State of New Mexico
Energy, Minerals and Natural Resources Department

New Mexico Oil Conservation Division approval and conditions listed below are made in accordance with OCD Rule 19.15.7.11 and are in addition to the actions approved by BLM on the following 3160-4 or 3160-5 form.

Operator Signature Date: December 9, 2013

Application Type:

☐ P&A ☒ Drilling/Casing Change ☐ Recomplete/DHC

☐ Location Change ☐ Other: Drilling plans Revised

Well information:
30-043-21182, Logos 601H, Logos Operating LLC, D, section 6, T22N, R5W

Conditions of Approval:

Notify NMOCD 24hrs prior to beginning operations
Hold C-104 for "As Drilled Plat", Directional Survey, and NSL
Pressure test casing for 30 minutes

JAN 07 2014

NMOCD Approved by Signature Date

Form 3160-5
(March 2012)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RECEIVED
DEC 09 2013
Farmington Field Office
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	5. Lease Serial No. Jicarilla Apache Lease #424
	6. If Indian, Allottee or Tribe Name Jicarilla Apache Nation
	7. If Unit of CA/Agreement, Name and/or No. RCVD DEC 31 '13
	8. Well Name and No. Logos 601H OIL CONS. DIV.
2. Name of Operator Logos Operating, LLC	9. API Well No. 30-043- 21182 DIST. 3
3a. Address 4001 North Butler Avenue, Building 7101 Farmington, NM 87401 3b. Phone No. *(include area code)* 505-330-9333	10. Field and Pool or Exploratory Area Gallup
4. Location of Well *(Footage, Sec., T.,R.,M., or Survey Description)* Surface: 440' FNL, 560' FWL Section 5, T22N, R5W, UL D Bottom: 440' FNL, 330' FWL Section 6, T22N, R5W, UL D	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
	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Subsequent Report	☐ Casing Repair	☐ New Construction	☐ Recomplete	☑ Other Drilling Plans Revised
	☑ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
☐ Final Abandonment Notice	☐ 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 Operating would like to revise the casing weight/grade, setting depths, cement plans, and drilling plan that was submitted with the APD. The 16" conductor casing has been removed, 9-5/8" changed to J-55, 7" changed to 23# J-55 with a setting depth of 5700'MD and legal position to 440' FNL & 37' FWL in Section 5, 4-1/2" changed to 11.6# P-110 with a setting depth of 10687'MD. Also see the change in the drilling plan section for angles and depths. The cement program has been adjusted accordingly.

Please see the attached revised drilling program and horizontal planning report. Hole sizes and bottom hole target of 440' FNL & 330' FWL of Section 6 will remain the same.

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 12/09/2013

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by	Title AFM	Date 12/31/13
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)

NMOCD

Attachment To Application For Permit To Drill.
Drilling program

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

LOGOS #601H
Horizontal Gallup Oil and Gas Well
Surface Location: 440' FNL – 560' FWL
Section 5, T22N, R5W
Ungraded GL Elev = 6891'
Lat. = 36.17248885 deg N
Long. = 107.39161336 deg W
NAD83
Sandoval County, New Mexico

Proposed Bottom Hole Location: 440' FNL – 330' FWL
Section 6, T22N, R5W
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

1. ESTIMATED TOPS FOR IMPORTANT GEOLOGICAL FORMATIONS

Formation Tops	Surface (TVD)
Ojo Alamo	1330
Kirtland	1460
Fruitland	1890
Pictured Cliff's	1900
Cliffs House	3370
Menefee	3400
Point Lookout	4200
Mancos	4330
Gallup	5180
Greenhorn Member of Mancos	6230
Dakota	6256

Drilling Plan

Drill 12 ¼" hole to 500' then set 9 5/8" casing. Drill 8 3/4" vertical hole with fresh water mud from 500' MD to kick off point at 4850'MD. Trip out of hole and pick up 8 ¾" kick off assembly at 4850'MD. Build angle at 10 deg/100' to 85 degrees inclination and 270.82 degrees azimuth in the Gallup formation at 5700'MD/5420'TVD where 7" intermediate casing will be set.
7" casing will be set in a legal position 440' FNL & 37' FWL in Section 5.
The 7" casing will be drilled out with a 6 1/8" drilling assembly building angle at 5 deg/100' to 90.76 degrees inclination and 270.82 degree azimuth to 5815.2'MD/5425'TVD. Hold 90.76 degrees, 270.82 degrees azimuth and drill to a total depth at 10687'MD/5360'TVD. Adjustments may be made to the directional program based on geology. Total depth will be 10687'MD/5360'TVD- 90.76 degrees, 270.82 degrees Azimuth.
The Bottom hole location will be in a legal location at 10687' MD at 440'FNL & 330' FWL of section 6.
A total of 4872' of horizontal hole will be drilled.

2. ANTICIPATED DEPTHS OF PROSPECTIVE OIL GAS AND OTHER HYDROCARBONS

Primary objective is the Gallup formation encountered first at 5420' TVD at 7" casing point

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

3. MINIMUM SPECIFICATIONS FOR PRESSURE CONTROL EQUIPMENT

A. Wellhead Equipment 3,000 PSI System (See Exhibit A)

1. 9 5/8" slip-on / welded x 11" 3,000 psi casing head.
2. One 11" 3,000 psi WP double-ram preventer with one (1) set of blind rams on top & one (1) set of pipe rams on bottom complete with hand wheels and extension arms.
3. The choke and kill lines will be connected to outlets between the bottom and top rams, utilizing either the ram body outlet or a drilling spool with side outlets for 2" kill line and minimum 3" choke line
4. One 11" x 3,000 psi WP Hydril GK (or equivalent) annular preventer.

5. Accumulator - Four Station Koomey (or equivalent) 120 gallon closing unit with remote, backup. The accumulator shall have sufficient capacity to open the hydraulically-controlled gate valve and close all rams plus the annular preventer, with a 50% safety factor and retain a minimum of 200 psi above the precharge on the closing manifold without the use of the closing unit pumps. The reservoir capacity shall be double the usable accumulator capacity, and the fluid level shall be maintained at the manufacturer's recommendations.
6. The BOP system shall have two (2) independent power sources (electric and air) available for powering the closing unit pumps. Sufficient nitrogen bottles are suitable as a backup power source only, and shall be recharged when the pressure falls below manufacturer's specification.
7. A valve shall be installed in the closing line as close as possible to the annular preventer to act as a locking device. This valve shall be maintained in the open position and shall be closed only when the power source for the accumulator system is inoperative.

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

The wellhead BOP equipment will be nippled-up on the 9-5/8" x 11" 3,000 psi WP casing head prior to drilling out from under surface casing. All ram preventers and related equipment will be tested to 3,000 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.

4. PROPOSED BIT AND CASING PROGRAM

A. Bit Program
12 1/4" Surface Hole = Surface to 500'
8 3/4" = 500' to 5700' = 7" Casing point
6-1/8" Lateral = 5700' MD to 10687' MD = Gallup Pay Zone Horizontal

B. 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-55	LT&C	0' - 500'	New casing. Cement to surface.
7" (8 ¾")	23 ppf	J-55	LT&C	0' - 5700' MD	New Casing. Cement to surface with foam cement.
4 ½" (6 1/8")	11.6 ppf	P-110	LT&C	5000' - 10687' MD	New Casing - Horizontal Hole Cemented full length with foam cement - TOL at 15 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.

5. 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.

a) 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 – (0-500'):
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)
0.4 % Halad(R)-344 (Low Fluid Loss Control)

Fluid Weight	15.80 lbm/gal
Slurry Yield:	1.15 ft^3/sk
Total Mixing Fluid:	4.94 Gal/sk
Top of Fluid:	0 ft
Calculated Fill:	500 ft
Volume:	55.8 bbl 313.2
Calculated Sacks:	273 sks

Intermediate Casing – Single Stage Job (0-5700'MD):
Excess – 50% over gauge hole – 8-3/4" hole and 7" casing (0.1503 ft3/ft)
Top of Cement – Surface.
Foamed Lead Cement
ELASTISEAL (TM) SYSTEM
0.2 % Versaset (Thixotropic Additive)
0.15 % HALAD-766 (Low Fluid Loss Control)
1.5 % CHEM - FOAMER 760, TOTETANK (Foamer)

Fluid Weight	13 lbm/gal
Slurry Yield:	1.43 ft^3/sk
Total Mixing Fluid:	6.74 Gal/sk
Top of Fluid:	0 ft
Calculated Fill:	5200 ft
Volume:	209 bbl
Calculated Sacks:	820 sks

Tail Cement
HALCEM (TM) SYSTEM
0.2 % Versaset (Thixotropic Additive)
0.15 % HALAD-766 (Low Fluid Loss Control)

Fluid Weight	13.50 lbm/gal
Slurry Yield:	1.29 ft^3/sk
Total Mixing Fluid:	5.70 Gal/sk
Top of Fluid:	5200 ft
Calculated Fill:	500 ft
Volume:	20
Calculated Sacks:	90 sks

Primary Cement – Cap Cement
HALCEM (TM) SYSTEM
2 % Calcium Chloride (Accelerator)

Fluid Weight	15.80 lbm/gal
Slurry Yield:	1.17 ft^3/sk
Total Mixing Fluid:	5.02 Gal/sk
Calculated Fill:	500 ft
Volume:	20.77 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	Foamed Lead Cement	13.0		820 sks
5	Cement	Tail Cement	13.5		90 sks
6	Spacer	Displacement	8.3		
7	Cement	Cap Cement	15.8		100 sks

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						
4	Foamed Lead Cement	200bbl	9.5	9.5	4.2	372.9

Foam Design Specifications:

Foam Calculation Method: Constant Density
Backpressure: 14 psig
Bottom Hole Circulating Temp: 105 degF
Mud Outlet Temperature: 85 degF

Calculated Gas = 23129.9 scf
Additional Gas = 50000 scf
Total Gas = 73129.9 scf

Cement volumes are minimums and may be adjusted based on caliper log results.

Production Casing – Single Stage Job (5000' - 10687'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: 4700 ft
Calculated Fill: 300 ft
Volume: 7.15 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: 5000 ft
Calculated Fill: 4618 ft
Volume: 93 bbl
Calculated Sacks: 270 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: 9618 ft
Calculated Fill: 1069 ft
Volume: 20.85 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		270 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	50.98bbl	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

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

Production liner clarification: Utilizing foam cement for zonal isolation in the production liner.

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.

6. **PROPOSED DRILLING FLUIDS PROGRAM**

a) Vertical Portion

Hole Size (in)	TVD (ft)	Mud Type	Density (lb/gal)	Viscosity (sec/qt)	Fluid Loss (cc)
12 1/4"	0-500'	Fresh Water	8.4-8.6	60-70	NC
8 3/4"	500'-4850'	Fresh Water LSND	8.5-8.8	40-50	8-10

b) 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"	4850' (KOP)-5700'	Fresh Water LSND	8.5-8.8	40-50	8-10
6 1/8"	5000' - 10687'	Synthetic Oil Based Mud	7.0-9.0	15-25	<1

c) 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.

d) 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.

7. TESTING, CORING and LOGGING

a) Drill Stem Testing - None anticipated
b) Coring - None anticipated.
c) Mud Logging – Mud loggers will be on location from intermediate casing point to TD.
d) Logging - See Below
e) Gamma Ray from surface casing point to TD

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

8. ABNORMAL PRESSURES & HYDROGEN SULFIDE

The anticipated bottom hole pressure is +/- 2537 psi based on a 9.0 ppg at 5420' TVD of the landing point of the horizontal. No abnormal pressure or temperatures are anticipated.

No hydrogen sulfide gas is anticipated, however, if H_2S 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 December 27, 2013. 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 45 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:

1. The closed-loop system will be signed in accordance with 19.15.17.11 NMAC.
2. 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.
3. Topsoil will be salvaged and stored for use in reclamation activities.
4. The closed-loop system storage tanks will be placed in bermed secondary containment sized to contain a minimum of 110percent 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:

1. Fluid levels will be maintained to provide sufficient freeboard to prevent over-topping.
2. 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.
3. 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.
4. 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.

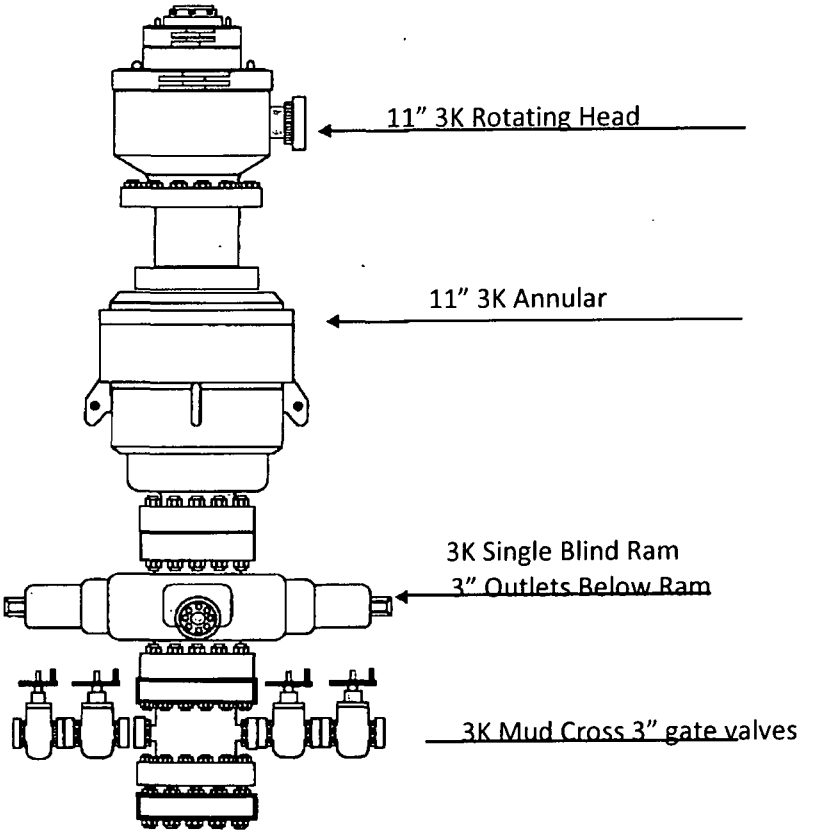
CLOSED-LOOP SYSTEM CLOSURE PLAN

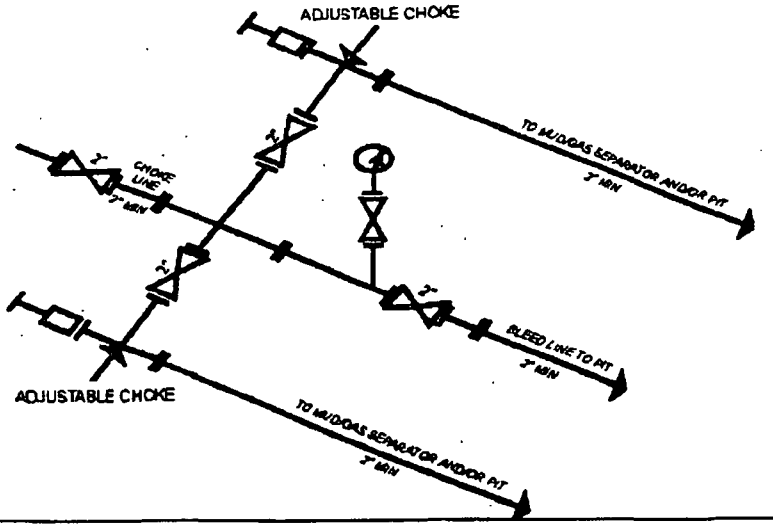
The closed-loop system will be closed in accordance with 19.15.17.13 NMAC.

Closure considerations include:

1. Drilling fluids will be recycled and transferred to other permitted closed-loop systems or returned to the vendor for reuse, as practical.
2. 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.
3. 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.
4. Storage tanks will be removed from the well location during the rig move.
5. The well pad will be reclaimed and seeded in accordance with subsections G, Hand I of 19.15.17.13NMAC.

WELLHEAD BLOWOUT CONTROL SYSTEM





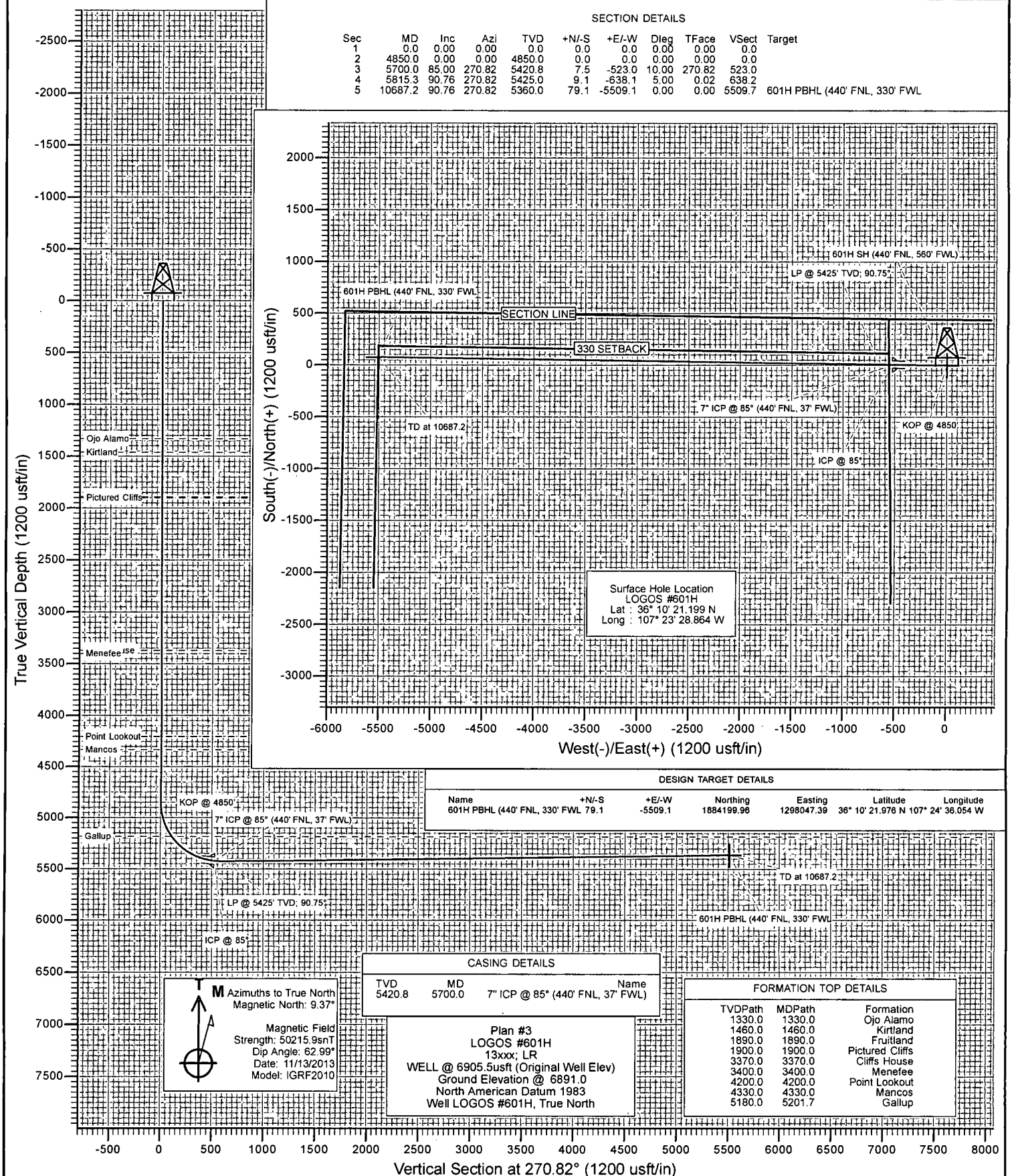
LOGOS RESOURCES LLC

Project: Sandoval County, NM
Site: S5-T22N-R5W
Well: LOGOS #601H
Wellbore: Hz
Design: Plan #3

CATHEDRAL

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	4850.0	0.00	0.00	4850.0	0.0	0.0	0.00	0.00	0.0	
3	5700.0	85.00	270.82	5420.8	7.5	-523.0	10.00	270.82	523.0	
4	5815.3	90.76	270.82	5425.0	9.1	-638.1	5.00	0.02	638.2	
5	10687.2	90.76	270.82	5360.0	79.1	-5509.1	0.00	0.00	5509.7	601H PBHL (440' FNL, 330' FWL



DESIGN TARGET DETAILS

Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
601H PBHL (440' FNL, 330' FWL	79.1	-5509.1	1884199.96	1298047.39	36° 10' 21.976 N	107° 24' 36.054 W

CASING DETAILS

TVD	MD	Name
5420.8	5700.0	7" ICP @ 85° (440' FNL, 37' FWL)

Azimuths to True North
Magnetic North: 9.37°

Magnetic Field
Strength: 50215.9snT
Dip Angle: 62.99°
Date: 11/13/2013
Model: IGRF2010

Plan #3
LOGOS #601H
13xxx; LR
WELL @ 6905.5usft (Original Well Elev)
Ground Elevation @ 6891.0
North American Datum 1983
Well LOGOS #601H, True North

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
1330.0	1330.0	Ojo Alamo
1460.0	1460.0	Kirtland
1890.0	1890.0	Fruitland
1900.0	1900.0	Pictured Cliffs
3370.0	3370.0	Cliffs House
3400.0	3400.0	Menefee
4200.0	4200.0	Point Lookout
4330.0	4330.0	Mancos
5180.0	5201.7	Gallup

Planning Report

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well LOGOS #601H
Company:	LOGOS Operating LLC	**TVD Reference:**	WELL @ 6905.5usft (Original Well Elev)
Project:	Sandoval County, NM	**MD Reference:**	WELL @ 6905.5usft (Original Well Elev)
Site:	S5-T22N-R5W	**North Reference:**	True
Well:	LOGOS #601H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #3		

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-R5W

Site Position:		**Northing:**	1,884,056.13 usft	**Latitude:**	36° 10' 21.199 N
From:	Lat/Long	**Easting:**	1,303,555.19 usft	**Longitude:**	107° 23' 28.864 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16"	**Grid Convergence:**	-0.67 °

Well LOGOS #601H

Well Position	**+N/-S**	0.0 usft	**Northing:**	1,884,056.13 usft	**Latitude:**	36° 10' 21.199 N
	+E/-W	0.0 usft	**Easting:**	1,303,555.19 usft	**Longitude:**	107° 23' 28.864 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	6,891.0 usft

Wellbore Hz

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/13/2013	9.37	62.99	50,216

Design Plan #3

Audit Notes:

Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.0
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.0	0.0	0.0	270.82	

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	
4,850.0	0.00	0.00	4,850.0	0.0	0.0	0.00	0.00	0.00	0.00	
5,700.0	85.00	270.82	5,420.8	7.5	-523.0	10.00	10.00	0.00	270.82	
5,815.3	90.76	270.82	5,425.0	9.1	-638.1	5.00	5.00	0.00	0.02	
10,687.2	90.76	270.82	5,360.0	79.1	-5,509.1	0.00	0.00	0.00	0.00	601H PBHL (440' FNL

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well LOGOS #601H
Company:	LOGOS Operating LLC	**TVD Reference:**	WELL @ 6905.5usft (Original Well Elev)
Project:	Sandoval County, NM	**MD Reference:**	WELL @ 6905.5usft (Original Well Elev)
Site:	S5-T22N-R5W	**North Reference:**	True
Well:	LOGOS #601H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #3		

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	601H SH (440' FNL, 560' FWL)
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	
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	
1,330.0	0.00	0.00	1,330.0	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	
1,460.0	0.00	0.00	1,460.0	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	
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	
1,890.0	0.00	0.00	1,890.0	0.0	0.0	0.0	0.00	0.00	Fruitland
1,900.0	0.00	0.00	1,900.0	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	
2,400.0	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	
3,370.0	0.00	0.00	3,370.0	0.0	0.0	0.0	0.00	0.00	Cliffs House
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	Menefee
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
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	
4,330.0	0.00	0.00	4,330.0	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	

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well LOGOS #601H
Company:	LOGOS Operating LLC	**TVD Reference:**	WELL @ 6905.5usft (Original Well Elev)
Project:	Sandoval County, NM	**MD Reference:**	WELL @ 6905.5usft (Original Well Elev)
Site:	S5-T22N-R5W	**North Reference:**	True
Well:	LOGOS #601H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #3		

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
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	
4,850.0	0.00	0.00	4,850.0	0.0	0.0	0.0	0.00	0.00	KOP @ 4850'
4,900.0	5.00	270.82	4,899.9	0.0	-2.2	2.2	10.00	10.00	
5,000.0	15.00	270.82	4,998.3	0.3	-19.5	19.5	10.00	10.00	
5,100.0	25.00	270.82	5,092.1	0.8	-53.7	53.7	10.00	10.00	
5,200.0	35.00	270.82	5,178.6	1.5	-103.6	103.6	10.00	10.00	
5,201.7	35.17	270.82	5,180.0	1.5	-104.6	104.6	10.00	10.00	Gallup
5,300.0	45.00	270.82	5,255.1	2.4	-167.8	167.8	10.00	10.00	
5,400.0	55.00	270.82	5,319.3	3.5	-244.3	244.3	10.00	10.00	
5,500.0	65.00	270.82	5,369.3	4.7	-330.8	330.8	10.00	10.00	
5,600.0	75.00	270.82	5,403.4	6.1	-424.6	424.7	10.00	10.00	
5,700.0	85.00	270.82	5,420.8	7.5	-523.0	523.0	10.00	10.00	ICP @ 85° - 7" ICP @ 85° (440' FNL, 37' FWL)
5,800.0	90.00	270.82	5,425.1	8.9	-622.8	622.9	5.00	5.00	
5,815.3	90.76	270.82	5,425.0	9.1	-638.1	638.2	5.00	5.00	LP @ 5425' TVD; 90.75°
5,900.0	90.76	270.82	5,423.9	10.4	-722.8	722.9	0.00	0.00	
6,000.0	90.76	270.82	5,422.6	11.8	-822.8	822.9	0.00	0.00	
6,100.0	90.76	270.82	5,421.2	13.2	-922.8	922.9	0.00	0.00	
6,200.0	90.76	270.82	5,419.9	14.7	-1,022.7	1,022.8	0.00	0.00	
6,300.0	90.76	270.82	5,418.6	16.1	-1,122.7	1,122.8	0.00	0.00	
6,400.0	90.76	270.82	5,417.2	17.5	-1,222.7	1,222.8	0.00	0.00	
6,500.0	90.76	270.82	5,415.9	19.0	-1,322.7	1,322.8	0.00	0.00	
6,600.0	90.76	270.82	5,414.6	20.4	-1,422.7	1,422.8	0.00	0.00	
6,700.0	90.76	270.82	5,413.2	21.8	-1,522.6	1,522.8	0.00	0.00	
6,800.0	90.76	270.82	5,411.9	23.3	-1,622.6	1,622.8	0.00	0.00	
6,900.0	90.76	270.82	5,410.6	24.7	-1,722.6	1,722.8	0.00	0.00	
7,000.0	90.76	270.82	5,409.2	26.1	-1,822.6	1,822.8	0.00	0.00	
7,100.0	90.76	270.82	5,407.9	27.6	-1,922.6	1,922.8	0.00	0.00	
7,200.0	90.76	270.82	5,406.6	29.0	-2,022.5	2,022.8	0.00	0.00	
7,300.0	90.76	270.82	5,405.2	30.4	-2,122.5	2,122.7	0.00	0.00	
7,400.0	90.76	270.82	5,403.9	31.9	-2,222.5	2,222.7	0.00	0.00	
7,500.0	90.76	270.82	5,402.5	33.3	-2,322.5	2,322.7	0.00	0.00	
7,600.0	90.76	270.82	5,401.2	34.8	-2,422.5	2,422.7	0.00	0.00	
7,700.0	90.76	270.82	5,399.9	36.2	-2,522.5	2,522.7	0.00	0.00	
7,800.0	90.76	270.82	5,398.5	37.6	-2,622.4	2,622.7	0.00	0.00	
7,900.0	90.76	270.82	5,397.2	39.1	-2,722.4	2,722.7	0.00	0.00	
8,000.0	90.76	270.82	5,395.9	40.5	-2,822.4	2,822.7	0.00	0.00	
8,100.0	90.76	270.82	5,394.5	41.9	-2,922.4	2,922.7	0.00	0.00	
8,200.0	90.76	270.82	5,393.2	43.4	-3,022.4	3,022.7	0.00	0.00	
8,300.0	90.76	270.82	5,391.9	44.8	-3,122.3	3,122.7	0.00	0.00	
8,400.0	90.76	270.82	5,390.5	46.2	-3,222.3	3,222.6	0.00	0.00	
8,500.0	90.76	270.82	5,389.2	47.7	-3,322.3	3,322.6	0.00	0.00	
8,600.0	90.76	270.82	5,387.9	49.1	-3,422.3	3,422.6	0.00	0.00	
8,700.0	90.76	270.82	5,386.5	50.5	-3,522.3	3,522.6	0.00	0.00	
8,800.0	90.76	270.82	5,385.2	52.0	-3,622.2	3,622.6	0.00	0.00	
8,900.0	90.76	270.82	5,383.9	53.4	-3,722.2	3,722.6	0.00	0.00	
9,000.0	90.76	270.82	5,382.5	54.8	-3,822.2	3,822.6	0.00	0.00	
9,100.0	90.76	270.82	5,381.2	56.3	-3,922.2	3,922.6	0.00	0.00	
9,200.0	90.76	270.82	5,379.9	57.7	-4,022.2	4,022.6	0.00	0.00	
9,300.0	90.76	270.82	5,378.5	59.2	-4,122.1	4,122.6	0.00	0.00	
9,400.0	90.76	270.82	5,377.2	60.6	-4,222.1	4,222.6	0.00	0.00	
9,500.0	90.76	270.82	5,375.8	62.0	-4,322.1	4,322.5	0.00	0.00	

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well LOGOS #601H
Company:	LOGOS Operating LLC	**TVD Reference:**	WELL @ 6905.5usft (Original Well Elev)
Project:	Sandoval County, NM	**MD Reference:**	WELL @ 6905.5usft (Original Well Elev)
Site:	S5-T22N-R5W	**North Reference:**	True
Well:	LOGOS #601H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #3		

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
9,600.0	90.76	270.82	5,374.5	63.5	-4,422.1	4,422.5	0.00	0.00	
9,700.0	90.76	270.82	5,373.2	64.9	-4,522.1	4,522.5	0.00	0.00	
9,800.0	90.76	270.82	5,371.8	66.3	-4,622.0	4,622.5	0.00	0.00	
9,900.0	90.76	270.82	5,370.5	67.8	-4,722.0	4,722.5	0.00	0.00	
10,000.0	90.76	270.82	5,369.2	69.2	-4,822.0	4,822.5	0.00	0.00	
10,100.0	90.76	270.82	5,367.8	70.6	-4,922.0	4,922.5	0.00	0.00	
10,200.0	90.76	270.82	5,366.5	72.1	-5,022.0	5,022.5	0.00	0.00	
10,300.0	90.76	270.82	5,365.2	73.5	-5,121.9	5,122.5	0.00	0.00	
10,400.0	90.76	270.82	5,363.8	74.9	-5,221.9	5,222.5	0.00	0.00	
10,500.0	90.76	270.82	5,362.5	76.4	-5,321.9	5,322.5	0.00	0.00	
10,600.0	90.76	270.82	5,361.2	77.8	-5,421.9	5,422.4	0.00	0.00	
10,687.2	90.76	270.82	5,360.0	79.1	-5,509.1	5,509.7	0.00	0.00	TD at 10687.2 - 601H PBHL (440' FNL, 330' FV

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
601H PBHL (440' FNL, 3 - plan hits target center - Point	0.00	359.32	5,360.0	79.1	-5,509.1	1,884,199.96	1,298,047.39	36° 10' 21.976 N	107° 24' 36.054 W
601H SH (440' FNL, 56(- plan misses target center by 5360.0usft at 0.0usft MD (0.0 TVD, 0.0 N, 0.0 E) - Point	0.00	359.32	-5,360.0	0.0	0.0	1,884,056.13	1,303,555.19	36° 10' 21.199 N	107° 23' 28.864 W

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
5,700.0	5,420.8	7" ICP @ 85° (440' FNL, 37' FWL)	0	0

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,330.0	1,330.0	Ojo Alamo		0.00	
1,460.0	1,460.0	Kirtland		0.00	
1,890.0	1,890.0	Fruitland		0.00	
1,900.0	1,900.0	Pictured Cliffs		0.00	
3,370.0	3,370.0	Cliffs House		0.00	
3,400.0	3,400.0	Menefee		0.00	
4,200.0	4,200.0	Point Lookout		0.00	
4,330.0	4,330.0	Mancos		0.00	
5,201.7	5,180.0	Gallup		0.00	

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well LOGOS #601H
Company:	LOGOS Operating LLC	**TVD Reference:**	WELL @ 6905.5usft (Original Well Elev)
Project:	Sandoval County, NM	**MD Reference:**	WELL @ 6905.5usft (Original Well Elev)
Site:	S5-T22N-R5W	**North Reference:**	True
Well:	LOGOS #601H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #3		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
4,850.0	4,850.0	0.0	0.0	KOP @ 4850'
5,700.0	5,420.8	7.5	-523.0	ICP @ 85°
5,815.3	5,425.0	9.1	-638.1	LP @ 5425' TVD; 90.75°
10,687.2	5,360.0	79.1	-5,509.1	TD at 10687.2