING DATE	SAMPLING TIME	8015M	Moist. %	Chlorides
H19838-1	Puddle G (B10) 35'	G	1			✓					✓		5/5/10	10:15	✓	✓	✓
2	" 37'	G	1			✓					✓		"	10:32		✓	✓

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:	Date: 5/7/10 Time: 8:05	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Date: Time:	Received By: Jodi Henson	Fax Result: ☐ Yes ☐ No Add'l Fax #:
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition Cool: ☑ Yes ☐ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials) JH

REMARKS: email to wholeearth-ael

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

#26

Leking, Geoffrey R, EMNRD

From: Roy Rascone [Royr@vadose.us]
Sent: Sunday, February 20, 2011 6:16 PM
To: Don Mayberry; Nathan Kuhnert; Shannon Moss; Jerry Mathews ; Paul Evans ; Leking, Geoffrey R, EMNRD
Cc: MC Griffin ; ElliotW; MC Griffin
Subject: 2-17-11 DAILY REPORT
Attachments: Devon Tom Cat Fed 21 Com #1 Plat Map.xlsx

Good morning everyone

Our daily report for Friday is as follows, Doc continued to excavate the finger between area J and K, for the moment we have two areas that are clean, this will depending on the results of the side walls of these extensions which will have to tested. I got the area A & B dug out and is now ready for further sampling laterally to see if we are getting any closer to the lateral sides of the leak, this will be done on Monday. Shannon and Silvio arrived onsite today and we discussed the fence problem, Silvio will be moving his cattle from this area so we can remove the fence in the leak area and not have it impeding work progress. I talked to MMX foreman Cody and we may have a crew onsite on Monday to remove the fence. All fence material (post) will be saved and reused when job is complete.

Attached is the leak area map along with specific site maps. If you will open the attachment and down at the bottom of the page there will be tabs ided as to what they contain, if you will click on the tab it should appear.

If you have any questions or comments please don't hesitate to call or email me.

Thank you very much and have a great day.

Roy R. Rascon
Regional Manager / Project Manager
Whole Earth Environmental Inc.
Cell: 713-560-6076
Email: royr@vadose.us

DEVON TOM CAT FED 21 COM #1 LEAK #1
AREA A & B CL- FIELD TITRATIONS RESULTS

AREA A
22'L X18'W X4'D
Area A e. wall
18'L X 4'D
Area A n. wall
22'L X 4'D
AB notch
15'L X 4'D
Area B ne. wall
18'L x 4'D