

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

Ken McQueen
Cabinet Secretary

Matthias Sayer
Deputy Cabinet Secretary

Heather Riley, Division Director
Oil Conservation Division



New Mexico Oil Conservation Division approval and conditions listed below are made in accordance with OCD Rule 19.15.7.11 and are in addition to the actions approved by BLM on the following 3160-3 APD form.

Operator Signature Date: 4/25/18

Well information;

Operator LOGOS, Well Name and Number Athena 2308 14L 3H

API# 30-045-35876, Section 14, Township 23 NS, Range 8 E(W)

Conditions of Approval: (See the below checked and handwritten conditions)

- ☒ Notify Aztec OCD 24hrs prior to casing & cement.
- ☒ Hold C-104 for directional survey & "As Drilled" Plat
- ☒ Hold C-104 for NSL, NSP, DHC
- ☐ Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned
- ☐ Regarding the use of a pit, closed loop system or below grade tank, the operator must comply with the following as applicable:
 - A pit requires a complete C-144 be submitted and approved prior to the construction or use of the pit, pursuant to 19.15.17.8.A
 - A closed loop system requires notification prior to use, pursuant to 19.15.17.9.A
 - A below grade tank requires a registration be filed prior to the construction or use of the below grade tank, pursuant to 19.15.17.8.C
- ☐ Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string
- ☐ Submit Gas Capture Plan form prior to spudding or initiating recompletion operations
- ☒ Regarding Hydraulic Fracturing, review EPA Underground Injection Control Guidance 84
- ☒ Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system.
- ☒ Well-bore communication is regulated under 19.15.29 NMAC. This requires well-bore Communication to be reported in accordance with 19.15.29.8.


NMOCD Approved by Signature

6-5-2018
Date

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

5. Lease Serial No.
NMNM018463

6. If Indian, Allottee or Tribe Name

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
ATHENA 2308 14L 3H

9. API Well No.
30-045-35876

10. Field and Pool, or Exploratory
BASIN / MANCOS

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 14 / T23N / R8W / NMP

12. County or Parish
SAN JUAN

13. State
NM

1a. Type of work: ☒ DRILL ☐ REENTER
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone
2. Name of Operator
LOGOS OPERATING LLC

3a. Address
2010 Afton Place FARMINGTON NM 87401

3b. Phone No. (include area code)
(505)324-4145

4. Location of Well (Report location clearly and in accordance with any State requirements.)
At surface NWSW / 2200 FSL / 578 FWL / LAT 36.225737 / LONG -107.658241
At proposed prod. zone NWSW / 2329 FSL / 250 FWL / LAT 36.226185 / LONG -107.677268

14. Distance in miles and direction from nearest town or post office*
39.1 miles

15. Distance from proposed*
location to nearest 250 feet
property or lease line, ft.
(Also to nearest drig. unit line, if any)

16. No. of acres in lease
2243.16

17. Spacing Unit dedicated to this well
320

18. Distance from proposed location*
to nearest well, drilling, completed, 20 feet
applied for, on this lease, ft.

19. Proposed Depth
5158 feet / 10460 feet

20. BLM/BIA Bond No. on file
FED: NMB001387

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
6878 feet

22. Approximate date work will start*
05/21/2018

23. Estimated duration
45 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, must be attached to this form:

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the BLM.

25. Signature
(Electronic Submission)

Name (Printed/Typed)
Marie Florez / Ph: (505)419-8420

Date
04/25/2018

Title
Permitting Tech III

Approved by (Signature)

Name (Printed/Typed)

Date
5/25/18

Title

Office
FARMINGTON

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

BLM'S APPROVAL OR ACCEPTANCE OF
THIS ACTION DOES NOT RELIEVE THE
LESSEE AND OPERATOR FROM
OBTAINING ANY OTHER AUTHORIZATION
REQUIRED FOR OPERATIONS ON
FEDERAL AND INDIAN LANDS

NMOC

MAY 30 2018

DISTRICT 11
DRILLING OPERATIONS
ARE SUBJECT TO
COMPLIANCE WITH ATTACHED
"GENERAL REQUIREMENTS"

NMOC
PV

This action is subject to technical
and procedural review pursuant to
43 CFR 3165.3 and appeal
pursuant to 43 CFR 3165.4

DISTRICT I
1825 N. Franch Dr., Hobbs, N.M. 88240
Phone: (505) 393-8161 Fax: (505) 393-0720

DISTRICT II
811 S. First St., Artesia, N.M. 88210
Phone: (505) 748-1289 Fax: (505) 748-9720

DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410
Phone: (505) 334-8178 Fax: (505) 334-8170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION

1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-045-35876	² Pool Code 97232	³ Pool Name BASIN MANCOS
⁴ Property Code 320689	⁵ Property Name ATHENA 2308 14L	⁶ Well Number 3H
⁷ OGRID No. 289408	⁸ Operator Name LOGOS OPERATING, LLC	⁹ Elevation 6878'

¹⁰ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	14	23-N	8-W		2200	SOUTH	578	WEST	SAN JUAN

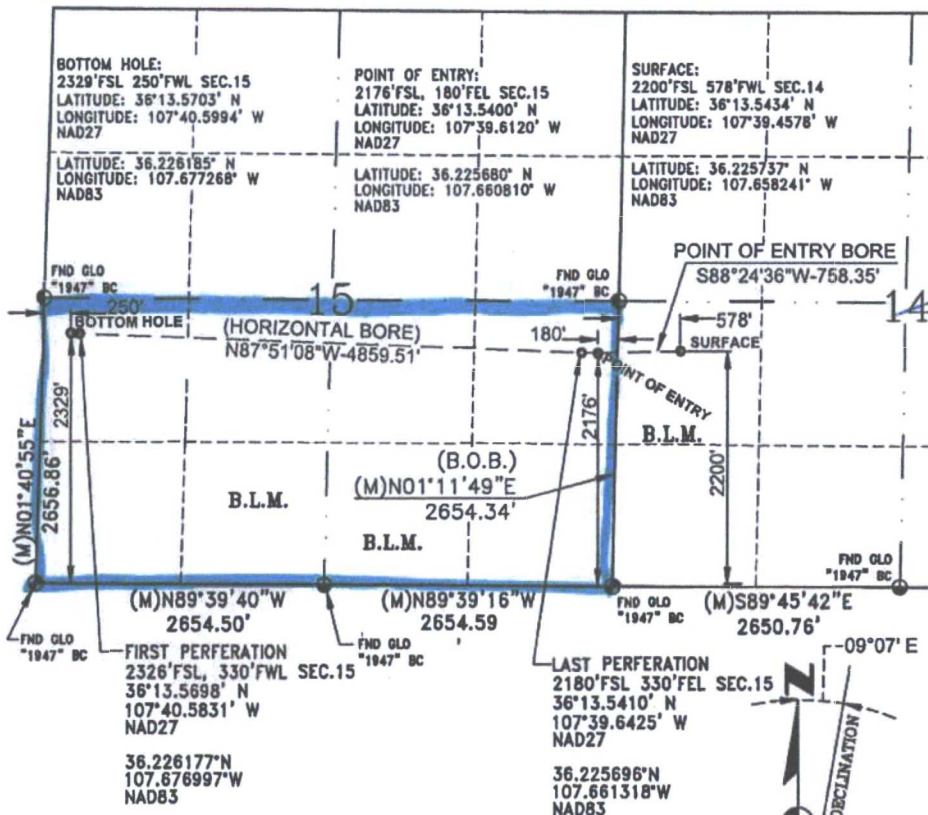
¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	15	23-N	8-W		2329	SOUTH	250	WEST	SAN JUAN

¹² Dedicated Acres 320.00 ACRES = S/2 SEC. 15	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
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NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16



¹⁷ OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or a working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Tamra Sessions 4/17/18
Signature Date
Tamra Sessions
Printed Name
tsessions@logosresourcesllc.com
E-mail Address

¹⁸ SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

APRIL 17, 2018
Date of Survey
Signature and Seal of Professional Surveyor
GLEN W. RUSSELL
Certificate Number 15703
GLEN W. RUSSELL
15703

BASIS OF BEARING:

AS MEASURED BY GPS BETWEEN FOUND MONUMENTS AT THE SOUTHWEST CORNER AND THE WEST QUARTER CORNER OF SECTION 14, TOWNSHIP 23 NORTH, RANGE 8 WEST, N.M.P.M. SAN JUAN COUNTY, NEW MEXICO.

LINE BEARS: N 01°11'49\"/>

**Sundry Drilling Plan
LOGOS Operating,
LLC**

4/20/2018

**Athena 2308 14L #3H
API # 30-045-
Lease Serial # NMNM18463**

Surface Location: 2200 FSL, 578 FWL

Legal Description: Sec 14, T23N, R8W (36.225737° N, 107.658241° W –NAD83)

Pay Zone Entry Point Location: 2176' FSL, 180' FEL

Legal Description: Sec 15, T23N, R8W (36.225680° N, 107.660810° W –NAD83)

Permitted Bottom Hole Location (PBHL): 2329' FSL, 250' FWL

Legal Description: Sec 15, T23N, R8W (36.226185° N, 107.677268° W –NAD83)

San Juan County, NM

1. The elevation of the unprepared ground is 6,878 feet above sea level. Estimated KB Elevation = 6903' (25'KB)
2. The geological name of the surface formation is the Nacimiento.
3. A rotary rig will be used to drill the well to a Proposed Total measured Depth of 5,158' TVD/10,460' MD with the first perforation at the PBHL 10,409' MD/5,158' TVD, 2326' FSL, 330' FWL. Sec. 15.
4. Estimated top of important geological markers:

<u>Formation</u>	<u>Depth TVD (ft)</u>	<u>Depth MD (ft)</u>
Nacimiento	Surface	Surface
Ojo Alamo	896	896
Kirtland	1,053	1,053
Fruitland	1,154	1,154
Pictured Cliffs	1,502	1,502
Chacra	2,304	2,303
Cliff House	3,009	2,964
Menefee	3,102	3,043
Point Lookout	4,152	3,910
Mancos	4,375	4,088
Gallup	5,193	4,763

5. Estimated depth at which anticipated water, oil, gas or other mineral bearing formations are expected to be encountered:

<u>Formation</u>	<u>Depth TVD (ft)</u>	<u>Water/Hydrocarbon</u>
Fruitland	1,165	Gas
Pictured Cliffs	1,525	Gas
Cliff House	2,976	Gas
Point Lookout	3,922	Gas
Mancos	4,106	Oil/Gas

6. All proposed casing is new and the program is as follows:

Casing	Size	Depth		Grade	Weight	Connection	PSI x1000lbs		
		MD	TVD				Burst	Collapse	Tension
Surface	9-5/8"	0-320'	0-320'	J-55	36.00	STC	3520	2020	394
Intermediate	7"	0-5,601'	0-5,188'	J-55	23.00	LTC	4360	3270	313
Production	4-1/2 "	5,451'-10,460'	5,171'-5,158'	P-110	11.60	LTC	10690	7560	278

7. Cementing Program:

- a. 12-1/4" hole x 9-5/8" casing at 320' will have cement circulated to surface with 100 sks (50% excess true hole) Type I-II neat cement with 20% flyash 14.5 ppg, 1.61 ft³/sk. Note: CEMENT MUST BE CIRCULATED TO SURFACE. STANDARD BOW SPRING CENTRALIZERS SHALL BE PLACED ON THE FIRST 3 (BOTTOM 3) JOINTS OF CASING (1 PER JOINT) AND 1 EVERY 3RD JOINT TO SURFACE. 20 BBLs OF WATER FOLLOWED BY 20 BBLs OF MUDFLUSH AHEAD OF CEMENT AS SPACER. Test Surface Casing to 1500 psi.
- b. 8-3/4" hole x 7" casing at 5,601' MD. Cement will be circulated to surface in a single stage with 531 sks (60% excess true hole) of HALCEM with 1.0 % CaC₂. 1/4 #/sk Poly-E-Flake, 5 #/sk Kol-Seal (Gilsonite) – 12.3 ppg, 1.95 ft³/sk followed by 229 sks (60% excess true hole) VARICEM with 0.15% Versaset, 0.30% HALAD-9, 1/4 #/sk Poly-E-Flake, 5 #/sk Kol-Seal — 13.5 ppg, 1.3 ft³/sk. ONE CENTRALIZER PER JOINT FOR THE FIRST 3 JOINTS, THEN EVERY OTHER JOINT TO KOP, THEN ONE EVERY 3RD JOINT TO SURFACE. 20 BBLs OF WATER FOLLOWED BY 30 BBLs OF MUDFLUSH AHEAD OF CEMENT AS SPACER. Test Intermediate Casing to 1500 psi. Cement additives subject to change based on wellbore conditions and cement design criteria.
- c. 6-1/8" hole x 4-1/2" liner at 10,460' MD. It will be a conventional liner job using 30% excess for TOC at 5,451' MD liner top, Cement slurry consist of 451 sks EXTENDACEM cement, -13.3 ppg, 1.36 ft³/sk. CENTRALIZERS TO BE USED AT DISCRETION IN LATERAL TO ACHIEVE 70% STAND OFF. CENTRALIZERS TO BE USED TO TIE BACK DEPTH OF 6000' TO ACHIEVE 70% STAND OFF. PACKOFF SEAL ASSEMBLY TO BE USED FOR LINER TOP ISOLATION. Cement additives subject to change based on wellbore conditions and cement design criteria. Liner to be pressure tested during completion operations.

8. Pressure Control Equipment

BOP equipment and accessories will meet or exceed BLM requirements outlined in 43 CFR Part 3160.

A 2000 psig double ram hydraulic BOP will be used (see attached diagram). Since maximum anticipated formation pressure is 1882 psig (0.364 psi/ft @ 5171' TVD), accessories to the BOP will meet BLM requirements for a 2000 psig system. In accordance with Onshore Order #2 (111.A well requirements) the anticipated surface pressure assuming a partially evacuated hole with normal pressure gradient of 0.22 psi/ft will be 1138 psi (5171' TVD x 0.22 psi/ft).

The accumulator system capacity will be sufficient to close all BOPE with a 50% safety factor. Fill line, kill line and line to the choke manifold will be 2".

BOPs will be function tested every 24 hours and will be recorded on an IADC log. Accessories to the BOPE will include upper and lower Kelly cocks with handles with a stabbing valve to fit drill pipe on the floor at all times, string float at bit, 3000 psig choke manifold with 2" adjustable and 2" positive chokes, and pressure gauge.

All BOP equipment will be hydraulically operated with controls accessible both on the rig floor.

The wellhead BOP equipment will be nipped-up on the 9-5/8" x 11" 2,000 psi WP casing head prior to drilling out from under surface casing. All ram preventers and related equipment will be tested to 2,000 psi for 10 minutes. Annular preventers will be tested to 50% of rated working pressure for 10 minutes. Surface casing will be tested to 1500 psi. All preventers and surface casing will be tested before drilling out of surface casing. BOP equipment will be tested every 30 days, after any repairs are made to the BOP equipment, and after the BOP equipment is subjected to pressure. Annular preventers will be functionally operated at least once per week. Pipe rams will be activated daily and blind rams shall be activated each trip or at least weekly. The New Mexico Oil & Gas Conservation Commission and the BLM will be notified 24 hours in advance of testing of BOPE.

9. Mud Program:

0' - 320'	Fresh water/Spud Mud. Paper for losses and seepage. 8.4 to 8.8 ppg, 32 to 44 vis, PV <8, YP 2 to 13, FLNC, LGS < 3%
320' - 5601'	KCL WBM. As needed LCM for losses and seepage. 9.0 to 9.5 ppg, pH 9.0-9.5, 38 to 45 vis, PV 8-14, YP 8-14, FL <20cc/30min, LGS <6%
5601' - 10460'	LSND WBM. As needed LCM for losses and seepage. 8.8 to 9.0 ppg, PH 9.0-9.5, 34 to 38 vis, PV 4-8, YP 6-8, FL <8cc/30min, LGS < 4%

**During drilling operations, all necessary products will be sufficiently stored on location for abnormal situations. The characteristics, use, testing of drilling mud and the implementation of related drilling procedures shall be designed to prevent the loss of well control. Sufficient quantities of mud materials shall be maintained or readily accessible for the purpose of assuring well control.

**A pH of 8.0-9.0 in the fresh water base mud system shall be maintained to control the effects corrosion has on metallurgy of equipment used.

✓ Operating and Maintenance

LOGOS Operating will be using all above ground steel pits for fluid and cuttings while drilling. If any tank develops a leak we will have immediate visual discovery, we would then transfer the fluid to another tank then remove any contaminated soil and dispose of it in the cuttings bins for transportation. Any leaks, spills or other undesirable events will be reported in accordance with BLM NTL 3A. Rig crews will monitor the tanks at all times. A trip/surge tank will be used to monitor returns for any "kicks" of formation fluids.

Equipment:

1- Drying Shaker

2- Centrifuges with stands and pumps

2- Cuttings Drive in Bins

2-Roll off bins

1-400 bbl Diffuser/Cement tank

1-Flock Tank

Electronic or Visual monitoring system to indicate lost returns and gas detection sensors

10. Testing, Logging and Coring Program:

- Testing Program: No drillstem tests are anticipated
- Electric Logging Program: None
- LWD Program: TBD
- Coring Program: None anticipated.
- CBL's and/or Temperature Surveys Will Be Performed as Needed or Required.
- MudLogging: On location from 4500'TVD to TD.

11. Bottom Hole Pressure expected to be 2,500 +/- psi

12. Bottom Hole Temperature expected to be 150 deg F.



Company: Logos Operating LLC
Project: San Juan, NM NAD83
Site: Athena 2308-14L
Well: Athena 2308-14L 3H
Wellbore: OH
Design: Plan #1

PROJECT DETAILS: San Juan, NM NAD83

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Western Zone
System Datum: Mean Sea Level
Local North: True



Azimuths to True North
Magnetic North: 8.90°

Magnetic Field
Strength: 49548.0snT
Dip Angle: 62.83°
Date: 4/18/2018
Model: HDGM

WELL DETAILS: Athena 2308-14L 3H

GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
+N/-S +E/-W Northing Easting Latitude Longitude
0.00 0.00 1901512.88 2774733.79 36.2257370 -107.6582410

Plan: Plan #1 (Athena 2308-14L 3H/OH)

Created By: Janie Collins Date: 9:54, April 19 2018

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
Athena 3H LP	5188.00	-20.74	-757.71	1901490.77	2773976.12
Athena 3H BHL	5158.00	163.63	-5611.85	1901666.37	2769121.66

SECTION DETAILS

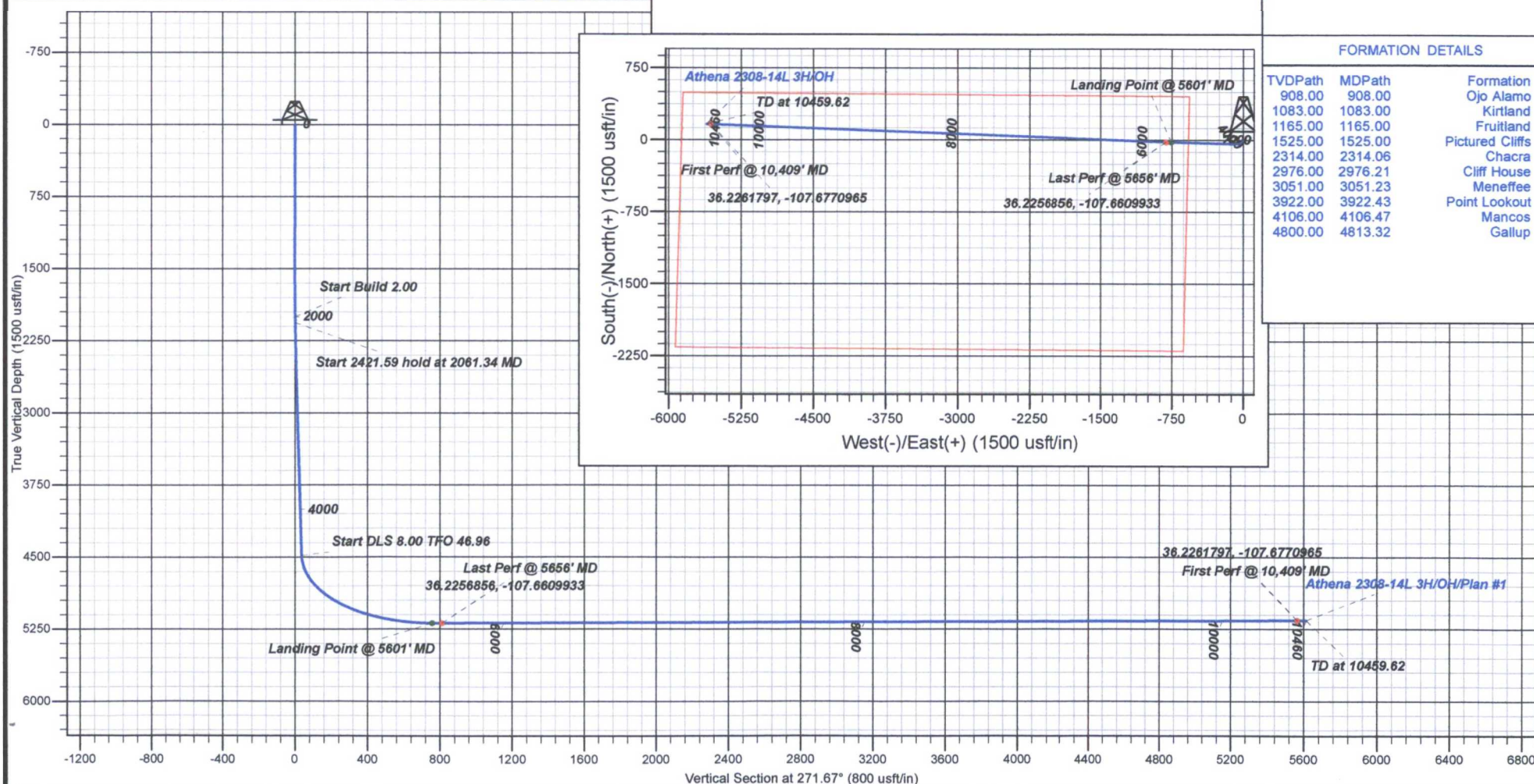
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2000.00	0.00	0.00	2000.00	0.00	0.00	0.00	0.00	0.00	
2061.34	1.23	225.22	2061.33	-0.46	-0.47	2.00	225.22	0.45	
4482.93	1.23	225.22	4482.37	-36.98	-37.26	0.00	0.00	36.17	
5601.89	90.35	272.18	5188.00	-20.74	-757.71	8.00	46.96	756.78	Athena 3H LP
10459.62	90.35	272.18	5158.00	163.63	-5611.85	0.00	0.00	5614.23	Athena 3H BHL

CASING DETAILS

No casing data is available

FORMATION DETAILS

TVDPath	MDPath	Formation
908.00	908.00	Ojo Alamo
1083.00	1083.00	Kirtland
1165.00	1165.00	Fruitland
1525.00	1525.00	Pictured Cliffs
2314.00	2314.06	Chacra
2976.00	2976.21	Cliff House
3051.00	3051.23	Meneffee
3922.00	3922.43	Point Lookout
4106.00	4106.47	Mancos
4800.00	4813.32	Gallup





Logos Operating LLC

San Juan, NM NAD83

Athena 2308-14L

Athena 2308-14L 3H

OH

Plan: Plan #1

Standard Planning Report

19 April, 2018



www.scientificdrilling.com



Planning Report



Database:	Grand Junction District	Local Co-ordinate Reference:	Well Athena 2308-14L 3H
Company:	Logos Operating LLC	TVD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Project:	San Juan, NM NAD83	MD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Site:	Athena 2308-14L	North Reference:	True
Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Project	San Juan, NM NAD83		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Western Zone		

Site		Athena 2308-14L			
Site Position:		Northing:	1,901,483.74 usft	Latitude:	36.2256570
From:	Lat/Long	Easting:	2,774,726.48 usft	Longitude:	-107.6582660
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.10 °

Well	Athena 2308-14L 3H					
Well Position	+N/-S	29.12 usft	Northing:	1,901,512.88 usft	Latitude:	36.2257370
	+E/-W	7.37 usft	Easting:	2,774,733.80 usft	Longitude:	-107.6582410
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,878.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	4/18/2018	8.90	62.83	49,548

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	271.67

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,061.34	1.23	225.22	2,061.33	-0.46	-0.47	2.00	2.00	0.00	225.22	
4,482.93	1.23	225.22	4,482.37	-36.98	-37.26	0.00	0.00	0.00	0.00	
5,601.89	90.35	272.18	5,188.00	-20.74	-757.71	8.00	7.97	4.20	46.96	Athena 3H LP
10,459.62	90.35	272.18	5,158.00	163.63	-5,611.85	0.00	0.00	0.00	0.00	Athena 3H BHL

Database:	Grand Junction District	Local Co-ordinate Reference:	Well Athena 2308-14L 3H
Company:	Logos Operating LLC	TVD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Project:	San Juan, NM NAD83	MD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Site:	Athena 2308-14L	North Reference:	True
Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
908.00	0.00	0.00	908.00	0.00	0.00	0.00	0.00	0.00	0.00
Ojo Alamo									
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,083.00	0.00	0.00	1,083.00	0.00	0.00	0.00	0.00	0.00	0.00
Kirtland									
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,165.00	0.00	0.00	1,165.00	0.00	0.00	0.00	0.00	0.00	0.00
Fruitland									
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,525.00	0.00	0.00	1,525.00	0.00	0.00	0.00	0.00	0.00	0.00
Pictured Cliffs									
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
2,061.34	1.23	225.22	2,061.33	-0.46	-0.47	0.45	2.00	2.00	0.00
Start 2421.59 hold at 2061.34 MD									
2,100.00	1.23	225.22	2,099.99	-1.05	-1.05	1.02	0.00	0.00	0.00
2,200.00	1.23	225.22	2,199.96	-2.55	-2.57	2.50	0.00	0.00	0.00
2,300.00	1.23	225.22	2,299.94	-4.06	-4.09	3.97	0.00	0.00	0.00
2,314.06	1.23	225.22	2,314.00	-4.27	-4.31	4.18	0.00	0.00	0.00
Chacra									
2,400.00	1.23	225.22	2,399.92	-5.57	-5.61	5.45	0.00	0.00	0.00
2,500.00	1.23	225.22	2,499.89	-7.08	-7.13	6.92	0.00	0.00	0.00
2,600.00	1.23	225.22	2,599.87	-8.59	-8.65	8.40	0.00	0.00	0.00
2,700.00	1.23	225.22	2,699.85	-10.09	-10.17	9.87	0.00	0.00	0.00
2,800.00	1.23	225.22	2,799.83	-11.60	-11.69	11.35	0.00	0.00	0.00
2,900.00	1.23	225.22	2,899.80	-13.11	-13.21	12.82	0.00	0.00	0.00
2,976.21	1.23	225.22	2,976.00	-14.26	-14.37	13.95	0.00	0.00	0.00
Cliff House									
3,000.00	1.23	225.22	2,999.78	-14.62	-14.73	14.30	0.00	0.00	0.00
3,051.23	1.23	225.22	3,051.00	-15.39	-15.51	15.05	0.00	0.00	0.00
Meneffee									
3,100.00	1.23	225.22	3,099.76	-16.13	-16.25	15.77	0.00	0.00	0.00
3,200.00	1.23	225.22	3,199.73	-17.64	-17.77	17.25	0.00	0.00	0.00
3,300.00	1.23	225.22	3,299.71	-19.14	-19.29	18.72	0.00	0.00	0.00

Database:	Grand Junction District	Local Co-ordinate Reference:	Well Athena 2308-14L 3H
Company:	Logos Operating LLC	TVD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Project:	San Juan, NM NAD83	MD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Site:	Athena 2308-14L	North Reference:	True
Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
3,400.00	1.23	225.22	3,399.69	-20.65	-20.81	20.20	0.00	0.00	0.00	
3,500.00	1.23	225.22	3,499.67	-22.16	-22.33	21.67	0.00	0.00	0.00	
3,600.00	1.23	225.22	3,599.64	-23.67	-23.85	23.15	0.00	0.00	0.00	
3,700.00	1.23	225.22	3,699.62	-25.18	-25.37	24.62	0.00	0.00	0.00	
3,800.00	1.23	225.22	3,799.60	-26.68	-26.89	26.10	0.00	0.00	0.00	
3,900.00	1.23	225.22	3,899.57	-28.19	-28.41	27.57	0.00	0.00	0.00	
3,922.43	1.23	225.22	3,922.00	-28.53	-28.75	27.90	0.00	0.00	0.00	
Point Lookout										
4,000.00	1.23	225.22	3,999.55	-29.70	-29.92	29.05	0.00	0.00	0.00	
4,100.00	1.23	225.22	4,099.53	-31.21	-31.44	30.52	0.00	0.00	0.00	
4,106.47	1.23	225.22	4,106.00	-31.31	-31.54	30.62	0.00	0.00	0.00	
Mancos										
4,200.00	1.23	225.22	4,199.51	-32.72	-32.96	32.00	0.00	0.00	0.00	
4,300.00	1.23	225.22	4,299.48	-34.22	-34.48	33.47	0.00	0.00	0.00	
4,400.00	1.23	225.22	4,399.46	-35.73	-36.00	34.95	0.00	0.00	0.00	
4,482.93	1.23	225.22	4,482.37	-36.98	-37.26	36.17	0.00	0.00	0.00	
Start DLS 8.00 TFO 46.96										
4,500.00	2.38	250.04	4,499.43	-37.23	-37.73	36.62	8.00	6.75	145.39	
4,600.00	10.24	267.20	4,598.75	-38.38	-48.57	47.43	8.00	7.86	17.17	
4,700.00	18.22	269.45	4,695.61	-38.96	-73.13	71.96	8.00	7.98	2.24	
4,800.00	26.22	270.35	4,788.10	-38.98	-110.92	109.73	8.00	7.99	0.90	
4,813.32	27.28	270.43	4,800.00	-38.94	-116.91	115.73	8.00	8.00	0.62	
Gallup										
4,900.00	34.21	270.85	4,874.45	-38.43	-161.20	160.01	8.00	8.00	0.48	
5,000.00	42.21	271.18	4,952.96	-37.32	-222.99	221.81	8.00	8.00	0.33	
5,100.00	50.21	271.42	5,022.10	-35.67	-295.10	293.94	8.00	8.00	0.24	
5,200.00	58.21	271.61	5,080.54	-33.51	-376.12	374.99	8.00	8.00	0.19	
5,300.00	66.21	271.77	5,127.13	-30.90	-464.48	463.38	8.00	8.00	0.16	
5,400.00	74.21	271.92	5,160.97	-27.87	-558.44	557.39	8.00	8.00	0.14	
5,500.00	82.20	272.05	5,181.39	-24.48	-656.19	655.20	8.00	8.00	0.13	
5,600.00	90.20	272.17	5,188.01	-20.81	-755.82	754.90	8.00	8.00	0.13	
5,601.89	90.35	272.18	5,188.00	-20.74	-757.71	756.78	8.00	8.00	0.13	
Landing Point @ 5601' MD - Athena 3H LP										
5,656.00	90.35	272.18	5,187.67	-18.69	-811.78	810.89	0.00	0.00	0.00	
Last Perf @ 5656' MD - 36.2256856, -107.6609933										
5,700.00	90.35	272.18	5,187.39	-17.02	-855.75	854.89	0.00	0.00	0.00	
5,800.00	90.35	272.18	5,186.78	-13.22	-955.68	954.89	0.00	0.00	0.00	
5,900.00	90.35	272.18	5,186.16	-9.42	-1,055.60	1,054.88	0.00	0.00	0.00	
6,000.00	90.35	272.18	5,185.54	-5.63	-1,155.53	1,154.87	0.00	0.00	0.00	
6,100.00	90.35	272.18	5,184.92	-1.83	-1,255.46	1,254.87	0.00	0.00	0.00	
6,200.00	90.35	272.18	5,184.31	1.96	-1,355.38	1,354.86	0.00	0.00	0.00	
6,300.00	90.35	272.18	5,183.69	5.76	-1,455.31	1,454.86	0.00	0.00	0.00	
6,400.00	90.35	272.18	5,183.07	9.55	-1,555.23	1,554.85	0.00	0.00	0.00	
6,500.00	90.35	272.18	5,182.45	13.35	-1,655.16	1,654.85	0.00	0.00	0.00	
6,600.00	90.35	272.18	5,181.84	17.14	-1,755.09	1,754.84	0.00	0.00	0.00	
6,700.00	90.35	272.18	5,181.22	20.94	-1,855.01	1,854.83	0.00	0.00	0.00	
6,800.00	90.35	272.18	5,180.60	24.73	-1,954.94	1,954.83	0.00	0.00	0.00	
6,900.00	90.35	272.18	5,179.98	28.53	-2,054.86	2,054.82	0.00	0.00	0.00	
7,000.00	90.35	272.18	5,179.37	32.33	-2,154.79	2,154.82	0.00	0.00	0.00	
7,100.00	90.35	272.18	5,178.75	36.12	-2,254.72	2,254.81	0.00	0.00	0.00	
7,200.00	90.35	272.18	5,178.13	39.92	-2,354.64	2,354.80	0.00	0.00	0.00	

Database:	Grand Junction District	Local Co-ordinate Reference:	Well Athena 2308-14L 3H
Company:	Logos Operating LLC	TVD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Project:	San Juan, NM NAD83	MD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Site:	Athena 2308-14L	North Reference:	True
Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,300.00	90.35	272.18	5,177.51	43.71	-2,454.57	2,454.80	0.00	0.00	0.00
7,400.00	90.35	272.18	5,176.90	47.51	-2,554.49	2,554.79	0.00	0.00	0.00
7,500.00	90.35	272.18	5,176.28	51.30	-2,654.42	2,654.79	0.00	0.00	0.00
7,600.00	90.35	272.18	5,175.66	55.10	-2,754.35	2,754.78	0.00	0.00	0.00
7,700.00	90.35	272.18	5,175.04	58.89	-2,854.27	2,854.78	0.00	0.00	0.00
7,800.00	90.35	272.18	5,174.43	62.69	-2,954.20	2,954.77	0.00	0.00	0.00
7,900.00	90.35	272.18	5,173.81	66.48	-3,054.12	3,054.76	0.00	0.00	0.00
8,000.00	90.35	272.18	5,173.19	70.28	-3,154.05	3,154.76	0.00	0.00	0.00
8,100.00	90.35	272.18	5,172.57	74.08	-3,253.98	3,254.75	0.00	0.00	0.00
8,200.00	90.35	272.18	5,171.95	77.87	-3,353.90	3,354.75	0.00	0.00	0.00
8,300.00	90.35	272.18	5,171.34	81.67	-3,453.83	3,454.74	0.00	0.00	0.00
8,400.00	90.35	272.18	5,170.72	85.46	-3,553.75	3,554.74	0.00	0.00	0.00
8,500.00	90.35	272.18	5,170.10	89.26	-3,653.68	3,654.73	0.00	0.00	0.00
8,600.00	90.35	272.18	5,169.48	93.05	-3,753.61	3,754.72	0.00	0.00	0.00
8,700.00	90.35	272.18	5,168.87	96.85	-3,853.53	3,854.72	0.00	0.00	0.00
8,800.00	90.35	272.18	5,168.25	100.64	-3,953.46	3,954.71	0.00	0.00	0.00
8,900.00	90.35	272.18	5,167.63	104.44	-4,053.38	4,054.71	0.00	0.00	0.00
9,000.00	90.35	272.18	5,167.01	108.23	-4,153.31	4,154.70	0.00	0.00	0.00
9,100.00	90.35	272.18	5,166.40	112.03	-4,253.24	4,254.69	0.00	0.00	0.00
9,200.00	90.35	272.18	5,165.78	115.83	-4,353.16	4,354.69	0.00	0.00	0.00
9,300.00	90.35	272.18	5,165.16	119.62	-4,453.09	4,454.68	0.00	0.00	0.00
9,400.00	90.35	272.18	5,164.54	123.42	-4,553.01	4,554.68	0.00	0.00	0.00
9,500.00	90.35	272.18	5,163.93	127.21	-4,652.94	4,654.67	0.00	0.00	0.00
9,600.00	90.35	272.18	5,163.31	131.01	-4,752.87	4,754.67	0.00	0.00	0.00
9,700.00	90.35	272.18	5,162.69	134.80	-4,852.79	4,854.66	0.00	0.00	0.00
9,800.00	90.35	272.18	5,162.07	138.60	-4,952.72	4,954.65	0.00	0.00	0.00
9,900.00	90.35	272.18	5,161.46	142.39	-5,052.64	5,054.65	0.00	0.00	0.00
10,000.00	90.35	272.18	5,160.84	146.19	-5,152.57	5,154.64	0.00	0.00	0.00
10,100.00	90.35	272.18	5,160.22	149.98	-5,252.50	5,254.64	0.00	0.00	0.00
10,200.00	90.35	272.18	5,159.60	153.78	-5,352.42	5,354.63	0.00	0.00	0.00
10,300.00	90.35	272.18	5,158.99	157.58	-5,452.35	5,454.63	0.00	0.00	0.00
10,400.00	90.35	272.18	5,158.37	161.37	-5,552.27	5,554.62	0.00	0.00	0.00
10,409.00	90.35	272.18	5,158.31	161.71	-5,561.27	5,563.62	0.00	0.00	0.00
First Perf @ 10,409' MD - 36.2261797, -107.6770965									
10,459.62	90.35	272.18	5,158.00	163.63	-5,611.85	5,614.23	0.00	0.00	0.00
TD at 10459.62 - Athena 3H BHL									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Athena 3H BHL - hit/miss target - Shape	0.00	0.00	5,158.00	163.63	-5,611.85	1,901,666.38	2,769,121.66	36.2261850	-107.6772680
- plan hits target center - Point									
Athena 3H LP - plan hits target center - Point	0.00	0.00	5,188.00	-20.74	-757.71	1,901,490.77	2,773,976.13	36.2256800	-107.6608100

Database:	Grand Junction District	Local Co-ordinate Reference:	Well Athena 2308-14L 3H
Company:	Logos Operating LLC	TVD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Project:	San Juan, NM NAD83	MD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Site:	Athena 2308-14L	North Reference:	True
Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
908.00	908.00	Ojo Alamo		0.00	0.00	
1,083.00	1,083.00	Kirtland		0.00	0.00	
1,165.00	1,165.00	Fruitland		0.00	0.00	
1,525.00	1,525.00	Pictured Cliffs		0.00	0.00	
2,314.06	2,314.00	Chacra		0.00	0.00	
2,976.21	2,976.00	Cliff House		0.00	0.00	
3,051.23	3,051.00	Meneffee		0.00	0.00	
3,922.43	3,922.00	Point Lookout		0.00	0.00	
4,106.47	4,106.00	Mancos		0.00	0.00	
4,813.32	4,800.00	Gallup		0.00	0.00	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
2,000.00	2,000.00	0.00	0.00	Start Build 2.00	
2,061.34	2,061.33	-0.46	-0.47	Start 2421.59 hold at 2061.34 MD	
4,482.93	4,482.37	-36.98	-37.26	Start DLS 8.00 TFO 46.96	
5,601.89	5,188.00	-20.74	-757.71	Landing Point @ 5601' MD	
5,656.00	5,187.67	-18.69	-811.78	Last Perf @ 5656' MD	
5,656.00	5,187.67	-18.69	-811.78	36.2256856, -107.6609933	
10,409.00	5,158.31	161.71	-5,561.27	First Perf @ 10,409' MD	
10,409.00	5,158.31	161.71	-5,561.27	36.2261797, -107.6770965	
10,459.62	5,158.00	163.63	-5,611.85	TD at 10459.62	



Logos Operating LLC

San Juan, NM NAD83

Athena 2308-14L

Athena 2308-14L 3H

OH

Plan #1

Anticollision Report

19 April, 2018



www.scientificdrilling.com



Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Athena 2308-14L 3H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Reference Site:	Athena 2308-14L	MD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #1	Offset TVD Reference:	Reference Datum

Reference	Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 30,000.00 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	4/19/2018		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	10,459.57	Plan #1 (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	

Summary						
Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance		Separation Factor	Warning
			Between Centres (usft)	Between Ellipses (usft)		
Athena 2308-14L						
Athena 2308-14L 1H - OH - OH	100.00	88.97	30.08	29.90	166.181	CC
Athena 2308-14L 1H - OH - OH	300.00	288.90	30.50	29.65	35.967	ES
Athena 2308-14L 1H - OH - OH	10,459.62	10,403.00	893.01	624.71	3.328	SF
Athena 2308-14L 2H - OH - OH	100.00	88.99	49.99	49.81	275.567	CC
Athena 2308-14L 2H - OH - OH	500.00	488.89	50.46	48.86	31.484	ES
Athena 2308-14L 2H - OH - OH	10,459.62	10,869.00	1,952.40	1,683.53	7.262	SF

Offset Design		Athena 2308-14L - Athena 2308-14L 1H - OH - OH										Offset Site Error:		0.00 usft	
Survey Program:		418-SDI MWD, 5752-SDI MWD										Offset Well Error:		0.00 usft	
Reference		Offset		Semi Major Axis			Distance								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
0.00	0.00	0.00	11.00	0.00	0.00	-165.79	-29.12	-7.37	31.99						
100.00	100.00	88.97	99.97	0.08	0.10	-165.81	-29.17	-7.37	30.08	29.90	0.18	166.181	CC		
200.00	200.00	188.94	199.94	0.31	0.21	-165.88	-29.32	-7.38	30.24	29.72	0.51	58.769			
300.00	300.00	288.90	299.90	0.53	0.31	-165.99	-29.59	-7.38	30.50	29.65	0.85	35.967	ES		
400.00	400.00	388.87	399.87	0.76	0.42	-166.16	-29.97	-7.39	30.87	29.69	1.18	26.130			
500.00	500.00	488.83	499.83	0.98	0.60	-166.18	-30.43	-7.49	31.34	29.75	1.59	19.748			
600.00	600.00	588.76	599.76	1.21	0.81	-166.04	-31.15	-7.75	32.10	30.08	2.02	15.894			
700.00	700.00	688.55	699.53	1.43	1.02	-165.56	-32.16	-8.28	33.22	30.76	2.45	13.532			
800.00	800.00	788.48	799.45	1.66	1.24	-164.70	-33.46	-9.15	34.70	31.80	2.90	11.972			
900.00	900.00	888.76	899.71	1.88	1.45	-162.85	-34.53	-10.66	36.14	32.81	3.33	10.852			
1,000.00	1,000.00	988.88	999.83	2.11	1.65	-161.21	-34.58	-11.77	36.53	32.78	3.75	9.729			
1,100.00	1,100.00	1,088.86	1,099.80	2.33	1.86	-158.84	-34.69	-13.43	37.20	33.01	4.19	8.876			
1,200.00	1,200.00	1,188.82	1,199.75	2.56	2.07	-156.40	-34.76	-15.19	37.93	33.31	4.63	8.201			
1,300.00	1,300.00	1,288.70	1,299.62	2.78	2.28	-154.93	-35.08	-16.41	38.73	33.67	5.06	7.657			
1,400.00	1,400.00	1,388.75	1,399.66	3.01	2.49	-153.63	-35.56	-17.63	39.69	34.20	5.49	7.226			
1,500.00	1,500.00	1,488.54	1,499.43	3.23	2.70	-151.81	-35.93	-19.26	40.77	34.83	5.93	6.872			
1,600.00	1,600.00	1,588.22	1,599.08	3.46	2.92	-149.49	-36.76	-21.66	42.67	36.30	6.38	6.693			
1,700.00	1,700.00	1,688.21	1,699.04	3.68	3.13	-147.44	-37.59	-24.00	44.61	37.80	6.81	6.550			
1,800.00	1,800.00	1,788.37	1,799.17	3.91	3.34	-145.67	-38.45	-26.26	46.57	39.32	7.24	6.429			
1,900.00	1,900.00	1,888.41	1,899.18	4.13	3.54	-144.26	-39.20	-28.21	48.30	40.63	7.67	6.294			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Athena 2308-14L 3H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Reference Site:	Athena 2308-14L	MD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #1	Offset TVD Reference:	Reference Datum

Offset Design														Athena 2308-14L - Athena 2308-14L 1H - OH - OH		Offset Site Error:		0.00 usft	
Survey Program:				418-SDI MWD, 5752-SDI MWD										Offset Well Error:		0.00 usft			
Reference		Offset		Semi Major Axis			Distance							Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor							
2,000.00	2,000.00	1,987.61	1,998.36	4.35	3.75	-143.24	-40.34	-30.13	50.38	42.27	8.11	6.212							
2,100.00	2,099.99	2,085.52	2,096.12	4.55	3.98	-8.27	-44.33	-33.59	54.28	45.79	8.50	6.390							
2,200.00	2,199.96	2,185.05	2,195.35	4.73	4.20	-9.84	-51.20	-37.10	59.84	50.95	8.89	6.731							
2,300.00	2,299.94	2,283.37	2,293.18	4.91	4.43	-14.57	-60.81	-37.67	66.28	57.00	9.28	7.142							
2,400.00	2,399.92	2,380.59	2,389.63	5.10	4.67	-18.06	-72.81	-40.03	76.24	66.56	9.68	7.874							
2,500.00	2,499.89	2,476.93	2,484.82	5.29	4.93	-20.87	-87.23	-43.29	89.22	79.13	10.09	8.845							
2,600.00	2,599.87	2,572.99	2,579.21	5.48	5.22	-23.14	-104.58	-47.40	105.56	95.06	10.50	10.056							
2,700.00	2,699.85	2,669.39	2,673.51	5.68	5.53	-25.10	-124.11	-51.69	124.17	113.26	10.91	11.381							
2,800.00	2,799.83	2,767.00	2,768.70	5.88	5.84	-27.80	-145.62	-53.41	143.77	132.45	11.32	12.697							
2,900.00	2,899.80	2,861.76	2,860.94	6.08	6.17	-29.77	-167.25	-55.39	164.46	152.72	11.74	14.009							
3,000.00	2,999.78	2,956.62	2,952.87	6.28	6.54	-31.30	-190.50	-57.80	187.06	174.89	12.17	15.375							
3,100.00	3,099.76	3,049.80	3,042.76	6.48	6.92	-32.53	-214.92	-60.36	211.46	198.86	12.59	16.791							
3,200.00	3,199.73	3,150.98	3,140.41	6.69	7.31	-33.52	-241.20	-63.35	235.75	222.72	13.03	18.094							
3,300.00	3,299.71	3,241.70	3,227.95	6.90	7.67	-34.40	-264.90	-65.40	260.13	246.69	13.45	19.342							
3,400.00	3,399.69	3,335.08	3,317.36	7.11	8.10	-35.32	-291.82	-67.11	287.15	273.26	13.89	20.679							
3,500.00	3,499.67	3,433.94	3,412.16	7.32	8.52	-36.21	-319.79	-68.40	313.63	299.30	14.33	21.888							
3,600.00	3,599.64	3,532.28	3,506.56	7.53	8.95	-37.09	-347.36	-68.86	339.81	325.03	14.78	22.997							
3,700.00	3,699.62	3,633.65	3,604.20	7.74	9.38	-37.91	-374.61	-68.95	364.84	349.61	15.23	23.954							
3,800.00	3,799.60	3,734.39	3,701.48	7.95	9.81	-38.68	-400.77	-68.47	388.97	373.28	15.69	24.796							
3,900.00	3,899.57	3,832.15	3,795.95	8.17	10.24	-39.23	-425.90	-68.72	412.96	396.81	16.14	25.582							
4,000.00	3,999.55	3,930.03	3,890.81	8.38	10.67	-39.55	-449.97	-70.21	435.97	419.37	16.60	26.267							
4,100.00	4,099.53	4,014.96	3,972.73	8.60	11.07	-39.78	-472.32	-71.75	460.74	443.71	17.03	27.054							
4,200.00	4,199.51	4,111.88	4,065.81	8.81	11.54	-39.99	-499.24	-73.80	487.02	469.52	17.50	27.836							
4,300.00	4,299.48	4,224.53	4,174.69	9.03	12.04	-40.31	-528.06	-75.16	510.98	492.99	17.99	28.404							
4,400.00	4,399.46	4,345.78	4,292.82	9.25	12.54	-40.37	-555.15	-78.65	531.96	513.46	18.50	28.752							
4,500.00	4,499.43	4,457.94	4,402.96	9.47	12.95	-40.37	-575.64	-83.34	548.88	529.90	18.99	28.909							
4,600.00	4,598.75	4,537.87	4,480.44	9.70	13.26	-80.13	-589.06	-97.16	565.34	545.91	19.42	29.108							
4,700.00	4,695.61	4,630.51	4,566.59	9.97	13.66	-80.32	-605.50	-126.83	583.52	563.58	19.93	29.273							
4,800.00	4,788.10	4,707.00	4,634.94	10.29	14.01	-79.54	-618.76	-158.43	601.54	581.07	20.47	29.380							
4,900.00	4,874.45	4,778.18	4,695.36	10.73	14.41	-78.61	-633.07	-193.20	621.85	600.66	21.19	29.349							
5,000.00	4,952.96	4,848.27	4,752.80	11.33	14.87	-78.03	-650.24	-229.50	644.81	622.64	22.17	29.079							
5,100.00	5,022.10	4,936.84	4,824.85	12.17	15.50	-78.57	-673.67	-275.37	668.09	644.46	23.63	28.275							
5,200.00	5,080.54	5,101.84	4,952.06	13.29	16.77	-81.74	-708.99	-373.89	687.59	661.50	26.09	26.356							
5,300.00	5,127.13	5,215.00	5,030.52	14.70	17.71	-83.73	-720.67	-454.45	696.58	667.74	28.84	24.154							
5,400.00	5,160.97	5,287.40	5,072.32	16.36	18.47	-84.56	-728.94	-512.90	708.12	676.40	31.72	22.322							
5,500.00	5,181.39	5,373.00	5,109.45	18.24	19.56	-85.28	-738.73	-589.30	720.97	685.87	35.10	20.540							
5,600.00	5,188.01	5,499.82	5,150.91	20.25	21.46	-87.07	-753.38	-708.16	735.06	695.78	39.28	18.715							
5,700.00	5,187.39	5,650.00	5,175.39	22.36	23.98	-89.06	-756.94	-855.98	740.02	695.98	44.05	16.801							
5,800.00	5,186.78	5,737.52	5,175.72	24.55	25.17	-89.13	-757.48	-943.45	744.45	696.82	47.62	15.632							
5,900.00	5,186.16	5,851.50	5,169.04	26.80	26.40	-88.68	-759.46	-1,057.21	750.23	699.12	51.11	14.678							
6,000.00	5,185.54	5,969.71	5,167.44	29.09	27.81	-88.62	-758.14	-1,175.37	752.99	698.13	54.86	13.725							
6,100.00	5,184.92	6,063.00	5,171.00	31.42	29.06	-88.94	-756.06	-1,268.57	754.47	695.84	58.63	12.868							
6,200.00	5,184.31	6,148.35	5,172.72	33.78	30.32	-89.11	-755.84	-1,353.90	757.89	695.42	62.47	12.133							
6,300.00	5,183.69	6,243.24	5,173.19	36.17	31.82	-89.19	-756.30	-1,448.79	762.16	695.63	66.53	11.455							
6,400.00	5,183.07	6,344.35	5,173.89	38.57	33.54	-89.30	-757.07	-1,549.89	766.69	695.89	70.80	10.829							
6,500.00	5,182.45	6,433.51	5,175.63	40.98	35.14	-89.47	-758.48	-1,639.02	772.02	697.02	75.00	10.294							
6,600.00	5,181.84	6,539.95	5,174.84	43.41	37.15	-89.47	-760.97	-1,745.42	778.20	698.68	79.53	9.786							
6,700.00	5,181.22	6,655.55	5,174.62	45.85	39.40	-89.50	-760.25	-1,861.01	781.24	696.96	84.27	9.270							
6,800.00	5,180.60	6,750.86	5,173.31	48.30	41.33	-89.45	-760.15	-1,956.32	784.92	696.14	88.78	8.841							
6,900.00	5,179.98	6,861.35	5,171.97	50.76	43.62	-89.41	-758.76	-2,066.78	787.42	693.84	93.58	8.414							
7,000.00	5,179.37	6,956.21	5,172.03	53.22	45.63	-89.46	-757.66	-2,161.64	790.05	691.87	98.17	8.048							

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Athena 2308-14L 3H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Reference Site:	Athena 2308-14L	MD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #1	Offset TVD Reference:	Reference Datum

Offset Design Athena 2308-14L - Athena 2308-14L 1H - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 418-SDI MWD, 5752-SDI MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
7,100.00	5,178.75	7,070.36	5,170.84	55.69	48.10	-89.42	-756.11	-2,275.76	792.55	689.43	103.12	7.685		
7,200.00	5,178.13	7,174.38	5,167.59	58.17	50.39	-89.24	-752.68	-2,379.67	793.06	685.12	107.94	7.347		
7,300.00	5,177.51	7,271.96	5,165.12	60.65	52.56	-89.10	-749.33	-2,477.16	793.46	680.78	112.68	7.042		
7,400.00	5,176.90	7,369.89	5,164.45	63.13	54.57	-89.10	-747.67	-2,566.07	795.36	678.07	117.29	6.781		
7,500.00	5,176.28	7,430.05	5,164.54	65.61	56.14	-89.14	-748.05	-2,635.22	799.67	678.11	121.56	6.578		
7,600.00	5,175.66	7,545.05	5,167.18	68.10	58.79	-89.38	-749.11	-2,750.18	804.26	677.60	126.66	6.350		
7,700.00	5,175.04	7,630.02	5,168.30	70.60	60.76	-89.50	-750.25	-2,835.13	809.39	678.15	131.24	6.167		
7,800.00	5,174.43	7,716.13	5,169.53	73.09	62.78	-89.63	-753.21	-2,921.18	816.58	680.73	135.85	6.011		
7,900.00	5,173.81	7,806.84	5,168.93	75.59	64.91	-89.63	-757.40	-3,011.79	824.98	684.42	140.56	5.869		
8,000.00	5,173.19	7,911.81	5,166.20	78.09	67.39	-89.49	-762.68	-3,116.59	833.84	688.31	145.53	5.730		
8,100.00	5,172.57	8,002.78	5,163.67	80.59	69.54	-89.36	-767.48	-3,207.39	842.89	692.64	150.25	5.610		
8,200.00	5,171.95	8,099.43	5,160.84	83.09	71.84	-89.21	-772.79	-3,303.85	852.21	697.13	155.08	5.495		
8,300.00	5,171.34	8,234.33	5,156.68	85.60	75.06	-89.00	-778.84	-3,438.53	860.76	700.14	160.63	5.359		
8,400.00	5,170.72	8,350.01	5,149.93	88.10	77.83	-88.61	-779.16	-3,554.02	864.87	699.05	165.82	5.216		
8,500.00	5,170.10	8,454.57	5,145.34	90.61	80.35	-88.35	-779.41	-3,658.47	869.03	698.21	170.83	5.087		
8,600.00	5,169.48	8,548.85	5,141.71	93.12	82.62	-88.16	-779.19	-3,752.68	872.69	697.04	175.65	4.968		
8,700.00	5,168.87	8,664.19	5,140.95	95.63	85.41	-88.17	-778.45	-3,868.00	875.86	694.98	180.88	4.842		
8,800.00	5,168.25	8,768.89	5,140.80	98.14	87.95	-88.20	-776.19	-3,972.68	877.47	691.54	185.93	4.719		
8,900.00	5,167.63	8,879.43	5,140.83	100.65	90.64	-88.25	-773.14	-4,083.17	878.49	687.39	191.10	4.597		
9,000.00	5,167.01	8,979.53	5,142.34	103.16	93.08	-88.39	-769.63	-4,183.20	878.72	682.64	196.08	4.481		
9,100.00	5,166.40	9,067.15	5,142.78	105.67	95.22	-88.45	-767.16	-4,270.78	879.68	678.85	200.82	4.380		
9,200.00	5,165.78	9,184.76	5,141.56	108.19	98.10	-88.43	-764.23	-4,388.35	881.09	674.96	206.13	4.274		
9,300.00	5,165.16	9,296.90	5,140.96	110.70	100.84	-88.43	-758.75	-4,500.36	879.97	668.63	211.35	4.164		
9,400.00	5,164.54	9,402.65	5,140.07	113.22	103.43	-88.41	-752.55	-4,605.91	877.90	661.46	216.44	4.056		
9,500.00	5,163.93	9,496.92	5,140.32	115.73	105.74	-88.46	-747.01	-4,700.03	875.81	654.48	221.33	3.957		
9,567.35	5,163.51	9,550.26	5,140.19	117.43	107.06	-88.47	-744.48	-4,753.31	875.18	650.58	224.61	3.896		
9,600.00	5,163.31	9,574.33	5,140.27	118.25	107.65	-88.49	-743.69	-4,777.36	875.34	649.45	225.89	3.875		
9,700.00	5,162.69	9,668.50	5,140.16	120.76	109.97	-88.52	-741.55	-4,871.51	876.84	646.06	230.78	3.800		
9,800.00	5,162.07	9,770.22	5,139.75	123.28	112.48	-88.54	-739.28	-4,973.19	878.40	642.60	235.81	3.725		
9,900.00	5,161.46	9,865.04	5,140.42	125.80	114.82	-88.62	-737.41	-5,067.99	880.19	639.47	240.71	3.657		
10,000.00	5,160.84	9,971.86	5,138.40	128.32	117.46	-88.54	-735.20	-5,174.76	881.95	636.11	245.84	3.588		
10,100.00	5,160.22	10,065.01	5,137.01	130.84	119.77	-88.49	-733.07	-5,267.87	883.49	632.79	250.70	3.524		
10,200.00	5,159.60	10,167.49	5,137.05	133.35	122.31	-88.53	-731.16	-5,370.34	885.41	629.65	255.76	3.462		
10,300.00	5,158.99	10,256.25	5,136.53	135.87	124.51	-88.54	-729.96	-5,459.08	887.84	627.29	260.55	3.408		
10,400.00	5,158.37	10,354.81	5,135.77	138.39	126.95	-88.53	-729.37	-5,557.64	891.04	625.51	265.53	3.356		
10,459.62	5,158.00	10,403.00	5,135.60	139.90	128.15	-88.55	-729.07	-5,605.83	893.01	624.71	268.30	3.328 SF		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Anticollision Report



Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Athena 2308-14L 3H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Reference Site:	Athena 2308-14L	MD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #1	Offset TVD Reference:	Reference Datum

Offset Design Athena 2308-14L - Athena 2308-14L 2H - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 415-SDI MWD, 6162-SDI MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)						
0.00	0.00	0.00	11.00	0.00	0.00	-165.65	-48.41	-12.39	51.17					
100.00	100.00	88.99	99.99	0.08	0.10	-165.54	-48.40	-12.49	49.99	49.81	0.18	275.567 CC		
200.00	200.00	188.97	199.97	0.31	0.21	-165.14	-48.36	-12.83	50.03	49.52	0.52	97.101		
300.00	300.00	288.95	299.95	0.53	0.32	-164.47	-48.29	-13.42	50.12	49.27	0.85	59.023		
400.00	400.00	388.93	399.92	0.76	0.42	-163.53	-48.19	-14.25	50.25	49.07	1.18	42.478		
500.00	500.00	488.89	499.87	0.98	0.62	-162.21	-48.05	-15.42	50.46	48.86	1.60	31.484 ES		
600.00	600.00	587.96	598.93	1.21	0.83	-160.62	-48.26	-16.97	51.17	49.13	2.04	25.050		
700.00	700.00	686.88	697.79	1.43	1.04	-159.81	-51.16	-18.82	54.56	52.09	2.47	22.098		
800.00	800.00	786.76	797.59	1.66	1.24	-159.44	-54.86	-20.57	58.64	55.74	2.90	20.250		
900.00	900.00	886.72	897.46	1.88	1.44	-159.38	-58.65	-22.06	62.71	59.39	3.33	18.858		
1,000.00	1,000.00	986.66	997.32	2.11	1.66	-159.59	-62.58	-23.29	66.83	63.07	3.76	17.773		
1,100.00	1,100.00	1,086.89	1,097.48	2.33	1.87	-159.42	-66.01	-24.78	70.56	66.36	4.20	16.809		
1,200.00	1,200.00	1,187.19	1,197.72	2.56	2.09	-159.02	-68.91	-26.43	73.84	69.21	4.63	15.936		
1,300.00	1,300.00	1,287.23	1,297.72	2.78	2.30	-158.69	-71.58	-27.92	76.87	71.80	5.07	15.159		
1,400.00	1,400.00	1,387.65	1,398.10	3.01	2.52	-158.39	-74.00	-29.31	79.62	74.11	5.51	14.452		
1,500.00	1,500.00	1,487.65	1,498.07	3.23	2.73	-158.44	-76.21	-30.11	81.96	76.02	5.94	13.789		
1,600.00	1,600.00	1,587.99	1,598.38	3.46	2.94	-158.34	-78.15	-31.04	84.11	77.72	6.38	13.177		
1,700.00	1,700.00	1,687.78	1,698.16	3.68	3.15	-158.31	-79.98	-31.82	86.10	79.28	6.82	12.631		
1,800.00	1,800.00	1,788.47	1,798.83	3.91	3.36	-158.24	-81.36	-32.48	87.61	80.36	7.25	12.080		
1,900.00	1,900.00	1,888.48	1,898.83	4.13	3.57	-158.16	-82.66	-33.12	89.06	81.37	7.69	11.586		
2,000.00	2,000.00	1,988.82	1,999.17	4.35	3.78	-158.39	-83.65	-33.13	89.97	81.85	8.12	11.081		
2,100.00	2,099.99	2,086.74	2,097.06	4.55	3.99	-24.51	-85.97	-33.14	90.83	82.35	8.48	10.711		
2,200.00	2,199.96	2,185.03	2,195.27	4.73	4.21	-25.35	-89.89	-34.09	92.96	84.09	8.87	10.483		
2,300.00	2,299.94	2,283.19	2,293.24	4.91	4.43	-26.86	-95.85	-34.50	96.93	87.67	9.26	10.467		
2,400.00	2,399.92	2,376.81	2,386.40	5.10	4.66	-28.54	-104.95	-35.24	104.58	94.93	9.65	10.837		
2,500.00	2,499.89	2,468.31	2,476.61	5.29	4.91	-28.86	-119.36	-39.84	119.25	109.20	10.04	11.873		
2,600.00	2,599.87	2,555.23	2,561.05	5.48	5.20	-28.57	-138.54	-47.11	140.97	130.54	10.43	13.510		
2,700.00	2,699.85	2,641.30	2,642.98	5.68	5.54	-28.46	-163.43	-55.76	169.78	158.95	10.83	15.677		
2,800.00	2,799.83	2,723.00	2,719.09	5.88	5.92	-28.90	-192.00	-63.63	204.35	193.13	11.22	18.212		
2,900.00	2,899.80	2,807.98	2,796.57	6.08	6.38	-29.81	-226.16	-70.78	243.64	232.01	11.63	20.957		
3,000.00	2,999.78	2,891.40	2,871.64	6.28	6.89	-30.94	-262.12	-76.29	285.42	273.39	12.03	23.722		
3,100.00	3,099.76	2,972.00	2,942.82	6.48	7.42	-32.15	-299.69	-80.23	330.35	317.91	12.44	26.558		
3,200.00	3,199.73	3,043.42	3,004.45	6.69	7.95	-33.50	-335.75	-81.41	378.66	365.83	12.83	29.517		
3,300.00	3,299.71	3,116.58	3,066.06	6.90	8.53	-34.75	-375.18	-82.22	430.48	417.25	13.23	32.541		
3,400.00	3,399.69	3,206.74	3,141.80	7.11	9.21	-36.11	-424.10	-82.21	482.75	469.08	13.67	35.305		
3,500.00	3,499.67	3,280.40	3,203.55	7.32	9.79	-37.05	-464.24	-81.93	535.42	521.34	14.08	38.017		
3,600.00	3,599.64	3,367.39	3,275.81	7.53	10.53	-38.06	-512.66	-81.03	589.28	574.74	14.54	40.533		
3,700.00	3,699.62	3,451.43	3,345.76	7.74	11.26	-39.08	-559.15	-78.04	642.74	627.75	14.99	42.881		
3,800.00	3,799.60	3,526.25	3,407.71	7.95	11.95	-39.90	-600.99	-75.00	696.93	681.51	15.42	45.192		
3,900.00	3,899.57	3,592.75	3,462.12	8.17	12.58	-40.53	-639.14	-72.41	752.71	736.87	15.84	47.534		
4,000.00	3,999.55	3,676.53	3,529.99	8.38	13.36	-41.26	-688.13	-68.93	809.65	793.35	16.30	49.665		
4,100.00	4,099.53	3,762.01	3,599.57	8.60	14.11	-41.82	-737.72	-66.31	866.22	849.44	16.78	51.629		
4,200.00	4,199.51	3,860.00	3,679.89	8.81	14.98	-42.28	-793.81	-64.57	922.09	904.80	17.30	53.310		
4,300.00	4,299.48	3,931.09	3,738.31	9.03	15.64	-42.56	-834.30	-63.53	977.69	959.95	17.74	55.116		
4,400.00	4,399.46	4,041.06	3,828.87	9.25	16.66	-42.80	-896.68	-64.12	1,033.24	1,014.93	18.31	56.434		
4,500.00	4,499.43	4,113.00	3,888.91	9.47	17.31	-66.83	-936.30	-64.97	1,087.11	1,068.35	18.76	57.959		
4,600.00	4,598.75	4,176.00	3,940.78	9.70	17.93	-79.07	-972.00	-66.86	1,142.33	1,123.01	19.33	59.111		
4,700.00	4,695.61	4,218.64	3,975.12	9.97	18.37	-76.49	-997.18	-69.08	1,198.87	1,178.83	20.04	59.828		
4,800.00	4,788.10	4,282.58	4,025.74	10.29	19.02	-73.37	-1,036.00	-73.36	1,255.65	1,234.75	20.90	60.077		
4,900.00	4,874.45	4,391.95	4,113.08	10.73	20.10	-71.85	-1,101.48	-80.06	1,310.09	1,288.13	21.96	59.650		
5,000.00	4,952.96	4,636.50	4,319.85	11.33	22.28	-75.55	-1,231.40	-87.60	1,358.31	1,334.89	23.41	58.010		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Anticollision Report



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Reference Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #1	Offset TVD Reference:	Reference Datum

Offset Design Athena 2308-14L - Athena 2308-14L 2H - OH - OH														Offset Site Error:	0.00 usft
Survey Program: 415-SDI MWD, 8162-SDI MWD														Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)							
5,100.00	5,022.10	4,689.84	4,366.82	12.17	22.72	-73.82	-1,256.60	-89.55	1,400.83	1,376.12	24.71	56.690			
5,200.00	5,080.54	4,723.71	4,396.33	13.29	23.01	-71.44	-1,273.08	-91.59	1,444.17	1,418.00	26.17	55.181			
5,300.00	5,127.13	4,752.17	4,420.87	14.70	23.27	-68.86	-1,287.32	-93.78	1,488.23	1,460.44	27.79	53.546			
5,400.00	5,160.97	4,773.49	4,439.14	16.36	23.46	-66.05	-1,298.19	-95.43	1,532.69	1,503.18	29.51	51.938			
5,500.00	5,181.39	4,787.56	4,451.14	18.24	23.59	-63.02	-1,305.45	-96.50	1,577.15	1,545.90	31.25	50.467			
5,600.00	5,188.01	4,802.00	4,463.42	20.25	23.72	-60.14	-1,312.98	-97.59	1,621.11	1,588.04	33.07	49.022			
5,700.00	5,187.39	4,802.00	4,463.42	22.36	23.72	-60.07	-1,312.98	-97.59	1,666.87	1,631.47	35.41	47.074			
5,800.00	5,186.78	4,802.00	4,463.42	24.55	23.72	-60.07	-1,312.98	-97.59	1,717.25	1,679.42	37.83	45.392			
5,900.00	5,186.16	4,802.00	4,463.42	26.80	23.72	-60.07	-1,312.98	-97.59	1,771.83	1,731.53	40.30	43.961			
6,000.00	5,185.54	6,391.64	5,163.09	29.09	38.74	-89.28	-1,830.81	-1,168.60	1,825.36	1,769.75	55.61	32.822			
6,100.00	5,184.92	6,499.36	5,162.08	31.42	39.65	-89.27	-1,830.21	-1,276.31	1,828.64	1,769.20	59.44	30.765			
6,200.00	5,184.31	6,633.84	5,160.00	33.78	40.91	-89.24	-1,827.22	-1,410.73	1,830.18	1,766.42	63.76	28.706			
6,300.00	5,183.69	6,773.09	5,157.79	36.17	42.37	-89.19	-1,821.77	-1,549.85	1,830.15	1,761.78	68.38	26.766			
6,400.00	5,183.07	6,860.05	5,156.68	38.57	43.37	-89.18	-1,817.27	-1,636.69	1,828.83	1,756.34	72.49	25.230			
6,440.17	5,182.82	6,888.00	5,156.54	39.54	43.71	-89.18	-1,816.13	-1,664.62	1,828.71	1,754.31	74.40	24.578			
6,500.00	5,182.45	6,935.18	5,156.39	40.98	44.31	-89.18	-1,814.54	-1,711.77	1,828.95	1,752.45	76.50	23.907			
6,600.00	5,181.84	7,041.46	5,154.16	43.41	45.74	-89.13	-1,810.91	-1,817.95	1,829.34	1,748.31	81.03	22.576			
6,700.00	5,181.22	7,147.28	5,152.93	45.85	47.27	-89.11	-1,807.29	-1,923.70	1,829.74	1,744.11	85.63	21.368			
6,756.77	5,180.87	7,203.37	5,153.03	47.24	48.12	-89.13	-1,805.07	-1,979.75	1,829.64	1,741.19	88.45	20.685			
6,800.00	5,180.60	7,228.86	5,153.30	48.30	48.52	-89.14	-1,804.25	-2,005.22	1,829.88	1,739.97	89.91	20.352			
6,900.00	5,179.98	7,298.08	5,155.21	50.76	49.65	-89.22	-1,803.06	-2,074.40	1,831.86	1,737.84	94.03	19.482			
7,000.00	5,179.37	7,384.02	5,158.25	53.22	51.11	-89.33	-1,802.55	-2,160.29	1,835.00	1,736.56	98.44	18.641			
7,100.00	5,178.75	7,481.43	5,160.41	55.69	52.84	-89.42	-1,802.59	-2,257.68	1,838.81	1,735.73	103.07	17.840			
7,200.00	5,178.13	7,566.59	5,160.76	58.17	54.41	-89.44	-1,802.68	-2,342.83	1,842.72	1,735.18	107.54	17.135			
7,300.00	5,177.51	7,657.14	5,161.01	60.65	56.13	-89.47	-1,803.76	-2,433.38	1,847.66	1,735.54	112.12	16.479			
7,400.00	5,176.90	7,738.00	5,160.75	63.13	57.72	-89.48	-1,805.01	-2,514.22	1,853.02	1,736.47	116.56	15.898			
7,500.00	5,176.28	7,840.77	5,159.62	65.61	59.79	-89.47	-1,807.10	-2,616.96	1,858.85	1,737.46	121.39	15.313			
7,600.00	5,175.66	7,947.06	5,158.44	68.10	61.97	-89.45	-1,809.39	-2,723.22	1,864.83	1,738.52	126.31	14.764			
7,700.00	5,175.04	8,060.49	5,156.76	70.60	64.35	-89.42	-1,810.29	-2,836.63	1,869.35	1,737.98	131.38	14.229			
7,800.00	5,174.43	8,125.12	5,155.94	73.09	65.73	-89.41	-1,811.41	-2,901.25	1,874.94	1,739.34	135.59	13.828			
7,900.00	5,173.81	8,268.15	5,153.11	75.59	68.83	-89.35	-1,814.93	-3,044.17	1,881.56	1,740.34	141.22	13.323			
8,000.00	5,173.19	8,389.98	5,147.40	78.09	71.50	-89.20	-1,814.71	-3,165.86	1,885.21	1,738.71	146.49	12.869			
8,100.00	5,172.57	8,467.00	5,145.25	80.59	73.21	-89.15	-1,814.77	-3,242.85	1,889.08	1,738.11	150.97	12.513			
8,200.00	5,171.95	8,574.34	5,142.89	83.09	75.63	-89.11	-1,815.79	-3,350.15	1,893.89	1,737.89	156.00	12.140			
8,300.00	5,171.34	8,649.00	5,139.54	85.60	77.31	-89.02	-1,815.66	-3,424.74	1,897.82	1,737.37	160.44	11.829			
8,400.00	5,170.72	8,773.44	5,137.70	88.10	80.16	-88.99	-1,817.71	-3,549.13	1,903.46	1,737.65	165.81	11.480			
8,500.00	5,170.10	8,895.00	5,135.01	90.61	82.95	-88.93	-1,816.53	-3,670.65	1,906.19	1,735.06	171.13	11.139			
8,600.00	5,169.48	8,993.44	5,132.93	93.12	85.22	-88.89	-1,815.86	-3,769.06	1,909.33	1,733.29	176.04	10.846			
8,700.00	5,168.87	9,249.24	5,127.57	95.63	91.14	-88.78	-1,801.64	-4,024.31	1,906.60	1,722.63	183.97	10.363			
8,800.00	5,168.25	9,336.00	5,125.80	98.14	93.15	-88.74	-1,793.94	-4,110.71	1,901.57	1,712.97	188.61	10.082			
8,900.00	5,167.63	9,430.52	5,126.56	100.65	95.36	-88.77	-1,786.48	-4,204.93	1,897.43	1,703.96	193.47	9.808			
9,000.00	5,167.01	9,516.26	5,127.73	103.16	97.37	-88.82	-1,779.92	-4,290.41	1,893.53	1,695.36	198.17	9.555			
9,100.00	5,166.40	9,584.00	5,128.16	105.67	98.97	-88.85	-1,775.82	-4,358.02	1,891.14	1,688.61	202.53	9.338			
9,199.29	5,165.78	9,650.00	5,127.83	108.17	100.54	-88.85	-1,772.85	-4,423.95	1,890.38	1,683.54	206.85	9.139			
9,200.00	5,165.78	9,650.00	5,127.83	108.19	100.54	-88.85	-1,772.85	-4,423.95	1,890.38	1,683.52	206.86	9.138			
9,300.00	5,165.16	9,713.00	5,127.00	110.70	102.04	-88.84	-1,771.23	-4,486.92	1,891.54	1,680.40	211.14	8.959			
9,400.00	5,164.54	9,786.35	5,125.22	113.22	103.80	-88.80	-1,770.75	-4,560.25	1,894.58	1,678.97	215.61	8.787			
9,500.00	5,163.93	9,866.69	5,123.23	115.73	105.74	-88.75	-1,770.72	-4,640.56	1,898.41	1,678.19	220.21	8.621			
9,600.00	5,163.31	9,944.61	5,121.66	118.25	107.62	-88.72	-1,771.72	-4,718.46	1,903.50	1,678.72	224.77	8.468			
9,700.00	5,162.69	10,028.00	5,120.52	120.76	109.64	-88.71	-1,773.71	-4,801.82	1,909.66	1,680.22	229.44	8.323			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Anticollision Report



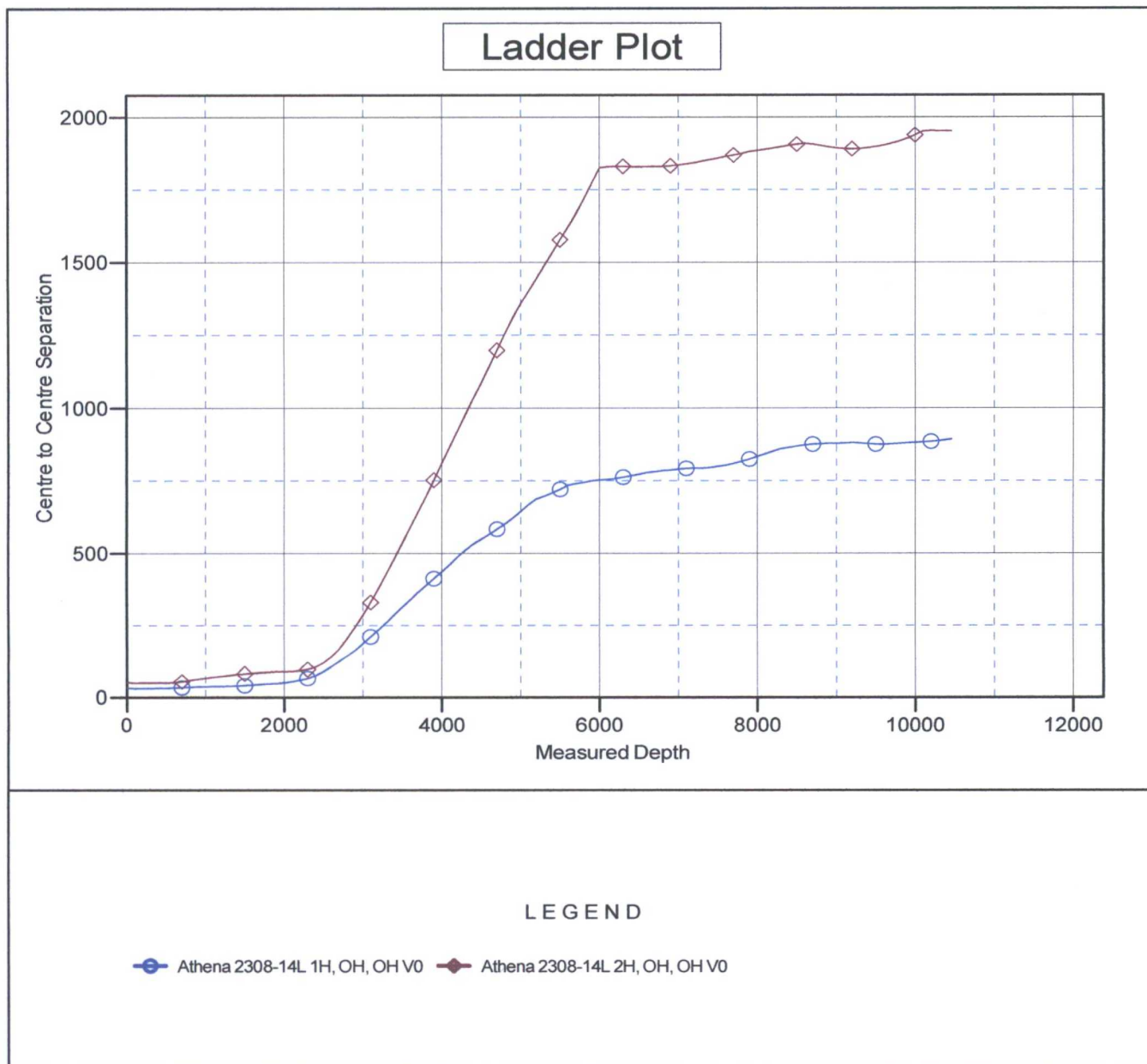
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Reference Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
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Reference Design:	Plan #1	Offset TVD Reference:	Reference Datum

Offset Design Athena 2308-14L - Athena 2308-14L 2H - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 415-SDI MWD, 6162-SDI MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore +N/-S (usft)	Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
9,800.00	5,162.07	10,091.00	5,120.06	123.28	111.17	-88.71	-1,776.10	-4,864.77	1,917.18	1,683.46	233.72	8.203		
9,900.00	5,161.46	10,154.00	5,119.54	125.80	112.70	-88.71	-1,779.82	-4,927.66	1,926.73	1,688.74	237.99	8.096		
10,000.00	5,160.84	10,218.00	5,118.81	128.32	114.26	-88.71	-1,785.03	-4,991.44	1,938.38	1,696.10	242.28	8.000		
10,100.00	5,160.22	10,363.47	5,115.97	130.84	117.80	-88.66	-1,797.06	-5,136.37	1,951.01	1,702.91	248.11	7.864		
10,200.00	5,159.60	10,695.67	5,110.47	133.35	125.89	-88.57	-1,795.63	-5,468.08	1,953.46	1,695.94	257.51	7.586		
10,300.00	5,158.99	10,770.97	5,112.97	135.87	127.72	-88.65	-1,791.60	-5,543.23	1,951.83	1,689.78	262.05	7.448		
10,343.88	5,158.71	10,797.76	5,113.85	136.98	128.37	-88.68	-1,790.47	-5,569.98	1,951.62	1,687.38	264.24	7.386		
10,400.00	5,158.37	10,846.06	5,115.63	138.39	129.55	-88.74	-1,788.86	-5,618.21	1,951.81	1,685.23	266.59	7.322		
10,459.62	5,158.00	10,869.00	5,116.48	139.90	130.11	-88.77	-1,788.10	-5,641.13	1,952.40	1,683.53	268.87	7.262 SF		

Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Athena 2308-14L 3H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Reference Site:	Athena 2308-14L	MD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	True
Reference Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to GL 6876' & RKB 25' @ 6903.00usft (A)
 Offset Depths are relative to Offset Datum
 Central Meridian is -107.833334

Coordinates are relative to: Athena 2308-14L 3H
 Coordinate System is US State Plane 1983, New Mexico Western Zone
 Grid Convergence at Surface is: 0.10°

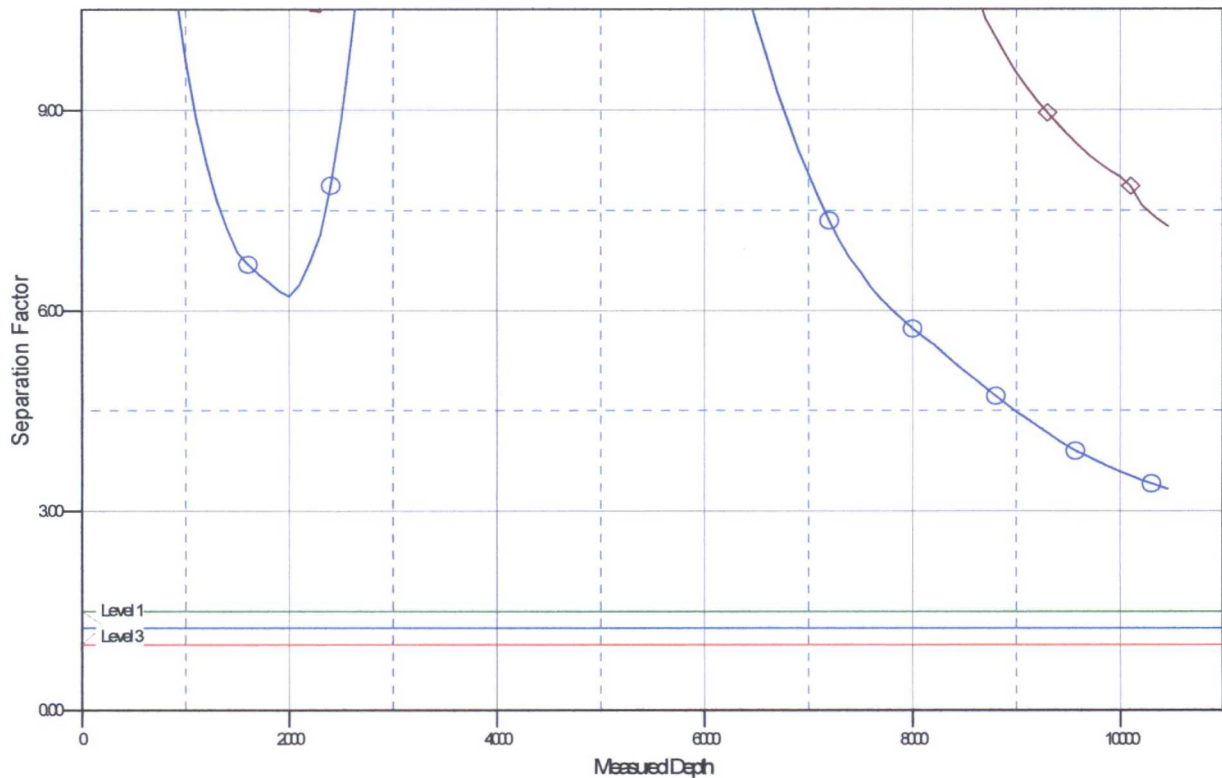


Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Athena 2308-14L 3H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
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Reference Well:	Athena 2308-14L 3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Grand Junction District
Reference Design:	Plan #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to GL 6876' & RKB 25' @ 6903.00usft (A)
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Central Meridian is -107.833334

Coordinates are relative to: Athena 2308-14L 3H
Coordinate System is US State Plane 1983, New Mexico Western Zone
Grid Convergence at Surface is: 0.10°

Separation Factor Plot



LEGEND

—○— Athena 2308-14L 1H, OH, OH V0 —◆— Athena 2308-14L 2H, OH, OH V0

Completion of the proposed well will include well stimulation (hydraulic fracturing). Water purchased for drilling and completion operations will be supplied from the following permitted water wells:

- Blanco Trading Post (Permit SJ 02105) Township 25N, Range 09W, SWNE Section 32, NMPM
- Turtle Mountain (Permit SJ 00960) Township 24N, Range 08W, SWSW Section 36, NMPM

Produced water from nearby existing gas wells will also be utilized for completions operations if such activity proves practicable. The water hauler(s) will access the proposed well pad via the roads described in the attached "Existing Roads" map. No water supply well will be drilled on this lease.

7 Construction Plan and Materials

The project will use existing well pad, access road, and pipeline infrastructure. No surface disturbances are anticipated for the addition of the Athena 2308 14L #3H well.

8 Methods for Handling Waste

Drilling operations will utilize a closed-loop system. Drilling of the horizontal lateral will be done using a water-based mud system. All water-based mud cuttings will be stored in metal containment bins until hauled to a commercial disposal facility. No reserve pit will be needed for this project. The drilling operations area will be enclosed by a containment berm and ditches, and the containment berm will be ramped to allow access to the solids control area. The contained operations area will drain gradually to one area of the pad which will be contoured for spill prevention and control.

LOGOS will follow New Mexico Oil Conservation Division Pit Rule and Onshore Orders No. 1 and No. 7 regarding placement, operation, and closure of the closed-loop system. No blow pit will be used. All refuse will be placed in metal trash basket and will be hauled off site and properly disposed in an approved landfill. Portable toilets will be provided and maintained during all construction, drilling and completion operations.

9 Ancillary Facilities

No additional ancillary facilities will be associated with the Athena 2308 14L #3H well.

10 Well Site Layout

The cuts, fills, and orientation for the existing Athena 2308 14L #1H and #2H well pad in addition to the proposed placement of the Athena 2308 14L #3H well are depicted on the construction plats included in the APD package.

11 Plans for Surface Reclamation

Well Control Equipment Schematic for 2M Service

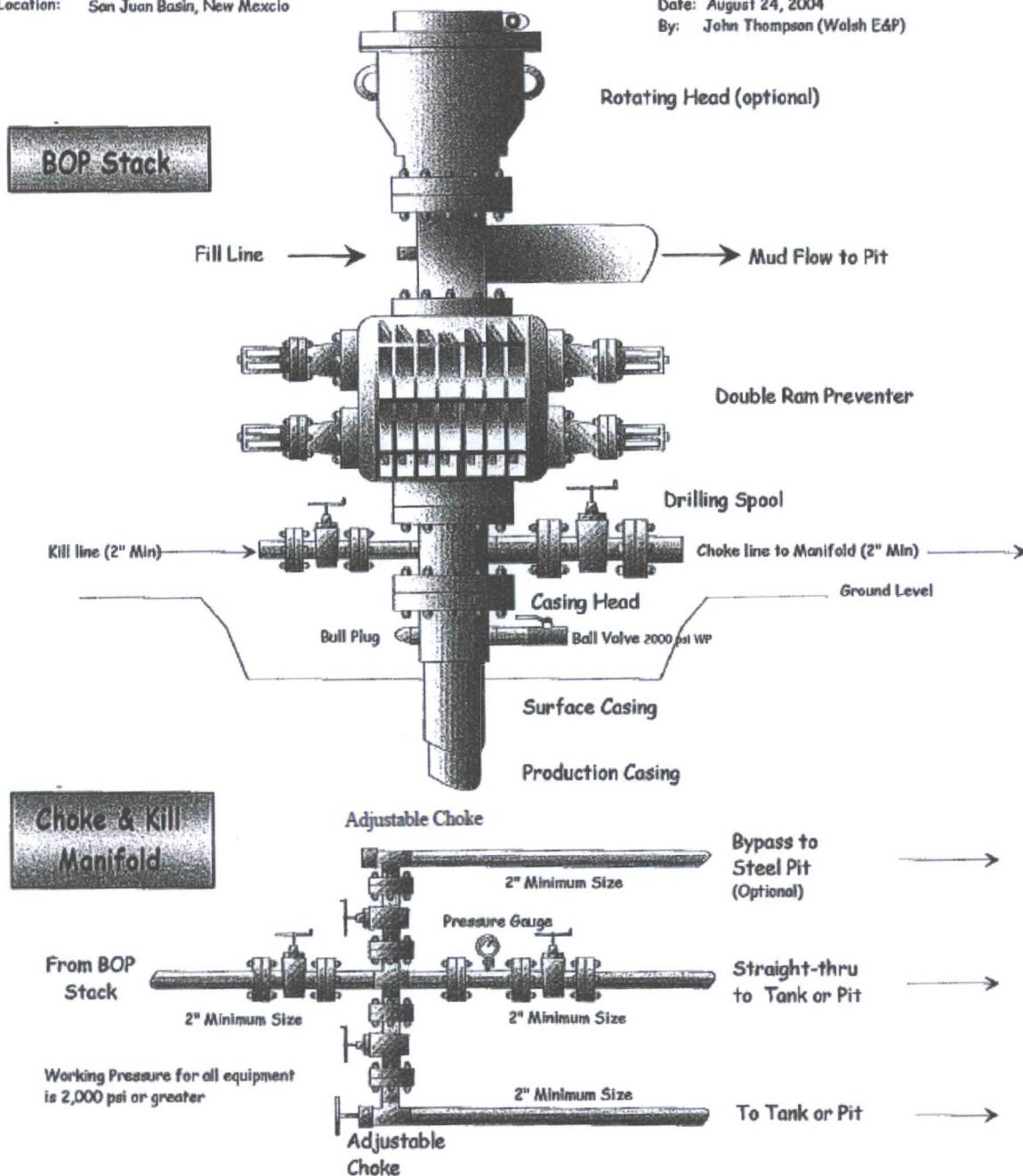
Attachment to Drilling Technical Program

Exhibit #1 Typical BOP setup

Location: San Juan Basin, New Mexico

Date: August 24, 2004

By: John Thompson (Welsh E&P)



**Directions from the Intersection of Highway 550 and Highway
64 in Bloomfield, NM**

to

LOGOS OPERATING, LLC

ATHENA 2308 14L #3H

2200' FSL 578' FWL,

**Section 14, T23N, R8W, N.M.P.M., San Juan County,
New Mexico**

Latitude: 36° 13' 32.653" N

Longitude: 107° 39' 29.667" W

Nad 1983

**From the Intersection of Highway 550 & Highway 64
Go South on Hwy 550 for 39.1 miles to Chaco Canyon road,
turn right (southerly) for 1.7 miles
turn left (easterly) thru cattle guard for 0.6 miles to Y-inetr,
stay left (east-northeasterly) for 1.9 miles,
stay rt (southeasterly) for 0.2 miles
to the new location on the right (west) side of the road.**