



## AUTHORIZATION TO PURCHASE AND TRANSPORT OIL FROM LEASE - FORM 8

INDUSTRIAL COMMISSION OF NORTH DAKOTA  
OIL AND GAS DIVISION  
600 EAST BOULEVARD DEPT 405  
BISMARCK, ND 58505-0840  
SFN 5698 (03-2000)

RECEIVED

JAN 28 2020

Well File No.  
23367

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.

PLEASE SUBMIT THE ORIGINAL.

ND OIL &amp; GAS DIVISION

Well Name and Number <b>Atlanta Federal 6-6H</b>	Qtr-Qtr <b>NWW</b>	Section <b>6</b>	Township <b>153 N</b>	Range <b>101 W</b>	County <b>Williams</b>
Operator <b>Continental Resources, Inc.</b>	Telephone Number <b>405-234-9000</b>		Field <b>Baker</b>		
Address <b>P.O. Box 268870</b>	City <b>Oklahoma City</b>		State <b>OK</b>	Zip Code <b>73126</b>	

Name of First Purchaser <b>Continental Resources, Inc.</b>	Telephone Number <b>405-234-9000</b>	% Purchased <b>100</b>	Date Effective <b>February 7, 2014</b>
Principal Place of Business <b>20 N. Broadway</b>	City <b>Oklahoma City</b>	State <b>OK</b>	Zip Code <b>73102</b>
Field Address	City	State	Zip Code
Name of Transporter <b>Hiland Crude</b>	Telephone Number <b>580-616-2050</b>	% Transported <b>100</b>	Date Effective <b>February 7, 2014</b>
Address <b>8811 S. Yale, Ste. 200</b>	City <b>Tulsa</b>	State <b>OK</b>	Zip Code <b>74137</b>

The above named producer authorizes the above named purchaser to purchase the percentage of oil stated above which is produced from the lease designated above until further notice. The oil will be transported by the above named transporter.

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective
Comments		

I hereby swear or affirm that all transporters of Bakken Petroleum System oil listed above implement or adhere to a tariff specification as stringent as the Commissions VPCR<sub>4</sub> requirement  13.7 psi VPCR<sub>4</sub> Tariff Specification Hiland Crude Tariff Authority

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records.		Date <b>January 20, 2020</b>
Signature 	Printed Name <b>Terry L. Olson</b>	Title <b>Regulatory Compliance Specialist</b>

Above Signature Witnessed By

Witness Signature 	Witness Printed Name <b>Christi Scritchfield</b>	Witness Title <b>Regulatory Compliance Specialist</b>
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FOR STATE USE ONLY

Date Approved <b>JAN 29 2020</b>	NDIC CTB NO <b>223372</b>
By 	
Title <b>Oil &amp; Gas Production Analyst</b>	



# SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA  
OIL AND GAS DIVISION  
600 EAST BOULEVARD DEPT 405  
BISMARCK, ND 58505-0840  
SFN 5749 (09-2006)

Received

Well File No.  
**23367**

**SEP 23 2016**

## ND Oil & Gas Division

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.  
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

<input type="checkbox"/> Notice of Intent	Approximate Start Date	<input type="checkbox"/> Drilling Prognosis	<input type="checkbox"/> Spill Report
<input checked="" type="checkbox"/> Report of Work Done	Date Work Completed <b>April 22, 2014</b>	<input type="checkbox"/> Redrilling or Repair	<input type="checkbox"/> Shooting
<input type="checkbox"/> Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.		<input type="checkbox"/> Casing or Liner	<input type="checkbox"/> Acidizing
Approximate Start Date		<input type="checkbox"/> Plug Well	<input type="checkbox"/> Fracture Treatment
		<input type="checkbox"/> Supplemental History	<input checked="" type="checkbox"/> Change Production Method
		<input type="checkbox"/> Temporarily Abandon	<input type="checkbox"/> Reclamation
		<input type="checkbox"/> Other	

Well Name and Number <b>Atlanta Federal 6-6H</b>					
Footages	Qtr-Qtr	Section	Township	Range	
495 F N L	NWW	6	153 N	101 W	
Field <b>Baker</b>	Pool <b>Bakken</b>		County <b>Williams</b>		

24-HOUR PRODUCTION RATE	
Before	After
Oil 43 Bbls	Oil 43 Bbls
Water 150 Bbls	Water 141 Bbls
Gas 75 MCF	Gas 59 MCF

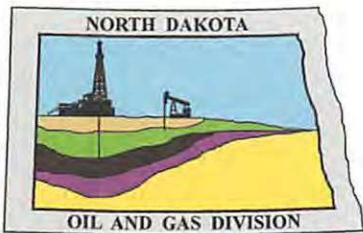
Name of Contractor(s)			
Address		City	State
			Zip Code

### DETAILS OF WORK

Continental Resources, Inc. requests a change in production on the above mentioned well. The well went from flowing to Rod Pump on 4/22/2014. New Tubing: 1 3/4 Depth: 8022

Company <b>Continental Resources</b>	Telephone Number <b>(405) 234-9000</b>
Address <b>P.O. Box 268870</b>	
City <b>Oklahoma City</b>	State <b>OK</b>
Zip Code <b>73126</b>	
Signature 	Printed Name <b>Zach Green</b>
Title <b>Regulatory Specialist</b>	Date <b>September 20, 2016</b>
Email Address <b>Zach.Green@clr.com</b>	

<input checked="" type="checkbox"/> Received	<input type="checkbox"/> Approved
Date <b>11-2-2016</b>	
By 	
Title <b>TAYLOR ROTH</b>	
Engineering Technician	



# Oil and Gas Division

Lynn D. Helms - Director

Bruce E. Hicks - Assistant Director

## Department of Mineral Resources

Lynn D. Helms - Director

## North Dakota Industrial Commission

[www.dmr.nd.gov/oilgas/](http://www.dmr.nd.gov/oilgas/)

September 16, 2016

CONTINENTAL RESOURCES  
ATTENTION: BOB SANDBO  
P.O. BOX 268870  
OKLAHOMA CITY, OK 73126

RE: ATLANTA FEDERAL 6-6H  
NW NW 6-153N-101W  
WILLIAMS COUNTY  
WELL FILE NO.: 23367

Dear Bob Sandbo:

A Sundry notice (Form 4) is needed for the above well, detailing the changeover from flowing to well now on rod pump. Review of the inspections show the well as converted to rod pump between March and May 2014. If you have any questions, feel free to contact our office.

Sincerely,

*Jessica Gilkey/BQ*  
Jessica Gilkey  
Petroleum Engineer - Field Inspector

JLG/RLR

Industrial Commission of North Dakota  
Oil and Gas Division  
Spill / Incident Report

Date/Time Reported : Feb 7 2014 / 12:07

State Agency person :

Responsible Party : Versatile Energy

Well Operator : CONTINENTAL RESOURCES, INC.

Date/Time of Incident : 2/6/2014 12:00:00 AM

NDIC File Number : 23367

Facility Number :

Well or Facility Name : ATLANTA FEDERAL 6-6H

Type of Incident : Other

Field Name : BAKER

County : WILLIAMS

Section : 6

Township : 153

Range : 101

Quarter-Quarter :

Quarter :

Distance to nearest residence :

Distance to nearest water well :

Release Oil : 0 barrels

Release Brine : 2 barrels

Release Other : 0 barrels

Recovered Oil : 0 barrels

Recovered Brine : 2 barrels

Recovered Other : 0 barrels

Has/Will the incident be reported to the NRC? : No

Was release contained : Yes - On Constructed Well Site

Description of other released substance :

Immediate risk evaluation : None

Followup Report Requested Y/N : N

Industrial Commission of North Dakota  
Oil and Gas Division  
Spill / Incident Report

Date/Time Reported : Nov 14 2013 / 09:16

State Agency person :

Responsible Party : Schlumberger

Well Operator : CONTINENTAL RESOURCES, INC.

Date/Time of Incident : 11/12/2013 12:00:00 AM

NDIC File Number : 23367

Facility Number :

Well or Facility Name : ATLANTA FEDERAL 6-6H

Type of Incident : Tank Leak

Field Name : BAKER

County : WILLIAMS

Section : 6

Township : 153

Range : 101

Quarter-Quarter :

Quarter :

Distance to nearest residence :

Distance to nearest water well :

Release Oil : 0 barrels

Release Brine : 2 barrels

Release Other : 0 barrels

Recovered Oil : 0 barrels

Recovered Brine : 1.5 barrels

Recovered Other : 0 barrels

Has/Will the incident be reported to the NRC? : No

Was release contained : Yes - On Constructed Well Site

Description of other released substance :

Immediate risk evaluation : none

Followup Report Requested Y/N : N

Industrial Commission of North Dakota  
Oil and Gas Division  
Spill / Incident Report

Date/Time Reported : Nov 10 2013 / 11:23

State Agency person :

Responsible Party : Schlumberger

Well Operator : CONTINENTAL RESOURCES, INC.

Date/Time of Incident : 11/9/2013 12:00:00 AM

NDIC File Number : 23367

Facility Number :

Well or Facility Name : ATLANTA FEDERAL 6-6H

Type of Incident : Valve/Piping Connection Leak

Field Name : BAKER

County : WILLIAMS

Section : 6

Township : 153

Range : 101

Quarter-Quarter :

Quarter :

Distance to nearest residence :

Distance to nearest water well :

Release Oil : 0 barrels

Release Brine : 3 barrels

Release Other : 0 barrels

Recovered Oil : 0 barrels

Recovered Brine : 3 barrels

Recovered Other : 0 barrels

Has/Will the incident be reported to the NRC? : Unknown

Was release contained : Yes - On Constructed Well Site

Description of other released substance :

Immediate risk evaluation :

Followup Report Requested Y/N : N



**WELL COMPLETION OR RECOMPLETION REPORT - FORM 6**

INDUSTRIAL COMMISSION OF NORTH DAKOTA  
OIL AND GAS DIVISION  
600 EAST BOULEVARD DEPT 405  
BISMARCK, ND 58505-0840  
SEN 2468 (04-2010)

Well File No.

**PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.**

**PLEASE SUBMIT THE ORIGINAL AND ONE COPY.**

Designate Type of Completion								
<input checked="" type="checkbox"/> Oil Well	<input type="checkbox"/> EOR Well	<input type="checkbox"/> Recompletion	<input type="checkbox"/> Deepened Well	<input checked="" type="checkbox"/> Added Horizontal Leg	<input type="checkbox"/> Extended Horizontal Leg			
<input type="checkbox"/> Gas Well	<input type="checkbox"/> SWD Well	<input type="checkbox"/> Water Supply Well	<input type="checkbox"/> Other:					
Well Name and Number <b>Atlanta Federal 6-6H</b>				Spacing Unit Description <b>Sec 5, 6, 7, &amp; 8 T153N R101W</b>				
Operator <b>Continental Resources, Inc.</b>		Telephone Number <b>405-234-9000</b>		Field <b>Baker</b>				
Address <b>P.O. Box 268870</b>				Pool <b>Bakken</b>				
City <b>Oklahoma City</b>		State <b>OK</b>	Zip Code <b>73126</b>	Permit Type		<input type="checkbox"/> Wildcat	<input checked="" type="checkbox"/> Development	<input type="checkbox"/> Extension

### **LOCATION OF WELL**

At Surface		Qtr-Qtr	Section	Township	Range	County
495 F N L	880 F W L	NWNW	6	153 N	101 W	Williams
Spud Date	Date TD Reached	Drilling Contractor and Rig Number		KB Elevation (Ft)	Graded Elevation (Ft)	
5/18/2013	7/3/2013	Cyclone 2		1967		1945

Type of Electric and Other Logs Run (See Instructions)

#### **CBL/GR/MAC/mud**

**CASING & TUBULARS RECORD (Report all strings set in well)**

String & Tools into Record (Report all strings set in well)										
Well Bore	String		Top Set (MD Ft)	Depth Set (MD Ft)	Hole Size (Inch)	Weight (Lbs/Ft)	Anchor Set (MD Ft)	Packer Set (MD Ft)	Sacks Cement	Top of Cement
	Type	Size (Inch)								
Lateral1	Conductor	16		102	20	133				0
	Surface	13 3/8		558	20	48			627	0
	Surface	9 5/8		2005	13 1/2	26-32			640	0
	Liner	4 1/2		10013	8 3/4	11.6				
	Intermediate	7		10858	8 3/4	6.5			993	1150
	Liner	4 1/2	9994	21845	6	11.6		9994		

#### **PERFORATION & OPEN HOLE INTERVALS**

## PRODUCTION

Current Producing Open Hole or Perforated Interval(s), This Completion, Top and Bottom, (MD Ft) <b>Bakken 10,858' - 22,005'</b>							Name of Zone (If Different from Pool Name) <b>Three Forks</b>	
Date Well Completed (SEE INSTRUCTIONS) 2/6/2014		Producing Method <b>Flowing</b>	Pumping-Size & Type of Pump				Well Status (Producing or Shut-In) <b>Producing</b>	
Date of Test <b>3/7/2014</b>	Hours Tested <b>24</b>	Choke Size <b>14 /64</b>	Production for Test	Oil (Bbls) <b>540</b>	Gas (MCF) <b>247</b>	Water (Bbls) <b>596</b>	Oil Gravity-API (Corr.) <b>39.6 °</b>	Disposition of Gas <b>Sold</b>
Flowing Tubing Pressure (PSI)		Flowing Casing Pressure (PSI)		Calculated 24-Hour Rate	Oil (Bbls) <b>540</b>	Gas (MCF) <b>247</b>	Water (Bbls) <b>596</b>	Gas-Oil Ratio <b>457</b>

## GEOLOGICAL MARKERS

## **PLUG BACK INFORMATION**

## CORES CUT

Top (Ft)	Bottom (Ft)	Formation	Top (Ft)	Bottom (Ft)	Formation

## Drill Stem Test

Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
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## Drill Pipe Recovery

### Sample Chamber Recovery

Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
-----------	-----------	----------	-------------	--------------	--------	---------	------------------	------------------

## Drill Pipe Recovery

### Sample Chamber Recovery

Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
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Drill Pipe Recovery

### Sample Chamber Recovery

Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
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## Drill Pipe Recovery

## Sample Chamber Recovery

Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
-----------	-----------	----------	-------------	--------------	--------	---------	------------------	------------------

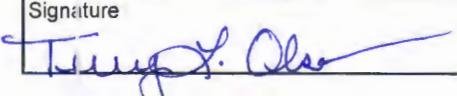
## Drill Pipe Recovery

### Sample Chamber Recovery

### Well Specific Stimulation

Date Stimulated 11/21/2013	Stimulated Formation 3 Forks		Top (Ft) 10858	Bottom (Ft) 22005	Stimulation Stages 37	Volume 64611	Volume Units Barrels
Type Treatment Sand Frac	Acid %	Lbs Proppant 3841831	Maximum Treatment Pressure (PSI) 8539			Maximum Treatment Rate (BBLS/Min) 24.0	
Details Pumped 39730# 40/70 mesh, 2734057# 20/40 sand and 1068044# 20/40 ceramic.							
Date Stimulated	Stimulated Formation		Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units
Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)			Maximum Treatment Rate (BBLS/Min)	
Details							
Date Stimulated	Stimulated Formation		Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units
Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)			Maximum Treatment Rate (BBLS/Min)	
Details							
Date Stimulated	Stimulated Formation		Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units
Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)			Maximum Treatment Rate (BBLS/Min)	
Details							
Date Stimulated	Stimulated Formation		Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units
Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)			Maximum Treatment Rate (BBLS/Min)	
Details							

### ADDITIONAL INFORMATION AND/OR LIST OF ATTACHMENTS

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records.	Email Address Terry.Olson@clr.com	Date 3/26/2014
Signature 	Printed Name Terry L. Olson	Title Regulatory Compliance Specialist

**AUTHORIZATION TO PURCHASE AND TRANSPORT OIL FROM LEASE - FORM 8**

INDUSTRIAL COMMISSION OF NORTH DAKOTA  
OIL AND GAS DIVISION  
600 EAST BOULEVARD DEPT 405  
BISMARCK, ND 58505-0840  
SFN 5698 (03-2000)



Well File No.  
**23367**  
NDIC CTB No.  
**223372**

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.

PLEASE SUBMIT THE ORIGINAL AND FOUR COPIES.

Well Name and Number <b>Atlanta Federal 6-6H</b>	Qtr-Qtr <b>NWNW</b>	Section <b>6</b>	Township <b>153 N</b>	Range <b>101 W</b>	County <b>Williams</b>
Operator <b>Continental Resources, Inc.</b>	Telephone Number <b>405-234-9000</b>		Field <b>Baker</b>		
Address <b>P.O. Box 268870</b>	City <b>Oklahoma City</b>		State <b>OK</b>	Zip Code <b>73126</b>	

Name of First Purchaser <b>Continental Resources, Inc.</b>	Telephone Number <b>405-234-9000</b>	% Purchased <b>100</b>	Date Effective <b>February 7, 2014</b>
Principal Place of Business <b>20 N. Broadway</b>	City <b>Oklahoma City</b>	State <b>OK</b>	Zip Code <b>73102</b>
Field Address	City	State	Zip Code
Name of Transporter <b>Hiland Crude (West Camp Creek Pipe)</b>	Telephone Number	% Transported	Date Effective <b>February 7, 2014</b>
Address <b>P.O. Box 3886</b>	City <b>Enid</b>	State <b>OK</b>	Zip Code <b>73702</b>

The above named producer authorizes the above named purchaser to purchase the percentage of oil stated above which is produced from the lease designated above until further notice. The oil will be transported by the above named transporter.

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective
Comments		

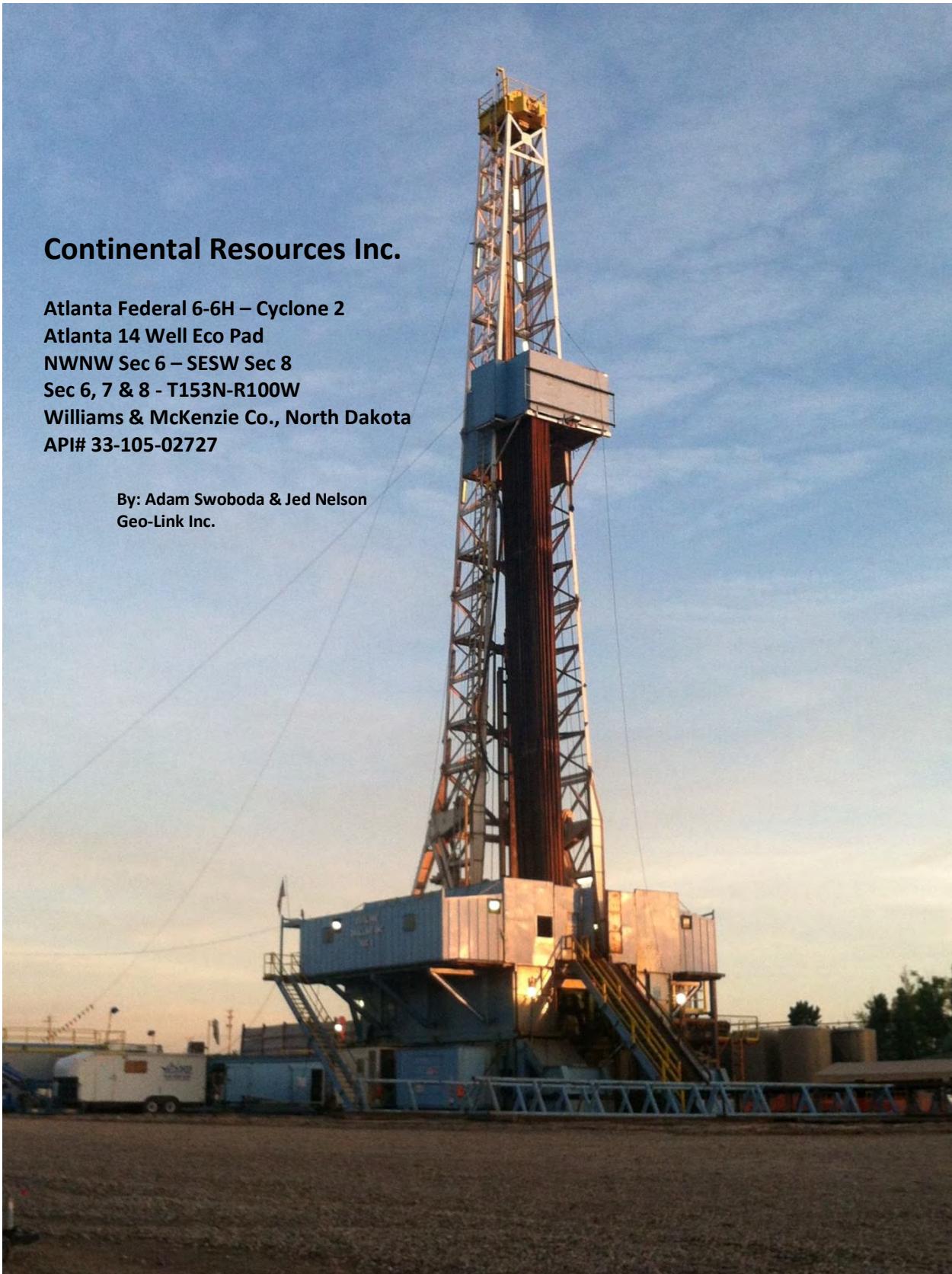
I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records.	Date <b>March 10, 2014</b>
Signature 	Printed Name <b>Terry L. Olson</b>
Title <b>Regulatory Compliance Specialist</b>	

Above Signature Witnessed By

Witness Signature 	Witness Printed Name <b>Christi Scritchfield</b>	Witness Title <b>Regulatory Compliance Specialist</b>
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FOR STATE USE ONLY

Date Approved <b>APR 09 2014</b>	
By 	
Title <b>Erie Peterson</b>	
Oil & Gas Production Analyst	



## **Continental Resources Inc.**

**Atlanta Federal 6-6H – Cyclone 2  
Atlanta 14 Well Eco Pad  
NWNW Sec 6 – SESW Sec 8  
Sec 6, 7 & 8 - T153N-R100W  
Williams & McKenzie Co., North Dakota  
API# 33-105-02727**

**By: Adam Swoboda & Jed Nelson  
Geo-Link Inc.**



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*Gamma Ray, Avg. ROP, 24 Hr Progress, Gas, Mud Weight, Oil Show Plot*

*Formation Tops, Critical Points, Lateral Summary*

*Formation Structure*

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*Directional Surveys*

*Drilling / Sliding Report*

*TVD Log*



## Well Information

WELL NAME: Atlanta Federal 6-6H  
Atlanta 14 Well Eco Pad

OPERATOR: Continental Resources, Inc.  
P.O. Box 269000  
Oklahoma City, Ok 73126

SURFACE LOCATION: 495 †FNL & 880 †FWL  
NWNW Section 6, T153N, R101W

CASING: 7 ½" Intermediate casing set at 10849 †MD; 10607.73 †TVD  
879 †FNL & 1124 †FWL  
NWNW Section 6, T153N, R101W

BOTTOM HOLE LOCATION: Projection to Bit: 22005 †MD; 10605.05 †TVD  
248 †FSL & 2136 †FWL  
SESW Section 8, T153N, R101W

FIELD/AREA: Williston

COUNTY: Williams & McKenzie Co.

STATE: North Dakota

API#: 33-105-02727

ELEVATION: GL: 1945 † KB: 1967 †

SPUD: June 15<sup>th</sup> 2013

DRILLED OUT OF 7 ½" CASING: June 23<sup>rd</sup> 2013  
(LATERAL SECTION)

TOTAL DEPTH/DATE: 22005 †MD † July 3<sup>rd</sup>, 2013  
Total Days: 19

BOTTOM HOLE DATA:

Kick-off Point:	10063 †MD; 10062 †TVD
Vertical Section:	11605.93 †
Drift of Azimuth	146.01°
Average Inclination (lateral):	89.99°
Lateral footage:	11156 †

WELL STATUS: To be completed as a Three Forks oil well

MWD REP: MS Energy (Tim Coleman, Kevin Krenz and Brent Boyd)



## Well Information

DIRECTIONAL REP: MS Energy (Kurt Wortley and Justin Klauzer)

MUD LOGGING SERVICE: Geo-Link Inc.

GEOLOGICAL CONSULTANT: Adam Swoboda/Jed D Nelson  
Second Hand: Joe Dunn/R.C. Whitmoe

GAS EQUIPMENT: M-Logger / M-Control SN ML-197  
Spare SN ML-077

SAMPLE PROGRAM:  
Vertical & Build Section:  
30+ Samples lagged and caught by mud loggers 8300 + 0881 +  
Charles Salt, Mission Canyon, Lodgepole, Upper Bakken Shale,  
Middle Bakken Member, Lower Bakken Shale, Three Forks  
Dolomite

Lateral Section:  
100+ Samples lagged and caught by mud loggers 11000 + 2005 +  
Logging: Three Forks Dolomite  
One set sent to NDGS Core Library (Grand Forks)

DISTRIBUTION LIST:

Continental Resources, Inc.  
Land Department

# Memo

**To:** Archie Taylor, Brian A. Moss, David McMahan, Doug Pollitt, Gerry Allen, Gil Smith, Gina Callaway, Greg Blocker, Jack Stark, Jaclyn Jantz, Jeanette McDonald, Josh Byler, Marjorie McKenzie, Matt Liter, Michael Kyle, Paula Fast, Renee Sanders, Rob Hersom, Robert Sandbo, Sally Messenger, Shamika Morrison, Shawn Roche and Shelly Ramirez

**From:** **Casey Holder**

**CC:** Rick Muncrief and Heath Hibbard

**Date:** May 9, 2013



## Well Information

**RE:           Atlanta Federal 6-6H**  
Sections 5, 6, 7 & 8-153N-101W  
Williams & McKenzie Counties, North Dakota

Regarding the referenced well, the following parties are entitled to receive the indicated information and be contacted for elections as shown.

**"Standard Information"** means the following:

**DURING DRILLING OPERATIONS:**

E-mail the following  
during drilling and completion operations:

- 1) Daily Drilling Report
- 2) Mud Log
- 3) Lateral Profile
- 4) Gamma Ray, MD & TVD Logs
- 5) Directional Surveys

**POST DRILL:**

Mail the following items after  
drilling is completed:

- 1) Complete Electric Log
- 2) Complete Mud Log
- 3) Complete DST report
- 4) Core Analyses
- 5) Complete Directional Surveys
- 6) Complete Lateral Profile
- 7) Water, Oil & Gas Analysis
- 8) Cement Bond Log
- 9) Final complete drilling report

Owner	Information	Casing Point Election	Dry Hole Takeover Election
NDIC Oil and Gas Division Email: <a href="mailto:digitallogs@nd.gov">digitallogs@nd.gov</a>	<b>Open Hole Logs/Cased Hole Logs/Mudlogs (email TIFF &amp; LAS)</b>  <b>Final Geological Report (email PDF)</b>  <b>***NO PAPER COPIES***</b>		No
Continental Resources, Inc. Attn: Robert Sandbo PO Box 26900 OKC, OK 73126 Email: <a href="mailto:isologs@clr.com">isologs@clr.com</a>	<b>Standard Information</b>  <b>Open Hole Logs/Cased Hole Logs</b>	No	No



## Well Information

	<b>(5 hard copies, email TIFF &amp; LAS)</b>  <b>Mudlogs (5 hard copies, email TIFF, LAS &amp; raw log file)</b>  <b>5 copies of Final Geological Report (email PDF &amp; raw file)</b>		
Albert G. Metcalfe, III 550 West Texas, Suite 640 Midland, TX 79701-4241 Email: <a href="mailto:albertgmetcalfe@gmail.com">albertgmetcalfe@gmail.com</a> Phone: 432.684.4910 (Office) Phone: 432.528.2581 Fax: 432.684.0853 (Send Well Information daily, via email)	Standard Well Information	No	Yes
Black Stone Energy Company, LLC c/o Mark Connally 1001 Fannin, Suite 2020 Houston, TX 77002 Phone: 713.658.0647 (Office) Phone: 713.827.8629 (Home) Fax: 713.658.0943 Email: <a href="mailto:kdolfi@blackstoneminerals.com">kdolfi@blackstoneminerals.com</a> , <a href="mailto:mconnally@blackstoneminerals.com">mconnally@blackstoneminerals.com</a> (Send Well Information daily, via email)	See Attached Requirements	No	Yes
Boedecker Resources Attn: Brett Boedecker 151 O'Brien Ln Moore, MT 59464 Phone: 406.374.2270 E-Mail: <a href="mailto:brettboedecker@hotmail.com">brettboedecker@hotmail.com</a> (Send Well Info Daily, via E-Mail)	Standard Well Information	No	Yes
Dale Lease Acquisitions 2011-B, L.P. Attn: John D. Crocker, Jr. 2100 Ross Avenue, Suite 1870 Dallas, TX 75201	See Attached Requirements	No	Yes



## Well Information

Phone: 214.979.9010, Ext. 16 Fax: 214.969.9394 Email: <a href="mailto:reports@dale-energy.com">reports@dale-energy.com</a> (Send Well Information daily, via email)			
Golden Eye Resources, LLC 5460 South Quebec Street, Suite 335 Greenwood Village, CO 80111 Phone: 303.832.1994 Fax: 303.832.5118 Email: <a href="mailto:reports@goldeneyerесources.com">reports@goldeneyerесources.com</a> (Send Well Information daily, via email)	See Attached Requirements	No	Yes
Helm Energy, LLC c/o Joe Brinkman 5251 DTC Parkway, Suite 425 Greenwood Village, CO 80111 Email: <a href="mailto:jbrinkman@helmenergy.com">jbrinkman@helmenergy.com</a> (Send Well Information daily, via email)	See Attached Requirements	No	Yes
Intervention Energy, LLC Attn: John Zimmerman P.O. Box 1028 Minot, ND 58702-1028 Email: <a href="mailto:john@interventionenergy.com">john@interventionenergy.com</a> (Send Well Information daily, via email)	Standard Well Information	No	Yes
JAMEX Royalty Company Attn: Well Data P.O. Box 16336 Oklahoma City, OK 73113 Phone: (405) 413-5331 Email: <a href="mailto:minerals@jamexroyalty.com">minerals@jamexroyalty.com</a> (Send Well Information daily, via email)	See Attached Requirements	No	Yes
John H. Holt Oil Properties, Inc. Attn: John H. Holt P.O. Box 24 Williston, ND 58802 Phone: 701.774.1200 Fax: 701.572.8499 Email: <a href="mailto:john@jhhop.com">john@jhhop.com</a> (Send Well Information daily, via email)	Standard Well Information	No	Yes
Lario Oil & Gas Company P.O. Box 29 Denver, CO 80201-0029 Fax: 303.595.4849 Email: <a href="mailto:reportsdenver@lario.net">reportsdenver@lario.net</a> (Send Well Information daily, via email)	See Attached Requirements	No	Yes



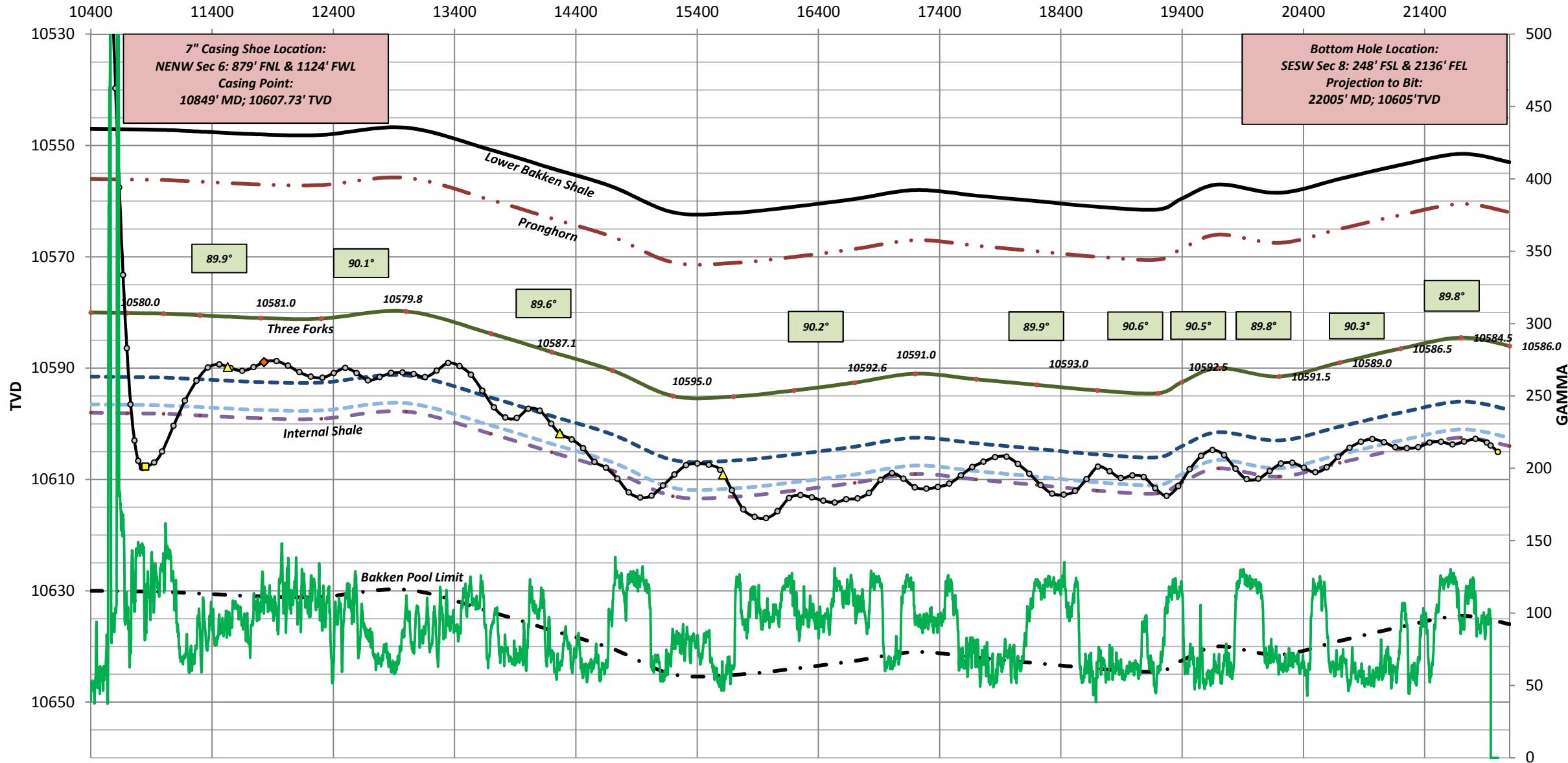
## Well Information

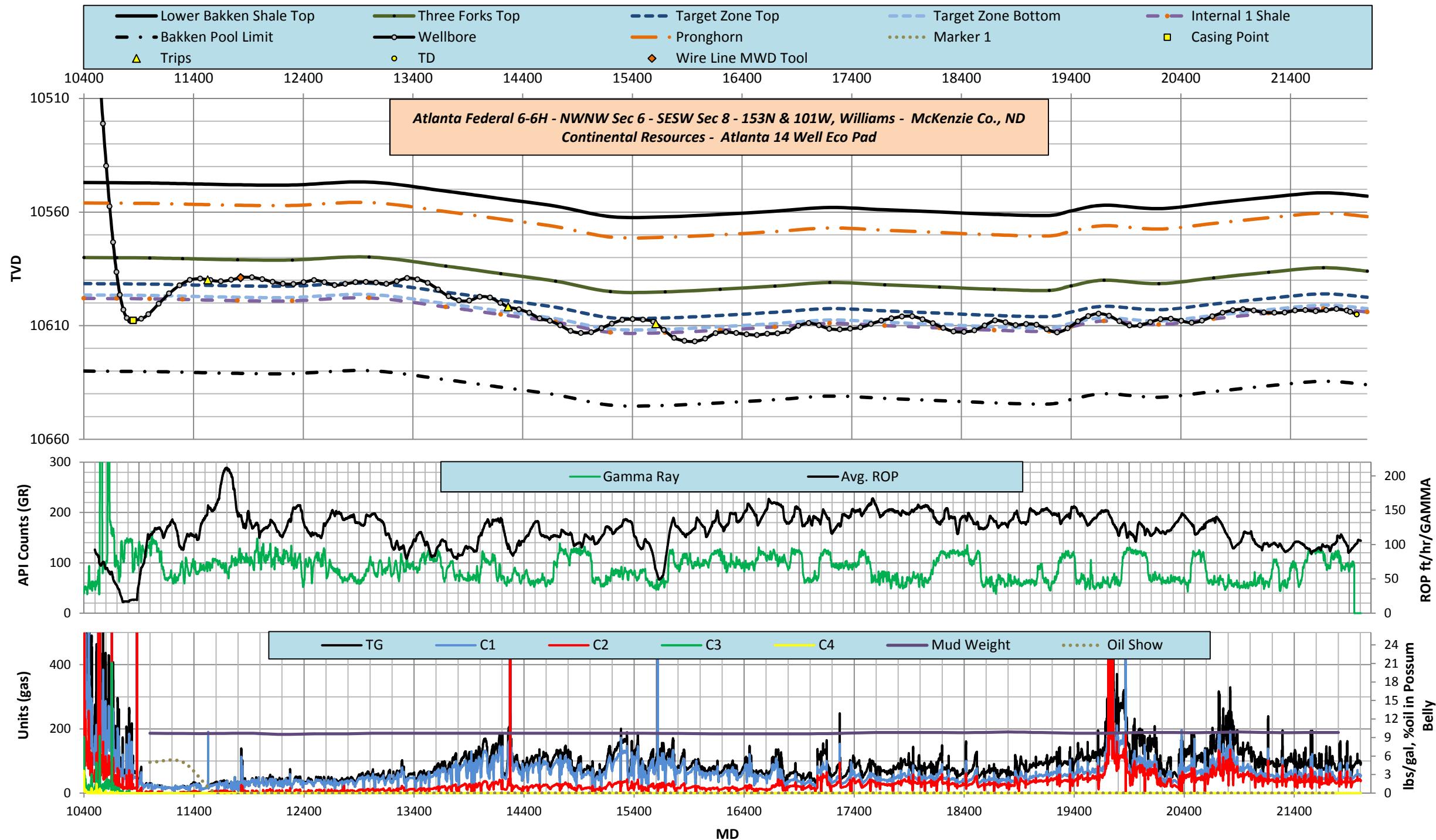
Liberty Resources, LLC Attn: Reports 1200 17 <sup>th</sup> Street, Suite 2050 Denver, CO 80202 Email: <a href="mailto:reports@libertyresourcesllc.com">reports@libertyresourcesllc.com</a> (Send Well Information daily, via email)	See Attached Requirements	No	Yes
MHM Resources, LP Attn: Julie Larson P.O. Box 51570 Midland, TX 79710 Phone: 432.685.6045 Fax: 432.685.9081 Email: <a href="mailto:drlreports@mhmresourceslp.com">drlreports@mhmresourceslp.com</a> , <a href="mailto:jlarson@mhmresourceslp.com">jlarson@mhmresourceslp.com</a> (Send Well Information daily, via email)	See Attached Requirements	No	Yes
Michael Harrison Moore, Trustee of the Michael Harrison Moore 2006 Trust Attn: Julie Larson P.O. Box 51570 Midland, TX 79710 Phone: 432.685.6045 Fax: 432.685.9081 Email: <a href="mailto:drlreports@mhmresourceslp.com">drlreports@mhmresourceslp.com</a> , <a href="mailto:jlarson@mhmresourceslp.com">jlarson@mhmresourceslp.com</a> (Send Well Information daily, via email)	See Attached Requirements	No	Yes
Statoil Oil & Gas LP 6300 Bridge Point Parkway Building 2, Suite 500 Austin, TX 78730 Phone: 512.427.3300 Fax: 512.427.3400 E-Mail: <a href="mailto:reports@bexp3d.com">reports@bexp3d.com</a> (Send Well Information daily, via email)	See Attached Requirements	No	Yes
The Steven H. Harris Family Limited Partnership P.O. Box 2323 Bismarck, ND 58502 Phone: 701.223.4866 Fax: 701.223.2556 E-Mail: <a href="mailto:w2harris@aol.com">w2harris@aol.com</a> (Send Well Information daily, via email)	Standard Well Information	No	Yes



## Well Information

William R. Weyman 1670 Ceylon Street Aurora, CO 80011 Phone: 303.344.4485 Email: <a href="mailto:bill@weyman.com">bill@weyman.com</a> (Send Well Information daily, via email)	Standard Well Information	No	Yes
XTO Energy, Inc. Attn: Randy Hosey 810 Houston Street Fort Worth, TX 76102 Phone: 817.885.2398 Fax: 817.885.2698 Email: <a href="mailto:randy_hosey@xtoenergy.com">randy_hosey@xtoenergy.com</a> , <a href="mailto:non-op_reports@xtoenergy.com">non-op_reports@xtoenergy.com</a> , <a href="mailto:rose_holman@xtoenergy.com">rose_holman@xtoenergy.com</a> (Send Well Information daily, via email)	See Attached Requirements	No	Yes



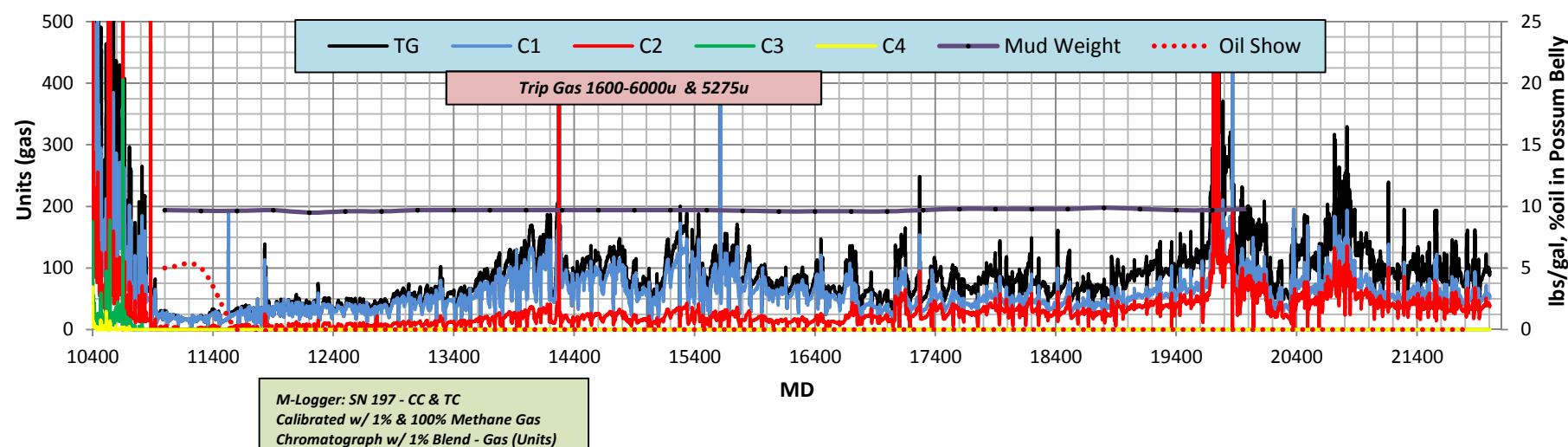
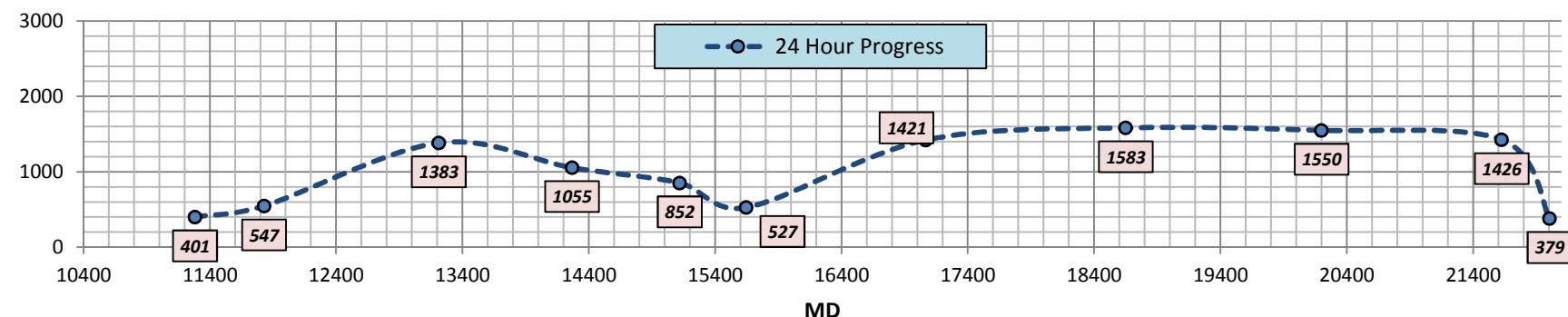
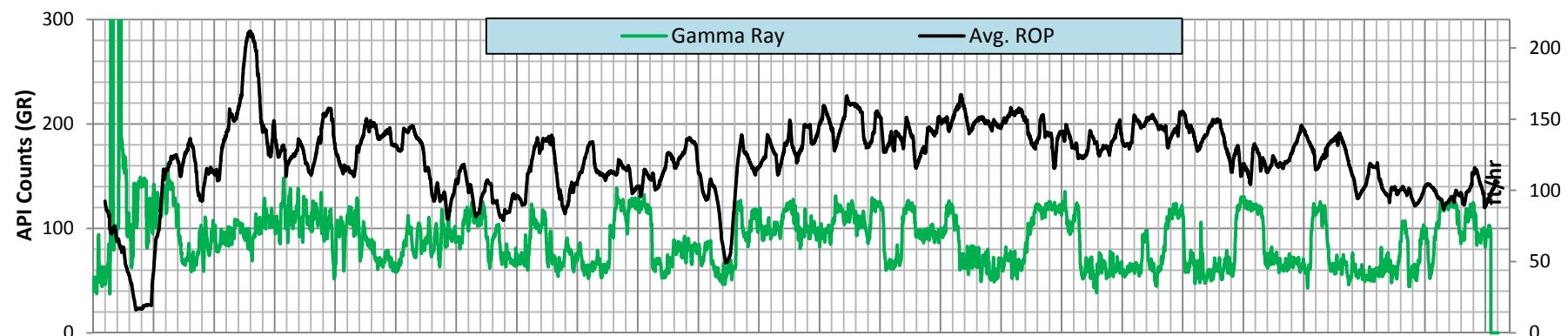


Drilling Activity													
Atlanta Federal 6-6H													
<u>Day</u>	<u>Date</u>	<u>Depth</u>	<u>Footage</u>	<u>WOB</u>	<u>RPM</u>	<u>Diff P</u>	<u>ROP</u>	<u>SPP</u>	<u>SPM</u>	<u>WT</u>	<u>VIS</u>	<u>ACTIVITY</u>	
3	6/18/2013	8809	1186	31.7	66	543.9	74.2	3518	104	10.5	57	Drilling Vertical Section: Drill, Slide, Survey, Rig Service, TIH w/ new vertical assembly, TOOH for BHA @ 8694' MD	
4	6/19/2013	9938	1129	32.4	66	457.3	81.2	3711	104	10.4	51	Drilling Vertical Section: Drill, Slide, Survey, Rig Service, Replaced Brakes on Top Drive	
5	6/20/2013	10268	330	14.7	0	137.7	20.3	3274	105	10.5	49	Drilling Build Section: Drill, Slide, Survey, Rig Service, TIH w/ Build Assembly, TOOH for Build Assembly, Reached KOP @ 10063' MD	
6	6/21/2013	10652	384	30.3	0	396.5	74.1	3196	99	10.5	51	Drilling Build Section: Drill, Slide, Survey, Rig Service, TOOH for Build Rates - Picking up Tri-Cone, TIH w/ Build Assembly, TOOH for Build Assembly	
7	6/22/2013	10833	181	3.6	28	70.8	10.6	3098	104	10.5	53	Drilling Build Section: Drill, Slide, Survey, Rig Service, TIH w/ new Build Assembly-Tri-Cone	
7	6/22/2013	10881	48	33.3	26	220.3	15.1	3342	105	10.6	50	TD Atlanta Federal Build Section @ 10881' MD, Wiper Trip, Drill, Slide, Survey, Rig Service , Casing Operations	
8	6/23/2013	Casing Operations											
9	6/24/2013	11282	401	11.6	71	788.7	71	2419	98	9.7	28	Drilling Lateral Section: Drill, Slide, Survey, Rig Service, Dilled out/ of 7" Casing, TIH w/ Lateral Assembly, Casing Operations	
10	6/25/2013	11829	547	11	72	805	215	2755	99	10.65	28	Drilling Lateral Section: Wire Line MWD Tool @ 11829' MD, Drill, Slide, Survey, Rig Service, TIH w/ new Lateral Assembly, TOOH for Mud Motor @ 11528' MD	
11	6/26/2013	13212	1383	17.3	57	684.9	167.6	2385	91	9.7	28	Drilling Lateral Section: Drill, Slide, Survey, Rig Service, Wire Line MWD Tool Successful	
12	6/27/2013	14267	1055	71.4	0	64.7	14.2	2065	101	9.7	28	Drilling Lateral Section: TOOH for BHA @ 14267' MD, Drill, Slide, Survey, Rig Service	
13	6/28/2013	15119	852	17.4	58	665	58	3035	89	9.7	28	Drilling Lateral Section: Drill, Slide, Survey, Rig Service, TIH w/ new Lateral Assembly	

14	6/29/2013	15646	527	11.3	57	308.1	85.4	2683	90	9.6	28	Drilling Lateral Section: Drill, Slide, Survey, Rig Service, TIH w/ new Lateral Assembly, TOOH for BHA @ 15614' MD
15	6/30/2013	17067	1421	15.8	58	746	170.6	3131	89	9.6	28	Drilling Lateral Section: Drill, Slide, Survey, Rig Service
16	7/1/2013	18650	1583	15.3	58	666.8	124.8	3246	89	9.8	27	Drilling Lateral Section: Drill, Slide, Survey, Rig Service
17	7/2/2013	20200	1550	16.1	61	605.8	123.3	3391	88	9.8	27	Drilling Lateral Section: Drill, Slide, Survey, Rig Service
18	7/3/2013	21626	1426	0	0	0	0	2925	90	9.8	27	Drilling Lateral Section: Drill, Slide, Survey, Rig Service
19	7/4/2013	22005	379	na	na	na	na	na	na	na	na	TD'D Atlanta Federal 6-6H @ 22005' MD; 10605' TVD

**Chronological Gas/Sample/Oil**  
**Atlanta Federal 6-6H**

<u>Date</u>	<u>Depth 0500hrs</u>	<u>Max Gas(u)</u>	<u>Avg Gas(u)</u>	<u>Conn Gas(u)</u>	<u>Trip Gas(u)</u>	<u>Oil Show</u>	<u>Sample Show</u>
6/18/2013	8809	51	17	18-24	28-51	na	no shows
6/19/2013	9938	125	51	54-125	na	na	no shows
6/20/2013	10268	3177	216	1068-3177	436-3177	na	no shows
6/21/2013	10652	7393	502	85-2302	697-2299	na	DULL INVERT FLOR, G IMMED STREAMING WHT POS IVERT CUT
6/22/2013	10833	4155	139	236-265	150-4155	na	DULL BRI YEL POS INV FLOR, G IMMED YEL BLU/WHT IFF/STRMNG POS INV C
6/22/2013	10881	215	71	na	250-1100	na	DULL BRI YEL POS INV FLOR, G IMMED YEL BLU/WHT IFF/STRMNG POS INV C
6/23/2013	<b>Casing Operations</b>						
6/24/2013	11282	3810	35	25	173-3810	5%	no shows, TR P DULL YEL POS INV FLOR, TR P IMMED YEL BLU/WHT DIFF/STRMNG POS INV C
6/25/2013	11829	190	23	20-23	150-190	0%	no shows, TR P DULL YEL POS INV FLOR, TR P IMMED YEL BLU/WHT DIFF/STRMNG POS INV C
6/26/2013	13212	139	23	36-75	110-139	0%	no shows
6/27/2013	14267	187	87	67-162	na	0%	no shows
6/28/2013	15119	6000	117	105-135	1600-6000	0%	no shows
6/29/2013	15646	5273	121	146-159	1379-5273	0%	no shows
6/30/2013	17067	186	78	55-186	na	0%	no shows
7/1/2013	18650	249	77	36-103	na	0%	no shows
7/2/2013	20200	4818	142	39-232	na	0%	no shows
7/3/2013	21626	330	115	60-204	na	0%	no shows
7/4/2013	22005	87	161	161-122	na	0%	no shows



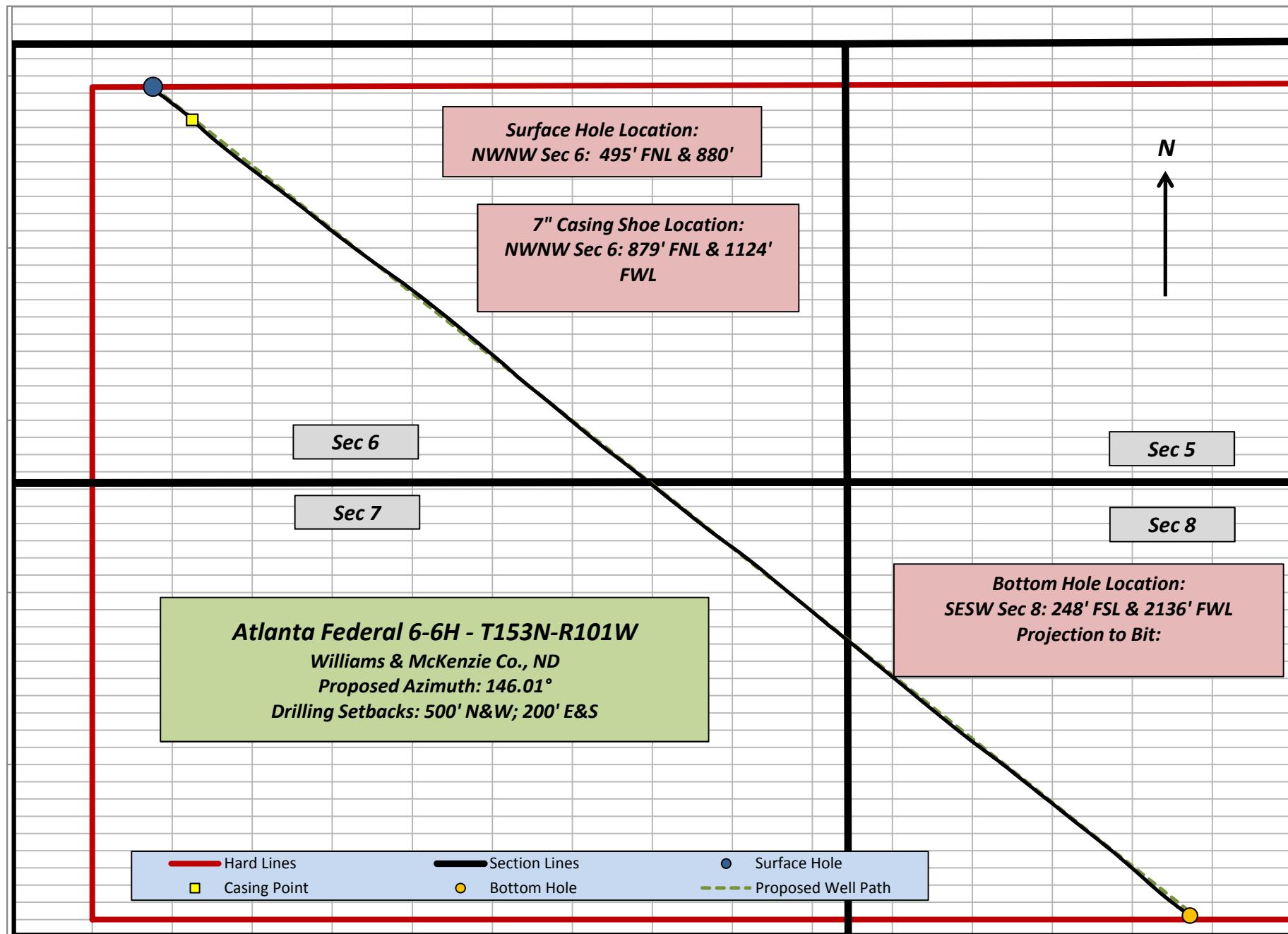
Formation Tops - Atlanta Federal 6-6H						
VERTICAL & BUILD SECTIONS						
FORMATION TOPS	Ground Elevation:		1945	Kelly Bushing:		1967
Formation	MD (ft)	TVD (ft)	VS (ft)	SS (ft)	Prognosed SS (ft)	Difference
Pierre Shale		1867			100	
Greenhorn		4549			-2582	
Dakota Grp. (fka Mowry)		4925			-2958	
Base of Dakota Sand		5624			-3657	
Dunham Salt Top		na			na	
Dunham Salt Base		na			na	
Pine Salt Top		7156			-5189	
Pine Salt Base		7183			-5216	
Minnekahta		7202			-5235	
Opeche Salt Top		na			na	
Opeche Salt Base		na			na	
Minnelusa Grp.		7431			-5464	
Tyler		7617			-5650	
Kibbey		8153			-6186	
Charles	8316	8315	5.82	-6348	-6333	15
BLS	9020	9019	5.74	-7052	-7044	8
Mission Canyon	9230	9229	5.96	-7262	-7267	-5
Lodgepole	9784	9783	6.77	-7816	-7820	-4
False Bakken	10534	10492	174.30	-8525		
Upper Bakken Shale	10546	10501	182.40	-8534	-8529	5
Middle Bakken	10568	10516	198.20	-8549	-8543	6
Lower Bakken Shale	10617	10547	236.10	-8580	-8574	6
Three Forks	10681	10580	291.10	-8613	-8602	11
Three Forks Target	10725	10595	332.08	-8628	-8617	11
Three Forks Internal 1 Shale	10736	10598	342.50	-8631		
		Projected Tops				
		<i>Tops picked by Drilling breaks (ROP &amp; Differential Data), Samples, and Gamma</i>				

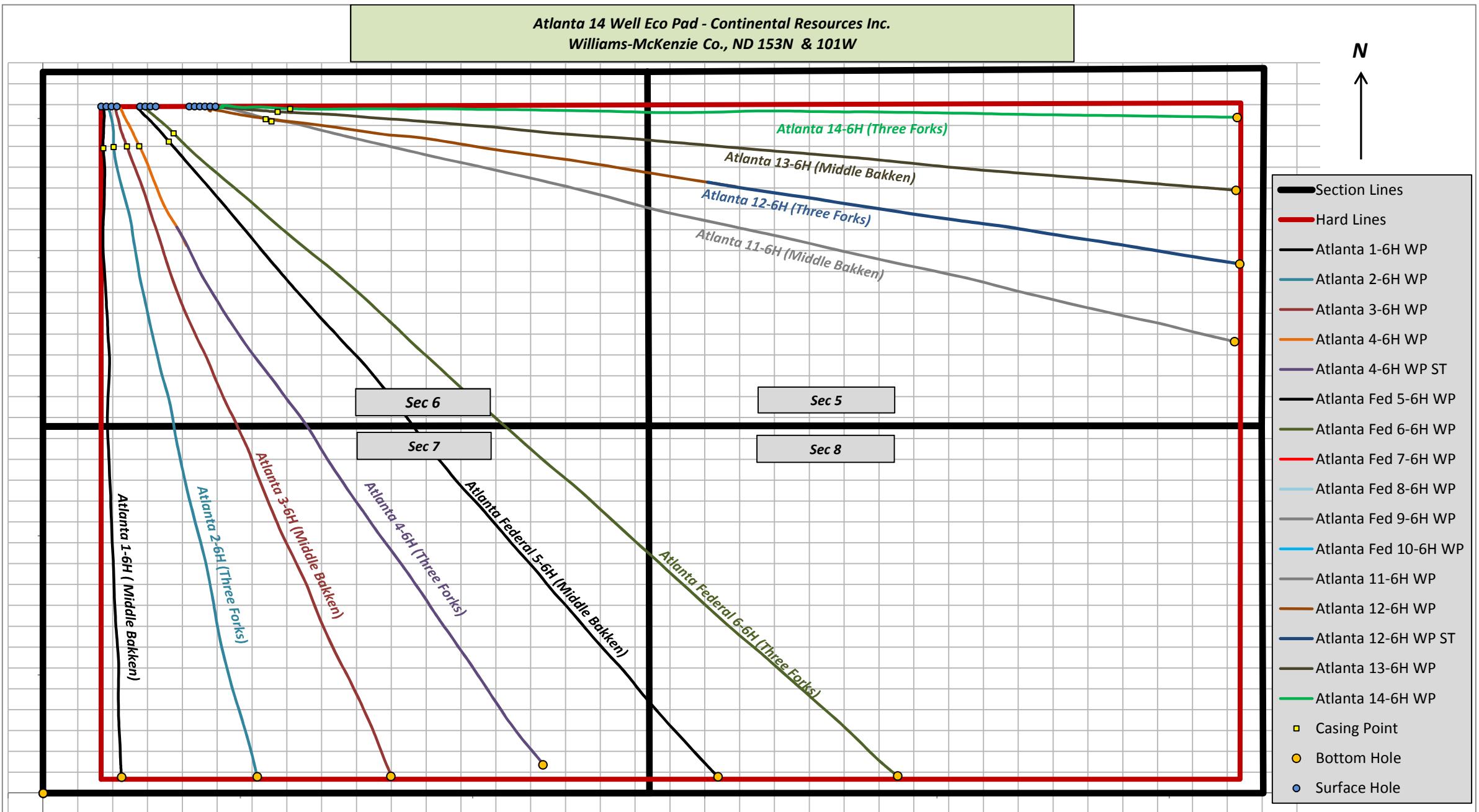
<b>Critical Points</b>	<b>MD</b>	<b>TVD</b>	<b>SUBSEA</b>	<b>V/S</b>
Three Forks Formation	<b>10681</b>	<b>10580</b>	<b>-8613</b>	<b>291.1</b>
Kick off Point (KOP)	<b>10063</b>	<b>10062</b>	<b>-8095</b>	<b>7.51</b>
Surface Hole location	<b>NWNW Sec 6: 495' FNL &amp; 880' FWL</b>			
Casing Point	<b>10849</b>	<b>10608</b>	<b>-8641</b>	<b>454.8</b>
Casing Location	<b>NWNW Sec 6: 879' FNL &amp; 1124' FWL</b>			
Total Depth (projection to Bit)	<b>22005</b>	<b>10605</b>	<b>-8638</b>	<b>11605.93</b>
Bottom Hole Location	<b>SESW Sec: 8 ' FSL &amp; ' FWL</b>			

<b>Lateral Trips</b>	<b>MD</b>	<b>TVD</b>	<b>Vertical &amp; Build Trips</b>	<b>MD</b>	<b>TVD</b>
TOOH for Mud Motor	<b>10528</b>	<b>10590</b>	TOOH for Bit (BHA)	<b>8694</b>	<b>8693</b>
Wire Line MWD Tool (Trip to 10017' MD)	<b>11829</b>	<b>10589</b>	TOOH for Build Assembly (KOP)	<b>10063</b>	<b>10062</b>
TOOH for BHA	<b>14267</b>	<b>10602</b>	TOOH for Build Rates	<b>10530</b>	<b>10489</b>
TOOH for BHA	<b>15614</b>	<b>10609</b>	TOOH for Build Rates - Picking up Tri-Cone	<b>10652</b>	<b>10566</b>

<b>LATERAL SUMMARY</b>		
Total Lateral Footage	<b>11156</b>	%
Three Forks	<b>7086</b>	63.5% <i>Target Zone</i>
Internal Shale	<b>4070</b>	36.5% <i>Out of Target Zone</i>
		<b>100.0%</b>

STRUCTURE (MD - TVD) - Atlanta Federal 6-6H										
MD (ft)	Lower Bakken Shale Top	Three Forks Top	Target Zone Top	Target Zone Bottom	Internal 1 Shale	Bakken Pool Limit	Pronghorn	Marker 1	Dip (angle)	Dip Rate (ft/100)
10400.0	10547.0	10580.0	10591.5	10596.5	10598.0	10630.0	10556.0			
10700.0	10547.1	10580.1	10591.6	10596.6	10598.1	10630.1	10556.1		89.98	0.03
11000.0	10547.2	10580.2	10591.7	10596.7	10598.2	10630.2	10556.2		89.98	0.03
11300.0	10547.5	10580.5	10592.0	10597.0	10598.5	10630.5	10556.5		89.94	0.10
11800.0	10548.0	10581.0	10592.5	10597.5	10599.0	10631.0	10557.0		89.94	0.10
12300.0	10548.1	10581.1	10592.6	10597.6	10599.1	10631.1	10557.1		89.99	0.02
13000.0	10546.8	10579.8	10591.3	10596.3	10597.8	10629.8	10555.8		90.11	-0.19
13700.0	10550.8	10583.8	10595.3	10600.3	10601.8	10633.8	10559.8		89.67	0.57
14200.0	10554.1	10587.1	10598.6	10603.6	10605.1	10637.1	10563.1		89.62	0.66
14700.0	10557.4	10590.4	10601.9	10606.9	10608.4	10640.4	10566.4		89.62	0.66
15200.0	10562.0	10595.0	10606.5	10611.5	10613.0	10645.0	10571.0		89.47	0.92
15700.0	10562.1	10595.1	10606.6	10611.6	10613.1	10645.1	10571.1		89.99	0.02
16200.0	10561.0	10594.0	10605.5	10610.5	10612.0	10644.0	10570.0		90.13	-0.22
16700.0	10559.6	10592.6	10604.1	10609.1	10610.6	10642.6	10568.6		90.16	-0.28
17200.0	10558.0	10591.0	10602.5	10607.5	10609.0	10641.0	10567.0		90.18	-0.32
17700.0	10559.0	10592.0	10603.5	10608.5	10610.0	10642.0	10568.0		89.89	0.20
18200.0	10560.0	10593.0	10604.5	10609.5	10611.0	10643.0	10569.0		89.89	0.20
18700.0	10561.0	10594.0	10605.5	10610.5	10612.0	10644.0	10570.0		89.89	0.20
19200.0	10561.5	10594.5	10606.0	10611.0	10612.5	10644.5	10570.5		89.94	0.10
19400.0	10559.5	10592.5	10604.0	10609.0	10610.5	10642.5	10568.5		90.57	-1.00
19700.0	10557.0	10590.0	10601.5	10606.5	10608.0	10640.0	10566.0		90.48	-0.83
20200.0	10558.5	10591.5	10603.0	10608.0	10609.5	10641.5	10567.5		89.83	0.30
20700.0	10556.0	10589.0	10600.5	10605.5	10607.0	10639.0	10565.0		90.29	-0.50
21200.0	10553.5	10586.5	10598.0	10603.0	10604.5	10636.5	10562.5		90.29	-0.50
21700.0	10551.5	10584.5	10596.0	10601.0	10602.5	10634.5	10560.5		90.23	-0.40
22100.0	10553.0	10586.0	10597.5	10602.5	10604.0	10636.0	10562.0		89.79	0.38





Ver 1.2	<b>SURVEY CALCULATION PROGRAM</b> 												ctrl-shift-I = Insert Survey			
													ctrl-shift-D = Delete Survey			
	Minimum Curviture												API Number:	33-105-02727		
OIL & GAS CO.:		Continental Resources						Target Information				VS Referenced to Offset from Surface				
WELL:		Atlanta Federal 6-6H						TARGET TVD:		10597.00		NORTH/SOUTH:		0.00		
COUNTY / STATE:		Williams	STATE:	ND				TARGET INCL:		89.97		EAST/WEST:		0.00		
RIG:		Cyclone 2						TARGET AZM:		146.00		(Enter 0' N and 0' E for Surface)				
JOB NUMBER:		DDMT-130415														
SURVEY COMPANY:			DIRECTIONAL COMPANY:			PROPOSED DIRECTION:				146.01		MAG-DEC. / TOTAL CORR.(+/-):		8.52		
MS Guidance			MS Directional									REFERENCED TO:		True North		
MWD SPECIALIST(S):			DIRECTIONAL DRILLER(S):			COMMENTS:										
Kevin Krenz			Kurt Wortley			Tie-in provided by Newsco. Final Survey is PBHL										
Brent Boyd			Justin Klauzer													
PTB:	MD	INC	AZM	TVD		N/S		E/W		VS						
33-105-02727												Target Calculations				
SVY	MD	INC	TRUE	TEMP	Course			Surface	CLOSURE		DLS/	BUR/	TVD AT 0'	RIGHT(+)	ABOVE (+)	
			AZM	°F	Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100	100'	V. SEC.	LEFT(-)	BELOW (-)
Tie In	1956	0.70	260.60			1955.98	0.24	-3.12	-1.94	3.13	274.40			1955.98	2.45	8641.02
1	2012	0.70	323.20	85.7	56	2011.98	0.46	-3.66	-2.43	3.69	277.13	1.30	0.00	2011.98	2.78	8585.02
2	2105	0.70	240.90	87.0	93	2104.97	0.64	-4.50	-3.04	4.54	278.05	0.99	0.00	2104.97	3.37	8492.03
3	2199	1.00	249.20	95.0	94	2198.96	0.07	-5.77	-3.28	5.77	270.66	0.34	0.32	2198.96	4.74	8398.04
4	2292	0.20	247.60	98.5	93	2291.96	-0.28	-6.68	-3.50	6.68	267.56	0.86	-0.86	2291.96	5.69	8305.04
5	2386	0.20	258.40	101.0	94	2385.95	-0.38	-6.99	-3.59	7.00	266.89	0.04	0.00	2385.96	6.01	8211.04
6	2479	0.60	204.70	102.3	93	2478.95	-0.85	-7.35	-3.40	7.40	263.37	0.55	0.43	2478.95	6.57	8118.05
7	2572	0.40	128.30	101.5	93	2571.95	-1.50	-7.30	-2.84	7.45	258.40	0.69	-0.22	2571.95	6.89	8025.05
8	2666	0.50	197.00	101.9	94	2665.95	-2.09	-7.16	-2.27	7.46	253.71	0.55	0.11	2665.95	7.11	7931.05
9	2758	0.40	1.10	105.0	92	2757.95	-2.16	-7.27	-2.28	7.59	253.49	0.97	-0.11	2757.95	7.24	7839.05
10	2850	0.50	10.60	110.9	92	2849.94	-1.44	-7.19	-2.83	7.34	258.67	0.14	0.11	2849.95	6.77	7747.05
11	2944	0.40	7.90	111.8	94	2943.94	-0.71	-7.07	-3.36	7.11	264.25	0.11	-0.11	2943.94	6.26	7653.06
12	3036	0.50	1.80	112.5	92	3035.94	0.01	-7.02	-3.93	7.02	270.05	0.12	0.11	3035.94	5.81	7561.06
13	3129	0.50	358.30	112.5	93	3128.93	0.82	-7.02	-4.60	7.06	276.65	0.03	0.00	3128.94	5.36	7468.06
14	3221	0.50	342.50	116.3	92	3220.93	1.60	-7.15	-5.32	7.33	282.63	0.15	0.00	3220.93	5.03	7376.07
15	3315	0.30	357.50	119.0	94	3314.93	2.24	-7.28	-5.93	7.62	287.09	0.24	-0.21	3314.93	4.79	7282.07
16	3407	0.30	10.70	119.0	92	3406.93	2.72	-7.25	-6.30	7.74	290.54	0.07	0.00	3406.93	4.49	7190.07
17	3501	0.20	11.60	119.5	94	3500.93	3.12	-7.17	-6.59	7.82	293.51	0.11	-0.11	3500.93	4.20	7096.07
18	3595	0.30	348.70	120.0	94	3594.93	3.52	-7.18	-6.94	8.00	296.11	0.15	0.11	3594.93	3.99	7002.07
19	3688	0.00	32.70	123.4	93	3687.93	3.76	-7.23	-7.16	8.15	297.47	0.32	-0.32	3687.93	3.89	6909.07

			33-105-02727												Target Calculations		
			TRUE	TEMP	Course				Surface	CLOSURE		DLS/	BUR/	TVD AT 0'	RIGHT(+)	ABOVE (+)	
SVY	MD	INC	AZM	°F	Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100	100'	V. SEC.	LEFT(-)	BELLOW (-)	
20	3782	0.20	72.30	127.0	94	3781.92	3.81	-7.08	-7.11	8.04	298.30	0.21	0.21	3781.93	3.74	6815.07	
21	3874	0.10	76.30	127.9	92	3873.92	3.88	-6.85	-7.04	7.87	299.53	0.11	-0.11	3873.93	3.51	6723.07	
22	3968	0.10	157.50	128.8	94	3967.92	3.82	-6.73	-6.93	7.74	299.57	0.14	0.00	3967.93	3.45	6629.07	
23	4061	0.00	231.00	130.6	93	4060.92	3.75	-6.70	-6.85	7.68	299.20	0.11	-0.11	4060.93	3.46	6536.07	
24	4155	0.30	161.40	131.5	94	4154.92	3.51	-6.62	-6.62	7.50	297.94	0.32	0.32	4154.93	3.53	6442.07	
25	4248	0.20	112.70	130.6	93	4247.92	3.22	-6.40	-6.25	7.16	296.71	0.24	-0.11	4247.93	3.50	6349.07	
26	4341	0.10	107.00	130.6	93	4340.92	3.13	-6.17	-6.05	6.92	296.92	0.11	-0.11	4340.93	3.36	6256.07	
27	4435	0.20	102.60	131.5	94	4434.92	3.07	-5.93	-5.86	6.68	297.39	0.11	0.11	4434.93	3.20	6162.07	
28	4529	0.20	55.50	132.4	94	4528.92	3.13	-5.64	-5.75	6.45	299.05	0.17	0.00	4528.93	2.92	6068.07	
29	4623	0.20	88.30	190.8	94	4622.92	3.23	-5.34	-5.66	6.24	301.17	0.12	0.00	4622.92	2.62	5974.08	
30	4716	0.50	102.20	134.2	93	4715.92	3.15	-4.78	-5.28	5.72	303.37	0.33	0.32	4715.92	2.20	5881.08	
31	4810	1.30	102.80	135.1	94	4809.91	2.82	-3.34	-4.21	4.37	310.24	0.85	0.85	4809.91	1.19	5787.09	
32	4903	0.10	90.10	135.1	93	4902.90	2.59	-2.23	-3.39	3.42	319.31	1.29	-1.29	4902.90	0.40	5694.10	
33	4996	0.40	52.80	136.9	93	4995.90	2.79	-1.89	-3.37	3.37	325.89	0.35	0.32	4995.90	0.01	5601.10	
34	5090	0.60	105.30	138.7	94	5089.89	2.86	-1.15	-3.01	3.08	338.04	0.51	0.21	5089.90	-0.64	5507.10	
35	5184	1.40	138.10	139.6	94	5183.88	1.87	0.09	-1.50	1.87	2.77	1.01	0.85	5183.88	-1.12	5413.12	
36	5277	0.40	136.80	134.2	93	5276.87	0.79	1.07	-0.05	1.33	53.66	1.08	-1.08	5276.87	-1.33	5320.13	
37	5371	0.50	132.90	137.8	94	5370.86	0.27	1.60	0.67	1.62	80.41	0.11	0.11	5370.86	-1.47	5226.14	
38	5464	0.60	156.70	139.6	93	5463.86	-0.45	2.09	1.54	2.14	102.27	0.27	0.11	5463.86	-1.48	5133.14	
39	5558	0.50	145.80	140.5	94	5557.86	-1.24	2.51	2.44	2.80	116.37	0.15	-0.11	5557.85	-1.39	5039.15	
40	5651	0.80	139.30	142.3	93	5650.85	-2.07	3.16	3.49	3.78	123.24	0.33	0.32	5650.85	-1.46	4946.15	
41	5744	0.20	325.60	144.1	93	5743.85	-2.43	3.49	3.97	4.26	124.82	1.07	-0.65	5743.85	-1.54	4853.15	
42	5837	0.40	170.60	145.9	93	5836.85	-2.62	3.46	4.10	4.34	127.14	0.63	0.22	5836.84	-1.40	4760.16	
43	5929	1.00	180.20	147.7	92	5928.84	-3.74	3.51	5.06	5.12	136.83	0.66	0.65	5928.84	-0.82	4668.16	
44	6023	1.40	161.30	149.5	94	6022.82	-5.65	3.87	6.84	6.84	145.56	0.59	0.43	6022.82	-0.05	4574.18	
45	6116	0.90	196.10	150.4	93	6115.80	-7.42	4.03	8.41	8.45	151.49	0.90	-0.54	6115.80	0.81	4481.20	
46	6209	1.80	190.50	150.4	93	6208.77	-9.56	3.56	9.92	10.20	159.56	0.98	0.97	6208.77	2.39	4388.23	
47	6303	1.00	167.00	152.2	94	6302.75	-11.81	3.48	11.74	12.31	163.59	1.03	-0.85	6302.74	3.72	4294.26	
48	6397	1.00	195.20	154.0	94	6396.73	-13.40	3.45	13.04	13.84	165.57	0.52	0.00	6396.73	4.64	4200.27	
49	6490	1.30	165.30	155.8	93	6489.71	-15.21	3.50	14.57	15.60	167.02	0.71	0.32	6489.71	5.60	4107.29	
50	6584	1.20	162.20	157.6	94	6583.69	-17.17	4.08	16.52	17.65	166.65	0.13	-0.11	6583.68	6.23	4013.32	
51	6677	0.30	199.80	159.4	93	6676.68	-18.33	4.29	17.60	18.83	166.83	1.05	-0.97	6676.67	6.69	3920.33	
52	6770	1.00	165.50	162.1	93	6769.68	-19.35	4.41	18.51	19.84	167.16	0.83	0.75	6769.67	7.16	3827.33	
53	6864	0.40	227.10	158.5	94	6863.67	-20.36	4.38	19.33	20.83	167.87	0.94	-0.64	6863.66	7.76	3733.34	
54	6957	0.50	260.90	161.2	93	6956.67	-20.65	3.74	19.21	20.98	169.74	0.30	0.11	6956.66	8.45	3640.34	
55	7050	0.40	265.30	163.9	93	7049.67	-20.74	3.01	18.88	20.96	171.73	0.11	-0.11	7049.66	9.10	3547.34	

						33-105-02727								Target Calculations		
			TRUE	TEMP	Course			Surface	CLOSURE		DLS/	BUR/	TVD AT 0'	RIGHT(+)	ABOVE (+)	
SVY	MD	INC	AZM	°F	Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100	100'	V. SEC.	LEFT(-)	BELLOW (-)
56	7144	0.70	263.60	165.7	94	7143.66	-20.83	2.12	18.45	20.94	174.20	0.32	0.32	7143.65	9.89	3453.35
57	7238	0.80	248.60	167.5	94	7237.65	-21.13	0.93	18.04	21.15	177.47	0.23	0.11	7237.64	11.04	3359.36
58	7331	1.00	262.80	169.3	93	7330.64	-21.47	-0.48	17.54	21.48	181.27	0.32	0.22	7330.63	12.40	3266.37
59	7425	0.70	267.40	171.1	94	7424.63	-21.60	-1.86	16.87	21.68	184.93	0.33	-0.32	7424.62	13.62	3172.38
60	7519	1.00	280.60	165.7	94	7518.62	-21.48	-3.24	15.99	21.72	188.59	0.38	0.32	7518.61	14.70	3078.39
61	7611	0.70	293.10	168.4	92	7610.61	-21.11	-4.55	14.96	21.59	192.16	0.38	-0.33	7610.60	15.57	2986.40
62	7705	0.80	321.10	171.9	94	7704.60	-20.37	-5.49	13.82	21.10	195.08	0.40	0.11	7704.60	15.94	2892.40
63	7798	0.80	327.60	172.8	93	7797.59	-19.32	-6.24	12.53	20.30	197.91	0.10	0.00	7797.59	15.98	2799.41
64	7892	1.00	359.60	174.6	94	7891.58	-17.94	-6.60	11.19	19.12	200.20	0.57	0.21	7891.58	15.51	2705.42
65	7986	1.00	350.40	178.2	94	7985.57	-16.32	-6.74	9.76	17.65	202.46	0.17	0.00	7985.56	14.71	2611.44
66	8079	0.90	343.50	178.2	93	8078.56	-14.81	-7.09	8.32	16.42	205.57	0.16	-0.11	8078.55	14.16	2518.45
67	8172	0.70	349.40	180.0	93	8171.55	-13.56	-7.40	7.10	15.44	208.63	0.23	-0.22	8171.54	13.71	2425.46
68	8264	0.50	330.10	181.8	92	8263.54	-12.66	-7.70	6.19	14.82	211.33	0.31	-0.22	8263.54	13.46	2333.46
69	8358	0.30	336.70	182.4	94	8357.54	-12.07	-8.00	5.54	14.49	213.54	0.22	-0.21	8357.54	13.39	2239.46
70	8452	0.10	188.20	184.5	94	8451.54	-11.93	-8.11	5.36	14.43	214.22	0.41	-0.21	8451.54	13.40	2145.46
71	8545	0.20	210.80	182.7	93	8544.54	-12.15	-8.21	5.48	14.66	214.04	0.12	0.11	8544.54	13.60	2052.46
72	8636	0.20	261.00	186.3	91	8635.54	-12.31	-8.45	5.49	14.93	214.45	0.19	0.00	8635.54	13.89	1961.46
73	8730	0.10	240.50	178.2	94	8729.54	-12.38	-8.68	5.41	15.12	215.04	0.12	-0.11	8729.53	14.12	1867.47
74	8823	0.20	219.40	180.0	93	8822.54	-12.54	-8.85	5.45	15.35	215.22	0.12	0.11	8822.53	14.35	1774.47
75	8917	0.10	155.90	182.7	94	8916.54	-12.74	-8.92	5.58	15.56	215.00	0.19	-0.11	8916.53	14.52	1680.47
76	9005	0.10	161.40	184.5	88	9004.54	-12.89	-8.87	5.73	15.64	214.54	0.01	0.00	9004.53	14.56	1592.47
77	9103	0.10	79.10	188.1	98	9102.54	-12.95	-8.76	5.84	15.63	214.06	0.13	0.00	9102.53	14.50	1494.47
78	9197	0.10	94.60	188.1	94	9196.54	-12.94	-8.59	5.93	15.54	213.59	0.03	0.00	9196.53	14.36	1400.47
79	9291	0.10	108.40	189.7	94	9290.54	-12.97	-8.43	6.04	15.48	213.03	0.03	0.00	9290.53	14.25	1306.47
80	9384	0.10	202.40	194.4	93	9383.54	-13.08	-8.39	6.15	15.54	212.68	0.16	0.00	9383.53	14.27	1213.47
81	9478	0.10	140.00	195.3	94	9477.54	-13.21	-8.37	6.28	15.64	212.34	0.11	0.00	9477.53	14.33	1119.47
82	9572	0.10	266.90	196.2	94	9571.54	-13.28	-8.40	6.32	15.71	212.30	0.19	0.00	9571.53	14.39	1025.47
83	9665	0.10	167.30	190.8	93	9664.54	-13.36	-8.46	6.35	15.82	212.33	0.16	0.00	9664.53	14.49	932.47
84	9759	0.30	160.50	187.2	94	9758.54	-13.68	-8.36	6.67	16.03	211.43	0.21	0.21	9758.53	14.58	838.47
85	9853	0.30	193.30	198.0	94	9852.53	-14.15	-8.33	7.07	16.42	210.50	0.18	0.00	9852.53	14.82	744.47
86	9946	0.10	166.20	201.6	93	9945.53	-14.46	-8.37	7.31	16.71	210.06	0.23	-0.22	9945.53	15.03	651.47
87	10010	0.10	134.30	185.4	64	10009.53	-14.56	-8.32	7.42	16.77	209.74	0.09	0.00	10009.53	15.04	587.47
88	10070	0.10	135.40	190.8	60	10069.53	-14.63	-8.24	7.52	16.79	209.40	0.00	0.00	10069.53	15.02	527.47
89	10101	2.00	136.90	190.8	31	10100.53	-15.05	-7.85	8.08	16.97	207.57	6.13	6.13	10100.52	14.93	496.48
90	10132	6.00	140.60	190.8	31	10131.45	-16.69	-6.46	10.23	17.90	201.14	12.92	12.90	10131.44	14.69	465.56

						33-105-02727								Target Calculations		
			TRUE	TEMP	Course			Surface	CLOSURE		DLS/	BUR/	TVD AT 0'	RIGHT(+)	ABOVE (+)	
SVY	MD	INC	AZM	°F	Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100	100'	V. SEC.	LEFT(-)	BELLOW (-)
91	10163	10.50	142.50	193.5	31	10162.12	-20.19	-3.71	14.67	20.53	190.40	14.54	14.52	10162.11	14.36	434.89
92	10194	14.40	143.70	193.5	31	10192.38	-25.54	0.30	21.34	25.54	179.33	12.61	12.58	10192.37	14.03	404.63
93	10227	17.40	149.80	196.2	33	10224.12	-33.11	5.21	30.37	33.52	171.06	10.39	9.09	10224.10	14.20	372.90
94	10258	18.90	149.60	196.2	31	10253.57	-41.45	10.08	40.00	42.66	166.33	4.84	4.84	10253.55	14.82	343.45
95	10290	20.40	148.00	196.2	32	10283.71	-50.65	15.66	50.75	53.01	162.82	4.98	4.69	10283.68	15.34	313.32
96	10321	23.00	144.50	197.1	31	10312.51	-60.16	22.04	62.21	64.07	159.88	9.37	8.39	10312.48	15.37	284.52
97	10352	24.20	143.30	197.1	31	10340.92	-70.19	29.36	74.61	76.08	157.30	4.17	3.87	10340.88	14.91	256.12
98	10383	26.80	142.70	197.1	31	10368.90	-80.84	37.39	87.93	89.07	155.18	8.43	8.39	10368.85	14.21	228.15
99	10415	30.80	141.60	197.1	32	10396.93	-93.01	46.85	103.31	104.14	153.26	12.61	12.50	10396.88	13.17	200.12
100	10446	34.20	142.30	197.1	31	10423.07	-106.13	57.11	119.92	120.52	151.71	11.03	10.97	10423.01	11.99	173.99
101	10477	36.50	144.00	198.0	31	10448.36	-120.48	67.86	137.83	138.28	150.61	8.07	7.42	10448.29	11.11	148.71
102	10513	40.30	144.90	187.2	36	10476.57	-138.67	80.86	160.18	160.52	149.76	10.67	10.56	10476.48	10.51	120.52
103	10544	44.00	145.90	188.1	31	10499.55	-155.80	92.66	180.98	181.27	149.26	12.13	11.94	10499.45	10.30	97.55
104	10575	47.60	145.20	188.1	31	10521.15	-174.12	105.23	203.20	203.45	148.85	11.73	11.61	10521.05	10.12	75.95
105	10604	52.70	144.00	189.0	29	10539.73	-192.26	118.13	225.45	225.65	148.43	17.87	17.59	10539.61	9.57	57.39
106	10635	57.20	143.90	189.0	31	10557.53	-212.77	133.07	250.80	250.95	147.98	14.52	14.52	10557.40	8.66	39.60
107	10666	61.70	144.30	190.8	31	10573.28	-234.39	148.71	277.48	277.59	147.61	14.56	14.52	10573.14	7.78	23.86
108	10697	68.10	145.30	195.3	31	10586.43	-257.32	164.88	305.53	305.61	147.35	20.85	20.65	10586.27	7.20	10.73
109	10729	75.10	146.60	197.1	32	10596.52	-282.47	181.87	335.87	335.95	147.22	22.21	21.88	10596.35	7.18	0.65
110	10760	80.70	148.00	200.7	31	10603.02	-307.96	198.23	366.16	366.25	147.23	18.60	18.06	10602.83	7.87	-5.83
111	10791	85.80	148.40	200.7	31	10606.66	-334.12	214.45	396.92	397.02	147.31	16.50	16.45	10606.45	9.05	-9.45
112	10822	89.60	149.60	202.5	31	10607.90	-360.67	230.40	427.84	427.98	147.43	12.85	12.26	10607.68	10.67	-10.68
113	10831	90.10	149.80	202.5	9	10607.93	-368.44	234.94	436.83	436.97	147.48	5.98	5.56	10607.70	11.25	-10.70
114	10924	91.10	149.80	248.3	93	10606.95	-448.81	281.72	529.62	529.90	147.88	1.08	1.08	10606.68	17.42	-9.68
115	10988	92.40	149.50	251.0	64	10605.00	-504.01	314.04	593.46	593.84	148.07	2.08	2.03	10604.69	21.49	-7.69
116	11083	93.20	148.00	251.9	95	10600.36	-585.13	363.26	688.23	688.72	148.17	1.79	0.84	10600.00	26.04	-3.00
117	11177	92.30	146.70	251.9	94	10595.85	-664.18	413.91	782.09	782.60	148.07	1.68	-0.96	10595.44	28.25	1.56
118	11272	92.00	146.20	254.6	95	10592.28	-743.30	466.38	877.02	877.50	147.89	0.61	-0.32	10591.82	29.00	5.18
119	11366	90.90	145.00	255.5	94	10589.91	-820.83	519.47	970.99	971.40	147.67	1.73	-1.17	10589.40	28.34	7.60
120	11460	89.80	144.70	256.4	94	10589.33	-897.69	573.58	1064.96	1065.29	147.42	1.21	-1.17	10588.77	26.46	8.23
121	11555	89.40	144.70	260.9	95	10589.99	-975.22	628.48	1159.94	1160.19	147.20	0.42	-0.42	10589.39	24.30	7.61
122	11649	90.00	144.60	260.9	94	10590.49	-1051.89	682.86	1253.91	1254.10	147.01	0.65	0.64	10589.83	22.09	7.17
123	11743	90.80	143.20	234.8	94	10589.83	-1127.83	738.25	1347.84	1347.97	146.79	1.72	0.85	10589.12	18.64	7.88
124	11838	90.40	144.80	229.4	95	10588.84	-1204.68	794.08	1442.77	1442.85	146.61	1.74	-0.42	10588.08	15.33	8.92
125	11932	89.70	144.40	225.8	94	10588.75	-1281.30	848.53	1536.74	1536.80	146.49	0.86	-0.74	10587.95	13.03	9.05

							33-105-02727							Target Calculations		
			TRUE	TEMP	Course			Surface	CLOSURE		DLS/	BUR/	TVD AT 0'	RIGHT(+)	ABOVE (+)	
SVY	MD	INC	AZM	°F	Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100	100'	V. SEC.	LEFT(-)	BELLOW (-)
126	12026	89.30	145.40	226.7	94	10589.57	-1358.20	902.58	1630.72	1630.76	146.39	1.15	-0.43	10588.72	11.23	8.28
127	12121	89.30	145.80	227.6	95	10590.73	-1436.58	956.25	1725.71	1725.74	146.35	0.42	0.00	10589.83	10.56	7.17
128	12215	89.70	146.00	221.4	94	10591.55	-1514.42	1008.95	1819.71	1819.74	146.33	0.48	0.43	10590.60	10.40	6.40
129	12310	90.10	145.70	226.1	95	10591.72	-1593.04	1062.27	1914.71	1914.73	146.30	0.53	0.42	10590.72	10.15	6.28
130	12404	90.90	145.70	230.3	94	10590.90	-1670.69	1115.24	2008.70	2008.72	146.28	0.85	0.85	10589.85	9.66	7.15
131	12499	90.20	144.90	231.2	95	10589.99	-1748.79	1169.32	2103.69	2103.70	146.23	1.12	-0.74	10588.89	8.50	8.11
132	12593	88.70	143.90	232.1	94	10590.89	-1825.21	1224.04	2197.64	2197.65	146.15	1.92	-1.60	10589.74	5.87	7.26
133	12687	89.70	144.20	233.0	94	10592.20	-1901.30	1279.22	2291.58	2291.58	146.07	1.11	1.06	10591.00	2.68	6.00
134	12782	91.00	144.40	235.7	95	10591.62	-1978.44	1334.65	2386.53	2386.53	146.00	1.38	1.37	10590.37	-0.14	6.63
135	12876	89.90	143.10	235.7	94	10590.88	-2054.24	1390.23	2480.45	2480.45	145.91	1.81	-1.17	10589.59	-3.83	7.41
136	12970	90.20	142.90	237.5	94	10590.80	-2129.32	1446.80	2574.32	2574.34	145.81	0.38	0.32	10589.45	-8.75	7.55
137	13064	89.50	142.20	238.4	94	10591.05	-2203.94	1503.96	2668.15	2668.19	145.69	1.05	-0.74	10589.65	-14.41	7.35
138	13158	89.80	143.80	234.8	94	10591.62	-2279.01	1560.52	2762.01	2762.08	145.60	1.73	0.32	10590.18	-19.33	6.82
139	13253	91.60	145.00	238.4	95	10590.46	-2356.24	1615.82	2856.96	2857.05	145.56	2.28	1.89	10588.97	-21.98	8.03
140	13347	90.10	144.90	237.5	94	10589.07	-2433.18	1669.80	2950.93	2951.03	145.54	1.60	-1.60	10587.52	-23.70	9.48
141	13442	89.20	145.30	237.5	95	10589.65	-2511.10	1724.15	3045.92	3046.03	145.53	1.04	-0.95	10588.05	-25.20	8.95
142	13536	88.90	146.00	238.4	94	10591.21	-2588.69	1777.18	3139.90	3140.01	145.53	0.81	-0.32	10589.56	-25.77	7.44
143	13630	87.60	146.00	239.3	94	10594.08	-2666.58	1829.72	3233.86	3233.97	145.54	1.38	-1.38	10592.38	-25.77	4.62
144	13725	88.80	146.60	239.3	95	10597.06	-2745.58	1882.40	3328.81	3328.91	145.57	1.41	1.26	10595.32	-25.27	1.68
145	13820	89.00	146.90	240.2	95	10598.88	-2825.01	1934.48	3423.78	3423.87	145.60	0.38	0.21	10597.09	-24.03	-0.09
146	13914	90.90	147.50	240.2	94	10598.97	-2904.02	1985.40	3517.76	3517.83	145.64	2.12	2.02	10597.12	-22.06	-0.12
147	14009	91.10	147.40	241.1	95	10597.31	-2984.09	2036.50	3612.71	3612.77	145.69	0.24	0.21	10595.42	-19.66	1.58
148	14103	88.50	146.70	242.0	94	10597.64	-3062.96	2087.62	3706.69	3706.73	145.72	2.86	-2.77	10595.70	-17.93	1.30
149	14197	88.60	146.60	241.1	94	10600.02	-3141.45	2139.28	3800.65	3800.69	145.75	0.15	0.11	10598.03	-16.87	-1.03
150	14271	88.60	148.60	246.5	74	10601.82	-3203.91	2178.92	3874.60	3874.63	145.78	2.70	0.00	10599.79	-14.80	-2.79
151	14366	90.20	149.10	246.5	95	10602.82	-3285.21	2228.06	3969.47	3969.49	145.85	1.76	1.68	10600.74	-10.08	-3.74
152	14460	87.90	148.10	248.3	94	10604.38	-3365.42	2277.02	4063.36	4063.36	145.92	2.67	-2.45	10602.25	-5.82	-5.25
153	14554	89.10	146.80	247.4	94	10606.84	-3444.63	2327.58	4157.29	4157.29	145.95	1.88	1.28	10604.66	-3.44	-7.66
154	14649	89.60	146.00	247.4	95	10607.92	-3523.75	2380.15	4252.28	4252.28	145.96	0.99	0.53	10605.69	-2.78	-8.69
155	14743	88.00	146.20	248.3	94	10609.88	-3601.75	2432.56	4346.26	4346.26	145.97	1.72	-1.70	10607.61	-2.61	-10.61
156	14837	89.00	146.50	245.6	94	10612.34	-3679.97	2484.63	4440.22	4440.22	145.97	1.11	1.06	10610.02	-2.04	-13.02
157	14931	89.90	147.60	247.4	94	10613.25	-3758.85	2535.75	4534.20	4534.20	146.00	1.51	0.96	10610.87	-0.32	-13.87
158	15025	90.50	147.20	246.5	94	10612.92	-3838.04	2586.40	4628.17	4628.17	146.02	0.77	0.64	10610.50	1.98	-13.50
159	15120	91.70	146.90	249.2	95	10611.09	-3917.74	2638.06	4723.14	4723.14	146.05	1.30	1.26	10608.62	3.72	-11.62
160	15214	90.70	146.70	250.1	94	10609.13	-3996.38	2689.52	4817.11	4817.11	146.06	1.08	-1.06	10606.60	5.03	-9.60

							33-105-02727							Target Calculations		
			TRUE	TEMP	Course			Surface	CLOSURE		DLS/	BUR/	TVD AT 0'	RIGHT(+)	ABOVE (+)	
SVY	MD	INC	AZM	°F	Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100	100'	V. SEC.	LEFT(-)	BELLOW (-)
161	15309	91.30	147.10	251.9	95	10607.47	-4075.95	2741.39	4912.08	4912.08	146.08	0.76	0.63	10604.90	6.53	-7.90
162	15403	89.10	145.60	250.1	94	10607.14	-4154.19	2793.47	5006.07	5006.07	146.08	2.83	-2.34	10604.52	7.10	-7.52
163	15497	90.60	145.20	250.1	94	10607.39	-4231.56	2846.85	5100.06	5100.06	146.07	1.65	1.60	10604.72	6.12	-7.72
164	15592	88.30	144.90	249.2	95	10608.30	-4309.42	2901.26	5195.04	5195.04	146.05	2.44	-2.42	10605.58	4.54	-8.58
165	15687	87.30	144.90	251.0	95	10611.94	-4387.08	2955.85	5289.95	5289.95	146.03	1.05	-1.05	10609.17	2.72	-12.17
166	15781	88.50	145.60	248.3	94	10615.39	-4464.27	3009.39	5383.87	5383.87	146.02	1.48	1.28	10612.57	1.49	-15.57
167	15876	89.90	146.00	248.3	95	10616.72	-4542.83	3062.78	5478.86	5478.86	146.01	1.53	1.47	10613.85	1.16	-16.85
168	15970	89.80	145.50	250.1	94	10616.96	-4620.53	3115.68	5572.86	5572.86	146.01	0.54	-0.11	10614.04	0.75	-17.04
169	16064	91.70	146.70	249.1	94	10615.73	-4698.54	3168.10	5666.84	5666.84	146.01	2.39	2.02	10612.76	0.91	-15.76
170	16159	91.20	146.00	249.2	95	10613.33	-4777.59	3220.73	5761.81	5761.81	146.01	0.91	-0.53	10610.31	1.49	-13.31
171	16253	89.40	145.90	251.0	94	10612.84	-4855.47	3273.36	5855.81	5855.81	146.01	1.92	-1.91	10609.77	1.41	-12.77
172	16347	90.10	146.00	251.9	94	10613.25	-4933.35	3325.99	5949.80	5949.80	146.01	0.75	0.74	10610.13	1.33	-13.13
173	16441	89.20	145.60	252.8	94	10613.82	-5011.10	3378.82	6043.80	6043.80	146.01	1.05	-0.96	10610.66	1.00	-13.66
174	16536	90.40	145.50	252.8	95	10614.15	-5089.43	3432.56	6138.80	6138.80	146.00	1.27	1.26	10610.94	0.25	-13.94
175	16630	90.30	144.60	251.0	94	10613.58	-5166.48	3486.41	6232.78	6232.78	145.99	0.96	-0.11	10610.31	-1.31	-13.31
176	16724	89.90	143.80	250.1	94	10613.41	-5242.72	3541.39	6326.73	6326.73	145.96	0.95	-0.43	10610.10	-4.26	-13.10
177	16818	91.30	143.20	252.8	94	10612.43	-5318.27	3597.30	6420.63	6420.64	145.93	1.62	1.49	10609.07	-8.36	-12.07
178	16913	91.50	144.00	251.9	95	10610.11	-5394.72	3653.66	6515.52	6515.53	145.89	0.87	0.21	10606.70	-12.33	-9.70
179	17007	90.00	145.30	251.0	94	10608.88	-5471.37	3708.04	6609.48	6609.50	145.87	2.11	-1.60	10605.42	-14.55	-8.42
180	17102	88.80	145.40	253.7	95	10609.87	-5549.52	3762.05	6704.47	6704.49	145.87	1.27	-1.26	10606.36	-15.63	-9.36
181	17196	89.30	147.50	253.7	94	10611.43	-5627.84	3813.99	6798.45	6798.47	145.87	2.30	0.53	10607.87	-14.89	-10.87
182	17291	90.40	147.30	253.7	95	10611.68	-5707.88	3865.17	6893.42	6893.43	145.90	1.18	1.16	10608.07	-12.57	-11.07
183	17386	90.00	146.70	255.5	95	10611.35	-5787.55	3916.91	6988.40	6988.41	145.91	0.76	-0.42	10607.69	-10.91	-10.69
184	17480	90.70	146.80	254.6	94	10610.77	-5866.16	3968.45	7082.39	7082.40	145.92	0.75	0.74	10607.07	-9.68	-10.07
185	17575	91.10	146.70	256.4	95	10609.28	-5945.59	4020.53	7177.37	7177.38	145.93	0.43	0.42	10605.52	-8.44	-8.52
186	17669	90.70	146.90	256.4	94	10607.80	-6024.24	4071.99	7271.35	7271.36	145.94	0.48	-0.43	10604.00	-7.12	-7.00
187	17763	90.50	146.60	256.4	94	10606.82	-6102.85	4123.53	7365.34	7365.34	145.95	0.38	-0.21	10602.96	-5.89	-5.96
188	17858	90.50	147.20	257.3	95	10605.99	-6182.43	4175.41	7460.32	7460.32	145.97	0.63	0.00	10602.09	-4.40	-5.09
189	17952	89.60	146.40	257.3	94	10605.91	-6261.08	4226.88	7554.31	7554.31	145.98	1.28	-0.96	10601.95	-3.09	-4.95
190	18046	88.80	145.80	257.3	94	10607.22	-6339.09	4279.30	7648.30	7648.30	145.98	1.06	-0.85	10603.22	-2.92	-6.22
191	18141	89.10	146.20	255.1	95	10608.96	-6417.84	4332.41	7743.28	7743.29	145.98	0.53	0.32	10604.91	-2.92	-7.91
192	18235	88.40	145.60	254.6	94	10611.01	-6495.66	4385.10	7837.26	7837.26	145.98	0.98	-0.74	10606.91	-3.09	-9.91
193	18329	89.70	147.60	256.4	94	10612.57	-6574.12	4436.84	7931.24	7931.24	145.98	2.54	1.38	10608.42	-2.10	-11.42
194	18424	90.10	147.50	256.4	95	10612.74	-6654.28	4487.81	8026.20	8026.20	146.00	0.43	0.42	10608.54	0.47	-11.54
195	18518	90.70	146.20	255.5	94	10612.08	-6732.98	4539.21	8120.19	8120.19	146.01	1.52	0.64	10607.83	1.86	-10.83

						33-105-02727								Target Calculations		
			TRUE	TEMP	Course			Surface	CLOSURE		DLS/	BUR/	TVD AT 0'	RIGHT(+)	ABOVE (+)	
SVY	MD	INC	AZM	°F	Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100	100'	V. SEC.	LEFT(-)	BELLOW (-)
196	18612	91.90	146.20	258.2	94	10609.95	-6811.07	4591.49	8214.16	8214.16	146.02	1.28	10605.65	2.19	-8.65	
197	18707	90.80	146.80	256.4	95	10607.71	-6890.27	4643.90	8309.13	8309.13	146.02	1.32	-1.16	10603.36	3.02	-6.36
198	18801	88.20	146.20	257.3	94	10608.53	-6968.64	4695.78	8403.11	8403.11	146.03	2.84	-2.77	10604.13	3.84	-7.13
199	18895	90.30	147.40	257.3	94	10609.76	-7047.29	4747.24	8497.09	8497.09	146.03	2.57	2.23	10605.31	5.15	-8.31
200	18990	90.30	147.30	259.1	95	10609.26	-7127.27	4798.49	8592.06	8592.06	146.05	0.11	0.00	10604.77	7.39	-7.77
201	19084	89.30	146.30	259.1	94	10609.59	-7205.93	4849.96	8686.05	8686.05	146.06	1.50	-1.06	10605.04	8.70	-8.04
202	19179	88.30	146.20	260.0	95	10611.58	-7284.90	4902.73	8781.03	8781.03	146.06	1.06	-1.05	10606.98	9.11	-9.98
203	19273	90.00	146.80	258.2	94	10612.98	-7363.27	4954.60	8875.01	8875.01	146.06	1.92	1.81	10608.33	9.94	-11.33
204	19368	92.10	145.60	258.2	95	10611.24	-7442.20	5007.44	8969.99	8969.99	146.07	2.55	2.21	10606.54	10.27	-9.54
205	19463	91.60	145.30	259.1	95	10608.17	-7520.40	5061.29	9064.93	9064.93	146.06	0.61	-0.53	10603.42	9.36	-6.42
206	19557	91.30	145.10	260.0	94	10605.79	-7597.56	5114.92	9158.89	9158.89	146.05	0.38	-0.32	10600.99	8.04	-3.99
207	19651	90.00	144.20	260.0	94	10604.72	-7674.22	5169.30	9252.86	9252.86	146.04	1.68	-1.38	10599.88	5.83	-2.88
208	19746	88.90	144.00	257.3	95	10605.64	-7751.17	5225.00	9347.80	9347.80	146.02	1.18	-1.16	10600.74	2.68	-3.74
209	19840	88.10	144.00	256.4	94	10608.10	-7827.19	5280.23	9441.71	9441.71	146.00	0.85	-0.85	10603.15	-0.60	-6.15
210	19933	89.60	146.00	257.3	93	10609.96	-7903.35	5333.56	9534.67	9534.67	145.99	2.69	1.61	10604.97	-2.22	-7.97
211	20028	90.50	146.40	258.2	95	10609.88	-7982.30	5386.41	9629.66	9629.67	145.99	1.04	0.95	10604.84	-1.89	-7.84
212	20122	91.20	145.90	258.2	94	10608.48	-8060.35	5438.76	9723.65	9723.65	145.99	0.92	0.74	10603.39	-1.64	-6.39
213	20216	90.40	146.00	259.1	94	10607.17	-8138.23	5491.39	9817.64	9817.64	145.99	0.86	-0.85	10602.03	-1.73	-5.03
214	20310	89.80	145.30	260.0	94	10607.01	-8215.84	5544.43	9911.64	9911.64	145.99	0.98	-0.64	10601.82	-2.30	-4.82
215	20405	89.10	145.30	260.0	95	10607.92	-8293.94	5598.51	10006.63	10006.63	145.98	0.74	-0.74	10602.68	-3.46	-5.68
216	20499	89.90	145.60	259.1	94	10608.74	-8371.35	5651.81	10100.62	10100.62	145.98	0.91	0.85	10603.45	-4.36	-6.45
217	20593	91.20	146.80	259.1	94	10607.84	-8449.46	5704.10	10194.61	10194.61	145.98	1.88	1.38	10602.50	-4.04	-5.50
218	20687	91.10	146.20	260.9	94	10605.95	-8527.83	5755.97	10288.59	10288.59	145.98	0.65	-0.11	10600.56	-3.22	-3.56
219	20781	90.90	145.70	258.2	94	10604.31	-8605.70	5808.60	10382.57	10382.57	145.98	0.57	-0.21	10598.87	-3.30	-1.87
220	20876	90.40	145.10	260.0	95	10603.23	-8683.89	5862.54	10477.56	10477.56	145.98	0.82	-0.53	10597.75	-4.29	-0.75
221	20970	90.20	145.40	256.4	94	10602.74	-8761.13	5916.12	10571.55	10571.55	145.97	0.38	-0.21	10597.21	-5.52	-0.21
222	21065	89.10	146.70	259.1	95	10603.32	-8839.93	5969.17	10666.55	10666.55	145.97	1.79	-1.16	10597.74	-5.44	-0.74
223	21158	89.80	147.30	259.1	93	10604.21	-8917.92	6019.82	10759.53	10759.53	145.98	0.99	0.75	10598.58	-3.82	-1.58
224	21254	90.00	148.20	260.0	96	10604.38	-8999.11	6071.04	10855.48	10855.48	146.00	0.96	0.21	10598.70	-0.89	-1.70
225	21347	90.20	148.20	260.9	93	10604.22	-9078.15	6120.05	10948.41	10948.41	146.01	0.22	0.22	10598.49	2.68	-1.49
226	21442	90.80	149.00	260.0	95	10603.39	-9159.23	6169.54	11043.31	11043.31	146.04	1.05	0.63	10597.61	6.99	-0.61
227	21536	89.40	149.00	258.2	94	10603.23	-9239.80	6217.95	11137.18	11137.19	146.06	1.49	-1.49	10597.40	11.91	-0.40
228	21630	90.00	148.00	259.1	94	10603.72	-9319.95	6267.07	11231.09	11231.10	146.08	1.24	0.64	10597.84	16.01	-0.84
229	21725	90.60	146.60	260.0	95	10603.22	-9399.89	6318.39	11326.06	11326.07	146.09	1.60	0.63	10597.29	18.17	-0.29
230	21819	90.00	145.20	260.9	94	10602.73	-9477.72	6371.09	11420.06	11420.07	146.09	1.62	-0.64	10596.75	18.00	0.25





**JOB NO.:** DDMT130415  
**Company:** Continental Resources  
**LOCATION:** Williston  
**RIG NAME:** Cyclone #2  
**STATE:** North Dakota  
**COUNTY:** Country  
**WELL NAME:** Atlanta 6-6H

**FIELD:** Atlanta Eco pad  
**Township:** NW6  
**Range:** R94W

#### MOTOR INFORMATION

**Desc:** 4 3/4 5/6 8.3 stg 1.83fxd 1.04 rpg  
**Bent Hsg/Sub:** 1.8 / 1.8 Bit to Bend: 5.96  
**Pad OD:** .25      **NB Stab:** 5 5/8

### Slide Report for all BHA's in Job: DDMT130415

Note: Surveys listed are interpolated from the actual surveys

#	Date	Drill Mode	Start Time	End Time	Hours	Start MD	End MD	Depth Drilled	WOB	ROP	RPM	Surf. Torque	Flow Rate	SPP	TFO	INC	AZM	DLS	Note
1	15-Jun	Drilling	22:00	22:15	0.25	2003	2067	64		256.0	0	0				0.00	0.00	0.00	
1	15-Jun	Drilling	22:30	22:45	0.25	2067	2254	187	25	748.0	110	5000	550	3000		0.00	0.00	0.00	
1	15-Jun	Drilling	23:00	23:15	0.25	2254	2278	24	25	96.0	110	5000	550	3000		0.00	0.00	0.00	
1	15-Jun	Sliding	23:15	23:30	0.25	2278	2292	14	10	56.0	0	0	550	3000	30	0.00	0.00	0.00	
1	15-Jun	Drilling	23:30	23:45	0.25	2292	2441	149	25	596.0	110	5000	550	3000		0.00	0.00	0.00	
1	16-Jun	Drilling	00:00	00:30	0.50	2441	2548	107	25	214.0	110	5000	550	3000		0.00	0.00	0.00	
1	16-Jun	Sliding	00:30	00:45	0.25	2548	2565	17	10	68.0	0	0	550	2700	30	0.00	0.00	0.00	
1	16-Jun	Drilling	00:45	01:00	0.25	2565	2725	160	25	640.0	110	5000	550	3500		0.00	0.00	0.00	
1	16-Jun	Sliding	01:00	01:15	0.25	2725	2745	20	10	80.0	0	0	550	3300	30	0.00	0.00	0.00	
1	16-Jun	Drilling	01:15	01:30	0.25	2745	2815	70	25	280.0	110	5000	550	3500		0.00	0.00	0.00	
1	16-Jun	Drilling	01:45	02:00	0.25	2815	2907	92	25	368.0	110	5000	550	3500		0.00	0.00	0.00	
1	16-Jun	Drilling	02:15	02:30	0.25	2907	3094	187	25	748.0	110	5000	550	3500		0.00	0.00	0.00	
1	16-Jun	Drilling	02:45	03:15	0.50	3094	3279	185	25	370.0	110	5000	550	3500		0.00	0.00	0.00	
1	16-Jun	Drilling	03:45	04:00	0.25	3279	3462	183	25	732.0	110	8000	550	3700		0.00	0.00	0.00	
1	16-Jun	Drilling	04:15	04:45	0.50	3462	3653	191	25	382.0	110	8000	550	3700		0.00	0.00	0.00	
1	16-Jun	Drilling	05:00	05:15	0.25	3653	3837	184	25	736.0	110	8000	550	3700		0.00	0.00	0.00	
1	16-Jun	Drilling	05:30	06:00	0.50	3837	4022	185	25	370.0	110	8000	550	3700		0.00	0.00	0.00	
1	16-Jun	Drilling	06:20	06:50	0.50	4022	4210	188	25	376.0	110	8000	550	3700		0.00	0.00	0.00	
1	16-Jun	Drilling	07:05	07:40	0.58	4210	4396	186	25	318.9	110	8000	550	3700		0.00	0.00	0.00	
1	16-Jun	Drilling	07:50	08:20	0.50	4396	4584	188	25	376.0	110	8000	550	3700		0.00	0.00	0.00	
1	16-Jun	Drilling	08:40	08:55	0.25	4584	4771	187	25	748.0	110	8000	550	3700		0.00	0.00	0.00	
1	16-Jun	Drilling	09:15	09:25	0.17	4771	4866	95	25	570.0	110	8000	550	3700		0.00	0.00	0.00	
1	16-Jun	Sliding	09:25	09:40	0.25	4866	4886	20	5	80.0	0	0	550	3700	300	0.00	0.00	0.00	
1	16-Jun	Drilling	09:40	10:15	0.58	4886	5051	165	25	282.9	60	10	550	3900		0.00	0.00	0.00	
1	16-Jun	Drilling	10:30	10:50	0.33	5051	5239	188	25	564.0	60	10	550	3900		0.00	0.00	0.00	
1	16-Jun	Sliding	11:05	11:25	0.33	5239	5261	22	5	66.0	0	0	550	3900	320	0.00	0.00	0.00	

Slide Report for all BHA's in Job: DDMT130415															Note: Surveys listed are interpolated from the actual surveys					
#	Date	Drill Mode	Start Time	End Time	Hours	Start MD	End MD	Depth Drilled	WOB	ROP	RPM	Surf. Torque	Flow Rate	SPP	TFO	INC	AZM	DLS	Note	
1	16-Jun	Drilling	11:25	12:15	0.83	5261	5426	165	25	198.0	60	8	550	3900		0.00	0.00	0.00		
1	16-Jun	Drilling	12:30	13:10	0.67	5426	5613	187	25	280.5	60	8	550	3900		0.00	0.00	0.00		
1	16-Jun	Drilling	13:25	13:40	0.25	5613	5706	93	25	372.0	60	8	550	3900		0.00	0.00	0.00		
1	16-Jun	Sliding	13:55	14:10	0.25	5706	5723	17	15	68.0	0	0	550	3900	320	0.00	0.00	0.00		
1	16-Jun	Drilling	14:10	15:40	1.50	5723	6078	355	25	236.7	60	0	550	3900		0.00	0.00	0.00		
1	16-Jun	Sliding	15:55	16:15	0.33	6078	6116	38	15	114.0	0	0	550	3900	320	0.00	0.00	0.00		
1	16-Jun	Drilling	16:15	17:00	0.75	6116	6264	148	25	197.3	60	9144	550	3900		0.00	0.00	0.00		
1	16-Jun	Sliding	17:15	17:30	0.25	6264	6288	24	15	96.0	0	0	550	3900	10	0.00	0.00	0.00		
1	16-Jun	Drilling	17:30	17:45	0.25	6288	6359	71	25	284.0	60	9550	550	3900		0.00	0.00	0.00		
1	16-Jun	Sliding	17:45	17:55	0.17	6359	6374	15	15	90.0	0	0	550	3900	320	0.00	0.00	0.00		
1	16-Jun	Drilling	17:55	18:15	0.33	6374	6452	78	25	234.0	60	9500	550	3900		0.00	0.00	0.00		
1	16-Jun	Drilling	19:00	19:30	0.50	6452	6546	94	25	188.0	60	9500	550	3900		0.00	0.00	0.00		
1	16-Jun	Sliding	19:30	19:45	0.25	6546	6565	19	15	76.0	0	0	550	3900	320	0.00	0.00	0.00		
1	16-Jun	Drilling	19:45	20:00	0.25	6565	6640	75	25	300.0	60	9500	550	3900		0.00	0.00	0.00		
1	16-Jun	Sliding	20:30	21:00	0.50	6640	6665	25	15	50.0	0	0	550	3900	320	0.00	0.00	0.00		
1	16-Jun	Drilling	21:00	21:30	0.50	6665	6827	162	25	324.0	60	9500	550	3900		0.00	0.00	0.00		
1	16-Jun	Drilling	22:00	22:15	0.25	6827	6840	13	25	52.0	60	9500	550	3900		0.00	0.00	0.00		
1	16-Jun	Sliding	22:15	22:45	0.50	6840	6865	25	15	50.0	0	0	550	3900	320	0.00	0.00	0.00		
1	16-Jun	Drilling	22:45	23:30	0.75	6865	7015	150	25	200.0	60	9500	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	00:00	00:45	0.75	7015	7202	187	25	249.3	60	9500	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	01:15	02:00	0.75	7202	7389	187	25	249.3	60	9500	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	02:30	03:30	1.00	7389	7576	187	25	187.0	60	9500	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	04:15	04:45	0.50	7576	7613	37	25	74.0	60	9500	550	3900		0.00	0.00	0.00		
1	17-Jun	Sliding	04:45	05:15	0.50	7613	7633	20	26	40.0	0	0	550	3900	90	0.00	0.00	0.00		
1	17-Jun	Drilling	05:15	06:35	1.33	7633	7853	220	25	165.0	60	7	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	06:45	07:30	0.75	7853	7947	94	25	125.3	60	7	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	07:40	08:20	0.67	7947	8041	94	28	141.0	60	8	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	08:40	10:15	1.58	8041	8134	93	28	58.7	60	8	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	10:35	12:35	2.00	8134	8227	93	32	46.5	60	8	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	12:45	13:55	1.17	8227	8319	92	32	78.9	60	8	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	14:05	14:50	0.75	8319	8413	94	32	125.3	60	8	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	15:10	15:45	0.58	8413	8507	94	32	161.1	60	8	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	16:00	16:50	0.83	8507	8600	93	32	111.6	60	8	550	3900		0.00	0.00	0.00		
1	17-Jun	Drilling	17:20	18:30	1.17	8600	8691	91	32	78.0	60	8	550	3900		0.00	0.00	0.00		
2	18-Jun	Drilling	03:00	03:45	0.75	8691	8785	94	32	125.3	60	8	550	3900		0.00	0.00	0.00		

# Slide Report for all BHA's in Job: DDMT130415

Note: Surveys listed are interpolated from the actual surveys

#	Date	Drill Mode	Start Time	End Time	Hours	Start MD	End MD	Depth Drilled	WOB	ROP	RPM	Surf. Torque	Flow Rate	SPP	TFO	INC	AZM	DLS	Note
2	18-Jun	Drilling	04:30	06:40	2.17	8785	8972	187	32	86.3	65	8	490	3800		0.00	0.00	0.00	
2	18-Jun	Drilling	06:45	08:10	1.42	8972	9158	186	32	131.3	65	8	490	3800		0.00	0.00	0.00	
2	18-Jun	Drilling	08:15	09:00	0.75	9158	9252	94	32	125.3	65	8	490	3800		0.00	0.00	0.00	
2	18-Jun	Drilling	09:25	11:05	1.67	9252	9439	187	32	112.2	65	8	490	3800		0.00	0.00	0.00	
2	18-Jun	Drilling	11:15	12:30	1.25	9439	9533	94	25	75.2	65	8	490	3800		0.00	0.00	0.00	
2	18-Jun	Drilling	12:40	15:50	3.17	9533	9627	94	20	29.7	65	8	490	3800		0.00	0.00	0.00	
2	18-Jun	Drilling	16:00	17:15	1.25	9627	9667	40	20	32.0	65	8	490	3800		0.00	0.00	0.00	
2	18-Jun	Drilling	21:30	23:45	2.25	9667	9765	98	20	43.6	65	8	490	3800		0.00	0.00	0.00	
2	19-Jun	Drilling	00:00	00:45	0.75	9765	9799	34	20	45.3	65	8	490	3800		0.00	0.00	0.00	
2	19-Jun	Drilling	02:30	07:15	4.75	9799	10060	261	20	54.9	65	8	490	3800		4.89	146.00	10.00	
3	19-Jun	Drilling	23:30	24:00	0.50	10060	10069	9	20	18.0	65	8	490	3800		0.10	135.38	0.00	
3	20-Jun	Drilling	00:00	00:20	0.33	10069	10070	1	25	3.0	30	6	516	3725		0.10	135.31	0.00	
3	20-Jun	Sliding	00:20	02:10	1.83	10070	10158	88	30	48.0	0	0	516	3775	150M	9.77	142.31	14.54	
3	20-Jun	Sliding	02:50	03:40	0.83	10158	10190	32	25	38.4	0	0	516	3775	15R	13.90	143.58	12.61	
3	20-Jun	Drilling	03:40	04:00	0.33	10190	10209	19	22	57.0	25	6	516	3645		15.74	146.75	10.39	
3	20-Jun	Sliding	04:00	04:20	0.33	10209	10219	10	26	30.0	0	0	516	3550	10R	16.66	148.52	10.39	
3	20-Jun	Drilling	04:20	04:50	0.50	10219	10239	20	20	40.0	30	5.5	516	3510		0.00	0.00	0.00	
3	20-Jun	Sliding	04:50	05:15	0.42	10239	10252	13	30	31.2	0	0	516	3600		0.00	0.00	0.00	
3	20-Jun	Drilling	05:45	06:20	0.58	10252	10282	30	20	51.4	30	0	516	3200		0.00	0.00	0.00	
3	20-Jun	Sliding	06:20	07:45	1.42	10282	10345	63	30	44.5	30	0	516	3200		0.00	0.00	0.00	
3	20-Jun	Sliding	08:00	09:25	1.42	10345	10435	90	30	63.5	30	0	516	3200	20L	0.00	0.00	0.00	
3	20-Jun	Sliding	09:45	11:30	1.75	10435	10501	66	30	37.7	30	0	516	3200	10L	0.00	0.00	0.00	
3	20-Jun	Sliding	12:10	13:00	0.83	10501	10532	31	30	37.2	30	0	516	3200	10L	0.00	0.00	0.00	
4	20-Jun	Sliding	23:15	24:00	0.75	10532	10573	41	30	54.7	0	0	516		10L	47.37	145.24	11.73	
4	21-Jun	Sliding	00:10	01:40	1.50	10573	10625	52	36	34.7	0	0	491	3175		55.75	143.93	14.52	
4	21-Jun	Sliding	02:00	02:40	0.67	10625	10652	27	31	40.5	0	0	491	3200		59.67	144.12	14.56	
5	21-Jun	Sliding	14:30	18:20	3.83	10652	10704	52	62	13.6	0	0	516	3300		69.63	145.59	22.21	
5	21-Jun	Sliding	18:50	19:45	0.92	10704	10716	12	70	13.1	0	0	516	3130		72.26	146.08	22.21	
5	21-Jun	Sliding	19:55	22:30	2.58	10716	10747	31	70	12.0	0	0	516	3160		78.35	147.42	18.60	
5	21-Jun	Sliding	22:40	24:00	1.33	10747	10771	24	70	18.0	0	0	516	3050		82.51	148.14	16.50	
5	22-Jun	Sliding	00:00	00:40	0.67	10771	10779	8	70	12.0	0	0	516	3060		83.83	148.25	16.50	
5	22-Jun	Sliding	00:50	01:35	0.75	10779	10796	17	70	22.7	0	0	516	3060	5R	86.41	148.59	12.85	
5	22-Jun	Drilling	01:35	02:50	1.25	10796	10810	14	28	11.2	30	8.5	516	3080		88.13	149.14	12.85	
5	22-Jun	Sliding	03:00	04:30	1.50	10810	10831	21	70	14.0	0	0	516	3300	5L	90.10	149.80	5.98	
5	22-Jun	Drilling	04:30	08:15	3.75	10831	10881	50	35	13.3	30	6.5	516	3190		90.10	149.80	0.00	

# Slide Report for all BHA's in Job: DDMT130415

Note: Surveys listed are interpolated from the actual surveys

#	Date	Drill Mode	Start Time	End Time	Hours	Start MD	End MD	Depth Drilled	WOB	ROP	RPM	Surf. Torque	Flow Rate	SPP	TFO	INC	AZM	DLS	Note
6	23-Jun	Drilling	20:10	20:45	0.58	10881	10920	39	15	66.9	52	4	291	2125		91.06	149.80	1.08	
6	23-Jun	Sliding	20:45	22:20	1.58	10920	10940	20	13	12.6	0	0	291	1580		91.43	149.73	2.08	
6	23-Jun	Drilling	22:20	23:25	1.08	10940	11020	80	14	73.8	70	4.3	291	2220		92.67	149.00	1.79	
6	23-Jun	Sliding	23:25	23:50	0.42	11020	11036	16	27	38.4	0	0	291	1915	70L	92.80	148.74	1.79	
6	23-Jun	Drilling	23:50	24:00	0.17	11036	11043	7	14	42.0	70	3.5	291	2340		92.86	148.63	1.79	
6	24-Jun	Drilling	00:00	00:55	0.92	11043	11108	65	14	70.9	70	4	291	2320		0.00	0.00	0.00	
6	24-Jun	Sliding	00:55	01:30	0.58	11108	11123	15	22	25.7	0	0	291	1850	120L	0.00	0.00	0.00	
6	24-Jun	Drilling	01:30	01:40	0.17	11123	11138	15	17	90.0	0	6	291	2180		0.00	0.00	0.00	
6	24-Jun	Drilling	02:10	02:25	0.25	11138	11201	63	19	252.0	70	4.8	291	2050		0.00	0.00	0.00	
6	24-Jun	Sliding	02:25	03:25	1.00	11201	11231	30	27	30.0	0	0	291	1875	90	0.00	0.00	0.00	
6	24-Jun	Drilling	03:25	03:40	0.25	11231	11246	15	19	60.0	70	5	291	1875		0.00	0.00	0.00	
6	24-Jun	Sliding	04:00	04:30	0.50	11246	11264	18	27	36.0	0	0	291	1875	170L	0.00	0.00	0.00	
6	24-Jun	Drilling	04:30	05:20	0.83	11264	11326	62	19	74.4	70	5	291	1875		0.00	0.00	0.00	
6	24-Jun	Drilling	05:35	05:45	0.17	11326	11340	14	19	84.0	70	5	291	1875		0.00	0.00	0.00	
6	24-Jun	Sliding	05:45	06:15	0.50	11340	11360	20	27	40.0	70	0	291	1875	150L	0.00	0.00	0.00	
6	24-Jun	Drilling	06:15	06:45	0.50	11360	11421	61	19	122.0	70	5	291	1875		0.00	0.00	0.00	
6	24-Jun	Sliding	07:00	07:25	0.42	11421	11426	5	20	12.0	0	0	291	1875	150L	0.00	0.00	0.00	
6	24-Jun	Drilling	07:25	08:15	0.83	11426	11460	34	19	40.8	70	5	291	1875		0.00	0.00	0.00	
6	24-Jun	Drilling	08:25	08:30	0.08	11515	11528	13	19	156.0	70	5	291	1875		0.00	0.00	0.00	
7	24-Jun	Drilling	18:30	20:05	1.58	11528	11704	176	15	111.2	70	5.6	291	2325		90.47	143.78	1.72	
7	24-Jun	Drilling	20:35	21:45	1.17	11704	11750	46	18	39.4	70	5	291	2250		90.77	143.32	1.74	
7	24-Jun	Sliding	21:45	21:50	0.08	11750	11755	5	20	60.0	0	0	291	1800	180	90.75	143.40	1.74	
7	24-Jun	Drilling	21:50	22:00	0.17	11755	11770	15	16	90.0	73	5.3	291	2110		90.69	143.65	1.74	
7	24-Jun	Sliding	22:20	23:00	0.67	11770	11785	15	20	22.5	0	0	291	1800	150L	90.62	143.91	1.74	
7	24-Jun	Drilling	23:00	23:45	0.75	11785	11798	13	18	17.3	73	5	291	2210		90.57	144.13	1.74	
7	25-Jun	Drilling	01:00	01:35	0.58	11798	11829	31	12	53.1	70	5	291	2750		90.44	144.65	1.74	
7	25-Jun	Drilling	09:10	10:00	0.83	11829	11893	64	10	76.8	50	4	275	2200		89.99	144.57	0.86	
7	25-Jun	Sliding	10:10	10:30	0.33	11893	11903	10	21	30.0	0	0	291	2200	180	89.92	144.52	0.86	
7	25-Jun	Drilling	10:30	11:30	1.00	11903	11987	84	11	84.0	50	4	270	2150		89.47	144.99	1.15	
7	25-Jun	Sliding	12:00	12:20	0.33	11987	11995	8	21	24.0	0	0	270	2150	180	89.43	145.07	1.15	
7	25-Jun	Drilling	12:20	13:15	0.92	11995	12081	86	11	93.8	40	4	260	2100		89.30	145.63	0.42	
7	25-Jun	Drilling	13:30	14:40	1.17	12081	12176	95	10	81.4	35	4	247	2000		89.53	145.92	0.48	
7	25-Jun	Drilling	14:55	15:35	0.67	12176	12241	65	12	97.5	40	4	291	2200		89.81	145.92	0.53	
7	25-Jun	Drilling	16:00	16:10	0.17	12241	12270	29	13	174.0	40	4	291	2200		89.93	145.83	0.53	
7	25-Jun	Sliding	16:25	16:40	0.25	12270	12277	7	21	28.0	40	4	270	2200	180	89.96	145.80	0.53	

Slide Report for all BHA's in Job: DDMT130415															Note: Surveys listed are interpolated from the actual surveys				
#	Date	Drill Mode	Start Time	End Time	Hours	Start MD	End MD	Depth Drilled	WOB	ROP	RPM	Surf. Torque	Flow Rate	SPP	TFO	INC	AZM	DLS	Note
7	25-Jun	Drilling	16:40	17:25	0.75	12277	12365	88	13	117.3	40	5	260	2200		90.57	145.70	0.85	
7	25-Jun	Sliding	17:35	18:00	0.42	12365	12375	10	26	24.0	0	0	270	2200	180	90.65	145.70	0.85	
7	25-Jun	Drilling	18:00	19:15	1.25	12375	12470	95	15	76.0	55	5	262	2150		90.41	145.14	1.12	
7	25-Jun	Sliding	19:15	19:35	0.33	12470	12485	15	45	45.0	0	0	262	1930	160L	90.30	145.02	1.12	
7	25-Jun	Drilling	19:35	20:35	1.00	12485	12580	95	16	95.0	50	6	262	2500		88.91	144.04	1.92	
7	25-Jun	Sliding	20:35	20:50	0.25	12580	12590	10	35	40.0	0	0	262	1900	180	88.75	143.93	1.92	
7	25-Jun	Drilling	20:50	21:15	0.42	12590	12648	58	16	139.2	50	5.6	262	2310		89.29	144.08	1.11	
7	25-Jun	Drilling	21:45	23:50	2.08	12648	12850	202	15	97.0	60	6.2	262	2430		90.20	143.46	1.81	
7	25-Jun	Sliding	23:50	24:00	0.17	12850	12860	10	50	60.0	0	0	262	1900	180	90.09	143.32	1.81	
7	26-Jun	Sliding	00:00	00:05	0.08	12860	12862	2	50	24.0	0	0	262	1900	180	90.06	143.29	1.81	
7	26-Jun	Drilling	00:05	00:40	0.58	12862	12931	69	20	118.3	60	7	262	2465		90.08	142.98	0.38	
7	26-Jun	Drilling	01:10	02:45	1.58	12931	13125	194	17	122.5	60	6.3	262	2500		89.69	143.24	1.73	
7	26-Jun	Sliding	02:45	03:20	0.58	13125	13141	16	70	27.4	0	0	262	1850	90R	89.75	143.51	1.73	
7	26-Jun	Drilling	03:20	03:50	0.50	13141	13182	41	22	82.0	55	6.6	262	2190		0.00	0.00	0.00	
7	26-Jun	Sliding	03:50	04:40	0.83	13182	13198	16	80	19.2	0	0	262	1800	90R	0.00	0.00	0.00	
7	26-Jun	Drilling	04:40	04:50	0.17	13198	13213	15	22	90.0	55	6.5	262	1800		0.00	0.00	0.00	
7	26-Jun	Drilling	05:20	06:25	1.08	13213	13308	95	22	87.7	55	6	262	2200		0.00	0.00	0.00	
7	26-Jun	Sliding	06:35	07:25	0.83	13308	13321	13	35	15.6	0	0	262	1750	180	0.00	0.00	0.00	
7	26-Jun	Drilling	07:25	08:10	0.75	13321	13402	81	18	108.0	55	6	262	2200		0.00	0.00	0.00	
7	26-Jun	Sliding	08:20	08:50	0.50	13402	13415	13	42	26.0	0	0	262	1800	120R	0.00	0.00	0.00	
7	26-Jun	Drilling	08:50	09:55	1.08	13415	13497	82	18	75.7	55	6	262	2250		0.00	0.00	0.00	
7	26-Jun	Sliding	10:05	10:30	0.42	13497	13507	10	42	24.0		262	1950	90R	0.00	0.00	0.00		
7	26-Jun	Drilling	10:30	11:35	1.08	13507	13591	84	22	77.5	60	6.5	291	2600		0.00	0.00	0.00	
7	26-Jun	Drilling	11:45	12:40	0.92	13591	13685	94	22	102.5	60	6.5	291	2600		0.00	0.00	0.00	
7	26-Jun	Sliding	12:50	13:40	0.83	13685	13700	15	50	18.0	0	0	262	2600	20R	0.00	0.00	0.00	
7	26-Jun	Drilling	13:40	14:45	1.08	13700	13780	80	22	73.8	60	6.5	291	2600		0.00	0.00	0.00	
7	26-Jun	Sliding	15:00	15:30	0.50	13780	13790	10	52	20.0	0	0	291	2600	30R	0.00	0.00	0.00	
7	26-Jun	Drilling	15:30	16:25	0.92	13790	13875	85	27	92.7	70	7.5	291	2600		0.00	0.00	0.00	
7	26-Jun	Sliding	16:40	17:15	0.58	13875	13885	10	55	17.1	0	0	291	2600	10R	0.00	0.00	0.00	
7	26-Jun	Drilling	17:15	18:50	1.58	13885	14001	116	28	73.3	73	11.2	291	2690		0.00	0.00	0.00	
7	26-Jun	Sliding	18:50	19:20	0.50	14001	14009	8	80	16.0	0	0	291	2070	180	0.00	0.00	0.00	
7	26-Jun	Drilling	19:20	20:10	0.83	14009	14074	65	28	78.0	73	9.9	291	2700		0.00	0.00	0.00	
7	26-Jun	Sliding	20:10	20:35	0.42	14074	14084	10	80	24.0	0	0	291	2090	180	0.00	0.00	0.00	
7	26-Jun	Drilling	20:35	21:10	0.58	14084	14158	74	17	126.9	75	8.5	291	2750		0.00	0.00	0.00	
7	26-Jun	Drilling	21:40	21:50	0.17	14158	14189	31	28	186.0	75	10.5	291	2450		0.00	0.00	0.00	

# Slide Report for all BHA's in Job: DDMT130415

Note: Surveys listed are interpolated from the actual surveys

#	Date	Drill Mode	Start Time	End Time	Hours	Start MD	End MD	Depth Drilled	WOB	ROP	RPM	Surf. Torque	Flow Rate	SPP	TFO	INC	AZM	DLS	Note
7	26-Jun	Sliding	21:50	22:30	0.67	14189	14201	12	80	18.0	0	0	291	2040	40R	0.00	0.00	0.00	
7	26-Jun	Drilling	22:30	23:45	1.25	14201	14262	61	28	48.8	75	0	291	2375		0.00	0.00	0.00	
8	27-Jun	Sliding	13:40	14:00	0.33	14262	14270	8	60	24.0	0	0	260	2350	10R	89.06	148.74	1.78	
8	27-Jun	Drilling	14:00	14:30	0.50	14270	14303	33	15	66.0	50	6.5	260	2750		89.62	148.92	1.78	
8	27-Jun	Drilling	14:40	15:35	0.92	14303	14397	94	13	102.5	50	6	260	2750		88.75	148.47	2.64	
8	27-Jun	Drilling	16:10	16:55	0.75	14397	14492	95	15	126.7	55	6	260	3050		88.67	147.27	1.88	
8	27-Jun	Drilling	17:00	17:10	0.17	14492	14502	10	15	60.0	55	6	260	3050		88.79	147.13	1.88	
8	27-Jun	Sliding	17:10	17:45	0.58	14502	14512	10	50	17.1	0	0	260	3050	50L	88.92	146.99	1.88	
8	27-Jun	Drilling	17:45	18:50	1.08	14512	14600	88	16	81.2	55	7	291	3300		89.49	146.17	1.00	
8	27-Jun	Sliding	18:50	19:20	0.50	14600	14610	10	75	20.0	0	0	291	2840	10R	89.55	146.09	1.00	
8	27-Jun	Drilling	19:20	21:05	1.75	14610	14774	164	16	93.7	55	7.7	262	2970		0.00	0.00	0.00	
8	27-Jun	Drilling	21:35	21:45	0.17	14774	14790	16	15	96.0	58	7.2	262	2925		0.00	0.00	0.00	
8	27-Jun	Sliding	21:45	22:20	0.58	14790	14795	5	80	8.6	0	0	262	2400	60R	0.00	0.00	0.00	
8	27-Jun	Drilling	22:20	22:30	0.17	14795	14805	10	15	60.0	55	7	262	2920		0.00	0.00	0.00	
8	27-Jun	Sliding	22:30	23:50	1.33	14805	14825	20	21	15.0	0	0	262	2500	30R	0.00	0.00	0.00	
8	27-Jun	Drilling	23:50	24:00	0.17	14825	14832	7	15	42.0	55	65	262	3300		0.00	0.00	0.00	
8	28-Jun	Drilling	00:00	01:00	1.00	14832	14889	57	12	57.0	58	6.3	262	3120		0.00	0.00	0.00	
8	28-Jun	Sliding	01:00	01:30	0.50	14889	14897	8	25	16.0	0	0	262	2520	10R	0.00	0.00	0.00	
8	28-Jun	Drilling	01:30	02:50	1.33	14897	15000	103	13	77.3	58	6.4	262	2965		0.00	0.00	0.00	
8	28-Jun	Sliding	02:50	03:25	0.58	15000	15012	12	45	20.6	0	0	262	2490	20L	0.00	0.00	0.00	
8	28-Jun	Drilling	03:25	04:00	0.58	15012	15057	45	13	77.1	58	0	262	2490		0.00	0.00	0.00	
8	28-Jun	Drilling	04:30	05:40	1.17	15057	15090	33	13	28.3	58	6.5	262	2490		0.00	0.00	0.00	
8	28-Jun	Sliding	05:40	06:00	0.33	15090	15098	8	70	24.0	0	0	262	2490	180	0.00	0.00	0.00	
8	28-Jun	Drilling	06:00	06:40	0.67	15098	15274	176	13	264.0	58	7	262	2490		0.00	0.00	0.00	
8	28-Jun	Drilling	06:50	07:40	0.83	15274	15369	95	15	114.0	55	8	262	3100		0.00	0.00	0.00	
8	28-Jun	Drilling	07:50	08:00	0.17	15369	15378	9	15	54.0	55	8	262	3100		0.00	0.00	0.00	
8	28-Jun	Sliding	08:00	08:40	0.67	15378	15382	4	65	6.0	0	0	262	3100	160L	0.00	0.00	0.00	
8	28-Jun	Drilling	08:40	08:55	0.25	15382	15390	8	15	32.0	55	8	262	3100		0.00	0.00	0.00	
8	28-Jun	Sliding	08:55	09:15	0.33	15390	15394	4	68	12.0	0	0	262	3100	160L	0.00	0.00	0.00	
8	28-Jun	Drilling	09:15	10:00	0.75	15394	15469	75	15	100.0	55	8	262	3100		0.00	0.00	0.00	
8	28-Jun	Drilling	10:15	11:50	1.58	15469	15557	88	15	55.6	55	8	262	3100		0.00	0.00	0.00	
8	28-Jun	Drilling	12:00	12:25	0.42	15557	15573	16	15	38.4	40	8	262	3100		0.00	0.00	0.00	
8	28-Jun	Sliding	12:25	13:35	1.17	15573	15586	13	68	11.1		8	262	2550	160L	0.00	0.00	0.00	
8	28-Jun	Drilling	13:35	14:20	0.75	15586	15615	29	22	38.7	40	9	262	3100		0.00	0.00	0.00	
9	29-Jun	Drilling	04:50	06:10	1.33	15615	15747	132	15	99.0	50	7	261	2900		88.07	145.35	1.48	

Slide Report for all BHA's in Job: DDMT130415															Note: Surveys listed are interpolated from the actual surveys				
#	Date	Drill Mode	Start Time	End Time	Hours	Start MD	End MD	Depth Drilled	WOB	ROP	RPM	Surf. Torque	Flow Rate	SPP	TFO	INC	AZM	DLS	Note
9	29-Jun	Drilling	06:35	06:45	0.17	15747	15757	10	13	60.0	55	7	261	2900		88.19	145.42	1.48	
9	29-Jun	Sliding	07:50	08:10	0.33	15757	15773	16	30	48.0	0	0	262	2900	30R	88.40	145.54	1.48	
9	29-Jun	Drilling	08:10	08:50	0.67	15773	15841	68	13	102.0	55	5	261	2900		89.38	145.85	1.53	
9	29-Jun	Drilling	09:00	09:05	0.08	15841	15851	10	13	120.0	55	5	261	2900		89.53	145.89	1.53	
9	29-Jun	Sliding	09:05	09:55	0.83	15851	15869	18	35	21.6	0	0	261	2900	30R	89.80	145.97	1.53	
9	29-Jun	Drilling	09:55	10:30	0.58	15869	15936	67	13	114.9	55	5.4	261	2900		89.84	145.68	0.54	
9	29-Jun	Drilling	10:40	11:30	0.83	15936	16030	94	13	112.8	55	5.5	261	2900		91.01	146.27	2.39	
9	29-Jun	Drilling	11:35	11:40	0.08	16030	16040	10	13	120.0	55	0	261	2900		91.21	146.39	2.39	
9	29-Jun	Sliding	11:40	12:10	0.50	16040	16052	12	35	24.0			261	2900	30R	91.46	146.55	2.39	
9	29-Jun	Drilling	12:10	13:00	0.83	16052	16124	72	13	86.4	55	5.4	261	2900		91.38	146.26	0.91	
9	29-Jun	Drilling	13:10	13:31	0.35	16124	16157	33	13	94.3	55	5.4	261	2900		91.21	146.01	0.91	
9	29-Jun	Sliding	13:31	14:05	0.57	16157	16170	13	35	22.9	0	0	261	2900	180	90.99	145.99	1.92	
9	29-Jun	Drilling	14:05	14:30	0.42	16170	16219	49	13	117.6	55	5.5	261	2900		90.05	145.94	1.92	
9	29-Jun	Drilling	14:40	15:25	0.75	16219	16313	94	13	125.3	55	6	261	2900		89.85	145.96	0.75	
9	29-Jun	Drilling	15:50	15:55	0.08	16313	16323	10	15	120.0	55	6	261	2900		89.92	145.97	0.75	
9	29-Jun	Sliding	15:55	16:20	0.42	16323	16331	8	35	19.2	0	0	261	2900	10R	89.98	145.98	0.75	
9	29-Jun	Drilling	16:20	18:00	1.67	16331	16501	170	15	102.0	55	6.8	261	2900		89.96	145.54	1.27	
9	29-Jun	Drilling	18:05	18:15	0.17	16501	16511	10	16	60.0	57	6.1	262	3050		90.08	145.53	1.27	
9	29-Jun	Sliding	18:15	18:50	0.58	16511	16523	12	40	20.6	0	0	262	2600		90.24	145.51	1.27	
9	29-Jun	Drilling	18:50	19:55	1.08	16523	16652	129	16	119.1	58	7.4	262	3185		90.21	144.41	0.95	
9	29-Jun	Drilling	21:50	23:10	1.33	16652	16753	101	14	75.8	58	7.2	262	3190		90.33	143.61	1.62	
9	29-Jun	Sliding	23:10	23:45	0.58	16753	16765	12	75	20.6	0	0	262	2550	20R	90.51	143.54	1.62	
9	29-Jun	Drilling	23:45	24:00	0.25	16765	16784	19	13	76.0	58	6.8	262	3050		90.79	143.42	1.62	
9	30-Jun	Drilling	00:45	01:25	0.67	16784	16910	126	13	189.0	60	5.7	262	3185		91.49	143.97	0.87	
9	30-Jun	Sliding	01:25	02:30	1.08	16910	16930	20	80	18.5	0	0	262	2650	100R	91.23	144.24	2.11	
9	30-Jun	Drilling	02:30	03:20	0.83	16930	16990	60	13	72.0	60	9	262	2650		90.27	145.06	2.11	
9	30-Jun	Sliding	03:20	04:20	1.00	16990	17010	20	80	20.0	60	0	262	2650	150R	89.96	145.30	1.27	
9	30-Jun	Drilling	04:20	04:30	0.17	17010	17067	57	13	342.0	60	9	262	3150		89.24	145.36	1.27	
9	30-Jun	Drilling	05:15	06:10	0.92	17067	17162	95	13	103.6	60	7	262	3150		89.12	146.74	2.30	
9	30-Jun	Drilling	06:30	06:35	0.08	17162	17172	10	13	120.0	60	7	262	3100		89.17	146.96	2.30	
9	30-Jun	Sliding	06:35	07:20	0.75	17172	17190	18	40	24.0	0	0	262	2650	60R	89.27	147.37	2.30	
9	30-Jun	Drilling	07:20	07:55	0.58	17190	17256	66	13	113.1	60	6.5	262	3150		89.99	147.37	1.18	
9	30-Jun	Drilling	08:05	08:10	0.08	17256	17266	10	13	120.0	60	6.5	262	3150		90.11	147.35	1.18	
9	30-Jun	Sliding	09:00	09:20	0.33	17266	17276	10	40	30.0	0	0	275	3150	20L	90.23	147.33	1.18	
9	30-Jun	Drilling	09:20	10:00	0.67	17276	17351	75	13	112.5	55	7	275	3200		90.15	146.92	0.76	

## Slide Report for all BHA's in Job: DDMT130415

Note: Surveys listed are interpolated from the actual surveys

#	Date	Drill Mode	Start Time	End Time	Hours	Start MD	End MD	Depth Drilled	WOB	ROP	RPM	Surf. Torque	Flow Rate	SPP	TFO	INC	AZM	DLS	Note
9	30-Jun	Drilling	10:20	10:50	0.50	17341	17446	105	13	210.0	55	7	275	3200		90.45	146.76	0.75	
9	30-Jun	Drilling	11:00	11:15	0.25	17446	17456	10	13	40.0	55	7	275	3200		90.52	146.77	0.75	
9	30-Jun	Sliding	11:15	11:55	0.67	17456	17462	6	70	9.0			275	3200	10R	90.57	146.78	0.75	
9	30-Jun	Drilling	11:55	12:30	0.58	17462	17540	78	13	133.7	55	7	275	3200		90.95	146.74	0.43	
9	30-Jun	Drilling	12:45	13:30	0.75	17540	17635	95	13	126.7	55	7	275	3200		90.84	146.83	0.48	
9	30-Jun	Drilling	13:40	14:20	0.67	17635	17729	94	13	141.0	55	6	275	3200		90.57	146.71	0.38	
9	30-Jun	Drilling	14:40	15:15	0.58	17729	17823	94	15	161.1	55	5.5	275	3350		90.50	146.98	0.63	
9	30-Jun	Drilling	15:30	16:15	0.75	17823	17918	95	15	126.7	55	5.5	275	3350		89.93	146.69	1.28	
9	30-Jun	Drilling	16:20	17:10	0.83	17918	18012	94	15	112.8	55	5.5	275	3350		89.09	146.02	1.06	
9	30-Jun	Drilling	17:20	18:10	0.83	18012	18106	94	15	112.8	55	6	275	3350		88.99	146.05	0.53	
9	30-Jun	Drilling	18:25	18:35	0.17	18106	18116	10	16	60.0	55	6.5	262	3480		89.02	146.09	0.53	
9	30-Jun	Sliding	18:35	19:45	1.17	18116	18123	7	80	6.0	0	0	262	2730	30R	89.04	146.12	0.53	
9	30-Jun	Drilling	19:45	21:20	1.58	18123	18248	125	16	78.9	55	7.4	262	3375		88.58	145.88	2.54	
9	30-Jun	Sliding	21:20	22:10	0.83	18248	18260	12	45	14.4	0	0	262	2750	30R	88.75	146.13	2.54	
9	30-Jun	Drilling	22:10	23:00	0.83	18260	18315	55	16	66.0	55	6.4	262	3340		89.51	147.30	2.54	
9	30-Jun	Sliding	23:00	23:30	0.50	18315	18333	18	75	36.0	0	0	262	2820	30R	89.72	147.60	0.43	
9	30-Jun	Drilling	23:30	24:00	0.50	18333	18376	43	16	86.0	57	7.3	262	3230		89.90	147.55	0.43	
9	1-Jul	Drilling	00:00	00:10	0.17	18376	18389	13	16	78.0	55	7.3	262	3230		89.95	147.54	0.43	
9	1-Jul	Drilling	00:40	00:55	0.25	18389	18412	23	16	92.0	55	7.3	262	3230		90.05	147.51	0.43	
9	1-Jul	Sliding	00:55	01:30	0.58	18412	18422	10	48	17.1	0	0	262	2700		90.09	147.50	0.43	
9	1-Jul	Drilling	01:30	02:45	1.25	18422	18515	93	16	74.4	58	7.5	262	3230		90.68	146.24	1.52	
9	1-Jul	Sliding	02:45	03:45	1.00	18515	18530	15	50	15.0	0	0	262	2850		90.85	146.20	1.28	
9	1-Jul	Drilling	03:45	05:10	1.42	18530	18672	142	16	100.2	58	6.7	262	3300		91.21	146.58	1.32	
9	1-Jul	Drilling	05:40	06:00	0.33	18672	18692	20	16	60.0	58	0	262	2550		90.97	146.71	1.32	
9	1-Jul	Sliding	06:00	06:45	0.75	18692	18701	9	30	12.0	0		262	2550	100R	90.87	146.76	1.32	
9	1-Jul	Drilling	06:45	07:20	0.58	18701	18767	66	16	113.1	58	6.5	262	3450		89.14	146.42	2.84	
9	1-Jul	Drilling	07:30	07:50	0.33	18767	18785	18	16	54.0	58	6.5	262	3450		88.64	146.30	2.84	
9	1-Jul	Sliding	07:50	08:10	0.33	18785	18789	4	40	12.0			262	3450	160R	88.53	146.28	2.84	
9	1-Jul	Drilling	08:10	08:40	0.50	18789	18861	72	17	144.0	58	8	262	3450		89.54	146.97	2.57	
9	1-Jul	Drilling	08:50	09:00	0.17	18861	18875	14	17	84.0	58	8	262	3450		89.85	147.14	2.57	
9	1-Jul	Sliding	09:00	09:40	0.67	18875	18893	18	55	27.0			262	3450	10R	90.26	147.37	2.57	
9	1-Jul	Drilling	09:40	10:10	0.50	18893	18955	62	17	124.0	58	8	262	3450		90.30	147.34	0.11	
9	1-Jul	Drilling	10:20	11:05	0.75	18955	19050	95	17	126.7	58	6.5	262	3450		89.66	146.66	1.50	
9	1-Jul	Drilling	11:15	11:55	0.67	19050	19144	94	17	141.0	58	6.5	262	3450		88.67	146.24	1.06	
9	1-Jul	Drilling	12:05	12:45	0.67	19144	19239	95	17	142.5	58	6.5	262	3450		89.39	146.58	1.92	

# Slide Report for all BHA's in Job: DDMT130415

Note: Surveys listed are interpolated from the actual surveys

#	Date	Drill Mode	Start Time	End Time	Hours	Start MD	End MD	Depth Drilled	WOB	ROP	RPM	Surf. Torque	Flow Rate	SPP	TFO	INC	AZM	DLS	Note
9	1-Jul	Drilling	12:55	13:05	0.17	19239	19254	15	17	90.0	58	6.5	262	3450		89.66	146.68	1.92	
9	1-Jul	Sliding	13:05	13:55	0.83	19254	19270	16	60	19.2	0	0	262	3450	5R	89.95	146.78	1.92	
9	1-Jul	Drilling	13:55	14:30	0.58	19270	19333	63	17	108.0	0	7	262	3550	5R	91.33	146.04	2.55	
9	1-Jul	Drilling	14:34	14:45	0.18	19333	19348	15	17	81.8	0	7	262	3550		91.66	145.85	2.55	
9	1-Jul	Sliding	14:45	15:15	0.50	19348	19356	8	60	16.0	0	0	262	3550	5R	91.83	145.75	2.55	
9	1-Jul	Drilling	15:15	15:50	0.58	19356	19428	72	17	123.4	0	7	262	3550		91.78	145.41	0.61	
9	1-Jul	Drilling	16:25	17:10	0.75	19428	19523	95	17	126.7	55	7	262	3550		91.41	145.17	0.38	
9	1-Jul	Drilling	17:15	20:30	3.25	19523	19787	264	16	81.2	60	8.7	262	3430		88.55	144.00	0.85	
9	1-Jul	Sliding	20:30	21:00	0.50	19787	19792	5	80	10.0	0	0	262	2725	60R	88.51	144.00	0.85	
9	1-Jul	Drilling	21:00	21:10	0.17	19792	19806	14	16	84.0	60	8.4	262	3490		88.39	144.00	0.85	
9	1-Jul	Drilling	21:40	21:55	0.25	19806	19855	49	16	196.0	55	8.4	262	3490		88.34	144.32	2.69	
9	1-Jul	Sliding	21:55	22:45	0.83	19855	19875	20	60	24.0	0	0	262	2920	45R	88.66	144.75	2.69	
9	1-Jul	Drilling	22:45	24:00	1.25	19875	19940	65	12	52.0	55	6.3	262	3385		89.67	146.03	1.04	
9	2-Jul	Sliding	00:00	00:30	0.50	19940	19955	15	75	30.0	0	0	262	2910	10R	89.81	146.09	1.04	
9	2-Jul	Drilling	00:30	01:40	1.17	19955	20026	71	15	60.9	60	6.6	262	3320		90.48	146.39	1.04	
9	2-Jul	Sliding	01:40	02:20	0.67	20026	20038	12	80	18.0	0	0	262	2870	30R	90.57	146.35	0.92	
9	2-Jul	Drilling	02:20	02:50	0.50	20038	20088	50	16	100.0	57	7.6	262	3400		90.95	146.08	0.92	
9	2-Jul	Drilling	03:45	06:00	2.25	20088	20276	188	16	83.6	57	8	262	3500		90.02	145.55	0.98	
9	2-Jul	Drilling	06:10	06:45	0.58	20276	20370	94	16	161.1	57	8	262	3500		89.36	145.30	0.74	
9	2-Jul	Drilling	07:00	07:45	0.75	20370	20465	95	16	126.7	57	8	262	3500		89.61	145.49	0.91	
9	2-Jul	Drilling	08:30	08:45	0.25	20465	20480	15	16	60.0	57	8	262	3500		89.74	145.54	0.91	
9	2-Jul	Sliding	08:45	09:15	0.50	20480	20489	9	60	18.0	0	0	262	3500	30R	89.81	145.57	0.91	
9	2-Jul	Drilling	09:15	09:50	0.58	20489	20559	70	18	120.0	55	8	262	3500		90.73	146.37	1.88	
9	2-Jul	Drilling	10:10	10:15	0.08	20559	20475	-84	18	-1008.0	55	8	262	3500		89.70	145.52	0.91	
9	2-Jul	Sliding	10:15	10:45	0.50	20475	20484	9	60	18.0			262	3500	30R	89.77	145.55	0.91	
9	2-Jul	Drilling	10:45	11:20	0.58	20484	20653	169	18	289.7	55	8	262	3500		91.14	146.42	0.65	
9	2-Jul	Drilling	12:00	13:10	1.17	20653	20747	94	18	80.6	55	8	262	3500		90.97	145.88	0.57	
9	2-Jul	Drilling	13:20	14:00	0.67	20747	20819	72	18	108.0	55	8	262	3500		90.70	145.46	0.82	
9	2-Jul	Drilling	14:40	14:50	0.17	20819	20841	22	18	132.0	55	8	262	3500		90.58	145.32	0.82	
9	2-Jul	Drilling	15:00	15:55	0.92	20841	20936	95	18	103.6	55	8	262	3500		90.27	145.29	0.38	
9	2-Jul	Drilling	16:05	16:45	0.67	20936	21001	65	18	97.5	55	8	262	3500		89.84	145.82	1.79	
9	2-Jul	Sliding	16:45	17:55	1.17	21001	21014	13	71	11.1	0	0	262	3500	90R	89.69	146.00	1.79	
9	2-Jul	Drilling	17:55	20:05	2.17	21014	21150	136	16	62.8	57	7.2	262	3765		89.74	147.25	0.99	
9	2-Jul	Sliding	20:05	20:40	0.58	21150	21165	15	62	25.7	0	0	262	3250	30R	89.81	147.37	0.96	
9	2-Jul	Drilling	20:40	21:10	0.50	21165	21219	54	18	108.0	50	7.3	262	3920		89.93	147.87	0.96	

## Slide Report for all BHA's in Job: DDMT130415

Note: Surveys listed are interpolated from the actual surveys

#	Date	Drill Mode	Start Time	End Time	Hours	Start MD	End MD	Depth Drilled	WOB	ROP	RPM	Surf. Torque	Flow Rate	SPP	TFO	INC	AZM	DLS	Note
9	2-Jul	Drilling	21:40	24:00	2.33	21219	21410	191	16	81.9	58	8.5	262	3810		90.60	148.73	1.05	
9	3-Jul	Drilling	00:00	00:50	0.83	21410	21502	92	17	110.4	58	7.1	262	3710		89.91	149.00	1.49	
9	3-Jul	Drilling	01:20	01:40	0.33	21502	21533	31	17	93.0	58	7.1	262	3710		89.44	149.00	1.49	
9	3-Jul	Sliding	01:40	02:15	0.58	21533	21548	15	70	25.7	0	0	262	3300	90L	0.00	0.00	0.00	
9	3-Jul	Drilling	02:15	04:40	2.42	21548	21626	78	14	32.3	58	6.7	262	3875		0.00	0.00	0.00	
9	3-Jul	Sliding	04:40	05:35	0.92	21626	21641	15	75	16.4	0	0	262	3110	70L	0.00	0.00	0.00	
9	3-Jul	Drilling	05:35	06:15	0.67	21641	21690	49	14	73.5	58	7	262	3500		0.00	0.00	0.00	
9	3-Jul	Drilling	06:30	06:40	0.17	21690	21705	15	14	90.0	58	7	262	3500		0.00	0.00	0.00	
9	3-Jul	Sliding	06:40	07:15	0.58	21705	21713	8	65	13.7	0		262	3500	56L	0.00	0.00	0.00	
9	3-Jul	Drilling	07:15	08:00	0.75	21713	21785	72	16	96.0	55	7.5	262	3500		0.00	0.00	0.00	
9	3-Jul	Drilling	08:10	09:15	1.08	21785	21879	94	16	86.8	55	7.5	262	3500		0.00	0.00	0.00	
9	3-Jul	Drilling	09:30	10:45	1.25	21879	21974	95	16	76.0	55	7.5	262	3500		0.00	0.00	0.00	
9	3-Jul	Drilling	11:00	11:15	0.25	21974	22005	31	16	124.0	55	7.5	262	3500		0.00	0.00	0.00	

**Total Drilled:** 19957    **Avg. Total ROP:** 83.99    **DEPTH% - TIME %**

**Total Rotary Drilled:** 18134    **Avg. Rotary ROP:** 108.89    **Percent Rotary:** 90.87 - 70.09

**Total Drilled Sliding:** 1823    **Avg. Slide ROP:** 25.65    **Percent Slide:** 9.13 - 29.91



Scale 1:240 (5"=100') Imperial  
Measured Depth Log

Well Name: Atlanta Federal 6-6H (Atlanta 14 Well Eco Pad)  
Location: NWNW Sec 6 - T153N - R101W - Williams Co., ND  
License Number: 33-105-02727 Region: Williston  
Spud Date: 6/15/13 Drilling Completed: 6/22/13  
Surface Coordinates: NWNW Sec 6 - T153N - R101W - Williams Co., ND  
495' FNL & 880' FWL  
Bottom Hole Coordinates: NWNW Sec 6 - T153N - R101W - Williams Co., ND  
CP 10849' MD; 10607.73' TVD, 879' FNL & 1124' FWL  
Ground Elevation (ft): 1945' K.B. Elevation (ft): 1967'  
Logged Interval (ft): 9707' To: 10608' Total Depth (ft): 901'  
Formation: MCyn, Lodgple, UBkkn Sh, MB Dol, LBkkn Sh, Thr Fks  
Type of Drilling Fluid: Invert

Printed by MUD.LOG from WellSight Systems 1-800-447-1534 [www.WellSight.com](http://www.WellSight.com)

CORE

Contractor:  
Core #:  
Formation:  
Core Interval: From: Cut:  
To: Recovered:  
Bit type:  
Size:  
Coring Time:

OPERATOR

Company: Continental Resources, Inc.  
Address: 20 N. Broadway  
P.O. Box 269000  
Oklahoma City, Ok 73126

GEOLOGIST

Name: Adam Swoboda  
Company: Geo-Link Inc  
Address: PO Box 1764  
Red Lodge, MT 59068

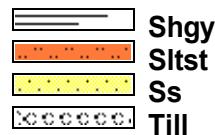
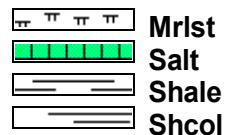
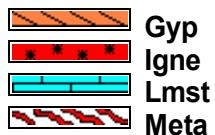
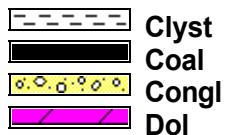
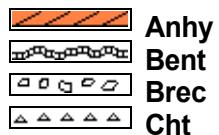
Directional

MS Energy - Kurt Wortley & Justin Klauzer

# Second Hand

Joe Dunn

## ROCK TYPES



## ACCESSORIES

### MINERAL

- Anhy
- Arggrn
- Arg
- Bent
- Bit
- Brecfrag
- Calc
- Carb
- Chtdk
- Chtlt
- Dol
- Feldspar
- Ferrpel
- Ferr
- Glau

- Gyp
- Hvymin
- Kaol
- Marl
- Minxl
- Nodule
- Phos
- Pyr
- Salt
- Sandy
- Silt
- Sil
- Sulphur
- Tuff

### FOSSIL

- Algae
- Amph
- Belm
- Bioclyst
- Brach
- Bryozoa
- Cephal
- Coral
- Crin
- Echin
- Fish
- Foram
- Fossil
- Gastro
- Oolite

- Ostra
- Pelec
- Pellet
- Pisolite
- Plant
- Strom

- Slstrg
- Ssstrg

- TEXTURE
- Boundst
- Chalky
- Cryxln
- Earthy
- Finexln
- Grainst
- Lithogr
- Microxln
- Mudst
- Packst
- Wackest

### STRINGER

- Anhy
- Arg
- Bent
- Coal
- Dol
- Gyp
- Ls
- Mrst

## OTHER SYMBOLS

### POROSITY TYPE

- Earthy
- Fenest
- Fracture
- Inter
- Moldic
- Organic
- Pinpoint

- Vuggy
- SORTING
- Well
- Moderate
- Poor

### ROUNDING

- Rounded
- Subrnd
- Subang
- Angular

### EVENTS

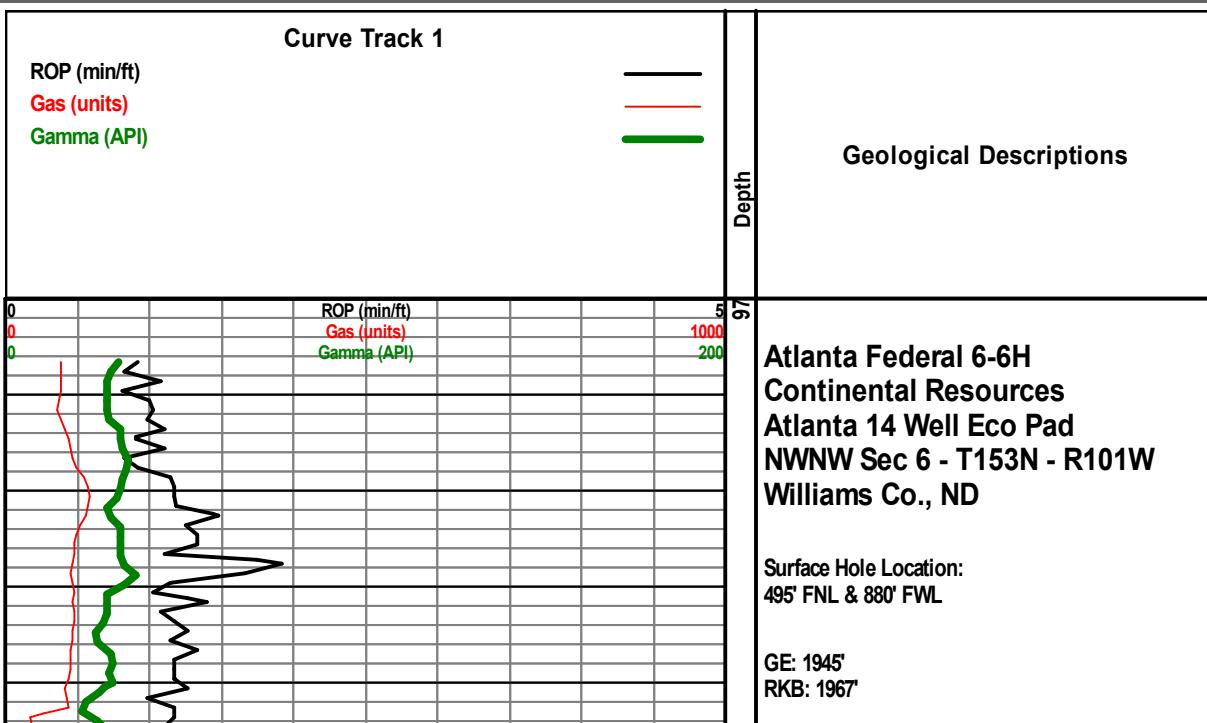
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- Sidewall

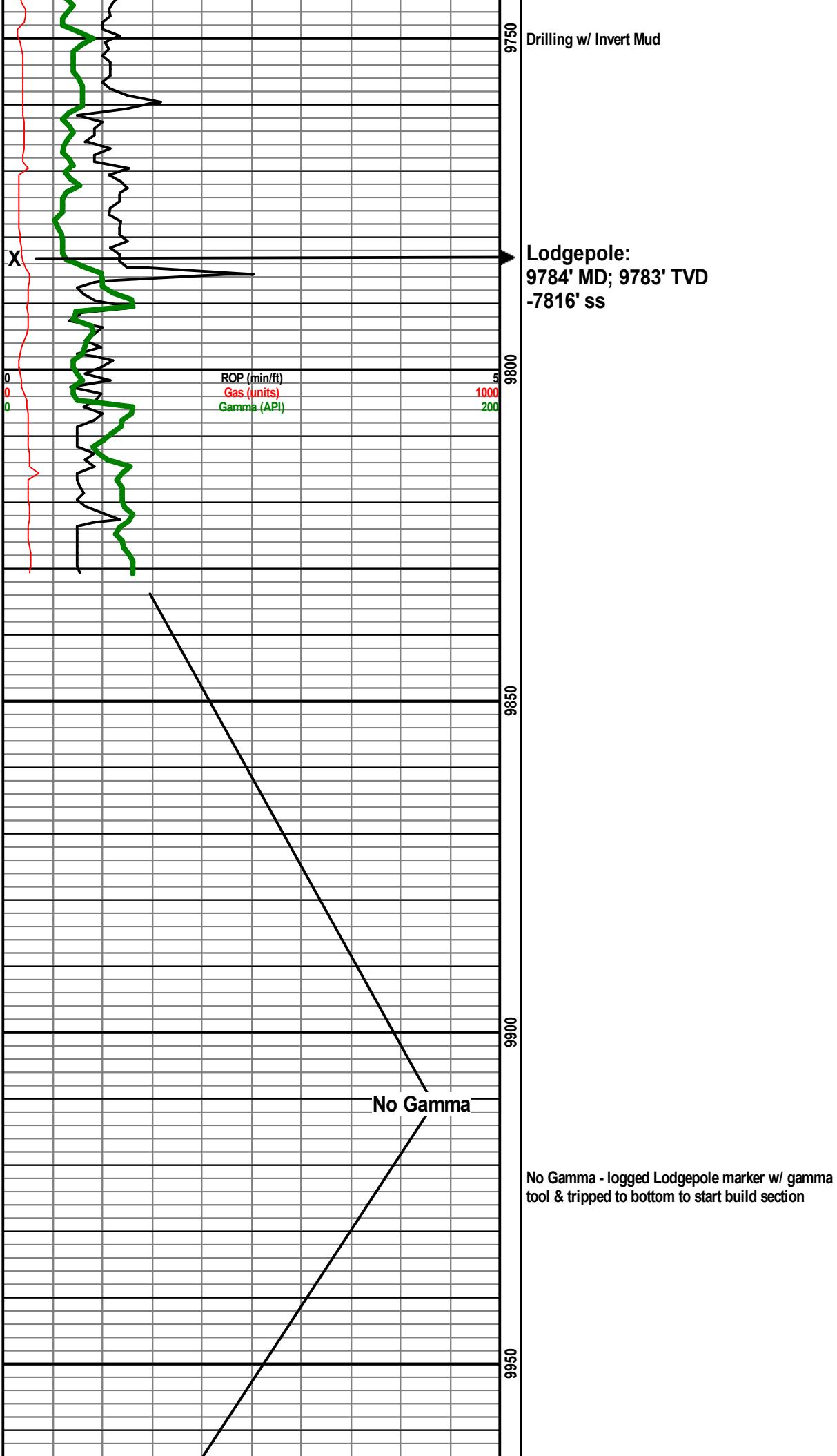
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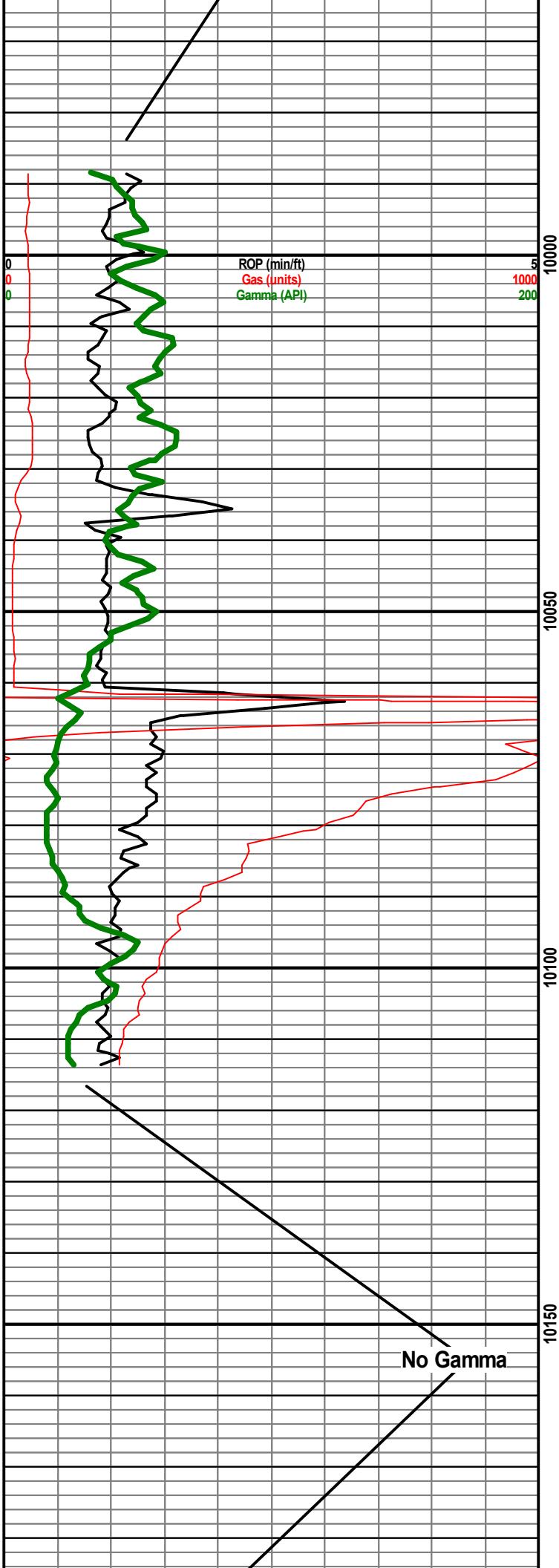
- Even

### INTERVALS

- Core
- Dst



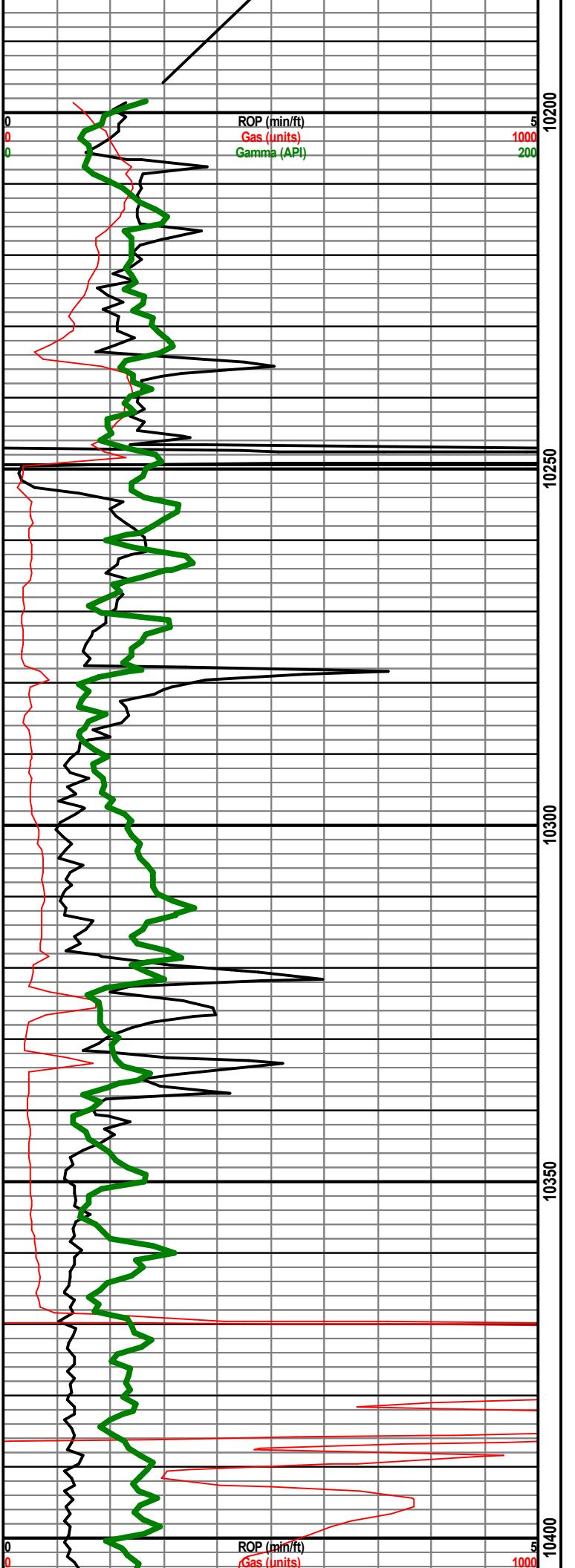


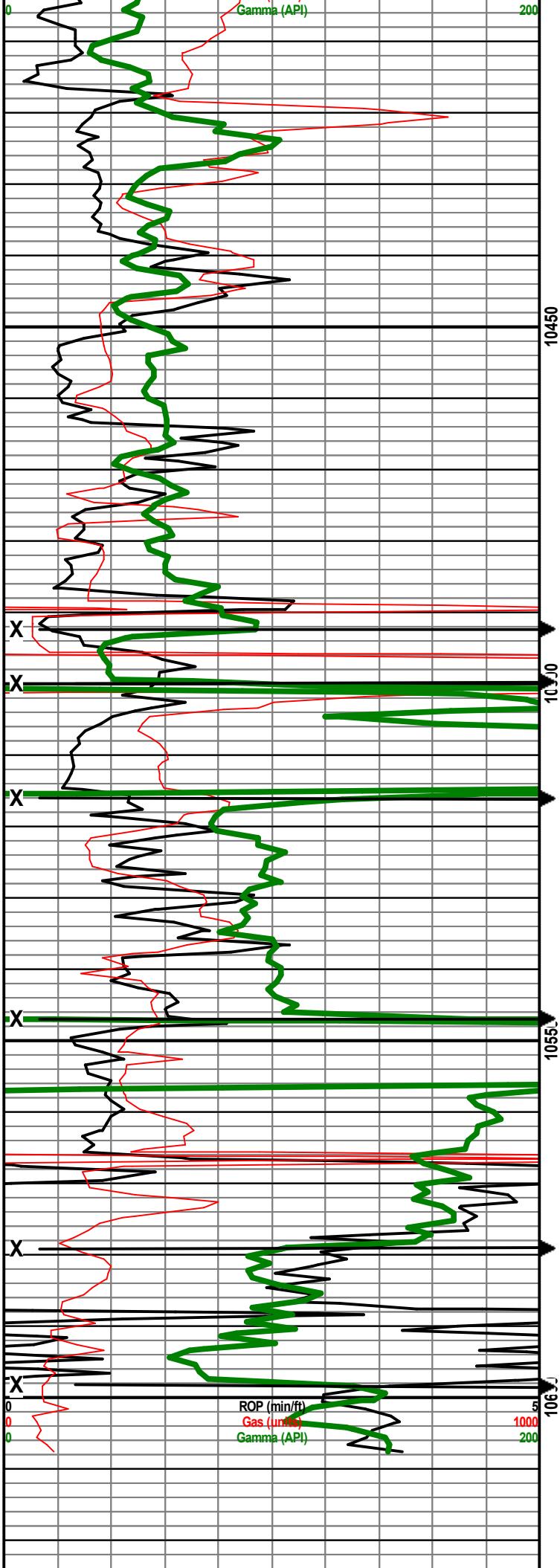


KOP: 10063' MD; 10062' TVD  
- 8095' ss

TOOH for Build Assembly @ 10063' MD - 6/19/13 -  
07:30  
Resume Drilling - 6/19/13 - 23:50

No Gamma





Field Geologist: Adam Swoboda  
Second Hand: Joe Dunn  
Geo-Link Inc.

Thank You For Using Geo-Link Inc.

# **NEWSCO**

## **International Energy Services Inc.**

Continental Resources  
Company

33214  
Job Number

5/20/2013  
Date

AES 4  
Rig

Atlanta Federal 6-6H  
Well Name

Williams Co., ND  
County & State

Surveyed from depth of: Surface to 1934'

GL to KB: 6'

Type of Survey: Nvader

**True North**

Directional Supervisor/Surveyor: David Hopper

The data and calculations for this survey have been checked by me and conform to the standards and procedures set forth by Newsco International Energy Services Inc. This report represents a true and correct directional survey of this well based on the original data obtained at the well site. Wellbore

Certified by:

  
Joshua Mahoney

# **NEWSCO**

Directional Services U.S.A.



7821 Will Rogers Blvd.  
Fort Worth, Texas 76140

817.568.1038 (office)  
817.568.1499 (fax)  
[www.msenergyservices.com](http://www.msenergyservices.com)

July 16, 2013

North Dakota Mineral Resources  
Survey Certification Sheet

**Company:** Continental Resources, Inc.

**Lease:** Atlanta Federal 6

**Well Number:** 6H

**Location:** Williams County, ND

**Job Number:** DDMT-130415

**Well API# 33-105-02727**

Attached please find the original surveys performed on the above referenced well by MS Energy Services. The data is true, correct, complete and within the limitations of the tool as set forth by MS Energy Services. I am authorized and qualified to make this report and it conforms to the principles and procedures as set forth by MS Energy Services. The surveys were performed as listed below.

---

<b>Name of Surveyor</b>	<b>Drain hole No.</b>	<b>Surveyed Depths</b>	<b>Dates Performed</b>	<b>Survey</b>
Tim Coleman	Original Wellbore	2,012' – 21,945' MD	06/14/2013 to 07/04/2013	MWD

If any other information is required, please contact the undersigned at the letterhead address and telephone number.

Sincerely,

Amber Greer  
MWD Operations Office Administrator

Attachments

**Company:** Continental Resources, Inc.

**Well Name:** Atlanta Federal 6-6H

**Location:** Williams County, ND

**Rig:** Cyclone #2

**Job Number:** DDMT-130415

**API #:** 33-105-02727

**Vertical Section Azimuth:** 146.01

**Survey Calculation Method:** Minimum Curvature

**Magnetic Declination:** 8.52

REFERENCED TO TRUE NORTH

**Proposed Direction:** 146.01

PTB:	MD	INC	AZM	TVD	N/S	E/W	VS
	22,005	88.9	143.8	10605.06	-9628.48	6479.99	11605.94

#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance	DLS/ 100	BUR/ 100'
TIE IN	1,956	0.70	260.60	1955.98	0.24	-3.12	-1.94	3.13	274.40	
1	2,012	0.70	323.20	2011.98	0.46	-3.66	-2.43	3.69	277.13	1.30 0.00
2	2,105	0.70	240.90	2104.97	0.64	-4.50	-3.04	4.54	278.05	0.99 0.00
3	2,199	1.00	249.20	2198.96	0.07	-5.77	-3.28	5.77	270.66	0.34 0.32
4	2,292	0.20	247.60	2291.96	-0.28	-6.68	-3.50	6.68	267.56	0.86 -0.86
5	2,386	0.20	258.40	2385.95	-0.38	-6.99	-3.59	7.00	266.89	0.04 0.00
6	2,479	0.60	204.70	2478.95	-0.85	-7.35	-3.40	7.40	263.37	0.55 0.43
7	2,572	0.40	128.30	2571.95	-1.50	-7.30	-2.84	7.45	258.40	0.69 -0.22
8	2,666	0.50	197.00	2665.95	-2.09	-7.16	-2.27	7.46	253.71	0.55 0.11
9	2,758	0.40	1.10	2757.95	-2.16	-7.27	-2.28	7.59	253.49	0.97 -0.11
10	2,850	0.50	10.60	2849.94	-1.44	-7.19	-2.83	7.34	258.67	0.14 0.11
11	2,944	0.40	7.90	2943.94	-0.71	-7.07	-3.36	7.11	264.25	0.11 -0.11
12	3,036	0.50	1.80	3035.94	0.01	-7.02	-3.93	7.02	270.05	0.12 0.11
13	3,129	0.50	358.30	3128.93	0.82	-7.02	-4.60	7.06	276.65	0.03 0.00
14	3,221	0.50	342.50	3220.93	1.60	-7.15	-5.32	7.33	282.63	0.15 0.00
15	3,315	0.30	357.50	3314.93	2.24	-7.28	-5.93	7.62	287.09	0.24 -0.21
16	3,407	0.30	10.70	3406.93	2.72	-7.25	-6.30	7.74	290.54	0.07 0.00
17	3,501	0.20	11.60	3500.93	3.12	-7.17	-6.59	7.82	293.51	0.11 -0.11
18	3,595	0.30	348.70	3594.93	3.52	-7.18	-6.94	8.00	296.11	0.15 0.11
19	3,688	0.00	32.70	3687.93	3.76	-7.23	-7.16	8.15	297.47	0.32 -0.32
20	3,782	0.20	72.30	3781.92	3.81	-7.08	-7.11	8.04	298.30	0.21 0.21
21	3,874	0.10	76.30	3873.92	3.88	-6.85	-7.04	7.87	299.53	0.11 -0.11
22	3,968	0.10	157.50	3967.92	3.82	-6.73	-6.93	7.74	299.57	0.14 0.00
23	4,061	0.00	231.00	4060.92	3.75	-6.70	-6.85	7.68	299.20	0.11 -0.11
24	4,155	0.30	161.40	4154.92	3.51	-6.62	-6.62	7.50	297.94	0.32 0.32
25	4,248	0.20	112.70	4247.92	3.22	-6.40	-6.25	7.16	296.71	0.24 -0.11
26	4,341	0.10	107.00	4340.92	3.13	-6.17	-6.05	6.92	296.92	0.11 -0.11
27	4,435	0.20	102.60	4434.92	3.07	-5.93	-5.86	6.68	297.39	0.11 0.11
28	4,529	0.20	55.50	4528.92	3.13	-5.64	-5.75	6.45	299.05	0.17 0.00
29	4,623	0.20	88.30	4622.92	3.23	-5.34	-5.66	6.24	301.17	0.12 0.00
30	4,716	0.50	102.20	4715.92	3.15	-4.78	-5.28	5.72	303.37	0.33 0.32
31	4,810	1.30	102.80	4809.91	2.82	-3.34	-4.21	4.37	310.24	0.85 0.85

Company:	Continental Resources, Inc.
Well Name:	Atlanta Federal 6-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130415
API #:	33-105-02727

Magnetic Declination: 8.52 REFERENCED TO TRUE NORTH ▼

Vertical Section Azimuth:	146.01	Proposed Direction:	146.01
Survey Calculation Method:	Minimum Curvature		

PTB:	MD	INC	AZM	TVD	N/S	E/W	VS
	22,005	88.9	143.8	10605.06	-9628.48	6479.99	11605.94

#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance	DLS/ 100	BUR/ 100'	
32	4,903	0.10	90.10	4902.90	2.59	-2.23	-3.39	3.42	319.31	1.29	-1.29
33	4,996	0.40	52.80	4995.90	2.79	-1.89	-3.37	3.37	325.89	0.35	0.32
34	5,090	0.60	105.30	5089.89	2.86	-1.15	-3.01	3.08	338.04	0.51	0.21
35	5,184	1.40	138.10	5183.88	1.87	0.09	-1.50	1.87	2.77	1.01	0.85
36	5,277	0.40	136.80	5276.87	0.79	1.07	-0.05	1.33	53.66	1.08	-1.08
37	5,371	0.50	132.90	5370.86	0.27	1.60	0.67	1.62	80.41	0.11	0.11
38	5,464	0.60	156.70	5463.86	-0.45	2.09	1.54	2.14	102.27	0.27	0.11
39	5,558	0.50	145.80	5557.86	-1.24	2.51	2.44	2.80	116.37	0.15	-0.11
40	5,651	0.80	139.30	5650.85	-2.07	3.16	3.49	3.78	123.24	0.33	0.32
41	5,744	0.20	325.60	5743.85	-2.43	3.49	3.97	4.26	124.82	1.07	-0.65
42	5,837	0.40	170.60	5836.85	-2.62	3.46	4.10	4.34	127.14	0.63	0.22
43	5,929	1.00	180.20	5928.84	-3.74	3.51	5.06	5.12	136.83	0.66	0.65
44	6,023	1.40	161.30	6022.82	-5.65	3.87	6.84	6.84	145.56	0.59	0.43
45	6,116	0.90	196.10	6115.80	-7.42	4.03	8.41	8.45	151.49	0.90	-0.54
46	6,209	1.80	190.50	6208.77	-9.56	3.56	9.92	10.20	159.56	0.98	0.97
47	6,303	1.00	167.00	6302.75	-11.81	3.48	11.74	12.31	163.59	1.03	-0.85
48	6,397	1.00	195.20	6396.73	-13.40	3.45	13.04	13.84	165.57	0.52	0.00
49	6,490	1.30	165.30	6489.71	-15.21	3.50	14.57	15.60	167.02	0.71	0.32
50	6,584	1.20	162.20	6583.69	-17.17	4.08	16.52	17.65	166.65	0.13	-0.11
51	6,677	0.30	199.80	6676.68	-18.33	4.29	17.60	18.83	166.83	1.05	-0.97
52	6,770	1.00	165.50	6769.68	-19.35	4.41	18.51	19.84	167.16	0.83	0.75
53	6,864	0.40	227.10	6863.67	-20.36	4.38	19.33	20.83	167.87	0.94	-0.64
54	6,957	0.50	260.90	6956.67	-20.65	3.74	19.21	20.98	169.74	0.30	0.11
55	7,050	0.40	265.30	7049.67	-20.74	3.01	18.88	20.96	171.73	0.11	-0.11
56	7,144	0.70	263.60	7143.66	-20.83	2.12	18.45	20.94	174.20	0.32	0.32
57	7,238	0.80	248.60	7237.65	-21.13	0.93	18.04	21.15	177.47	0.23	0.11
58	7,331	1.00	262.80	7330.64	-21.47	-0.48	17.54	21.48	181.27	0.32	0.22
59	7,425	0.70	267.40	7424.63	-21.60	-1.86	16.87	21.68	184.93	0.33	-0.32
60	7,519	1.00	280.60	7518.62	-21.48	-3.24	15.99	21.72	188.59	0.38	0.32
61	7,611	0.70	293.10	7610.61	-21.11	-4.55	14.96	21.59	192.16	0.38	-0.33
62	7,705	0.80	321.10	7704.60	-20.37	-5.49	13.82	21.10	195.08	0.40	0.11
63	7,798	0.80	327.60	7797.59	-19.32	-6.24	12.53	20.30	197.91	0.10	0.00
64	7,892	1.00	359.60	7891.58	-17.94	-6.60	11.19	19.12	200.20	0.57	0.21



V09.04.02

## SURVEY CALCULATION PROGRAM

7/16/13 10:37

Company:	Continental Resources, Inc.
Well Name:	Atlanta Federal 6-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130415
API #:	33-105-02727

Magnetic Declination: 8.52 REFERENCED TO TRUE NORTH ▼

Vertical Section Azimuth:	146.01	Proposed Direction:	146.01
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Survey Calculation Method:	Minimum Curvature
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PTB:	MD	INC	AZM	TVD	N/S	E/W	Closure		DLS/	BUR/	
	22,005	88.9	143.8	10605.06	-9628.48	6479.99	Distance	Azm	100	100'	
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec				
65	7,986	1.00	350.40	7985.57	-16.32	-6.74	9.76	17.65	202.46	0.17	0.00
66	8,079	0.90	343.50	8078.56	-14.81	-7.09	8.32	16.42	205.57	0.16	-0.11
67	8,172	0.70	349.40	8171.55	-13.56	-7.40	7.10	15.44	208.63	0.23	-0.22
68	8,264	0.50	330.10	8263.54	-12.66	-7.70	6.19	14.82	211.33	0.31	-0.22
69	8,358	0.30	336.70	8357.54	-12.07	-8.00	5.54	14.49	213.54	0.22	-0.21
70	8,452	0.10	188.20	8451.54	-11.93	-8.11	5.36	14.43	214.22	0.41	-0.21
71	8,545	0.20	210.80	8544.54	-12.15	-8.21	5.48	14.66	214.04	0.12	0.11
72	8,636	0.20	261.00	8635.54	-12.31	-8.45	5.49	14.93	214.45	0.19	0.00
73	8,730	0.10	240.50	8729.54	-12.38	-8.68	5.41	15.12	215.04	0.12	-0.11
74	8,823	0.20	219.40	8822.54	-12.54	-8.85	5.45	15.35	215.22	0.12	0.11
75	8,917	0.10	155.90	8916.54	-12.74	-8.92	5.58	15.56	215.00	0.19	-0.11
76	9,005	0.10	161.40	9004.54	-12.89	-8.87	5.73	15.64	214.54	0.01	0.00
77	9,103	0.10	79.10	9102.54	-12.95	-8.76	5.84	15.63	214.06	0.13	0.00
78	9,197	0.10	94.60	9196.54	-12.94	-8.59	5.93	15.54	213.59	0.03	0.00
79	9,291	0.10	108.40	9290.54	-12.97	-8.43	6.04	15.48	213.03	0.03	0.00
80	9,384	0.10	202.40	9383.54	-13.08	-8.39	6.15	15.54	212.68	0.16	0.00
81	9,478	0.10	140.00	9477.54	-13.21	-8.37	6.28	15.64	212.34	0.11	0.00
82	9,572	0.10	266.90	9571.54	-13.28	-8.40	6.32	15.71	212.30	0.19	0.00
83	9,665	0.10	167.30	9664.54	-13.36	-8.46	6.35	15.82	212.33	0.16	0.00
84	9,759	0.30	160.50	9758.54	-13.68	-8.36	6.67	16.03	211.43	0.21	0.21
85	9,853	0.30	193.30	9852.53	-14.15	-8.33	7.07	16.42	210.50	0.18	0.00
86	9,946	0.10	166.20	9945.53	-14.46	-8.37	7.31	16.71	210.06	0.23	-0.22
87	10,010	0.10	134.30	10009.53	-14.56	-8.32	7.42	16.77	209.74	0.09	0.00
88	10,070	0.10	135.40	10069.53	-14.63	-8.24	7.52	16.79	209.40	0.00	0.00
89	10,101	2.00	136.90	10100.53	-15.05	-7.85	8.08	16.97	207.57	6.13	6.13
90	10,132	6.00	140.60	10131.45	-16.69	-6.46	10.23	17.90	201.14	12.92	12.90
91	10,163	10.50	142.50	10162.12	-20.19	-3.71	14.67	20.53	190.40	14.54	14.52
92	10,194	14.40	143.70	10192.38	-25.54	0.30	21.34	25.54	179.33	12.61	12.58
93	10,227	17.40	149.80	10224.12	-33.11	5.21	30.37	33.52	171.06	10.39	9.09
94	10,258	18.90	149.60	10253.57	-41.45	10.08	40.00	42.66	166.33	4.84	4.84
95	10,290	20.40	148.00	10283.71	-50.65	15.66	50.75	53.01	162.82	4.98	4.69
96	10,321	23.00	144.50	10312.51	-60.16	22.04	62.21	64.07	159.88	9.37	8.39

Company:	Continental Resources, Inc.
Well Name:	Atlanta Federal 6-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130415
API #:	33-105-02727

Magnetic Declination: 8.52 REFERENCED TO TRUE NORTH ▼

Vertical Section Azimuth:	146.01	Proposed Direction:	146.01
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Survey Calculation Method:	Minimum Curvature
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PTB:	MD		INC		AZM		TVD	N/S	E/W	VS	
	22,005		88.9		143.8		10605.06	-9628.48	6479.99	11605.94	
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance	Azm	DLS/ 100	BUR/ 100'
97	10,352	24.20	143.30	10340.92	-70.19	29.36	74.61	76.08	157.30	4.17	3.87
98	10,383	26.80	142.70	10368.90	-80.84	37.39	87.93	89.07	155.18	8.43	8.39
99	10,415	30.80	141.60	10396.93	-93.01	46.85	103.31	104.14	153.26	12.61	12.50
100	10,446	34.20	142.30	10423.07	-106.13	57.11	119.92	120.52	151.71	11.03	10.97
101	10,477	36.50	144.00	10448.36	-120.48	67.86	137.83	138.28	150.61	8.07	7.42
102	10,513	40.30	144.90	10476.57	-138.67	80.86	160.18	160.52	149.76	10.67	10.56
103	10,544	44.00	145.90	10499.55	-155.80	92.66	180.98	181.27	149.26	12.13	11.94
104	10,575	47.60	145.20	10521.15	-174.12	105.23	203.20	203.45	148.85	11.73	11.61
105	10,604	52.70	144.00	10539.73	-192.26	118.13	225.45	225.65	148.43	17.87	17.59
106	10,635	57.20	143.90	10557.53	-212.77	133.07	250.80	250.95	147.98	14.52	14.52
107	10,666	61.70	144.30	10573.28	-234.39	148.71	277.48	277.59	147.61	14.56	14.52
108	10,697	68.10	145.30	10586.43	-257.32	164.88	305.53	305.61	147.35	20.85	20.65
109	10,729	75.10	146.60	10596.52	-282.47	181.87	335.87	335.95	147.22	22.21	21.88
110	10,760	80.70	148.00	10603.02	-307.96	198.23	366.16	366.25	147.23	18.60	18.06
111	10,791	85.80	148.40	10606.66	-334.12	214.45	396.92	397.02	147.31	16.50	16.45
112	10,822	89.60	149.60	10607.90	-360.67	230.40	427.84	427.98	147.43	12.85	12.26
113	10,831	90.10	149.80	10607.93	-368.44	234.94	436.83	436.97	147.48	5.98	5.56
114	10,924	91.10	149.80	10606.95	-448.81	281.72	529.62	529.90	147.88	1.08	1.08
115	10,988	92.40	149.50	10605.00	-504.01	314.04	593.46	593.84	148.07	2.08	2.03
116	11,083	93.20	148.00	10600.36	-585.13	363.26	688.23	688.72	148.17	1.79	0.84
117	11,177	92.30	146.70	10595.85	-664.18	413.91	782.09	782.60	148.07	1.68	-0.96
118	11,272	92.00	146.20	10592.28	-743.30	466.38	877.02	877.50	147.89	0.61	-0.32
119	11,366	90.90	145.00	10589.91	-820.83	519.47	970.99	971.40	147.67	1.73	-1.17
120	11,460	89.80	144.70	10589.33	-897.69	573.58	1064.96	1065.29	147.42	1.21	-1.17
121	11,555	89.40	144.70	10589.99	-975.22	628.48	1159.94	1160.19	147.20	0.42	-0.42
122	11,649	90.00	144.60	10590.49	-1051.89	682.86	1253.91	1254.10	147.01	0.65	0.64
123	11,743	90.80	143.20	10589.83	-1127.83	738.25	1347.84	1347.97	146.79	1.72	0.85
124	11,838	90.40	144.80	10588.84	-1204.68	794.08	1442.77	1442.85	146.61	1.74	-0.42
125	11,932	89.70	144.40	10588.75	-1281.30	848.53	1536.74	1536.80	146.49	0.86	-0.74
126	12,026	89.30	145.40	10589.57	-1358.20	902.58	1630.72	1630.76	146.39	1.15	-0.43
127	12,121	89.30	145.80	10590.73	-1436.58	956.25	1725.71	1725.74	146.35	0.42	0.00
128	12,215	89.70	146.00	10591.55	-1514.42	1008.95	1819.71	1819.74	146.33	0.48	0.43

Company:	Continental Resources, Inc.
Well Name:	Atlanta Federal 6-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130415
API #:	33-105-02727

Magnetic Declination: 8.52 REFERENCED TO TRUE NORTH ▼

Vertical Section Azimuth:	146.01	Proposed Direction:	146.01
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Survey Calculation Method:	Minimum Curvature
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PTB:	MD	INC	AZM	TVD	N/S	E/W	VS
	22,005	88.9	143.8	10605.06	-9628.48	6479.99	11605.94

#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance	DLS/ 100	BUR/ 100'	
129	12,310	90.10	145.70	10591.72	-1593.04	1062.27	1914.71	1914.73	146.30	0.53	0.42
130	12,404	90.90	145.70	10590.90	-1670.69	1115.24	2008.70	2008.72	146.28	0.85	0.85
131	12,499	90.20	144.90	10589.99	-1748.79	1169.32	2103.69	2103.70	146.23	1.12	-0.74
132	12,593	88.70	143.90	10590.89	-1825.21	1224.04	2197.64	2197.65	146.15	1.92	-1.60
133	12,687	89.70	144.20	10592.20	-1901.30	1279.22	2291.58	2291.58	146.07	1.11	1.06
134	12,782	91.00	144.40	10591.62	-1978.44	1334.65	2386.53	2386.53	146.00	1.38	1.37
135	12,876	89.90	143.10	10590.88	-2054.24	1390.23	2480.45	2480.45	145.91	1.81	-1.17
136	12,970	90.20	142.90	10590.80	-2129.32	1446.80	2574.32	2574.34	145.81	0.38	0.32
137	13,064	89.50	142.20	10591.05	-2203.94	1503.96	2668.15	2668.19	145.69	1.05	-0.74
138	13,158	89.80	143.80	10591.62	-2279.01	1560.52	2762.01	2762.08	145.60	1.73	0.32
139	13,253	91.60	145.00	10590.46	-2356.24	1615.82	2856.96	2857.05	145.56	2.28	1.89
140	13,347	90.10	144.90	10589.07	-2433.18	1669.80	2950.93	2951.03	145.54	1.60	-1.60
141	13,442	89.20	145.30	10589.65	-2511.10	1724.15	3045.92	3046.03	145.53	1.04	-0.95
142	13,536	88.90	146.00	10591.21	-2588.69	1777.18	3139.90	3140.01	145.53	0.81	-0.32
143	13,630	87.60	146.00	10594.08	-2666.58	1829.72	3233.86	3233.97	145.54	1.38	-1.38
144	13,725	88.80	146.60	10597.06	-2745.58	1882.40	3328.81	3328.91	145.57	1.41	1.26
145	13,820	89.00	146.90	10598.88	-2825.01	1934.48	3423.78	3423.87	145.60	0.38	0.21
146	13,914	90.90	147.50	10598.97	-2904.02	1985.40	3517.76	3517.83	145.64	2.12	2.02
147	14,009	91.10	147.40	10597.31	-2984.09	2036.50	3612.71	3612.77	145.69	0.24	0.21
148	14,103	88.50	146.70	10597.64	-3062.96	2087.62	3706.69	3706.73	145.72	2.86	-2.77
149	14,197	88.60	146.60	10600.02	-3141.45	2139.28	3800.65	3800.69	145.75	0.15	0.11
150	14,271	88.60	148.60	10601.82	-3203.91	2178.92	3874.60	3874.63	145.78	2.70	0.00
151	14,366	90.20	149.10	10602.82	-3285.21	2228.06	3969.47	3969.49	145.85	1.76	1.68
152	14,460	87.90	148.10	10604.38	-3365.42	2277.02	4063.36	4063.36	145.92	2.67	-2.45
153	14,554	89.10	146.80	10606.84	-3444.63	2327.58	4157.29	4157.29	145.95	1.88	1.28
154	14,649	89.60	146.00	10607.92	-3523.75	2380.15	4252.28	4252.28	145.96	0.99	0.53
155	14,743	88.00	146.20	10609.88	-3601.75	2432.56	4346.26	4346.26	145.97	1.72	-1.70
156	14,837	89.00	146.50	10612.34	-3679.97	2484.63	4440.22	4440.22	145.97	1.11	1.06
157	14,931	89.90	147.60	10613.25	-3758.85	2535.75	4534.20	4534.20	146.00	1.51	0.96
158	15,025	90.50	147.20	10612.92	-3838.04	2586.40	4628.17	4628.17	146.02	0.77	0.64
159	15,120	91.70	146.90	10611.09	-3917.74	2638.06	4723.14	4723.14	146.05	1.30	1.26
160	15,214	90.70	146.70	10609.13	-3996.38	2689.52	4817.11	4817.11	146.06	1.08	-1.06

Company:	Continental Resources, Inc.
Well Name:	Atlanta Federal 6-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130415
API #:	33-105-02727

Magnetic Declination: 8.52 REFERENCED TO TRUE NORTH ▼

Vertical Section Azimuth:	146.01	Proposed Direction:	146.01
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Survey Calculation Method:	Minimum Curvature
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PTB:	MD	INC	AZM	TVD	N/S	E/W	VS
	22,005	88.9	143.8	10605.06	-9628.48	6479.99	11605.94

#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance	DLS/ 100	BUR/ 100'	
161	15,309	91.30	147.10	10607.47	-4075.95	2741.39	4912.08	4912.08	146.08	0.76	0.63
162	15,403	89.10	145.60	10607.14	-4154.19	2793.47	5006.07	5006.07	146.08	2.83	-2.34
163	15,497	90.60	145.20	10607.39	-4231.56	2846.85	5100.06	5100.06	146.07	1.65	1.60
164	15,592	88.30	144.90	10608.30	-4309.42	2901.26	5195.04	5195.04	146.05	2.44	-2.42
165	15,687	87.30	144.90	10611.94	-4387.08	2955.85	5289.95	5289.95	146.03	1.05	-1.05
166	15,781	88.50	145.60	10615.39	-4464.27	3009.39	5383.87	5383.87	146.02	1.48	1.28
167	15,876	89.90	146.00	10616.72	-4542.83	3062.78	5478.86	5478.86	146.01	1.53	1.47
168	15,970	89.80	145.50	10616.96	-4620.53	3115.68	5572.86	5572.86	146.01	0.54	-0.11
169	16,064	91.70	146.70	10615.73	-4698.54	3168.10	5666.84	5666.84	146.01	2.39	2.02
170	16,159	91.20	146.00	10613.33	-4777.59	3220.73	5761.81	5761.81	146.01	0.91	-0.53
171	16,253	89.40	145.90	10612.84	-4855.47	3273.36	5855.81	5855.81	146.01	1.92	-1.91
172	16,347	90.10	146.00	10613.25	-4933.35	3325.99	5949.80	5949.80	146.01	0.75	0.74
173	16,441	89.20	145.60	10613.82	-5011.10	3378.82	6043.80	6043.80	146.01	1.05	-0.96
174	16,536	90.40	145.50	10614.15	-5089.43	3432.56	6138.80	6138.80	146.00	1.27	1.26
175	16,630	90.30	144.60	10613.58	-5166.48	3486.41	6232.78	6232.78	145.99	0.96	-0.11
176	16,724	89.90	143.80	10613.41	-5242.72	3541.39	6326.73	6326.73	145.96	0.95	-0.43
177	16,818	91.30	143.20	10612.43	-5318.27	3597.30	6420.63	6420.64	145.93	1.62	1.49
178	16,913	91.50	144.00	10610.11	-5394.72	3653.66	6515.52	6515.53	145.89	0.87	0.21
179	17,007	90.00	145.30	10608.88	-5471.37	3708.04	6609.48	6609.50	145.87	2.11	-1.60
180	17,102	88.80	145.40	10609.87	-5549.52	3762.05	6704.47	6704.49	145.87	1.27	-1.26
181	17,196	89.30	147.50	10611.43	-5627.84	3813.99	6798.45	6798.47	145.87	2.30	0.53
182	17,291	90.40	147.30	10611.68	-5707.88	3865.17	6893.42	6893.43	145.90	1.18	1.16
183	17,386	90.00	146.70	10611.35	-5787.55	3916.91	6988.40	6988.41	145.91	0.76	-0.42
184	17,480	90.70	146.80	10610.77	-5866.16	3968.45	7082.39	7082.40	145.92	0.75	0.74
185	17,575	91.10	146.70	10609.28	-5945.59	4020.53	7177.37	7177.38	145.93	0.43	0.42
186	17,669	90.70	146.90	10607.80	-6024.24	4071.99	7271.35	7271.36	145.94	0.48	-0.43
187	17,763	90.50	146.60	10606.82	-6102.85	4123.53	7365.34	7365.34	145.95	0.38	-0.21
188	17,858	90.50	147.20	10605.99	-6182.43	4175.41	7460.32	7460.32	145.97	0.63	0.00
189	17,952	89.60	146.40	10605.91	-6261.08	4226.88	7554.31	7554.31	145.98	1.28	-0.96
190	18,046	88.80	145.80	10607.22	-6339.09	4279.30	7648.30	7648.30	145.98	1.06	-0.85
191	18,141	89.10	146.20	10608.96	-6417.84	4332.41	7743.28	7743.29	145.98	0.53	0.32
192	18,235	88.40	145.60	10611.01	-6495.66	4385.10	7837.26	7837.26	145.98	0.98	-0.74

Company:	Continental Resources, Inc.
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Well Name:	Atlanta Federal 6-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130415
API #:	33-105-02727

Magnetic Declination:	8.52	REFERENCED TO TRUE NORTH
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V09.04.02

## SURVEY CALCULATION PROGRAM

7/16/13 10:37

Company:	Continental Resources, Inc.
Well Name:	Atlanta Federal 6-6H
Location:	Williams County, ND

Rig:	Cyclone #2
Job Number:	DDMT-130415
API #:	33-105-02727

Vertical Section Azimuth:	146.01
Survey Calculation Method:	Minimum Curvature

PTB:	MD	INC	AZM	TVD	N/S	E/W	VS
	22,005	88.9	143.8	10605.06	-9628.48	6479.99	11605.94

#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance	Closure Azm	DLS/ 100	BUR/ 100'
225	21,347	90.20	148.20	10604.22	-9078.15	6120.05	10948.41	10948.41	146.01	0.22	0.22
226	21,442	90.80	149.00	10603.39	-9159.23	6169.54	11043.31	11043.31	146.04	1.05	0.63
227	21,536	89.40	149.00	10603.23	-9239.80	6217.95	11137.18	11137.19	146.06	1.49	-1.49
228	21,630	90.00	148.00	10603.72	-9319.95	6267.07	11231.09	11231.10	146.08	1.24	0.64
229	21,725	90.60	146.60	10603.22	-9399.89	6318.39	11326.06	11326.07	146.09	1.60	0.63
230	21,819	90.00	145.20	10602.73	-9477.72	6371.09	11420.06	11420.07	146.09	1.62	-0.64
231	21,914	89.20	143.80	10603.39	-9555.06	6426.25	11515.02	11515.03	146.08	1.70	-0.84
232	21,945	88.90	143.80	10603.91	-9580.07	6444.56	11545.99	11546.00	146.07	0.97	-0.97



## SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA  
OIL AND GAS DIVISION  
600 EAST BOULEVARD DEPT 405  
BISMARCK, ND 58505-0840  
SFN 5749 (09-2006)



Well File No.  
**23367**

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.  
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

<input checked="" type="checkbox"/> Notice of Intent	Approximate Start Date <b>May 18, 2013</b>	<input type="checkbox"/> Drilling Prognosis	<input type="checkbox"/> Spill Report
<input type="checkbox"/> Report of Work Done	Date Work Completed	<input type="checkbox"/> Redrilling or Repair	<input type="checkbox"/> Shooting
<input type="checkbox"/> Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date	<input type="checkbox"/> Casing or Liner	<input type="checkbox"/> Acidizing
		<input type="checkbox"/> Plug Well	<input type="checkbox"/> Fracture Treatment
		<input type="checkbox"/> Supplemental History	<input type="checkbox"/> Change Production Method
		<input type="checkbox"/> Temporarily Abandon	<input type="checkbox"/> Reclamation
		<input checked="" type="checkbox"/> Other	<b>Suspension of Drilling</b>

Well Name and Number <b>Atlanta Federal 6-6H</b>						
Footages <b>495 F N L</b>	<b>880 F WL</b>	Qtr-Qtr <b>NWNW</b>	Section <b>6</b>	Township <b>153 N</b>	Range <b>101 W</b>	
Field <b>Baker</b>	Pool <b>Bakken</b>	County <b>Williams</b>				

24-HOUR PRODUCTION RATE			
Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s) <b>Advanced Energy Services</b>			
Address <b>P.O. Box 85</b>	City <b>S. Boardman</b>	State <b>MI</b>	Zip Code

### DETAILS OF WORK

Continental Resources, Inc. (CRI) requests permission for suspension of drilling for up to 90 days for the referenced well under NDAC 43-02-03-55. CRI intends to drill the surface hole with freshwater based drilling mud and set surface casing with a small drilling rig and move off within 3 to 5 days. The casing will be set at a depth pre-approved by the NDIC per the Application for Permit to Drill NDAC 43-02-03-21. No saltwater will be used in the drilling and cementing operations of the surface casing. Once the surface casing is cemented, a plug or mechanical seal will be placed at the top of the casing to prevent any foreign matter from getting into the well. A rig capable of drilling to TD will move onto the location within the 90 days previously outlined to complete the drilling and casing plan as per the APD. The undersigned states that this request for suspension of drilling operations in accordance with the Subsection 4 of Section 43-02-03-55 of the NDAC, is being requested to take advantage of the cost savings and time savings of using an initial rig that is smaller than the rig necessary to drill a well to total depth but is not intended to alter or extend the terms and conditions of, or suspend any obligation under, any oil and gas lease with acreage in or under the spacing or drilling unit for the above-referenced well. CRI understands NDAC 43-02-03-31 requirements regarding confidentiality pertaining to this permit. The drilling pit will be fenced immediately after construction if the well pad is located in a pasture (NDAC 43-02-03-19 & 19.1). CRI will plug and abandon the well and reclaim the well site if the well is not drilled by the larger rotary rig within 90 days after spudding the well with the smaller drilling rig.

<i>Notify NOIC Inspector JESSICA GILKEY 701-770-7340 with Spud &amp; TD Info</i>		
Company <b>Continental Resources, Inc.</b>	Telephone Number <b>(405) 234-9000</b>	
Address <b>P.O. Box 268870</b>		
City <b>Oklahoma City</b>	State <b>OK</b>	Zip Code <b>73126</b>
Signature <i>Terry L. Olson</i>	Printed Name <b>Terry L. Olson</b>	
Title <b>Regulatory Compliance Specialist</b>	Date <b>May 13, 2013</b>	
Email Address <b>Terry.Olson@clr.com</b>		
FOR STATE USE ONLY		
<input type="checkbox"/> Received <input checked="" type="checkbox"/> Approved		
Date <b>5-13-2013</b>		
By <i>Dawn Tamm</i>		
Title <b>Engineering Technician</b>		



# SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA  
OIL AND GAS DIVISION  
600 EAST BOULEVARD DEPT 405  
BISMARCK, ND 58505-0840  
SFN 5749 (03-2004)

Well File No.

23367



PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.  
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

<input checked="" type="checkbox"/> Notice of Intent	Approximate Start Date <b>January 29, 2013</b>	<input type="checkbox"/> Drilling Prognosis	<input type="checkbox"/> Spill Report
<input type="checkbox"/> Report of Work Done	Date Work Completed	<input type="checkbox"/> Redrilling or Repair	<input type="checkbox"/> Shooting
<input type="checkbox"/> Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date	<input type="checkbox"/> Casing or Liner	<input type="checkbox"/> Acidizing
		<input type="checkbox"/> Plug Well	<input type="checkbox"/> Fracture Treatment
		<input type="checkbox"/> Supplemental History	<input type="checkbox"/> Change Production Method
		<input type="checkbox"/> Temporarily Abandon	<input type="checkbox"/> Reclamation
		<input checked="" type="checkbox"/> Other	<b>Flow back exemption</b>

Well Name and Number <b>Atlanta Federal 6-6H</b>					
Footages	Qtr-Qtr	Section	Township	Range	
495 F N L	880 F W L	NWNW	6	153 N	101 W
Field <b>Baker</b>	Pool <b>Bakken</b>		County <b>Williams</b>		

24-HOUR PRODUCTION RATE			
Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Address	City	State	Zip Code

## DETAILS OF WORK

Continental Resources, Inc. requests a waiver from the tubing/pkr requirement included in NDIC 43-02-03-21: Casing, Tubing, and Cementing Requirements during the completion period immediately following the upcoming fracture stimulation. The following assurances apply:

- 1) The well is equipped with 26#/ft P-110 7" casing at surface with an API burst rating of 9960 psig for the 26 #/ft casing.
- 2) The frac design will use a safety factor of 0.85 \* API burst rating to determine the max pressure.
- 3) Damage to the casing during the frac would be detected immediately by monitoring equipment.
- 4) The casing is exposed to significantly lower rates and pressures during flow back than during the frac job.
- 5) The frac fluid and formation fluids have very low corrosion and erosion rates
- 6) Production equipment will be installed as soon as possible after the well ceases flowing.
- 7) A 300# gauge will be installed on surface casing during flowback period.

Company <b>Continental Resources, Inc.</b>	Telephone Number <b>405-234-9000</b>	
Address <b>P.O. Box 269000</b>		
City <b>Oklahoma City</b>	State <b>OK</b>	Zip Code <b>73126</b>
Signature 	Printed Name <b>Jim Landrigan</b>	
Title <b>Completion Engineer</b>	Date <b>December 3, 2012</b>	

FOR STATE USE ONLY	
<input type="checkbox"/> Received	<input checked="" type="checkbox"/> Approved
Date <b>December 14, 2012</b>	
By 	
Title <b>PETROLEUM ENGINEER</b>	

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

8105 Black Hawk Rd • PQ Box 558 • Black Hawk, SD 57718-0558 • Phone (605) 787-9303 • FAX (605) 787-9515  
140 Pine Needle Drive • Spearfish, SD 57783 • Phone (605) 642-2742 • Mobile 390-3768

**CONTINENTAL RESOURCES, INC.**

C/O Brosz Engineering  
P.O. Box 357  
Bowman, North Dakota 58623

June 12, 2012

**Attn: Jade Hedge**

**Subj: Report of Geotechnical Engineering Analysis**  
**Atlanta Drill Pad**  
**Continental Resources**  
Near Williston, North Dakota

ATS No. 12-12165

We have completed the geotechnical engineering analysis of the soils at the proposed Atlanta Drill Pad site located approximately 5 miles southwest of Williston, North Dakota. This analysis was authorized by Jade Hedge of Brosz Engineering on behalf of Continental Resources. Our soil design and construction recommendations are attached.

**Geologic Profile:**

Based on our analysis, we have determined the soil profile at the proposed Atlanta Drill Pad site consists of variable depths of sand and clay glacial deposits overlying fat clay glacial till and Pierre Shale. The sand and clay glacial deposits have variable amounts of clay, sand, gravel and traces of coal. The sands are of low plasticity and the fat clay glacial till is highly plastic and expansive.

**Global Slope Stability:**

The Owner elected not to conduct a slope stability analysis at this site. Thus, our recommendations are given with no acceptance or assumption of the global stability of the slopes at this site. Global stability issues may be present and may create land shifting or sliding in the future.

**Geotechnical Summary:**

The Atlanta Drill Pad will be constructed on a site with ridge and swale topography on the breaks of the Missouri River near Williston. We understand the Atlanta Drill pad will be created with massive cut and fill earthwork techniques. Cut depths on the order of 20 to 25 feet and fill depths up to 50 feet are planned for the construction of the drill pad.

We are providing drill pad construction earthwork recommendations given the soil profile and knowing the earthwork required to create the drill pad. We offer the following:

**Cut Sections:**

We recommend that any structure, drill rig, or other more permanent elements which are intolerant to differential movement be placed on the cut areas of the site.

Based on our drill program, we know that variable depths of sand mixtures overlie fat clay glacial till in the cut areas of the site. We recommend the fill pad finished elevation be established at the fat clay till contact or the sands be totally removed to the glacial till contact and then replaced with compacted clays. It is desired to not have layers of sand over clays as instability can result with moisture accumulation below sands and atop clays.

**Fill Sections:**

We recommend that no structure, drill rig, or other more permanent elements which are intolerant to differential movement be placed over fill areas. If it is desired or necessary to occupy fill areas, we recommend placement of such elements not be conducted until the fill sections have been allowed to consolidate for a minimum of one (1) year. We recommend the fill sections be monitored for vertical and horizontal movement upon completion in order to determine the stability of the sections.

We recommend the swales (valleys) which will be filled have underdrains installed prior to placing fill. We recommend pairs (set of 2 pipes) of 6" flexible PVC drain tile materials be installed along the toes of the existing swales prior to placing fill. The underdrain pipes should be sloped to daylight and must be kept unobstructed.

Fill placed on the existing toes of slopes must be keyed in a minimum depth of five (5) feet prior to placing fill. Fill must also be horizontally benched into existing slopes as fill is placed. We recommend benches be a minimum of 8 feet wide and be installed every two (2) feet vertically.

**Drainage Considerations:**

We recommend an intercepting drainage trench be excavated atop the cut to divert surface runoff away from the site. We also recommend the final drill pad be sloped to drain at a minimum rate of 5%.

We recommend the drill pad finished surface consist of compacted clays (either exposed native soils or placed clay soils) to minimize subsurface infiltration. Service gravel with separation fabric should be used in traffic areas to allow for access over clay surfaces.

**Earthwork Considerations:**

All fill soils must be moisture conditioned to +/-3% of optimum moisture content and be compacted to a minimum of 95% of ASTM D 698 standard proctor value.

Loose lifts of fill must not exceed 8" and may be increased to 12" if proper compaction equipment is used and density is verified. Cut/fill earthwork operations in freezing weather must be monitored for frost intrusion and frost lensing. Cut/fill earthwork in winter months is not recommended for this site due to the depths of fill planned.

**CONTINENTAL RESOURCES, INC.  
Report of Geotechnical Engineering Analysis  
Atlanta Drill Pad**

**June 12, 2012  
ATS No. 12-12165  
Near Williston, ND**

**Closure:**

Critical specific recommendations are presented in the report. Reference the site plan in the Appendix for boring locations.

We are available to give further design or consultation if necessary. We should be retained to observe, test, and approve the soils at the time of construction.

We look forward to working with you on future projects.

Sincerely,  
**American Technical Services, Inc.**



Dave G. Bressler, P.E.  
Director of Engineering

Copies to: Addressee (4)

## **INTRODUCTION**

This report presents the results of our geotechnical engineering analysis of the soils at the proposed Atlanta Drill Pad site located approximately 5 miles southwest of Williston, North Dakota. This analysis was authorized by Jade Hedge of Brosz Engineering on behalf of Continental Resources.

Our services included laboratory testing of provided samples, performing engineering analysis, providing recommendations for use in drill pad design and construction. Results of the laboratory tests are presented in the report.

Our professional services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by geotechnical engineers practicing in this or similar localities. No other warranty, express or implied, is made. This report is not a bidding document. Any contractor reviewing this report must draw his own conclusions regarding site conditions and specific construction techniques to be used on this project.

## **PROJECT INFORMATION**

Project information supplied by Brosz Engineering indicates Continental Resources intends to construct a drill pad near Williston, North Dakota. It is our understanding the site will be leveled by massive cut/fill construction. Based on our review of the provided site plans, some fill sections will be upwards of 50 feet in depth. Based on the request for proposal from Brosz Engineering, we are to provide a geotechnical evaluation of the site, provide recommendations for benching and side slopes, and provide slope construction guidelines.

We previously submitted (March, 2012) a proposal for the work at this site which included a slope stability analysis. We understand the Owner elected not to conduct the slope stability analysis.

## **SUBSURFACE EXPLORATION & TESTING PROGRAMS**

We conducted ten (10) explorations to depths of 21 to 61 feet below existing site grades at the Atlanta Drill pad site. The explorations were at the approximate location shown on the attached site plan.

The Unified Soil Classification System was used to classify the soils encountered. Laboratory analyses were performed on representative soil samples to aid in material classification and to estimate pertinent engineering properties of the on-site soils. Testing was performed in accordance with applicable ASTM specifications.

The scope of our services did not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, surface water, groundwater or air, on or below this site. All conditions noted or observed are strictly for the information of our client. If environmental information is required, we recommend an environmental assessment be conducted which addresses environmental concerns.

## **SITE CONDITIONS**

### **Surface:**

The Atlanta Drill Pad site is located approximately 5 miles southwest of Williston, North Dakota. The site lies on the breaks of the Missouri River. The surface at the pad site consists of ridge and swale topography with well defined drainage swales present. The surface is primarily grass and weed covered with overall drainage trending to the south.

### **Subsurface:**

Detailed soil profiles are presented in the boring logs in the Appendix. Based on our analysis, we have determined the soil profile at the proposed Atlanta Drill Pad site consists of variable depths of sand and clay glacial deposits overlying fat clay glacial till and Pierre Shale. The sand and clay glacial deposits have variable amounts of clay, sand, gravel and traces of coal. The sands are of low plasticity and the fat clay glacial till is highly plastic and expansive.

### **Groundwater Conditions:**

Groundwater was encountered at our Boring 1 (57' below existing site grades) location, and at approximately 15 to 18 feet below existing site grades at our boring 8, 9, and 10 locations (lower area of site). Fluctuations in the groundwater table may occur for various reasons, i.e., variations in precipitation, evaporation, surface runoff, groundwater withdrawal and recharge. A more accurate evaluation of the water table would require installing and monitoring piezometers over an extended time period.

### **Laboratory Analyses:**

In-situ moisture contents and dry densities of representative samples from the borings are presented on the boring logs in the Appendix.

## **CONCLUSIONS AND RECOMMENDATIONS**

### **GENERAL**

Our recommendations are based on the assumption that the soil conditions are similar to those disclosed by the provided samples. If variations are noted during construction or if changes are made in the site plan, structural loading, or foundation type, we should be notified so we can supplement our recommendations, as applicable. This report does not encompass the effects, if any, of underlying geologic hazards or regional groundwater withdrawal and expresses no opinion regarding their effects on surface movement.

### **Global Slope Stability:**

The Owner elected not to conduct a slope stability analysis at this site. Thus, our recommendations are given with no acceptance or assumption of the global stability of the slopes at this site. Global stability issues may be present and may create land shifting or sliding in the future.

**Geotechnical Summary:**

The Atlanta Drill Pad will be constructed on a site with ridge and swale topography on the breaks of the Missouri River near Williston. We understand the Atlanta Drill pad will be created with massive cut and fill earthwork techniques. Cut depths on the order of 20 to 25 feet and fill depths up to 50 feet are planned for the construction of the drill pad.

We recommend an intercepting drainage trench be excavated atop the cut to divert surface runoff away from the site. We also recommend the final drill pad be sloped to drain at a minimum rate of 5%.

We recommend the drill pad finished surface consist of compacted clays (either exposed native soils or placed clay soils) to minimize subsurface infiltration. Service gravel with separation fabric should be used in traffic areas to allow for access over clay surfaces.

We are providing drill pad construction earthwork recommendations given the soil profile and knowing the earthwork required to create the drill pad.

**DRILL PAD CUT SECTIONS:**

We recommend that any structure, drill rig, or other more permanent elements which are intolerant to differential movement be placed on the cut areas of the site.

Based on our drill program, we know that variable depths of sand mixtures overlie fat clay glacial till in the cut areas of the site. We recommend the fill pad finished elevation be established at the fat clay till contact or the sands be totally removed to the glacial till contact and then replaced with compacted clays. It is desired to not have layers of sand over clays as instability can result with moisture accumulation below sands and atop clays.

For grading cut slope design purposes and due to the presence of sandy soils, we recommend cut slopes be designed to slope at a rate of no steeper than 3:1 (horizontal to vertical). Said slopes will allow for maintenance and repair as necessary and will minimize erosion after vegetation is established. We offer the following grading guidelines for construction of surfacing or elements (excluding permanent structures) over cut sections:

- 1) We recommend a minimum of 8 inches of the on-site surficial soils and topsoil be removed, as applicable.
- 2) We recommend the soils exposed in the cut area be scarified a minimum of 8 inches, and be moisture conditioned to +/-3% of optimum moisture content.
- 3) We recommend the soils be compacted to a minimum of 95% of ASTM 698 standard proctor value. Compaction equipment must be sufficient to gain the desired results and will depend on the soils placed. The geotechnical engineer should observe, classify, and test the soils during the fill placement to assure proper techniques are employed.

- 4) After subgrade preparation and compaction, we recommend gravel base course or desired surfacing be placed. We recommend stabilization/separation fabric such as Mirafi HP370 be placed between the soil subgrade and surfacing material. Oversized rock may be required high traffic or soft soil areas.

#### **DRILL PAD FILL SECTIONS:**

We recommend that no structure, drill rig, or other more permanent elements which are intolerant to differential movement be placed over fill areas.

If it is desired or necessary to occupy fill areas, we recommend placement of such elements not be conducted until the fill sections have been allowed to consolidate for a minimum of one (1) year. We recommend the fill sections be monitored for vertical and horizontal movement upon completion in order to determine the stability of the sections.

We recommend the final slopes be no steeper than 3:1 (horizontal to vertical).

#### **Underdrains:**

We recommend the swales (valleys) which will be filled have underdrains installed prior to placing fill. We recommend pairs (set of 2 pipes) be installed along the toes of the existing swales prior to placing fill. We recommend the underdrains consist of 6" diameter fabric wrapped flexible perforated drain pipe. We recommend the drain pipe be bedded with a minimum of 12 inches of 1" clean rock bedding for the entire pipe length at the specified locations. The underdrain pipes should be sloped to daylight and must be kept unobstructed.

#### **Keyways:**

At the toes of the existing slopes, we recommend the native soils have a keyway cut to aid in supporting slope fill retention. We recommend the slope keyway consist of a five (5) foot minimum vertical cut in the native approved soils along the east side toe. Keyway areas over daylight pipe areas may be modified depending on depth. We recommend the keyway be a minimum of 10 feet in width. Additional underdrains may be required for the system if water is encountered within keyways.

#### **Fill Construction:**

We understand the fill for the pad will come from on-site as the grading is conducted. With the aforementioned grading plan in mind and our analysis of the soils present, we offer the following grading recommendations:

- 1) We recommend the fill areas be stripped to receive new fill. Stripping should clear all vegetation, topsoil and debris. The depth of such materials and horizontal extent of the fill/cut slopes will vary along the proposed toe slopes.
- 2) We recommend a minimum of 8 inches of the soils at the base of fill sections be removed (includes topsoil).

- 3) We recommend the soils present at the bottom of the aforementioned stripping depth be proofrolled in the presence of the geotechnical engineer. Soft or debris laden soil areas may require removal or stabilization with oversized rock prior to placing fill.
- 4) It is critical that newly placed embankment fill be benched into the existing side slopes as the fill is raised. We recommend a minimum bench width of eight (8) feet or one (1) scraper width per every two (2) feet of fill placed.
- 5) The soils placed must be placed in an engineered manner. The soils should be moisture conditioned to within 3% of optimum moisture content and be compacted to a minimum of 95% of ASTM D 698 standard proctor value. Compaction equipment must be sufficient to gain the desired results and will depend on the soils placed. The geotechnical engineer should observe, classify, and test the soils during the fill placement to assure proper techniques are employed.
- 6) Loose lifts of fill must not exceed 8" and may be increased to 12" if proper compaction equipment is used and density is verified. Cut/fill earthwork operations in freezing weather must be monitored for frost intrusion and frost lensing. Cut/fill earthwork in winter months is not recommended for this site due to the depths of fill planned.
- 7) We recommend that all finished fill slopes for the roadways be covered with topsoil and/or be hydro-seeded as soon as possible after the slopes have been finished to avoid excessive moisture intrusion and erosion. Seeding and erosion control measures should then follow as dictated by progress.
- 8) Erosion control measures must be implemented during and after construction to avoid loss of soil structure and sedimentation due to surface water infiltration and erosion. Erosion control techniques and materials should be upgraded or repaired as necessary during the course of construction. We recommend final slopes be no steeper than 3:1 (horizontal to vertical) to reduce erosion and facilitate mowing, etc. Steeper slopes can be used, however, maintenance during and after construction must be provided.
- 9) We estimate a shrinkage of soil from cut to fill of 25%.

**Buried Debris, Large Cobbles, Boulders & Lignite Coal Lenses:**

Buried debris may be present at any location at this site. Traces of lignite coal was encountered during our drilling and sampling program at this site. Cobbles were also encountered in the mixed glacial deposit areas.

We recommend buried debris pockets and lignite coal lenses, if exposed, be observed by the geotechnical engineer to determine the affects of the soils with respect to the drill pad. Removal and replacement of said materials may be required.

Large cobbles or boulders encountered may be placed at the bottom of fill areas as long as large particles are not allowed to "nest". Such particles should be isolated and surrounded by compacted fill.

### **Frost Depth Considerations**

A minimum frost depth of 5 feet (60 inches) should be used for pertinent element design.

### **DRAINAGE AND MOISTURE PROTECTION**

It is extremely important that the site soils not be allowed to become saturated during or after construction. Sump pumps should be present during construction to facilitate water removal after inclement weather.

Surface drainage is critical to assure long tank pad life. Grades should be such that drainage is away from all structures. Utility line excavations should be properly backfilled to avoid possible sources for subsurface saturation. The finished exterior grades of the pad must be sloped a minimum of 5% to promote positive drainage. Respective structure or well pads should be elevated relative to the surrounding finished grades to aid in promoting positive drainage.

We recommend the surface across the pad consist of native or placed compacted clay. We recommend any clay cap material be moisture conditioned to +/-3% of optimum moisture content and be compacted to a minimum of 95% of ASTM D 698 standard proctor value.

### **OSHA SLOPE STABILITY**

#### **GENERAL**

The owner and contractor should make themselves aware of and become familiar with applicable local, state, and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing this information solely as a service to our client. Under no circumstances should the information provided below be interpreted to mean that American Technical Services, Inc., is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

#### **EXCAVATIONS AND SLOPES**

The Contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety regulations, e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations, such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties.

For this site, the overburden soil encountered in our exploratory investigation is primarily a sand. This is considered to be a type B soil when applying the OSHA regulations. OSHA recommends a maximum slope inclination of 1:1 - (horizontal/vertical) for type B soils. As a safety measure, it is recommended that all vehicles and soil piles be kept a minimum lateral distance from the crest of the slope equal to no less than the slope height. Also, the exposed slope face should be protected against the elements.

We recommend that you retain us to monitor the soils exposed in all excavations and provide engineering services for such slopes. This will provide an opportunity to monitor the soil types encountered and to modify the excavation slope as necessary. It also offers an opportunity to verify the soil type and bearing capacity of the exposed soils.

## **EARTHWORK**

### **GENERAL**

1. The conclusions in this report are contingent upon compliance with recommendations in this section.
2. Due to the possible presence of buried debris, lignite coal, and groundwater impacted soils, we recommend the geotechnical engineer or his representative observe the soils exposed at bottom of slope keyway elevations and along underdrain areas prior to placing fill. Additional overexcavation and replacement may be required.

### **SITE CLEARING**

Strip and remove existing debris, soft or loose soil and any other deleterious materials from the building and parking areas and at least 5 feet beyond. All exposed surfaces should be free of mounds and depressions which could prevent uniform compaction.

### **EXCAVATION**

1. Standard excavation equipment should be sufficient for excavations at this site. Buried debris or large cobble to boulder sized materials may be encountered which are difficult to handle.
2. On-site soils may pump if allowed to become saturated. Scarification and drying, replacement with granular materials, use of special equipment or stabilization may be required to minimize subgrade pumping.

### **CONSTRUCTION OVER CUT OR FILL AREAS**

1. Drain, prepare and construct cut or fill areas as presented in the respective sections of this report. Fill section consolidation period with monitoring is recommended prior to construction of elements.
2. Drainage of cut and fill slope surfaces is critical to prevent erosion and slope movement. Drill pad surface cross-slopes must be maintained at a minimum of 5% to promote surface drainage.

3. Respective subgrade preparation area to be accomplished in a manner which will result in uniform water contents and densities after compaction.
4. Soft, wet or debris laden soil lenses may require additional removal and replacement with oversized rock to stabilize.

## **MATERIALS**

1. Granular engineered fill for structures should consist of on-site or imported sand or gravel. Structure placement recommendations is beyond the scope of this report.
2. Frozen soils should not be used as fill or backfill.
3. Gravel surfacing materials should conform to the following:
  - o Gradation (ASTM C136):

Sieve Size	Percent Finer By Weight
3"	100
No. 4 Sieve	40-100
No. 200 Sieve	15 (max)
Liquid Limit	25 (max)
  - o Maximum expansive potential(%) \*0.2

\*Measured on a sample compacted to approximately 95 percent of the ASTM D698 maximum dry density at about 3 percent below optimum water content. The sample is confined under a 100 psf surcharge and submerged.

4. Acceptance of use of on-site materials shall be at the direction of the geotechnical engineer. The on-site soils shall be placed in an engineered manner. Moisture and density conditioning of the soil is critical.

## **PLACEMENT AND COMPACTION**

1. Place and compact fill in horizontal lifts using equipment and procedures that will produce recommended water contents and densities throughout the lift.
2. No fill should be placed over frozen ground.
3. Materials should be compacted to the following:

Soil Placement	Minimum Percent Compaction (ASTM D698)
----------------	--

Miscellaneous fill ----- 95

4. On -site and imported soils should be compacted at or near optimum moisture conditions.

## **COMPLIANCE**

Structure foundation and slab support is beyond the scope of this report. Structures supported on cut surfaces or compacted fills are dependent upon compliance to respective cut and fill construction recommendations. To assess compliance with these recommendations, observation and testing should be performed under the direction of a geotechnical engineer.

## **CLOSURE**

Our conclusions and recommendations are predicated on observation and testing of the earthwork preparations directed by a geotechnical engineer. Responsibility for any design or construction work or for our conclusions, recommendations, opinions or interpretations, either oral or written, cannot be accepted unless we perform the plan and specification review and construction monitoring to determine whether or not the work performed is in substantial compliance with our conclusions, recommendations, opinions or interpretations, and whether changed soil conditions have occurred.

Deviations from our recommendations by the plans, written specifications, or field applications shall relieve us of responsibility unless our written concurrence with such deviations has been obtained.

## **APPENDIX**

**PROJECT LOCATION MAP**

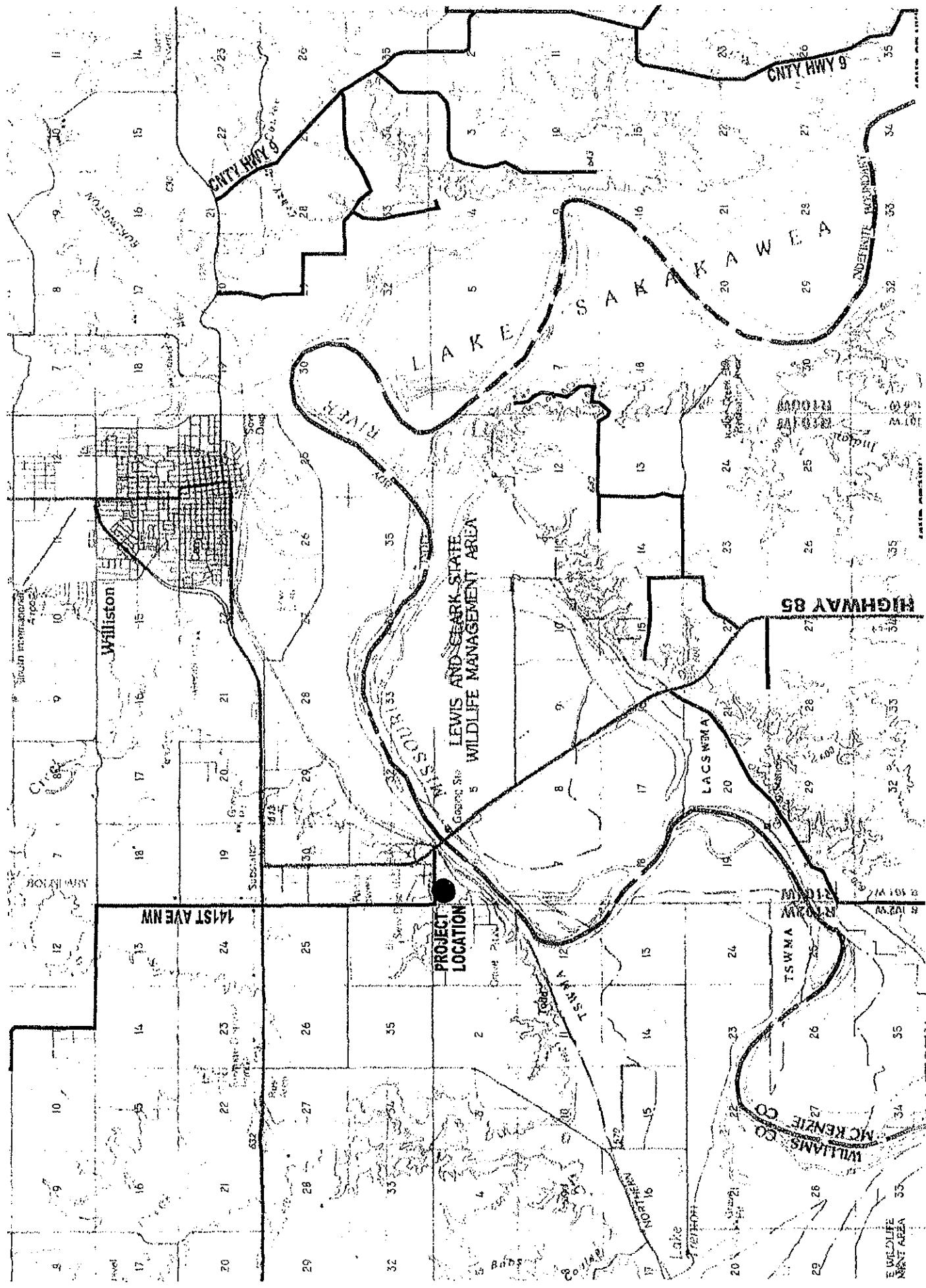
**SITE PLAN WITH BORING LOCATIONS**

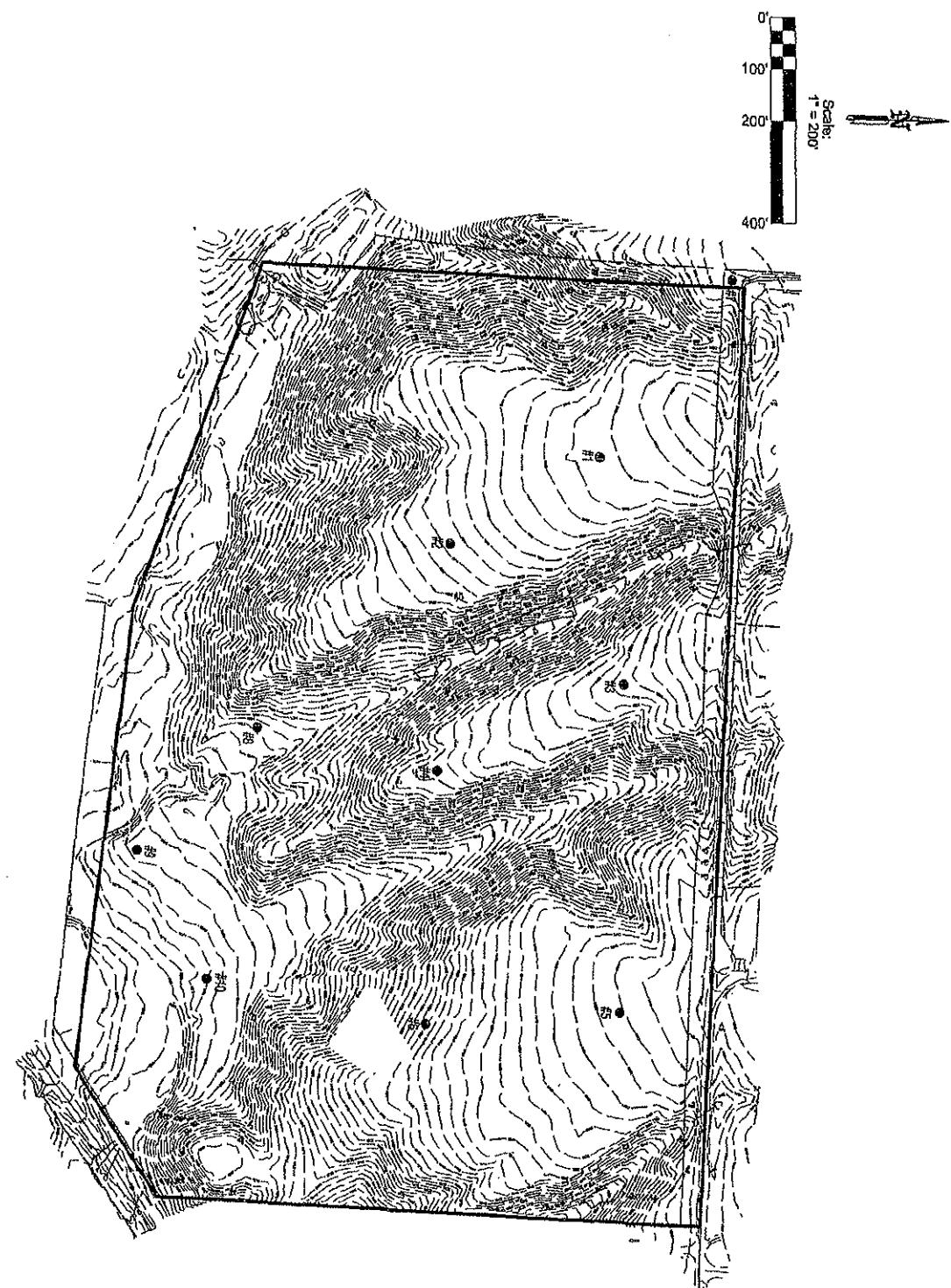
**BORING LOGS**

**BORING LOG GENERAL NOTES**

**CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES**

**MOISTURE-DENSITY CURVES**





SHEET DESCRIPTION: Site Layout		REVISION	DATE	DESIGNED BY:	O OF
BROSZ ENGINNEERING, INC. ARCHITECTURE ENGINEERING SURVEYING	PROJECT NAME: Atlanta Site	1	xx/xx/xx	DRAWN BY: JBE	
	PROJECT NO.: N12B10	2			
		3			
		4			
				DATE PRINTED: 9/8/12	

# TEST BORING LOG

PROJECT TITLE: Continental Atlanta Drill Pad, Near Williston, ND

PROJECT NUMBER: 12-12165

BORING NO: 1

DEPTH IN FEET	Approximate Surface Elevation = 1969.2' Description of Materials	GEOLOGIC ORIGIN	SAMPLE DATA				LABORATORY TESTS			
			WL	N	NO	TYPE	W	D	LL PL	QU
0.0'	Grass/weed cover									
2.5'	Sand w/clay: Brown, dry, loose (SC)	Alluvium								
5.0'	Sand: Brown, sl. moist, loose, m. grained, poorly graded, gravel present (SP)	Glacial Deposit		7	1	SB	4	FR	NP	
9.0'										
10.0'										
12.0'	Sandy Clay w/gravel: Brown, sl. Moist v. stiff, cobble present, variable gravel and sand content (CL w/sand and gravel)			15	2	SB	9	118		
15.0'	cobble absent, less gravel				12	3	SB	17	110	
17.5'										
20.0'	Fat Clay w/sand: Brown, moist, stiff, gravel present (CH w/sand) traces of gravel, variable sand content	Glacial Till		14	4	SB	16	108		
24.0'										
25.0'				14	5	SB				
30.0'					12	6	SB	18	108	
35.0'							NSR			
36.0'										
40.0'							13	7	SB	111
45.0'							NSR			
48.0'										
50.0'	Dk gray				14	8	SB			
55.0'										
57.0'										
58.0'							V			
60.0'	Shale: Dk. Gray, wet, m. stiff (CH)	Pierre Shale			9	9	SB	30	95	
61.0'	End of Boring									
DATE:	WATER TABLE MEASUREMENTS		DATE: 6/5/12							
6/5/12	Encountered at 57'		METHOD OF DRILLING: 2.25" HSA							
	Borehole caved to 40'		CREW CHIEF: MS							

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# TEST BORING LOG

PROJECT TITLE: Continental Atlanta Drill Pad, Near Williston, ND

PROJECT NUMBER: 12-12165

BORING NO: 2

DEPTH IN FEET	Approximate Surface Elevation = 1955.0' Description of Materials	GEOLOGIC ORIGIN	SAMPLE DATA				LABORATORY TESTS			
			WL	N	NO	TYPE	W	D	LL	QU
										PL
0.0'	Grass/weed cover	Glacial Deposit								
2.5'	Sand w/clay: Brown, dry, loose variable clay content (SC)									
5.0'	Clayey Sand: Brown, sl. Moist, m. dense, variable sand content, trace of gravel (SC)			16	1	SB	8	117		
8.0'		Glacial Till								
10.0'	Fat Clay w/sand: Brown, moist, v. stiff, traces of gravel, variable sand content (CH)			16	2	SB	16	105	64	28
15.0'	stiff			13	3	SB	17	111		
16.0'										
20.0'	v. stiff			21	4	SB	18	102		
24.0'										
25.0'				21	5	SB	19	107		
30.0'						NSR				
32.0'										
35.0'				15	6	SB				
40.0'										
41.0'	End of Boring			14	7	SB				
DATE:	WATER TABLE MEASUREMENTS	DATE: 6/5/12								
6/5/12	Not Encountered	METHOD OF DRILLING: 2.25" HSA								
	Borehole caved to 25'	CREW CHIEF: MS								

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# TEST BORING LOG

PROJECT TITLE: Continental Atlanta Drill Pad, Near Williston, ND  
 PROJECT NUMBER: 12-12165

BORING NO: 3

DEPTH IN FEET	Approximate Surface Elevation = 1958.9'  Description of Materials	GEOLOGIC ORIGIN	SAMPLE DATA				LABORATORY TESTS			
			WL	N	NO	TYPE	W	D	LL	QU
							PL			
0.0'	Grass/weed cover									
1.5'	Sand w/clay: Brown, dry, loose (SC)	Glacial Deposit								
	Sand w/clay: Brown, dry, m. dense m. grained, poorly graded (SP) variable clay content									
5.0'				18	1	SB	4	FR	NP	
8.0'										
10.0'				11	2	SB				
13.0'	Sandy Clay: Brown, moist, stiff, gravel present, variable sand content (CL)									
15.0'	Fat Clay w/sand: Brown, moist, stiff, traces of gravel variable sand content (CH)	Glacial Till		11	3	SB	17	110		
16.0'										
20.0'				12	4	SB				
24.0'										
25.0'						NSR				
30.0'	dk. Gray			13	5	SB	15	107		
32.0'										
35.0'						NSR				
40.0'	less stiff									
41.0'	End of Boring									
DATE: 6/5/12	WATER TABLE MEASUREMENTS Not Encountered Borehole caved to 25'	DATE: 6/5/12	METHOD OF DRILLING: 2.25" HSA CREW CHIEF: MS							

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# TEST BORING LOG

PROJECT TITLE: Continental Atlanta Drill Pad, Near Williston, ND

PROJECT NUMBER: 12-12165

BORING NO: 4

DEPTH IN FEET	Approximate Surface Elevation = 1941.2' Description of Materials	GEOLOGIC ORIGIN	SAMPLE DATA				LABORATORY TESTS			
			WL	N	NO	TYPE	W	D	LL	QU
							PL			
0.0'	Grass/weed cover									
1.5'	Sand w/clay: Brown, dry, loose, gravel and cobble present (SC)	Glacial Deposit								
3.0'										
4.5'	Sand: Tan, dry, loose (SP)									
5.0'	Sandy Clay: Brown, moist, stiff, trace of gravel, variable sand content (CL)									
8.0'										
9.0'										
10.0'	Fat Clay w/sand: Brown, moist stiff, traces of gravel, variable sand content (CH)	Glacial Till	14	2	SB	16	107			
15.0'			14	3	SB					
16.0'										
20.0'			14	4	SB					
24.0'						NSR				
25.0'										
30.0'										
31.0'										
32.0'	End of Boring									
40.0'										
DATE: 6/6/12	WATER TABLE MEASUREMENTS Not Encountered Borehole caved to 24'	DATE: 6/6/12	METHOD OF DRILLING: 2.25" HSA				CREW CHIEF: MS			

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# TEST BORING LOG

PROJECT TITLE: Continental Atlanta Drill Pad, Near Williston, ND

PROJECT NUMBER: 12-12165

BORING NO: 5

DEPTH IN FEET	Approximate Surface Elevation = 1963.6' Description of Materials	GEOLOGIC ORIGIN	SAMPLE DATA				LABORATORY TESTS			
			WL	N	NO	TYPE	W	D	LL PL	QU
0.0'	Grass/weed cover									
1.0'	Sand w/clay: Brown, dry, loose (SC)	Alluvium								
5.0'	Sand w/clay: Brown, sl. moist, m. dense, m. grained, poorly graded, gravel present (SP)	Glacial Deposit		13	1	SB	5	FR		
10.0'										
12.0'	Fat Clay w/sand: Brown, moist, stiff, gravel present, (CH w/sand)	Glacial Till		11	2	SB	15	112		
15.0'				11	3	SB	20	97	62	26
20.0'				10	4	SB	19	107		
24.0'										
25.0'										
30.0'										
35.0'										
36.0'										
40.0'	dk. Gray			12	6	SB	15	115		
45.0'										
48.0'										
50.0'	v. stiff			15	7	SB	15	FR		
51.0'	End of Boring									
60.0'										
DATE: 6/6/12	WATER TABLE MEASUREMENTS Not Encountered Borehole caved to 32'	DATE: 6/6/12	METHOD OF DRILLING: 2.25" HSA CREW CHIEF: MS							

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# TEST BORING LOG

PROJECT TITLE: Continental Atlanta Drill Pad, Near Williston, ND

PROJECT NUMBER: 12-12165

BORING NO: 6

DEPTH IN FEET	Approximate Surface Elevation = 1921.5' Description of Materials	GEOLOGIC ORIGIN	SAMPLE DATA				LABORATORY TESTS			
			WL	N	NO	TYPE	W	D	LL	QU
0.0'	Grass/weed cover									
	Clayey Sand/Sandy Clay: Brown, dry, stiff/m. dense, variable clay & sand content (SC-CL)	Glacial Deposit								
4.5'										
5.0'	Fat Clay w/sand: Brown, moist, v. stiff, traces of gravel, variable sand content (CH)	Glacial Till		19	1	SB	11	114		
10.0'	less stiff				8	2	SB	11	118	
15.0'					11	3	SB	15	116	
17.0'										
	Shale: Gray & brown, moist, stiff, sand present (CH)	Pierre Shale								
20.0'					10	4	SB	34	88	
25.0'										
26.0'	End of Boring				11	5	SB			
DATE:	WATER TABLE MEASUREMENTS	DATE: 6/6/12								
6/6/12	Not Encountered	METHOD OF DRILLING: 2.25" HSA								
	Borehole caved to 24'	CREW CHIEF: MS								

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# TEST BORING LOG

PROJECT TITLE: Continental Atlanta Drill Pad, Near Williston, ND

PROJECT NUMBER: 12-12165

BORING NO: 7

DEPTH IN FEET	Approximate Surface Elevation = 1977.1' Description of Materials	GEOLOGIC ORIGIN	SAMPLE DATA				LABORATORY TESTS			
			WL	N	NO	TYPE	W	O	LL	QU
										PL
0.0'	Grass/weed cover									
2.0'	Sand w/clay: Brown, dry, loose (SC)	Alluvium								
5.0'	Sand: Brown, sl. moist, loose, m. grained, poorly graded, gravel present (SP)	Glacial Deposit		9	1	SB	6	FR		
10.0'	Fat Clay w/sand: Brown, moist, stiff, gravel present, (CH w/sand) variable sand content	Glacial Till		10	2	SB	16	109		
12.0'										
15.0'				8	3	SB				
20.0'				9	4	SB	16	111		
24.0'										
25.0'				10	5	SB				
30.0'						NSR				
35.0'				9	6	SB				
36.0'										
40.0'						NSR				
45.0'	Dk. Gray			10	7	SB				
48.0'										
50.0'						NSR				
55.0'				9	8	SB				
60.0'										
61.0'	End of Boring			8	9	SB				
DATE: 6/6/12	WATER TABLE MEASUREMENTS Not Encountered	DATE: 6/6/12	METHOD OF DRILLING: 2.25" HSA							
	Borehole caved to 43'	CREW CHIEF: MS								

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# TEST BORING LOG

PROJECT TITLE: Continental Atlanta Drill Pad, Near Williston, ND

PROJECT NUMBER: 12-12165

BORING NO: 8

DEPTH IN FEET	Approximate Surface Elevation = 1892.3' Description of Materials	GEOLOGIC ORIGIN	SAMPLE DATA				LABORATORY TESTS			
			WL	N	NO	TYPE	W	D	LL	QU
0.0'	Grass/weed cover	Alluvium								
	Clay w/sand: Gray, moist, stiff, sand present (CL)									
5.0'				8	1	SB	21	97		
10.0'				10	2	SB	19	107		
15.0'	Fat Clay w/sand: Brown, moist, stiff, variable sand content (CH)	Pierre Shale		9	3	SB	22	97		
18.0'			V							
20.0'				10	4	SB	33	91		
21.0'										
25.0'	End of Boring									
DATE: 6/7/12	WATER TABLE MEASUREMENTS Encountered at 18' Borehole caved to 14'	DATE: 6/7/12	METHOD OF DRILLING: 2.25" HSA							
			CREW CHIEF: MS							

**AMERICAN TECHNICAL SERVICES, INC. (605) 787-9303**

# TEST BORING LOG

PROJECT TITLE: Continental Atlanta Drill Pad, Near Williston, ND

PROJECT NUMBER: 12-12165

BORING NO: 9

DEPTH IN FEET	Approximate Surface Elevation = 1878.6' Description of Materials	GEOLOGIC ORIGIN	SAMPLE DATA				LABORATORY TESTS			
			WL	N	NO	TYPE	W	D	LL	QU
							PL			
0.0'	Grass/weed cover									
	Sand w/clay: Brown, moist, loose, variable clay content (SC), traces of gravel present	Alluvium								
5.0'										
10.0'	Gravelly Sand: Brown, moist, dense, variable sand content (SW)									
15.0'	obstructed sampler									
18.0'	less dense, wet, less gravel									
20.0'										
21.0'	End of Boring									
25.0'										
DATE:	WATER TABLE MEASUREMENTS	DATE: 6/7/12								
6/7/12	Encountered at 18'	METHOD OF DRILLING: 2.25" HSA								
	Borehole caved to 13'	CREW CHIEF: MS								

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# TEST BORING LOG

PROJECT TITLE: Continental Atlanta Drill Pad, Near Williston, ND

PROJECT NUMBER: 12-12165

BORING NO: 10

DEPTH IN FEET	Approximate Surface Elevation = 1874.4' Description of Materials	GEOLOGIC ORIGIN	SAMPLE DATA				LABORATORY TESTS			
			WL	N	NO	TYPE	W	D	LL	QU
							PL			
0.0'	Grass/weed cover									
	Sandy Clay/Clayey Sand: Brown, moist, m. stiff/loose, variable sand & clay content (CL-SC)	Alluvium								
5.0'	traces of gravel present			6	1	SB	11	111		
10.0'	soft/v. loose			4	2	SB	19	105		
15.0'	wet, softer/looser		V	2	3	SB	25	FR		
19.0'										
20.0'	Sand: Brown, poorly graded wet, v. loose (SP)						NSR			
22.0'	Gravel & cobble present									
25.0'							NSR			
26.0'	End of Boring									
DATE:	WATER TABLE MEASUREMENTS		DATE: 6/7/12							
6/7/12	Encountered at 15'		METHOD OF DRILLING: 2.25" HSA							
	Borehole caved to 13'		CREW CHIEF: MS							

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## GENERAL NOTES

DESCRIPTIVE TERMINOLOGY		RELATIVE SIZES	
Density Term	"N" Value	Boulder	> 12"
Very Loose	0 - 4	Cobble	3" - 12"
Loose	4 - 10	Gravel	3/4" - 3"
Medium Dense	10 - 16	Coarse	#4 - 3/4"
Dense	16 - 30	Fine	#4 - #10
Very Dense	> 30	Sand	#10 - #40
		Coarse	#40 - #200
		Medium	#200 (PI)
		Fine	<#200 (PI)
		Silt & Clay	
Consistency Term	"N" Value	Term	Range
Very Soft	0 - 2	Trace	0 - 5%
Soft	2 - 4	A Little	5 - 15%
Medium stiff	4 - 8	Some	15 - 30%
Stiff	8 - 15	With	30 - 50%
Very stiff	15 - 30		
Hard	< 30		
BORING AND SAMPLING SYMBOLS			
SYMBOL	DEFINITION		
HSA	Hollow Stem Auger - 3 1/4" ID & 4 1/4" ID		
FA	Flight Auger - 4" OD		
HA	Hand Auger - 1 1/2" OD		
DC	Drive Casing		
PD	Pipe Drill or Clean Out Tube		
CS	Continuous Split Barrel Sampling		
DM	Drilling Mud		
JW	Jetting Water		
SB	Split Barrel Sampler		
TW	Thin Wall Tube Sampler		
LS	Split Barrel Liner Sample		
W	Wash Sample		
B	Bag Sample		
NSR	No Sample Retrieved		
NMR	No Water Level Measurement Recorded		
WL	Water Level		
N	Standard Penetration Value		
	Water Level Symbol		
LABORATORY TEST SYMBOLS			
SYMBOL	DEFINITION		
W	Moisture Content-Percent of Dry Weight    ASTM D2216		
D	Dry Density-Pound Per Cubic Foot		
LL & PL	Liquid Limit and Plastic Limit ASTM D4318		
Qu	Unconfined Compressive Strength Pounds Per Square Foot    ASTM D2166		

# CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

ASTM Designation: D 2487 — 69 AND D 2488 — 69

(Unified Soil Classification System)

Major divisions		Group symbols	Typical Names		Classification Criteria				
Coarse-grained soils More than 50% retained on No. 200 sieve*	Gravels More than 50% of coarse fraction retained on No. 4 sieve	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Clean gravels	$C_u = \frac{D_{50}}{D_{10}}$ greater than 4; $C_z = \frac{(D_{50})^2}{D_{10} \times D_{50}}$ between 1 and 3	Not meeting both criteria for GW			
		GP	Poorly graded gravels and gravel-sand mixtures, little or no fines	Clean gravels		Not meeting both criteria for GW			
		GM	Silty gravels, gravel-sand-silt mixtures	Clean sands	Atterberg limits below "A" line or PI. less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols			
		GC	Clayey gravels, gravel-sand-clay mixtures	Clean sands	Atterberg limits above "A" line with PI. greater than 7	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols			
		SW	Well-graded sands and gravelly sands, little or no fines	Clean sands	Classification on basis of percentage of fines Less than 5% pass No. 200 sieve ..... GW, GP, SW, SP More than 12% pass No. 200 sieve ..... GM, GC, SM, SC 5 to 12% pass No. 200 sieve ..... Borderline classifications requiring use of dual symbols	Not meeting both criteria for SW			
		SP	Poorly graded sands and gravelly sands, little or no fines	Sands with fines		Atterberg limits below "A" line or PI. less than 4			
		SM	Silty sands, sand-silt mixtures	Sands with fines		Atterberg limits above "A" line with PI. greater than 7			
		SC	Clayey sands, sand-clay mixtures	Sands with fines		Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols			
		ML	Inorganic silts, very fine sands, rock flour; silty or clayey fine sands	Silts and clays Liquid limit 50% or less		Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols			
Fine-grained soils 50% or more passes No. 200 sieve*	Sils and clays Liquid limit greater than 50%	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Plasticity Chart	For classification of fine-grained soils and fine fraction of coarse-grained soils.				
		OL	Organic silts and organic silty clays of low plasticity		Atterberg Limits plotting in hatched area are borderline classifications requiring use of dual symbols.				
		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts		Equation of A-line: $PI = 0.73 (LL - 20)$				
		CH	Inorganic clays of high plasticity, fat clays		CH				
		OH	Organic clays of medium to high plasticity		OH and MH				
	Highly organic soils	PI	Peat, muck and other highly organic soils		Based on the material passing the 3 in. (75 mm) sieve.				



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140 Pine Needle Drive • Spearfish, SD 57783 • Phone (605) 642-2742 • Mobile 390-3768

**PROCTOR TEST**

**MOISTURE DENSITY RELATION**

BROSZ ENGINEERING

Proctor#: 1 Date:06/11/12

ASTM: 698 Method:A

Attn: Jade

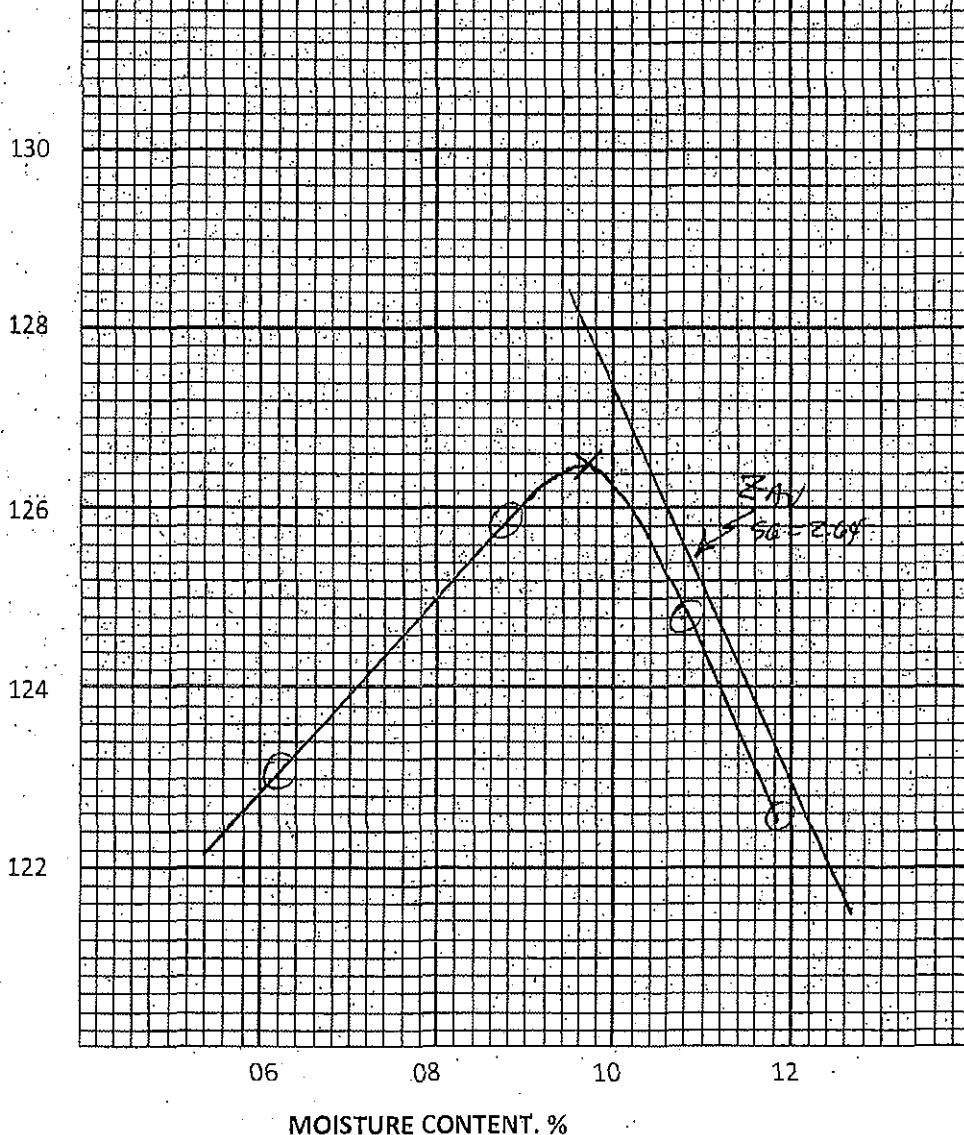
Soil Classification: (SC-CL) Clayey  
Sand/Sandy Clay

Project: Continental Atlanta Pad, Near  
Williston, North Dakota

Project Number: 12-12165

**MAXIMUM DENSITY: 126.5 pdf**

**OPTIMUM MOISTURE CONTENT: 9.7%**



DRY DENSITY. pdf

Cc:

SIOUX FALLS • BLACK HAWK • SPEARFISH

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

8105 Black Hawk Rd • PO Box 558 • Black Hawk, SD 57718-0558 • Phone (605) 787-9303 • FAX (605) 787-9515  
140 Pine Needle Drive • Spearfish, SD 57783 • Phone (605) 642-2742 • Mobile 390-3768

**PROCTOR TEST**

**MOISTURE DENSITY RELATION**

BROSZ ENGINEERING

Proctor#: 2 Date: 06/11/12

ASTM: 698 Method: A

Attn: Jade

Soil Classification: (SP) Sand w/ Gravel,  
B15-0'-10'

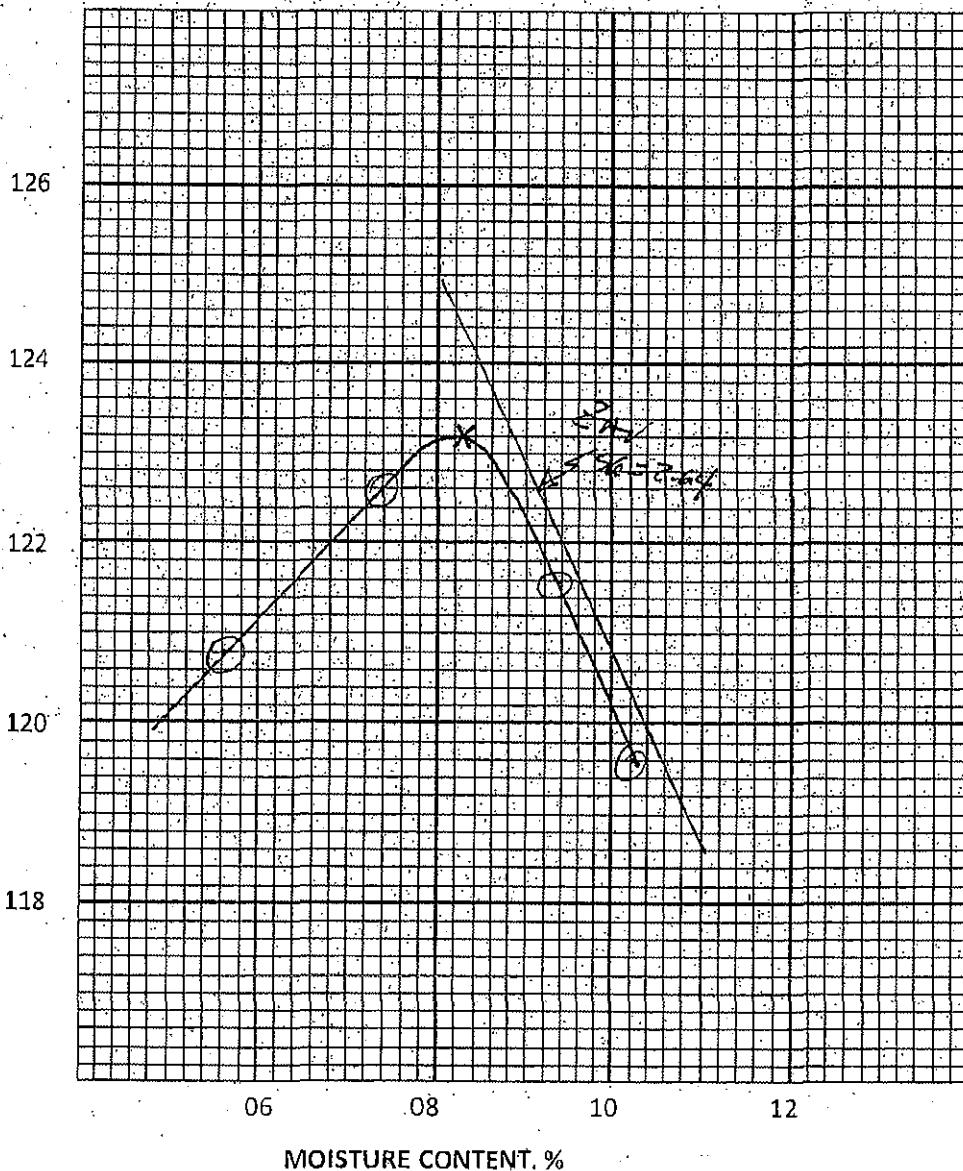
Project: Continental Atlanta Pad, Near  
Williston, North Dakota

Project Number: 12-12165

**MAXIMUM DENSITY: 123.2 pcf**

**OPTIMUM MOISTURE CONTENT: 8.3%**

DRY DENSITY, pcf



Cc:

**SIOUX FALLS • BLACK HAWK • SPEARFISH**

# PERMEABILITY TEST REPORT

**TEST DATA:**

Specimen Height (cm): 7.50  
 Specimen Diameter (cm): 7.07  
 Dry Unit Weight (pcf): 110.8  
 Moisture Before Test (%): 13.8  
 Moisture After Test (%): 0.0  
 Run Number: 1 • 2 ▲  
 Cell Pressure (psi): 65.0  
 Test Pressure(psi): 60.0  
 Back Pressure(psi): 57.9  
 Diff. Head (psi): 2.1  
 Flow Rate (cc/sec):  $6.93 \times 10^{-3}$   
 Perm. (cm/sec):  $9.08 \times 10^{-6}$

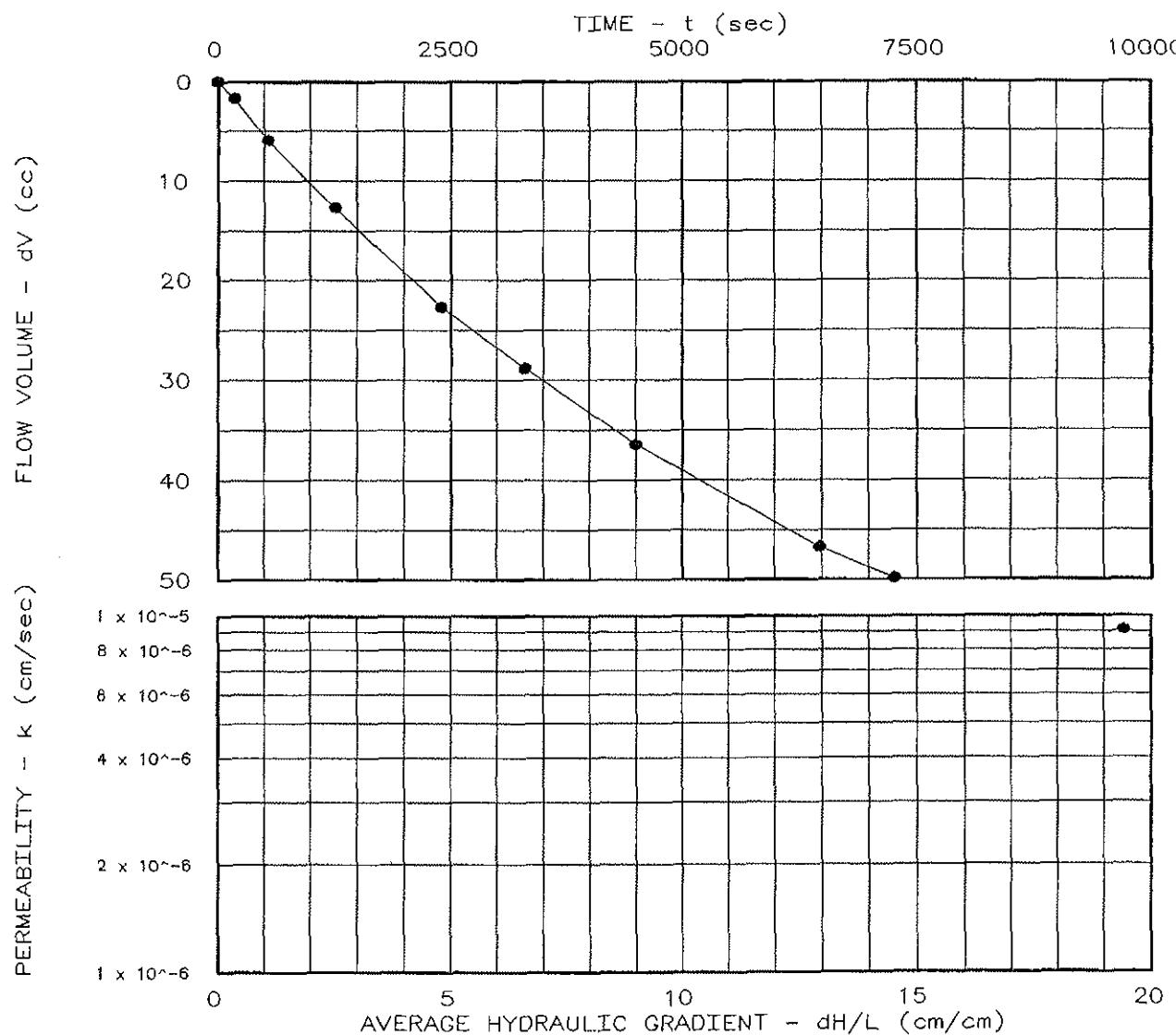
**SAMPLE DATA:**

Sample Identification: Fill No.3

Visual Description:

**Remarks:**

Maximum Dry Density (pcf): 116.6  
 Optimum Moisture Content (%): 13.8  
 ASTM(D698)  
 Percent Compaction: 95.0%  
 Permeameter type: Flexwett  
 Sample type: Remolded



Project: Atlanta Site

Location:

Date: 9/10/2012

Project No.: 114-551057

File No.: 258

Lab No.:

Tested by:

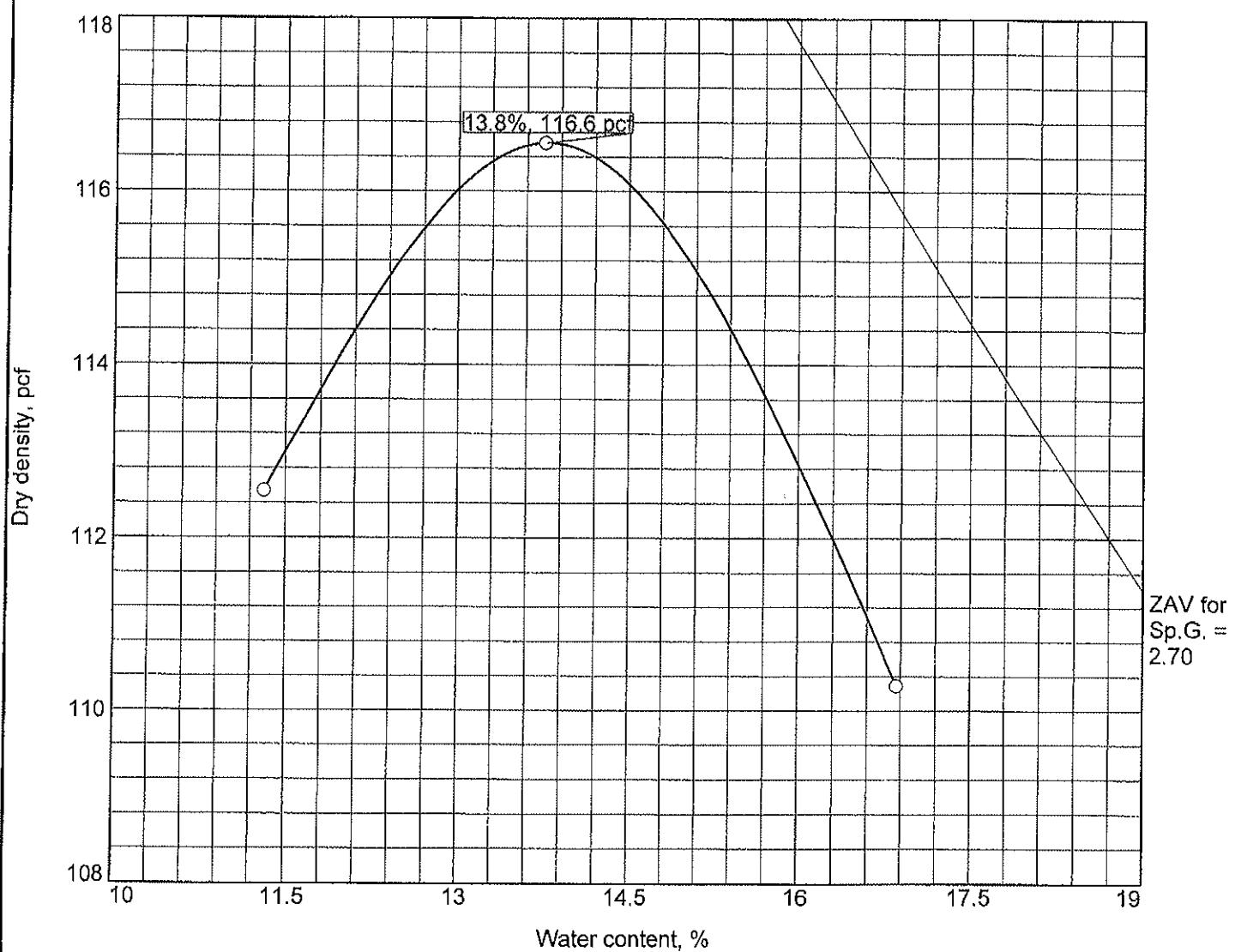
Checked by:

Test: CH - Constant head

PERMEABILITY TEST REPORT

TETRA TECH

## Moisture Density Relationship



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.70				

TEST RESULTS		MATERIAL DESCRIPTION
Maximum dry density = 116.6 pcf		
Optimum moisture = 13.8 %		
Project No. 114-551057 Client: Continental Resources Project: Atlanta Site		Remarks:
Source of Sample: Fill No. 3		
Tetra Tech, Inc.		
Billings, MT		Figure

# PERMEABILITY TEST REPORT

**TEST DATA:**

Specimen Height (cm): 7.50  
 Specimen Diameter (cm): 7.07  
 Dry Unit Weight (pcf): 112.3  
 Moisture Before Test (%): 13.1  
 Moisture After Test (%): 0.0  
 Run Number: 1 • 2 ▲  
 Cell Pressure (psi): 65.0  
 Test Pressure(psi): 60.0  
 Back Pressure(psi): 57.9  
 Diff. Head (psi): 2.1  
 Flow Rate (cc/sec):  $1.90 \times 10^{-2}$   
 Perm. (cm/sec):  $2.49 \times 10^{-5}$

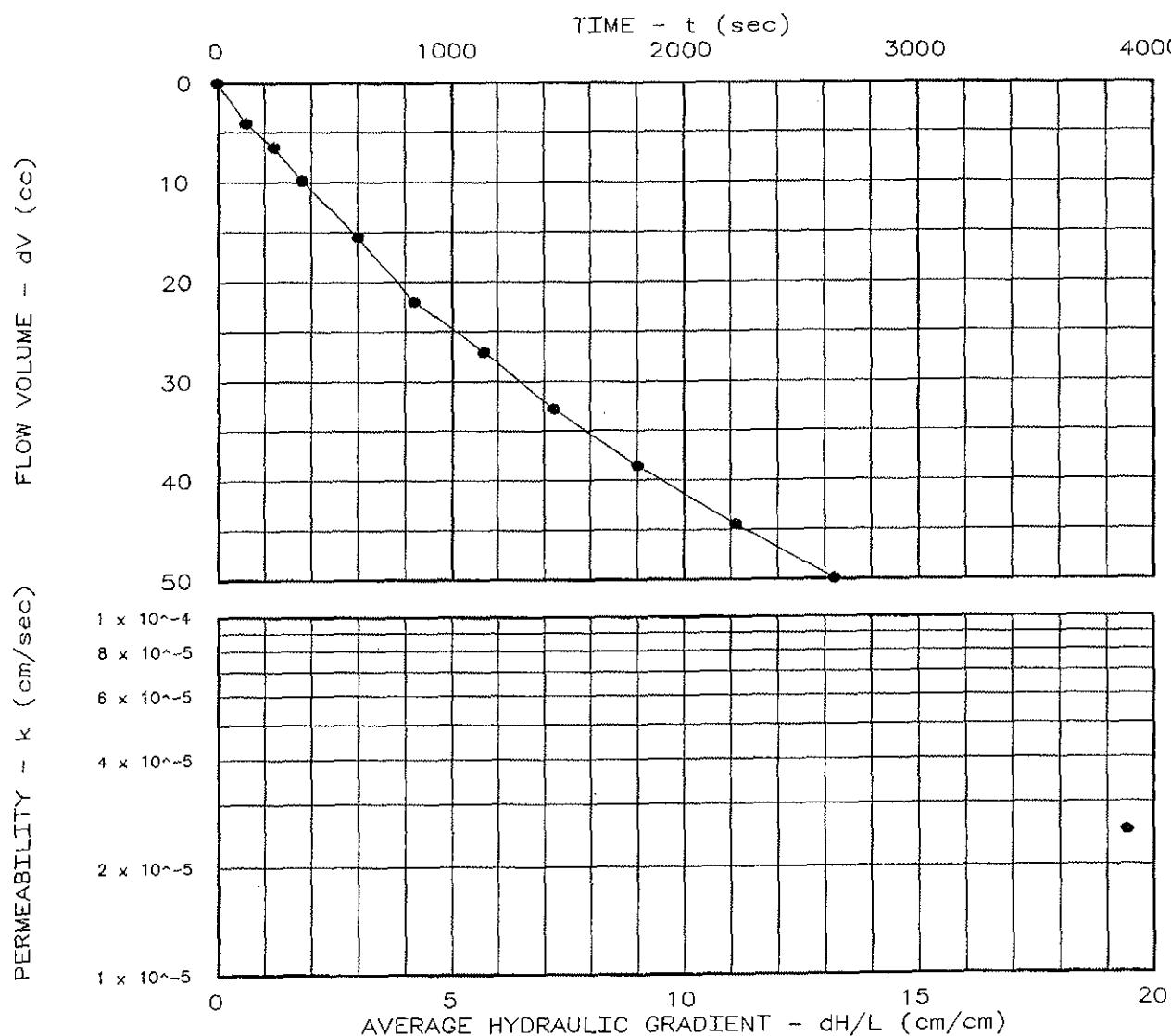
**SAMPLE DATA:**

Sample Identification: Fill No.1

Visual Description:

Remarks:

Maximum Dry Density (pcf): 118.2  
 Optimum Moisture Content (%): 12.1  
 ASTM(D698)  
 Percent Compaction: 95.0%  
 Permeameter type: Flexwall  
 Sample type: Remolded



Project: Atlanta Site

Location:

Date: 9/10/2012

Project No.: 114-551057

File No.: 259

Lab No.:

Tested by:

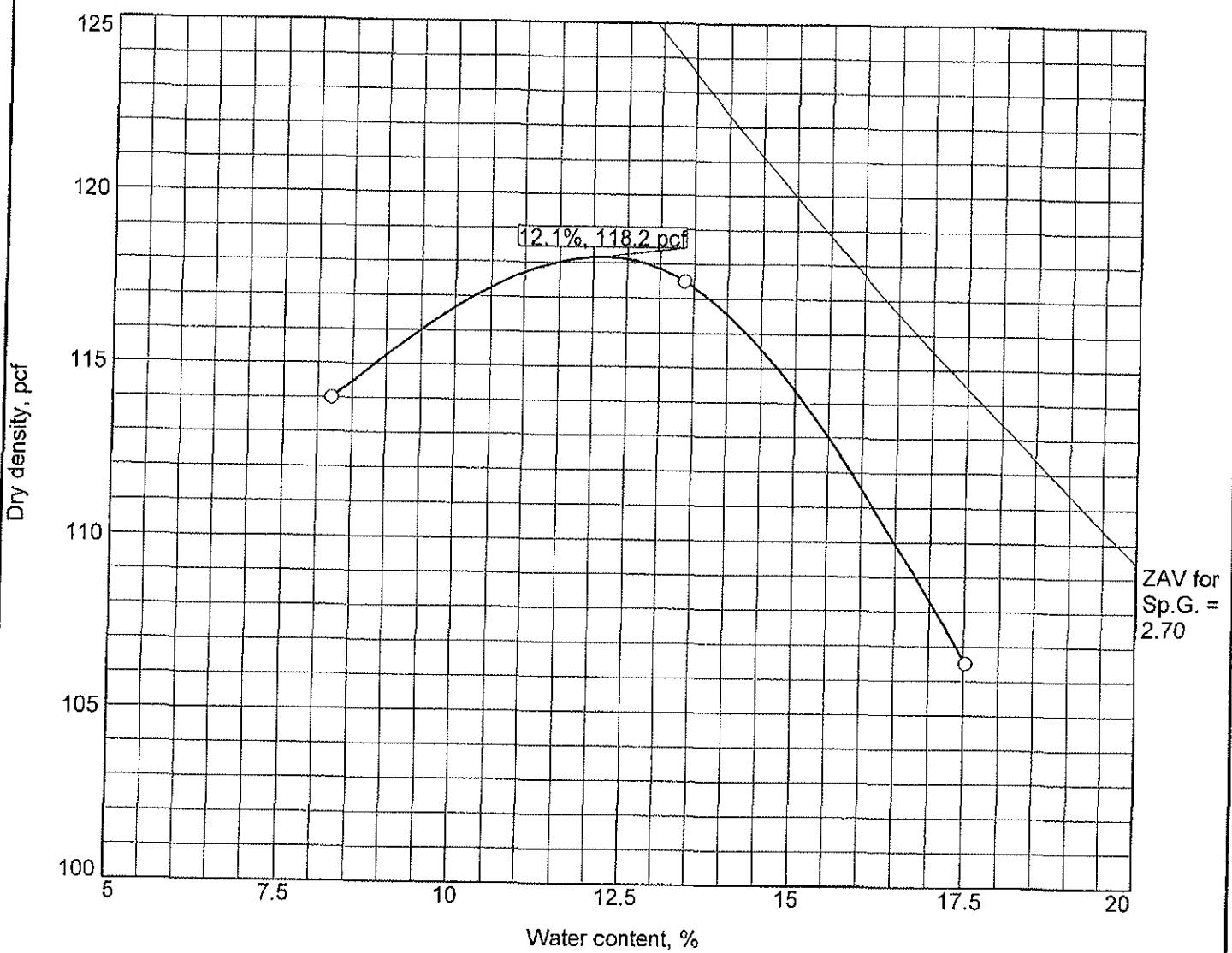
Checked by:

Test: CH - Constant head

PERMEABILITY TEST REPORT

TETRA TECH

## Moisture Density Relationship



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.70				
<b>TEST RESULTS</b>							<b>MATERIAL DESCRIPTION</b>	
Maximum dry density = 118.2 pcf								
Optimum moisture = 12.1 %								
Project No. 114-551057 Client: Continental Resources Project: Atlanta Site							Remarks:	
<input checked="" type="checkbox"/> Source of Sample: Fill No.1								
Tetra Tech, Inc.								
Billings, MT							Figure	

# PERMEABILITY TEST REPORT

**TEST DATA:**

Specimen Height (cm): 7.50  
 Specimen Diameter (cm): 7.07  
 Dry Unit Weight (pcf): 112.1  
 Moisture Before Test (%): 12.6  
 Moisture After Test (%): 0.0  
 Run Number: 1 • 2 ▲  
 Cell Pressure (psi): 65.0  
 Test Pressure(psi): 60.0  
 Back Pressure(psi): 57.9  
 Diff. Head (psi): 2.1  
 Flow Rate (cc/sec):  $2.63 \times 10^{-2}$   
 Perm. (cm/sec):  $1.97 \times 10^{-5}$

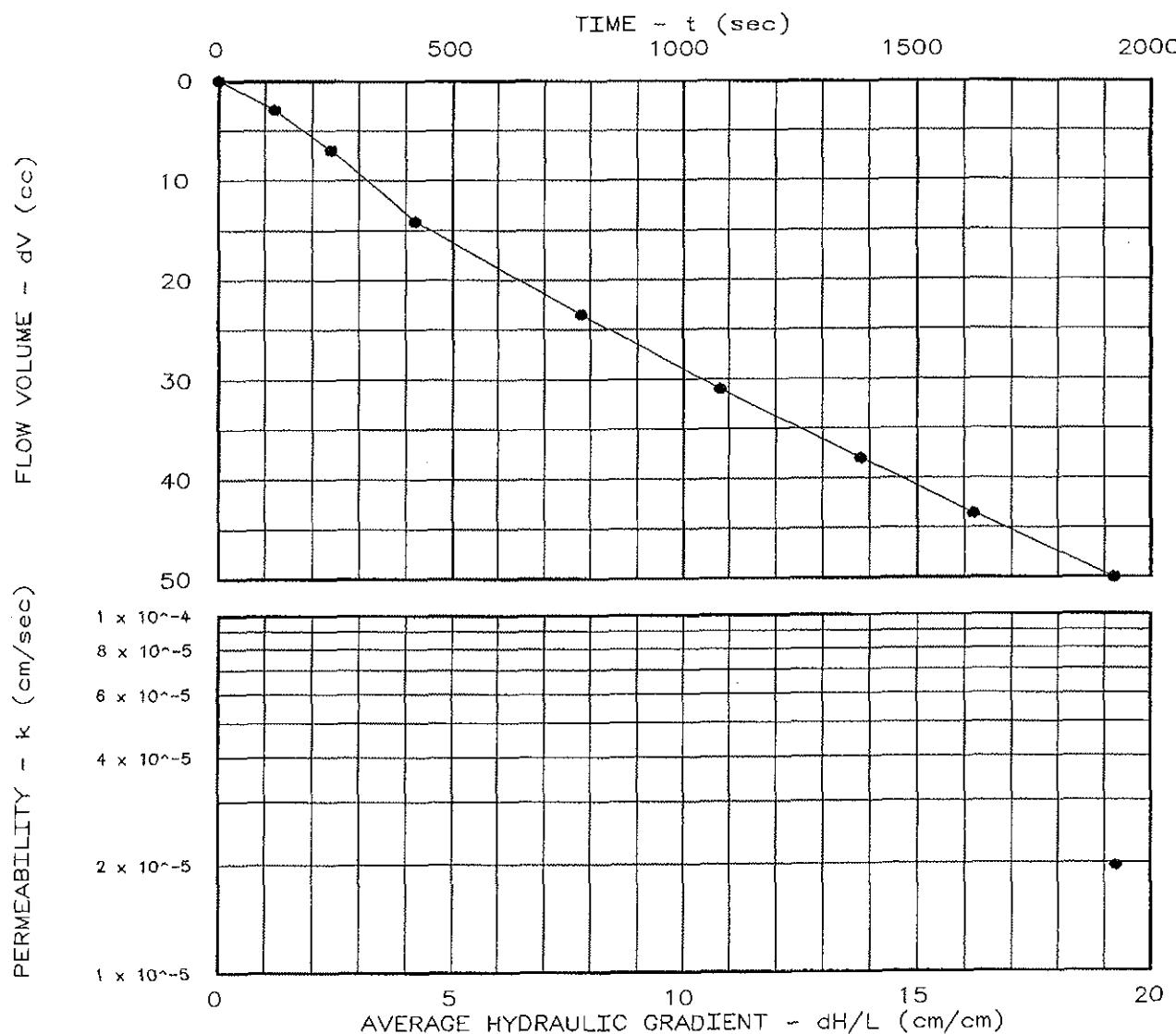
**SAMPLE DATA:**

Sample Identification: Fill No.2

Visual Description:

Remarks:

Maximum Dry Density (pcf): 118.0  
 Optimum Moisture Content (%): 12.6  
 ASTM(D698)  
 Percent Compaction: 95.0%  
 Permeameter type: Flexwall  
 Sample type: Remolded



Project: Atlanta Site

Location:

Date: 9/10/2012

Project No.: 114-551057

File No.: 260

Lab No.:

Tested by:

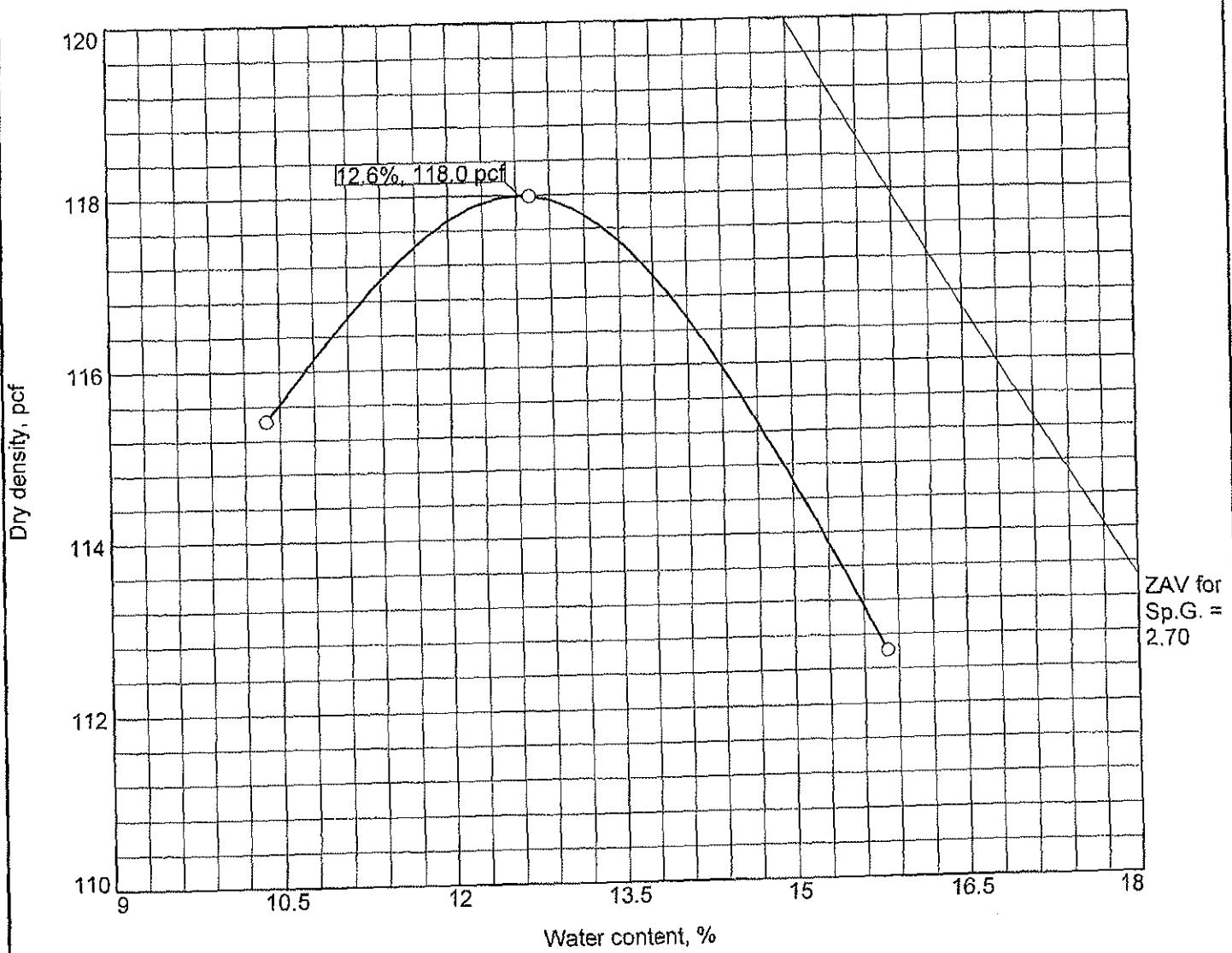
Checked by:

Test: CH - Constant head

PERMEABILITY TEST REPORT

**TETRA TECH**

## Moisture Density Relationship



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200		
	USCS	AASHTO								
				2.70						
<b>TEST RESULTS</b>							<b>MATERIAL DESCRIPTION</b>			
Maximum dry density = 118.0 pcf Optimum moisture = 12.6 %										
Project No. 114-551057 Client: Continental Resources Project: Atlanta Site					Remarks:					
<input checked="" type="checkbox"/> Source of Sample: Fill No. 2 <b>Tetra Tech, Inc.</b> <b>Billings, MT</b>					Figure					

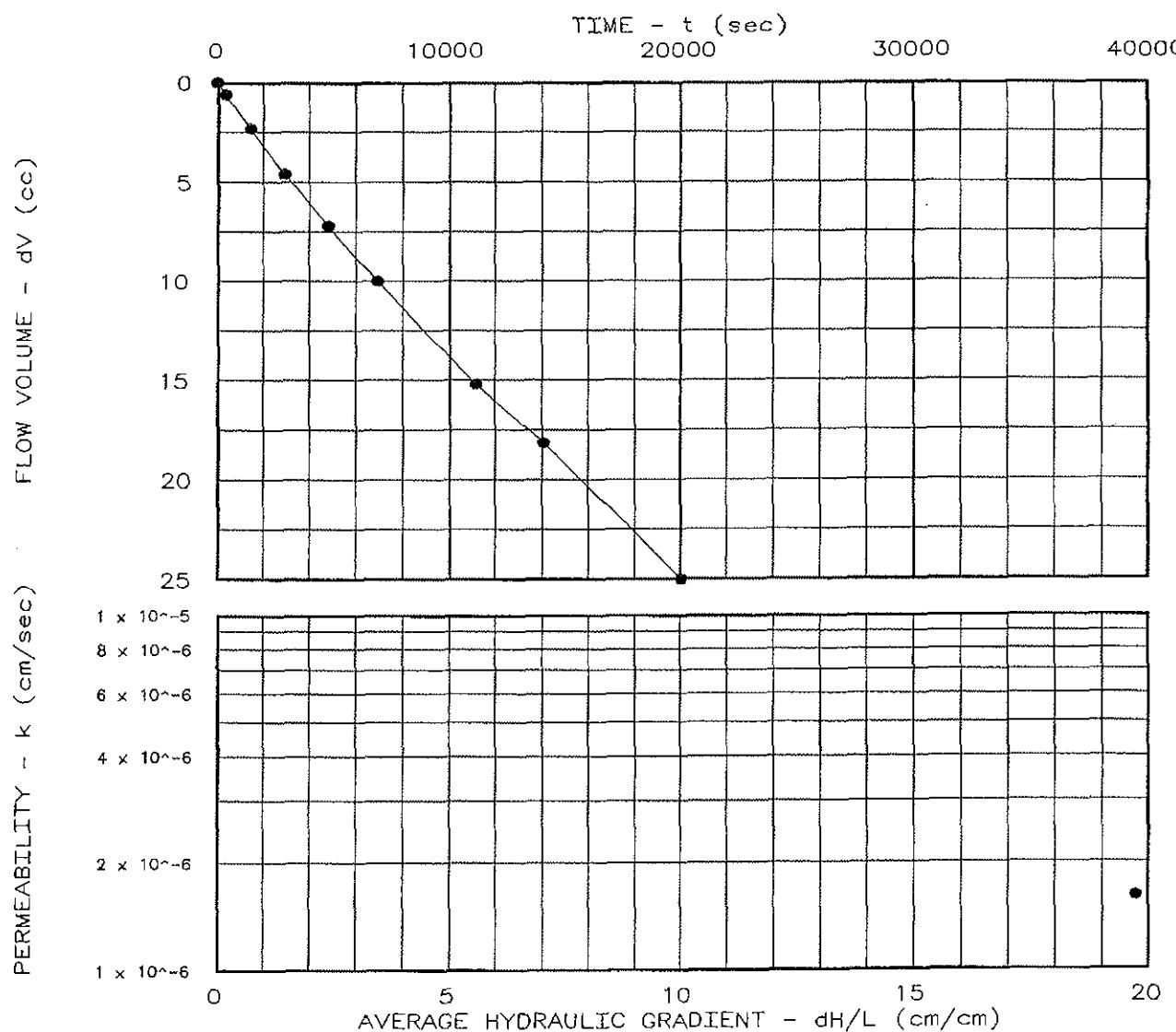
# PERMEABILITY TEST REPORT

**TEST DATA:**

Specimen Height (cm): 7.50  
 Specimen Diameter (cm): 7.07  
 Dry Unit Weight (pcf): 98.6  
 Moisture Before Test (%): 19.0  
 Moisture After Test (%): 0.0  
 Run Number: 1 • 2 A  
 Cell Pressure (psi): 65.0  
 Test Pressure(psi): 60.0  
 Back Pressure(psi): 57.9  
 Diff. Head (psi): 2.1  
 Flow Rate (cc/sec):  $1.25 \times 10^{-3}$   
 Perm. (cm/sec):  $1.61 \times 10^{-6}$

**SAMPLE DATA:**

Sample Identification: Cement No.1  
 Visual Description:  
 Remarks:  
 Maximum Dry Density (pcf): 103.7  
 Optimum Moisture Content (%): 18.9  
 ASTM(D698)  
 Percent Compaction: 95.0%  
 Permeameter type: Flexwall  
 Sample type: Remolded



Project: Atlanta Site

Location:

Date: 9/12/2012

Project No.: 114-551057

File No.: 261

Lab No.:

Tested by:

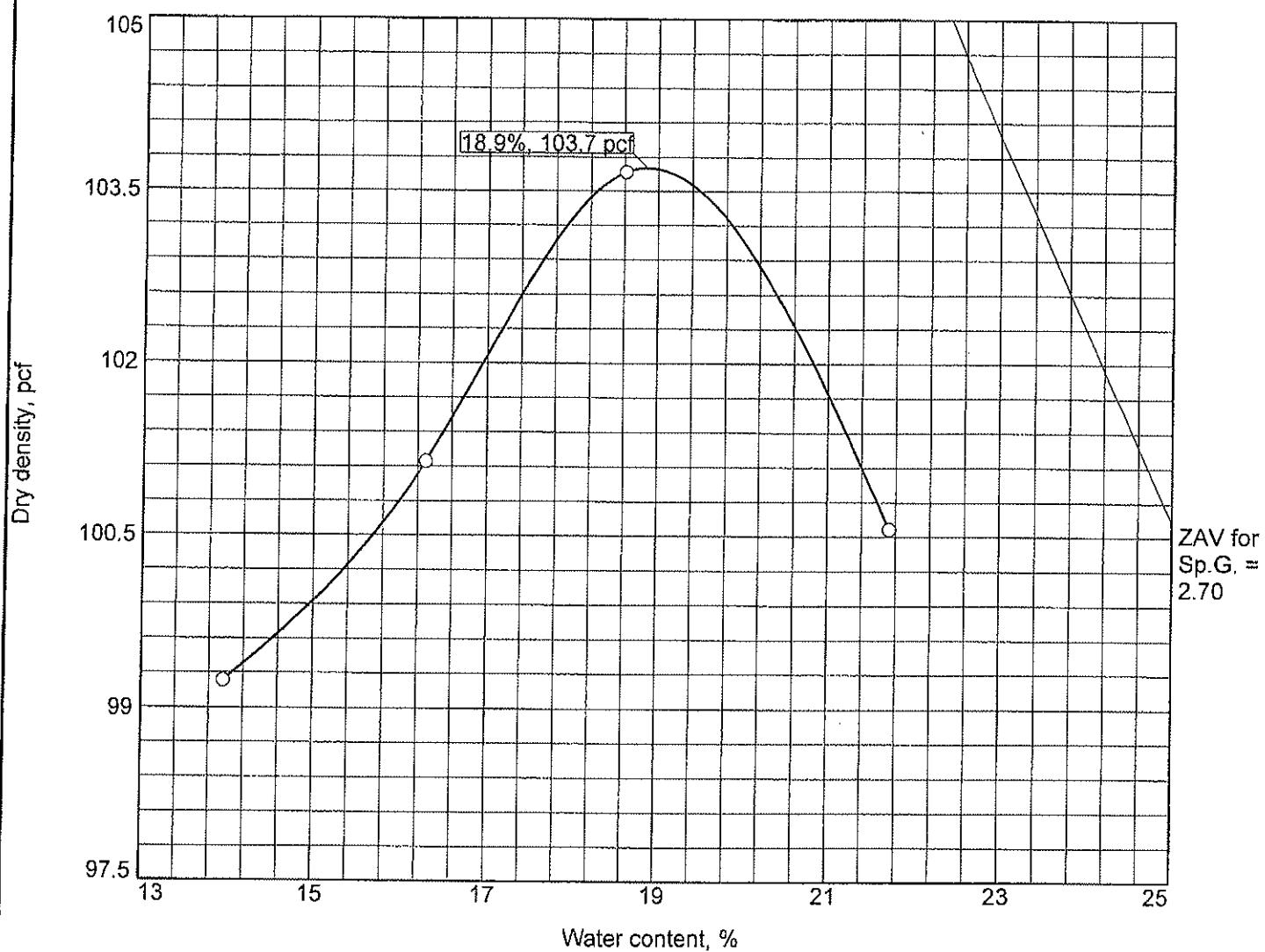
Checked by:

Test: CH - Constant head

PERMEABILITY TEST REPORT

TETRA TECH

## Moisture Density Relationship



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.70				

### TEST RESULTS

### MATERIAL DESCRIPTION

Maximum dry density = 103.7 pcf

Optimum moisture = 18.9 %

Project No. 114-551057 Client: Continental Resources  
Project: Atlanta Site

Remarks:

○ Source of Sample: Cement No.1

Tetra Tech, Inc.

Billings, MT

Figure

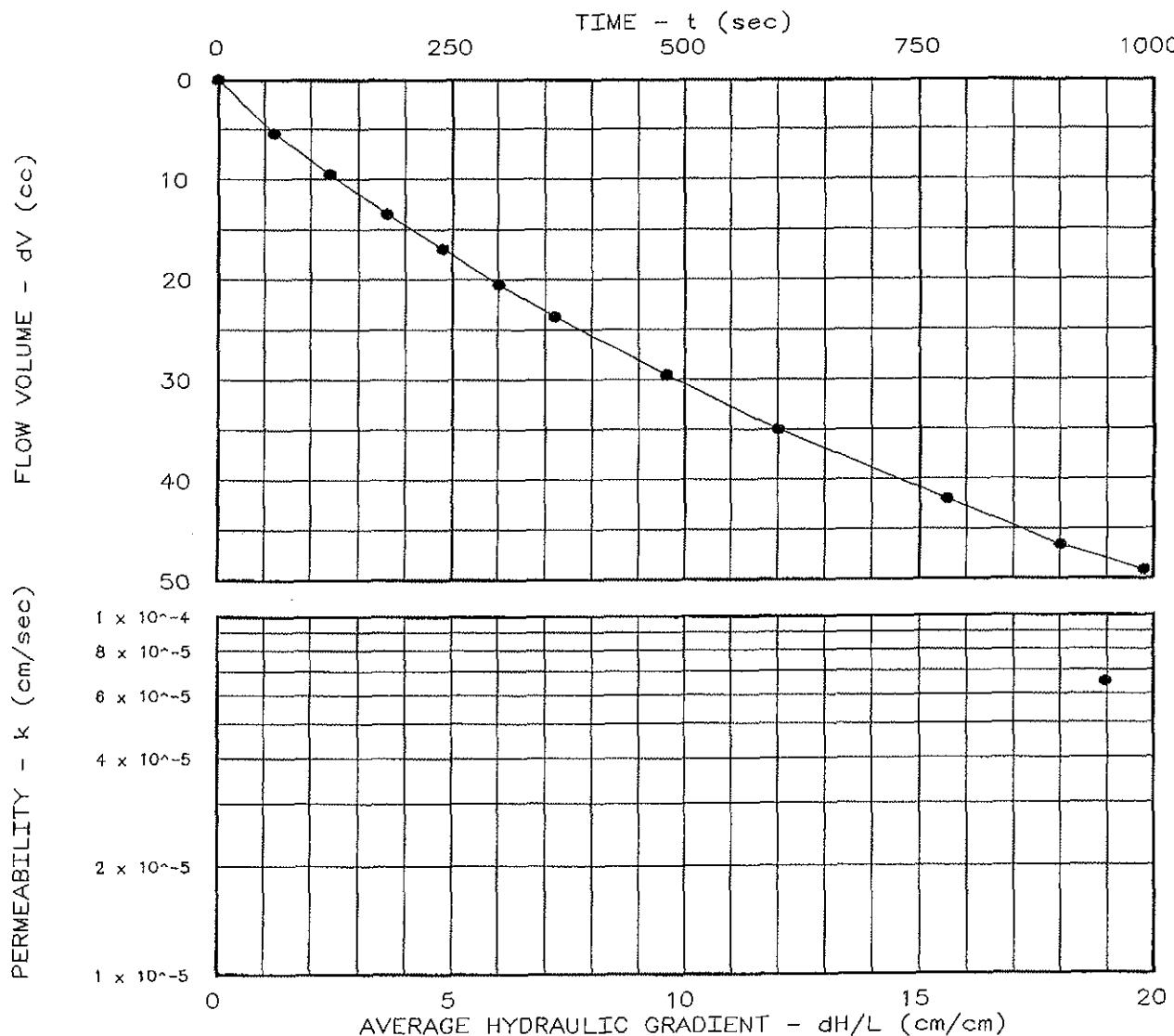
# PERMEABILITY TEST REPORT

**TEST DATA:**

Specimen Height (cm): 7.50  
 Specimen Diameter (cm): 7.07  
 Dry Unit Weight (pcf): 97.9  
 Moisture Before Test (%): 19.0  
 Moisture After Test (%): 0.0  
 Run Number: 1      2  
 Cell Pressure (psi): 65.0  
 Test Pressure(psi): 60.0  
 Back Pressure(psi): 58.0  
 Diff. Head (psi): 2.0  
 Flow Rate (cc/sec):  $4.84 \times 10^{-2}$   
 Perm. (cm/sec):  $6.51 \times 10^{-5}$

**SAMPLE DATA:**

Sample Identification: Cement No.3  
 Visual Description:  
 Remarks:  
 Maximum Dry Density (pcf): 103.0  
 Optimum Moisture Content (%): 19.0  
 ASTM(D698)  
 Percent Compaction: 95.0%  
 Permeameter type: Flexwall  
 Sample type: Remolded



Project: Atlanta Site

Location:

Date: 9/12/12

Project No.: 114-551057

File No.: 262

Lab No.:

Tested by:

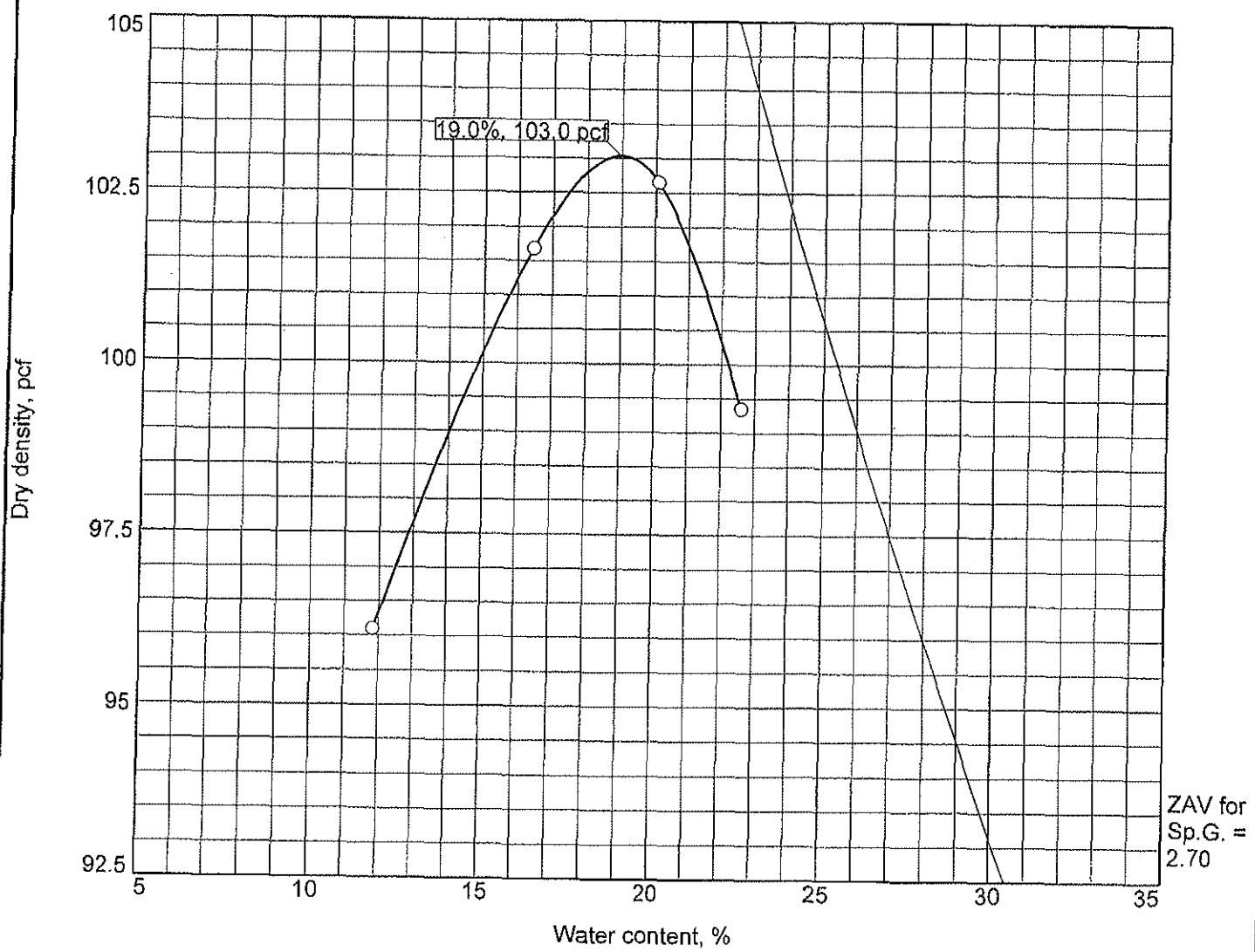
Checked by:

Test: CH - Constant head

PERMEABILITY TEST REPORT

TETRA TECH

## Moisture Density Relationship



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.70				

### TEST RESULTS

Maximum dry density = 103.0 pcf

Optimum moisture = 19.0 %

### MATERIAL DESCRIPTION

Project No. 114-551057 Client: Continental Resources  
Project: Atlanta Site

Remarks:

Source of Sample: Cement No. 3

Tetra Tech, Inc.

Billings, MT

Figure

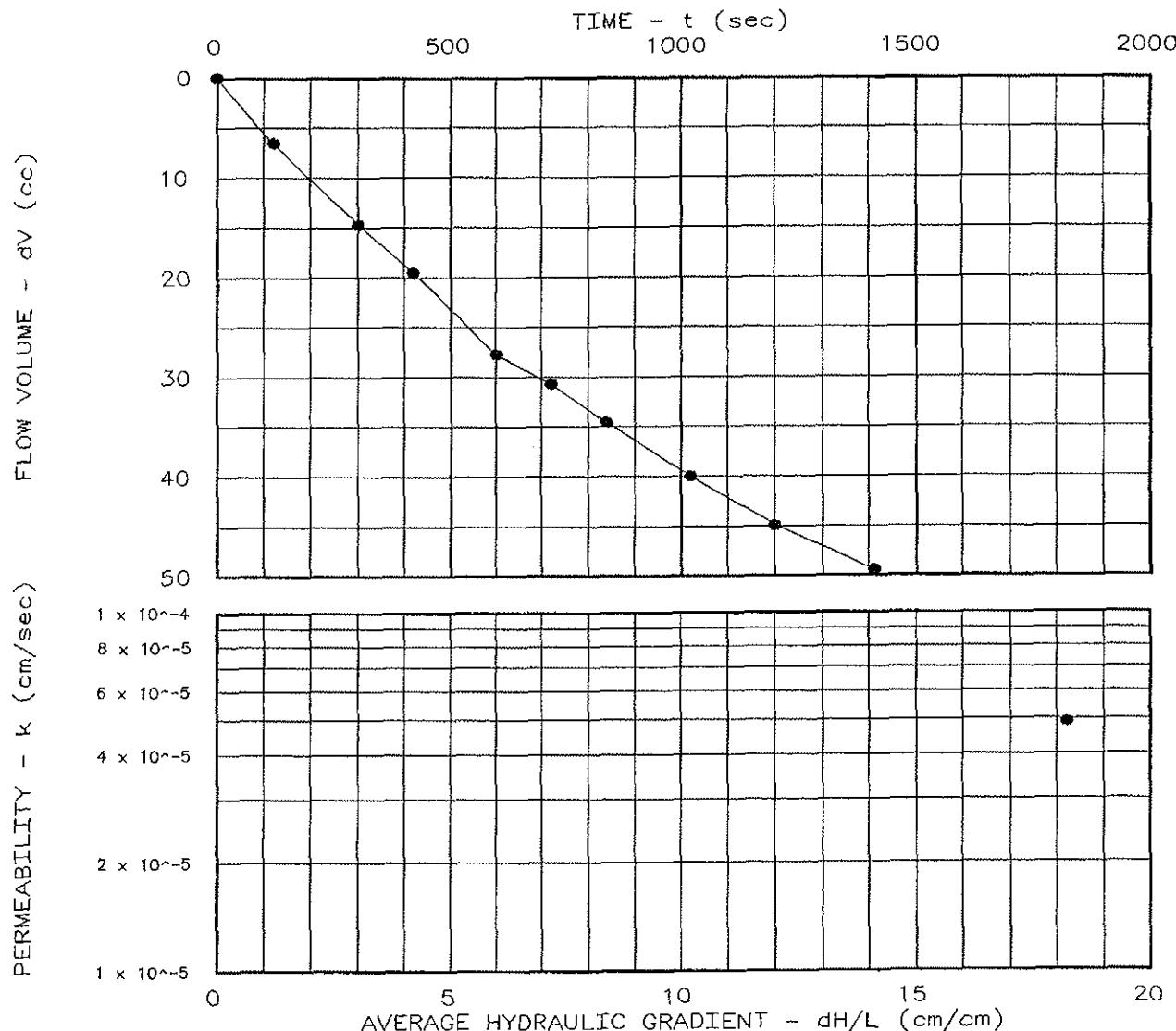
# PERMEABILITY TEST REPORT

**TEST DATA:**

Specimen Height (cm): 7.50  
 Specimen Diameter (cm): 7.07  
 Dry Unit Weight (pcf): 102.4  
 Moisture Before Test (%): 16.7  
 Moisture After Test (%): 0.0  
 Run Number: 1 • 2 A  
 Cell Pressure (psi): 65.0  
 Test Pressure(psi): 60.0  
 Back Pressure(psi): 58.1  
 Diff. Head (psi): 1.9  
 Flow Rate (cc/sec):  $3.50 \times 10^{-2}$   
 Perm. (cm/sec):  $4.90 \times 10^{-5}$

**SAMPLE DATA:**

Sample Identification: Cement No.2  
 Visual Description:  
 Remarks:  
 Maximum Dry Density (pcf): 107.7  
 Optimum Moisture Content (%): 16.7  
 ASTM(D698)  
 Percent Compaction: 95.0%  
 Permeometer type: Flexwall  
 Sample type: Remolded



Project: Atlanta Site

Location:

Date: 9/12/12

Project No.: 114-551057

File No.: 263

Lab No.:

Tested by:

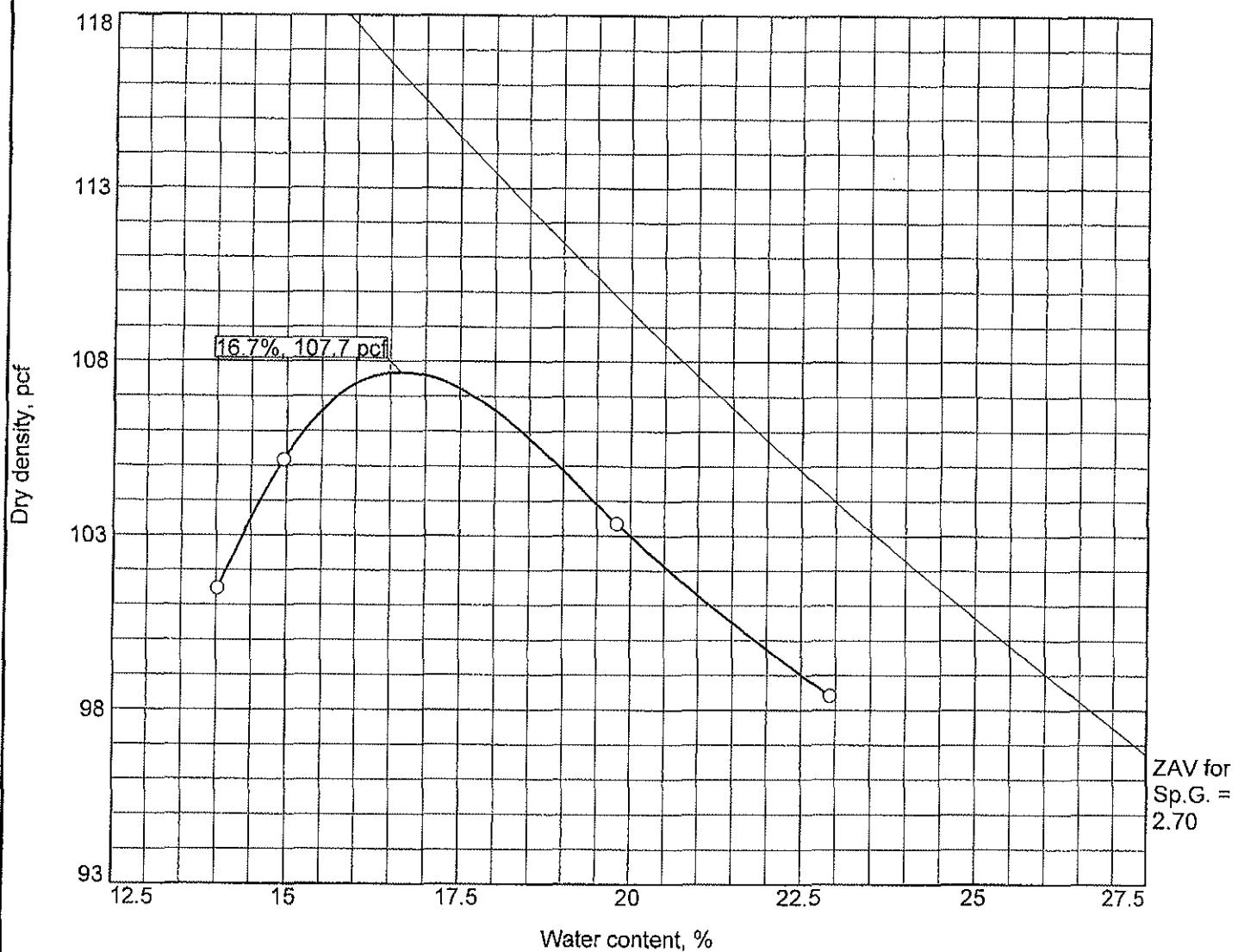
Checked by:

Test: CH - Constant head

PERMEABILITY TEST REPORT

TETRA TECH

## Moisture Density Relationship



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.70				

TEST RESULTS		MATERIAL DESCRIPTION
Maximum dry density = 107.7 pcf		
Optimum moisture = 16.7 %		
Project No. 114-551057 Client: Continental Resources Project: Atlanta Site		Remarks:
<input type="checkbox"/> Source of Sample: Cement No. 2 Tetra Tech, Inc.		Billings, MT
		Figure

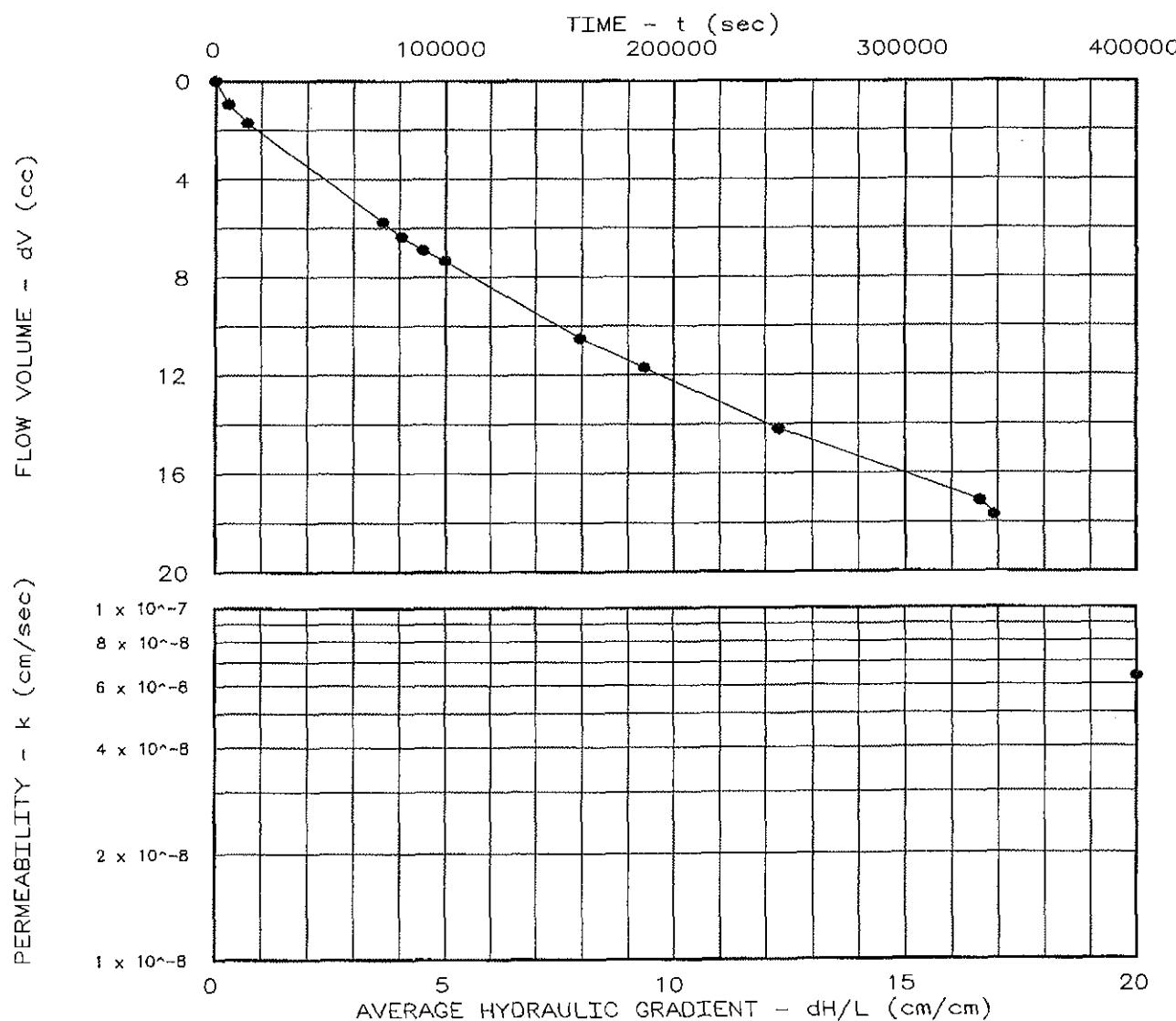
# PERMEABILITY TEST REPORT

**TEST DATA:**

Specimen Height (cm): 7.50  
 Specimen Diameter (cm): 7.07  
 Dry Unit Weight (pcf): 103.7  
 Moisture Before Test (%): 17.2  
 Moisture After Test (%): 0.0  
 Run Number: 1 • 2 ▲  
 Cell Pressure (psi): 65.0  
 Test Pressure(psi): 60.0  
 Back Pressure(psi): 57.9  
 Diff. Head (psi): 2.1  
 Flow Rate (cc/sec):  $4.99 \times 10^{-5}$   
 Perm. (cm/sec):  $6.35 \times 10^{-8}$

**SAMPLE DATA:**

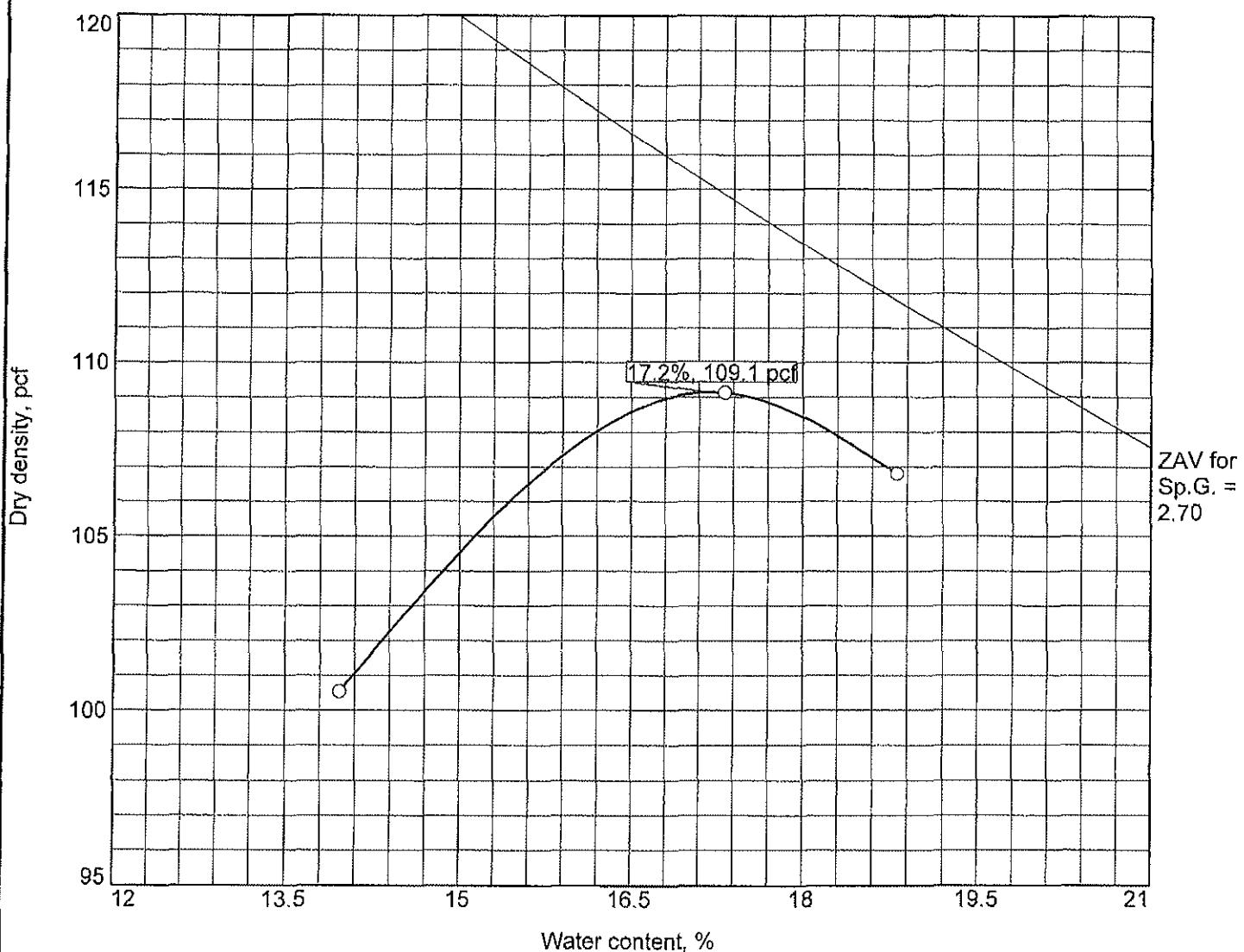
Sample Identification: Fill No. 4  
 Visual Description:  
 Remarks:  
 Maximum Dry Density (pcf): 109.1  
 Optimum Moisture Content (%): 17.2  
 ASTM(D698)  
 Percent Compaction: 95.0%  
 Permeameter type: Flexwall  
 Sample type: Remolded



Project: Atlanta Site  
 Location:  
 Date: 9/14/2012

Project No.: 114-551057  
 File No.: 264  
 Lab No.:  
 Tested by:  
 Checked by:  
 Test: CH - Constant head

## Moisture Density Relationship



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.70				

TEST RESULTS		MATERIAL DESCRIPTION
Maximum dry density = 109.1 pcf		
Optimum moisture = 17.2 %		
<b>Project No.</b> 114-551057 <b>Client:</b> Continental Resources <b>Project:</b> Atlanta Site		<b>Remarks:</b>
<input checked="" type="radio"/> <b>Source of Sample:</b> Fill No. 4 <b>Tetra Tech, Inc.</b>		
<b>Billings, MT</b>		<b>Figure</b>



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## ANALYTICAL SUMMARY REPORT

September 06, 2012

Continental Resources  
PO Box 268870  
Oklahoma City, OK 73126-8870

Workorder No.: B12082786

Project Name: Atlanta Site

Energy Laboratories Inc Billings MT received the following 4 samples for Continental Resources on 8/30/2012 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B12082786-001	Original Material, From Cut 08/29/12 19:00	08/30/12		Soil	Cation Exchange Capacity Cations, Saturated Paste Conductivity pH, Saturated Paste NH4AC Soil Extraction for CEC Saturated Paste Extraction Sodium Adsorption Ratio
B12082786-002	Fill #1	08/29/12 19:00	08/30/12	Soil	Same As Above
B12082786-003	Fill #2	08/29/12 19:00	08/30/12	Soil	Same As Above
B12082786-004	Fill #3	08/29/12 19:00	08/30/12	Soil	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

*Sonye Mallott*



## LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Continental Resources

Project: Atlanta Site

Client Sample ID: Original Material, From Cut

Location: E-1180177.20, N-421287.75, Elv. 1940.40

Lab ID: B12082786-001

Report Date: 09/06/12

Collection Date: 08/29/12 19:00

Date Received: 08/30/12

Sampled By: Spencer Ingalls

Analyses

Result Units Qualifier Method Analysis Date / By

### SATURATED PASTE

pH, sat. paste	7.8 s.u.	ASAM10-3.	09/06/12 16:30 / srm
Conductivity, sat. paste	4.8 mmhos/cm	ASA10-3	09/06/12 16:30 / srm
Calcium, sat. paste	24.4 meq/l.	SW6010B	09/05/12 13:07 / rh
Magnesium, sat. paste	29.5 meq/L	SW6010B	09/05/12 13:07 / rh
Sodium, sat. paste	18.7 meq/L	D	SW6010B 09/05/12 13:07 / rh
Sodium Adsorption Ratio (SAR)	3.60 unitless		Calculation 09/06/12 16:30 / srm

### CHEMICAL CHARACTERISTICS

Cation Exchange Capacity	19.8 meq/100g	D	SW6010B	09/06/12 15:11 / rh
--------------------------	---------------	---	---------	---------------------

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



## LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Continental Resources  
Project: Atlanta Site  
Client Sample ID: Fill #1  
Location: E-1179926.05, N-421267.60, Elv. 1937.65  
Lab ID: B12082786-002

Report Date: 09/06/12  
Collection Date: 09/29/12 19:00  
Date Received: 09/30/12  
Sampled By: Spencer Ingalls

Analytes	Result	Units	Qualifier	Method	Analysis Date / By
<b>SATURATED PASTE</b>					
pH, sat. paste	7.7	s.u.		ASAM10-3	09/06/12 16:30 / sm
Conductivity, sat. paste	2.8	mmhos/cm		ASA10-3	09/06/12 16:30 / sm
Calcium, sat. paste	14.2	meq/L		SW6010B	09/05/12 13:14 / rh
Magnesium, sat. paste	20.1	meq/L		SW6010B	09/05/12 13:14 / rh
Sodium, sat. paste	5.61	meq/L	D	SW6010B	09/05/12 13:14 / rh
Sodium Adsorption Ratio (SAR)	1.35	unitless		Calculation	09/06/12 16:30 / sm
<b>CHEMICAL CHARACTERISTICS</b>					
Cation Exchange Capacity	15.1	meq/100g	D	SW6010B	09/06/12 15:15 / rh

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



## LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Continental Resources  
Project: Atlanta Site  
Client Sample ID: Fill #2  
Location: E-1179924.40, N-421196.70, Elv. 1937.95  
Lab ID: B12002786-003

Report Date: 09/06/12  
Collection Date: 08/29/12 19:00  
Date Received: 08/30/12  
Sampled By: Spencer Ingalls

Analyses	Result	Units	Qualifier	Method	Analysis Date / By
<b>SATURATED PASTE</b>					
pH, sat. paste	8.1	s.u.		ASAm10-3,	09/06/12 16:30 / srm
Conductivity, sat. paste	1.2	mmhos/cm		ASA10-3	09/06/12 16:30 / srm
Calcium, sat. paste	2.59	meq/L		SW6010B	09/05/12 13:28 / rh
Magnesium, sat. paste	8.07	meq/L		SW6010B	09/05/12 13:28 / rh
Sodium, sat. paste	3.40	meq/L		SW6010B	09/05/12 13:28 / rh
Sodium Adsorption Ratio (SAR)	1.47	unitless		Calculation	09/06/12 16:30 / srm
<b>CHEMICAL CHARACTERISTICS</b>					
Cation Exchange Capacity	12.3	meq/100g	D	SW6010B	09/06/12 15:22 / rh

Report: RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.  
D - RL increased due to sample matrix.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



## LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Continental Resources

Project: Atlanta Site

Client Sample ID: Fill #3

Location: E-1179963.65, N-421120.95, Elv. 1937.90

Lab ID: B120827B6-004

Report Date: 09/06/12

Collection Date: 08/29/12 19:00

Date Received: 08/30/12

Sampled By: Spencer Ingalls

Analytes

Result Units Qualifier Method Analysis Date / By

### SATURATED PASTE

pH, sat. paste	7.9 s.u.	ASAM10-3	09/06/12 16:30 / srn
Conductivity, sat. paste	4.5 mmhos/cm	ASA10-3	09/06/12 16:30 / srn
Calcium, sat. paste	25.1 meq/L	SW6010B	09/05/12 13:32 / rh
Magnesium, sat. paste	36.7 meq/L	SW6010B	09/05/12 13:32 / rh
Sodium, sat. paste	11.5 meq/L	D	SW6010B 09/05/12 13:32 / rh
Sodium Adsorption Ratio (SAR)	2.07 unitless		Calculation 09/06/12 16:30 / srn

### CHEMICAL CHARACTERISTICS

Cation Exchange Capacity	16.4 meq/100g	D	SW6010B	09/06/12 15:29 / rh
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Report: RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.  
D - RL increased due to sample matrix.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



## QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Continental Resources

Report Date: 09/06/12

Project: Atlanta Site

Work Order: B12082786

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: ASA10-3									Batch: R191314
Sample ID: B12082786-001A DUP	Sample Duplicate								09/06/12 16:30
Conductivity, sat. paste	4.86	mmhos/cm	0.10				1.2		30
Sample ID: LCS-1209061630	Laboratory Control Sample								09/06/12 16:30
Conductivity, sat. paste	7.54	mmhos/cm	0.10	97	50	150			

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



## QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Continental Resources

Report Date: 09/06/12

Project: Atlanta Site

Work Order: B12082786

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method:</b> ASAM10-9.2									
Sample ID: B12082786-001A DUP pH, sat. paste	Sample Duplicate 7.60	s.u.	0.10		Run: MISC-SOIL_120906B		2.6	10	09/06/12 16:30
Sample ID: LCS-1209061630 pH, sat. paste	Laboratory Control Sample 7.00	s.u.	0.10	99	90	110			09/06/12 16:30

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



## QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Continental Resources

Report Date: 09/06/12

Project: Atlanta Site

Work Order: B12082786

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: Calculation	Batch: R191314								
Sample ID: B12082786-001A DUP	Sample Duplicate				Run: MISC-SOIL_120906B				09/06/12 16:30
Sodium Adsorption Ratio (SAR)	3.86	unitless	0.010				6.7		30
Sample ID: LCS-1209061630	Laboratory Control Sample				Run: MISC-SOIL_120906B				09/06/12 16:30
Sodium Adsorption Ratio (SAR)	5.11	unitless	0.010	83	50	150			

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



## QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Continental Resources

Report Date: 09/06/12

Project: Atlanta Site

Work Order: B12082786

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW6010B									Batch: 65170
Sample ID: LCS-65170	Laboratory Control Sample				Run: ICP201-B_120905A				09/05/12 13:03
Calcium, sat. paste	46.4	meq/L	0.050	88	50	150			
Magnesium, sat. paste	29.0	meq/L	0.082	86	50	150			
Sodium, sat. paste	32.0	meq/L	0.16	77	50	150			
Sample ID: B12082786-001A DUP	Sample Duplicate				Run: ICP201-B_120905A				09/05/12 13:10
Calcium, sat. paste	25.2	meq/L	0.050				3.1		30
Magnesium, sat. paste	31.0	meq/L	0.082				4.8		30
Sodium, sat. paste	20.4	meq/L	0.081				8.7		30
Sample ID: B12082786-002AMS2	Sample Matrix Spike				Run: ICP201-B_120905A				09/05/12 13:25
Calcium, sat. paste	26.8	meq/L	0.050	101	50	150			
Magnesium, sat. paste	39.5	meq/L	0.082	94	50	150			
Sodium, sat. paste	16.1	meq/L	0.084	96	50	150			
Method: SW6010B									Batch: 65201
Sample ID: LCS-65201	Laboratory Control Sample				Run: ICP201-B_120905B				09/06/12 15:08
Cation Exchange Capacity	22.4	meq/100g	0.16	90	60	140			
Sample ID: B12082786-002A DUP	Sample Duplicate				Run: ICP201-B_120905B				09/06/12 15:18
Cation Exchange Capacity	13.8	meq/100g	0.16				8.8		50
Sample ID: B12082786-003AMS2	Sample Matrix Spike				Run: ICP201-B_120905B				09/06/12 15:25
Cation Exchange Capacity	33.6	meq/100g	0.17	98	50	150			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



## Standard Reporting Procedures

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as -dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

## Workorder Receipt Checklist

Continental Resources

B12082786

Login completed by: Randa Nees

Date Received: 8/30/2012

Reviewed by: BL2000\kmcdonald

Received by: jrz

Reviewed Date: 8/30/2012

Carrier Hand Del  
name:

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temp Blank received?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Not Applicable <input type="checkbox"/>
Container/Temp Blank temperature:	24.6°C No Ice		
Water + VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water + pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Applicable <input checked="" type="checkbox"/>

### Contact and Corrective Action Comments:

Perc analysis not done at Energy Laboratories. These samples were taken to another laboratory by Mick Albright of Continental Resources.



# Chain of Custody and Analytical Request Record

PLEASE PRINT- Provide as much information as possible.

Page 1 of 1

Company Name: <b>Continental Resources</b>		Project Name, PWS, Permit, Etc. <b>Atlanta Site</b>		Sample Origin State: <b>ND</b>	EPA/State Compliance: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Report Mail Address: PO Box 268870      73126 Oklahoma City, OK		Contact Name: <b>Chad Newby</b> Phone/Fax: <b>405-574-2172</b> Email: <b>chad.newby@clr.com</b>		Purchase Order: <b>Spencer Ingalls</b>	Sampler, (Please Print) <b>Chad Newby</b>
Invoice Address: PO Box 268870      73126 Oklahoma City, OK		Invoice Contact & Phone: <b>Chad Newby</b> <b>405-574-2172</b>		Quote/Bottle Order: <b>Unknown</b>	Shipment <b>Hand</b> Cedar (R40):
Special Report/Formats - ELI must be notified prior to sample submittal for the following:		ANALYSIS REQUESTED		Comments: <b>E-1180177.20</b> <b>N-421287.75</b> <b>ELU 1940.40</b>	Receipt Temp <b>24.6 °C</b>
<input type="checkbox"/> DW <input type="checkbox"/> GSA <input type="checkbox"/> POTW/MMWTP <input type="checkbox"/> Format: _____ <input type="checkbox"/> State: _____ <input type="checkbox"/> Other: _____		<input type="checkbox"/> A2LA <input type="checkbox"/> EDD/EDT(Electronic Data) <input type="checkbox"/> LEVEL IV <input type="checkbox"/> NELAC		Number of Containers Sample Type: A/W/S/V/R/D Soil/Solids Air/Water/Bioassay Other	Normal Turnaround (TAT) <b>24 hrs</b>
<b>SAMPLE IDENTIFICATION</b> (Name, Location, Interval, etc.)		Collection Date <b>8-29-12</b>	Collection Time <b>7:00pm</b>	MATRIX <b>I-S</b>	SEE ATTACHED <b>X</b>
Original Material ( <input checked="" type="checkbox"/> ) 2 3 4 5 6 7 8 9 10 11 12					
<b>Custody Record MUST be Signed</b>		Received by (print): <b>Mick Albright</b>	Date/Time: <b>8-30-12 9:00 AM</b>	Received by (print): <b>Mick Albright</b>	Date/Time: <b>8-30-12 9:00 AM</b>
		Received by (print): <b>Mick Albright</b>	Date/Time: <b>8-30-12 3:05 PM</b>	Received by (print): <b>Mick Albright</b>	Date/Time: <b>8-30-12 3:05 PM</b>
Sample Disposal: <b>Return to Client</b>		Lab Disposal: <b>X</b>	LABORATORY USE ONLY <b>8-30-12 3:05 PM</b>		

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested.

This serves as notice of this possibility. All sub-contract data will be clearly noted on your analytical report.  
Visit our web site at [www.enerylab.com](http://www.enerylab.com) for additional information, downloadable fee schedule, forms, and links.



## Chain of Custody and Analytical Request Record

PLEASE PRINT- Provide as much information as possible.

Page 1 of 1

Company Name: <b>Continental Resources</b>		Project Name, PWS, Permit, Etc. <b>Atlanta Site</b>		Sample Origin State: <b>ND</b>	EPA/State Compliance: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Report Mail Address: <b>Oklahoma City, OK PO Box 268870 73126</b>		Contact Name: <b>Chad Newby</b> Phone/Fax: <b>405-574-2172</b> Email: <b>chad.newby@cir.com</b>		Sampler: (Please Print) <b>Spencer Ingalls</b>		
Invoice Address: <b>Oklahoma City, OK PO Box 268870 73126</b>		Invoice Contact & Phone: <b>Chad Newby 405-574-2172</b>		Purchase Order: <b>Chad Newby</b>	Quote/Bottle Order: <b>Unknown</b>	
Special Report/Formats - ELI must be notified prior to sample submittal for the following:		Number of Containers Sample Type: A/W/S/V/B/O Air/Water/Solids/Solvent Vegetation/Other	ANALYSIS REQUESTED		Shipped by: <b>Chad</b> Carrier ID(s):	
<input type="checkbox"/> DW <input type="checkbox"/> GSA <input type="checkbox"/> POTW/WWTP <input type="checkbox"/> State: _____ <input type="checkbox"/> Other: _____		<input type="checkbox"/> A2LA <input type="checkbox"/> EDD/EDT(Electronic Data) Format: _____ <input type="checkbox"/> LEVEL IV <input type="checkbox"/> NELAC	<b>E</b> <b>C</b> <b>SAR</b> <b>S</b> <b>CEC</b> <b>PH</b> <b>Prec</b>	<b>R</b> <b>U</b> <b>S</b> <b>H</b>	Contact ELI prior to RUSH sample submittal for charges and scheduling - See Instruction Page Comments: <b>E-1179926-05</b> <b>W-421267-60</b> <b>E.U. 1937-65</b> Receipt Temp: <b>24.5°C</b> On Ice: <b>Yes</b> <input checked="" type="checkbox"/> Custody Seal: <b>Y</b> <input checked="" type="checkbox"/> Intact: <b>Y</b> <input checked="" type="checkbox"/> Signature: <b>Y</b> <input checked="" type="checkbox"/> Match: <b>Y</b> <input checked="" type="checkbox"/>	
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)		Collection Date <b>8-29-12</b>	Collection Time <b>7:00PM</b>	MATRIX	Normal Turnaround (TAT)	
<b>Fill #1</b>					<b>X</b>	
2						
3						
4						
5						
6						
7						
8						
9						
10						
Custody Record <b>MUST be Signed</b>	Relinquished by (print): <b>Mark Albright</b>	Date/Time: <b>8-30-12 9:00AM</b>	Signature: <b>Mark Albright</b>	Received by (print):	Date/Time:	Signature:
	Requisitioned by (print): <b>Mark Albright</b>	Date/Time: <b>8-30-12 3:05</b>	Signature: <b>Mark Albright</b>	Received by (print):	Date/Time:	Signature:
	Sample Disposal: Return to Client	Lab Disposal: <b>X</b>	Received by Laboratory: <b>SP2000NER 8/30/12 3:05pm</b>			

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# Chain of Custody and Analytical Request Record

PLEASE PRINT. Provide as much information as possible.

Page 1 of 1

Company Name: <b>Continental Resources</b>		Project Name, PWS, Permit, Etc. <b>Atlanta Site</b>			Sample Origin State: <b>ND</b>	EPA/State Compliance: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>																												
Report Mail Address: <b>PO Box 268870 73126</b>		Contact Name: <b>Chad Newby</b> Phone/Fax: <b>405-574-2172</b> Email: <b>chad.newby@okc.com</b>			Purchase Order: <b>Spencer Ingalls</b>	Sampler: (Please Print)																												
Invoice Address: <b>PO Box 268870 73126</b>		Invoice Contact & Phone: <b>Chad Newby 405-574-2172</b>			Quote/Bottle Order: <b>Chad Newby Unknown</b>																													
Special Report/Formats – ELI must be notified prior to sample submittal for the following:		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="4">ANALYSIS REQUESTED</th> </tr> <tr> <th>Number of Containers</th> <th>Sample Type: A/W/S/V/B/O</th> <th>Air/Water/Solids/Solids</th> <th>Vegetation/Holassay/Other</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> DW</td> <td><input type="checkbox"/> A2LA</td> <td><input type="checkbox"/> S/A/R</td> <td><input type="checkbox"/> Per.</td> </tr> <tr> <td><input type="checkbox"/> GSA</td> <td><input type="checkbox"/> EDD/EDT (Electronic Data)</td> <td><input type="checkbox"/> C/E/C</td> <td><input type="checkbox"/> H</td> </tr> <tr> <td><input type="checkbox"/> POTWWWWTP</td> <td>Format: <input type="checkbox"/> LEVEL IV</td> <td><input type="checkbox"/> PH</td> <td><input type="checkbox"/> S</td> </tr> <tr> <td><input type="checkbox"/> State: _____</td> <td><input type="checkbox"/> NELAC</td> <td><input type="checkbox"/> E/C</td> <td><input type="checkbox"/> U</td> </tr> <tr> <td><input type="checkbox"/> Other: _____</td> <td></td> <td><input type="checkbox"/> T/R</td> <td><input type="checkbox"/> R</td> </tr> </tbody> </table>			ANALYSIS REQUESTED				Number of Containers	Sample Type: A/W/S/V/B/O	Air/Water/Solids/Solids	Vegetation/Holassay/Other	<input type="checkbox"/> DW	<input type="checkbox"/> A2LA	<input type="checkbox"/> S/A/R	<input type="checkbox"/> Per.	<input type="checkbox"/> GSA	<input type="checkbox"/> EDD/EDT (Electronic Data)	<input type="checkbox"/> C/E/C	<input type="checkbox"/> H	<input type="checkbox"/> POTWWWWTP	Format: <input type="checkbox"/> LEVEL IV	<input type="checkbox"/> PH	<input type="checkbox"/> S	<input type="checkbox"/> State: _____	<input type="checkbox"/> NELAC	<input type="checkbox"/> E/C	<input type="checkbox"/> U	<input type="checkbox"/> Other: _____		<input type="checkbox"/> T/R	<input type="checkbox"/> R	Contact ELI prior to RUSH sample submittal for charges and scheduling - See Instruction Page	Shipped by: <b>Terry</b> Carrier: <b>UPS</b>
ANALYSIS REQUESTED																																		
Number of Containers	Sample Type: A/W/S/V/B/O	Air/Water/Solids/Solids	Vegetation/Holassay/Other																															
<input type="checkbox"/> DW	<input type="checkbox"/> A2LA	<input type="checkbox"/> S/A/R	<input type="checkbox"/> Per.																															
<input type="checkbox"/> GSA	<input type="checkbox"/> EDD/EDT (Electronic Data)	<input type="checkbox"/> C/E/C	<input type="checkbox"/> H																															
<input type="checkbox"/> POTWWWWTP	Format: <input type="checkbox"/> LEVEL IV	<input type="checkbox"/> PH	<input type="checkbox"/> S																															
<input type="checkbox"/> State: _____	<input type="checkbox"/> NELAC	<input type="checkbox"/> E/C	<input type="checkbox"/> U																															
<input type="checkbox"/> Other: _____		<input type="checkbox"/> T/R	<input type="checkbox"/> R																															
<input type="checkbox"/> DW <input type="checkbox"/> GSA <input type="checkbox"/> POTWWWWTP <input type="checkbox"/> State: _____ <input type="checkbox"/> Other: _____					Comments: <b>E-1179924-V0</b> <b>N-421196-70</b> <b>Elv. 1937.95</b>	Receipt Temp: <b>24.6°C</b> Color: <b>Yes</b>																												
<b>SAMPLE IDENTIFICATION</b> (Name, Location, Interval, etc.) <b>Fill # 2</b>		Collection Date <b>8/29/12</b>	Collection Time <b>7:00pm</b>	MATRIX <b>I-S d d a d K</b>	SEE ATTACHED	Custody Seal: <b>Y</b> Initial: <b>Y</b> Signature Match: <b>Y</b>																												
						<b>20098-03</b>																												
						<b>LABORATORY USE ONLY</b>																												
<b>Custody Record MUST be Signed</b>	Released by (print): <b>Mark Albright</b>	Date/Time: <b>8-30-12 9:00 AM</b>	Signature: <b>Mark Albright</b>	Received by (print):	Date/Time:	Signature:																												
	Released by (print): <b>Mark Albright</b>	Date/Time: <b>8-30-12 3:05 PM</b>	Signature: <b>Mark Albright</b>	Received by (print):	Date/Time:	Signature:																												
Sample Disposal: Return to Client:		Lab Disposal: <b>K</b>		Received by Laboratory:	Date/Time:	Signature:																												
In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly noted on your analytical report. Visit our web site at <a href="http://www.energylab.com">www.energylab.com</a> for additional information, downloadable fee schedule, terms, and links.																																		



## Chain of Custody and Analytical Request Record

Page 1 of 1

PLEASE PRINT - Provide as much information as possible.			
Company Name: <b>Continental Resources</b>		Project Name, PMS, Permit, Etc. <b>Atlanta Site</b>	
Report Mail Address: <b>PO Box 2168870 73126 Oklahoma City, OK</b>		Sample Origin State: <b>ND</b>	
Invoice Address: <b>PO Box 2168870 73126 Oklahoma City, OK</b>		EPA/State Compliance: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Special Report/Formats - ELI must be notified prior to sample submittal for the following:		Sampler, (Please Print) <b>Spencer Ingalls</b>	
<input type="checkbox"/> DW <input type="checkbox"/> GSA <input type="checkbox"/> PCTWAWWTP <input type="checkbox"/> State: _____ <input type="checkbox"/> Other: _____		<input type="checkbox"/> A2LA <input type="checkbox"/> EDD/EDT (Electronic Data) Format <input type="checkbox"/> LEVEL IV <input type="checkbox"/> NELAC	
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)		Collection Date	Collection Time
<b>Fill #3</b>		<b>8-29-12</b>	<b>7:00pm</b>
		1-3	d d d d d
		MATRIX	SEE ATTACHED
		CC	Normal Turnaround (TAT)
		SAR	R
		CEC	U
		P/H	G
		Perch	H
		45	Comments: <b>E-1179963.65 N-421120.95 EL-1937.90</b>
		LABORATORY USE ONLY	Received Temp <b>24.5 °C</b>
			On Site: <b>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></b>
			Custody Seal <b>Y</b>
			In tact <b>Y</b>
			Signature Match <b>Y</b>
Custody Record <b>MUST be Signed</b>		Received by (print): <b>Mick Albright</b>	Date/Time: <b>8-30-12 9:00AM</b>
		Signature: <b>Mick Albright</b>	Received by (print):
		Received by (print): <b>Mick Albright</b>	Date/Time: <b>8-30-12 3:05 PM</b>
		Received by (print): <b>Mick Albright</b>	Signature: <b>Mick Albright</b>
Sample Disposal: Return to Client:		Lab Disposal:	Received by Laboratory: <b>Spencer Ingalls</b>
		Date/Time: <b>8-30-12 3:05 PM</b>	Signature: <b>Spencer Ingalls</b>

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**AMERICAN  
TECHNICAL  
SERVICES, INC.**

8105 Black Hawk Rd • PO Box 558 • Black Hawk, SD 57718-0558 • Phone (605) 787-9303 • FAX (605) 787-9515  
140 Pine Needle Drive • Spearfish, SD 57783 • Phone (605) 642-2742 • Mobile 390-3768

**PROCTOR TEST**

**MOISTURE DENSITY RELATION**

CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
Attn: Project Manager

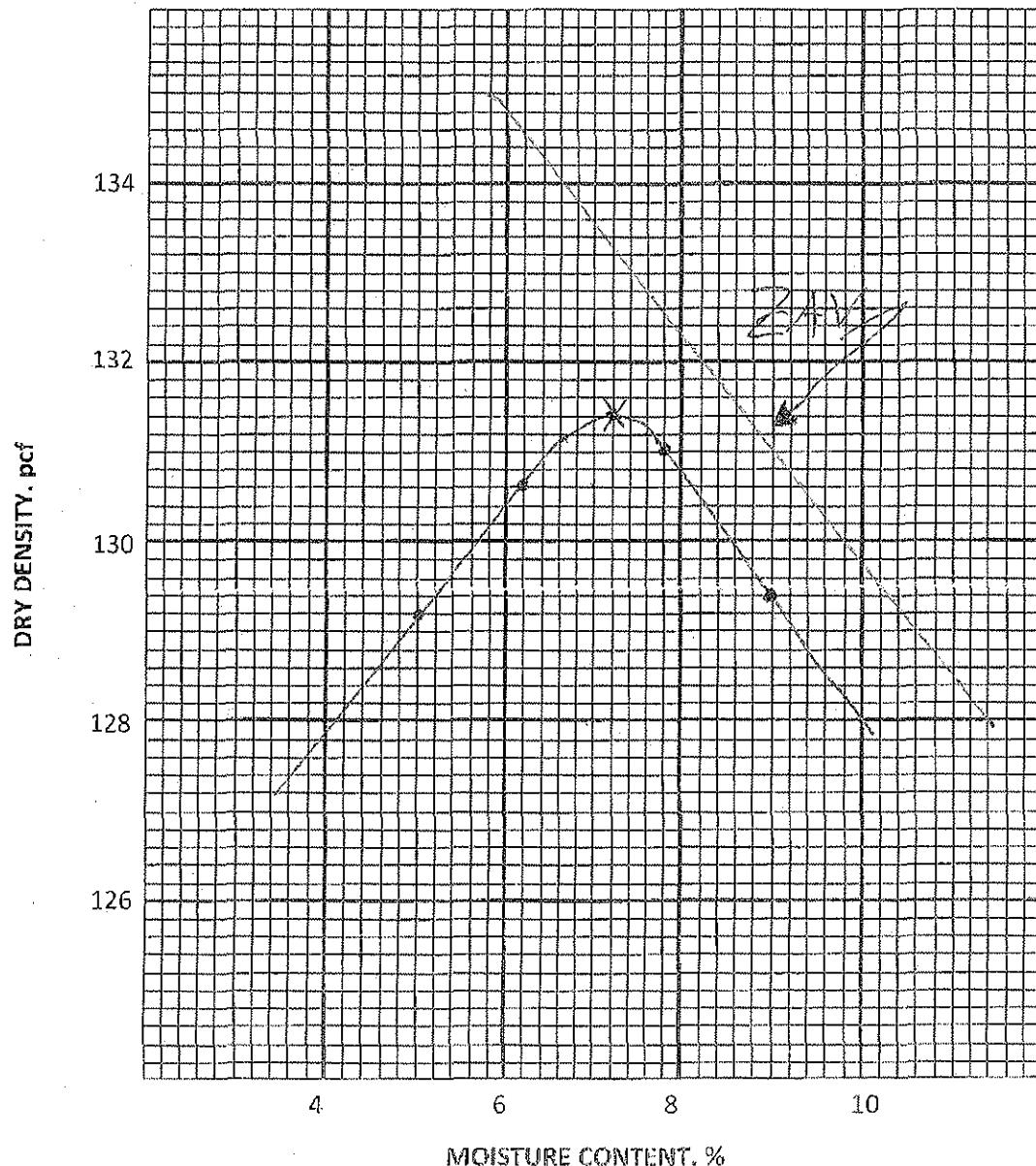
Proctor#: Date: 08/21/12  
ASTM: 698 Method: C  
Soil Classification: Brown Gravelly  
Sand

Project: Atlanta Drill Pad, Williston,  
North Dakota

Project Number: 12-12165

**MAXIMUM DENSITY: 131.4 pcf**

**OPTIMUM MOISTURE CONTENT: 7.2%**



Cc:

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140 Pine Needle Drive • Spearfish, SD 57783 • Phone (605) 642-2742 • Mobile 390-3788

**PROCTOR TEST**

**MOISTURE DENSITY RELATION**

CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
Attn: Project Manager

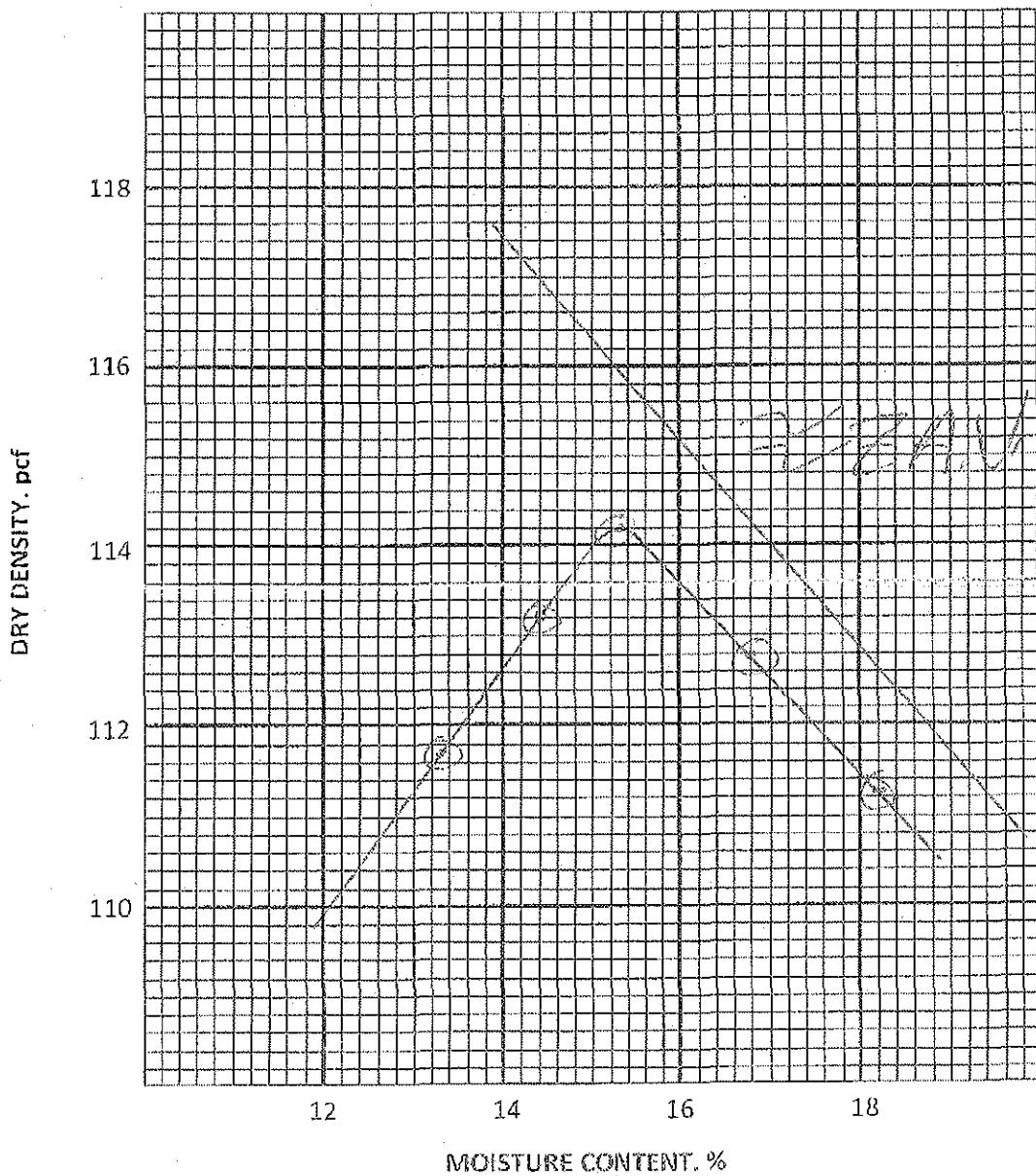
Proctor#: Date: 07/31/12  
ASTM: 698 Method:  
Soil Classification: CL

Project: Atlanta Drill Pad, Williston,  
North Dakota

Project Number: 12-12165

MAXIMUM DENSITY: 114.2pcf

OPTIMUM MOISTURE CONTENT: 15.3%



Cc:

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## **REPORT OF EXCAVATION OBSERVATIONS**

**CONTINENTAL RESOURCES**  
P.O. Box 268836  
Oklahoma City, OK 73126

**September 7, 2012**

**Attn: Project Manager**

**Subj: Report of Excavation Observations**  
**Drill Pad Spillage Line Construction**  
**Atlanta Drill Pad**  
**Williston, North Dakota**

**ATS No. 12-12165**

## **INTRODUCTION**

Our presence on the above referenced project was requested by Continental Resources of Oklahoma City, Oklahoma.

We were to observe and test the overexcavation and fill placement over the spillage liner placed below the Atlanta Drill Pad being constructed in Williston, North Dakota.

## **EXCAVATION OBSERVATIONS**

### **Pad Spillage Liner Excavation & Subgrade Preparation:**

We observed the overexcavation of the spillage liner on August 12, 2012. We observed that the bottom of the overexcavation was taken to 5 feet below finished grades in the spillage liner site. The bottom of the overexcavation was recompacted and smoothed prior to synthetic liner installation.

The synthetic liner material was delivered in rolls and placed over the prepared subgrade soils. We observed that the liner laps were welded as the liner materials were pulled into place.

### **Liner Area Backfill:**

On August 14, 2012, we observed on-site soil placement over the synthetic liner. A cushion layer was compacted in place then material was placed via scrapers. Water was added and dozers mixed the soils prior to compaction in lifts. All compaction tests taken indicate the backfill material was placed in an engineered manner.

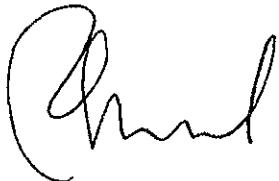
## **CONCLUSIONS AND RECOMMENDATIONS**

Based on our observations and tests, it is our opinion that the liner subgrade was prepared and the backfill placed in an engineered manner.

## **CLOSURE**

If you have questions or comments about this report, please contact us and we will be glad to respond.

Sincerely,  
**AMERICAN TECHNICAL SERVICES, INC.**



Dave G. Bressler, P.E.  
Geotechnical Consultant

cc: File

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager

PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 07/30/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	
1	07/25/12	#1	9.7	126.5	7.7	128.2	101	+/-2%	95	PASS
2	07/25/12	#1	9.7	126.5	8.7	120.2	95	+/-2%	95	PASS
3	07/25/12	#1	9.7	126.5	8.8	125.8	99	+/-2%	95	PASS
4	07/25/12	#1	9.7	126.5	9.9	126.8	100	+/-2%	95	PASS
5	07/25/12	#1	9.7	126.5	9.1	120.4	95	+/-2%	95	PASS
6	07/25/12	#1	9.7	126.5	7.8	121.0	96	+/-2%	95	PASS
7							#DIV/0!			
8							#DIV/0!			
9							#DIV/0!			
10							#DIV/0!			

TEST #	LOCATION	ELEVATION
1	North 421071.00, East 117953.00	1913.95
2	North 421274.95, East 1179466.60	1924.65
3	North 421032.65, East 1179535.15	1911.2
4	North 421208.75, East 1179464.72	1922.6
5	North 421225.55, East 1179501.00	1923.1
6	North 420954.70, East 1179641.10	1905.35
7		
8		
9		
10		

NOTES: All Test in West Valley Fill

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8105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

**CLIENT** CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
  
**ATTENTION:** Project Manager  
**PROJECT:** Atlanta Drill Site

ATS # 12-12165  
DATE 07/30/12  
ATS TECH Russell Harwood  
GAGE # 2  
BENCHMARK

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
7	07/26/12	#1	9.7	126.5	8.1	126.2	100	+/-2%	95	PASS
8	07/26/12	#1	9.7	126.5	7.8	128.4	102	+/-2%	95	PASS
9	07/26/12	#1	9.7	126.5	7.9	126.1	100	+/-2%	95	PASS
10	07/26/12	#1	9.7	126.5	7.7	120.2	95	+/-2%	95	PASS
11	07/26/12	#1	9.7	126.5	8.0	124.7	99	+/-2%	95	PASS
12	07/26/12	#1	9.7	126.5	8.1	123.7	98	+/-2%	95	PASS
13							#DIV/0!			
14							#DIV/0!			
15							#DIV/0!			
16							#DIV/0!			

TEST #	LOCATION	ELEVATION
7	North 420733.85, East 1179715.80	1889.35
8	North 421024.65, East 1179590.75	1911.8
9	North 4211162.20, East 1179535.00	1920.75
10	North 420989.90, East 1179617.40	1910.3
11	North 421163.80, East 1179533.60	1921.65
12	North 420730.65, East 1179774.25	1887.9
13		
14		
15		
16		

NOTES:  


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 CC:

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**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 07/30/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	
13	07/27/12	#1	9.7	126.5	8.2	128.8	102	+/-2%	95	PASS
14	07/27/12	#1	9.7	126.5	7.8	125.7	99	+/-2%	95	PASS
15	07/27/12	#1	9.7	126.5	8.0	126.2	100	+/-2%	95	PASS
16	07/27/12	#1	9.7	126.5	7.9	126.7	100	+/-2%	95	PASS
17	07/27/12	#1	9.7	126.5	8.3	121.5	96	+/-2%	95	PASS
18	07/27/12	#1	9.7	126.5	8.0	120.7	95	+/-2%	95	PASS
19	07/27/12	#1	9.7	126.5	10.4	124.3	98	+/-2%	95	PASS
20	07/27/12	#1	9.7	126.5	8.3	121.5	96	+/-2%	95	PASS
21	07/27/12	#1	9.7	126.5	8.7	123.2	97	+/-2%	95	PASS
22	07/27/12	#1	9.7	126.5	10.1	121.2	96	+/-2%	95	PASS

TEST #	LOCATION	ELEVATION
13	North 420922.45, East 1179615.55	1907.5
14	North 421133.55, East 1179531.25	1920.75
15	North 421328.60, East 1179449.60	1930
16	North 420734.90, East 1179720.10	1891.95
17	North 421331.0, East 1179468.55	1930.25
18	North 421115.0, East 1179565.80	1920.35
19	North 421129.55, East 1179544.70	1921.55
20	North 420997.45, East 1179569.10	1913.85
21	North 421218.20, East 1179468.55	1927.65
22	North 421036.70, East 1179556.20	1916.5

NOTES

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Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 07/30/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
23	07/28/12	#1	9.7	126.5	7.7	121.3	96	+/-2%	95	PASS
24	07/28/12	#1	9.7	126.5	8.6	122.3	97	+/-2%	95	PASS
25	07/28/12	#1	9.7	126.5	9.8	121.4	96	+/-2%	95	PASS
26	07/28/12	#1	9.7	126.5	10.3	120.4	95	+/-2%	95	PASS
27	07/28/12	#1	9.7	126.5	8.8	123.1	97	+/-2%	95	PASS
28	07/28/12	#1	9.7	126.5	10.2	121.1	96	+/-2%	95	PASS
29	07/28/12	#1	9.7	126.5	9.5	121.7	96	+/-2%	95	PASS
30	07/28/12	#1	9.7	126.5	8.9	121.6	96	+/-2%	95	PASS
31							#DIV/0!			
32							#DIV/0!			

TEST #	LOCATION	ELEVATION
23	North 421030.00, East 1179567.90	1917.25
24	North 421168.40, East 1179502.30	1925.8
25	North 420941.60, East 1179621.90	1910.9
26	North 420775.75, East 1179540.35	1915
27	North 420747.80, East 1179641.35	1901.75
28	North 421160.85, East 1179530.85	1925
29	North 421021.90, East 117618.15	1915.65
30	North 420886.85, East 1179717.40	1904.9
31		
32		

NOTES:

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REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 07/30/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
31	07/29/12	#1	9.7	126.5	10.2	120.4	95	+/-2%	95	PASS
32	07/29/12	#1	9.7	126.5	10.1	121.2	96	+/-2%	95	PASS
33	07/29/12	#1	9.7	126.5	8.2	121.7	96	+/-2%	95	PASS
34	07/29/12	#1	9.7	126.5	9.2	121.7	96	+/-2%	95	PASS
35	07/29/12	#1	9.7	126.5	9.9	120.4	95	+/-2%	95	PASS
36	07/29/12	#1	9.7	126.5	9.4	120.8	95	+/-2%	95	PASS
37							#DIV/0!			
38							#DIV/0!			
39							#DIV/0!			
40							#DIV/0!			

TEST #	LOCATION	ELEVATION
31	North 421067.10, East 1179554.40	1920.8
32	North 420928.65, East 1179636.40	1911.25
33	North 420835.80, East 1179608.55	1912.35
34	North 421077.20, East 1179797.50	1922.35
35	North 420932.15, East 1179576.05	1914.35
36	North 420901.40, East 1179652.05	1909.95
37		
38		
39		
40		

NOTES:

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8105 Black Hawk Rd. • PO Box 558  
Black Hawk SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT	CONTINENTAL RESOURCES, INC. PO Box 268836 Oklahoma City, OK 73126	ATS #	12-12165
ATTENTION:	Project Manager	DATE	08/01/12
PROJECT	Atlanta Drill Site	ATS TECH	Russell Harwood
		GAGE #	2
		BENCHMARK	

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
37	07/30/12	#3	15.3	114.2	14.2	108.7	95	+/-2%	95	PASS
38	07/30/12	#3	15.3	114.2	13.7	109.1	96	+/-2%	95	PASS
39	07/30/12	#3	15.3	114.2	13.6	110.4	97	+/-2%	95	PASS
40	07/30/12	#3	15.3	114.2	14.1	109.2	96	+/-2%	95	PASS
41	07/30/12	#3	15.3	114.2	13.8	110.0	96	+/-2%	95	PASS
42	07/30/12	#3	15.3	114.2	14.0	112.6	99	+/-2%	95	PASS
43							#DIV/0!			
44							#DIV/0!			
45							#DIV/0!			
46							#DIV/0!			

TEST #	LOCATION	ELEVATION
37	North 420807.75 East 1179702.80	1909.05
38	North 420783.10 East 1179629.25	1916.6
39	North 421008.30 East 1179597.45	1916.65
40	North 420912.45 East 1179672.00	1910.05
41	North 420800.0 East 1179606.85	1922.55
42	North 420784.65 East 1179714.00	1911.75
43		
44		
45		
46		

NOTES:

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Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/01/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
43	07/31/12	#3	15.3	114.2	13.4	108.9	95	+/-2%	95	PASS
44	07/31/12	#3	15.3	114.2	14.1	113.3	99	+/-2%	95	PASS
45	07/31/12	#3	15.3	114.2	13.3	109.5	96	+/-2%	95	PASS
46	07/31/12	#3	15.3	114.2	13.5	115.0	101	+/-2%	95	PASS
47	07/31/12	#1	9.7	126.5	8.9	124.7	99	+/-2%	95	PASS
48							#DIV/0!			
49							#DIV/0!			
50							#DIV/0!			
51							#DIV/0!			
52							#DIV/0!			

TEST #	LOCATION	ELEVATION
43	North 421075.80, East 1179492.75	1925.45
44	North 420939.60, East 1179667.90	1915.7
45	North 421024.15, East 1179494.95	1926.15
46	North 420978.15, East 1179573.50	1923.35
47	North 420958.05, East 1179629.60	1919.6
48		
49		
50		
51		
52		

NOTES: \_\_\_\_\_

CC: \_\_\_\_\_

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**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

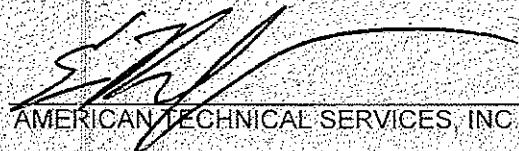
CLIENT	CONTINENTAL RESOURCES, INC. PO Box 268836 Oklahoma City, OK 73126	ATS #	12-12165
ATTENTION:	Project Manager	DATE	08/03/12
PROJECT:	Atlanta Drill Site	ATS TECH	Russell Harwood
		GAGE #	2
		BENCHMARK	

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	
48	08/01/12	#3	15.3	114.2	13.7	113.9	100	+/-2%	95	PASS
49	08/01/12	#3	15.3	114.2	13.4	112.6	99	+/-2%	95	PASS
50	08/01/12	#3	15.3	114.2	13.5	108.9	95	+/-2%	95	PASS
51	08/01/12	#3	15.3	114.2	14.2	110.0	96	+/-2%	95	PASS
52	08/01/12	#3	15.3	114.2	13.3	113.5	99	+/-2%	95	PASS
53							#DIV/0!			
54							#DIV/0!			
55							#DIV/0!			
56							#DIV/0!			
57							#DIV/0!			

TEST #	LOCATION	ELEVATION
48	78' North of South End of West Valley- Middle	
49	25' North of South End of West Valley-Middle	
50	225' North of South End of West Valley-Middle	
51	North 42 1100.20 East 1179617.10	1924.9
52	North 420962.20 East 1179574.20	1928.75
53		
54		
55		
56		
57		

NOTES: Not Able to Get GPS Readings System Down

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CC:

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Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/03/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

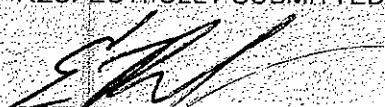
TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
53	08/02/12	#3	15.3	114.2	13.5	114.9	101	+/-2%	95	PASS
54	08/02/12	#3	15.3	114.2	13.7	112.9	99	+/-2%	95	PASS
55	08/02/12	#3	15.3	114.2	13.5	110.2	96	+/-2%	95	PASS
56	08/02/12	#3	15.3	114.2	13.6	114.0	100	+/-2%	95	PASS
57	08/02/12	#3	15.3	114.2	13.6	113.9	100	+/-2%	95	PASS
58	08/02/12	#3	15.3	114.2	13.8	115.5	101	+/-2%	95	PASS
59	08/02/12	#3	15.3	114.2	13.4	109.7	96	+/-2%	95	PASS
60							#DIV/0!			
61							#DIV/0!			
62							#DIV/0!			

TEST #	LOCATION	ELEVATION
53	North 420981.65 East 1179560.25	1930.75
54	North 420989.70 East 1179597.65	1928.25
55	North 420091.15 East 1179511.90	1933.95
56	North 421074.40 East 1179515.05	1933.45
57	North 421145.45 East 1179458.95	1932.75
58	North 421084.85 East 1179531.55	1934.45
59	North 421196.80 East 1179508.90	1934.35
60		
61		
62		

NOTES:

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AMERICAN TECHNICAL SERVICES, INC.

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SERVICES, INC.**

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Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
P.O. Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/07/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
60	08/04/12	#3	15.3	114.2	13.9	112.2	98	+/-2%	95	PASS
61	08/04/12	#1	9.7	126.5	8.9	120.6	95	+/-2%	95	PASS
62	08/04/12	#3	15.3	114.2	14.1	113.9	100	+/-2%	95	PASS
63	08/04/12	#3	15.3	114.2	13.4	113.3	99	+/-2%	95	PASS
64							#DIV/0!			
65							#DIV/0!			
66							#DIV/0!			
67							#DIV/0!			
68							#DIV/0!			
69							#DIV/0!			

TEST #	LOCATION	ELEVATION
60	300' North of South Slope, East 1/3 of West Valley	4 to 5' Below
61	100' North of South Slope, East 1/3 of West Valley	4 to 5' Below
62	North 421154.15, East 1179488.85	1930.7
63	North 421086.15, East 1179544.25	1937.05
64		
65		
66		
67		
68		
69		

NOTES: No GPS for Location

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9105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/07/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	
64	08/05/12	#1	9.7	126.5	10.1	124.9	99	+/-2%	95	PASS
65	08/05/12	#3	15.3	114.2	13.4	112.2	98	+/-2%	95	PASS
66	08/05/12	#1	9.7	126.5	8.3	128.5	102	+/-2%	95	PASS
67	08/05/12	#1	9.7	126.5	9.1	121.8	96	+/-2%	95	PASS
68							#DIV/0!			
69							#DIV/0!			
70							#DIV/0!			
71							#DIV/0!			
72							#DIV/0!			
73							#DIV/0!			

TEST #	LOCATION	ELEVATION
64	North 421047 10 East 1179483.90	1939
65	North 421236 15 East 1179463.75	1938.55
66	North 421344 40 East 1179447.75	1940.25
67	North 421219 15 East 1179501.00	1940.4
68		
69		
70		
71		
72		
73		

NOTES

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9105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/09/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
68	08/07/12	#1	9.7	126.5	7.8	122.6	97	+/-2%	95	PASS
69	08/07/12	#2	8.3	123.2	7.5	118.7	96	+/-2%	95	PASS
70	08/07/12	#1	9.7	126.5	8.7	126.3	100	+/-2%	95	PASS
71	08/07/12	#1	9.7	126.5	7.8	123.8	98	+/-2%	95	PASS
72							#DIV/0!			
73							#DIV/0!			
74							#DIV/0!			
75							#DIV/0!			
76							#DIV/0!			
77							#DIV/0!			

TEST #	LOCATION	ELEVATION
68	North 420982.95 East 1179952.45	1895.45
69	North 421008.10 East 1179936.05	1896.5
70	North 421099.00 East 1179911.80	1898.75
71	North 421191.80 East 1179859.30	1904.05
72		
73		
74		
75		
76		
77		

NOTES

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SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd • PO Box 556  
Black Hawk, SD 57718-0556

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/09/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
72	08/08/12	#1	9.7	126.5	8.6	124.9	99	+/-2%	95	PASS
73	08/08/12	#1	9.7	123.2	7.7	128.6	104	+/-2%	95	PASS
74	08/08/12	#2	8.3	123.2	8.4	117.5	95	+/-2%	95	PASS
75	08/08/12	#1	9.7	126.5	7.9	128.5	102	+/-2%	95	PASS
76							#DIV/0!			
77							#DIV/0!			
78							#DIV/0!			
79							#DIV/0!			
80							#DIV/0!			
81							#DIV/0!			

TEST #	LOCATION	ELEVATION
72	North 421032.80 East 1179904.95	1907.4
73	North 421121.00 East 1179879.00	1909.35
74	North 421046.25 East 1179873.80	1911.65
75	North 421154.10 East 1179910.70	1913.7
76		
77		
78		
79		
80		
81		

NOTES: \_\_\_\_\_ RESPECTFULLY SUBMITTED

CC:

  
AMERICAN TECHNICAL SERVICES, INC.

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TECHNICAL  
SERVICES, INC.**

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8105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT           CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/15/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	
76	08/09/12	#1	9.7	126.5	8.0	120.4	95	+/-2%	95	PASS
77	08/09/12	#2	8.3	123.2	8.1	120.3	98	+/-2%	95	PASS
78							#DIV/0!			
79							#DIV/0!			
80							#DIV/0!			
81							#DIV/0!			
82							#DIV/0!			
83							#DIV/0!			
84							#DIV/0!			
85							#DIV/0!			

TEST #	LOCATION	ELEVATION
76	North 421078.95 East 1179862.60	1914.45
77	North 421199.70 East 1179870.90	1915.05
78		
79		
80		
81		
82		
83		
84		
85		

NOTES:

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CC:

AMERICAN TECHNICAL SERVICES, INC.

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Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/15/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
82	08/12/12	#1	9.7	126.5	10.0	124.2	98	+/-2%	95	PASS
83	08/12/12	#1	9.7	126.5	10.3	120.7	95	+/-2%	95	PASS
84	08/12/12	#1	9.7	126.5	10.1	122.8	97	+/-2%	95	PASS
85	08/12/12	#3	15.3	114.2	13.4	115.5	101	+/-2%	95	PASS
86	08/12/12	#3	15.3	114.2	14.0	116.6	102	+/-2%	95	PASS
87	08/12/12	#3	15.3	114.2	13.9	114.9	101	+/-2%	95	PASS
88						#DIV/0!				
89						#DIV/0!				
90						#DIV/0!				
91						#DIV/0!				

TEST #	LOCATION	ELEVATION
82	North 421169.15 East 1179661.00	1934.25
83	North 421281.75 East 1179530.30	1935.9
84	North 421187.85 East 1179466.20	1935.2
85	North 421265.35 East 1179372.75	1936.3
86	North 421179.15 East 1179257.80	1935.9
87	North 421253.65 East 1179177.25	1937.1
88		
89		
90		
91		

NOTES: All Test in Overex on West 1/2 Subgrade Before Liner Installation

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CC:

  
AMERICAN TECHNICAL SERVICES, INC.

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6105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/15/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

		LABORATORY		FIELD		SPECIFICATIONS				
TEST #	DATE	PROCTOR # / CLASSIFICATION	% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
78	08/12/12	#3	15.3	114.2	13.5	113.9	100	+/-2%	95	PASS
79	08/12/12	#3	15.3	114.2	13.7	115.1	101	+/-2%	95	PASS
80	08/12/12	#3	15.3	114.2	13.4	114.9	101	+/-2%	95	PASS
81	08/12/12	#3	15.3	114.2	13.3	113.3	99	+/-2%	95	PASS
82							#DIV/0!			
83							#DIV/0!			
84							#DIV/0!			
85							#DIV/0!			
86							#DIV/0!			
87							#DIV/0!			

TEST #	LOCATION	ELEVATION
78	North 421150.90 East 1179896.40	1917
79	North 421240.60 East 1179845.60	1917.8
80	North 421006.70 East 1179882.55	1922.3
81	North 420992.55 East 1179992.15	1919.75
82		
83		
84		
85		
86		
87		

NOTES: \_\_\_\_\_ RESPECTFULLY SUBMITTED

CC:

  
AMERICAN TECHNICAL SERVICES, INC.

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SERVICES, INC.

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8105 Back Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD  
ASTM D6938

CLIENT: CONTINENTAL RESOURCES INC  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/15/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	
88	08/13/12	#3	15.3	114.2	13.6	113.7	100	+/-2%	95	PASS
89	08/13/12	#3	15.3	114.2	13.8	113.3	99	+/-2%	95	PASS
90	08/13/12	#3	15.3	114.2	13.4	115.5	101	+/-2%	95	PASS
91	08/13/12	#2	8.3	123.2	8.8	118.9	97	+/-2%	95	PASS
92	08/13/12	#1	9.7	126.5	8.9	126.1	100	+/-2%	95	PASS
93							#DIV/0!			
94							#DIV/0!			
95							#DIV/0!			
96							#DIV/0!			
97							#DIV/0!			

TEST #	LOCATION	ELEVATION
88	North 421063.70 East 1179944.20	1918.35
89	North 421008.35 East 1179861.05	1927.7
90	North 421038.50 East 1179985.85	1920.7
91	North 421044.50 East 1179840.40	1927.5
92	North 421017.25 East 1179950.30	1925.65
93		
94		
95		
96		
97		

NOTES:

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CC:

AMERICAN TECHNICAL SERVICES, INC.

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ERVICES, INC.**

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8105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57713-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**  
ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/15/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	
98	08/14/12	#1	9.7	126.5	10.2	120.9	96	+/-2%	95	PASS
99	08/14/12	#1	9.7	126.5	10.3	121.3	96	+/-2%	95	PASS
100	08/14/12	#1	9.7	126.5	10.1	121.9	96	+/-2%	95	PASS
101	08/14/12	#3	15.3	114.2	13.3	114.5	100	+/-2%	95	PASS
102	08/14/12	#1	9.7	126.5	10.1	123.5	98	+/-2%	95	PASS
103	08/14/12	#1	9.7	126.5	10.2	121.2	96	+/-2%	95	PASS
104	08/14/12	#3	15.3	114.2	13.4	115.6	101	+/-2%	95	PASS
105							#DIV/0!			
106							#DIV/0!			
107							#DIV/0!			

TEST #	LOCATION	ELEVATION
98	North 421249.95 East 1179384.30	1937.55
99	North 421288.40 East 1179300.25	1938.65
100	North 421171.30 East 1179237.30	1937.9
101	North 421272.15 East 1179362.50	1938.75
102	North 421267.10 East 1179238.35	1939.7
103	North 421229.90 East 1179254.90	1939.2
104	North 421203.80 East 1179320.25	1938.65
105		
106		
107		

NOTES: Drill Pad Area on Liner Fill

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CC:

AMERICAN TECHNICAL SERVICES, INC.

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TECHNICAL  
SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
3105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**  
ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/15/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
93	08/14/12	#3	15.3	114.2	13.6	114.5	100	+/-2%	95	PASS
94	08/14/12	#3	15.3	114.2	13.7	114.7	100	+/-2%	95	PASS
95	08/14/12	#1	9.7	126.5	10.4	122.5	97	+/-2%	95	PASS
96	08/14/12	#1	9.7	126.5	8.7	124.0	98	+/-2%	95	PASS
97	08/14/12	#1	9.7	126.5	9.3	121.3	96	+/-2%	95	PASS
98						#DIV/0!				
99						#DIV/0!				
100						#DIV/0!				
101						#DIV/0!				
102						#DIV/0!				

TEST #	LOCATION	ELEVATION
93	North 421035.45 East 1179873.40	1927.55
94	North 421012.25 East 1179971.80	1925.7
95	North 421091.95 East 1179838.70	1927.15
96	North 421038.25 East 1179899.75	1928.35
97	North 420986.05 East 1170007.50	1925.5
98		
99		
100		
101		
102		

NOTES:

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CC:

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TECHNICAL  
SERVICES, INC.**

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8105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**  
ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/17/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
111	08/15/12	#1	9.7	126.5	10.4	120.1	95	+/-2%	95	PASS
112	08/15/12	#3	15.3	114.2	13.7	113.9	100	+/-2%	95	PASS
113							#DIV/0!			
114							#DIV/0!			
115							#DIV/0!			
116							#DIV/0!			
117							#DIV/0!			
118							#DIV/0!			
119							#DIV/0!			
120							#DIV/0!			

TEST #	LOCATION	ELEVATION
111	North 421056 40 East 1179836.10	1931.4
112	North 421052.05 East 1179918.50	1927.8
113		
114		
115		
116		
117		
118		
119		
120		

NOTES:

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CC:

AMERICAN TECHNICAL SERVICES, INC.

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/17/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

			LABORATORY		FIELD			SPECIFICATIONS		
TEST #	DATE	PROCTOR # / CLASSIFICATION	% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE	% SPEC COMPACT	PASS
105	08/15/12	#3	15.3	114.2	13.6	118.0	103	+/-2%	95	PASS
106	08/15/12	#2	8.3	123.2	8.9	119.5	97	+/-2%	95	PASS
107	08/15/12	#3	15.3	114.2	13.7	115.6	101	+/-2%	95	PASS
108	08/15/12	#1	9.7	126.5	10.6	123.6	98	+/-2%	95	PASS
109	08/15/12	#3	15.3	114.2	13.4	116.1	102	+/-2%	95	PASS
110	08/15/12	#3	15.3	114.2	13.7	114.7	100	+/-2%	95	PASS
111							#DIV/0!			
112							#DIV/0!			
113							#DIV/0!			
114							#DIV/0!			

TEST #	LOCATION	ELEVATION
105	North 421228.10 East 1179216.50	1941.2
106	North 421250.80 East 1179341.55	1940.4
107	North 421159.45 East 1179335.60	1939.75
108	North 421292.70 East 1179491.85	1939.45
109	North 421261.20 East 1179545.20	1938.45
110	North 421175.25 East 1179545.40	1937.05
111		
112		
113		
114		

NOTES: Drill Pad Back Fill

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AMERICAN TECHNICAL SERVICES, INC.

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TECHNICAL  
SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

**CLIENT:** CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

**ATTENTION:** Project Manager  
**PROJECT:** Atlanta Drill Site

**ATS #:** 12-12165  
**DATE:** 08/17/12  
**ATS TECH:** Russell Harwood  
**GAGE #:** 2  
**BENCHMARK:** \_\_\_\_\_

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
119	08/16/12	#1	15.3	114.2	13.7	110.0	96	+/-2%	95	PASS
120	08/16/12	#1	15.3	114.2	13.9	112.0	98	+/-2%	95	PASS
121	08/16/12	#1	15.3	114.2	13.6	112.4	98	+/-2%	95	PASS
122	08/16/12	#1	15.3	114.2	13.4	112.6	99	+/-2%	95	PASS
123	08/16/12	#1	15.3	114.2	13.6	114.0	100	+/-2%	95	PASS
124	08/16/12	#1	15.3	114.2	13.9	115.2	101	+/-2%	95	PASS
125							#DIV/0!			
126							#DIV/0!			
127							#DIV/0!			
128							#DIV/0!			

TEST #	LOCATION	ELEVATION
119	120' East of West Outlet	6' Above Top of Pipe
120	110' East of West Outlet	8' Above Top of Pipe
121	100' East of West Outlet	10' Above Top of Pipe
122	STA 2 + 80	6' Above Top of Pipe
123	STA 2 + 70	8' Above Top of Pipe
124	STA 2 + 60	10' Above Top of Pipe
125		
126		
127		
128		

NOTES: Northwest Storm Sewer Trench Back Fill

RESPECTFULLY SUBMITTED

CC:

  
**AMERICAN TECHNICAL SERVICES, INC.**

**AMERICAN  
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SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/17/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	
116	08/16/12	#3	15.3	114.2	13.6	115.5	101	+/-2%	95	PASS
117	08/16/12	#3	15.3	114.2	13.3	111.5	98	+/-2%	95	PASS
118	08/16/12	#3	15.3	114.2	13.8	111.3	97	+/-2%	95	PASS
119							#DIV/0!			
120							#DIV/0!			
121							#DIV/0!			
122							#DIV/0!			
123							#DIV/0!			
124							#DIV/0!			
125							#DIV/0!			

TEST #	LOCATION	ELEVATION
116	North 421295.55 East 1179462.65	1941.3
117	North 421250.20 East 1179528.35	1939.95
118	North 421191.60 East 1179541.70	1939.5
119		
120		
121		
122		
123		
124		
125		

NOTES: Drill Pad Area

RESPECTFULLY SUBMITTED



AMERICAN TECHNICAL SERVICES, INC.

CC:

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

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Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**  
ASTM D6938

**CLIENT** CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
**ATTENTION:** Project Manager  
**PROJECT** Atlanta Drill Site

**ATS #** 12-12165  
**DATE:** 08/17/12  
**ATS TECH:** Russell Harwood  
**GAGE #** 2  
**BENCHMARK**

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST.	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
113	08/16/12	#3	15.3	114.2	14.5	116.3	102	+/-2%	95	PASS
114	08/16/12	#2	8.3	123.2	9.4	119.5	97	+/-2%	95	PASS
115	08/16/12	#3	15.3	114.2	13.4	114.0	100	+/-2%	95	PASS
116							#DIV/0!			
117							#DIV/0!			
118							#DIV/0!			
119							#DIV/0!			
120							#DIV/0!			
121							#DIV/0!			
122							#DIV/0!			

TEST #	LOCATION	ELEVATION
113	North 421004.30 East 1180053.35	1925.95
114	North 421047.15 East 1179917.95	1929.8
115	North 421131.15 East 1179860.70	1923.2
116		
117		
118		
119		
120		
121		
122		

NOTES: East Valley Fill

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Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/20/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK: \_\_\_\_\_

TEST #	DATE	PROCTOR#/CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE	% SPEC COMPACTION	
125	08/17/12	#3	15.3	114.2	13.3	110.1	96	+/-2%	95	PASS
126	08/17/12	#1	9.7	126.5	10.4	122.2	97	+/-2%	95	PASS
127	08/17/12	#3	15.3	114.2	13.4	116.7	102	+/-2%	95	PASS
128							#DIV/0!			
129							#DIV/0!			
130							#DIV/0!			
131							#DIV/0!			
132							#DIV/0!			
133							#DIV/0!			
134							#DIV/0!			

TEST #	LOCATION		ELEVATION
125	421406.45	1178944.55	1951.4
126	421405.80	1179870.85	1952.55
127	421474.75	1179005.90	1952.45
128			
129			
130			
131			
132			
133			
134			

NOTES: Road Rebuild Going North & South Along West Side

RESPECTFULLY SUBMITTED

CC:

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**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/20/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION
128	08/17/12	#1	9.7	126.5	10.3	126.5	100	+/-2%	95
129	08/17/12	#1	9.7	126.5	9.3	124.1	98	+/-2%	95
130	08/17/12	#1	9.7	126.5	10.2	124.2	98	+/-2%	95
131							#DIV/0!		
132							#DIV/0!		
133							#DIV/0!		
134							#DIV/0!		
135							#DIV/0!		
136							#DIV/0!		
137							#DIV/0!		

TEST #	LOCATION	ELEVATION
128	N 421184.10 E 117937.90	1943.55
129	N 421234.95 E 1179377.35	1943.6
130	N 421205.50 E 1179455.95	1943.55
131		
132		
133		
134		
135		
136		
137		

NOTES: Drill Pad Area

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CC:

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**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/20/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE	% SPEC COMPACTION	PASS
131	08/18/12	#2	8.3	123.2	9.0	118.4	96	+/-2%	95	PASS
132	08/18/12	#3	15.3	114.2	13.8	113.9	100	+/-2%	95	PASS
133	08/18/12	#3	15.3	114.2	13.6	113.3	99	+/-2%	95	PASS
134	08/18/12	#3	15.3	114.2	13.4	116.1	102	+/-2%	95	PASS
135	08/18/12	#2	8.3	123.2	9.1	118.5	96	+/-2%	95	PASS
136	08/18/12	#2	8.3	123.2	9.2	117.5	95	+/-2%	95	PASS
137							#DIV/0!			
138							#DIV/0!			
139							#DIV/0!			
140							#DIV/0!			

TEST #	LOCATION	ELEVATION
131	N 421121.60 E 1179889.35	1925.65
132	N 421052.95 E 1179930.80	1929.35
133	N 421037.40 E 1179997.15	1929.1
134	N 421186.90 E 1179885.25	1919.9
135	N 421258.50 E 1179843.35	1920
136	N 421339.55 E 1179823.35	1921.65
137		
138		
139		
140		

NOTES: All Test in East Valley.

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CC:

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Black Hawk, SD 57718-0558

## REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/20/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
137	08/19/12	#3	15.3	114.2	13.3	114.1	100	+/-2%	95	PASS
138	08/19/12	#3	15.3	114.2	14.2	113.5	99	+/-2%	95	PASS
139	08/19/12	#3	15.3	114.2	13.7	110.3	97	+/-2%	95	PASS
140	08/19/12	#3	15.3	114.2	13.5	115.5	101	+/-2%	95	PASS
141							#DIV/0!			
142							#DIV/0!			
143							#DIV/0!			
144							#DIV/0!			
145							#DIV/0!			
146							#DIV/0!			

TEST #	LOCATION	ELEVATION
137	N 421079.05 E 1180014.40	1927.3
138	N 421111.75 E 1179924.40	1928.6
139	N 421192.30 E 1179886.40	1920.7
140	N 421263.65 E 1179839.65	1922.1
141		
142		
143		
144		
145		
146		

NOTES: East Valley

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AMERICAN TECHNICAL SERVICES, INC.



CC:

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Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/20/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE	% SPEC COMPACTION	PASS
141	08/19/12	#2	8.3	123.2	8.8	121.8	99	+/-2%	95	PASS
142	08/19/12	#2	8.3	123.2	7.2	122.1	99	+/-2%	95	PASS
143	08/19/12	#2	8.3	123.2	7.1	120.4	98	+/-2%	95	PASS
144	08/19/12	#1	9.7	126.5	9.6	123.8	98	+/-2%	95	PASS
145							#DIV/0!			
146							#DIV/0!			
147							#DIV/0!			
148							#DIV/0!			
149							#DIV/0!			
150							#DIV/0!			

TEST #	LOCATION	ELEVATION
141	N 421638.85 E 1178871.85	1963.85
142	N 421644.55 E 1178852.40	1964
143	N 421637.05 E 1178851.85	1967.65
144	N 421669.20 E 1178823.50	1969.9
145		
146		
147		
148		
149		
150		

NOTES: Over Culvert North Road

CC:

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Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT:	CONTINENTAL RESOURCES, INC. PO Box 268836 Oklahoma City, OK 73126	ATS #:	12-12165
ATTENTION:	Project Manager	DATE	08/23/12
PROJECT:	Atlanta Drill Site	ATS TECH:	Russell Harwood
		GAGE #:	2
		BENCHMARK:	

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
145	08/20/12	#3	15.3	114.2	13.4	115.6	101	+/-2%	95	PASS
146	08/20/12	#2	8.3	123.2	7.2	121.5	99	+/-2%	95	PASS
147	08/20/12	#3	15.3	114.2	13.8	115.9	101	+/-2%	95	PASS
148	08/20/12	#3	15.3	114.2	14.2	111.6	98	+/-2%	95	PASS
149							#DIV/0!			
150							#DIV/0!			
151							#DIV/0!			
152							#DIV/0!			
153							#DIV/0!			
154							#DIV/0!			

TEST #	LOCATION	ELEVATION
145	N 421166.85 E 1179865.40	1922.8
146	N 421256.90 E 1179836.55	1923.95
147	N 420996.10 E 1180218.95	1928.9
148	N 421096.00 E 1180016.65	1927.85
149		
150		
151		
152		
153		
154		

NOTES: East Valley Fill

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Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/23/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK

TEST #	DATE	PROCTOR#/ CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	
149	08/21/12	#3	15.3	114.2	15.2	111.7	98	+/-2%	95	PASS
150	08/21/12	#3	15.3	114.2	15.1	113.9	100	+/-2%	95	PASS
151	08/21/12	#3	15.3	114.2	15.8	109.2	96	+/-2%	95	PASS
152	08/21/12	#3	15.3	114.2	13.4	112.2	98	+/-2%	95	PASS
153	08/21/12	#1	9.7	126.5	9.8	122.0	96	+/-2%	95	PASS
154							#DIV/0!			
155							#DIV/0!			
156							#DIV/0!			
157							#DIV/0!			
158							#DIV/0!			

TEST #	LOCATION	ELEVATION
149	N 421037.20 E 1180130.55	1932.6
150	N 421061.85 E 1179979.85	1933.1
151	N 421067.40 E 1180184.00	1936.15
152	N 421064.45 E 1180152.60	1937.45
153	N 421025.40 E 1180078.60	1935.85
154		
155		
156		
157		
158		

NOTES: East Valley Fill

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CC:

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SERVICES, INC.**

Engineering • Environmental • Drilling • Materials  
3105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57713-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/23/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
154	08/22/12	#3	15.3	114.2	14.7	108.8	95	+/-2%	95	PASS
155	08/22/12	#3	15.3	114.2	14.3	110.2	96	+/-2%	95	PASS
156	08/22/12	#3	15.3	114.2	14.4	109.7	96	+/-2%	95	PASS
157	08/22/12	#3	15.3	114.2	13.8	110.5	97	+/-2%	95	PASS
158	08/22/12	#3	15.3	114.2	13.5	113.9	100	+/-2%	95	PASS
159	08/22/12	#3	15.3	114.2	13.3	110.0	96	+/-2%	95	PASS
160							#DIV/0!			
161							#DIV/0!			
162							#DIV/0!			
163							#DIV/0!			

TEST #	LOCATION	ELEVATION
154	N 421280.95 E 1178919.20	1926.3
155	N 421212.65 E 1179814.85	1925.7
156	N 421284.60 E 1179834.35	1926.75
157	N 421178.25 E 1179842.25	1929.45
158	N 421253.35 E 1179825.80	1928.9
159	N 421234.00 E 1179906.10	1928.15
160		
161		
162		
163		

NOTES: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
CC: \_\_\_\_\_

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8105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT	CONTINENTAL RESOURCES, INC. PO Box 268836 Oklahoma City, OK 73126	ATS #	12-12165
ATTENTION:	Project Manager	DATE	08/28/12
PROJECT:	Atlanta Drill Site	ATS TECH	Russell Harwood
		GAGE #	2
		BENCHMARK	

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE	% SPEC COMPACTION	PASS
160	08/23/12	#3	15.3	114.2	13.3	111.8	98	+/-2%	95	PASS
161	08/23/12	#2	8.3	123.2	9.3	118.7	96	+/-2%	95	PASS
162	08/23/12	#3	15.3	114.2	13.7	115.4	101	+/-2%	95	PASS
163	08/23/12	#3	15.3	114.2	13.4	109.7	96	+/-2%	95	PASS
164	08/23/12	#3	15.3	114.2	13.6	109.3	96	+/-2%	95	PASS
165	08/23/12	#3	15.3	114.2	13.4	115.6	101	+/-2%	95	PASS
166	08/23/12	#3	15.3	114.2	13.5	113.9	100	+/-2%	95	PASS
167							#DIV/0!			
168							#DIV/0!			
169							#DIV/0!			

TEST #	LOCATION	ELEVATION
160	N 421096.35 E 1179858.25	1934.6
161	N 421213.05 E 1179810.50	1932.55
162	N 421263.40 E 1179882.15	1930.9
163	N 421144.40 E 1179949.80	1931.65
164	N 421153.10 E 1179905.35	1933.6
165	N 421225.20 E 1179886.80	1933.15
166	N 421206.55 E 1179945.15	1932.5
167		
168		
169		

NOTES: \_\_\_\_\_

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AMERICAN TECHNICAL SERVICES, INC.

CC:

**AMERICAN  
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SERVICES, INC.**

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8105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

## REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD

ASTM D6938

CLIENT:	CONTINENTAL RESOURCES, INC
	PO Box 268836
	Oklahoma City, OK 73126
ATTENTION:	Project Manager
PROJECT:	Atlanta Drill Site

ATS #:	12-12165
DATE:	08/28/12
ATS TECH:	Russell Harwood
GAGE #:	2
BENCHMARK:	

TEST #	DATE	PROCTOR #/CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
167	08/24/12	#3	15.3	114.2	14.3	112.8	99	+/-2%	95	PASS
168	08/24/12	#2	8.3	123.2	9.2	119.9	97	+/-2%	95	PASS
169	08/24/12	#2	8.3	123.2	9.4	118.5	96	+/-2%	95	PASS
170							#DIV/0!			
171							#DIV/0!			
172							#DIV/0!			
173							#DIV/0!			
174							#DIV/0!			
175							#DIV/0!			
176							#DIV/0!			

TEST #	LOCATION	ELEVATION
167	N 421222.70 E 1179902.60	1934.85
168	N 421303.55 E 1179866.40	1934.45
169	N 421401.35 E 1179821.85	1933.25
170		
171		
172		
173		
174		
175		
176		

NOTES: \_\_\_\_\_

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~~AMERICAN TECHNICAL SERVICES, INC.~~

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**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/28/12  
ATS TECH: Evan Schultze  
GAGE #: 2  
BENCHMARK: East Valley Fill

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE	% SPEC COMPACTION	
170	08/24/12	#3	15.3	114.2	14.6	113.5	99	+/-2%	95	PASS
171	08/24/12	#3	15.3	114.2	14.4	111.8	98	+/-2%	95	PASS
172	08/24/12	#3	15.3	114.2	14.9	112.3	98	+/-2%	95	PASS
173							#DIV/0!			
174							#DIV/0!			
175							#DIV/0!			
176							#DIV/0!			
177							#DIV/0!			
178							#DIV/0!			
179							#DIV/0!			

TEST #	LOCATION	ELEVATION
170	N 421153.30 E 1179861.65	1936.7
171	N 421252.75 E 1179826.85	1936.5
172	N 421346.00 E 1179790.95	1936.6
173		
174		
175		
176		
177		
178		
179		

NOTES:

RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

CC:

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57719-0558

## REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/28/12  
ATS TECH: Evan Schultze  
GAGE #: 2  
BENCHMARK: South Road Culvert Back Fill

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
191	08/25/12	#3	15.3	114.2	14.0	110.5	97	+/-2%	95	PASS
192							#DIV/0!			
193							#DIV/0!			
194							#DIV/0!			
195							#DIV/0!			
196							#DIV/0!			
197							#DIV/0!			
198							#DIV/0!			
199							#DIV/0!			
200							#DIV/0!			

TEST #	LOCATION	ELEVATION
191	3' East of Center of Pipe-77' South of Type 2 Inlet at STA 545 + 70	5' Above Pipe
192		
193		
194		
195		
196		
197		
198		
199		
200		

NOTES: \_\_\_\_\_

RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

CC:

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**  
ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/28/12  
ATS TECH: Evan Schultze  
GAGE #: 2  
BENCHMARK: East Valley Fill

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
173	08/25/12	#1	9.7	126.5	10.1	121.4	96	+/-2%	95	PASS
174	08/25/12	#1	9.7	126.5	9.4	121.7	96	+/-2%	95	PASS
175	08/25/12	#2	8.3	123.2	7.8	119.7	97	+/-2%	95	PASS
176							#DIV/0!			
177							#DIV/0!			
178							#DIV/0!			
179							#DIV/0!			
180							#DIV/0!			
181							#DIV/0!			
182							#DIV/0!			

TEST #	LOCATION	ELEVATION
173	N 421098.70 E 1179890.60	1936.15
174	N 421274.30 E 1179841.15	1936.7
175	N 421152.42 E 1179836.80	1937.7
176		
177		
178		
179		
180		
181		
182		

NOTES:

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CC:

  
AMERICAN TECHNICAL SERVICES, INC.

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/28/12  
ATS TECH: Evan Schultze  
GAGE #: 2  
BENCHMARK: East Valley Fill

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
176	08/26/12	#1	9.7	126.5	9.5	123.2	97	+/-2%	95	PASS
177	08/26/12	#3	15.3	114.2	14.8	114.0	100	+/-2%	95	PASS
178	08/26/12	#2	8.3	123.2	8.6	121.6	99	+/-2%	95	PASS
179	08/26/12	#2	8.3	123.2	8.4	119.5	97	+/-2%	95	PASS
180	08/26/12	#1	9.7	126.5	8.9	126.3	100	+/-2%	95	PASS
181							#DIV/0!			
182							#DIV/0!			
183							#DIV/0!			
184							#DIV/0!			
185							#DIV/0!			

TEST #	LOCATION	ELEVATION
176	N 421289.45 E 1179811.95	1937.6
177	N 421261.50 E 1179823.70	1936.9
178	N 421129.50 E 1179936.90	1938.3
179	N 421407.25 E 1179820.20	1937.4
180	N 421405.25 E 1179828.90	1937.25
181		
182		
183		
184		
185		

NOTES:

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RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

CC:

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**AMERICAN  
TECHNICAL  
SERVICES, INC.**

BURNDLEY • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57713-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/28/12  
ATS TECH: Evan Schultze  
GAGE #: 2  
BENCHMARK: South Road Culvert Back Fill

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
192	08/26/12	#3	15.3	114.2	15.7	112.8	99	+/-2%	95	PASS
193	08/26/12	#3	15.3	114.2	14.2	114.1	100	+/-2%	95	PASS
194	08/26/12	#3	15.3	114.2	13.9	113.7	100	+/-2%	95	PASS
195	08/26/12	#3	15.3	114.2	15.1	113.9	100	+/-2%	95	PASS
196							#DIV/0!			
197							#DIV/0!			
198							#DIV/0!			
199							#DIV/0!			
200							#DIV/0!			
201							#DIV/0!			

TEST #	LOCATION	ELEVATION
192	3' West of Center Pipe-60' South of Type 2 Inlet at STA 545 + 71	4' Above Pipe
193	Center of Pipe-65' South of Type 2 Inlet at STA 545 + 72	7' Above Pipe
194	2' East of Center of Pipe-55' South of Type 2 Inlet at STA 545 + 73	10' Above Pipe
195	2' West of Center of Pipe-50' South of type 2 Inlet at STA 545 + 74	12' Above Pipe
196		
197		
198		
199		
200		
201		

NOTES: \_\_\_\_\_  
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\_\_\_\_\_  
CC: \_\_\_\_\_

RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

**A**MERICAN  
TECHNICAL  
SERVICES, INC.

Engineering • Environmental • Drilling • Mapping  
8105 Black Hawk Rd • PO Box 550  
Black Hawk, SD 57718-0550

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

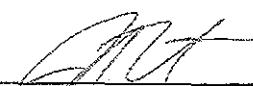
ATS #: 12-12165  
DATE: 08/28/12  
ATS TECH: Evan Schultze  
GAGE #: 2  
BENCHMARK: East Valley Fill

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS	
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION
181	08/27/12	#1	9.7	126.5	9.9	120.5	95	+/-2%	95
182	08/27/12	#3	15.3	114.2	13.9	111.8	98	+/-2%	95
183	08/27/12	#2	8.3	123.2	8.1	120.1	97	+/-2%	95
184	08/27/12	#3	15.3	114.2	15.0	113.8	100	+/-2%	95
185	08/27/12	#3	15.3	114.2	14.8	111.3	97	+/-2%	95
186	08/27/12	#3	15.3	114.2	14.2	112.7	99	+/-2%	95
187	08/27/12	#3	15.3	114.2	14.9	112.7	99	+/-2%	95
188	08/27/12	#3	15.3	114.2	13.9	112.8	99	+/-2%	95
189	08/27/12	#1	9.7	126.5	10.1	122.0	96	+/-2%	95
190	08/27/12	#3	15.3	114.2	14.0	111.8	98	+/-2%	95

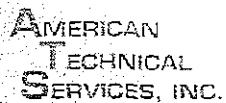
TEST #	LOCATION	ELEVATION
181	N 421380.15 E 1179686.15	1939.3
182	N 421450.10 E 1179722.45	1940.2
183	N 421439.30 E 1179760.00	1941.5
184	N 421399.40 E 1179722.30	1941.95
185	N 421415.95 E 1179832.95	1942.2
186	N 421485.05 E 1179852.75	1942.95
187	N 421491.20 E 1179749.45	1943.1
188	N 421264.40 E 1179734.90	1938.2
189	N 421224.35 E 1179924.85	1937.5
190	N 421295.60 E 1180039.95	1937.35

NOTES: \_\_\_\_\_  
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\_\_\_\_\_  
CC: \_\_\_\_\_

RESPECTFULLY SUBMITTED



AMERICAN TECHNICAL SERVICES, INC.



## REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD

ASTM D6938

**Engineering • Environmental • Drilling • Materials**  
8105 Black Hawk Rd. • PO Box 558  
Black Hawk, CO 80426-0558

CLIENT:	CONTINENTAL RESOURCES, INC. PO Box 268836 Oklahoma City, OK 73126
ATTENTION:	Project Manager
PROJECT:	Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/28/12  
ATS TECH: Evan Schultze  
GAGE #: 2  
BENCHMARK: South Road Culvert Back Fill

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
196	08/27/12	#3	15.3	114.2	14.8	112.8	99	+/-2%	95	PASS
197							#DIV/0!			
198							#DIV/0!			
199							#DIV/0!			
200							#DIV/0!			
201							#DIV/0!			
202							#DIV/0!			
203							#DIV/0!			
204							#DIV/0!			
205							#DIV/0!			

TEST #	LOCATION	ELEVATION
196	1' East of Center of Pipe-12' South of type 2 Inlet at STA 545 + 75	5' Above Pipe
197		
198		
199		
200		
201		
202		
203		
204		
205		

NOTES: \_\_\_\_\_  
\_\_\_\_\_

RESPECTFULLY SUBMITTED

  
John C. Stennis

AMERICAN TECHNICAL SERVICES, INC.

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**  
ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/31/12  
ATS TECH: Evan Schultze  
GAGE #: 2  
BENCHMARK: East Valley Fill

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE	% SPEC COMPACT	PASS
197	08/28/12	#1	9.7	126.5	8.2	121.3	96	+/-2%	95	PASS
198	08/28/12	#1	9.7	126.5	9.6	123.2	97	+/-2%	95	PASS
199	08/28/12	#1	9.7	126.5	9.8	124.5	98	+/-2%	95	PASS
200	08/28/12	#1	9.7	126.5	9.3	123.6	98	+/-2%	95	PASS
201							#DIV/0!			
202							#DIV/0!			
203							#DIV/0!			
204							#DIV/0!			
205							#DIV/0!			
206							#DIV/0!			

TEST #	LOCATION	ELEVATION
197	421186.95 1180094.55	1939.05
198	421133.25 1179974.25	1938.15
199	421273.45 1179880.10	1937.65
200	421117.15 1179767.85	1938.8
201		
202		
203		
204		
205		
206		

NOTES: \_\_\_\_\_

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CC:

AMERICAN TECHNICAL SERVICES, INC.

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**  
ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 08/31/12  
ATS TECH: Evan Schultze  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
201	08/29/12	#3	15.3	114.2	15.0	112.1	98	+/-2%	95	PASS
202							#DIV/0!			
203							#DIV/0!			
204							#DIV/0!			
205							#DIV/0!			
206							#DIV/0!			
207							#DIV/0!			
208							#DIV/0!			
209							#DIV/0!			
210							#DIV/0!			

TEST #	LOCATION	ELEVATION
201	60' North of Type 2 Inlet at STA 545 + 70	4' Above Pipe
202		
203		
204		
205		
206		
207		
208		
209		
210		

NOTES:

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RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.



CC:

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**AMERICAN  
TECHNICAL  
SERVICES, INC.**

Engineering • Environmental • Drilling • Materials  
8105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 09/04/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS	
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION
202	08/30/12	#2	8.3	123.2	9.7	122.5	99	+/-2%	95
203	08/30/12	#3	15.3	114.2	13.4	115.7	101	+/-2%	95
204	08/30/12	#3	15.3	114.2	13.6	113.0	99	+/-2%	95
205	08/30/12	#3	15.3	114.2	13.5	113.4	99	+/-2%	95
206							#DIV/0!		
207							#DIV/0!		
208							#DIV/0!		
209							#DIV/0!		
210							#DIV/0!		
211							#DIV/0!		

TEST #	LOCATION	ELEVATION
202	200' North of South Manhole	3' Below Grade
203	120' North of South Manhole	2' Below Grade
204	250' North of South Manhole	1' Below Grade
205	80' North of South Manhole	1' Below Grade
206		
207		
208		
209		
210		
211		

NOTES: Storm Sewer in Drill Pad Area

CC:

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AMERICAN TECHNICAL SERVICES, INC.



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SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 09/04/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
206	09/01/12	#1	9.7	126.5	9.2	123.4	98	+/-2%	95	PASS
207	09/01/12	#2	8.3	123.2	8.7	121.5	99	+/-2%	95	PASS
208	09/01/12	#2	8.3	123.2	9.3	117.5	95	+/-2%	95	PASS
209	09/01/12	#1	9.7	126.5	10.5	120.4	95	+/-2%	95	PASS
210	09/01/12	#1	9.7	126.5	8.9	122.6	97	+/-2%	95	PASS
211	09/01/12	#1	9.7	126.5	9.0	120.5	95	+/-2%	95	PASS
212	09/01/12	#3	15.3	114.2	13.3	114.1	100	+/-2%	95	PASS
213							#DIV/0!			
214							#DIV/0!			
215							#DIV/0!			

TEST #	LOCATION	ELEVATION
206	N 421148.50 E 1179772.65	1939
207	N 421278.05 E 1179873.65	1936.95
208	N 421243.90 E 1179995.40	1937
209	N 421256.85 E 1180111.45	1937
210	N 421246.20 E 1180276.70	1936.7
211	N 421165.45 E 1180219.90	1937
212	N 421131.65 E 1180128.40	1937
213		
214		
215		

NOTES: Drill Pad Subgrade Pre-Liner

RESPECTFULLY SUBMITTED

CC:

AMERICAN TECHNICAL SERVICES, INC.



**AMERICAN  
TECHNICAL  
SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 09/04/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
213	09/02/12	#3	15.3	114.2	13.4	112.5	99	+/-2%	95	PASS
214	09/02/12	#2	8.3	123.2	8.5	119.2	97	+/-2%	95	PASS
215	09/02/12	#2	8.3	123.2	7.6	119.4	97	+/-2%	95	PASS
216	09/02/12	#3	15.3	114.2	13.6	114.1	100	+/-2%	95	PASS
217	09/02/12	#3	15.3	114.2	13.5	114.1	100	+/-2%	95	PASS
218	09/02/12	#1	9.7	126.5	9.2	121.9	96	+/-2%	95	PASS
219	09/02/12	#1	9.7	126.5	8.5	121.7	96	+/-2%	95	PASS
220							#DIV/0!			
221							#DIV/0!			
222							#DIV/0!			

TEST #	LOCATION	ELEVATION
213	N 421177.85 E 1179944.00	1939.2
214	N 421197.20 E 1179980.55	1938.5
215	N 421155.10 E 1180018.00	1938.65
216	N 421161.40 E 1179809.10	1940.8
217	N 421166.65 E 1179943.15	1940.55
218	N 421198.80 E 1179984.45	1939.55
219	N 421207.30 E 1179940.30	1939.9
220		
221		
222		

NOTES: Drill Pad Area Over Liner Fill

RESPECTFULLY SUBMITTED

CC:

AMERICAN TECHNICAL SERVICES, INC.





Engineering • Environmental • Drilling • Materials  
8105 Black Hawk Rd. • PO Box 556  
Black Hawk, SD 57718-0556

REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD  
ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 09/04/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
220	09/03/12	#3	15.3	114.2	13.7	114.9	101	+/-2%	95	PASS
221	09/03/12	#3	15.3	114.2	13.4	114.1	100	+/-2%	95	PASS
222	09/03/12	#3	15.3	114.2	13.8	114.8	101	+/-2%	95	PASS
223							#DIV/0!			
224							#DIV/0!			
225							#DIV/0!			
226							#DIV/0!			
227							#DIV/0!			
228							#DIV/0!			
229							#DIV/0!			

TEST #	LOCATION	ELEVATION
220	N 421261.45 E 1179919.60	1940.9
221	N 421234.80 E 1179980.75	1940.75
222	N 421166.65 E 1179999.30	1940.65
223		
224		
225		
226		
227		
228		
229		

NOTES: Drill Pad Area Over Liner Fill  
  
  
  
  
CC:

RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd. • PO Box 658  
Black Hawk, CO 80428-0658

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**  
ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 09/07/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK: \_\_\_\_\_

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE	% SPEC COMPACTION	PASS
223	09/04/12	#3	15.3	114.2	13.6	110.4	97	+/-2%	95	PASS
224	09/04/12	#3	15.3	114.2	13.4	110.8	97	+/-2%	95	PASS
225	09/04/12	#3	15.3	114.2	13.7	111.2	97	+/-2%	95	PASS
226	09/04/12	#3	15.3	114.2	13.3	115.9	101	+/-2%	95	PASS
227	09/04/12	#1	9.7	126.5	10.2	121.0	96	+/-2%	95	PASS
228	09/04/12	#1	9.7	126.5	10.1	121.1	96	+/-2%	95	PASS
229	09/04/12	#1	9.7	126.5	9.3	120.6	95	+/-2%	95	PASS
230	09/04/12	#3	15.3	114.2	13.8	115.6	101	+/-2%	95	PASS
231	09/04/12	#3	15.3	114.2	14.4	111.7	98	+/-2%	95	PASS
232							#DIV/0!			

TEST #	LOCATION	ELEVATION
223	N 421253.00 E 1180307.60	1938
224	N 421215.25 E 1180269.15	1938.7
225	N 421166.55 E 1180234.35	1938.1
226	N 421208.40 E 1180056.70	1941.35
227	N 421254.80 E 1179946.55	1941.45
228	N 421191.80 E 1179850.65	1941.75
229	N 421178.45 E 1179723.60	1943.35
230	N 421233.40 E 1180248.00	1939.75
231	N 421180.50 E 1180248.70	1940.4
232		

NOTES: Drill Pad Area  
  
  
  
CC:

RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

Engineering • Environmental • Drilling • Materials  
8105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57712-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager

PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 09/07/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
232	09/05/12	#3	15.3	114.2	13.3	114.1	100	+/-2%	95	PASS
233	09/05/12	#3	15.3	114.2	13.6	114.0	100	+/-2%	95	PASS
234	09/05/12	#2	8.3	123.2	9.5	120.3	98	+/-2%	95	PASS
235	09/05/12	#3	15.3	114.2	13.4	114.2	100	+/-2%	95	PASS
236	09/05/12	#3	15.3	114.2	13.7	114.4	100	+/-2%	95	PASS
237							#DIV/0!			
238							#DIV/0!			
239							#DIV/0!			
240							#DIV/0!			
241							#DIV/0!			

TEST #	LOCATION	ELEVATION
232	N 421154.40 E 1180235.30	1941.3
233	N 421194.20 E 1180115.05	1941.25
234	N 421154.70 E 1179961.25	1941.2
235	N 421215.40 E 1179812.25	1943.3
236	N 421164.80 E 1179750.50	1943.2
237		
238		
239		
240		
241		

NOTES: Drill Pad Final Subgrade

RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

CC:

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

Engineering • Environmental • Drilling • Materials  
510S Black Hawk Rd • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 258836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 09/11/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
237	09/07/12	#2	8.3	123.2	7.9	122.1	99	+/-2%	95	PASS
238	09/07/12	#3	15.3	114.2	14.5	108.7	95	+/-2%	95	PASS
239	09/07/12	#2	8.3	123.2	8.1	118.5	96	+/-2%	95	PASS
240	09/07/12	#3	15.3	114.2	14.0	110.0	96	+/-2%	95	PASS
241	09/07/12	#3	15.3	114.2	13.4	114.1	100	+/-2%	95	PASS
242	09/07/12	#3	15.3	114.2	13.7	111.0	97	+/-2%	95	PASS
243	09/07/12	#2	8.3	123.2	8.1	117.4	95	+/-2%	95	PASS
244	09/07/12	#3	15.3	114.2	14.1	109.9	96	+/-2%	95	PASS
245							#DIV/0!			
246							#DIV/0!			

TEST #	LOCATION	ELEVATION
237	N 421519.00 E 1180368.00	1963.9
238	N 421460.00 E 1180390.40	1956.8
239	N 421424.20 E 1180438.15	1961.7
240	N 421414.40 E 1180424.20	1954.1
241	N 421365.45 E 1180416.00	1960.75
242	N 421362.70 E 1180451.00	1954.5
243	N 421279.10 E 1180484.90	1961.7
244	N 421283.65 E 1180471.85	1952.45
245		
246		

NOTES: East Berm

CC:

RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**  
ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 09/18/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE	% SPEC COMPACTION	
245	09/14/12	#4	7.2	131.4	5.3	127.4	97	+/-2%	95	PASS
246	09/14/12	#4	7.2	131.4	5.7	131.0	100	+/-2%	95	PASS
247	09/14/12	#4	7.2	131.4	5.4	131.1	100	+/-2%	95	PASS
248	09/14/12	#4	7.2	131.4	5.6	127.9	97	+/-2%	95	PASS
249	09/14/12	#4	7.2	131.4	5.5	131.5	100	+/-2%	95	PASS
250	09/14/12	#4	7.2	131.4	5.3	130.5	99	+/-2%	95	PASS
251	09/14/12	#4	7.2	131.4	5.4	131.3	100	+/-2%	95	PASS
252							#DIV/0!			
253							#DIV/0!			
254							#DIV/0!			

TEST #	LOCATION	ELEVATION
245	N 421250.10 E 1180221.35	1941.9
246	N 421172.20 E 1180121.95	1941.9
247	N 421231.95 E 1180017.80	1941.95
248	N 421271.80 E 1179924.75	1941.9
249	N 421228.85 E 1179835.15	1943.9
250	N 421180.60 E 1179720.90	1943.9
251	N 421236.80 E 1179604.75	1943.9
252		
253		
254		

NOTES: Drill Pad Gravel

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CC:

AMERICAN TECHNICAL SERVICES, INC.



SHORING • ENVIRONMENTAL • DRILLING • MATERIALS  
9105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57715-0558

REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD  
ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager

PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 09/18/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
252	09/17/12	#3	15.3	114.2	13.3	109.3	96	+/-2%	95	PASS
253	09/17/12	#3	15.3	114.2	13.4	108.9	95	+/-2%	95	PASS
254	09/17/12	#1	9.7	126.5	8.9	122.4	97	+/-2%	95	PASS
255	09/17/12	#3	15.3	114.2	13.8	110.3	97	+/-2%	95	PASS
256	09/17/12	#2	8.3	123.2	8.1	118.4	96	+/-2%	95	PASS
257							#DIV/0!			
258							#DIV/0!			
259							#DIV/0!			
260							#DIV/0!			
261							#DIV/0!			

TEST #	LOCATION	ELEVATION
252	N 420632.90 E 1180063.05	1880.8
253	N 420613.15 E 1179979.55	1870.1
254	N 420646.00 E 1179961.30	1864.95
255	N 420670.10 E 1179894.80	1872.05
256	N 420613.40 E 1179840.10	1873.45
257		
258		
259		
260		
261		

NOTES: South Pond Pre-Liner (Finish Subgrade)

CC:

RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

Engineering • Environmental • Drilling • Materials  
8105 Bent Hwy Rd • PO Box 558  
Clark Ferry, SD 57712-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126

ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 09/25/12  
ATS TECH: Russell Harwood  
GAGE #: 2  
BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
257	09/22/12	#3	15.3	114.2	14.1	109.2	96	+/-2%	95	PASS
258	09/22/12	#2	8.3	123.2	7.2	118.5	96	+/-2%	95	PASS
259	09/22/12	#2	8.3	123.2	8.0	118.7	96	+/-2%	95	PASS
260	09/22/12	#2	8.3	123.2	7.1	120.7	98	+/-2%	95	PASS
261	09/22/12	#3	15.3	114.2	13.8	110.0	96	+/-2%	95	PASS
262	09/22/12	#2	8.3	123.2	7.9	119.6	97	+/-2%	95	PASS
263	09/22/12	#3	15.3	114.2	13.4	109.4	96	+/-2%	95	PASS
264							#DIV/0!			
265							#DIV/0!			
266							#DIV/0!			

TEST #	LOCATION	ELEVATION
257	N 420679.75 E 1180078.75	1870.1
258	N 420720.90 E 1180029.20	1878.2
259	N 420680.85 E 1179984.50	1870.7
260	N 420614.75 E 1179949.80	1869.95
261	N 420614.40 E 1179901.55	1868.85
262	N 420594.10 E 1179848.15	1877.55
263	N 420592.00 E 1179984.65	1884.6
264		
265		
266		

NOTES: Pond Subgrade After Liner & Finish Grade

CC:

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AMERICAN TECHNICAL SERVICES, INC.



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TECHNICAL  
SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**  
ASTM D6938

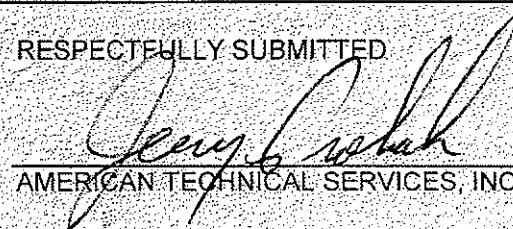
CLIENT	CONTINENTAL RESOURCES, INC. PO Box 268836 Oklahoma City, OK 73126	ATS #	12-12165
ATTENTION:	Project Manager	DATE	10/15/12
PROJECT:	Atlanta Drill Site	ATS TECH	Evan Schultze
		GAGE #	26
		BENCHMARK	Atlanta Pad Road

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE	% SPEC COMPACTION	PASS
264	10/10/12	#1	9.7	126.5	9.3	120.3	95	+/-2%	95	PASS
265	10/10/12	#1	9.7	126.5	9.5	120.9	96	+/-2%	95	PASS
266	10/10/12	#1	9.7	126.5	9.8	122.1	97	+/-2%	95	PASS
267							#VALUE!			
268							#VALUE!			
269							#VALUE!			
270							#VALUE!			
271							#DIV/0!			
272							#DIV/0!			
273							#DIV/0!			

TEST #	LOCATION	ELEVATION
264	N 48D07.125' W 103D44.108'	1.5' Below Top of Subgrade
265	N 48D07.071' W 103D44.106'	1' Below Top of Subgrade
266	N 48D07.053' W 103D44.018'	5' Below Top of Subgrade
267		
268		
269		
270		
271		
272		
273		

NOTES: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 CC: \_\_\_\_\_

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AMERICAN TECHNICAL SERVICES, INC.

AMERICAN  
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SERVICES, INC.

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd • PO Box 558  
Black Hawk, SD 57718-0558

REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD  
ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

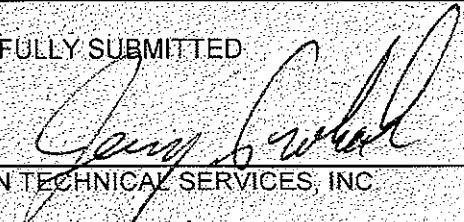
ATS #: 12-12165  
DATE: 10/15/12  
ATS TECH: Evan Schultze  
GAGE #: 26  
BENCHMARK: Atlanta Pad Road

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	
267	10/11/12	#1	9.7	126.5	8.9	123.4	98	+/-2%	95	PASS
268	10/11/12	#1	9.7	126.5	9.2	122.8	97	+/-2%	95	PASS
269	10/11/12	#1	9.7	126.5	8.8	124.3	98	+/-2%	95	PASS
270	10/11/12	#1	9.7	126.5	9.1	123.7	98	+/-2%	95	PASS
271							#VALUE!			
272							#VALUE!			
273							#VALUE!			
274							#DIV/0!			
275							#DIV/0!			
276							#DIV/0!			

TEST #	LOCATION		ELEVATION
267	N 48D06.762'	W 103D44.019'	5' Below Top of Subgrade
268	N 48D07.078'	W 103D44.106'	5' Below Top of Subgrade
269	N 48D07.101'	W 103D44.020'	1' Below Top of Subgrade
270	N 48D07.164'	W 103D44.019'	2' Below Top of Subgrade
271			
272			
273			
274			
275			
276			

NOTES: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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AMERICAN TECHNICAL SERVICES, INC.

CC:

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**  
ASTM D6938

CLIENT: CONTINENTAL RESOURCES, INC.  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

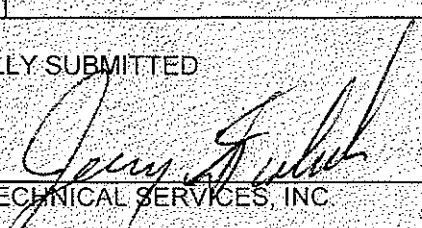
ATS #: 12-12165  
DATE: 10/15/12  
ATS TECH: Evan Schultze  
GAGE #: 26  
BENCHMARK: Atlanta Pad Road

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
271	10/12/12	#1	9.7	126.5	9.4	124.8	99	+/-2%	95	PASS
272							#VALUE!			
273							#VALUE!			
274							#VALUE!			
275							#VALUE!			
276							#VALUE!			
277							#VALUE!			
278							#DIV/0!			
279							#DIV/0!			
280							#DIV/0!			

TEST #	LOCATION		ELEVATION
271	N 48D06.807'	W 103D44.019'	1' Below Top of Subgrade
272			
273			
274			
275			
276			
277			
278			
279			
280			

NOTES: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
CC: \_\_\_\_\_

RESPECTFULLY SUBMITTED

  
AMERICAN TECHNICAL SERVICES, INC.

**A**MERICAN  
TECHNICAL  
SERVICES, INC.

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
8105 Black Hawk Rd. • PO Box 558  
Black Hawk, SD 57718-0558

**REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD**

ASTM D6938

CLIENT: **CONTINENTAL RESOURCES, INC.**  
PO Box 268836  
Oklahoma City, OK 73126  
ATTENTION: Project Manager  
PROJECT: Atlanta Drill Site

ATS #: 12-12165  
DATE: 10/17/12  
ATS TECH: Evan Schultze  
GAGE #: 26  
BENCHMARK: Atlanta Pad Road- Cement Stabilized Soil

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
283	10/16/12	#1	9.7	126.5	9.7	123.0	97	+/-2%	95	PASS
284	10/16/12	#1	9.7	126.5	9.5	124.2	98	+/-2%	95	PASS
285	10/16/12	#1	9.7	126.5	9.9	122.3	97	+/-2%	95	PASS
286	10/16/12	#1	9.7	126.5	9.8	123.4	98	+/-2%	95	PASS
287	10/16/12	#1	9.7	126.5	10.3	124.1	98	+/-2%	95	PASS
288	10/16/12	#1	9.7	126.5	10.5	121.9	96	+/-2%	95	PASS
289							#VALUE!			
290							#DIV/0!			
291							#DIV/0!			
292							#DIV/0!			

TEST #	LOCATION			ELEVATION
283	North 48d07 167'	West 103d44 014		1.5' Below Top of Subgrade
284	North 48d07 187'	West 103d44 021		2' Below Top of Subgrade
285	North 48d07 175'	West 103d44 017		1' Below Top of Subgrade
286	North 48d06 217'	West 103d44 015		1' Below Top of Subgrade
287	North 48d07 235'	West 103d44 013		.5' Below Top of Subgrade
288	North 48d07 197'	West 103d44 014		5' Below Top of Subgrade
289				
290				
291				
292				

NOTES: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
CC: \_\_\_\_\_

RESPECTFULLY SUBMITTED

  
AMERICAN TECHNICAL SERVICES, INC.

23367  
VAD

# Oil and Gas Division

Lynn D. Helms - Director      Bruce E. Hicks - Assistant Director

## Department of Mineral Resources

Lynn D. Helms - Director

## North Dakota Industrial Commission

[www.dmr.nd.gov/oilgas](http://www.dmr.nd.gov/oilgas)

BECKY BARNES  
CONTINENTAL RESOURCES, INC.  
PO BOX 1032  
ENID, OK 73702-1032 USA

Date: 7/23/2012

**RE: CORES AND SAMPLES**

Well Name: ATLANTA FEDERAL 6-6H Well File No.: 23367  
Location: NWNW 6-153-101 County: WILLIAMS  
Fermit Type: Development - HORIZONTAL  
Field: BAKER Target Horizon: THREE FORKS

Dear BECKY BARNES:

North Dakota Century Code (NDCC) Section 38-08-04 provides for the preservation of cores and samples and their shipment to the State Geologist when requested. The following is required on the above referenced well:

- 1) All cores, core chips and samples must be submitted to the State Geologist as provided for the NDCC Section 38-08-04 and North Dakota Administrative Code 43-02-03-38.1.
- 2) Samples shall include all cuttings from:

**Base of the Last Charles Salt**

Samples of cuttings shall be taken at 30' maximum intervals through all vertical, build and horizontal sections. Samples must be washed, dried, packed in sample envelopes in correct order with labels showing operator, well name, location and depth, and forwarded in standard boxes to the State Geologist within 30 days of the completion of drilling operations.

- 3) Cores: ALL CORES cut shall be preserved in correct order, properly boxed, and forwarded to the State Geologist within 90 days of completion of drilling operations. Any extension of time must have written approval from the State Geologist.
- 4) All cores, core chips, and samples must be shipped, prepaid, to the State Geologist at the following address:

ND Geological Survey Core Library  
Campus Road and Cornell  
Grand Forks, ND 58202

- 5) NDCC Section 38-08-16 allows for a civil penalty for any violation of Chapter 38 08 not to exceed \$12,500 for each offense, and each day's violation is a separate offense.

Sincerely

Richard A. Suggs  
Geologist



## SUNDY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA  
OIL AND GAS DIVISION  
600 EAST BOULEVARD DEPT 405  
BISMARCK, ND 58505-0840  
SFN 5749 (09-2006)

Well File No.

*23367*



PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.  
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

<input type="checkbox"/> Notice of Intent	Approximate Start Date	
<input type="checkbox"/> Report of Work Done	Date Work Completed	
<input type="checkbox"/> Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03		
Approximate Start Date		
<input type="checkbox"/> Drilling Prognosis <input type="checkbox"/> Spill Report <input type="checkbox"/> Redrilling or Repair <input type="checkbox"/> Shooting <input type="checkbox"/> Casing or Liner <input type="checkbox"/> Acidizing <input type="checkbox"/> Plug Well <input type="checkbox"/> Fracture Treatment <input type="checkbox"/> Supplemental History <input type="checkbox"/> Change Production Method <input type="checkbox"/> Temporarily Abandon <input type="checkbox"/> Reclamation <input checked="" type="checkbox"/> Other      Open Hole Log Waiver		

Well Name and Number

**Atlanta Federal 6-6H**

Footages	495 F N L	880 F W L	Qtr-Qtr NWNW	Section 6	Township 153 N	Range 101 W
Field		Pool Bakken		County Williams		

### 24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)

Address

City

State

Zip Code

### DETAILS OF WORK

Requested variance to not run openhole logs. GR/CBL/CCL will be run from deepest point obtainable to base of surface casing.

Offset logs used will be the Brigham Oil and Gas, LP, Lippert 1-12, Sec 1-153N-102W, Williams County, ND.

The Gamma Ray Log will be run all the way to surface and all mud logs will be submitted as one digital tiff formatted file and one digital LAS formatted file.

Company <b>Continental Resources, Inc.</b>		Telephone Number <b>580-233-8955</b>	
Address <b>P.O. Box 1032</b>			
City <b>Enid</b>		State <b>OK</b>	Zip Code <b>73702</b>
Signature <i>Terry L. Olson</i>		Printed Name <b>Terry L. Olson</b>	
Title <b>Regulatory Compliance Specialist</b>		Date <b>May 7, 2012</b>	
Email Address <b>Terry.Olson@cir.com</b>			

### FOR STATE USE ONLY

<input type="checkbox"/> Received	<input checked="" type="checkbox"/> Approved
Date <b>7-20-2012</b>	
By <i>PLC/RS</i>	
Title <b>Richard A. Suggs Geologist</b>	



Approved  
David Tabor  
7-20-2012

Engineering Technician

July 20, 2012

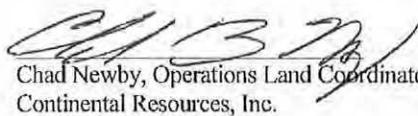
Industrial Commission of North Dakota  
Oil & Gas Division  
600 East Boulevard, Dept 405  
Bismarck, North Dakota 58505

Continental Resources, Inc. (CRI) respectfully requests a waiver to the requirement to delay commencement of operations until three business days following approval of the drilling permit for the Atlanta 1-14-6H.

Township 153N, Range 101W of the 5<sup>th</sup> P.M.  
Section 6, N/2 NW/4 Williams County, North Dakota.

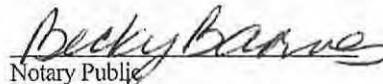
In the event that another owner seeks revocation of the drilling permit, CRI should retain the permit for the following reasons:

- 1) CRI has the necessary technical ability to drill and complete the well(s).
- 2) CRI has drilled and completed more than 130 horizontal Bakken wells in North Dakota.
- 3) CRI operates more than 500 wells in North Dakota and more than 100 in McKenzie County.
- 4) CRI has a contract with Cyclone Drilling that may require standby payments in the event a location is not ready to move onto. There are no near term lease expirations associated with the subject well.
- 5) CRI controls a working interest of 55.54% and is the majority working interest owner within the subject spacing unit consisting of 2560 acres of sections 5, 6, 7, 8, 153N – 101W of the 5<sup>th</sup> P.M.

  
Chad Newby, Operations Land Coordinator  
Continental Resources, Inc.

STATE OF OKLAHOMA                  )  
  )  
COUNTY OF GARFIELD                 )

On the 20<sup>th</sup> day of July 2012, before me, a Notary Public in and for said County and State, personally appeared Chad Newby, known to me to be the Operations Land Coordinator of Continental Resources, Inc., the Corporation that executed the within instrument, and acknowledged to me that such Corporation executed the same.

  
Notary Public

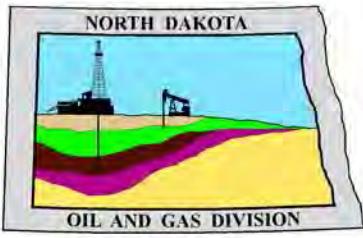
Garfield County, Oklahoma

My Commission Expires: 7/5/2015

Commission No.: 11006023

P.O. Box 1032 • 302 N. Independence • Enid, OK 73702  
Voice (580) 233-8955 • Fax (580) 242-4703





# Oil and Gas Division

Lynn D. Helms - Director

Bruce E. Hicks - Assistant Director

## Department of Mineral Resources

Lynn D. Helms - Director

## North Dakota Industrial Commission

[www.oilgas.nd.gov](http://www.oilgas.nd.gov)

July 20, 2012

Terry L. Olson  
Regulatory Compliance Specialist  
CONTINENTAL RESOURCES, INC.  
P.O. Box 1032  
Enid, OK 73702

**RE: HORIZONTAL WELL  
ATLANTA FEDERAL 6-6H  
NW NW Section 6-153N-101W  
Williams County  
Well File # 23367**

Dear Terry :

Pursuant to Commission Order No. 19840, approval to drill the above captioned well is hereby given. The approval is granted on the condition that all portions of the well bore not isolated by cement, be no closer than the **500' setback** from the north or west boundaries and **200' setback** from the east or south boundaries within the 2560 acre spacing unit consisting of Sections 5, 6, 7, & 8 T153N R101W.

**PERMIT STIPULATIONS:** A sufficient number of horizontal wells shall be drilled and completed in the 2560-acre spacing unit described as Sections 5, 6, 7, and 8, Township 153 North, Range 101 West, McKenzie and Williams Counties, North Dakota, which reasonably develop all portions of the 2560-acre spacing unit within two years after the first horizontal well is completed. If this condition is not met, the Commission shall schedule the matter for a consideration to reduce the size of the spacing unit **THIS WELL IS LOCATED IN A SURFACE WATER PROTECTION AREA: ONSITE INSPECTION REQUIRED (CONTACT NDIC FIELD INSPECTOR FOR SITE SPECIFIC STIPULATIONS).** TO INCLUDE BUT NOT LIMITED TO: CLOSED MUD SYSTEM, NO DRILLING PIT, AND IMPERMEABLE LINER IS REQUIRED ON THE ENTIRE LOCATION AND A STRING OF CASING MUST BE PLACED IN THE RAT AND MOUSE HOLE AND CEMENTED TO GROUND LEVEL. FURTHERMORE CONTINENTAL MUST COMPLY WITH ALL AFFIDAVIT'S. LASTLY, AN IMPERMEABLE PERIMETER DIKE MUST BE PLACED AROUND THE ENTIRE LOCATION. CONTINENTAL RESOURCES must contact NDIC Field Inspector John Axtman at 701-770-2564 prior to location construction.

### Drilling pit

NDAC 43-02-03-19.4 states that "a pit may be utilized to bury drill cuttings and solids generated during well drilling and completion operations, providing the pit can be constructed, used and reclaimed in a manner that will prevent pollution of the land surface and freshwaters. Reserve and circulation of mud system through earthen pits are prohibited. All pits shall be inspected by an authorized representative of the director prior to lining and use. Drill cuttings and solids must be stabilized in a manner approved by the director prior to placement in a cuttings pit."

### Form 1 Changes & Hard Lines

Any changes, shortening of casing point or lengthening at Total Depth must have prior approval by the NDIC. The proposed directional plan is at a legal location. The minimum legal coordinate from the well head at casing point is: 5S. Also, based on the azimuth of the proposed lateral the maximum legal coordinate from the well head is: 9701S.

### **Location Construction Commencement (Three Day Waiting Period)**

Operators shall not commence operations on a drill site until the 3rd business day following publication of the approved drilling permit on the NDIC - OGD Daily Activity Report. If circumstances require operations to commence before the 3rd business day following publication on the Daily Activity Report, the waiting period may be waived by the Director. Application for a waiver must be by sworn affidavit providing the information necessary to evaluate the extenuating circumstances, the factors of NDAC 43-02-03-16.2 (1), (a)-(f), and any other information that would allow the Director to conclude that in the event another owner seeks revocation of the drilling permit, the applicant should retain the permit.

### **Permit Fee & Notification**

Payment was received in the amount of \$100 via credit card. It is requested that notification be given immediately upon the spudding of the well. This information should be relayed to the Oil & Gas Division, Bismarck, via telephone. The following information must be included: Well name, legal location, permit number, drilling contractor, company representative, date and time of spudding. Office hours are 8:00 a.m. to 12:00 p.m. and 1:00 p.m. to 5:00 p.m. Central Time. Our telephone number is (701) 328-8020, leave a message if after hours or on the weekend.

### **Survey Requirements for Horizontal, Horizontal Re-entry, and Directional Wells**

NDAC Section 43-02-03-25 (Deviation Tests and Directional Surveys) states in part (that) the survey contractor shall file a certified copy of all surveys with the director free of charge within thirty days of completion. Surveys must be submitted as one electronic copy, or in a form approved by the director. However, the director may require the directional survey to be filed immediately after completion if the survey is needed to conduct the operation of the director's office in a timely manner. Certified surveys must be submitted via email in one adobe document, with a certification cover page to [certsurvey@nd.gov](mailto:certsurvey@nd.gov).

Survey points shall be of such frequency to accurately determine the entire location of the well bore.

Specifically, the Horizontal and Directional well survey frequency is 100 feet in the vertical, 30 feet in the curve (or when sliding) and 90 feet in the lateral.

### **Confidential status**

Your request for confidential status of all information furnished to the Director, or his representatives, is hereby granted. Such information, except production runs, shall remain confidential for six months commencing on the date the well is spud.

Confidential status notwithstanding, the Director and his representatives shall have access to all well records wherever located. Your company personnel, or any person performing work for your company shall permit the Director and his representatives to come upon any lease, property, well, or drilling rig operated or controlled by them, complying with all safety rules, and to inspect the records and operation of such wells and to have access at all times to any and all records of wells. The Commission's field personnel periodically inspect producing and drilling wells. Any information regarding such wells shall be made available to them at any time upon request. The information so obtained by the field personnel shall be maintained in strict confidence and shall be available only to the Commission and its staff.

### **Surface casing cement**

Tail cement utilized on surface casing must have a minimum compressive strength of 500 psi within 12 hours, and tail cement utilized on production casing must have a minimum compressive strength of 500 psi before drilling the plug or initiating tests.

### **Logs**

NDAC Section 43-02-03-31 requires the running of (1) a suite of open hole logs from which formation tops and porosity zones can be determined, (2) a Gamma Ray Log run from total depth to ground level elevation of the well bore, and (3) a log from which the presence and quality of cement can be determined (Standard CBL or Ultrasonic cement evaluation log) in every well in which production or intermediate casing has been set, this log must be run prior to completing the well. All logs run must be submitted free of charge, as one digital TIFF (tagged image file format) copy and one digital LAS (log ASCII) formatted copy. Digital logs may be submitted on a standard CD, DVD, or attached to an email sent to [digitallogs@nd.gov](mailto:digitallogs@nd.gov). Thank you for your cooperation.

Sincerely,

Todd L. Holweger  
Mineral Resources Permit Manager



# APPLICATION FOR PERMIT TO DRILL HORIZONTAL WELL - FORM 1H

INDUSTRIAL COMMISSION OF NORTH DAKOTA  
OIL AND GAS DIVISION  
600 EAST BOULEVARD DEPT 405  
BISMARCK, ND 58505-0840  
SFN 54269 (08-2005)

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.

PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

Type of Work <b>New Location</b>	Type of Well <b>Oil &amp; Gas</b>	Approximate Date Work Will Start <b>6 / 1 / 2012</b>	Confidential Status <b>Yes</b>
Operator <b>CONTINENTAL RESOURCES, INC.</b>		Telephone Number <b>580-233-8955</b>	
Address <b>P.O. Box 1032</b>		City <b>Enid</b>	State <b>OK</b> Zip Code <b>73702</b>

Notice has been provided to the owner of any permanently occupied dwelling within 1,320 feet.

This well is not located within five hundred feet of an occupied dwelling.

## WELL INFORMATION (If more than one lateral proposed, enter data for additional laterals on page 2)

Well Name <b>ATLANTA FEDERAL</b>			Well Number <b>6-6H</b>				
Surface Footages <b>495 F N L      880 F W L</b>		Qtr-Qtr <b>NWNW</b>	Section <b>6</b>	Township <b>153 N</b>	Range <b>101 W</b>	County <b>Williams</b>	
Longstring Casing Point Footages <b>970 F N L      1200 F W L</b>		Qtr-Qtr <b>NWNW</b>	Section <b>6</b>	Township <b>153 N</b>	Range <b>101 W</b>	County <b>Williams</b>	
Longstring Casing Point Coordinates From Well Head <b>475 S From WH      320 E From WH</b>		Azimuth <b>146 °</b>	Longstring Total Depth <b>10911 Feet MD      10584 Feet TVD</b>				
Bottom Hole Footages From Nearest Section Line <b>228 F S L      2178 F W L</b>		Qtr-Qtr <b>SESW</b>	Section <b>8</b>	Township <b>153 N</b>	Range <b>101 W</b>	County <b>McKenzie</b>	
Bottom Hole Coordinates From Well Head <b>9673 S From WH      6521 E From WH</b>		KOP Lateral 1 <b>10011 Feet MD</b>	Azimuth Lateral 1 <b>146 °</b>	Estimated Total Depth Lateral 1 <b>22004 Feet MD      10590 Feet TVD</b>			
Latitude of Well Head <b>48 ° 06 ' 33.66 "</b>		Longitude of Well Head <b>-103 ° 43 ' 47.97 "</b>	NAD Reference <b>NAD83</b>	Description of Spacing Unit: <b>Sec 5, 6, 7, &amp; 8 T153N R101W</b> (Subject to NDIC Approval)			
Ground Elevation <b>1945 Feet Above S.L.</b>	Acres in Spacing/Drilling Unit <b>2560</b>		Spacing/Drilling Unit Setback Requirement Feet N/S		Industrial Commission Order <b>19840</b>		
North Line of Spacing/Drilling Unit <b>10517 Feet</b>		South Line of Spacing/Drilling Unit <b>10511 Feet</b>		East Line of Spacing/Drilling Unit <b>10422 Feet</b>		West Line of Spacing/Drilling Unit <b>10368 Feet</b>	
Objective Horizons <b>Three Forks</b>						Pierre Shale Top <b>1867</b>	
Proposed Surface Casing	Size <b>9 - 5/8 "</b>	Weight <b>36 Lb./Ft.</b>	Depth <b>1970 Feet</b>	Cement Volume <b>743 Sacks</b>	NOTE: Surface hole must be drilled with fresh water and surface casing must be cemented back to surface.		
Proposed Longstring Casing	Size <b>7 - "</b>	Weight(s) <b>26-32 Lb./Ft.</b>	Longstring Total Depth <b>10911 Feet MD      10584 Feet TVD</b>		Cement Volume <b>839 Sacks</b>	Cement Top <b>0 Feet</b>	Top Dakota Sand <b>5624 Feet</b>
Base Last Charles Salt (If Applicable) <b>9011 Feet</b>		NOTE: Intermediate or longstring casing string must be cemented above the top Dakota Group Sand.					
Proposed Logs <b>CBL/GR from deepest depth obtainable to ground surface/mud</b>							
Drilling Mud Type (Vertical Hole - Below Surface Casing) <b>Invert</b>				Drilling Mud Type (Lateral) <b>Brine</b>			
Survey Type in Vertical Portion of Well <b>MWD Every 100 Feet</b>		Survey Frequency: Build Section <b>30 Feet</b>		Survey Frequency: Lateral <b>90 Feet</b>		Survey Contractor <b>Baker Hughes</b>	

NOTE: A Gamma Ray log must be run to ground surface and a CBL must be run on intermediate or longstring casing string if set.

Surveys are required at least every 30 feet in the build section and every 90 feet in the lateral section of a horizontal well. Measurement inaccuracies are not considered when determining compliance with the spacing/drilling unit boundary setback requirement except in the following scenarios: 1) When the angle between the well bore and the respective boundary is 10 degrees or less; or 2) If Industry standard methods and equipment are not utilized. Consult the applicable field order for exceptions.

If measurement inaccuracies are required to be considered, a 2° MWD measurement inaccuracy will be applied to the horizontal portion of the well bore. This measurement inaccuracy is applied to the well bore from KOP to TD.

**REQUIRED ATTACHMENTS:** Certified surveyor's plat, horizontal section plat, estimated geological tops, proposed mud/cementing plan, directional plot/plan, \$100 fee.

See Page 2 for Comments section and signature block.

**COMMENTS, ADDITIONAL INFORMATION, AND/OR LIST OF ATTACHMENTS****Proposed FW casing: 13 3/8, 48#, 0-500', 189 sks cmt. Setbacks: 500' N&W 200' E&S**

Lateral 2

KOP Lateral 2 Feet MD	Azimuth Lateral 2 °	Estimated Total Depth Lateral 2 Feet MD		KOP Coordinates From Well Head From WH	
Formation Entry Point Coordinates From Well Head From WH		Bottom Hole Coordinates From Well Head From WH			From WH
KOP Footages From Nearest Section Line F L		Qtr-Qtr	Section	Township <b>N</b>	Range <b>W</b>
F	L				County
Bottom Hole Footages From Nearest Section Line F L		Qtr-Qtr	Section	Township <b>N</b>	Range <b>W</b>
F	L				County

Lateral 3

KOP Lateral 3 Feet MD	Azimuth Lateral 3 °	Estimated Total Depth Lateral 3 Feet MD		KOP Coordinates From Well Head From WH	
Formation Entry Point Coordinates From Well Head From WH		Bottom Hole Coordinates From Well Head From WH			From WH
KOP Footages From Nearest Section Line F L		Qtr-Qtr	Section	Township <b>N</b>	Range <b>W</b>
F	L				County
Bottom Hole Footages From Nearest Section Line F L		Qtr-Qtr	Section	Township <b>N</b>	Range <b>W</b>
F	L				County

Lateral 4

KOP Lateral 4 Feet MD	Azimuth Lateral 4 °	Estimated Total Depth Lateral 4 Feet MD		KOP Coordinates From Well Head From WH	
Formation Entry Point Coordinates From Well Head From WH		Bottom Hole Coordinates From Well Head From WH			From WH
KOP Footages From Nearest Section Line F L		Qtr-Qtr	Section	Township <b>N</b>	Range <b>W</b>
F	L				County
Bottom Hole Footages From Nearest Section Line F L		Qtr-Qtr	Section	Township <b>N</b>	Range <b>W</b>
F	L				County

Lateral 5

KOP Lateral 5 Feet MD	Azimuth Lateral 5 °	Estimated Total Depth Lateral 5 Feet MD		KOP Coordinates From Well Head From WH	
Formation Entry Point Coordinates From Well Head From WH		Bottom Hole Coordinates From Well Head From WH			From WH
KOP Footages From Nearest Section Line F L		Qtr-Qtr	Section	Township <b>N</b>	Range <b>W</b>
F	L				County
Bottom Hole Footages From Nearest Section Line F L		Qtr-Qtr	Section	Township <b>N</b>	Range <b>W</b>
F	L				County

I hereby swear or affirm the information provided is true, complete and correct as determined from all available records.

Date

5 / 7 / 2012

ePermit

Printed Name  
**Terry L. Olson**

Title

**Regulatory Compliance Specialist****FOR STATE USE ONLY**

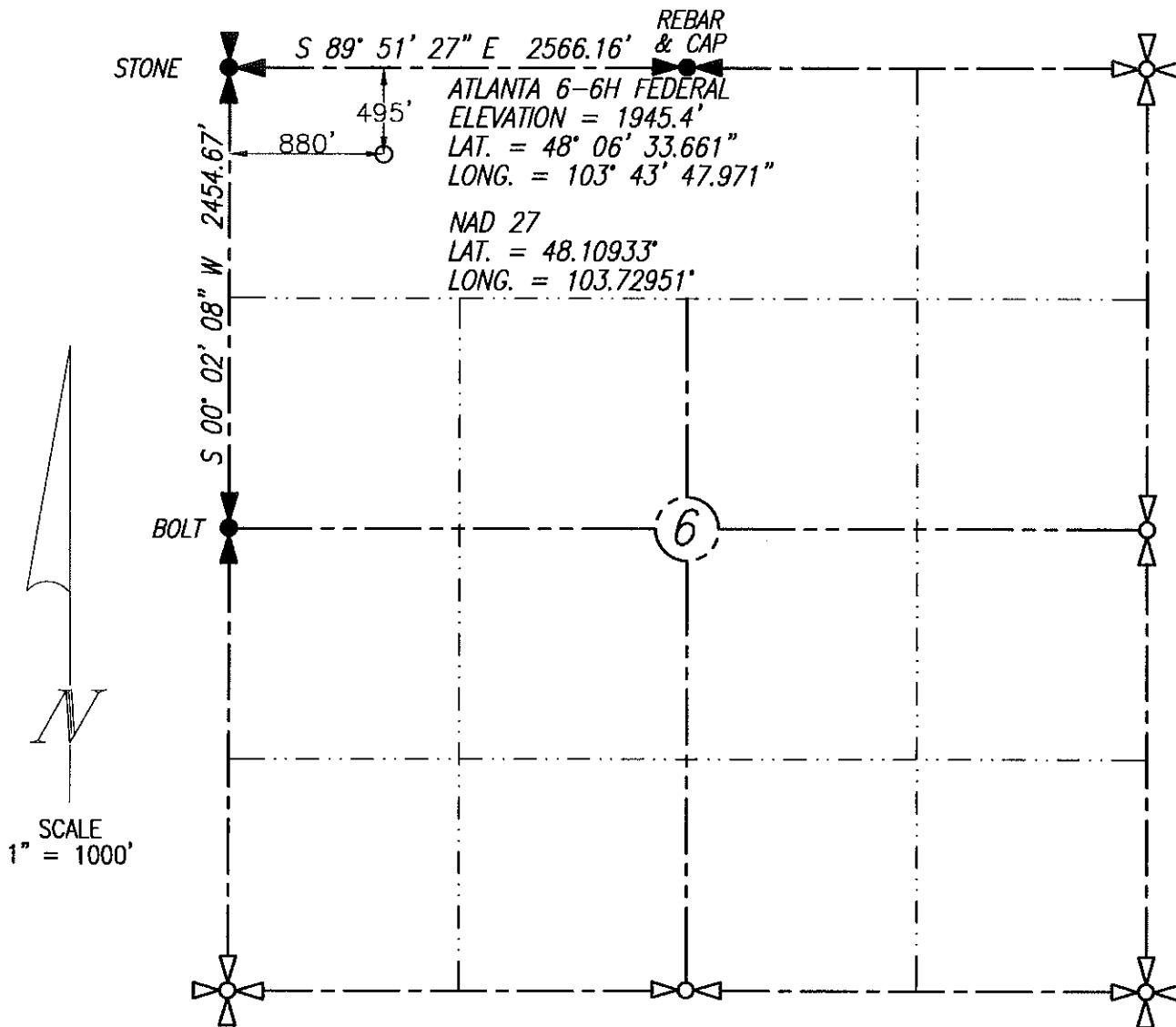
Permit and File Number <b>23367</b>	API Number <b>33 - 105 - 02727</b>
Field <b>BAKER</b>	
Pool <b>BAKKEN</b>	Permit Type <b>DEVELOPMENT</b>

**FOR STATE USE ONLY**

Date Approved <b>7 / 20 / 2012</b>
By <b>Todd L. Holweger</b>
Title <b>Mineral Resources Permit Manager</b>

WELL LOCATION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 6-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA  
495' FNL & 880' FWL

REVISED: 4-23-2012



I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS  
WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE  
CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF  
MY KNOWLEDGE AND BELIEF

4-23-12  
DATE STAKED: 2-9-2012  
BASIS OF VERTICAL DATUM:  
NAVD 1988 GEOID 09

PERSON AUTHORIZING SURVEY;  
CHAD NEWBY

EXPLANATION AREA: NAD83(CORS96)

BASIS OF BEARING: TRUE NORTH

**BROSZ ENGINEERING INC.**

BOX 357  
BOWMAN, N.D. 58623  
PHONE: 701-523-3340  
FAX: 701-523-5243

PROJECT NO. 12-10

Continental Resources, Inc. (CRI) respectfully submits the following information concerning the drilling of the Atlanta 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 -- 6H, N/2 NW/4 Sec. 6, T153N, R101W, Williams County, North Dakota.

The Atlanta well(s) are located in a Well Head Protection Area. CRI would like to propose the following safeguards and precautions to be taken to prevent any contamination to freshwater sources during the drilling and completion of the well.

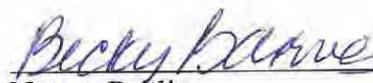
- 1) During construction of the location, the entire location will be constructed per NDIC permit stipulations, and to ensure any spills or runoff which occur on location do not penetrate the fresh ground water and are contained on surface of the location.
- 2) Drainage will be re-routed to avoid the location and fiber rolls will be employed around the site to reduce sediment contamination to freshwater runoff due to weather events.
- 3) The earthen berm constructed to keep any freshwater runoff off the location will also eliminate any spills from leaving the location
- 4) No reserve pit or dry cuttings pit will be utilized on location.
- 5) The conductor will be drilled to a depth of 80' and 20" pipe will be run to depth and cemented to surface.
- 6) During drilling operations, a freshwater protection string of 13-3/8" 48# H40 casing will be set to a depth of 500' and cemented to surface to protect the shallow freshwater zones. Standard 9-5/8" 36# J-55 surface casing will be set 100' into the Pierre Shale to a depth of 1970' and cemented to surface.
- 7) A frac string will be used to protect the intermediate casing during hydraulic fracturing of the well.
- 8) CRI is submitting a comprehensive; site specific Spill Contingency Plan to prepare for any event which may occur during drilling and completion operations.
- 9) CRI believes a Flood Prevention plan is not necessary for this site due to the Army Corps of Engineers documentation that the high water level for Lake Sakakawea will not affect any elevation 1855' above sea level or higher. The finished rig grade elevation for Atlanta location is 1959.6' above sea level.
- 10) The Atlanta wells will be drilled continuously. They will be batch drilled. The order of drilling for all wells on the pad will be:
  - a. 1, 2, 3, 4,
  - b. 11, 12, 13, 14,
  - c. 9, 10,
  - d. 5, 6, 7, 8.

CRI believes adequate planning and precautions are being taken to prevent any contamination to ground water, shallow aquifers, and fresh water reservoirs.

  
Chad Newby, Operations Land Coordinator  
Continental Resources, Inc.

STATE OF OKLAHOMA )  
                          )ss:  
COUNTY OF GARFIELD )

On the 8<sup>th</sup> day of June 2012, before me, a Notary Public in and for said County and State, personally appeared Chad Newby, known to me to be the Operations Land Coordinator of Continental Resources, Inc., the Corporation that executed the within instrument, and acknowledged to me that such Corporation executed the same.

  
Notary Public

Garfield County, Oklahoma

My Commission Expires: 7/5/2015

Commission No.: 11006023



## Continental Resources Atlanta Site Contact List

### Drilling & Completions / Production

		phone	mobile
<b>Construction / Reclaim &amp; ROW</b>	Title		
Terry Chapman	Construction foreman		970.673.2411
Chad Newby	Operations Land Coordinator - Office		405.574.2172
<b>Drilling</b>			
Company man Cyclone 2 Rig Phone		701.570.8834	
Jared Miller	Lead Company Man Cyclone 2		701.290.0443
Brandon Simkins	Relief Company Man Cyclone 2		307.231.6420
Don Radke	Drilling Superintendent - Field		701.570.6326
Kyle Davis	Drilling Engineer - Office	580.249.4750	
Bryan George	Drilling Superintendent - Office	580.249.4757	
Alan McNally	Drilling Manager - Office	580.249.4792	
<b>Completions</b>			
Jason Walters	Production Superintendent		406.489.1456
Gene Dowhaniuk	Production Superintendent		701.770.8358
Chris Nichols	Area Completions Manager - Office	580.249.4711	580.278.9003
<b>Production</b>			
Howard Hill	Operator		406.489.2832
Brent Bowlds	Production Foreman	406.433.3006	406.489.3029
Donald Kennedy	Senior Production Engineer - Office	580.249.4788	
Russ Atkins	Area Production Manager		406.433.3006
Brad Aman	VP Production Northern Region	580.548.5283	

### **Health Safety Environmental**

Dusty Grosulak	Safety Supervisor		701.260.1138
Zach Laird	Safety Manager		405.742.2696
Mike White	Northern Region Senior Environment Specialist		406.941.2521
Stacy Aguirre	Northern Region Environmental Supervisor		406.478.4450
Andy Truhan	Director of Environmental Compliance		405.535.8967

### **Public Relations & Media Contact Information**

Kristin Miskovsky	VP Public Relations	405.234.9480	
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**Burns, David J.**

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**From:** Shawn Svob <ShawnSvob@contres.com>  
**Sent:** Tuesday, March 13, 2012 3:23 PM  
**To:** Burns, David J.  
**Cc:** Holweger, Todd L.; Becky Barnes; Nicole Caddell; Terry Olson  
**Subject:** Clarification of Drilling and Mud program

Continental Resources respectfully submits this memo as clarification on previously submitted permits.

In the Drilling Program, sub-section Mud Program, Surface Holes will be drilled with Fresh Water. Current Drilling Programs state "Native" as the current mud system. Future permits will reflect Fresh Water as the mud system.

Please contact me if you have further questions or require more clarification.

Respectfully,

Shawn Svob  
580-747-6678

Shawn

NOTICE: This message contains confidential information and is intended for the individual named. If you are not the named addressee, you should not disseminate, distribute or copy this e-mail. Please notify the sender immediately by reply e-mail if you have received this e-mail by mistake and delete this e-mail from your system. E-mail transmission cannot be guaranteed to be secure or error-free as information could be intercepted, corrupted, lost, destroyed, arrive late or incomplete, or contain viruses. The sender therefore does not accept liability for any errors or omissions in the contents of this message which arise as a result of e-mail transmission.

**PRELIMINARY DRILLING PROGRAM**

5/7/2012

Lease and Well No.

Atlanta Federal 5-6H

<b>MUD PROGRAM</b>							
Depth		Type	Weight	Remarks			
0 '	-	1970 '	Native Freshwater	8.4-8.8	Add Soap Sticks for Mud Rings		
1970 '	-	6500 '	Invert	9.3-9.5	35-50 sec, 10-30 cc's		
6500 '	-	10857 '	Invert	9.6-10.0	40-55 sec, 10-15 cc's O/W 70/30 to 80/20		
10857 '	-	TD	Brine	8.7-10.0	Cuttings Pit		

**TUBULAR PROGRAM**

String Type	Hole Size	Depth	Feet	Casing Diameter	Weight, Grade, Connection	ERW/Seamless	Critical Inspection
FW	17 1/2 "	500 '	500 '	13-3/8 "	13-3/8", 48 #, H-40, STC	ERW	BCI & Drift
					Float shoe, shoe joint & float collar. Centralize bottom 3 jts and every 4th jt to surface.		
Surf	12 1/4 "	1970 '	1970 '	9 5/8 "	9-5/8", 36 #, J-55, STC	ERW	BCI & Drift
					Float shoe, shoe joint & float collar. Centralize bottom joint then 5 more every other, 1 at conductor		
Int	8 3/4 "	80 '	80 '	7 "	7", 32#, P-110 IC, LTC	ERW	BCI & Drift
		4000 '	3920 '	7 "	7", 26#, P-110 IC, LTC	ERW	BCI & Drift
		8100 '	4100 '	7 "	7", 29#, P-110 IC, LTC	ERW	BCI & Drift
		9210 '	1110 '	7 "	7", 32#, P-110 IC, LTC	Seamless	BCI & Drift
		10857 '	1647 '	7 "	7", 29#, P-110 IC, LTC	ERW	BCI & Drift
					Float shoe, shoe joint & float collar. Centralize bottom 3 joints. Centralize thru curve and across all salts.		
Liner	6 "	20980 '	11060 '	4 1/2 "	4-1/2", 11.6 #, P-110, BTC		
Tubing		9960 '	9960 '	2 7/8 "	2-7/8", 6.5 #, L-80, EUE		

Notes: Pipe to end up in hole from top to bottom as shown.

**CEMENT PROGRAM**

String Type	SHOE/DV Depth	Stage Lead/Tail	Cement Bottom	Cement Top	No Sacks	Cement System	Cement Yield	Cement Weight
		Lead	350 '	0 '	111	35/65 Poz/Class "C", 3% CaCl, 12% gel	2.39	12
FW	500	Tail	500 '	350 '	77.8	Class "C", 2% CaCl	1.46	14.3
(Basis: Gauge hole + 55% excess, tail 30% of length, lead to surface.)								
		Lead	1380 '	0 '	437	35/65 Poz/Class "C", 3% CaCl, 12% gel	2.39	12
Surf	1970	Tail	1970 '	1380 '	306	Class "C", 2% CaCl	1.46	14.3
(Basis: Gauge hole + 55% excess, tail 30% of length, lead to surface.)								
Int	10857	Lead	7800 '	0 '	457	35/65 Poz/Class "C", 3% KCl, 5#/sk Silica	3.21	11.3
		Tail	10857 '	7800 '	376	Class "G", 3% KCl, 35% Silica	1.59	15.6
(Basis: Gauge hole + 30% excess, Tail to 500 ft above top of Charles Salt, Lead to Surface)								

**GEOLOGIC PROGNOSIS**

**Well Name:** Atlanta Federal 6-6H      **SHL:** 495' FNL & 880' FWL  
**Rig:** Cyclone 02      Sec. 6 - 153N - 101W  
**Prospect:** Williston      Williams, ND  
**Target:** Three Forks  
**Spacing:** 2560  
 Pre-Staked  
 Staked

Rig Grade Elevation: 1945'  
 KB: 22'  
 RKB: 1967'

FORMATION	SUBSEA	TVD
Pierre Shale	100	<b>1,867</b>
Greenhorn	-2,582	<b>4,549</b>
Dakota Group (fka Mowry)	-2,958	<b>4,925</b>
Basal Dakota Sand	-3,657	<b>5,624</b>
Dunham Salt Top	NA	
Dunham Salt Base	NA	
Pine Salt Top	-5,189	<b>7,156</b>
Pine Salt Base	-5,216	<b>7,183</b>
Minnekahta	-5,235	<b>7,202</b>
Opeche Salt Top	NA	
Opeche Salt Base	NA	
Minnelusa Group	-5,464	<b>7,431</b>
Tyler	-5,650	<b>7,617</b>
Kibby	-6,186	<b>8,153</b>
Top Charles	-6,333	<b>8,300</b>
Base Last Charles Salt	-7,044	<b>9,011</b>
Mission Canyon	-7,267	<b>9,234</b>
Lodgepole	-7,820	<b>9,787</b>
Upper Bakken Shale	-8,529	<b>10,496</b>
Middle Bakken Member	-8,543	<b>10,510</b>
Lower Bakken Shale	-8,574	<b>10,541</b>
Three Forks/Base of Shale	-8,602	<b>10,569</b>
Three Forks Target	-8,617	<b>10,584</b>
<b>End of Lateral</b>	-8,623	<b>10,590</b>



To: Todd Holweger, NDIC  
From: Shawn Svob  
Date: 4/5/2012  
Re: Continental Resources standard CCL, CBL, 4-1/2" liner running and testing procedures

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Continental Resources' standard practice for running the cement bond log and casing caliper log is to run both logs immediately after coming out of the hole after TD, prior to running the 4-1/2" liner, to the deepest depth obtainable; however, if there are well control concerns that require us to run the liner sooner, only the CBL will be run and the CCL will be run after setting the liner.

Based on the CCL results, we determine the actual API minimum burst allowance for the 7" casing. If the downgraded API burst pressure is below our minimum required frac pressures, we will run a 4-1/2" frac string; if severe wear or holes are found in the casing, we will run a 5" cemented, to surface, tie back string.

The CBL log is run in order to determine the top of cement, as required by the NDIC. Our current 4-1/2" liner program for a 1280 unit is 30, evenly spaced, stages with 29 swellable packers. The liner shoe is set approximately 180 feet off bottom. The shoe stage below the last packer has 2 joints, a double valved float, one joint, and a ported guide shoe – appx 130 ft. The liner is run using a running tool on the end of 4" DP. The 7" packer/hanger is set about 40 ft above KOP between two casing collars but conditions occasionally occur that require setting higher, either through unexpected failure or in order to isolate casing wear close to KOP. Recently we have tried 40 stage liners and the trend to explore the optimum stage count will continue.. Once the liner is at depth, a ball is dropped through the DP, the ball is pressured up against the setting tool to approximately 2500 psi, and the 7" packer/hanger is set.

A push pull test is done to confirm the hanger has set. Then, a 4500 psi pressure test is completed on the back side of the 4" DP to confirm the packer has set. The setting tool is then backed off and the 4" DP/running tool is laid down.

Immediately after the rotary rig has been moved off the well location, the 7" csg and liner packer/ hanger are tested to the frac pressure. The testers will rig up and test the tubing head to 5000 psi. Next a test plug will be run and set, using wire line, in the top of the 7" packer/hanger. Testers will pressure up to our frac pressure, typically 8500 psi, to confirm the 7" is ready for completion.

Shawn Svob  
Drilling Operations Coordinator

# CONTINENTAL RESOURCES

Location: NORTH DAKOTA

Slot: SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)

Field: WILLIAMS COUNTY

Well: ATLANTA FEDERAL 6-6H

Facility: SEC.06-T153N-R101W

Wellbore: ATLANTA FEDERAL 6-6H PWB

Plot reference wellpath is ATLANTA FEDERAL 6-6H (REV.C.0) PWP

True vertical depths are referenced to CYCLONE 2 (RKB)

Measured depths are referenced to CYCLONE 2 (RKB)

CYCLONE 2 (RKB) to Mean Sea Level: 1967 feet

Mean Sea Level to Mud line (At Slot: SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)): 0 feet

Coordinates are in feet referenced to Slot

Created by: painstir on 4/25/2012

## Location Information

Facility Name			Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
SEC.06-T153N-R101W			1179034.199	421199.095	48°06'32.379"N	103°43'56.960"W
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)	28.59	610.04	1179644.864	421202.052	48°06'33.661"N	103°43'47.971"W

CYCLONE 2 (RKB) to Mud line (At Slot: SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06))

Mean Sea Level to Mud line (At Slot: SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06))

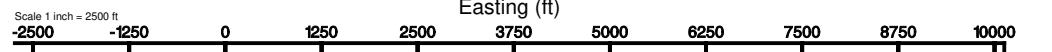
CYCLONE 2 (RKB) to Mean Sea Level

## Targets

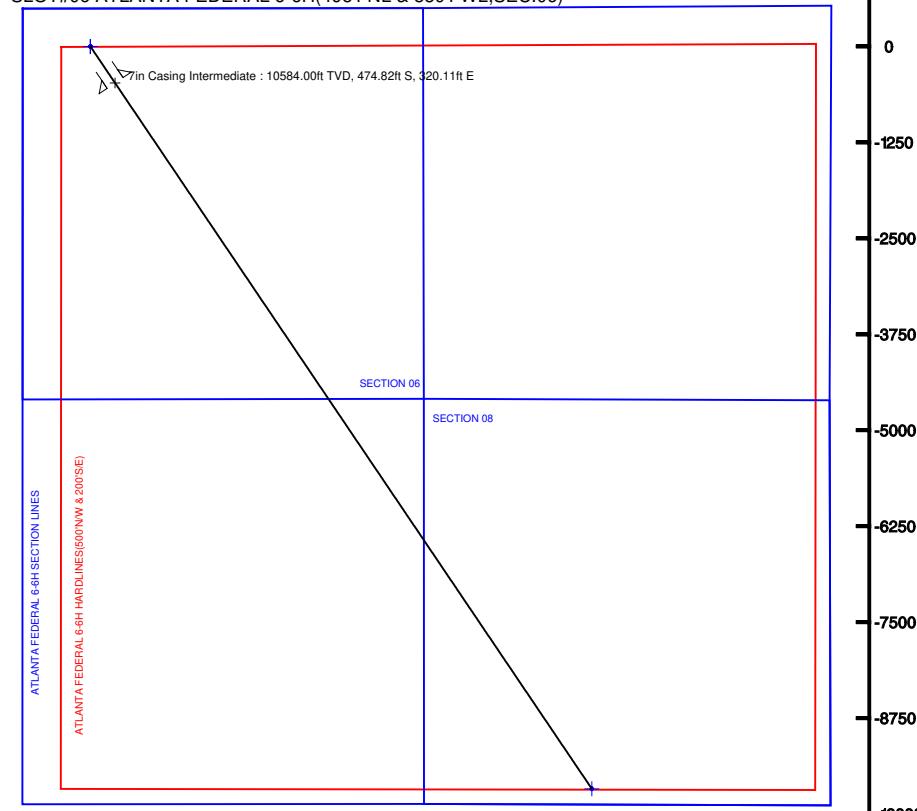
Name	MD (ft)	TVD (ft)	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
ATLANTA FEDERAL 6-6H SECTION 06	0.00	0.00	0.00	0.00	1179644.86	421202.05	48°06'33.661"N	103°43'47.971"W
ATLANTA FEDERAL 6-6H SECTION 08	0.00	0.00	0.00	0.00	1179644.86	421202.05	48°06'33.661"N	103°43'47.971"W
ATLANTA FEDERAL 6-6H SECTION LINES	0.00	0.00	0.00	0.00	1179644.86	421202.05	48°06'33.661"N	103°43'47.971"W
ATLANTA 6-6H BHL ON PLAT REV-1(200'FSL & 2195'FWL,SEC.08)	10575.00	9865.04	6595.00	1185819.94	411069.79	48°04'55.298"N	103°42'10.845"W	
ATLANTA FEDERAL 6-6H HARDLINE(S500'FSL & 2050'E)	10590.00	0.00	0.00	1179644.86	421202.05	48°06'33.661"N	103°43'47.971"W	
ATLANTA FEDERAL 6-6H BHL ON PLAT REV-2 (200'FSL & 2195'FWL,SEC.08)	22003.89	10590.00	-9672.90	6521.20	411264.84	48°04'58.195"N	103°42'11.930"W	

## Well Profile Data

Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (%/100ft)	VS (ft)
Tie On	22.00	0.000	146.013	22.00	0.00	0.00	0.00	0.00
End of Tangent	10011.04	0.000	146.013	10011.04	0.00	0.00	0.00	0.00
End of Build	10910.73	89.969	146.013	10584.00	-474.82	320.11	10.00	572.65
End of Tangent	22003.89	89.969	146.013	10590.00	-9672.90	6521.20	0.00	11665.81



SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)

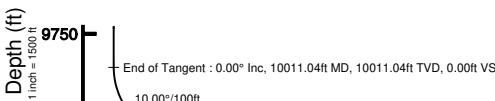


ATLANTA FEDERAL 6-6H BHL ON PLAT REV-2 (200'FSL & 2195'FWL,SEC.08)



BGGM (1945.0 to 2013.0) Dip: 73.08° Field: 56635.5 nT  
Magnetic North is 8.76 degrees East of True North (at 2/10/2012)

To correct azimuth from Magnetic to True add 8.76 degrees  
For example: if the Magnetic North Azimuth = 90 degs, then the True North Azimuth = 90 + 8.76 = 98.76



Vertical Section (ft)

Azimuth 146.01° with reference 0.00 N, 0.00 E

End of Tangent : 89.97° Inc, 22003.89ft MD, 10590.00ft TVD, 11665.81ft VS  
ATLANTA FEDERAL 6-6H BHL ON PLAT REV-2 (200'FSL & 2195'FWL,SEC.08)

Scale 1 inch = 1500 ft



# Planned Wellpath Report

ATLANTA FEDERAL 6-6H (REV-C.0) PWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 6-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 6-6H PWB
Facility	SEC.06-T153N-R101W		

## REPORT SETUP INFORMATION

Projection System	NAD83 / Lambert North Dakota SP, Northern Zone (3301), US feet	Software System	WellArchitect® 3.0.2
North Reference	True	User	Painstr
Scale	0.999936	Report Generated	4/25/2012 at 2:42:07 PM
Convergence at slot	2.40° West	Database/Source file	WA_Denver/ATLANTA_FEDERAL_6-6H_PWB.xml

## WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	28.59	610.04	1179644.86	421202.05	48°06'33.661"N	103°43'47.971"W
Facility Reference Pt			1179034.20	421199.10	48°06'33.379"N	103°43'56.960"W
Field Reference Pt			1379474.78	594749.03	48°36'17.680"N	102°56'05.560"W

## WELLPATH DATUM

Calculation method	Minimum curvature	CYCLONE 2 (RKB) to Facility Vertical Datum	1967.00ft
Horizontal Reference Pt	Slot	CYCLONE 2 (RKB) to Mean Sea Level	1967.00ft
Vertical Reference Pt	CYCLONE 2 (RKB)	CYCLONE 2 (RKB) to Mud Line at Slot (SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06))	1967.00ft
MD Reference Pt	CYCLONE 2 (RKB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	146.01°



# Planned Wellpath Report

ATLANTA FEDERAL 6-6H (REV-C.0) PWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 6-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 6-6H PWB
Facility	SEC.06-T153N-R101W		

## WELLPATH DATA (224 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
0.00†	0.000	146.013	0.00	0.00	0.00	0.00	0.00	
22.00	0.000	146.013	22.00	0.00	0.00	0.00	0.00	
122.00†	0.000	146.013	122.00	0.00	0.00	0.00	0.00	
222.00†	0.000	146.013	222.00	0.00	0.00	0.00	0.00	
322.00†	0.000	146.013	322.00	0.00	0.00	0.00	0.00	
422.00†	0.000	146.013	422.00	0.00	0.00	0.00	0.00	
522.00†	0.000	146.013	522.00	0.00	0.00	0.00	0.00	
622.00†	0.000	146.013	622.00	0.00	0.00	0.00	0.00	
722.00†	0.000	146.013	722.00	0.00	0.00	0.00	0.00	
822.00†	0.000	146.013	822.00	0.00	0.00	0.00	0.00	
922.00†	0.000	146.013	922.00	0.00	0.00	0.00	0.00	
1022.00†	0.000	146.013	1022.00	0.00	0.00	0.00	0.00	
1122.00†	0.000	146.013	1122.00	0.00	0.00	0.00	0.00	
1222.00†	0.000	146.013	1222.00	0.00	0.00	0.00	0.00	
1322.00†	0.000	146.013	1322.00	0.00	0.00	0.00	0.00	
1422.00†	0.000	146.013	1422.00	0.00	0.00	0.00	0.00	
1522.00†	0.000	146.013	1522.00	0.00	0.00	0.00	0.00	
1622.00†	0.000	146.013	1622.00	0.00	0.00	0.00	0.00	
1722.00†	0.000	146.013	1722.00	0.00	0.00	0.00	0.00	
1822.00†	0.000	146.013	1822.00	0.00	0.00	0.00	0.00	
1922.00†	0.000	146.013	1922.00	0.00	0.00	0.00	0.00	
2022.00†	0.000	146.013	2022.00	0.00	0.00	0.00	0.00	
2122.00†	0.000	146.013	2122.00	0.00	0.00	0.00	0.00	
2222.00†	0.000	146.013	2222.00	0.00	0.00	0.00	0.00	
2322.00†	0.000	146.013	2322.00	0.00	0.00	0.00	0.00	
2422.00†	0.000	146.013	2422.00	0.00	0.00	0.00	0.00	
2522.00†	0.000	146.013	2522.00	0.00	0.00	0.00	0.00	
2622.00†	0.000	146.013	2622.00	0.00	0.00	0.00	0.00	
2722.00†	0.000	146.013	2722.00	0.00	0.00	0.00	0.00	
2822.00†	0.000	146.013	2822.00	0.00	0.00	0.00	0.00	



# Planned Wellpath Report

ATLANTA FEDERAL 6-6H (REV-C.0) PWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 6-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 6-6H PWB
Facility	SEC.06-T153N-R101W		

## WELLPATH DATA (224 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
2922.00†	0.000	146.013	2922.00	0.00	0.00	0.00	0.00	
3022.00†	0.000	146.013	3022.00	0.00	0.00	0.00	0.00	
3122.00†	0.000	146.013	3122.00	0.00	0.00	0.00	0.00	
3222.00†	0.000	146.013	3222.00	0.00	0.00	0.00	0.00	
3322.00†	0.000	146.013	3322.00	0.00	0.00	0.00	0.00	
3422.00†	0.000	146.013	3422.00	0.00	0.00	0.00	0.00	
3522.00†	0.000	146.013	3522.00	0.00	0.00	0.00	0.00	
3622.00†	0.000	146.013	3622.00	0.00	0.00	0.00	0.00	
3722.00†	0.000	146.013	3722.00	0.00	0.00	0.00	0.00	
3822.00†	0.000	146.013	3822.00	0.00	0.00	0.00	0.00	
3922.00†	0.000	146.013	3922.00	0.00	0.00	0.00	0.00	
4022.00†	0.000	146.013	4022.00	0.00	0.00	0.00	0.00	
4122.00†	0.000	146.013	4122.00	0.00	0.00	0.00	0.00	
4222.00†	0.000	146.013	4222.00	0.00	0.00	0.00	0.00	
4322.00†	0.000	146.013	4322.00	0.00	0.00	0.00	0.00	
4422.00†	0.000	146.013	4422.00	0.00	0.00	0.00	0.00	
4522.00†	0.000	146.013	4522.00	0.00	0.00	0.00	0.00	
4622.00†	0.000	146.013	4622.00	0.00	0.00	0.00	0.00	
4722.00†	0.000	146.013	4722.00	0.00	0.00	0.00	0.00	
4822.00†	0.000	146.013	4822.00	0.00	0.00	0.00	0.00	
4922.00†	0.000	146.013	4922.00	0.00	0.00	0.00	0.00	
5022.00†	0.000	146.013	5022.00	0.00	0.00	0.00	0.00	
5122.00†	0.000	146.013	5122.00	0.00	0.00	0.00	0.00	
5222.00†	0.000	146.013	5222.00	0.00	0.00	0.00	0.00	
5322.00†	0.000	146.013	5322.00	0.00	0.00	0.00	0.00	
5422.00†	0.000	146.013	5422.00	0.00	0.00	0.00	0.00	
5522.00†	0.000	146.013	5522.00	0.00	0.00	0.00	0.00	
5622.00†	0.000	146.013	5622.00	0.00	0.00	0.00	0.00	
5722.00†	0.000	146.013	5722.00	0.00	0.00	0.00	0.00	
5822.00†	0.000	146.013	5822.00	0.00	0.00	0.00	0.00	



# Planned Wellpath Report

ATLANTA FEDERAL 6-6H (REV-C.0) PWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 6-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 6-6H PWB
Facility	SEC.06-T153N-R101W		

## WELLPATH DATA (224 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
5922.00†	0.000	146.013	5922.00	0.00	0.00	0.00	0.00	
6022.00†	0.000	146.013	6022.00	0.00	0.00	0.00	0.00	
6122.00†	0.000	146.013	6122.00	0.00	0.00	0.00	0.00	
6222.00†	0.000	146.013	6222.00	0.00	0.00	0.00	0.00	
6322.00†	0.000	146.013	6322.00	0.00	0.00	0.00	0.00	
6422.00†	0.000	146.013	6422.00	0.00	0.00	0.00	0.00	
6522.00†	0.000	146.013	6522.00	0.00	0.00	0.00	0.00	
6622.00†	0.000	146.013	6622.00	0.00	0.00	0.00	0.00	
6722.00†	0.000	146.013	6722.00	0.00	0.00	0.00	0.00	
6822.00†	0.000	146.013	6822.00	0.00	0.00	0.00	0.00	
6922.00†	0.000	146.013	6922.00	0.00	0.00	0.00	0.00	
7022.00†	0.000	146.013	7022.00	0.00	0.00	0.00	0.00	
7122.00†	0.000	146.013	7122.00	0.00	0.00	0.00	0.00	
7222.00†	0.000	146.013	7222.00	0.00	0.00	0.00	0.00	
7322.00†	0.000	146.013	7322.00	0.00	0.00	0.00	0.00	
7422.00†	0.000	146.013	7422.00	0.00	0.00	0.00	0.00	
7522.00†	0.000	146.013	7522.00	0.00	0.00	0.00	0.00	
7622.00†	0.000	146.013	7622.00	0.00	0.00	0.00	0.00	
7722.00†	0.000	146.013	7722.00	0.00	0.00	0.00	0.00	
7822.00†	0.000	146.013	7822.00	0.00	0.00	0.00	0.00	
7922.00†	0.000	146.013	7922.00	0.00	0.00	0.00	0.00	
8022.00†	0.000	146.013	8022.00	0.00	0.00	0.00	0.00	
8122.00†	0.000	146.013	8122.00	0.00	0.00	0.00	0.00	
8222.00†	0.000	146.013	8222.00	0.00	0.00	0.00	0.00	
8322.00†	0.000	146.013	8322.00	0.00	0.00	0.00	0.00	
8422.00†	0.000	146.013	8422.00	0.00	0.00	0.00	0.00	
8522.00†	0.000	146.013	8522.00	0.00	0.00	0.00	0.00	
8622.00†	0.000	146.013	8622.00	0.00	0.00	0.00	0.00	
8722.00†	0.000	146.013	8722.00	0.00	0.00	0.00	0.00	
8822.00†	0.000	146.013	8822.00	0.00	0.00	0.00	0.00	



# Planned Wellpath Report

ATLANTA FEDERAL 6-6H (REV-C.0) PWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 6-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 6-6H PWB
Facility	SEC.06-T153N-R101W		

## WELLPATH DATA (224 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
8922.00†	0.000	146.013	8922.00	0.00	0.00	0.00	0.00	
9022.00†	0.000	146.013	9022.00	0.00	0.00	0.00	0.00	
9122.00†	0.000	146.013	9122.00	0.00	0.00	0.00	0.00	
9222.00†	0.000	146.013	9222.00	0.00	0.00	0.00	0.00	
9322.00†	0.000	146.013	9322.00	0.00	0.00	0.00	0.00	
9422.00†	0.000	146.013	9422.00	0.00	0.00	0.00	0.00	
9522.00†	0.000	146.013	9522.00	0.00	0.00	0.00	0.00	
9622.00†	0.000	146.013	9622.00	0.00	0.00	0.00	0.00	
9722.00†	0.000	146.013	9722.00	0.00	0.00	0.00	0.00	
9822.00†	0.000	146.013	9822.00	0.00	0.00	0.00	0.00	
9922.00†	0.000	146.013	9922.00	0.00	0.00	0.00	0.00	
10011.04	0.000	146.013	10011.04	0.00	0.00	0.00	0.00	End of Tangent
10022.00†	1.096	146.013	10022.00	0.10	-0.09	0.06	10.00	
10122.00†	11.096	146.013	10121.31	10.71	-8.88	5.99	10.00	
10222.00†	21.096	146.013	10217.27	38.40	-31.84	21.47	10.00	
10322.00†	31.096	146.013	10306.96	82.33	-68.27	46.02	10.00	
10422.00†	41.096	146.013	10387.66	141.17	-117.05	78.92	10.00	
10522.00†	51.096	146.013	10456.92	213.13	-176.72	119.14	10.00	
10622.00†	61.096	146.013	10512.62	296.02	-245.45	165.48	10.00	
10722.00†	71.096	146.013	10553.09	387.33	-321.16	216.52	10.00	
10822.00†	81.096	146.013	10577.09	484.28	-401.55	270.71	10.00	
10910.73	89.969	146.013	10584.00	572.65	-474.82	320.11	10.00	End of Build
10922.00†	89.969	146.013	10584.00	583.92	-484.17	326.41	0.00	
11022.00†	89.969	146.013	10584.06	683.92	-567.08	382.31	0.00	
11122.00†	89.969	146.013	10584.11	783.92	-650.00	438.21	0.00	
11222.00†	89.969	146.013	10584.17	883.92	-732.92	494.11	0.00	
11322.00†	89.969	146.013	10584.22	983.92	-815.83	550.01	0.00	
11422.00†	89.969	146.013	10584.27	1083.92	-898.75	605.91	0.00	
11522.00†	89.969	146.013	10584.33	1183.92	-981.67	661.81	0.00	
11622.00†	89.969	146.013	10584.38	1283.92	-1064.58	717.71	0.00	



# Planned Wellpath Report

ATLANTA FEDERAL 6-6H (REV-C.0) PWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 6-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 6-6H PWB
Facility	SEC.06-T153N-R101W		

## WELLPATH DATA (224 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
11722.00†	89.969	146.013	10584.44	1383.92	-1147.50	773.61	0.00	
11822.00†	89.969	146.013	10584.49	1483.92	-1230.42	829.51	0.00	
11922.00†	89.969	146.013	10584.54	1583.92	-1313.33	885.41	0.00	
12022.00†	89.969	146.013	10584.60	1683.92	-1396.25	941.31	0.00	
12122.00†	89.969	146.013	10584.65	1783.92	-1479.17	997.21	0.00	
12222.00†	89.969	146.013	10584.71	1883.92	-1562.08	1053.11	0.00	
12322.00†	89.969	146.013	10584.76	1983.92	-1645.00	1109.01	0.00	
12422.00†	89.969	146.013	10584.82	2083.92	-1727.92	1164.91	0.00	
12522.00†	89.969	146.013	10584.87	2183.92	-1810.83	1220.81	0.00	
12622.00†	89.969	146.013	10584.92	2283.92	-1893.75	1276.71	0.00	
12722.00†	89.969	146.013	10584.98	2383.92	-1976.67	1332.61	0.00	
12822.00†	89.969	146.013	10585.03	2483.92	-2059.58	1388.51	0.00	
12922.00†	89.969	146.013	10585.09	2583.92	-2142.50	1444.41	0.00	
13022.00†	89.969	146.013	10585.14	2683.92	-2225.42	1500.31	0.00	
13122.00†	89.969	146.013	10585.19	2783.92	-2308.33	1556.21	0.00	
13222.00†	89.969	146.013	10585.25	2883.92	-2391.25	1612.11	0.00	
13322.00†	89.969	146.013	10585.30	2983.92	-2474.17	1668.01	0.00	
13422.00†	89.969	146.013	10585.36	3083.92	-2557.08	1723.91	0.00	
13522.00†	89.969	146.013	10585.41	3183.92	-2640.00	1779.81	0.00	
13622.00†	89.969	146.013	10585.46	3283.92	-2722.92	1835.71	0.00	
13722.00†	89.969	146.013	10585.52	3383.92	-2805.83	1891.61	0.00	
13822.00†	89.969	146.013	10585.57	3483.92	-2888.75	1947.51	0.00	
13922.00†	89.969	146.013	10585.63	3583.92	-2971.67	2003.41	0.00	
14022.00†	89.969	146.013	10585.68	3683.92	-3054.58	2059.31	0.00	
14122.00†	89.969	146.013	10585.74	3783.92	-3137.50	2115.21	0.00	
14222.00†	89.969	146.013	10585.79	3883.92	-3220.42	2171.11	0.00	
14322.00†	89.969	146.013	10585.84	3983.92	-3303.33	2227.01	0.00	
14422.00†	89.969	146.013	10585.90	4083.92	-3386.25	2282.91	0.00	
14522.00†	89.969	146.013	10585.95	4183.92	-3469.17	2338.81	0.00	
14622.00†	89.969	146.013	10586.01	4283.92	-3552.08	2394.71	0.00	



# Planned Wellpath Report

ATLANTA FEDERAL 6-6H (REV-C.0) PWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 6-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 6-6H PWB
Facility	SEC.06-T153N-R101W		

## WELLPATH DATA (224 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
14722.00†	89.969	146.013	10586.06	4383.92	-3635.00	2450.62	0.00	
14822.00†	89.969	146.013	10586.11	4483.92	-3717.92	2506.52	0.00	
14922.00†	89.969	146.013	10586.17	4583.92	-3800.83	2562.42	0.00	
15022.00†	89.969	146.013	10586.22	4683.92	-3883.75	2618.32	0.00	
15122.00†	89.969	146.013	10586.28	4783.92	-3966.67	2674.22	0.00	
15222.00†	89.969	146.013	10586.33	4883.92	-4049.58	2730.12	0.00	
15322.00†	89.969	146.013	10586.38	4983.92	-4132.50	2786.02	0.00	
15422.00†	89.969	146.013	10586.44	5083.92	-4215.42	2841.92	0.00	
15522.00†	89.969	146.013	10586.49	5183.92	-4298.33	2897.82	0.00	
15622.00†	89.969	146.013	10586.55	5283.92	-4381.25	2953.72	0.00	
15722.00†	89.969	146.013	10586.60	5383.92	-4464.17	3009.62	0.00	
15822.00†	89.969	146.013	10586.66	5483.92	-4547.08	3065.52	0.00	
15922.00†	89.969	146.013	10586.71	5583.92	-4630.00	3121.42	0.00	
16022.00†	89.969	146.013	10586.76	5683.92	-4712.92	3177.32	0.00	
16122.00†	89.969	146.013	10586.82	5783.92	-4795.83	3233.22	0.00	
16222.00†	89.969	146.013	10586.87	5883.92	-4878.75	3289.12	0.00	
16322.00†	89.969	146.013	10586.93	5983.92	-4961.67	3345.02	0.00	
16422.00†	89.969	146.013	10586.98	6083.92	-5044.58	3400.92	0.00	
16522.00†	89.969	146.013	10587.03	6183.92	-5127.50	3456.82	0.00	
16622.00†	89.969	146.013	10587.09	6283.92	-5210.42	3512.72	0.00	
16722.00†	89.969	146.013	10587.14	6383.92	-5293.33	3568.62	0.00	
16822.00†	89.969	146.013	10587.20	6483.92	-5376.25	3624.52	0.00	
16922.00†	89.969	146.013	10587.25	6583.92	-5459.17	3680.42	0.00	
17022.00†	89.969	146.013	10587.30	6683.92	-5542.08	3736.32	0.00	
17122.00†	89.969	146.013	10587.36	6783.92	-5625.00	3792.22	0.00	
17222.00†	89.969	146.013	10587.41	6883.92	-5707.92	3848.12	0.00	
17322.00†	89.969	146.013	10587.47	6983.92	-5790.83	3904.02	0.00	
17422.00†	89.969	146.013	10587.52	7083.92	-5873.75	3959.92	0.00	
17522.00†	89.969	146.013	10587.57	7183.92	-5956.67	4015.82	0.00	
17622.00†	89.969	146.013	10587.63	7283.92	-6039.58	4071.72	0.00	



# Planned Wellpath Report

ATLANTA FEDERAL 6-6H (REV-C.0) PWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 6-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 6-6H PWB
Facility	SEC.06-T153N-R101W		

## WELLPATH DATA (224 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
17722.00†	89.969	146.013	10587.68	7383.92	-6122.50	4127.62	0.00	
17822.00†	89.969	146.013	10587.74	7483.92	-6205.42	4183.52	0.00	
17922.00†	89.969	146.013	10587.79	7583.92	-6288.33	4239.42	0.00	
18022.00†	89.969	146.013	10587.85	7683.92	-6371.25	4295.32	0.00	
18122.00†	89.969	146.013	10587.90	7783.92	-6454.17	4351.22	0.00	
18222.00†	89.969	146.013	10587.95	7883.92	-6537.08	4407.12	0.00	
18322.00†	89.969	146.013	10588.01	7983.92	-6620.00	4463.02	0.00	
18422.00†	89.969	146.013	10588.06	8083.92	-6702.92	4518.92	0.00	
18522.00†	89.969	146.013	10588.12	8183.92	-6785.83	4574.82	0.00	
18622.00†	89.969	146.013	10588.17	8283.92	-6868.75	4630.72	0.00	
18722.00†	89.969	146.013	10588.22	8383.92	-6951.67	4686.62	0.00	
18822.00†	89.969	146.013	10588.28	8483.92	-7034.58	4742.52	0.00	
18922.00†	89.969	146.013	10588.33	8583.92	-7117.50	4798.42	0.00	
19022.00†	89.969	146.013	10588.39	8683.92	-7200.42	4854.32	0.00	
19122.00†	89.969	146.013	10588.44	8783.92	-7283.33	4910.22	0.00	
19222.00†	89.969	146.013	10588.49	8883.92	-7366.25	4966.12	0.00	
19322.00†	89.969	146.013	10588.55	8983.92	-7449.17	5022.02	0.00	
19422.00†	89.969	146.013	10588.60	9083.92	-7532.08	5077.92	0.00	
19522.00†	89.969	146.013	10588.66	9183.92	-7615.00	5133.82	0.00	
19622.00†	89.969	146.013	10588.71	9283.92	-7697.92	5189.72	0.00	
19722.00†	89.969	146.013	10588.77	9383.92	-7780.83	5245.62	0.00	
19822.00†	89.969	146.013	10588.82	9483.92	-7863.75	5301.52	0.00	
19922.00†	89.969	146.013	10588.87	9583.92	-7946.67	5357.42	0.00	
20022.00†	89.969	146.013	10588.93	9683.92	-8029.58	5413.32	0.00	
20122.00†	89.969	146.013	10588.98	9783.92	-8112.50	5469.22	0.00	
20222.00†	89.969	146.013	10589.04	9883.92	-8195.42	5525.12	0.00	
20322.00†	89.969	146.013	10589.09	9983.92	-8278.33	5581.02	0.00	
20422.00†	89.969	146.013	10589.14	10083.92	-8361.25	5636.92	0.00	
20522.00†	89.969	146.013	10589.20	10183.92	-8444.17	5692.82	0.00	
20622.00†	89.969	146.013	10589.25	10283.92	-8527.08	5748.72	0.00	



# Planned Wellpath Report

ATLANTA FEDERAL 6-6H (REV-C.0) PWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 6-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 6-6H PWB
Facility	SEC.06-T153N-R101W		

## WELLPATH DATA (224 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
20722.00†	89.969	146.013	10589.31	10383.92	-8610.00	5804.62	0.00	
20822.00†	89.969	146.013	10589.36	10483.92	-8692.92	5860.52	0.00	
20922.00†	89.969	146.013	10589.41	10583.92	-8775.83	5916.42	0.00	
21022.00†	89.969	146.013	10589.47	10683.92	-8858.75	5972.32	0.00	
21122.00†	89.969	146.013	10589.52	10783.92	-8941.67	6028.22	0.00	
21222.00†	89.969	146.013	10589.58	10883.92	-9024.58	6084.12	0.00	
21322.00†	89.969	146.013	10589.63	10983.92	-9107.50	6140.02	0.00	
21422.00†	89.969	146.013	10589.69	11083.92	-9190.42	6195.92	0.00	
21522.00†	89.969	146.013	10589.74	11183.92	-9273.33	6251.82	0.00	
21622.00†	89.969	146.013	10589.79	11283.92	-9356.25	6307.72	0.00	
21722.00†	89.969	146.013	10589.85	11383.92	-9439.17	6363.62	0.00	
21822.00†	89.969	146.013	10589.90	11483.92	-9522.08	6419.52	0.00	
21922.00†	89.969	146.013	10589.96	11583.92	-9605.00	6475.42	0.00	
22003.89	89.969	146.013	10590.00 <sup>1</sup>	11665.81	-9672.90	6521.20	0.00	End of Tangent

## HOLE & CASING SECTIONS - Ref Wellbore: ATLANTA FEDERAL 6-6H PWB      Ref Wellpath: ATLANTA FEDERAL 6-6H (REV-C.0) PWP

String/Diameter	Start MD [ft]	End MD [ft]	Interval [ft]	Start TVD [ft]	End TVD [ft]	Start N/S [ft]	Start E/W [ft]	End N/S [ft]	End E/W [ft]
7in Casing Intermediate	22.00	10910.73	10888.73	22.00	10584.00	0.00	0.00	-474.82	320.11



# Planned Wellpath Report

ATLANTA FEDERAL 6-6H (REV-C.0) PWP

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 6-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 6-6H PWB
Facility	SEC.06-T153N-R101W		

## TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
ATLANTA FEDERAL 6-6H SECTION 06		0.00	0.00	0.00	1179644.86	421202.05	48°06'33.661"N	103°43'47.971"W	polygon
ATLANTA FEDERAL 6-6H SECTION 08		0.00	0.00	0.00	1179644.86	421202.05	48°06'33.661"N	103°43'47.971"W	polygon
ATLANTA FEDERAL 6-6H SECTION LINES		0.00	0.00	0.00	1179644.86	421202.05	48°06'33.661"N	103°43'47.971"W	polygon
ATLANTA 6-6H BHL ON PLAT REV-1 (200'FSL & 2195'FWL,SEC.08)		10576.00	-9865.04	6595.00	1185819.94	411069.79	48°04'56.298"N	103°42'10.845"W	point
ATLANTA FEDERAL 6-6H HARDLINES (500'N/W & 200'S/E)		10590.00	0.00	0.00	1179644.86	421202.05	48°06'33.661"N	103°43'47.971"W	polygon
1) ATLANTA FEDERAL 6-6H BHL ON PLAT REV-2 (200'FSL & 2195'FWL,SEC.08)	22003.89	10590.00	-9672.90	6521.20	1185754.27	411264.84	48°04'58.195"N	103°42'11.930"W	point

## SURVEY PROGRAM - Ref Wellbore: ATLANTA FEDERAL 6-6H PWB    Ref Wellpath: ATLANTA FEDERAL 6-6H (REV-C.0) PWP

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
22.00	23000.00	NaviTrak (Standard)		ATLANTA FEDERAL 6-6H PWB



**Planned Wellpath Report**  
**ATLANTA FEDERAL 6-6H (REV-C.0) PWP**  
 Page 11 of 11



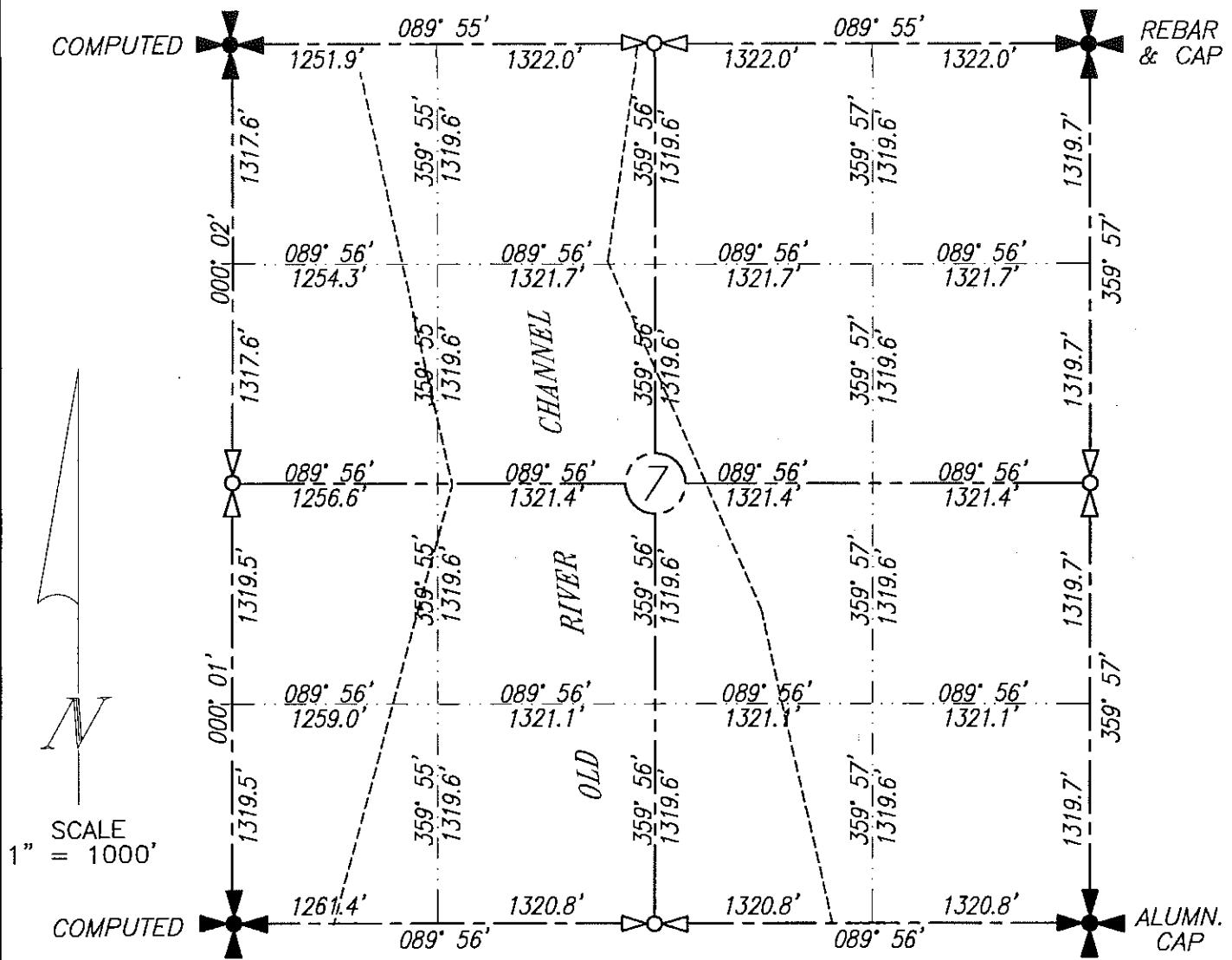
**REFERENCE WELLPATH IDENTIFICATION**

Operator	CONTINENTAL RESOURCES	Slot	SLOT#06 ATLANTA FEDERAL 6-6H(495'FNL & 880'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 6-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 6-6H PWB
Facility	SEC.06-T153N-R101W		

**DESIGN COMMENTS**

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Comment
22.00	0.000	146.013	22.00	Tie On
10011.04	0.000	146.013	10011.04	End of Tangent
10910.73	89.969	146.013	10584.00	End of Build
22003.89	89.969	146.013	10590.00	End of Tangent

HORIZONTAL SECTION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 6-6H FEDERAL  
SECTION 7, T153N, R101W  
MCKENZIE COUNTY, NORTH DAKOTA



*MOST OF THE SECTION IS LOTTED DUE TO THE MISSOURI RIVER.*

ALL CORNERS SHOWN ON THIS PLAT WERE FOUND IN THE FIELD  
DISTANCES TO ALL OTHERS ARE CALCULATED.  
ALL BEARINGS SHOWN ARE ASSUMED.

I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS  
WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE  
CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF  
MY KNOWLEDGE AND BELIEF

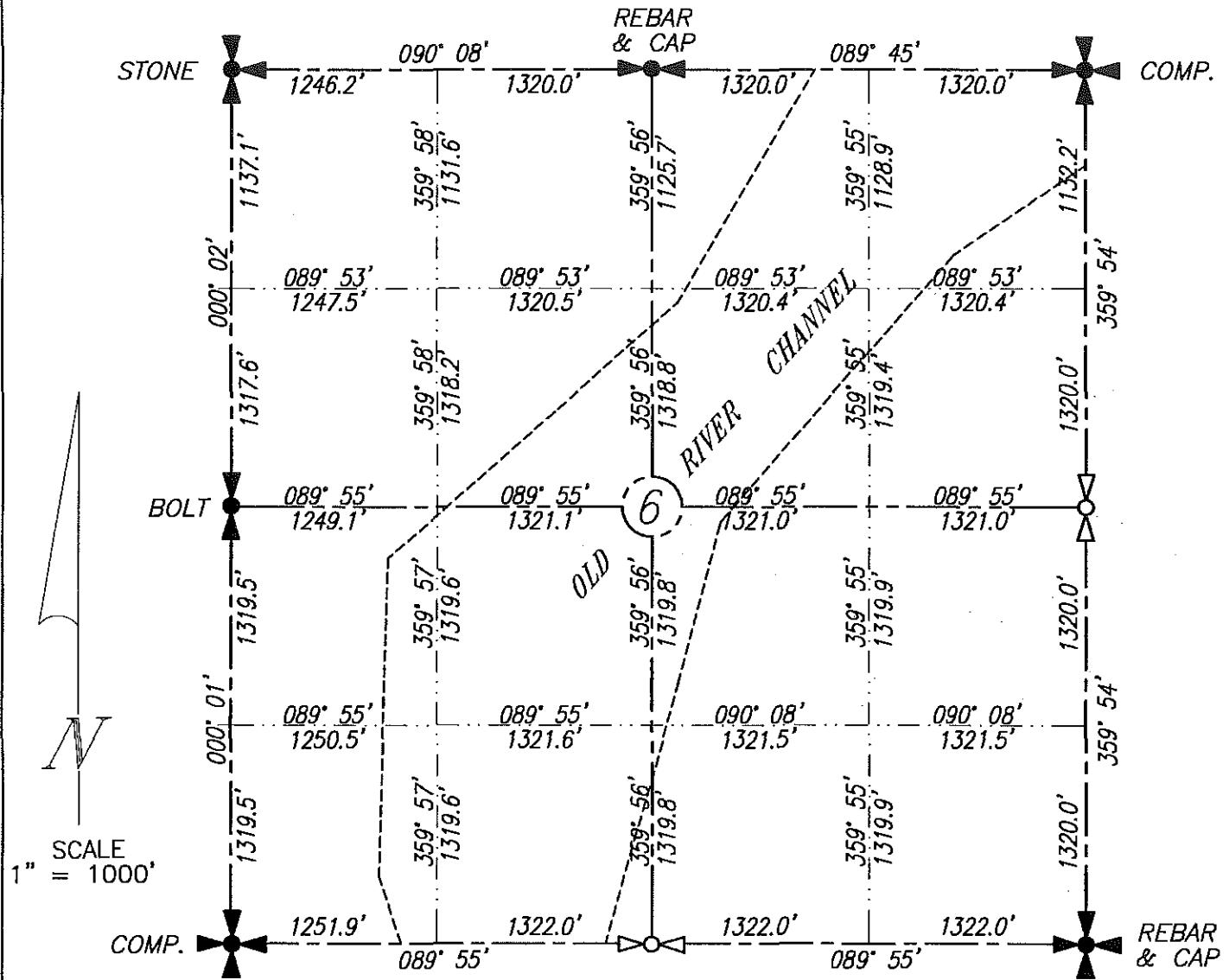
~~JOHN PAULSON R.D.S.~~ 3366

BROSZ ENGINEERING, INC.

BOX 357  
BOWMAN, N.D. 58623  
PHONE: 701-523-3340  
FAX: 701-523-5243

PROJECT NO. 12-10

HORIZONTAL SECTION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 6-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA  
MCKENZIE COUNTY, NORTH DAKOTA



*MOST OF THE SECTION IS LOTTED DUE TO THE MISSOURI RIVER.*

ALL CORNERS SHOWN ON THIS PLAT WERE FOUND IN THE FIELD  
DISTANCES TO ALL OTHERS ARE CALCULATED.  
MATERIAL BEARINGS SHOWN ARE ASSUMED.

I CERTIFY THAT THE REGISTERED WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

JOHN PAULSON R.L.S. 3366

~~JOHN PAULSON R.L.S. 3366~~

**BROSZ ENGINEERING, INC.**

BOX 357

BOWMAN, N.D. 58623

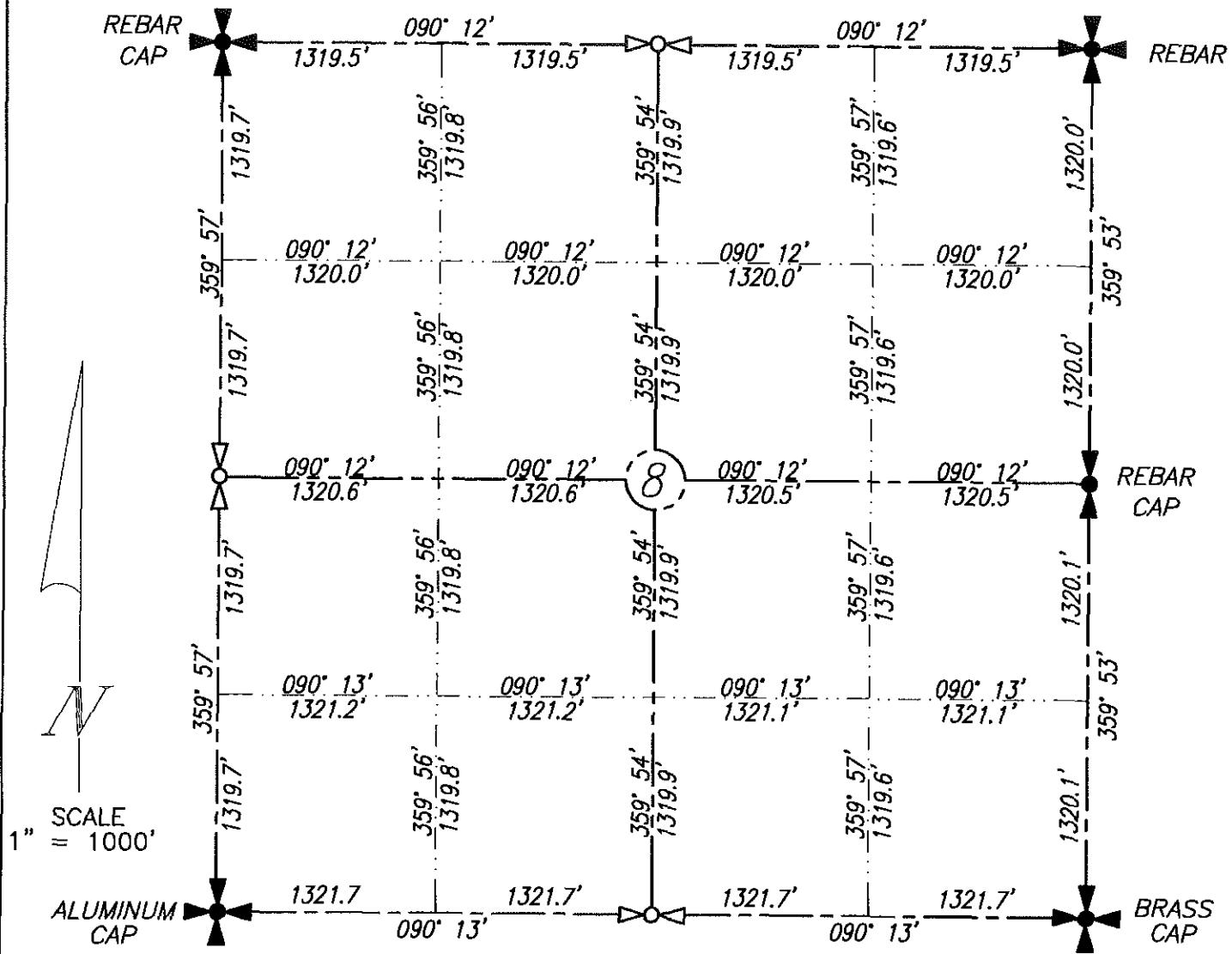
PHONE: 701-523-3340

FAX: 701-523-5243

PROJECT NO. 12-10

HORIZONTAL SECTION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 6-6H FEDERAL  
SECTION 8, T153N, R101W  
MCKENZIE COUNTY, NORTH DAKOTA

REVISED: 5-2-2012



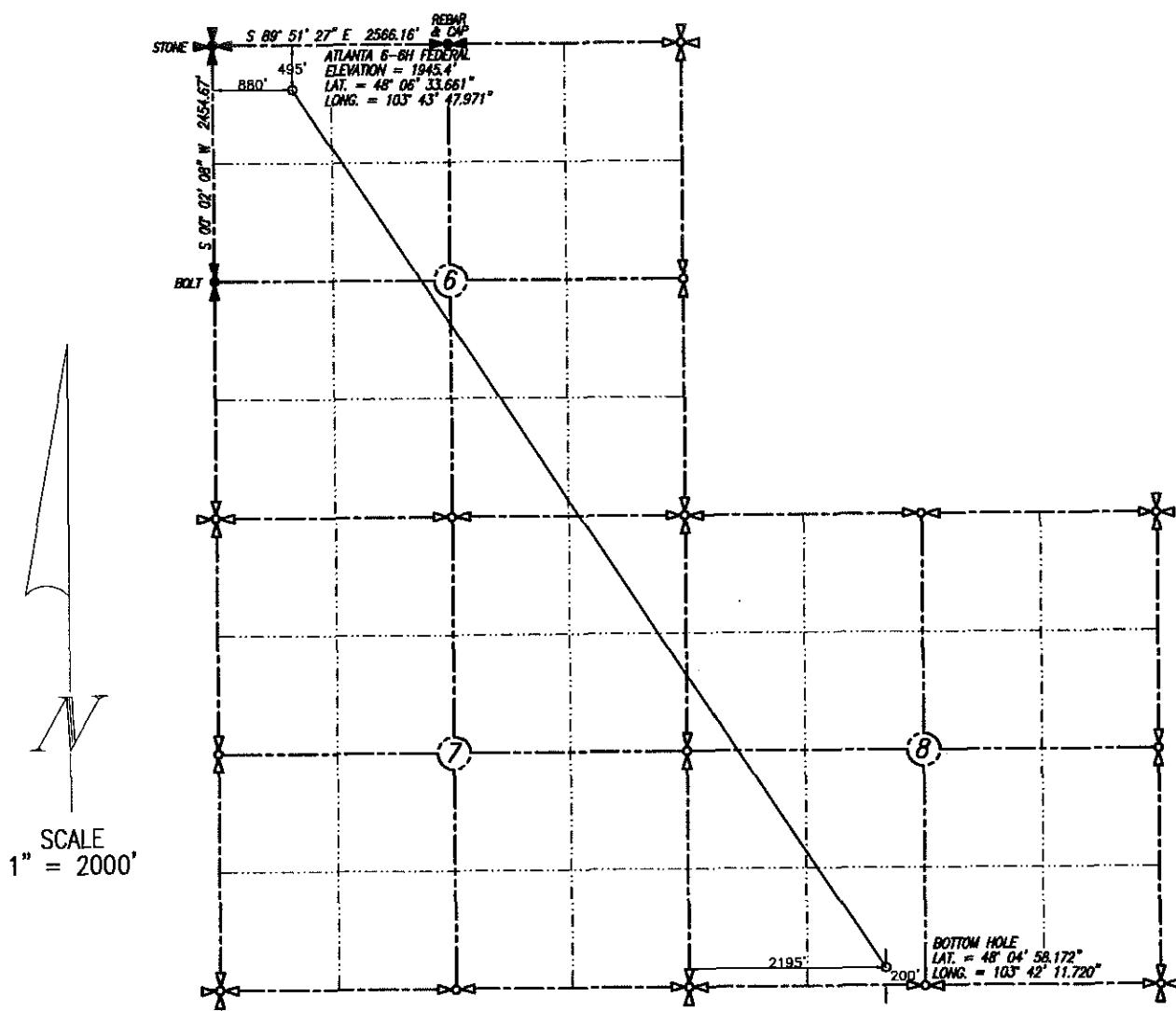
~~ALL CORNERS SHOWN ON THIS PLAT WERE FOUND IN THE FIELD  
DISTANCES TO ALL OTHERS ARE CALCULATED.  
ALL BEARINGS SHOWN ARE ASSUMED.~~

I CERTIFY REGISTERED PLAT CORRECTLY REPRESENTS  
WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE  
CHARGE AND IS TRUE AND CORRECT TO THE BEST OF  
MY KNOWLEDGE AND BELIEF

*John Paulson* JOHN PAULSON R.I.S. 3366  
B-12

**BROSZ ENGINEERING INC.**  
BOX 357  
BOWMAN, N.D. 58623  
PHONE: 701-523-3340  
FAX: 701-523-5243  
PROJECT NO. 12-10

BOTTOM HOLE LOCATION PLAT  
 CONTINENTAL RESOURCES INC.  
 ATLANTA 6-6H FEDERAL  
 SECTION 6, T153N, R101W  
 WILLIAMS COUNTY, NORTH DAKOTA  
 495' FNL & 880' FWL



I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS  
 WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE  
 CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF  
 MY KNOWLEDGE AND BELIEF

*John Paulson*  
 JOHN PAULSON R.L.S./3366

4-23-12

REGISTERED  
 LAND  
 SURVEYOR  
 L.S. 3366

NORTH DAKOTA

DATE STAKED: 2-9-2012

BASIS OF VERTICAL DATUM:  
 NAVD 1988 GEODETIC

PERSON AUTHORIZING SURVEY;  
CHAD NEWBY

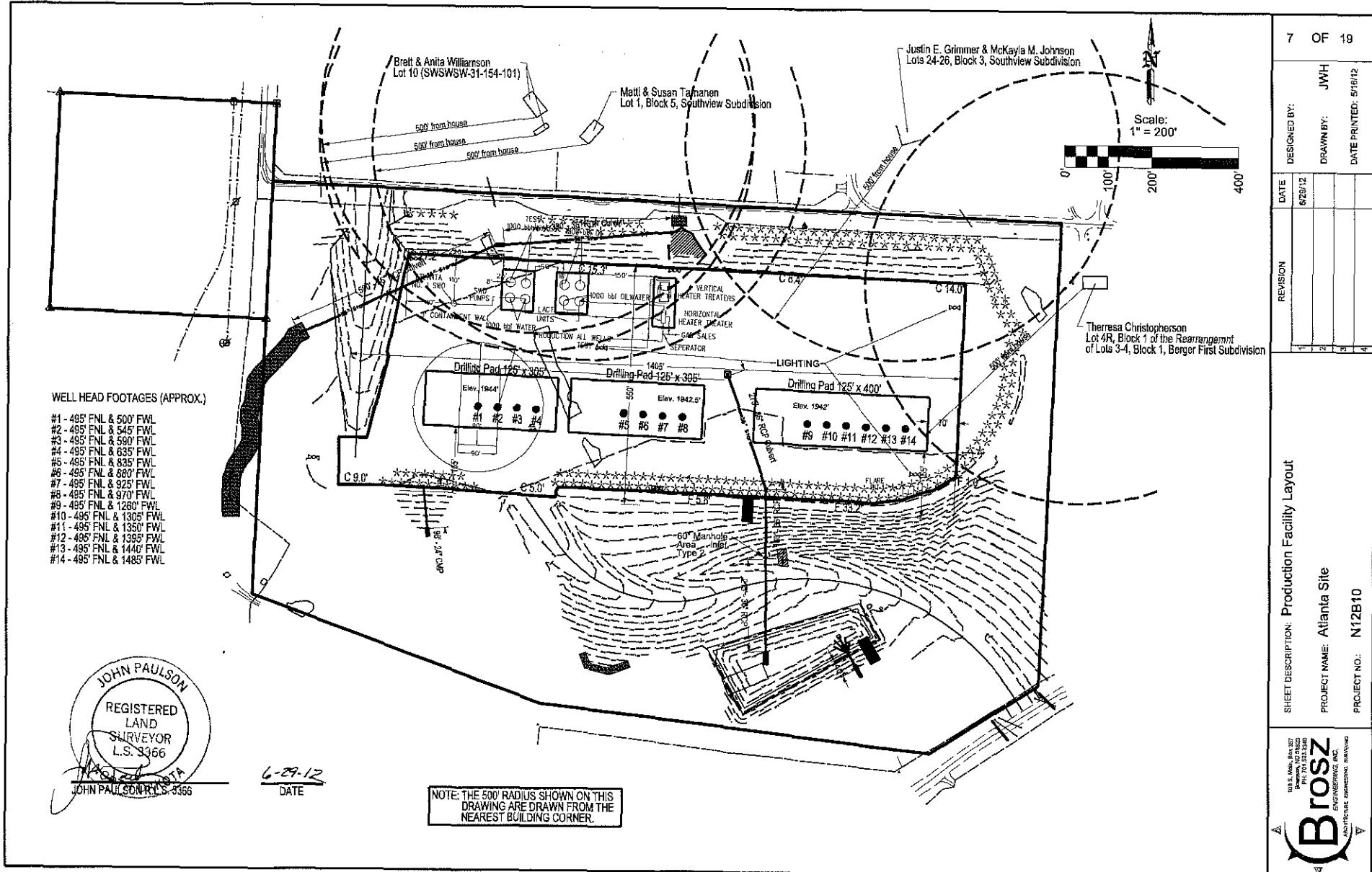
EXPLANATION AREA: NAD83(CORS96)

BASIS OF BEARING: TRUE NORTH

**BROSZ ENGINEERING INC.**

BOX 357  
 BOWMAN, N.D. 58623  
 PHONE: 701-523-3340  
 FAX: 701-523-5243

PROJECT NO. 12-10



## Spill Toolkit Inventory

(To be Checked After Each Use)

Supplies	Quantity	Actual	Supplies	Quantity	Actual
<b>Personal Protection</b>			<b>Miscellaneous</b>		
Trauma/1st Aid Kit	1		EnviroClean (5-gal units of concentrate)	2	
Eye Wash	1		Duct Tape (Case)	3	
Hand Cleaner	2		Flashlights	6	
Nitrile Gloves (L & XL Case)	2		Flood Lights	2	
FRC Rain Coat - Extra Large	3		Extension Cord 50' 12-gauge	5	
FRC Rain Coat - Large	3		55-gal. Drums w/lids	2	
Rubber Safety Toed Boots - Size 10	2		Large Trash Cans	2	
Rubber Safety Toed Boots - Size 11	2		HD Drum Liners - boxes	2	
Rubber Safety Toed Boots - Size 12	2		Hoses - Kit (Blue & Green)	5	
FRC Tyvex Suits - Case XL	1		Plastic Buckets	5	
Neoprene Chest Waders - L	1		Propane Cylinders - 20-lb.	2	
Neoprene Chest Waders - L	1		Propane Weed Burner W/Hose	1	
<b>Containment</b>			Pump - Trash	2	
Absorbent (sphag)	10		Pump - 115V Water Transfer	2	
Absorbent Boom 3" x 10'	2		Gas Powered Generator (3-5K Watt)	1	
Absorbent Boom 5" x 10'	10		Misc. Ratchet Straps	6	
Absorbent Boom 8" x 10'	8		Rope 1/2" x 100'	2	
Containment Boom - Fast Water	3		Rope 1/4" x 50'	4	
Absorbent Pads (Hydrocarbon)	10		Rope 3/8" x 100'	2	
Absorbent Pads (Universal)	5		Shop Towels - box	2	
Absorbent Pillows 18" x 18" box	3		Caulking Gun	2	
Absorbent Pom Pom Cube	7		Silicon Tubes	10	
Absorbent Sweep - 16" x 100' - Bag	5		Metal Stakes/Spikes	8	
<b>Miscellaneous</b>			Metal T-Posts	6	
Antifreeze	2		Bungee Cords	3	
Push Broom	2		Wire - 25' roll - smooth	1	
Shovels	2		Fire Extinguisher	1	
Rake	5		Equipment Hooks	6	
Squeegees	2		Shelving	4	
Scoop	2		Drawers	1	
Spark Resistant Scoop	1		Misc. Building Supplies	1	

## **Tabor, David**

---

**From:** Becky Barnes <Becky.Barnes@clr.com>  
**Sent:** Wednesday, June 06, 2012 1:46 PM  
**To:** Tabor, David  
**Subject:** Atlanta Pad Wells

All cuttings for the Atlanta Pad wells will be hauled to the Tioga Prairie disposal.

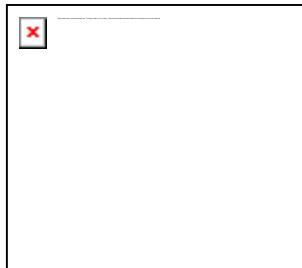
Prairie Disposal for Cuttings  
102C10 52<sup>nd</sup> St NW  
Tioga ND 58852

Let me know if there is anything else that you need.

Thanks.

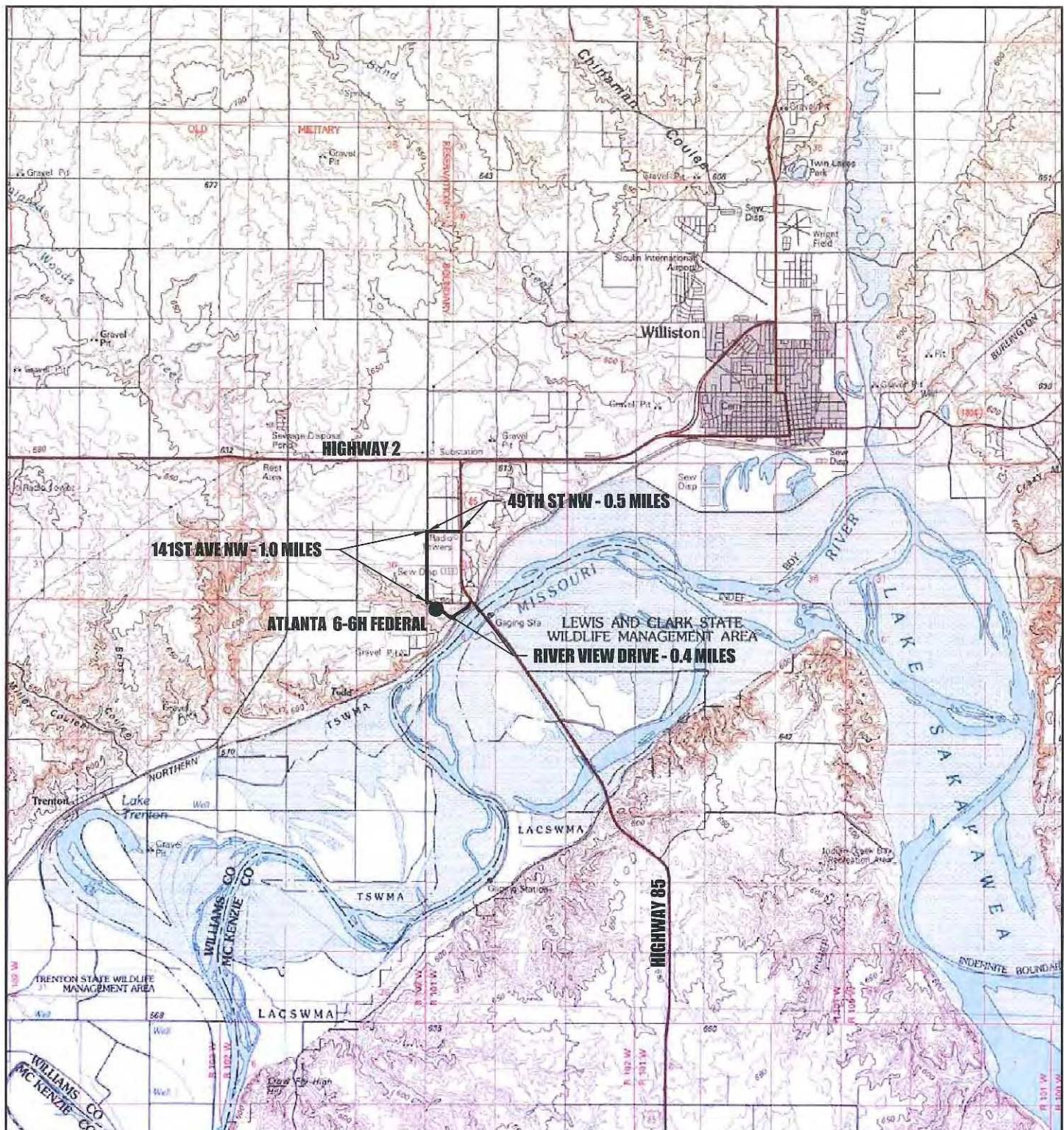
Bb

*Becky Barnes*  
Regulatory Compliance Specialist  
Continental Resources, Inc.  
Office 405-234-9161  
Fax 580-548-5293



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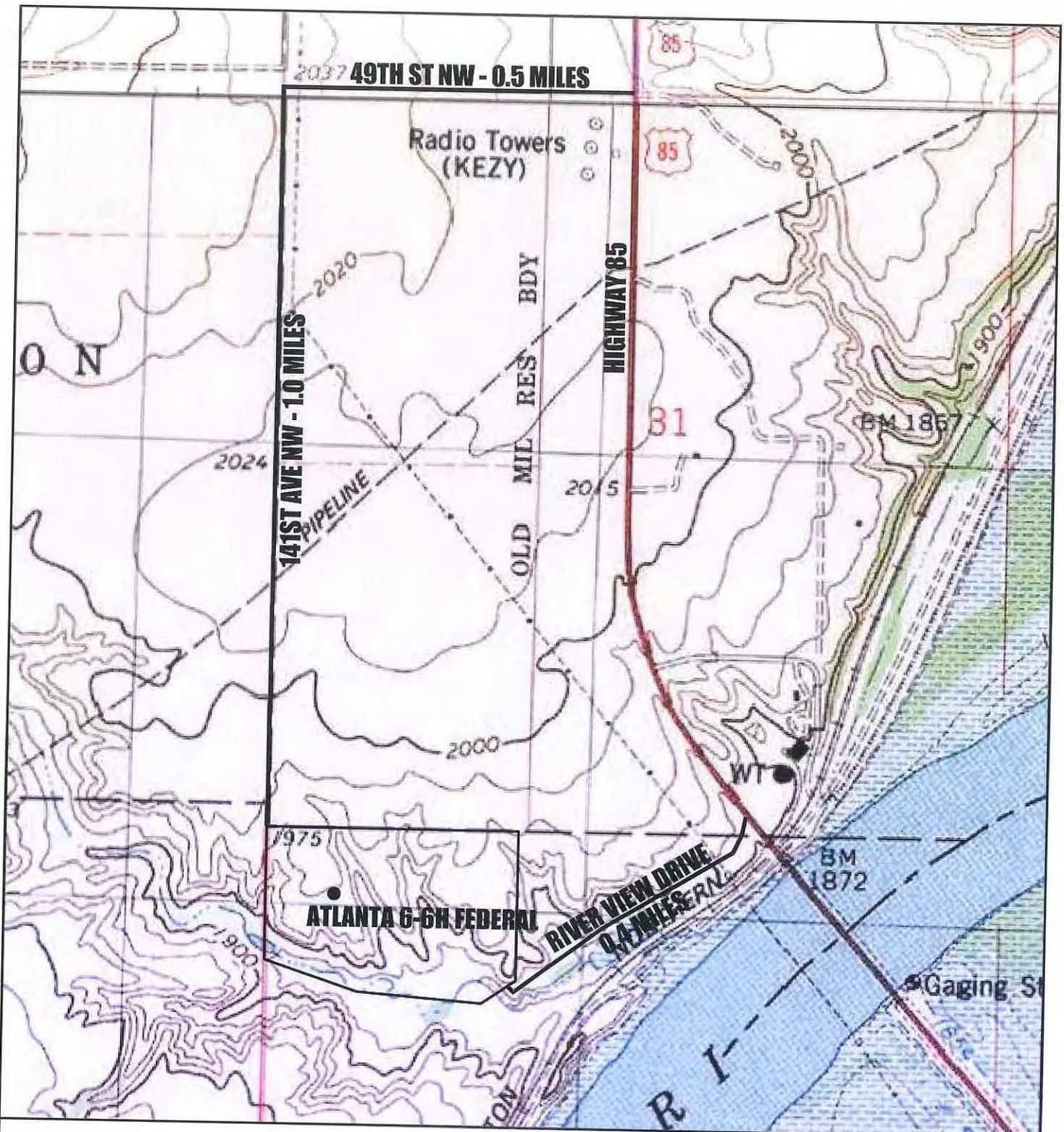
**NOTICE:** This message contains confidential information and is intended for the individual named. If you are not the named addressee, you should not disseminate, distribute or copy this e-mail. Please notify the sender immediately by reply e-mail if you have received this e-mail by mistake and delete this e-mail from your system. E-mail transmission cannot be guaranteed to be secure or error-free as information could be intercepted, corrupted, lost, destroyed, arrive late or incomplete, or contain viruses. The sender therefore does not accept liability for any errors or omissions in the contents of this message which arise as a result of e-mail transmission.



**CONTINENTAL RESOURCES INC.**

**EXHIBIT 1**  
**VICINITY MAP**  
**PROPOSED ACCESS ROUTE**

**ATLANTA 6-6H FEDERAL  
 SECTION 6, T153N, R101W  
 WILLIAMS COUNTY, NORTH DAKOTA**



CONTINENTAL RESOURCES INC.

EXHIBIT 2  
QUAD ACCESS

ATLANTA 6-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA

CYCLONE DRILLING, INC. RIG NO. 20  
CONTINGENCY PLAN  
FOR DRILLING ACTIVITIES CONDUCTED AT THE  
CONTINENTAL RESOURCES, INC. ATLANTA 1-6H  
6-153N-101W, WILLIAMS COUNTY, NORTH DAKOTA

---

#### **8. PLAN AMENDMENT**

In the event that a reportable spill or flooding occurs, Cyclone personnel will review the event to determine if an amendment to this Plan is necessary. In addition, Cyclone personnel will amend the Plan whenever there is a modification in the facility design, construction, storage capacity, operation, or maintenance that renders the existing Plan inadequate.

#### **9. MANAGEMENT APPROVAL**

This Contingency Plan has been prepared for operation of Cyclone Drilling, Inc.'s Rig No. 20 to be reviewed prior to beginning operations at the Continental Resources, Inc. Atlanta 1-6 lease. The Plan will be implemented as herein described.

*Ryan M*  

---

*(Signature)*

*Ryan Nelson*      *Drilling Engineer*  

---

*(Name and Title - Please Print)*

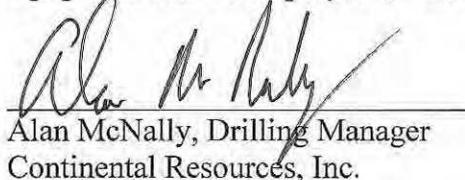
Continental Resources, Inc. (CRI) respectfully submits the following information concerning the drilling of the Atlanta 1 through 14-H, NWNW Sec. 6, T153N, R101W, Williams County, North Dakota.

The Atlanta site is located in an area with neighboring occupied dwellings located within 500 feet of the production equipment and is therefore subject to the provisions of:

NORTH DAKOTA ADMINISTRATIVE CODE § 43-02-03-28.

1. To illustrate more clearly the proximity of the occupied dwellings, the Atlanta Site Production Facility Layout, page 7 of 19 revised 6/29/12 of the plan set has been attached with this affidavit.
2. To comply with the provisions of NORTH DAKOTA ADMINISTRATIVE CODE § 43-02-03-28, waivers from the affected homeowners have been executed and are attached with this affidavit and illustrated on the attached.
  - a. Homeowners affected: Brett and Anita Williamson in Lot 10(SWSWSW-31-154-101).
  - b. Homeowners affected: Matti & Susan Tarnanen in Lot 1, Block 5, Southview Subdivision.
3. Shown on the Atlanta Site Production Facility Layout, page 7 of 19 revised 6/29/12, but not subject to the provisions of NORTH DAKOTA ADMINISTRATIVE CODE § 43-02-03-28 are the homes of:
  - a. Justin E. Grimmer & McKayla M. Johnson in Lots 24-26, Block 3, Southview Subdivision.
  - b. Therresa Christopherson in Lot 4R, Block 1 of the Rearrangement of Lots 3-4, Block 1, Berger First Subdivision.
    - i. Waivers from these homeowners have not been executed.

CRI believes adequate planning and precautions are being taken to limit the impact to the affected homeowners through enhanced drilling and completion techniques such as electric line fed drilling and supplying water pipelined to the site instead of trucking along with visual mitigation via landscaping and privacy fencing to be installed as part of the construction of the site. Fire suppression and other safety equipment will be employed on the site to ensure the safety of these homeowners and their property.



\_\_\_\_\_  
Alan McNally, Drilling Manager  
Continental Resources, Inc.

STATE OF OKLAHOMA )  
                          )ss:  
COUNTY OF GARFIELD )

On the 29th day of June 2012, before me, a Notary Public in and for said County and State, personally appeared Alan McNally, known to me to be the Drilling Manager of Continental Resources, Inc., the Corporation that executed the within instrument, and acknowledged to me that such Corporation executed the same.

Becky Barnes  
Notary Public

Garfield County, Oklahoma

My Commission Expires: 7/5/2015

Commission No.: 11006023



**AFFIDAVIT WAIVING PROVISIONS OF  
NORTH DAKOTA ADMINISTRATIVE CODE § 43-02-03-28**

STATE OF NORTH DAKOTA              )  
  )ss:  
COUNTY OF WILLIAMS              )

Brett M. Williamson and Anita J. Williamson, being duly sworn deposes and states as follows:

1. That we are the owners of two houses located on a parcel of land in SW¼SW¼SW¼ (Lot 10) MFD in Document #720523 containing 5.0 acres more or less in TWN 154 RNG 101 SEC 31 of the Williston Township.
2. That we are aware of the proposed location for Continental Resources, Inc.'s Atlanta multi well pad, which is less than 500 feet from the location of our houses which are located on the above parcel of land.
3. That Section 43-02-03-28 of the North Dakota Administrative Code provided in pertinent part "no well shall be drilled nor production equipment installed less than five hundred feet [152.40 meters] from an occupied dwelling unless agreed to in writing by the surface owner or authorized by order of the commission."
4. I hereby agree to the location of the Continental Resources, Inc.'s Atlanta multi well pad which is less than 500 feet from our houses. Further, I waive any rights that I might otherwise have to protest or contest such location.

Dated this 22<sup>nd</sup> day of June, 2012.

**Affiant:**

x Brett Williamson  
Brett M. Williamson

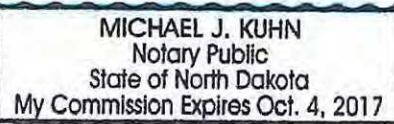
**Affiant:**

x Anita Williamson  
Anita J. Williamson

STATE OF NORTH DAKOTA              )  
  )ss:  
COUNTY OF WILLIAMS              )

The foregoing instrument was acknowledged before me this 22<sup>nd</sup> day of June, 2012, by  
Brett M. Williamson and Anita J. Williamson.

Michael J. Kuhn  
Notary Public  
My Commission Expires: OCT 4<sup>th</sup> - 2017



**AFFIDAVIT WAIVING PROVISIONS OF  
NORTH DAKOTA ADMINISTRATIVE CODE § 43-02-03-28**

STATE OF NORTH DAKOTA      )  
    )ss:  
COUNTY OF WILLIAMS      )

Matti K. Tarnanen and Susan V. Tarnanen, being duly sworn deposes and states as follows:

1. That we are the owners of the house located on a parcel of land in Lot 1 Block 5 of Southview Subdivision in TWN 154 RNG 101 SEC 31 of the Williston Township.
2. That we are aware of the proposed location for Continental Resources, Inc.'s Atlanta multi well pad, which is less than 500 feet from the location of our house which is located on the above parcel of land.
3. That Section 43-02-03-28 of the North Dakota Administrative Code provided in pertinent part "no well shall be drilled nor production equipment installed less than five hundred feet [152.40 meters] from an occupied dwelling unless agreed to in writing by the surface owner or authorized by order of the commission."
4. I hereby agree to the location of the Continental Resources, Inc.'s Atlanta multi well pad which is less than 500 feet from our house. Further, I waive any rights that I might otherwise have to protest or contest such location.

Dated this 20<sup>th</sup> day of June, 2012.

Affiant:

X Matti K. Tarnanen  
Matti K. Tarnanen

Affiant:

X Susan V. Tarnanen  
Susan V. Tarnanen

STATE OF NORTH DAKOTA      )  
    )ss:  
COUNTY OF WILLIAMS      )

The foregoing instrument was acknowledged before me this 20<sup>th</sup> day of June, 2012, by  
Matti K. Tarnanen and Susan V. Tarnanen.

  
Notary Public  
My Commission Expires: Jan 31, 2016





July 19, 2012

Industrial Commission of North Dakota  
Oil & Gas Division  
600 East Boulevard, Dept 405  
Bismarck, North Dakota 58505

Continental Resources, Inc. (CRI) respectfully submits the following information concerning the drilling of the Atlanta 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 -- 6H,

Township 153N, Range 101W of the 5<sup>th</sup> P.M.  
Section 6, N/2 NW/4 Williams County, North Dakota.

Continental Resources Inc. is currently conducting or planning to conduct the following work in the following manner in accordance with NDIC requirements:

- 1) Testing of water well(s)
  - a. The water well on the Atlanta property will be kept operable and has had baseline testing conducted including, hydrocarbon, salinity etc. These results will be kept on record and the well tested from time to time or as requested.
  - b. Currently, the environmental and operations teams are researching other wells in the area to sample.
- 2) CEMENT STABILIZATION:
  - a. Per NDIC requirement, samples will be taken for stabilized areas at pad grade and will be tested for current levels of: pH / EC / CEC / SAR / Soil Permeability.
  - b. These test results will be submitted before cement stabilization work begins and submitted via the appropriate NDIC Form 4 sundry
- 3) The contractor on the project is OE Construction - 16702 West 56<sup>th</sup> Drive Golden, CO 80403
  - a. Cement soil stabilization will be conducted in accordance NDIC requirements and project specifications stated on:  
Plan Page 3, of the construction plan set, section 4. B. Cement Application and Blending:  
Portland cement shall be added to the top 8 inches of the final subgrade at a rate of 5 percent by weight of material or as otherwise indicated in the basis of estimate. The specified manner that allows for uniform distribution of cement over the entire area. The contractor shall supply and use a computer controlled vane feeder to place the cement on the sub-grade prior to mixing. The vane feeder will spread the cement uniformly in the quantity specified. Dumping or blowing cement directly on the ground will not be accepted. The contractor shall apply the cement in a way that minimizes dust and is satisfactory to the Owner.
- 4) RECLAMATION PLAN for the stabilized portion of the drilling pad will be to rip and till the soil adding soil amendments as applicable to reach the original pH, permeability, and other test levels identified above.
- 5) REASON FOR CEMENT STABILIZATION: Cement stabilization will be conducted on this drilling pad to produce the most serviceable and least permeable surface possible so that water that falls on site will sheet directly to the planned site drainage system where it can be disposed of in a controlled fashion.

July 19, 2012

- 6) LINING OF THE SITE: Soil stabilization will be conducted in conjunction with permanently lining with a poly liner, the area around the wellheads, the trenches containing the flow lines from the well heads to the production equipment and the area under the production equipment itself inside the steel containment berms along with the detention pond. Under these systems, a minimum of 1ft. compacted clay liner of native and / or engineered fill material will be placed in 6" lifts maximum and density tested to 95% proctor per specifications provided in the Geotechnical Engineering Analysis for the project dated June 12, 2012 from American Technical Services.
- 7) As the land owner of the property in question, CRI is fully aware and approves of this system. This will also be identified on the sundry form 4 to be provided with the testing data listed above prior to beginning stabilization work.



Chad Newby, Operations Land Coordinator  
Continental Resources, Inc.

STATE OF OKLAHOMA )  
                          )ss:  
COUNTY OF GARFIELD )

On the 19<sup>th</sup> day of July 2012, before me, a Notary Public in and for said County and State, personally appeared Chad Newby, known to me to be the Operations Land Coordinator of Continental Resources, Inc., the Corporation that executed the within instrument, and acknowledged to me that such Corporation executed the same.

  
Notary Public

Garfield County, Oklahoma

My Commission Expires: 7/5/2015

Commission No.: 11006023



Sincerely,

CONTINENTAL RESOURCES, INC.

Becky Barnes  
Regulatory Compliance Specialist

**OILFIELD SAFETY INC  
A Total Safety Company**

**CONTINGENCY PLAN**

This Contingency Plan was written  
Specifically for:

**Continental Resources Inc.  
P.O. Box 1032  
Enid, Oklahoma 73702**

**SAFETY PROGRAM & EMERGENCY EVACUATION PLAN**

**Continental Resources Inc.  
Williams County, North Dakota**

**Oilfield Safety Inc.  
A Total Safety Company  
2523 2<sup>nd</sup> Street West  
Williston, ND 58801**

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THIS PLAN IS SUBJECT TO UPDATING

## **PURPOSE OF PROGRAM**

It is Continental Resources Inc. practice, to provide for the safety of its employees and contractor's employees at the job site, and to provide for the protection of the environment in accordance with applicable laws and regulations.

The primary purpose of this contingency plan is to guide location personnel in the responses expected of them in the event that hydrogen sulfide (H<sub>2</sub>S) is liberated during the drilling program.

Hydrogen Sulfide is extremely hazardous to normal oil field operations due to its capability (1) of destroying life at very low concentrations and (2) of causing instantaneous failure of high strength metals. Drilling and producing operations of hydrocarbons containing toxic gases can, however, be performed safely and without incident when the necessary precautions are taken and the outlined safety procedures are followed. It is imperative that sulfide resistant materials be used, that the proper safety equipment be used, that this equipment be properly maintained, and that all safety regulations be complied with.

The procedures outlined are for your safety and the safety of all others: therefore, it is mandatory that each individual give his one hundred percent cooperation.

## RESPONSIBILITIES AND DUTIES

### ALL PERSONNEL

1. It is the responsibility of all personnel on location to familiarize themselves with the safety procedures.
2. All personnel will attend to their personal safety first.
3. Help anyone who may be injured or overcome by toxic gases. The Drilling Foreman will assign someone to administer first aid to unconscious person (s).
4. Report to the designated "SAFE BRIEFING AREA" and follow the instructions of the Drilling Foreman.

### DRILLING FOREMAN

1. It is the responsibility of the Drilling Foreman to see that these safety and emergency procedures are observed by all personnel on location.
2. The Drilling Foreman will advise Oilfield Safety Inc. whenever the procedures as specified herein are complied with or cannot be followed.
3. The Drilling Foreman will notify the Safety Advisor at least two weeks before the safety equipment specified herein is needed.
4. The Drilling Foreman will keep the number of personnel on location to a minimum during hazardous operations.
5. The Drilling Foreman is responsible for designating the "SAFE BRIEFING AREA". This "SAFE BRIEFING AREA" will change depending upon wind direction and must be redesignated as soon as a wind change occurs.
6. If an unexpected emergency occurs or the H2S alarm sounds, the Drilling Foreman will assess the situation and will advise all personnel what condition exists.
7. When it is necessary to secure the location, the access road to location will be blocked; personnel from the rig crew will be used to guard same.

### **TEMPORARY SERVICE PERSONNEL**

All service personnel such as cementing crews, logging crews, specialists, mechanics, and welders will furnish their own safety equipment as required, to comply with OSHA and the DRILLING FOREMAN for CONTINENTAL RESOURCES INC.

### **VISITORS**

1. VISITORS will be restricted when Hydrogen Sulfide might be unless accompanied by the DRILLING FOREMAN for CONTINENTAL RESOURCES INC.
2. VISITORS and non-essential personnel will be prohibited from remaining in or entering contaminated areas where Hydrogen Sulfide concentration in the atmosphere exceeds 10 ppm.

**NOTE: WHEN HYDROGEN SULFIDE MIGHT BE ENCOUNTERED NO PERSONNEL ON LOCATION WILL BE PERMITTED TO SLEEP IN VEHICLES.**

DIRECTIONS TO: Atlanta 5-6H Federal

From Williston, ND head West on E Broadway toward 2<sup>nd</sup> Ave E; turn left onto Main St; Take the first right onto N Dakota 1804 W/2<sup>nd</sup> St W; continue to follow N Dakota 1804 W for 4.8 miles; Turn left onto US-85 S for 2 miles; Turn right onto 47<sup>th</sup> Ln NW; Turn right onto 48<sup>th</sup> St NW ; Continue onto 141<sup>st</sup> Ave NW and your destination will be ahead.

## THE DRILL SITE

The location as shown in Figure 2 is planned in order to obtain the maximum safety benefits consistent with the rig configuration, well depth, and prevailing winds.

1. Through the use of several maps, the area within a One mile radius of the location has been surveyed and contacts with all permanent residents have been made. Except in a dead calm and a tremendous release of high concentration gases, the probability of lethal dosages beyond one mile is extremely unlikely. Note on the rig layout plat, Figure 2, the direction of prevailing winds.
2. The location of houses, schools, roads, and anything where people may be present and who might need to be warned or evacuated in a crisis have been surveyed. This information with names and telephone numbers are keyed and listed on page 11 and Figure 3 for use if evacuation might be necessary should an emergency develop.
3. The drilling rig, see Figure 2, should be situated at such a location that prevailing winds blow across the rig toward the flare pit.
4. Two (2) SAFETY BRIEFING AREAS will be established not less than 200 feet from the wellhead and in locations so that at least one SAFE BRIEFING AREA will be up-wind of the well at all times.
5. Protective equipment will be stored in strategic locations around the wellsite and each of the SAFE BRIEFING AREAS. Such equipment will include Self Contained Breathing Apparatus (SCBA), First Aid Kits, Stretchers, and Hydrogen Sulfide Hand Operated Detectors. In the event of an emergency, personnel should assemble at the up-wind SAFE BRIEFING AREA for instructions from their supervisor.
6. Windsocks or streamers will be utilized to give wind directions at several elevations; i.e., tree top, derrick floor level, and 6 to 8 feet above ground level. PERSONNEL SHOULD DEVELOP THE PRACTICE OF ROUTINE OBSERVATION OF WIND DIRECTION.
7. Windbreakers and rig curtains can be removed from around the derrick floor and monkey board, if hazardous amounts of H<sub>2</sub>S encountered.
8. Explosion proof ventilating fans if required will be positioned to ensure adequate circulation at the derrick floor, cellar area and any other location where hydrogen sulfide is accumulating in excess of 10 PPM.
9. A kill line of ample strength and securely staked should be laid to the well head from a safe location to permit pumping into the well in an emergency.
10. When approaching a depth where Hydrogen Sulfide may be encountered, the MUD SHOULD BE MAINTAINED IN AN OVER BALANCED CONDITION TO restrict the Hydrogen Sulfide to be treated to that contained in the formation drilled.
11. When approaching a depth where Hydrogen Sulfide may be encountered, appropriate operational danger or caution sign(s) shall be displayed along all controlled accesses to the site.

12. When available 24-hour radio or telephone communication will be provided at the rig. Emergency telephone numbers will be prominently posted: SHERIFF'S DEPARTMENT, AMBULANCE, HOSPITALS, DOCTORS, AND OPERATORS' SUPERVISORY PERSONNEL.
13. Filter-type gas masks are not suitable for protection from Hydrogen Sulfide on drilling rigs. Pressure demand, SCBA'S will be provided for use in any Hydrogen Sulfide concentration. They are not physically exhausting to use, are rugged and dependable, and require little maintenance.
14. SCBA'S will be stored on racks and protected from the weather. Rig crew equipment will be located at readily accessible location on the rig floor. For hygienic reasons, SCBA'S are to be cleaned and sterilized at regular intervals. A six outlet air supply manifold will be installed on the rig floor for continuous use by crews and supervisory personnel working in a "Mask On" situation. The multi-bottle supply cylinders are to be located approximately 200 feet from the well. A minimum of 3,600 cu. ft. compressed breathing air will be on location at all times.
15. An alarm system which can be heard during operations and which can be activated from several points if gas is detected will be installed. When the alarm is sounded, personnel must assemble at the BRIEFING AREA designated SAFE. However, your company may have steps different from these, so pay heed to the requirements on your rig.
16. There will be No Smoking on rig floor or near wellhead. Designated Smoking Areas will be provided by your Supervisor.
17. Safety meetings and training sessions will be held at frequent intervals by the Safety Advisor, the Drilling Supervisor, or the Rig Supervisor. All persons required to work on location will be thoroughly familiar with the use, care and servicing of the following: Personal protective equipment such as respirators, and gas detection equipment.
18. All electric lighting, wiring and electrical devices within 100 feet of the well will be put in vapor-proof condition to minimize the possibility of explosion.
19. Blowout preventers should meet or exceed the recommendations for hydrogen sulfide service (API RP 53). Choke manifolds will be of similar materials.
20. Inspection of installation, operation, and testing of blowout preventers, choke manifolds, etc., dressed for Hydrogen Sulfide services, will be conducted regularly.
21. Every person involved in the operation will be informed of the characteristics of Hydrogen Sulfide and its dangers, safe procedures to use when it is encountered, and recommended first aid procedures. This will be done through frequent safety talks and training sessions.

NAMES AND DUTIES OF PERSONS WITH PRIME RESPONSIBILITIES

A. Continental Resources Inc.  
P.O. Box 1032  
Enid, Oklahoma 73702

B. OILFIELD SAFETY INC.  
2523 2nd Street West  
Williston, ND 58802

Terrie Turbiville  
District Manager  
Office: 701-774-3014  
Cell: 701-580-2912

EMERGENCY NOTIFICATION

LOCAL OFFICIALS AND MEDICAL

WILLISTON, NORTH DAKOTA

AMBULANCE .....	911
FIRE .....	911
NON-EMERGENCY .....	701-627-3903
POLICE .....	911
THREE AFFILIATED TRIBES .....	701-627-3244
MOUNTRAIL COUNTY SHERIF.....	701-628-2975
MOUNTRAIL COUNTY SHERIFF DISPATCH .....	911

WATFORD CITY, NORTH DAKOTA

AMBULANCE .....	911
FIRE .....	911
POLICE .....	911 OR 701-842-2400
McKenzie COUNTY SHERIFF DISPATCH .....	911

BUREAU OF LAND MANAGEMENT

OFFICE REPRESENTATIVE .....	DICKINSON, ND 701-225-9148
-----------------------------	-------------------------------

NORTH DAKOTA HIGHWAY EMERGENCY ASSISTANCE 1-800-472-2121

#### PHYSICAL AND CHEMICAL PROPERTIES

1. Extremely toxic (almost as toxic as Hydrogen Cyanide and 5 to 6 times toxic as Carbon Monoxide).
2. Colorless.
3. Offensive odor, often described as that of rotten eggs.
4. Heavier than air - specific gravity 1.189 (Air = 1.000 @ 60° F.). Vapors may travel considerable distance to a source of ignition and flash back.
5. Forms an explosive mixture with a concentration between 4.3 and 46 percent by volume with auto-ignition occurring at 500° F.
6. Burns with a blue flame and produces Sulfur Dioxide (SO<sub>2</sub>), which is less toxic than Hydrogen Sulfide but very irritating to eyes and lungs and causes serious injury.
7. Soluble in both water and liquid hydrocarbons.
8. Produces irritation to eyes, throat and respiratory system.
9. Threshold Limit Valve (TLV) - Maximum of eight hours exposure.
10. Corrosive to all electrochemical series metals.
11. Boiling Point (-79° F).
12. Melting Point (-177° F).

### PHYSICAL EFFECTS OF HYDROGEN SULFIDE POISONING

THE PRINCIPAL HAZARD IS DEATH BY INHALATION. When the amount of gas absorbed into the blood stream exceeds that which is readily oxidized, systemic poisoning results, with a general action on the nervous system. Labored respiration occurs shortly, and respiratory paralysis may follow immediately at concentrations of 700 ppm and above. This condition may be reached almost without warning as the originally detected odor of Hydrogen Sulfide may have disappeared due to olfactory paralysis. Death then occurs from asphyxiation unless the exposed person is removed immediately to fresh air and breathing stimulated by artificial respiration. Other levels of exposure may cause the following symptoms individually or in combinations:

- a. Headache
- b. Dizziness
- c. Excitement
- d. Nausea or gastro-intestinal disturbances
- e. Dryness and sensation of pain in nose, throat and chest
- f. Coughing
- g. Drowsiness

All personnel should be alerted to the fact that detection of Hydrogen Sulfide solely by smell is highly dangerous as the sense of smell is rapidly paralyzed by the gas.

### H2S TOXICITY TABLE

1 ppm	=	.0001% (1/10,000 of 1%)	Can smell
10 ppm	=	.001% (1/1000 of 1%)	Allowable for 8 hours' exposure. OVER THE ALLOWABLE CONCENTRATION, PROTECTIVE EQUIPMENT WILL BE NECESSARY.
100 ppm	=	.01% (1/100 of 1%)	Kills smell in 3 to 15 minutes. May burn eyes and throat.
200 ppm	=	.02% (2/100 of 1%)	Kills smell rapidly. Burns eyes and throat.
500 ppm	=	.05% (5/100 of 1%)	Loses sense of reasoning and balance. Respiratory disturbances in 2 to 15 minutes. Needs prompt artificial resuscitation.
700 ppm	=	.07% (7/100 of 1%)	Will become unconscious quickly. Breathing will stop and death result if not rescued promptly. Immediate artificial resuscitation.
1,000 ppm	=	.10% (1/10 of 1%)	Unconscious at once. PERMANENT BRAIN DAMAGE MAY RESULT UNLESS RESCUED PROMPTLY.

Ppm= Parts of gas per million parts of air by volume.

1%= 10,000 ppm

## RESUSCITATION CHART

### DID YOU KNOW?

THERE IS NO TIME TO WASTE  
WHEN BREATHING STOPS!

ARTIFICIAL RESUSCITATION MUST BE STARTED IMMEDIATELY!!!

After Breathing is stopped for:

1 Minute  
2 Minutes  
3 Minutes  
4 Minutes  
5 Minutes  
6 Minutes  
7 Minutes  
8 Minutes  
9 Minutes  
10 Minutes  
11 Minutes  
12 Minutes

The Chances for Life are:  
98 out of 100  
92 out of 100  
72 out of 100  
50 out of 100  
25 out of 100 \*  
11 out of 100 \*  
8 out of 100 \*  
5 out of 100 \*  
2 out of 100 \*  
1 out of 100 \*  
1 out of 1,000 \*  
1 out of 10,000 \*

\* Irreparable brain damage starts at about the fifth minute.

**COOL-HEADED ACTION IN RESCUE IS CRITICAL.**

## TREATMENT FOR HYDROGEN SULFIDE POISONING

### INHALATION

As Hydrogen Sulfide in the blood oxidizes rapidly, symptoms of acute poisoning pass off when inhalation of the gas ceases. It is important, therefore, to get the victim of poisoning to fresh air as quickly as possible. He should be kept at rest and chilling should be prevented. If respiration is slow, labored, or impaired, artificial respiration may be necessary. Most persons overcome by Hydrogen Sulfide may be revived if artificial respiration is applied before the heart action ceases. Victims of poisoning should be under the care of a physician as soon as possible. Irritation due to sub-acute poisoning may lead to serious complications such as pneumonia. Under those conditions, treatment by the physician necessarily would be symptomatic. The patient should be kept in fresh air, and hygienic conditions should be watched carefully.

### CONTACT WITH EYES

Eye contact with liquid and/or gas containing Hydrogen Sulfide will cause painful irritation (conjunctivitis). Keep patient in a darkened room, apply ice compresses to eyes, put ice on forehead, and send for a physician. Eye irritation caused by exposure to Hydrogen Sulfide requires treatment by a physician, preferably an eye specialist. The progress to recovery in these cases is usually good.

### CONTACT WITH SKIN

Skin absorption is very low. Skin discoloration is possible after contact with liquids containing Hydrogen Sulfide. If such skin contact is suspected, the area should be thoroughly washed.

### EFFECTS OF HYDROGEN SULFIDE ON METAL

Hydrogen Sulfide dissolves in water to form a weak acid that can cause some pitting, particularly in the presence of oxygen and/or carbon dioxide. However, the most significant action of H<sub>2</sub>S is its contribution to a form of hydrogen embrittlement known as sulfide stress cracking. Sulfide stress cracking is a result of metals being subjected to high stress levels in a corrosive environment where H<sub>2</sub>S is present. The metal will often fail catastrophically in a brittle manner. Sulfide stress cracking of steel is dependent upon and determined by:

- a. Strength (hardness) of the steel - the higher the strength, the greater the susceptibility to sulfide stress cracking. Steels having yield strengths up to 95,000 psi and hardness up to Rockwell C 22 are generally resistant to sulfide stress cracking. These limitations can be extended slightly higher for properly quenched and tempered materials.
- b. Total member stress (load) - the higher the stress level (load) the greater the susceptibility to sulfide stress cracking.
- c. Corrosive environment - corrosive reactions, acids, bacterial action, thermal degradation, or low PH fluid environment.

Use as protection against sulfide stresses cracking, all casing, BOP and safety equipment should be of H<sub>2</sub>S resistant material.

### CASING GRADES ACCEPTABLE FOR H2S SERVICE

CASING GRADE	H2S SERVICE	COMMENTS **	
H-40	YES		
K-55	YES		
C-75	YES		
N-80	CONDITIONAL	ABOVE	200° F
L-80	YES		
MN-80	YES		
C-90	YES		
C-95	YES		
S-95	NO	ABOVE	200° F
SOO-95	NO	ABOVE	200° F
S-105	NO	ABOVE	200° F
SOO-90	YES	ABOVE	200° F
P-110	NO	ABOVE	200° F
S-135	NO	ABOVE	200° F
V-150	NO	ABOVE	200° F

\* Service conditions for any H2S environment.

\*\* Denotes usable grades above 200° F.

### DRILL PIPE GRADES FOR H2S SERVICE

<u>GRADE</u>	<u>H2S SERVICE</u>
D	YES
E	YES
X-95	YES
G-105	NO
S-135	YES
ALUMINUM	YES

### DRILL STEM TEST

1. Drill Stem testing shall be done during daylight hours whenever practical. If it is necessary to work under artificial light, levels shall be sufficient to allow employees to conduct the test safely.
2. Ammine Corrosion Inhibitor should be used to coat inside of drill pipe prior to conducting Drill Stem Test in order to prevent Sulfide Stress Cracking.
3. If warranted, the use of Ammonia Hydroxide (26 Degree B'eaume Aqua Ammonia) for neutralizing Hydrogen Sulfide from tubing or drill pipe can be used.

## H2S SAFETY EQUIPMENT ON LOCATION

(PROVIDED BY SAFETY CONTRACTOR)

1. One safety trailer with a cascade system of cylinders of compressed GRADE D breathing air, complete with high pressure regulator.
2. Low pressure breathing air line (approximately 1,000 feet depending on the location). Equipped with quick connects.
3. Two low pressure manifold systems.
4. Eight pressure-demand type breathing apparatus (SCBA) 30 minute duration, NIOSH, and MSHA approved.
5. Eight airline breathing apparatus c/w 7 cu. ft. egress cylinders.
6. One four (4) channel fixed electronic monitoring system with sensors and alarms (explosion proof light and siren).
7. One hand operated portable pump type (with low and high range H2S detector tubes).
8. One first aid kit.
9. One stretcher (Ferro folding).
10. Three luminous wind socks with frames and extension poles. Windsocks must be placed so that they are visible by day and by night from all points on location.
11. One Flare Piston with 12 gauge meteor flares for igniting well.
12. One operating condition sign with flags at well entrance.  
Condition I - Normal Operating Conditions (green flag);  
Condition II - Potential to Moderate Danger to Life (yellow flag);  
Condition III - Moderate to Extreme Danger to Life (red flag).
13. One fire blanket.
14. One warning light.
15. One warning siren.

**H2S SAFETY EQUIPMENT ON LOCATION**

(PROVIDED BY THE SAFETY CONTRACTOR)

16. Two traffic cones.
17. Two compressed breathing air cylinders for briefing area number 2.
18. Briefing area stand
19. Briefing area number 2 sign.

NOTE: ADDITIONAL EQUIPMENT WILL BE ADDED IF WELL CONDITIONS REQUIRE OR UPON REQUEST

NOTE: Equipment for a maximum of sixteen (16) people on location.

Equipment will be rigged up and operational when drilling reaches a depth of 500 ft. above, or three days, whichever is sooner, prior to penetrating the first zone containing or reasonably expected to contain H2S.

## IGNITING THE WELL

### RESPONSIBILITY

THE DECISION TO IGNITE THE WELL IS THE RESPONSIBILITY OF THE DRILLING FOREMAN. In the event he is incapacitated, it becomes the responsibility of the Rig Tool Pusher. This decision should be made only as a last resort and in a situation where it is clear that:

1. Human life and property are endangered.
2. No hope exists for controlling the blowout under prevailing conditions at the well.

Notify the Oilfield Safety Inc. office, if time permits, but do not delay if human life is in danger. Initiate first phase of evacuation plan.

### INSTRUCTIONS FOR IGNITING THE WELL

1. Two people are required for the actual igniting operation. They must wear self-contained breathing units and have a safety rope attached. One man will check the atmosphere for explosive gases with the Explosimeter. The other man is responsible for igniting the well.
2. Primary method to ignite: Meteor-type Flare Gun.
3. Ignite upwind and do not approach any closer than is warranted.
4. Select the ignition site which is best for protection.
5. Select area for hasty retreat.
6. BEFORE FIRING, check regarding combustible gases.
7. Since Hydrogen Sulfide converts to Sulfur Dioxide, the area is not safe after igniting the well.
8. After igniting, continue emergency action and procedure as before.
9. All unassigned personnel will limit their actions to only those directed by the Drilling Foreman.

REMEMBER: AFTER WELL IS IGNITED, BURNING HYDROGEN SULFIDE WILL CONVERT TO SULFUR DIOXIDE, WHICH IS ALSO HIGHLY TOXIC. DO NOT ASSUME THE AREA IS SAFE AFTER THE WELL IS IGNITED.

## BLOWOUT PREVENTION EQUIPMENT

1. A kill line of ample strength and length should be laid to a safe point to allow pumping into the well in an emergency situation.
2. The closing unit should be located a safe distance from the wellbore and positioned for maximum utilization based on the prevailing wind direction.
3. BOP equipment will be tested in accordance with standard company practice.
4. All equipment should be H2S trimmed for service in sour gas environments.
5. All drill pipe and casing will be of a grade acceptable for H2S service.

### SPECIAL EQUIPMENT

1. If a MUD-GAS SEPARATOR is installed, it will be installed with one or more flare lines.
2. Flare lines should be as long as practical and securely staked.
3. Flare Systems must be equipped with a safe and suitable means of ignition. The ignition system must either be electrically or gas operated. Buckets of diesel fuel and torches are no longer acceptable.
4. An automatic Hydrogen Sulfide monitor will be installed with a combination visual and audible alarm system located where it can be seen and/or heard throughout the drilling location. This system will have the capabilities of being activated from several points, which are the rig floor, cellar, and shale shaker.
5. The automatic monitor should be set to trigger the drilling location visual/audible alarms when the Hydrogen Sulfide concentration in the atmosphere reaches 10 ppm. Explosion proof lights and sirens will be provided at or near the rig floor and such that all personnel will be subject to visual and audible warnings.

## MUD ADDITIVES

### DRILLING FLUID RECOMMENDATION

#### MUD TYPE

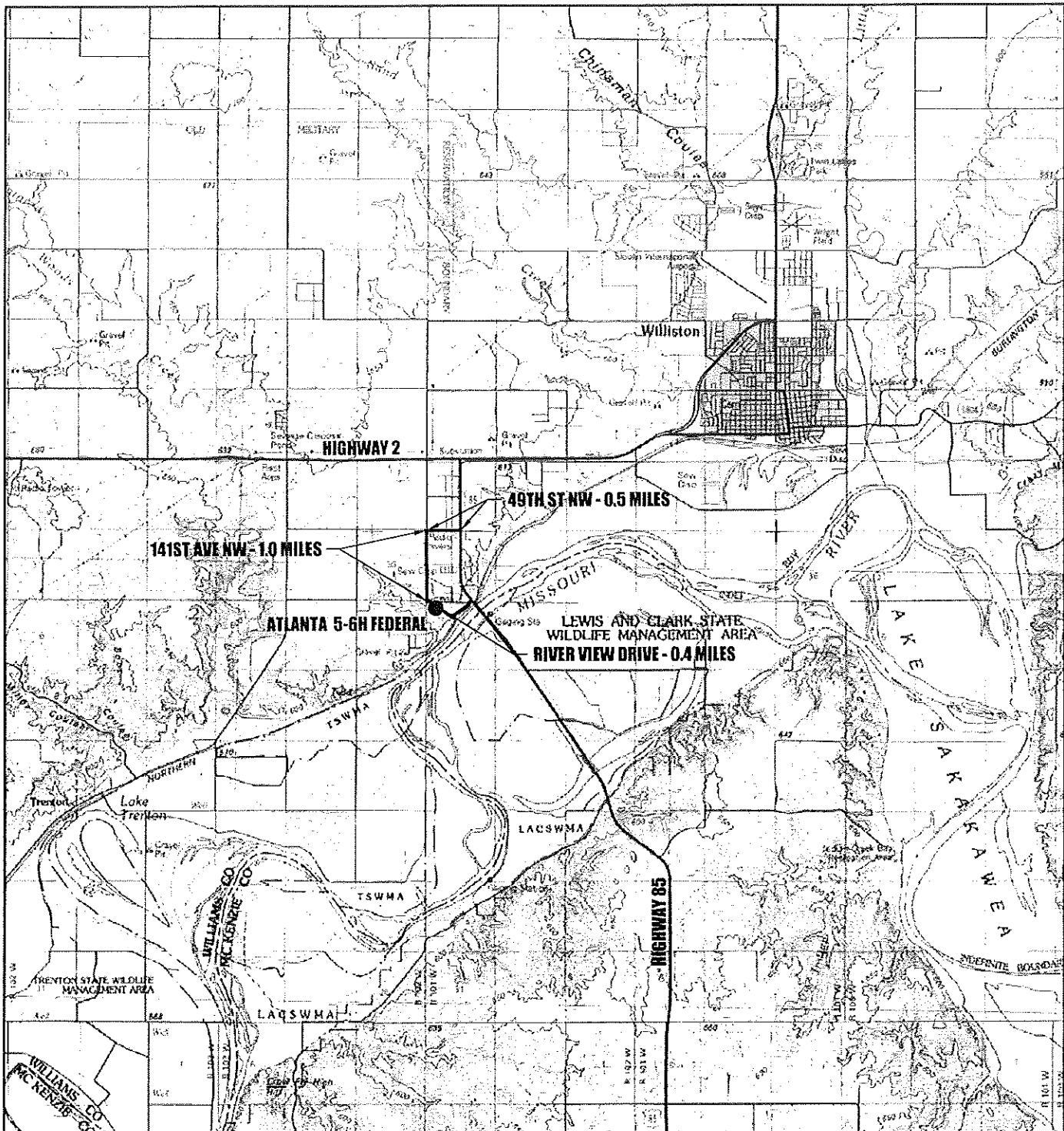
An overbalanced mud should be used to drill potential pay zone with necessary additives for all stabilization.

In the event of H<sub>2</sub>S contamination of the mud system, Hydrogen Sulfide scavengers should be added to the mud.

## EMERGENCY DRILLS

### Hydrogen Sulfide Alarm Drills

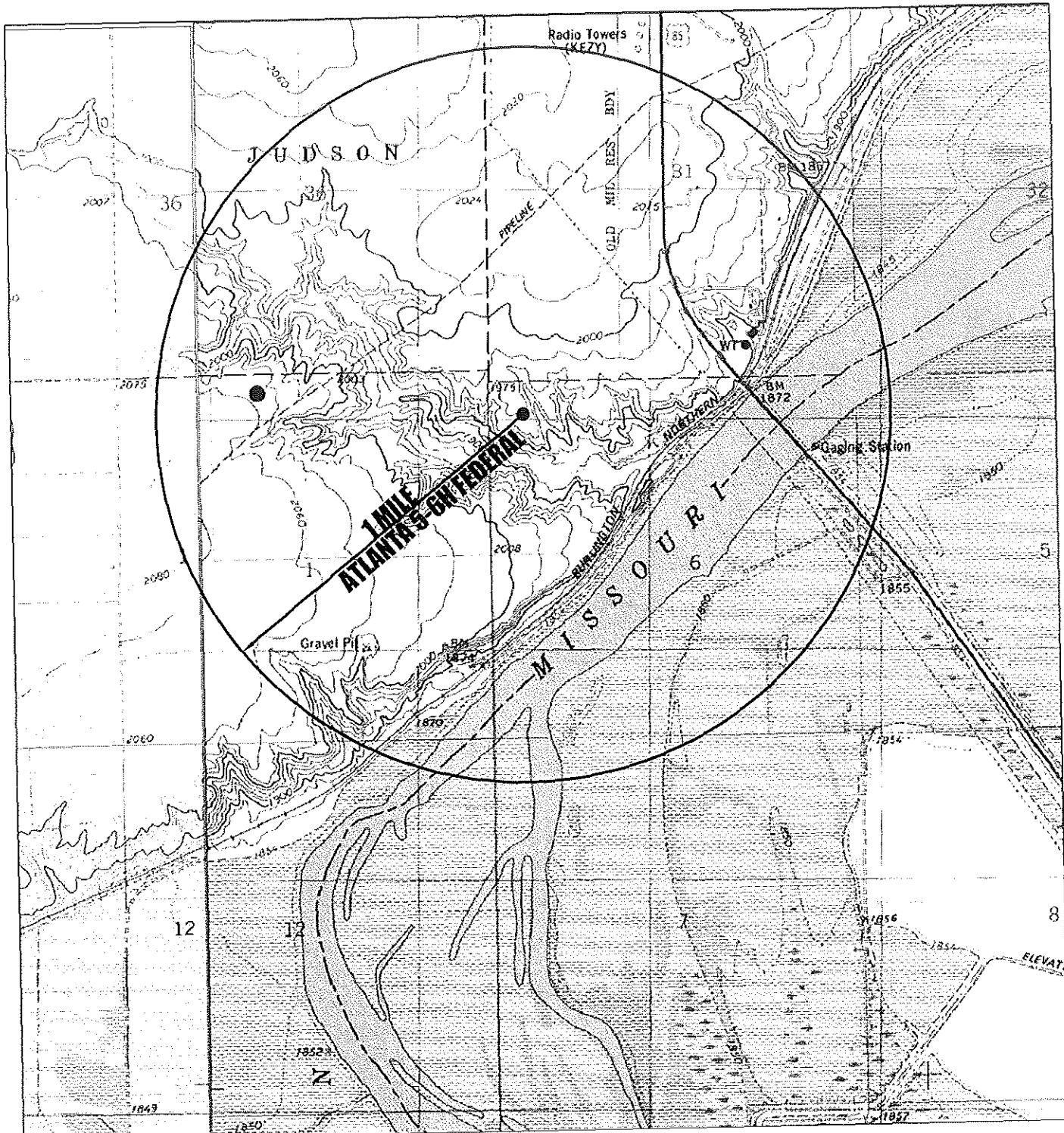
The Safety Advisor will conduct frequent H2S emergency drills for each crew by manually activating the H2S detector. When the lights flash, all personnel on location will assemble at the Upwind Briefing Area. A head count will be taken at this time to determine if rescue operations are indicated. The Safety Advisor must be notified if more personnel are on location than during normal operations. A "Masks On" policy will prevail until the all clear is sounded. These drills will be implemented as frequently as required to familiarize all personnel with the procedures to be followed in the event an actual emergency occurs.



CONTINENTAL RESOURCES INC.

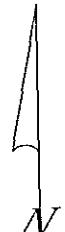
**EXHIBIT 1**  
**VICINITY MAP**  
**PROPOSED ACCESS ROUTE**

ATLANTA 5-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA



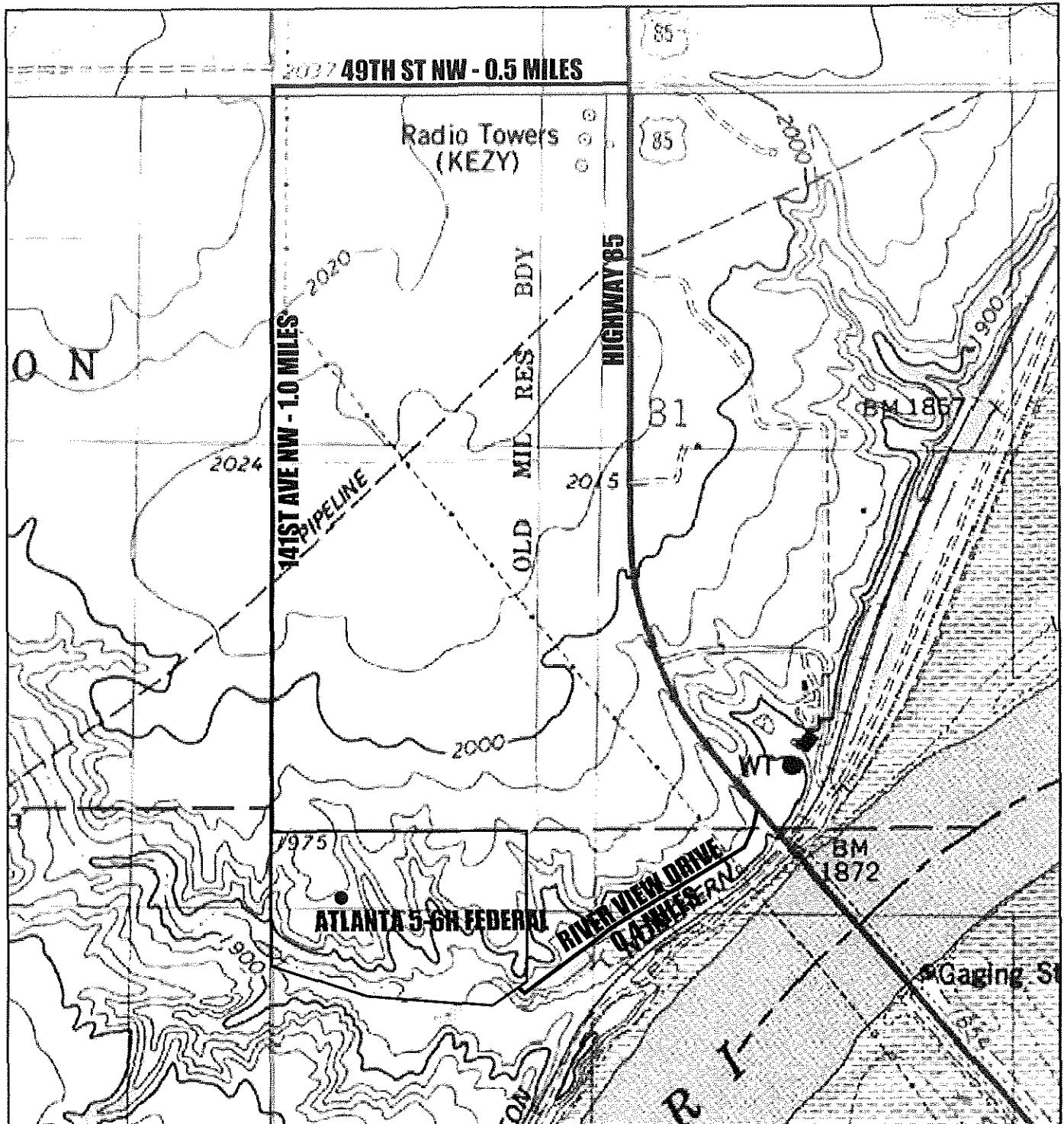
**CONTINENTAL RESOURCES INC.**

● = OIL WELL



**EXHIBIT 3**  
**ONE-MILE RADIUS MAP**

ATLANTA 5-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA



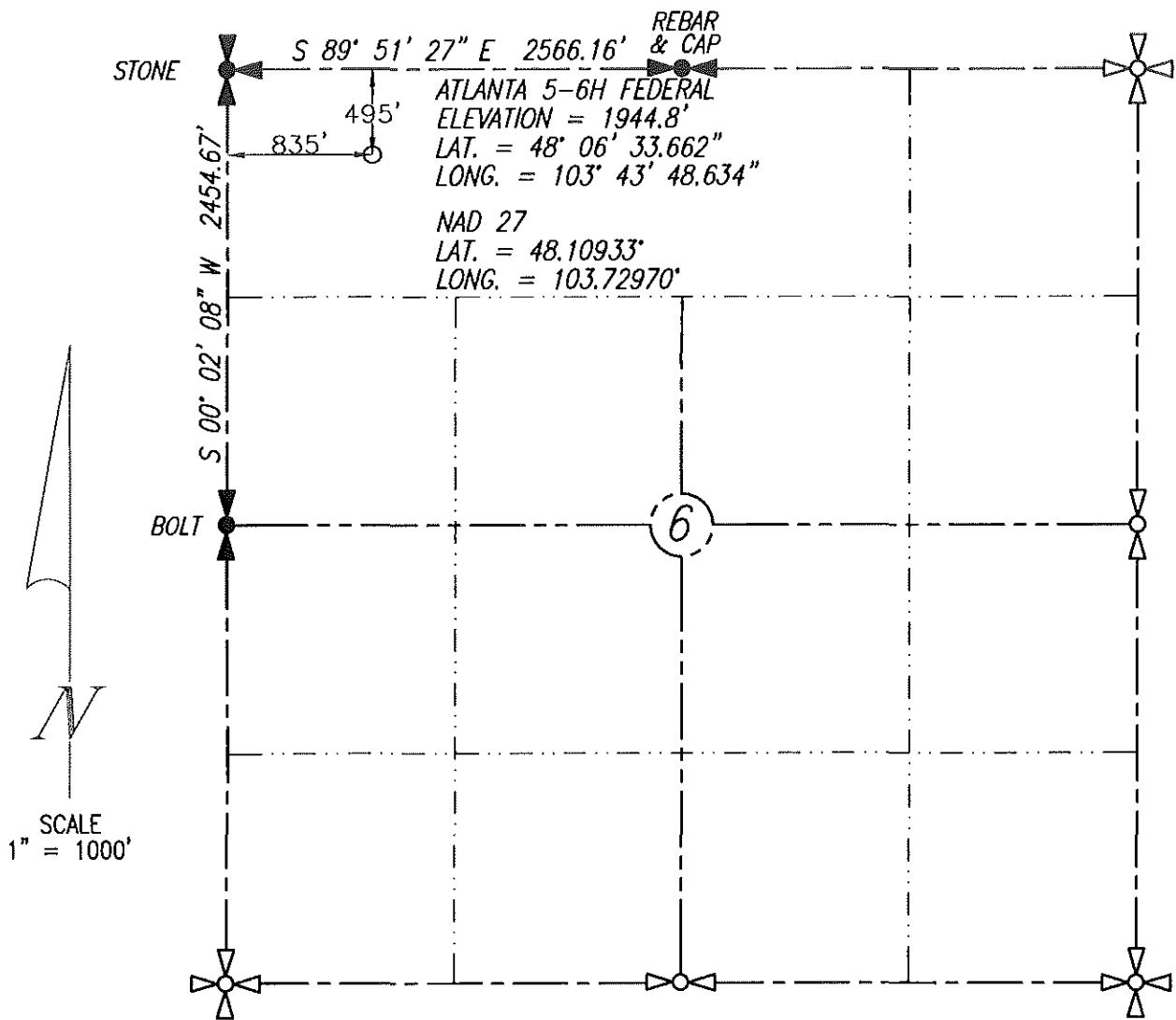
CONTINENTAL RESOURCES INC.

**EXHIBIT 2**  
QUAD ACCESS

ATLANTA 5-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA

REVISED: 4-23-2012

WELL LOCATION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 5-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA  
495' FNL & 835' FWL



I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS  
WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE  
CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF  
MY KNOWLEDGE AND BELIEF



4-23-12

DATE STAKED: 2-9-2012

BASIS OF VERTICAL DATUM:  
NAVD 1988 GEOID 09

PERSON AUTHORIZING SURVEY;  
CHAD NEWBY

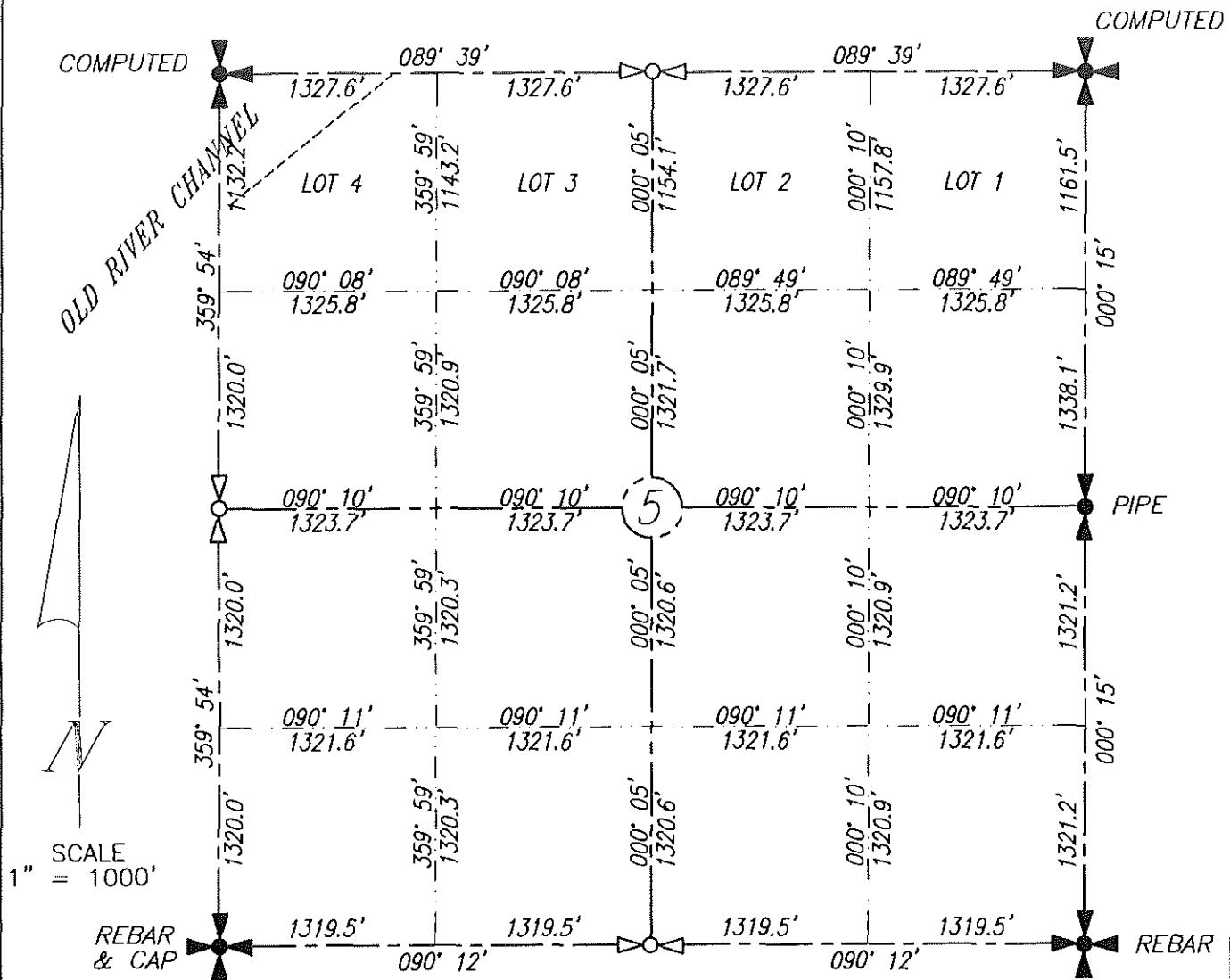
EXPLANATION AREA: NAD83(CORS96)

BASIS OF BEARING: TRUE NORTH

**BROSZ ENGINEERING INC.**

BOX 357  
BOWMAN, N.D. 58623  
PHONE: 701-523-3340  
FAX: 701-523-5243  
PROJECT NO. 12-10

HORIZONTAL SECTION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 5-6H FEDERAL  
SECTION 5, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA  
MCKENZIE COUNTY, NORTH DAKOTA



ALL CORNERS SHOWN ON THIS PLAT WERE FOUND IN THE FIELD  
DISTANCES TO ALL OTHERS ARE CALCULATED.  
ALL BEARINGS SHOWN ARE ASSUMED.

I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS  
WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE  
CHARGE, AND IS STATED AND CORRECT TO THE BEST OF  
MY KNOWLEDGE AND BELIEF

JOHN PAULSON  
SURVEYOR  
R.L.S. #3366

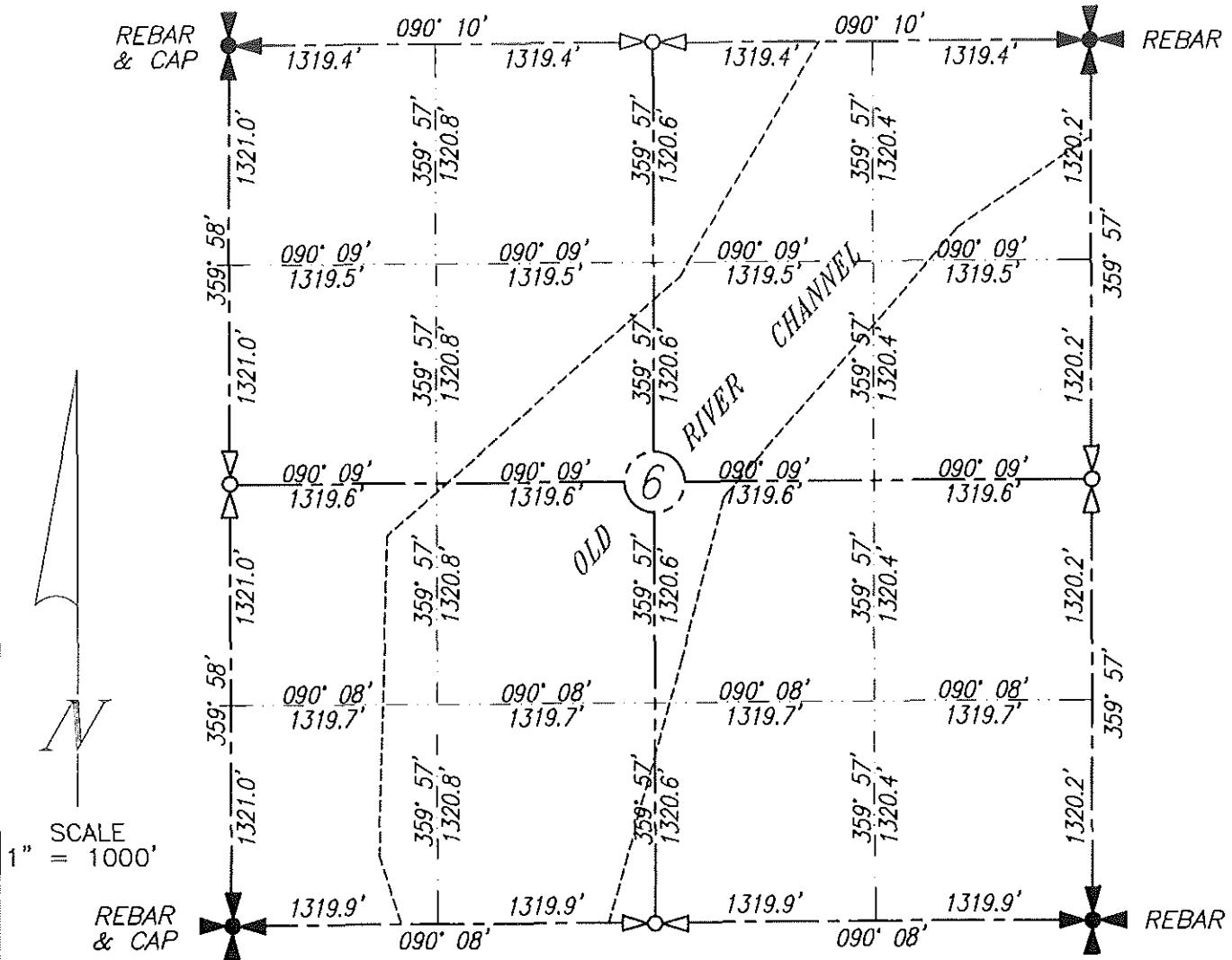
4-9-12

JOHN PAULSON R.L.S. #3366  
NORTH DAKOTA

BROSZ ENGINEERING INC.

BOX 357  
BOWMAN, N.D. 58623  
PHONE: 701-523-3340  
FAX: 701-523-5243  
PROJECT NO. 12-10

HORIZONTAL SECTION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 5-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA  
MCKENZIE COUNTY, NORTH DAKOTA



*MOST OF THE SECTION IS LOTTED DUE TO THE MISSOURI RIVER.*

ALL CORNERS SHOWN ON THIS PLAT WERE FOUND IN THE FIELD  
DISTANCES TO ALL OTHERS ARE CALCULATED.

~~DISADVANTAGE OF THE CURRENT LINE~~  
~~ALL BEARINGS SHOWN ARE ASSUMED.~~

I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS  
WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE  
CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF  
MY KNOWLEDGE AND BELIEF

~~JOHN PATRICK DALE~~ 49-12  
JOHN PATRICK DALE S. 3366

## *BROSZ ENGINEERING INC.*

BOX 357

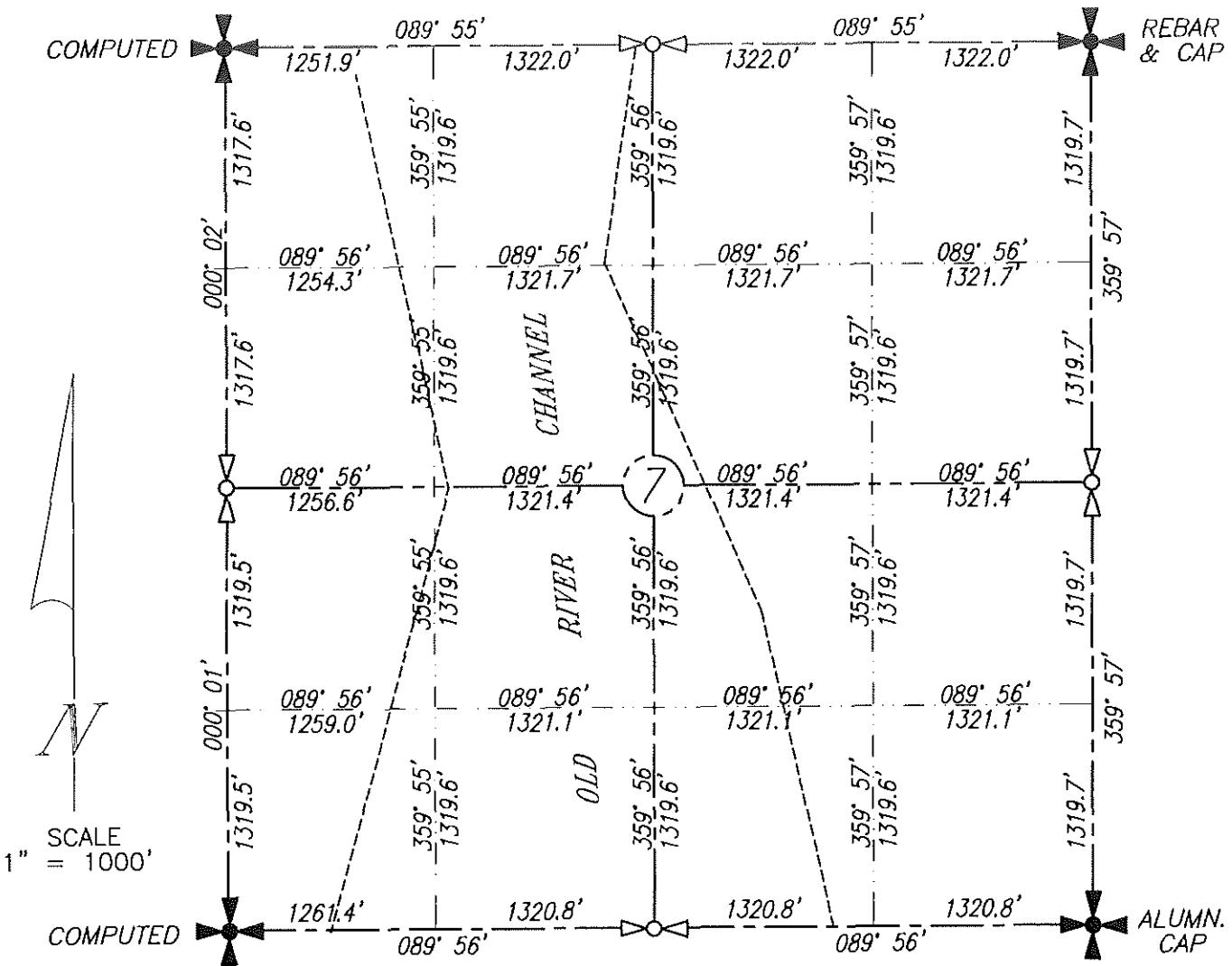
BOWMAN, N.D. 58623

PHONE: 701-523-3340

FAX: 701-523-5243

PROJECT NO. 12-10

HORIZONTAL SECTION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 5-6H FEDERAL  
SECTION 7, T153N, R101W  
CKENZIE COUNTY, NORTH DAKOT



*MOST OF THE SECTION IS LOTTED DUE TO THE MISSOURI RIVER.*

ALL CORNERS SHOWN ON THIS PLAT WERE FOUND IN THE FIELD  
DISTANCES TO ALL OTHERS ARE CALCULATED.

JOHN PAUPERTANCES TO ALL  
ALL BEARINGS SHOW

REGISTERED  
I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS  
WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE  
CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF  
MY KNOWLEDGE AND BELIEF

*John Paulson* **JOHN PAULSON R.L.S. 336**

4-9-12

## BROSZ ENGINEERING INC.

BOX 357

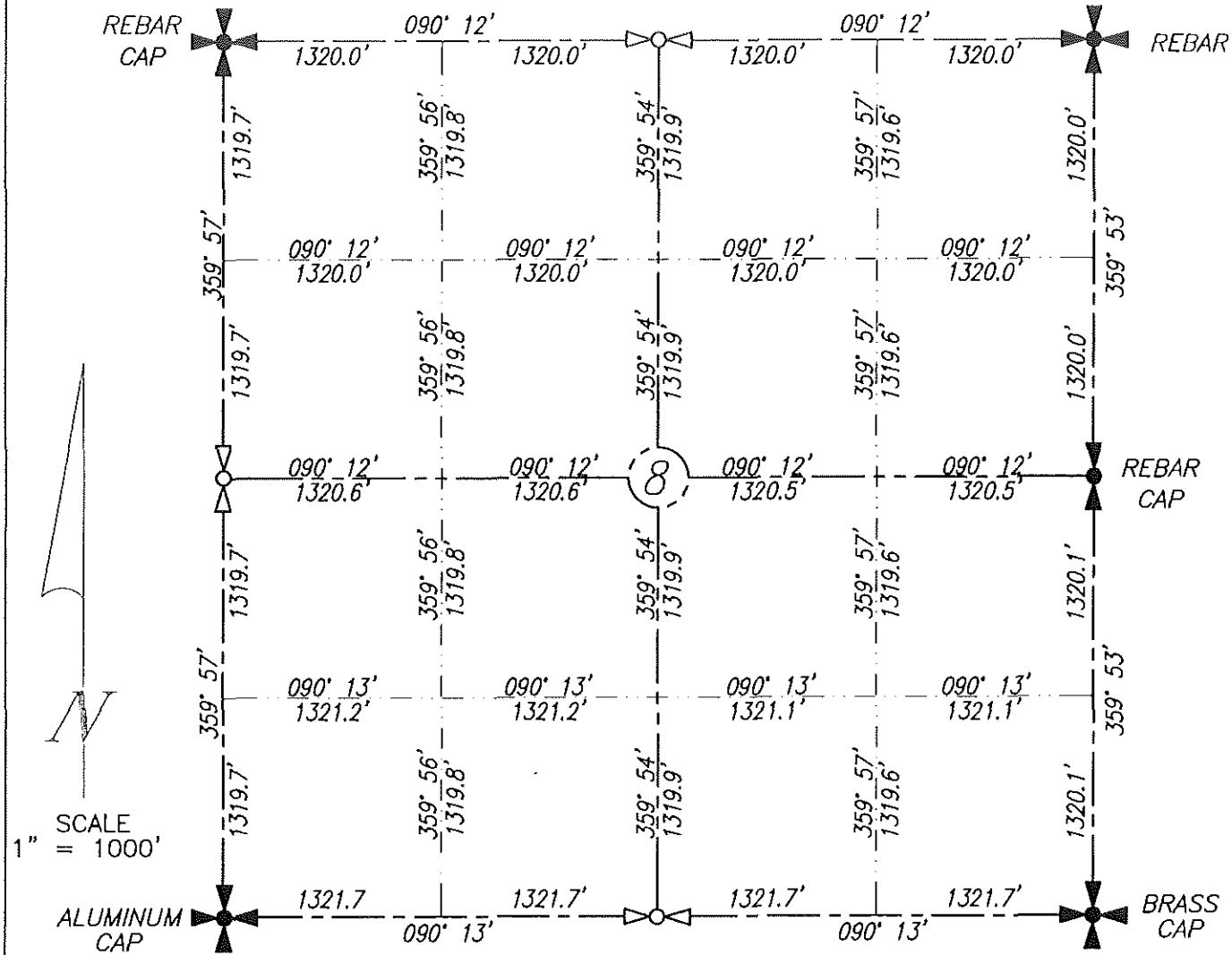
BOWMAN, N.D. 58623

PHONE: 701-523-3340

FAX: 701-523-5243

PROJECT NO. 12-10

HORIZONTAL SECTION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 5-6H FEDERAL  
SECTION 8, T153N, R101W  
MCKENZIE COUNTY, NORTH DAKOTA



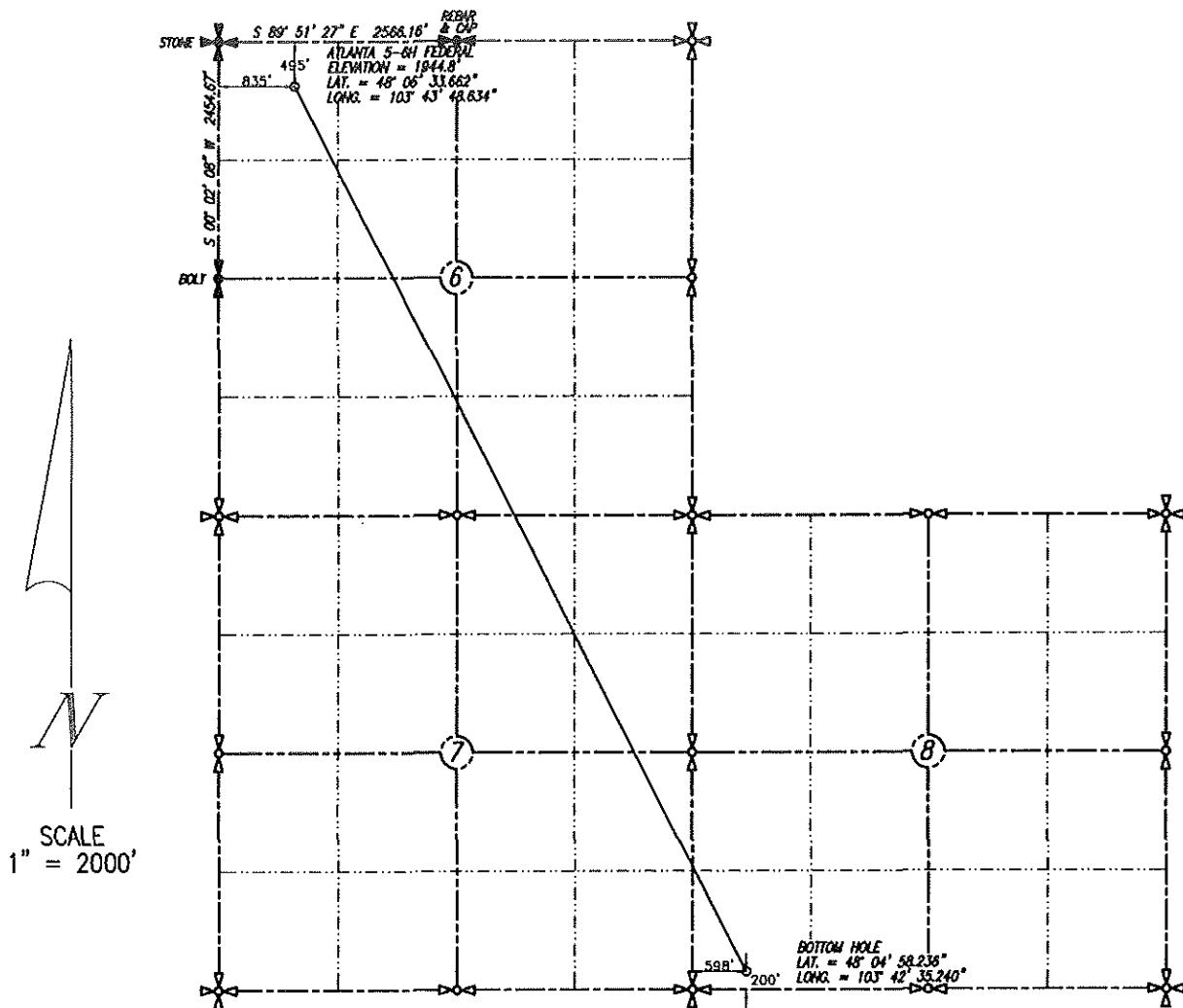
ALL CORNERS SHOWN ON THIS PLAT WERE FOUND IN THE FIELD  
DISTANCES TO ALL OTHERS ARE CALCULATED.  
ALL BEARINGS SHOWN ARE ASSUMED.

I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS  
WORK PERFORMED THEREIN OR UNDER MY RESPONSIBLE  
CHARGE, AND IS FAIR AND CORRECT TO THE BEST OF  
MY KNOWLEDGE AND JURISDICTION  
L.S. 3365

L.S. 3366  
JOHN PAULSON R.L.S.  
DAKOTA

*BROSZ ENGINEERING INC.*  
BOX 357  
*BOWMAN, N.D. 58623*  
*PHONE: 701-523-3340*  
*FAX: 701-523-5243*  
*PROJECT NO. 12-10*

BOTTOM HOLE LOCATION PLAT  
 CONTINENTAL RESOURCES INC.  
 ATLANTA 5-6H FEDERAL  
 SECTION 6, T153N, R101W  
 WILLIAMS COUNTY, NORTH DAKOTA  
 495' FNL & 835' FWL



I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS  
 WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE  
 CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF  
 MY KNOWLEDGE AND BELIEF

*John Pagsund* -23-12  
 JOHN PAGSUND L.S. 3366  
 LAND SURVEYOR  
 L.S. 3366

NORTH DAKOTA

DATE STAKED: 2-9-2012

BASIS OF VERTICAL DATUM:  
 NAVD 1988 GEODETIC

PERSON AUTHORIZING SURVEY;  
CHAD NEWBY

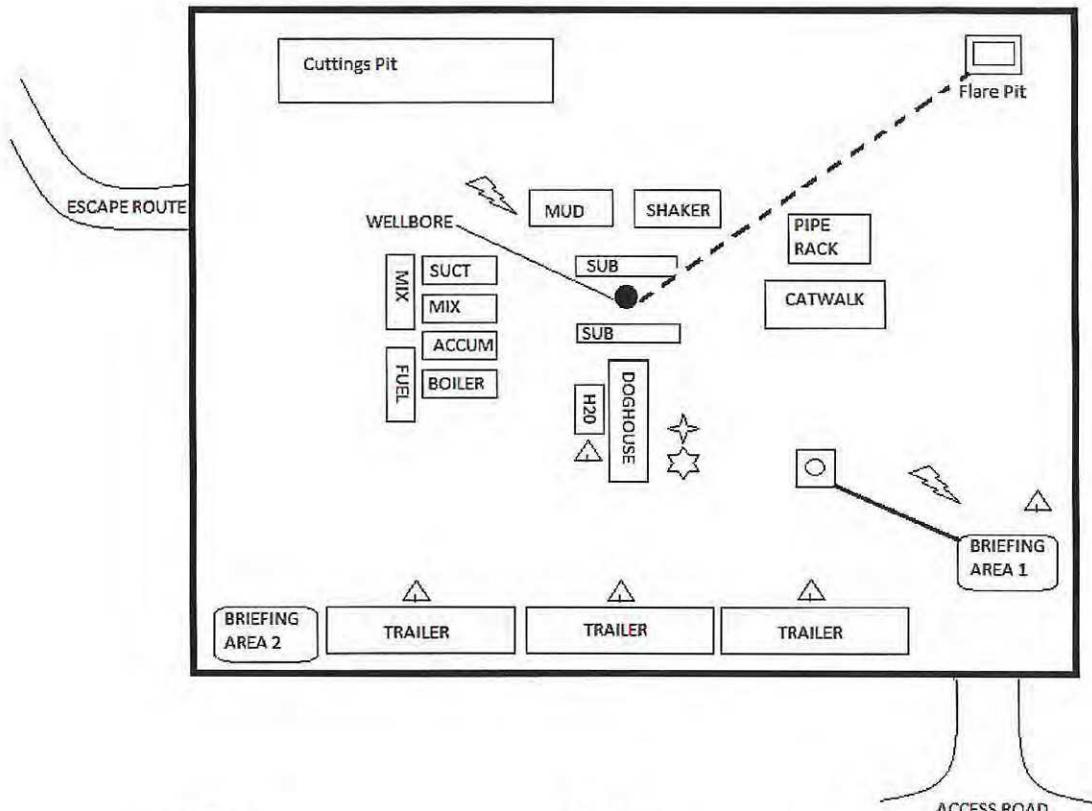
EXPLANATION AREA: NAD83(CORS96)

BASIS OF BEARING: TRUE NORTH

**BROSZ ENGINEERING INC.**

BOX 357  
 BOWMAN, N.D. 58623  
 PHONE: 701-523-3340  
 FAX: 701-523-5243

PROJECT NO. 12-10



### LEGEND

- ⚡ WINDSOCK
- ★ ALARM FLASHING LIGHT
- ☆ ALARM SIREN
- ▲ 30 MIN AIRPACK
  
- AIRLINE BREATHING APPARATUS W/MANIFOLD
- WELLBORE
- 1/2" LOW PRESSURE HOSE CONNECTED TO BREATHING AIR TRAILER
- SAFETY TRAILER W/ CASCADE AIRSYSTEM

**NOTE:** Continuous H<sub>2</sub>S monitoring heads located:

- A. Return airline while air drilling
- B. Shaker while mud drilling
- C. Floor
- D. Substructure, Bell Nipple

READOUT INSTRUMENT IN DOGHOUSE

Continental Resources, Inc	
Name: Atlanta Federal 5-6H	Site Plan of Safety Equipment
Location: Sec 6-T153N-R101W	
State: ND      County: Williams	



July 20, 2012

Industrial Commission of North Dakota  
Oil & Gas Division  
600 East Boulevard, Dept 405  
Bismarck, North Dakota 58505

Continental Resources, Inc. (CRI) respectfully submits the following information concerning the drilling of the Atlanta 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 -- 6H,  
Township 153N, Range 101W of the 5<sup>th</sup> P.M.  
Section 6, N/2 NW/4 Williams County, North Dakota.

Continental Resources Inc. would like to propose the following automatic shut down equipment and level sensing monitoring equipment be installed on the site to aid in the prevention of any accidental release or safety issue. One-line schematic diagrams, flowchart model, and general product information are attached for your review and approval with this affidavit.

- 1) Tank Side – i) K-Tek Guided Wave Radar and Z-Bend High Level Switch Level Detectors ii) High level switches for oil and water tanks ii) Battery box with solar backup
  - 2) Treater / Separator – i) Buffer Switch ii) U003 Gap Switch iii) 2 - AST 4600 pressure transducers – monitor pressure & liquid content of flare / gas sales lines iv) Battery box with solar backup
  - 3) Wellhead – i) TotalFlow Controller ii) Emergency ShutDown Valve package iii) Battery box with solar backup
  - 4) System Automation through the proposed equipment will provide an independent control system on all equipment on site which will be able to shut the well(s) in should any of the other equipment be incapacitated or functioning improperly.
  - 5) Once the system is operational and linked to the CRI Williston Basin SCADA system, a notification will be sent directly to the (Sidney, MT) field office, and field personnel in charge of the site's operation. This system will also provide the capability for remote shutdown from a computer terminal on the system at another location. In the event that an alert was sent from the site, or a call received, CRI estimates that personnel would be able to respond to an incident through the remote system within minutes and be present at the site within 15 to 30 minutes.

~~Chad Newby, Operations Land Coordinator  
Continental Resources, Inc.~~

**STATE OF OKLAHOMA**)  
**COUNTY OF GARFIELD**)  
ss;

On the 20<sup>th</sup> day of July 2012, before me, a Notary Public in and for said County and State, personally appeared Chad Newby, known to me to be the Operations Land Coordinator of Continental Resources, Inc., the Corporation that executed the within instrument, and acknowledged to me that such Corporation executed the same.

Percy Barnes  
Notary Public

## Garfield County, Oklahoma

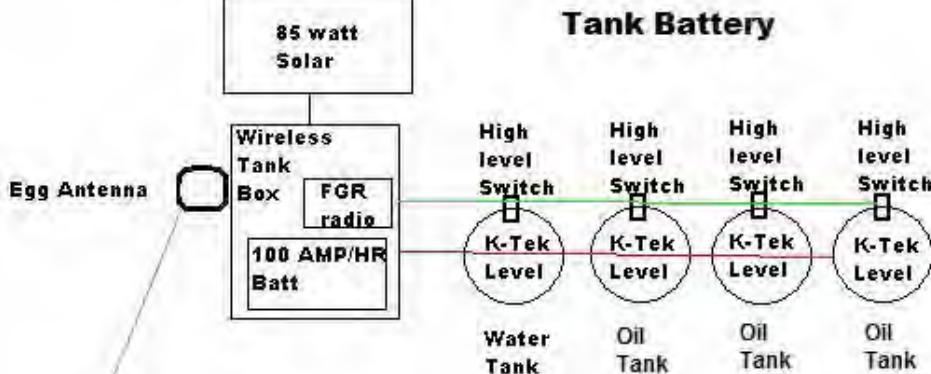
My Commission Expires: 7/5/2015  
Commission No.: 11006023



# Continental Resources Wellhead Automation

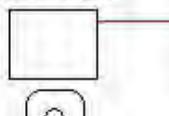


Analog  
Radio  
RS485 Modbus  
Digital I/O



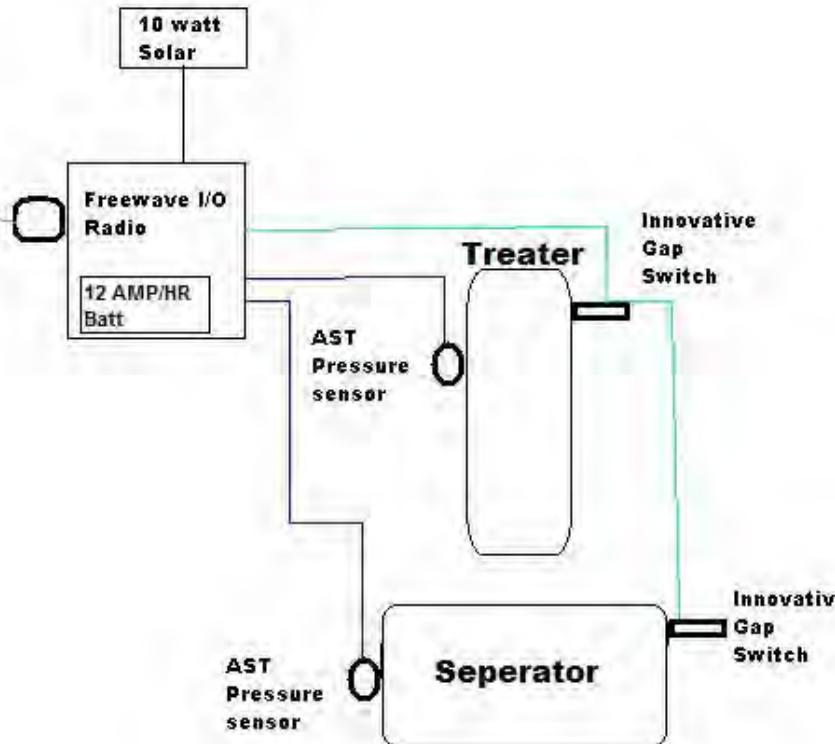
## Wellhead

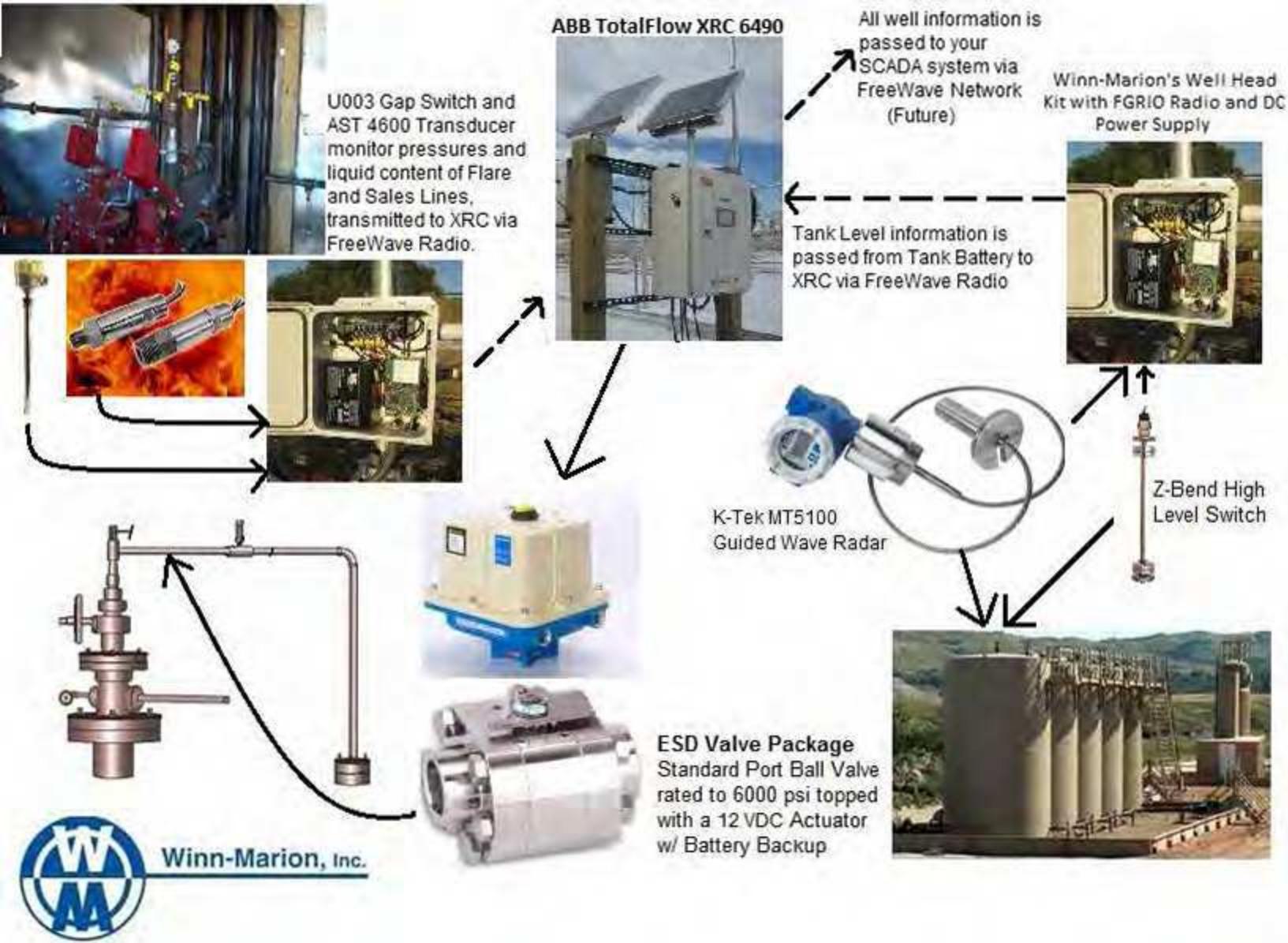
LADC1000  
Actuator



Habonim Valve

Egg Antenna





# Tank Side

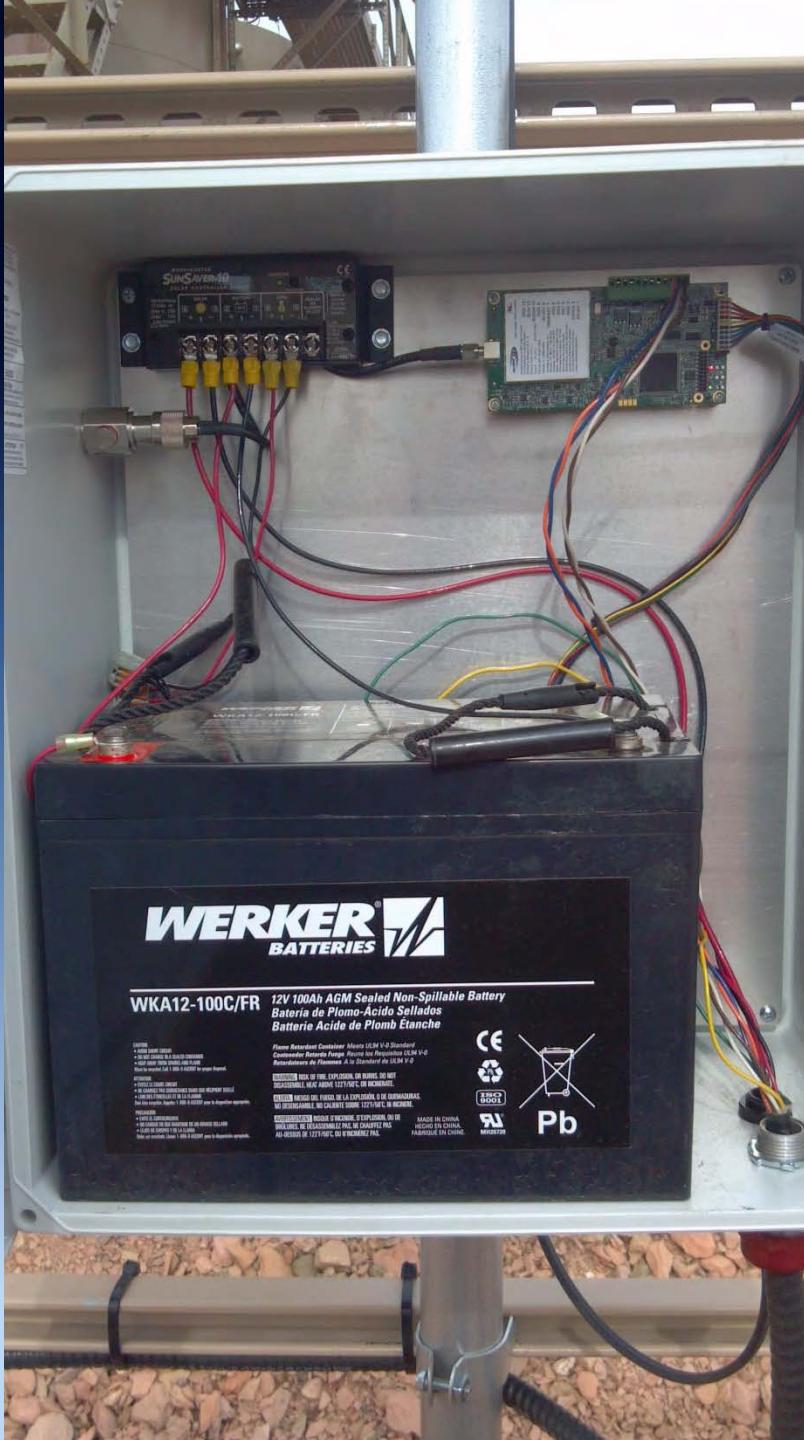
Contains the following Equipment

- 4 K-Tek Guided Wave Radar Level Detectors
- 3 High Level Switches (Oil Tanks)
- 1 Side Level Switch (Water Tank)
- Battery box with 100 AH Battery and 90 W Solar





WM Automation  
Service, LLC



WM Automation  
Service, LLC



WM Automation  
Service, LLC



WM Automation  
Service, LLC



WM Automation  
Service, LLC

# Treater Shack

Contains the following Equipment

- 1 Buffer Switch (Short Gap Switch)
- 1 Gap Switch
- 2 Pressure Transducers
- Battery box with 35 AH Battery and 10 W Solar





WM Automation  
Service, LLC



WM Automation  
Service, LLC



WM Automation  
Service, LLC





WM Automation  
Service, LLC



WM Automation  
Service, LLC

# Wellhead

Contains the following Equipment

- TotalFlow
- ESD Valve
- Battery box with 100 AH Battery and 50 W Solar

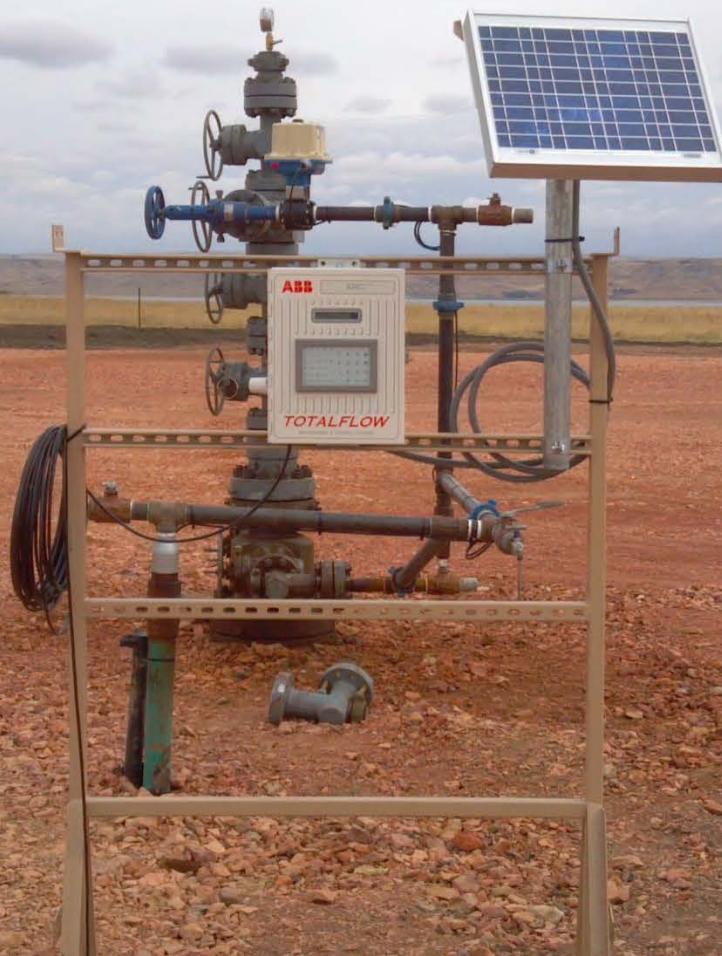




WM Automation  
Service, LLC



WM Automation  
Service, LLC



WM Automation  
Service, LLC

---

**Cyclone Drilling Rig No. 20  
Contingency Plan  
For Drilling Activities Conducted at  
Continental Resources, Inc.'s  
Atlanta 1-6H  
Located in Williams County, ND**



November 2011

**CYCLONE DRILLING, INC. RIG NO. 20  
CONTINGENCY PLAN  
FOR DRILLING ACTIVITIES CONDUCTED AT THE  
CONTINENTAL RESOURCES, INC. ATLANTA 1-6H  
6-153N-101W, WILLIAMS COUNTY, NORTH DAKOTA**

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<b>FIGURE 2</b>	DRILLING RIG LAYOUT
<b>FIGURE 3</b>	WELL LOCATION MAP

**CYCLONE DRILLING, INC. RIG NO. 20**  
**CONTINGENCY PLAN**  
**FOR DRILLING ACTIVITIES CONDUCTED AT THE**  
**CONTINENTAL RESOURCES, INC. ATLANTA 1-6H**  
**6-153N-101W, WILLIAMS COUNTY, NORTH DAKOTA**

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## 1. INTRODUCTION

The purpose of this Contingency Plan is to outline the procedures that will be implemented by Cyclone Drilling, Inc.'s Rig No. 20 personnel should a spill or flood occur during drilling activities conducted at the Continental Resources, Inc. Atlanta 1-6H lease located in Section 6, 153N, 101W in Williams County, North Dakota. Such procedures are designed to minimize the effects of spills and potential flooding on Cyclone field personnel, Continental facilities, the surrounding community, and the environment in general.

## 2. GENERAL INFORMATION

**2.1 Equipment Description.** Cyclone Drilling, Inc. operates drilling rigs that are moved from site to site therefore, the exact equipment layout will vary slightly. The Atlanta 1-6H location encompasses 3.1-acres and the standard equipment for most drilling jobs is as follows:

- r Mobile Rig (w/integrated fuel/oil storage tanks)
- r Storage Facilities
- r Mud Pumps (diesel-powered pumps w/integrated fuel storage tanks)
- r Generators (w/integrated fuel storage tanks)
- r Water Tanks
- r Pipe Racks

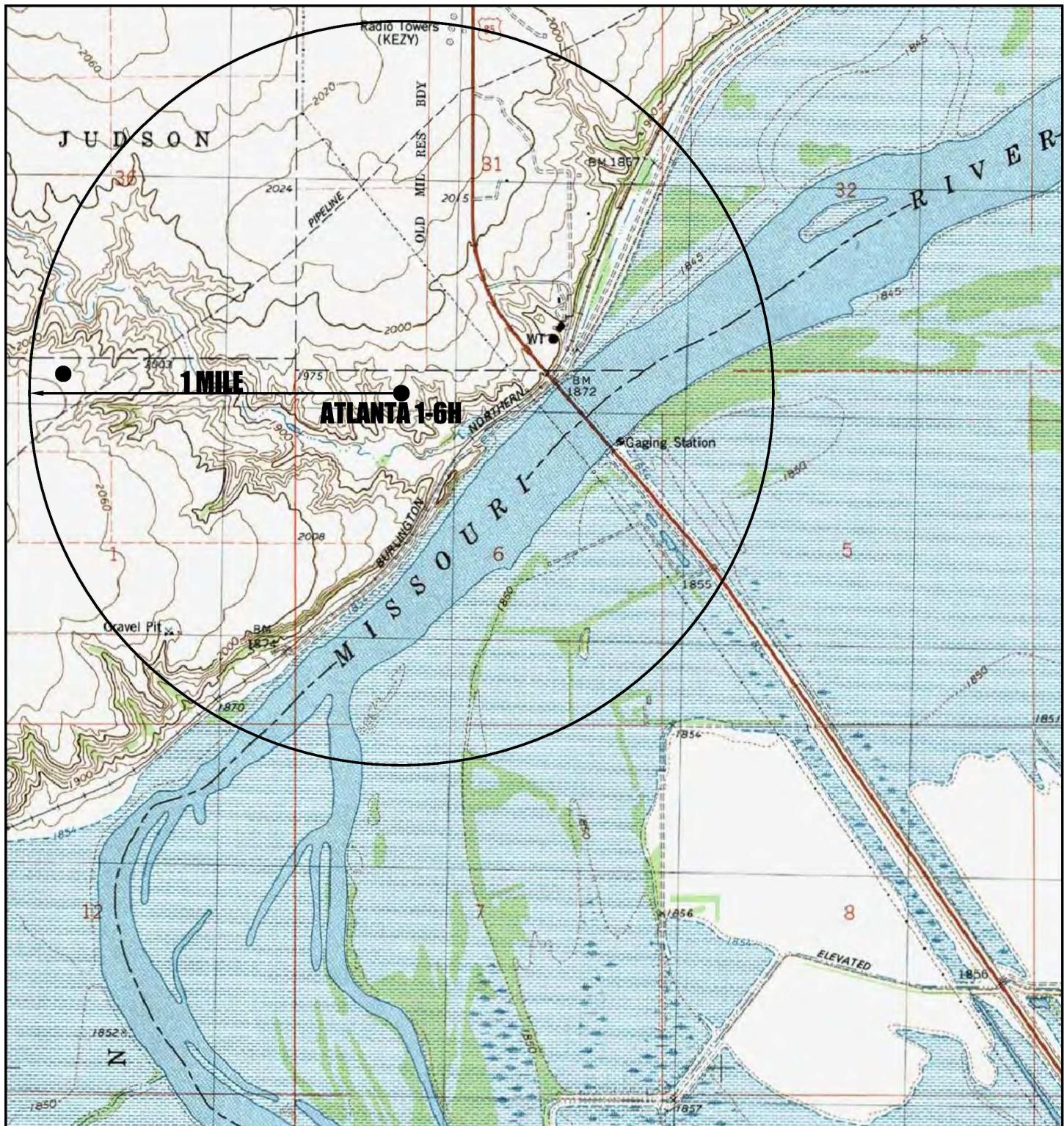
**2.2 Proximity of Rigs to Navigable Waters.** According to 40 CFR 112.7(e)(6)(i), mobile drilling equipment should be positioned or located so as to prevent spilled oil from reaching navigable waters. Depending on the location, catch basins or diversion structures may be necessary to intercept and contain fuel, crude oil, or oily drilling fluid spills.

The nearest potential receiving water for an oil spill is unnamed intermittent tributary of the Missouri River located approximately 500-ft. south of the Atlanta 1-6 lease. A One-Mile Radius Map indicating the location of Continental's Atlanta 1-6H lease is included herein as *Figure 1*.

Cyclone personnel will locate Rig No. 20 and its associated equipment to best prevent a potential release to waterways and provide drainage and containment, as discussed in *Section 3.4* of this Plan. A Drilling Rig Layout Map is included herein as *Figure 2*.

**2.3 Potential Spills and Releases.** The spill prevention system includes visual inspections and containment structures to help reduce the potential for releases to the off-site soil or surface waters. Generally, minor spills or leaks within the work site will be contained by drip pans located on skid-mounted equipment and cleaned-up using an absorbent (i.e., granular or pads). A list of activities that represent the greatest potential for a release of oil to the environment is as follows:

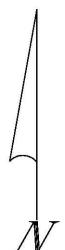
- r Loading/unloading fuel, oil, and used oil to/from storage tanks and containers.
- r Temporary storage of oil containers outside of secondary containment.



**CONTINENTAL RESOURCES INC.**

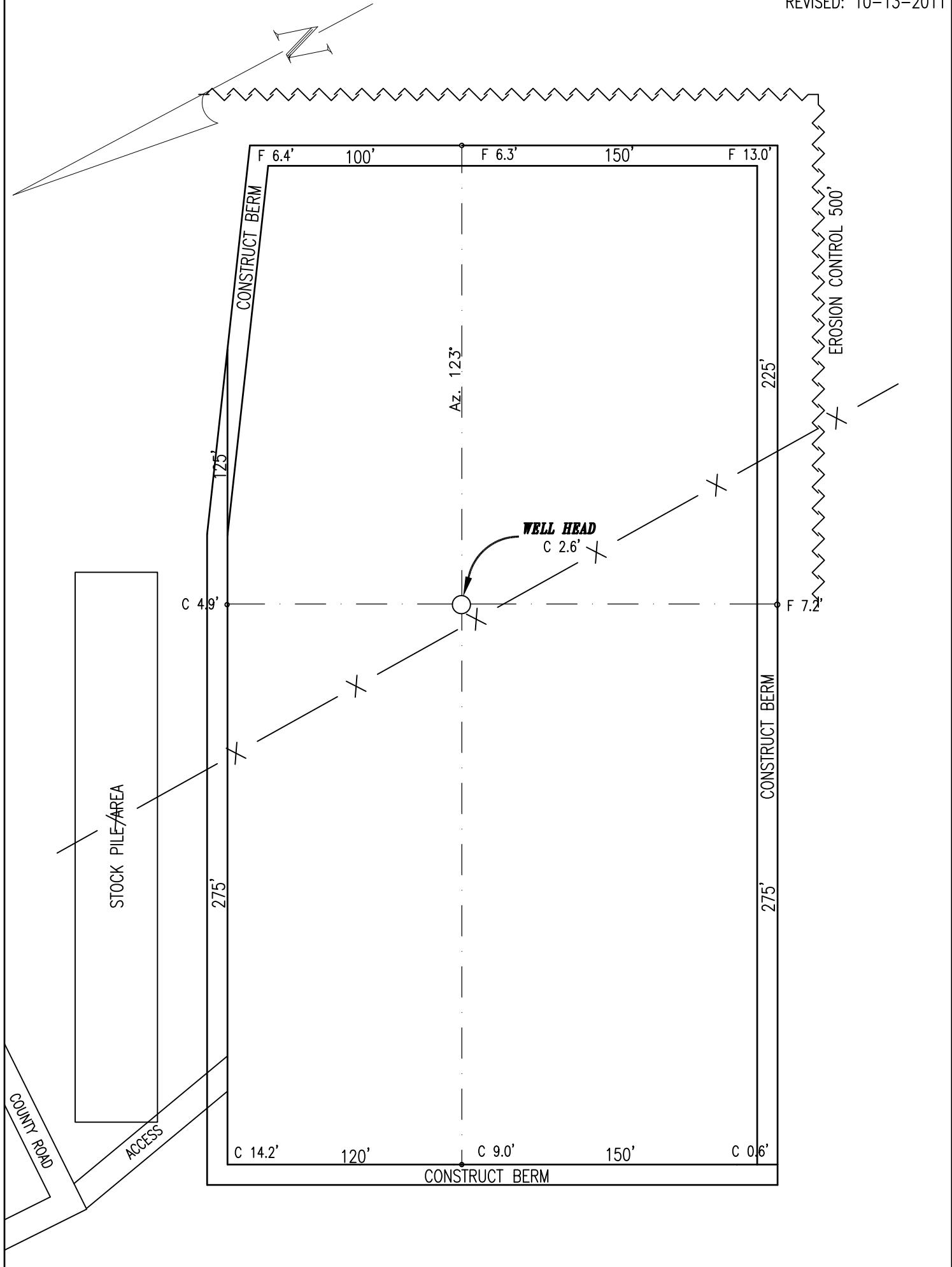
## ONE-MILE RADIUS MAP

**● = OIL WELL**



SCALE 1" = 2000'

ATLANTA 1-6H  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA



CONTINENTAL RESOURCES INC. PO BOX 1032 ENID, OKLAHOMA 73702	ESTIMATED EARTH QUANTITIES		ALL INDICATED CUTS & FILLS ARE STAKED GRADE ELEVATIONS.
	TOP-SOIL:	2,500 CUBIC YARDS	
SUB-SOIL:		14,531 CUBIC YARDS	
TOTAL CUT:		17,031 CUBIC YARDS	
TOTAL FILL:		12,769 CUBIC YARDS	
Use excess materials in access road fill			BACKSLOPES ASSUMED AT 1 1/2 : 1 %
DRILLING RIG LAYOUT ATLANTA 1-6H SECTION 6, T153N, R101W WILLIAMS COUNTY, NORTH DAKOTA		Ground Elevation at Well Head:	1955.6 ft. ASL
		Finished Rig Grade Elevation:	1953.0 ft. ASL
DRAFT: PAULSON	SCALE 1" = 60'	DATE: MAY 29, 2010	PROJECT NO. 10-10

**CYCLONE DRILLING, INC. RIG NO. 20  
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FOR DRILLING ACTIVITIES CONDUCTED AT THE  
CONTINENTAL RESOURCES, INC. ATLANTA 1-6H  
6-153N-101W, WILLIAMS COUNTY, NORTH DAKOTA**

---

- r      Rigs that are operated without a fresh water or well fluids pit.

### **3. OIL/FUEL STORAGE**

- 3.1 Oil, Fuel, and Used Oil Storage Tanks.** The materials stored on-site are mainly used to operate the drilling rig's generators and pumps and generally included the following:

- r      Diesel Fuel
- r      Engine Oil
- r      Hydraulic Oil
- r      Gear Oil
- r      Used Oil

- 3.2 Container Storage.** Multi-compartment storage containers are used to store hydraulic, motor and gear oil in approximate 100- to 150-gal. capacities. These container is generally located within the operating area near the accumulator valve skid. In lieu of such a multi-compartment storage container, fresh oil may be stored in 55-gal. drums.

Used oil is stored in 55-gal. drums prior to contractor removal. Because of limited available space within the rig's operating area, these drums are usually stored outside the operating area. In this event, these drums will be placed in a spill containment pan or within an earthen berm.

Containers stored within the trenched operating area would be contained by drainage to the well fluids pit. Containers used at sites that do not use pits are provided with earthen dike containment or other containment (i.e., metal containment pan.) The containment volume for containers located outside of the trenched operating area will be approximately 10% of the total volume of all containers within the containment area.

- 3.3 Transfer Facilities.** Fuel is transferred from bulk tanks into smaller day tanks located on the drilling rig, pump skids, and generator skids. Most bulk fuel tanks are equipped with a fuel pump attached to the skid. The fuel level in the day tanks is usually monitored until the tank is full.

Personnel transfer fresh oil from bulk storage tanks or drums into smaller tanks located on the drilling rig by filling 5-gal. buckets and manually filling the smaller tanks. Personnel transfer used equipment oil into 55-gal. drums using 5-gal. buckets.

Cyclone personnel are present at all times during oil and diesel transfer operations to ensure quick response in the event of a release. In addition, all pumps are securely grounded for static electricity for safety and personnel protection purposes.

- 3.4 Drainage and Containment Facilities.** The drains on containment systems will be closed and sealed except during water drainage. Prior to draining water the following steps will be taken:

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CONTINENTAL RESOURCES, INC. ATLANTA 1-6H  
6-153N-101W, WILLIAMS COUNTY, NORTH DAKOTA**

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- r Visually inspect the diked areas around tanks to ensure that the water does not exhibit an oily sheen and will not result in a harmful discharge.
- r Opening, closing, and locking the bypass valve under responsible supervision following drainage activities.
- r Maintain adequate drainage operation records.

**3.5 Bulk Storage Tanks.** The bulk storage tanks are located within a trenched area where releases drain into the well fluids pit. The well fluids pit will be sized to provide containment volume to accommodate the largest tank within the containment area as well as sufficient volume for stormwater accumulation and the volume required for well fluid storage. Bulk storage tanks at sites that do not use pits are contained by an earthen containment dike constructed around the tank.

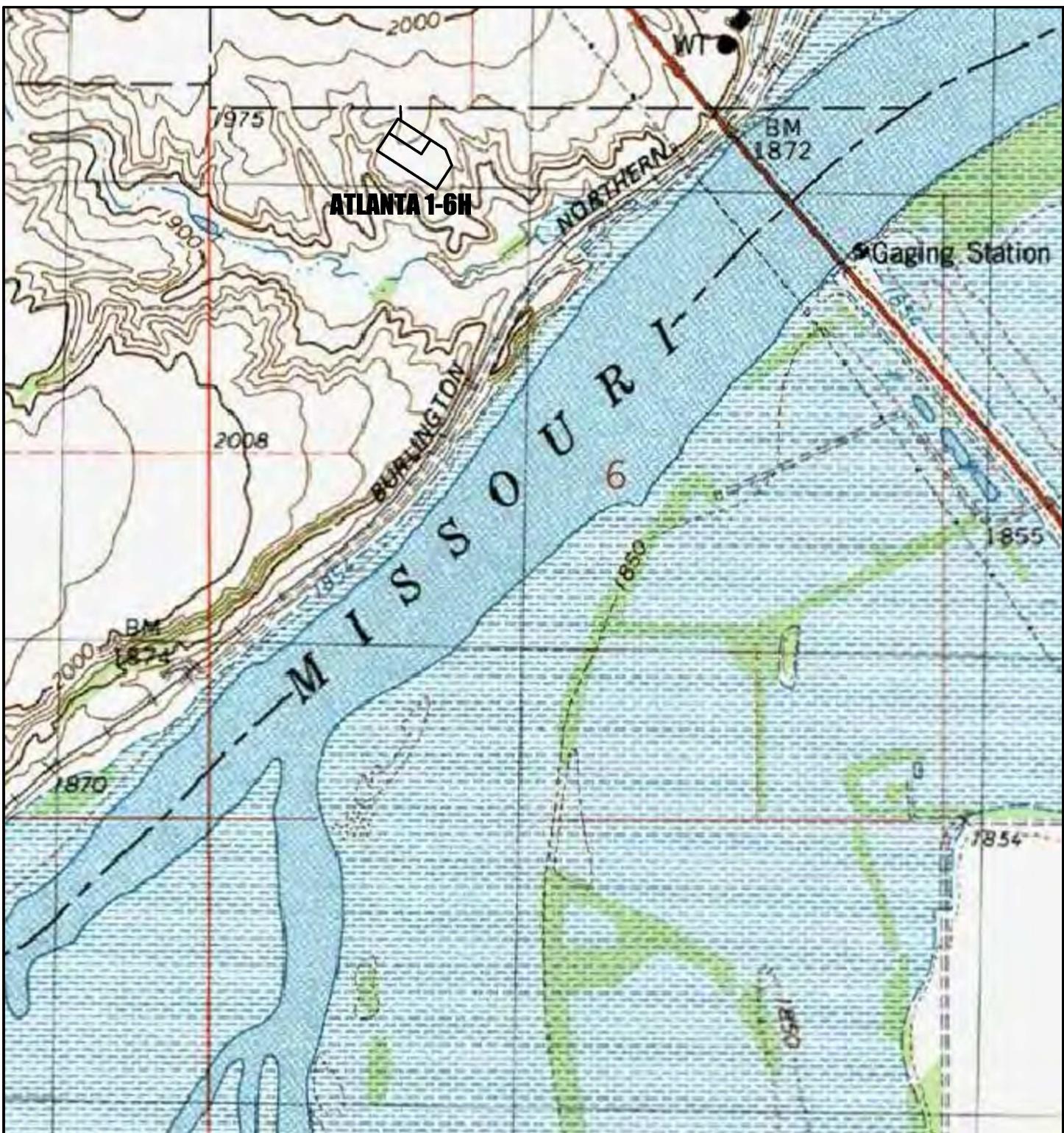
Stormwater that collects within the trenched area flows into the well fluids pit. Stormwater that collects within the earthen dike containment structures is inspected and if no free oil or oil sheen is observed, Continental field personnel or their on-site representatives may pump the water outside of the containment structure. In the event oil is observed in the stormwater within the earthen dike containment structures, it is pumped into a temporary container or storage tank for off-site disposal.

**3.6 Truck Loading/Unloading Areas.** Cyclone personnel will use spill containment booms to contain a release from a truck during loading/unloading operations or hand shovels and containment booms to direct the release to a containment trench or pit. Collected oil from such a release will be pumped into a temporary container or storage tank for off-site disposal.

#### **4. FLOOD CONTINGENCY**

Floods can develop slowly during an extended period of rain, or in a warming trend following a heavy snow. Others, such as flash floods, can occur quickly, even without any visible signs of rain. It's important to be prepared for flooding when working in a low-lying area, near water or downstream from a dam. The Atlanta 1-6H lease is located approximately 500-ft. north of an unnamed intermittent tributary of the Missouri River at an approximate elevation of 1,953-ft. above Mean Sea Level (MSL). A Well Location Map reflecting the topography of the subject site is presented herein as *Figure 3*.

- 4.1 Flood Watch.** A Flood Watch indicates flooding is possible. Tune in to NOAA Weather Radio, commercial radio, or television for information regarding potential timing of flooding. Begin preparing to move portable equipment and storage tanks to higher ground. Anchor equipment and storage tanks that cannot be readily moved.
- 4.2 Flash Flood Watch.** A Flash Flood Watch indicates flooding may occur without warning. Be prepared to move personnel, equipment, and portable storage tanks to higher ground; listen to NOAA Weather Radio, commercial radio, or television for information.



**CONTINENTAL RESOURCES**  
WELL LOCATION



ATLANTA 1-6H  
SECTION 6, T153N, R101W  
WILLIAMS CO., NORTH DAKOTA

**CYCLONE DRILLING, INC. RIG NO. 20  
CONTINGENCY PLAN  
FOR DRILLING ACTIVITIES CONDUCTED AT THE  
CONTINENTAL RESOURCES, INC. ATLANTA 1-6H  
6-153N-101W, WILLIAMS COUNTY, NORTH DAKOTA**

---

- 4.3 Flood Warning.** A Flood Warning indicates flooding is occurring or will occur soon; if advised to evacuate, do so immediately, if safe to do so move equipment and portable storage tanks to higher ground.
- 4.4 Flash Flood Warning.** A Flash Flood Warning indicates flash flood is occurring; personnel should seek higher ground on foot immediately.
- 4.5 Flood Evacuation Plan.** In the event the Cyclone Drilling Foreman determines that the facility must be evacuated due to flooding, they will notify the personnel concerned by verbally announcing an evacuation or using internal two-way radios. All personnel will be required to meet at the designated evacuation assembly area.

The Cyclone Drilling Foreman will account for all employees at the work site. In the event any employees are missing, an immediate report will be made to the Safety Department. Good judgment must be used in evacuation procedures to avoid placing people in greater danger.

## **5. PREPAREDNESS AND PREVENTION REQUIREMENTS**

Preparedness and prevention is required for all spills and potential flooding. The Cyclone Drilling Foreman will function as Emergency Coordinator and be responsible for establishing and implementing the preparedness and prevention measures discussed in the following sections of this Plan.

- 5.1 Emergency Equipment.** Cyclone Rig No. 20 located at the Atlanta 1-6H will be properly equipped so that Cyclone personnel can immediately respond to an emergency during working hours utilizing emergency equipment. Typical emergency equipment includes but is not limited to fire extinguishers, eyewash stations, first-aid stations, and spill response equipment. Employees will be trained and familiarized with the use and location of all emergency equipment prior to beginning operations at a work site
- 5.2 Internal Communication.** For larger jobs, Cyclone personnel use two-way radios to communicate between the rig personnel and supervisor. For smaller jobs, verbal communication is sufficient. During emergency situations, verbal communication and two-way radios (if available) will be used to provide immediate instructions to emergency response personnel. These systems are maintained, as necessary, to ensure proper operation during an emergency.
- 5.3 External Communication.** Telephones (available on some larger jobs) and cell phones are used to notify Continental's office in the event of an emergency. The office would telephone for assistance from local emergency response personnel, if necessary. The phones are routinely used to ensure proper operation.
- 5.4 Inspections.** Inspections of oil storage units, containment, and emergency equipment are conducted routinely to detect malfunctions and deterioration, operator errors, and/or

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6-153N-101W, WILLIAMS COUNTY, NORTH DAKOTA**

---

discharges that may lead to, or cause a release of, oil from containment units or from the work site.

- 5.5 Training.** Cyclone personnel that are likely to respond to an incident are trained at least annually in solid waste management, spill response procedures, and stormwater management according to the procedures contained in this Plan. These employees are trained to perform in a manner that emphasizes accident and pollution prevention in an effort to safeguard human health and the environment.

The Cyclone Drilling Foreman is responsible for instructing appropriate personnel in the operation and maintenance of spill response equipment as well as all applicable spill control procedures. When employees are assigned to areas where oil spills may occur, it is required that a review of this Contingency Plan be conducted during on-the-job training sessions.

- 5.6 Emergency Evacuation Plan.** In the event the Cyclone Drilling Foreman determines that the facility has experienced a release, fire, or explosion that could threaten human health, they will notify the personnel concerned by verbally announcing an evacuation or using internal two-way radios. All personnel in the immediate vicinity of the emergency will be required to leave the area and report to his/her immediate supervisor at the designated evacuation assembly area. The assembly area will be determined prior to beginning operations at a work site, but may change based on wind direction during an actual emergency. The assembly area should be upwind of the work site.

The Cyclone Drilling Foreman will account for all employees at the work site. In the event any employees are missing, an immediate report will be made to the Safety Department. Good judgment must be used in evacuation procedures to avoid placing people in greater danger.

## **6. EMERGENCY RESPONSE PROCEDURES**

Emergency Response Procedures have been established for Cyclone's work sites in the event of a spill. All spills, major and minor, will be reported to the Cyclone Drilling Foreman and Continental's Environmental Specialist. The emergency response procedures are included in *Appendix A*. The responsibilities of the First Responder, Cyclone Drilling Foreman, and Continental's Environmental Specialist are addressed in the following sections of this Plan.

- 6.1 First Responder.** When a spill occurs, the employee observing the incident will immediately notify the Cyclone Drilling Foreman and proceed to eliminate the spill source, if possible.
- 6.2 Emergency Coordinator Responsibilities.** The Cyclone Drilling Foreman will **(a)** be responsible for determining whether the release could reach navigable waters or threaten human health and/or the environment; **(b)** assess the hazard, make immediate notifications, and implement spill response procedures; **(c)** collect the necessary information for regulatory notifications and reports; and **(d)** provide the reporting information to Continental's Environmental Specialist.

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Continental's Environmental Specialist will make immediate verbal notifications and prepare and submit all required written spill reports.

Material Safety Data Sheets (MSDS) for the hazardous materials used at the work site are maintained on-site in the "doghouse" and provide information on the chemical hazards at the work site. Most releases will be minor and require only clean-up and disposal of small quantities of material. However, in the event the assessment indicates that evacuation of local areas may be advisable, they will immediately notify appropriate local authorities, as necessary. Appropriate authorities may include local police and fire departments, hospitals, and state and local emergency response teams, as identified in *Table 1*.

The Cyclone Drilling Foreman will immediately notify Continental's Environmental Specialist who will make initial verbal notifications to regulatory agencies and prepare written follow-up reports, as required. In the event the release has impacted the environment, the Cyclone Drilling Foreman and Continental's Environmental Specialist will determine clean-up requirements. In addition, the Cyclone Drilling Foreman and Environmental Specialist will coordinate the appropriate disposal of waste material generated during the response activities.

## **7. SPILL NOTIFICATION REPORTING**

**7.1 Spill Notification and Reporting.** Upon receiving spill information, the Emergency Coordinator will notify Continental's Environmental Specialist who will determine if the spill requires notification and/or reporting to regulatory agencies, as outlined below:

**7.1.1 North Dakota Industrial Commission (NDIC).** According to the North Dakota Industrial Commission's (NDIC) General Rules and Regulations North Dakota Administrative Code (NAC) Chapter 43-02-03 Section C. Drilling:

*All persons controlling or operating any well, pipeline, receiving tank, storage tank, or production facility into which oil, gas, or water is produced, received, stored, processed, or through which oil, gas, or water is injected, piped, or transported, shall verbally notify the director within 24-hrs. after discovery of any fire, leak, spill, blowout, or release of fluid. If any such incident occurs or travels offsite of a facility, the persons, as named above, responsible for proper notification shall within a reasonable time also notify the surface owners upon whose land the incident occurred or traveled. Notification requirements prescribed by this section do not apply to any leak, spill or release of fluid that is less than 1-bbl total volume and remains onsite of a facility. The verbal notification must be followed by a written report within 10-days after cleanup of the incident, unless deemed unnecessary by the director.*

**7.1.2 National Response Center (NRC).** Any discharge to water must be reported immediately to the National Response Center. Therefore, the Cyclone Drilling Foreman must immediately inform Continental's Environmental Specialist with details regarding the spill so that official notifications can be made to the National Response Center.



May 7, 2012

Industrial Commission of North Dakota  
Oil & Gas Division  
600 East Boulevard, Dept 405  
Bismarck, North Dakota 58505

Re: Atlanta Federal 6-6H

Continental Resources, Inc., would like to request all filings and information regarding the above captioned well be considered "Tight Hole".

Please charge the Continental Resources, Inc., credit card that is on file with your agency for the application fee of this well.

Thank you for your prompt attention to this matter. If you have any questions, you may contact me at 580-548-5139 or email the following [Terry.Olson@clr.com](mailto:Terry.Olson@clr.com).

Sincerely,

**CONTINENTAL RESOURCES, INC.**

  
Terry L. Olson  
Regulatory Compliance Specialist