DATE IN	SUSPENSE	ENGINEER	LOGGED IN	TYPE	APP NO.
12/13/2013		MAM	12/13/2013	NSL	pMAM1335069180

ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION

- Engineering Bureau -

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

ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Application Acronyms:

[NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication]
[DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]
[PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]
[WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]
[SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]
[EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

[1] **TYPE OF APPLICATION** - Check Those Which Apply for [A]

[A] Location - Spacing Unit - Simultaneous Dedication
☒ NSL ☐ NSP ☐ SD

Check One Only for [B] or [C]

[B] Commingling - Storage - Measurement
☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

[C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery
☐ WFX ☐ PMX ☐ SWD ☐ IPI ☐ EOR ☐ PPR

[D] Other: Specify _____

[2] **NOTIFICATION REQUIRED TO:** - Check Those Which Apply, or Does Not Apply

[A] ☐ Working, Royalty or Overriding Royalty Interest Owners

[B] ☒ Offset Operators, Leaseholders or Surface Owner

[C] ☐ Application is One Which Requires Published Legal Notice

[D] ☐ Notification and/or Concurrent Approval by BLM or SLO
U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office

[E] ☒ For all of the above, Proof of Notification or Publication is Attached, and/or,

[F] ☐ Waivers are Attached

[3] **SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.**

[4] **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

John Austin Akers		VP of Land	1/8/13
Print or Type Name	Signature	Title	Date

aakers@logosresourcesllc.com
e-mail Address

LOGOS
RESOURCES LLC

Main office: 4001 N. Butler Ave. Bldg 7101
Farmington, NM 87401
Phone: (505) 436-2626

Nashville office: 110 30th Ave. North, Suite 4
Nashville TN, 37203
Phone: (615) 523-2661

Ms. Jami Bailey, Director
New Mexico Oil Conservation Division
1220 S. St. Francis Dr.
Santa Fe, NM 87505

December 10, 2013
Sent Via Overnight Mail

Re: Logos Operating, LLC
Request for Administrative Approval
Unorthodox Well Location
Wildcat Oil
LOGOS 601H
API No. – Not yet issued
Surface Location-440' FNL, 580' FWL
NE/4NE/4 Section 5, T24N, R6W

Dear Ms. Bailey:

On behalf of Logos Operating, LLC ("Logos") and pursuant to Division Rule 19.15.15.13 and and 19.15.15.9 governing the spacing for wildcat oil wells, we request administrative approval an unorthodox well location for the LOGOS 601H to be located at an unorthodox location as follows:

Surface location:	440' FNL, 580' FWL	(NWNW Section 5)
Initial Casing Point:	440' FNL, 37' FWL	(NENE Section 6)
End Casing Point:	440' FNL, 330' FWL	(NENE Section 6)

The pool rules for Wildcat Oil Wells provide that wells shall be drilled not closer than 330' to any quarter-quarter section. The location proposed for this well is consequently unorthodox by approximately 293' to the East toward LOGOS Resources, LLC's continuation of Jicarilla Lease 424. The hypotenuse of the initial casing point is only 441.55' from the NE corner of Section 6, which is less than the required 467', and therefore is unorthodox towards that corner by 25.45'. LOGOS Has provided notice of this unorthodox location to the Jicarilla Oil and Gas Association and Jicarilla BIA- sent via overnight mail on 12/11/2013.

The APD along with the C-102 plat showing the proposed location for the well are attached as Exhibits A and B.

Logos seeks an exception from the applicable well location rules for the following reasons: The efficient development of the resources underlying LOGOS Jicarilla Lease 424 requires the development of the Mancos interval within the 330' setbacks between sections 5 and 6 (as well as 7 and 8- though they are not affected by this well location) of

Township 22 North, Range 5 West. The attached map illustrates the resource that would be lost if this was not allowed.

Logos Resources LLC owns and operates all depths in Section 5 toward which the well location encroaches. The Jicarilla Apache Nation owns 100% of the minerals in all of Sections 31 and 32 of T23N, R5W towards which the "hypotenuse incursion" exists. Therefore, in accordance with 19.15.4.12 A, LOGOS Has provided notice of this application for approval of unorthodox location to the Jicarilla Oil and Gas Association and Jicarilla BIA sent via overnight mail on 12/~~10~~11/2013.

The Division's Administrative Application Checklist is enclosed.

Thank you for your consideration of this request. Should more information be required, please do not hesitate to contact me at 615-523-2663.

Very truly yours,

John Austin Akers
Vice President of Land

Enclosures:

Lease Map
Exhibit A - APD
Exhibit B – C-102
Administrative Application Checklist

McMillan, Michael, EMNRD

From: John Austin Akers <aakers@logosresourcesllc.com>
Sent: Tuesday, December 17, 2013 1:48 PM
To: McMillan, Michael, EMNRD
Subject: RE: NSL Logos 601H Sandoval County

I think it should be from East- we are encroaching on Section 5 to the east.

John "Austin" Akers
Vice President of Land- Logos Resources, LLC
P:615-253-2661 F: 303-974-1767

From: McMillan, Michael, EMNRD [mailto:Michael.McMillan@state.nm.us]
Sent: Tuesday, December 17, 2013 2:25 PM
To: John Austin Akers
Subject: RE: NSL Logos 601H Sandoval County

Should the start of the perforated interval be 440 FNL and 37**E? and not 440FNl and 37' FWL?**

From: John Austin Akers [mailto:aakers@logosresourcesllc.com]
Sent: Tuesday, December 17, 2013 1:12 PM
To: McMillan, Michael, EMNRD
Subject: Re: NSL Logos 601H Sandoval County

Thanks

Sent from my iPhone

On Dec 17, 2013, at 2:11 PM, "McMillan, Michael, EMNRD" <Michael.McMillan@state.nm.us> wrote:

> You are correct, it should have said 440'FNL & 37'FWL
> Mike McMillan
>
> ---
>
> **From:** John Austin Akers [mailto:aakers@logosresourcesllc.com]
> **Sent:** Tuesday, December 17, 2013 12:05 PM
> **To:** McMillan, Michael, EMNRD
> **Cc:** Goetze, Phillip, EMNRD; David Gonzales
> **Subject:** RE: NSL Logos 601H Sandoval County
>
> Dear Mr. McMillan,
>
> At this time, we would like to permit the NSL to have the perforated interval commencing exactly at the 440' FNL, 37' FWL which I believe as the start casing point identified in the letter. You noted "44" FNL and 34" FWL" as being stated in the letter, but the copy I have shows 440' FNL, 37' FWL. Please let me know if I am incorrect.
>
> Thank you!
>
> John "Austin" Akers

RECEIVED

DEC 09 2013

Farmington Field Office
Bureau of Land Management

Form 3160-5
(March 2012)

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.

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.

1. Type of Well
☑ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
Logos 601H

2. Name of Operator
Logos Operating, LLC

9. API Well No.
30-043- 21182

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
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☑ Other Drilling Plans Revised
	☑ 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 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.

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 12/09/2013

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by D. Mankiewicz

Title AFM

Date 12/11/13

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)

OPERATOR

DISTRICT I
1625 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) 748-1283 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, 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

RECEIVED
OCT 24 2013
Farmington Field Office
Bureau of Land Management

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	2 Pool Code	3 Pool Name
30-043-21182	97989	WC 22N5W16; Gallup (O)

4 Property Code	5 Property Name	6 Well Number
311963	LOGOS	601H

7 OGRID No.	8 Operator Name	9 Elevation
289408	LOGOS OPERATING, LLC	6891

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
D	5	22-N	5-W	4	440	NORTH	560	WEST	SANDOVAL

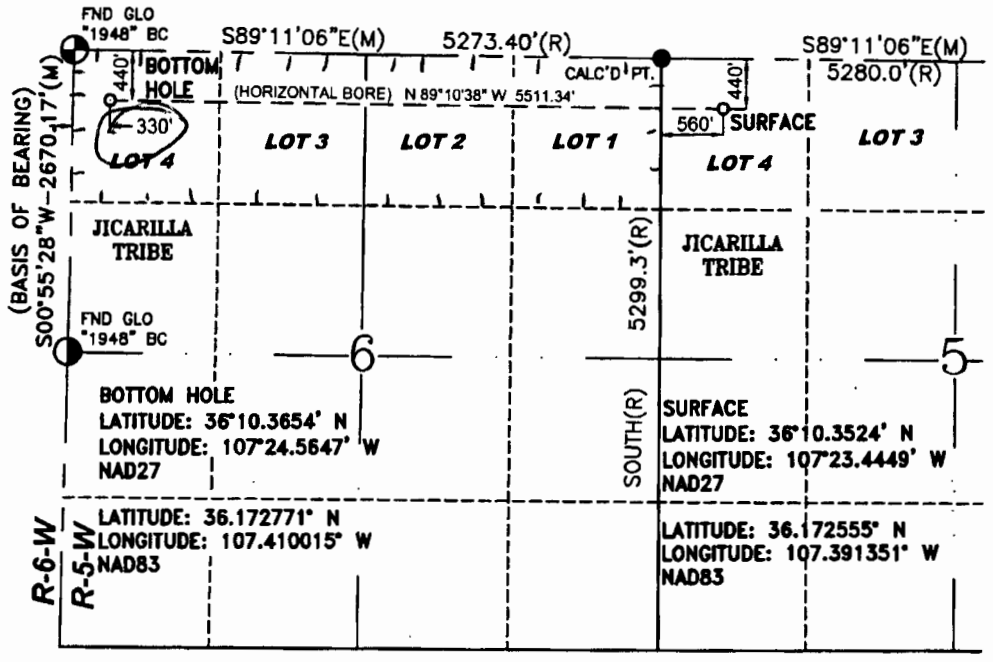
11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	6	22-N	5-W	4	440	NORTH	330	WEST	SANDOVAL

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
161 ACRES N/2, N/2 Sect. 6			

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



BASIS OF BEARING:
BETWEEN FOUND MONUMENTS AT THE NORTHWEST CORNER AND THE WEST QUARTER CORNER OF SECTION 6, TOWNSHIP 22 NORTH, RANGE 5 WEST, N.M.P.M. SANDOVAL COUNTY, NEW MEXICO.

LINE BEARS: S 00°55'28" W A DISTANCE OF 2670.17 FEET AS MEASURED BY G.P.S. LOCAL GRID NAD83.

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.

Kristy Graham 10/22/13
Signature Date

Kristy Graham
Printed Name

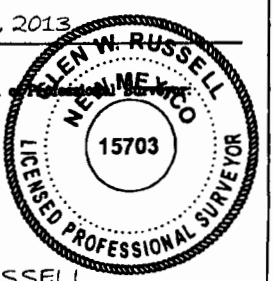
Kgraham@logosresourcesllc.com
E-mail Address

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.

OCTOBER 9, 2013
Date of Survey

Signature and Seal of Professional Surveyor:



GLEN W. RUSSELL
Certificate Number 15703

Plat #1

One Mile Radius for Logos 601H

API	Well Name	Well Number	Type	Status	Unit Letter	Section	Township	Range	Current Operator
30-043-20080	JAIR	#001	Oil	Producing	H	7	22N	05W	LOGOS OPERATING, LLC
30-043-20085	JAIR	#002	Oil	Producing	L	8	22N	05W	LOGOS OPERATING, LLC
30-043-21119	LOGOS	#001	Oil	Producing	F	5	22N	05W	LOGOS OPERATING, LLC
30-043-21120	LOGOS	#002	Oil	Producing	I	6	22N	05W	LOGOS OPERATING, LLC
30-043-20068	PRE-ONGARD WELL	#001	Oil	Plugged	D	8	22N	05W	PRE-ONGARD WELL OPERATOR
	LOGOS	#007	Oil	Permitted	E	5	22N	05W	LOGOS OPERATING, LLC
	LOGOS	#008	Oil	Permitted	G	5	22N	05W	LOGOS OPERATING, LLC
	LOGOS	#009	Oil	Permitted	H	5	22N	05W	LOGOS OPERATING, LLC
	LOGOS	#010	Oil	Permitted	L	6	22N	05W	LOGOS OPERATING, LLC
	LOGOS	#011	Oil	Permitted	K	6	22N	05W	LOGOS OPERATING, LLC
	LOGOS	#012	Oil	Permitted	J	6	22N	05W	LOGOS OPERATING, LLC
	LOGOS	#601H	Oil	Proposed	D	5	22N	05W	LOGOS OPERATING, LLC

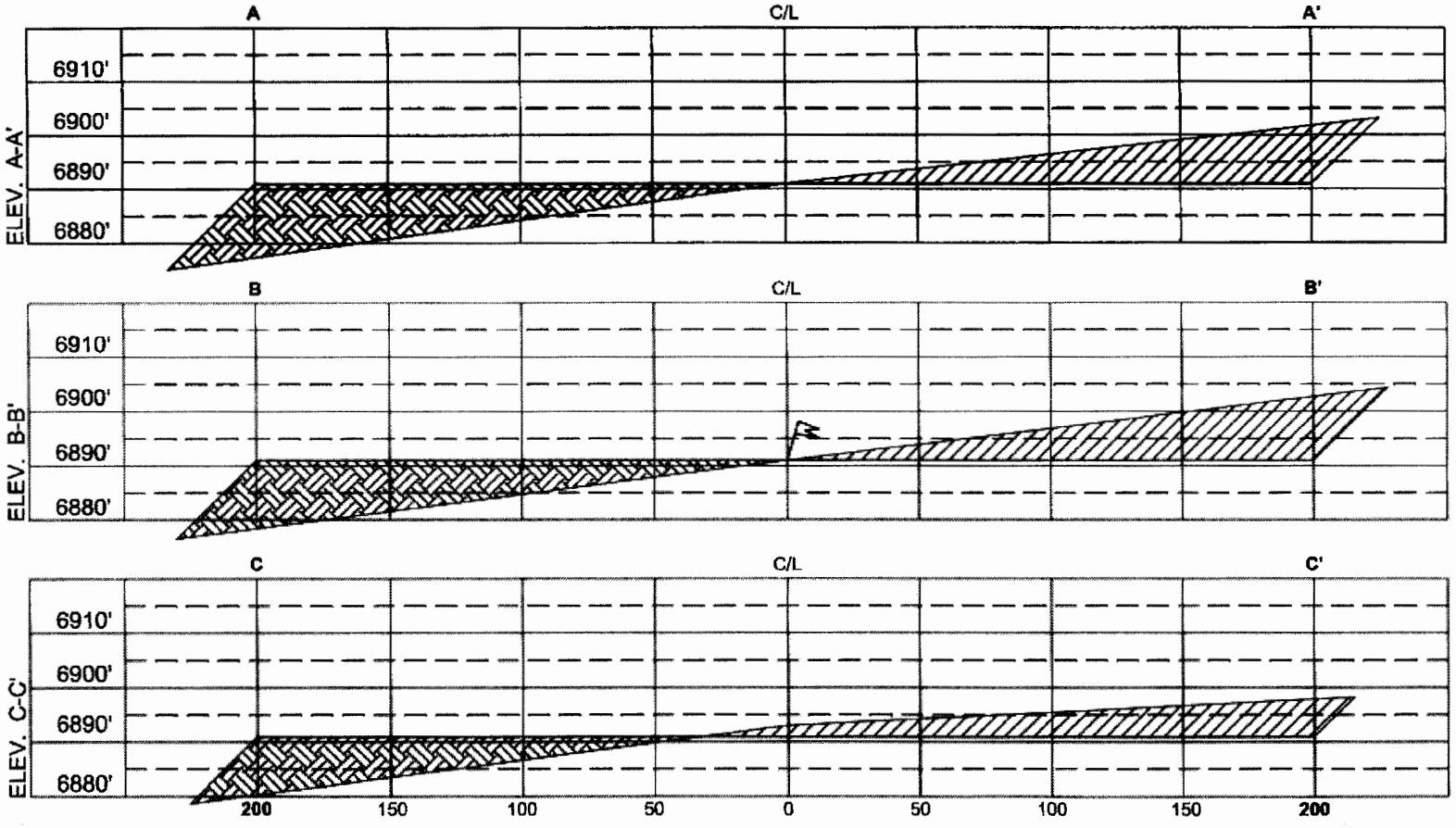
Directions from the Intersection of Highway 550 and Highway 64 in Bloomfield, NM
to
LOGOS OPERATING, LLC
LOGOS #601H
440' FNL 560' FWL,
Section 5, T22N, R5W, N.M.P.M., SANDOVAL County, New Mexico
Latitude: 36° 10' 21.199" N
Longitude: 107° 23' 28.864" W
Nad 1983

From the Intersection of Highway 550 & Highway 64
Go South on Hwy 550 for 58.7 miles
turn right (southerly)on for 1.4 miles

Plat #2

LOGOS OPERATING, LLC

LOGOS #601H, 440' FNL & 560' FWL
SECTION 5, T-22-N, R-5-W, NMPM, SANDOVAL COUNTY, NM
GROUND ELEVATION: 6891', DATE: SEPTEMBER 6, 2013



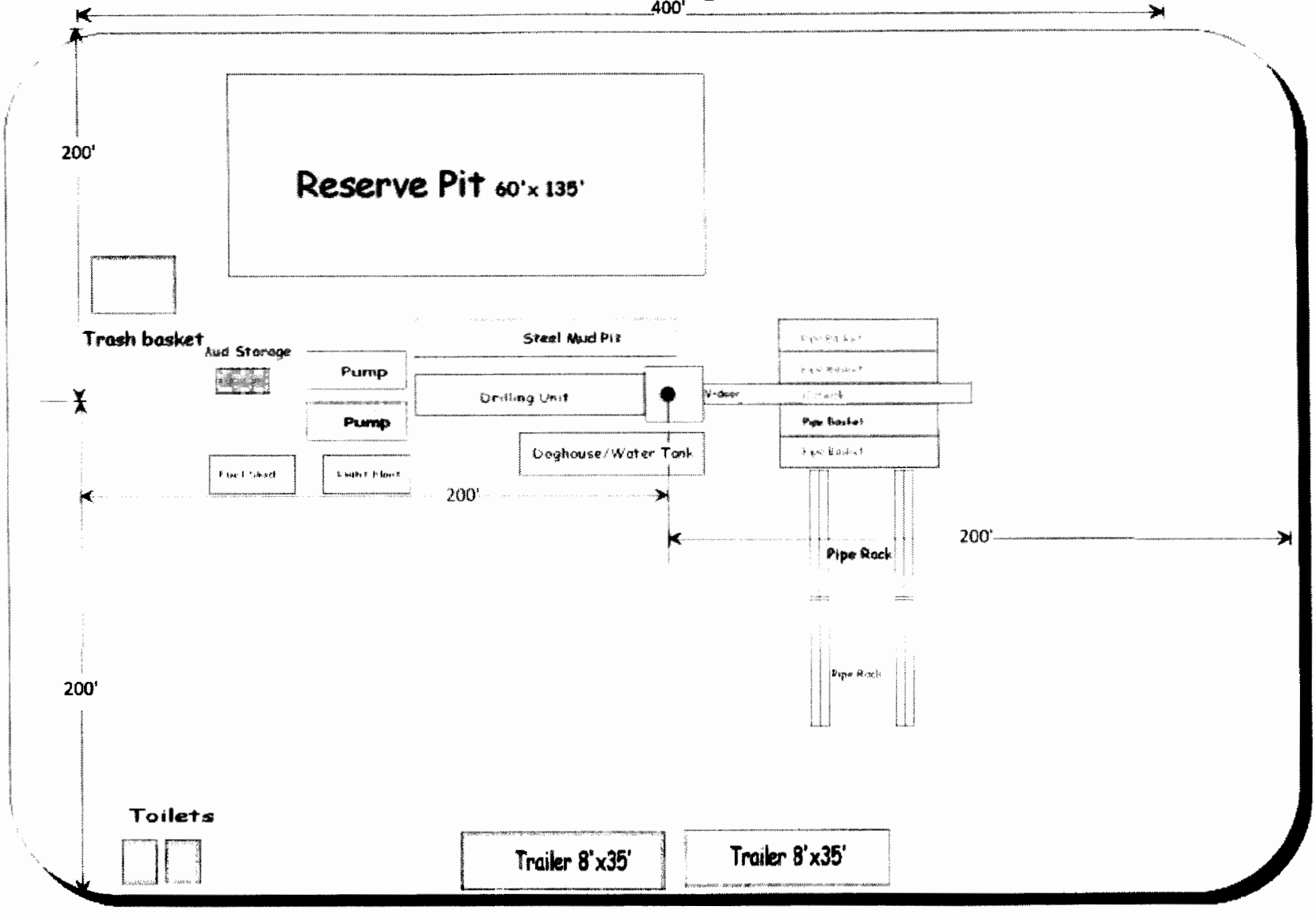
HORIZ. SCALE: 1" = 40'
VERT. SCALE: 1" = 30'

NOTE:
VECTOR SURVEYS IS NOT LIABLE FOR UNDERGROUND UTILITIES OR PIPELINES. CONTRACTOR SHOULD CALL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED BURIED PIPELINES OR CABLES ON WELL PAD AND OR ACCESS ROAD AT LEAST TWO (2) WORKING DAYS PRIOR TO CONSTRUCTION.

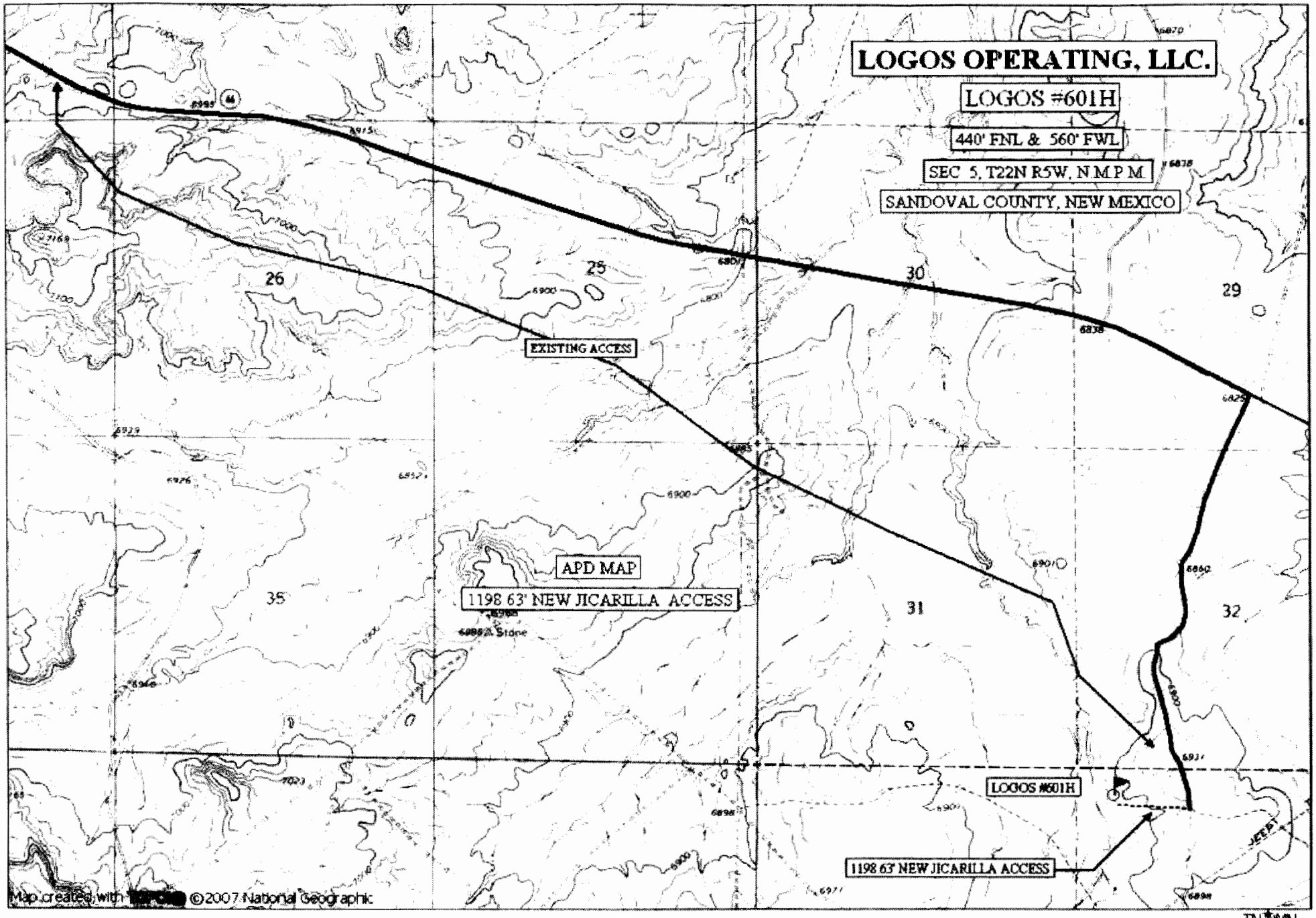
Plat #3

Location Diagram

Location Dimensions: 400' x 400'



Typical Location Layout



NATIONAL GEOGRAPHIC

0.0 0.5 1.0 miles
0.0 0.5 1.0 1.5 km

TN MN
9½°

10/09/13

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.

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:**	1,884,056.13usft	**Latitude:**	36° 10' 21.199 N
From:	Lat/Long	**Easting:**	1,303,555.19usft	**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	270.62	

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	270.62	5,420.8	7.5	-523.0	10.00	10.00	0.00	270.62	
5,815.3	90.76	270.62	5,425.0	9.1	-638.1	5.00	5.00	0.00	0.02	
10,667.2	90.76	270.62	5,360.0	79.1	-5,509.1	0.00	0.00	0.00	0.00	601H PBHL (440' FNI

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		

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	

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		

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	-103.8	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	-424.8	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	822.9	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	-2,022.6	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	

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		

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

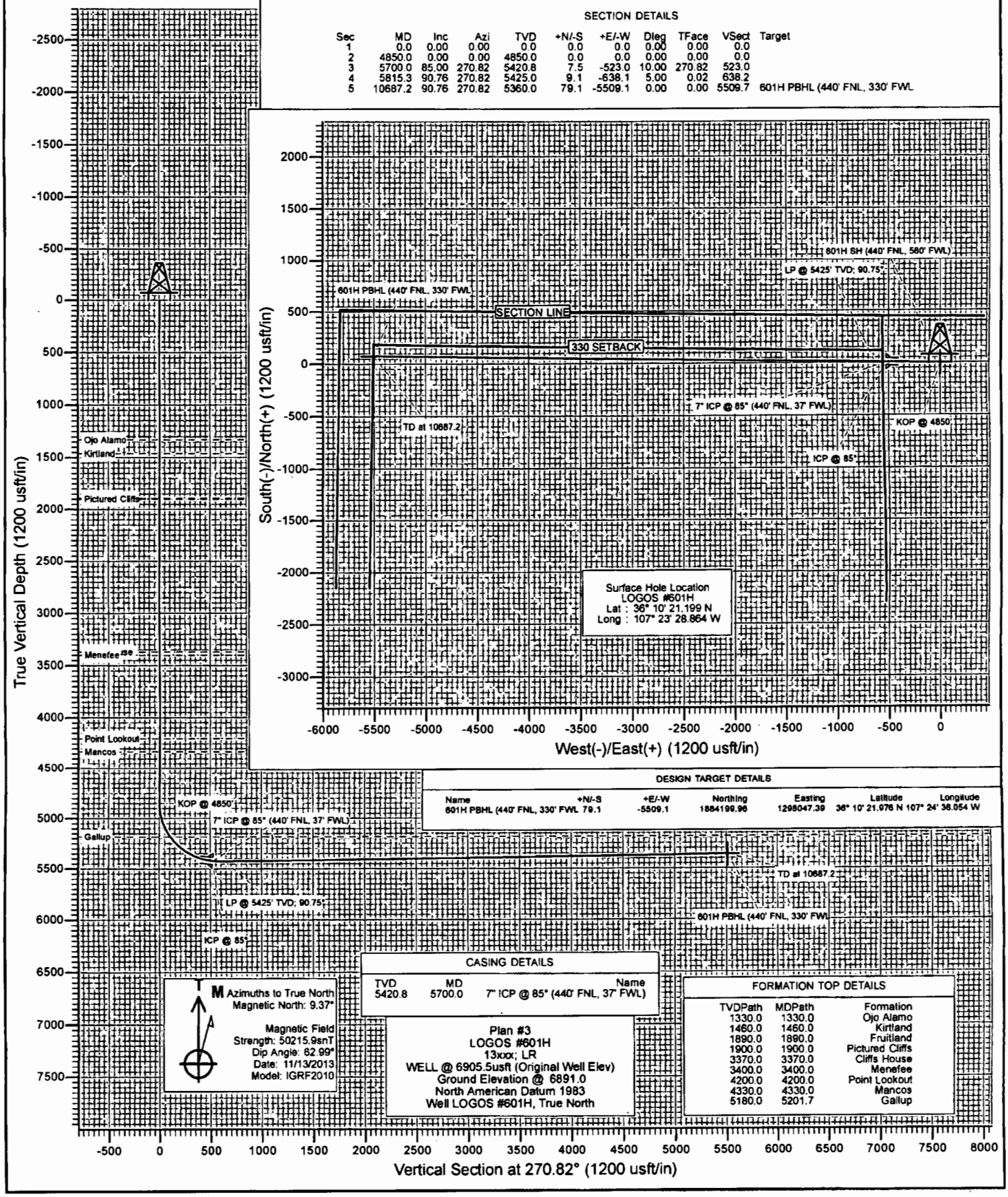
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
4,850.0	4,850.0	0.0	0.0	KOP @ 4850'
5,700.0	5,420.8	7.5	-523.0	ICP @ 85°
5,815.3	5,425.0	9.1	-638.1	LP @ 5425' TVD; 90.75°
10,887.2	5,360.0	79.1	-5,509.1	TD at 10887.2

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' 38.054 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

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 5800' = 7" Casing point
6-1/8" Lateral = 5800' MD to 10412' MD = Gallup Pay Zone Horizontal

B. Casing Program – all casing stings are new casing

Casing & Hole Size	Weight	Grade	Coupling	Setting Depth (MD)	Comments
16" Conductor				0' - 60-ft BGL	New casing.
9-5/8" (12 1/4")	36 ppf	K-55	LT&C	0' - 500'	New casing. Cement to surface.
7" (8 ¾")	26 ppf	K-55	LT&C	0' - 5800' MD	New Casing. Cement to surface.
4 ½" (6 1/8")	11.5 ppf	K-55	LT&C	4800' - 10412' MD	New Casing - Horizontal Hole Fresh water swell packers - TOL 100' above KOP, no cement

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

Tail - (0'-500'): 227 sx – 14.5 ppg, conventional cement containing:
Cement - Type III
CaCl2 – Accelerator - 1% WBWOB
Cello Flake – Lost Circulation Control Agent – 0.25 lbs/sx WBWOB
Yield – 1.38 ft3/sx,
Compressive strength: 24 hr – 1000+ psi

Total sacks of cement pumped = 227

Intermediate Casing – Single Stage Job (0-5800'MD):
Excess – 50% over gauge hole – 8-3/4" hole and 7" casing (0.1503 ft3/ft)
Top of Cement – Surface.

Lead - (0' – 5300'): 568 sx - 12.1 ppg, conventional cement containing:
Cement – Premium Lite (35:65)
CaCl2 – Accelerator - 3% WBWOB
Cello Flake – Lost Circulation Control Agent – 0.25 lbs/sx WBWOB
Kolite - Lost Circulation Control Agent – 5 lbs/sx WBWOB
Yield – 2.13 ft3/sx,
Compressive strength: 24 hr – 1000+ psi

Tail - (5300' – 5800'): 82 sx – 14.5 ppg, conventional cement containing:
Cement - Type III
CaCl2 – Accelerator - 1% WBWOB
Cello Flake – Lost Circulation Control Agent – 0.25 lbs/sx WBWOB
Yield – 1.38 ft3/sx,
Compressive strength: 24 hr – 1500+ psi

Total sacks of cement pumped = 650
Cement volumes are minimums and may be adjusted based on caliper log results.

Production liner clarification: Utilizing external swell casing packer system for zonal isolation will not use cement 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"	500-4900'	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"	4900' (KOP)-5800'	Fresh Water LSND	8.5-8.8	40-50	8-10
6 1/8"	5800' - 10412'	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 – Mudloggers will be on location from intermediate casing point to TD.
d) Logging - See Below

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

8. ABNORMAL PRESSURES & HYDROGEN SULFIDE

The anticipated bottom hole pressure is +/- 2552 psi based on a 9.0 ppg at 5455' 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 1, 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.

MULTI-POINT SURFACE USE PLAN
Logos #601H

1. Existing Roads:

All existing roads used to access the proposed location are shown on attached Plat #1 and shall be maintained in the same or better condition than presently found.

Directions: Go South on HWY 550 for 58.7 miles, turn right, go for 1.4 miles

2. Planned Access Roads:

Per the on-site inspection with a Jicarilla representative performed on October 11, 2013, the new access road is being re-directed and a subsequent plat will be submitted reflecting the changes. The existing access road will be maintained in at least the current condition and will be upgraded where necessary to provide uninterrupted access to the proposed well.

3. Location of Existing Wells:

Attached map (Plat #1) shows existing wells within a one mile radius of the proposed well. There is one P&A well, four producing wells, and seven permitted wells (including the Logos #601H) within one mile. All producing wells and permitted wells are Logos Operating, LLC.

4. Location of Production Facilities:

In the event of production, production facilities will be located on the drill pad. The actual placement of this equipment will be determined when the well's production characteristics can be evaluated after completion.

Upon completion of drilling, the location and surrounding area will be cleared of all debris.

5. Water Supply:

Water for drilling and completion operations will be hauled by truck from various permitted water sources within the area through the water haulers association.

6. Source of Construction Materials:

No additional construction materials will be required to build the proposed location.

7. Methods for Handling Waste Disposal:

a. The drill cuttings, fluids and completion fluids will be placed in a reserve pit and a closed loop system. The drill cuttings, fluids and completion fluids from the

closed loop system will be hauled to disposal. The reserve pit will be lined with a 20 mil liner and fenced prior to drilling. The reserve pit will be allowed to dry, and materials remaining in the reserve pit buried. The reserve pit will be backfilled, leveled and contoured so as to prevent any materials being carried into the watershed. Upon completion, the pad will be leveled, contoured and reseeded with the appropriate seed mixture.

b. All garbage and trash will be placed in a metal trash basket. It will be hauled off and dumped in an approved land fill upon completion of operations.

c. Portable toilets will be provided and maintained during drilling operations. See Plat #3 for location.

8. Ancillary Facilities:

Ancillary facilities are to be based on well productivity. The gas pipeline size and route is yet to be determined.

9. Well Site Layout:

A cross section of the drill pad with approximate cuts, fills, and pad orientation is attached as Plat #2. Location of drilling equipment and rig orientation is also attached as Plat #3.

As per the on-site the following will apply for location construction:

a. The pit will be "stepped-down" into the cut.
b. Standard BLM tree stipulations.
c. 24" culvert @ take off for access.
d. Divert water around pad with top soil.
e. Plan to use top soil for interim reclamation.

Please note "Conditions of Approval" for any additional stipulations.

10. Plans for Restoration of Surface:

When the well is abandoned, the location and access road will be cleaned and restored to the original topographical contours as much as possible. The area will be reseeded with the appropriate seed mixture.

If the well is productive, areas not used in production will be contoured and seeded with stipulated seed mixture. Production equipment will be painted the color designated by the surface managing agency.

11. Surface Ownership:

The surface ownership of the proposed well pad is Jicarilla Apache. An on-site inspection with a Jicarilla representative was performed October 11, 2013.

12. Other Information:

Adkins Consulting, Inc. has prepared an EA and a T&E species survey for the access road and location. Adkins Consulting, Inc. performed an archaeology survey. Copies of their reports will be sent directly to the BLM. No conflicts were discovered.

13. Lessee's or Operator's Representative:

Kristy Graham
Logos Operating, LLC
4001 North Butler Ave, Buidling 7101
Farmington, NM 87401
Phone: (505) 436-2627

14. Certification:

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill site and access route; that I am familiar with the conditions which presently exist; that I have full knowledge of state and federal laws applicable to this operation; that the statements made in this plan are, to the best of my knowledge, true and correct; and, that the work associated with the operations proposed herein will be performed by Logos Operating, LLC, and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved. This statement is subject to 18 U.S. Code 1001 for the filing of a false statement.

10/23/13
Date

Kristy Graham
Production Engineer

Typical BOP setup