



## 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)

REMOVED

JAN 28 2020

Well File No.  
23363

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.

PLEASE SUBMIT THE ORIGINAL.

NO OIL &amp; GAS DIVISION

Well Name and Number <b>Atlanta Federal 10-6H</b>	Qtr-Qtr <b>NENW</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 25, 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 25, 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>	



**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/)

#23363

March 29, 2017

Ms. Donna Patocka  
Continental Resources, Inc.  
P.O. Box 269000  
Oklahoma City, OK 73126

**RE: Atlanta Federal #10-6H  
NENW Sec. 6, T.153N., R.101W.  
Williams County, North Dakota  
Baker Field  
Well File No. 23363  
STRIPPER WELL DETERMINATION**

Dear Ms. Patocka:

Continental Resources, Inc. (Continental) filed with the North Dakota Industrial Commission – Oil and Gas Division (Commission) on December 15, 2016 an application for a Stripper Well Determination for the above captioned well.

Information contained in the application indicates that the above mentioned well is a stripper well pursuant to statute and rule, and Continental has elected to designate said well as a stripper well. The well produced from a well depth greater than 10000 feet and was completed after June 30, 2013. During the qualifying period, December 1, 2015 through November 30, 2016, the well produced at a maximum efficient rate or was not capable of exceeding the production threshold. The average daily production from the well was 32.2 barrels of oil per day during this period.

It is therefore determined that the above captioned well qualifies as a "Stripper Well" pursuant to Section 57-51.1-01 of the North Dakota Century Code. This determination is applicable only to the Bakken Pool in and under said well.

The Commission shall have continuing jurisdiction, and shall have the authority to review the matter, and to amend or rescind the determination if such action is supported by additional or newly discovered information. If you have any questions, do not hesitate to contact me.

Sincerely,

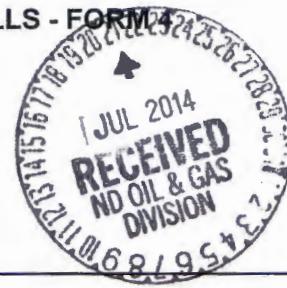
David J. McCusker  
Petroleum Engineer

Cc: ND Tax Department



## SUNDRY NOTICES AND REPORTS ON WELLS - FORM 5

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.  
**23363**

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>June 4, 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 10-6H</b>					
Footages	Qtr-Qtr	Section	Township	Range	
<b>495 F N L</b>	<b>1305 F W L</b>	<b>NENW</b>	<b>6</b>	<b>153 N</b>	<b>101 W</b>
Field	Pool	County			
<b>Baker</b>	<b>Bakken</b>	<b>Williams</b>			

24-HOUR PRODUCTION RATE	
Before	After
Oil <b>93</b> Bbls	Oil <b>48</b> Bbls
Water <b>299</b> Bbls	Water <b>208</b> Bbls
Gas <b>36</b> MCF	Gas <b>17</b> MCF

Name of Contractor(s)			
Address	City	State	Zip Code

### DETAILS OF WORK

Continental Resources would like to request a change in production method on the Atlanta Federal 10-6H. The well went from flowing to pumping on 6/4/2014.

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 Compliance Specialist</b>	Date <b>July 18, 2014</b>	
Email Address <b>Zach.Green@clr.com</b>		

FOR STATE USE ONLY	
<input checked="" type="checkbox"/> Received	<input type="checkbox"/> Approved
Date <i>7/18/14</i>	
By <i>Zach Green</i>	
Title <i>Regulatory Compliance Specialist</i>	



## **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  
SFN 2468 (04-2010)

Well File No.  
**23363**

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

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

**Designate Type of Completion**

- Oil Well       EOR Well       Recompletion       Deepened Well       Added Horizontal Leg       Extended Horizontal Leg  
 Gas Well       SWD Well       Water Supply Well       Other:

### We | Name and Number

**WEI Name and Number  
Atlanta Federal 10-6H**

MAR 2014  
RECEIVED  
LIBRARY

Well Name and Number <b>Atlanta Federal 10-6H</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**

## **CASING & TUBULARS 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	94				0
	Surface	13 3/8		553	13 1/2	48			625	0
	Surface	9 5/8		2002	13 1/2	36			522	0
	Liner	4 1/2		9999	8 3/4	11.6				
	Intermediate	7		10918	8 3/4	26-32			935	2000
	Liner	4 1/2	9979	20385	6	11.6		9979		

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

## PRODUCTION

Current Producing Open Hole or Perforated Interval(s), This Completion, Top and Bottom, (MD Ft) <b>Bakken 10,918' - 21,517'</b>							Name of Zone (If Different from Pool Name) <b>Three Forks</b>	
Date Well Completed (SEE INSTRUCTIONS) 2/24/2014			Producing Method <b>Flowing</b>	Pumping-Size & Type of Pump			Well Status (Producing or Shut-In) <b>Producing</b>	
Date of Test <b>3/15/2014</b>	Hours Tested <b>24</b>	Choke Size <b>14 /64</b>	Production for Test	Oil (Bbls) <b>410</b>	Gas (MCF) <b>174</b>	Water (Bbls) <b>580</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>410</b>	Gas (MCF) <b>174</b>	Water (Bbls) <b>580</b>	Gas-Oil Ratio <b>424</b>

## GEOLOGICAL MARKERS

#### **PLUG BACK INFORMATION**

CORES CUT

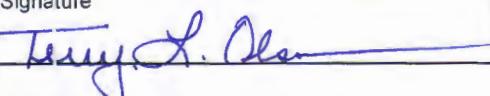
Top (Ft)	Bottom (Ft)	Formation	Top (Ft)	Bottom (Ft)	Formation

## Drill Stem Test

**Well Specific Stimulations**

Date Stimulated 12/28/2014	Stimulated Formation 3 Forks		Top (Ft) 10918	Bottom (Ft) 20517	Stimulation Stages 30	Volume 58554	Volume Units Barrels
Type Treatment Sand Frac	Acid %	Lbs Proppant 3483041			Maximum Treatment Pressure (PSI) 7877	Maximum Treatment Rate (BBLS/Min) 24.0	
Details Puniped 139087# 40/70 mesh, 2343240# 20/40 sand and 1000714# 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

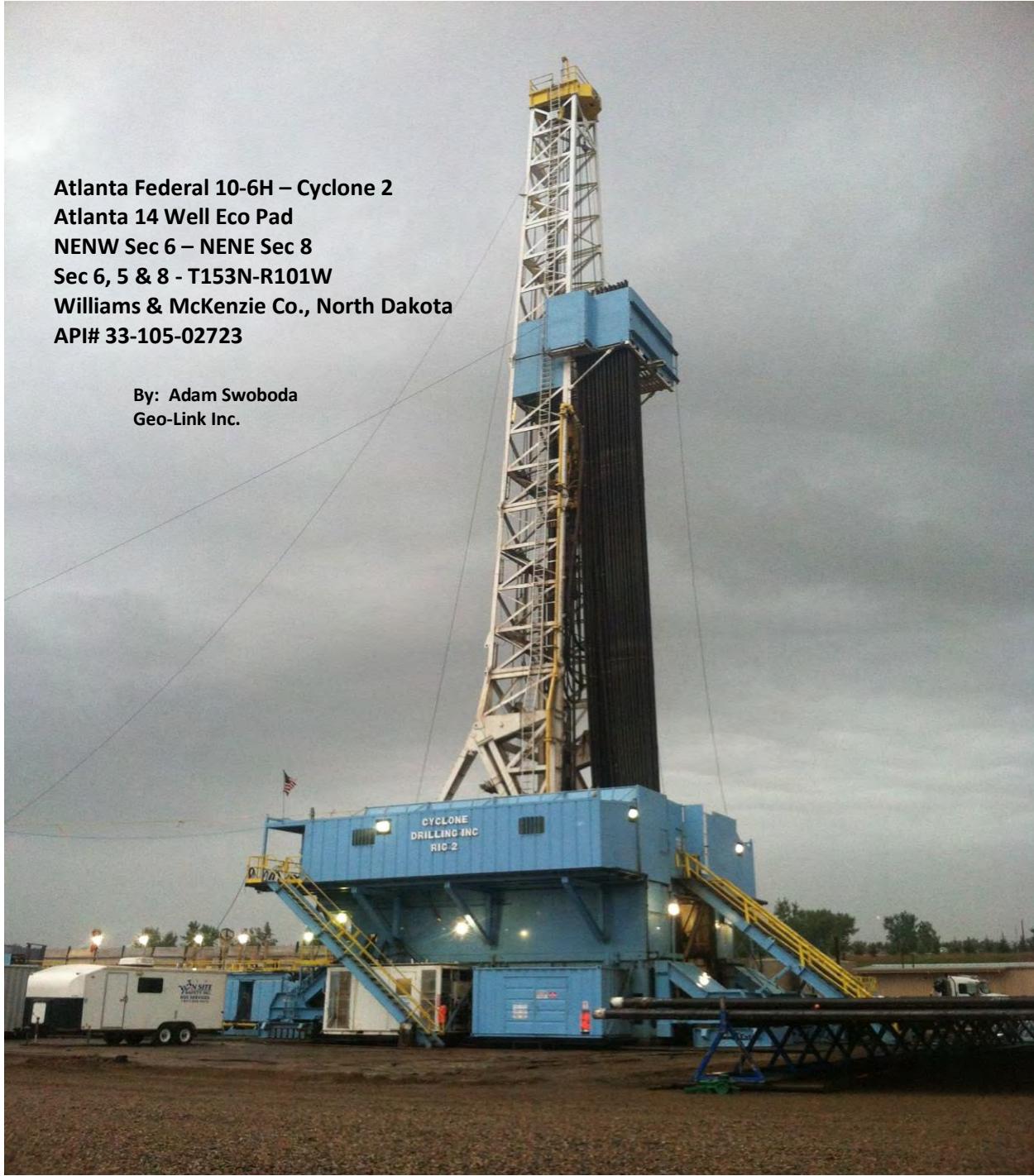
INDUSTRIAL COMMISSION OF NORTH DAKOTA  
OIL AND GAS DIVISION  
600 EAST BOULEVARD DEPT 405  
BISMARCK, ND 58505-0840  
SFSN 5698 (03-2000)





**Atlanta Federal 10-6H – Cyclone 2**  
**Atlanta 14 Well Eco Pad**  
**NENW Sec 6 – NENE Sec 8**  
**Sec 6, 5 & 8 - T153N-R101W**  
**Williams & McKenzie Co., North Dakota**  
**API# 33-105-02723**

By: Adam Swoboda  
Geo-Link Inc.





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## Well Information

WELL NAME:	Atlanta Federal 10-6H Atlanta 14 Well Eco Pad
OPERATOR:	Continental Resources, Inc. P.O. Box 269000 Oklahoma City, Ok 73126
SURFACE LOCATION:	495qFNL & 1305qFWL NENW Section 6, T153N, R101W
CASING:	7+intermediate casing set at 10918qMD; 10589.28qTVD 786qFNL & 1818qFWL NENW Section 6, T153N, R101W
BOTTOM HOLE LOCATION:	Projection to Bit: 20517qMD; 10594.83qTVD 252qFNL & 231qFEL NENE Section 8, T153N, R101W
FIELD/AREA:	Williston
COUNTY:	Williams & McKenzie Co.
STATE:	North Dakota
API#:	33-105-02723
ELEVATION:	GL: 1945q KB: 1967q
SPUD:	September 6 <sup>th</sup> , 2013
DRILLED OUT OF 7+CASING: (LATERAL SECTION)	September 14 <sup>th</sup> , 2013
TOTAL DEPTH/DATE:	20517qMD . September 23 <sup>rd</sup> , 2013 . 09:50
Total Days:	17
BOTTOM HOLE DATA:	
Kick-off Point:	10080qMD; 10077qTVD
Vertical Section:	10185.62q
Drift of Azimuth	118.43°
Average Inclination (lateral):	90.3° - Start/Lateral to 15200qMD; 89.7° - 15200 to End/Lateral
Lateral footage:	9579q
WELL STATUS:	To be completed as a Three Forks oil well
MWD REP:	MS Energy (Tim Coleman)



## Well Information

DIRECTIONAL REP: MS Energy (Kurt Wortley)

MUD LOGGING SERVICE: Geo-Link Inc.

GEOLOGICAL CONSULTANT: Adam Swoboda  
Second Hand: R.C. Whitmore / Joe Dunn

GAS EQUIPMENT: M-Logger / M-Control . SN ML-137  
Spare SN ML-077

SAMPLE PROGRAM:  
Vertical & Build Section:  
30qSamples lagged and caught by mud loggers 8300q10938q  
Charles Salt, Mission Canyon, Lodgepole, Upper Bakken Shale,  
Middle Bakken Member, Lower Bakken Shale, Three Forks  
Dolomite

Lateral Section:  
100qSamples lagged and caught by mud loggers 11000q20517q  
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 10-6H**  
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



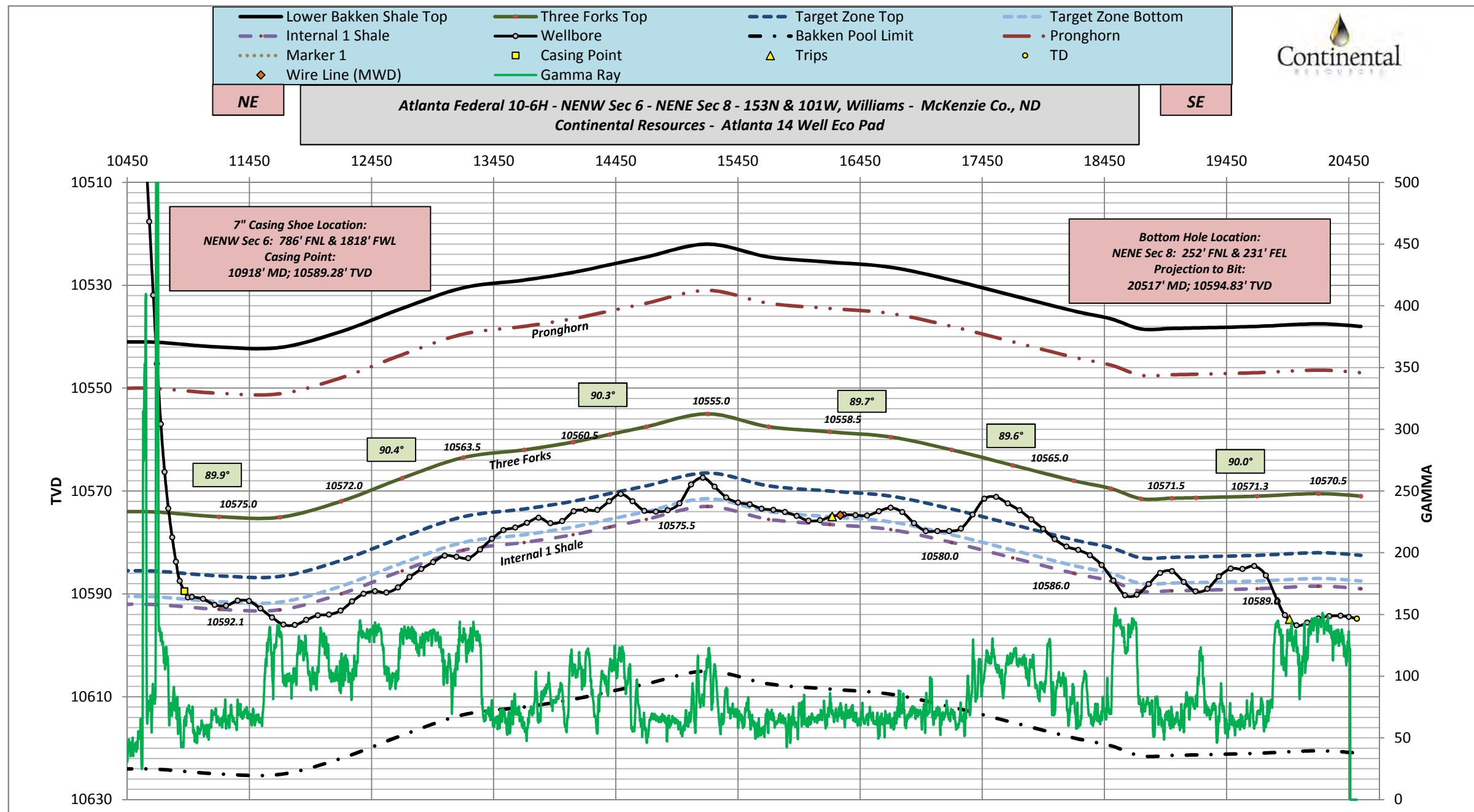
## Well Information

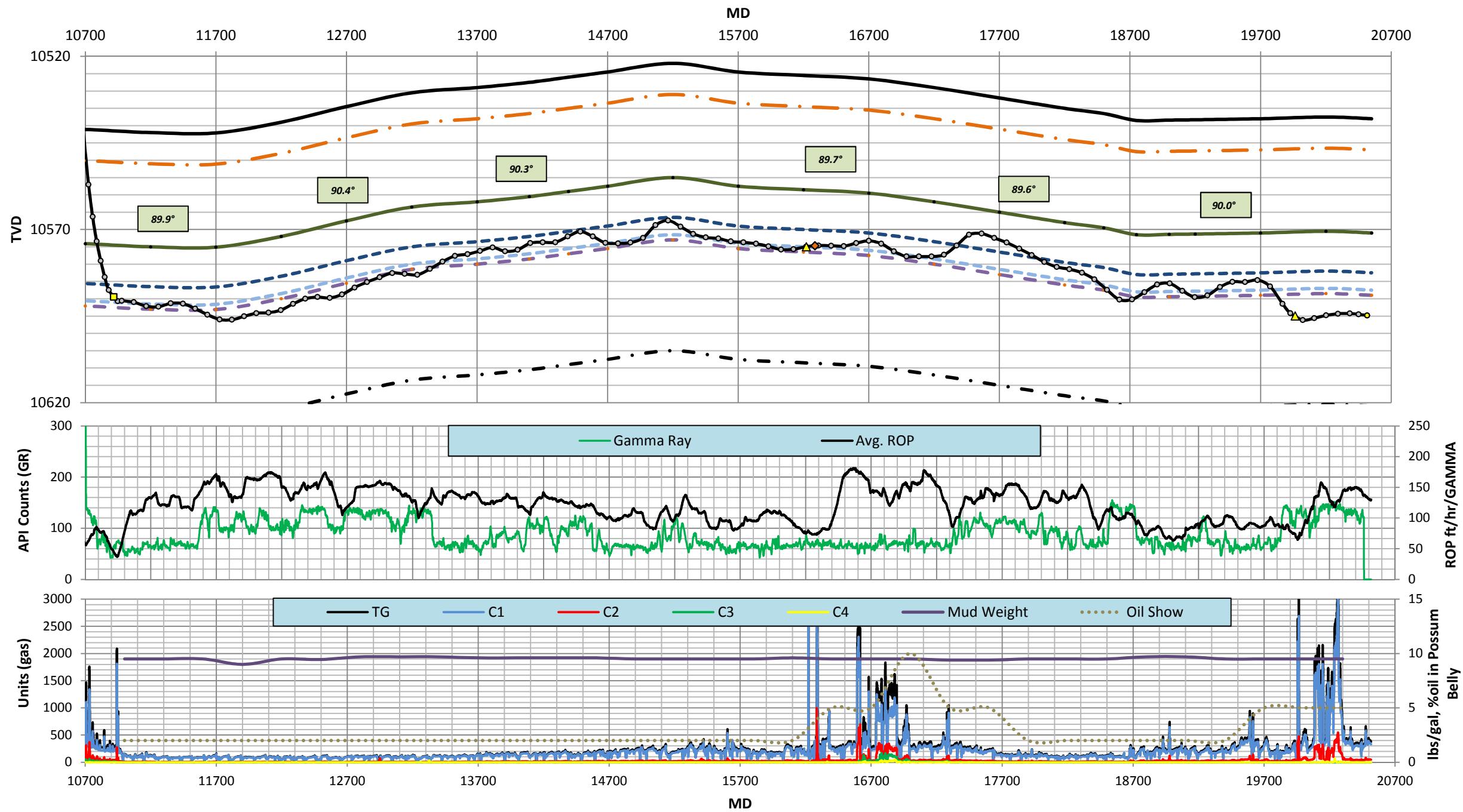
Liberty Resources, LLC Attn: Reports 1200 17 <sup>th</sup> Street, Suite 2050 Denver, CO 80202 Email: <a href="mailto:reports@libertyresourcesllc.com">reports@libertyresourcesllc.com</a> (Send Well Information daily, via email)	See Attached Requirements	No	Yes
MHM Resources, LP Attn: Julie Larson P.O. 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
Richard J. Rigo 709 Glen Ct., Unit 10 Grand Junction, CO 81506-8232 Phone: 970.257.9465 E-Mail: <a href="mailto:dickjanrigo@gmail.com">dickjanrigo@gmail.com</a> (Send Well Information daily, via email)	Standard Well Information; Final copy of logs/reports on disc	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	Standard Well Information	No	Yes



## Well Information

Fax: 701.223.2556 E-Mail: <a href="mailto:w2harris@aol.com">w2harris@aol.com</a> (Send Well Information daily, via email)			
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







## WELL SYNOPSIS

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**Well Plan:** The Atlanta Federal 10-6H was spud on September 6<sup>th</sup>, 2013 with a surface location of 495' FNL and 1305' FWL, NENW Section 6 - Township 153 North and Range 101 West in Williams County, North Dakota. This well was operated by Continental Resources Incorporated with the objective target of the late Devonian Three Forks Formation.

The plan showed a build section with a kickoff point of 10011' MD in the Mississippian Lodgepole with a 10°/100' build rate to the landing point of 10911' MD; 10584' TVD in the clean gamma zone within the Three Forks Formation. This zone started approximately 11' below the Three Forks. The landing target was approximately 15' into the Three Forks Formation. The plan was to drill lateral for an estimated 9655' to the hardline in the NENE corner of section 8 - Township 153 North and Range 101 West following the estimated dip of 89.9°. The projected well path is to the Southeast with a proposed azimuth of 118.43°.

The offsets provided were the Atlanta wells already drilled on the Atlanta Eco pad. These include the Atlanta 1-6H through 4-6H, 11-6H through 14-6H, and Atlanta Federal 5-6H through 9-6H drilled by Continental Resources.

Gas logged in the vertical and lateral sections were monitored using Mud Logging Systems – Mlogger & Mcontrol. (Primary Logger: ML-137 – Backup Logger ML-077) M-Logger CC & TC filaments calibrated with 1% and 100% test gas – Chromatograph calibrated with 1% test gas (gas-units).

**Build Section:** The well was kicked off at 10080' MD on September 11<sup>th</sup>, 2013 at 00:25 hrs. The up hole markers logged were the Charles Salt (8310' TVD), Base of the Last Salt (9019' TVD), Mission Canyon (9241' TVD), and the Lodgepole (9784' TVD). The down hole markers below kick off point consisted of the False Bakken (10483' TVD), Upper Bakken Shale (10493' TVD), Middle Bakken Member (10508' TVD), Lower Bakken Shale (10542' TVD), Three Forks Dolomite (10574' TVD). The down hole markers fluctuated between 1-3' high versus the other Atlanta Eco Pad Three Forks Wells and fluctuated 1-3' in thickness. The Bakken Shale and Middle Bakken Dolomite came in 1-2' higher than the previous Atlanta Wells giving us an estimated landing @ 10589' TVD. The Lower Bakken Shale had a thickness of 11' of actual black-brown shale, but consisted of a sticky intermediate layer (Pronghorn) below the shale that was 23' thick – our landing was targeted 15' below the base of this intermediate layer in the clean Dolomite zone. The landing was completed September 12<sup>th</sup>, 2013 at 10:40 hrs @ 10938' MD, with a Casing point: 10918' MD; 10589.28' TVD and casing location of NENW Sec 6: 786' FNL & 1818' FWL (See Atlanta Federal 10-6H Build and TVD log for more information regarding samples & formation thicknesses)

Gas observed in the build section showed gas averaging 52 units through the Lodgepole formation with trace amounts of background sample shows and oil shows. Both Upper and Lower Bakken Shale resulted in 129-2205 units. The Middle Bakken Member ranged from 230-1259 units, averaging 290 units. The Three Forks ranged from 230-480 units, averaging 263 units. Connection gasses ranged from 521 units to 1267 units through the entire build section. (See Atlanta Federal 10-6H Build Log, for more detailed gas data)



## WELL SYNOPSIS

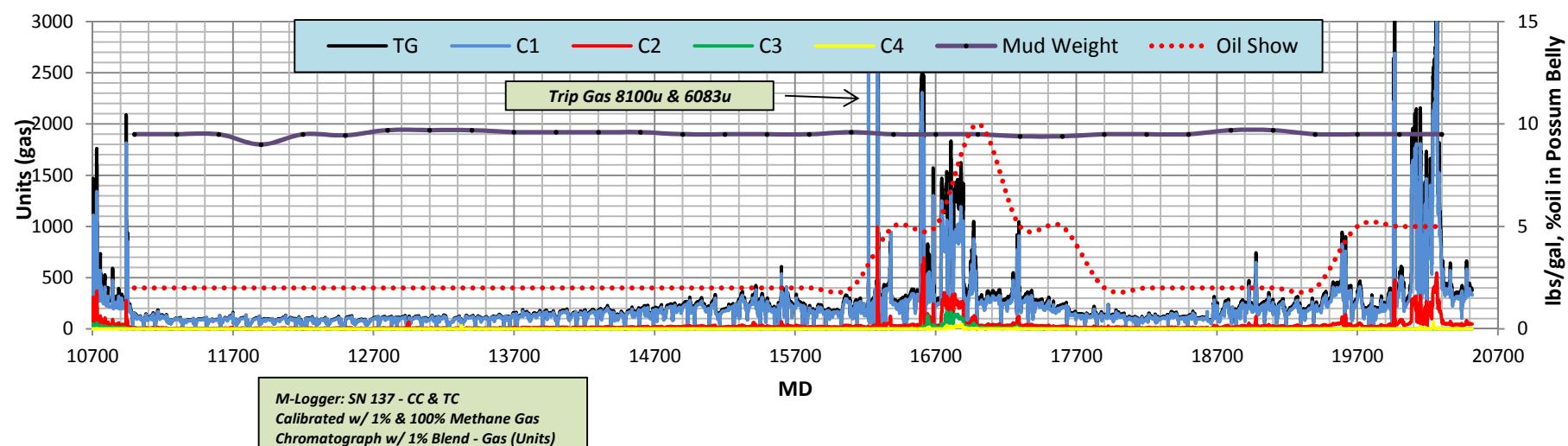
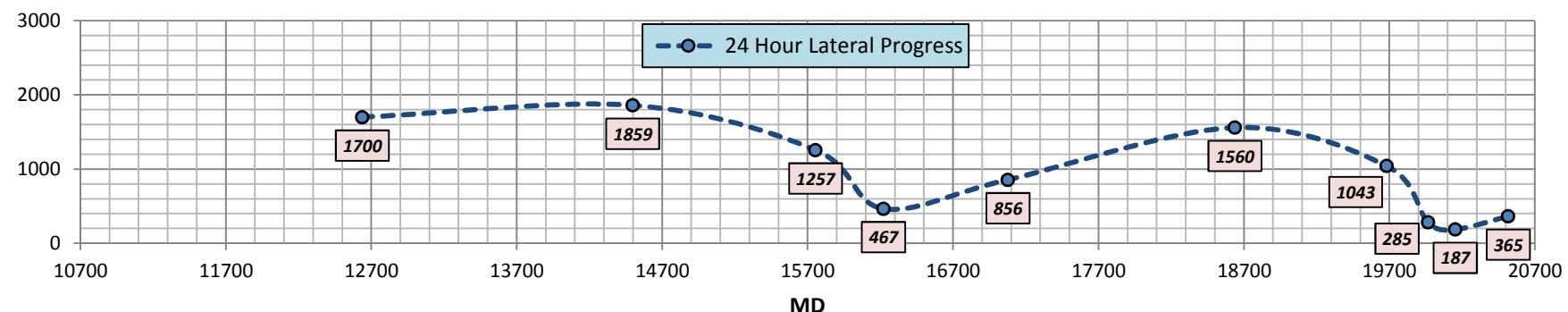
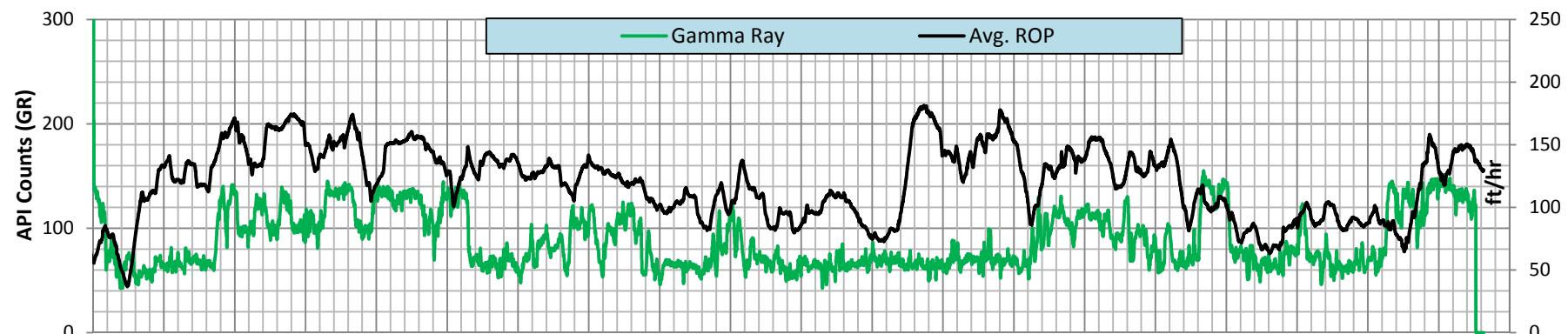
**Lateral Leg:** Penetration of the lateral section started on September 14<sup>th</sup>, 2013 at 06:00 hrs with a depth of 10938' MD, drilling with a 6" Smith MDSi613 bit and Hunting 4.75, 6/7lobe 5.0 stage 1.5° fxd; RPG .81 mud motor. The plan was to drill in the Target zone and follow the 6' zone of interest between the Internal Shale and a hot gamma marker 11.5' from the top of the Three Forks. The lateral section was drilled from 10938' MD to 20517' MD for a lateral length of 9579', with a bottom hole location: 252' FNL & 231' FEL – NENE Sec 8, T153N-R101W – completed on September 23<sup>rd</sup>, 2013 – 09:50 hrs. The lateral section was drilled entirely in the Three Forks Formation with two complete trips for BHA's; (16221'MD & 19965'MD) and one successful wire-line attempt at 16287'MD.

Samples collected in the lateral section mostly consisted of light-medium gray, buff-tan Dolomite/Limestone consisting of trace amounts of disseminated Pyrite, mainly in our target zone starting about 12' below the Three Forks top. The lower zone resulted in tan/brown clean Dolomite, above the Internal 1 Shale. These two zones showed fair to good porosity, but little to trace amounts of oil shows or cut. The Internal 1 Shale consisted of light-medium gray Limestone at the top ranging to red oxidized limestone/Shale. Gas averaged 237 units and ranged from 42 units to 3420 units of gas. Connection gasses ranged from 100 units to 6083 units and trip gas ranged from 200 units to 8100 units. Gas in the target zone was predominately better than drilling above the target zone. Gas in the Internal 1 Shale was consistent with the target zone, although oil shows were in very little amounts with trace amounts of cut. (For more detailed sample descriptions – see Atlanta Federal 10-6H Lateral Log)

The formation dip was configured using two significant hot spots in our target zone. These were illustrated by the upper and lower target markers. The upper marker ranged from 100–129 (API) and in the lower section of our target zone was a cool gamma zone roughly from just below the top of target to about 2.5' above the Internal 1 Shale, which ranged from 52-95 (API) seen throughout the lateral. The Internal 1 Shale ranged from 90-155 (API) displaying hotter counts towards the top gradually cooling the deeper we got. There was a total of 2700' drilled in the Internal 1 Shale, or about 28.2% of the total lateral. The markers in the bottom were definitely clearer versus being above the upper target zone. Above the upper target zone displayed more Pyrite, giving more erratic gamma counts, whereas below the target zone displayed less Pyrite in the clean tan-brown Dolomite giving us lower gamma counts. This zone resulted in much better well control resulting in less erratic build rates versus what's typical above the upper target zone where pyrite is more concentrated; about 619' was drilled above the target zone. Although, drilling in the target zone resulted in one significant dog leg of 7.33°, taking a 91.1° Inc. to an 86.7° Inc. ultimately putting us into the Internal 1 Shale 700' before lateral completion. The Internal 1 Shale resulted in excellent drilling, but large slides were needed just to exit the Internal Shale because of terrible build rates, common in the Internal 1 Shale as well as the Internal Shale top was often quite hard and difficult to drill out of. Utilizing both zones we were able to calculate an accurate formation dip rate. The Formation climbed 19' from the start of the lateral to about 15200' MD (90.3° Dip) and then dropped roughly 16' before leveling out at 19000' MD (89.7° Dip), then slightly climbing 1-2' for the last 1500' (90.04° Dip). The lateral was TD'd approximately 5.83' below the Internal 1 Shale top – due to the inability to get to bottom and slide. (For more detailed gamma signatures and structure please see Atlanta Federal 10-6H cross section)

Drilling Activity - Atlanta Federal 10-6H															
Day	Date	Depth	Footage	WOB	RPM	Diff P	ROP	SPP	SPM	WT	VIS	ACTIVITY			
3	9/9/2013	8860	1480	35.9	88	440	78.3	2875	99	10.9	46	Drilling Vertical Section: Drill, Slide, Survey, Rig Service			
4	9/10/2013	9729	869	29.7	62	302	42	2705	100	10.7	47	Drilling Vertical Section: Drill, Slide, Survey, Rig Service, TIH w/ new Bit, TOOH for Bit @ 9058' MD			
5	9/11/2013	10157	428	31	24	327	29.4	3032	99	10.8	50	Drilling Build Section: Drill, Slide, Survey, Rig Service, TIH w/ Build Assembly, TOOH for Build Assembly @ 10080' MD (KOP)			
6	9/12/2013	10811	654	35.9	0	163.8	32.1	3868	97	11	56	Drilling Build Section: Drill, Slide, Survey, Rig Service			
6	9/12/2013	10938	127	19.7	28	280.7	61.6	2612	89	10.9	52	TD Atlanta Federal 10-6H Build Section @ 10938' MD - 9/12/13 - 10:40, Short Trip, Drill, Slide, Survey, Rig Service, Casing Operations			
7	9/13/2013	Casing Operations													
8	9/14/2013	Casing Operations													
9	9/15/2013	12638	1700	19	54	574.5	131.4	2437	89	9.8	26	Drilling Lateral Section: Drill, Slide, Survey, Rig Service, Drill out of Casing: 9/14/13 - 06:00, TIH w/ Lateral Assembly			
10	9/16/2013	14497	1859	14.5	52	591.8	116.4	2582	90	9.6	28	Drilling Lateral Section: Drill, Slide, Survey, Rig Service			
11	9/17/2013	15754	1257	50.9	0	64.5	46.8	2299	97	9.5	27	Drilling Lateral Section: Drill, Slide, Survey, Rig Service			
12	9/18/2013	16221	467	19.8	54	404.3	63.2	2593	94	9.6	28	Drilling Lateral Section: TIH w/ new Lateral Assembly, TOOH for BHA @ 16221' MD: 9/17/13 - 13:15, Drill, Slide, Survey, Rig Service			
13	9/19/2013	17077	856	20.5	48	686	246.1	3636	106	9.5	27	Drilling Lateral Section: Drill, Slide, Survey, Rig Service, Wire-Line MWD @ 16287' MD - 9/18/13 - 09:15 Resume Drilling 9/18/13 - 17:00, Resume Drilling: 9/18/13 - 06:00, TIH w/ new Lateral Assembly			
14	9/20/2013	18637	1560	21.8	0	94.5	0	3230	105	9.5	27	Drilling Lateral Section: Drill, Slide, Survey, Rig Service			
15	9/21/2013	19680	1043	28.6	56	613.7	104.5	3534	106	9.5	27	Drilling Lateral Section: Drill, Slide, Survey, Rig Service			
16	9/22/2013	19965	285	23.8	51	25.4	0	2935	106	9.45	29	Drilling Lateral Section: Picking up new Lateral Assembly, TOOH for BHA @ 19965' MD - 9/21/13 - 18:30, Circulate Polymer Sweep, Drill, Slide, Survey, Rig Service			
17	9/23/2013	20152	187	13.4	54	275.3	57.9	2717	92	9.5	27	Drilling Lateral Section: Drill, Slide, Survey, Rig Service, Resume Drilling: 9/22/13 - 21:20, Repair Top Drive, TIH w/ new Lateral Assembly			
17	9/23/2013	20517	365	11.3	56	684.9	128.7	3138	89	9.5	28	TD Atlanta Federal 10-6H @ 20517' MD: 9/23/13 - 09:50, Drill, Slide, Survey, Rig Service			

Chronological Gas/Sample/Oil							
Atlanta Federal 10-6H							
Date	Depth 0500hrs	Max Gas(u)	Avg Gas(u)	Conn Gas(u)	Trip Gas(u)	Oil Show	Sample Show
9/9/2013	8860	50	17	na	na	na	no shows
9/10/2013	9729	134	32	na	na	na	no shows
9/11/2013	10157	81	42	17-60	34-59	na	no shows
9/12/2013	10811	2078	238	521-1267	na	na	DULL INVERT FLOR, G IMMED STREAMING WHT POS IVERT CUT
9/12/2013	10938	584	273	584	500-1860	na	DULL BRI YEL POS INV FLOR, F-G IMMED YEL BLU/WHT DIFF/STRMNG POS INV C
9/13/2013	Casing Operations						
9/14/2013	Casing Operations						
9/15/2013	12638	2052	94	100-939	250-2051	2%	V FNT DULL YEL/GRN FLOR, P SLW-WK BLU/WHT C
9/16/2013	14497	228	115	93-228	na	2%	V FNT DULL YEL/GRN FLOR, P SLW-WK BLU/WHT C
9/17/2013	15754	609	207	174-420	na	2%	V FNT DULL YEL/GRN FLOR, P SLW-WK BLU/WHT C
9/18/2013	16221	331	195	228-277	250-475	2%	V FNT DULL YEL/GRN FLOR, P SLW-WK BLU/WHT C
9/19/2013	17077	8102	605	381-6083	500-8102	10%	DULL YEL/GRN FLOR, P SLW-WK BLU/WHT C
9/20/2013	18637	1046	180	140-397	na	2%	V FNT DULL YEL/GRN FLOR, P SLW-WK BLU/WHT C
9/21/2013	19680	943	236	289-741	na	5%	DULL YEL/GRN FLOR, P SLW-WK BLU/WHT C
9/22/2013	19965	2631	247	200-397	na	5%	DULL YEL/GRN FLOR, P SLW-WK BLU/WHT C
9/23/2013	20152	2631	805	397-1877	400-3200	5%	DULL YEL/GRN FLOR, P SLW-WK BLU/WHT C
9/23/2013	20517	3540	809	642	na	5%	DULL YEL/GRN FLOR, P SLW-WK BLU/WHT C



Formation Tops - Atlanta Federal 10-6H						
VERTICAL & BUILD SECTIONS						
FORMATION TOPS	Ground Elevation:		1945	Kelly Bushing:		1967
Formation	MD (ft)	TVD (ft)	SS (ft)	VS (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	8313	8310	-6343	36.78	-6333	10
BLS	9022	9019	-7052	36.74	-7044	8
Mission Canyon	9244	9241	-7274	36.12	-7267	7
Lodgepole	9787	9784	-7817	32.72	-7820	-3
False Bakken	10562	10483	-8516	256.05		
Upper Bakken Shale	10581	10493	-8526	272.01	-8529	-3
Middle Bakken	10611	10508	-8541	297.88	-8543	-2
Lower Bakken Shale	10686	10542	-8575	364.81	-8574	1
Three Forks	10790	10574	-8607	463.24	-8602	5
			Projected Tops			
			Not Projected			
			Sub Sea (ft)			
			Actual Tops Picked			
			Tops picked by Drilling breaks (Rop & Differential), Samples, and Gamma			

<b>Critical Points</b>	<b>MD</b>	<b>TVD</b>	<b>SUBSEA</b>	<b>V/S</b>
Three Forks Formation	<b>10790</b>	<b>10574</b>	<b>-8607</b>	<b>463.24</b>
Kick off Point (KOP)	<b>10080</b>	<b>10077</b>	<b>-8110</b>	<b>31.89</b>
Surface Hole location	<b>NENW Sec 6: 495' FNL &amp; 1305' FWL</b>			
Casing Point	<b>10918</b>	<b>10589</b>	<b>-8622</b>	<b>590.07</b>
Casing Location	<b>NENW Sec 6: 786' FNL &amp; 1818' FWL</b>			
Total Depth (projection to Bit)	<b>20517</b>	<b>10594</b>	<b>-8627</b>	<b>10185.62</b>
Bottom Hole Location	<b>NENE Sec 8: 252' FNL &amp; 231' FEL</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 BHA	<b>16221</b>	<b>10575</b>	TOOH for Bit	<b>9058</b>	<b>9055</b>
Wire-Line	<b>16287</b>	<b>10575</b>	TOOH for Build Assembly (KOP)	<b>10080</b>	<b>10077</b>
TOOH for BHA	<b>19965</b>	<b>10595</b>			

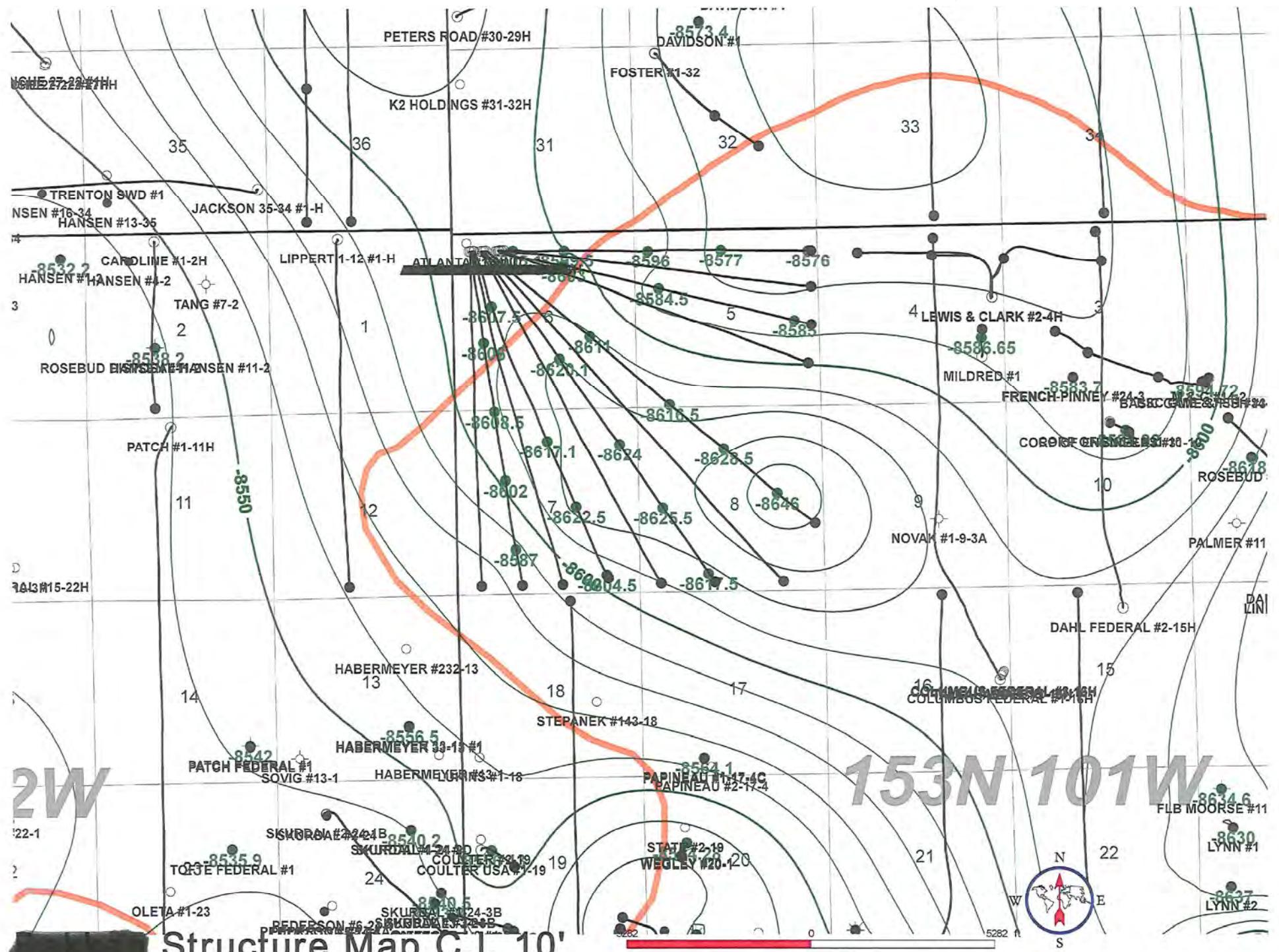
<b>LATERAL SUMMARY</b>		
Total Lateral Footage	<b>9579</b>	%
Three Forks	6879	71.8% <i>Target Zone</i>
Internal Shale	2700	28.2% <i>Out of Target Zone</i>
		<b>100.0%</b>

Atlanta 1-6H					Atlanta 2-6H					Atlanta 3-6H					Atlanta 4-6H				
Formation	MD	TVD	SS	VS	Formation	MD	TVD	SS	VS	Formation	MD	TVD	SS	VS	Formation	MD	TVD	SS	VS
BLS	9017	9016	-7049	18.14	BLS	9020	9019	-7052	13.14	BLS	9015	9014	-7047	-9.18	BLS	9019	9018	-7051	4.06
Mission C.	9239	9238	-7271	16.99	Mission C.	9240	9239	-7272	13.05	Mission C.	9237	9236	-7269	-10.45	Mission C.	9239	9238	-7271	2.15
Lodgepole	9780	9779	-7812	15.28	Lodgepole	9782	9781	-7814	14.82	Lodgepole	9784	9783	-7816	-14.47	Lodgepole	9780	9779	-7812	6.09
KOP	10000	9999	-8032	15.60	KOP	10000	9999	-8032	15.21	KOP	9930	9929	-7962	-15.39	KOP	10011	10010	-8043	12.09
False Bkkn.	10610	10488	-8521	326.17	False Bkkn.	10571	10488	-8521	272.78	False Bkkn.	10642	10485	-8518	360.84	False Bkkn.	10559	10485	-8518	252.58
Up. Bkkn.	10620	10493	-8526	335.47	Up. Bkkn.	10581	10494	-8527	280.93	Up. Bkkn.	10659	10493	-8526	376.20	Up. Bkkn.	10571	10492	-8525	262.37
Mid. Bkkn.	10668	10506	-8539	380.93	Mid. Bkkn.	10609	10509	-8542	304.2	Mid. Bkkn.	10700	10507	-8540	414.34	Mid. Bkkn.	10599	10507	-8540	285.58
Bkkn. Targe	10724	10516	-8549	435.71	Low. Bkkn.	10676	10541	-8574	362.77	Bkkn. Targe	10735	10517	-8550	447.94	Low. Bkkn.	10669	10541	-8574	346.86
7" Int. CP	10890	10524	-8557	601.07	Thr. Frks	10772	10576	-8609	451.53	7" Int. CP	10875	10527	-8560	587.05	Thr. Frks	10760	10574	-8607	431.55
TD Lateral	19936	10478	-8511	9643.55	Thr. Frks TG	10839	10591	-8624	516.01	TD Lateral	20225	10521	-8554	9030.78	7" Int. CP	10933	10587	-8620	602.85
Atlanta Federal 5-6H					Atlanta Federal 6-6H					Atlanta Federal 7-6H					Atlanta Federal 8-6H				
Formation	MD	TVD	SS	VS	Formation	MD	TVD	SS	VS	Formation	MD	TVD	SS	VS	Formation	MD	TVD	SS	VS
Charles Salt	NP	NP	NP	NP	Charles Salt	8316	8315	-6348	5.82	Charles Salt	8311	8310	-6343	7.7	Charles Salt	8313	8312	-6345	40.45
BLS	9016	9015	-7048	11.36	BLS	9020	9019	-7052	5.74	BLS	9015	9014	-7047	1.1	BLS	9022	9021	-7054	41.5
Mission C.	9233	9232	-7265	10.9	Mission C.	9230	9229	-7262	5.96	Mission C.	9238	9237	-7270	0.4	Mission C.	9230	9229	-7262	40.68
Lodgepole	9782	9781	-7814	9.48	Lodgepole	9784	9783	-7816	6.77	Lodgepole	9782	9781	-7814	0.01	Lodgepole	9779	9778	-7811	37.25
KOP	10045	10044	-8077	8.9	KOP	10063	10062	-8095	7.51	KOP	10000	9999	-8032	-0.01	KOP	10070	10069	-8102	39.47
False Bkkn.	10594	10482	-8515	289.63	False Bkkn.	10534	10492	-8525	174.3	False Bkkn.	10595	10480	-8513	295.08	False Bkkn.	10534	10479	-8512	233.15
Up. Bkkn.	10612	10489	-8522	306.19	Up. Bkkn.	10546	10501	-8534	182.4	Up. Bkkn.	10613	10488	-8521	311.41	Up. Bkkn.	10546	10486	-8519	242.68
Mid. Bkkn.	10653	10502	-8535	344.99	Mid. Bkkn.	10568	10516	-8549	198.2	Mid. Bkkn.	10658	10504	-8537	353.17	Mid. Bkkn.	10575	10502	-8535	266.42
7" Int. CP	10872	10521	-8554	562.2	Low. Bkkn.	10617	10547	-8580	236.1	7" Int. CP	10836	10522	-8555	529.05	Low. Bkkn.	10642	10535	-8568	332.53
TD Lateral	21165	10517	-8550	10850.02	Thr. Frks	10681	10580	-8613	291.1	Thr. Frks	10725	10595	-8628	332.1	Thr. Frks	10740	10569	-8602	416.75
Atlanta Federal 9-6H					Atlanta Federal 10-6H					Atlanta 11-6H					Atlanta 12-6H				
Formation	MD	TVD	SS	VS	Formation	MD	TVD	SS	VS	Formation	MD	TVD	SS	VS	Formation	MD	TVD	SS	VS
BLS	9024	9023	-7056	13.77	Charles Salt	8313	8310	-6343	36.78	BLS	9018	9017	-7050	-0.73	BLS	9018	9015	-9015	-6.95
Mission C.	9244	9243	-7276	13.34	BLS	9022	9019	-7052	36.74	Mission C.	9245	9244	-7277	-0.66	Mission C.	9243	9240	-7273	-4.28
Lodgepole	9786	9785	-7818	12.88	Mission C.	9244	9241	-7274	36.12	Lodgepole	9788	9787	-9054	-1.36	Lodgepole	9787	9784	-7817	2.48
KOP	10050	10049	-8082	14.19	Lodgepole	9787	9784	-7817	32.72	KOP	9900	9899	-9166	0.00	KOP	10070	10067	-10067	5.47
False Bkkn.	10603	10486	-8519	296.01	KOP	10080	10077	-8110	31.89	False Bkkn.	10698	10487	-8520	464.23	False Bkkn.	10581	10484	-10484	261.68
Up. Bkkn.	10627	10495	-8528	318.33	False Bkkn.	10562	10483	-8516	256.05	Up. Bkkn.	10719	10496	-8529	483.52	Up. Bkkn.	10600	10493	-10493	278.42
Mid. Bkkn.	10672	10509	-8542	361.21	Up. Bkkn.	10581	10493	-8526	272.01	Mid. Bkkn.	10755	10510	-8543	517.04	Mid. Bkkn.	10632	10508	-10508	306.78
7" Int. CP	10874	10526	-8559	561.86	Mid. Bkkn.	10611	10508	-8541	297.88	Bkkn. Targe	10794	10520	-9787	554.37	Low. Bkkn.	10705	10542	-10542	371.29
TD Lateral	21315	10531	-8564	11000.47	Low. Bkkn.	10686	10542	-8575	364.81	7" Int. CP	10896	10532	-9799	652.7	Thr. Frks	10783	10574	-10574	442.58
Atlanta Federal 9-6H					Thr. Frks	10790	10574	-8607	463.24	7" Int. CP	10918	10589	-8622	590.07	Thr. Frks	10799	10579	-10579	457.77
TD Lateral	20517	10594	-8627	10185.62	TD Lateral	20517	10594	-8627	10185.62	TD Lateral	19697	10509	-9776	9448.37	TD Lateral	19500	10568	-10568	9087.07

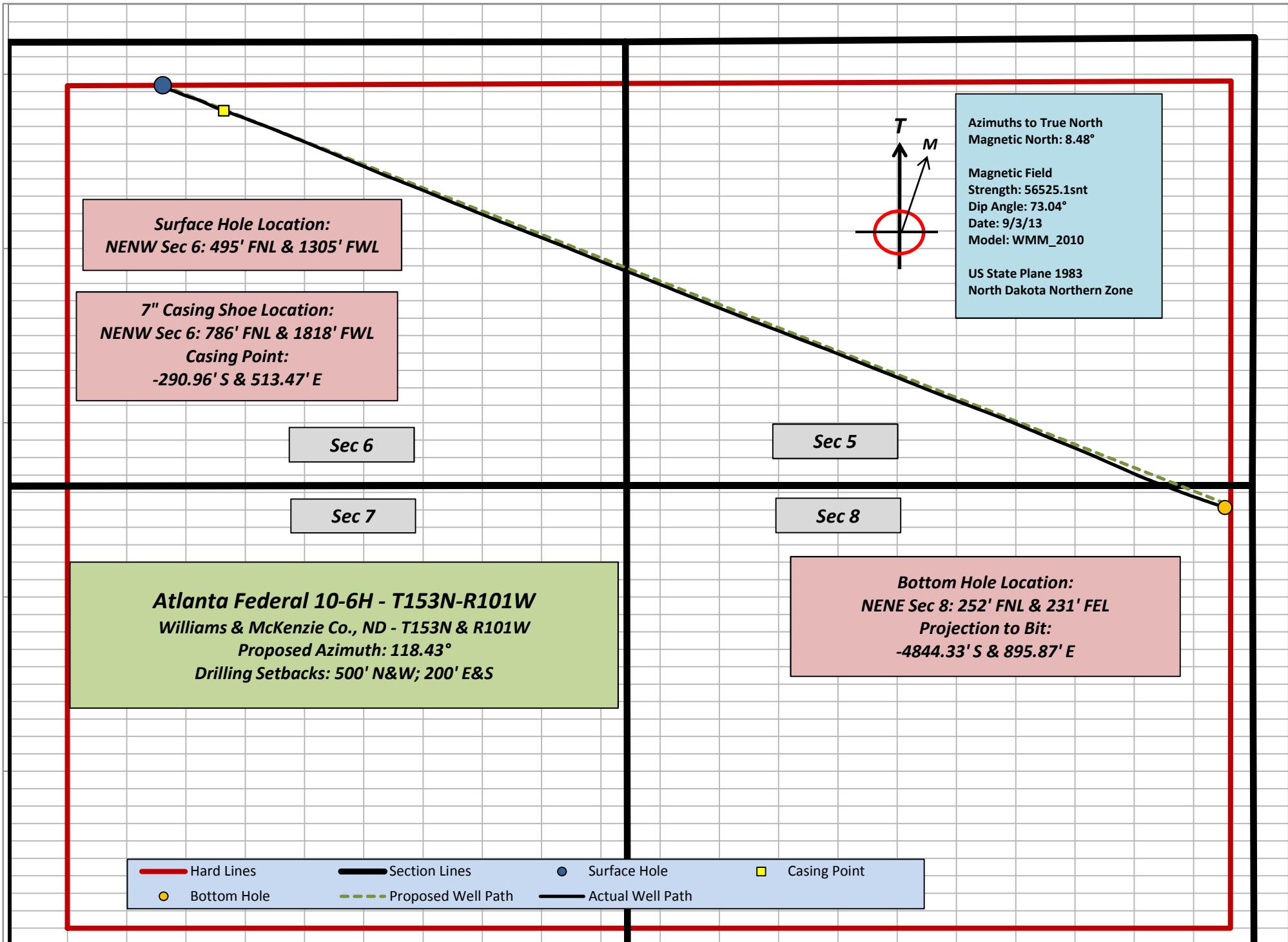
Atlanta 13-6H				Atlanta 14-6H							
Formation	MD	TVD	SS	Formation	MD	TVD	SS				
Charles	8303	8300	-6333	44.95	Charles Salt	8305	8304	-6337	60.14		
BLS	9021	9018	-7051	43.51	BLS	9022	9021	-7054	56.69		
Mission C.	9244	9241	-7274	44.37	Mission C.	NP	NP	NP	NP		
Lodgepole	9787	9784	-7817	47.88	Lodgepole	9782	9781	-7814	61.36		
KOP	10039	10036	-8069	50.89	KOP	10040	10039	-8072	65.67		
False Bkkn.	10613	10487	-8520	353.41	703	False Bkkn.	10576	10486	-9762	315.25	705
Up. Bkkn.	10635	10495	-8528	373.65	711	Up. Bkkn.	10592	10495	-9771	328.91	714
Mid. Bkkn.	10677	10509	-8542	413.09	725	Mid. Bkkn.	10622	10509	-9785	354.90	728
7" Int. CP	10850	10525	-8558	584.39		Low. Bkkn.	10695	10541	-9817	420.53	760
TD Lateral	19185	10495	-8528	8916.28		Thr. Frks	10814	10572	-9848	534.56	791
						Thr. Frks TG	10933	10587	-9863	652.33	
						7" Int. CP	10924	10586	-8618	643.39	
						TD Lateral	19085	10562	-9838	8799.35	

**STRUCTURE (MD - TVD) - Atlanta Federal 10-6H**

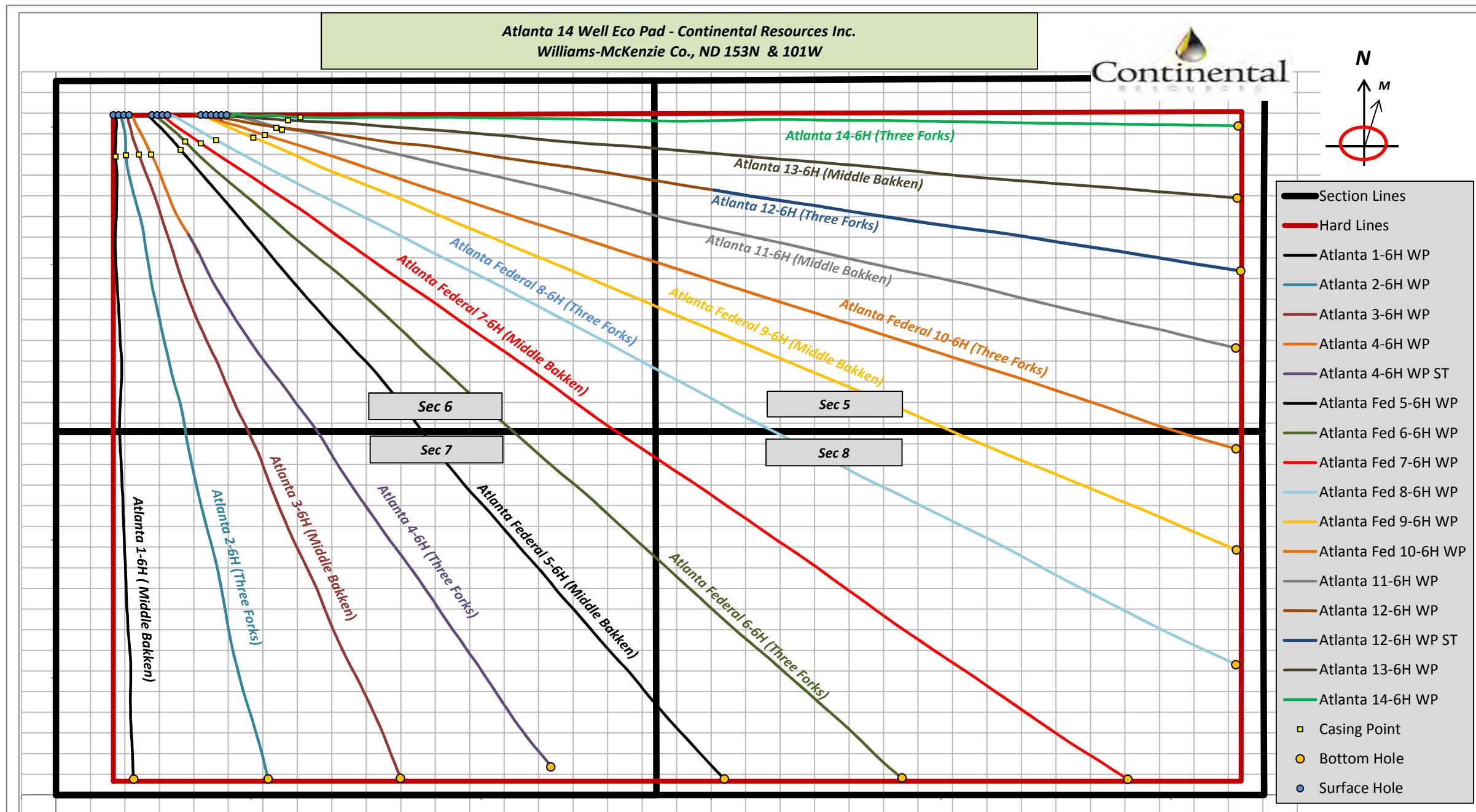
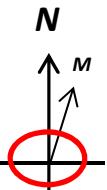
STRUCTURE (MD - TVD) - Atlanta Federal 10-6H										
MD (ft)	Lower Bakken Shale Top	Three Forks Top	Target Zone Top	Target Zone Bottom	Internal 1 Shale	Bakken Pool Limit	Pronghorn		Dip (angle)	Dip Rate (ft/100)
10400.0	10541.0	10574.0	10585.5	10590.5	10592.0	10624.0	10550.0			
10700.0	10541.1	10574.1	10585.6	10590.6	10592.1	10624.1	10550.1		89.98	0.03
11200.0	10542.0	10575.0	10586.5	10591.5	10593.0	10625.0	10551.0		89.90	0.18
11700.0	10542.1	10575.1	10586.6	10591.6	10593.1	10625.1	10551.1		89.99	0.02
12200.0	10539.0	10572.0	10583.5	10588.5	10590.0	10622.0	10548.0		90.36	-0.62
12700.0	10534.5	10567.5	10579.0	10584.0	10585.5	10617.5	10543.5		90.52	-0.90
13200.0	10530.5	10563.5	10575.0	10580.0	10581.5	10613.5	10539.5		90.46	-0.80
13700.0	10529.0	10562.0	10573.5	10578.5	10580.0	10612.0	10538.0		90.17	-0.30
14100.0	10527.5	10560.5	10572.0	10577.0	10578.5	10610.5	10536.5		90.21	-0.38
14400.0	10526.0	10559.0	10570.5	10575.5	10577.0	10609.0	10535.0		90.29	-0.50
14700.0	10524.5	10557.5	10569.0	10574.0	10575.5	10607.5	10533.5		90.29	-0.50
15200.0	10522.0	10555.0	10566.5	10571.5	10573.0	10605.0	10531.0		90.29	-0.50
15700.0	10524.5	10557.5	10569.0	10574.0	10575.5	10607.5	10533.5		89.71	0.50
16200.0	10525.5	10558.5	10570.0	10575.0	10576.5	10608.5	10534.5		89.89	0.20
16700.0	10526.5	10559.5	10571.0	10576.0	10577.5	10609.5	10535.5		89.89	0.20
17200.0	10529.0	10562.0	10573.5	10578.5	10580.0	10612.0	10538.0		89.71	0.50
17700.0	10532.0	10565.0	10576.5	10581.5	10583.0	10615.0	10541.0		89.66	0.60
18200.0	10535.0	10568.0	10579.5	10584.5	10586.0	10618.0	10544.0		89.66	0.60
18500.0	10536.5	10569.5	10581.0	10586.0	10587.5	10619.5	10545.5		89.71	0.50
18750.0	10538.5	10571.5	10583.0	10588.0	10589.5	10621.5	10547.5		89.54	0.80
19000.0	10538.4	10571.4	10582.9	10587.9	10589.4	10621.4	10547.4		90.02	-0.04
19200.0	10538.3	10571.3	10582.8	10587.8	10589.3	10621.3	10547.3		90.03	-0.05
19700.0	10538.0	10571.0	10582.5	10587.5	10589.0	10621.0	10547.0		90.03	-0.06
20200.0	10537.5	10570.5	10582.0	10587.0	10588.5	10620.5	10546.5		90.06	-0.10
20550.0	10538.0	10571.0	10582.5	10587.5	10589.0	10621.0	10547.0		89.92	0.14



3 Forks



Atlanta 14 Well Eco Pad - Continental Resources Inc.  
Williams-McKenzie Co., ND 153N & 101W





**JOB NO.:** DDMT-130617  
**Company:** Continental Resources  
**LOCATION:** Atlanta Eco pad  
**RIG NAME:** Cyclone Drilling Rig 2  
**STATE:** North Dakota  
**COUNTY:** Country  
**WELL NAME:** Atlanta 10-6H

**FIELD:** Baker  
**Township:** 153 N  
**Range:** 101 W

#### MOTOR INFORMATION

Desc: MSEnergy;1.5txd;5/6;8.3;Trn@ 1.04  
Rnd

Bent Hsg/Sub: 1.5 / 0 Bit to Bend: 5

Pad OD: .25

NB Stab:

## Slide Report for all BHA's in Job: DDMT-130617

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	6-Sep	Drilling	00:10	00:15	0.08	2002	2026	24	3	288.0	25	1.2	393	945		0.00	0.00	0.00	
1	6-Sep	Drilling	01:30	02:05	0.58	2026	2147	121	20	207.4	88	5	425	1450		0.00	0.00	0.00	
1	6-Sep	Sliding	02:15	02:30	0.25	2147	2157	10	7	40.0	0	0	425	1320	350	0.00	0.00	0.00	
1	6-Sep	Drilling	02:30	02:40	0.17	2157	2241	84	20	504.0	100	6.5	490	1750		0.00	0.00	0.00	
1	6-Sep	Sliding	02:50	02:55	0.08	2241	2251	10	7	120.0	0	0	490	1500	20	0.00	0.00	0.00	
1	6-Sep	Drilling	02:55	03:10	0.25	2251	2335	84	20	336.0	100	6.5	490	1850		0.00	0.00	0.00	
1	6-Sep	Sliding	03:15	03:30	0.25	2335	2345	10	7	40.0			490	1500	60	0.00	0.00	0.00	
1	6-Sep	Drilling	03:30	03:35	0.08	2345	2359	14	20	168.0	100	6.5	490	1500		0.00	0.00	0.00	
1	6-Sep	Sliding	03:35	03:40	0.08	2359	2369	10	7	120.0			490	1500	60	0.00	0.00	0.00	
1	6-Sep	Drilling	03:40	03:50	0.17	2369	2429	60	20	360.0	100	6.5	490	1850		0.00	0.00	0.00	
1	6-Sep	Sliding	04:00	04:10	0.17	2439	2449	10	7	60.0			490	1500	70	0.00	0.00	0.00	
1	6-Sep	Drilling	04:10	04:20	0.17	2449	2522	73	20	438.0	100	6.5	490	1850		0.00	0.00	0.00	
1	6-Sep	Sliding	04:30	04:45	0.25	2522	2532	10	7	40.0			490	1650	30	0.00	0.00	0.00	
1	6-Sep	Drilling	04:45	05:00	0.25	2532	2616	84	20	336.0	100	5.5	490	1850		0.00	0.00	0.00	
1	6-Sep	Sliding	05:10	05:25	0.25	2616	2626	10	7	40.0			490	1650	40	0.00	0.00	0.00	
1	6-Sep	Drilling	05:25	05:35	0.17	2626	2709	83	20	498.0	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Sliding	05:45	06:00	0.25	2709	2720	11	7	44.0	100	6	490	1850	40	0.00	0.00	0.00	
1	6-Sep	Drilling	06:00	06:25	0.42	2720	2803	83	20	199.2	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Drilling	06:30	06:55	0.42	2803	2896	93	20	223.2	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Drilling	07:00	07:20	0.33	2896	2990	94	20	282.0	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Sliding	07:25	07:30	0.08	2990	3000	10	10	120.0	100	6	490	1850	90	0.00	0.00	0.00	
1	6-Sep	Drilling	07:30	07:45	0.25	3000	3083	83	20	332.0	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Drilling	07:50	08:10	0.33	3083	3176	93	20	279.0	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Drilling	08:15	08:30	0.25	3176	3270	94	20	376.0	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Drilling	08:40	09:00	0.33	3270	3364	94	20	282.0	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Drilling	09:05	09:20	0.25	3364	3457	93	20	372.0	100	6	490	1850		0.00	0.00	0.00	

# Slide Report for all BHA's in Job: DDMT-130617

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	6-Sep	Drilling	09:25	09:45	0.33	3457	3551	94	20	282.0	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Drilling	09:50	10:05	0.25	3551	3643	92	20	368.0	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Drilling	10:15	10:30	0.25	3643	3737	94	20	376.0	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Drilling	10:35	10:50	0.25	3737	3830	93	20	372.0	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Drilling	11:00	11:15	0.25	3830	3924	94	20	376.0	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Drilling	11:20	11:25	0.08	3924	3941	17	25	204.0	100	6	490	1850		0.00	0.00	0.00	
1	6-Sep	Sliding	11:25	11:35	0.17	3941	3951	10	10	60.0			490	1850	320M	0.00	0.00	0.00	
1	6-Sep	Drilling	11:35	11:50	0.25	3951	4017	66	25	264.0	100	6	490	2300		0.00	0.00	0.00	
1	6-Sep	Drilling	11:55	12:05	0.17	4017	4111	94	25	564.0	100	6.4	490	2300		0.00	0.00	0.00	
1	6-Sep	Drilling	12:15	12:30	0.25	4111	4204	93	25	372.0	100	6.4	490	2300		0.00	0.00	0.00	
1	6-Sep	Drilling	12:35	12:50	0.25	4204	4298	94	25	376.0	100	8	490	2300		0.00	0.00	0.00	
1	6-Sep	Drilling	13:00	13:15	0.25	4298	4391	93	25	372.0	100	8	490	2300		0.00	0.00	0.00	
1	6-Sep	Drilling	13:20	13:35	0.25	4391	4485	94	25	376.0	100	8.8	490	2300		0.00	0.00	0.00	
1	6-Sep	Drilling	13:40	13:55	0.25	4485	4579	94	25	376.0	100	8.8	490	2300		0.00	0.00	0.00	
1	6-Sep	Drilling	14:05	15:30	1.42	4579	4953	374	25	264.0	100	8.8	490	2300		0.00	0.00	0.00	
1	6-Sep	Drilling	15:35	15:50	0.25	4953	5046	93	20	372.0	50	6	490	2300		0.00	0.00	0.00	
1	6-Sep	Drilling	16:05	16:40	0.58	5046	5233	187	20	320.6	50	6	490	2300		0.00	0.00	0.00	
1	6-Sep	Sliding	17:15	17:25	0.17	5233	5243	10	10	60.0			490	2300	300M	0.00	0.00	0.00	
1	6-Sep	Drilling	17:25	17:45	0.33	5243	5327	84	16	252.0	50	7.2	490	2600		0.00	0.00	0.00	
1	6-Sep	Drilling	17:55	18:00	0.08	5327	5330	3	16	36.0	50	7.2	490	2600		0.00	0.00	0.00	
1	6-Sep	Sliding	18:00	18:20	0.33	5330	5340	10	10	30.0	0	0	490	2200	180	0.00	0.00	0.00	
1	6-Sep	Drilling	18:20	18:45	0.42	5340	5421	81	20	194.4	50	6	490	2600		0.00	0.00	0.00	
1	6-Sep	Sliding	18:55	19:15	0.33	5421	5431	10	10	30.0	0	0	490	2200	210	0.00	0.00	0.00	
1	6-Sep	Drilling	19:15	19:35	0.33	5431	5514	83	20	249.0	50	7.3	490	2600		0.00	0.00	0.00	
1	6-Sep	Sliding	19:45	20:05	0.33	5514	5524	10	10	30.0	0	0	490	2200	250	0.00	0.00	0.00	
1	6-Sep	Drilling	20:05	20:10	0.08	5524	5534	10	20	120.0	50	8	490	2600		0.00	0.00	0.00	
1	6-Sep	Sliding	20:10	20:20	0.17	5534	5544	10	10	60.0	0	0	490	2200	250	0.00	0.00	0.00	
1	6-Sep	Drilling	20:20	20:40	0.33	5544	5607	63	20	189.0	50	7	490	2200		0.00	0.00	0.00	
1	6-Sep	Sliding	20:50	21:15	0.42	5607	5617	10	10	24.0	0	0	490	2200	260	0.00	0.00	0.00	
1	6-Sep	Drilling	21:15	21:20	0.08	5617	5627	10	20	120.0	50	7	490	2200		0.00	0.00	0.00	
1	6-Sep	Sliding	21:20	21:40	0.33	5627	5637	10	10	30.0	0	0	490	2200	260	0.00	0.00	0.00	
1	6-Sep	Drilling	21:40	21:50	0.17	5637	5657	20	20	120.0	50	7	490	2200		0.00	0.00	0.00	
1	6-Sep	Sliding	21:50	22:05	0.25	5657	5667	10	10	40.0	50	7	490	2200	260	0.00	0.00	0.00	
1	6-Sep	Drilling	22:05	22:10	0.08	5667	5700	33	20	396.0	50	7	490	2200		0.00	0.00	0.00	
1	6-Sep	Drilling	22:15	22:25	0.17	5700	5720	20	20	120.0	50	7	490	2200		0.00	0.00	0.00	

Slide Report for all BHA's in Job: DDMT-130617															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	6-Sep	Sliding	22:25	22:45	0.33	5720	5735	15	10	45.0	0	0	490	2200	180	0.00	0.00	0.00		
2	7-Sep	Sliding	07:00	08:15	1.25	5735	5787	52	10	41.6		490	2200	320M	0.00	0.00	0.00			
2	7-Sep	Sliding	08:30	10:20	1.83	5787	5881	94	12	51.3		490	2200	340M	0.00	0.00	0.00			
2	7-Sep	Drilling	10:30	10:35	0.08	5881	5891	10	14	120.0	50	6	490	2200		0.00	0.00	0.00		
2	7-Sep	Sliding	10:35	11:10	0.58	5891	5921	30	12	51.4		490	2200	340M	0.00	0.00	0.00			
2	7-Sep	Drilling	11:10	11:20	0.17	5921	5931	10	14	60.0	50	7	490	2200		0.00	0.00	0.00		
2	7-Sep	Sliding	11:20	11:50	0.50	5931	5961	30	12	60.0		490	2200	340M	0.00	0.00	0.00			
2	7-Sep	Drilling	11:50	12:00	0.17	5961	5974	13	14	78.0	50	6.5	490	2200		0.00	0.00	0.00		
2	7-Sep	Drilling	12:05	12:35	0.50	5974	6067	93	18	186.0	50	8.4	490	2500		0.00	0.00	0.00		
2	7-Sep	Sliding	12:45	13:20	0.58	6067	6087	20	15	34.3		490	2500	320	0.00	0.00	0.00			
2	7-Sep	Drilling	13:20	13:45	0.42	6087	6160	73	14	175.2	50	9	490	2600		0.00	0.00	0.00		
2	7-Sep	Drilling	13:55	14:10	0.25	6160	6251	91	14	364.0	50	9	490	2600		0.00	0.00	0.00		
2	7-Sep	Sliding	14:20	14:45	0.42	6251	6251	0	14	0.0		490	2600	320M	0.00	0.00	0.00			
2	7-Sep	Drilling	14:45	15:05	0.33	6251	6346	95	14	285.0	50	8	490	2600		0.00	0.00	0.00		
2	7-Sep	Sliding	15:15	15:50	0.58	6346	6366	20	8	34.3		490	2600	320M	0.00	0.00	0.00			
2	7-Sep	Drilling	15:50	16:15	0.42	6366	6439	73	15	175.2	50	7	490	2600		0.00	0.00	0.00		
2	7-Sep	Sliding	16:55	17:35	0.67	6439	6459	20	8	30.0	0	0	490	2300	345M	0.00	0.00	0.00		
2	7-Sep	Drilling	17:35	18:00	0.42	6459	6535	76	15	182.4	50	8	490	2300		0.00	0.00	0.00		
2	7-Sep	Sliding	18:10	18:30	0.33	6535	6555	20	8	60.0	0	0	490	2400	60	0.00	0.00	0.00		
2	7-Sep	Drilling	18:30	19:00	0.50	6555	6628	73	15	146.0	50	9	490	2600		0.00	0.00	0.00		
2	7-Sep	Sliding	19:10	19:50	0.67	6628	6648	20	8	30.0	0	0	490	2300	290M	0.00	0.00	0.00		
2	7-Sep	Drilling	19:50	20:15	0.42	6648	6720	72	15	172.8	50	10	490	2675		0.00	0.00	0.00		
2	7-Sep	Drilling	20:25	20:50	0.42	6720	6814	94	15	225.6	50	10	490	2675		0.00	0.00	0.00		
2	7-Sep	Drilling	21:05	21:45	0.67	6814	6835	21	15	31.5	50	10	490	2675		0.00	0.00	0.00		
2	7-Sep	Sliding	21:45	22:30	0.75	6835	6845	10	8	13.3	0	0	490	2400	280M	0.00	0.00	0.00		
2	7-Sep	Drilling	22:30	22:50	0.33	6845	6907	62	15	186.0	50	8.5	490	2400		0.00	0.00	0.00		
2	7-Sep	Drilling	23:00	23:05	0.08	6907	6921	14	15	168.0	50	8.5	490	2700		0.00	0.00	0.00		
2	7-Sep	Sliding	23:05	23:20	0.25	6921	6931	10	8	40.0	0	0	490	2300	60	0.00	0.00	0.00		
2	7-Sep	Drilling	23:20	24:00	0.67	6931	7001	70	15	105.0	50	7.5	490	2800		0.00	0.00	0.00		
2	8-Sep	Drilling	00:05	00:45	0.67	7001	7095	94	15	141.0	50	7.5	490	2800		0.00	0.00	0.00		
2	8-Sep	Drilling	00:55	01:30	0.58	7095	7188	93	15	159.4	50	7.5	490	2800		0.00	0.00	0.00		
2	8-Sep	Sliding	01:40	02:15	0.58	7188	7198	10	8	17.1	0	0	490	2400	340M	0.00	0.00	0.00		
2	8-Sep	Drilling	02:15	02:50	0.58	7198	7281	83	15	142.3	50	7.5	490	2800		0.00	0.00	0.00		
2	8-Sep	Sliding	03:25	03:50	0.42	7281	7291	10	8	24.0	0	0	490	2400	30	0.00	0.00	0.00		
2	8-Sep	Drilling	03:50	04:30	0.67	7291	7376	85	15	127.5	50	10	490	2400		0.00	0.00	0.00		

Slide Report for all BHA's in Job: DDMT-130617															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	8-Sep	Sliding	04:50	05:15	0.42	7376	7386	10	8	24.0	50	0	490	2300	130	0.00	0.00	0.00		
2	8-Sep	Drilling	05:15	05:25	0.17	7386	7406	20	15	120.0	50	10	490	2800		0.00	0.00	0.00		
2	8-Sep	Drilling	06:10	06:40	0.50	7406	7468	62	15	124.0	50	10	490	2800		0.00	0.00	0.00		
2	8-Sep	Sliding	07:25	08:10	0.75	7468	7488	20	8	26.7	0	0	490	2800	210	0.00	0.00	0.00		
2	8-Sep	Drilling	08:10	08:50	0.67	7488	7561	73	15	109.5	50	10	490	2800		0.00	0.00	0.00		
2	8-Sep	Drilling	08:55	09:40	0.75	7561	7656	95	15	126.7	50	10	490	2800		0.00	0.00	0.00		
2	8-Sep	Drilling	09:50	10:00	0.17	7656	7660	4	15	24.0	50	10	490	2800		0.00	0.00	0.00		
2	8-Sep	Sliding	10:00	10:15	0.25	7660	7668	8	8	32.0	50	10	490	2800	20	0.00	0.00	0.00		
2	8-Sep	Drilling	10:15	10:50	0.58	7668	7750	82	15	140.6	50	10	490	2800		0.00	0.00	0.00		
2	8-Sep	Drilling	10:55	11:25	0.50	7750	7842	92	24	184.0	50	10	490	2800		0.00	0.00	0.00		
2	8-Sep	Drilling	11:40	12:25	0.75	7842	7936	94	24	125.3	75	9	490	3000		0.00	0.00	0.00		
2	8-Sep	Drilling	12:35	13:25	0.83	7936	8029	93	24	111.6	75	9	490	3000		0.00	0.00	0.00		
2	8-Sep	Drilling	14:00	15:40	1.67	8029	8123	94	28	56.4	50	7	490	3000		0.00	0.00	0.00		
2	8-Sep	Drilling	15:50	17:30	1.67	8123	8216	93	28	55.8	50	7	490	3000		0.00	0.00	0.00		
2	8-Sep	Drilling	17:40	18:50	1.17	8216	8310	94	28	80.6	50	7	490	3000		0.00	0.00	0.00		
2	8-Sep	Drilling	19:05	20:20	1.25	8310	8405	95	28	76.0	50	7	490	3000		0.00	0.00	0.00		
2	8-Sep	Drilling	20:35	21:45	1.17	8405	8496	91	28	78.0	50	7	490	3000		0.00	0.00	0.00		
2	8-Sep	Drilling	21:55	23:25	1.50	8496	8591	95	28	63.3	50	7	490	3000		0.00	0.00	0.00		
2	8-Sep	Drilling	23:35	24:00	0.42	8591	8627	36	28	86.4	50	7	490	3000		0.00	0.00	0.00		
2	9-Sep	Drilling	00:00	01:05	1.08	8627	8684	57	28	52.6	50	7	490	3000		0.00	0.00	0.00		
2	9-Sep	Drilling	01:10	03:00	1.83	8684	8778	94	35	51.3	80	7	490	3000		0.00	0.00	0.00		
2	9-Sep	Drilling	03:20	05:15	1.92	8778	8871	93	25	48.5	80	0	490	3000		0.00	0.00	0.00		
2	9-Sep	Drilling	06:10	07:45	1.58	8871	8965	94	35	59.4	50	9.3	490	3000		0.00	0.00	0.00		
2	9-Sep	Drilling	07:55	09:10	1.25	8965	9058	93	35	74.4	50	9.3	490	3000		0.00	0.00	0.00		
3	9-Sep	Drilling	18:10	19:25	1.25	9058	9152	94	35	75.2	65	11	490	3000		0.00	0.00	0.00		
3	9-Sep	Drilling	19:35	19:45	0.17	9152	9162	10	35	60.0	65	11	490	3000		0.00	0.00	0.00		
3	9-Sep	Sliding	19:45	20:15	0.50	9162	9172	10	25	20.0	0	0	490	2600	340M	0.00	0.00	0.00		
3	9-Sep	Drilling	20:15	21:05	0.83	9172	9246	74	35	88.8	65	0	490	3000		0.00	0.00	0.00		
3	9-Sep	Drilling	21:15	21:30	0.25	9246	9256	10	35	40.0	65	0	490	3000		0.00	0.00	0.00		
3	9-Sep	Sliding	21:30	22:00	0.50	9256	9266	10	25	20.0	0	0	490	2600	340M	0.00	0.00	0.00		
3	9-Sep	Drilling	22:00	22:45	0.75	9266	9339	73	35	97.3	65	0	490	2600		0.00	0.00	0.00		
3	9-Sep	Drilling	22:55	23:50	0.92	9339	9432	93	35	101.5	65	0	490	2600		0.00	0.00	0.00		
3	10-Sep	Drilling	00:00	00:10	0.17	9432	9435	3	35	18.0	65	11	490	3000		0.00	0.00	0.00		
3	10-Sep	Sliding	00:10	00:30	0.33	9435	9445	10	25	30.0	0	0	490	2600	355M	0.00	0.00	0.00		
3	10-Sep	Drilling	00:30	01:30	1.00	9445	9526	81	35	81.0	65	12	490	3000		0.00	0.00	0.00		

Slide Report for all BHA's in Job: DDMT-130617															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	
3	10-Sep	Drilling	01:40	02:35	0.92	9526	9620	94	35	102.5	65	12	490	3000		0.00	0.00	0.00		
3	10-Sep	Drilling	02:45	04:15	1.50	9620	9713	93	35	62.0	65	12	490	3000		0.00	0.00	0.00		
3	10-Sep	Drilling	04:40	06:35	1.92	9713	9806	93	35	48.5	65	10	490	3200		0.00	0.00	0.00		
3	10-Sep	Drilling	06:45	07:20	0.58	9806	9843	37	35	63.4	65	10	490	3000		0.00	0.00	0.00		
3	10-Sep	Sliding	07:20	08:05	0.75	9843	9853	10	25	13.3			490	3000	350M	0.00	0.00	0.00		
3	10-Sep	Drilling	08:05	08:55	0.83	9853	9900	47	35	56.4	50	10	490	3000		0.00	0.00	0.00		
3	10-Sep	Drilling	09:00	09:25	0.42	9900	9915	15	35	36.0	50	10	490	3000		0.00	0.00	0.00		
3	10-Sep	Sliding	09:25	09:50	0.42	9915	9925	10	25	24.0			490	3000	350M	0.00	0.00	0.00		
3	10-Sep	Drilling	09:50	11:05	1.25	9925	9993	68	35	54.4	50	10	490	3000		0.00	0.00	0.00		
3	10-Sep	Drilling	11:15	12:40	1.42	9993	10080	87	35	61.4	50	10	490	3000		0.00	0.00	0.00		
4	11-Sep	Sliding	00:05	01:45	1.67	10080	10099	19	25	11.4			490	3000	120M	0.00	0.00	0.00		
4	11-Sep	Sliding	01:55	02:45	0.83	10099	10105	6	25	7.2	0	0	490	3000	120M	0.00	0.00	0.00		
4	11-Sep	Sliding	02:55	06:10	3.25	10105	10184	79	25	24.3	0	0	490	3000	120M	0.00	0.00	0.00		
4	11-Sep	Sliding	06:10	06:45	0.58	10184	10192	8	25	13.7	0	0	490	3000	45L	0.00	0.00	0.00		
4	11-Sep	Sliding	06:50	07:50	1.00	10192	10223	31	25	31.0	0	0	490	3000	45L	0.00	0.00	0.00		
4	11-Sep	Sliding	08:00	09:05	1.08	10223	10254	31	25	28.6	0	0	490	3000	30L	0.00	0.00	0.00		
4	11-Sep	Sliding	09:10	10:10	1.00	10254	10286	32	25	32.0	0	0	490	2700	30L	0.00	0.00	0.00		
4	11-Sep	Drilling	10:25	10:35	0.17	10286	10291	5	20	30.0	25	7	490	3000		0.00	0.00	0.00		
4	11-Sep	Sliding	10:35	11:35	1.00	10291	10316	25	25	25.0			490	2700	30L	0.00	0.00	0.00		
4	11-Sep	Drilling	11:40	11:55	0.25	10316	10330	14	20	56.0	25	7	490	3000		0.00	0.00	0.00		
4	11-Sep	Sliding	11:55	12:35	0.67	10330	10346	16	25	24.0			490	2700	30L	0.00	0.00	0.00		
4	11-Sep	Sliding	12:45	13:45	1.00	10346	10377	31	25	31.0	0	0	490	3000	25R	0.00	0.00	0.00		
4	11-Sep	Sliding	13:55	14:50	0.92	10377	10408	31	25	33.8	0	0	490	2700	25R	0.00	0.00	0.00		
4	11-Sep	Drilling	15:00	15:15	0.25	10408	10428	20	20	80.0	25	7	490	3000		0.00	0.00	0.00		
4	11-Sep	Sliding	15:15	15:45	0.50	10428	10439	11	25	22.0	0	0	490	2700	30R	0.00	0.00	0.00		
4	11-Sep	Drilling	15:50	16:00	0.17	10439	10446	7	20	42.0	25	7	490	3000		0.00	0.00	0.00		
4	11-Sep	Sliding	16:00	16:55	0.92	10446	10470	24	25	26.2			490	2700	355	0.00	0.00	0.00		
4	11-Sep	Drilling	17:05	17:15	0.17	10470	10475	5	20	30.0	25	6	490	3000		0.00	0.00	0.00		
4	11-Sep	Sliding	17:15	18:15	1.00	10475	10501	26	25	26.0	0	0	490	2700	20R	0.00	0.00	0.00		
4	11-Sep	Sliding	18:25	19:25	1.00	10501	10532	31	25	31.0	0	0	490	2700	20L	0.00	0.00	0.00		
4	11-Sep	Sliding	19:35	20:35	1.00	10532	10564	32	25	32.0	0	0	490	2700	20L	0.00	0.00	0.00		
4	11-Sep	Drilling	20:45	21:00	0.25	10564	10570	6	20	24.0	25	0	490	3000		0.00	0.00	0.00		
4	11-Sep	Sliding	21:00	21:35	0.58	10570	10595	25	25	42.9	0	0	490	2700	20R	0.00	0.00	0.00		
4	11-Sep	Drilling	21:45	22:00	0.25	10595	10605	10	20	40.0	25	0	490	3000		0.00	0.00	0.00		
4	11-Sep	Sliding	22:00	22:40	0.67	10605	10626	21	25	31.5	0	0	490	3000	20R	0.00	0.00	0.00		

Slide Report for all BHA's in Job: DDMT-130617															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	
4	11-Sep	Sliding	22:50	23:40	0.83	10626	10642	16	25	19.2	0	0	490	2700	60R	0.00	0.00	0.00	0.00	
4	11-Sep	Drilling	23:40	24:00	0.33	10642	10657	15	20	45.0	25	0	490	3000		0.00	0.00	0.00		
4	12-Sep	Sliding	00:15	01:10	0.92	10657	10688	31	25	33.8	25	0	490	2700	60R	0.00	0.00	0.00		
4	12-Sep	Sliding	01:25	01:55	0.50	10688	10720	32	25	64.0	0	0	490	2700	10R	0.00	0.00	0.00		
4	12-Sep	Sliding	02:05	02:30	0.42	10720	10751	31	25	74.4	0	0	490	2700	10R	0.00	0.00	0.00		
4	12-Sep	Sliding	03:00	03:40	0.67	10751	10794	43	25	64.5	0	0	490	2700	20L	0.00	0.00	0.00		
4	12-Sep	Drilling	03:50	03:55	0.08	10794	10800	6	20	72.0	25	0	490	2700		0.00	0.00	0.00		
4	12-Sep	Sliding	03:55	05:30	1.58	10800	10813	13	25	8.2		0	490	2700	20L	0.00	0.00	0.00		
4	12-Sep	Drilling	05:50	06:15	0.42	10813	10844	31	20	74.4	25	8.9	490	2700		0.00	0.00	0.00		
4	12-Sep	Sliding	06:25	07:05	0.67	10844	10857	13	25	19.5		490	2700	20L	0.00	0.00	0.00			
4	12-Sep	Drilling	07:05	07:30	0.42	10857	10875	18	20	43.2	25	10	490	2700		0.00	0.00	0.00		
4	12-Sep	Sliding	07:30	09:20	1.83	10875	10907	32	25	17.5		490	2700	20L	0.00	0.00	0.00			
4	12-Sep	Sliding	09:25	10:00	0.58	10907	10920	13	25	22.3		490	2700	20L	0.00	0.00	0.00			
4	12-Sep	Drilling	10:00	10:20	0.33	10920	10938	18	20	54.0	25	10	490	2700		0.00	0.00	0.00		
5	14-Sep	Drilling	05:50	06:15	0.42	10938	10949	11	10	26.4	55	5	261	1600		0.00	0.00	0.00		
5	14-Sep	Drilling	07:15	07:55	0.67	10949	11044	95	25	142.5	55	6	261	2150		0.00	0.00	0.00		
5	14-Sep	Sliding	08:30	09:10	0.67	11044	11064	20	30	30.0		261	1900	90R	0.00	0.00	0.00			
5	14-Sep	Drilling	09:10	09:50	0.67	11064	11137	73	12	109.5	55	7	261	1900		0.00	0.00	0.00		
5	14-Sep	Drilling	09:55	10:40	0.75	11137	11231	94	12	125.3	55	7	261	2200		0.00	0.00	0.00		
5	14-Sep	Drilling	10:45	10:55	0.17	11231	11240	9	15	54.0	55	7	261	2200		0.00	0.00	0.00		
5	14-Sep	Sliding	10:55	11:30	0.58	11240	11257	17	30	29.1		261	2200	60R	0.00	0.00	0.00			
5	14-Sep	Drilling	11:30	12:10	0.67	11257	11325	68	15	102.0	50	7.5	261	2200		0.00	0.00	0.00		
5	14-Sep	Drilling	12:15	13:00	0.75	11325	11419	94	18	125.3	50	7.5	261	2200		0.00	0.00	0.00		
5	14-Sep	Sliding	13:10	13:45	0.58	11419	11431	12	32	20.6		261	2200	120R	0.00	0.00	0.00			
5	14-Sep	Drilling	13:45	14:30	0.75	11431	11513	82	20	109.3	50	7.6	261	2200		0.00	0.00	0.00		
5	14-Sep	Drilling	14:35	15:15	0.67	11513	11606	93	20	139.5	50	7.6	261	2200		0.00	0.00	0.00		
5	14-Sep	Sliding	15:25	15:40	0.25	11606	11613	7	32	28.0		261	2200	30R	0.00	0.00	0.00			
5	14-Sep	Drilling	15:40	16:10	0.50	11613	11700	87	20	174.0	50	8	261	2200		0.00	0.00	0.00		
5	14-Sep	Sliding	16:20	16:55	0.58	11700	11710	10	42	17.1		261	1850	30R	0.00	0.00	0.00			
5	14-Sep	Drilling	16:55	17:05	0.17	11710	11720	10	20	60.0	50	7	261	2200		0.00	0.00	0.00		
5	14-Sep	Sliding	17:05	17:25	0.33	11720	11728	8	38	24.0		261	2200	30R	0.00	0.00	0.00			
5	14-Sep	Drilling	17:25	17:55	0.50	11728	11794	66	20	132.0	50	0	261	2400		0.00	0.00	0.00		
5	14-Sep	Drilling	18:05	18:20	0.25	11794	11805	11	20	44.0	50	0	261	2400		0.00	0.00	0.00		
5	14-Sep	Sliding	18:20	19:00	0.67	11805	11823	18	38	27.0	0	0	261	1850	10R	0.00	0.00	0.00		
5	14-Sep	Drilling	19:00	19:25	0.42	11823	11887	64	20	153.6	50	8	261	2200		0.00	0.00	0.00		

Slide Report for all BHA's in Job: DDMT-130617															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	
5	14-Sep	Drilling	19:35	20:10	0.58	11887	11981	94	20	161.1	50	8	261	2400		0.00	0.00	0.00		
5	14-Sep	Drilling	20:20	20:55	0.58	11981	12075	94	20	161.1	50	8	261	2400		0.00	0.00	0.00		
5	14-Sep	Drilling	21:05	21:40	0.58	12075	12168	93	20	159.4	50	8	261	2400		0.00	0.00	0.00		
5	14-Sep	Drilling	21:50	22:00	0.17	12168	12187	19	20	114.0	50	8	261	2400		0.00	0.00	0.00		
5	14-Sep	Sliding	22:00	22:45	0.75	12187	12199	12	38	16.0	0	0	261	2200	10L	0.00	0.00	0.00		
5	14-Sep	Drilling	22:45	23:20	0.58	12199	12262	63	20	108.0	50	0	261	2200		0.00	0.00	0.00		
5	14-Sep	Drilling	23:30	24:00	0.50	12262	12293	31	20	62.0	50	0	261	2200		0.00	0.00	0.00		
5	15-Sep	Sliding	00:00	00:05	0.08	12293	12298	5	38	60.0			261	2200	150L	0.00	0.00	0.00		
5	15-Sep	Drilling	00:05	00:35	0.50	12298	12356	58	20	116.0	50	7	261	2200		0.00	0.00	0.00		
5	15-Sep	Drilling	00:45	00:50	0.08	12356	12372	16	20	192.0	50	7	261	2200		0.00	0.00	0.00		
5	15-Sep	Sliding	00:50	01:10	0.33	12372	12378	6	38	18.0			261	2200	130L	0.00	0.00	0.00		
5	15-Sep	Drilling	01:10	01:50	0.67	12378	12450	72	20	108.0	50	7	261	2200		0.00	0.00	0.00		
5	15-Sep	Drilling	01:55	02:10	0.25	12450	12465	15	20	60.0	50	8	261	2500		0.00	0.00	0.00		
5	15-Sep	Sliding	02:10	02:30	0.33	12465	12477	12	38	36.0			261	2500	90L	0.00	0.00	0.00		
5	15-Sep	Drilling	02:30	03:00	0.50	12477	12544	67	20	134.0	50	8	261	2500		0.00	0.00	0.00		
5	15-Sep	Drilling	03:05	03:30	0.42	12544	12559	15	20	36.0	50	8	261	2500		0.00	0.00	0.00		
5	15-Sep	Drilling	04:20	05:00	0.67	12559	12637	78	20	117.0	50	7.6	261	2500		0.00	0.00	0.00		
5	15-Sep	Drilling	05:05	05:15	0.17	12637	12647	10	20	60.0	50	7.6	261	2500		0.00	0.00	0.00		
5	15-Sep	Sliding	05:15	05:50	0.58	12647	12660	13	38	22.3			261	2500	5L	0.00	0.00	0.00		
5	15-Sep	Drilling	05:50	06:30	0.67	12660	12731	71	20	106.5	50	7.6	261	2500		0.00	0.00	0.00		
5	15-Sep	Drilling	06:35	07:20	0.75	12731	12827	96	16	128.0	50	7.6	261	2500		0.00	0.00	0.00		
5	15-Sep	Drilling	07:25	08:05	0.67	12827	12923	96	16	144.0	50	9	261	2500		0.00	0.00	0.00		
5	15-Sep	Drilling	08:20	09:00	0.67	12923	13019	96	16	144.0	50	9	261	2750		0.00	0.00	0.00		
5	15-Sep	Drilling	09:10	09:55	0.75	13019	13115	96	16	128.0	50	9	261	2750		0.00	0.00	0.00		
5	15-Sep	Drilling	10:05	10:55	0.83	13115	13211	96	16	115.2	50	10	261	2750		0.00	0.00	0.00		
5	15-Sep	Drilling	11:05	11:30	0.42	13211	13224	13	16	31.2	50	10	261	2750		0.00	0.00	0.00		
5	15-Sep	Sliding	11:30	12:50	1.33	13224	13245	21	50	15.8			261	2750	5L	0.00	0.00	0.00		
5	15-Sep	Drilling	12:50	13:25	0.58	13245	13308	63	16	108.0	50	10	261	2750		0.00	0.00	0.00		
5	15-Sep	Drilling	13:40	15:05	1.42	13308	13320	12	16	8.5	50	10	261	2750		0.00	0.00	0.00		
5	15-Sep	Drilling	15:15	15:55	0.67	13404	13500	96	16	144.0	50	11	261	2750		0.00	0.00	0.00		
5	15-Sep	Drilling	16:05	16:55	0.83	13500	13596	96	16	115.2	50	11	261	2750		0.00	0.00	0.00		
5	15-Sep	Drilling	17:05	17:50	0.75	13596	13692	96	16	128.0	50	11	261	2750		0.00	0.00	0.00		
5	15-Sep	Drilling	18:05	18:15	0.17	13692	13717	25	16	150.0	50	11	261	2750		0.00	0.00	0.00		
5	15-Sep	Drilling	18:30	19:05	0.58	13717	13788	71	16	121.7	50	11	261	2750		0.00	0.00	0.00		
5	15-Sep	Drilling	19:20	19:50	0.50	13788	13810	22	16	44.0	50	11	261	2750		0.00	0.00	0.00		

Slide Report for all BHA's in Job: DDMT-130617															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	
5	15-Sep	Sliding	19:50	20:10	0.33	13810	13817	7	50	21.0	0	0	261	2300	170L	0.00	0.00	0.00	0.00	
5	15-Sep	Drilling	20:10	20:50	0.67	13817	13884	67	16	100.5	50	10.5	261	2750		0.00	0.00	0.00	0.00	
5	15-Sep	Drilling	21:00	21:50	0.83	13884	13980	96	16	115.2	50	11	261	2750		0.00	0.00	0.00	0.00	
5	15-Sep	Drilling	22:00	22:15	0.25	13980	13990	10	16	40.0	50	11	261	2750		0.00	0.00	0.00	0.00	
5	15-Sep	Sliding	22:15	22:45	0.50	13990	14005	15	50	30.0	0	0	261	2300	20R	0.00	0.00	0.00	0.00	
5	15-Sep	Drilling	22:45	23:30	0.75	14005	14076	71	16	94.7	50	10	261	2300		0.00	0.00	0.00	0.00	
5	15-Sep	Drilling	23:40	23:55	0.25	14076	14088	12	16	48.0	50	10	261	2750		0.00	0.00	0.00	0.00	
5	15-Sep	Sliding	23:55	24:00	0.08	14088	14089	1	50	12.0	0	0	261	2300	150L	0.00	0.00	0.00	0.00	
5	16-Sep	Sliding	00:00	00:10	0.17	14089	14095	6	50	36.0	0	0	261	2300	150L	0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	00:10	00:55	0.75	14095	14172	77	16	102.7	50	11	261	2700		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	01:05	02:05	1.00	14172	14268	96	16	96.0	50	11	261	2700		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	02:15	03:10	0.92	14268	14364	96	16	104.7	50	10	261	2700		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	03:20	04:15	0.92	14364	14460	96	16	104.7	50	11	261	2700		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	04:25	04:30	0.08	14460	14470	10	16	120.0	50	10	261	2700		0.00	0.00	0.00	0.00	
5	16-Sep	Sliding	04:30	04:45	0.25	14470	14477	7	50	28.0		261	2300	170L	0.00	0.00	0.00	0.00		
5	16-Sep	Drilling	04:45	05:35	0.83	14477	14556	79	16	94.8	50	10	261	2300		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	05:45	06:50	1.08	14556	14652	96	20	88.6	50	10	261	2500		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	07:05	07:30	0.42	14652	14667	15	20	36.0	50	10	261	2500		0.00	0.00	0.00	0.00	
5	16-Sep	Sliding	07:30	08:05	0.58	14667	14680	13	50	22.3		276	2800		0.00	0.00	0.00	0.00		
5	16-Sep	Drilling	08:05	08:55	0.83	14680	14748	68	20	81.6	50	10	261	2800		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	09:10	09:25	0.25	14748	14763	15	20	60.0	50	10	261	2800		0.00	0.00	0.00	0.00	
5	16-Sep	Sliding	09:25	10:10	0.75	14763	14778	15	50	20.0		276	2800	10L	0.00	0.00	0.00	0.00		
5	16-Sep	Drilling	10:10	11:00	0.83	14778	14844	66	20	79.2	50	10	261	2800		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	11:10	12:25	1.25	14844	14940	96	24	76.8	50	10	261	2800		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	12:35	12:40	0.08	14940	14950	10	24	120.0	50	10	261	2800		0.00	0.00	0.00	0.00	
5	16-Sep	Sliding	12:40	13:30	0.83	14950	14965	15	50	18.0		276	2800	10	0.00	0.00	0.00	0.00		
5	16-Sep	Drilling	13:50	14:50	1.00	14965	15036	71	24	71.0	50	10	261	2800		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	15:00	15:55	0.92	15036	15132	96	24	104.7	50	10	261	2800		0.00	0.00	0.00	0.00	
5	16-Sep	Sliding	16:25	17:15	0.83	15132	15162	30	48	36.0		261	2800	150L	0.00	0.00	0.00	0.00		
5	16-Sep	Drilling	17:15	17:50	0.58	15162	15228	66	24	113.1	50	7.5	261	2800		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	18:05	19:05	1.00	15228	15324	96	24	96.0	50	7.5	261	2800		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	19:15	20:25	1.17	15324	15420	96	24	82.3	50	7.5	261	2800		0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	20:35	20:45	0.17	15420	15430	10	24	60.0	50	11	261	2800		0.00	0.00	0.00	0.00	
5	16-Sep	Sliding	20:45	21:45	1.00	15430	15445	15	80	15.0	0	0	261	2100	10L	0.00	0.00	0.00	0.00	
5	16-Sep	Drilling	21:45	22:45	1.00	15445	15516	71	24	71.0	50	11	261	2800		0.00	0.00	0.00	0.00	

# Slide Report for all BHA's in Job: DDMT-130617

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
5	16-Sep	Drilling	22:55	23:35	0.67	15516	15553	37	24	55.5	50	11	261	2800		0.00	0.00	0.00	
5	16-Sep	Sliding	23:35	23:45	0.17	15553	15559	6	80	36.0	0	0	261	2800	45R	0.00	0.00	0.00	
5	16-Sep	Drilling	23:45	24:00	0.25	15559	15575	16	24	64.0	50	10	261	2100		0.00	0.00	0.00	
5	17-Sep	Drilling	00:00	00:20	0.33	15575	15602	27	24	81.0	50	10	261	2900		0.00	0.00	0.00	
5	17-Sep	Drilling	01:10	01:20	0.17	15602	15613	11	24	66.0	50	10	261	2900		0.00	0.00	0.00	
5	17-Sep	Drilling	01:35	01:45	0.17	15613	15623	10	24	60.0	50	10	261	2900		0.00	0.00	0.00	
5	17-Sep	Sliding	01:45	02:40	0.92	15623	15638	15	80	16.4	0		261	2300	10R	0.00	0.00	0.00	
5	17-Sep	Drilling	02:40	03:40	1.00	15638	15709	71	24	71.0	50	10	261	2300		0.00	0.00	0.00	
5	17-Sep	Drilling	03:50	04:30	0.67	15709	15741	32	24	48.0	50	10	261	2300		0.00	0.00	0.00	
5	17-Sep	Sliding	04:30	05:00	0.50	15741	15753	12	80	24.0	0		261	2300	10R	0.00	0.00	0.00	
5	17-Sep	Drilling	05:00	05:35	0.58	15753	15805	52	24	89.1	50	10	261	2300		0.00	0.00	0.00	
5	17-Sep	Drilling	05:50	07:00	1.17	15805	15901	96	24	82.3	50	10	261	2900		0.00	0.00	0.00	
5	17-Sep	Drilling	07:05	08:05	1.00	15901	15997	96	24	96.0	50	10	261	2900		0.00	0.00	0.00	
5	17-Sep	Drilling	08:15	08:35	0.33	15997	16007	10	24	30.0	50	10	261	2900		0.00	0.00	0.00	
5	17-Sep	Sliding	08:35	09:00	0.42	16007	16015	8	50	19.2			261	2900	10L	0.00	0.00	0.00	
5	17-Sep	Drilling	09:00	09:55	0.92	16015	16093	78	24	85.1	50	10	261	2900		0.00	0.00	0.00	
5	17-Sep	Drilling	10:15	10:25	0.17	16093	16103	10	24	60.0	50	10	261	2900		0.00	0.00	0.00	
5	17-Sep	Sliding	10:25	11:15	0.83	16103	16118	15	50	18.0	50		261	2900	10L	0.00	0.00	0.00	
5	17-Sep	Drilling	11:15	12:20	1.08	16118	16189	71	24	65.5	50	10	261	2900		0.00	0.00	0.00	
5	17-Sep	Drilling	12:30	13:00	0.50	16189	16221	32	24	64.0	50	10	261	2900		0.00	0.00	0.00	
6	18-Sep	Drilling	05:50	07:35	1.75	16221	16285	64	10	36.6	50	11	305	3700		0.00	0.00	0.00	
6	18-Sep	Drilling	17:00	18:25	1.42	16285	16381	96	10	67.8	50	14	305	3700		0.00	0.00	0.00	
6	18-Sep	Drilling	18:35	19:20	0.75	16381	16477	96	10	128.0	50	14	305	3700		0.00	0.00	0.00	
6	18-Sep	Drilling	19:30	20:05	0.58	16477	16573	96	20	164.6	50	14	305	3700		0.00	0.00	0.00	
6	18-Sep	Drilling	20:10	20:15	0.08	16573	16592	19	20	228.0	50	14	305	3700		0.00	0.00	0.00	
6	18-Sep	Drilling	20:25	20:55	0.50	16592	16659	67	20	134.0	50	14	305	3550		0.00	0.00	0.00	
6	18-Sep	Drilling	21:05	21:15	0.17	16659	16669	10	20	60.0	50	14	305	3550		0.00	0.00	0.00	
6	18-Sep	Drilling	21:25	21:30	0.08	16669	16680	11	20	132.0	50	14	305	3550		0.00	0.00	0.00	
6	18-Sep	Sliding	23:25	23:55	0.50	16680	16692	12	35	24.0	0	0	261	3000	90R	0.00	0.00	0.00	
6	18-Sep	Drilling	23:55	24:00	0.08	16692	16698	6	20	72.0	50	7	305	3550		0.00	0.00	0.00	
6	19-Sep	Drilling	00:00	00:30	0.50	16698	16765	67	20	134.0	50	7	305	3550		0.00	0.00	0.00	
6	19-Sep	Drilling	00:35	01:30	0.92	16765	16861	96	20	104.7	50	7	305	3550		0.00	0.00	0.00	
6	19-Sep	Drilling	01:40	02:15	0.58	16861	16898	37	20	63.4	50	7	305	3550		0.00	0.00	0.00	
6	19-Sep	Sliding	02:15	02:40	0.42	16898	16912	14	35	33.6	0	0	261	3000	20R	0.00	0.00	0.00	
6	19-Sep	Drilling	02:40	02:55	0.25	16912	16941	29	20	116.0	50	8.5	305	3550		0.00	0.00	0.00	

Slide Report for all BHA's in Job: DDMT-130617															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	19-Sep	Drilling	03:10	03:15	0.08	16941	16957	16	20	192.0	50	8.5	305	3550		0.00	0.00	0.00		
6	19-Sep	Drilling	03:30	04:00	0.50	16957	16992	35	20	70.0	50	12	305	3550		0.00	0.00	0.00		
6	19-Sep	Sliding	04:00	04:15	0.25	16992	17000	8	44	32.0	0	0	261	3000	20R	0.00	0.00	0.00		
6	19-Sep	Drilling	04:15	04:40	0.42	17000	17053	53	20	127.2	50	11	305	3650		0.00	0.00	0.00		
6	19-Sep	Drilling	04:50	05:35	0.75	17053	17149	96	20	128.0	50	14	305	3650		0.00	0.00	0.00		
6	19-Sep	Drilling	05:45	06:35	0.83	17149	17245	96	20	115.2	50	15	305	3500		0.00	0.00	0.00		
6	19-Sep	Drilling	06:45	08:20	1.58	17245	17296	51	20	32.2	50	13	305	3500		0.00	0.00	0.00		
6	19-Sep	Sliding	08:20	09:05	0.75	17296	17316	20	74	26.7			305	3500	60R	0.00	0.00	0.00		
6	19-Sep	Drilling	09:05	09:20	0.25	17316	17341	25	20	100.0	50	14	305	3500		0.00	0.00	0.00		
6	19-Sep	Drilling	09:30	10:20	0.83	17341	17432	91	20	109.2	50	14	305	3500		0.00	0.00	0.00		
6	19-Sep	Drilling	10:30	10:45	0.25	17432	17452	20	20	80.0	50	14	305	3500		0.00	0.00	0.00		
6	19-Sep	Sliding	10:45	11:30	0.75	17452	17471	19	75	25.3			305	3500	150R	0.00	0.00	0.00		
6	19-Sep	Drilling	11:30	12:05	0.58	17471	17533	62	20	106.3	50	10	305	3500		0.00	0.00	0.00		
6	19-Sep	Sliding	12:15	12:55	0.67	17533	17552	19	60	28.5			305	3500	180	0.00	0.00	0.00		
6	19-Sep	Drilling	12:55	13:40	0.75	17552	17564	12	20	16.0	50	12.2	305	3500		0.00	0.00	0.00		
6	19-Sep	Drilling	13:50	14:40	0.83	17564	17725	161	20	193.2	50	11	305	3500		0.00	0.00	0.00		
6	19-Sep	Drilling	14:50	15:30	0.67	17725	17821	96	20	144.0	50	11	305	3500		0.00	0.00	0.00		
6	19-Sep	Drilling	16:00	16:55	0.92	17821	17917	96	20	104.7	50	11	305	3500		0.00	0.00	0.00		
6	19-Sep	Drilling	17:10	17:55	0.75	17917	18013	96	20	128.0	50	11	305	3500		0.00	0.00	0.00		
6	19-Sep	Drilling	18:05	18:35	0.50	18013	18050	37	20	74.0	50	11	305	3500		0.00	0.00	0.00		
6	19-Sep	Sliding	18:35	19:00	0.42	18050	18062	12	60	28.8	0	0	305	3500	45R	0.00	0.00	0.00		
6	19-Sep	Drilling	19:00	19:30	0.50	18062	18109	47	20	94.0	50	0	305	3500		0.00	0.00	0.00		
6	19-Sep	Drilling	19:35	20:35	1.00	18109	18205	96	20	96.0	50	0	305	3650		0.00	0.00	0.00		
6	19-Sep	Drilling	20:40	20:45	0.08	18205	18214	9	20	108.0	50	0	305	3650		0.00	0.00	0.00		
6	19-Sep	Drilling	21:00	21:40	0.67	18214	18301	87	20	130.5	50	0	305	3650		0.00	0.00	0.00		
6	19-Sep	Drilling	21:50	23:05	1.25	18301	18397	96	20	76.8	50	0	305	3750		0.00	0.00	0.00		
6	19-Sep	Drilling	23:15	23:35	0.33	18397	18415	18	20	54.0	50	0	305	3750		0.00	0.00	0.00		
6	19-Sep	Sliding	23:35	24:00	0.42	18415	18430	15	60	36.0	0	0	305	3200	90R	0.00	0.00	0.00		
6	20-Sep	Sliding	00:00	00:10	0.17	18430	18433	3	60	18.0	0	0	305	3200	90R	0.00	0.00	0.00		
6	20-Sep	Drilling	00:10	00:45	0.58	18433	18493	60	20	102.9	50	0	305	3850		0.00	0.00	0.00		
6	20-Sep	Drilling	00:55	01:30	0.58	18493	18530	37	20	63.4	50	10	305	3850		0.00	0.00	0.00		
6	20-Sep	Sliding	02:00	02:30	0.50	18530	18546	16	20	32.0			305	3250	40R	0.00	0.00	0.00		
6	20-Sep	Drilling	02:30	03:05	0.58	18546	18589	43	20	73.7	50	10.6	305	3850		0.00	0.00	0.00		
6	20-Sep	Drilling	03:10	03:50	0.67	18589	18626	37	20	55.5	50	10.6	305	3850		0.00	0.00	0.00		
6	20-Sep	Sliding	04:30	04:55	0.42	18626	18637	11	40	26.4	0	0	305	3300	10L	0.00	0.00	0.00		

Slide Report for all BHA's in Job: DDMT-130617															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	20-Sep	Drilling	04:55	05:25	0.50	18637	18677	40	20	80.0	50	10.8	305	3300		0.00	0.00	0.00	
6	20-Sep	Drilling	05:35	05:40	0.08	18677	18685	8	20	96.0	50	8.6	305	3300		0.00	0.00	0.00	
6	20-Sep	Drilling	06:00	06:10	0.17	18685	18702	17	20	102.0	50	10.8	305	3700		0.00	0.00	0.00	
6	20-Sep	Sliding	06:10	07:05	0.92	18702	18724	22	75	24.0		305	3300	10R	0.00	0.00	0.00		
6	20-Sep	Drilling	07:05	08:10	1.08	18724	18781	57	20	52.6	50	10.9	305	3650		0.00	0.00	0.00	
6	20-Sep	Drilling	08:25	09:40	1.25	18781	18877	96	20	76.8	50	14	305	3650		0.00	0.00	0.00	
6	20-Sep	Drilling	09:50	10:25	0.58	18877	18903	26	20	44.6	50	14	305	3650		0.00	0.00	0.00	
6	20-Sep	Sliding	10:25	10:35	0.17	18903	18908	5	60	30.0		305	3650	170R	0.00	0.00	0.00		
6	20-Sep	Drilling	10:35	11:20	0.75	18908	18927	19	20	25.3	50	14	305	3650		0.00	0.00	0.00	
6	20-Sep	Drilling	12:25	13:00	0.58	18927	18973	46	20	78.9	50	10	311	3650		0.00	0.00	0.00	
6	20-Sep	Drilling	13:15	13:25	0.17	18973	18979	6	20	36.0	50	10	311	3650		0.00	0.00	0.00	
6	20-Sep	Sliding	13:25	14:05	0.67	18979	18998	19	60	28.5		305	3650	170R	0.00	0.00	0.00		
6	20-Sep	Drilling	14:05	15:30	1.42	18998	19069	71	20	50.1	50	10	305	3650		0.00	0.00	0.00	
6	20-Sep	Drilling	15:45	16:00	0.25	19069	19078	9	20	36.0	50	10	305	3650		0.00	0.00	0.00	
6	20-Sep	Drilling	17:05	17:30	0.42	19078	19098	20	20	48.0	50	10	305	3650		0.00	0.00	0.00	
6	20-Sep	Sliding	17:30	18:00	0.50	19098	19112	14	60	28.0		305	3650	30R	0.00	0.00	0.00		
6	20-Sep	Drilling	18:00	18:50	0.83	19112	19166	54	20	64.8	50	10	305	3650		0.00	0.00	0.00	
6	20-Sep	Drilling	19:00	19:05	0.08	19166	19172	6	20	72.0	50	14	305	3650		0.00	0.00	0.00	
6	20-Sep	Drilling	19:40	20:00	0.33	19172	19182	10	20	30.0	50	13	305	3650		0.00	0.00	0.00	
6	20-Sep	Sliding	20:00	20:05	0.08	19182	19188	6	60	72.0		305	3275	30R	0.00	0.00	0.00		
6	20-Sep	Drilling	20:05	21:00	0.92	19188	19262	74	20	80.7	50	10	305	4200		0.00	0.00	0.00	
6	20-Sep	Drilling	21:10	21:20	0.17	19262	19275	13	20	78.0	50	10	305	4200		0.00	0.00	0.00	
6	20-Sep	Drilling	21:40	21:55	0.25	19275	19285	10	20	40.0	50	10	305	4200		0.00	0.00	0.00	
6	20-Sep	Sliding	21:55	22:30	0.58	19285	19300	15	70	25.7	50	10	305	3650	10R	0.00	0.00	0.00	
6	20-Sep	Drilling	22:30	23:10	0.67	19300	19358	58	20	87.0	50	10	305	4200		0.00	0.00	0.00	
6	20-Sep	Drilling	23:20	24:00	0.67	19358	19408	50	20	75.0	50	10	305	4200		0.00	0.00	0.00	
6	21-Sep	Drilling	00:00	00:25	0.42	19408	19454	46	20	110.4	50	10	305	4200		0.00	0.00	0.00	
6	21-Sep	Drilling	00:35	01:00	0.42	19454	19479	25	20	60.0	50	10	305	4200		0.00	0.00	0.00	
6	21-Sep	Sliding	01:20	01:35	0.25	19479	19486	7	70	28.0	0	0	305	3600	130L	0.00	0.00	0.00	
6	21-Sep	Drilling	01:35	02:30	0.92	19486	19550	64	20	69.8	50	13	305	4200		0.00	0.00	0.00	
6	21-Sep	Drilling	02:45	03:55	1.17	19550	19646	96	20	82.3	50	14	305	4200		0.00	0.00	0.00	
6	21-Sep	Drilling	04:25	04:30	0.08	19646	19647	1	20	12.0	50	15	305	4200		0.00	0.00	0.00	
6	21-Sep	Drilling	04:45	05:45	1.00	19647	19742	95	20	95.0	50	16	305	4200		0.00	0.00	0.00	
6	21-Sep	Drilling	05:55	06:20	0.42	19742	19756	14	30	33.6	50	16	305	4200		0.00	0.00	0.00	
6	21-Sep	Sliding	06:20	07:55	1.58	19756	19773	17	70	10.7		290	3900	90L	0.00	0.00	0.00		

# Slide Report for all BHA's in Job: DDMT-130617

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	21-Sep	Drilling	07:55	08:45	0.83	19773	19838	65	30	78.0	50	16	305	3900		0.00	0.00	0.00	
6	21-Sep	Drilling	09:00	09:45	0.75	19838	19853	15	30	20.0	50	16	305	3900		0.00	0.00	0.00	
6	21-Sep	Sliding	10:00	10:40	0.67	19853	19863	10	70	15.0			290	3900	10R	0.00	0.00	0.00	
6	21-Sep	Sliding	11:20	11:45	0.42	19863	19870	7	70	16.8	0	0	290	3900	10R	0.00	0.00	0.00	
6	21-Sep	Drilling	11:45	12:00	0.25	19870	19880	10	30	40.0	50	13	305	3900		0.00	0.00	0.00	
6	21-Sep	Sliding	12:20	13:10	0.83	19880	19890	10	70	12.0			290	3900	10R	0.00	0.00	0.00	
6	21-Sep	Drilling	13:10	13:55	0.75	19890	19934	44	30	58.7	50	15	305	3900		0.00	0.00	0.00	
6	21-Sep	Drilling	14:05	14:20	0.25	19934	19965	31	30	124.0	50	15	305	3900		0.00	0.00	0.00	
7	22-Sep	Sliding	22:45	22:55	0.17	19965	19972	7	50	42.0	0	0	290	3000	10L	0.00	0.00	0.00	
7	22-Sep	Sliding	23:15	24:00	0.75	19972	19984	12	50	16.0	0	0	290	3000	10L	0.00	0.00	0.00	
7	23-Sep	Drilling	00:00	00:10	0.17	19984	19996	12	30	72.0	50	0	261	3000		0.00	0.00	0.00	
7	23-Sep	Drilling	00:25	00:45	0.33	19996	20018	22	30	66.0	50	0	261	3000		0.00	0.00	0.00	
7	23-Sep	Sliding	00:45	01:45	1.00	20018	20028	10	50	10.0			261	2400	10L	0.00	0.00	0.00	
7	23-Sep	Drilling	01:45	02:15	0.50	20028	20088	60	30	120.0	50	13	261	3000		0.00	0.00	0.00	
7	23-Sep	Drilling	02:25	02:55	0.50	20088	20118	30	30	60.0	50	13	261	3000		0.00	0.00	0.00	
7	23-Sep	Sliding	02:55	03:05	0.17	20118	20121	3	50	18.0			261	2400	10L	0.00	0.00	0.00	
7	23-Sep	Drilling	03:10	03:30	0.33	20121	20147	26	30	78.0	50	13	261	3000		0.00	0.00	0.00	
7	23-Sep	Drilling	04:45	06:00	1.25	20147	20179	32	12	25.6	50	14	261	3000		0.00	0.00	0.00	
7	23-Sep	Drilling	06:15	07:15	1.00	20179	20270	91	12	91.0	50	14	261	3000		0.00	0.00	0.00	
7	23-Sep	Drilling	07:25	08:15	0.83	20270	20361	91	12	109.2	50	10	261	3000		0.00	0.00	0.00	
7	23-Sep	Drilling	08:20	09:05	0.75	20361	20452	91	12	121.3	50	10	261	3000		0.00	0.00	0.00	
7	23-Sep	Drilling	09:15	09:50	0.58	20452	20517	65	12	111.4	50	11	261	3000		0.00	0.00	0.00	

**Total Drilled:** 18579    **Avg. Total ROP:** 79.51    **DEPTH% - TIME %**

**Total Rotary Drilled:** 16592    **Avg. Rotary ROP:** 103.75    **Percent Rotary:** 89.31 - 68.44

**Total Drilled Sliding:** 1987    **Avg. Slide ROP:** 26.94    **Percent Slide:** 10.69 - 31.56

Ver 1.2



## SURVEY CALCULATION PROGRAM

ctrl-shift-I = Insert Survey

ctrl-shift-D = Delete Survey

Minimum Curviture												API Number:		33-105-02723		
OIL & GAS CO.:		Continental Resources						Target Information				VS Referenced to Offset from Surface				
WELL:		Atlanta Federal 10-6H						TARGET TVD:		10598.00		NORTH/SOUTH:		0.00		
COUNTY / STATE:		Williams	STATE:	ND				TARGET INCL:		89.92		EAST/WEST:		0.00		
RIG:		Cyclone 2						TARGET AZM:		118.43		(Enter 0' N and 0' E for Surface)				
JOB NUMBER:		DDMT-130617														
SURVEY COMPANY:			DIRECTIONAL COMPANY:						PROPOSED DIRECTION:		118.43		MAG-DEC. / TOTAL CORR.(+/-):		8.48	
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 PBHL							
Brent Boyd			Clay Moore													
PTB:	MD	INC	AZM		TVD			N/S		E/W		VS				
33-105-02723												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(-)	BELOW (-)
Tie In	1955	0.50	261.20			1954.97	-1.54	-3.76	-2.57	4.06	247.73			1954.97	3.14	8643.03
1	2030	0.70	262.40	89.3	75	2029.97	-1.65	-4.54	-3.20	4.83	250.01	0.27	0.27	2029.97	3.61	8568.03
2	2092	0.90	263.50	89.3	62	2091.96	-1.76	-5.40	-3.91	5.68	251.98	0.32	0.32	2091.97	4.11	8506.03
3	2186	1.80	281.80	92.0	94	2185.93	-1.54	-7.58	-5.93	7.73	258.53	1.05	0.96	2185.94	4.96	8412.06
4	2280	2.40	286.20	94.7	94	2279.87	-0.69	-10.91	-9.27	10.93	266.40	0.66	0.64	2279.88	5.80	8318.12
5	2374	1.30	292.40	97.4	94	2373.82	0.27	-13.79	-12.25	13.79	271.12	1.19	-1.17	2373.84	6.33	8224.16
6	2467	0.90	266.10	100.0	93	2466.80	0.62	-15.49	-13.92	15.50	272.30	0.68	-0.43	2466.82	6.83	8131.18
7	2561	0.70	338.00	102.8	94	2560.80	1.10	-16.44	-14.98	16.48	273.84	1.01	-0.21	2560.82	6.86	8037.18
8	2654	1.10	330.00	105.5	93	2653.78	2.40	-17.10	-16.18	17.27	278.00	0.45	0.43	2653.81	6.03	7944.19
9	2748	1.90	343.50	100.0	94	2747.75	4.68	-18.00	-18.05	18.59	284.57	0.92	0.85	2747.78	4.45	7850.22
10	2841	1.50	17.30	103.7	93	2840.71	7.32	-18.07	-19.38	19.50	292.05	1.14	-0.43	2840.74	2.17	7757.26
11	2935	1.20	345.60	104.0	94	2934.69	9.45	-17.95	-20.28	20.28	297.76	0.84	-0.32	2934.72	0.24	7663.28
12	3028	1.70	31.90	111.8	93	3027.66	11.56	-17.46	-20.86	20.94	303.51	1.32	0.54	3027.69	-1.85	7570.31
13	3121	1.60	31.70	113.6	93	3120.62	13.84	-16.05	-20.70	21.19	310.76	0.11	-0.11	3120.65	-4.53	7477.35
14	3215	1.40	37.30	114.5	94	3214.59	15.87	-14.67	-20.45	21.61	317.25	0.26	-0.21	3214.62	-6.97	7383.38
15	3309	1.40	34.90	116.3	94	3308.56	17.72	-13.31	-20.15	22.17	323.09	0.06	0.00	3308.59	-9.25	7289.41
16	3402	1.20	33.10	118.1	93	3401.54	19.47	-12.13	-19.94	22.94	328.07	0.22	-0.22	3401.57	-11.35	7196.43
17	3495	1.00	33.60	119.9	93	3494.52	20.96	-11.15	-19.79	23.74	331.99	0.22	-0.22	3494.55	-13.13	7103.45
18	3588	0.90	32.40	120.7	93	3587.51	22.25	-10.31	-19.66	24.53	335.14	0.11	-0.11	3587.53	-14.66	7010.47
19	3682	0.90	38.40	122.5	94	3681.50	23.46	-9.46	-19.48	25.29	338.04	0.10	0.00	3681.52	-16.13	6916.48

				33-105-02723										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(-)	BELOW (-)
20	3775	0.70	52.00	123.4	93	3774.49	24.38	-8.55	-19.13	25.84	340.66	0.30	-0.22	3774.51	-17.37	6823.49
21	3869	0.80	69.80	125.2	94	3868.48	24.96	-7.49	-18.47	26.06	343.30	0.27	0.11	3868.50	-18.38	6729.50
22	3962	0.50	348.70	126.1	93	3961.47	25.58	-6.96	-18.30	26.51	344.79	0.94	-0.32	3961.50	-19.18	6636.50
23	4056	0.40	10.90	127.9	94	4055.47	26.31	-6.98	-18.66	27.21	345.15	0.21	-0.11	4055.50	-19.81	6542.50
24	4149	0.20	79.60	129.7	93	4148.47	26.65	-6.75	-18.63	27.50	345.78	0.41	-0.22	4148.50	-20.22	6449.50
25	4243	0.10	91.30	130.6	94	4242.47	26.68	-6.51	-18.43	27.46	346.29	0.11	-0.11	4242.50	-20.36	6355.50
26	4336	0.20	75.50	132.4	93	4335.47	26.72	-6.27	-18.24	27.45	346.79	0.12	0.11	4335.50	-20.51	6262.50
27	4430	0.20	88.30	134.0	94	4429.47	26.77	-5.95	-17.97	27.42	347.47	0.05	0.00	4429.49	-20.71	6168.51
28	4524	0.30	88.60	135.1	94	4523.47	26.78	-5.54	-17.62	27.34	348.31	0.11	0.11	4523.49	-20.91	6074.51
29	4617	0.40	83.60	136.9	93	4616.47	26.82	-4.97	-17.14	27.28	349.49	0.11	0.11	4616.49	-21.22	5981.51
30	4711	0.80	108.80	137.8	94	4710.46	26.64	-4.03	-16.23	26.95	351.41	0.50	0.43	4710.48	-21.51	5887.52
31	4804	1.00	123.90	138.7	93	4803.45	25.98	-2.74	-14.78	26.13	353.98	0.33	0.22	4803.47	-21.55	5794.53
32	4898	0.60	89.80	140.5	94	4897.44	25.53	-1.57	-13.53	25.57	356.49	0.64	-0.43	4897.46	-21.70	5700.54
33	4991	0.60	65.70	140.5	93	4990.44	25.73	-0.63	-12.81	25.74	358.59	0.27	0.00	4990.45	-22.32	5607.55
34	5085	0.80	60.80	141.4	94	5084.43	26.25	0.39	-12.16	26.25	0.84	0.22	0.21	5084.45	-23.27	5513.55
35	5178	1.70	65.30	140.5	93	5177.41	27.14	2.21	-10.98	27.23	4.65	0.97	0.97	5177.42	-24.92	5420.58
36	5272	1.50	57.10	142.0	94	5271.37	28.40	4.51	-9.56	28.75	9.02	0.32	-0.21	5271.38	-27.12	5326.62
37	5366	1.60	97.70	145.9	94	5365.34	28.89	6.84	-7.74	29.69	13.32	1.15	0.11	5365.35	-28.66	5232.65
38	5459	2.30	122.10	146.8	93	5458.28	27.72	9.71	-4.66	29.37	19.30	1.15	0.75	5458.29	-29.00	5139.71
39	5552	3.70	132.20	146.8	93	5551.16	24.71	13.51	0.12	28.17	28.67	1.60	1.51	5551.16	-28.17	5046.84
40	5645	5.80	150.80	149.5	93	5643.84	18.60	18.03	7.00	25.90	44.11	2.77	2.26	5643.83	-24.94	4954.17
41	5732	6.70	156.40	136.9	87	5730.32	10.11	22.20	14.71	24.40	65.52	1.25	1.03	5730.30	-19.46	4867.70
42	5826	6.30	167.90	142.3	94	5823.72	0.04	25.48	22.39	25.48	89.91	1.45	-0.43	5823.69	-12.17	4774.31
43	5919	3.00	173.00	146.8	93	5916.40	-7.37	26.85	27.12	27.84	105.34	3.57	-3.55	5916.36	-6.30	4681.64
44	6012	2.00	179.20	149.5	93	6009.31	-11.41	27.17	29.32	29.46	112.77	1.11	-1.08	6009.27	-2.90	4588.73
45	6106	1.30	200.50	152.2	94	6103.27	-14.04	26.82	30.27	30.27	117.64	0.98	-0.74	6103.23	-0.42	4494.77
46	6199	2.00	181.50	154.9	93	6196.23	-16.66	26.40	31.15	31.22	122.24	0.95	0.75	6196.19	2.08	4401.81
47	6293	2.60	181.70	155.8	94	6290.16	-20.43	26.30	32.85	33.30	127.84	0.64	0.64	6290.11	5.44	4307.89
48	6387	2.30	193.70	154.0	94	6384.07	-24.39	25.79	34.29	35.50	133.40	0.63	-0.32	6384.02	9.17	4213.98
49	6480	1.50	185.40	155.8	93	6477.02	-27.41	25.23	35.24	37.26	137.37	0.91	-0.86	6476.97	12.10	4121.03
50	6574	1.20	170.60	156.7	94	6570.99	-29.61	25.28	36.33	38.93	139.51	0.49	-0.32	6570.94	14.01	4027.06
51	6665	0.60	183.00	159.4	91	6661.98	-31.03	25.41	37.11	40.10	140.69	0.69	-0.66	6661.93	15.19	3936.07
52	6759	1.60	174.50	163.0	94	6755.96	-32.82	25.51	38.06	41.57	142.15	1.07	1.06	6755.91	16.72	3842.09
53	6852	0.90	189.00	163.0	93	6848.94	-34.84	25.52	39.03	43.18	143.78	0.82	-0.75	6848.89	18.49	3749.11
54	6946	0.30	279.00	165.7	94	6942.94	-35.53	25.16	39.04	43.53	144.70	1.01	-0.64	6942.88	19.27	3655.12
55	7039	0.30	221.40	168.4	93	7035.94	-35.67	24.76	38.76	43.42	145.24	0.31	0.00	7035.88	19.58	3562.12

				33-105-02723										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(-)	BELOW (-)
56	7133	0.50	217.70	170.2	94	7129.93	-36.18	24.34	38.63	43.61	146.07	0.21	0.21	7129.88	20.23	3468.12
57	7227	0.70	344.60	169.3	94	7223.93	-35.95	23.94	38.17	43.20	146.34	1.15	0.21	7223.88	20.22	3374.12
58	7321	1.70	358.80	171.9	94	7317.91	-34.01	23.76	37.08	41.48	145.06	1.10	1.06	7317.86	18.59	3280.14
59	7413	1.50	31.10	171.9	92	7409.88	-31.61	24.35	36.46	39.90	142.39	0.99	-0.22	7409.82	16.20	3188.18
60	7508	0.90	169.10	174.6	95	7504.87	-31.28	25.14	37.00	40.13	141.21	2.37	-0.63	7504.81	15.54	3093.19
61	7601	0.90	177.60	178.2	93	7597.85	-32.73	25.30	37.83	41.37	142.29	0.14	0.00	7597.80	16.73	3000.20
62	7695	0.70	160.40	179.1	94	7691.85	-34.00	25.53	38.64	42.52	143.10	0.33	-0.21	7691.79	17.75	2906.21
63	7787	0.20	51.30	181.8	92	7783.84	-34.43	25.84	39.12	43.05	143.11	0.86	-0.54	7783.79	17.98	2814.21
64	7881	0.20	303.50	182.7	94	7877.84	-34.24	25.83	39.02	42.89	142.97	0.34	0.00	7877.79	17.81	2720.21
65	7974	0.40	276.90	182.4	93	7970.84	-34.11	25.38	38.56	42.51	143.35	0.26	0.22	7970.79	17.92	2627.21
66	8068	0.30	337.80	184.5	94	8064.84	-33.84	24.96	38.06	42.05	143.59	0.39	-0.11	8064.79	17.88	2533.21
67	8161	0.30	293.40	188.1	93	8157.84	-33.52	24.64	37.63	41.60	143.68	0.24	0.00	8157.79	17.75	2440.21
68	8255	0.40	291.40	189.0	94	8251.84	-33.30	24.11	37.06	41.12	144.10	0.11	0.11	8251.79	17.81	2346.21
69	8349	0.20	255.10	189.9	94	8345.84	-33.23	23.65	36.61	40.78	144.56	0.28	-0.21	8345.78	17.96	2252.22
70	8442	0.30	226.10	190.8	93	8438.84	-33.44	23.31	36.42	40.76	145.11	0.17	0.11	8438.78	18.31	2159.22
71	8536	0.20	191.50	192.6	94	8532.83	-33.77	23.10	36.39	40.92	145.62	0.19	-0.11	8532.78	18.70	2065.22
72	8629	0.00	1.20	192.6	93	8625.83	-33.93	23.07	36.44	41.03	145.78	0.22	-0.22	8625.78	18.85	1972.22
73	8723	0.10	347.00	195.3	94	8719.83	-33.85	23.05	36.39	40.95	145.74	0.11	0.11	8719.78	18.79	1878.22
74	8816	0.10	60.20	193.5	93	8812.83	-33.73	23.11	36.38	40.88	145.59	0.13	0.00	8812.78	18.66	1785.22
75	8910	0.20	121.60	197.1	94	8906.83	-33.77	23.32	36.58	41.04	145.38	0.19	0.11	8906.78	18.60	1691.22
76	9003	0.00	202.50	189.0	93	8999.83	-33.86	23.45	36.75	41.19	145.29	0.22	-0.22	8999.78	18.61	1598.22
77	9097	0.00	308.70	187.2	94	9093.83	-33.86	23.45	36.75	41.19	145.29	0.00	0.00	9093.78	18.61	1504.22
78	9190	0.30	296.20	189.0	93	9186.83	-33.75	23.24	36.50	40.98	145.45	0.32	0.32	9186.78	18.62	1411.22
79	9284	0.50	305.80	192.6	94	9280.83	-33.40	22.68	35.85	40.38	145.82	0.22	0.21	9280.78	18.58	1317.22
80	9378	0.50	315.50	195.3	94	9374.83	-32.87	22.06	35.05	39.59	146.13	0.09	0.00	9374.78	18.40	1223.22
81	9471	0.40	326.70	199.0	93	9467.82	-32.31	21.60	34.38	38.86	146.24	0.14	-0.11	9467.78	18.13	1130.22
82	9565	0.40	336.40	200.7	94	9561.82	-31.73	21.29	33.83	38.21	146.15	0.07	0.00	9561.77	17.77	1036.23
83	9658	0.50	347.70	199.8	93	9654.82	-31.04	21.07	33.31	37.52	145.83	0.14	0.11	9654.77	17.26	943.23
84	9751	0.50	6.70	201.6	93	9747.82	-30.24	21.03	32.89	36.84	145.18	0.18	0.00	9747.77	16.58	850.23
85	9845	0.50	344.60	203.4	94	9841.81	-29.44	20.97	32.46	36.14	144.53	0.20	0.00	9841.77	15.90	756.23
86	9938	0.50	339.80	205.2	93	9934.81	-28.67	20.72	31.87	35.37	144.14	0.05	0.00	9934.76	15.34	663.24
87	10042	0.30	23.00	186.3	104	10038.81	-27.99	20.67	31.51	34.80	143.55	0.33	-0.19	10038.76	14.77	559.24
88	10073	0.60	119.60	172.8	31	10069.81	-28.00	20.85	31.66	34.90	143.33	2.26	0.97	10069.76	14.69	528.24
89	10104	3.30	134.30	172.8	31	10100.78	-28.70	21.63	32.68	35.93	143.00	8.79	8.71	10100.74	14.94	497.26
90	10135	6.90	131.10	192.6	31	10131.66	-30.55	23.67	35.36	38.64	142.23	11.64	11.61	10131.61	15.59	466.39

				33-105-02723										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(-)	BELOW (-)
91	10166	11.40	125.00	193.5	31	10162.26	-33.53	27.58	40.22	43.42	140.56	14.83	14.52	10162.20	16.35	435.80
92	10198	15.30	119.30	194.4	32	10193.39	-37.41	33.86	47.59	50.46	137.85	12.85	12.19	10193.32	16.78	404.68
93	10229	19.20	117.00	194.4	31	10222.99	-41.73	41.97	56.78	59.18	134.83	12.77	12.58	10222.91	16.71	375.09
94	10258	23.50	116.40	194.4	29	10249.99	-46.47	51.40	67.33	69.29	132.11	14.85	14.83	10249.90	16.39	348.10
95	10289	26.90	115.90	184.5	31	10278.04	-52.28	63.25	80.51	82.06	129.58	10.99	10.97	10277.92	15.86	320.08
96	10320	29.20	114.70	197.1	31	10305.39	-58.50	76.43	95.07	96.25	127.43	7.64	7.42	10305.26	15.06	292.74
97	10351	32.30	115.30	198.0	31	10332.03	-65.20	90.79	110.89	111.78	125.68	10.05	10.00	10331.88	14.12	266.12
98	10382	36.50	117.40	198.0	31	10357.60	-72.99	106.47	128.38	129.09	124.43	14.08	13.55	10357.43	13.50	240.57
99	10413	39.60	118.90	198.9	31	10382.01	-82.01	123.31	147.49	148.09	123.63	10.43	10.00	10381.81	13.41	216.19
100	10444	42.00	120.20	199.8	31	10405.48	-92.00	140.93	167.74	168.30	123.14	8.21	7.74	10405.25	13.81	192.75
101	10475	44.90	119.60	198.9	31	10427.98	-102.63	159.41	189.05	189.59	122.77	9.45	9.35	10427.72	14.36	170.28
102	10507	48.70	117.50	198.9	32	10449.89	-113.76	179.90	212.37	212.85	122.31	12.80	11.88	10449.59	14.39	148.41
103	10538	53.20	114.90	200.9	31	10469.41	-124.37	201.50	236.41	236.79	121.68	15.91	14.52	10469.08	13.44	128.92
104	10569	57.20	112.90	200.7	31	10487.10	-134.67	224.77	261.78	262.03	120.93	13.95	12.90	10486.74	11.42	111.26
105	10600	60.80	112.50	201.6	31	10503.07	-144.92	249.28	288.21	288.35	120.17	11.67	11.61	10502.66	8.77	95.34
106	10631	63.10	114.40	201.6	31	10517.64	-155.81	274.38	315.47	315.53	119.59	9.18	7.42	10517.20	6.40	80.80
107	10663	63.80	117.40	200.7	32	10531.95	-168.32	300.12	344.06	344.10	119.28	8.67	2.19	10531.47	5.13	66.53
108	10694	65.30	121.30	201.6	31	10545.27	-182.04	324.51	372.04	372.08	119.29	12.35	4.84	10544.75	5.59	53.25
109	10725	70.20	122.40	204.3	31	10557.01	-197.18	348.87	400.67	400.74	119.47	16.14	15.81	10556.45	7.31	41.55
110	10756	74.80	121.90	204.0	31	10566.33	-212.90	373.90	430.16	430.26	119.66	14.92	14.84	10565.73	9.22	32.27
111	10787	78.70	120.90	202.5	31	10573.43	-228.62	399.65	460.29	460.42	119.77	12.97	12.58	10572.79	10.78	25.21
112	10818	80.50	120.20	202.5	31	10579.03	-244.12	425.91	490.76	490.91	119.82	6.22	5.81	10578.34	11.91	19.66
113	10849	81.90	119.20	200.7	31	10583.77	-259.29	452.52	521.39	521.54	119.81	5.53	4.52	10583.04	12.59	14.96
114	10880	84.30	118.20	202.5	31	10587.49	-274.07	479.51	552.16	552.31	119.75	8.38	7.74	10586.72	12.73	11.28
115	10948	90.30	114.70	221.4	68	10590.70	-304.30	540.29	620.00	620.09	119.39	10.21	8.82	10589.83	10.38	8.17
116	10979	90.10	115.10	220.5	31	10590.59	-317.36	568.41	650.94	651.00	119.18	1.44	-0.65	10589.68	8.47	8.32
117	11072	89.40	117.80	217.8	93	10591.00	-358.77	651.66	743.88	743.90	118.84	3.00	-0.75	10589.96	5.26	8.04
118	11166	89.20	117.00	220.5	94	10592.14	-402.03	735.11	837.85	837.86	118.67	0.88	-0.21	10590.97	3.57	7.03
119	11260	90.60	117.80	218.7	94	10592.31	-445.29	818.56	931.84	931.84	118.55	1.72	1.49	10591.01	1.88	6.99
120	11354	90.60	117.60	220.5	94	10591.32	-488.98	901.78	1025.82	1025.82	118.47	0.21	0.00	10589.89	0.68	8.11
121	11448	89.30	119.10	220.5	94	10591.41	-533.61	984.50	1119.82	1119.82	118.46	2.11	-1.38	10589.84	0.55	8.16
122	11541	88.90	118.50	222.3	93	10592.87	-578.41	1065.99	1212.80	1212.81	118.48	0.78	-0.43	10591.17	1.15	6.83
123	11635	89.00	118.70	223.1	94	10594.59	-623.40	1148.51	1306.79	1306.79	118.49	0.24	0.11	10592.76	1.43	5.24
124	11729	89.30	119.80	221.4	94	10595.98	-669.33	1230.51	1400.77	1400.77	118.54	1.21	0.32	10594.03	2.78	3.97
125	11822	90.60	119.30	222.3	93	10596.06	-715.19	1311.41	1493.75	1493.75	118.61	1.50	1.40	10593.98	4.59	4.02

				33-105-02723										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(-)	BELOW (-)
126	11916	90.60	119.90	224.0	94	10595.08	-761.62	1393.14	1587.72	1587.73	118.67	0.64	0.00	10592.86	6.51	5.14
127	12010	90.50	119.50	225.8	94	10594.18	-808.19	1474.79	1681.69	1681.72	118.72	0.44	-0.11	10591.83	8.60	6.17
128	12103	89.70	118.90	226.1	93	10594.02	-853.56	1555.97	1774.68	1774.71	118.75	1.08	-0.86	10591.54	9.85	6.46
129	12197	91.20	119.10	225.8	94	10593.28	-899.13	1638.18	1868.67	1868.71	118.76	1.61	1.60	10590.67	10.78	7.33
130	12291	91.00	120.40	226.7	94	10591.47	-945.76	1719.77	1962.63	1962.67	118.81	1.40	-0.21	10588.73	12.95	9.27
131	12385	90.80	120.20	227.6	94	10590.00	-993.18	1800.92	2056.57	2056.63	118.88	0.30	-0.21	10587.12	16.01	10.88
132	12479	89.80	118.00	227.6	94	10589.50	-1038.89	1883.05	2150.55	2150.62	118.89	2.57	-1.06	10586.50	17.11	11.50
133	12572	89.90	118.20	227.6	93	10589.75	-1082.70	1965.09	2243.55	2243.61	118.85	0.24	0.11	10586.61	16.58	11.39
134	12666	91.30	117.80	228.5	94	10588.76	-1126.83	2048.08	2337.54	2337.59	118.82	1.55	1.49	10585.50	15.87	12.50
135	12762	91.10	118.70	230.3	96	10586.75	-1172.25	2132.62	2433.52	2433.57	118.80	0.96	-0.21	10583.35	15.57	14.65
136	12858	90.80	118.40	232.1	96	10585.16	-1218.13	2216.94	2529.50	2529.55	118.79	0.44	-0.31	10581.63	15.77	16.37
137	12954	90.80	119.90	233.0	96	10583.82	-1264.88	2300.77	2625.49	2625.54	118.80	1.56	0.00	10580.15	16.98	17.85
138	13050	90.70	119.00	233.9	96	10582.56	-1312.08	2384.35	2721.46	2721.52	118.82	0.94	-0.10	10578.76	18.69	19.24
139	13146	89.00	118.50	234.8	96	10582.81	-1358.25	2468.52	2817.46	2817.52	118.82	1.85	-1.77	10578.88	19.22	19.12
140	13243	90.70	118.20	232.1	97	10583.07	-1404.31	2553.88	2914.45	2914.51	118.81	1.78	1.75	10579.00	19.09	19.00
141	13339	91.30	119.00	233.9	96	10581.39	-1450.26	2638.15	3010.43	3010.50	118.80	1.04	0.62	10577.19	19.37	20.81
142	13435	91.20	120.00	235.7	96	10579.30	-1497.52	2721.69	3106.39	3106.47	118.82	1.05	-0.10	10574.96	21.16	23.04
143	13531	90.80	117.70	236.6	96	10577.62	-1543.83	2805.75	3202.37	3202.44	118.82	2.43	-0.42	10573.15	21.87	24.85
144	13627	89.80	117.30	238.4	96	10577.12	-1588.16	2890.90	3298.35	3298.42	118.78	1.12	-1.04	10572.52	20.31	25.48
145	13723	91.30	118.40	239.3	96	10576.20	-1633.00	2975.78	3394.34	3394.40	118.76	1.94	1.56	10571.46	19.34	26.54
146	13819	89.90	118.20	238.4	96	10575.19	-1678.51	3060.29	3490.33	3490.39	118.74	1.47	-1.46	10570.32	19.12	27.68
147	13915	88.80	117.10	240.2	96	10576.28	-1723.05	3145.32	3586.32	3586.36	118.71	1.62	-1.15	10571.28	17.81	26.72
148	14011	91.70	118.50	239.3	96	10575.86	-1767.82	3230.23	3682.30	3682.33	118.69	3.35	3.02	10570.72	16.76	27.28
149	14107	90.60	118.40	239.3	96	10573.94	-1813.55	3314.62	3778.27	3778.31	118.68	1.15	-1.15	10568.66	16.79	29.34
150	14203	89.70	118.00	240.2	96	10573.69	-1858.91	3399.22	3874.27	3874.31	118.67	1.03	-0.94	10568.28	16.41	29.72
151	14299	90.30	119.50	242.0	96	10573.69	-1905.08	3483.39	3970.27	3970.30	118.67	1.68	0.62	10568.14	16.94	29.86
152	14395	91.70	118.80	242.0	96	10572.01	-1951.84	3567.21	4066.24	4066.28	118.69	1.63	1.46	10566.33	18.15	31.67
153	14491	90.00	118.20	242.0	96	10570.59	-1997.64	3651.57	4162.23	4162.27	118.68	1.88	-1.77	10564.78	18.27	33.22
154	14587	88.30	117.70	242.9	96	10572.01	-2042.62	3736.35	4258.21	4258.25	118.66	1.85	-1.77	10566.07	17.46	31.93
155	14683	89.50	117.70	242.0	96	10573.85	-2087.24	3821.34	4354.18	4354.21	118.64	1.25	1.25	10567.77	16.24	30.23
156	14779	90.30	117.60	242.0	96	10574.02	-2131.79	3906.37	4450.17	4450.20	118.62	0.84	0.83	10567.81	14.93	30.19
157	14875	90.00	117.60	242.9	96	10573.77	-2176.27	3991.45	4546.16	4546.18	118.60	0.31	-0.31	10567.42	13.54	30.58
158	14971	91.60	118.50	242.9	96	10572.43	-2221.40	4076.16	4642.15	4642.17	118.59	1.91	1.67	10565.95	12.90	32.05
159	15067	92.80	118.90	242.9	96	10568.74	-2267.47	4160.30	4738.07	4738.09	118.59	1.32	1.25	10562.13	13.36	35.87
160	15163	88.80	117.70	242.9	96	10567.40	-2312.97	4244.80	4834.04	4834.06	118.59	4.35	-4.17	10560.65	13.14	37.35

				33-105-02723										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(-)	BELOW (-)
161	15259	89.10	119.70	244.7	96	10569.16	-2359.06	4328.99	4930.02	4930.04	118.59	2.11	0.31	10562.28	13.59	35.72
162	15355	88.40	118.30	245.6	96	10571.26	-2405.59	4412.93	5025.99	5026.01	118.60	1.63	-0.73	10564.24	14.55	33.76
163	15451	90.40	118.00	245.6	96	10572.26	-2450.87	4497.56	5121.98	5122.00	118.59	2.11	2.08	10565.11	14.08	32.89
164	15548	89.20	118.20	245.6	97	10572.60	-2496.56	4583.13	5218.97	5218.99	118.58	1.25	-1.24	10565.31	13.52	32.69
165	15644	89.80	118.30	245.6	96	10573.44	-2542.00	4667.69	5314.97	5314.99	118.57	0.63	0.62	10566.02	13.22	31.98
166	15740	89.90	118.40	245.6	96	10573.69	-2587.58	4752.18	5410.97	5410.99	118.57	0.15	0.10	10566.14	13.08	31.86
167	15836	89.60	117.60	247.4	96	10574.11	-2632.65	4836.94	5506.96	5506.98	118.56	0.89	-0.31	10566.42	12.36	31.58
168	15932	89.50	117.70	248.3	96	10574.86	-2677.20	4921.97	5602.95	5602.96	118.54	0.15	-0.10	10567.04	11.05	30.96
169	16028	89.40	117.40	247.4	96	10575.79	-2721.60	5007.08	5698.94	5698.95	118.53	0.33	-0.10	10567.83	9.58	30.17
170	16124	90.70	117.30	246.5	96	10575.70	-2765.71	5092.35	5794.92	5794.92	118.51	1.36	1.35	10567.61	7.77	30.39
171	16220	90.20	117.60	242.0	96	10574.95	-2809.96	5177.54	5890.90	5890.90	118.49	0.61	-0.52	10566.72	6.13	31.28
172	16316	90.20	117.60	245.6	96	10574.61	-2854.43	5262.61	5986.89	5986.89	118.48	0.00	0.00	10566.25	4.74	31.75
173	16412	89.70	117.70	245.6	96	10574.70	-2898.98	5347.65	6082.88	6082.88	118.46	0.53	-0.52	10566.20	3.43	31.80
174	16508	90.20	118.10	246.5	96	10574.78	-2943.91	5432.49	6178.88	6178.88	118.45	0.67	0.52	10566.15	2.54	31.85
175	16604	90.80	116.80	245.6	96	10573.94	-2988.16	5517.68	6274.86	6274.86	118.44	1.49	0.62	10565.18	0.90	32.82
176	16700	90.00	118.30	245.6	96	10573.27	-3032.56	5602.78	6370.84	6370.84	118.42	1.77	-0.83	10564.38	-0.57	33.62
177	16796	89.00	118.30	246.5	96	10574.11	-3078.07	5687.31	6466.83	6466.83	118.42	1.04	-1.04	10565.08	-0.79	32.92
178	16892	88.40	118.90	245.6	96	10576.29	-3124.01	5771.57	6562.81	6562.81	118.43	0.88	-0.62	10567.12	-0.51	30.88
179	16988	89.80	118.40	245.6	96	10577.80	-3170.03	5855.80	6658.79	6658.79	118.43	1.55	1.46	10568.50	-0.14	29.50
180	17084	90.20	118.40	246.5	96	10577.80	-3215.69	5940.25	6754.79	6754.79	118.43	0.42	0.42	10568.36	-0.19	29.64
181	17180	89.80	117.80	247.4	96	10577.80	-3260.91	6024.93	6850.79	6850.79	118.42	0.75	-0.42	10568.23	-0.74	29.77
182	17276	90.80	118.30	244.7	96	10577.29	-3306.05	6109.65	6946.78	6946.79	118.42	1.16	1.04	10567.59	-1.38	30.41
183	17372	92.40	119.20	247.4	96	10574.61	-3352.20	6193.78	7042.74	7042.74	118.42	1.91	1.67	10564.78	-0.84	33.22
184	17468	91.30	119.00	246.5	96	10571.51	-3398.86	6277.62	7138.68	7138.68	118.43	1.16	-1.15	10561.55	0.28	36.45
185	17564	89.10	118.20	247.4	96	10571.18	-3444.82	6361.90	7234.68	7234.68	118.43	2.44	-2.29	10561.08	0.57	36.92
186	17660	89.40	118.50	248.3	96	10572.43	-3490.40	6446.38	7330.67	7330.67	118.43	0.44	0.31	10562.20	0.43	35.80
187	17756	89.00	118.10	248.3	96	10573.78	-3535.91	6530.90	7426.66	7426.66	118.43	0.59	-0.42	10563.41	0.21	34.59
188	17852	88.90	117.30	249.2	96	10575.53	-3580.52	6615.88	7522.63	7522.63	118.42	0.84	-0.10	10565.03	-1.01	32.97
189	17948	88.90	117.10	250.1	96	10577.38	-3624.40	6701.25	7618.59	7618.59	118.41	0.21	0.00	10566.74	-3.07	31.26
190	18044	88.70	117.40	249.2	96	10579.39	-3668.34	6786.57	7714.55	7714.55	118.39	0.38	-0.21	10568.62	-5.05	29.38
191	18140	89.60	117.60	251.0	96	10580.81	-3712.66	6871.72	7810.53	7810.53	118.38	0.96	0.94	10569.91	-6.60	28.09
192	18236	89.60	117.50	251.9	96	10581.48	-3757.07	6956.83	7906.51	7906.52	118.37	0.10	0.00	10570.44	-8.08	27.56
193	18332	89.20	117.40	251.0	96	10582.49	-3801.32	7042.02	8002.49	8002.50	118.36	0.43	-0.42	10571.31	-9.72	26.69
194	18428	88.50	118.90	251.0	96	10584.41	-3846.60	7126.64	8098.47	8098.48	118.36	1.72	-0.73	10573.11	-10.19	24.89
195	18524	87.90	119.50	249.2	96	10587.43	-3893.41	7210.40	8194.41	8194.42	118.37	0.88	-0.62	10575.99	-8.90	22.01





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

Well Name: Atlanta Federal 10-6H (Atlanta 14 Well Eco Pad)  
Location: NENW Sec 6 - T153N - R101W - Williams Co., ND  
License Number: 33-105-02723 Region: Williston  
Spud Date: 9/6/13 Drilling Completed: 9/12/13  
Surface Coordinates: NENW Sec 6 - T153N - R101W - Williams Co., ND  
495' FNL & 1305' FWL  
Bottom Hole NENW Sec 6 - T153N - R101W - Williams Co., ND  
Coordinates: CP: 10918' MD; 10589.28' TVD, 786' FNL & 1818' FWL  
Ground Elevation (ft): 1945' K.B. Elevation (ft): 1967'  
Logged Interval (ft): 9700' To: 10588' Total Depth (ft): 888'  
Formation: Mis Canyon, Lodgple, Uppr Bkkn Sh, Mid Bkkn Sh, Low Bkkn Sh, Thr Forks  
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 & Clay Moore

# Second Hand

Joe Dunn / RC Whitmore

## ROCK TYPES

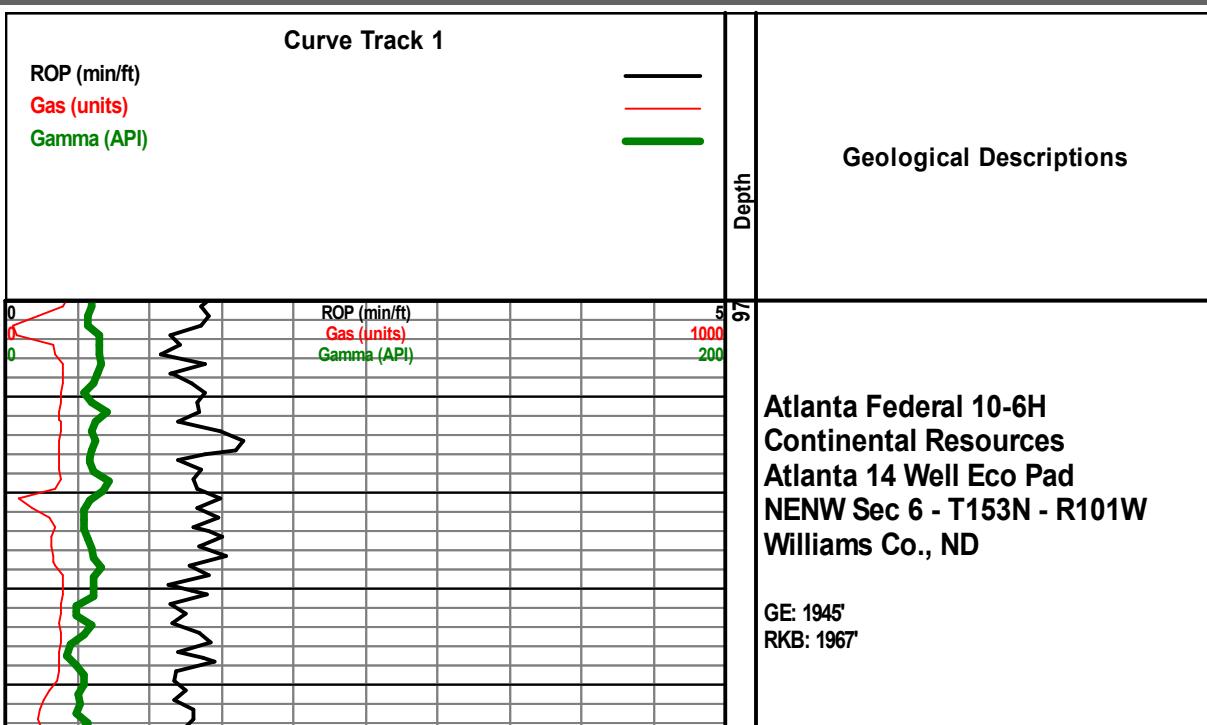
	Anhy		Clyst		Gyp		Mrslst		Shgy
	Bent		Coal		Igne		Salt		Sltst
	Brec		Congl		Lmst		Shale		Ss
	Cht		Dol		Meta		Shcol		Till

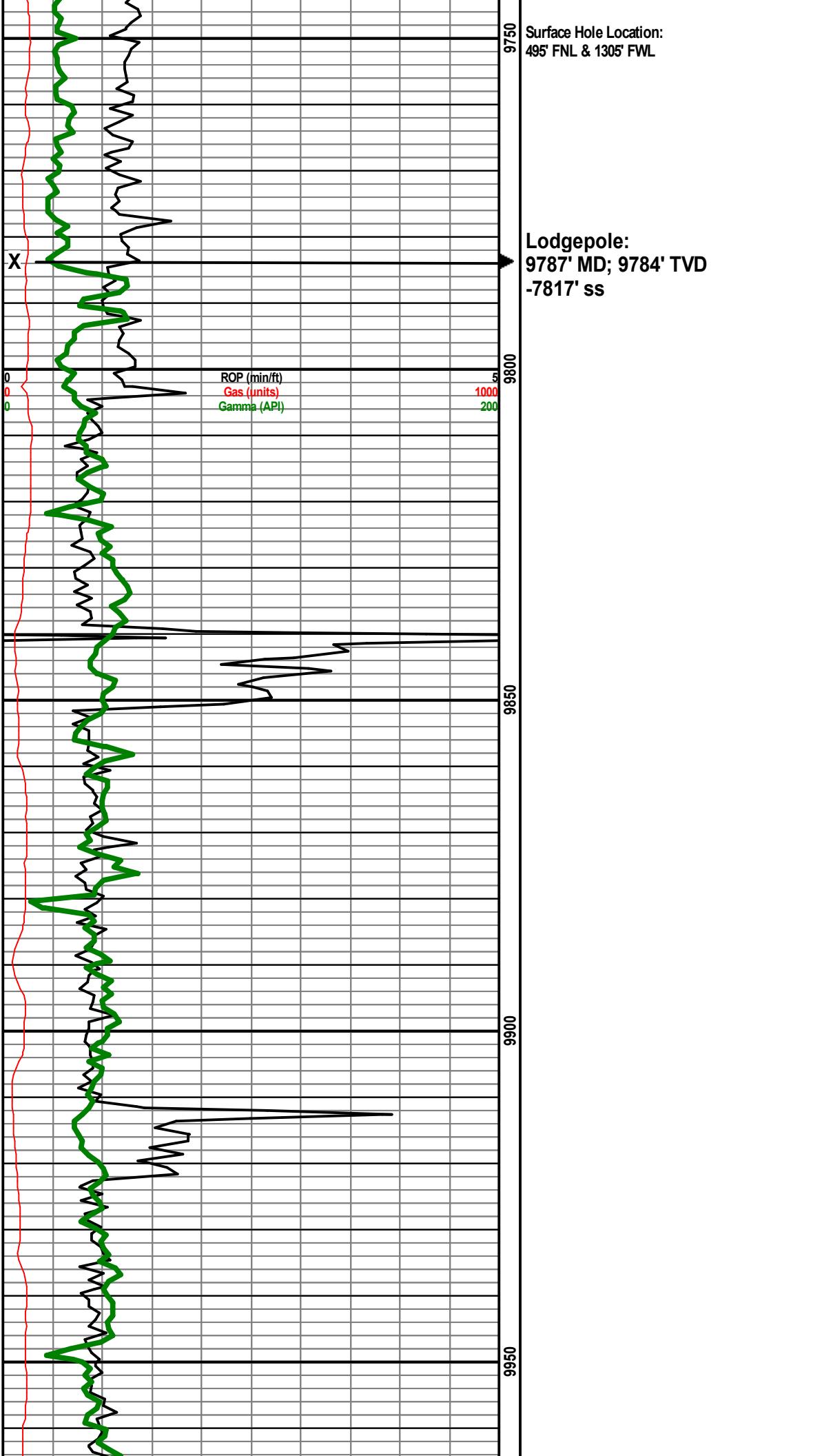
## ACCESSORIES

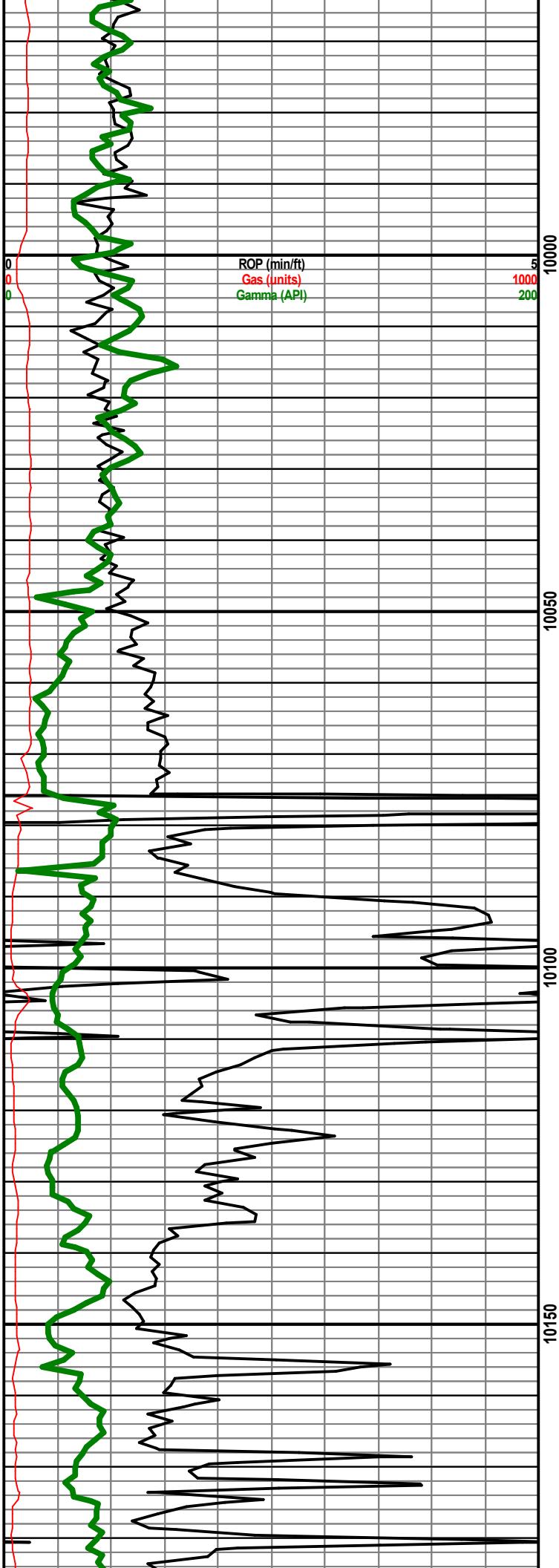
MINERAL	Gyp	FOSSIL	Ostra	TEXTURE

## OTHER SYMBOLS

POROSITY TYPE	Vuggy	ROUNDING	Spotted	EVENTS
SORTING				
		INTERVALS		
OIL SHOWS	Even			

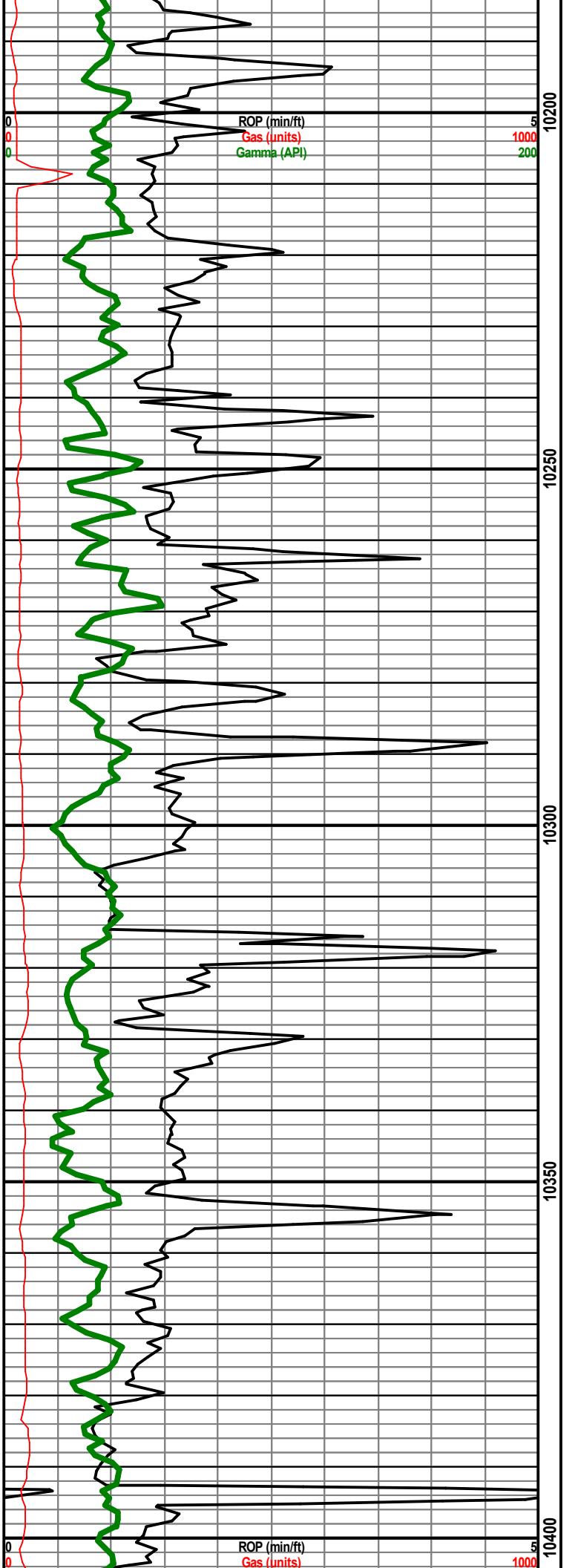


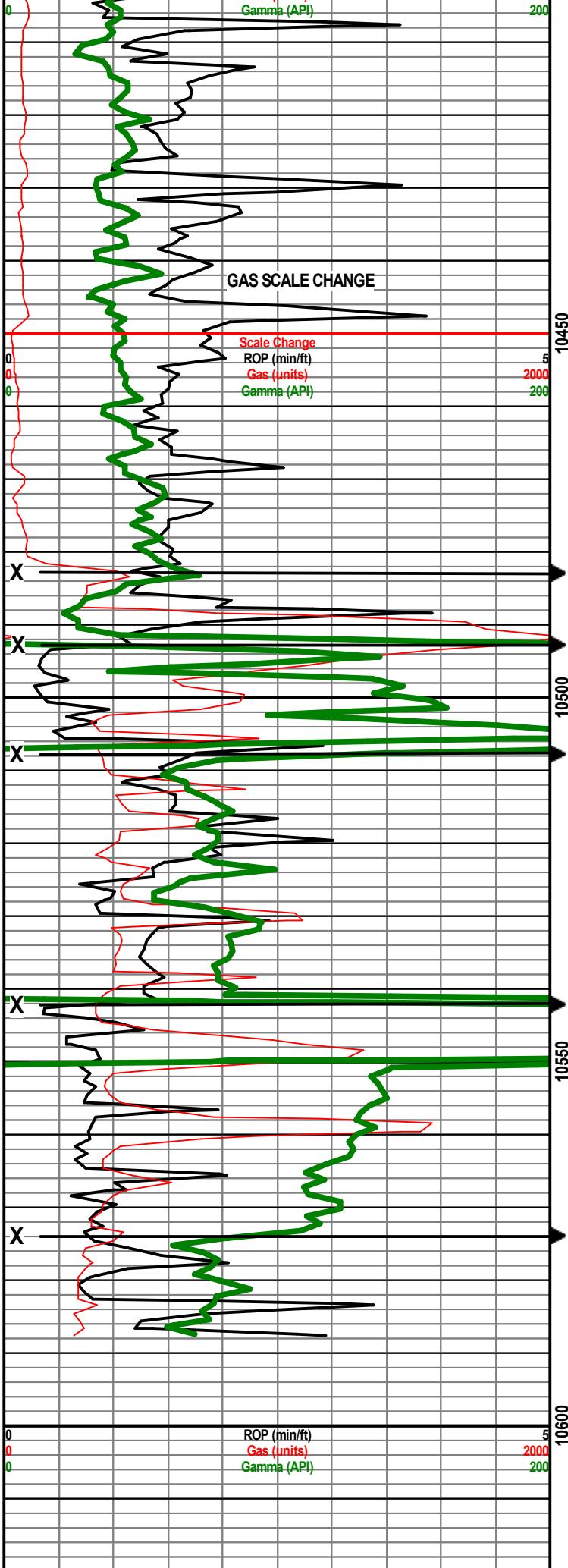




TOOH for Build Assembly @ 10080' MD  
9/10/13 - 13:20  
Resume Drilling: 9/11/13 - 00:25

KOP: 10080' MD; 10077' TVD  
-8110' ss





**False Bakken: 10562' MD  
10483' TVD; -8516' ss**

**Upper Bakken Shale: 10581' MD  
10493' TVD; -8526' ss**

**Middle Bakken: 10611' MD  
10508' TVD; -8541' ss**

**Lower Bakken Shale: 10686' MD  
10542' TVD; -8575' ss**

**Three Forks/Base of Shale:  
10790' MD; 10574' TVD  
-8607' ss**

**TD Build Section @ 10938' MD**  
9/12/13 - 10:40  
**Casing Point: 10918' MD; 10589.28' TVD**  
**Casing Loc: NENW Sec 6**  
**786' FNL & 1818' FWL**  
**Continued on Atlanta Federal 10-6H Horz. log**

**Field Geologist: Adam Swoboda  
Second Hand: Joe Dunn & RC Whitmore  
Geo-Link Inc.**

Thank You For Using Geo-Link Inc.

# **NEWSCO**

## **International Energy Services Inc.**

Continental Resources  
Company

32284  
Job Number

6/4/2013  
Date

Cyclone 2  
Rig

Atlanta Federal 10-6H  
Well Name

Williams Co., ND  
County & State

Surveyed from depth of: Surface to 1955'

GL to KB: 22'

Type of Survey: Nvader/MWD

**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 coordinates are calculated using minimum curvature .

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)

October 2, 2013

North Dakota Mineral Resources  
Survey Certification Sheet

**Company:** Continental Resources, Inc.

**Lease:** Atlanta Federal 10

**Well Number:** 6H

**Location:** Williams County, ND

**Job Number:** DDMT-130617

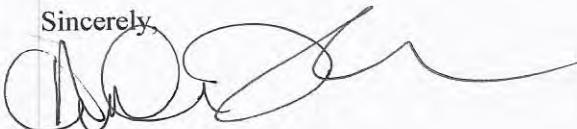
**Well API# 33-105-02723**

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	2,030' – 20,451' MD	09/03/2013 to 09/23/2013	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 10-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130617
API #:	33-105-02723

Magnetic Declination:	8.48	REFERENCED TO TRUE NORTH
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Company:	Continental Resources, Inc.
Well Name:	Atlanta Federal 10-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130617
API #:	33-105-02723

Magnetic Declination: 8.48 REFERENCED TO TRUE NORTH ▼

Vertical Section Azimuth:	118.43	Proposed Direction:	118.43
Survey Calculation Method:	Minimum Curvature		

PTB:	MD	INC	AZM	TVD	N/S	E/W	VS
	20,517	89.7	114.4	10594.83	-4844.33	8959.87	10185.62

#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance	DLS/ 100	BUR/ 100'	
32	4,898	0.60	89.80	4897.44	25.53	-1.57	-13.53	25.57	356.49	0.64	-0.43
33	4,991	0.60	65.70	4990.44	25.73	-0.63	-12.81	25.74	358.59	0.27	0.00
34	5,085	0.80	60.80	5084.43	26.25	0.39	-12.16	26.25	0.84	0.22	0.21
35	5,178	1.70	65.30	5177.41	27.14	2.21	-10.98	27.23	4.65	0.97	0.97
36	5,272	1.50	57.10	5271.37	28.40	4.51	-9.56	28.75	9.02	0.32	-0.21
37	5,366	1.60	97.70	5365.34	28.89	6.84	-7.74	29.69	13.32	1.15	0.11
38	5,459	2.30	122.10	5458.28	27.72	9.71	-4.66	29.37	19.30	1.15	0.75
39	5,552	3.70	132.20	5551.16	24.71	13.51	0.12	28.17	28.67	1.60	1.51
40	5,645	5.80	150.80	5643.84	18.60	18.03	7.00	25.90	44.11	2.77	2.26
41	5,732	6.70	156.40	5730.32	10.11	22.20	14.71	24.40	65.52	1.25	1.03
42	5,826	6.30	167.90	5823.72	0.04	25.48	22.39	25.48	89.91	1.45	-0.43
43	5,919	3.00	173.00	5916.40	-7.37	26.85	27.12	27.84	105.34	3.57	-3.55
44	6,012	2.00	179.20	6009.31	-11.41	27.17	29.32	29.46	112.77	1.11	-1.08
45	6,106	1.30	200.50	6103.27	-14.04	26.82	30.27	30.27	117.64	0.98	-0.74
46	6,199	2.00	181.50	6196.23	-16.66	26.40	31.15	31.22	122.24	0.95	0.75
47	6,293	2.60	181.70	6290.16	-20.43	26.30	32.85	33.30	127.84	0.64	0.64
48	6,387	2.30	193.70	6384.07	-24.39	25.79	34.29	35.50	133.40	0.63	-0.32
49	6,480	1.50	185.40	6477.02	-27.41	25.23	35.24	37.26	137.37	0.91	-0.86
50	6,574	1.20	170.60	6570.99	-29.61	25.28	36.33	38.93	139.51	0.49	-0.32
51	6,665	0.60	183.00	6661.98	-31.03	25.41	37.11	40.10	140.69	0.69	-0.66
52	6,759	1.60	174.50	6755.96	-32.82	25.51	38.06	41.57	142.15	1.07	1.06
53	6,852	0.90	189.00	6848.94	-34.84	25.52	39.03	43.18	143.78	0.82	-0.75
54	6,946	0.30	279.00	6942.94	-35.53	25.16	39.04	43.53	144.70	1.01	-0.64
55	7,039	0.30	221.40	7035.94	-35.67	24.76	38.76	43.42	145.24	0.31	0.00
56	7,133	0.50	217.70	7129.93	-36.18	24.34	38.63	43.61	146.07	0.21	0.21
57	7,227	0.70	344.60	7223.93	-35.95	23.94	38.17	43.20	146.34	1.15	0.21
58	7,321	1.70	358.80	7317.91	-34.01	23.76	37.08	41.48	145.06	1.10	1.06
59	7,413	1.50	31.10	7409.88	-31.61	24.35	36.46	39.90	142.39	0.99	-0.22
60	7,508	0.90	169.10	7504.87	-31.28	25.14	37.00	40.13	141.21	2.37	-0.63
61	7,601	0.90	177.60	7597.85	-32.73	25.30	37.83	41.37	142.29	0.14	0.00
62	7,695	0.70	160.40	7691.85	-34.00	25.53	38.64	42.52	143.10	0.33	-0.21
63	7,787	0.20	51.30	7783.84	-34.43	25.84	39.12	43.05	143.11	0.86	-0.54
64	7,881	0.20	303.50	7877.84	-34.24	25.83	39.02	42.89	142.97	0.34	0.00



V09.04.02

## SURVEY CALCULATION PROGRAM

10/2/13 15:34

Company:	Continental Resources, Inc.
Well Name:	Atlanta Federal 10-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130617
API #:	33-105-02723

Magnetic Declination: 8.48 REFERENCED TO TRUE NORTH ▼

Vertical Section Azimuth:	118.43	Proposed Direction:	118.43
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Survey Calculation Method:	Minimum Curvature
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PTB:	MD	INC	AZM	TVD	N/S	E/W	VS
	20,517	89.7	114.4	10594.83	-4844.33	8959.87	10185.62

#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance	DLS/ 100	BUR/ 100'	
65	7,974	0.40	276.90	7970.84	-34.11	25.38	38.56	42.51	143.35	0.26	0.22
66	8,068	0.30	337.80	8064.84	-33.84	24.96	38.06	42.05	143.59	0.39	-0.11
67	8,161	0.30	293.40	8157.84	-33.52	24.64	37.63	41.60	143.68	0.24	0.00
68	8,255	0.40	291.40	8251.84	-33.30	24.11	37.06	41.12	144.10	0.11	0.11
69	8,349	0.20	255.10	8345.84	-33.23	23.65	36.61	40.78	144.56	0.28	-0.21
70	8,442	0.30	226.10	8438.84	-33.44	23.31	36.42	40.76	145.11	0.17	0.11
71	8,536	0.20	191.50	8532.83	-33.77	23.10	36.39	40.92	145.62	0.19	-0.11
72	8,629	0.00	1.20	8625.83	-33.93	23.07	36.44	41.03	145.78	0.22	-0.22
73	8,723	0.10	347.00	8719.83	-33.85	23.05	36.39	40.95	145.74	0.11	0.11
74	8,816	0.10	60.20	8812.83	-33.73	23.11	36.38	40.88	145.59	0.13	0.00
75	8,910	0.20	121.60	8906.83	-33.77	23.32	36.58	41.04	145.38	0.19	0.11
76	9,003	0.00	202.50	8999.83	-33.86	23.45	36.75	41.19	145.29	0.22	-0.22
77	9,097	0.00	308.70	9093.83	-33.86	23.45	36.75	41.19	145.29	0.00	0.00
78	9,190	0.30	296.20	9186.83	-33.75	23.24	36.50	40.98	145.45	0.32	0.32
79	9,284	0.50	305.80	9280.83	-33.40	22.68	35.85	40.38	145.82	0.22	0.21
80	9,378	0.50	315.50	9374.83	-32.87	22.06	35.05	39.59	146.13	0.09	0.00
81	9,471	0.40	326.70	9467.82	-32.31	21.60	34.38	38.86	146.24	0.14	-0.11
82	9,565	0.40	336.40	9561.82	-31.73	21.29	33.83	38.21	146.15	0.07	0.00
83	9,658	0.50	347.70	9654.82	-31.04	21.07	33.31	37.52	145.83	0.14	0.11
84	9,751	0.50	6.70	9747.82	-30.24	21.03	32.89	36.84	145.18	0.18	0.00
85	9,845	0.50	344.60	9841.81	-29.44	20.97	32.46	36.14	144.53	0.20	0.00
86	9,938	0.50	339.80	9934.81	-28.67	20.72	31.87	35.37	144.14	0.05	0.00
87	10,042	0.30	23.00	10038.81	-27.99	20.67	31.51	34.80	143.55	0.33	-0.19
88	10,073	0.60	119.60	10069.81	-28.00	20.85	31.66	34.90	143.33	2.26	0.97
89	10,104	3.30	134.30	10100.78	-28.70	21.63	32.68	35.93	143.00	8.79	8.71
90	10,135	6.90	131.10	10131.66	-30.55	23.67	35.36	38.64	142.23	11.64	11.61
91	10,166	11.40	125.00	10162.26	-33.53	27.58	40.22	43.42	140.56	14.83	14.52
92	10,198	15.30	119.30	10193.39	-37.41	33.86	47.59	50.46	137.85	12.85	12.19
93	10,229	19.20	117.00	10222.99	-41.73	41.97	56.78	59.18	134.83	12.77	12.58
94	10,258	23.50	116.40	10249.99	-46.47	51.40	67.33	69.29	132.11	14.85	14.83
95	10,289	26.90	115.90	10278.04	-52.28	63.25	80.51	82.06	129.58	10.99	10.97
96	10,320	29.20	114.70	10305.39	-58.50	76.43	95.07	96.25	127.43	7.64	7.42

Company:	Continental Resources, Inc.
Well Name:	Atlanta Federal 10-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130617
API #:	33-105-02723

Magnetic Declination: 8.48 REFERENCED TO TRUE NORTH ▼

Vertical Section Azimuth:	118.43	Proposed Direction:	118.43
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Survey Calculation Method:	Minimum Curvature
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PTB:	MD	INC	AZM	TVD	N/S	E/W	VS
	20,517	89.7	114.4	10594.83	-4844.33	8959.87	10185.62

#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance	DLS/ 100	BUR/ 100'	
97	10,351	32.30	115.30	10332.03	-65.20	90.79	110.89	111.78	125.68	10.05	10.00
98	10,382	36.50	117.40	10357.60	-72.99	106.47	128.38	129.09	124.43	14.08	13.55
99	10,413	39.60	118.90	10382.01	-82.01	123.31	147.49	148.09	123.63	10.43	10.00
100	10,444	42.00	120.20	10405.48	-92.00	140.93	167.74	168.30	123.14	8.21	7.74
101	10,475	44.90	119.60	10427.98	-102.63	159.41	189.05	189.59	122.77	9.45	9.35
102	10,507	48.70	117.50	10449.89	-113.76	179.90	212.37	212.85	122.31	12.80	11.88
103	10,538	53.20	114.90	10469.41	-124.37	201.50	236.41	236.79	121.68	15.91	14.52
104	10,569	57.20	112.90	10487.10	-134.67	224.77	261.78	262.03	120.93	13.95	12.90
105	10,600	60.80	112.50	10503.07	-144.92	249.28	288.21	288.35	120.17	11.67	11.61
106	10,631	63.10	114.40	10517.64	-155.81	274.38	315.47	315.53	119.59	9.18	7.42
107	10,663	63.80	117.40	10531.95	-168.32	300.12	344.06	344.10	119.28	8.67	2.19
108	10,694	65.30	121.30	10545.27	-182.04	324.51	372.04	372.08	119.29	12.35	4.84
109	10,725	70.20	122.40	10557.01	-197.18	348.87	400.67	400.74	119.47	16.14	15.81
110	10,756	74.80	121.90	10566.33	-212.90	373.90	430.16	430.26	119.66	14.92	14.84
111	10,787	78.70	120.90	10573.43	-228.62	399.65	460.29	460.42	119.77	12.97	12.58
112	10,818	80.50	120.20	10579.03	-244.12	425.91	490.76	490.91	119.82	6.22	5.81
113	10,849	81.90	119.20	10583.77	-259.29	452.52	521.39	521.54	119.81	5.53	4.52
114	10,880	84.30	118.20	10587.49	-274.07	479.51	552.16	552.31	119.75	8.38	7.74
115	10,948	90.30	114.70	10590.70	-304.30	540.29	620.00	620.09	119.39	10.21	8.82
116	10,979	90.10	115.10	10590.59	-317.36	568.41	650.94	651.00	119.18	1.44	-0.65
117	11,072	89.40	117.80	10591.00	-358.77	651.66	743.88	743.90	118.84	3.00	-0.75
118	11,166	89.20	117.00	10592.14	-402.03	735.11	837.85	837.86	118.67	0.88	-0.21
119	11,260	90.60	117.80	10592.31	-445.29	818.56	931.84	931.84	118.55	1.72	1.49
120	11,354	90.60	117.60	10591.32	-488.98	901.78	1025.82	1025.82	118.47	0.21	0.00
121	11,448	89.30	119.10	10591.41	-533.61	984.50	1119.82	1119.82	118.46	2.11	-1.38
122	11,541	88.90	118.50	10592.87	-578.41	1065.99	1212.80	1212.81	118.48	0.78	-0.43
123	11,635	89.00	118.70	10594.59	-623.40	1148.51	1306.79	1306.79	118.49	0.24	0.11
124	11,729	89.30	119.80	10595.98	-669.33	1230.51	1400.77	1400.77	118.54	1.21	0.32
125	11,822	90.60	119.30	10596.06	-715.19	1311.41	1493.75	1493.75	118.61	1.50	1.40
126	11,916	90.60	119.90	10595.08	-761.62	1393.14	1587.72	1587.73	118.67	0.64	0.00
127	12,010	90.50	119.50	10594.18	-808.19	1474.79	1681.69	1681.72	118.72	0.44	-0.11
128	12,103	89.70	118.90	10594.02	-853.56	1555.97	1774.68	1774.71	118.75	1.08	-0.86

Company:	Continental Resources, Inc.
Well Name:	Atlanta Federal 10-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130617
API #:	33-105-02723

Magnetic Declination: 8.48 REFERENCED TO TRUE NORTH ▼

Vertical Section Azimuth:	118.43	Proposed Direction:	118.43
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Survey Calculation Method:	Minimum Curvature
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PTB:	MD		INC		AZM		TVD	N/S	E/W		VS	
	20,517		89.7		114.4		10594.83	-4844.33	8959.87		10185.62	
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure		DLS/ 100	BUR/ 100'	
129	12,197	91.20	119.10	10593.28	-899.13	1638.18	1868.67	1868.71	118.76	1.61	1.60	
130	12,291	91.00	120.40	10591.47	-945.76	1719.77	1962.63	1962.67	118.81	1.40	-0.21	
131	12,385	90.80	120.20	10590.00	-993.18	1800.92	2056.57	2056.63	118.88	0.30	-0.21	
132	12,479	89.80	118.00	10589.50	-1038.89	1883.05	2150.55	2150.62	118.89	2.57	-1.06	
133	12,572	89.90	118.20	10589.75	-1082.70	1965.09	2243.55	2243.61	118.85	0.24	0.11	
134	12,666	91.30	117.80	10588.76	-1126.83	2048.08	2337.54	2337.59	118.82	1.55	1.49	
135	12,762	91.10	118.70	10586.75	-1172.25	2132.62	2433.52	2433.57	118.80	0.96	-0.21	
136	12,858	90.80	118.40	10585.16	-1218.13	2216.94	2529.50	2529.55	118.79	0.44	-0.31	
137	12,954	90.80	119.90	10583.82	-1264.88	2300.77	2625.49	2625.54	118.80	1.56	0.00	
138	13,050	90.70	119.00	10582.56	-1312.08	2384.35	2721.46	2721.52	118.82	0.94	-0.10	
139	13,146	89.00	118.50	10582.81	-1358.25	2468.52	2817.46	2817.52	118.82	1.85	-1.77	
140	13,243	90.70	118.20	10583.07	-1404.31	2553.88	2914.45	2914.51	118.81	1.78	1.75	
141	13,339	91.30	119.00	10581.39	-1450.26	2638.15	3010.43	3010.50	118.80	1.04	0.62	
142	13,435	91.20	120.00	10579.30	-1497.52	2721.69	3106.39	3106.47	118.82	1.05	-0.10	
143	13,531	90.80	117.70	10577.62	-1543.83	2805.75	3202.37	3202.44	118.82	2.43	-0.42	
144	13,627	89.80	117.30	10577.12	-1588.16	2890.90	3298.35	3298.42	118.78	1.12	-1.04	
145	13,723	91.30	118.40	10576.20	-1633.00	2975.78	3394.34	3394.40	118.76	1.94	1.56	
146	13,819	89.90	118.20	10575.19	-1678.51	3060.29	3490.33	3490.39	118.74	1.47	-1.46	
147	13,915	88.80	117.10	10576.28	-1723.05	3145.32	3586.32	3586.36	118.71	1.62	-1.15	
148	14,011	91.70	118.50	10575.86	-1767.82	3230.23	3682.30	3682.33	118.69	3.35	3.02	
149	14,107	90.60	118.40	10573.94	-1813.55	3314.62	3778.27	3778.31	118.68	1.15	-1.15	
150	14,203	89.70	118.00	10573.69	-1858.91	3399.22	3874.27	3874.31	118.67	1.03	-0.94	
151	14,299	90.30	119.50	10573.69	-1905.08	3483.39	3970.27	3970.30	118.67	1.68	0.62	
152	14,395	91.70	118.80	10572.01	-1951.84	3567.21	4066.24	4066.28	118.69	1.63	1.46	
153	14,491	90.00	118.20	10570.59	-1997.64	3651.57	4162.23	4162.27	118.68	1.88	-1.77	
154	14,587	88.30	117.70	10572.01	-2042.62	3736.35	4258.21	4258.25	118.66	1.85	-1.77	
155	14,683	89.50	117.70	10573.85	-2087.24	3821.34	4354.18	4354.21	118.64	1.25	1.25	
156	14,779	90.30	117.60	10574.02	-2131.79	3906.37	4450.17	4450.20	118.62	0.84	0.83	
157	14,875	90.00	117.60	10573.77	-2176.27	3991.45	4546.16	4546.18	118.60	0.31	-0.31	
158	14,971	91.60	118.50	10572.43	-2221.40	4076.16	4642.15	4642.17	118.59	1.91	1.67	
159	15,067	92.80	118.90	10568.74	-2267.47	4160.30	4738.07	4738.09	118.59	1.32	1.25	
160	15,163	88.80	117.70	10567.40	-2312.97	4244.80	4834.04	4834.06	118.59	4.35	-4.17	

Company:	Continental Resources, Inc.
Well Name:	Atlanta Federal 10-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130617
API #:	33-105-02723

Magnetic Declination: 8.48 REFERENCED TO TRUE NORTH ▼

Vertical Section Azimuth:	118.43	Proposed Direction:	118.43
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Survey Calculation Method:	Minimum Curvature
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PTB:	MD	INC	AZM	TVD	N/S	E/W	VS
	20,517	89.7	114.4	10594.83	-4844.33	8959.87	10185.62

#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure Distance	DLS/ 100	BUR/ 100'	
161	15,259	89.10	119.70	10569.16	-2359.06	4328.99	4930.02	4930.04	118.59	2.11	0.31
162	15,355	88.40	118.30	10571.26	-2405.59	4412.93	5025.99	5026.01	118.60	1.63	-0.73
163	15,451	90.40	118.00	10572.26	-2450.87	4497.56	5121.98	5122.00	118.59	2.11	2.08
164	15,548	89.20	118.20	10572.60	-2496.56	4583.13	5218.97	5218.99	118.58	1.25	-1.24
165	15,644	89.80	118.30	10573.44	-2542.00	4667.69	5314.97	5314.99	118.57	0.63	0.62
166	15,740	89.90	118.40	10573.69	-2587.58	4752.18	5410.97	5410.99	118.57	0.15	0.10
167	15,836	89.60	117.60	10574.11	-2632.65	4836.94	5506.96	5506.98	118.56	0.89	-0.31
168	15,932	89.50	117.70	10574.86	-2677.20	4921.97	5602.95	5602.96	118.54	0.15	-0.10
169	16,028	89.40	117.40	10575.79	-2721.60	5007.08	5698.94	5698.95	118.53	0.33	-0.10
170	16,124	90.70	117.30	10575.70	-2765.71	5092.35	5794.92	5794.92	118.51	1.36	1.35
171	16,220	90.20	117.60	10574.95	-2809.96	5177.54	5890.90	5890.90	118.49	0.61	-0.52
172	16,316	90.20	117.60	10574.61	-2854.43	5262.61	5986.89	5986.89	118.48	0.00	0.00
173	16,412	89.70	117.70	10574.70	-2898.98	5347.65	6082.88	6082.88	118.46	0.53	-0.52
174	16,508	90.20	118.10	10574.78	-2943.91	5432.49	6178.88	6178.88	118.45	0.67	0.52
175	16,604	90.80	116.80	10573.94	-2988.16	5517.68	6274.86	6274.86	118.44	1.49	0.62
176	16,700	90.00	118.30	10573.27	-3032.56	5602.78	6370.84	6370.84	118.42	1.77	-0.83
177	16,796	89.00	118.30	10574.11	-3078.07	5687.31	6466.83	6466.83	118.42	1.04	-1.04
178	16,892	88.40	118.90	10576.29	-3124.01	5771.57	6562.81	6562.81	118.43	0.88	-0.62
179	16,988	89.80	118.40	10577.80	-3170.03	5855.80	6658.79	6658.79	118.43	1.55	1.46
180	17,084	90.20	118.40	10577.80	-3215.69	5940.25	6754.79	6754.79	118.43	0.42	0.42
181	17,180	89.80	117.80	10577.80	-3260.91	6024.93	6850.79	6850.79	118.42	0.75	-0.42
182	17,276	90.80	118.30	10577.29	-3306.05	6109.65	6946.78	6946.79	118.42	1.16	1.04
183	17,372	92.40	119.20	10574.61	-3352.20	6193.78	7042.74	7042.74	118.42	1.91	1.67
184	17,468	91.30	119.00	10571.51	-3398.86	6277.62	7138.68	7138.68	118.43	1.16	-1.15
185	17,564	89.10	118.20	10571.18	-3444.82	6361.90	7234.68	7234.68	118.43	2.44	-2.29
186	17,660	89.40	118.50	10572.43	-3490.40	6446.38	7330.67	7330.67	118.43	0.44	0.31
187	17,756	89.00	118.10	10573.78	-3535.91	6530.90	7426.66	7426.66	118.43	0.59	-0.42
188	17,852	88.90	117.30	10575.53	-3580.52	6615.88	7522.63	7522.63	118.42	0.84	-0.10
189	17,948	88.90	117.10	10577.38	-3624.40	6701.25	7618.59	7618.59	118.41	0.21	0.00
190	18,044	88.70	117.40	10579.39	-3668.34	6786.57	7714.55	7714.55	118.39	0.38	-0.21
191	18,140	89.60	117.60	10580.81	-3712.66	6871.72	7810.53	7810.53	118.38	0.96	0.94
192	18,236	89.60	117.50	10581.48	-3757.07	6956.83	7906.51	7906.52	118.37	0.10	0.00

Company:	Continental Resources, Inc.
Well Name:	Atlanta Federal 10-6H
Location:	Williams County, ND
Rig:	Cyclone #2
Job Number:	DDMT-130617
API #:	33-105-02723

Magnetic Declination: 8.48 REFERENCED TO TRUE NORTH ▼

Vertical Section Azimuth:	118.43	Proposed Direction:	118.43
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Survey Calculation Method:	Minimum Curvature
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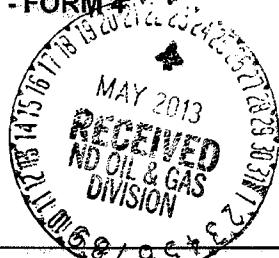
PTB:	MD		INC		AZM		TVD	N/S	E/W		VS		
	20,517	89.7	89.7	114.4	10594.83	-4844.33	8959.87	10185.62	100	100'	DLS/	BUR/	
#	Depth Feet	Inc Degrees	Azm Degrees	TVD Feet	N/S Feet	E/W Feet	Surface Vert Sec	Closure		Distance	Azm		
193	18,332	89.20	117.40	10582.49	-3801.32	7042.02	8002.49	8002.50	118.36	0.43	-0.42		
194	18,428	88.50	118.90	10584.41	-3846.60	7126.64	8098.47	8098.48	118.36	1.72	-0.73		
195	18,524	87.90	119.50	10587.43	-3893.41	7210.40	8194.41	8194.42	118.37	0.88	-0.62		
196	18,620	88.70	119.80	10590.28	-3940.88	7293.79	8290.35	8290.35	118.38	0.89	0.83		
197	18,716	91.40	119.50	10590.19	-3988.36	7377.21	8386.32	8386.32	118.40	2.83	2.81		
198	18,812	91.10	119.20	10588.10	-4035.41	7460.87	8482.28	8482.28	118.41	0.44	-0.31		
199	18,908	91.50	118.80	10585.92	-4081.94	7544.81	8578.25	8578.25	118.41	0.59	0.42		
200	19,004	88.90	118.90	10585.59	-4128.25	7628.89	8674.24	8674.24	118.42	2.71	-2.71		
201	19,101	88.60	119.20	10587.70	-4175.34	7713.67	8771.21	8771.21	118.43	0.44	-0.31		
202	19,197	89.20	119.00	10589.55	-4222.02	7797.53	8867.19	8867.19	118.43	0.66	0.63		
203	19,293	91.40	121.20	10589.04	-4270.16	7880.58	8963.13	8963.13	118.45	3.24	2.29		
204	19,389	91.50	121.30	10586.61	-4319.95	7962.62	9058.99	9058.99	118.48	0.15	0.10		
205	19,485	90.30	120.50	10585.11	-4369.24	8044.98	9154.88	9154.89	118.51	1.50	-1.25		
206	19,581	89.60	121.10	10585.19	-4418.40	8127.44	9250.80	9250.81	118.53	0.96	-0.73		
207	19,677	91.10	122.10	10584.60	-4468.70	8209.20	9346.65	9346.67	118.56	1.88	1.56		
208	19,773	86.70	116.60	10586.45	-4515.71	8292.81	9442.56	9442.58	118.57	7.33	-4.58		
209	19,869	87.30	118.40	10591.47	-4559.98	8377.84	9538.41	9538.43	118.56	1.97	0.62		
210	19,928	87.50	116.80	10594.15	-4587.28	8430.07	9597.34	9597.36	118.55	2.73	0.34		
211	20,023	90.10	117.50	10596.14	-4630.62	8514.58	9692.29	9692.30	118.54	2.83	2.74		
212	20,111	90.60	116.80	10595.60	-4670.78	8592.88	9780.26	9780.28	118.53	0.98	0.57		
213	20,202	90.40	116.00	10594.81	-4711.24	8674.39	9871.20	9871.21	118.51	0.91	-0.22		
214	20,293	90.20	115.40	10594.33	-4750.70	8756.38	9962.09	9962.10	118.48	0.69	-0.22		
215	20,384	89.90	114.70	10594.25	-4789.23	8838.82	10052.94	10052.94	118.45	0.84	-0.33		
216	20,451	89.70	114.40	10594.48	-4817.07	8899.77	10119.78	10119.78	118.42	0.54	-0.30		



## 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.  
**23363**



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 27, 2013</b>
<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	<b>Suspension of Drilling</b>

Well Name and Number  
**Atlanta Federal 10-6H**

Footages:	Qtr-Qtr	Section	Township	Range:
495 F N L 1305 F	WL	NENW	6	153 N 101 W
Field Baker	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)  
**Advanced Energy Services**

Address <b>P.O. Box 85</b>	City <b>S. Boardman</b>	State <b>MI</b>	Zip Code
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### 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.

(R1 must notify NDIC Inspector John Arzman 701-770-7564 with 3/10/2013)

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 	Printed Name <b>Terry L. Olson</b>	
Title <b>Regulatory Compliance Specialist</b>	Date <b>May 23, 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>05-23-2013</b>	
By 	
Title <b>David Burns</b>	
Engineering Tech.	



# 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)



*(Handwritten signature)*

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

Notice of Intent

Approximate Start Date  
**January 29, 2013**

Report of Work Done

Date Work Completed

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

Drilling Prognosis

Spill Report

Redrilling or Repair

Shooting

Casing or Liner

Acidizing

Plug Well

Fracture Treatment

Supplemental History

Change Production Method

Temporarily Abandon

Reclamation

Other

**Flow back exemption**

Well Name and Number

**Atlanta Federal 10-6H**

Footages

495

F

N

L

1305

F

W

L

Qtr-Qtr  
**NENW**

Section  
**6**

Township  
**153 N**

Range  
**101 W**

Field

**Baker**

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

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>
Signature <i>[Signature]</i>	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 <i>December 14, 2012</i>	
By <i>Jim Landrigan</i>	
Title <b>PETROLEUM ENGINEER</b>	

**A  
MERICAN  
TECHNICAL  
SERVICES, INC.**

8105 Black Hawk Rd • PQ Box 658 • 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 proofroiled 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**

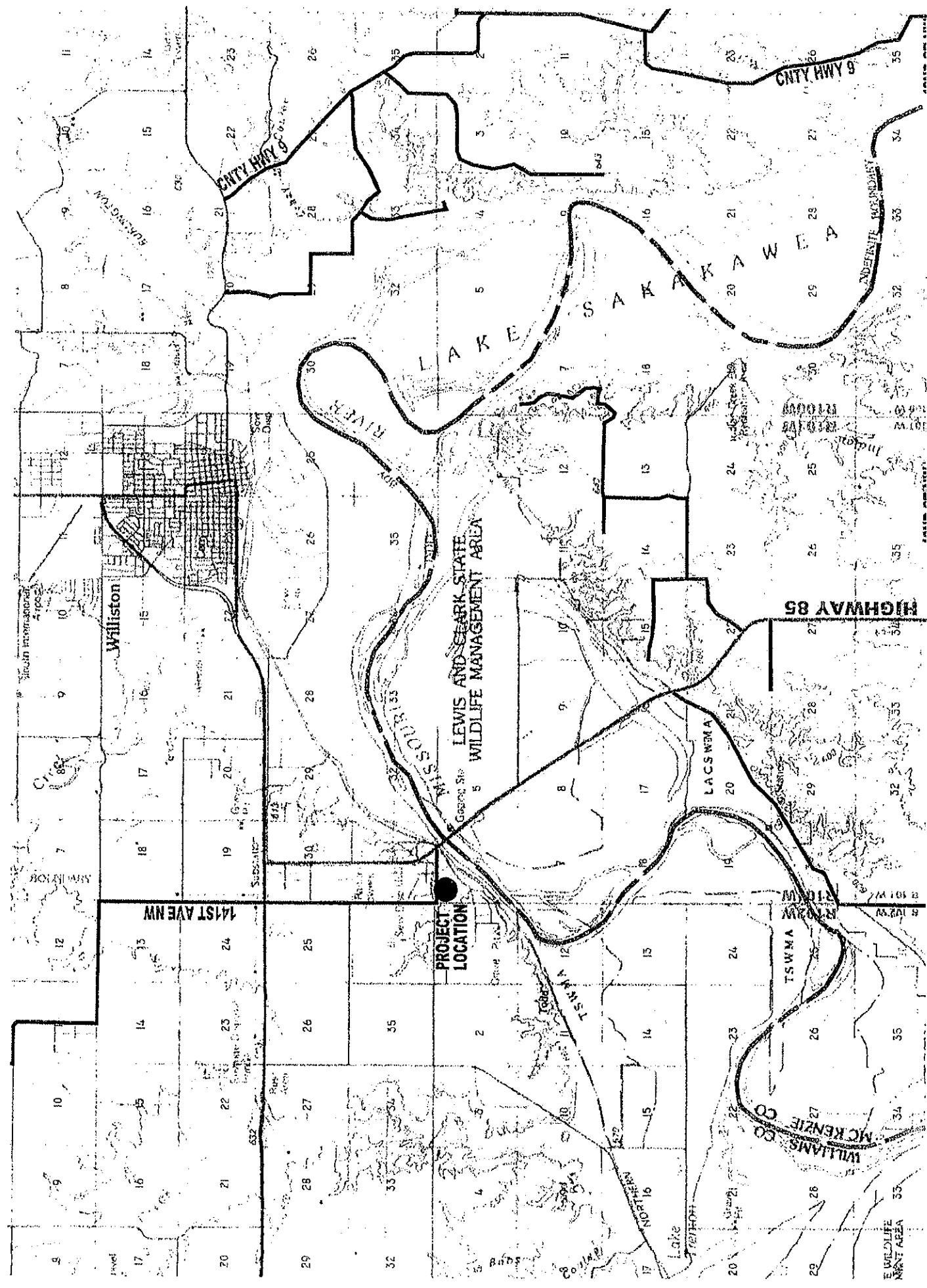
**SITE PLAN WITH BORING LOCATIONS**

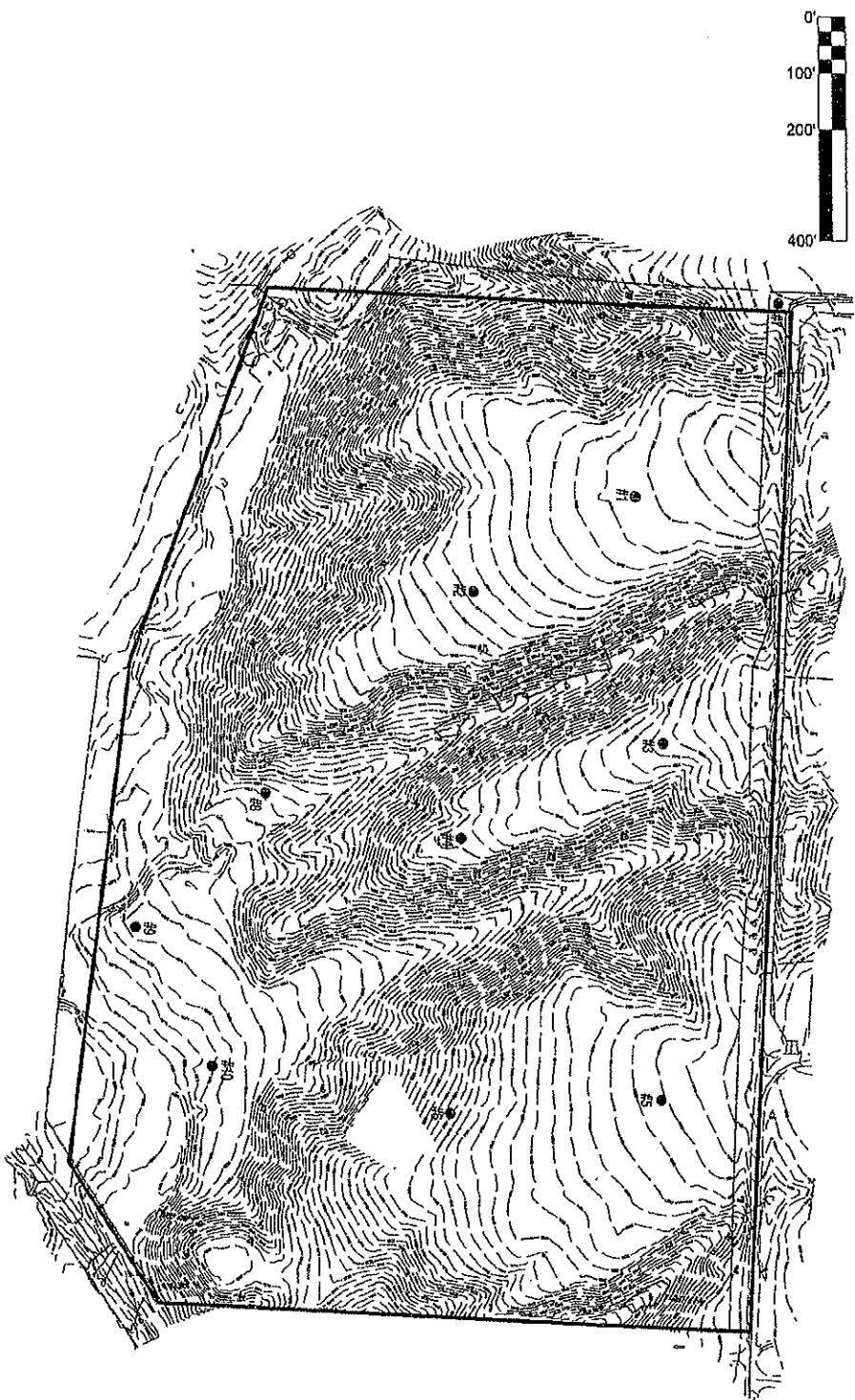
**BORING LOGS**

**BORING LOG GENERAL NOTES**

**CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES**

**MOISTURE-DENSITY CURVES**





SHEET DESCRIPTION: Site Layout

PROJECT NAME: Atlanta Site

PROJECT NO.: N12B10

REVISION	DATE	DESIGNED BY:	0 OF
1	xx/xx/xx	DRAWN BY: JBE	
2			
3			
4		DATE PRINTED: 3/8/12	

# 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	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	18	111	
45.0'							NSR			
48.0'										
50.0'	Dk gray				14	8	SB			
55.0'										
57.0'							NSR			
58.0'										
60.0'	Shale: Dk. Gray, wet, m. stiff (CH)	Pierre Shale								
61.0'	End of Boring			9	9	SB	30	95		
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							

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: 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
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							

**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: 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				9	6	SB			

DATE: 6/5/12	WATER TABLE MEASUREMENTS Not Encountered	DATE: 6/5/12
	Borehole caved to 25'	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: 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
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)			17	1	SB	11	FR	36 22	
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'										
25.0'						NSR				
30.0'										
31.0'					9	5	SB			
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								

**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: 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	QU
										PL
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'				11	2	SB	15	112		
12.0'	Fat Clay w/sand: Brown, moist, stiff, gravel present, (CH w/sand)	Glacial Till		11	3	SB	20	97	62	26
15.0'				10	4	SB	19	107		
20.0'										
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:	WATER TABLE MEASUREMENTS	DATE: 6/6/12								
6/6/12	Not Encountered	METHOD OF DRILLING: 2.25" HSA								
	Borehole caved to 32'	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: 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								

**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: 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'										
60.0'					9	8	SB			
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								

**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: 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
PL										
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'	Shale: Gray & brown, moist, stiff, sand present (CH)									
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'					9	1	SB	14	105	
10.0'	Gravelly Sand: Brown, moist, dense, variable sand content (SW)			22	2	SB	4		FR	
15.0'	obstructed sampler				11	NSR	SB	4		FR
18.0'	less dense, wet, less gravel		V							
20.0'				4	4	SB	23	109		
21.0'	End of Boring									
25.0'										
DATE: 6/7/12	WATER TABLE MEASUREMENTS Encountered at 18' Borehole caved to 13'	DATE: 6/7/12	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: 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
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'										
26.0'	End of Boring						NSR			
DATE: 6/7/12	WATER TABLE MEASUREMENTS Encountered at 15' Borehole caved to 13'	DATE: 6/7/12	METHOD OF DRILLING: 2.25" HSA 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		
Fine-grained soils 50% or more passes No. 200 sieve*	Sands and clays Liquid limit 50% or less	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	$C_u = \frac{D_{50}}{D_{10}}$ greater than 4; $C_z = \frac{(D_{30})^2}{D_{10} \times D_{50}}$ between 1 and 3		
			Clean gravels			
		GP	Poorly graded gravels and gravel-sand mixtures, little or no fines	Not meeting both criteria for GW		
		GM	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4 Less than 5% pass No. 200 sieve	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols	
		GC	Clayey gravels, gravel-sand-clay mixtures			
		Sands More than 50% of coarse fraction passes No. 4 sieve	SW	Well-graded sands and gravelly sands, little or no fines	Atterberg limits above "A" line with P.I. greater than 7 More than 12% pass No. 200 sieve 5 to 12% pass No. 200 sieve	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			SP	Poorly graded sands and gravelly sands, little or no fines		
			SM	Silty sands, sand-silt mixtures		
			SC	Clayey sands, sand-clay mixtures		
	Sils and clays Liquid limit greater than 50%	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	Plasticity Chart		
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	For classification of fine-grained soils and fine fraction of coarse-grained soils. Atterberg Limits plotting in hatched area are borderline classifications requiring use of dual symbols.		
		OL	Organic silts and organic silty clays of low plasticity	Equation of A-line: $PI = 0.73(LL - 20)$		
		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts			
		CH	Inorganic clays of high plasticity, fat clays			
		OH	Organic clays of medium to high plasticity			
		PI	Peat, muck and other highly organic soils	Liquid Limit		

\* Based on the material passing the 3 in. (75 mm) sieve.



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#: 1 Date: 06/11/12

ASTM: 698 Method:A

Attn: Jade

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

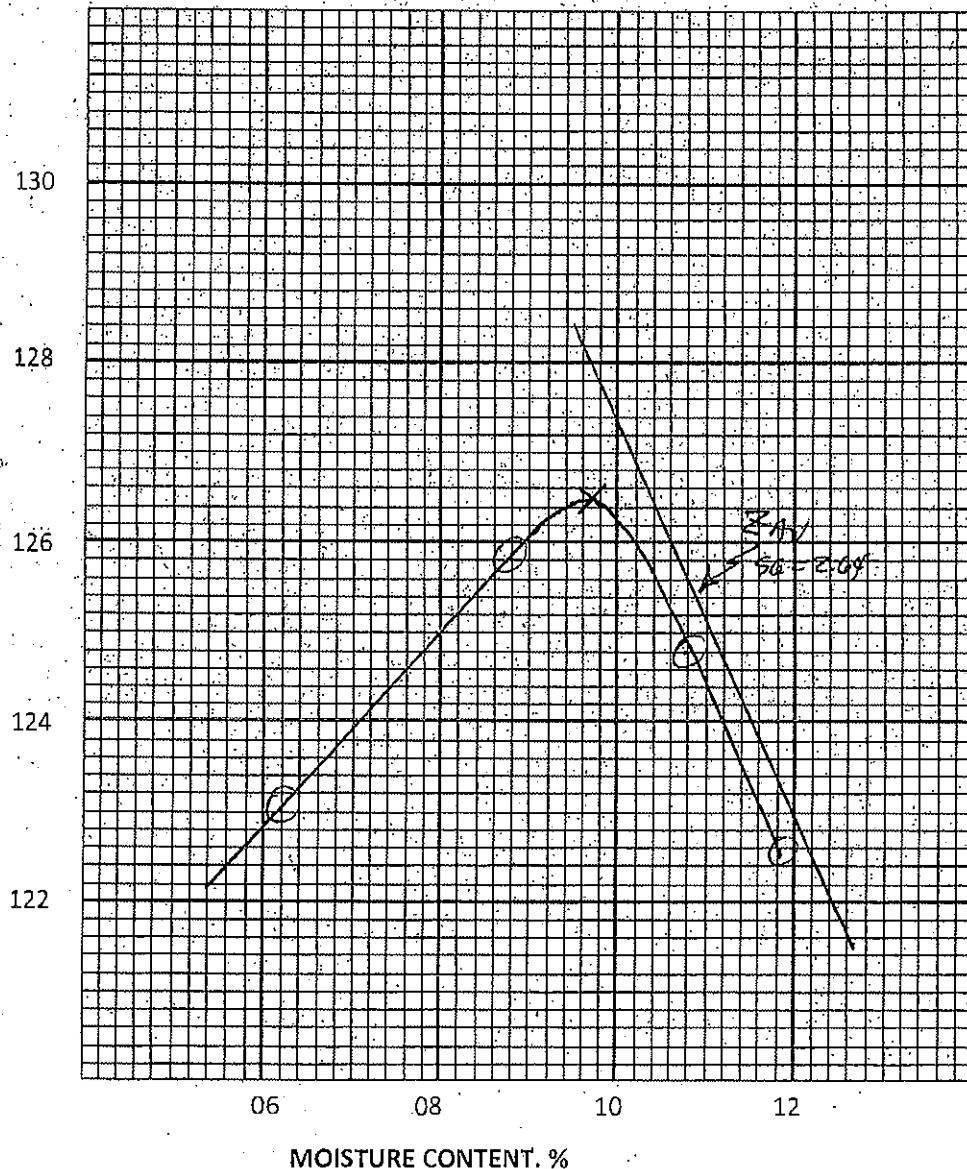
Project: Continental Atlanta Pad, Near  
Williston, North Dakota

Project Number: 12-12165

MAXIMUM DENSITY: 126.5 pcf

OPTIMUM MOISTURE CONTENT: 9.7%

DRY DENSITY, pcf



Cc:

SIOUX FALLS • BLACK HAWK • SPEARFISH

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TECHNICAL  
SERVICES, INC.**

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**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

126

124

122

120

118

06 08 10 12

MOISTURE CONTENT, %

Cc:

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# PERMEABILITY TEST REPORT

**TEST DATA:**

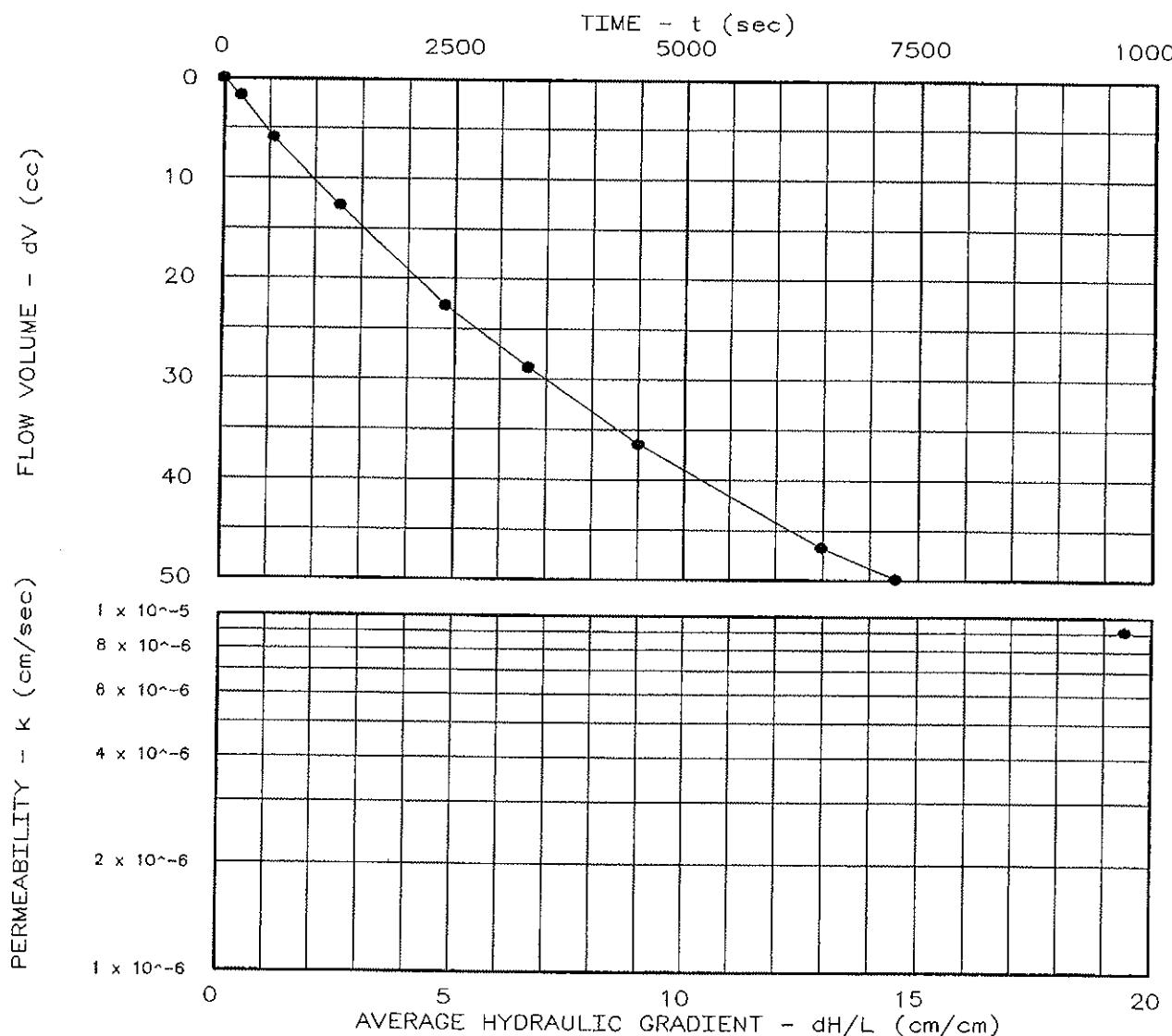
Specimen Height (cm): 7.50  
 Specimen Diameter (cm): 7.07  
 Dry Unit Weight (pcf): 110.8  
 Moisture Before Test (%): 13.8  
 Moisture After Test (%): 0.0  
 Run Number: 1 ● 2 ▲  
 Cell Pressure (psi): 65.0  
 Test Pressure(psi): 60.0  
 Back Pressure(psi): 57.9  
 Diff. Head (psi): 2.1  
 Flow Rate (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: Flexwall  
 Sample type: Remolded



Project: Atlanta Site

Location:

Date: 9/10/2012

Project No.: 114-551057

File No.: 258

Lab No.:

Tested by:

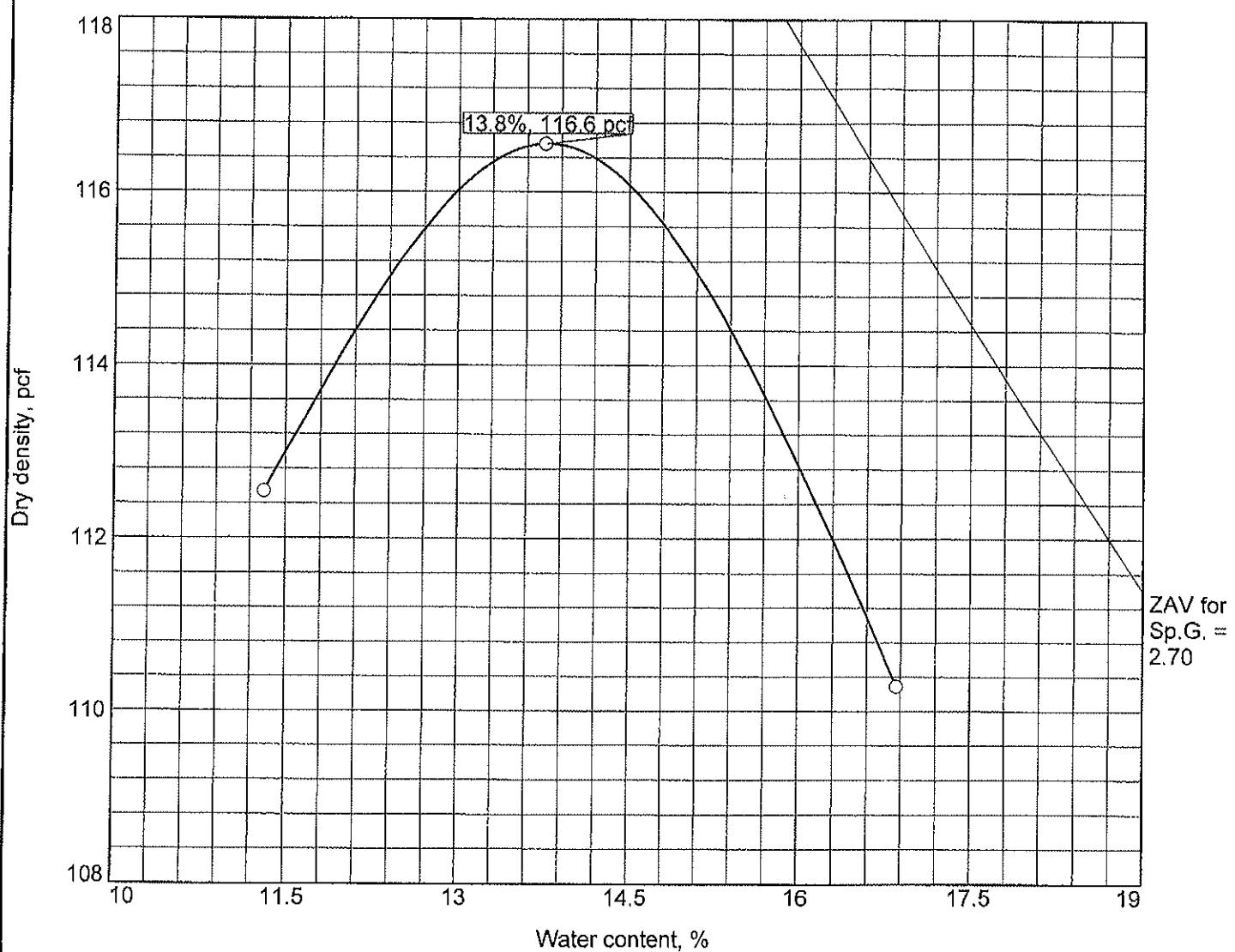
Checked by:

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:**

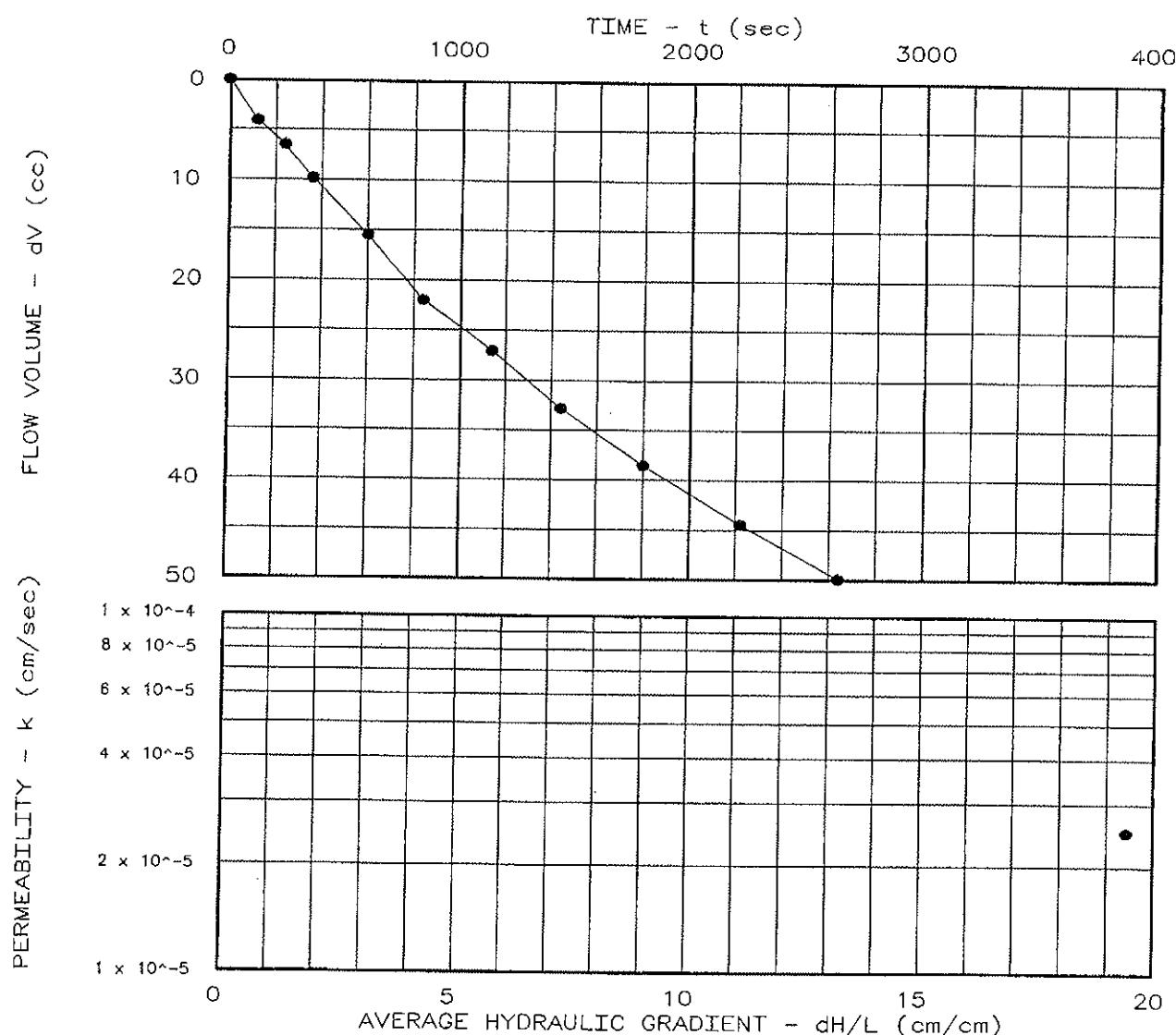
Specimen Height (cm): 7.50  
 Specimen Diameter (cm): 7.07  
 Dry Unit Weight (pcf): 112.3  
 Moisture Before Test (%): 13.1  
 Moisture After Test (%): 0.0  
 Run Number: 1 • 2 ▲  
 Cell Pressure (psi): 65.0  
 Test Pressure(psi): 60.0  
 Back Pressure(psi): 57.9  
 Diff. Head (psi): 2.1  
 Flow Rate (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				

### TEST RESULTS

Maximum dry density = 118.2 pcf

Optimum moisture = 12.1 %

### MATERIAL DESCRIPTION

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

Remarks:

Source of Sample: Fill No.1

Tetra Tech, Inc.

Billings, MT

Figure

# PERMEABILITY TEST REPORT

**TEST DATA:**

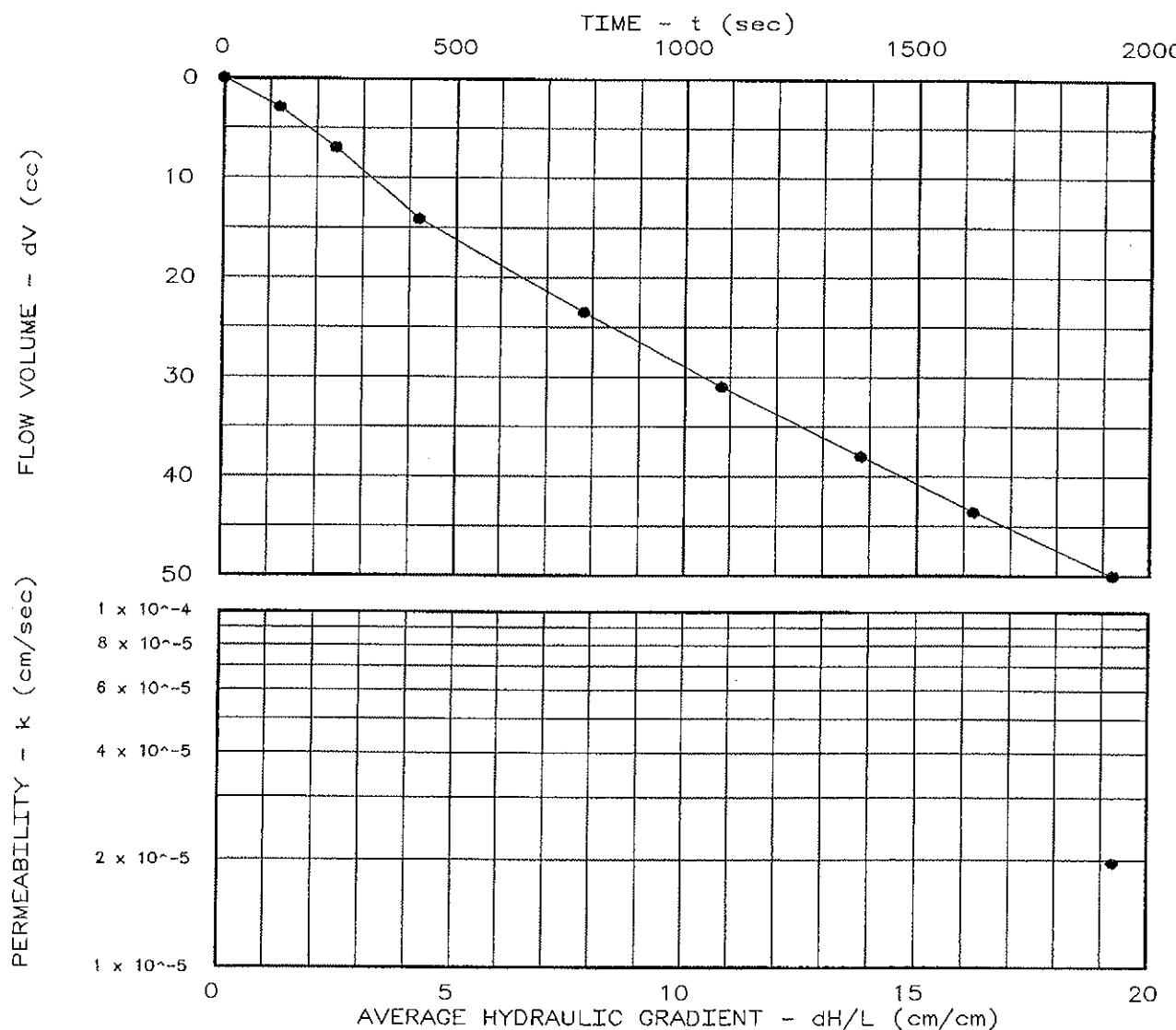
Specimen Height (cm): 7.50  
 Specimen Diameter (cm): 7.07  
 Dry Unit Weight (pcf): 112.1  
 Moisture Before Test (%): 12.6  
 Moisture After Test (%): 0.0  
 Run Number: 1 • 2 ▲  
 Cell Pressure (psi): 65.0  
 Test Pressure(psi): 60.0  
 Back Pressure(psi): 57.9  
 Diff. Head (psi): 2.1  
 Flow Rate (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:

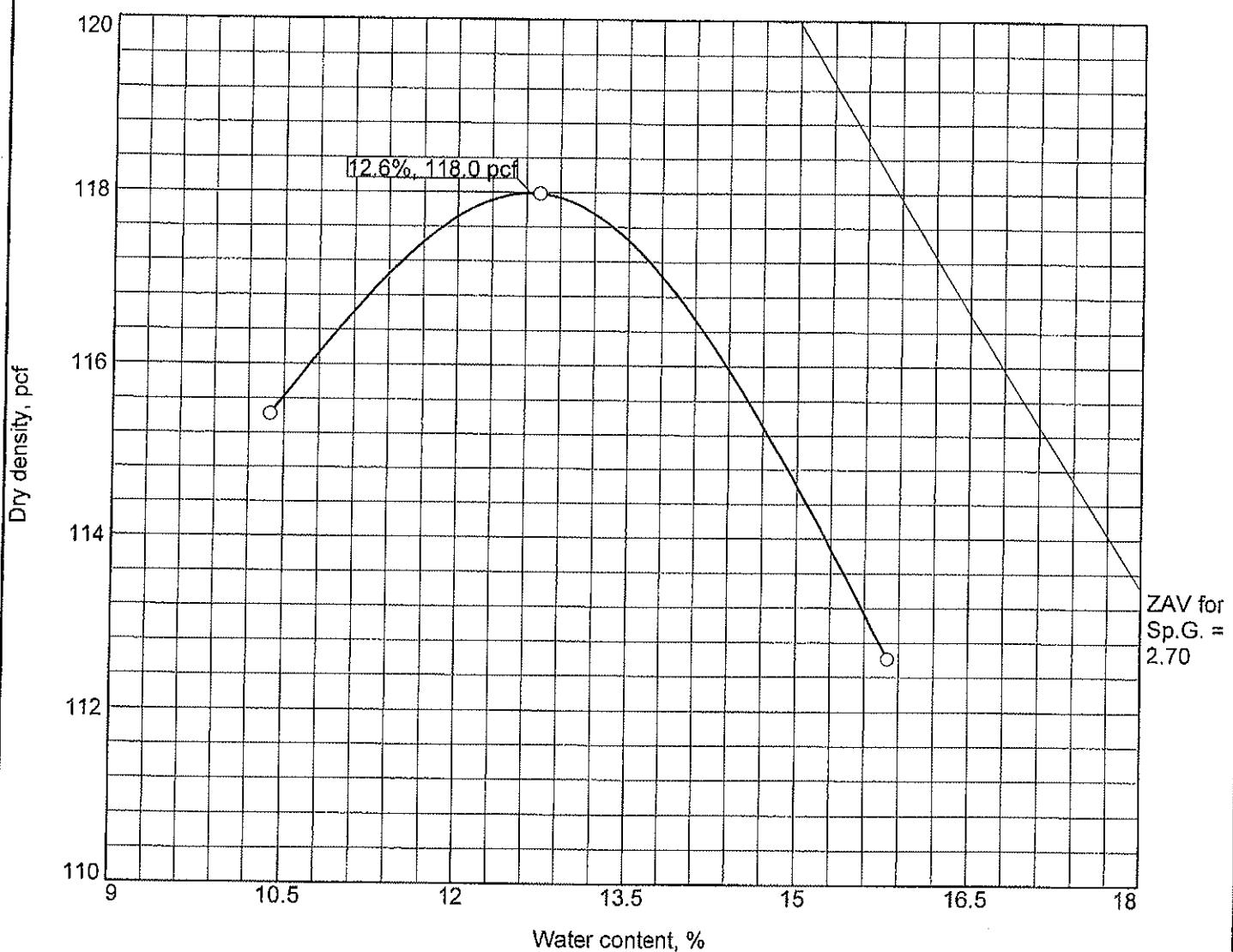
Checked by:

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				

TEST RESULTS		MATERIAL DESCRIPTION
Maximum dry density = 118.0 pcf		
Optimum moisture = 12.6 %		
Project No. 114-551057 Client: Continental Resources Project: Atlanta Site		Remarks:
<input type="checkbox"/> Source of Sample: Fill 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): 98.6  
 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): 57.9  
 Diff. Head (psi): 2.1  
 Flow Rate (cc/sec):  $1.25 \times 10^{-3}$   
 Perm. (cm/sec):  $1.61 \times 10^{-6}$

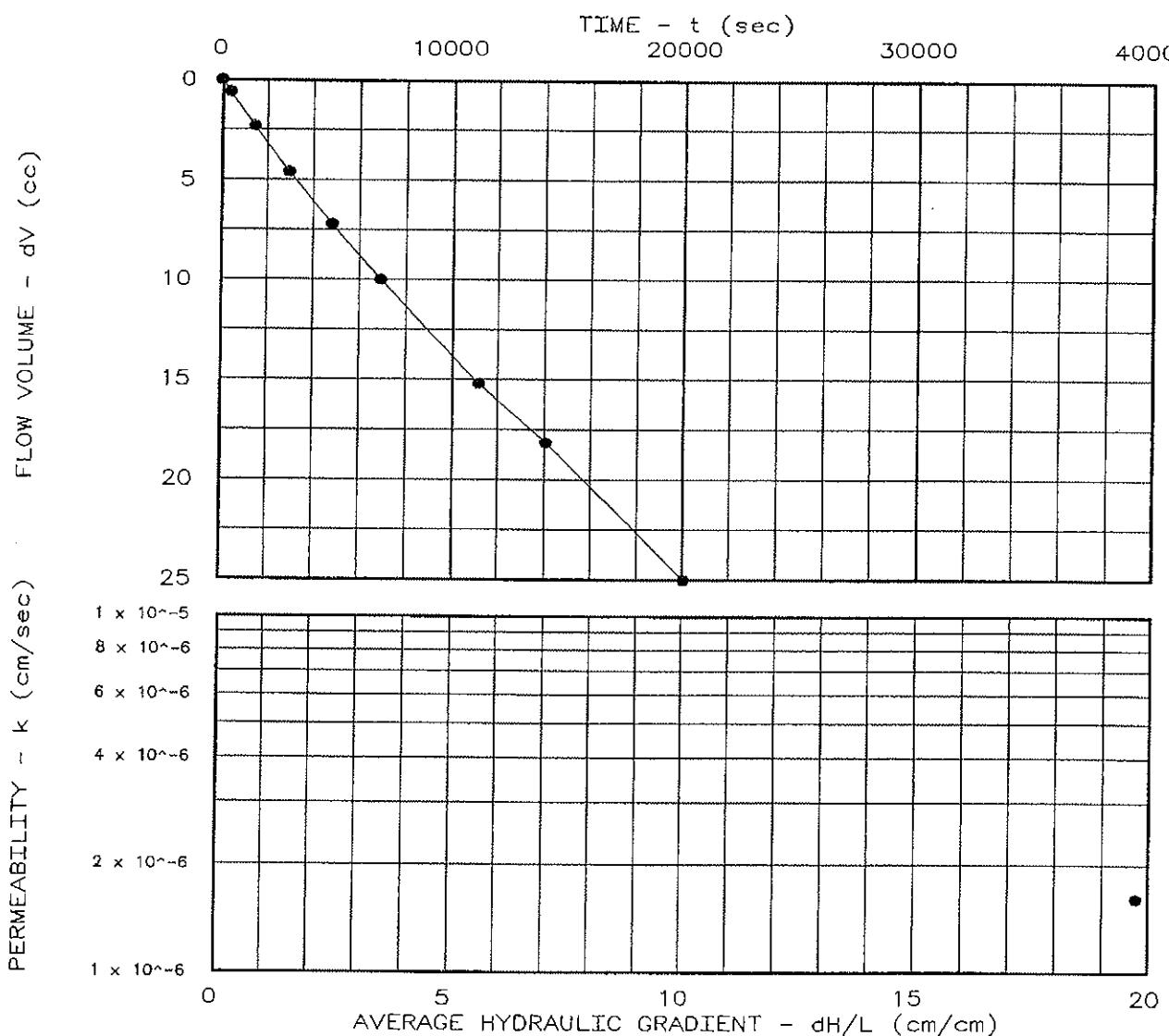
**SAMPLE DATA:**

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:

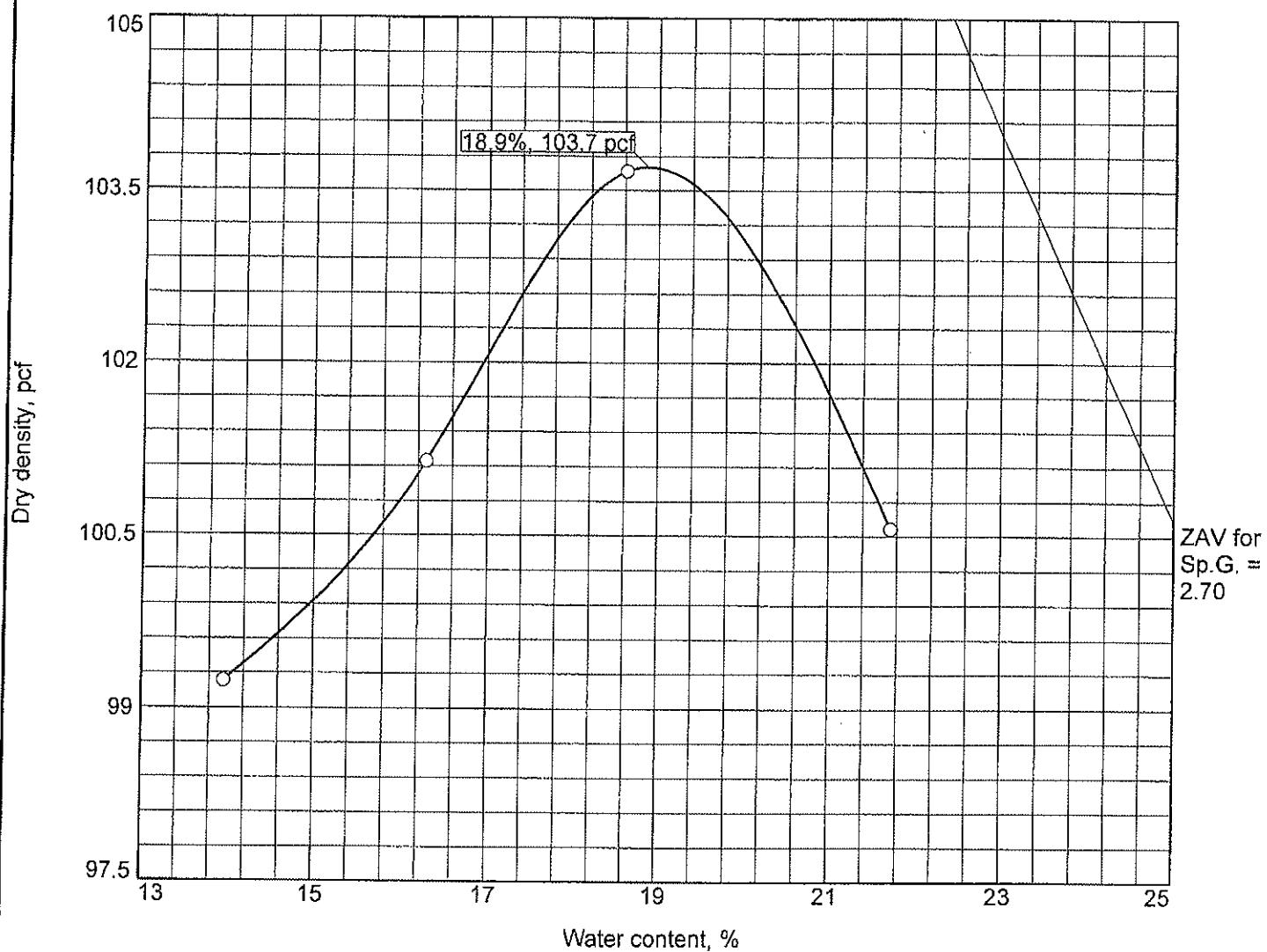
Checked by:

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

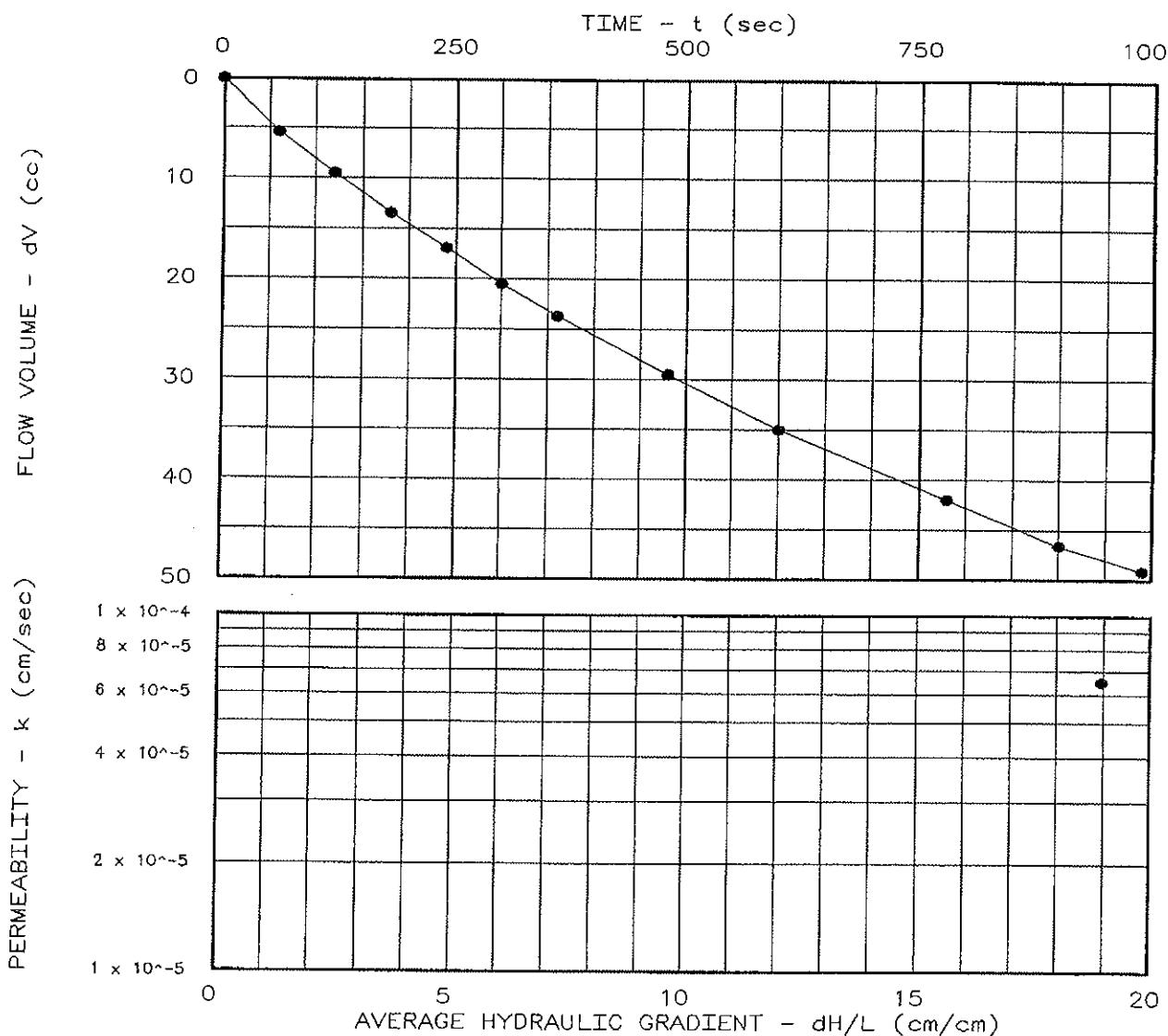
# PERMEABILITY TEST REPORT

**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:

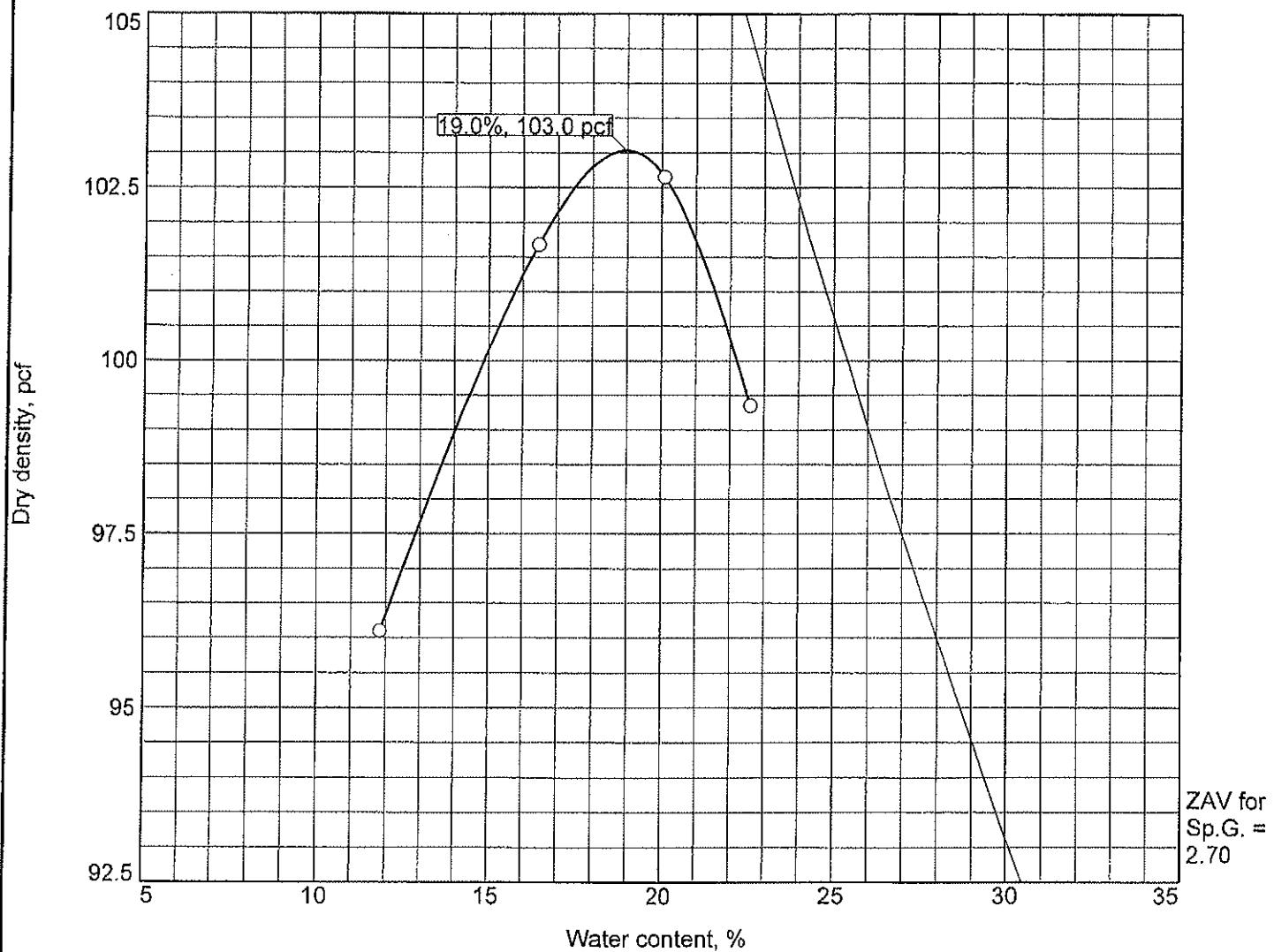
Checked by:

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		MATERIAL DESCRIPTION
Maximum dry density = 103.0 pcf		
Optimum moisture = 19.0 %		
Project No. 114-551057 Client: Continental Resources Project: Atlanta Site		Remarks:
<input checked="" type="checkbox"/> Source of Sample: Cement No. 3		
Tetra Tech, Inc.		
Billings, MT		Figure

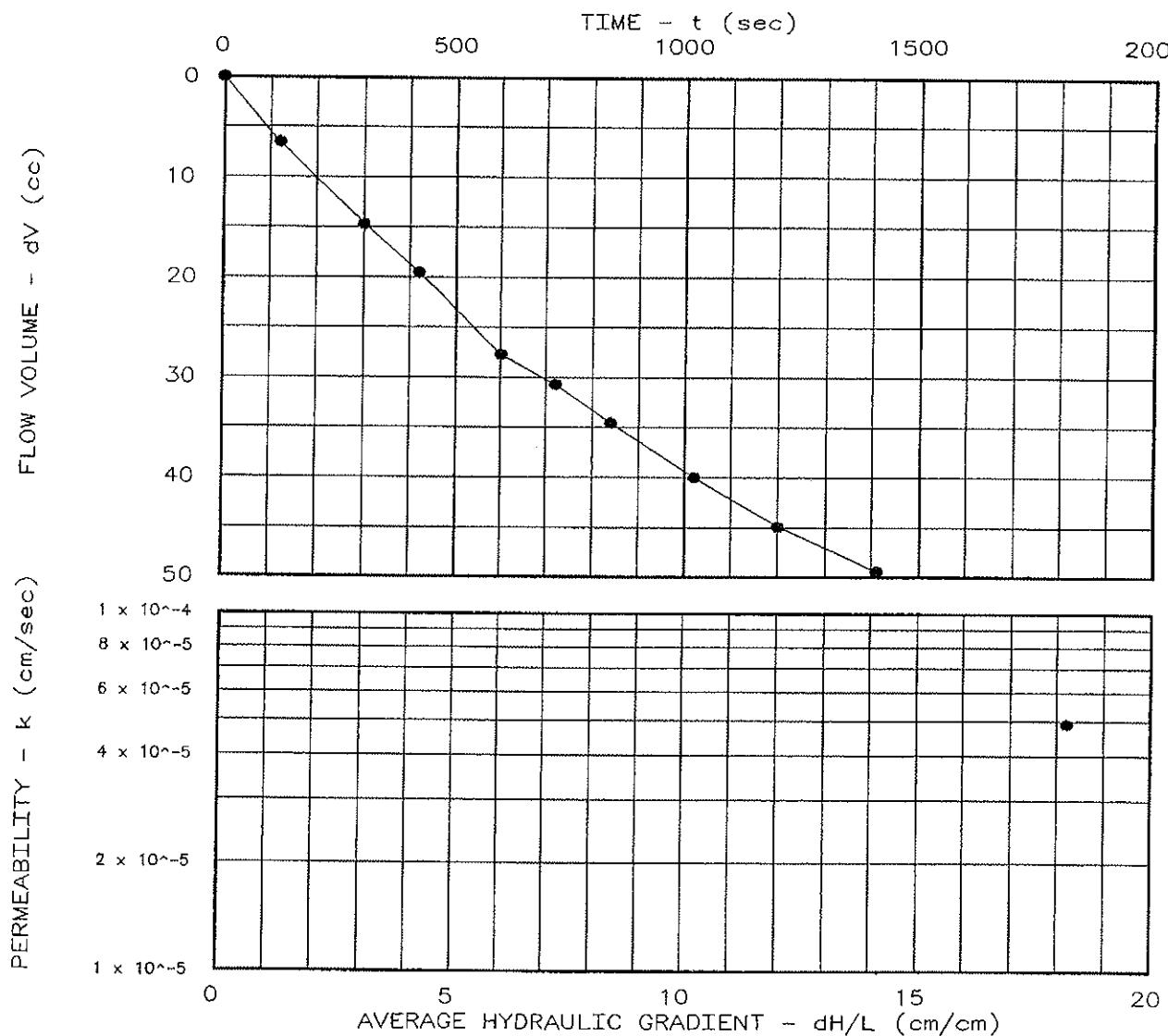
# PERMEABILITY TEST REPORT

**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 ▲  
 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:

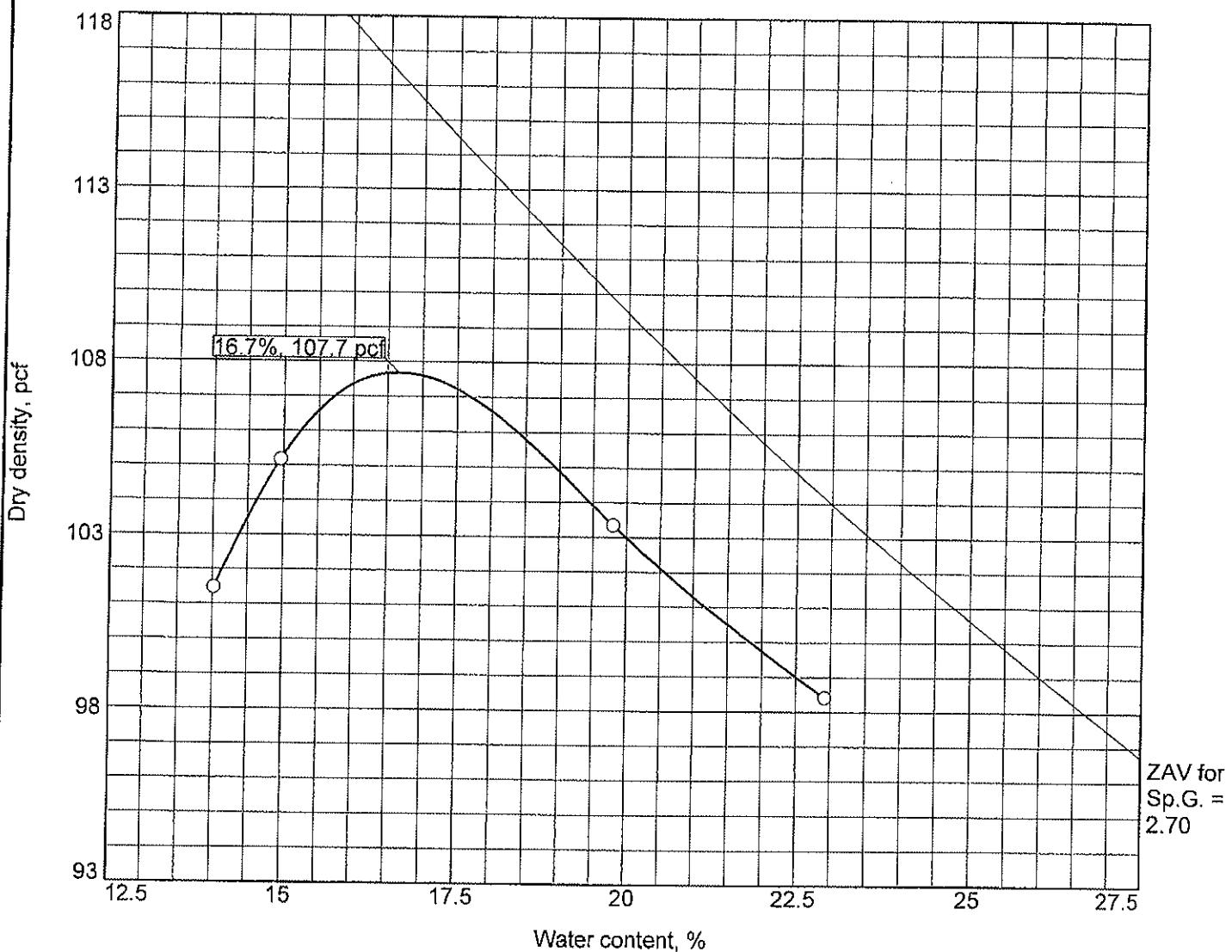
Checked by:

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):  $6.35 \times 10^{-8}$

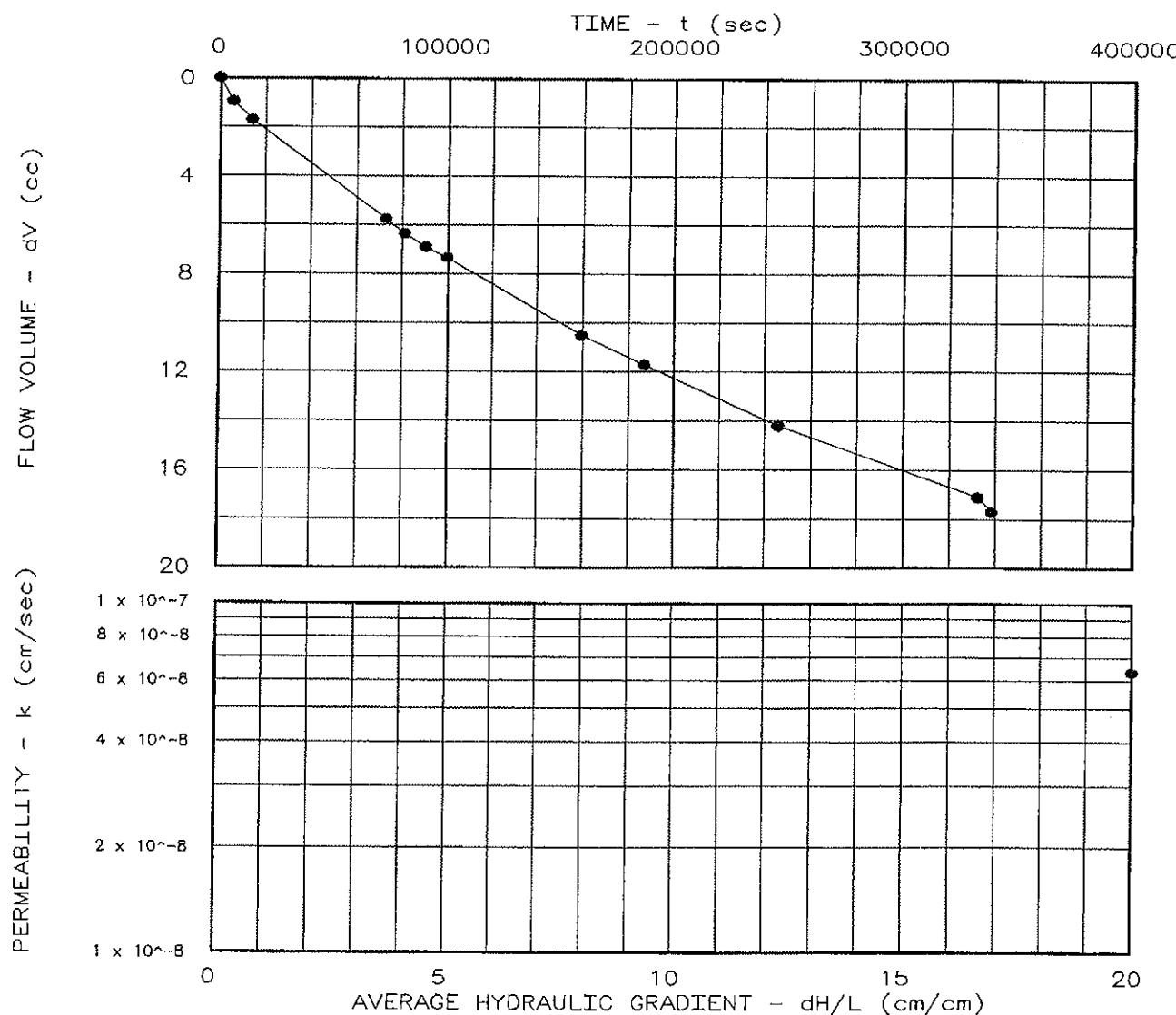
**SAMPLE DATA:**

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:

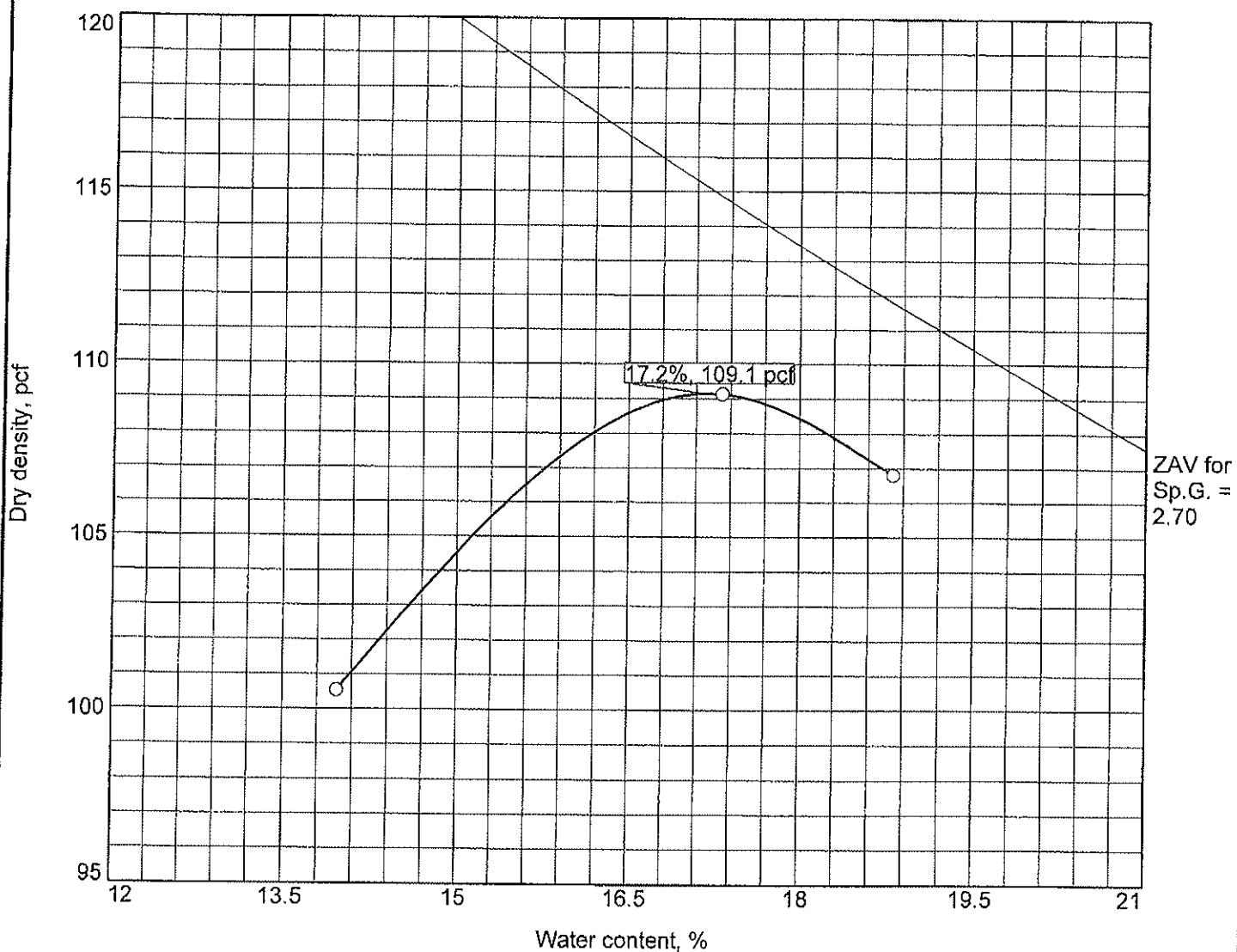
Checked by:

Test: CH - Constant head

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



## 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:



## LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Continental Resources

Project: Atlanta Site

Client Sample ID: Original Material, From Cut

Location: E-1160177.20, 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 / sm
Conductivity, sat. paste	4.8 mmhos/cm		ASA10-3	09/06/12 16:30 / sm
Calcium, sat. paste	24.4 meq/L		SW6010B	09/05/12 13:07 / rlh
Magnesium, sat. paste	29.5 meq/L		SW6010B	09/05/12 13:07 / rlh
Sodium, sat. paste	10.7 meq/L	D	SW6010B	09/05/12 13:07 / rlh
Sodium Adsorption Ratio (SAR)	3.60 unitless		Calculation	09/06/12 16:30 / sm

#### CHEMICAL CHARACTERISTICS

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



## 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. 1997.65  
Lab ID: B12082706-002

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
<b>SATURATED PASTE</b>					
pH, sat. paste	7.7	s.u.		ASAM10-3	09/06/12 16:30 / srm
Conductivity, sat. paste	2.8	mmhos/cm		ASA10-3	09/06/12 16:30 / srm
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 / srm
<b>CHEMICAL CHARACTERISTICS</b>					
Cation Exchange Capacity	15.1	meq/100g	D	SW6010B	09/06/12 15:15 / 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 #2  
Location: E-1179924.40, N-421196.70, Elv. 1937.95  
Lab ID: B12082786-003  
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
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### SATURATED PASTE

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 / rlh
Magnesium, sat. paste	8.07	meq/L		SW6010B	09/05/12 13:28 / rlh
Sodium, sat. paste	3.40	meq/L		SW6010B	09/05/12 13:28 / rlh
Sodium Adsorption Ratio (SAR)	1.47	unitless		Calculation	09/06/12 16:30 / srm

### CHEMICAL CHARACTERISTICS

Cation Exchange Capacity	12.3	meq/100g	D	SW6010B	09/06/12 15:22 / rlh
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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.



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Gillette, WY 800-686-7176 • Rapid City, SD 800-872-1226 • College Station, TX 800-686-2218

## 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: B12082786-004

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	7.9	s.u.		ASAM10-3,	09/06/12 16:30 / srm
Conductivity, sat. paste	4.5	mmhos/cm		ASA10-3	09/06/12 16:30 / srm
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	11.6	meq/L	D	SW6010B	09/05/12 13:32 / rh
Sodium Adsorption Ratio (SAR)	2.07	unitless		Calculation	09/06/12 16:30 / srm
<b>CHEMICAL CHARACTERISTICS</b>					
Cation Exchange Capacity	16.4	meq/100g	D	SW6010B	09/06/12 16:29 / 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.



## 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						Run: MISC-SOIL_120906B		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
Method: ASAM10-3.2	Batch: R191314								
Sample ID: B12082706-001A DUP pH, sat. paste	Sample Duplicate 7.60	s.u.	0.10		Run: MISC-SOIL_120906B		2.6	10	
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	RPD Limit	Qual
Method: Calculation	Batch: R191314								
Sample ID: B12082786-001A DUP	Sample Duplicate	Run: MISC-SOIL_120906B							
Sodium Adsorption Ratio (SAR)	3.85	unitless	0.010				6.7	30	
Sample ID: LCS-1209061630	Laboratory Control Sample	Run: MISC-SOIL_120906B							
Sodium Adsorption Ratio (SAR)	5.11	unitless	0.010	03	60	150			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: SW6010B	Batch: 66170								
Sample ID: LCS-65170	Run: ICP201-B_120905A								
Calcium, sat. paste	46.4	meq/L	0.050	88	50	150			09/05/12 13:03
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	Run: ICP201-B_120905A								
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	Run: ICP201-B_120905A								
Calcium, sat. paste	26.8	meq/L	0.050	101	50	150			09/05/12 13:25
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	Run: ICP201-B_120905B								
Cation Exchange Capacity	Laboratory Control Sample	22.4 meq/100g	0.16	90	60	140			09/06/12 15:08
Sample ID: B12082786-002A DUP	Run: ICP201-B_120905B								
Cation Exchange Capacity	Sample Duplicate	13.8 meq/100g	0.16				8.8		50
Sample ID: B12082786-003AMS2	Run: ICP201-B_120905B								
Cation Exchange Capacity	Sample Matrix Spike	33.6 meq/100g	0.17	98	50	150			09/06/12 15:25

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.





## **Chain of Custody and Analytical Request Record**

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 Oklahoma City, OK 73126		Contact Name: <b>Chad Newby</b> Phone/Fax: <b>405-574-2172</b> Email: <b>chad.newby@ctr.com</b>				Sampler. (Please Print) <b>Spencer Insights</b>	Invoice Address: PO Box 268870 Oklahoma City, OK 73126
Invoice Address: PO Box 268870 Oklahoma City, OK 73126		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:		ANALYSIS REQUESTED				Contact ELI prior to RUSH sample submittal for charges and scheduling - See Instruction Page	Shipped by <b>Hand</b> Carrier ID#:
<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: <b>LEVEL IV</b> <input type="checkbox"/> NELAC				Comments: <b>E-1180177-20 N-421287.75 Elev. 1440.40</b>	Received Temp <b>24.6 °C</b>
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)		Collection Date <b>8-29-12</b>	Collection Time <b>7:00pm</b>	MATRIX <b>I-S</b>	Number of Containers Sample Type: <b>A</b> W S V B O Air/Water/Solids Soil/Solids Biosolids Vegetation Other	SEE ATTACHED Normal Turnaround (TAT)	On Ice: <b>Yes</b>
<b>Original Material (EPA)</b>		<b>✓</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>Y</b>
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
<b>LABORATORY USE ONLY</b>							
Custody Record <b>MUST be Signed</b>	Released by (print): <b>Mark Albright</b> Date/Term: <b>8-30-12 9:00 AM</b> Signature: <b>Mark Albright</b>			Received by (print): <b>Mark Albright</b> Date/Term: <b>8-30-12 9:00 AM</b> Signature: <b>Mark Albright</b>			
	Released by (print): <b>Mark Albright</b> Date/Term: <b>8-30-12 3:05 PM</b> Signature: <b>Mark Albright</b>			Received by (print): <b>Mark Albright</b> Date/Term: <b>8-30-12 3:05 PM</b> Signature: <b>Mark Albright</b>			
Sample Disposal: <b>Return to Client</b>	Lab Disposal: <b>K</b>	Received by Laboratory: <b>Spencer Insights</b> Date/Term: <b>8-30-12 3:05 PM</b> Signature: <b>Spencer Insights</b>					

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

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



## **Chain of Custody and Analytical Request Record**

Page \_\_\_\_\_ of \_\_\_\_\_

Continental Resources										Atlanta Site										Sample Origin		EPA/State Compliance:	
Report Mail Address: PO Box 268870 Oklahoma City, OK 73126					Invoice Address: PO Box 268870 Oklahoma City, OK 73126					Project Name, PWS, Permit, Etc. Chad Newby					State: ND		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>						
										Phone/Fax: 405-574-2172					Email: chad.newby@cir.com		Sampler: (Please Print) Spencer Ingraham						
										Purchase Order: Chad Newby					Quote/Bottle Order: Unknown		Shipped by: Hand						
Special Report/Formats – ELI must be notified prior to sample submittal for the following:										ANALYSIS REQUESTED													
<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					Number of Containers: 1 Sample Type: AW/SV/B/C Air/Water/Solids/Residue/Other: X Vegetation: X					<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: E-1179926-05 Normal Turnaround (TAT): N-421267-60 ELI: 1937-65		Receipt Temp: 24 Loc: C On loc: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Custody Seal: Y Intact: Y Signature Match: Y N				
SAMPLE IDENTIFICATION (Name, Location, Interval, etc.) Fill #1					Collection Date: 8-29-12 Collection Time: 7:00PM					MATRIX 1-S x x x x x					SEE ATTACHED X		\$12082782-007 LABORATORY USE ONLY						
10										10										Signature:			
<b>Custody Record MUST be Signed</b>		Requisitioned by (print): <i>Mick Albright</i>			Date/Time: 8-30-12 9:00AM		Signature: <i>Mick Albright</i>		Received by (print):			Date/Time:		Signature:									
		Released by (print): <i>Mick Albright</i>			Date/Time: 8-30-12 305		Signature: <i>Mick Albright</i>		Received by (print):			Date/Time:		Signature:									
Sample Disposal: Return to Client Lab Disposal: X		Received by Laboratory: <i>30200012 8/30/12 305X000</i>			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 notated on your analytical report. Visit our web site at [www.energylab.com](http://www.energylab.com) for additional information, downloadable fee schedule forms, and links.



# Chain of Custody and Analytical Request Record

Page 1 of 1

Company Name: <b>Continental Resources</b>		PLEASE PRINT. Provide as much information as possible. Project Name, PWS, Permit, Etc.			
Report Mail Address: <b>PO Box 268870 Oklahoma City, OK 73126</b>		Contact Name: <b>Atlanta Site</b> Phone/Fax:		Sample Origin State: <b>ND</b>	
Invoice Address: <b>PO Box 268870 Oklahoma City, OK 73126</b>		Invoice Contact & Phone <b>Chad Newby 405-574-2172 chad.newby@okc.com</b>		EPA/State Compliance: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Sampler: (Please Print) <b>Spencer Ingalls</b>	
Special Report/Formats – ELI must be notified prior to sample submittal for the following:		Purchase Order: <b>Chad Newby 405-574-2172</b>		Quote/Bottle Order: <b>Chad Newby UNKNOWN</b>	
<input type="checkbox"/> DW <input type="checkbox"/> GSA <input type="checkbox"/> POTW/MMTWP <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		Number of Containers: <b>0</b> Sample Type: <b>A/W S/V B/O</b> Air Water Spots/Solids Vegetation Necessary <b>E/C SFR CEC PH Penn</b> <b>SEE ATTACHED</b> <b>Normal Turnaround (TAT)</b> <b>R U S H</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>	<b>MATRIX</b> <b>P-S d d a a K</b>	
<b>LABORATORY USE ONLY</b> <b>20082782-003</b>		<b>Comments:</b> <b>E-1179924-40</b> <b>N. 421196.70</b> <b>Alt. 1937.95</b>		<b>Receipt Temp:</b> <b>24.6°C</b> <b>Date:</b> <b>Yes <input checked="" type="checkbox"/></b>	
<b>Custody Seal</b> <b>Intact</b> <b>Signature Match</b> <b>Y N</b>		<b>Received by (print):</b> <b>Mark Albright 8-30-12 9:00 AM</b> <b>Received by (print):</b> <b>Mark Albright 8-30-12 3:05 PM</b>		<b>Date/Time:</b> <b>8/30/12 9:00 AM</b> <b>Date/Time:</b> <b>8/30/12 3:05 PM</b>	
<b>Custody Record</b> <b>MUST be Signed</b>		<b>Received by Laboratory:</b> <b>Mark Albright 8/30/12 3:05 PM</b>		<b>Date/Time:</b> <b>8/30/12 3:05 PM</b>	
<b>Sample Disposal:</b> Return to Client		<b>Lab Dispos:</b> <b>X</b>		<b>Signature:</b> <b>Mark Albright 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.energylab.com](http://www.energylab.com) for additional information, downloadable fee schedule, forms, and links.



## **Chain of Custody and Analytical Request Record**

Page 1 of 1

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.energylab.com](http://www.energylab.com) for additional information, downloadable fee schedule, forms, and links.

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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

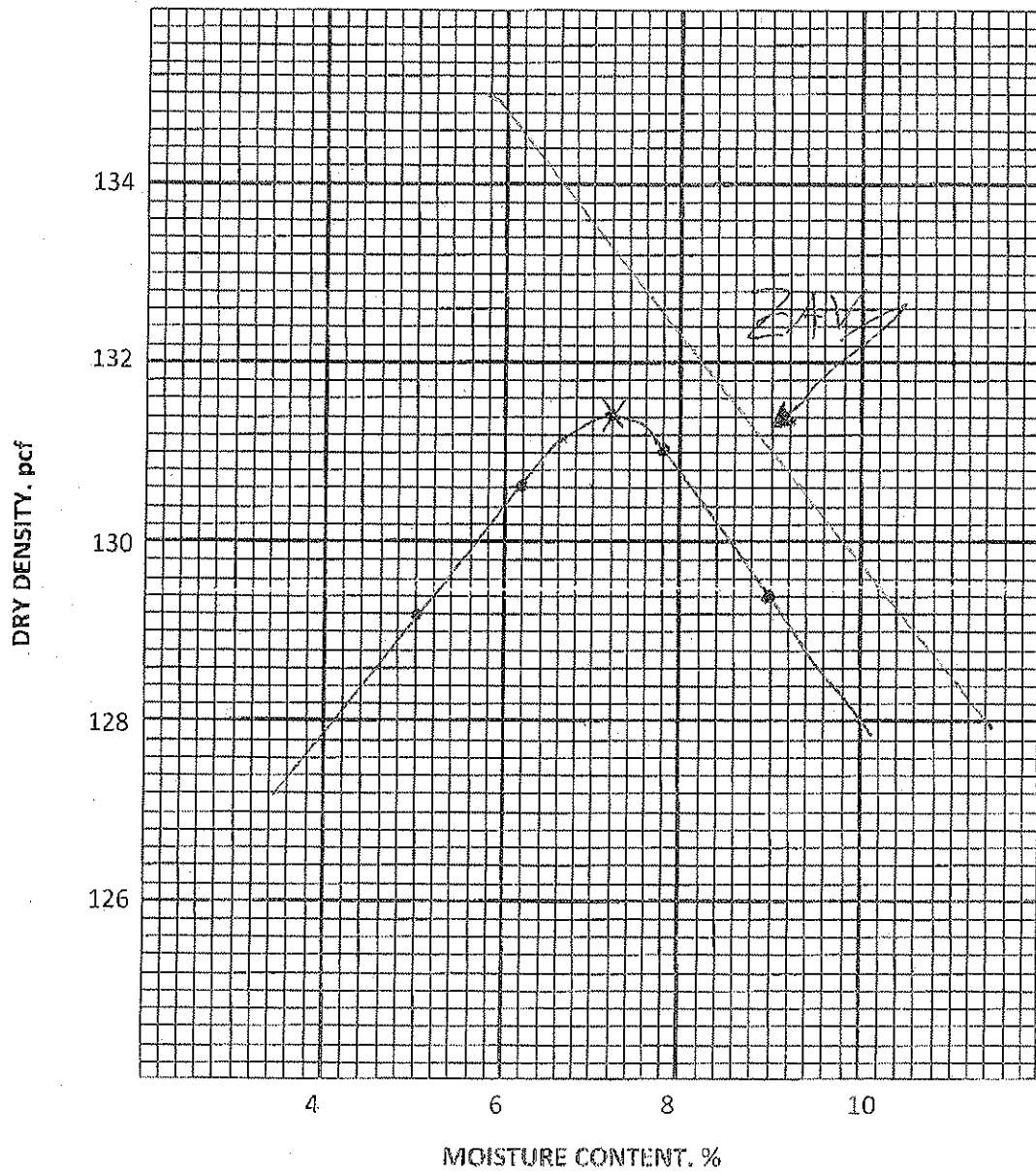
Proctor#: Date: 08/21/12  
ASTM: 698 Method: C  
Soil Classification: Brown Gravelly  
Sand

Project: Atlanta Drill Pad, Williston,  
North Dakota

Project Number: 12-12165

**MAXIMUM DENSITY: 131.4 pcf**

**OPTIMUM MOISTURE CONTENT: 7.2%**



Cc:

Sioux Falls • Black Hawk • Spearfish

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140 Pine Needle Drive • Spearfish, SD 57763 • 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

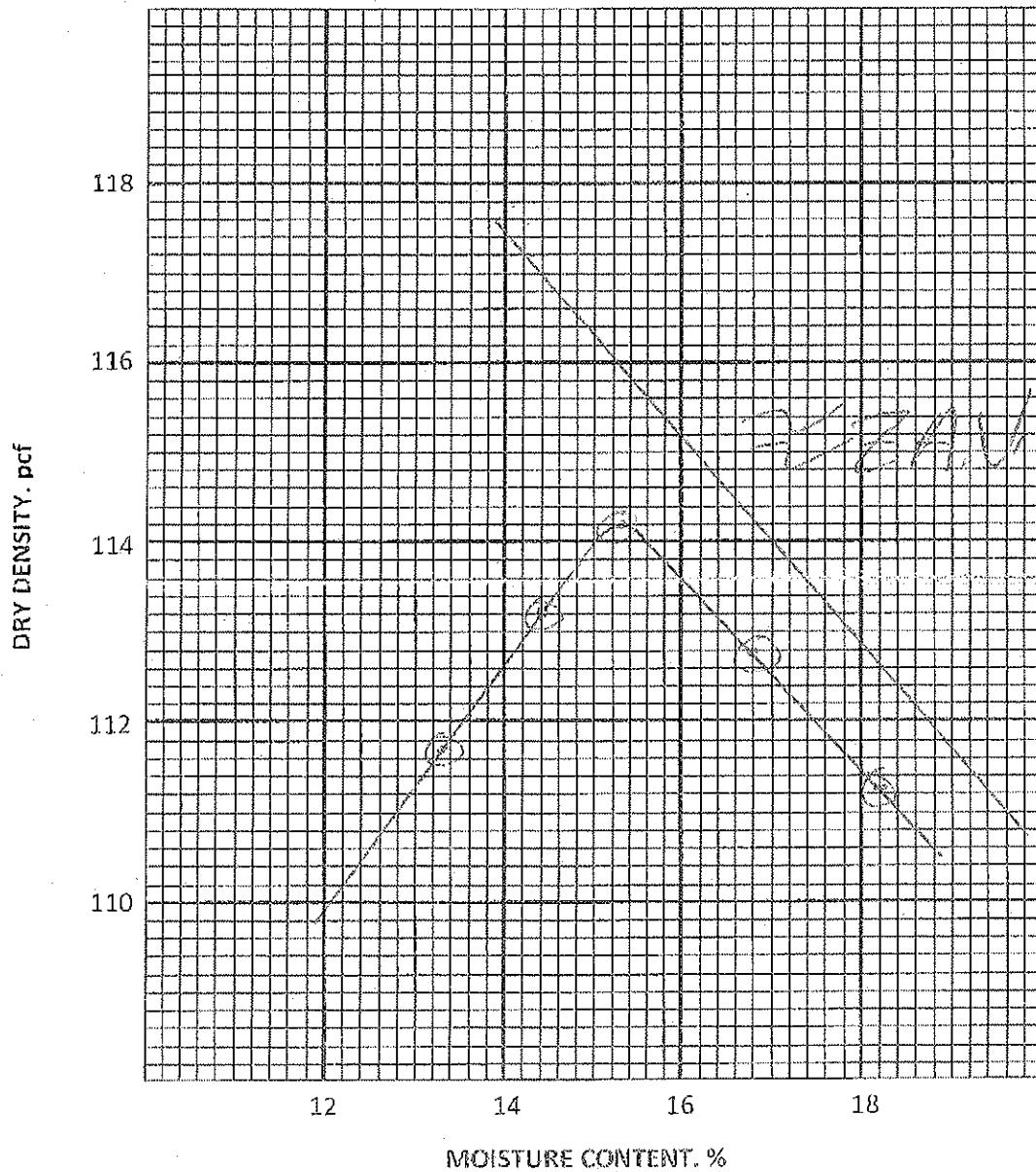
Proctor#: Date: 07/31/12  
ASTM: 698 Method:  
Soil Classification: CL

## Project: Atlanta Drill Pad, Williston, North Dakota

Project Number: 12-12165

MAXIMUM DENSITY: 114.2pcf

OPTIMUM MOISTURE CONTENT: 15.3%



Cc:

**SIOUX FALLS • BLACK HAWK • SPEARFISH**

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

## **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.

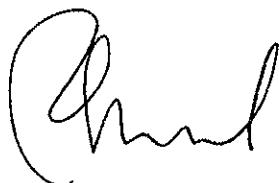
## **CONCLUSIONS AND RECOMMENDATIONS**

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

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

Engineering • Environmental • Drilling • Research &  
9105 Black Hawk Rd • PO Box 558  
Black Hawk, CO 80101-0558

**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
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

cc:

RESPECTFULLY SUBMITTED

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 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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AMERICAN TECHNICAL SERVICES, INC.

CC:

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Black Hawk, CO 80428-0558

**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			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE	% SPEC COMPACTA	
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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CC:

AMERICAN 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: 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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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: 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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

RESPECTFULLY SUBMITTED

  
 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: 08/01/12  
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
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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CC:

AMERICAN TECHNICAL SERVICES, INC.

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8105 Black Hawk Rd. • P.O. 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: 08/01/12  
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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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

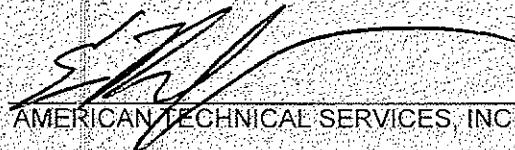
ATS #: 12-12165  
 DATE: 08/03/12  
 ATS TECH: Russell Harwood  
 GAGE #: 2  
 BENCHMARK:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS		PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	
48	08/01/12	#3	15.3	114.2	13.7	113.9	100	+/-2%	95
49	08/01/12	#3	15.3	114.2	13.4	112.6	99	+/-2%	95
50	08/01/12	#3	15.3	114.2	13.5	108.9	95	+/-2%	95
51	08/01/12	#3	15.3	114.2	14.2	110.0	96	+/-2%	95
52	08/01/12	#3	15.3	114.2	13.3	113.5	99	+/-2%	95
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 421100.20 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

RESPECTFULLY SUBMITTED



CC:

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: 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: \_\_\_\_\_

RESPECTFULLY SUBMITTED



CC:

AMERICAN TECHNICAL SERVICES, INC.

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

ENGINEERS • 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: 08/07/12  
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, CO 80428-0558

**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		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
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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CC:

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SERVICES, INC.**

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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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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 08/09/12  
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:

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AMERICAN TECHNICAL SERVICES, INC.

CC:

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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.**  
 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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5105 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
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

RESPECTFULLY SUBMITTED

CC:

AMERICAN TECHNICAL SERVICES, INC.

**A**MERICAN  
**T**ECHNICAL  
**S**ERVICES, 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:

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS			PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	
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	ELeLEVEL
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:

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CC:

AMERICAN TECHNICAL SERVICES, INC.

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TECHNICAL  
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:

			LABORATORY		FIELD			SPECIFICATIONS		
TEST #	DATE	PROCTOR # / CLASSIFICATION	% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE	% SPEC COMPACTION	PASS
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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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

RESPECTFULLY SUBMITTED

CC:

  
**AMERICAN TECHNICAL SERVICES, INC.**

**AMERICAN  
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:

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: 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:

RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

CC:

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S  
ERVICES, 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	08/17/12
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	
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

RESPECTFULLY SUBMITTED

cc:

  
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Black Hawk, CO 80428-0558

**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	08/17/12
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 %	
119	08/16/12	#1	15.3	114.2	13.7	110.0	96	+/-2%	95
120	08/16/12	#1	15.3	114.2	13.9	112.0	98	+/-2%	95
121	08/16/12	#1	15.3	114.2	13.6	112.4	98	+/-2%	95
122	08/16/12	#1	15.3	114.2	13.4	112.6	99	+/-2%	95
123	08/16/12	#1	15.3	114.2	13.6	114.0	100	+/-2%	95
124	08/16/12	#1	15.3	114.2	13.9	115.2	101	+/-2%	95
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

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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			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.

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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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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: 08/20/12  
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
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:

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: 08/20/12  
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
128	08/17/12	#1	9.7	126.5	10.3	126.5	100	+/-2%	95	PASS
129	08/17/12	#1	9.7	126.5	9.3	124.1	98	+/-2%	95	PASS
130	08/17/12	#1	9.7	126.5	10.2	124.2	98	+/-2%	95	PASS
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 1179371.90	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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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
131	08/18/12	#2	8.3	123.2	9.0	118.4	96	+/-2%	95
132	08/18/12	#3	15.3	114.2	13.8	113.9	100	+/-2%	95
133	08/18/12	#3	15.3	114.2	13.6	113.3	99	+/-2%	95
134	08/18/12	#3	15.3	114.2	13.4	116.1	102	+/-2%	95
135	08/18/12	#2	8.3	123.2	9.1	118.5	96	+/-2%	95
136	08/18/12	#2	8.3	123.2	9.2	117.5	95	+/-2%	95
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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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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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: **Project Manager**  
**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

RESPECTFULLY SUBMITTED

CC:

AMERICAN 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: 08/23/12  
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
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

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 57716-0558

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

ASTM C6938

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
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

RESPECTFULLY SUBMITTED

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 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: 08/23/12  
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: \_\_\_\_\_

RESPECTFULLY SUBMITTED

  
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 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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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: Project Manager  
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	98	+/-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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\_\_\_\_\_  
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 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
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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
CC: \_\_\_\_\_

RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

ENGINEERING • ENVIRONMENTAL • DRILLING • MATERIALS  
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: 08/28/12  
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, CO 80428-0558

**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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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: 08/28/12  
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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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: 08/28/12  
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:  


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AMERICAN TECHNICAL SERVICES, INC.

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

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

**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

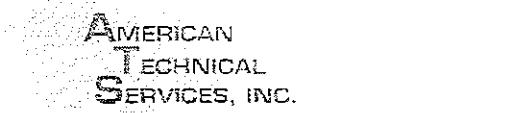
TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD			SPECIFICATIONS		
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	SPEC COMPACTION	PASS
181	08/27/12	#1	9.7	126.5	9.9	120.5	95	+/-2%	95	PASS
182	08/27/12	#3	15.3	114.2	13.9	111.8	98	+/-2%	95	PASS
183	08/27/12	#2	8.3	123.2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

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

**EXCELSIOR • ENTHALOGEL • DBLINE • MAYERS**

8105 Black Hawk Rd. • PO Box 558  
Black Hawk, CO 80219-0558

**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: \_\_\_\_\_  
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RESPECTFULLY SUBMITTED

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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		PASS
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %	
201	08/29/12	#3	15.3	114.2	15.0	112.1	98	+/-2%	95
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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AMERICAN TECHNICAL SERVICES, INC.



CC:

**A**MERICAN  
**T**ECHNICAL  
**S**ERVICES, INC.

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

**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
202	08/30/12	#2	8.3	123.2	9.7	122.5	99	+/-2%	95	PASS
203	08/30/12	#3	15.3	114.2	13.4	115.7	101	+/-2%	95	PASS
204	08/30/12	#3	15.3	114.2	13.6	113.0	99	+/-2%	95	PASS
205	08/30/12	#3	15.3	114.2	13.5	113.4	99	+/-2%	95	PASS
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

RESPECTFULLY SUBMITTED

  
AMERICAN TECHNICAL SERVICES, INC.

CC:

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

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AMERICAN TECHNICAL SERVICES, INC.

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

Engineering • Environmental • Drilling • Materials  
8105 Black Hawk Rd. • PO Box 556  
Black Hawk, SD 57718-0566

**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

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: 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  
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: 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

CC:

RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

Engineering • Environmental • Drilling • Materials  
5105 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: 09/11/12  
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:

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AMERICAN TECHNICAL SERVICES, INC.

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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: 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
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

RESPECTFULLY SUBMITTED

AMERICAN TECHNICAL SERVICES, INC.

CC:

**AMERICAN  
TECHNICAL  
SERVICES, INC.**

Engineering • Environmental • Drilling • Materials  
9105 Black Hawk Rd. • PO Box 558  
Black Hawk, CO 80426-0558

**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
252	09/17/12	#3	15.3	114.2	13.3	109.3	96	+/-2%	95
253	09/17/12	#3	15.3	114.2	13.4	108.9	95	+/-2%	95
254	09/17/12	#1	9.7	126.5	8.9	122.4	97	+/-2%	95
255	09/17/12	#3	15.3	114.2	13.8	110.3	97	+/-2%	95
256	09/17/12	#2	8.3	123.2	8.1	118.4	96	+/-2%	95
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.



**A**MERICAN  
**T**ECHNICAL  
**S**ERVICES, INC.

Engineering • Environmental • Drilling • Materials  
8105 Bent Head Rd • PO Box 558  
Clark 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: 09/25/12  
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
257	09/22/12	#3	15.3	114.2	14.1	109.2	96	+/-2%	95
258	09/22/12	#2	8.3	123.2	7.2	118.5	96	+/-2%	95
259	09/22/12	#2	8.3	123.2	8.0	118.7	96	+/-2%	95
260	09/22/12	#2	8.3	123.2	7.1	120.7	98	+/-2%	95
261	09/22/12	#3	15.3	114.2	13.8	110.0	96	+/-2%	95
262	09/22/12	#2	8.3	123.2	7.9	119.6	97	+/-2%	95
263	09/22/12	#3	15.3	114.2	13.4	109.4	96	+/-2%	95
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: \_\_\_\_\_

RESPECTFULLY SUBMITTED

  
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

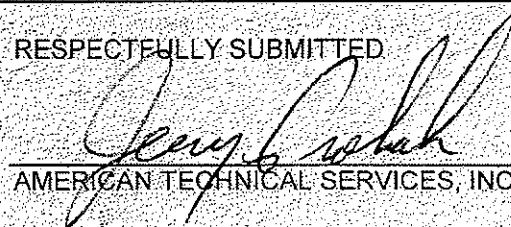
CLIENT:	CONTINENTAL RESOURCES, INC. PO Box 268836 Oklahoma City, OK 73126	ATS #:	12-12165
ATTENTION:	Project Manager	DATE:	10/15/12
PROJECT:	Atlanta Drill Site	ATS TECH:	Evan Schultze
		GAGE #:	26
		BENCHMARK:	Atlanta Pad Road

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

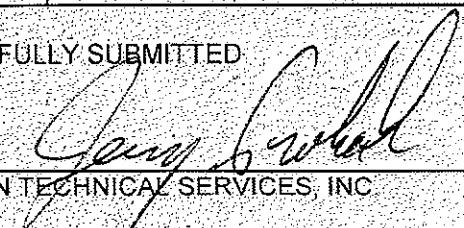
ATS #: 12-12165  
DATE: 10/15/12  
ATS TECH: Evan Schultze  
GAGE #: 26  
BENCHMARK: Atlanta Pad Road

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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RESPECTFULLY SUBMITTED



AMERICAN TECHNICAL SERVICES, INC.

CC:

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# REPORT OF SOIL DENSITY TESTING - NUCLEAR METHOD

ASTM D6938

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

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:** \_\_\_\_\_  
\_\_\_\_\_

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

TEST #	DATE	PROCTOR # / CLASSIFICATION	LABORATORY		FIELD		SPECIFICATIONS		PASS	
			% MOIST	DRY DENSITY	% MOISTURE	DRY DENSITY	% COMPACTION	SPEC MOISTURE %		
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  


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CC

RESPECTFULLY SUBMITTED

  
AMERICAN TECHNICAL SERVICES, INC.



# 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)

23363  
TA

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

Date: 7/23/2012

### RE: CORES AND SAMPLES

Well Name: **ATLANTA FEDERAL 10-6H** Well File No.: 23363  
Location: **NENW 6-153-101** County: WILLIAMS  
Permit 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

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

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

MAY 2012

RECEIVED

Well File No. 23363

<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 10-6H**

#### Footages

495 F N L 1305 F W L NWNW 6 153 N 101 W  
Field Pool County  
**Bakken** **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

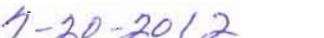
## DETAILS OF WORK

**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>
Signature 		Printed Name <b>Terry L. Olson</b>
Title <b>Regulatory Compliance Specialist</b>		Date <b>May 7, 2012</b>
Email Address <b>Terry.Olson@clr.com</b>		

FOR STATE USE ONLY	
<input type="checkbox"/> Received	<input checked="" type="checkbox"/> Approved
Date	1-20-2012
By	
Title	Richard A. Suggs Physician



Approved  
David Tabor  
7-20-2012

Engineering Technician

July 20, 2012

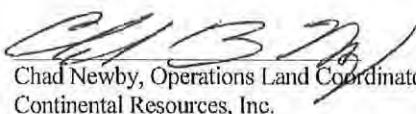
Industrial Commission of North Dakota  
Oil & Gas Division  
600 East Boulevard, Dept 405  
Bismarck, North Dakota 58505

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 )  
                          )  
                          )ss:  
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

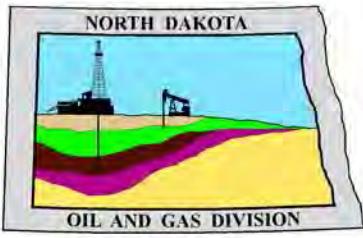
Garfield County, Oklahoma

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 10-6H  
NENW Section 6-153N-101W  
Williams County  
Well File # 23363**

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: 8990E.

#### **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>10-6H</b>				
Surface Footages <b>495 F N L      1305 F W L</b>		Qtr-Qtr <b>NENW</b>	Section <b>6</b>	Township <b>153 N</b>	Range <b>101 W</b>	County <b>Williams</b>	
Longstring Casing Point Footages <b>767 F N L      1808 F W L</b>		Qtr-Qtr <b>NENW</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>272 S From WH      503 E From WH</b>		Azimuth <b>118 °</b>	Longstring Total Depth <b>10910 Feet MD      10584 Feet TVD</b>				
Bottom Hole Footages From Nearest Section Line <b>222 F N L      200 F E L</b>		Qtr-Qtr <b>NENE</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>4869 S From WH      8990 E From WH</b>		KOP Lateral 1 <b>10011 Feet MD</b>	Azimuth Lateral 1 <b>118 °</b>		Estimated Total Depth Lateral 1 <b>20563 Feet MD      10598 Feet TVD</b>		
Latitude of Well Head <b>48 ° 06 ' 33.65 "</b>	Longitude of Well Head <b>-103 ° 43 ' 41.71 "</b>	NAD Reference <b>NAD83</b>		Description of Spacing Unit: (Subject to NDIC Approval) <b>Sec 5, 6, 7, &amp; 8 T153N R101W</b>			
Ground Elevation <b>1946 Feet Above S.L.</b>	Acres in Spacing/Drilling Unit <b>2560</b>	Spacing/Drilling Unit Setback Requirement Feet N/S      Feet E/W			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>10910 Feet MD      10584 Feet TVD</b>		Cement Volume <b>839 Sacks</b>	Cement Top <b>0 Feet</b>	Top Dakota Sand <b>4925 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      Feet TVD			KOP Coordinates From Well Head From WH      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>	County	
Bottom Hole Footages From Nearest Section Line F      L		Qtr-Qtr	Section	Township <b>N</b>	Range <b>W</b>	County	

## Lateral 3

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

## Lateral 4

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

## Lateral 5

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

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

Date

5 / 8 / 2012

ePermit

Printed Name  
**Terry L. Olson**

Title

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

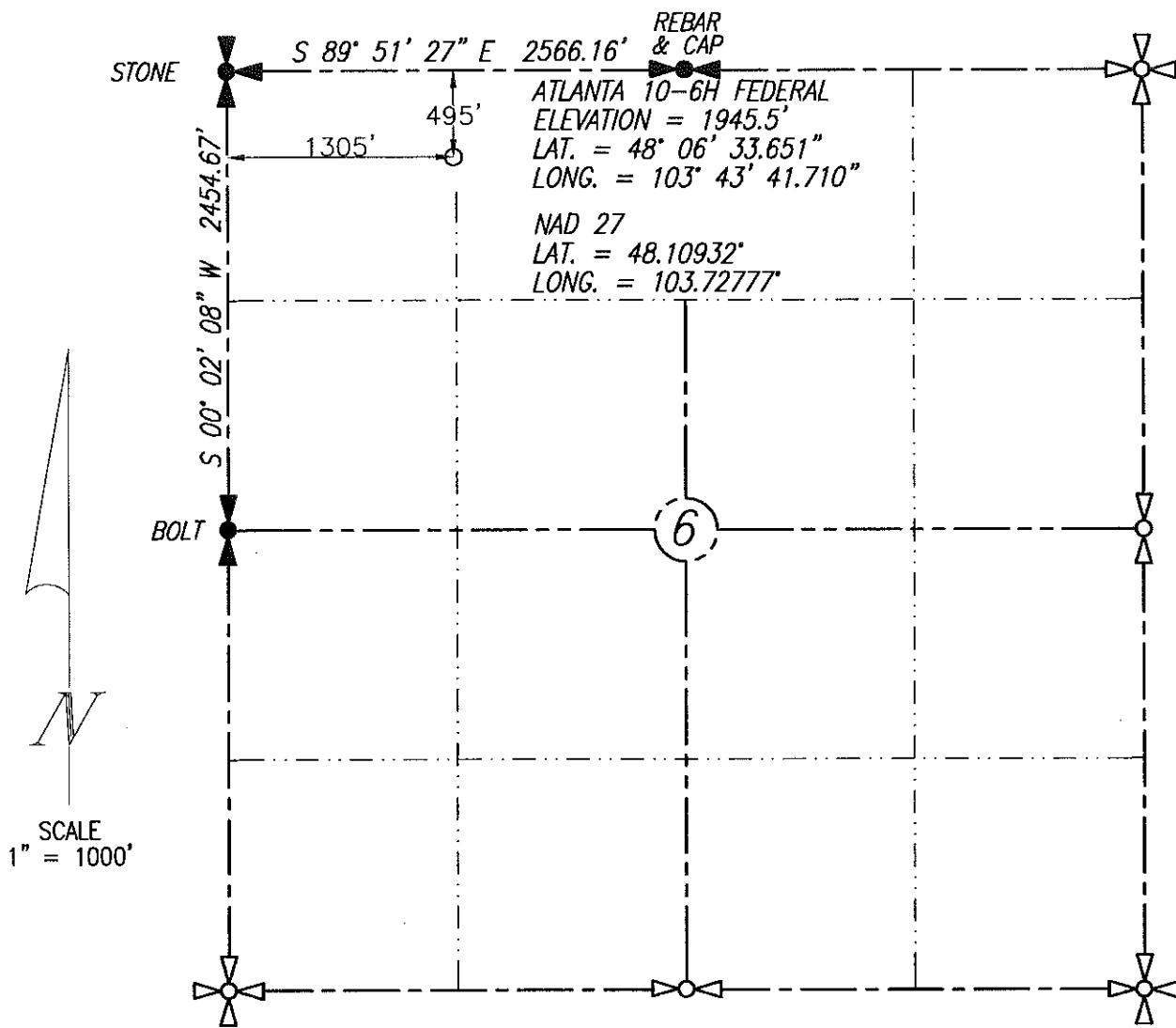
Permit and File Number <b>23363</b>	API Number <b>33 - 105 - 02723</b>
Field <b>BAKER</b>	
Pool <b>BAKKEN</b>	Permit Type <b>DEVELOPMENT</b>

**FOR STATE USE ONLY**

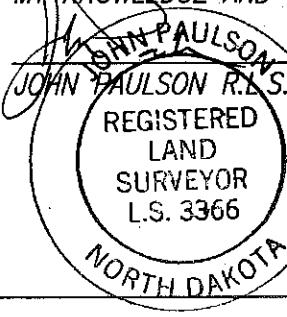
Date Approved <b>7 / 20 / 2012</b>
By <b>Todd L. Holweger</b>
Title <b>Mineral Resources Permit Manager</b>

REVISED: 4-23-2012

WELL LOCATION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 10-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA  
495' FNL & 1305' 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 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

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//2012

Lease and Well No.

Atlanta Federal10-6H**MUD PROGRAM**

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 ' - 10910 '	Invert	9.6-10.0	40-55 sec, 10-15 cc's O/W 70/30 to 80/20
10910 ' - 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
		10910 '	1700 '	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 "	20390 '	10420 '	4 1/2 "	4-1/2", 11.6 #, P-110, BTC		
Tubing		10010 '	10010 '	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
FW	500	Lead	350 '	0 '	111	35/65 Poz/Class "C", 3% CaCl, 12% gel	2.39	12
		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.)								
Surf	1970	Lead	1380 '	0 '	437	35/65 Poz/Class "C", 3% CaCl, 12% gel	2.39	12
		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	10910	Lead	7800 '	0 '	457	35/65 Poz/Class "C", 3% KCl, 5 #/sk Silica	3.21	11.3
		Tail	10910 '	7800 '	382	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 10-6H  
**Rig:** Cyclone 02  
**Prospect:** Williston  
**Target:** Three Forks  
**Spacing:** 2560

**SHL:** 495' FNL & 1305' FWL  
 Sec. 6 - 153N - 101W  
 Williams , ND  
**BHL:** 270' FNL & 200' FEL  
 Sec. 8 - 153N - 101W  
 Williams , ND

- Pre-Staked  
 Staked

Rig Grade Elevation: 1945'  
 KB: 22'  
 RKB: 1967'

FORMATION	SUBSEA	TVD
Pierre Shale	100	1,867
Greenhorn	-2,582	4,549
Dakota Group (fka Mowry)	-2,958	4,925
Basal Dakota Sand	-3,657	5,624
Dunham Salt Top	NA	
Dunham Salt Base	NA	
Pine Salt Top	-5,189	7,156
Pine Salt Base	-5,216	7,183
Minnekahta	-5,235	7,202
Opeche Salt Top	NA	
Opeche Salt Base	NA	
Minnelusa Group	-5,464	7,431
Tyler	-5,650	7,617
Kibby	-6,186	8,153
Top Charles	-6,333	8,300
Base Last Charles Salt	-7,044	9,011
Mission Canyon	-7,267	9,234
Lodgepole	-7,820	9,787
Upper Bakken Shale	-8,529	10,496
Middle Bakken Member	-8,543	10,510
Lower Bakken Shale	-8,574	10,541
Three Forks/Base of Shale	-8,602	10,569
Three Forks Target	-8,617	10,584
<b>End of Lateral</b>	<b>-8,631</b>	<b>10,598</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

---

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#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)

Field: WILLIAMS COUNTY Well: ATLANTA FEDERAL 10-6H  
Facility: SEC.06-T153N-R101W Wellbore: ATLANTA FEDERAL 10-6H PWB

**Plot reference wellpath is ATLANTA FEDERAL 10-6H (REV-G.0) PW**

True vertical depths are referenced to CYCLONE 2 (RKB)

Grid System: NAD83 / Lambert North Dakota SP, Northern Zone (3301), US feet

Measured depths are referenced to CYCLONE 2 (RKB)

North Reference: True north

CYCLONE 2 (RKB) to Mean Sea Level: 1967 feet

Scale: True distance

Mean Sea Level to Mud line (At Slot: SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)): 0 feet

Depths are in feet

Coordinates are in feet referenced to Slot

Created by: painsetr on 6/4/2012

## Location Information

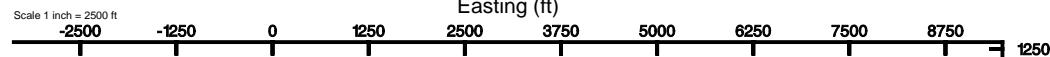
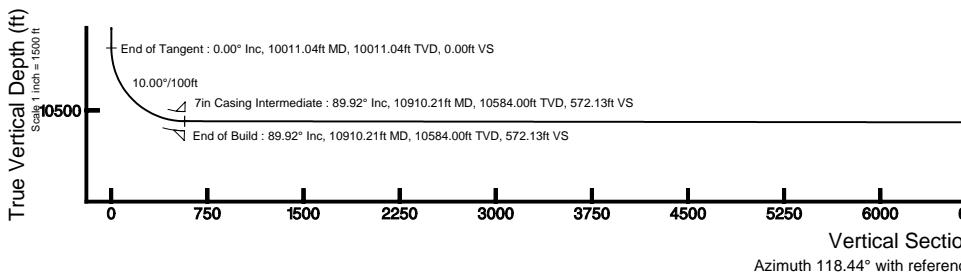
Facility Name		Grid East (US ft)	Grid North (US ft)	Latitude	Longitude	
SEC.06-T153N-R101W		1179034.199	421199.095	48°06'33.379"N	103°43'56.960"W	
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)	27.59	1034.95	1180069.326	421183.226	48°06'33.651"N	103°43'41.710"W
CYCLONE 2 (RKB) to Mud line (At Slot: SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06))					1967ft	
Mean Sea Level to Mud line (At Slot: SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06))					0ft	
CYCLONE 2 (RKB) to Mean Sea Level					1967ft	

## Targets

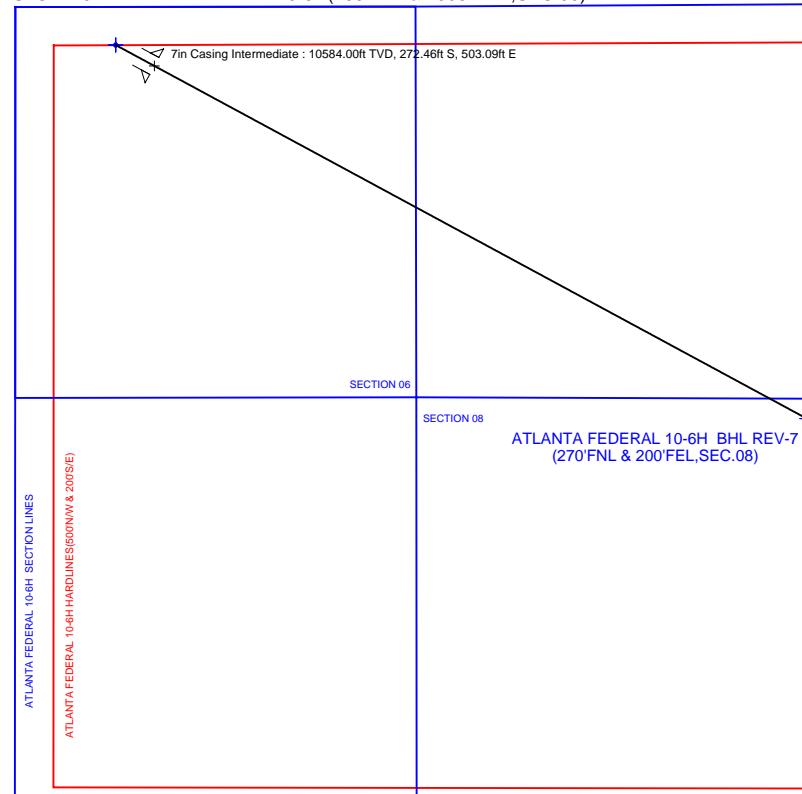
Name	MD (ft)	TVD (ft)	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
ATLANTA FEDERAL 10-6H SECTION 06	0.00	0.00	0.00	1180069.33	421183.23	48°06'33.651"N	103°43'41.710"W	
ATLANTA FEDERAL 10-6H SECTION 08	0.00	0.00	0.00	1180069.33	421183.23	48°06'33.651"N	103°43'41.710"W	
ATLANTA FEDERAL 10-6H SECTION LINES	0.00	0.00	0.00	1180069.33	421183.23	48°06'33.651"N	103°43'41.710"W	
ATLANTA 10-6H BHL ON PLAT REV-1(270'FNL & 500'FEL,SEC.08)	10584.00	-6054.43	8754.93	1188604.14	415766.63	48°05'43.752"N	103°41'32.741"W	
ATLANTA 10-6H BHL REV-2(270'FNL & 200'FEL,SEC.08)	10584.00	-6055.04	9055.00	1188093.90	415753.45	48°05'43.745"N	103°41'28.320"W	
ATLANTA 10-6H HARDLINES(500'NW & 200'SE)	10584.00	0.00	1180069.33	421183.23	48°06'33.651"N	103°43'41.710"W		
ATLANTA FEDERAL 10-6H BHL REV-3(270'FNL & 200'FEL,SEC.08)	10588.00	-4868.70	9005.60	1188862.36	415941.68	48°05'45.584"N	103°41'29.047"W	
ATLANTA FEDERAL 10-6H BHL REV-4(270'FNL & 200'FEL,SEC.08)	10588.00	-4868.70	9034.40	1188896.13	415940.27	48°05'45.584"N	103°41'28.499"W	
ATLANTA FEDERAL 10-6H BHL REV-5(270'FNL & 200'FEL,SEC.08)	10588.00	-4868.70	8994.40	1188851.17	415942.15	48°05'45.584"N	103°41'29.212"W	
ATLANTA FEDERAL 10-6H BHL REV-6(270'FNL & 200'FEL,SEC.08)	10588.00	-4868.70	8990.90	1188847.67	415942.30	48°05'45.584"N	103°41'29.263"W	
ATLANTA FEDERAL 10-6H BHL REV-7(270'FNL & 200'FEL,SEC.08)	20561.81	10588.00	-4868.70	8990.00	1188846.77	415942.34	48°05'45.584"N	103°41'29.277"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	118.439	22.00	0.00	0.00	0.00	0.00
End of Tangent	10011.04	0.000	118.439	10011.04	0.00	0.00	0.00	0.00
End of Build	10910.21	89.917	118.439	10584.00	-272.46	503.09	10.00	572.13
End of Tangent	20561.81	89.917	118.439	10598.00	-4868.70	8990.00	0.00	10223.71

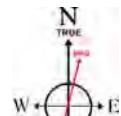


SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)



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





# Planned Wellpath Report

ATLANTA FEDERAL 10-6H (REV-G.0) PWP  
Page 1 of 12



## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 10-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 10-6H 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	Painsetr
Scale	0.999936	Report Generated	6/4/2012 at 8:53:27 AM
Convergence at slot	2.40° West	Database/Source file	WA_Denver/ATLANTA_FEDERAL_10-6H_PWB.xml

## WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	27.59	1034.95	1180069.33	421183.23	48°06'33.651"N	103°43'41.710"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
Horizontal Reference Pt	Slot	CYCLONE 2 (RKB) to Mean Sea Level
Vertical Reference Pt	CYCLONE 2 (RKB)	CYCLONE 2 (RKB) to Mud Line at Slot (SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06))
MD Reference Pt	CYCLONE 2 (RKB)	Section Origin
Field Vertical Reference	Mean Sea Level	Section Azimuth



**Planned Wellpath Report**  
**ATLANTA FEDERAL 10-6H (REV-G.0) PWP**  
 Page 2 of 12



**REFERENCE WELLPATH IDENTIFICATION**

Operator	CONTINENTAL RESOURCES	Slot	SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 10-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 10-6H PWB
Facility	SEC.06-T153N-R101W		

**WELLPATH DATA (210 stations) † = interpolated/extrapolated station**

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
0.00†	0.000	118.439	0.00	0.00	0.00	0.00	0.00	
22.00	0.000	118.439	22.00	0.00	0.00	0.00	0.00	Tie On
122.00†	0.000	118.439	122.00	0.00	0.00	0.00	0.00	
222.00†	0.000	118.439	222.00	0.00	0.00	0.00	0.00	
322.00†	0.000	118.439	322.00	0.00	0.00	0.00	0.00	
422.00†	0.000	118.439	422.00	0.00	0.00	0.00	0.00	
522.00†	0.000	118.439	522.00	0.00	0.00	0.00	0.00	
622.00†	0.000	118.439	622.00	0.00	0.00	0.00	0.00	
722.00†	0.000	118.439	722.00	0.00	0.00	0.00	0.00	
822.00†	0.000	118.439	822.00	0.00	0.00	0.00	0.00	
922.00†	0.000	118.439	922.00	0.00	0.00	0.00	0.00	
1022.00†	0.000	118.439	1022.00	0.00	0.00	0.00	0.00	
1122.00†	0.000	118.439	1122.00	0.00	0.00	0.00	0.00	
1222.00†	0.000	118.439	1222.00	0.00	0.00	0.00	0.00	
1322.00†	0.000	118.439	1322.00	0.00	0.00	0.00	0.00	
1422.00†	0.000	118.439	1422.00	0.00	0.00	0.00	0.00	
1522.00†	0.000	118.439	1522.00	0.00	0.00	0.00	0.00	
1622.00†	0.000	118.439	1622.00	0.00	0.00	0.00	0.00	
1722.00†	0.000	118.439	1722.00	0.00	0.00	0.00	0.00	
1822.00†	0.000	118.439	1822.00	0.00	0.00	0.00	0.00	
1922.00†	0.000	118.439	1922.00	0.00	0.00	0.00	0.00	
2022.00†	0.000	118.439	2022.00	0.00	0.00	0.00	0.00	
2122.00†	0.000	118.439	2122.00	0.00	0.00	0.00	0.00	
2222.00†	0.000	118.439	2222.00	0.00	0.00	0.00	0.00	
2322.00†	0.000	118.439	2322.00	0.00	0.00	0.00	0.00	
2422.00†	0.000	118.439	2422.00	0.00	0.00	0.00	0.00	
2522.00†	0.000	118.439	2522.00	0.00	0.00	0.00	0.00	
2622.00†	0.000	118.439	2622.00	0.00	0.00	0.00	0.00	
2722.00†	0.000	118.439	2722.00	0.00	0.00	0.00	0.00	
2822.00†	0.000	118.439	2822.00	0.00	0.00	0.00	0.00	



# Planned Wellpath Report

ATLANTA FEDERAL 10-6H (REV-G.0) PWP  
Page 3 of 12



## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 10-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 10-6H PWB
Facility	SEC.06-T153N-R101W		

## WELLPATH DATA (210 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
2922.00†	0.000	118.439	2922.00	0.00	0.00	0.00	0.00	
3022.00†	0.000	118.439	3022.00	0.00	0.00	0.00	0.00	
3122.00†	0.000	118.439	3122.00	0.00	0.00	0.00	0.00	
3222.00†	0.000	118.439	3222.00	0.00	0.00	0.00	0.00	
3322.00†	0.000	118.439	3322.00	0.00	0.00	0.00	0.00	
3422.00†	0.000	118.439	3422.00	0.00	0.00	0.00	0.00	
3522.00†	0.000	118.439	3522.00	0.00	0.00	0.00	0.00	
3622.00†	0.000	118.439	3622.00	0.00	0.00	0.00	0.00	
3722.00†	0.000	118.439	3722.00	0.00	0.00	0.00	0.00	
3822.00†	0.000	118.439	3822.00	0.00	0.00	0.00	0.00	
3922.00†	0.000	118.439	3922.00	0.00	0.00	0.00	0.00	
4022.00†	0.000	118.439	4022.00	0.00	0.00	0.00	0.00	
4122.00†	0.000	118.439	4122.00	0.00	0.00	0.00	0.00	
4222.00†	0.000	118.439	4222.00	0.00	0.00	0.00	0.00	
4322.00†	0.000	118.439	4322.00	0.00	0.00	0.00	0.00	
4422.00†	0.000	118.439	4422.00	0.00	0.00	0.00	0.00	
4522.00†	0.000	118.439	4522.00	0.00	0.00	0.00	0.00	
4622.00†	0.000	118.439	4622.00	0.00	0.00	0.00	0.00	
4722.00†	0.000	118.439	4722.00	0.00	0.00	0.00	0.00	
4822.00†	0.000	118.439	4822.00	0.00	0.00	0.00	0.00	
4922.00†	0.000	118.439	4922.00	0.00	0.00	0.00	0.00	
5022.00†	0.000	118.439	5022.00	0.00	0.00	0.00	0.00	
5122.00†	0.000	118.439	5122.00	0.00	0.00	0.00	0.00	
5222.00†	0.000	118.439	5222.00	0.00	0.00	0.00	0.00	
5322.00†	0.000	118.439	5322.00	0.00	0.00	0.00	0.00	
5422.00†	0.000	118.439	5422.00	0.00	0.00	0.00	0.00	
5522.00†	0.000	118.439	5522.00	0.00	0.00	0.00	0.00	
5622.00†	0.000	118.439	5622.00	0.00	0.00	0.00	0.00	
5722.00†	0.000	118.439	5722.00	0.00	0.00	0.00	0.00	
5822.00†	0.000	118.439	5822.00	0.00	0.00	0.00	0.00	



# Planned Wellpath Report

ATLANTA FEDERAL 10-6H (REV-G.0) PWP  
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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 10-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 10-6H PWB
Facility	SEC.06-T153N-R101W		

## WELLPATH DATA (210 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
5922.00†	0.000	118.439	5922.00	0.00	0.00	0.00	0.00	
6022.00†	0.000	118.439	6022.00	0.00	0.00	0.00	0.00	
6122.00†	0.000	118.439	6122.00	0.00	0.00	0.00	0.00	
6222.00†	0.000	118.439	6222.00	0.00	0.00	0.00	0.00	
6322.00†	0.000	118.439	6322.00	0.00	0.00	0.00	0.00	
6422.00†	0.000	118.439	6422.00	0.00	0.00	0.00	0.00	
6522.00†	0.000	118.439	6522.00	0.00	0.00	0.00	0.00	
6622.00†	0.000	118.439	6622.00	0.00	0.00	0.00	0.00	
6722.00†	0.000	118.439	6722.00	0.00	0.00	0.00	0.00	
6822.00†	0.000	118.439	6822.00	0.00	0.00	0.00	0.00	
6922.00†	0.000	118.439	6922.00	0.00	0.00	0.00	0.00	
7022.00†	0.000	118.439	7022.00	0.00	0.00	0.00	0.00	
7122.00†	0.000	118.439	7122.00	0.00	0.00	0.00	0.00	
7222.00†	0.000	118.439	7222.00	0.00	0.00	0.00	0.00	
7322.00†	0.000	118.439	7322.00	0.00	0.00	0.00	0.00	
7422.00†	0.000	118.439	7422.00	0.00	0.00	0.00	0.00	
7522.00†	0.000	118.439	7522.00	0.00	0.00	0.00	0.00	
7622.00†	0.000	118.439	7622.00	0.00	0.00	0.00	0.00	
7722.00†	0.000	118.439	7722.00	0.00	0.00	0.00	0.00	
7822.00†	0.000	118.439	7822.00	0.00	0.00	0.00	0.00	
7922.00†	0.000	118.439	7922.00	0.00	0.00	0.00	0.00	
8022.00†	0.000	118.439	8022.00	0.00	0.00	0.00	0.00	
8122.00†	0.000	118.439	8122.00	0.00	0.00	0.00	0.00	
8222.00†	0.000	118.439	8222.00	0.00	0.00	0.00	0.00	
8322.00†	0.000	118.439	8322.00	0.00	0.00	0.00	0.00	
8422.00†	0.000	118.439	8422.00	0.00	0.00	0.00	0.00	
8522.00†	0.000	118.439	8522.00	0.00	0.00	0.00	0.00	
8622.00†	0.000	118.439	8622.00	0.00	0.00	0.00	0.00	
8722.00†	0.000	118.439	8722.00	0.00	0.00	0.00	0.00	
8822.00†	0.000	118.439	8822.00	0.00	0.00	0.00	0.00	



**Planned Wellpath Report**  
**ATLANTA FEDERAL 10-6H (REV-G.0) PWP**  
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**REFERENCE WELLPATH IDENTIFICATION**

Operator	CONTINENTAL RESOURCES	Slot	SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 10-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 10-6H PWB
Facility	SEC.06-T153N-R101W		

**WELLPATH DATA (210 stations) † = interpolated/extrapolated station**

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
8922.00†	0.000	118.439	8922.00	0.00	0.00	0.00	0.00	
9022.00†	0.000	118.439	9022.00	0.00	0.00	0.00	0.00	
9122.00†	0.000	118.439	9122.00	0.00	0.00	0.00	0.00	
9222.00†	0.000	118.439	9222.00	0.00	0.00	0.00	0.00	
9322.00†	0.000	118.439	9322.00	0.00	0.00	0.00	0.00	
9422.00†	0.000	118.439	9422.00	0.00	0.00	0.00	0.00	
9522.00†	0.000	118.439	9522.00	0.00	0.00	0.00	0.00	
9622.00†	0.000	118.439	9622.00	0.00	0.00	0.00	0.00	
9722.00†	0.000	118.439	9722.00	0.00	0.00	0.00	0.00	
9822.00†	0.000	118.439	9822.00	0.00	0.00	0.00	0.00	
9922.00†	0.000	118.439	9922.00	0.00	0.00	0.00	0.00	
10011.04	0.000	118.439	10011.04	0.00	0.00	0.00	0.00	End of Tangent
10022.00†	1.096	118.439	10022.00	0.10	-0.05	0.09	10.00	
10122.00†	11.096	118.439	10121.31	10.71	-5.10	9.42	10.00	
10222.00†	21.096	118.439	10217.27	38.40	-18.29	33.77	10.00	
10322.00†	31.096	118.439	10306.96	82.33	-39.21	72.40	10.00	
10422.00†	41.096	118.439	10387.66	141.17	-67.23	124.14	10.00	
10522.00†	51.096	118.439	10456.92	213.13	-101.50	187.41	10.00	
10622.00†	61.096	118.439	10512.62	296.02	-140.97	260.30	10.00	
10722.00†	71.096	118.439	10553.09	387.33	-184.45	340.59	10.00	
10822.00†	81.096	118.439	10577.09	484.28	-230.62	425.84	10.00	
10910.21	89.917	118.439	10584.00	572.13	-272.46	503.09	10.00	End of Build
10922.00†	89.917	118.439	10584.01	583.92	-278.07	513.46	0.00	
11022.00†	89.917	118.439	10584.16	683.92	-325.69	601.39	0.00	
11122.00†	89.917	118.439	10584.30	783.92	-373.31	689.32	0.00	
11222.00†	89.917	118.439	10584.45	883.92	-420.94	777.25	0.00	
11322.00†	89.917	118.439	10584.59	983.92	-468.56	865.19	0.00	
11422.00†	89.917	118.439	10584.74	1083.92	-516.18	953.12	0.00	
11522.00†	89.917	118.439	10584.88	1183.92	-563.80	1041.05	0.00	
11622.00†	89.917	118.439	10585.03	1283.92	-611.42	1128.98	0.00	



# Planned Wellpath Report

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 10-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 10-6H PWB
Facility	SEC.06-T153N-R101W		

## WELLPATH DATA (210 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
11722.00†	89.917	118.439	10585.17	1383.92	-659.04	1216.92	0.00	
11822.00†	89.917	118.439	10585.32	1483.92	-706.67	1304.85	0.00	
11922.00†	89.917	118.439	10585.47	1583.92	-754.29	1392.78	0.00	
12022.00†	89.917	118.439	10585.61	1683.92	-801.91	1480.72	0.00	
12122.00†	89.917	118.439	10585.76	1783.92	-849.53	1568.65	0.00	
12222.00†	89.917	118.439	10585.90	1883.92	-897.15	1656.58	0.00	
12322.00†	89.917	118.439	10586.05	1983.92	-944.77	1744.51	0.00	
12422.00†	89.917	118.439	10586.19	2083.92	-992.39	1832.45	0.00	
12522.00†	89.917	118.439	10586.34	2183.92	-1040.02	1920.38	0.00	
12622.00†	89.917	118.439	10586.48	2283.92	-1087.64	2008.31	0.00	
12722.00†	89.917	118.439	10586.63	2383.92	-1135.26	2096.24	0.00	
12822.00†	89.917	118.439	10586.77	2483.92	-1182.88	2184.18	0.00	
12922.00†	89.917	118.439	10586.92	2583.92	-1230.50	2272.11	0.00	
13022.00†	89.917	118.439	10587.06	2683.92	-1278.12	2360.04	0.00	
13122.00†	89.917	118.439	10587.21	2783.92	-1325.75	2447.98	0.00	
13222.00†	89.917	118.439	10587.35	2883.92	-1373.37	2535.91	0.00	
13322.00†	89.917	118.439	10587.50	2983.92	-1420.99	2623.84	0.00	
13422.00†	89.917	118.439	10587.64	3083.92	-1468.61	2711.77	0.00	
13522.00†	89.917	118.439	10587.79	3183.92	-1516.23	2799.71	0.00	
13622.00†	89.917	118.439	10587.93	3283.91	-1563.85	2887.64	0.00	
13722.00†	89.917	118.439	10588.08	3383.91	-1611.48	2975.57	0.00	
13822.00†	89.917	118.439	10588.22	3483.91	-1659.10	3063.50	0.00	
13922.00†	89.917	118.439	10588.37	3583.91	-1706.72	3151.44	0.00	
14022.00†	89.917	118.439	10588.51	3683.91	-1754.34	3239.37	0.00	
14122.00†	89.917	118.439	10588.66	3783.91	-1801.96	3327.30	0.00	
14222.00†	89.917	118.439	10588.80	3883.91	-1849.58	3415.24	0.00	
14322.00†	89.917	118.439	10588.95	3983.91	-1897.21	3503.17	0.00	
14422.00†	89.917	118.439	10589.09	4083.91	-1944.83	3591.10	0.00	
14522.00†	89.917	118.439	10589.24	4183.91	-1992.45	3679.03	0.00	
14622.00†	89.917	118.439	10589.38	4283.91	-2040.07	3766.97	0.00	



**Planned Wellpath Report**  
**ATLANTA FEDERAL 10-6H (REV-G.0) PWP**  
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**REFERENCE WELLPATH IDENTIFICATION**

Operator	CONTINENTAL RESOURCES	Slot	SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 10-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 10-6H PWB
Facility	SEC.06-T153N-R101W		

**WELLPATH DATA (210 stations) † = interpolated/extrapolated station**

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
14722.00†	89.917	118.439	10589.53	4383.91	-2087.69	3854.90	0.00	
14822.00†	89.917	118.439	10589.67	4483.91	-2135.31	3942.83	0.00	
14922.00†	89.917	118.439	10589.82	4583.91	-2182.93	4030.76	0.00	
15022.00†	89.917	118.439	10589.96	4683.91	-2230.56	4118.70	0.00	
15122.00†	89.917	118.439	10590.11	4783.91	-2278.18	4206.63	0.00	
15222.00†	89.917	118.439	10590.25	4883.91	-2325.80	4294.56	0.00	
15322.00†	89.917	118.439	10590.40	4983.91	-2373.42	4382.50	0.00	
15422.00†	89.917	118.439	10590.54	5083.91	-2421.04	4470.43	0.00	
15522.00†	89.917	118.439	10590.69	5183.91	-2468.66	4558.36	0.00	
15622.00†	89.917	118.439	10590.83	5283.91	-2516.29	4646.29	0.00	
15722.00†	89.917	118.439	10590.98	5383.91	-2563.91	4734.23	0.00	
15822.00†	89.917	118.439	10591.12	5483.91	-2611.53	4822.16	0.00	
15922.00†	89.917	118.439	10591.27	5583.91	-2659.15	4910.09	0.00	
16022.00†	89.917	118.439	10591.41	5683.91	-2706.77	4998.02	0.00	
16122.00†	89.917	118.439	10591.56	5783.91	-2754.39	5085.96	0.00	
16222.00†	89.917	118.439	10591.70	5883.91	-2802.02	5173.89	0.00	
16322.00†	89.917	118.439	10591.85	5983.91	-2849.64	5261.82	0.00	
16422.00†	89.917	118.439	10591.99	6083.91	-2897.26	5349.76	0.00	
16522.00†	89.917	118.439	10592.14	6183.91	-2944.88	5437.69	0.00	
16622.00†	89.917	118.439	10592.28	6283.91	-2992.50	5525.62	0.00	
16722.00†	89.917	118.439	10592.43	6383.91	-3040.12	5613.55	0.00	
16822.00†	89.917	118.439	10592.57	6483.91	-3087.74	5701.49	0.00	
16922.00†	89.917	118.439	10592.72	6583.91	-3135.37	5789.42	0.00	
17022.00†	89.917	118.439	10592.86	6683.91	-3182.99	5877.35	0.00	
17122.00†	89.917	118.439	10593.01	6783.91	-3230.61	5965.28	0.00	
17222.00†	89.917	118.439	10593.15	6883.91	-3278.23	6053.22	0.00	
17322.00†	89.917	118.439	10593.30	6983.91	-3325.85	6141.15	0.00	
17422.00†	89.917	118.439	10593.44	7083.91	-3373.47	6229.08	0.00	
17522.00†	89.917	118.439	10593.59	7183.91	-3421.10	6317.02	0.00	
17622.00†	89.917	118.439	10593.73	7283.91	-3468.72	6404.95	0.00	



# Planned Wellpath Report

ATLANTA FEDERAL 10-6H (REV-G.0) PWP  
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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 10-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 10-6H PWB
Facility	SEC.06-T153N-R101W		

## WELLPATH DATA (210 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
17722.00†	89.917	118.439	10593.88	7383.91	-3516.34	6492.88	0.00	
17822.00†	89.917	118.439	10594.03	7483.91	-3563.96	6580.81	0.00	
17922.00†	89.917	118.439	10594.17	7583.91	-3611.58	6668.75	0.00	
18022.00†	89.917	118.439	10594.32	7683.91	-3659.20	6756.68	0.00	
18122.00†	89.917	118.439	10594.46	7783.91	-3706.83	6844.61	0.00	
18222.00†	89.917	118.439	10594.61	7883.91	-3754.45	6932.54	0.00	
18322.00†	89.917	118.439	10594.75	7983.91	-3802.07	7020.48	0.00	
18422.00†	89.917	118.439	10594.90	8083.91	-3849.69	7108.41	0.00	
18522.00†	89.917	118.439	10595.04	8183.91	-3897.31	7196.34	0.00	
18622.00†	89.917	118.439	10595.19	8283.91	-3944.93	7284.27	0.00	
18722.00†	89.917	118.439	10595.33	8383.91	-3992.55	7372.21	0.00	
18822.00†	89.917	118.439	10595.48	8483.91	-4040.18	7460.14	0.00	
18922.00†	89.917	118.439	10595.62	8583.91	-4087.80	7548.07	0.00	
19022.00†	89.917	118.439	10595.77	8683.91	-4135.42	7636.01	0.00	
19122.00†	89.917	118.439	10595.91	8783.91	-4183.04	7723.94	0.00	
19222.00†	89.917	118.439	10596.06	8883.91	-4230.66	7811.87	0.00	
19322.00†	89.917	118.439	10596.20	8983.91	-4278.28	7899.80	0.00	
19422.00†	89.917	118.439	10596.35	9083.91	-4325.91	7987.74	0.00	
19522.00†	89.917	118.439	10596.49	9183.91	-4373.53	8075.67	0.00	
19622.00†	89.917	118.439	10596.64	9283.91	-4421.15	8163.60	0.00	
19722.00†	89.917	118.439	10596.78	9383.91	-4468.77	8251.53	0.00	
19822.00†	89.917	118.439	10596.93	9483.91	-4516.39	8339.47	0.00	
19922.00†	89.917	118.439	10597.07	9583.91	-4564.01	8427.40	0.00	
20022.00†	89.917	118.439	10597.22	9683.91	-4611.64	8515.33	0.00	
20122.00†	89.917	118.439	10597.36	9783.91	-4659.26	8603.27	0.00	
20222.00†	89.917	118.439	10597.51	9883.91	-4706.88	8691.20	0.00	
20322.00†	89.917	118.439	10597.65	9983.91	-4754.50	8779.13	0.00	
20422.00†	89.917	118.439	10597.80	10083.91	-4802.12	8867.06	0.00	
20522.00†	89.917	118.439	10597.94	10183.91	-4849.74	8955.00	0.00	
20561.81	89.917	118.439	10598.00 <sup>1</sup>	10223.71	-4868.70	8990.00	0.00	End of Tangent



# Planned Wellpath Report

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 10-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 10-6H PWB
Facility	SEC.06-T153N-R101W		

## HOLE & CASING SECTIONS -

Ref Wellbore: ATLANTA FEDERAL 10-6H PWB    Ref Wellpath: ATLANTA FEDERAL 10-6H (REV-G.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	10910.21	10888.21	22.00	10584.00	0.00	0.00	-272.46	503.09



# Planned Wellpath Report

ATLANTA FEDERAL 10-6H (REV-G.0) PWP  
Page 10 of 12



## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)						
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 10-6H						
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 10-6H 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 10-6H SECTION 06		0.00	0.00	0.00	1180069.33	421183.23	48°06'33.651"N	103°43'41.710"W	polygon
ATLANTA FEDERAL 10-6H SECTION 08		0.00	0.00	0.00	1180069.33	421183.23	48°06'33.651"N	103°43'41.710"W	polygon
ATLANTA FEDERAL 10-6H SECTION LINES		0.00	0.00	0.00	1180069.33	421183.23	48°06'33.651"N	103°43'41.710"W	polygon
ATLANTA 10-6H BHL ON PLAT REV-1(270'FNL & 500'FEL,SEC.08)		10584.00	-5054.43	8754.93	1188604.14	415766.63	48°05'43.752"N	103°41'32.741"W	point
ATLANTA 10-6H BHL REV-2 (270'FNL & 200'FEL,SEC.08)		10584.00	-5055.04	9055.00	1188903.90	415753.45	48°05'43.745"N	103°41'28.320"W	point
ATLANTA FEDERAL 10-6H HARDLINES(500'N/W & 200'S/E)		10598.00	0.00	0.00	1180069.33	421183.23	48°06'33.651"N	103°43'41.710"W	polygon
ATLANTA FEDERAL 10-6H BHL REV-3(270'FNL & 200'FEL,SEC.08)		10598.00	-4868.70	9005.60	1188862.36	415941.68	48°05'45.584"N	103°41'29.047"W	point
ATLANTA FEDERAL 10-6H BHL REV-4(270'FNL & 200'FEL,SEC.08)		10598.00	-4868.70	9039.40	1188896.13	415940.27	48°05'45.584"N	103°41'28.549"W	point
ATLANTA FEDERAL 10-6H BHL REV-5(270'FNL & 200'FEL,SEC.08)		10598.00	-4868.70	8994.40	1188851.17	415942.15	48°05'45.584"N	103°41'29.212"W	point
ATLANTA FEDERAL 10-6H BHL REV-6(270'FNL & 200'FEL,SEC.08)		10598.00	-4868.70	8990.90	1188847.67	415942.30	48°05'45.584"N	103°41'29.263"W	point
1) ATLANTA FEDERAL 10-6H BHL REV-7(270'FNL & 200'FEL,SEC.08)	20561.81	10598.00	-4868.70	8990.00	1188846.77	415942.34	48°05'45.584"N	103°41'29.277"W	point



# Planned Wellpath Report

ATLANTA FEDERAL 10-6H (REV-G.0) PWP  
Page 11 of 12



## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 10-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 10-6H PWB
Facility	SEC.06-T153N-R101W		

**SURVEY PROGRAM - Ref Wellbore: ATLANTA FEDERAL 10-6H PWB    Ref Wellpath: ATLANTA FEDERAL 10-6H (REV-G.0) PWP**

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
22.00	22000.00	NaviTrak (Standard)		ATLANTA FEDERAL 10-6H PWB



# Planned Wellpath Report

ATLANTA FEDERAL 10-6H (REV-G.0) PWP  
Page 12 of 12



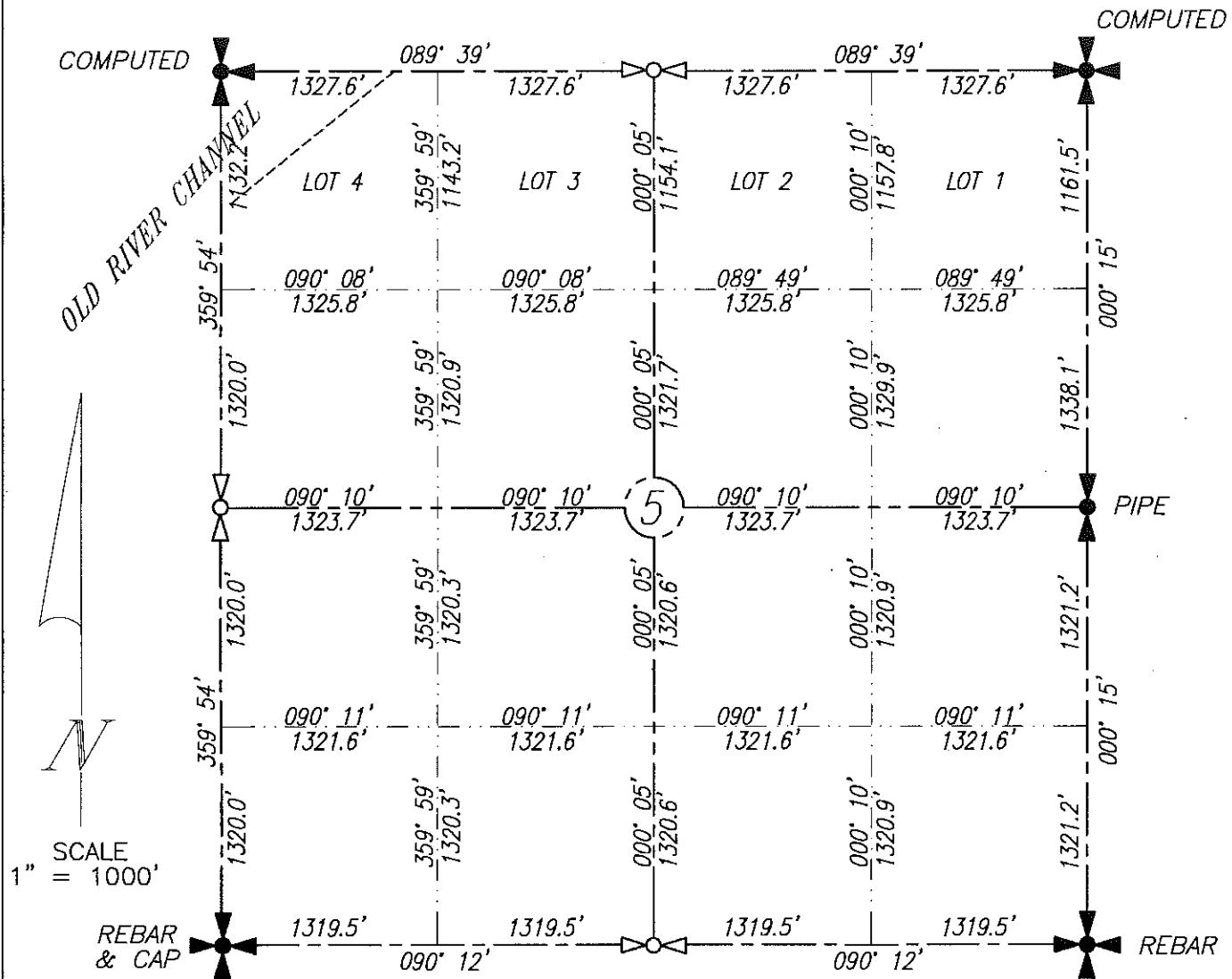
## REFERENCE WELLPATH IDENTIFICATION

Operator	CONTINENTAL RESOURCES	Slot	SLOT#10 ATLANTA FEDERAL 10-6H(495'FNL & 1305'FWL,SEC.06)
Area	NORTH DAKOTA	Well	ATLANTA FEDERAL 10-6H
Field	WILLIAMS COUNTY	Wellbore	ATLANTA FEDERAL 10-6H PWB
Facility	SEC.06-T153N-R101W		

## DESIGN COMMENTS

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Comment
22.00	0.000	118.439	22.00	Tie On
10011.04	0.000	118.439	10011.04	End of Tangent
10910.21	89.917	118.439	10584.00	End of Build
20561.81	89.917	118.439	10598.00	End of Tangent

HORIZONTAL SECTION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 10-6H 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.

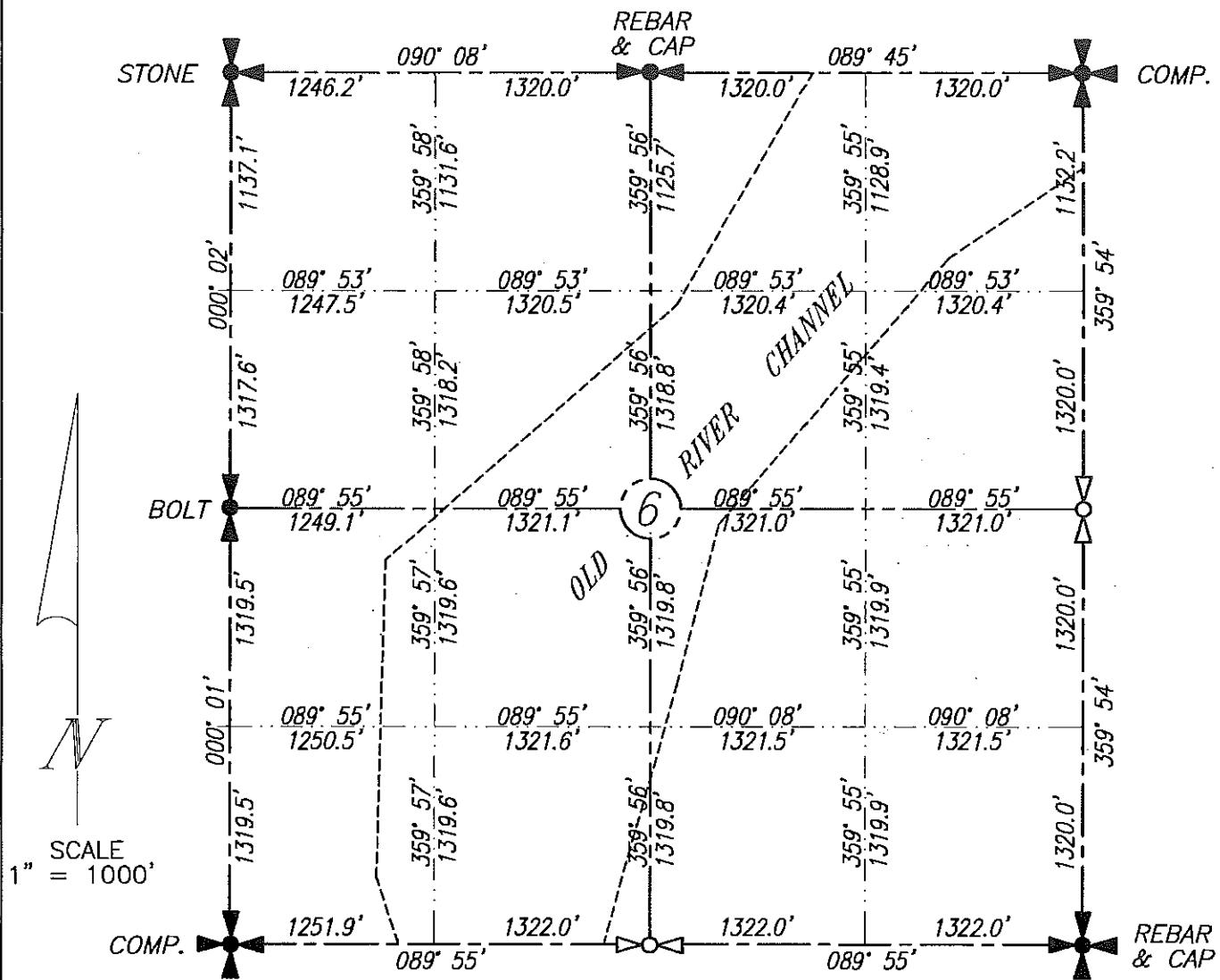
CERTIFIED THIS PLAT CORRECTLY REPRESENTS  
WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE  
CHARGE SURVEYOR TRUE AND CORRECT TO THE BEST OF  
MY KNOWLEDGE AND BELIEF

~~JOHN PAULSON~~ NORTH DAKOTA 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 10-6H 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.  
~~PAGE~~  
~~ALL BEARINGS~~ SHOWN ARE ASSUMED.

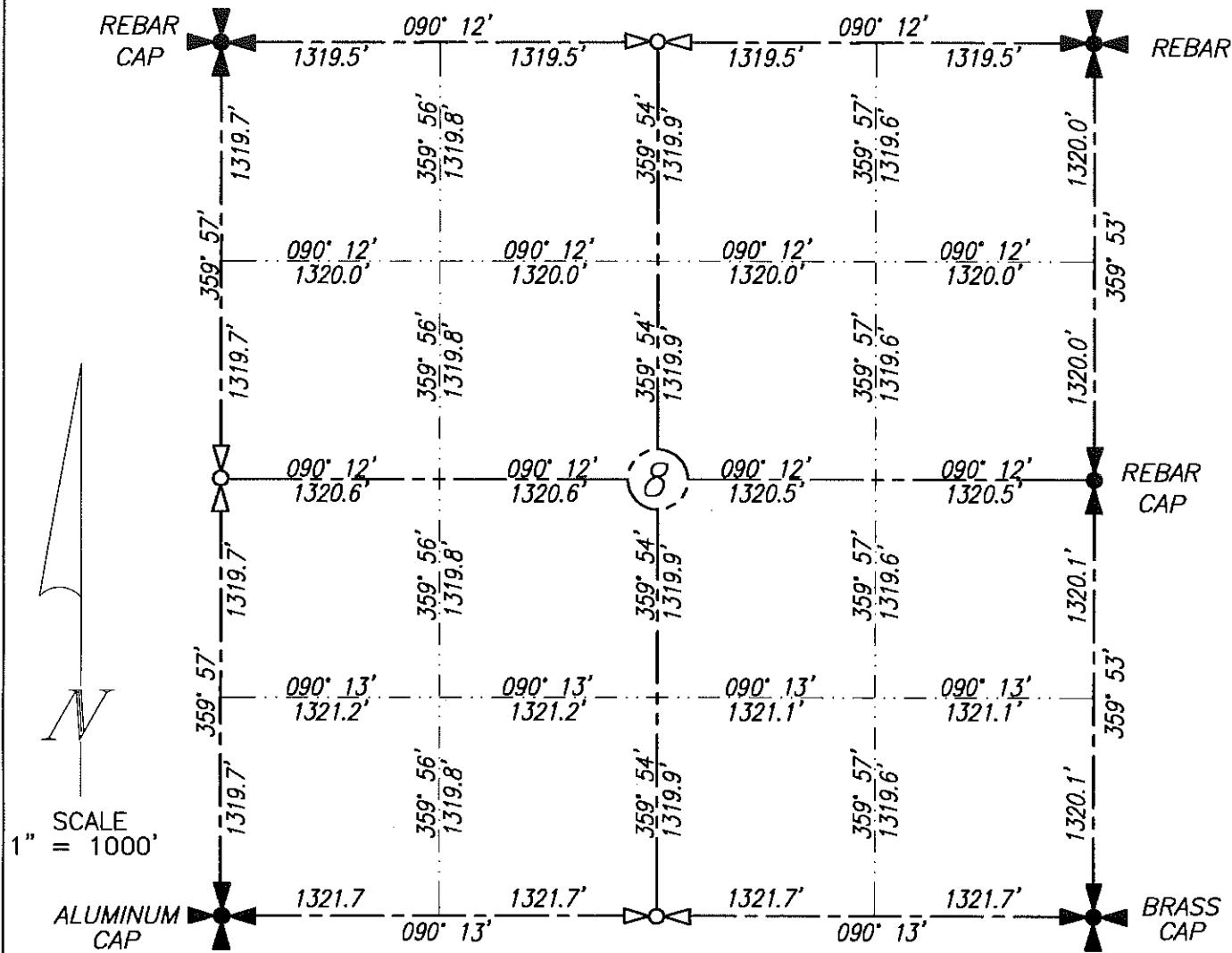
I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS  
WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE  
CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF  
MY KNOWLEDGE AND BELIEF

**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.

REVISED: 5-2-2012

ATLANTA 10-6H 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 BY ME OR UNDER MY RESPONSIBLE  
CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF  
MY KNOWLEDGE AND BELIEF  
SURVEYOR  
JOHN PAULSON  
P.L.S. #3366  
5-3-12

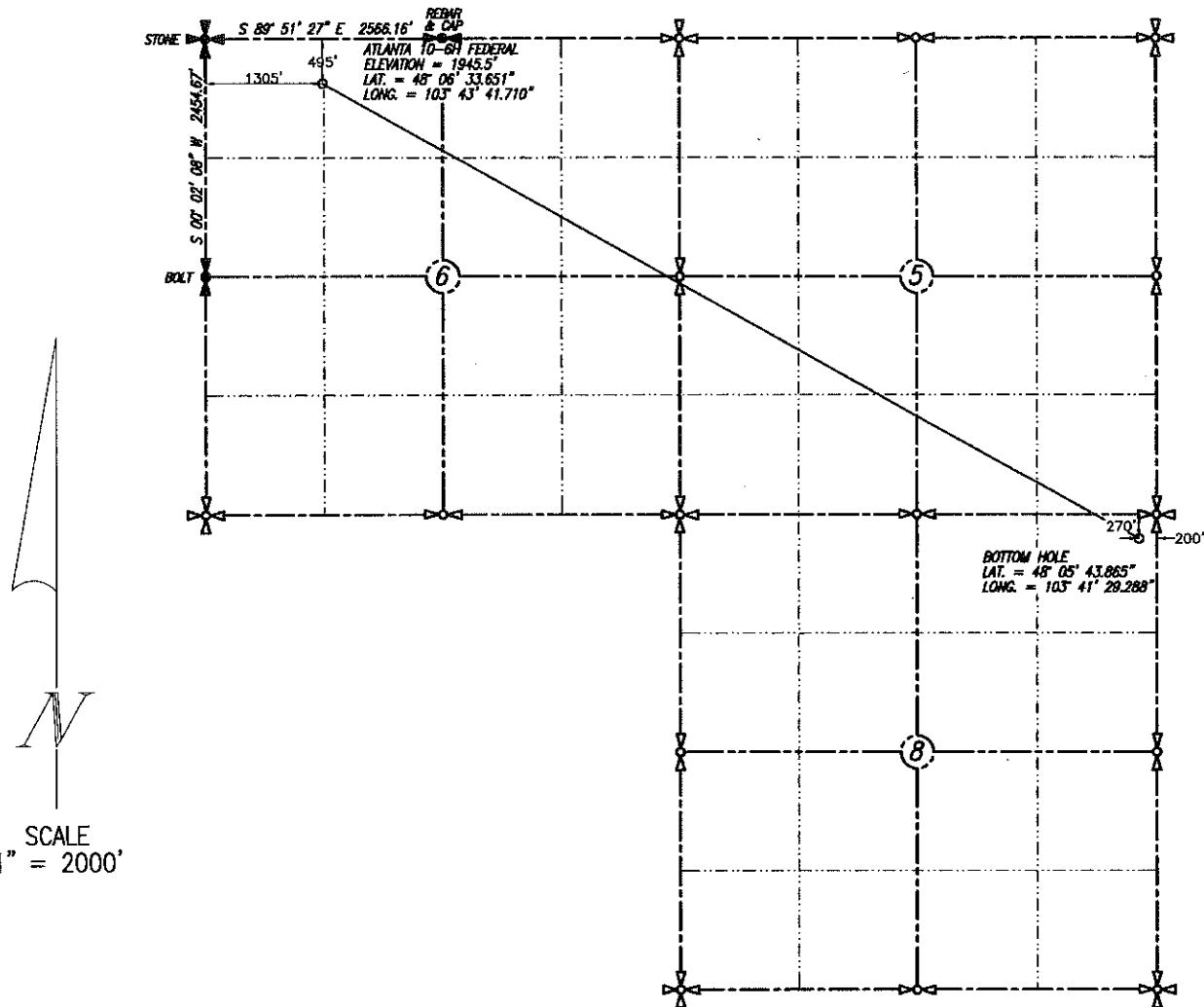
JOHN PAULSON P.L.S. #3366  
C.R.T.H. DAKOTA'S

BROSZ ENGINEERING INC.

BOX 357  
BOWMAN, N.D. 58623  
PHONE: 701-523-3340  
FAX: 701-523-5243  
PROJECT NO. 12-10

REVISED: 5-4-2012

BOTTOM HOLE LOCATION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 10-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA  
495' FNL & 1305' 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



5-4-12

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.**

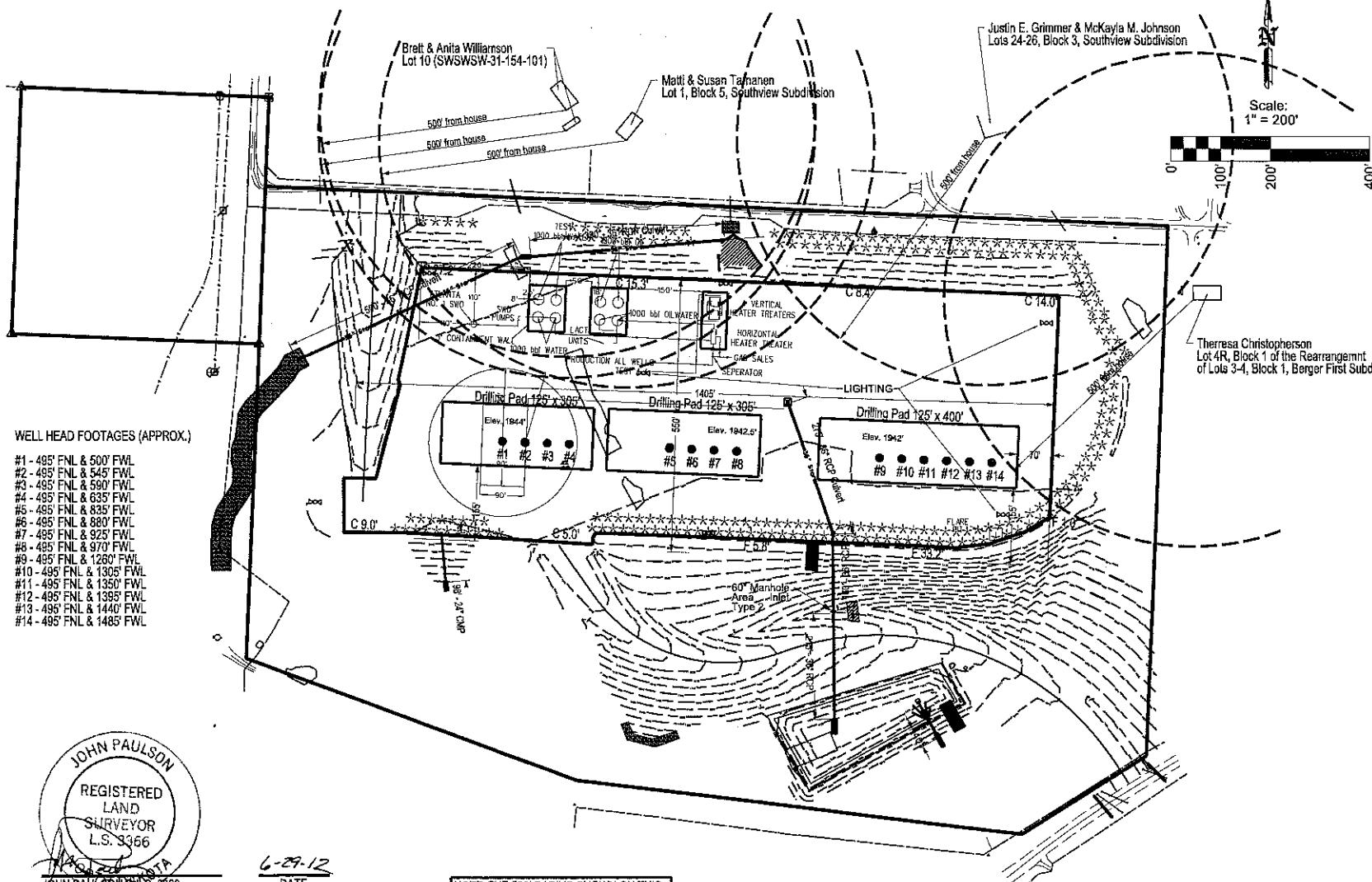
BOX 357  
BOWMAN, N.D. 58623  
PHONE: 701-523-3340  
FAX: 701-523-5243  
PROJECT NO. 12-10

DESIGNED BY:  
DRAWN BY:  
DATE PRINTED:

JWH  
5/16/12

REVISION	DATE
1	6/25/12
2	
3	
4	

SHEET DESCRIPTION: Production Facility Layout  
PROJECT NAME: Atlanta Site  
PROJECT NO.: N12B10



## 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.

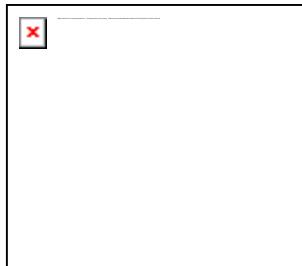
Prairie Disposal for Cuttings  
102C10 52<sup>nd</sup> St NW  
Tioga ND 58852

Let me know if there is anything else that you need.

Thanks.

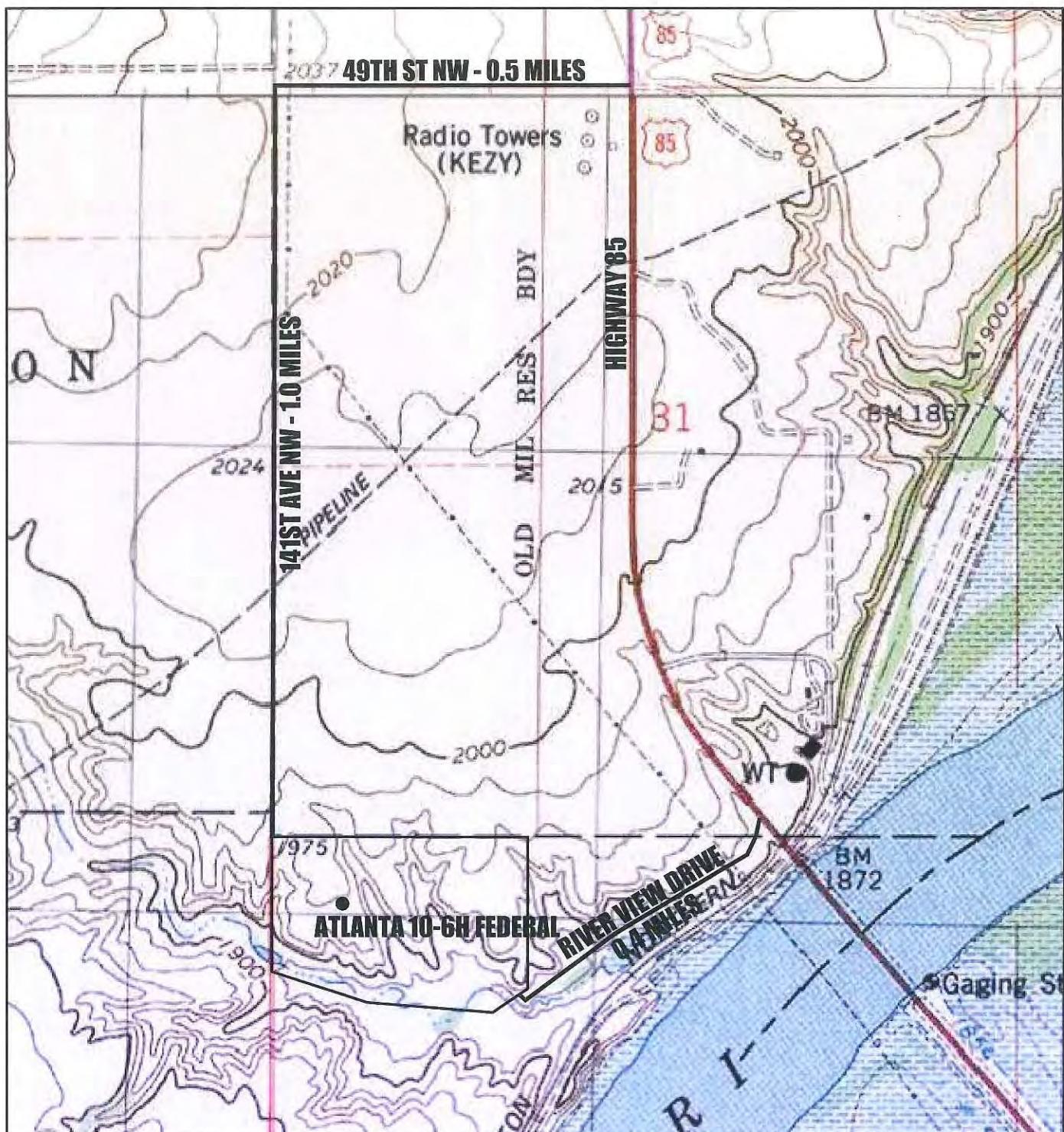
Bb

*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.

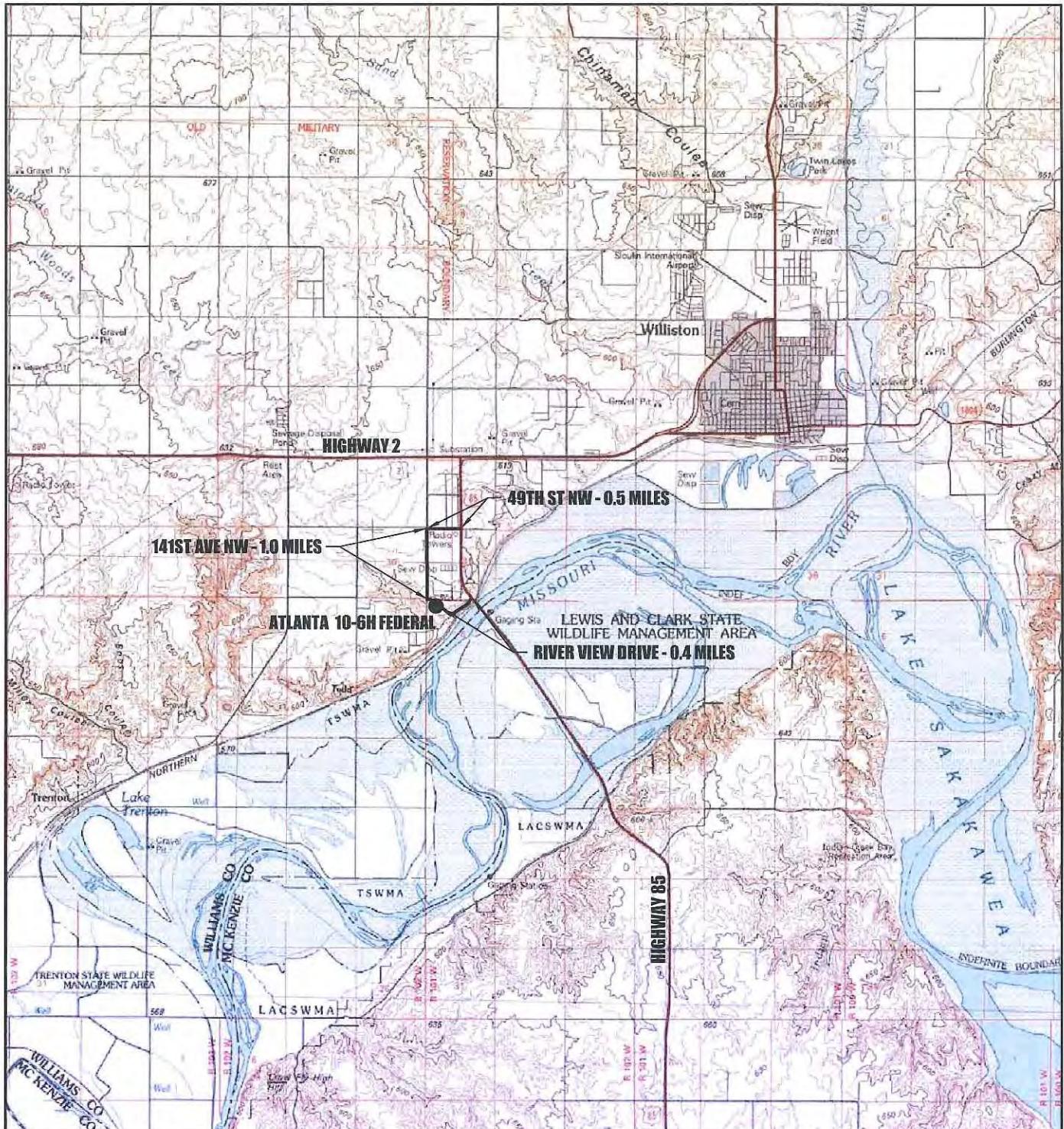


CONTINENTAL RESOURCES INC.

EXHIBIT 2  
QUAD ACCESS

ATLANTA 10-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA





**CONTINENTAL RESOURCES INC.**

---

**EXHIBIT 1**  
**VICINITY MAP**  
**PROPOSED ACCESS ROUTE**

**ATLANTA 10-6H FEDERAL  
 SECTION 6, T153N, R101W  
 WILLIAMS COUNTY, NORTH DAKOTA**

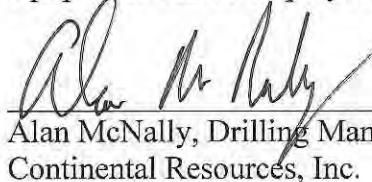
Continental Resources, Inc. (CRI) respectfully submits the following information concerning the drilling of the Atlanta 1 through 14-H, NWNW Sec. 6, T153N, R101W, Williams County, North Dakota.

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 )

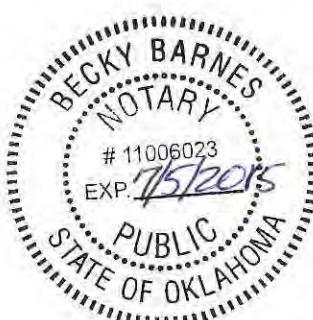
On the 29th day of June 2012, before me, a Notary Public in and for said County and State, personally appeared Alan McNally, known to me to be the Drilling Manager of Continental Resources, Inc., the Corporation that executed the within instrument, and acknowledged to me that such Corporation executed 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 SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  (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

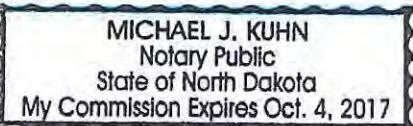
Affiant:

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 )  
 )  
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:

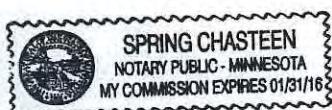
X Matti K. Tarnanen  
Matti K. Tarnanen

**Affiant:**

X Susan V. Tarnanen  
Susan V. Tarnanen

STATE OF NORTH DAKOTA )  
 )  
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, 2012



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.



Becky Barnes  
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

WILLIAMS COUNTY

WATFORD CITY, NORTH DAKOTA

AMBULANCE .....	911
FIRE .....	911
POLICE .....	911 OR 701-842-2400
McKenzie COUNTY SHERIFF DISPATCH .....	911

McKenzie COUNTY

BUREAU OF LAND MANAGEMENT

OFFICE REPRESENTATIVE .....	701-225-9148
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DICKINSON, ND

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

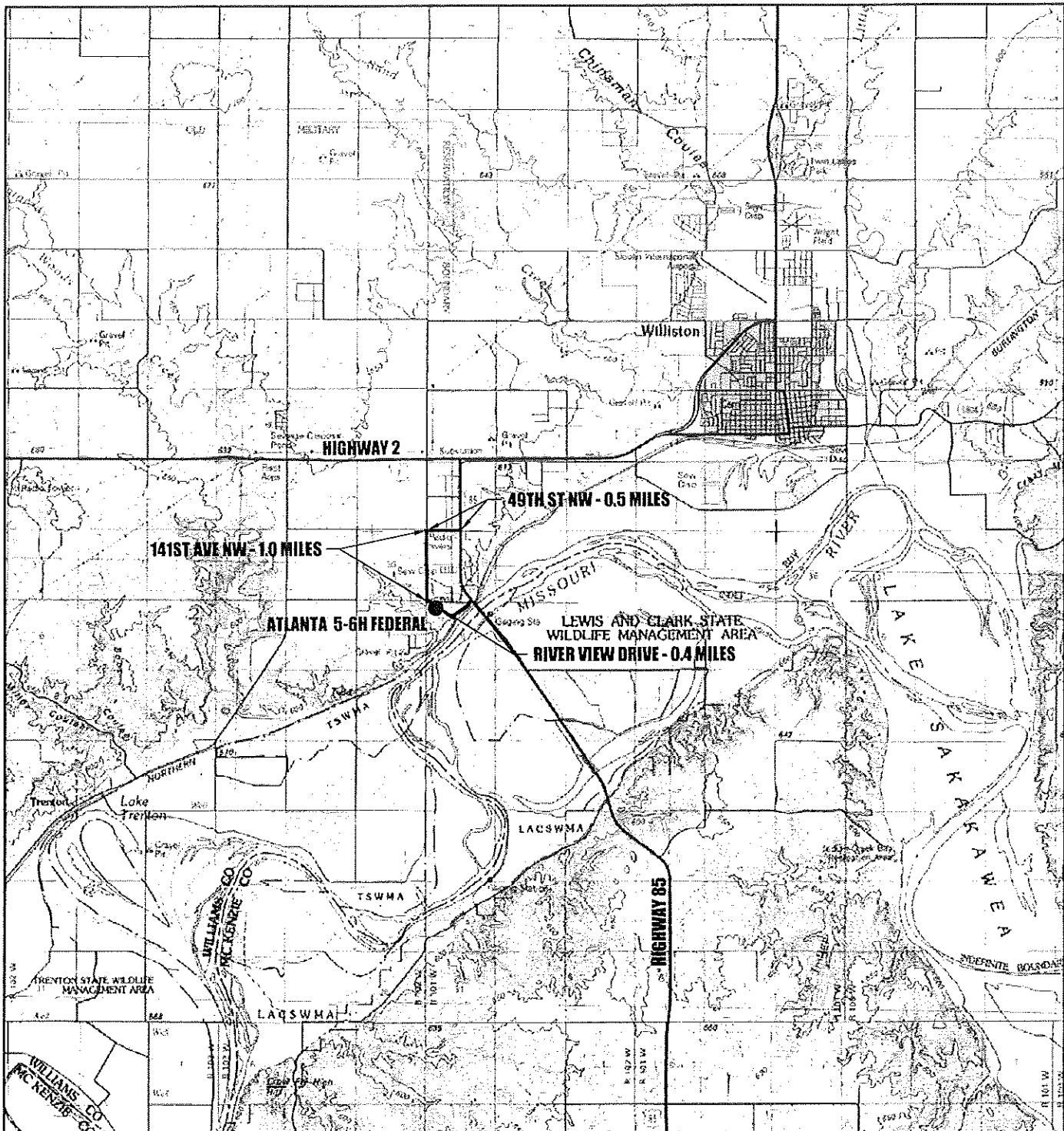
An overbalanced mud should be used to drill potential pay zone with necessary additives for all stabilization.

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**

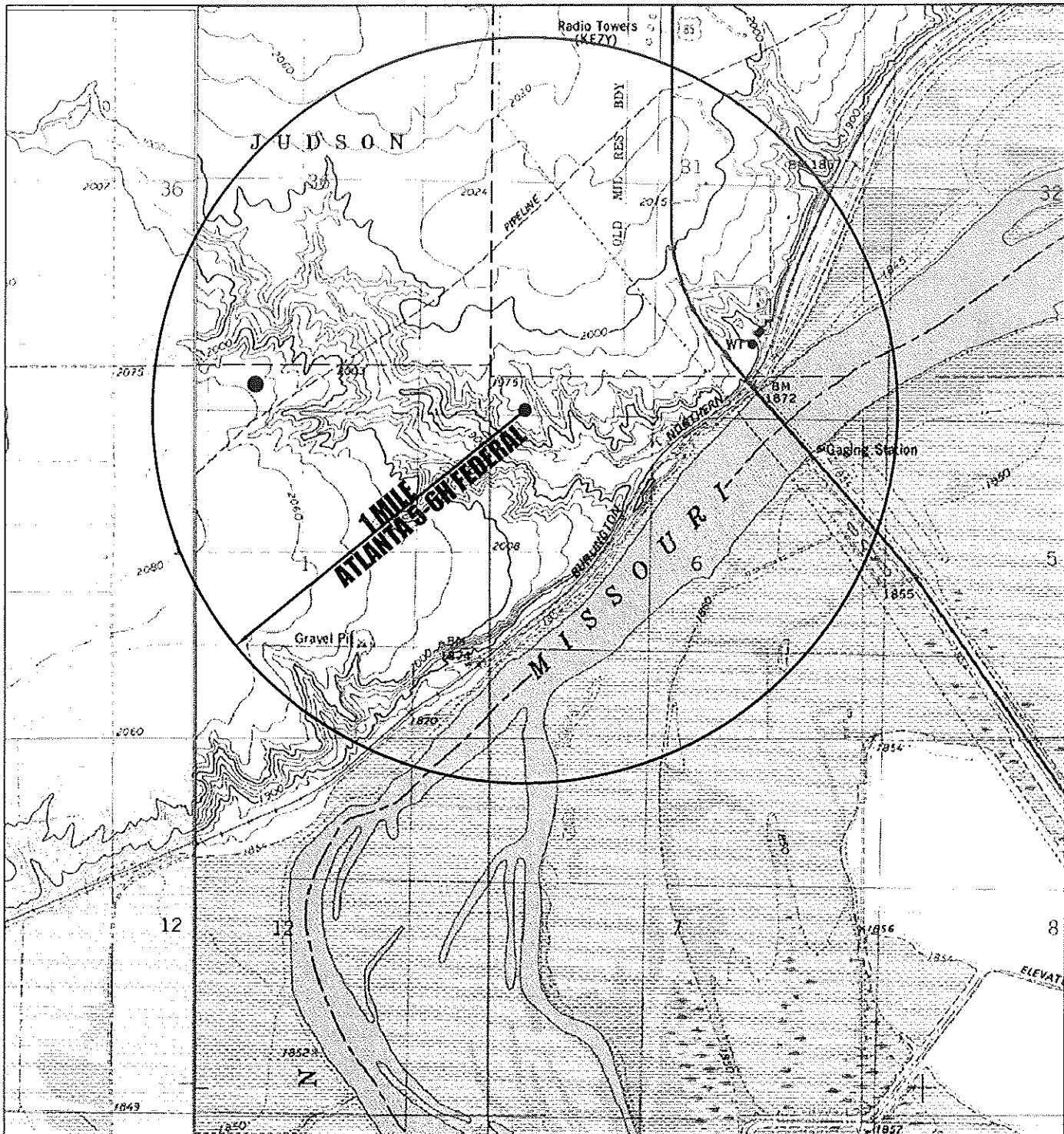
The Safety Advisor will conduct frequent H2S emergency drills for each crew by manually activating the H2S detector. When the lights flash, all personnel on location will assemble at the Upwind Briefing Area. A head count will be taken at this time to determine if rescue operations are indicated. The 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

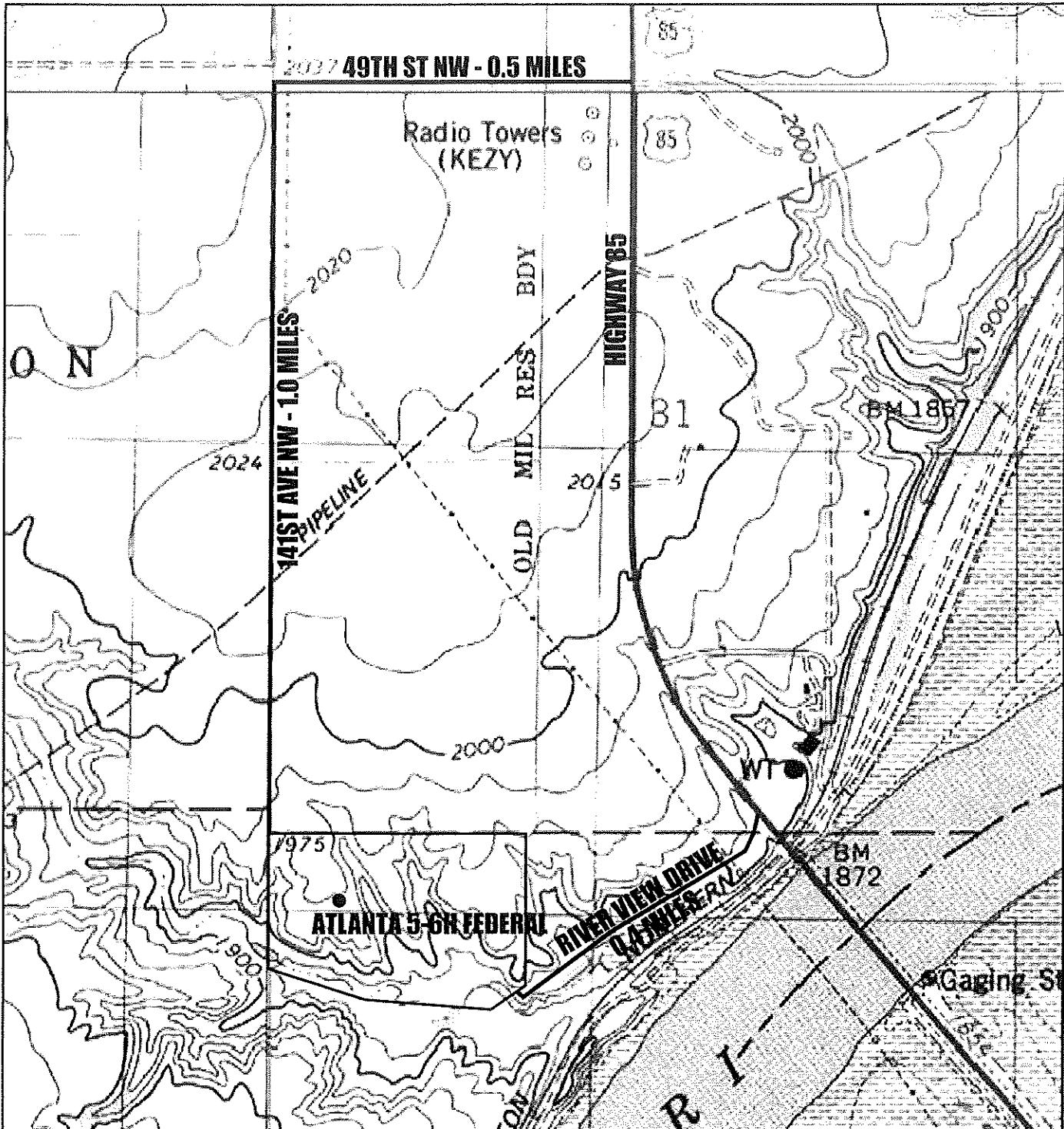


**CONTINENTAL RESOURCES INC.**

**EXHIBIT 3**  
**ONE-MILE RADIUS MAP**

ATLANTA 5-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA

● = OIL WELL



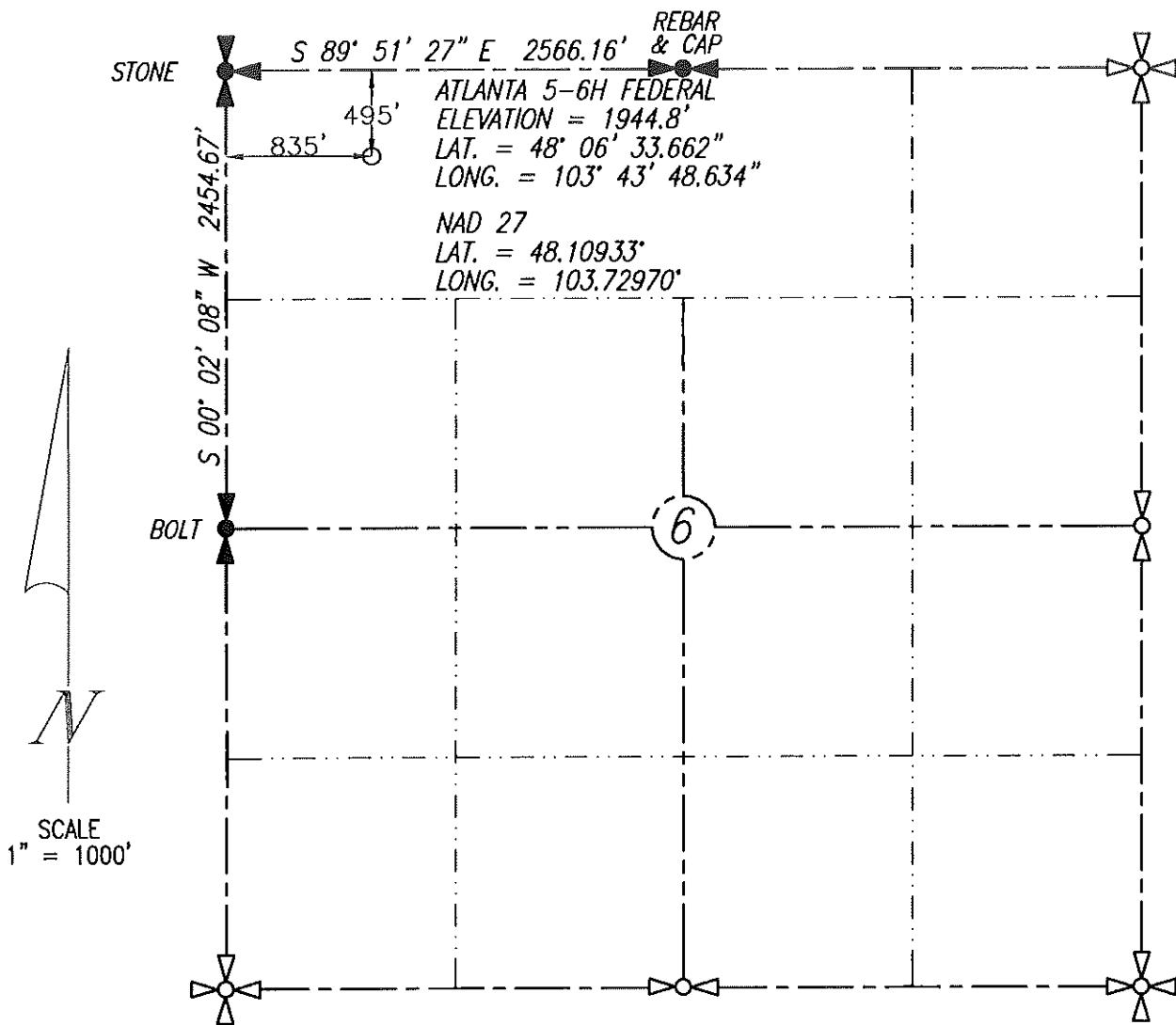
CONTINENTAL RESOURCES INC.

**EXHIBIT 2  
QUAD ACCESS**

ATLANTA 5-6H FEDERAL  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA

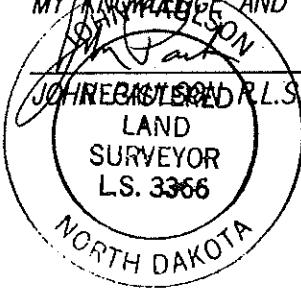
REVISED: 4-23-2012

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

John J. Newby  
4-23-12



DATE STAKED: 2-9-2012

BASIS OF VERTICAL DATUM:  
NAVD 1988 GEOD 09

PERSON AUTHORIZING SURVEY;  
CHAD NEWBY

EXPLANATION AREA: NAD83(CORS96)

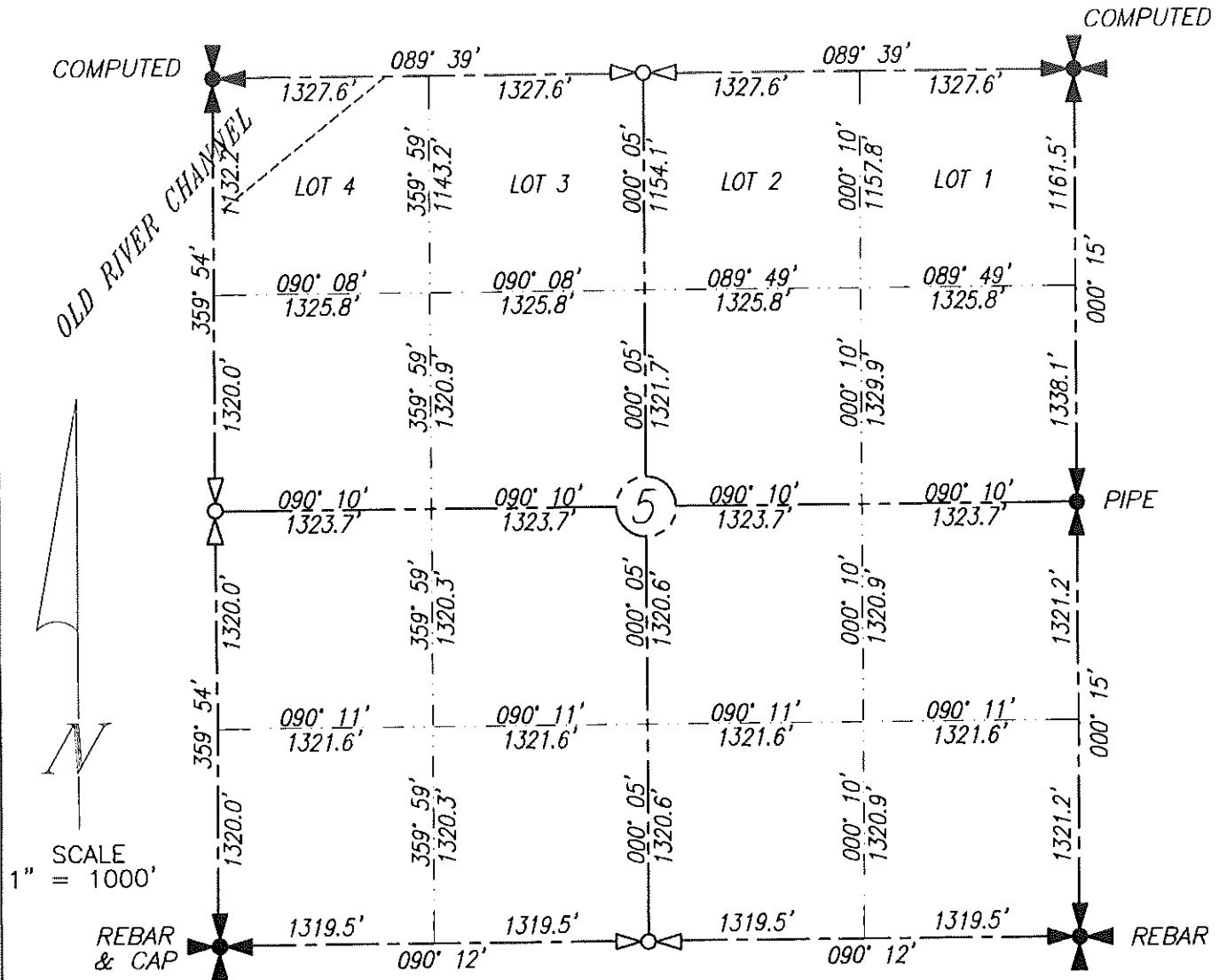
BASIS OF BEARING: TRUE NORTH

**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 REGISTERED AND CORRECT TO THE BEST OF  
MY KNOWLEDGE AND BELIEF  
SURVEYOR  
R.L.S. 3366  
4-9-12

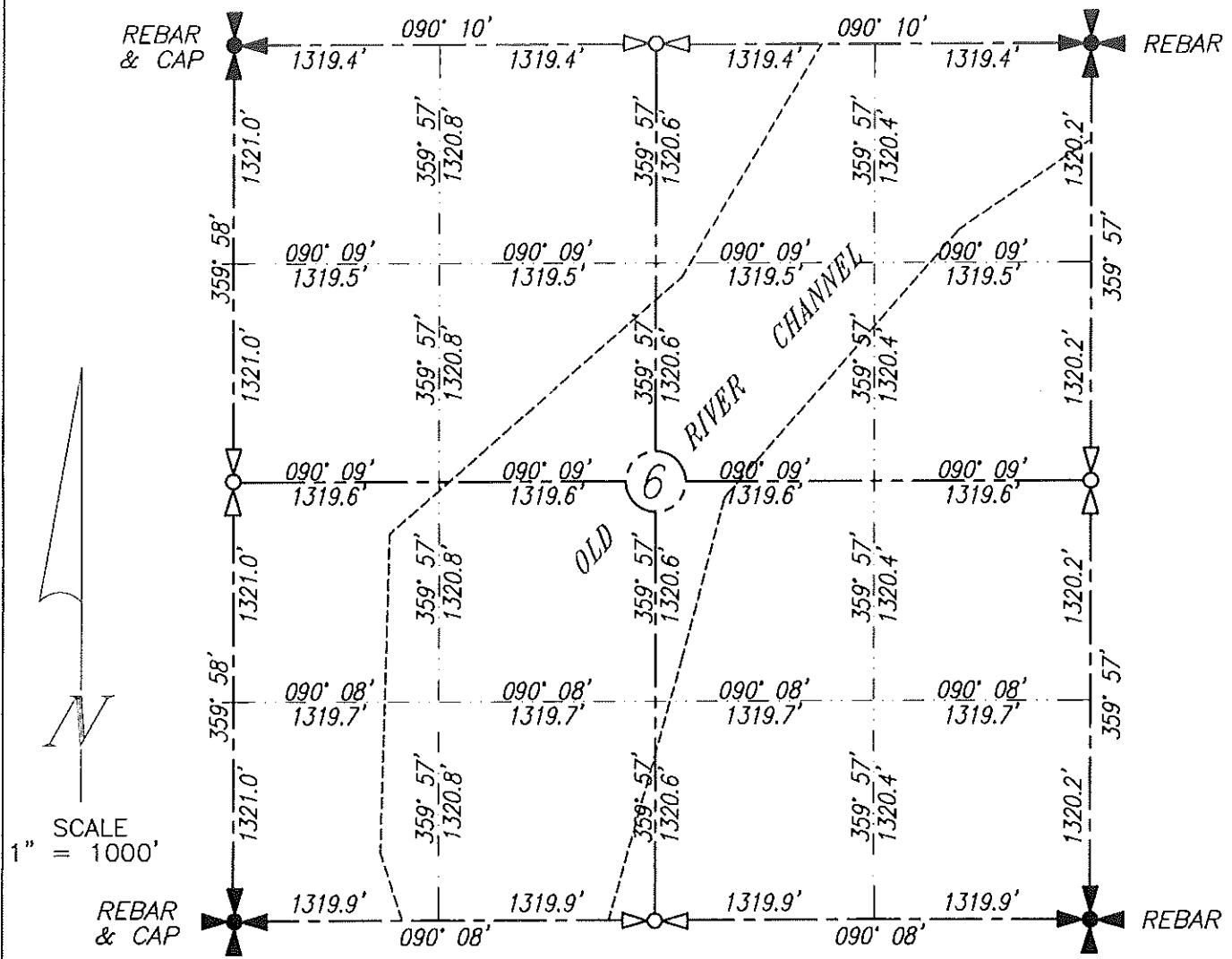
JOHN PAULSON R.L.S. 3366  
NORTH DAKOTA

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.

~~ALL BEARINGS SHOWN ARE ASSUMED.~~

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

~~JOHN PAULSON R.P.L.S.~~ / 49-12  
JOHN PAULSON R.P.L.S. 3366

## *BROSZ ENGINEERING INC.*

BOX 357

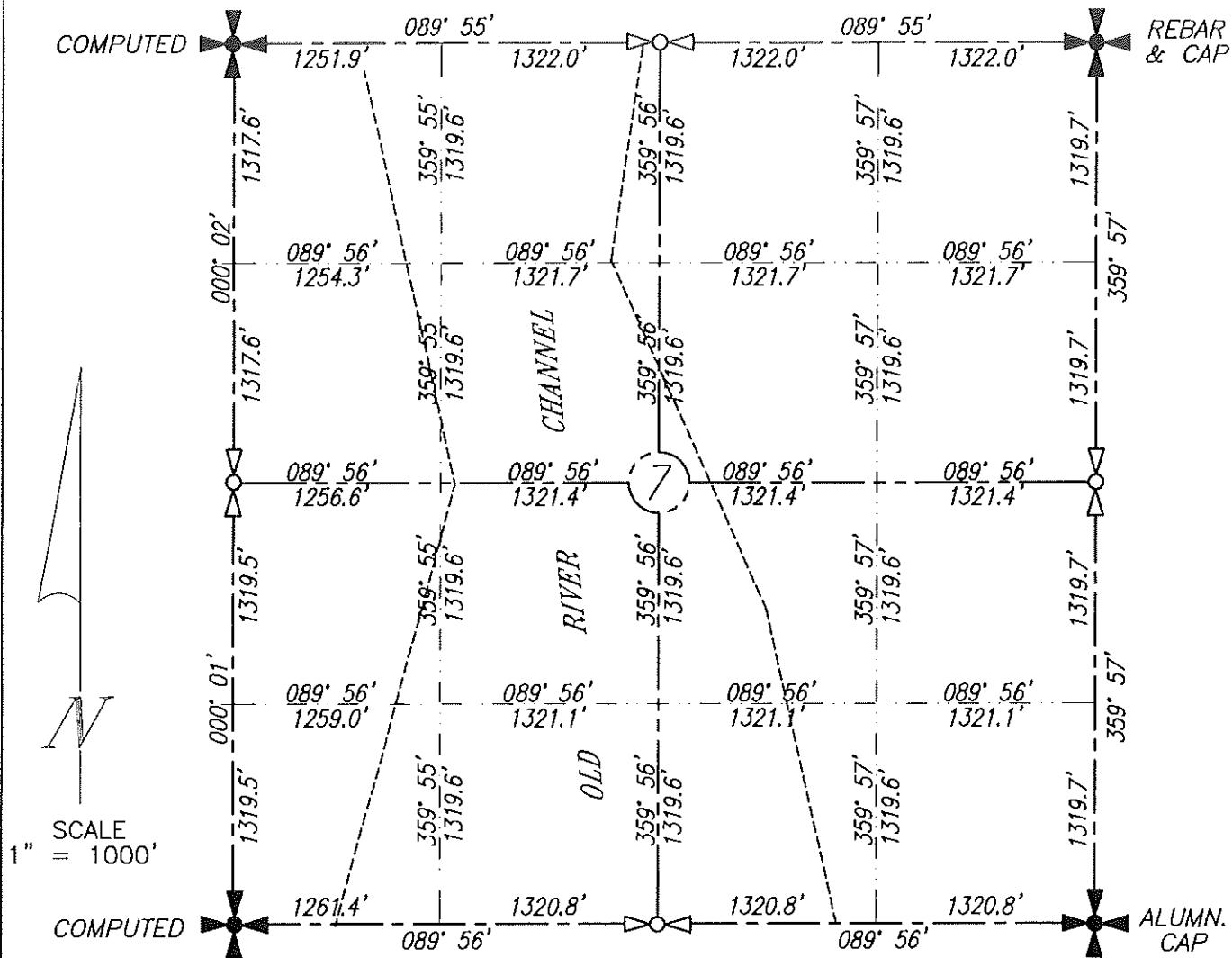
BOWMAN, N.D. 58623

PHONE: 701-523-3340

FAX: 701-523-5243

PROJECT NO. 12-10

HORIZONTAL SECTION PLAT  
CONTINENTAL RESOURCES INC.  
ATLANTA 5-6H 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.  
BEARINGS SHOWN ARE ASSUMED.

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

4-9-12

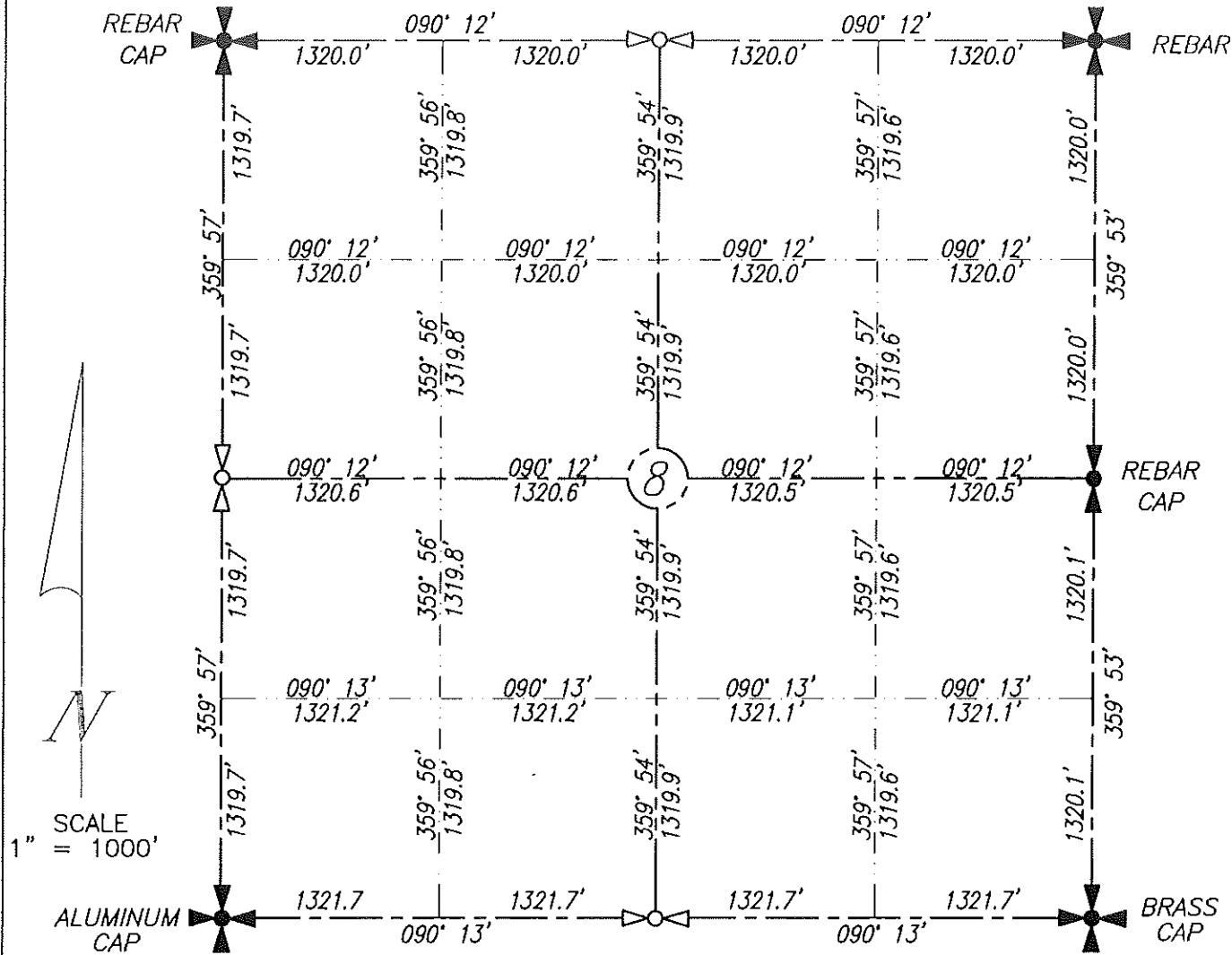
JOHN PAULSON R.L.S. 3366

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 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.

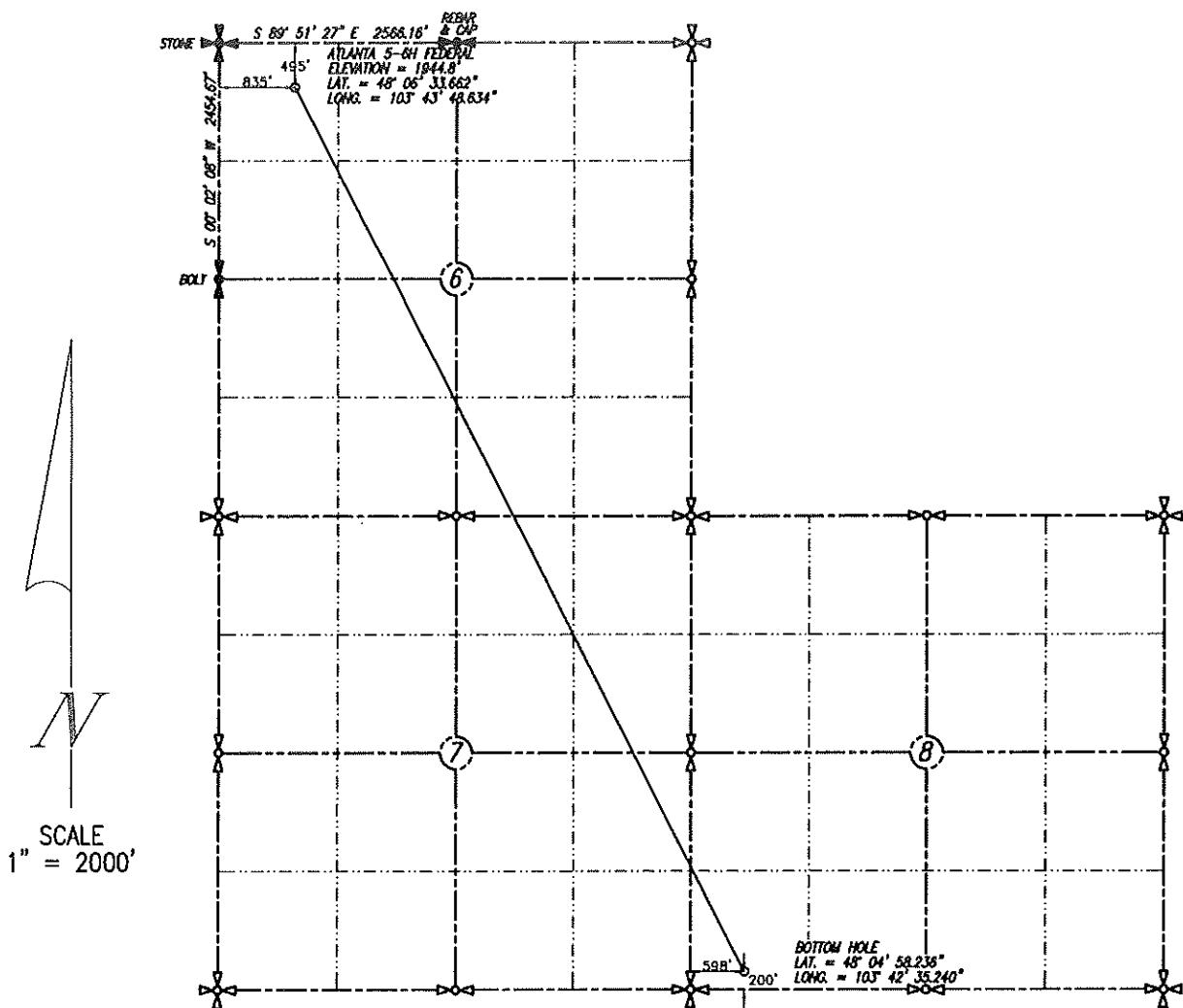
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CHARGE, AND IS FAIR AND CORRECT TO THE BEST OF  
MY KNOWLEDGE SURVEYOR'S LIBF  
L.S. 3366

*John Paulson*  
JOHN PAULSON TRUST L.S. #036

**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

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

*John Newby* -23-12

JOHN NEWBY, L.S. 3366  
 LAND SURVEYOR  
 L.S. 3366

NORTH DAKOTA

DATE STAKED: 2-9-2012

BASIS OF VERTICAL DATUM:  
 NAVD 1988 GEOD 09

PERSON AUTHORIZING SURVEY;  
CHAD NEWBY

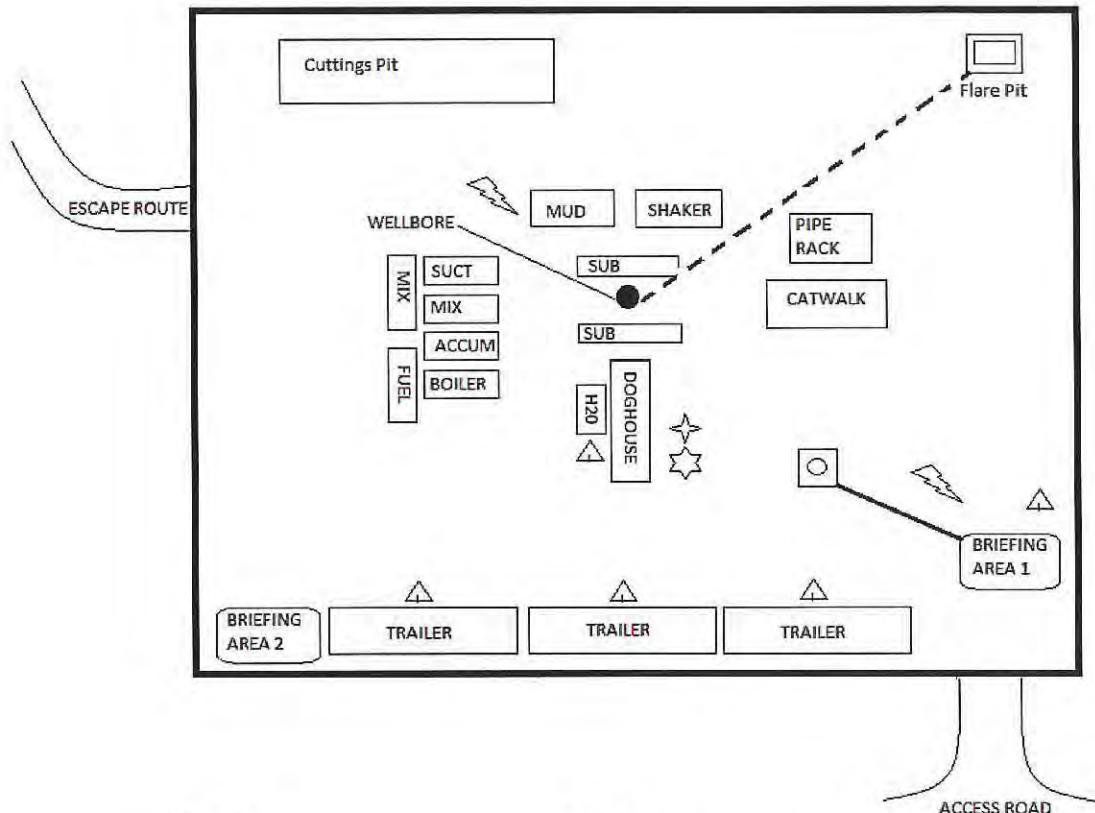
EXPLANATION AREA: NAD83(CORS96)

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



### 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 )  
                            )

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

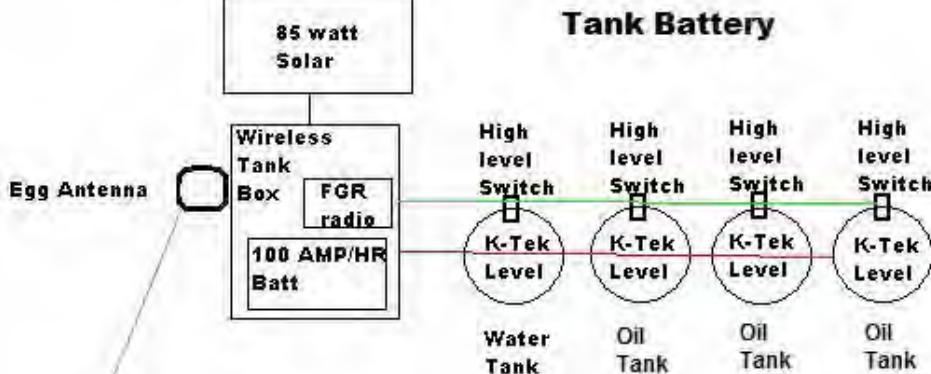
My Commission Expires: 7/5/2015  
Commission No.: 11006023



# Continental Resources Wellhead Automation

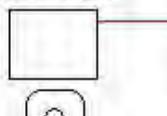


Analog  
Radio  
RS485 Modbus  
Digital I/O



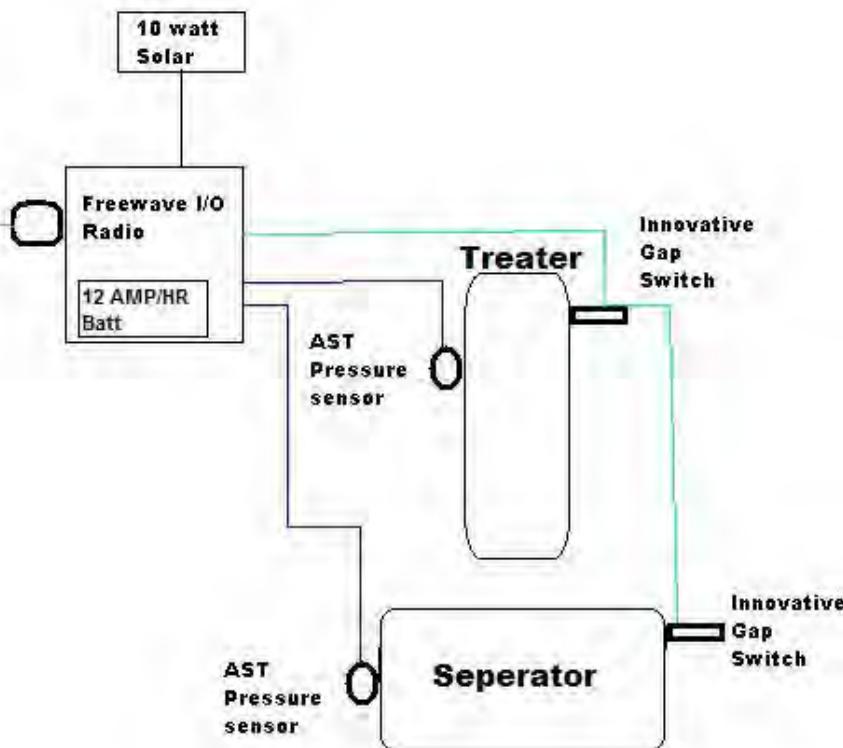
## Wellhead

LADC1000  
Actuator



Habonim Valve

Egg Antenna





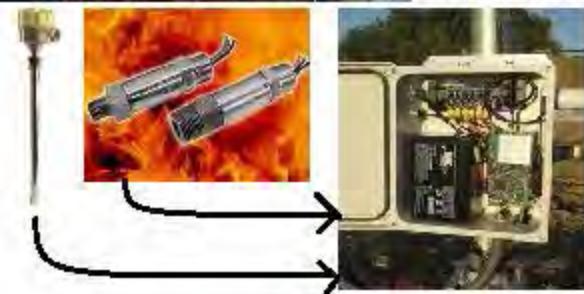
U003 Gap Switch and AST 4600 Transducer monitor pressures and liquid content of Flare and Sales Lines, transmitted to XRC via FreeWave Radio.

ABB TotalFlow XRC 6490



All well information is passed to your SCADA system via FreeWave Network (Future)

Winn-Marion's Well Head Kit with FGRIO Radio and DC Power Supply



K-Tek MT5100  
Guided Wave Radar

**ESD Valve Package**  
Standard Port Ball Valve rated to 6000 psi topped with a 12 VDC Actuator w/ Battery Backup



Z-Bend High Level Switch



Winn-Marion, Inc.

# Tank Side

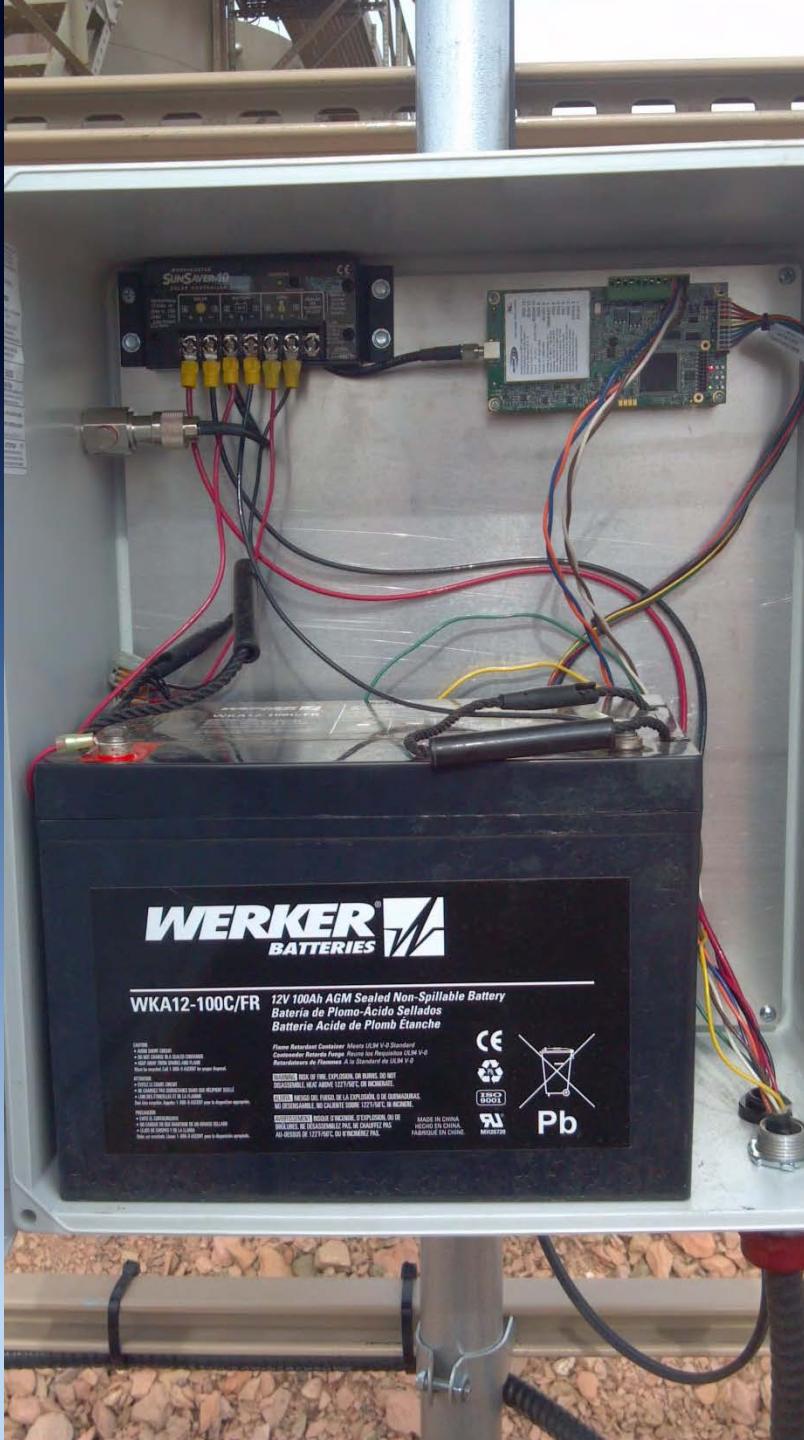
Contains the following Equipment

- 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

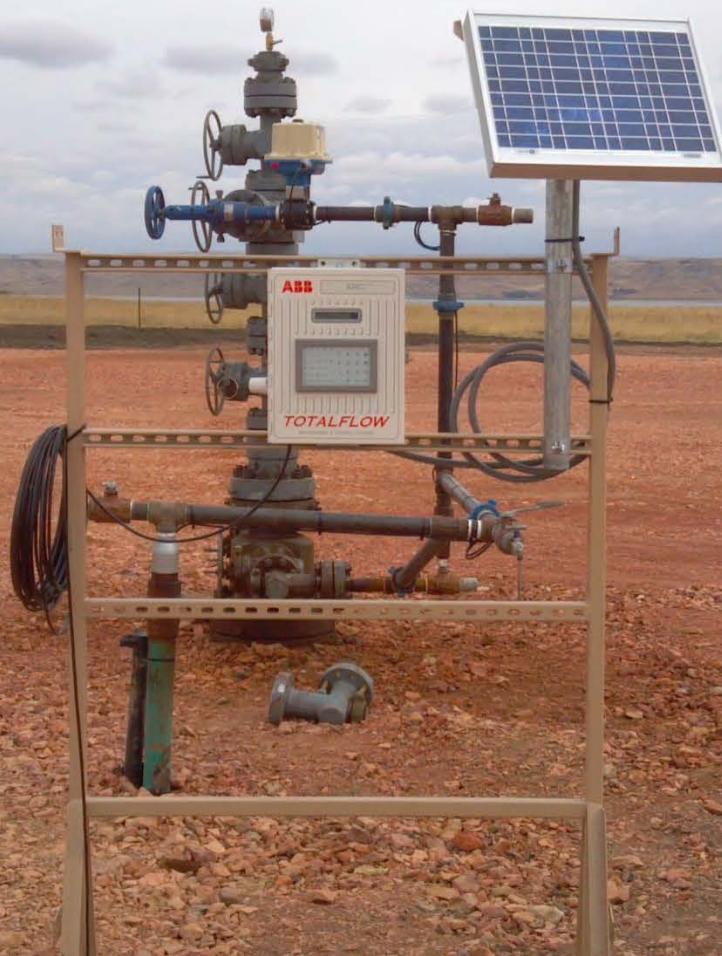




WM Automation  
Service, LLC



WM Automation  
Service, LLC



WM Automation  
Service, LLC

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**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**

---

## 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:

- ❑ Mobile Rig (w/integrated fuel/oil storage tanks)
- ❑ Storage Facilities
- ❑ Mud Pumps (diesel-powered pumps w/integrated fuel storage tanks)
- ❑ Generators (w/integrated fuel storage tanks)
- ❑ Water Tanks
- ❑ Pipe Racks

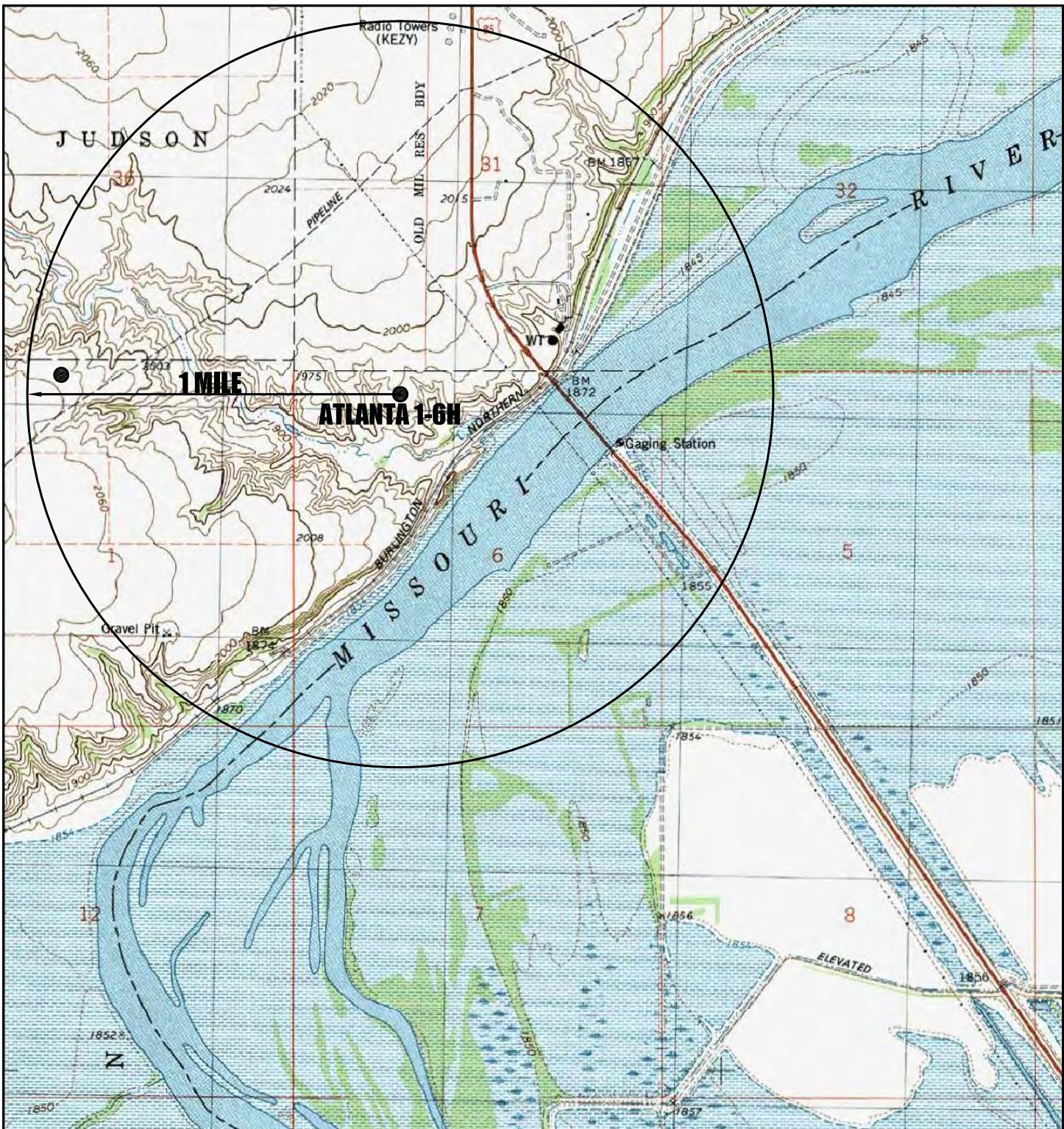
**2.2 Proximity of Rigs to Navigable Waters.** According to 40 CFR 112.7(e)(6)(i), mobile drilling equipment should be positioned or located so as to prevent spilled oil from reaching navigable waters. Depending on the location, catch basins or diversion structures may be necessary to intercept and contain 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:

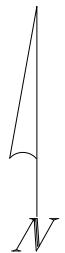
- ❑ Loading/unloading fuel, oil, and used oil to/from storage tanks and containers.
- ❑ Temporary storage of oil containers outside of secondary containment.



**CONTINENTAL RESOURCES INC.**

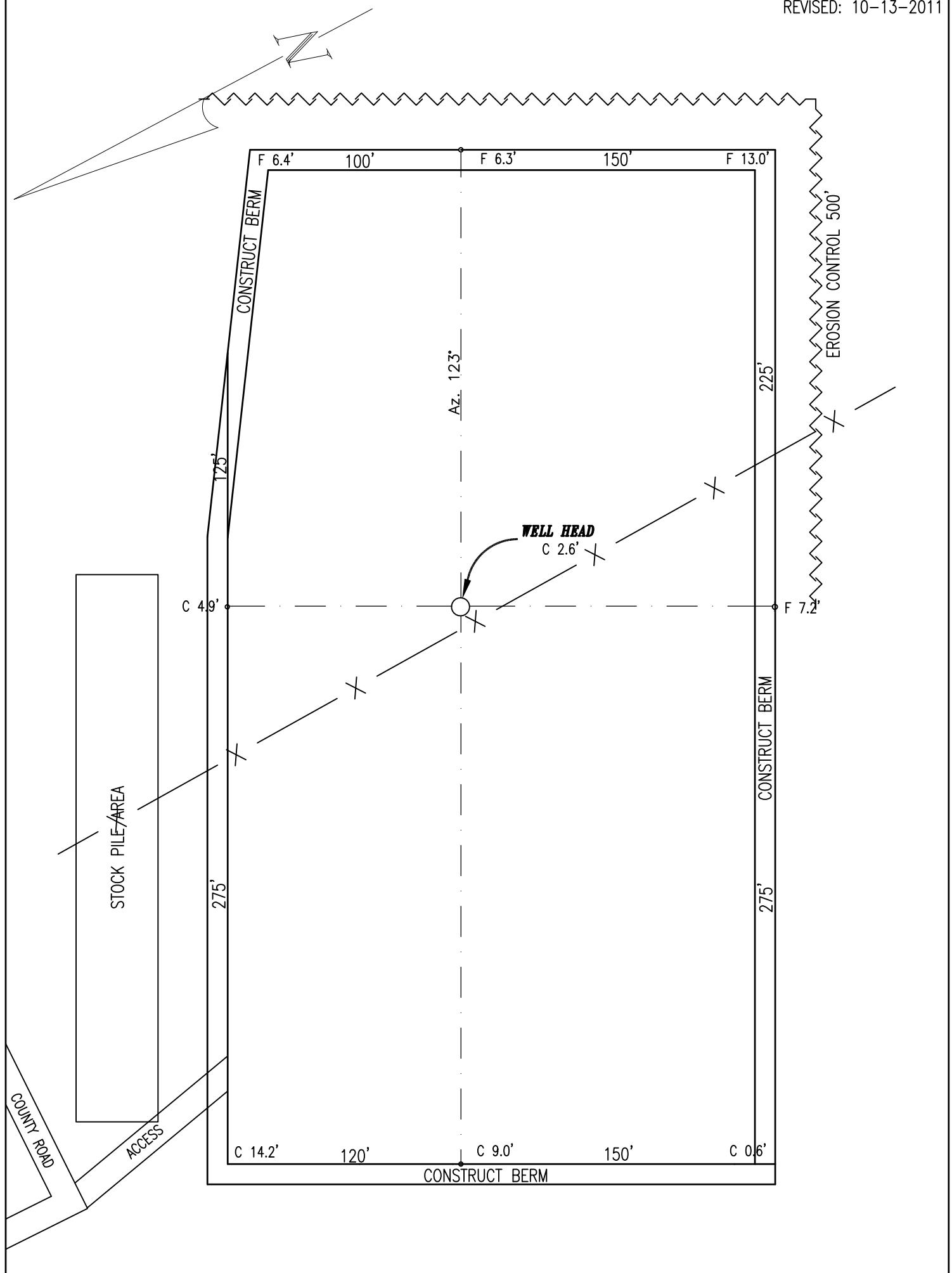
ONE-MILE RADIUS MAP

● = 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

DRILLING RIG LAYOUT  
ATLANTA 1-6H  
SECTION 6, T153N, R101W  
WILLIAMS COUNTY, NORTH DAKOTA

#### ESTIMATED EARTH QUANTITIES

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

ALL INDICATED  
CUTS & FILLS  
ARE STAKED  
GRADE ELEVA-  
TIONS.

BACKSLOPES  
ASSUMED  
AT 1 1/2 : 1 %

Ground Elevation at Well Head: 1955.6 ft. ASL  
Finished Rig Grade Elevation: 1953.0 ft. ASL

**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**

---

- ❑ 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:

- ❑ Diesel Fuel
- ❑ Engine Oil
- ❑ Hydraulic Oil
- ❑ Gear Oil
- ❑ 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**

---

- ❑ 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.
- ❑ Opening, closing, and locking the bypass valve under responsible supervision following drainage activities.
- ❑ 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.

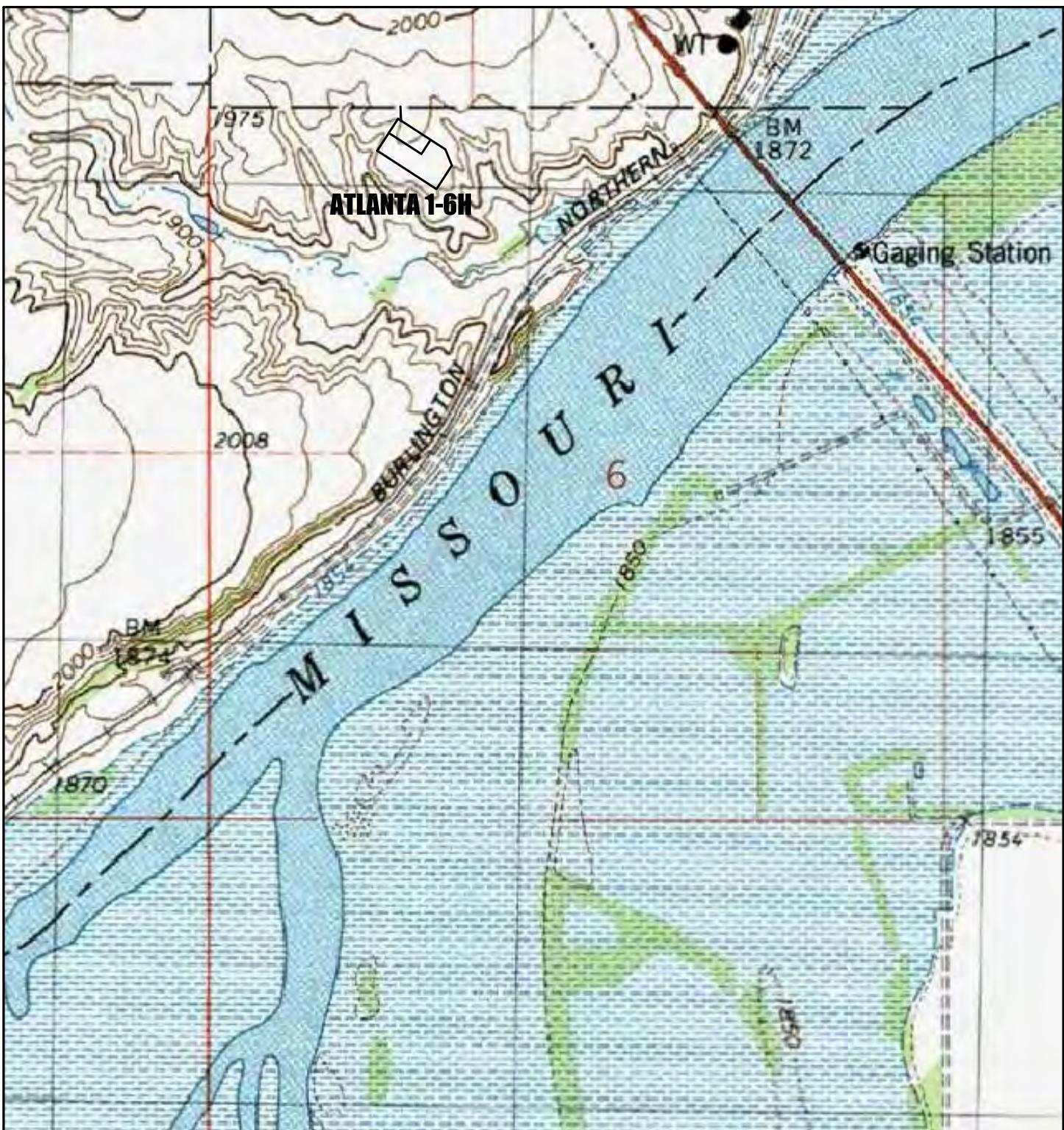
Stormwater that collects within the trenched area flows into the well fluids pit. Stormwater that collects within the earthen dike containment structures is inspected and if no free oil or oil sheen is observed, Continental field personnel or their on-site representatives may pump the water outside of 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**

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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 RESOURCES, INC. ATLANTA 1-6H  
6-153N-101W, WILLIAMS COUNTY, NORTH DAKOTA**

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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.

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#### 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*  

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(Signature)

*Ryan Nelson      Drilling Engineer*  

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(Name and Title - Please Print)



May 9, 2012

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

Re: Atlanta Federal 10-6H

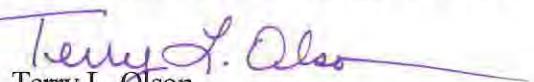
Continental Resources, Inc., would like to request all filings and information regarding the above captioned well be considered "Tight Hole".

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.**

  
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Terry L. Olson  
Regulatory Compliance Specialist