

RECEIVED

Form 3160-5
(June 2015)UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

JUN 01 2018

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

SUNDRY NOTICES AND REPORTS ON WELLS
Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

5. Lease Serial No. NMNM18463

6. If Indian, Allottee or Tribe Name

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

8. Well Name and No. Athena 2308 14L 3H

9. API Well No. 30-045-35876

10. Field and Pool or Exploratory Area
Basin Mancos11. Country or Parish, State
San Juan County, NM

SUBMIT IN TRIPLICATE - Other instructions on page 2

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other

2. Name of Operator

LOGOS Operating, LLC

3a. Address

2010 Afton Place
Farmington, NM 87401

3b. Phone No. (include area code)

(505) 787-2218

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

2200 FSL & 578 FWL, NW/SW, L Sec 14 T23N R08W

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

TYPE OF SUBMISSION

TYPE OF ACTION

☒ Notice of Intent☐ Subsequent Report☐ Final Abandonment Notice☐ Acidize☐ Alter Casing☐ Casing Repair☒ Change Plans☐ Convert to Injection☐ Deepen☐ Hydraulic Fracturing☐ New Construction☐ Plug and Abandon☐ Plug Back☐ Production (Start/Resume)☐ Reclamation☐ Recomplete☐ Temporarily Abandon☐ Water Disposal☐ Water Shut-Off☐ Well Integrity☐ Other

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleate horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleation in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

NMOCB

JUN 08 2018

DISTRICT III

LOGOS Operating LLC, request a change in plans to the Point of Entry (POE), Last Perforation (LP) and Total Depth(TD), per the attached C102 Plat, the Drilling and Directional Drill Plan.

**ADHERE TO PREVIOUS NMOCB
CONDITIONS OF APPROVAL**

**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**

14. I hereby certify that the foregoing is true and correct. Name (Printed/Typed)

Marie E. Florez

Regulatory Specialist

Title

Signature

Date

05/31/2018

THE SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

Title

RE

Date

6/7/18

Conditions of approval, if any, are attached. Approval of this notice 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.

Office

FFO

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.

(Instructions on page 2)

NMOCB A

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DISTRICT I
1825 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, N.M. 88210
Phone: (575) 748-1263 Fax: (575) 748-8720

DISTRICT III
1000 Rio Brazos Rd., Artesia, N.M. 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

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

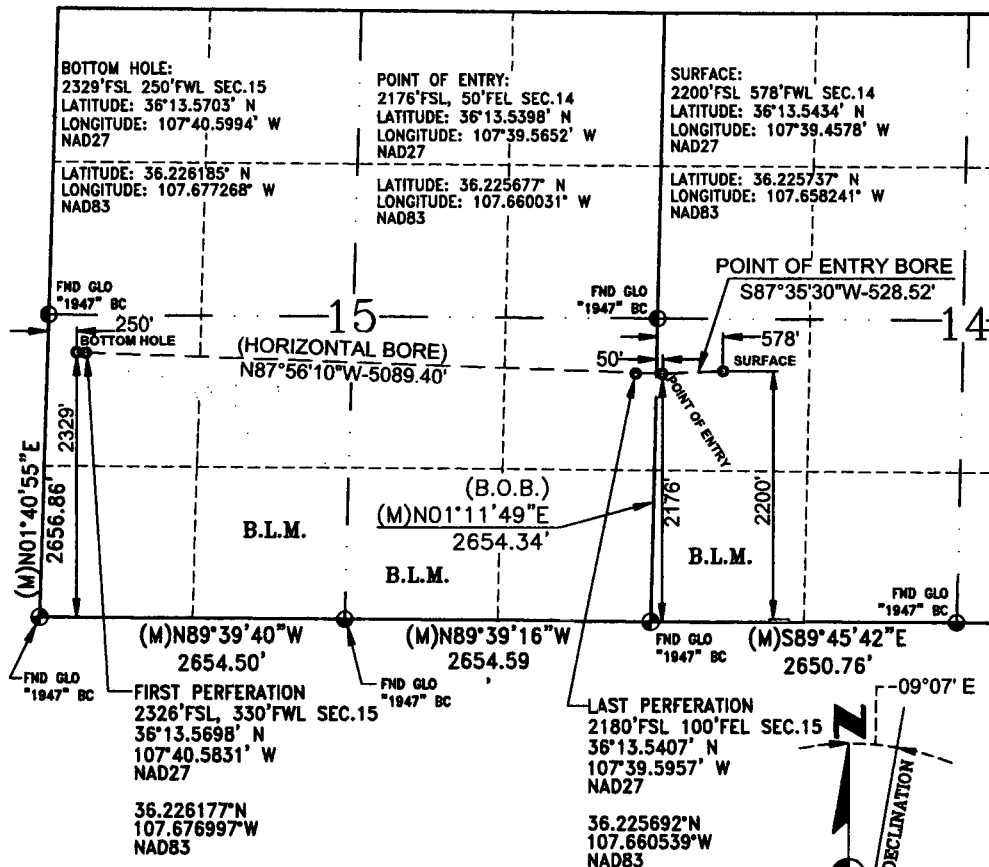
¹¹ Bottom Hole Location If Different From Surface

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

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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.

Marie E. Florez 5/31/2018
Signature Date

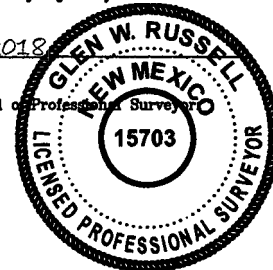
Marie E. Florez
Printed Name
mflorez@logosresourcesllc.com
E-mail Address

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 26, 2018
Date of Survey

Signature and Seal of Professional Surveyor



GLEN W. RUSSELL
Certificate Number 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" E A DISTANCE OF 2654.34 FEET AS MEASURED BY G.P.S. LOCAL NAD83.

**Sundry Drilling Plan
LOGOS Operating,
LLC**

Change in Plans 5/30/2018

**Athena 2308 14L #3H
API # 30-045-35876
Lease Serial # NMNM18463**

Surface Location: 2200 FSL, 578 FWL

Legal Description: Sec 14, T23N, R8W (36.225737° N, 107.658241° 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/10,502' 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	908	908
Kirtland	1,083	1,083
Fruitland	1,165	1,165
Pictured Cliffs	1,525	1,525
Chacra	2,314	2,314
Cliff House	2,976	2,976
Menefee	3,051	3,051
Point Lookout	3,922	3,922
Mancos	4,106	4,106
Gallup	4,800	4,812

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'-10,502'	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 10,502' MD. It will be a conventional liner job using 30% excess for TOC at 5,451' MD liner top, Cement slurry consist of 455 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' - 10,502'	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:

- a. Testing Program: No drillstem tests are anticipated
- b. Electric Logging Program: None
- c. LWD Program: TBD
- d. Coring Program: None anticipated.
- e. CBL's and/or Temperature Surveys Will Be Performed as Needed or Required.
- f. 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.

Well Control Equipment Schematic for 2M Service

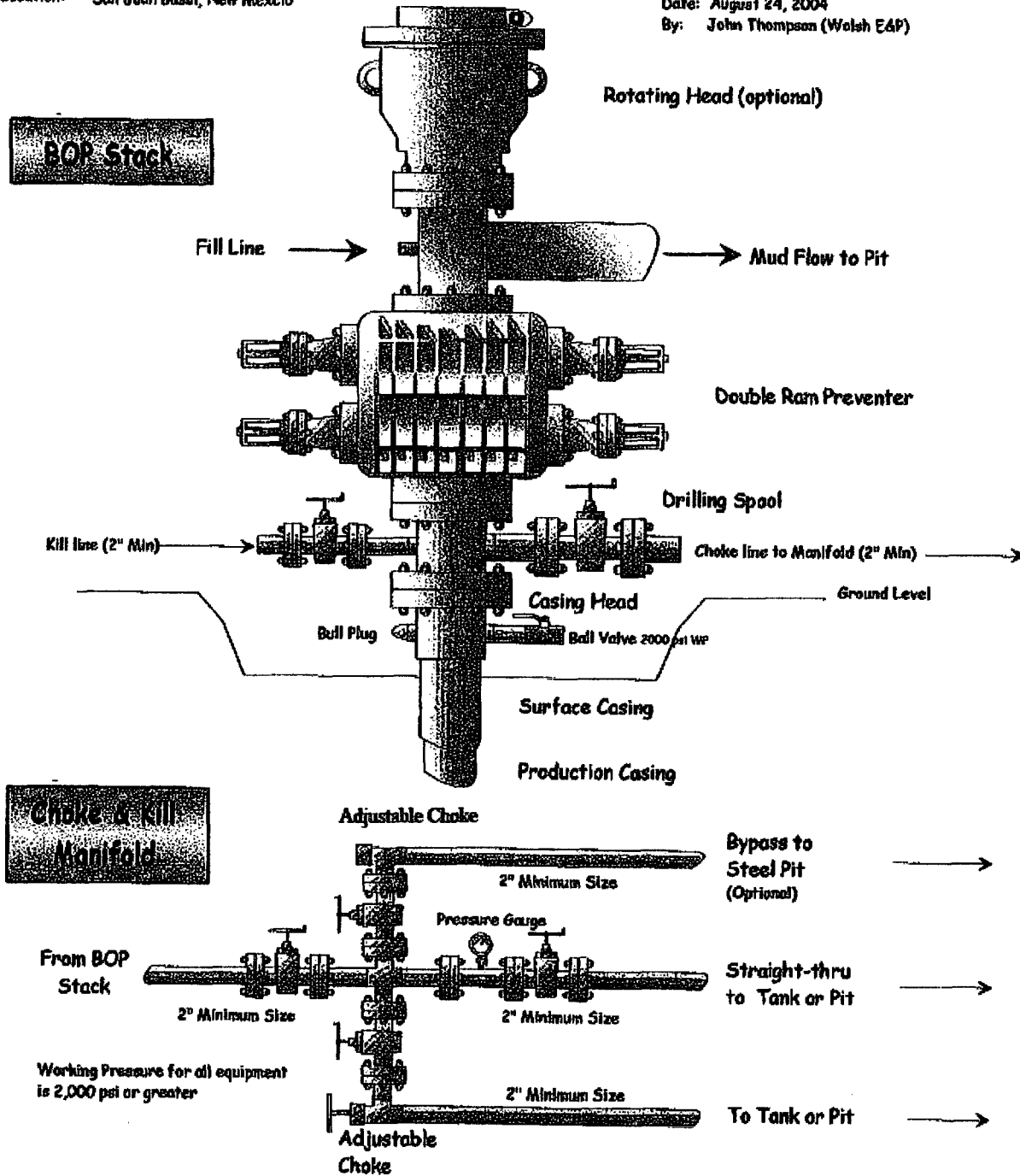
Attachment to Drilling Technical Program

Exhibit #1 Typical BOP setup

Location: San Juan Basin, New Mexico

Date: August 24, 2004

By: John Thompson (Walsh E&P)





Company: Logos Operating LLC
Project: San Juan, NM NAD83
Site: Athena 2308-14L
Well: Athena 2308-14L 3H
Wellbore: OH
Design: Plan #2

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 #2 (Athena 2308-14L 3H/OH)

Created By: Janie Collins Date: 9:10, May 25 2018

DESIGN TARGET DETAILS

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

SECTION DETAILS

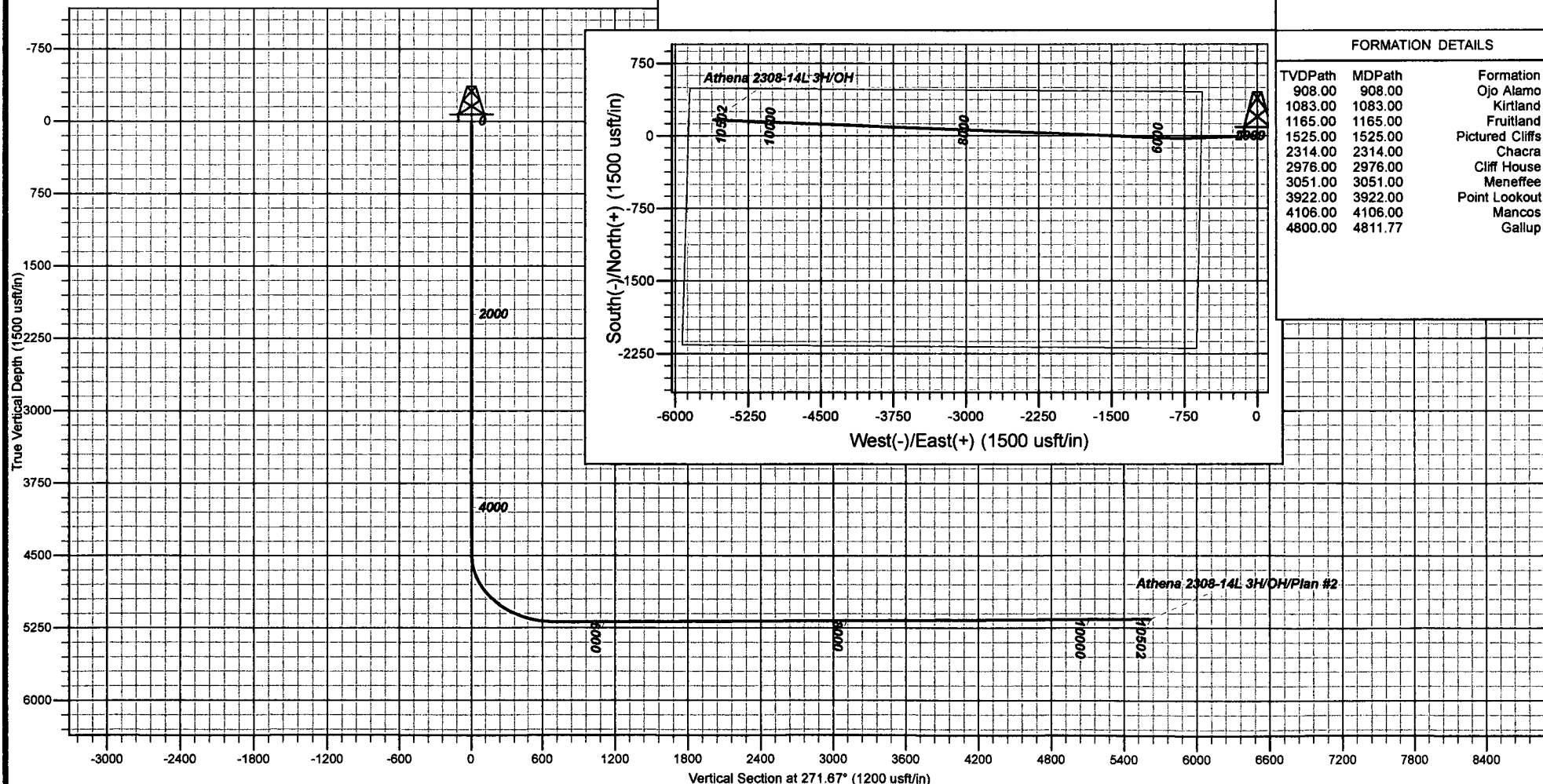
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2000.00	0.00	0.00	2000.00	0.00	0.00	0.00	0.00	0.00	
4483.25	0.00	0.00	4483.25	0.00	0.00	0.00	0.00	0.00	
5590.28	90.00	268.00	5188.00	-24.60	-704.32	8.13	268.00	703.30	
5805.53	90.38	272.29	5187.32	-24.05	-919.53	2.00	85.23	918.44	
10501.69	90.38	272.29	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	2314.00	Chacra
2976.00	2976.00	Cliff House
3051.00	3051.00	Menefee
3922.00	3922.00	Point Lookout
4106.00	4106.00	Mancos
4800.00	4811.77	Gallup





Logos Operating LLC

San Juan, NM NAD83

Athena 2308-14L

Athena 2308-14L 3H

OH

Plan: Plan #2

Standard Planning Report

25 May, 2018



www.scientificdrilling.com



Scientific Drilling, Intl
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 #2		

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
From:	Lat/Long	Easting:	2,774,726.48 usft
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	Latitude: 36.2257370
	+E/-W	7.37 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
			(°)
	HDGM	4/18/2018	8.90
			Dip Angle
			(°)
			Field Strength
			(nT)
			49,548

Design	Plan #2		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			271.67

Plan Sections										
Measured Depth	Inclination	Azimuth	Vertical Depth	+N/-S	+E/-W	Dogleg Rate	Build Rate	Turn Rate	TFO	Target
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(°/100usft)	(°/100usft)	(°/100usft)	(°)	
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	
4,483.25	0.00	0.00	4,483.25	0.00	0.00	0.00	0.00	0.00	0.00	
5,590.26	90.00	268.00	5,188.00	-24.60	-704.32	8.13	8.13	0.00	268.00	
5,805.53	90.36	272.29	5,187.32	-24.05	-919.53	2.00	0.17	1.99	85.23	
10,501.69	90.36	272.29	5,158.00	163.63	-5,611.85	0.00	0.00	0.00	0.00	Athena 3H BHL



Scientific Drilling, Intl
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 #2		

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	0.00	0.00	2,061.34	0.00	0.00	0.00	0.00	0.00	0.00
Start 2421.59 hold at 2061.34 MD									
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,314.00	0.00	0.00	2,314.00	0.00	0.00	0.00	0.00	0.00	0.00
Chacra									
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,976.00	0.00	0.00	2,976.00	0.00	0.00	0.00	0.00	0.00	0.00
Cliff House									
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,051.00	0.00	0.00	3,051.00	0.00	0.00	0.00	0.00	0.00	0.00
Maneffee									
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00



Scientific Drilling, Intl
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 #2		

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	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,922.00	0.00	0.00	3,922.00	0.00	0.00	0.00	0.00	0.00	0.00	
Point Lookout										
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,106.00	0.00	0.00	4,106.00	0.00	0.00	0.00	0.00	0.00	0.00	
Mancos										
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,482.93	0.00	0.00	4,482.93	0.00	0.00	0.00	0.00	0.00	0.00	
Start DLS 8.00 TFO 46.96										
4,483.25	0.00	0.00	4,483.25	0.00	0.00	0.00	0.00	0.00	0.00	
4,500.00	1.36	268.00	4,500.00	-0.01	-0.20	0.20	8.13	8.13	0.00	
4,600.00	9.49	268.00	4,599.47	-0.34	-9.64	9.63	8.13	8.13	0.00	
4,700.00	17.62	268.00	4,696.60	-1.15	-33.05	33.00	8.13	8.13	0.00	
4,800.00	25.75	268.00	4,789.44	-2.44	-69.95	69.85	8.13	8.13	0.00	
4,811.77	26.71	268.00	4,800.00	-2.62	-75.15	75.04	8.13	8.13	0.00	
Gallup										
4,900.00	33.88	268.00	4,876.13	-4.18	-119.60	119.43	8.13	8.13	0.00	
5,000.00	42.01	268.00	4,954.92	-6.32	-181.00	180.74	8.13	8.13	0.00	
5,100.00	50.14	268.00	5,024.24	-8.83	-252.93	252.56	8.13	8.13	0.00	
5,200.00	58.27	268.00	5,082.67	-11.66	-333.92	333.44	8.13	8.13	0.00	
5,300.00	66.40	268.00	5,129.06	-14.75	-422.36	421.75	8.13	8.13	0.00	
5,400.00	74.53	268.00	5,162.47	-18.04	-516.47	515.73	8.13	8.13	0.00	
5,500.00	82.66	268.00	5,182.22	-21.45	-614.36	613.47	8.13	8.13	0.00	
5,590.26	90.00	268.00	5,188.00	-24.60	-704.32	703.30	8.13	8.13	0.00	
5,600.00	90.02	268.19	5,187.99	-24.92	-714.05	713.02	2.00	0.17	1.99	
5,601.89	90.02	268.23	5,187.99	-24.98	-715.93	714.90	2.00	0.17	1.99	
Landing Point @ 5601' MD										
5,643.56	90.09	269.06	5,187.95	-25.96	-757.60	756.52	2.00	0.17	1.99	
Athena 3H LP										
5,656.00	90.11	269.31	5,187.93	-26.14	-770.04	768.95	2.00	0.17	1.99	
Last Perf @ 5656' MD - 36.2256856, -107.6609933										
5,700.00	90.18	270.19	5,187.82	-26.33	-814.03	812.92	2.00	0.17	1.99	
5,800.00	90.35	272.18	5,187.36	-24.27	-914.01	912.91	2.00	0.17	1.99	
5,805.53	90.36	272.29	5,187.32	-24.05	-919.53	918.44	2.00	0.17	1.99	
5,900.00	90.36	272.29	5,186.73	-20.27	-1,013.93	1,012.90	0.00	0.00	0.00	
6,000.00	90.36	272.29	5,186.11	-16.28	-1,113.84	1,112.90	0.00	0.00	0.00	
6,100.00	90.36	272.29	5,185.48	-12.28	-1,213.76	1,212.89	0.00	0.00	0.00	
6,200.00	90.36	272.29	5,184.86	-8.28	-1,313.68	1,312.88	0.00	0.00	0.00	
6,300.00	90.36	272.29	5,184.24	-4.29	-1,413.60	1,412.87	0.00	0.00	0.00	
6,400.00	90.36	272.29	5,183.61	-0.29	-1,513.52	1,512.86	0.00	0.00	0.00	
6,500.00	90.36	272.29	5,182.99	3.70	-1,613.43	1,612.86	0.00	0.00	0.00	
6,600.00	90.36	272.29	5,182.36	7.70	-1,713.35	1,712.85	0.00	0.00	0.00	
6,700.00	90.36	272.29	5,181.74	11.70	-1,813.27	1,812.84	0.00	0.00	0.00	



Scientific Drilling, Intl
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 #2		

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)
6,800.00	90.36	272.29	5,181.11	15.69	-1,913.19	1,912.83	0.00	0.00	0.00
6,900.00	90.36	272.29	5,180.49	19.69	-2,013.11	2,012.83	0.00	0.00	0.00
7,000.00	90.36	272.29	5,179.86	23.69	-2,113.02	2,112.82	0.00	0.00	0.00
7,100.00	90.36	272.29	5,179.24	27.68	-2,212.94	2,212.81	0.00	0.00	0.00
7,200.00	90.36	272.29	5,178.62	31.68	-2,312.86	2,312.80	0.00	0.00	0.00
7,300.00	90.36	272.29	5,177.99	35.68	-2,412.78	2,412.79	0.00	0.00	0.00
7,400.00	90.36	272.29	5,177.37	39.67	-2,512.70	2,512.79	0.00	0.00	0.00
7,500.00	90.36	272.29	5,176.74	43.67	-2,612.62	2,612.78	0.00	0.00	0.00
7,600.00	90.36	272.29	5,176.12	47.67	-2,712.53	2,712.77	0.00	0.00	0.00
7,700.00	90.36	272.29	5,175.49	51.66	-2,812.45	2,812.76	0.00	0.00	0.00
7,800.00	90.36	272.29	5,174.87	55.66	-2,912.37	2,912.76	0.00	0.00	0.00
7,900.00	90.36	272.29	5,174.25	59.66	-3,012.29	3,012.75	0.00	0.00	0.00
8,000.00	90.36	272.29	5,173.62	63.65	-3,112.21	3,112.74	0.00	0.00	0.00
8,100.00	90.36	272.29	5,173.00	67.65	-3,212.12	3,212.73	0.00	0.00	0.00
8,200.00	90.36	272.29	5,172.37	71.65	-3,312.04	3,312.72	0.00	0.00	0.00
8,300.00	90.36	272.29	5,171.75	75.64	-3,411.96	3,412.72	0.00	0.00	0.00
8,400.00	90.36	272.29	5,171.12	79.64	-3,511.88	3,512.71	0.00	0.00	0.00
8,500.00	90.36	272.29	5,170.50	83.64	-3,611.80	3,612.70	0.00	0.00	0.00
8,600.00	90.36	272.29	5,169.87	87.63	-3,711.72	3,712.69	0.00	0.00	0.00
8,700.00	90.36	272.29	5,169.25	91.63	-3,811.63	3,812.68	0.00	0.00	0.00
8,800.00	90.36	272.29	5,168.63	95.62	-3,911.55	3,912.68	0.00	0.00	0.00
8,900.00	90.36	272.29	5,168.00	99.62	-4,011.47	4,012.67	0.00	0.00	0.00
9,000.00	90.36	272.29	5,167.38	103.62	-4,111.39	4,112.66	0.00	0.00	0.00
9,100.00	90.36	272.29	5,166.75	107.61	-4,211.31	4,212.65	0.00	0.00	0.00
9,200.00	90.36	272.29	5,166.13	111.61	-4,311.22	4,312.65	0.00	0.00	0.00
9,300.00	90.36	272.29	5,165.50	115.61	-4,411.14	4,412.64	0.00	0.00	0.00
9,400.00	90.36	272.29	5,164.88	119.60	-4,511.06	4,512.63	0.00	0.00	0.00
9,500.00	90.36	272.29	5,164.25	123.60	-4,610.98	4,612.62	0.00	0.00	0.00
9,600.00	90.36	272.29	5,163.63	127.60	-4,710.90	4,712.61	0.00	0.00	0.00
9,700.00	90.36	272.29	5,163.01	131.59	-4,810.82	4,812.61	0.00	0.00	0.00
9,800.00	90.36	272.29	5,162.38	135.59	-4,910.73	4,912.60	0.00	0.00	0.00
9,900.00	90.36	272.29	5,161.76	139.59	-5,010.65	5,012.59	0.00	0.00	0.00
10,000.00	90.36	272.29	5,161.13	143.58	-5,110.57	5,112.58	0.00	0.00	0.00
10,100.00	90.36	272.29	5,160.51	147.58	-5,210.49	5,212.58	0.00	0.00	0.00
10,200.00	90.36	272.29	5,159.88	151.58	-5,310.41	5,312.57	0.00	0.00	0.00
10,300.00	90.36	272.29	5,159.26	155.57	-5,410.32	5,412.56	0.00	0.00	0.00
10,400.00	90.36	272.29	5,158.64	159.57	-5,510.24	5,512.55	0.00	0.00	0.00
10,409.00	90.36	272.29	5,158.58	159.93	-5,519.23	5,521.55	0.00	0.00	0.00
First Perf @ 10,409' MD - 36.2261797, -107.6770965									
10,459.62	90.36	272.29	5,158.26	161.95	-5,569.81	5,572.16	0.00	0.00	0.00
TD at 10459.62									
10,500.00	90.36	272.29	5,158.01	163.57	-5,610.16	5,612.54	0.00	0.00	0.00
10,501.69	90.36	272.29	5,158.00	163.63	-5,611.85	5,614.23	0.00	0.00	0.00
Athena 3H BHL									



Scientific Drilling, Intl
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 #2		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
Athena 3H BHL	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	0.00	0.00	5,188.00	-20.74	-757.71	1,901,490.77	2,773,976.13	36.2256800	-107.6608100
- plan misses target center by 5.22usft at 5643.60usft MD (5187.95 TVD, -25.96 N, -757.63 E)									
- Point									

Formations						
Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction	
(usft)	(usft)			(°)	(°)	
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	
2,314.00	2,314.00	Chacra		0.00	0.00	
2,976.00	2,976.00	Cliff House		0.00	0.00	
3,051.00	3,051.00	Meneffee		0.00	0.00	
3,922.00	3,922.00	Point Lookout		0.00	0.00	
4,106.00	4,106.00	Mancos		0.00	0.00	
4,811.77	4,800.00	Gallup		0.00	0.00	

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(usft)	(usft)	+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 #2

Anticollision Report

24 May, 2018



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Scientific Drilling, Intl
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 #2	Offset TVD Reference:	Offset Datum

Reference	Plan #2		
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 15,000.00 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date 5/24/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	10,480.01	Plan #2 (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Athena 2308-14L						
Athena 2308-14L 1H - OH - OH	100.00	88.97	30.08	29.90	166.174	CC
Athena 2308-14L 1H - OH - OH	700.00	688.39	31.57	29.16	13.099	ES
Athena 2308-14L 1H - OH - OH	10,480.01	10,403.00	893.01	623.82	3.317	SF
Athena 2308-14L 2H - OH - OH	100.00	88.99	49.99	49.81	275.815	CC
Athena 2308-14L 2H - OH - OH	600.00	587.93	50.76	48.73	25.073	ES
Athena 2308-14L 2H - OH - OH	10,480.01	10,869.00	1,952.40	1,682.43	7.232	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	Vertical Depth (usft)	Measured Depth (usft)	Offset	Vertical Depth (usft)	Semi Major Axis	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance	Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Offset	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance	Minimum Separation (usft)	Separation Factor	Warning	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	-165.79	-29.12	-7.37	31.99				
100.00	100.00	88.97	88.97	0.08	0.10	-165.81	-29.17	-7.37	30.08	29.90	0.18	166.174	CC	
200.00	200.00	188.94	188.94	0.31	0.21	-165.88	-29.32	-7.38	30.24	29.72	0.51	58.778		
300.00	300.00	288.90	288.90	0.53	0.31	-165.99	-29.59	-7.38	30.50	29.65	0.85	35.974		
400.00	400.00	388.87	388.87	0.76	0.42	-166.16	-29.97	-7.39	30.87	29.69	1.18	26.136		
500.00	500.00	488.83	488.83	0.98	0.60	-166.18	-30.43	-7.49	31.34	29.75	1.59	19.752		
600.00	599.98	588.74	588.74	1.19	0.81	72.94	-31.15	-7.75	31.55	29.55	2.00	15.777		
651.99	651.92	640.55	640.54	1.29	0.92	77.06	-31.58	-7.96	31.43	29.22	2.21	14.217		
700.00	699.84	688.39	688.38	1.39	1.02	82.42	-32.16	-8.28	31.57	29.16	2.41	13.099	ES	
800.00	799.45	787.88	787.86	1.61	1.24	97.77	-33.46	-8.15	33.17	30.32	2.85	11.624		
900.00	898.70	887.25	887.21	1.86	1.45	116.40	-34.52	-10.64	38.70	35.40	3.31	11.704		
1,000.00	997.47	985.87	985.83	2.16	1.64	133.37	-34.58	-11.73	48.90	45.15	3.75	13.028		
1,100.00	1,095.62	1,083.50	1,083.43	2.51	1.85	145.56	-34.70	-13.33	65.24	61.04	4.20	15.516		
1,200.00	1,193.44	1,181.27	1,181.19	2.89	2.05	153.45	-34.75	-15.08	85.06	80.41	4.65	18.289		
1,300.00	1,291.25	1,279.25	1,279.16	3.29	2.26	158.27	-35.03	-16.30	105.28	100.18	5.10	20.655		
1,400.00	1,389.07	1,376.67	1,376.58	3.71	2.46	161.42	-35.52	-17.47	125.87	120.32	5.55	22.695		
1,500.00	1,486.88	1,473.59	1,473.48	4.13	2.67	163.69	-35.85	-18.97	147.10	141.10	6.00	24.525		
1,600.00	1,585.48	1,571.02	1,570.89	4.47	2.88	161.51	-36.57	-21.21	164.84	158.41	6.43	25.618		
1,700.00	1,685.13	1,670.83	1,670.66	4.69	3.09	142.36	-37.43	-23.57	174.13	167.29	6.84	25.464		
1,800.00	1,785.07	1,771.38	1,771.18	4.82	3.30	9.92	-38.31	-25.92	174.79	167.56	7.23	24.172		

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



Scientific Drilling, Intl
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 #2	Offset TVD Reference:	Offset 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
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
1,900.00	1,884.85	1,871.30	1,871.08	4.92	3.51	6.63	-39.08	-27.88	169.82	162.22	7.61	22.319	
2,000.00	1,984.63	1,971.11	1,970.86	5.03	3.72	6.36	-40.04	-29.71	164.61	156.61	8.00	20.583	
2,100.00	2,084.41	2,070.39	2,070.02	5.14	3.94	5.08	-43.48	-32.97	159.97	151.55	8.41	19.017	
2,200.00	2,184.19	2,173.92	2,173.25	5.27	4.18	2.45	-50.30	-36.89	155.06	146.19	8.87	17.481	
2,300.00	2,283.96	2,276.01	2,274.87	5.40	4.41	-1.17	-60.00	-37.59	148.79	137.46	9.33	15.727	
2,400.00	2,383.74	2,372.55	2,370.66	5.54	4.65	-6.11	-71.73	-39.78	140.38	130.58	9.81	14.312	
2,500.00	2,483.52	2,470.36	2,467.35	5.69	4.92	-12.80	-86.14	-43.03	136.20	125.89	10.32	13.200	
2,577.96	2,561.30	2,546.03	2,541.77	5.82	5.14	-18.74	-99.48	-46.16	135.12	124.40	10.73	12.598	
2,600.00	2,583.30	2,567.09	2,562.43	5.85	5.21	-20.56	-103.45	-47.12	135.24	124.40	10.84	12.477	
2,700.00	2,683.07	2,665.97	2,659.17	6.01	5.52	-29.50	-123.38	-51.58	138.00	126.64	11.36	12.149	
2,800.00	2,782.85	2,764.98	2,755.73	6.18	5.83	-39.03	-145.17	-53.38	142.45	130.61	11.84	12.034	
2,900.00	2,882.63	2,859.18	2,847.43	6.35	6.16	-47.56	-166.64	-55.32	151.27	139.04	12.23	12.365	
3,000.00	2,982.40	2,954.26	2,939.59	6.53	6.53	-55.44	-189.91	-57.74	164.86	152.25	12.62	13.067	
3,100.00	3,082.18	3,047.48	3,029.53	6.72	6.91	-62.25	-214.30	-60.29	182.66	169.70	12.96	14.097	
3,200.00	3,181.96	3,146.57	3,125.15	6.90	7.29	-68.10	-240.09	-63.23	202.75	189.39	13.36	15.179	
3,300.00	3,281.74	3,239.09	3,214.45	7.10	7.66	-72.72	-264.17	-65.35	224.16	210.47	13.69	16.379	
3,400.00	3,381.51	3,331.82	3,303.23	7.29	8.08	-76.92	-290.88	-67.05	249.14	235.10	14.04	17.745	
3,500.00	3,481.29	3,429.96	3,397.34	7.49	8.50	-80.63	-318.67	-68.37	274.64	260.17	14.47	18.986	
3,600.00	3,581.07	3,526.85	3,490.34	7.69	8.92	-83.79	-345.86	-68.82	300.51	285.62	14.89	20.184	
3,700.00	3,680.85	3,627.15	3,586.93	7.90	9.35	-86.55	-372.90	-68.97	325.94	310.58	15.35	21.227	
3,800.00	3,780.62	3,726.74	3,683.08	8.11	9.78	-88.93	-398.82	-68.56	350.93	335.11	15.82	22.185	
3,900.00	3,880.40	3,821.70	3,774.84	8.32	10.20	-90.82	-423.26	-68.56	376.17	359.92	16.25	23.151	
4,000.00	3,980.18	3,921.01	3,871.06	8.54	10.63	-92.30	-447.73	-70.15	400.92	384.20	16.73	23.968	
4,100.00	4,079.96	4,005.30	3,952.44	8.75	11.02	-93.44	-469.68	-71.53	427.28	410.20	17.08	25.022	
4,200.00	4,179.73	4,099.80	4,043.20	8.98	11.48	-94.53	-495.92	-73.61	455.59	438.05	17.53	25.984	
4,300.00	4,279.51	4,210.39	4,149.99	9.20	11.98	-95.76	-524.60	-74.94	482.11	463.98	18.13	26.591	
4,400.00	4,379.29	4,325.78	4,262.24	9.43	12.46	-96.85	-551.08	-78.09	508.04	487.30	18.74	27.002	
4,500.00	4,479.07	4,439.74	4,374.09	9.65	12.89	-97.33	-572.55	-81.79	525.88	506.57	19.31	27.234	
4,600.00	4,578.61	4,525.84	4,457.97	9.89	13.21	-98.96	-586.90	-84.25	544.75	525.05	19.71	27.642	
4,700.00	4,676.12	4,614.39	4,540.84	10.17	13.59	-98.41	-602.71	-120.98	565.68	545.51	20.17	28.046	
4,800.00	4,769.66	4,698.41	4,616.44	10.52	13.97	-82.72	-617.20	-154.54	586.16	565.43	20.73	28.277	
4,900.00	4,857.41	4,771.00	4,678.38	10.99	14.37	-80.76	-631.49	-189.54	608.45	587.02	21.43	28.387	
5,000.00	4,937.65	4,834.00	4,730.18	11.62	14.77	-79.36	-646.55	-222.09	633.18	610.78	22.40	28.265	
5,100.00	5,008.82	4,920.11	4,800.41	12.49	15.37	-79.27	-669.24	-266.43	658.49	634.45	24.03	27.397	
5,200.00	5,069.54	5,066.79	4,914.84	13.61	16.50	-81.56	-703.56	-351.28	681.53	654.87	26.66	25.566	
5,300.00	5,118.63	5,203.70	5,012.27	15.00	17.61	-83.91	-719.62	-445.85	692.74	683.18	29.56	23.437	
5,400.00	5,155.14	5,269.28	5,051.70	16.65	18.27	-84.49	-726.72	-497.70	704.56	672.00	32.55	21.642	
5,500.00	5,178.34	5,358.99	5,093.12	18.50	19.37	-85.26	-737.05	-576.45	717.89	681.85	36.05	19.916	
5,600.00	5,187.79	5,459.61	5,128.01	20.49	20.83	-86.34	-749.72	-669.93	732.70	692.81	39.89	18.369	
5,700.00	5,187.52	5,637.08	5,163.48	22.58	23.75	-88.98	-757.02	-843.09	739.39	694.99	44.40	16.653	
5,800.00	5,186.90	5,720.18	5,165.39	24.74	24.94	-89.17	-757.25	-926.13	743.38	695.22	48.16	15.436	
5,900.00	5,186.29	5,813.66	5,159.86	26.97	26.00	-88.80	-759.15	-1,019.42	749.27	697.64	51.63	14.511	
6,000.00	5,185.67	5,941.98	5,155.88	29.25	27.46	-88.56	-758.72	-1,147.66	752.86	697.58	55.07	13.666	
6,100.00	5,185.05	6,044.88	5,159.41	31.56	28.81	-88.88	-756.40	-1,250.46	754.09	695.24	58.85	12.814	
6,200.00	5,184.43	6,129.04	5,161.42	33.91	30.02	-89.08	-755.81	-1,334.60	757.09	694.29	62.81	12.054	
6,300.00	5,183.81	6,224.16	5,162.19	36.28	31.51	-89.18	-756.16	-1,429.71	761.23	694.34	66.89	11.380	
6,400.00	5,183.20	6,326.11	5,162.44	38.67	33.22	-89.25	-756.99	-1,531.65	765.84	694.72	71.11	10.769	
6,500.00	5,182.58	6,415.48	5,164.50	41.08	34.81	-89.45	-758.12	-1,620.99	770.85	695.47	75.38	10.226	
6,600.00	5,181.96	6,508.84	5,164.09	43.50	36.55	-89.47	-760.32	-1,714.32	776.99	697.26	79.73	9.745	
6,700.00	5,181.34	6,603.00	5,163.66	45.93	39.01	-89.50	-760.44	-1,841.47	780.67	696.27	84.40	9.250	
6,800.00	5,180.73	6,729.09	5,162.83	48.37	40.89	-89.48	-760.17	-1,934.56	784.16	695.25	88.91	8.819	

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



Scientific Drilling, Intl
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 #2	Offset TVD Reference:	Offset 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							
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
6,900.00	5,180.11	6,842.25	5,160.94	50.82	43.22	-89.40	-759.06	-2,047.89	788.97	693.35	93.61	8.406	
7,000.00	5,179.49	6,936.56	5,161.16	53.28	45.21	-89.46	-757.84	-2,141.99	789.46	691.22	98.24	8.036	
7,100.00	5,178.87	7,044.67	5,160.26	55.74	47.54	-89.44	-756.72	-2,250.08	792.26	689.27	103.00	7.692	
7,200.00	5,178.26	7,155.33	5,157.31	58.21	49.97	-89.28	-753.31	-2,360.65	792.95	685.15	107.80	7.356	
7,300.00	5,177.64	7,255.88	5,154.32	60.69	52.20	-89.11	-749.84	-2,461.09	793.33	680.75	112.57	7.047	
7,400.00	5,177.02	7,341.34	5,153.76	63.17	54.12	-89.11	-747.97	-2,546.53	794.89	677.63	117.26	6.779	
7,500.00	5,176.40	7,414.51	5,153.23	65.65	55.79	-89.11	-747.69	-2,619.69	798.44	676.88	121.76	6.557	
7,600.00	5,175.79	7,525.18	5,155.86	68.14	58.33	-89.35	-749.01	-2,730.31	803.39	676.66	126.73	6.340	
7,700.00	5,175.17	7,609.00	5,157.01	70.63	60.27	-89.47	-749.81	-2,814.12	808.21	676.87	131.34	6.154	
7,800.00	5,174.55	7,697.27	5,158.36	73.12	62.33	-89.61	-752.46	-2,902.34	815.00	679.02	135.99	5.993	
7,900.00	5,173.93	7,787.59	5,158.26	75.61	64.45	-89.64	-756.42	-2,992.57	823.17	682.52	140.65	5.853	
8,000.00	5,173.32	7,888.75	5,155.84	78.11	66.84	-89.52	-761.62	-3,093.56	832.11	688.57	145.54	5.717	
8,100.00	5,172.70	7,980.88	5,153.33	80.61	69.02	-89.39	-766.26	-3,185.54	840.98	690.73	150.24	5.597	
8,200.00	5,172.08	8,080.26	5,150.18	83.11	71.38	-89.23	-771.68	-3,284.72	850.25	695.14	155.11	5.482	
8,300.00	5,171.46	8,202.34	5,147.21	85.61	74.30	-89.09	-778.11	-3,406.59	859.52	699.04	160.47	5.356	
8,400.00	5,170.85	8,331.51	5,139.87	88.12	77.39	-88.66	-779.22	-3,535.54	864.14	698.29	165.85	5.210	
8,500.00	5,170.23	8,427.66	5,135.42	90.62	79.70	-88.41	-779.49	-3,631.58	868.30	697.59	170.71	5.087	
8,600.00	5,169.61	8,527.53	5,131.42	93.13	82.11	-88.20	-779.18	-3,731.37	871.89	696.26	175.62	4.965	
8,700.00	5,168.99	8,640.08	5,129.82	95.63	84.83	-88.15	-778.79	-3,843.90	875.39	694.66	180.73	4.844	
8,800.00	5,168.38	8,748.66	5,129.80	98.14	87.46	-88.20	-776.64	-3,952.46	877.15	691.36	185.79	4.721	
8,900.00	5,167.76	8,856.63	5,129.65	100.65	90.09	-88.23	-773.87	-4,060.39	878.38	687.56	190.82	4.603	
9,000.00	5,167.14	8,960.60	5,131.06	103.16	92.62	-88.36	-770.28	-4,164.28	878.66	682.82	195.83	4.487	
9,100.00	5,166.52	9,050.00	5,131.84	105.68	94.80	-88.45	-767.53	-4,253.84	879.35	678.63	200.72	4.381	
9,200.00	5,165.91	9,154.45	5,130.84	108.19	97.35	-88.43	-765.28	-4,358.06	881.02	675.28	205.73	4.282	
9,300.00	5,165.29	9,273.78	5,130.11	110.70	100.27	-88.43	-769.96	-4,477.27	880.27	669.42	210.85	4.175	
9,400.00	5,164.67	9,381.97	5,129.11	113.21	102.92	-88.41	-753.80	-4,585.27	878.36	662.50	215.86	4.069	
9,500.00	5,164.05	9,479.03	5,129.31	115.73	105.30	-88.45	-748.00	-4,682.16	876.17	655.32	220.84	3.967	
9,587.75	5,163.51	9,560.26	5,129.19	117.94	107.06	-88.47	-744.48	-4,753.31	875.18	649.98	225.21	3.886	
9,600.00	5,163.43	9,559.30	5,129.20	118.24	107.28	-88.48	-744.16	-4,762.33	875.21	649.48	225.72	3.877	
9,700.00	5,162.82	9,647.92	5,129.34	120.76	109.46	-88.52	-741.99	-4,850.93	876.50	645.90	230.60	3.801	
9,800.00	5,162.20	9,749.36	5,128.48	123.28	111.96	-88.51	-739.76	-4,952.34	878.10	642.49	235.61	3.727	
9,900.00	5,161.58	9,845.20	5,129.47	125.79	114.33	-88.62	-737.76	-5,048.15	879.78	639.21	240.57	3.657	
10,000.00	5,160.96	9,950.50	5,128.02	128.31	116.93	-88.57	-735.75	-5,153.42	881.69	636.06	245.63	3.590	
10,100.00	5,160.35	10,046.89	5,126.13	130.83	119.32	-88.49	-733.41	-5,249.76	883.10	632.52	250.58	3.524	
10,200.00	5,159.73	10,149.60	5,126.01	133.35	121.86	-88.52	-731.55	-5,352.45	885.08	629.47	255.62	3.463	
10,300.00	5,159.11	10,237.81	5,125.71	135.86	124.05	-88.54	-730.12	-5,440.85	887.25	626.79	260.46	3.407	
10,400.00	5,158.49	10,334.34	5,124.85	138.38	126.44	-88.53	-729.49	-5,537.17	890.39	624.99	265.40	3.355	
10,480.01	5,158.00	10,403.00	5,124.60	140.40	128.15	-88.55	-729.07	-5,605.83	893.01	623.82	269.19	3.317 SF	

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



Scientific Drilling, Intl
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 #2	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error: 0.00 usft	
Survey Program: 415-SDI MWD, 8182-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	0.00	0.00	0.00	-165.65	-48.41	-12.39	51.17					
100.00	100.00	88.99	88.99	0.08	0.10	-165.54	-48.40	-12.49	49.99	49.81	0.18	275.815	CC	
200.00	200.00	188.97	188.97	0.31	0.21	-165.14	-48.36	-12.83	50.03	49.52	0.51	97.169		
300.00	300.00	288.95	288.95	0.53	0.32	-164.47	-48.29	-13.42	50.12	49.27	0.85	59.062		
400.00	400.00	388.93	388.92	0.76	0.42	-163.53	-48.19	-14.25	50.25	49.07	1.18	42.506		
500.00	500.00	488.89	488.87	0.98	0.62	-162.21	-48.05	-15.42	50.46	48.86	1.60	31.502		
600.00	599.98	587.93	587.90	1.19	0.83	77.25	-48.26	-16.97	50.76	48.73	2.02	25.073	ES	
700.00	699.84	686.75	686.67	1.39	1.04	83.36	-51.16	-18.82	53.32	50.89	2.43	21.959		
800.00	799.45	786.32	786.15	1.61	1.24	91.84	-54.84	-20.57	57.05	54.20	2.85	20.036		
900.00	898.70	885.70	885.44	1.86	1.44	101.99	-58.61	-22.05	62.41	59.11	3.30	18.899		
1,000.00	997.47	984.62	984.28	2.16	1.65	112.65	-62.50	-23.27	70.60	66.80	3.80	18.596		
1,100.00	1,095.62	1,082.68	1,082.27	2.51	1.86	123.18	-65.88	-24.71	82.63	78.32	4.31	19.169		
1,200.00	1,193.44	1,180.85	1,180.39	2.89	2.07	132.15	-68.74	-26.33	98.02	93.20	4.82	20.351		
1,300.00	1,291.25	1,278.67	1,278.16	3.29	2.28	138.68	-71.36	-27.79	114.93	109.63	5.31	21.657		
1,400.00	1,389.07	1,376.94	1,376.39	3.71	2.49	143.63	-73.77	-29.19	132.67	127.08	5.79	22.945		
1,500.00	1,486.88	1,475.45	1,474.87	4.13	2.70	147.50	-75.94	-30.01	150.97	144.70	6.27	24.088		
1,600.00	1,585.48	1,573.72	1,573.12	4.47	2.91	146.71	-77.91	-30.91	165.76	159.06	6.70	24.729		
1,700.00	1,685.13	1,673.71	1,673.09	4.69	3.12	128.12	-79.71	-31.71	172.74	165.64	7.10	24.322		
1,800.00	1,785.07	1,773.88	1,773.25	4.82	3.33	-4.44	-81.19	-32.39	171.67	164.18	7.49	22.920		
1,900.00	1,884.85	1,873.54	1,872.90	4.92	3.54	-8.30	-82.47	-33.03	165.65	157.78	7.87	21.049		
2,000.00	1,984.63	1,974.91	1,974.26	5.03	3.75	-9.02	-83.49	-33.18	159.13	150.87	8.26	19.267		
2,100.00	2,084.41	2,073.78	2,073.10	5.14	3.96	-10.19	-85.55	-33.09	152.34	143.69	8.65	17.609		
2,200.00	2,184.19	2,171.86	2,171.11	5.27	4.18	-12.10	-89.26	-33.89	146.49	137.43	9.06	16.168		
2,300.00	2,283.96	2,273.88	2,272.95	5.40	4.41	-15.10	-95.18	-34.53	140.68	131.18	9.51	14.797		
2,400.00	2,383.74	2,368.93	2,367.58	5.54	4.63	-19.51	-103.98	-35.03	135.57	125.62	9.95	13.624		
2,433.30	2,416.97	2,399.22	2,397.59	5.59	4.71	-21.43	-107.97	-36.02	135.15	125.06	10.10	13.384		
2,500.00	2,483.52	2,460.76	2,458.21	5.69	4.89	-26.01	-117.99	-39.35	136.72	126.32	10.40	13.151		
2,600.00	2,583.30	2,550.15	2,545.17	5.85	5.18	-33.85	-137.24	-46.61	145.39	134.60	10.80	13.468		
2,700.00	2,683.07	2,640.24	2,630.98	6.01	5.53	-42.59	-163.09	-55.65	162.32	151.16	11.17	14.536		
2,800.00	2,782.85	2,727.15	2,711.91	6.18	5.94	-50.95	-193.58	-64.02	186.66	175.21	11.44	16.309		
2,900.00	2,882.63	2,814.90	2,791.83	6.35	6.42	-58.70	-229.06	-71.29	217.72	206.00	11.73	18.568		
3,000.00	2,982.40	2,899.35	2,867.73	6.53	6.93	-65.06	-265.68	-76.80	253.47	241.51	11.96	21.194		
3,100.00	3,082.18	2,981.01	2,939.87	6.72	7.49	-70.48	-304.11	-80.45	294.07	281.89	12.18	24.153		
3,200.00	3,181.96	3,055.95	3,004.12	6.90	8.05	-75.04	-342.33	-81.54	339.30	326.98	12.32	27.546		
3,300.00	3,281.74	3,133.03	3,068.84	7.10	8.68	-78.99	-384.17	-82.33	389.25	376.71	12.54	31.032		
3,400.00	3,381.51	3,220.93	3,142.75	7.29	9.31	-82.68	-431.75	-82.11	440.19	427.22	12.97	33.941		
3,500.00	3,481.29	3,291.08	3,201.41	7.49	9.88	-85.08	-470.20	-81.98	492.84	479.67	13.17	37.418		
3,600.00	3,581.07	3,379.79	3,275.13	7.69	10.64	-87.73	-519.53	-80.68	546.80	533.13	13.67	39.995		
3,700.00	3,680.85	3,461.31	3,342.97	7.90	11.35	-89.93	-564.63	-77.64	600.84	586.75	14.08	42.661		
3,800.00	3,780.62	3,534.00	3,403.09	8.11	12.02	-91.62	-605.37	-74.70	656.12	641.71	14.41	45.545		
3,900.00	3,880.40	3,598.93	3,456.13	8.32	12.64	-92.95	-642.75	-72.16	713.34	698.68	14.65	48.680		
4,000.00	3,980.18	3,682.27	3,523.66	8.54	13.41	-94.44	-691.47	-68.69	771.75	756.59	15.16	50.923		
4,100.00	4,079.96	3,765.05	3,591.05	8.75	14.14	-95.84	-739.48	-66.25	830.03	814.37	15.66	53.009		
4,200.00	4,179.73	3,860.00	3,668.89	8.98	14.98	-96.72	-793.81	-64.57	887.81	871.50	16.31	54.429		
4,300.00	4,279.51	3,929.59	3,726.09	9.20	15.63	-97.40	-833.44	-63.54	945.45	928.77	16.68	56.693		
4,400.00	4,379.29	4,033.74	3,811.78	9.43	16.59	-98.15	-892.63	-64.06	1,003.23	985.79	17.44	57.522		
4,500.00	4,479.07	4,113.00	3,877.91	9.65	17.31	-98.62	-936.30	-64.97	1,059.29	1,041.36	17.92	59.099		
4,600.00	4,578.81	4,176.00	3,929.78	9.89	17.93	-99.60	-972.00	-66.88	1,116.81	1,098.55	18.26	61.175		
4,700.00	4,678.12	4,214.35	3,960.69	10.17	18.32	-92.11	-994.61	-68.83	1,175.59	1,157.19	18.40	63.892		
4,800.00	4,769.66	4,274.26	4,008.16	10.52	18.94	-76.92	-1,030.94	-72.80	1,234.73	1,215.80	18.93	65.225		
4,900.00	4,857.41	4,372.13	4,086.08	10.99	19.91	-73.91	-1,089.84	-79.00	1,291.74	1,271.63	20.11	64.241		

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



Scientific Drilling, Intl
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 #2	Offset TVD Reference:	Offset 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
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		
5,000.00	4,937.65	4,926.32	4,299.87	11.62	22.20	-77.16	-1,226.61	-87.37	1,343.38	1,320.28	23.10	58.164			
5,100.00	5,008.82	4,675.00	4,342.78	12.49	22.60	-74.78	-1,249.54	-88.87	1,387.69	1,363.26	24.43	56.805			
5,200.00	5,069.54	4,718.23	4,380.58	13.61	22.97	-72.39	-1,270.38	-91.22	1,432.35	1,406.24	26.11	54.863			
5,300.00	5,118.63	4,739.00	4,398.54	15.00	23.15	-69.29	-1,280.69	-92.74	1,477.56	1,449.63	27.93	52.911			
5,400.00	5,155.14	4,770.03	4,425.18	16.65	23.43	-66.70	-1,296.42	-95.17	1,522.82	1,492.65	30.17	50.473			
5,500.00	5,178.34	4,785.37	4,438.28	18.50	23.57	-63.84	-1,304.32	-96.34	1,567.87	1,535.41	32.47	48.293			
5,600.00	5,187.79	4,802.00	4,452.42	20.49	23.72	-60.82	-1,312.98	-97.59	1,612.22	1,577.31	34.91	46.183			
5,700.00	5,187.52	4,802.00	4,452.42	22.58	23.72	-60.07	-1,312.98	-97.59	1,657.15	1,620.01	37.15	44.612			
5,800.00	5,186.90	4,802.00	4,452.42	24.74	23.72	-60.07	-1,312.98	-97.59	1,706.62	1,667.34	39.28	43.447			
5,900.00	5,186.29	4,802.00	4,452.42	26.97	23.72	-60.07	-1,312.98	-97.59	1,760.38	1,719.09	41.29	42.637			
6,000.00	5,185.67	4,802.00	4,452.42	29.25	23.72	-60.07	-1,312.98	-97.59	1,818.05	1,774.90	43.15	42.130			
6,100.00	5,185.05	4,802.00	4,452.42	31.56	23.72	-60.07	-1,312.98	-97.59	1,878.00	1,834.31	44.91	41.612			
6,200.00	5,184.43	4,802.00	4,452.42	33.91	23.72	-60.07	-1,312.98	-97.59	1,939.00	1,895.31	46.58	41.094			
6,300.00	5,183.81	4,802.00	4,452.42	36.28	23.72	-60.07	-1,312.98	-97.59	1,999.00	1,955.31	48.16	40.576			
6,400.00	5,183.20	4,802.00	4,452.42	38.67	23.72	-60.07	-1,312.98	-97.59	2,059.00	2,015.31	49.65	40.058			
6,460.57	5,182.82	4,802.00	4,452.42	40.13	23.72	-60.07	-1,312.98	-97.59	2,082.62	2,038.93	50.27	39.822			
6,500.00	5,182.58	4,802.00	4,452.42	41.08	23.72	-60.07	-1,312.98	-97.59	2,106.24	2,062.55	50.89	39.586			
6,600.00	5,181.96	4,802.00	4,452.42	43.50	23.72	-60.07	-1,312.98	-97.59	2,166.24	2,122.55	52.39	39.058			
6,700.00	5,181.34	4,802.00	4,452.42	45.93	23.72	-60.07	-1,312.98	-97.59	2,226.24	2,182.55	53.89	38.530			
6,777.21	5,180.87	4,802.00	4,452.42	47.81	23.72	-60.07	-1,312.98	-97.59	2,286.24	2,242.55	55.39	38.002			
6,800.00	5,180.73	4,802.00	4,452.42	48.37	23.72	-60.07	-1,312.98	-97.59	2,309.86	2,266.17	55.91	37.766			
6,900.00	5,180.11	4,802.00	4,452.42	50.82	23.72	-60.07	-1,312.98	-97.59	2,369.86	2,326.17	57.41	37.238			
7,000.00	5,179.49	4,802.00	4,452.42	53.28	23.72	-60.07	-1,312.98	-97.59	2,429.86	2,386.17	58.91	36.710			
7,100.00	5,178.87	4,802.00	4,452.42	55.74	23.72	-60.07	-1,312.98	-97.59	2,489.86	2,446.17	60.41	36.182			
7,200.00	5,178.26	4,802.00	4,452.42	58.21	23.72	-60.07	-1,312.98	-97.59	2,549.86	2,506.17	61.91	35.654			
7,300.00	5,177.64	4,802.00	4,452.42	60.69	23.72	-60.07	-1,312.98	-97.59	2,609.86	2,566.17	63.41	35.126			
7,400.00	5,177.02	4,802.00	4,452.42	63.17	23.72	-60.07	-1,312.98	-97.59	2,669.86	2,626.17	64.91	34.598			
7,500.00	5,176.40	4,802.00	4,452.42	65.65	23.72	-60.07	-1,312.98	-97.59	2,729.86	2,686.17	66.41	34.070			
7,600.00	5,175.79	4,802.00	4,452.42	68.14	23.72	-60.07	-1,312.98	-97.59	2,789.86	2,746.17	67.91	33.542			
7,700.00	5,175.17	4,802.00	4,452.42	70.63	23.72	-60.07	-1,312.98	-97.59	2,849.86	2,806.17	69.41	33.014			
7,800.00	5,174.55	4,802.00	4,452.42	73.12	23.72	-60.07	-1,312.98	-97.59	2,909.86	2,866.17	70.91	32.486			
7,900.00	5,173.93	4,802.00	4,452.42	75.61	23.72	-60.07	-1,312.98	-97.59	2,969.86	2,926.17	72.41	31.958			
8,000.00	5,173.32	4,802.00	4,452.42	78.11	23.72	-60.07	-1,312.98	-97.59	3,029.86	2,986.17	73.91	31.430			
8,100.00	5,172.70	4,802.00	4,452.42	80.61	23.72	-60.07	-1,312.98	-97.59	3,089.86	3,046.17	75.41	30.902			
8,200.00	5,172.08	4,802.00	4,452.42	83.11	23.72	-60.07	-1,312.98	-97.59	3,149.86	3,106.17	76.91	30.374			
8,300.00	5,171.46	4,802.00	4,452.42	85.61	23.72	-60.07	-1,312.98	-97.59	3,209.86	3,166.17	78.41	29.846			
8,400.00	5,170.85	4,802.00	4,452.42	88.12	23.72	-60.07	-1,312.98	-97.59	3,269.86	3,226.17	79.91	29.318			
8,500.00	5,170.23	4,802.00	4,452.42	90.62	23.72	-60.07	-1,312.98	-97.59	3,329.86	3,286.17	81.41	28.790			
8,600.00	5,169.61	4,802.00	4,452.42	93.13	23.72	-60.07	-1,312.98	-97.59	3,389.86	3,346.17	82.91	28.262			
8,700.00	5,168.99	4,802.00	4,452.42	95.63	23.72	-60.07	-1,312.98	-97.59	3,449.86	3,406.17	84.41	27.734			
8,800.00	5,168.38	4,802.00	4,452.42	98.14	23.72	-60.07	-1,312.98	-97.59	3,509.86	3,466.17	85.91	27.206			
8,900.00	5,167.76	4,802.00	4,452.42	100.65	23.72	-60.07	-1,312.98	-97.59	3,569.86	3,526.17	87.41	26.678			
9,000.00	5,167.14	4,802.00	4,452.42	103.16	23.72	-60.07	-1,312.98	-97.59	3,629.86	3,586.17	88.91	26.150			
9,100.00	5,166.52	4,802.00	4,452.42	105.68	23.72	-60.07	-1,312.98	-97.59	3,689.86	3,646.17	90.41	25.622			
9,200.00	5,165.91	4,802.00	4,452.42	108.19	23.72	-60.07	-1,312.98	-97.59	3,749.86	3,706.17	91.91	25.094			
9,219.68	5,165.78	4,802.00	4,452.42	108.68	23.72	-60.07	-1,312.98	-97.59	3,773.48	3,729.79	92.40	24.967			
9,300.00	5,165.29	4,802.00	4,452.42	110.70	23.72	-60.07	-1,312.98	-97.59	3,833.48	3,789.79	93.91	24.439			
9,400.00	5,164.67	4,802.00	4,452.42	113.21	23.72	-60.07	-1,312.98	-97.59	3,893.48	3,849.79	95.41	23.911			
9,500.00	5,164.05	4,802.00	4,452.42	115.73	23.72	-60.07	-1,312.98	-97.59	3,953.48	3,909.79	96.91	23.383			
9,600.00	5,163.43	4,802.00	4,452.42	118.24	23.72	-60.07	-1,312.98	-97.59	4,013.48	3,969.79	98.41	22.855			

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



Scientific Drilling, Intl
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 #2	Offset TVD Reference:	Offset Datum

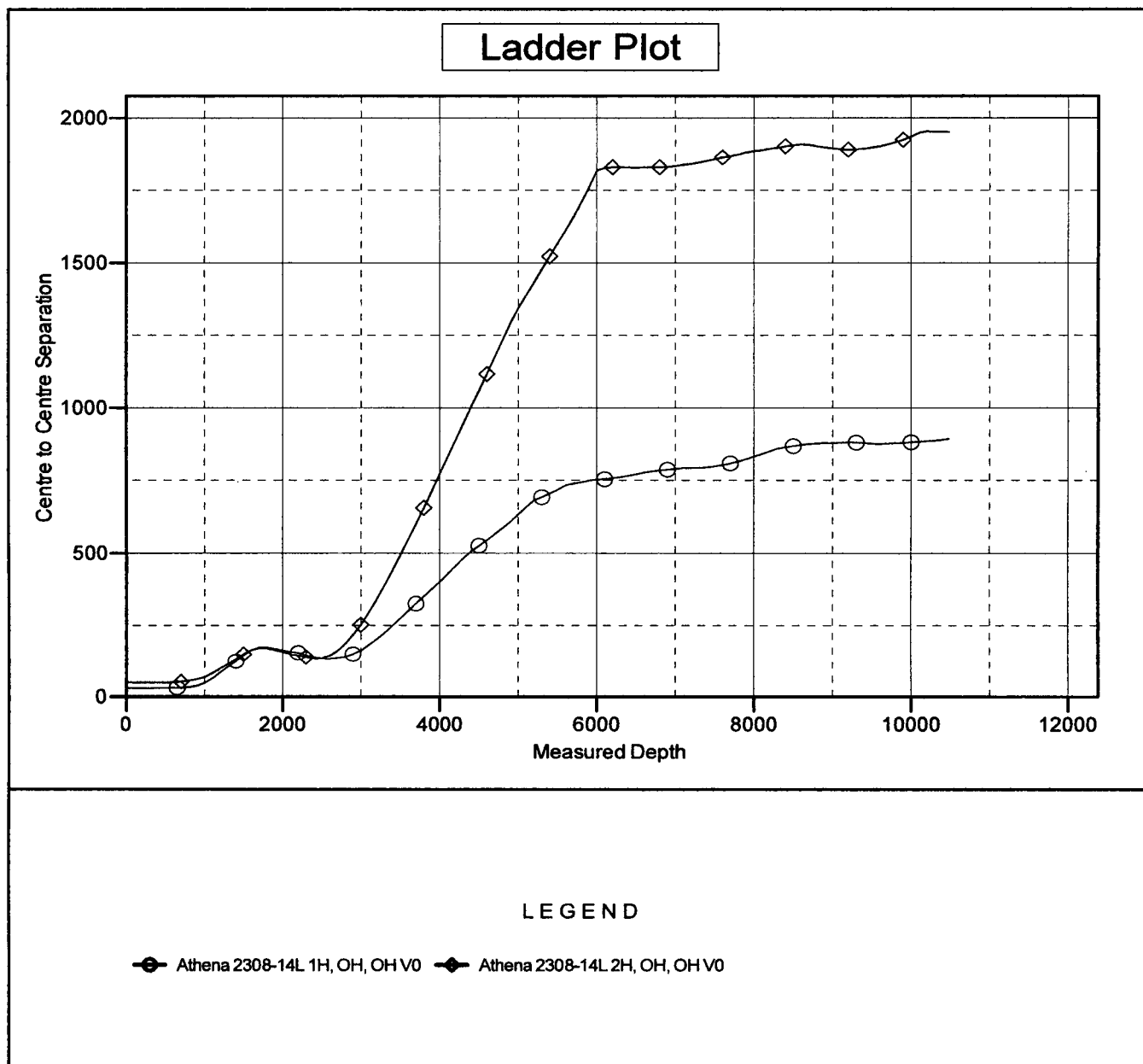
Offset Design Athena 2308-14L - Athena 2308-14L 2H - OH - OH													Offset Site Error:	0.00 usft
Survey Program: 415-SDI MWD, 6162-SDI MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
9,700.00	5,162.82	10,006.18	5,109.68	120.76	109.11	-88.71	-1,773.07	-4,780.01	1,908.29	1,678.37	228.91	8.300		
9,800.00	5,162.20	10,077.98	5,109.18	123.28	110.86	-88.71	-1,775.54	-4,851.76	1,915.52	1,681.12	234.40	8.172		
9,900.00	5,161.58	10,134.28	5,108.69	125.79	112.22	-88.71	-1,778.46	-4,907.99	1,924.56	1,686.04	238.51	8.069		
10,000.00	5,160.96	10,195.96	5,108.13	128.31	113.72	-88.71	-1,783.12	-4,969.48	1,935.84	1,693.22	242.62	7.979		
10,100.00	5,160.35	10,271.57	5,106.92	130.83	115.56	-88.69	-1,789.98	-5,044.77	1,948.68	1,701.70	246.98	7.890		
10,200.00	5,159.73	10,677.30	5,098.85	133.35	125.44	-88.54	-1,796.71	-5,449.74	1,953.90	1,697.18	256.72	7.611		
10,300.00	5,159.11	10,756.93	5,101.51	135.86	127.37	-88.64	-1,792.26	-5,529.21	1,952.04	1,690.44	261.60	7.462		
10,364.28	5,158.71	10,797.77	5,102.85	137.48	128.37	-88.68	-1,790.47	-5,569.98	1,951.62	1,686.79	264.83	7.369		
10,400.00	5,158.49	10,825.88	5,103.87	138.38	129.05	-88.72	-1,789.53	-5,597.86	1,951.73	1,685.38	266.35	7.328		
10,480.01	5,158.00	10,869.00	5,105.48	140.40	130.11	-88.77	-1,788.10	-5,641.13	1,952.40	1,682.43	269.97	7.232 SF		

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

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 #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to GL 6876' & RKB 25' @ 6903.00usft (A)
Offset Depths are relative to Offset Datum
Central Meridian is -107.8333334

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°





Scientific Drilling, Intl
Anticollision Report

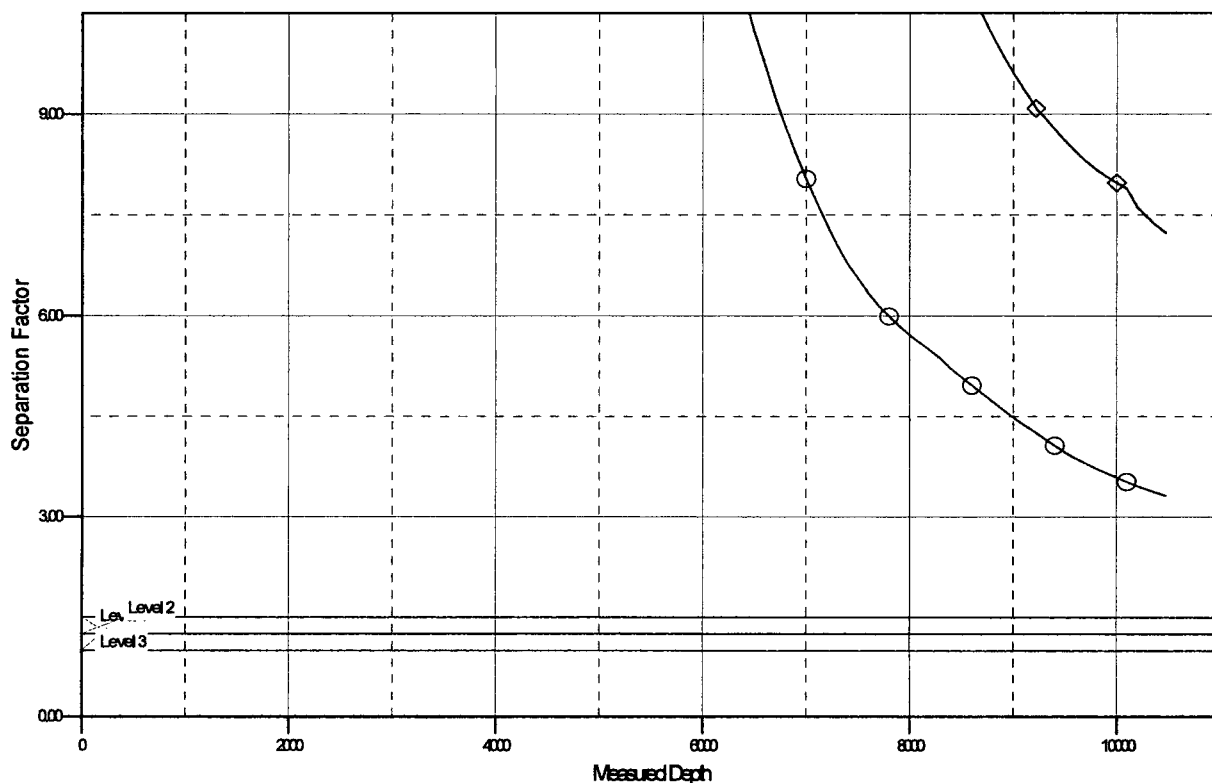


Company:	Logos Operating LLC	Local Co-ordinate Reference:	Well Athena 2308-14L 3H
Project:	San Juan, NM NAD83	TVD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Reference Site:	Athena 2308-14L	MD Reference:	GL 6876' & RKB 25' @ 6903.00usft (Aztec 1000)
Site Error:	0.00 usft	North Reference:	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 #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to GL 6876' & RKB 25' @ 6903.00usft (A)
Offset Depths are relative to Offset Datum
Central Meridian is -107.8333334

Coordinates are relative to: Athena 2308-14 L 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