

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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

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.

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
4001 North Butler Avenue, Building 7101
Farmington, NM 87401

3b. Phone No. (include area code)
505-330-9333

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
939' FNL, 357' FEL (NE/NE) BHL: 990' FNL & 2335' FEL (NW/NE)
Section 5, T22N, R6W, UL A Section 6, T22N, R6W, UL B

5. Lease Serial No.
NM 109387

6. If Indian, Allottee or Tribe Name

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

8. Well Name and No.
Aztec Oil Syndicate 1H

9. API Well No.
30-043-21226

10. Field and Pool or Exploratory Area
Lybrook Gallup

11. County or Parish, State
Sandoval County, NM

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

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

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 recomplete 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 recompletion 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.)

Logos proposes to change the landing point and TD for the Aztec Oil Syndicate 1H. The reason for the change is to minimize the drilling risk with reduced tangent and directional build for reservoir optimization. The intermediate cement job will be changed from a two stage to a one stage cement job and cement will be adjusted accordingly. Please see below:

Original Well Information:

LP in Sec 5, 350' FNL & 1201' FEL (6158' MD/5438' TVD)
BHL in Sec 6, 350' FNL & 2340' FEL (12,538' MD/5397' TVD)

New Well Information:

7" in Sec 5, 990' FNL & 1087' FEL (5857' MD/5463' TVD)
LP in Sec 5, 990' FNL & 1195' FEL (5965' MD/5467' TVD)
BHL in Sec 6, 990' FNL & 2335' FEL (12,345' MD/5422' TVD)

Based on additional mapping Logos has slightly adjusted the formation tops.

Received verbal approval from BLM (Troy Salyers) on 7/28/14 and OCD (Bill Hoppe) on 7/29/14 to proceed with new plans.

OIL CONS. DIV DIST. 3

AUG 14 2014

CONDITIONS OF APPROVAL

Adhere to previously issued stipulations

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)

Tamra Sessions

Title Operations Technician

Signature

Tamra Sessions

Date 07/29/2014

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

William Tambekou

Petroleum Engineer

Date 8/11/2014

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 FFD

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.

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Aztec Oil Syndicate 1H
Company:	LOGOS Operating LLC	TVD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Project:	Sandoval County, NM	MD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Site:	S5-T22N-R6W	North Reference:	True
Well:	Aztec Oil Syndicate 1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #7		

Project	Sandoval County, NM		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Central Zone		

Site	S5-T22N-R6W				
Site Position:		Northing:	1,883,183.57 usft	Latitude:	36.169247
From:	Lat/Long	Easting:	1,276,424.49 usft	Longitude:	-107.483219
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	-0.73 °

Well	Aztec Oil Syndicate 1H					
Well Position	+N/-S	0.0 usft	Northing:	1,884,404.52 usft	Latitude:	36.172600
	+E/-W	0.0 usft	Easting:	1,276,409.48 usft	Longitude:	-107.483323
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	7,126.0 usft	

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/22/2014	9.33	62.95	50,134

Design	Plan #7			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	270.80

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
4,675.0	0.00	0.00	4,675.0	0.0	0.0	0.00	0.00	0.00	0.00	
5,692.1	73.91	266.64	5,432.6	-33.4	-569.0	7.27	7.27	0.00	266.64	
5,856.8	85.00	271.21	5,462.7	-36.3	-730.6	7.26	6.73	2.77	22.51	LOGOS AOS 1H 7"/8"
5,964.9	90.40	271.21	5,467.0	-34.0	-838.5	5.00	5.00	0.00	0.05	
12,345.1	90.40	271.21	5,422.0	101.2	-7,217.2	0.00	0.00	0.00	0.00	LOGOS AOS 1H PB+

DISTRICT I

1825 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6181 Fax: (575) 393-0720

DISTRICT II

811 S. First St., Artesia, N.M. 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III

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

DISTRICT IV

1220 S. St. Francis Dr., Santa Fe, N.M. 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, N.M. 87505

Form C-112

Revised August 1, 2011

Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-043-21226	² Pool Code 42289	³ Pool Name LYBROOK GALLUP
⁴ Property Code 313377	⁵ Property Name AZTEC OIL SYNDICATE	⁶ Well Number 1H
⁷ GRID No. 289408	⁸ Operator Name LOGOS OPERATING, LLC	⁹ Elevation 7126

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
A	5	22 N	6 W	LOT 1	939	NORTH	357	EAST	SANDOVAL

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
B	6	22 N	6 W	LOT 2	990	NORTH	2335	EAST	SANDOVAL

¹² Dedicated Acres ¹³ Joint or Infill ¹⁴ Consolidation Code ¹⁵ Order No.
244.67 acres Sec 5 Lots 1, 2, 3, 4
& Sec 6 Lots 1, 2

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 BOTTOM HOLE 990' FNL 2335' FEL	LANDING POINT 990' FNL 1195' FEL	SURFACE 939' FNL 357' FEL LAT: 36.1726001° N LONG: 107.4833225° W NAD 83 LAT: 36°10.35514' N LONG: 107°28.96307' W NAD 27	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 working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. Signature: <i>Tamra Sessions</i> Date: <i>7/28/14</i> Printed Name: <i>Tamra Sessions</i> E-mail Address: <i>tssessions@logosresourcesllc.com</i>
			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. Date of Survey: <i>03/04/14</i> Signature and Seal: <i>Marshall W. Lindeen</i> Certificate Number: <i>17078</i> United Field Services, Inc.

LEGEND:

- = SURFACE LOCATION
- = BOTTOM HOLE LOCATION
- ⊕ = FOUND 1948 USGLO BRASS CAP
- ⊕ = FOUND 1948 BLM BRASS CAP
- ⊕ = FOUND 1/2 REBAR
- △ = LANDING POINT

BEARINGS & DISTANCES SHOWN
ARE REFERENCED TO THE
NEW MEXICO COORDINATE
SYSTEM, CENTRAL ZONE, NAD 83,
UNLESS OTHERWISE NOTED.

**Attachment To Application For Permit To Drill.
Drilling program**

LOGOS OPERATING, LLC
4001 N. Butler, Bldg 7101
Farmington, NM 87401
U.S.A

Aztec Oil Syndicate 1H
Horizontal Gallup Oil and Gas Well
Surface Location: 939' FNL – 357' FEL
Section 5, T22N, R6W
Ungraded GL Elev = 7,126'
Estimate KB Elev = 7,141' (14.5' KB)
Lat. = 36.1726001 deg N
Long. = 107.4833225 deg W
NAD83
Sandoval County, New Mexico

Proposed Bottom Hole Location: 990' FNL – 2,335' FEL
Section 6, T22N, R6W
Sandoval County, New Mexico

Drilling program written in compliance with onshore Oil and Gas Order No. 1
(001 III.D.3, effective May 2007) and Onshore Order No. 2 Dated November 18, 1988

• **ESTIMATED TOPS FOR IMPORTANT GEOLOGICAL FORMATIONS**

<u>Formation Tops</u>	<u>Surface (TVD)</u>
Ojo Alamo	1367
Kirtland	1485
Fruitland	1753
Pictured Cliffs	1924
Chacra	2324
Cliffs House	3396
Menefee	3429
Point Lookout	4200
Mancos	4363
Gallup	5266
Lower Gallup	5452
Landing Point	5467
Total Depth	5422

Drilling Plan

Drill 12 1/4" hole to 320' then set 9 5/8" casing. Drill 8 3/4" hole with fresh water mud from 500' MD to kick off point 4,557' MD

Trip out of hole and pick up 8 3/4" kick off assembly at 4,557' MD. Build angle at 7.27 deg/100' to 85 degrees inclination and 271.21 degrees azimuth in the Gallup formation at 5,343' MD/ 5,266' TVD where 7" intermediate casing will be set at 5,857' MD / 5,463' TVD.

7" casing will be set in a legal position 990' FNL & 1,087' FEL in Section 5.

The 7" casing will be drilled out with a 6 1/8" drilling assembly building angle at 5 deg/100' to 90.40 degrees inclination and 271.21 degree azimuth to 5,965' MD/ 5,467' TVD. Hold 90.41 degrees, 271.21 degrees azimuth and drill to a total depth at 12,345' MD/ 5,422' TVD. Adjustments may be made to the directional program based on geology. Total depth will be 12,345' MD/ 5,422' TVD - 90.40 degrees, 271.21 degrees Azimuth.

The Bottom hole location will be in a legal location at 12,345' MD at 990' FNL & 2335' FEL of section 6.

A total of 6,488' of horizontal hole will be drilled.

- **ANTICIPATED DEPTHS OF PROSPECTIVE OIL GAS AND OTHER HYDROCARBONS**

Primary objective is the Gallup formation encountered first at 5,266' TVD

See formation listings in #1 above for additional zones of interest.

- **MINIMUM SPECIFICATIONS FOR 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 1973 psig (0.364 psi/ft @ 5422' 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 1193 psi (5422' 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, 2000 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 70% of internal yield pressure. All preventers and surface casing will be tested before drilling out of surface casing. BOP equipment will be tested every 14 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.

1. **PROPOSED BIT AND CASING PROGRAM**

- A. Bit Program

12 1/4" Surface Hole = Surface to 320'

8 3/4" = 320' to 5,857' = 7" Casing point @ 85 degrees

8 3/4" Landing point = 5,965' @ 90.40 degrees

6-1/8" Lateral = 5,857' MD to 12,345' MD = Gallup Pay Zone Horizontal

- A. Casing Program – all casing stings are new casing

Casing & Hole Size	Weight	Grade	Coupling	Setting Depth (MD)	Comments
9-5/8" (12 1/4")	36 ppf	J or K-55	LT&C	0' - 320'	New casing. Cement to surface.
7" (8 3/4")	23 ppf	J or K-55	LT&C	0' – 5,857' MD	New Casing. Cement to surface with one stages
4 1/2" (6 1/8")	11.6 ppf	P-110	LT&C	5,500' – 12,345' MD	New Casing - Horizontal Hole Cemented full length with foam cement - TOL at 60 degrees.

Casing strings below the conductor casing will be tested to .22 psi per foot of casing string length or 1500 psi, whichever is greater, but not to exceed 70% of the minimum internal yield.

Minimum casing design factors used:	Collapse -	1.125
	Burst -	1.0
	Jt. Strength -	1.60

Surface casing shall have a minimum of 1 centralizer per joint on the bottom three (3) joints, starting with the shoe joint for a total of (4) minimum centralizers. Centralizers will be placed 10' above the shoe on the shoe joint, on the 1st, 2nd and 3rd casing collars.

The intermediate casing will be centralized using 1 centralizer the first 6 jts and spaced appropriately through the curve section of the well-bore and then spaced +/- 1 centralizer / 4 jts through the remainder of the cement column, using approximately 40 centralizers.

1. PROPOSED CEMENTING PROGRAM

The proposed cementing program has been designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement shall receive approval prior to use. The casing setting depth shall be calculated to position the casing seat opposite a competent formation which will contain the maximum pressure to which it will be exposed during normal drilling operations. All indications of useable water shall be reported.

- The proposed cementing program is as follows:

Top plugs shall be used to reduce contamination of cement by displacement fluid. A bottom plug or other acceptable technique, such as a pre-flush fluid, inner string cement method, etc. shall be utilized to help isolate the cement from contamination by the mud fluid being displaced ahead of the cement slurry.

Surface Casing Single Stage Job – (0-320'):

Excess – 100% over gauge hole – 12-1/4" hole and 9-5/8" casing (0.3132ft³/ft)

Top of Cement - Surface

Primary Cement

HALCEM (TM) SYSTEM

0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)

Fluid Weight	15.80 lbm/gal
Slurry Yield:	1.174 ft ³ /sk
Total Mixing Fluid:	5.13 Gal/sk
Top of Fluid:	0 ft
Calculated Fill:	500 ft
Volume:	55.8 bbls
Calculated Sacks:	270 sks

Intermediate Casing – One Stage Job – (0-5,857' MD):

Excess – 50% over gauge hole – 8-3/4" hole and 7" casing (0.1503 ft³/ft)

Top of Cement – Surface

Stage 1**Fluid 1: Water Spacer**

Fresh Water

Fluid Density: 8.33 lbm/gal

Volume : 10 bbl

Fluid 2: Reactive Spacer

Chemical Wash

1000 gal/Mgal FRESH WATER

Fluid Density: 8.4 lbm/gal

Volume : 40 bbl

Fluid 3: Water Spacer

Fresh Water

Fluid Density: 8.33 lbm/gal

Volume : 10 bbl

Fluid 4: Foamed

ELASTISEAL (TM) SYSTEM

1.50 % CHEM - FOAMER 760, TOTETANK

6.73 Gal FRESH WATER

Fluid Weight: 13 lbm/gal

Volume: 193.5 bbl

Slurry Yield: 1.438 ft³/sack

Total Mixing Fluid: 6.83 Gal/sack

Top Of Fluid: 0 ft

Calculated Fill: 5267 ft

Calculated sack: 42.26 sack

Proposed sack: 560 sack

Fluid 5: Tail Slurry

HALCEM (TM) SYSTEM

5.70 Gal FRESH WATER

Fluid Weight: 13.5 lbm/gal

Volume: 18.7 bbl

Slurry Yield: 1.291 ft³/sack

Total Mixing Fluid: 5.7 Gal/sack

Top Of Fluid: 5267 ft

Calculated Fill: 500 ft

Calculated sack: 81.33 sack

Proposed sack: 85 sack

Fluid 6: Water Based Spacer

Displacement

Fluid Density: 8.4 lbm/gal

Volume : 22.7 bbl

Fluid 7: Top Off Annulus

HALCEM (TM) SYSTEM

2 % Calcium Chloride

5.15 Gal FRESH WATER

Fluid Weight: 15.8 lbm/gal

Volume: 20.9 bbl

Slurry Yield: 1.174 ft³/sack

Total Mixing Fluid: 5.15 Gal sack

Calculated sack: 0 sack

Proposed sack: 100 sack

Production Casing – Single Stage Job (5,500' – 12,345' MD):

Excess – 50% over gauge hole – 6-1/8" hole and 4-1/2" casing (0.0942 ft³/ft)

Top of Cement – Top of Liner.

Lead Cement - Cap Cement

ELASTISEAL (TM) SYSTEM

0.2 % Versaset (Thixotropic Additive)

0.15 % HALAD-766 (Low Fluid Loss Control)

0.2 % Halad(R)-344 (Low Fluid Loss Control)

Fluid Weight	13 lbm/gal
Slurry Yield:	1.43 ft ³ /sk
Total Mixing Fluid:	6.75 Gal/sk
Top of Fluid:	4,600 ft
Calculated Fill:	300 ft
Volume:	7.55 bbl
Calculated Sacks:	30 sks

Foamed Lead Cement

ELASTISEAL (TM) SYSTEM

0.2 % Versaset (Thixotropic Additive)

0.15 % HALAD-766 (Low Fluid Loss Control)

2.5 % CHEM - FOAMER 760, TOTETANK (Foamer)

0.2 % Halad(R)-344 (Low Fluid Loss Control)

Fluid Weight	13 lbm/gal
Slurry Yield:	1.43 ft ³ /sk
Total Mixing Fluid:	6.75 Gal/sk
Top of Fluid:	4,900 ft
Calculated Fill:	6,732 ft
Volume:	169 bbl
Calculated Sacks:	666 sks

Tail Cement

ELASTISEAL (TM) SYSTEM

0.2 % Versaset (Thixotropic Additive)

0.15 % HALAD-766 (Low Fluid Loss Control)

0.05 % SA-1015 (Suspension Agent)

Fluid Weight	13.50 lbm/gal
Slurry Yield:	1.28 ft ³ /sk
Total Mixing Fluid:	5.64 Gal/sk
Top of Fluid:	11,632 ft
Calculated Fill:	905 ft
Volume:	23 bbl
Calculated Sacks:	100 sks

Detailed Pumping Schedule

Fluid #	Fluid Type	Fluid Name	Surface Density lbm/gal	Estimated Avg Rate bbl/min	Downhole Volume
1	Spacer	Fresh Water Spacer	8.3		10 bbl
2	Spacer	CHEMICAL WASH	8.4		40 bbl
3	Spacer	Fresh Water Spacer	8.3		10 bbl
4	Cement	Cap Cement	13.0		30 sks
5	Cement	Foamed Lead Cement	13.0		666 sks
6	Cement	Tail Cement	13.5		100 sks
7	Spacer	MMCR Spacer	8.3		20 bbl
8	Spacer	Fresh Water Displacement	8.3		

Foam Output Parameter Summary:

Fluid #	Fluid Name	Unfoamed Liquid Volume	Beginning Density lbm/gal	Ending Density lbm/gal	Beginning Rate scf/bbl	Ending Rate scf/bbl
Stage 1						
5	Foamed Lead Cement	94.57 bbl	10.0	10.0	303.8	509.4

Foam Design Specifications:

Foam Calculation Method: Constant Density
 Backpressure: 14 psig
 Bottom Hole Circulating Temp: 158 degF
 Mud Outlet Temperature: 100 degF
 Production liner clarification: Utilizing foam cement for zonal isolation in the production liner.

Calculated Gas = 20792.1 scf
 Additional Gas = 50000 scf
 Total Gas = 70792.1 scf

Actual volumes will be calculated and determined by conditions onsite. All cement slurries will meet or exceed minimum BLM and New Mexico Oil Conservation Division requirements. Slurries used will be the slurries listed above or equivalent slurries depending on service provider selected. Cement yields may change depending on slurries selected.

All waiting on cement times shall be a minimum of 8 hours or adequate to achieve a minimum of 500 psi compressive strength at the casing shoe prior to drilling out.

- **PROPOSED DRILLING FLUIDS PROGRAM**
 - Vertical Portion

Hole Size (in)	TVD (ft)	Mud Type	Density (lb/gal)	Viscosity (sec/qt)	Fluid Loss (cc)
12 1/4"	0-320'	FreshWater	8.4-8.6	60-70	NC
8 3/4"	320'-4,557'	FreshWater LSND	8.5-8.8	40-50	8-10

- Kick off to Horizontal Lateral:

Hole Size (in)	TVD/MD (ft)	Mud Type	Density (lb/gal)	Viscosity (sec/qt)	Fluid Loss (CC)
8 3/4"	4,557' – 5,937'	Fresh Water LSND	8.5-8.8	40-50	8-10
6 1/8"	5,937' – 12,345'	Synthetic Oil Based Mud	7.0-9.0	15-25	<1

- There will be sufficient mud on location to control a blowout should one occur. Mud flow and volume will be monitored both visually and with electronic pit volume totalizers. Mud tests shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.
- A closed-loop system will be used to recover drilling fluid and dry cuttings in both phases of the well and on all hole intervals, including fresh water and oil-based operations. Above-ground tanks will be utilized to hold cuttings and fluids for rig operations. A frac tank will be on location to store fresh water. Waste will be disposed of properly at an EPA-approved hazardous waste facility. Fresh water cuttings will be disposed of at Basin Disposal, Inc. and/or Industrial Ecosystems, Inc. The location will be lined in accordance with the Surface Use Plan of Operations.

• **TESTING, CORING and LOGGING**

- Drill Stem Testing - None anticipated
- Coring - None anticipated.
- Mud Logging - Mud loggers will be on location from intermediate casing point to TD.
- Logging - See Below
- Gamma Ray from surface casing point to TD

Cased Hole:

CBL/CCL/GRNDL will be run as needed for perforating control

• **ABNORMAL PRESSURES & HYDROGEN SULFIDE**

The anticipated bottom hole pressure is +/- 2537 psi based on a 9.0 ppg at 5422' TVD of the landing point of the horizontal. No abnormal pressure or temperatures are anticipated.

No hydrogen sulfide gas is anticipated, however, if H₂S is encountered, the guidelines in Onshore Order No. 6 will be followed.

9. ANTICIPATED START DATE AND DURATION OF OPERATIONS

Drilling is estimated to commence on July 30, 2014. It is anticipated that completion operations will begin within 30 days after the well has been drilled depending on fracture treatment schedules with various pumping service companies.

It is anticipated that the drilling of this well will take approximately 25 days.

CLOSED-LOOP SYSTEM DESIGN PLAN

The closed-loop system will consist of a series of temporary above-ground storage tanks and/or haul-off bins suitable for holding the cuttings and fluids from drilling operations. The closed-loop system will not entail temporary pits, below-grade storage tanks, below-grade sumps, or drying pads.

Design considerations include:

- The closed-loop system will be signed in accordance with 19.15.17.11 NMAC.
- The closed-loop system storage tanks will be of adequate volume to ensure confinement of all fluids and provide sufficient freeboard to prevent uncontrolled releases.
- Topsoil will be salvaged and stored for use in reclamation activities.
- The closed-loop system storage tanks will be placed in bermed secondary containment sized to contain a minimum of 110 percent of the volume of the largest storage tank.

CLOSED-LOOP SYSTEM OPERATING & MAINTENANCE PLAN

The closed-loop system will be operated and maintained to contain liquids and solids; minimize the amount of drilling fluids and cuttings that require disposal; maximize the amount of drilling fluid recycled and reused in the drilling process; isolate drilling wastes from the environment; prevent contamination of fresh water; and protect public health and the environment.

Operation and maintenance considerations include:

- Fluid levels will be maintained to provide sufficient freeboard to prevent over-topping.
- Visual inspections will be conducted on a daily basis to identify any potential leaks and to ensure that the closed-loop system storage tanks have sufficient freeboard to prevent over-topping.
- Only drilling fluids or cuttings intrinsic to, used by, or generated from, drilling operations will be stored in the closed-loop system storage tanks. Hazardous waste, miscellaneous solid waste, and/or debris will not be stored in the storage tanks.
- The OCD District Office will be notified within 48 hours of discovery of a leak in the closed-loop drilling system. If a leak is discovered, all liquid will be removed within 48 hours and the damage repaired.

CLOSED-LOOP SYSTEM CLOSURE PLAN

The closed-loop system will be closed in accordance with 19.15.17.13 NMAC. Closure

considerations include:

- Drilling fluids will be recycled and transferred to other permitted closed-loop systems or returned to the vendor for reuse, as practical.
- Residual fluids will be pulled from the storage tanks, mixed with saw dust or similar absorbent material, and disposed of at Industrial Ecosystem, Inc. waste disposal facilities.
- Remaining cuttings or sludges will be vacuumed from the storage tanks and disposed of at the Envirotech, Inc. and/or Industrial Ecosystem, Inc. waste disposal facilities.
- Storage tanks will be removed from the well location during the rig move.
- The well pad will be reclaimed and seeded in accordance with subsections G, H and I of 19.15.17.13 NMAC.

Well Control Equipment Schematic for 2M Service

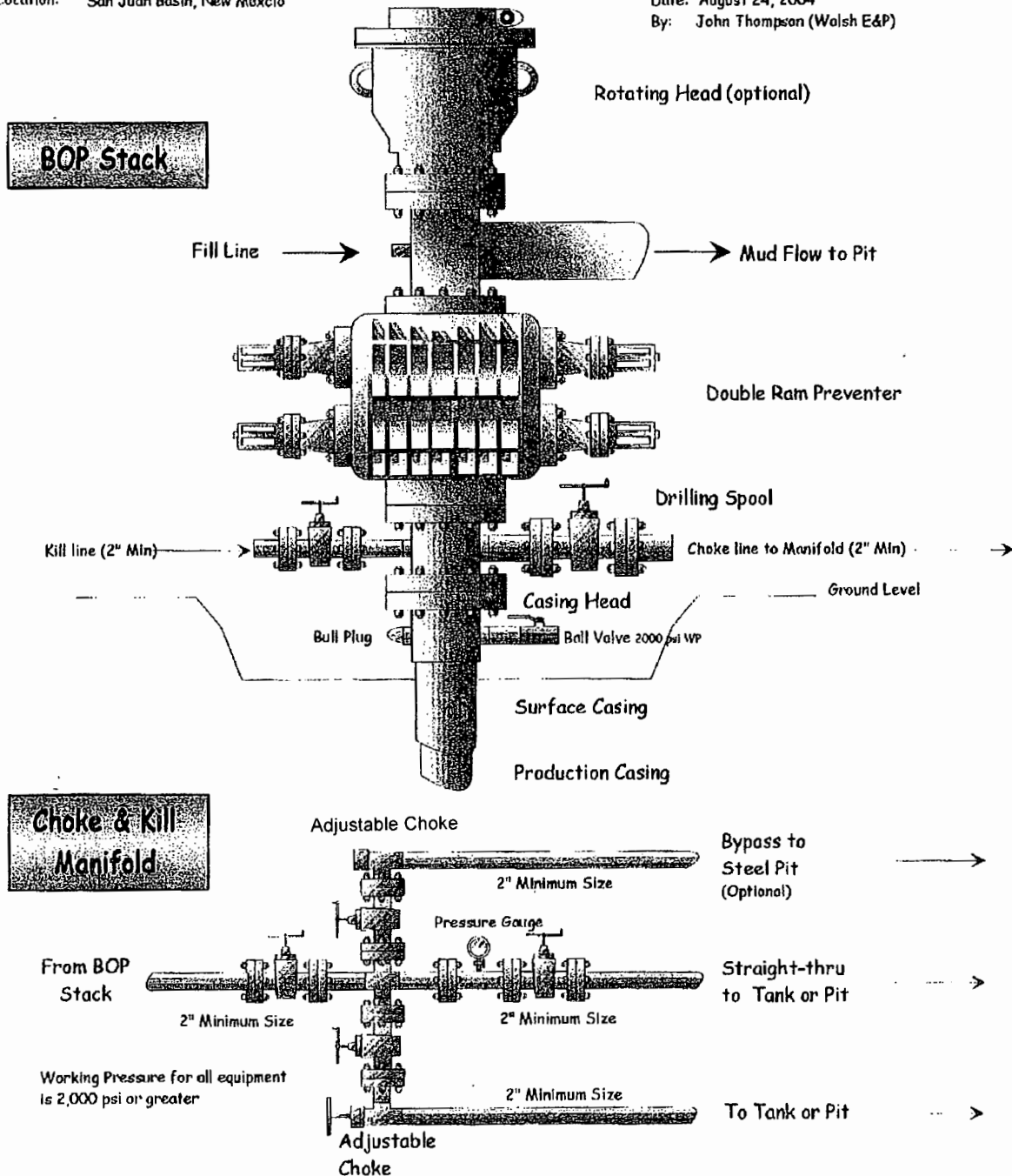
Attachment to Drilling Technical Program

Exhibit #1 Typical BOP setup

Location: San Juan Basin, New Mexico

Date: August 24, 2004

By: John Thompson (Walsh E&P)





Project: Sandoval County, NM
Site: S5-T22N-R6W
Well: Aztec Oil Syndicate 1H
Wellbore: HZ
Design: Plan #7

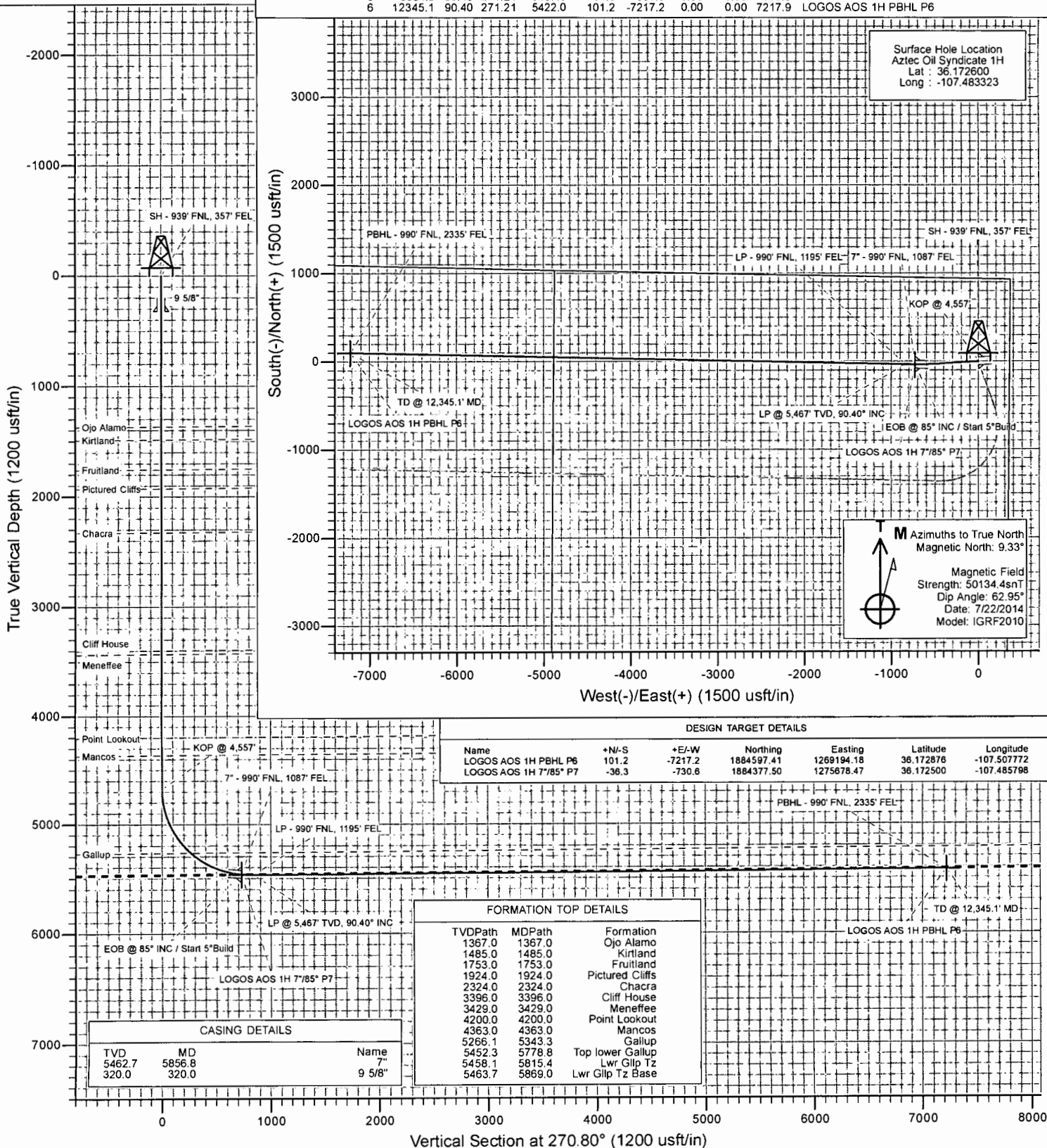


Plan #7
Aztec Oil Syndicate 1H
145245/12637; SC
KB=15' @ 7141.0usft (Aztec #222)
Ground Elevation @ 7126.0
North American Datum 1983
Well Aztec Oil Syndicate 1H, True North

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	4675.0	0.00	0.00	4675.0	0.0	0.0	0.00	0.00	0.0	
3	5692.1	73.91	266.64	5432.6	-33.4	-569.0	7.27	266.64	568.5	LOGOS AOS 1H 7"/85° P7
4	5856.8	85.00	271.21	5462.7	-36.3	-730.6	7.26	22.51	730.0	
5	5964.9	90.40	271.21	5467.0	-34.0	-838.5	5.00	0.05	838.0	
6	12345.1	90.40	271.21	5422.0	101.2	-7217.2	0.00	0.00	7217.9	LOGOS AOS 1H PBHL P6

Surface Hole Location
Aztec Oil Syndicate 1H
Lat : 36.172600
Long : -107.483323



Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Aztec Oil Syndicate 1H
Company:	LOGOS Operating LLC	TVD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Project:	Sandoval County, NM	MD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Site:	S5-T22N-R6W	North Reference:	True
Well:	Aztec Oil Syndicate 1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #7		

Project	Sandoval County, NM		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Central Zone		

Site	S5-T22N-R6W				
Site Position:		Northing:	1,883,183.57 usft	Latitude:	36.169247
From:	Lat/Long	Easting:	1,276,424.49 usft	Longitude:	-107.483219
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	-0.73 °

Well	Aztec Oil Syndicate 1H					
Well Position	+N/-S	0.0 usft	Northing:	1,884,404.52 usft	Latitude:	36.172600
	+E/-W	0.0 usft	Easting:	1,276,409.48 usft	Longitude:	-107.483323
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	7,126.0 usft	

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/22/2014	9.33	62.95	50,134

Design	Plan #7			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	270.80

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
4,675.0	0.00	0.00	4,675.0	0.0	0.0	0.00	0.00	0.00	0.00	
5,692.1	73.91	266.64	5,432.6	-33.4	-569.0	7.27	7.27	0.00	266.64	
5,856.8	85.00	271.21	5,462.7	-36.3	-730.6	7.26	6.73	2.77	22.51	LOGOS AOS 1H 7"1/8"
5,964.9	90.40	271.21	5,467.0	-34.0	-838.5	5.00	5.00	0.00	0.05	
12,345.1	90.40	271.21	5,422.0	101.2	-7,217.2	0.00	0.00	0.00	0.00	LOGOS AOS 1H PBH

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Aztec Oil Syndicate 1H
Company:	LOGOS Operating LLC	TVD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Project:	Sandoval County, NM	MD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Site:	S5-T22N-R6W	North Reference:	True
Well:	Aztec Oil Syndicate 1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #7		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
0.5	0.00	0.00	0.5	0.0	0.0	0.0	0.00	0.00	SH - 939' FNL, 357' FEL
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
320.0	0.00	0.00	320.0	0.0	0.0	0.0	0.00	0.00	9 5/8"
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	
1,367.0	0.00	0.00	1,367.0	0.0	0.0	0.0	0.00	0.00	Ojo Alamo
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	
1,485.0	0.00	0.00	1,485.0	0.0	0.0	0.0	0.00	0.00	Kirtland
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	
1,753.0	0.00	0.00	1,753.0	0.0	0.0	0.0	0.00	0.00	Fruitland
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	
1,924.0	0.00	0.00	1,924.0	0.0	0.0	0.0	0.00	0.00	Pictured Cliffs
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	
2,324.0	0.00	0.00	2,324.0	0.0	0.0	0.0	0.00	0.00	Chacra
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	
3,396.0	0.00	0.00	3,396.0	0.0	0.0	0.0	0.00	0.00	Cliff House
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	
3,429.0	0.00	0.00	3,429.0	0.0	0.0	0.0	0.00	0.00	Meneffee
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	Point Lookout

Cathedral Energy Services

Planning Report

Database: USA EDM 5000 Multi Users DB
Company: LOGOS Operating LLC
Project: Sandoval County, NM
Site: S5-T22N-R6W
Well: Aztec Oil Syndicate 1H
Wellbore: HZ
Design: Plan #7

Local Co-ordinate Reference: Well Aztec Oil Syndicate 1H
TVD Reference: KB=15' @ 7141.0usft (Aztec #222)
MD Reference: KB=15' @ 7141.0usft (Aztec #222)
North Reference: True
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	
4,363.0	0.00	0.00	4,363.0	0.0	0.0	0.0	0.00	0.00	Mancos
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	
4,675.0	0.00	0.00	4,675.0	0.0	0.0	0.0	0.00	0.00	KOP @ 4,557'
4,700.0	1.82	266.64	4,700.0	0.0	-0.4	0.4	7.27	7.27	
4,750.0	5.45	266.64	4,749.9	-0.2	-3.6	3.6	7.27	7.27	
4,800.0	9.08	266.64	4,799.5	-0.6	-9.9	9.9	7.27	7.27	
4,850.0	12.72	266.64	4,848.6	-1.1	-19.3	19.3	7.27	7.27	
4,900.0	16.35	266.64	4,897.0	-1.9	-31.8	31.8	7.27	7.27	
4,950.0	19.98	266.64	4,944.5	-2.8	-47.4	47.3	7.27	7.27	
5,000.0	23.62	266.64	4,990.9	-3.9	-65.9	65.9	7.27	7.27	
5,050.0	27.25	266.64	5,036.0	-5.1	-87.4	87.3	7.27	7.27	
5,100.0	30.88	266.64	5,079.7	-6.5	-111.6	111.5	7.27	7.27	
5,150.0	34.52	266.64	5,121.8	-8.1	-138.6	138.4	7.27	7.27	
5,200.0	38.15	266.64	5,162.1	-9.9	-168.1	168.0	7.27	7.27	
5,250.0	41.78	266.64	5,200.4	-11.7	-200.2	200.0	7.27	7.27	
5,300.0	45.42	266.64	5,236.6	-13.8	-234.6	234.4	7.27	7.27	
5,343.3	48.56	266.64	5,266.1	-15.6	-266.2	266.0	7.27	7.27	Gallup
5,350.0	49.05	266.64	5,270.5	-15.9	-271.2	271.0	7.27	7.27	
5,400.0	52.68	266.64	5,302.1	-18.2	-310.0	309.7	7.27	7.27	
5,450.0	56.32	266.64	5,331.1	-20.6	-350.6	350.3	7.27	7.27	
5,500.0	59.95	266.64	5,357.5	-23.1	-393.0	392.6	7.27	7.27	
5,550.0	63.59	266.64	5,381.1	-25.6	-436.9	436.5	7.27	7.27	
5,600.0	67.22	266.64	5,401.9	-28.3	-482.3	481.9	7.27	7.27	
5,650.0	70.85	266.64	5,419.8	-31.0	-528.9	528.4	7.27	7.27	
5,692.1	73.91	266.64	5,432.6	-33.4	-569.0	568.5	7.27	7.27	
5,700.0	74.44	266.87	5,434.7	-33.8	-576.6	576.0	7.26	6.71	
5,750.0	77.80	268.29	5,446.7	-35.9	-625.1	624.5	7.26	6.72	
5,778.8	79.74	269.09	5,452.3	-36.5	-653.3	652.7	7.26	6.73	Top lower Gallup
5,800.0	81.17	269.67	5,455.8	-36.7	-674.2	673.6	7.26	6.74	
5,815.4	82.21	270.09	5,458.1	-36.8	-689.5	688.9	7.26	6.74	Lwr Gllp Tz
5,850.0	84.54	271.03	5,462.1	-36.4	-723.8	723.2	7.26	6.74	
5,856.8	85.00	271.21	5,462.7	-36.3	-730.6	730.0	7.26	6.75	7" - 990' FNL, 1087' FEL - EOB @ 85° INC / Str
5,869.0	85.61	271.21	5,463.7	-36.0	-742.7	742.1	5.01	5.01	Lwr Gllp Tz Base
5,900.0	87.16	271.21	5,465.7	-35.4	-773.7	773.1	5.00	5.00	
5,964.9	90.40	271.21	5,467.0	-34.0	-838.5	838.0	5.00	5.00	LP - 990' FNL, 1195' FEL - LP @ 5,467' TVD, 91
6,000.0	90.40	271.21	5,466.8	-33.3	-873.6	873.1	0.00	0.00	
6,100.0	90.40	271.21	5,466.1	-31.2	-973.6	973.0	0.00	0.00	
6,200.0	90.40	271.21	5,465.4	-29.0	-1,073.6	1,073.0	0.00	0.00	
6,300.0	90.40	271.21	5,464.7	-26.9	-1,173.5	1,173.0	0.00	0.00	
6,400.0	90.40	271.21	5,464.0	-24.8	-1,273.5	1,273.0	0.00	0.00	
6,500.0	90.40	271.21	5,463.3	-22.7	-1,373.5	1,373.0	0.00	0.00	
6,600.0	90.40	271.21	5,462.5	-20.6	-1,473.5	1,473.0	0.00	0.00	
6,700.0	90.40	271.21	5,461.8	-18.4	-1,573.4	1,573.0	0.00	0.00	
6,800.0	90.40	271.21	5,461.1	-16.3	-1,673.4	1,673.0	0.00	0.00	
6,900.0	90.40	271.21	5,460.4	-14.2	-1,773.4	1,773.0	0.00	0.00	
7,000.0	90.40	271.21	5,459.7	-12.1	-1,873.4	1,873.0	0.00	0.00	
7,100.0	90.40	271.21	5,459.0	-10.0	-1,973.3	1,973.0	0.00	0.00	
7,200.0	90.40	271.21	5,458.3	-7.8	-2,073.3	2,073.0	0.00	0.00	
7,300.0	90.40	271.21	5,457.6	-5.7	-2,173.3	2,173.0	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Aztec Oil Syndicate 1H
Company:	LOGOS Operating LLC	TVD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Project:	Sandoval County, NM	MD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Site:	S5-T22N-R6W	North Reference:	True
Well:	Aztec Oil Syndicate 1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #7		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
7,400.0	90.40	271.21	5,456.9	-3.6	-2,273.3	2,273.0	0.00	0.00	
7,500.0	90.40	271.21	5,456.2	-1.5	-2,373.2	2,373.0	0.00	0.00	
7,600.0	90.40	271.21	5,455.5	0.6	-2,473.2	2,473.0	0.00	0.00	
7,700.0	90.40	271.21	5,454.8	2.8	-2,573.2	2,573.0	0.00	0.00	
7,800.0	90.40	271.21	5,454.1	4.9	-2,673.2	2,673.0	0.00	0.00	
7,900.0	90.40	271.21	5,453.4	7.0	-2,773.1	2,773.0	0.00	0.00	
8,000.0	90.40	271.21	5,452.7	9.1	-2,873.1	2,873.0	0.00	0.00	
8,100.0	90.40	271.21	5,452.0	11.2	-2,973.1	2,972.9	0.00	0.00	
8,200.0	90.40	271.21	5,451.3	13.4	-3,073.1	3,072.9	0.00	0.00	
8,300.0	90.40	271.21	5,450.6	15.5	-3,173.0	3,172.9	0.00	0.00	
8,400.0	90.40	271.21	5,449.8	17.6	-3,273.0	3,272.9	0.00	0.00	
8,500.0	90.40	271.21	5,449.1	19.7	-3,373.0	3,372.9	0.00	0.00	
8,600.0	90.40	271.21	5,448.4	21.8	-3,473.0	3,472.9	0.00	0.00	
8,700.0	90.40	271.21	5,447.7	23.9	-3,572.9	3,572.9	0.00	0.00	
8,800.0	90.40	271.21	5,447.0	26.1	-3,672.9	3,672.9	0.00	0.00	
8,900.0	90.40	271.21	5,446.3	28.2	-3,772.9	3,772.9	0.00	0.00	
9,000.0	90.40	271.21	5,445.6	30.3	-3,872.9	3,872.9	0.00	0.00	
9,100.0	90.40	271.21	5,444.9	32.4	-3,972.8	3,972.9	0.00	0.00	
9,200.0	90.40	271.21	5,444.2	34.5	-4,072.8	4,072.9	0.00	0.00	
9,300.0	90.40	271.21	5,443.5	36.7	-4,172.8	4,172.9	0.00	0.00	
9,400.0	90.40	271.21	5,442.8	38.8	-4,272.8	4,272.9	0.00	0.00	
9,500.0	90.40	271.21	5,442.1	40.9	-4,372.7	4,372.9	0.00	0.00	
9,600.0	90.40	271.21	5,441.4	43.0	-4,472.7	4,472.9	0.00	0.00	
9,700.0	90.40	271.21	5,440.7	45.1	-4,572.7	4,572.9	0.00	0.00	
9,800.0	90.40	271.21	5,440.0	47.3	-4,672.7	4,672.9	0.00	0.00	
9,900.0	90.40	271.21	5,439.3	49.4	-4,772.6	4,772.9	0.00	0.00	
10,000.0	90.40	271.21	5,438.6	51.5	-4,872.6	4,872.8	0.00	0.00	
10,100.0	90.40	271.21	5,437.8	53.6	-4,972.6	4,972.8	0.00	0.00	
10,200.0	90.40	271.21	5,437.1	55.7	-5,072.6	5,072.8	0.00	0.00	
10,300.0	90.40	271.21	5,436.4	57.9	-5,172.5	5,172.8	0.00	0.00	
10,400.0	90.40	271.21	5,435.7	60.0	-5,272.5	5,272.8	0.00	0.00	
10,500.0	90.40	271.21	5,435.0	62.1	-5,372.5	5,372.8	0.00	0.00	
10,600.0	90.40	271.21	5,434.3	64.2	-5,472.5	5,472.8	0.00	0.00	
10,700.0	90.40	271.21	5,433.6	66.3	-5,572.4	5,572.8	0.00	0.00	
10,800.0	90.40	271.21	5,432.9	68.5	-5,672.4	5,672.8	0.00	0.00	
10,900.0	90.40	271.21	5,432.2	70.6	-5,772.4	5,772.8	0.00	0.00	
11,000.0	90.40	271.21	5,431.5	72.7	-5,872.4	5,872.8	0.00	0.00	
11,100.0	90.40	271.21	5,430.8	74.8	-5,972.3	5,972.8	0.00	0.00	
11,200.0	90.40	271.21	5,430.1	76.9	-6,072.3	6,072.8	0.00	0.00	
11,300.0	90.40	271.21	5,429.4	79.1	-6,172.3	6,172.8	0.00	0.00	
11,400.0	90.40	271.21	5,428.7	81.2	-6,272.3	6,272.8	0.00	0.00	
11,500.0	90.40	271.21	5,428.0	83.3	-6,372.2	6,372.8	0.00	0.00	
11,600.0	90.40	271.21	5,427.3	85.4	-6,472.2	6,472.8	0.00	0.00	
11,700.0	90.40	271.21	5,426.6	87.5	-6,572.2	6,572.8	0.00	0.00	
11,800.0	90.40	271.21	5,425.8	89.6	-6,672.2	6,672.8	0.00	0.00	
11,900.0	90.40	271.21	5,425.1	91.8	-6,772.1	6,772.8	0.00	0.00	
12,000.0	90.40	271.21	5,424.4	93.9	-6,872.1	6,872.7	0.00	0.00	
12,100.0	90.40	271.21	5,423.7	96.0	-6,972.1	6,972.7	0.00	0.00	
12,200.0	90.40	271.21	5,423.0	98.1	-7,072.1	7,072.7	0.00	0.00	
12,300.0	90.40	271.21	5,422.3	100.2	-7,172.0	7,172.7	0.00	0.00	
12,345.1	90.40	271.21	5,422.0	101.2	-7,217.1	7,217.8	0.00	0.00	TD @ 12,345.1' MD - PBHL - 990' FNL, 2335' F

Cathedral Energy Services

Planning Report

Database: USA EDM 5000 Multi Users DB
Company: LOGOS Operating LLC
Project: Sandoval County, NM
Site: S5-T22N-R6W
Well: Aztec Oil Syndicate 1H
Wellbore: HZ
Design: Plan #7

Local Co-ordinate Reference: Well Aztec Oil Syndicate 1H
TVD Reference: KB=15' @ 7141.0usft (Aztec #222)
MD Reference: KB=15' @ 7141.0usft (Aztec #222)
North Reference: True
Survey Calculation Method: Minimum Curvature

Targets

Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
LOGOS AOS 1H PBHL I	0.00	0.00	5,422.0	741.1	-7,217.2	1,885,237.25	1,269,202.31	36.174633	-107.507773
- plan misses target center by 639.9usft at 12345.1usft MD (5422.0 TVD, 101.2 N, -7217.1 E)									
- Point									
LOGOS AOS 1H 7"/85°	0.00	0.00	5,442.7	605.8	-838.5	1,885,020.90	1,275,578.77	36.174264	-107.486163
- plan misses target center by 640.1usft at 5978.6usft MD (5466.9 TVD, -33.7 N, -852.2 E)									
- Point									
LOGOS AOS 1H PBHL I	0.00	0.00	5,422.0	101.2	-7,217.2	1,884,597.41	1,269,194.18	36.172876	-107.507772
- plan hits target center									
- Point									
LOGOS AOS 1H 7"/85°	0.00	0.00	5,462.4	-34.0	-838.5	1,884,381.17	1,275,570.64	36.172507	-107.486163
- plan misses target center by 4.6usft at 5964.8usft MD (5467.0 TVD, -34.0 N, -838.4 E)									
- Point									
LOGOS AOS 1H 7"/85°	0.00	0.00	5,462.7	46.0	-838.5	1,884,461.17	1,275,571.65	36.172726	-107.486163
- plan misses target center by 80.1usft at 5966.6usft MD (5467.0 TVD, -34.0 N, -840.2 E)									
- Point									
LOGOS AOS 1H 7"/85°	0.00	0.00	5,462.7	-36.3	-730.6	1,884,377.50	1,275,678.47	36.172500	-107.485798
- plan hits target center									
- Point									
LOGOS AOS 1H PBHL	0.00	0.00	5,402.0	741.1	-7,217.2	1,885,237.25	1,269,202.31	36.174633	-107.507773
- plan misses target center by 640.2usft at 12345.1usft MD (5422.0 TVD, 101.2 N, -7217.1 E)									
- Point									
LOGOS AOS 1H 7"/85°	0.00	0.00	5,462.7	605.8	-838.5	1,885,020.90	1,275,578.77	36.174264	-107.486163
- plan misses target center by 639.7usft at 5978.5usft MD (5466.9 TVD, -33.7 N, -852.1 E)									
- Point									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
320.0	320.0	9 5/8"	0	0
5,856.8	5,462.7	7"	0	0

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Aztec Oil Syndicate 1H
Company:	LOGOS Operating LLC	TVD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Project:	Sandoval County, NM	MD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Site:	S5-T22N-R6W	North Reference:	True
Well:	Aztec Oil Syndicate 1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #7		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,367.0	1,367.0	Ojo Alamo		-0.41	271.22
1,485.0	1,485.0	Kirtland		-0.41	271.22
1,753.0	1,753.0	Fruitland		-0.41	271.22
1,924.0	1,924.0	Pictured Cliffs		-0.41	271.22
2,324.0	2,324.0	Chacra		-0.41	271.22
3,396.0	3,396.0	Cliff House		-0.41	271.22
3,429.0	3,429.0	Meneffee		-0.41	271.22
4,200.0	4,200.0	Point Lookout		-0.41	271.22
4,363.0	4,363.0	Mancos		-0.41	271.22
5,343.3	5,268.0	Gallup		-0.41	271.22
5,778.8	5,457.0	Top lower Gallup		-0.41	271.22
5,815.4	5,463.0	Lwr Gllp Tz		-0.41	271.22
5,869.0	5,469.0	Lwr Gllp Tz Base		-0.41	271.22

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.5	0.5	0.0	0.0	SH - 939' FNL, 357' FEL
4,675.0	4,675.0	0.0	0.0	KOP @ 4,557'
5,856.8	5,462.7	-36.3	-730.6	7" - 990' FNL, 1087' FEL
5,856.8	5,462.7	-36.3	-730.6	EOB @ 85° INC / Start 5° Build
5,964.9	5,467.0	-34.0	-838.5	LP - 990' FNL, 1195' FEL
5,964.9	5,467.0	-34.0	-838.5	LP @ 5,467' TVD, 90.40° INC
12,345.1	5,422.0	101.2	-7,217.1	TD @ 12,345.1' MD
12,345.1	5,422.0	101.2	-7,217.1	PBHL - 990' FNL, 2335' FEL

LOGOS Operating LLC

Sandoval County, NM

S5-T22N-R6W

Aztec Oil Syndicate 1H

HZ

Plan #7

Anticollision Report

23 July, 2014

Cathedral Energy Services

Anticollision Report

Company:	LOGOS Operating LLC	Local Co-ordinate Reference:	Well Aztec Oil Syndicate 1H
Project:	Sandoval County, NM	TVD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Reference Site:	S5-T22N-R6W	MD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Site Error:	0.0usft	North Reference:	True
Reference Well:	Aztec Oil Syndicate 1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #7	Offset TVD Reference:	Offset Datum

Reference	Plan #7		
Filter type:	GLOBAL FILTER APPLIED: All wellpaths within 200'+ 100/1000 of reference		
Interpolation Method:	MD Interval 100.0usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 500.0usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program		Date	7/23/2014		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	12,345.1	Plan #7 (HZ)	Geolink MWD	Geolink MWD	

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						
S5-T22N-R6W						
Aztec Oil Syndicate 2H - HZ - Plan #7	4,500.0	4,500.0	52.2	36.5	3.334	CC, ES, SF

Cathedral Energy Services

Anticollision Report

Company:	LOGOS Operating LLC	Local Co-ordinate Reference:	Well Aztec Oil Syndicate 1H
Project:	Sandoval County, NM	TVD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Reference Site:	S5-T22N-R6W	MD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Site Error:	0.0usft	North Reference:	True
Reference Well:	Aztec Oil Syndicate 1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #7	Offset TVD Reference:	Offset Datum

Offset Design S5-T22N-R6W - Aztec Oil Syndicate 2H - HZ - Plan #7												Offset Site Error:	0.0 usft
Survey Program: 0-Geolink MWD												Offset Well Error:	0.0 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)	Total Uncertainty Axis	Separation Factor	
0.0	0.0	0.0	0.0	0.0	0.0	162.73	-49.8	15.5	52.2				
100.0	100.0	100.0	100.0	0.1	0.1	162.73	-49.8	15.5	52.2	51.9	0.30	175.913	
200.0	200.0	200.0	200.0	0.3	0.3	162.73	-49.8	15.5	52.2	51.5	0.65	80.825	
300.0	300.0	300.0	300.0	0.5	0.5	162.73	-49.8	15.5	52.2	51.2	0.99	52.465	
400.0	400.0	400.0	400.0	0.7	0.7	162.73	-49.8	15.5	52.2	50.9	1.34	38.838	
500.0	500.0	500.0	500.0	0.8	0.8	162.73	-49.8	15.5	52.2	50.5	1.69	30.830	
600.0	600.0	600.0	600.0	1.0	1.0	162.73	-49.8	15.5	52.2	50.2	2.04	25.560	
700.0	700.0	700.0	700.0	1.2	1.2	162.73	-49.8	15.5	52.2	49.8	2.39	21.829	
800.0	800.0	800.0	800.0	1.4	1.4	162.73	-49.8	15.5	52.2	49.5	2.74	19.048	
900.0	900.0	900.0	900.0	1.5	1.5	162.73	-49.8	15.5	52.2	49.1	3.09	16.896	
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	162.73	-49.8	15.5	52.2	48.8	3.44	15.180	
1,100.0	1,100.0	1,100.0	1,100.0	1.9	1.9	162.73	-49.8	15.5	52.2	48.4	3.79	13.781	
1,200.0	1,200.0	1,200.0	1,200.0	2.1	2.1	162.73	-49.8	15.5	52.2	48.1	4.14	12.618	
1,300.0	1,300.0	1,300.0	1,300.0	2.2	2.2	162.73	-49.8	15.5	52.2	47.7	4.49	11.636	
1,400.0	1,400.0	1,400.0	1,400.0	2.4	2.4	162.73	-49.8	15.5	52.2	47.4	4.83	10.796	
1,500.0	1,500.0	1,500.0	1,500.0	2.6	2.6	162.73	-49.8	15.5	52.2	47.0	5.18	10.069	
1,600.0	1,600.0	1,600.0	1,600.0	2.8	2.8	162.73	-49.8	15.5	52.2	46.7	5.53	9.434	
1,700.0	1,700.0	1,700.0	1,700.0	2.9	2.9	162.73	-49.8	15.5	52.2	46.3	5.88	8.874	
1,800.0	1,800.0	1,800.0	1,800.0	3.1	3.1	162.73	-49.8	15.5	52.2	46.0	6.23	8.377	
1,900.0	1,900.0	1,900.0	1,900.0	3.3	3.3	162.73	-49.8	15.5	52.2	45.6	6.58	7.932	
2,000.0	2,000.0	2,000.0	2,000.0	3.5	3.5	162.73	-49.8	15.5	52.2	45.3	6.93	7.533	
2,100.0	2,100.0	2,100.0	2,100.0	3.6	3.6	162.73	-49.8	15.5	52.2	44.9	7.28	7.172	
2,200.0	2,200.0	2,200.0	2,200.0	3.8	3.8	162.73	-49.8	15.5	52.2	44.6	7.63	6.843	
2,300.0	2,300.0	2,300.0	2,300.0	4.0	4.0	162.73	-49.8	15.5	52.2	44.2	7.98	6.544	
2,400.0	2,400.0	2,400.0	2,400.0	4.2	4.2	162.73	-49.8	15.5	52.2	43.9	8.33	6.269	
2,500.0	2,500.0	2,500.0	2,500.0	4.3	4.3	162.73	-49.8	15.5	52.2	43.5	8.67	6.017	
2,600.0	2,600.0	2,600.0	2,600.0	4.5	4.5	162.73	-49.8	15.5	52.2	43.2	9.02	5.784	
2,700.0	2,700.0	2,700.0	2,700.0	4.7	4.7	162.73	-49.8	15.5	52.2	42.8	9.37	5.569	
2,800.0	2,800.0	2,800.0	2,800.0	4.9	4.9	162.73	-49.8	15.5	52.2	42.5	9.72	5.369	
2,900.0	2,900.0	2,900.0	2,900.0	5.0	5.0	162.73	-49.8	15.5	52.2	42.1	10.07	5.183	
3,000.0	3,000.0	3,000.0	3,000.0	5.2	5.2	162.73	-49.8	15.5	52.2	41.8	10.42	5.009	
3,100.0	3,100.0	3,100.0	3,100.0	5.4	5.4	162.73	-49.8	15.5	52.2	41.4	10.77	4.847	
3,200.0	3,200.0	3,200.0	3,200.0	5.6	5.6	162.73	-49.8	15.5	52.2	41.1	11.12	4.695	
3,300.0	3,300.0	3,300.0	3,300.0	5.7	5.7	162.73	-49.8	15.5	52.2	40.7	11.47	4.552	
3,400.0	3,400.0	3,400.0	3,400.0	5.9	5.9	162.73	-49.8	15.5	52.2	40.4	11.82	4.417	
3,500.0	3,500.0	3,500.0	3,500.0	6.1	6.1	162.73	-49.8	15.5	52.2	40.0	12.16	4.291	
3,600.0	3,600.0	3,600.0	3,600.0	6.3	6.3	162.73	-49.8	15.5	52.2	39.7	12.51	4.171	
3,700.0	3,700.0	3,700.0	3,700.0	6.4	6.4	162.73	-49.8	15.5	52.2	39.3	12.86	4.058	
3,800.0	3,800.0	3,800.0	3,800.0	6.6	6.6	162.73	-49.8	15.5	52.2	39.0	13.21	3.950	
3,900.0	3,900.0	3,900.0	3,900.0	6.8	6.8	162.73	-49.8	15.5	52.2	38.6	13.56	3.849	
4,000.0	4,000.0	4,000.0	4,000.0	7.0	7.0	162.73	-49.8	15.5	52.2	38.3	13.91	3.752	
4,100.0	4,100.0	4,100.0	4,100.0	7.1	7.1	162.73	-49.8	15.5	52.2	37.9	14.26	3.660	
4,200.0	4,200.0	4,200.0	4,200.0	7.3	7.3	162.73	-49.8	15.5	52.2	37.6	14.61	3.573	
4,300.0	4,300.0	4,300.0	4,300.0	7.5	7.5	162.73	-49.8	15.5	52.2	37.2	14.96	3.490	
4,400.0	4,400.0	4,400.0	4,400.0	7.7	7.7	162.73	-49.8	15.5	52.2	36.9	15.31	3.410	
4,500.0	4,500.0	4,500.0	4,500.0	7.8	7.8	162.73	-49.8	15.5	52.2	36.5	15.66	3.334 CC, ES, SF	
4,600.0	4,600.0	4,592.2	4,591.9	8.0	8.0	162.46	-55.8	17.6	59.1	43.1	15.99	3.694	
4,700.0	4,700.0	4,681.0	4,678.8	8.2	8.2	-104.49	-72.7	23.7	79.4	63.1	16.32	4.867	
4,800.0	4,799.5	4,762.5	4,755.9	8.4	8.4	-106.48	-97.6	32.6	114.5	97.9	16.63	6.888	
4,900.0	4,897.0	4,833.3	4,819.8	8.6	8.6	-108.44	-126.2	42.9	164.3	147.4	16.91	9.718	
5,000.0	4,990.9	4,892.2	4,870.3	8.8	8.8	-108.41	-154.8	53.1	226.9	209.7	17.21	13.188	
5,100.0	5,079.7	4,939.5	4,908.7	9.2	9.0	-105.94	-180.6	62.4	299.7	282.1	17.61	17.015	

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

Cathedral Energy Services

Anticollision Report

Company:	LOGOS Operating LLC	Local Co-ordinate Reference:	Well Aztec Oil Syndicate 1H
Project:	Sandoval County, NM	TVD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Reference Site:	S5-T22N-R6W	MD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Site Error:	0.0usft	North Reference:	True
Reference Well:	Aztec Oil Syndicate 1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #7	Offset TVD Reference:	Offset Datum

Offset Design S5-T22N-R6W - Aztec Oil Syndicate 2H - HZ - Plan #7													Offset Site Error:	0.0 usft
Survey Program: 0-Geolink MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis		Highside		Offset Wellbore Centre		Distance		Total	Separation	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Toolface (°)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Uncertainty Axis	Factor	
5,200.0	5,162.1	4,976.2	4,937.2	9.7	9.2	-100.80		-202.4	70.2	380.0	361.8	18.25	20.819	
5,300.0	5,236.6	5,000.0	4,955.0	10.5	9.4	-92.17		-217.3	75.5	465.7	446.5	19.20	24.262	

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

Cathedral Energy Services

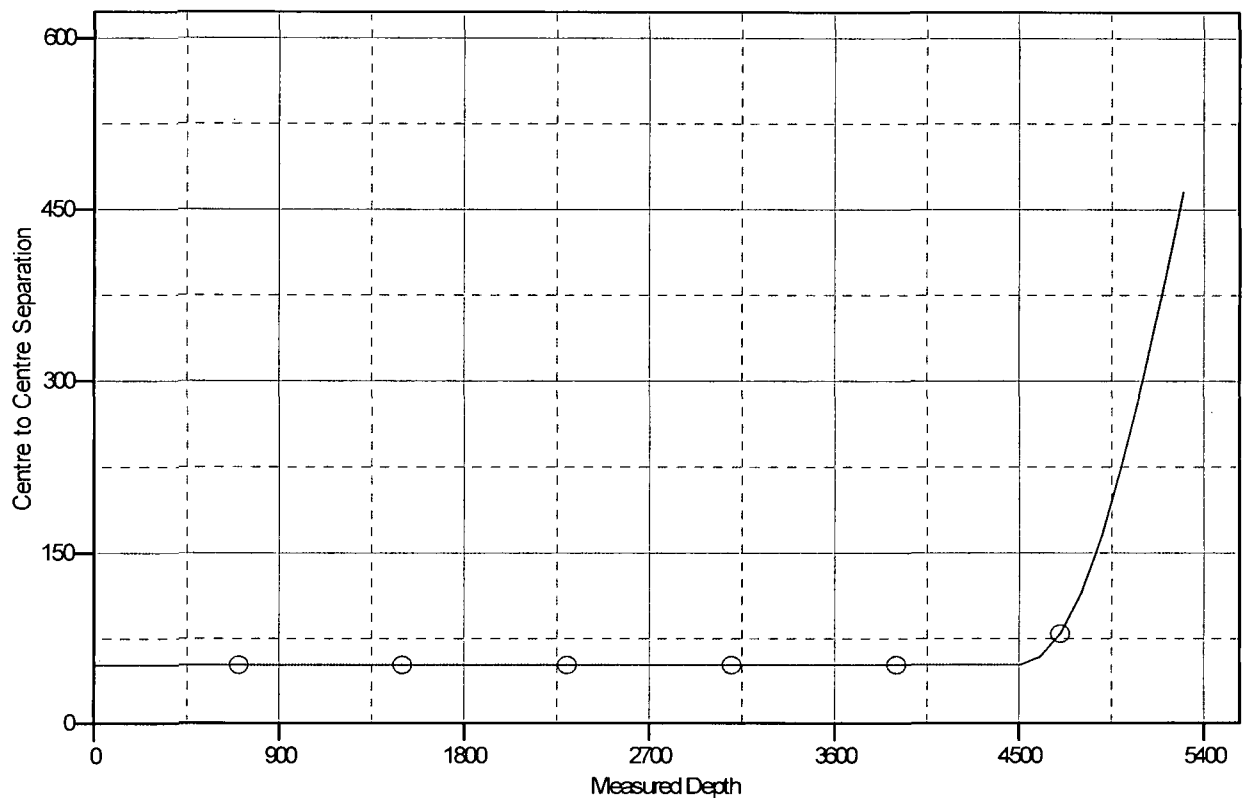
Anticollision Report

Company:	LOGOS Operating LLC	Local Co-ordinate Reference:	Well Aztec Oil Syndicate 1H
Project:	Sandoval County, NM	TVD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Reference Site:	S5-T22N-R6W	MD Reference:	KB=15' @ 7141.0usft (Aztec #222)
Site Error:	0.0usft	North Reference:	True
Reference Well:	Aztec Oil Syndicate 1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #7	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB=15' @ 7141.0usft (Aztec #222)
 Offset Depths are relative to Offset Datum
 Central Meridian is -106.250000 °

Coordinates are relative to: Aztec Oil Syndicate 1H
 Coordinate System is US State Plane 1983, New Mexico Central Zone
 Grid Convergence at Surface is: -0.73°

Ladder Plot



LEGEND

—○— Aztec Oil Syndicate 2H, HZ, Plan #7 V0